Removing and Replacing Hard Disk Drives on Sun Server Platforms
User Guide
Please Read

Important

Please read this entire guide. If this guide provides installation or operation instructions, give particular attention to all safety statements included in this guide.
Notices

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About This Guide

Introduction

This guide provides instructions for removing and replacing hard disk drives on various Sun Microsystems (Sun) servers.

Purpose

The purpose of this guide is to provide support engineers with instructions for removing and replacing hard disk drives on the Sun servers.

Audience

This guide is written for system operators who use a Sun server as their Digital Network Control System (DNCS) or Application Server platform. Cisco field service engineers and internal support technicians who assist system operators in managing their systems will also find this guide useful.

The individual responsible for completing the procedures in this guide must have the following capabilities:

- Familiarity with system administration using the Solaris operating system (OS)
- Knowledge of how to use a text editor, such as UNIX vi
- Privileges as a root user
Document Version

This is the third formal release of this document. In addition to minor text and graphic changes, the following table provides the technical changes to this document.

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Replace a Disk Drive on a Sun Fire V880 and V890 Server

Introduction
This chapter provides instructions for removing and replacing a hard disk drive on the Sun Fire V880 and V890 servers.

Important: Cisco engineers do not recommend shutting down the DNCS when replacing a hard disk drive. Your metadevices may become corrupted.

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- 6-Disk Configuration ................................................................. 2
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6-Disk Configuration

V880/V890 Hardware (6-Disk Configuration)

Hard Disk Layout

Depending on your system, the Sun Fire V880 or V890 server is configured with either 6 or 12 disk drives.

The following illustration shows the front view of the 6-disk V880/V890 system layout.

Verify Disk Drive Status

If a disk problem occurs on your V880 or V890 server, an orange banner with white text (banner window) appears on your console to alert you to the problem. Do not
close this window; the window disappears when the problem is resolved. The disk problem may be an event where one or all portions of a disk drive become inaccessible.

Should one or all portions of a disk drive become inaccessible, you must use the luxadm utility to accomplish the following steps:

- Verify the enclosure name assigned to the server's internal storage array
- Determine the status of the disk drive

**Note:** Cisco's default enclosure name is FCloop.

After using the luxadm utility, use the metadb utility to determine if a meta database is on the disk drive. If a meta database exists on the drive, you must delete the meta database *prior* to removing the disk drive.

**Finding the Enclosure Name**

Complete these steps to verify the enclosure name for the internal storage array using the *luxadm probe* command.

1. If necessary, open an xterm window on the V880 or V890 server.
2. Complete the following steps to log on to the xterm window as *root* user.
   - Type `su -` and press Enter. The password prompt appears.
   - Type the root password and press Enter.
3. Type the following command and then press Enter. The name of the enclosure appears.
   `luxadm probe`

**Example:** Sample output follows:

```text
Found Enclosure:
SUNWGS INT FCBLP   Name:FCloop   Node WWN:508002000011d7d8
   Logical Path:/dev/es/ses0
   Logical Path:/dev/es/ses1
```

**Note:** FCloop is the enclosure name in this example.
Determining the Status of the Disk Drive

Complete these steps to determine the disk drive status using the `luxadm display` command.

**Note:** If you have been following the procedures in this chapter in order, you should still be logged in to an xterm window as root user.

Type the following command and press Enter to determine the disk drive status:

```
luxadm display [enclosure name]
```

**Example:** `luxadm display FCloop`

Sample output showing the disk status follows:

```
SUNWGS INT FCBPL

DISK STATUS

SLOT DISKS (Node WWN)
0  On (O.K.)  2000002037f87099
1  On (O.K.)  2000002037f39796
2  On (Login failed)
3  On (O.K.)  2000002037ffab19
4  On (O.K.)  2000002037ff9ca5
5  On (O.K.)  2000002037ffa3c8
6  Not Installed
7  Not Installed
8  Not Installed
9  Not Installed
10 Not Installed
11 Not Installed

SUBSYSTEM STATUS

FW Revision:9218   Box ID:0

Node WWN:508002000011d7d8   Enclosure Name:FCloop

SSC100's - 0=Base Bkpln, 1=Base LoopB, 2=Exp Bkpln, 3=Exp LoopB

SSC100 #0: O.K.(11.A)
SSC100 #1: O.K.(11.A)
```
SSC100 #2: Not Installed
SSC100 #3: Not Installed

Temperature Sensors - 0 Base, 1 Expansion
0:21ºC
1:Not Installed

Note: In this example, notice the status of slot 2 is Login failed. This indicates that Slot 2 is the disk drive that needs to be replaced.

Important: The World Wide Name (WWN) is unique for each disk drive. Whenever you remove a drive and replace it, you get a new WWN value for the new drive.

Examine Mirrored Devices (6-Disk Setup)

The V880 and V890 servers support disk drive mirroring. Through disk mirroring, the DNCS stores identical information across sets of hard disks.

After using the luxadm display command to determine the drive status, use the check_metadevices command to determine if a single file system or multiple file systems have been affected.

The V880/V890 6-disk configuration has a total of three mirrored disk drives. The hard disks in drive bay 0 and drive bay 3 are mirrored, as are the hard disks in drive bay 1 and drive bay 4. The hard disks in drive bay 2 and drive bay 5 are also mirrored.

Before you disable the disk mirroring functions of the V880/V890 in preparation for replacing a disk drive, you should examine the status of the mirrored disks in the system. Examining the status of the mirrored devices also tells you if a specific disk slice needs maintenance.

Examining the Mirrored Devices

Complete these steps to examine the status of the mirrored disk drives on your DNCS using the check_metadevices command.

Note: If you have been following the procedures in this chapter in order, you should still be logged in to an xterm window as root user.

