



Sun StorEdge™ Network Data Replicator 3.0 Installation Guide

Sun Microsystems, Inc.
901 San Antonio Road
Palo Alto, CA 94303
U.S.A. 650-960-1300

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Send comments about this document to: docfeedback@sun.com

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Sun StorEdge Network Data Replicator 3.0 Installation Guide



Caution – Do not install or use the Sun StorEdge Version 3.0 Core and data services software on servers in a Sun Cluster 3.0 environment. **The Version 3.0 software is not co-existent with the Sun Cluster 3.0 environment.** The Version 3.0 software is co-existent in the Sun Cluster 2.2 environment, where it will not interfere with failover. The Version 3.0 core and data services software is cluster aware in the Sun Cluster 3.0 Update 1 environment and provides high availability for the Sun StorEdge software.

Note – If you are upgrading from Version 2.0, please see “Upgrading the Sun SNDR Version 2.0 Software” on page 22 for important information.

Introduction

This *Sun StorEdge Network Data Replicator 3.0 Installation Guide* describes installation procedures and product considerations for the Sun StorEdge™ Network Data Replicator (Sun SNDR) Version 3.0 software.

The Sun SNDR software is remote replication software that is used on Sun servers to provide redundant storage of critical information across physically separate sites. The replication that occurs during a synchronization is performed synchronously. Subsequent writes can be performed synchronously or asynchronously.

In synchronous mode, a write operation is not confirmed as complete until the remote volume has been updated. In asynchronous mode, a write operation is confirmed as complete before the remote volume has been updated.

Once replication has been established, when interruptions in service occur (for example, a disk or link failure), primary volume blocks that are being updated locally but have not been transmitted to the secondary site are tracked. When the Sun SNDR software data service is restored, fast update resynchronization can be requested, and this scoreboard logging information is used to bring the remote site up-to-date.

Sun StorEdge Fast Write Cache

The Version 2.0 and Version 3.0 Sun StorEdge data services are binary incompatible. If your system includes Version 2.0 of the Sun StorEdge Instant Image software (including Instant Image 2.0.1 with Sun StorEdge Target Emulation 1.2), Sun SNDR software, or Sun StorEdge Fast Write Cache, you must remove them before installation. For example, you cannot use Sun StorEdge Instant Image software Version 2.0 with Sun SNDR software Version 3.0. When you plan to install or upgrade to a Version 3.0 data service, you must uninstall all Version 2.0 and 2.0.1 data services.

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

See Appendix A for details.

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	N/A
	dscfg	
	file	
	fwcadm	
	pkgadd	
	pkgrm	
	pkgask	
	scmadm	
svadm		
Release	<i>Sun StorEdge Network Data Replicator 3.0 Release Notes</i>	806-7513
	<i>Sun StorEdge Instant Image 3.0 Release Notes</i>	806-7678
Installation and User	<i>Sun StorEdge Instant Image 3.0 Installation Guide</i>	806-7675
	<i>SunATM 3.0 Installation and User's Guide</i>	805-0331
	<i>Sun ATM 4.0 Installation and User's Guide</i>	805-6552
	<i>Sun Gigabit Ethernet FC-AL/P Combination Adapter Installation Guide</i>	806-2385
	<i>Sun Gigabit Ethernet/S 2.0 Adapter Installation and User's Guide</i>	805-2784
	<i>Sun Gigabit Ethernet/P 2.0 Adapter Installation and User's Guide</i>	805-2785
	<i>Sun Enterprise 10000 InterDomain Networks User Guide</i>	806-4131
	System Administration	<i>Sun StorEdge Network Data Replicator 3.0 System Administrator's Guide</i>
<i>Sun StorEdge Instant Image 3.0 System Administrator's Guide</i>		806-7677
<i>TCP/IP and Data Communications Administration Guide</i>		805-4003
<i>Sun StorEdge Fast Write Cache 2.0 System Administrator's Guide</i>		806-2064

Application	Title	Part Number
Configuration	<i>Sun StorEdge Network Data Replicator 3.0 Configuration Guide</i>	806-7550
	<i>Sun StorEdge Instant Image 3.0 Configuration Guide</i>	806-7676-10
	<i>Sun Enterprise 10000 InterDomain Network Configuration Guide</i>	806-5230

