



Platform Notes: Using luxadm Software

Solaris 2.6

*Sun™ Enterprise Network Array™
SPARCstorage™ Array
SPARCstorage RSM*

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Preface

Platform Notes: Using luxadm Software contains information about the luxadm administrative program for the Sun™ Enterprise Network Array™ and the SPARCstorage™ Array. These instructions are designed for an experienced system administrator.

Using UNIX Commands

This document does not contain information on basic UNIX® commands and procedures such as shutting down the system or booting the system.

See one or more of the following for this information:

- *Solaris 2.x Handbook for SMCC Peripherals*
- AnswerBook™ online documentation for the Solaris™ 2.x software environment
- Other software documentation that you received with your system

Typographic Conventions

TABLE P-1 Typographic 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 <i>root</i> to do this. To delete a file, type <code>rm filename</code> .

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TABLE P-2 SunExpress Contact Information

Country	Telephone	Fax
Belgium	02-720-09-09	02-725-88-50
Canada	1-800-873-7869	1-800-944-0661
France	0800-90-61-57	0800-90-61-58
Germany	01-30-81-61-91	01-30-81-61-92
Holland	06-022-34-45	06-022-34-46
Japan	0120-33-9096	0120-33-9097

TABLE P-2 SunExpress Contact Information

Luxembourg	32-2-720-09-09	32-2-725-88-50
Sweden	020-79-57-26	020-79-57-27
Switzerland	0800-55-19-26	0800-55-19-27
United Kingdom	0800-89-88-88	0800-89-88-87
United States	1-800-873-7869	1-800-944-0661

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Using the luxadm Command

The luxadm Command

The luxadm program is an administrative command that manages both the Sun Enterprise Network Array and SPARCstorage Array subsystems. luxadm performs a variety of control and query tasks, depending on the command line arguments and options used.

Synopsis

The command line must contain a subcommand.

```
luxadm [options] subcommand [options] {enclosure[,dev]... |  
pathname...}
```

You may also enter options, usually at least one enclosure name or pathname, and other parameters depending on the subcommand. You specify a device by entering a physical path name, or a logical path name. See “Addressing”.

You only need to enter as many characters as are required to uniquely identify a subcommand. For example, to run the display subcommand on an enclosure named box1, you could enter:

```
#luxadm disp box1
```

Addressing

Addressing a Sun Enterprise Network Array

Pathname

Either a complete physical path name or a complete logical path name may be entered to specify the device or controller. A typical physical path name for a Sun Enterprise Network Array device is:

```
/devices/sbus@1f,0/SUNW,socal@1,0/sf@0,0/  
ssd@w2200002037000f96,0:a,raw
```

or

```
/devices/io-unit@f,e0200000/sbi@0,0/SUNW,socal@2,0/sf@0,0/  
ssd@34,0:a,raw
```

For all Sun Enterprise Network Array IBs (Interface Boards) on the system, a logical link to the physical paths is kept in the directory `/dev/es`. An example of a logical link is `/dev/es/ses0`.

Enclosure

For the Sun Enterprise Network Array subsystem, the WWN may be used in place of the pathname to select a device or the Sun Enterprise Network Array subsystem Interface Board. The WWN is a unique 16 digit hexadecimal value that specifies either the port used to access the device or the device itself. A typical WWN value is: 2200002037000f96.

Or you can specify the name of the Sun Enterprise Network Array enclosure and an identifier for the particular device in the enclosure. A device in a Sun Enterprise Network Array enclosure is identified as follows:

```
BOX_NAME,[f|r]slot_number
```


where:

TABLE 1-1 Addressing a Sun Enterprise Network Array by Enclosure Name

Options/Arguments	Description
BOX_NAME	is the name of the Sun Enterprise Network Array enclosure, as specified by the enclosure_name subcommand
f or r	specifies the front or rear slots in the Sun Enterprise Network Array enclosure
slot_number	is the slot number in the Sun Enterprise Network Array enclosure, 0-6 or 0-10

When addressing the Sun Enterprise Network Array subsystem the pathname or enclosure name specifies the Sun Enterprise Network Array Interface Board (IB).

Addressing a SPARCstorage Array

When addressing the SPARCstorage Array, the pathname specifies the SPARCstorage Array controller or a disk in the SPARCstorage Array. The controller name is specified by its physical name, for example

```
/devices/.../.../SUNW,soc@3,0/SUNW,pln@xxxxxxxx,xxxxxxxx:ctlr
```

or by a name of the form cN, where N is the logical controller number. luxadm uses the cN name to find an entry in the /dev/rdisk directory of a disk that is attached to the SPARCstorage Array controller. The /dev/rdisk entry is then used to determine the physical name of the SPARCstorage Array controller. A disk in the SPARCstorage Array is specified by its logical or physical device name, for example,

```
/dev/rdisk/c1t0d0s2
```

or

```
/devices/.../.../SUNW,soc@3,0/SUNW,pln@xxxxxxxx,xxxxxxxx/  
ssd@0,0:c,raw
```

See the disks(1M) and devlinks(1M) manpages for more information on logical names for disks and subsystems.

Addressing a SPARCstorage RSM Tray

When addressing the SPARCstorage RSM tray, the pathname specifies the controller or a disk in the SPARCstorage RSM tray. The controller name is specified by its physical name, for example

```
/devices/sbus@1f,0/QLGC,isp@1,10000/sd@8,0:c,raw
```

or by a name of the form `cN`, where `N` is the logical controller number. `luxadm` uses the `cN` name to find an entry in the `/dev/rdisk` directory of a disk that is attached to the SPARCstorage Array controller. The `/dev/rdisk` entry is then used to determine the physical name of the controller. A disk in the SPARCstorage RSM tray is specified by its logical or physical device name, for example,

```
/dev/rdisk/c2t8d0s2
```

See the `disks(1M)` and `devlinks(1M)` manpages for more information on logical names for disks and subsystems.

Subcommand Support Matrix

The following table lists the `luxadm` subcommands that are supported on the Sun Enterprise Network Array, the SPARCstorage Array, and SPARCstorage RSM trays. Subcommands that are preceded by `-e` are expert mode subcommands and should only be used by qualified system personnel.

TABLE 1-2 Subcommand Support Matrix

Subcommand	Sun Enterprise Network Array	SPARCstorage Array	Sparcstorage RSM	page
<code>alarm_off</code>	—	yes	yes	page 22
<code>alarm_on</code>	—	yes	yes	page 23
<code>alarm_set</code>	—	yes	yes	page 23
<code>-e bus_getstate</code>	—	—	—	page 61
<code>-e bus_quiesce</code>	—	—	—	page 61
<code>-e bus_reset</code>	—	—	—	page 61
<code>-e bus_resetall</code>	—	—	—	page 61
<code>-e bus_unquiesce</code>	—	—	—	page 61
<code>-e dev_getstate</code>	—	—	—	page 61
<code>-e dev_reset</code>	—	—	—	page 61
<code>display</code>	yes	yes	—	page 12
<code>download</code>	yes	yes	—	page 17
<code>enclosure_name</code>	yes	—	—	page 24
<code>env_display</code>	—	—	yes	page 21
<code>fast_write</code>	—	yes	—	page 30
<code>fc_s_download</code>	—	yes	—	page 19
<code>fcsl_s_download</code>	yes	—	—	page 20
<code>-e forcelp</code>	yes	—	—	page 61
<code>inquiry</code>	yes	yes	yes	page 15
<code>insert_device</code>	yes	—	yes	page 36
<code>led</code>	yes	yes	yes	page 7
<code>led_blink</code>	yes	—	—	page 8