1 Type the following command and press Enter:
   su - dnsc
2 Type the following command and press Enter. The metadevice tool examines the mirrored disk drives on your DNCS and indicates if a drive or a specific disk slice needs maintenance.
/dvs/dnsc/bin/check_metadevices

**Example:** Sample output pertaining to when a disk slice needs maintenance follows:

```
WARNING: d520 metadevice Needs maintenance
Found Disk Problems at: Mon Jul 12 11:08:20 EDT 2004
```

**Important:** Write the name of the disk drive or disk slice that needs maintenance on a separate sheet of paper.

3 Type **exit** and then press Enter to exit from the DNCS shell.

**What Is the Status of the Mirrored Disk Drives?**

After using the check_metadevices command to examine the status of mirrored disk drives, the following scenarios could occur:

- If one slice of the disk needs maintenance, resync the disk slice. Go to **Resync the Disk Drive** (on page 7).

- If you have errors on multiple slices per disk, complete the following steps to verify the disk drive status.
  
  a Go back to **Verify Disk Drive Status** (on page 2) and run the luxadm probe command again.

  b Choose one of the following options based on the luxadm probe command results:

    - If this command does not show a disk drive problem, contact Cisco Services for assistance.

    - If this command shows login failed [drive name], you must replace the disk drive. Go to **Remove a Hard Disk Drive (6-Disk Setup)** (on page 9).

**Important:** If maintenance is required on drives that are mirrors of each other, such as c1t2d0s7 and c2t5d0s0, contact Cisco Services.
Resync the Disk Drive

After examining the mirrored devices, when one disk slice needs maintenance, you must resync the disk drive. The resync process could take from a half-hour to 7 hours to complete, based on your system.

Complete these steps to resync the disk drive.

**Note:** If you have been following the procedures in this chapter in order, you should still be logged in to an xterm window as root user.

1. Using the disk slice you recorded in *Examining the Mirrored Devices* (on page 5), type the following command and press **Enter**.

   ```bash
   metastat d[disk slice]
   ```

   **Example:** `metastat d520`

   **Result:** The submirrors of d520 are listed.

   ```
   d520: Mirror
   Submirror 0: d420
   State: Needs maintenance
   Submirror 1: d720
   State: Okay
   Pass: 1
   Read option: roundrobin (default)
   Write option: parallel (default)
   Size: 125256384 blocks
   
   d420: Submirror of d520
   State: Needs maintenance
   Invoke: metareplace d520 c1t2d0s0 <new device>
   Size: 125256384 blocks
   Stripe 0:
   Device    Start Block  Dbase State        Hot Spare
   c1t2d0s0          0     No    Maintenance
   
   d720: Submirror of d520
   State: Okay
   Size: 125256384 blocks
   Stripe 0:
   Device    Start Block  Dbase State        Hot Spare
   c2t5d0s0          0     No    Okay
   ```

**Notes:**

- In this example, notice the state of Submirror 1: d420 is **Needs Maintenance**. This indicates that d420 is the submirror of d520 that requires maintenance.
Also in this example, notice that the Device assignment for d420 is **c1t2d0s0**. You will use this value when you perform the meta replace command in the next step.

- Refer to the **V880/V890 6-Disk Device Assignments** (on page 22) table for more information.

2 Locate the disk slice in the **V880/V890 Meta Replace Commands** (on page 23) table and type the meta replace command for the disk slice.

**Example:** In the previous example, the device assignment for d420 is c1t2d0s0. Type the following to resync the disk drive:

```bash
grep -e d520 c1t2d0s0
```

**Important:** Type the meta replace command that affects the specific disk slice, only.

**Result:** You return to a prompt, and the orange banner window shows the disk drive is resyncing.

3 After you resync the drive, go back to the **Examining the Mirrored Devices** (on page 5) procedure and re-examine the mirrored devices using the check metadevices tool.

4 Did the metadevice tool indicate that the disk slice needs maintenance?

- If **yes**, you must replace the disk drive. Go to **Remove a Hard Disk Drive (6-Disk Setup)** (on page 9).

- If **no**, you do not need to replace the disk drive. However, keep a written record of the disk slice on which you performed the meta replace command. If a problem continues to occur with the same disk slice, you may consider replacing the disk drive. No further action is required. You may stop reading this guide.
Remove a Hard Disk Drive (6-Disk Setup)

Finding a Meta Database

After examining the mirrored disk drives and determining that multiple portions of a disk drive are inaccessible, you must remove the hard disk drive. Before you can remove the drive, use the metadb utility to determine if the drive in question has a metadevice.

**Important:** The V880/V890 6-disk setup has meta databases on all six disk drives.

**Note:** For more information about metadevice assignments, refer to the V880/V890 6-Disk Device Assignments (on page 22) table.

Complete these steps using the metadb utility to determine if a meta database is located on the disk drive.

1. Type the following command and press **Enter** to display the status of the disk drive:
   ```
   metadb -i
   ```

   **Example:** Sample output follows:

   ```
   flags           first blk    block count
   a m  p  luo     16           1034
   /dev/dsk/c1t0d0s7
   a    p  luo     16           1034
   /dev/dsk/c1t1d0s7
   a R  p  luo     16           1034
   /dev/dsk/c1t2d0s7
   a    p  luo     16           1034
   /dev/dsk/c2t3d0s7
   a    p  luo     16           1034
   /dev/dsk/c2t4d0s7
   a    p  luo     16           1034
   /dev/dsk/c2t5d0s7
   o - replica active prior to last mddb configuration change
   u - replica is up to date
   l - locator for this replica was read successfully
   c - replica's location was in /etc/lvm/mddb.cf
   p - replica's location was patched in kernel
   m - replica is master, this is replica selected as input
   W - replica has device write errors
   a - replica is active, commits are occurring to this replica
   M - replica had problem with master blocks
   ```
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>replica had problem with data blocks</td>
</tr>
<tr>
<td>F</td>
<td>replica had format problems</td>
</tr>
<tr>
<td>S</td>
<td>replica is too small to hold current database</td>
</tr>
<tr>
<td>R</td>
<td>replica had device read errors</td>
</tr>
</tbody>
</table>
2 Notice the drive flagged with a capital letter. This indicates which meta database has an error.