Documentation Conventions

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

Installation Requirements

Software	<p>Solaris™ 7 or 8 operating environment or a subsequent compatible version.</p> <p>Sun StorEdge Sun SNDR and data service core software; see “To Install the Sun SNDR Software” on page 13</p> <p>Appropriate software for the selected network transport (for example, the SunATM™ or Gigabit Ethernet transports).</p> <p>Sun StorEdge Instant Image software is an optional software component. Install this package for additional point-in-time capability.</p>
Hardware	<p>A CD-ROM drive connected to the host server where the Sun SNDR software is to be installed.</p> <p>The Sun SNDR software is supported on server hosts using the Solaris operating environment and any network interface card supported by Sun. Hosts include but are not limited to:</p> <ul style="list-style-type: none">• Sun Enterprise™ 2x0 through 4x0 servers• Sun Enterprise 3000 through 10000 servers <p>Disk space:</p> <ul style="list-style-type: none">• The Sun SNDR software requires approximately 1.4 Mbytes.• The Sun StorEdge configuration location requires 500 Kbytes (see “About The Configuration Location” on page 7).• Supporting packages require approximately 3 Mbytes.

Preparing for Installation

Note – Read the `pkgadm(1M)` and `pkgask(1M)` man pages.

When installing and using the Sun SNDR software, consider the information in the following sections.

Installation Order of the Sun StorEdge Software

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

Upgrading from Version 2.0

If you are upgrading from the Sun SNDR software Version 2.0, see “To Run the Sun StorEdge Validation Script” on page 12 before installing Version 3.0.

Bitmap Files Are Not Supported in Version 3.0

If you used files as bitmaps in the Sun SNDR Version 2.0 software, you must convert them to volumes after you upgrade from Version 2.0 to Version 3.0. The Sun SNDR software Version 3.0 software does not support bitmap files. See “Converting Bitmap Files to Bitmap Volumes” on page 27.

Using a Response File for Sun StorEdge Data Services Configuration During Installation

When you install the Sun StorEdge Core Services software, the installation process prompts you for a location for the Sun StorEdge data service configuration. (All Sun StorEdge data services use this location.) You can respond during the installation or you can use a response file you specify when you run the `install_core` script. See “To Install the Sun SNDR Software” on page 13.

You can create a response file two ways:

- Using a text editor
- Using the `pkgask(1M)` utility

About The Configuration Location

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/ctt1d0s7` or `/config`

If you select a file name, its file system **must** be the root (`/`) or `/usr` file system. If you select a volume manager-controlled volume, it must be available when the Sun StorEdge data services software is started.

The Sun StorEdge configuration location requires 500 Kbytes of disk space. If you specify a file for the configuration location, the file of the appropriate size is automatically created.

▼ To Use a Text Editor to Create a Response File

1. Open an ASCII file using a text editor such as `vi(1)` or `ed(1)`
2. Enter a single line in the file:

```
FILE_LOC=response
```

where *response* is a file name or block device for the single configuration location.

▼ To Use the pkgask Utility

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

1. Ensure that the Volume Manager daemon `vold(1M)` is running.
2. Insert the Sun StorEdge Core Services software CD into the CD-ROM drive that is connected to your system.
3. To use the `pkgask` utility to create a response file, type:

```
# pkgask -d /cdrom/cdrom0/CORE -r response-file SUNWscmu
```

where *response-file* is the response file you will specify when you run the Sun StorEdge Core Services `install_core` script.

The `pkgask` utility prompts you as follows:

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

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

4. Specify a file name or block device.

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.

The utility displays:

```
Response file <response-file> was created.

Processing of request script was successful.
```

About Bitmaps

Note – After editing the `/usr/kernel/drv/rdc.conf` file, reboot your server.

The Sun SNDR Version 3.0 software does not support bitmap files. The Sun SNDR software uses regular raw devices to store bitmaps. These raw devices should be stored on a disk separate from the disk that contains the data. Configure RAID (such as mirrored partitions) for these bitmap devices and ensure that the mirrored members are not stored on the same disk as the data.

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

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`. For example:

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

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 can also choose the bitmap mode setting of 1 to improve error or disaster recovery.