TABLE 1-2 Subcommand Support Matrix

Subcommand	Sun Enterprise Network Array	SPARCstorage Array	Sparcstorage RSM	page
led_off	yes	yes	—	page 9
led_on	—	yes	yes	page 10
nvrn_data	—	yes	—	page 31
-e offline	—	—	—	page 61
-e online	—	—	—	page 61
perf_statistics	—	yes	—	page 25
power_off	yes	yes	—	page 26
power_on	yes	—	—	page 26
probe	yes	—	—	page 11
purge	—	yes	—	page 31
-e rdls	yes	—	—	page 61
release	yes	yes	yes	page 27
remove_device	yes	—	yes	page 34
replace_device	—	—	yes	page 37
reserve	yes	yes	—	page 27
set_boot_dev	n/a	n/a	n/a	page 28
start	—	yes	—	page 28
stop	—	yes	—	page 29
sync_cache	—	yes	—	page 32

luxadm Subcommands

Disk LEDs

Displaying the Current State of a Disk LED

Use the `led` subcommand to display the current state of the yellow LED associated with a specific disk.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Supported

```
luxadm [ -v ] led { enclosure, dev... | pathname... }
```

TABLE 2-1 `led` Options and Arguments

Option/Argument	Description
<i>enclosure</i>	is the enclosure name of a Sun Enterprise Network Array ¹ .
<i>dev</i>	is the name of a specific disk in an enclosure ¹ .
<i>pathname</i>	is the physical or logical path name of a specific disk in an array ¹ .

¹See “Addressing” on page 2.

Example:

```
# luxadm led /devices/sbus@3,0/SUNW,socal@0,0/sf@0,0/  
ssd@w21000020370412ec,0:c,raw  
LED state is OFF for device in location: front,slot 0  
#
```

Setting a Disk LED to the Blink Mode

Use the `led_blink` subcommand to start blinking (flashing) the yellow LED associated with a specific disk. The `led_blink` subcommand only applies to subsystems that support this functionality.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Supported	Not Supported	Not Supported

```
luxadm [ -v ] led_blink { enclosure, dev... | pathname... }
```

TABLE 2-2 `led_blink` Options and Arguments

Option/Argument	Description
<i>enclosure</i>	is the enclosure name of a Sun Enterprise Network Array ¹ .
<i>dev</i>	is the name of a specific disk in an enclosure ¹ .
<i>pathname</i>	is the physical or logical path name of a specific disk in an array ¹ .

¹ See "Addressing" on page 2.

Example:

```
# luxadm led_blink /devices/sbus@3,0/SUNW,socal@0,0/sf@0,0/  
ssd@w21000020370412ec,0:c,raw  
LED state is BLINKING for device in location: front,slot 0  
#
```

Turning Off a Disk LED

Use the `led_off` subcommand to turn off the yellow LED associated with a specific disk.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Supported

```
luxadm [ -v ] led_off { enclosure, dev... | pathname... }
```

TABLE 2-3 `led_off` Options and Arguments

Option/Argument	Description
<i>enclosure</i>	is the enclosure name of a Sun Enterprise Network Array ¹ .
<i>dev</i>	is the name of a specific disk in an enclosure ¹ .
<i>pathname</i>	is the physical or logical path name of a specific disk in an array ¹ .

¹ See "Addressing" on page 2.

Note – On a Sun Enterprise Network Array this may or may not cause the yellow LED to turn off or stop blinking depending on the state of the Sun Enterprise Network Array. Refer to *Sun Enterprise Network Array Installation and Service Manual* for details.

Example:

```
# luxadm led_off /devices/sbus@3,0/SUNW,socal@0,0/sf@0,0/  
ssd@w21000020370412ec,0:c,raw  
LED state is OFF for device in location: front,slot 0  
#
```

Turning On a Disk LED

Use the `led_on` subcommand to turn on the yellow LED associated with a specific disk.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Supported

```
luxadm [ -v ] led_on pathname
```

TABLE 2-4 `led_on` Options and Arguments

Option/Argument	Description
<i>dev</i>	is the name of a specific disk in an enclosure ¹ .
<i>pathname</i>	is the physical or logical path name of a specific disk in an array ¹ .

¹ See "Addressing" on page 2.

Displaying

Probing for Sun Enterprise Network Arrays

Use the `probe` subcommand to display information about all attached Sun Enterprise Network Array. Information displayed includes the logical pathnames, the WWNs, and the enclosure names.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Supported	Not Supported	Not Supported

```
luxadm [ -v ] probe [-p]
```

TABLE 2-5 `probe` Options

Option	Description
<code>-p</code>	also displays the physical pathname.

Example:

```
# luxadm probe
Found
SENA Name:dogbert   Node WWN:1234123412341234
  Logical Path:/dev/es/ses0
  Logical Path:/dev/es/ses1
#
```

Example:

```
# luxadm probe -p
Found
SENA Name:dogbert   Node WWN:1234123412341234
  Logical Path:/dev/es/ses0
  Physical Path:/devices/sbus@3,0/SUNW,socal@0,0/sf@0,0/
ses@w1234123412341235,0:0
  Logical Path:/dev/es/ses1
  Physical Path:/devices/sbus@3,0/SUNW,socal@0,0/sf@0,0/
ses@w1234123412341236,0:0
#
```

Displaying Enclosure or Device Specific Data

Use the `display` subcommand to display enclosure specific or device specific data.

Enclosure data consists of enclosure environmental sense information and status for all subsystem devices including disks.

Device data consists of inquiry, capacity, and configuration information.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Not Supported

```
luxadm [ -v ] display enclosure[ ,dev]... | pathname...
```

TABLE 2-6 `display` Options and Arguments

Option/Argument	Description
<code>-v</code>	mode sense data is also displayed
<code>enclosure</code>	is the enclosure name of a Sun Enterprise Network Array ¹ .
<code>dev</code>	is the name of a specific disk in an enclosure ¹ .
<code>pathname</code>	is the physical or logical path name of a Sun Enterprise Network Array, SPARCstorage Array, or a specific disk in an array ¹ .

TABLE 2-6 display Options and Arguments

Option/Argument	Description
-p	displays performance information for the specified device or subsystem
-r	displays error information for the specified device or subsystem

¹See "Addressing" on page 2.

Example:

```
# luxadm display dogbert

                               (luxadm version: 1.23 97/05/22)

      SENA

                DISK STATUS
SLOT  FRONT DISKS          (Node WWN)          REAR DISKS          (Node WWN)
0     On (O.K.)           20000020370412ec    On (O.K.)           200000203704141d
1     On (O.K.)           20000020370412e7    On (O.K.)           2000002037041375
2     On (O.K.)           2000002037041397    On (O.K.)           20000020370412be
3     On (O.K.)           200000203704139f    On (O.K.)           2000002037041433
4     On (O.K.)           2000002037041418    On (O.K.)           2000002037041348
5     On (O.K.)           200000203704140f    On (O.K.)           2000002037041333
6     On (O.K.)           200000203704143d    On (O.K.)           2000002037041382

                SUBSYSTEM STATUS
Revision Level: 0.16  Node WWN: 1234123412341234Enclosure Name: dogbert
Power Supplies (0,2 in front, 1 in rear)
  0 O.K.(REV 0)1 O.K.(REV 0)2 O.K.(REV 0)
Fans (0 in front, 1 in rear)
  0 O.K.(REV 0)1 O.K.(REV 0)
ESI Interface board(IB) (A top, B bottom)
  A: O.K. (mma)
  GBIC module (1 on left, 0 on right in IB)
  0 Not Installed1 O.K.(MODn)
  B: Not Installed
Disk backplane (0 in front, 1 in rear)
  Temperature sensors (on front backplane)
  0:42°C 1:42°C 2:40°C 3:39°C 4:40°C 5:40°C
  6:42°C (All temperatures are NORMAL.)
  Temperature sensors (on rear backplane)
  0:43°C 1:42°C 2:42°C 3:40°C 4:42°C 5:42°C
  6:43°C (All temperatures are NORMAL.)
Loop configurationThe loop is configured as a single loop.
Language          USA English
#
```