Example: In this example, c1t2d0s7 is the drive with the meta database error.

3 Refer to the V880/V890 6-Disk Diagram and Configuration Table (on page 22) to verify the slot number matches the drive with the meta database error.

Example: Using the configuration table, the drive /dev/disk/c1t2d0s7 is located in physical slot 2.

4 Based upon the information in the V880/V890 6-Disk Diagram and Configuration Table, did the meta database match the slot number of the hard disk drive?
   - If yes, you must delete the meta database from the hard disk drive prior to removing the drive. Go to Deleting a Meta Database (on page 11).
   - If no, contact Cisco Services for assistance.

Deleting a Meta Database

Complete these steps to delete a meta database on the hard disk drive.

Note: If you have been following the procedures in this chapter in order, you should still be logged in to an xterm window as root user.

1 Type the following command and press Enter:
   metadb -d [device name]
   Example: metadb -d c1t2d0s7
   Result: The meta database is deleted from the disk drive.
   Note: Write the device name that you delete on a separate piece of paper. You will use this name when you add a meta database to the disk drive, later in this chapter.

2 Before you physically remove the hard disk drive, you must put the drive into an offline state. Go to Putting a Hard Disk Drive Into an Offline State (on page 11).
Putting a Hard Disk Drive Into an Offline State

When the status of the disk drive is anything other than not installed, you must put the drive into the offline state.

Complete these steps to put the disk drive into the offline state.

**Note:** If you have been following the procedures in this chapter in order, you should still be logged in to an xterm window as root user.

1. Before you remove the drive, Cisco highly recommends that you have a recent backup of the drive data. Refer to your backup and restore guide for backup procedures.

   **Note:** Refer to the V880/V890 6-Disk Diagram and Configuration Table (on page 22) to determine the disk role for the drive you are removing.

   **Examples:**
   - An error was found on drive c1t0d0s7. Based on the information in the 6-Disk configuration table, the role of drive c1t0d0s7 is /disk1, meaning it has a file system role. Because a file system contains the Cisco software, you would perform a file system backup.
   - If an error is found on a drive with a role of DB, this means that a drive with an Informix database role has an error. You would perform a database backup on the drive.

2. After backing up the drive data, type the following command and press Enter:

   luxadm remove_device [enclosure name],[slot]

   Example: luxadm remove_device FCloop,s2

   **Result:** A warning message appears prompting you to be sure all data on the disk drive is backed up.

   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 being used (either busy or reserved) by the host:

   1: Box Name:    "FCloop"  slot 2

   Please enter 's' or <CR> to Skip the "busy/reserved" device(s) or
   'q' to Quit and run the subcommand with
   -F (force) option. [Default: s]: q

3. Type q to quit and then press Enter.
4 Type the following command and press **Enter**:

```
luxadm remove_device -F [enclosure name],[slot]
```

**Example:** `luxadm remove_device -F FCloop,s2`

**Result:** The WWN entries and device links are removed for the disk drive and you are prompted to verify the disk drive to remove.

**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: "FCloop" slot 2
   Node WWN: 20000002037ff9bee
   Device Type:Disk device
   Device Paths:
   /dev/rdsk/c1t2d0s7
   /dev/rdsk/c2t2d0s2

5 Press **Enter**. You are prompted to remove the disk drive.

```
Press Enter. You are prompted to remove the disk drive.
```

Please verify the above list of devices and then enter 'c' or <CR> to Continue or 'q' to Quit.
[Default: c]:

```
stopping: Drive in "FCloop" slot 2....Done
offlining: Drive in "FCloop" slot 2....Done
```

Hit <Return> after removing the device(s).

6 Press **Enter** again to quit.

7 Go to *Replace a Hard Disk Drive (6-Disk Setup)* (on page 13).
Replace a Hard Disk Drive (6-Disk Setup)

Installing a New Hard Disk

If you have any questions about the equipment, refer to your copy of the Owner’s Guide before proceeding with these instructions.

CAUTION:
Static sensitive device. Always wear a properly grounded wrist strap when working on this equipment. Failure to observe this caution may result in equipment damage or premature equipment failure.

Use the instructions in this section to install a new hard disk into your V880 or V890. Refer to the following illustration for guidance as you complete this procedure.

Note: Use only Sun Microsystems Inc. (Sun) internal 72 GB, 10000 RPM, 1-in. high, UltraSCSI disk drives (Sun part number 5234A).

1. Swing open the disk drive bay door on the front of the V880/V890. Three columns of internal drive bays are exposed.

2. Remove the new hard disk from its protective packaging.

3. Slide the thumb latch UP on the old hard disk. The silver drive handle on the hard disk swings down.
4 Holding the silver drive handle, remove the old hard disk from the drive bay.

5 Complete the following steps to install the new hard disk.
   a Orient the new hard disk so that the silver drive handle is on the bottom.
   b Using the drive bay guide rails, slide the new disk drive halfway into the drive bay.
      Important: Do not slide the new disk drive completely into the drive bay at this time. You must put the new drive in the online state first before you can complete the disk installation.
      Note: In the event that the new disk drive arrives without guide rails, attach the guide rails from the old disk drive to the new disk drive.

6 Go to Putting the New Disk Drive Into an Online State (on page 16).

Putting the New Disk Drive Into an Online State

Before you can complete the new disk drive installation, you have to put the new disk drive into an online state.

Complete these steps to put the new disk drive in the online state.

Note: If you have been following the procedures in this chapter in order, you should still be logged in to an xterm window as root user.