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.)

Network Interruptions

If the Sun SNDR software network connection is interrupted, operations to Sun SNDR software volumes are blocked temporarily while Sun SNDR software starts its logging mode. See the *Sun StorEdge Network Data Replicator Version 3.0 Software System Administrator's Guide* for more information on handling interruptions and other recovery scenarios.

Installing the Sun SNDR Software



Caution – Do not install or use the Sun StorEdge Version 3.0 Core and data services software on servers in a Sun Cluster 3.0 environment. **The Version 3.0 software is not co-existent with the Sun Cluster 3.0 environment.** The Version 3.0 software is co-existent in the Sun Cluster 2.2 environment, where it will not interfere with failover. The Version 3.0 core and data services software is cluster aware in the Sun Cluster 3.0 Update 1 environment and provides high availability for the Sun StorEdge software.

TABLE 1 shows the installation steps summary.

TABLE 1 Installation Steps Summary

-
1. Run the `probe_script` validation script, remove old packages if needed, and reboot. See “Upgrading the Sun SNDR Version 2.0 Software” on page 22.
 2. Install the Sun StorEdge Core Services software.
 3. Install the Sun SNDR software.
 4. Edit the `/etc/hosts` file.
 5. Edit the `/etc/nsswitch.conf` file.
 6. Install other Sun StorEdge data services software, if applicable.
 7. Reboot your server.
-

Before you start the installation, run the Sun StorEdge validation `probe_script` script described in “To Run the Sun StorEdge Validation Script” on page 12.

Perform the following procedures on the primary and secondary server. To install Sun SNDR software requires two CDs:

- Sun StorEdge Core Services software CD
- Sun SNDR software CD

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

▼ To Run the Sun StorEdge Validation Script

Note – The `probe_script` script also lists any packages that you must remove and the order in which you must remove them when you use `pkgrm(1M)`.



Caution – Do not execute the `probe_script` script after you have installed Version 3.0 of the Sun SNDR, Instant Image, and `SUNWnvm` software. Generally, you should only run the script as part of the upgrade process from Version 2.0 to Version 3.0.

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

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

The `probe_script` script checks that you are the root user, you have the correct version of the Solaris operating environment installed, and whether you have Version 2.0 of any Sun StorEdge data services software currently installed. If you are not the root user or are not running the Solaris 7 operating environment or subsequent compatible 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 less than
the minimum version of Solaris required for installation.
The minimum version of Solaris required is 7
```

and continues to check if any Sun StorEdge Version 2.0 software is installed.

If the script detects that the Sun SNDR software Version 2.0 is currently installed on your system, perform the procedures described in “Upgrading the Sun SNDR Version 2.0 Software” on page 22. After the script executes successfully, the system displays the following message:

```
System is ready for data services 3.0 installation
```

▼ To Install the Sun SNDR Software

1. Log on as the root user.

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

2. Insert the Sun StorEdge Core Services software CD into the CD-ROM drive that is connected to your system.

3. Start the Volume Manager daemon `vold(1M)` (if needed) and install the Sun StorEdge Core Services software.

Choose method a. or b.

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

a. To install the Sun StorEdge Core Services software using the installation script, type:

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

b. To install the Sun StorEdge Core Services software using the installation script and a response file (see “Using a Response File for Sun StorEdge Data Services Configuration During Installation” on page 7), type:

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

where *response-file* is the file you created using the procedures in “Using a Response File for Sun StorEdge Data Services Configuration During Installation” on page 7. Proceed to Step 6.

The Core Services software package installation starts. If you did not use a response file, the installation process prompts you as follows. Proceed to Step 4.

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

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

The Core Services software prompts you as follows:

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

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

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

Note – If you select a file name, its file system *must* be the root (`/`) or `/usr` file system.

6. Remove the Sun StorEdge Core Services software CD from the CD-ROM drive:

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

7. Insert the Sun SNDR CD and install the Sun SNDR software.

- To install Sun SNDR software using the installation script, type:

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

The package installation starts.

8. Remove the Sun SNDR software CD from the CD-ROM drive:

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

9. Place the names and IP addresses of all machines you plan to use with the Sun SNDR software in the `/etc/hosts` file.

Edit this file on each machine where you are installing and running the Sun SNDR software.

- 10. In the `/etc/nsswitch.conf` file of each machine where the Sun SNDR software is installed, ensure that the `hosts:` section includes the `files` option. For example:**