Example:

```
# luxadm display -r dogbert

                               (luxadm version: 1.23 97/05/22)

      SENA
      Information for FC Loop on port 0 of SOC+ Host Adapter
      at path: /devices/sbus@3,0/SUNW,socal@0,0:0
Version Resets  Req_Q_Intrpts  Qfulls Requests Sol_Resps Unsol_Resps Lips
1             2             0             0             0             0             0             1
Els_sent  Els_rcvd  Abts           Abts_ok Offlines Onlines Online_loops
0          0          0             0             0             0             1
      Information from sf driver:
Version Lip_count  Lip_fail Alloc_fail #_cmds Throttle_limit Pool_size
1         0          0             0             0             1024             1
      TARGET ERROR INFORMATION:
AL_PA  Els_fail Timouts Abts_fail Tsk_m_fail  Data_ro_mis Dl_len_mis Logouts
9e     0         0         0         0         0         0         0         0
b2     0         0         0         0         0         0         0         0
b1     0         0         0         0         0         0         0         0
ae     0         0         0         0         0         0         0         0
ad     0         0         0         0         0         0         0         0
ac     0         0         0         0         0         0         0         0
ab     0         0         0         0         0         0         0         0
aa     0         0         0         0         0         0         0         0
1      0         0         0         0         0         0         0         0
75     0         0         0         0         0         0         0         0
98     0         0         0         0         0         0         0         0
97     0         0         0         0         0         0         0         0
90     0         0         0         0         0         0         0         0
8f     0         0         0         0         0         0         0         0
88     0         0         0         0         0         0         0         0
84     0         0         0         0         0         0         0         0
82     0         0         0         0         0         0         0         0
#
```

Displaying inquiry Information

Use the inquiry subcommand to display inquiry information for a specific disk.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Supported

Downloading

Downloading Firmware

Use the `download` subcommand to download a prom image to the FEPROMs on a Sun Enterprise Network Array Interface Board or on a SPARCstorage Array controller board.

In a Sun Enterprise Network Array, when the download is complete, the Sun Enterprise Network Array subsystem will be reset and the downloaded code will be executed.

In a SPARCstorage Array, when the download is complete, you must reset the SPARCstorage Array to execute the downloaded code.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Not Supported

```
luxadm [ -v ] download [-s] [-f filename-path ]
```



Caution – When using the `-s` option the download modifies the FEPROM in the Sun Enterprise Network Array and should be used with CAUTION.

Note – The `-s` option does not apply to the SPARCstorage Array controller as it always writes the downloaded firmware into the FEPRM.

TABLE 2-8 download Options and Arguments

Option/Argument	Description
<code>-s</code>	saves the downloaded firmware in the FEPRM in a Sun Enterprise Network Array. If <code>-s</code> is not specified the downloaded firmware will not be saved across power cycles.
<code>-f filename</code>	downloads the prom image in filename. If you do not specify a filename, the default prom image will be used. The default prom image in a Sun Enterprise Network Array is in the directory <code>/usr/lib/locale/C/LC_MESSAGES</code> and is named <code>ibfirmware</code> . The default prom image in a SPARCstorage Array is in the directory <code>/usr/lib/firmware/ssa</code> and is named <code>ssafirmware</code> .
<code>-w WWN</code>	This option is for the SPARCstorage Array only. See “Changing a SPARCstorage Array World Wide Name” on page 17.

¹ See “Addressing” on page 2.

Changing a SPARCstorage Array World Wide Name

Use the download subcommand to change the World Wide Name of a SPARCstorage Array controller board.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] download [-w WWN] pathname
```

TABLE 2-9 download Options and Arguments

Option/Argument	Description
<i>pathname</i>	is a SPARCstorage Array controller
-w WWN	changes the SPARCstorage Array's World Wide Name. WWN is a twelve-digit hex number; leading zeros are required. The new SPARCstorage Array controller's image will have the least significant 6 bytes of the 8-byte World Wide Name modified to WWN.

Downloading fcode in a SPARCstorage Array

Use the `fc_s_download` subcommand to download new fcode into all the FC/S Sbus Cards.

The `fc_s_download` subcommand is interactive and expects user confirmation before downloading the fcode.

The version of the FC/S Sbus Cards fcode that was released with this version of the Operating System is kept in the directory `usr/lib/firmware/fc_s` and is named `fc_s_fcode`.



Caution – Ensure that you download the `usr/lib/firmware/fc_s/fc_s_fcode` file.

Note – The `fc_s_download` subcommand should be used only in single user mode; otherwise the FC/S card could be reset.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] fc_s_download [-F] [-f fcode-file]
```


TABLE 2-10 fc_s_download Options

Option	Description
-F	Forcibly downloads the fcode. The subcommand still expects user confirmation before the download.
-f fcode-file	is the name of the file that has the new fcode. When the fc_s_download subcommand is invoked without the [-f fcode-file] option, the current version of the fcode in each FC/S Sbus card is printed.

Downloading fcode in a Sun Enterprise Network Array

Use the fcal_s_download subcommand to download new fcode into ALL the FC100/S Sbus Cards or to display the current version of the fcode in each FC100/S Sbus card

When downloading new fcode, the fcal_s_download subcommand is interactive and expects user confirmation before downloading the fcode.



Caution – Ensure that you download the /usr/lib/firmware/fc_s/fcal_s_fcode file.



Caution – Do not attempt to download fcode to a FC100/S Sbus Card that is in your boot path.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Supported	Not Supported	Not Supported

```
luxadm [ -v ] fcal_s_download [ -f fcode-file ]
```

TABLE 2-11 fcal_s_download Options

Option	Description
-f fcode-file	fcode-file is the name of the file that has the new fcode. If you invoke the fcal_s_download subcommand without the [-f fcode-file] option, the current version of the fcode in each FC100/S Sbus card is displayed. The version of the FC100/S Sbus Cards fcode released with this operating system is kept in the directory usr/lib/firmware/fc_s and is named fcal_s_fcode.

Enclosure Services Card

The `env_display` and `alarm` subcommands apply only to an Enclosure Services Card (SES) in a RSM tray in a SPARCstorage Array. The RSM tray is addressed by using the logical or physical path of the SES device or by specifying the controller followed by the tray number. The controller is addressed by `cN` or the physical path to the SSA's controller.

Displaying Environmental Information

Use the `env_display` subcommand to display the environmental information for a SPARCstorage Array.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Supported

```
luxadm [ -v ] env_display { pathname | controller tray-number }
```

TABLE 2-12 `env_display` Options and Arguments

Option/Argument	Description
<i>pathname</i>	is the path to an SES device ¹ .
<i>controller</i>	is the path to a SPARCstorage Array controller ¹ .
<i>tray-number</i>	is an RSM tray number. <i>tray-number</i> is only valid for an RSM tray in a SPARCstorage Array.

¹See “Addressing a SPARCstorage Array” on page 3.

Disabling the Alarm

Use the `alarm_off` subcommand to disable the audible alarm for this enclosure. When invoked without an option, the current state of audible alarm is printed.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Supported

```
luxadm [ -v ] alarm_off { pathname | controller tray-number }
```

TABLE 2-13 `alarm_off` Options and Arguments

Option/Argument	Description
<i>pathname</i>	is the path to an SES device ¹ .
<i>controller</i>	is the path to a SPARCstorage Array controller ¹ .
<i>tray-number</i>	is an RSM tray number. <i>tray-number</i> is only valid for an RSM tray in a SPARCstorage Array.

¹ See "Addressing a SPARCstorage Array" on page 3.