1 Type the following command and press Enter:
   luxadm insert_device

2 Press Enter again.

3 Complete the following steps to install the new hard disk.
   a Slide the hard disk completely into the drive bay and seat it securely against the back plane of the server.
   b Swing the silver drive handle closed until it latches.
      Note: When you latch the silver drive handle, it engages the hard disk with its back plane connector.

4 Is the green LED for the newly installed hard disk illuminated?
If yes, you have installed the hard disk correctly. Go to step 5.
If no, contact Cisco Services for help with troubleshooting the hard disk installation.

5 Close the drive bay door on the front of the server.
6 Press Enter. The computer incorporates the new disk drive into the operating system.

Note: This process takes a couple of minutes to complete.
Replace a Disk Drive on a Sun Fire V880 and V890 Server

7 Type the following command and press Enter:

```
luxadm display [enclosure name]
```

**Example:** `luxadm display FCloop`

**Result:** The disk status appears.

```
SUNWGS INT FCBPL

DISK STATUS

SLOT  DISKS             (Node WWN)
0      On (O.K.)         2000002037f87099
1      On (O.K.)         2000002037f39796
2      On (Login ok)
3      On (O.K.)         2000002037ffab19
4      On (O.K.)         2000002037ff9ca5
5      On (O.K.)         2000002037ffa3c8
6      Not Installed
7      Not Installed
8      Not Installed
9      Not Installed
10     Not Installed
11     Not Installed

SUBSYSTEM STATUS

FW Revision:9218   Box ID:0
Node WWN:508002000011d7d8   Enclosure Name:FCloop
SSC100's - 0=Base Bkpln, 1=Base LoopB, 2=Exp Bkpln, 3=Exp LoopB
SSC100 #0:    O.K.(11.A)
SSC100 #1:    O.K.(11.A)
SSC100 #2:    Not Installed
SSC100 #3:    Not Installed

Temperature Sensors - 0 Base, 1 Expansion
0:21ºC
1:Not Installed
```

**Note:** In this example, notice the status of slot 2 changed from **Login failed** to **Login ok**, indicating that Slot 2 is the disk drive that was replaced.

8 Does the system list slots 0 through 5?

- If **yes**, the system recognizes the newly installed hard disk; go to step 9.
- If **no**, contact Cisco Services for assistance.

9 Type the following command and press Enter:

```
prtvtoc /dev/rdsk/[device of drive mirror] > /tmp/[device of drive mirror].vtoc
```

**Example:** `prtvtoc /dev/rdsk/c2t5d0s2 > /tmp/c2t5d0.vtoc`
Note: Refer to the V880/V890 6-Disk Diagram and Configuration Table (on page 22) to determine the drive mirror. For example, c2t5 is mirrored to c1t2.

Result: The mirrored drive format is copied to use on the new drive.
10 Type the following command and press Enter:
   `fmthard -s /tmp/[mirrored device name].vtoc /dev/rdsk/[device name of replaced drive]`
   
   **Example:** `fmthard -s /tmp/c2t5d0.vtoc /dev/rdsk/c1t2d0s2`
   
   **Result:** The replacement hard disk is formatted. The replacement hard disk is c1t2d0s2.
   
   **Note:** If formatting the hard drive is unsuccessful, contact Cisco Services.

11 Go to *Add a Meta Database to the New Drive (6-Disk Setup)* (on page 20).

---

**Add a Meta Database to the New Drive (6-Disk Setup)**

**Adding a Meta Database to the Disk Drive**

A V880 or a V890 server with a 6-disk setup utilizes meta databases on each disk drive. Because the defective drive has a meta database, you must add a meta database to the new drive. Use the following instructions to add a meta database to the new disk drive.

**Note:** If you have been following the procedures in this chapter in order, you should still be logged in to an xterm window as root user.

1 Type the following command and press Enter:
   `metadb -a [new disk drive]`
   
   **Example:** `metadb -a c1t2d0s7`
   
   **Note:** The new disk drive name is the device name that you recorded on a separate piece of paper during the *Deleting a Meta Database* (on page 11) procedure.
   
   **Result:** The meta database is added to the new disk drive.

2 Go to *Using the Meta Replace Utility to Resynchronize Mirrors* (on page 20).

---

**Using the Meta Replace Utility to Resynchronize Mirrors**

Use the following instructions to resynchronize the mirrors on the new disk drive.

**Note:** This step could take from 1 to 7 hours to complete, based on your system.

1 Type the following command and press Enter:
   `metareplace -e [mirror device] [disk device]`
   
   **Example:** `metareplace -e d520 c1t2d0s0`
   
   **Result:** The mirrors on the new disk drive are synchronized.
   
   **Important:** You must run the `metareplace -e` command for every disk slice on the disk drive that you replaced. Refer to the *V880/V890 Meta Replace Commands* (on page 23) table to determine the `metareplace -e` commands you
must run.

2 Go to Using the Meta Check Utility to Monitor Disk Activity (on page 21).

Using the Meta Check Utility to Monitor Disk Activity
Performing a meta replace results in extensive disk activity. After you resynchronize the mirrors, run the check_metadevices command to monitor the disk activity.

Note: The check_metadevices utility automatically runs upon reload of the DBDS.
Go to Install a Boot Block on a Mirrored Disk Drive (6-Disk Setup) (on page 21).

Install a Boot Block on a Mirrored Disk Drive (6-Disk Setup)

Installing a Boot Block on a Mirrored Disk Drive
If the replaced disk is an OS disk, you must install a boot block on the hard drive to make the hard drive bootable.

Note: A boot block is a portion of computer code that makes the hard drive on which it is installed able to start itself.

Use the following instructions to install a boot block on a mirrored disk drive of the V880 or V890 server. You should still be logged in to an xterm window as root user.