```
hosts:      files nis
```

The Sun SNDR software starts before the host machine naming services start. This step helps ensure that the host names in the `/etc/hosts` file are read and known by the machine running the Sun SNDR software.

- 11. If you use the Internet Protocol version 6 (IPv6) transport protocol for replication, configure the IPv4 and IPv6 stack concurrently on the host for the interface where the Sun SNDR software is utilized.**

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.

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

- From the primary host:

```
# ping -s sechost
```

where *sechost* is the secondary host name.

- From the secondary host:

```
# ping -s prihost
```

where *prihost* is the primary host name.

For example, `ping` displays the following for IPv6 addresses:

```
# ping -s fred1
PING ipv2: 56 data bytes
64 bytes from fred1 (fe80::a00:20ff:feae:85fa): icmp_seq=0. time=1. ms
64 bytes from fred1 (fe80::a00:20ff:feae:85fa): icmp_seq=1. time=0. ms
64 bytes from fred1 (fe80::a00:20ff:feae:85fa): icmp_seq=2. time=0. ms
64 bytes from fred1 (fe80::a00:20ff:feae:85fa): icmp_seq=3. time=0. ms
64 bytes from fred1 (fe80::a00:20ff:feae:85fa): icmp_seq=4. time=0. ms
64 bytes from fred1 (fe80::a00:20ff:feae:85fa): icmp_seq=5. time=0. ms
```

12. Complete the installation.

- If you are installing other data services, continue installing those data services.
- If you are installing only the Sun SNDR software or if this is the last data service you are installing, ensure that you have ejected the CD and then reboot the system. ***You only need to reboot your system once, after you have installed all Sun StorEdge data software products.***

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

Installing the Sun StorEdge Software at Different Times

If you have performed one of the following installation sequences:

- Installed the Sun StorEdge Core Services Version 3.0 software and have rebooted
- Installed the Core Services and one or more Version 3.0 data service software packages and have rebooted

You must reboot your server as described in the following text after you install another Version 3.0 software package. This situation also applies if you want to add data services software at a later date.

For example, if you have:

- Installed the Core Services software
- Installed the Instant Image software
- Rebooted your server

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

- Install the Sun SNDR software
- Reboot your server as follows:

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

Configuring the Sun SNDR Software

When you enable the Sun SNDR software using the `/usr/opt/SUNWesm/sbin/sndradm` command, you can specify a configuration file containing information about the volume set (you can also enter this information from the command line): volumes, primary and secondary hosts, bitmaps, Sun SNDR software operating mode, and so on. See the `rdc.cf(4)` man page and *Sun StorEdge Network Data Replicator Version 3.0 Software System Administrator's Guide* for more information about this configuration file format.

Configuration Files From Version 2.0

If you upgrade from Sun SNDR software Version 2.0 to Version 3.0, the Sun SNDR software converts your Version 2.0 configuration files to the latest format during installation. The Sun SNDR Version 2.0 software uses three configuration files:

- The default configuration file named `/etc/opt/SUNWrdc/rdc.cf` is used to specify volume set information for volumes under the Sun SNDR software control. You could also create a customized configuration file, depending on your server connection and disaster recovery plans in the Sun SNDR software Version 2.0; if this customized configuration file is named `/etc/opt/SUNWrdc/rdc.cf`, the Sun SNDR 3.0 installation process will use it. (If it is not named `rdc.cf`, include this information in the `rdc.cf` file so that you can use it in Version 3.0.)
- The `/etc/opt/SUNWrdc/rdc_ii.cf` configuration file is used to list all secondary volumes on which Sun StorEdge Instant Image software was enabled by the `rdc_ii_enable` script.
- The `/etc/opt/SUNWspsv/sv.cf` Storage Volume (SV) driver interface file is used to place the Sun SNDR software volumes under SV control.

The Sun SNDR software Version 3.0 enables you to keep using the same volumes and volume sets that you used with the Sun SNDR software Version 2.0 as specified in the `rdc.cf`, `rdc_ii.cf`, and `sv.cf` configuration files. The upgrade procedure described in “Upgrading the Sun SNDR Version 2.0 Software” on page 22 requires that you remove the Version 2.0 software.

When you remove the Version 2.0 software, the removal process using `pkgrm(1M)` preserves the `rdc.cf`, `rdc_ii.cf`, and `sv.cf` configuration files in their original locations. When the Sun SNDR software Version 3.0 installation process finds them in their original locations, it converts them for use with Version 3.0.

Automatic Update Resynchronization

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

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

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