Enabling the Alarm

Use the `alarm_on` subcommand to enable the audible alarm for this enclosure. When invoked without an option, the current state of audible alarm is printed.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Supported

```
luxadm [ -v ] alarm_on { pathname | controller tray-number }
```

TABLE 2-14 alarm_on Options and Arguments

Option/Argument	Description
<i>pathname</i>	is the path to an SES device ¹ .
<i>controller</i>	is the path to a SPARCstorage Array controller ¹ .
<i>tray-number</i>	is an RSM tray number. <i>tray-number</i> is only valid for an RSM tray in a SPARCstorage Array.

¹ See "Addressing a SPARCstorage Array" on page 3.

Setting the Alarm

Use the `alarm_set` subcommand to set the duration of the audible alarm to a specified number of seconds.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Supported

```
luxadm [ -v ] alarm_set { pathname | controller tray-number } [seconds]
```

TABLE 2-15 alarm_set Options and Arguments

Option/Argument	Description
<i>pathname</i>	is the path to an SES device ¹ .
<i>controller</i>	is the path to a SPARCstorage Array controller ¹ .
<i>tray-number</i>	is an RSM tray number. <i>tray-number</i> is only valid for an RSM tray in a SPARCstorage Array.
seconds	is the number of seconds.

¹ See "Addressing a SPARCstorage Array" on page 3.

Enclosure and Disk Operations

Renaming a Sun Enterprise Network Array

Use the `enclosure_name new_name` subcommand to change the enclosure name of one or more Sun Enterprise Network Arrays. The new name must be 16 or less characters. The only allowed characters are alphabetic or numeric digits.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Supported	Not Supported	Not Supported

```
luxadm [ -v ] enclosure_name ##### enclosure... | pathname...
```

TABLE 2-16 enclosure_name Options and Arguments

Option/Argument	Description
#####	is the new enclosure name.
<i>enclosure</i>	is the enclosure name of a Sun Enterprise Network Array ¹ .
<i>pathname</i>	is the physical or logical path name of a Sun Enterprise Network Array ¹ .

¹ See "Addressing a Sun Enterprise Network Array" on page 2.

Collecting Performance Statistics

Use the `perf_statistics` subcommand to enable or disable the accumulation of performance statistics for a specific SPARCstorage Array controller.

Note – The accumulation of performance statistics must be enabled before using the `display -p` subcommand.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] perf_statistics [ -e ] pathname
```

TABLE 2-17 `perf_statistics` Options and Arguments

Option/Argument	Description
<i>pathname</i>	is a SPARCstorage Array controller ¹ .
<code>-e</code>	Enable the accumulation of performance statistics.

¹ See “Addressing a SPARCstorage Array” on page 3.

Powering Off an Enclosure or Disk Drive

Use the `power_off` subcommand to set an enclosure to the power-save mode.

Note – The Sun Enterprise Network Array disk drives are not available when in the power-save mode.

When an Enclosure Services card in a SPARCstorage Array is addressed, the RSM tray is powered off.

When a disk drive in a Sun Enterprise Network Array is addressed, the drive is set to the drive off/unmated state. When set to the drive off/unmated state, the drive is spun down (stopped) and put in the bypass mode.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Not Supported

```
luxadm [ -v ] power_off { enclosure[ , dev ]... | pathname... }
```

TABLE 2-18 `power_off` Options and Arguments

Option/Argument	Description
<i>enclosure</i>	is the enclosure name of a Sun Enterprise Network Array ¹ .
<i>dev</i>	is the name of a specific disk in an enclosure ¹ .
<i>pathname</i>	is the physical or logical path name of a Sun Enterprise Network Array, SPARCstorage Array, or a specific disk in an array ¹ .

¹ See "Addressing" on page 2.

Powering On Enclosures or Disk Drives

Use the `power_on` subcommand to set a drive to its normal power on state. If you specify a Sun Enterprise Network Array disk drive, the `power_on` subcommand sets the specified disks to the normal start-up state.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Supported	Not Supported	Not Supported

```
luxadm [ -v ] power_on { enclosure[ ,dev]... | pathname... }
```

TABLE 2-19 `power_on` Options and Arguments

Option/Argument	Description
<i>enclosure</i>	is the enclosure name of a Sun Enterprise Network Array ¹ .
<i>dev</i>	is the name of a specific disk in an enclosure ¹ .
<i>pathname</i>	is the physical or logical path name of a Sun Enterprise Network Array or a specific disk in an array ¹ .

¹ See "Addressing a Sun Enterprise Network Array" on page 2.

Releasing Disks

Use the `release` subcommand to release one or more disk drives from reservation.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Supported


```
luxadm [ -v ] release { enclosure[,dev]... | pathname... }
```

TABLE 2-20 release Options and Arguments

Option/Argument	Description
<i>enclosure</i>	is the enclosure name of a Sun Enterprise Network Array ¹ .
<i>dev</i>	is the name of a specific disk in an enclosure ¹ .
<i>pathname</i>	is the physical or logical path name of a Sun Enterprise Network Array, SPARCstorage Array, or a specific disk in an array ¹ .

¹ See “Addressing” on page 2.

Reserving Disks

Use the `reserve` subcommand to reserve the specified disk(s) for exclusive use by the host from which the subcommand was issued.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Supported

```
luxadm [ -v ] reserve { enclosure[,dev]... | pathname... }
```

TABLE 2-21 reserve Options and Arguments

Option/Argument	Description
<i>enclosure</i>	is the enclosure name of a Sun Enterprise Network Array ¹ .
<i>dev</i>	is the name of a specific disk in an enclosure ¹ .
<i>pathname</i>	is the physical or logical path name of a Sun Enterprise Network Array, SPARCstorage Array, or a specific disk in an array ¹ .

¹ See “Addressing” on page 2.

Setting the Boot Device Variable

Use the `set_boot_dev` subcommand to set the boot-device variable in the system PROM to physical device name. The `set_boot_device` subcommand normally runs interactively; it requests confirmation for setting the default boot-device in the PROM.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
n/a	n/a	n/a

```
luxadm [ -v ] set_boot_dev [ -y ] pathname
```

TABLE 2-22 `set_boot_dev` Options and Arguments

Option/Argument	Description
<i>pathname</i>	is a block special device or a mount-point ¹ .
-y	runs non-interactively; no confirmation is requested or required.

¹ See "Addressing" on page 2.

Starting Disks

Use the `start` subcommand to spin up one or more disks.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] start [ -t tray number ] pathname
```

TABLE 2-23 `start` Options and Arguments

Option/Argument	Description
-t <i>tray-number</i>	is the tray number.
<i>pathname</i>	is the physical or logical path name of a SPARCstorage Array, or a specific disk in an array ¹ .

¹ See "Addressing" on page 2.

Stopping Disks

Use the `stop` subcommand to spin down one or more disks.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] stop [ -t tray-number ] pathname
```

TABLE 2-24 `stop` Options and Arguments

Option/Argument	Description
<code>-t tray-number</code>	is the tray number.
<i>pathname</i>	is the physical or logical path name of a SPARCstorage Array, or a specific disk in an array ¹ .

¹ See "Addressing" on page 2.

NVRAM

Enabling and Disabling Fast Writes

Use the `fast_write` subcommand to enable or disable the use of the NVRAM to enhance the performance of writes in the SPARCstorage Array.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] fast_write [-s] -c pathname
```

TABLE 2-25 `fast_write` Options and Arguments

Option/Argument	Description
<i>pathname</i>	<i>pathname</i> is a SPARCstorage Array controller or an individual disk ¹ .
-e	causes the SPARCstorage Array to save the change so it will persist across power-cycles.
-c	enables fast writes for synchronous writes only.
-e	enables fast writes.
-d	disables fast writes.

¹ See "Addressing a SPARCstorage Array" on page 3.