1 Type the following command and press Enter:

```
installboot /usr/platform/sun4u/lib/fs/ufs/bootblk /dev/rdsk/[replaced drive device name]
```

Example: `installboot /usr/platform/sun4u/lib/fs/ufs/bootblk /dev/rdsk/c1t0d0s0`

Result: The system installs the boot block on the replaced disk drive.

2 Type exit and then press Enter to log out the root user.
V880/V890 6-Disk Configuration Details

V880/V890 6-Disk Diagram and Configuration Table

The following diagram and table describe the configuration of a 6-disk V880/V890.

![Diagram of V880/V890 6-Disk Configuration]

<table>
<thead>
<tr>
<th>Physical Slot #</th>
<th>Devices Enclosure, Slot #</th>
<th>MetaDB Location</th>
<th>*Disk Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>c1t0</td>
<td>c1t0d0s7</td>
<td>OS</td>
</tr>
<tr>
<td></td>
<td>c2t0</td>
<td>c1t2d0s7</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>c1t1</td>
<td>c1t1d0s7</td>
<td>/disk1</td>
</tr>
<tr>
<td></td>
<td>c2t1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>c1t2</td>
<td>c1t2d0s7</td>
<td>DB</td>
</tr>
<tr>
<td></td>
<td>c2t2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>c1t3</td>
<td>c2t3d0s7</td>
<td>OS</td>
</tr>
<tr>
<td></td>
<td>c2t3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>c1t4</td>
<td>c2t4d0s7</td>
<td>/disk1</td>
</tr>
<tr>
<td></td>
<td>c2t4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>c1t5</td>
<td>c2t5d0s7</td>
<td>DB</td>
</tr>
<tr>
<td></td>
<td>c2t5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- In the diagram, arrows indicate the mirrored disks (0 to 3, 1 to 4, and 2 to 5).
- *Disk Role:
  - OS is the Solaris operating system drive
  - /disk is file system containing the Cisco software
  - DB is the Informix database drive

V880/V890 6-Disk Device Assignments

The following table describes the metadevice assignments to the physical disk devices for the 6-disk V880 or V890 server. This information is provided as a reference tool for understanding the disk slice assignments.

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Metadevice</th>
<th>Submirrors</th>
<th>Physical Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>/</td>
<td>d500</td>
<td>d400</td>
<td>c1t0d0s0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d700</td>
<td>c2t3d0s0</td>
</tr>
<tr>
<td>swap</td>
<td>d501</td>
<td>d401</td>
<td>c1t0d0s1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d701</td>
<td>c2t3d0s1</td>
</tr>
<tr>
<td>/var</td>
<td>d503</td>
<td>d403</td>
<td>c1t0d0s3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d703</td>
<td>c2t3d0s3</td>
</tr>
</tbody>
</table>
### 6-Disk Configuration

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Metadevice</th>
<th>Submirrors</th>
<th>Physical Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>/export/home</td>
<td>d507</td>
<td>d407, d707</td>
<td>c1t0d0s5, c2t3d0s5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/disk1</td>
<td>d510</td>
<td>d410, d710</td>
<td>c1t1d0s0, c2t4d0s0</td>
</tr>
<tr>
<td>soft partitions</td>
<td>d520</td>
<td>d420, d720</td>
<td>c1t2d0s0, c2t5d0s0</td>
</tr>
</tbody>
</table>

### V880/V890 Meta Replace Commands

The following table contains the metareplace -e commands for each disk slice on the 6-disk V880 or V890 server. Use the information in this table when performing the procedure to resynchronize mirrors (see Using the Meta Replace Utility to Resynchronize Mirrors (on page 20)).

**Important:** You must run the metareplace -e command for every disk slice on the disk drive that you replaced.

<table>
<thead>
<tr>
<th>Disk Replaced</th>
<th>Meta Replace Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot 0</td>
<td>metareplace -e d500 c1t0d0s0</td>
</tr>
<tr>
<td></td>
<td>metareplace -e d501 c1t0d0s1</td>
</tr>
<tr>
<td></td>
<td>metareplace -e d503 c1t0d0s3</td>
</tr>
<tr>
<td></td>
<td>metareplace -e d507 c1t0d0s5</td>
</tr>
<tr>
<td>Slot 1</td>
<td>metareplace -e d510 c1t1d0s0</td>
</tr>
<tr>
<td>Slot 2</td>
<td>metareplace -e d520 c1t2d0s0</td>
</tr>
<tr>
<td>Slot 3</td>
<td>metareplace -e d500 c2t3d0s0</td>
</tr>
<tr>
<td></td>
<td>metareplace -e d501 c2t3d0s1</td>
</tr>
<tr>
<td></td>
<td>metareplace -e d503 c2t3d0s3</td>
</tr>
<tr>
<td></td>
<td>metareplace -e d507 c2t3d0s5</td>
</tr>
<tr>
<td>Slot 4</td>
<td>metareplace -e d510 c2t4d0s0</td>
</tr>
<tr>
<td>Slot 5</td>
<td>metareplace -e d520 c2t5d0s0</td>
</tr>
</tbody>
</table>
12-Disk Configuration

V880/V890 Hardware (12-Disk Configuration)

Hard Disk Layout

Depending on your system, the V880/V890 is configured with either 6 or 12 disk drives.

The following illustration shows the front view of the 12-disk V880 and V890 server layout.

Verify Disk Drive Status (12-Disk Setup)

If a disk problem occurs on your V880 or V890 server, an orange banner with white text (banner window) appears on your console to alert you to the problem. Do not
close this window; the window disappears when the problem is resolved. The disk problem may be an event where one or all portions of a disk drive become inaccessible.