▼ To Enable Automatic Update Resynchronization

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

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

where:

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

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

Using the `dscfg` Command to Back Up and Restore Configuration Information

You use the `/usr/opt/SUNWscm/sbin/dscfg` command to back up and restore the data services information. Typically, you make any volume set-related changes using the `/usr/opt/SUNWesm/sbin/sndradm` command described in the *Sun StorEdge Network Data Replicator 3.0 System Administrator's Guide*.

Perform the restore procedure if the volume where the configuration resides fails.

▼ 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 data services software (Instant Image, Sun SNDR, and Fast Write Cache) is not in use. In clustered environments, no node can be using the data service software.

1. Initialize the configuration file.

All data services 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 20.

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

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.*

Upgrading the Sun SNDR Version 2.0 Software

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

TABLE 2 shows the general steps to upgrade the Sun SNDR Version 2.0 software to Version 3.0 software.

TABLE 2 Sun SNDR Upgrade Steps Summary

1. If you have the Instant Image Version 2.0 software installed, back up the Instant Image configuration information according to the procedure described in “Upgrade Considerations” on page 23.
 2. Perform an orderly shutdown of any Version 2.0 and 2.0.1 Sun StorEdge data services software.
 3. Execute the validation script `probe_script` described in “To Run the Sun StorEdge Validation Script” on page 12.
 4. Remove any related patches.
 5. Remove any Version 2.0 and 2.0.1 Sun StorEdge data services software.
 6. Remove the Sun StorEdge SNDR and Core Services Version 2.0 software packages.
 7. Install the Sun StorEdge SNDR and Core Services Version 3.0 software packages.
 8. **Optional - Install the `SUNWnvm` Version 3.0 package;** see Appendix A.
 9. Convert any Sun SNDR bitmap files to bitmap volumes.
-

Upgrade Considerations



Caution – The Version 2.0 editions of any of the Sun StorEdge data services cannot operate with the Version 3.0 editions. These editions include Instant Image 2.0 and Instant Image Version 2.0.1, Sun StorEdge Target Emulation Version 1.2, Sun StorEdge Fast Write Cache Version 2.0, and Sun SNDR software. For example, you cannot use Sun StorEdge Instant Image software Version 2.0 with Sun SNDR software Version 3.0. When you plan to install or upgrade to a Version 3.0 data service, you must uninstall all Version 2.0 and 2.0.1 data services and patches.

Sun SNDR software Version 2.0 and its related packages include configuration files with a `.cf` suffix in the `/etc/opt/SUNWpkg` directories. See “Configuration Files From Version 2.0” on page 18.

- Sun SNDR software Version 3.0 enables you to keep using the same volumes that you used with Sun SNDR software Version 2.0 as specified in the `rdc.cf`, `rdc_ii.cf`, and `sv.cf` configuration files. The upgrade procedure described here requires that you remove the Version 2.0 software. When you remove the Version 2.0 software, the de-installation process using `pkgrm(1M)` preserves the `rdc.cf`, `rdc_ii.cf`, and `sv.cf` configuration files in their original locations. When the Sun SNDR software Version 3.0 installation process finds them in their original locations, it converts them for use with Version 3.0. See “Configuration Files From Version 2.0” on page 18.
- Sun StorEdge Instant Image software Version 2.0 does not have a configuration file. To create a configuration file that Instant Image software Version 3.0 can use, enter the following command as the root user *before* you remove old versions and install new versions.

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

During installation, the output of the `iiadm` command is converted to the Version 3.0 format, to be used by the Instant Image software Version 3.0.

▼ To Remove the Sun SNDR Software Version 2.0

Note – The `probe_script` described in “To Run the Sun StorEdge Validation Script” on page 12 lists the packages you must remove before upgrading. The `probe_script` script also lists the order in which to remove them when you use `pkgrm(1M)`. You must remove the packages in the order listed.

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

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

3. Execute the `probe_script` validation script described in “To Run the Sun StorEdge Validation Script” on page 12.

4. Remove the Sun StorEdge software-specific patches using `patchrm(1M)`.

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.

- For the Solaris 7 operating environment, remove the following patches in the order listed:

109981- <i>nn</i>	Sun StorEdge Network Data Replicator software patch
109969- <i>nn</i>	Sun StorEdge Core Services software patch

where *nn* specifies the patch revision.

For example:

```
# showrev -p | grep 109981
Patch: 109981-05 Obsoletes: Requires: 109967-05 Incompatibles: \
Packages: SUNWrdcu
# patchrm 109981-05
```

- **For the Solaris 8 operating environment**, remove the following patches in the order listed:

109982- <i>nn</i>	Sun StorEdge Network Data Replicator software patch
109970- <i>nn</i>	Sun StorEdge Core Services software patch

where *nn* specifies the patch revision.

5. Remove the Sun SNDR software.

```
# pkgrm SUNWrdcu SUNWrdcr
```

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

See the related Version 2.0 Installation Guide for specific removal steps. The *Sun StorEdge Instant Image Version 3.0 Installation Guide* describes how to remove the Instant Image 2.0 software.

7. Remove the Sun StorEdge Core Services software.

```
# pkgrm SUNWspsv SUNWscm SUNWspuni
```

8. Reboot your server.

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

▼ To Upgrade the Sun SNDR Software

Note – Remove the Sun SNDR Version 2.0 software according to procedures in “To Remove the Sun SNDR Software Version 2.0” on page 24.

1. **Log on as the root user.**
2. **Execute the validation script `probe_script` described in “To Run the Sun StorEdge Validation Script” on page 12.**
Run this script as a check to make sure that you have removed the recommended Version 2.0 software patches and packages.
3. **Insert the Sun SNDR software CD into the CD-ROM drive.**
Make sure that Volume Manager is running and that the CD-ROM drive is mounted according to the procedure described in Step 3 in “To Install the Sun SNDR Software” on page 13.
4. **Install the packages according to the procedures described in “To Install the Sun SNDR Software” on page 13.**
5. **Reboot your server.**

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



Caution – Do not execute the `probe_script` script after you have installed Version 3.0 of the Sun SNDR, Instant Image, and SUNWnvm software. Generally, you should only run the script as part of the upgrade process from Version 2.0 to Version 3.0.

Converting Bitmap Files to Bitmap Volumes

Note – This procedure works correctly on enabled Sun SNDR volume sets. If you used the default configuration file named `/etc/opt/SUNWrdc/rdc.cf` to specify all volumes under Sun SNDR Version 2.0 software control, the upgrade process uses this configuration information to enable volumes under the Version 3.0 software. See “Configuration Files From Version 2.0” on page 18.

If you used files to store bitmaps in Version 2.0, you must convert any bitmap files to bitmap volumes after you upgrade from Version 2.0 to Version 3.0. **The Sun SNDR Version 3.0 software does not support bitmap files.**

▼ To Convert Bitmap Files to Volumes

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

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

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

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

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

Note that the output is formatted as follows:

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

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

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

```
# file bitmapname
```

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

4. To convert the bitmap file to a bitmap volume, assign new primary and secondary host bitmap volumes to the Sun SNDR volume set.

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

- To change a primary host bitmap, issue the command from the primary host.
- To change a secondary host bitmap, issue the command from the secondary host.
- Optionally, to ensure consistency for status reporting, issue the command from both hosts. For example, to change a secondary host bitmap, issue the command from the secondary host first and then issue it from the primary host.