Displaying Fast Write Data

Use the `nvrाम_data` subcommand to display the amount of fast write data in the NVRAM for a specific disk. This command can only be used for an individual disk.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] nvram_data pathname
```

TABLE 2-26 nvram_data Options and Arguments

Option/Argument	Description
<i>pathname</i>	<i>pathname</i> is a SPARCstorage Array controller or an individual disk ¹ .

¹ See “Addressing a SPARCstorage Array” on page 3.

Purging Fast Write Data from NVRAM



Caution – The `purge` subcommand should be used with caution, usually only when a drive has failed.

Use the `purge` subcommand to purge any fast write data from NVRAM for one or more disks.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] purge pathname
```

TABLE 2-27 purge Options and Arguments

Option/Argument	Description
<i>pathname</i>	is a SPARCstorage Array controller or an individual disk. If you specify a SPARCstorage Array controller, fast write data for all disks associated with that controller will be purged ¹ .

¹ See “Addressing a SPARCstorage Array” on page 3.

Flushing NVRAM

Use the `sync_cache` subcommand to flush all outstanding writes for one or more disks from NVRAM to the media.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] sync_cache pathname
```

TABLE 2-28 `sync_cache` Options and Arguments

Option/Argument	Description
<i>pathname</i>	is a SPARCstorage Array controller or an individual disk.. If you specify a SPARCstorage Array controller, outstanding writes for all disks associated with that controller will be flushed ¹ .

¹ See "Addressing a SPARCstorage Array" on page 3.

Remove, Insert, Replace

Removing Devices

Use the `remove_device` subcommand to hot remove a device or a chain of devices.

The `remove_device` subcommand interactively guides you through the hot removal of one or more devices. In the Sun Enterprise Network Array the `remove_device` subcommand:

- Checks whether the device is busy and if so warns you.
- Offlines the device (this fails if the disk is open).
- Informs you when device(s) can be safely removed.
- Informs you which device to remove by blinking the activity LED on the enclosure.
- Requests confirmation that the list(s) is/are as expected.
- Removes the logical device(s) names for the device that was removed.

In the SPARCstorage RSM the `remove_device` subcommand:

- Takes the device offline.
- Quiesces the bus for buses that support quiescing.
- Informs you that the device can be safely replaced.
- Requests confirmation that the device has been replaced.
- Unquiesces the bus for buses that support quiescing.
- Brings the (now removed) device back online
- Removes the logical device name for the device that was removed.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Supported	Not Supported	Supported

```
luxadm [ -v ] remove_device { enclosure, dev... | pathname... }
```

TABLE 2-29 remove_device Options and Arguments

Option/Argument	Description
<i>enclosure</i>	is the enclosure name of a Sun Enterprise Network Array ¹ .
<i>dev</i>	is the name of a specific disk in an enclosure ¹ .
<i>pathname</i>	is the physical or logical path name of a Sun Enterprise Network Array or a specific disk in an array ¹ .

¹ See "Addressing a Sun Enterprise Network Array" on page 2.

Example:

```
# luxadm remove_device macs3,r1
```

```
WARNING!!! Please ensure that no filesystems are mounted on these  
device(s).
```

```
All data on these devices should have been backed up.
```

```
The list of devices which will be removed is:
```

```
1: Box Name "macs3" rear slot 1
```

```
Please enter 'q' to Quit OR <Return> to Continue:
```

```
offlining: Drive in "macs3" rear slot 1
```

```
Hit any key after inserting/removing drives:
```


You must physically remove the device at this time. After you hit a key, the following is displayed:

```
Drive in Box Name "macs3" rear slot 1
  Removing Logical Nodes:
    Removing /dev/dsk/clt81d0s0
    Removing /dev/rdisk/clt81d0s0
    Removing /dev/dsk/clt81d0s1
    Removing /dev/rdisk/clt81d0s1
    Removing /dev/dsk/clt81d0s2
    Removing /dev/rdisk/clt81d0s2
    Removing /dev/dsk/clt81d0s3
    Removing /dev/rdisk/clt81d0s3
    Removing /dev/dsk/clt81d0s4
    Removing /dev/rdisk/clt81d0s4
    Removing /dev/dsk/clt81d0s5
    Removing /dev/rdisk/clt81d0s5
    Removing /dev/dsk/clt81d0s6
    Removing /dev/rdisk/clt81d0s6
    Removing /dev/dsk/clt81d0s7
    Removing /dev/rdisk/clt81d0s7
#
```

Inserting Devices

Use the `insert_device` subcommand for hot insertion of a new device or a chain of new devices. If you specify more than one enclosure, you can perform concurrent hot insertions on multiple busses.

The `insert_device` subcommand interactively guides you through the hot insertion of one or more devices. In the Sun Enterprise Network Array the `insert_device` subcommand:

- Informs you when the device(s) can be safely inserted.
- Requests confirmation that the list(s) is/are as expected.
- Creates the logical device names for the new devices.
- Displays the logical path name for the devices.

In the SPARCstorage RSM the `insert_device` subcommand:

- Quiesces the bus for buses that support quiescing
- Informs you that the device can be safely inserted
- Requests confirmation that the device has been inserted
- Unquiesces the bus for buses that support quiescing

- Creates the logical device name for the new device.

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Supported	Not Supported	Supported

```
luxadm [ -v ] insert_device enclosure,dev...
```

TABLE 2-30 insert_device Options and Arguments

Option/Argument	Description
<i>enclosure</i>	is the enclosure name of a Sun Enterprise Network Array ¹ .
<i>dev</i>	is the name of a specific disk in an enclosure ¹ .

¹ See "Addressing a Sun Enterprise Network Array" on page 2.

Example:

```
# luxadm insert_device
Please hit <enter> when you have finished adding the device(s):
```

You must physically install the disk drive at this time. After hitting any key, the following is displayed:

```
Waiting for Loop Initialization to complete...
New Logical Nodes under /dev/es:
New Logical Nodes under /dev/dsk and /dev/rdsk :
    c1t81d0s0
    c1t81d0s1
    c1t81d0s2
    c1t81d0s3
    c1t81d0s4
    c1t81d0s5
    c1t81d0s6
    c1t81d0s7
#
```

Replacing Devices

Use the `replace_device` subcommand to hot replace a device.

The `replace_device` subcommand interactively guides you through the hot insertion of one or more devices. The `replace_device` subcommand:

- Takes the device offline.
- Quiesces the bus for buses that support quiescing.
- Informs you that the device can be safely replaced.
- Requests confirmation that the device has been replaced.
- Unquiesces the bus for buses that support quiescing.
- Brings the device back online..

Sun Enterprise Network Array	SPARCstorage Array	SPARCstorage RSM
Not Supported	Not Supported	Supported