```
# /usr/opt/SUNWesm/sbin/sndradm -R b p new-primary-bitmap set-name
```

where *set-name* is the name of the Sun SNDR software volume set as assigned by the Sun SDNR software. The Sun SDNR software assigns a default volume set name of *shost:sdev*, where *shost* is the secondary host name and *sdev* is the secondary volume partition name, separated by a colon (:).

Removing and Reinstalling the Sun SNDR Version 3.0 Software

Perform the following procedures on each server where you plan to reinstall the Sun SNDR Version 3.0 software. See also “Installing the Sun StorEdge Software at Different Times” on page 17.

▼ To Remove and Reinstall the Sun SNDR Software

1. Log on as the root user.
2. Back up your Sun StorEdge data services information as described in “Using the dscfg Command to Back Up and Restore Configuration Information” on page 20.
3. Remove the Sun SNDR software packages.

```
# pkgrm SUNWrdcu SUNWrdr
```

4. If no other Sun StorEdge data services software is installed, remove the Sun StorEdge Core Services software packages.

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

5. Reboot your server.

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

6. When the server completes its startup process, log in as root and install the packages according to the procedures described in “Installing the Sun SNDR Software” on page 11.

Note – When you reinstall Sun SNDR Version 3.0 software and wish to keep the previously designated configuration location, answer **n** to the prompt Do you want to specify the Sun StorEdge data services configuration location? [y,n,?]

7. If you answered **y** to the question in Step 6 and specified a new configuration location, restore your Sun StorEdge data services information as described in “Using the `dscfg` Command to Back Up and Restore Configuration Information” on page 20.
8. Reboot your server.

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

Configuring the Link Interface

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

When using ATM, ensure that the configuration supports TCP/IP by using either Classical IP or LAN Emulation. For more information on configuring the SunATM interface for these protocols, see the SunATM documentation listed in “Related Documentation” on page 3.

See the network protocol manuals listed in “Related Documentation” on page 3 for more information about other protocols.

Sun StorEdge Fast Write Cache Software

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

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

The Version 2.0 and Version 3.0 Sun StorEdge data services are binary incompatible. If your system includes Version 2.0 of the Sun StorEdge Instant Image software (including Instant Image 2.0.1 with STE 1.2), Sun SNDR software, or Sun StorEdge Fast Write Cache, you must remove them before installing Version 3.0 Sun StorEdge data services.

For example, you cannot use the Sun StorEdge Fast Write Cache product Version 2.0 with the Sun SNDR software Version 3.0. When you plan to install or upgrade to a Version 3.0 data service, you must uninstall all Version 2.0 and 2.01 data services.

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

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

- You can use the Sun FWC Version 2.0 software in the Solaris 2.6 operating environment and subsequent compatible versions. You can use the SUNWnvm Version 3.0 software in the Solaris 7 operating environment and subsequent compatible versions.
- The Sun FWC Version 2.0 software includes a graphical user interface to administer its features and the SUNWnvm Version 3.0 software package does not. Use the command line interface `fwcadm` and `scmadm` utilities to administer the SUNWnvm Version 3.0 features. The *Sun StorEdge Fast Write Cache 2.0 System Administrator's Guide*, part number 806-2064, describes the `fwcadm` utility. See the `scmadm` man page.
- The Sun FWC Version 2.0 software includes a cache parameter configuration file named `/etc/opt/SUNWscm/sd.cf`. The Version 3.0 software package does not. Use the `fwcadm` and `scmadm` utilities to change configuration parameters.

Preparing to Upgrade the Sun FWC Version 2.0 Software

Note – Read the `pkgadm(1M)` and `pkgask(1M)` man pages.

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

TABLE 1 Sun FWC Upgrade Steps Summary

1. Perform an orderly shutdown of any Version 2.0 and 2.0.1 Sun StorEdge data services software.
 2. Execute the validation script `probe_script` described in “To Run the Sun StorEdge Validation Script” on page 12.
 3. Remove any related patches.
 4. Remove Sun FWC Version 2.0 Management Services software.
 5. Remove the Sun FWC Version 2.0 software.
 6. Remove the Sun StorEdge Core Services Version 2.0 software packages.
 7. Remove the Sun StorEdge Java and Management Services 2.0 software packages.
 8. Install the Sun StorEdge Core Services (if needed) and `SUNWnvm` Version 3.0 software packages.
 9. Reboot your server.
-

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

The Sun StorEdge Core Services software installation process converts the information in the Sun FWC Version 2.0 configuration file `/etc/opt/SUNWscm/sd.cf` and adds it to the Sun StorEdge data services Version 3.0 configuration. The storage device cache is then enabled with the parameters that were specified in the `sd.cf` file.

Removing the Sun FWC Version 2.0 Software

Note – The `probe_script` described in “To Run the Sun StorEdge Validation Script” on page 12 lists the packages you must remove before upgrading and the order in which to remove them when you use `pkgrm(1M)`. You must remove the packages in the order listed.

When uninstalling, the order in which you remove packages matters.

Note – You might have already removed the Core and Management Services software and patches if you upgraded the Instant Image and Sun SNDR Version 2.0 software to Version 3.0.

▼ To Remove the Sun FWC Version 2.0 Software



Caution – Do not execute the `probe_script` script after you have installed Version 3.0 of the Sun SNDR, Instant Image, and `SUNWnvm` software. Generally, you should only run the script as part of the upgrade process from Version 2.0 to Version 3.0.

1. Log on as the root user.
2. Stop the Sun FWC Version 2.0 software and management services.

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

3. Execute the validation script `probe_script` described in “To Run the Sun StorEdge Validation Script” on page 12.

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

4. Remove the Sun FWC 2.0 Fast Write Cache and data services patches using `patchrm(1M)`.

- **For all Solaris operating environments**, remove the following patch:

109628- <i>nn</i>	Sun StorEdge Fast Write Cache software patch
-------------------	--

where *nn* specifies the patch revision.

- **For the Solaris 7 operating environment**, remove the following patches in the order listed:

109973- <i>nn</i>	Sun StorEdge Fast Write Cache software patch
109969- <i>nn</i>	Sun StorEdge Core Services software patch

where *nn* specifies the patch revision.

- **For the Solaris 8 operating environment**, remove the following patches in the order listed:

109974- <i>nn</i>	Sun StorEdge Fast Write Cache software patch
109970- <i>nn</i>	Sun StorEdge Core Services software patch

where *nn* specifies the patch revision.

If `patchrm(1M)` fails to remove the -06 patch revision level of the patches with the following error, you can ignore the error and continue.
Patch *patch-06* is not installed or is invalid

where *patch* is the patch number.

5. Remove any supporting packages for your locale.

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

```
# pkgrm SUNwfm scm
```

- b. For the Japanese locale, enter:**

```
# pkgrm SUNwjmscm
```

c. For the Chinese locale, enter:

```
# pkgrm SUNWcmscm
```

6. Remove the Sun FWC Version 2.0 Management Services packages.

```
# pkgrm SUNWmscmr SUNWmscmu
```

7. Remove the Sun FWC Version 2.0 package.

```
# pkgrm SUNWnvm
```

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

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

```
# pkgrm SUNWspcs1 SUNWspsv SUNWscm SUNWspuni
```

9. If this is the last Sun StorEdge Version 2.0 or 2.0.1 data service 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:

<i>locale1</i>	French — SUNWfresm
	Japanese — SUNWjeesm
	Chinese — SUNWcesm

<i>locale2</i>	French — SUNWfirdae
	Japanese — SUNWjadae
	Chinese — SUNWcdae

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

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

11. If this is the last Version 2.0 or 2.0.1 data service that you are removing, reboot the system now.

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

Installing the SUNWnvm Version 3.0 Software

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

Note – See “Installing the Sun StorEdge Software at Different Times” on page 17.

▼ To Install the SUNWnvm Version 3.0 Software

1. Log on as the root user.

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

2. Insert the Sun StorEdge Core Services software CD into the CD-ROM drive that is connected to your system.

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

Note – This procedure assumes that you have already installed the Sun StorEdge Core Services software (see “To Install the Sun SNDR Software” on page 13, Step 3). If you are installing more than one Sun StorEdge data service, you only need to start the Volume Manager daemon and install the Core Services software once. Do not start the daemon and install the Core Services software more than once.

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

4. Complete the installation.

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

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

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

- See also “Installing the Sun StorEdge Software at Different Times” on page 17.

The `fwcadm` Administrative Utility

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

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

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

Syntax

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

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

```
fwcadm nvr -s
```

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

cache Options

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

nvrasm Options

Option	Description
nvrasm -s	Displays the status of the NVRAM cards.

volume Options

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