```
luxadm [ -v ] replace_device pathname
```

TABLE 2-31 `replace_device` Options and Arguments

Option/Argument	Description
<i>pathname</i>	<i>pathname</i> is a SPARCstorage Array controller or an individual disk ¹ .

¹ See “Addressing a SPARCstorage RSM Tray” on page 4.

Hotplugging in the Sun Enterprise Network Array

Hotplugging Sun Enterprise Network Arrays

The procedure for hotplugging whole Sun Enterprise Network Array enclosures is very similar to the procedure for removing and replacing individual disk drives. Instead of specifying an *enclosure.dev* you only need to specify the *enclosure*.

For hotplugging Sun Enterprise Network Arrays, use the procedures in “Adding a Disk Drive” on page 40, “Replacing a Disk Drive” on page 43, and “Removing a Disk Drive” on page 54 except do not specify a device (*dev*). You only need to specify the *enclosure*.

Hotplugging Disks



Caution – As with other high-RAS products, drives should not be pulled out randomly. The Sun Enterprise Network Array design provides support to replace failed drives in redundant (mirrored or RAID) configurations. If the drive is active, you must stop that activity before removing it. This can be done without bringing down the operating system or powering down the unit. The Sun Enterprise Network

Array hardware fully supports hot-plugging, but there are software considerations that must be taken into account. Follow the procedures in this section when removing, replacing, and adding drives.

Overview

Hot-plug reconfiguration or hot-plug operations cannot be performed on an active disk drive. All disk access activity must be stopped prior to a disk drive being removed or replaced.

In general, hot-plug reconfiguration operations involve three stages:

1. Preparing for hot-plug reconfiguration
2. Adding, replacing, or removing a disk drive
3. Reconfiguring the operating environment.

Three specific cases exist where the hot-plug feature is useful.

- Adding a disk drive to a system to increase storage capacity
- Replacing a faulty disk drive while the system is running:
- Removing a drive from a system that no longer needs it

Adding a Disk Drive

This section contains information on how to configure your system when you add a disk drive while the power is on and the operating system is running.

The way you add a disk drive depends on the application you are using. Each application requires that you decide where to install the new disk drive, add the drive, and then reconfigure the operating environment. Each application is different.

In all cases, you must select a slot, install the disk drive, and configure the Solaris environment to recognize the drive. Then you must configure your application to accept the new disk drive.



Caution – These procedures should be performed only by a qualified system administrator. Performing hot-plug operations on an active disk drive may result in data loss and/or data corruption.

Selecting a Slot for the New Disk Drive

Select any available slot in the Sun Enterprise Network Array for the new disk drive. For reference when you configure the software environment, make a note of which enclosure and slot you chose.

Configuring the Solaris Environment

A new device entry needs to be created for the drive in the `/devices` and `/dev/dsk` and `/dev/rdisk` hierarchy. The new drive is assigned a name associated with the slot into which the drive was installed.

1. Use the `luxadm insert_device` command to add the new device.

This command is interactive. You will be guided through the procedure for inserting a new device or chain of devices.

```
# luxadm insert_device
Please hit <enter> when you have finished adding the device(s):
```

2. You must physically insert the disk drive at this time. After the drive is installed, hit Return. The following is displayed:

```
Waiting for Loop Initialization to complete...
New Logical Nodes under /dev/es:
New Logical Nodes under /dev/dsk and /dev/rdisk :
    c1t3d0s0
    c1t3d0s1
    c1t3d0s2
    c1t3d0s3
    c1t3d0s4
    c1t3d0s5
    c1t3d0s6
    c1t3d0s7
#
```

The new disk drive is now available for use as a block or character device. Refer to the `sd(7)` man pages for further details.

Configuring the New Disk Drive for a Unix File System (UFS)

Use the following procedure to configure a slice (single physical partition) on a disk to be used with a UFS file system. For instructions about adding a file system to a Volume Manager logical disk, refer to the documentation that came with your application.

1. Verify that the device label meets your requirements.

You can use the `prtvtoc` command to inspect the label for your disk. To modify the label, use the `format` command. Refer to the `prtvtoc(1M)` and `format(1M)` man pages for more information.

2. Once you have selected a disk slice for your UFS file system, create a file system on the slice:

```
# newfs /dev/rdisk/cwtxdysz
```

Refer to the `newfs(1M)` man page for more information.

3. If necessary, create a mountpoint for the new file system:

```
# mkdir mount_point
```

where: `mount_point` is a fully qualified pathname. Refer to the `mount(1M)` man page for more information.

4. After the file system and mountpoint have been created, modify the `/etc/vfstab` file to reflect the new file system.

See the `vfstab(4)` man page for more details.

5. Mount the new file system using the `mount` command:

```
# mount mount_point
```

where: `mount_point` is the directory you created.

The file system is ready to be used.

Adding the New Device to a Sun Enterprise Volume Manager Disk Group

Use the following procedure to configure the new device to be used with a new or existing Volume Manager disk group.

1. Configure the Volume Manager to recognize the disk drive.

```
# vxctl enable
```

2. Add the new disk to a new or existing Volume Manager disk group:

```
# vxdiskadd cwtxdysz
```

where: *cwtxdysz* is the new disk.

Refer to the `vxdiskadd(1M)` man page for further details.

The disk is now ready for use with Volume Manager: as part of a new volume, added to an existing volume as a plex, or to increase an existing volume. Refer to your *Sun Enterprise Volume Manager User's Guide* for more information.

Replacing a Disk Drive

This chapter contains information on configuring your system to replace a disk drive while the power is on and the operating system is running.

The way you replace a faulty disk drive depends on the application you are using. Each application is different, but requires that you

1. Determine which disk drive is failing or has failed
2. Remove the disk
3. Add the replacement drive
4. Reconfigure the operating environment.

In all cases you must stop any activity on the disk; physically remove the old drive and install the new one; and configure the Solaris environment to recognize the drive. Then you must configure your application to accept the new disk drive.



Caution – These procedures should be performed only by a qualified system administrator. Performing hot-plug operations on an active disk drive may result in data loss and/or data corruption.

Identifying the Faulty Disk Drive

Different applications provide various levels of error logging. In general, you can find messages about failing or failed disks in your system console window. The information is also logged in the `/usr/adm/messages` file(s). See the documentation that came with your application for more information.

UNIX File System (UFS)

The following procedure describes how to unconfigure a disk being used by one or more UFS file systems.



Caution – These procedures should be performed only by a qualified system administrator. Performing hot-plug operations on an active disk drive can result in data loss.

Preparing to Replace the Disk Drive

1. Stop any application processes on the file systems to be unconfigured.
2. Back up your system.
3. Determine what file system(s) are on the disk:

```
# mount | grep cwtxdysz
```

For example, if the device to be removed is `c1t3d0`, enter the following:

```
# mount | grep c1t3d0
/export/home (/dev/dsk/c1t3d0s7 ): 98892 blocks 142713 files
/export/home2 (/dev/dsk/c1t3d0s5 ): 153424 blocks 112107 files
```

4. Determine and save the partition table for the disk.

If the replacement disk is the same type as the faulty disk, you can use the `format` command to save the partition table of the disk. Use the `save` command in `format` to save a copy of the partition table to the `/etc/format.dat` file. This will allow you to configure the replacement disk so that its layout matches the current disk.

Refer to the `format(1M)` man page for more information.

5. Unmount any file systems on the disk.

Note – If the file system(s) are on a disk that is failing or has failed, the `umount` operation may not complete. A large number of error messages may be displayed in the system console and in the `/var` directory during the `umount` operation. If the `umount` operation does not complete, you may have to reboot the system.

For each file system from Step 3 returned, type:

```
# umount filesystem
```

where *filesystem* is the first field for each line returned in Step 3.

For example:

```
# umount /export/home  
# umount /export/home2
```

6. Using the `df` command, verify that the file system has been unmounted.

Removing the Disk Drive

1. Use the `luxadm remove_device` command to remove the disk.

The `luxadm remove_device` command is interactive. You will be guided through the procedure for removing a device or chain of devices.

```
# luxadm remove_device /dev/rdisk/c1t3d0

WARNING!!! Please ensure that no filesystems are mounted on these
device(s).
All data on these devices should have been backed up.

The list of devices which will be removed is:

1: Box Name "macs3" rear slot 1

Please enter 'q' to Quit OR <Return> to Continue:

offlining: Drive in "macs3" rear slot 1

Hit any key after inserting/removing drives:
```

2. You must physically remove the disk drive at this time. After the drive is removed, hit any key. The following is displayed:

Note – The yellow LED on the designated disk drive(s) should be flashing.

```
Drive in Box Name "macs3" rear slot 1
Removing Logical Nodes:
    Removing /dev/dsk/clt3d0s0
    Removing /dev/rdisk/clt3d0s0
    Removing /dev/dsk/clt3d0s1
    Removing /dev/rdisk/clt3d0s1
    Removing /dev/dsk/clt3d0s2
    Removing /dev/rdisk/clt3d0s2
    Removing /dev/dsk/clt3d0s3
    Removing /dev/rdisk/clt3d0s3
    Removing /dev/dsk/clt3d0s4
    Removing /dev/rdisk/clt3d0s4
    Removing /dev/dsk/clt3d0s5
    Removing /dev/rdisk/clt3d0s5
    Removing /dev/dsk/clt3d0s6
    Removing /dev/rdisk/clt3d0s6
    Removing /dev/dsk/clt3d0s7
    Removing /dev/rdisk/clt3d0s7
#
```

Installing the New Disk Drive

1. Use the `luxadm insert_device` command to add the new device.

This command is interactive. You will be guided through the procedure for inserting a new device or chain of devices.

```
# luxadm insert_device
Please hit <enter> when you have finished adding the device(s):
```

- 2. You must physically insert the disk drive at this time. After the drive is installed, hit Return. The following is displayed:**

```
Waiting for Loop Initialization to complete...
New Logical Nodes under /dev/es:
New Logical Nodes under /dev/dsk and /dev/rdisk :
    c1t3d0s0
    c1t3d0s1
    c1t3d0s2
    c1t3d0s3
    c1t3d0s4
    c1t3d0s5
    c1t3d0s6
    c1t3d0s7
#
```

The new disk drive is now available for use as a block or character device. Refer to the `sd(7)` man pages for further details.

Restoring the UFS File System

Use the following procedure to configure a slice on a disk to be used with the UFS file system.

- 1. Verify that the device label meets your requirements.**

You can use the `prtvtoc` command to inspect the label for your disk. To modify the label, use the `format` command. See the `prtvtoc(1M)` and `format(1M)` man pages for more information.

- 2. Verify that the device's partition table satisfies the requirements of the file system(s) you intend to re-create.**

You can use the `prtvtoc` command to inspect the label for your device. If you need to modify the label, use the `format` command. Refer to the `prtvtoc(1M)` and `format(1M)` man pages for more information.
For example:

```
# prtvtoc /dev/rdisk/cwtxdysz
```

If you have saved a disk partition table using the `format` utility and the replacement disk type matches the old disk type, then you can use the `format` utility's `partition` section to configure the partition table of the replacement disk. See the `select` and `label` commands in the `partition` section.

If the replacement disk is of a different type than the disk it replaced, you can use the partition size information from the previous disk to set the partition table for the replacement disk. Refer to the `prtvtoc(1M)` and `format(1M)` man pages for more information.

3. Once you have selected a disk slice for your UFS file system, create a file system on the slice:

```
# newfs /dev/rdisk/cwtxdysz
```

4. Mount the new file system using the `mount` command:

```
# mount mount_point
```

where: `mount_point` is the directory on which the faulty disk was mounted.

The new disk is ready to be used. You can now restore data from your backups.

Sun Enterprise Volume Manager

The following procedure assumes that all user- and application-level processes on all volumes, plexes, and/or subdisks that are located on the drive to be removed have been terminated.



Caution – These procedures should be performed only by a qualified system administrator. Performing hot-plug operations on an active disk drive may result in data loss.

Preparing to Replace the Disk Drive

1. Back up your system.

Refer to the documentation that came with your system for backup details.

2. Identify the disk media name for the disk you intend to replace.

```
# vxdisk list | grep cwtxdysz
```

For example, if the disk to be removed is c0t3d0, enter:

```
# vxdisk list | grep c0t3d0
c0t3d0s2      sliced      disk01      rootdg      online
```

The disk media name is the third field in the output above: disk01.

You can use the `vxdiskadm` utility to prepare the disk for replacement.

3. Type `vxdiskadm` in a shell.

For example:

```
# vxdiskadm
```

This operation is interactive and requires user confirmation of the operation.

4. Select the “Remove a disk for replacement” option.

When prompted for a disk name to replace, type the disk media name from Step 2.

`vxdiskadm` marks the disk for replacement and saves the subdisk information to be rebuilt on the replacement disk.

Redundant data is automatically recovered after the replacement disk has been reattached to Volume Manager. Non-redundant data is identified as unusable and must be recreated from backups.

Refer to the `vxdiskadm(1M)` man page for further details.

5. Quit the `vxdiskadm` utility.

Removing the Disk Drive

1. Use the `luxadm remove_device` command to remove the disk.

The `luxadm remove_device` command is interactive. You will be guided through the procedure for removing a device or chain of devices.

```
# luxadm remove_device /dev/rdisk/clt3d0

WARNING!!! Please ensure that no filesystems are mounted on these
device(s).
All data on these devices should have been backed up.

The list of devices which will be removed is:

1: Box Name "macs3" rear slot 1

Please enter 'q' to Quit OR <Return> to Continue:

offlining: Drive in "macs3" rear slot 1

Hit any key after inserting/removing drives:
```

2. You must physically remove the disk drive at this time. After the drive is removed, hit any key. The following is displayed:

Note – The yellow LED on the designated disk drive(s) should be flashing.

```
Drive in Box Name "macs3" rear slot 1
Removing Logical Nodes:
  Removing /dev/dsk/clt3d0s0
  Removing /dev/rdisk/clt3d0s0
  Removing /dev/dsk/clt3d0s1
  Removing /dev/rdisk/clt3d0s1
  Removing /dev/dsk/clt3d0s2
  Removing /dev/rdisk/clt3d0s2
  Removing /dev/dsk/clt3d0s3
  Removing /dev/rdisk/clt3d0s3
  Removing /dev/dsk/clt3d0s4
  Removing /dev/rdisk/clt3d0s4
  Removing /dev/dsk/clt3d0s5
  Removing /dev/rdisk/clt3d0s5
  Removing /dev/dsk/clt3d0s6
  Removing /dev/rdisk/clt3d0s6
  Removing /dev/dsk/clt3d0s7
  Removing /dev/rdisk/clt3d0s7
#
```

Installing the Disk Drive

1. Use the `luxadm insert_device` command to add the new device.

This command is interactive. You will be guided through the procedure for inserting a new device or chain of devices.

```
# luxadm insert_device
Please hit <enter> when you have finished adding device(s):
```

- 2. You must physically insert the disk drive at this time. After the drive is installed, hit Return. The following is displayed:**

```
Waiting for Loop Initialization to complete...
New Logical Nodes under /dev/es:
New Logical Nodes under /dev/dsk and /dev/rdisk :
    clt3d0s0
    clt3d0s1
    clt3d0s2
    clt3d0s3
    clt3d0s4
    clt3d0s5
    clt3d0s6
    clt3d0s7
#
```

The new disk drive is now available for use as a block or character device. Refer to the `sd(7)` man pages for further details.

Recreating a Volume Manager Configuration on the New Drive

To recreate the replaced disk on the new drive:

- 1. Configure the Volume Manager to recognize the disk drive.**

```
# vxdctl enable
```

- 2. Use the `vxdiskadm` utility to replace the failed disk.**

Select the “Replace a failed or removed disk” option.

This operation requires user confirmation. When prompted for a disk name to replace, use the disk media name from Step 2 of “Preparing to Replace the Disk Drive” on page 49.

`vxdiskadm` supplies a list of available disks to be used as replacements.

- 3. Select the replacement drive.**

`vxdiskadm` automatically configures the replacement drive to match the failed drive.

Redundant data is recovered automatically. Space for non-redundant data is created and identified. Non-redundant data must be recovered from backing store.

See the `vxdiskadm` man pages for further details.

You have now completed the replacement of the failed drive.

Removing a Disk Drive

This chapter contains information on how to configure your system to remove a disk drive while the power is on and the operating system is running. Use the procedures in this chapter if you do *not* intend to replace the disk drive.

The way in which you prepare to remove a disk drive depends on the application you are using. Each application is different, but requires that you

1. Select the disk drive
2. Remove the disk
3. Reconfigure the operating environment.

In all cases you must select the disk and stop any activity or applications on it, unmount it, physically remove the drive, and configure the Solaris environment to recognize that the drive is no longer there. Then you must configure your application to operate without this device in place.



Caution – These procedures should be performed only by a qualified system administrator. Performing hot-plug operations on an active disk drive may result in data loss and/or data corruption.

Unix File System (UFS)

The following procedure describes how to unconfigure a disk being used by one or more UFS file systems.



Caution – These procedures should be performed only by a qualified system administrator. Performing hot-plug operations on an active disk drive may result in data loss.

1. **Stop any application processes on the file systems to be unconfigured.**
2. **Back up your system.**
3. **Determine what file system(s) are on the disk:**

```
# mount | grep cwtxdysz
```

For example, if the device to be removed is `c1t3d0`, enter the following:

```
# mount | grep c1t3d0
/export/home (/dev/dsk/c1t3d0s7 ): 98892 blocks 142713 files
/export/home2 (/dev/dsk/c1t3d0s5 ): 153424 blocks 112107 files
```

4. Unmount any file systems on the disk.

Note – If the file system(s) are on a disk that is failing or has failed, the `umount` operation may not complete. A large number of error messages may be displayed in the system console and in the `/var` directory during the `umount` operation. If the `umount` operation does not complete, you may have to restart the system.

For each file system returned, type:

```
# umount filesystem
```

where: `filesystem` is the first field for each line returned in Step 3.

For example:

```
# umount /export/home
# umount /export/home2
```

Removing the Disk Drive

1. Use the `luxadm remove_device` command to remove the disk.

The `luxadm remove_device` command is interactive. You will be guided through the procedure for removing a device or chain of devices.

```
# luxadm remove_device /dev/rdisk/c1t3d0

WARNING!!! Please ensure that no filesystems are mounted on these
device(s).
All data on these devices should have been backed up.

The list of devices which will be removed is:

1: Box Name "macs3" rear slot 1

Please enter 'q' to Quit OR <Return> to Continue:

offlining: Drive in "macs3" rear slot 1

Hit any key after inserting/removing drives:
```

2. You must physically remove the disk drive at this time. After the drive is removed, hit any key. The following is displayed:

Note – The yellow LED on the designated disk drive(s) should be flashing.

```
Drive in Box Name "macs3" rear slot 1
Removing Logical Nodes:
  Removing /dev/dsk/clt3d0s0
  Removing /dev/rdisk/clt3d0s0
  Removing /dev/dsk/clt3d0s1
  Removing /dev/rdisk/clt3d0s1
  Removing /dev/dsk/clt3d0s2
  Removing /dev/rdisk/clt3d0s2
  Removing /dev/dsk/clt3d0s3
  Removing /dev/rdisk/clt3d0s3
  Removing /dev/dsk/clt3d0s4
  Removing /dev/rdisk/clt3d0s4
  Removing /dev/dsk/clt3d0s5
  Removing /dev/rdisk/clt3d0s5
  Removing /dev/dsk/clt3d0s6
  Removing /dev/rdisk/clt3d0s6
  Removing /dev/dsk/clt3d0s7
  Removing /dev/rdisk/clt3d0s7
#
```

Sun Enterprise Volume Manager

The following procedure assumes that all user- and application-level processes on all volumes, plexes, and/or subdisks that are located on the drive to be removed have been terminated.



Caution – These procedures should be performed only by a qualified system administrator. Performing hot-plug operations on an active disk drive may result in data loss.

Preparing to Remove the Disk Drive

1. **Back up your system.**
2. **Identify the disk media name for the disk you intend to remove.**

```
# vxdisk list | grep cwtxdysz
```

For example, if the disk to be removed is c0t3d0, enter:

```
# vxdisk list | grep c0t3d0
c0t3d0s2      sliced      disk01      rootdg      online
```

The disk media name is the third field in the output above: disk01.

You can use the vxdiskadm utility to prepare the disk for removal.

3. Type vxdiskadm in a shell.

For example:

```
# vxdiskadm
```

This operation is interactive and requires user confirmation of the operation.

4. Select the “Remove a disk” option.

When prompted for a disk name to remove, type the disk media name from Step 2.

vxdiskadm marks the disk to be removed.

Refer to the vxdiskadm(1M) man page for further details.

Removing the Disk Drive

1. Use the `luxadm remove_device` command to remove the disk.

The `luxadm remove_device` command is interactive. You will be guided through the procedure for removing a device or chain of devices.

```
# luxadm remove_device /dev/rdisk/clt3d0
```

```
WARNING!!! Please ensure that no filesystems are mounted on these  
device(s).
```

```
All data on these devices should have been backed up.
```

```
The list of devices which will be removed is:
```

```
1: Box Name "macs3" rear slot 1
```

```
Please enter 'q' to Quit OR <Return> to Continue:
```

```
offlining: Drive in "macs3" rear slot 1
```

```
Hit any key after inserting/removing drives:
```

2. You must physically remove the disk drive at this time. After the drive is removed, hit any key. The following is displayed:

Note – The yellow LED on the designated disk drive(s) should be flashing.

```
Drive in Box Name "macs3" rear slot 1
```

```
Removing Logical Nodes:
```

```
Removing /dev/dsk/clt3d0s0
Removing /dev/rdisk/clt3d0s0
Removing /dev/dsk/clt3d0s1
Removing /dev/rdisk/clt3d0s1
Removing /dev/dsk/clt3d0s2
Removing /dev/rdisk/clt3d0s2
Removing /dev/dsk/clt3d0s3
Removing /dev/rdisk/clt3d0s3
Removing /dev/dsk/clt3d0s4
Removing /dev/rdisk/clt3d0s4
Removing /dev/dsk/clt3d0s5
Removing /dev/rdisk/clt3d0s5
Removing /dev/dsk/clt3d0s6
Removing /dev/rdisk/clt3d0s6
Removing /dev/dsk/clt3d0s7
Removing /dev/rdisk/clt3d0s7
```

```
#
```

Expert Mode Subcommands



Caution – The expert mode subcommands should only be used by qualified personnel who are knowledgeable about the systems they are managing.

The command line must contain the `luxadm -e` (expert mode) option and a subcommand.

```
luxadm [options] subcommand pathname
```

TABLE A-1 Expert Mode Subcommands

Subcommand	Description
<code>bus_getstate</code>	Gets and displays the state of the specified bus or the bus controlling the specified device.
<code>bus_quiesce</code>	Quiesces the specified bus or the bus controlling the specified device.
<code>bus_reset</code>	Resets the specified bus or the bus controlling the specified device.
<code>bus_resetall</code>	Resets the specified bus or the bus controlling the specified device, and all devices on that bus.
<code>bus_unquiesce</code>	Unquiesces the specified bus or the bus controlling the specified device.
<code>dev_getstate</code>	Gets and displays the state of the specified device.
<code>dev_reset</code>	Resets the specified device.
<code>forcelip</code>	Forces the link to reinitialize using the Loop Initialize Primitive (LIP) sequence. The <code>forcelip</code> subcommand is supported on the Sun Enterprise Network Array only.

TABLE A-1 Expert Mode Subcommands

Subcommand	Description
offline	Takes the specified device offline.
online	Puts the specified device online.
rdls	Reads the link error status block from a specified device. The <code>rdls</code> subcommand also displays the link error status information for the Host Adapter associated with the specified device, if available. The <code>rdls</code> subcommand is supported on the Sun Enterprise Network Array only.

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