Should one or all portions of a disk drive become inaccessible, you must use the luxadm utility to accomplish the following steps:

- Verify the enclosure name assigned to the V880/V890 internal storage array
- Determine the status of the disk drive

**Note:** Cisco's default enclosure name is FCloop.

After using the luxadm utility, use the metadb utility to determine if a meta database is on the disk drive. If a meta database exists on the drive, you must delete the meta database *prior* to removing the disk drive.

**Finding the Enclosure Name**

Complete these steps to verify the enclosure name for the internal storage array using the luxadm probe command.

1. If necessary, open an xterm window on the V880 or V890 server.
2. Complete the following steps to log on to the xterm window as root user.
   a. Type `su -` and press Enter. The password prompt appears.
   b. Type the root password and press Enter.
3. Type the following command and then press Enter. The name of the enclosure appears.
   
   luxadm probe

**Example:** Sample output follows:

```
Found Enclosure:
SUNWGS INT FCBPL   Name:FCloop   Node WWN:508002000011d7d8
   Logical Path:/dev/es/ses0
   Logical Path:/dev/es/ses1
```

**Note:** FCloop is the enclosure name in this example.
Chapter 1  Replace a Disk Drive on a Sun Fire V880 and V890 Server

Determining the Status of the Disk Drive

Complete these steps to determine the disk drive status using the `luxadm display` command.

**Note:** If you have been following the procedures in this chapter in order, you should still be logged in to an xterm window as root user.

**1** Type the following command and press **Enter**:

```bash
luxadm display [enclosure name]
```

**Example:** `luxadm display FCloop`

**Result:** The disk status appears.

```
SUNWGS INT FCBPL

<table>
<thead>
<tr>
<th>SLOT</th>
<th>DISKS</th>
<th>(Node WWN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>On (O.K.)</td>
<td>2000002037ffa51d</td>
</tr>
<tr>
<td>1</td>
<td>On (O.K.)</td>
<td>2000002037ff9c4a</td>
</tr>
<tr>
<td>2</td>
<td>On (Login failed)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>On (O.K.)</td>
<td>2000002037ffab19</td>
</tr>
<tr>
<td>4</td>
<td>On (O.K.)</td>
<td>2000002037ff9ca5</td>
</tr>
<tr>
<td>5</td>
<td>On (O.K.)</td>
<td>2000002037ffa3c8</td>
</tr>
<tr>
<td>6</td>
<td>On (O.K.)</td>
<td>20000000870ebeda</td>
</tr>
<tr>
<td>7</td>
<td>On (O.K.)</td>
<td>20000000870f9e8f</td>
</tr>
<tr>
<td>8</td>
<td>On (O.K.)</td>
<td>20000000870f9d47</td>
</tr>
<tr>
<td>9</td>
<td>On (O.K.)</td>
<td>20000000870f9eb6</td>
</tr>
<tr>
<td>10</td>
<td>On (O.K.)</td>
<td>20000000870e3397</td>
</tr>
<tr>
<td>11</td>
<td>On (O.K.)</td>
<td>20000000870ea2ad</td>
</tr>
</tbody>
</table>

**SUBSYSTEM STATUS**

FW Revision:9226   Box ID:0

Node WWN:50800200001ac508   Enclosure Name:FCloop

SSC100's - 0=Base Bkpln, 1=Base LoopB, 2=Exp Bkpln, 3=Exp LoopB

SSC100 #0:   O.K.(9226/ FD99)
SSC100 #1:   O.K.(9226/ FD99)
SSC100 #2:   O.K.(9226/ FD99)
SSC100 #3:   O.K.(9226/ FD99)

Temperature Sensors - 0 Base, 1 Expansion
0:26°C 1:24°C  (All temperatures are NORMAL.)

Default Language is USA English, ASCII

**Note:** In this example, notice the status of slot 2 is Login failed. This indicates that Slot 2 is the disk drive that needs to be replaced.

**Important:** The World Wide Name (WWN) is unique for each disk drive. Whenever you remove a drive and replace it, you get a new WWN value for the
new drive.

2 Go to *Examine Mirrored Devices (12-Disk Setup)* (on page 23).
Examine Mirrored Devices (12-Disk Setup)

The V880 and V890 servers support disk drive mirroring. Through disk mirroring, the DNCS stores identical information across sets of hard disks.

After using the **luxadm display** command to determine the drive status, use the **check_metadevices** command to determine if a single file system or multiple file systems have been affected.

The V880/V890 12-disk configuration has a total of six mirrored disk drives. The hard disks in drive bay 0 and drive bay 8 are mirrored, as are the hard disks in drive bay 1 and drive bay 9. The hard disks in drive bays 2, 3, 4, 5 and drive bays 10, 11, 12, 13, respectively, are also mirrored.

Before you disable the disk mirroring functions of the V880 or V890 server in preparation of replacing a disk drive, you should examine the status of the mirrored disks in the system. Examining the status of the mirrored devices also tells you if a specific disk slice needs maintenance.

**Examining the Mirrored Devices**

Complete these steps to examine the status of the mirrored disk drives on your DNCS using the **check_metadevices** command.

**Note:** If you have been following the procedures in this chapter in order, you should still be logged in to an xterm window as root user.

1. Type the following command and press **Enter**:
   ```
   su - dncs
   ```

2. Type the following command and press **Enter**. The metadevice tool examines the mirrored disk drives on your DNCS and indicates if a drive or a specific disk slice needs maintenance.
   ```
   /dvs/dncs/bin/check_metadevices
   ```

   **Example:** Sample output pertaining to when a disk slice needs maintenance follows:
   ```
   WARNING: d520 metadevice Needs maintenance
   Found Disk Problems at: Mon Jul 12 11:08:20 EDT 2004
   ```

   **Important:** Write the name of the disk drive or disk slice that needs maintenance on a separate sheet of paper.

3. Type **exit** and then press **Enter** to exit from the DNCS shell.
What Is the Status of the Mirrored Disk Drives?

After using the check_metadevices command to examine the status of mirrored disk drives, the following scenarios could occur:

- If one slice of the disk needs maintenance, resync the disk slice. Go to Resync the Disk Drive (on page 25).

- If you have errors on multiple slices per disk, complete the following steps to verify the disk drive status.
  a. Go back to Verify Disk Drive Status (12-Disk Setup) (on page 24) and run the luxadm probe command again.
  b. Choose one of the following options based on the results of the luxadm probe command:
     – If this command does not show a disk drive problem, contact Cisco Services for assistance.
     – If this command shows login failed <drive name>, you must replace the disk drive. Go to Remove a Hard Disk Drive (12-Disk Setup) (on page 27).

Important: If maintenance is required on drives that are mirrors of each other, such as c1t2d0s7 and c2t5d0s0, contact Cisco Services.
Resync the Disk Drive

After examining the mirrored devices, when one disk slice needs maintenance, you must resync the disk drive.

**Note:** The resync process could take from a half-hour to 7 hours to complete, based on your system.

Complete these steps to resync the disk drive.

1. Using the disk slice you recorded in the *Examining the Mirrored Devices* (on page 28) procedure, type the following command and press Enter:

   ```plaintext
   metastat d[disk slice]
   ```

   **Example:** `metastat d520`

   **Result:** The submirrors of d520 are listed.

   ```plaintext
   d520: Mirror
   Submirror 0: d420
      State: Needs maintenance
   Submirror 1: d720
      State: Okay
   Pass: 1
   Read option: roundrobin (default)
   Write option: parallel (default)
   Size: 125256384 blocks
   ```

   ```plaintext
   d420: Submirror of d520
      State: Needs maintenance
   Invoke: metareplace d520 c1t2d0s0 <new device>
   Size: 125256384 blocks
   Stripe 0:
      Device    Start Block  Dbase State        Hot Spare
      c1t2d0s0          0     No    Maintenance
   ```

   ```plaintext
   d720: Submirror of d520
      State: Okay
   Size: 125256384 blocks
   Stripe 0:
      Device    Start Block  Dbase State        Hot Spare
      c2t10d0s0          0     No    Okay
   ```

**Notes:**

- In this example, notice the state of Submirror 1: d420 is **Needs Maintenance**. This indicates that d420 is the submirror of d520 that requires maintenance.
- Also in this example, notice that the Device assignment for d420 is **c1t2d0s0**.
You will use this value when you perform the meta replace command in the next step.

- Refer to the V880/V890 12-Disk Device Assignments (on page 46) table for more information.

2 Locate the disk slice in the V880/V890 Meta Replace Commands (on page 47) table and type the meta replace command for the disk slice.

**Example:** In the previous example, the device assignment for d420 is c1t2d0s0. Type the following to resync the disk drive:

```bash
metareplace -e d520 c1t2d0s0
```

**Important:** Type the meta replace command that affects the specific disk slice, only.

**Result:** You return to a prompt, and the orange banner window shows the disk drive is resyncing.

3 After you resync the drive, go back to the Examining Mirrored Devices (on page 28) procedure and re-examine the mirrored devices using the check metadevices tool.

4 Did the metadevice tool indicate that the disk slice needs maintenance?

- If yes, you must replace the disk drive. Go to Remove a Hard Disk Drive (12-Disk Setup) (on page 27).

- If no, you do not need to replace the disk drive. However, keep a written record of the disk slice on which you performed the meta replace command. If a problem continues to occur with the same disk slice, you may consider replacing the disk drive. No further action is required. You may stop reading this guide.
Remove a Hard Disk Drive (12-Disk Setup)

Finding a Meta Database

After examining the mirrored disk drives and determining that multiple portions of a disk drive are inaccessible, you must remove the hard disk drive. Before you can remove the drive, use the `metadb` utility to determine if the drive in question has a metadevice.

**Note:** For more information about metadevice assignments, refer to the *V880/V890 12-Disk Device Assignments* (on page 46) table.

Complete these steps using the metadb utility to determine if a meta database is located on the disk drive. If you have been following the procedures in this chapter in order, you should still be logged in to an xterm window as root user.

1. Type the following command and press **Enter** to display the status of the disk drive:

   ```
   metadb -i
<table>
<thead>
<tr>
<th>flags</th>
<th>first blk</th>
<th>block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>a m p luo</td>
<td>16</td>
<td>1034</td>
</tr>
<tr>
<td>/dev/dsk/c1t0d0s7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a p luo</td>
<td>16</td>
<td>1034</td>
</tr>
<tr>
<td>/dev/dsk/c1t1d0s7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a R p luo</td>
<td>16</td>
<td>1034</td>
</tr>
<tr>
<td>/dev/dsk/c1t2d0s7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a p luo</td>
<td>16</td>
<td>1034</td>
</tr>
<tr>
<td>/dev/dsk/c2t8d0s7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a p luo</td>
<td>16</td>
<td>1034</td>
</tr>
<tr>
<td>/dev/dsk/c2t9d0s7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a p luo</td>
<td>16</td>
<td>1034</td>
</tr>
<tr>
<td>/dev/dsk/c2t10d0s7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
   o - replica active prior to last mddb configuration change
   u - replica is up to date
   l - locator for this replica was read successfully
   c - replica's location was in /etc/lvm/mddb.cf
   p - replica's location was patched in kernel
   m - replica is master, this is replica selected as input
   W - replica has device write errors
   a - replica is active, commits are occurring to this replica
   M - replica had problem with master blocks
   D - replica had problem with data blocks
   F - replica had format problems
   ```
S - replica is too small to hold current data base
R - replica had device read errors

2 The drive flag with a capital letter indicates which meta database file has an error. In this example, \texttt{c1t2d0s7} is the drive with the meta database error.

3 Refer to the \textit{V880/V890 12-Disk Diagram and Configuration Table} (on page 45) to verify the slot number matches the drive with the meta database error.

\textbf{Example:} Using the configuration table, the drive \texttt{/dev/disk/c1t2d0s7} is located in physical slot 2.

4 Based upon the information in the \textit{V880/V890 12-Disk Diagram and Configuration Table}, did the meta database match the slot number of the hard disk drive?
   - \textbf{If yes}, you must delete the meta database from the hard disk drive prior to removing the drive. Go to \textit{Deleting a Meta Database} (on page 33).
   - \textbf{If no}, contact Cisco Services for assistance.

\textbf{Deleting a Meta Database}

Complete these steps to delete a meta database on the hard disk drive.

\textbf{Note:} If you have been following the procedures in this chapter in order, you should still be logged in to an xterm window as root user.

1 Type the following command and press \texttt{Enter} to delete the meta database from the disk drive:

\texttt{metadb -d [device name]}

\textbf{Example:} \texttt{metadb -d c1t2d0s7}

\textbf{Note:} Write the device name that you delete on a separate piece of paper. You will use this name when you add a meta database to the disk drive, later in this chapter.

2 Before you physically remove the hard disk drive, you must put the drive into an offline state. Go to \textit{Putting a Hard Disk Drive Into an Offline State} (on page 29).
Chapter 1  Replace a Disk Drive on a Sun Fire V880 and V890 Server

Putting the Hard Disk Drive Into an Offline State

When the status of the disk drive is anything other than not installed, you must put the drive into the offline state.

Complete these steps to put the disk drive into the offline state.

Note: If you have been following the procedures in this chapter in order, you should still be logged in to an xterm window as root user.

1  Before you remove the drive, Cisco highly recommends that you have a recent backup of the drive data. Refer to your current backup and restore guide for backup procedures.

Note: Refer to the V880/V890 12-Disk Diagram and Configuration Table (on page 45) to determine the disk role for the drive you are removing.

Examples:

- An error was found on drive c1t0d0s7. Based on the information in the 12-Disk configuration table, the role of drive c1t0d0s7 is /disk1, meaning it has a file system role. Because a file system contains the Cisco software, you would perform a file system backup for this drive.

- If an error is found on a drive with a role of DB Stripe, this means that a drive with an Informix database role has an error. You would perform a database backup on the drive.

2  After backing up the drive data, type the following command and press Enter:

luxadm remove_device [enclosure name],[slot]

Example: luxadm remove_device FCloop,s2

Result: A warning message appears prompting you to be sure all data on the disk drive is backed up.

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 being used (either busy or reserved) by the host:

1: Box Name: "FCloop" slot 2

Please enter 's' or <CR> to Skip the "busy/reserved" device(s) or 'q' to Quit and run the subcommand with -F (force) option. [Default: s]: q

3  Type q to quit and then press Enter.
12-Disk Configuration
4 Type the following command and press Enter:

```
luxadm remove_device -F [enclosure name],[slot]
```

**Example:** `luxadm remove_device -F FCloop,s2`

**Result:** The WWN entries and device links are removed for the disk drive and you are prompted to verify the disk drive to remove.

**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: "FCloop" slot 2
   Node WWN: 2000002037ff9bee
   Device Type: Disk device
   Device Paths:
   /dev/rdsk/c1t2d0s7
   /dev/rdsk/c2t2d0s2

5 Press Enter. The system prompts you to remove the disk drive.

Please verify the above list of devices and then enter 'c' or <CR> to Continue or 'q' to Quit.

[Default: c]:

```
stopping: Drive in "FCloop" slot 2....Done
offlining: Drive in "FCloop" slot 2....Done
Hit <Return> after removing the device(s).
```

6 Press Enter again to quit.

7 Go to Replace a Hard Disk Drive (12-Disk Setup) (on page 31).
Replace a Hard Disk Drive (12-Disk Setup)

Installing a New Hard Disk

If you have any questions about the equipment, refer to your copy of the Sun Fire 880 Server Owner’s Guide or Sun Fire 890 Server Owner’s Guide before proceeding with these instructions.

CAUTION:
Static sensitive device. Always wear a properly grounded wrist strap when working on this equipment. Failure to observe this caution may result in equipment damage or premature equipment failure.

Use the instructions in this section to install a new hard disk into your V880/V890. Refer to the following illustration for guidance as you complete this procedure.

Note: Use only Sun Microsystems Inc. (Sun) internal 72 GB, 10000 RPM, 1-in. high, UltraSCSI disk drives (Sun part number 5234A).

1. Swing open the disk drive bay door on the front of the server. Three columns of internal drive bays are exposed.
2. Remove the new hard disk from its protective packaging.
3. Slide the thumb latch UP on the old hard disk. The silver drive handle on the hard disk swings down.
Chapter 1  Replace a Disk Drive on a Sun Fire V880 and V890 Server

4  Holding the silver drive handle, remove the old hard disk from the drive bay.

5  Complete the following steps to install the new hard disk.
   a  Orient the new hard disk so that the silver drive handle is on the bottom.
   b  Using the drive bay guide rails, slide the new disk drive halfway into the drive bay.

      Important: Do not slide the new disk drive completely into the drive bay at this time. You must put the new drive in the online state first before you can complete the disk installation.

      Note: In the event that the new disk drive arrives without guide rails, attach the guide rails from the old disk drive to the new disk drive.

6  Go to Putting the New Disk Drive Into an Online State (on page 38).

Putting the New Disk Drive Into an Online State

Before you can complete the new disk drive installation, you have to put the new disk drive into an online state.

Complete these steps to put the new disk drive in the online state.

Note: If you have been following the procedures in this chapter in order, you should still be logged in to an xterm window as root user.

1  Type the following command and press Enter:
   luxadm insert_device

2  Press Enter again.

3  Complete the following steps to install the new hard disk.
   a  Slide the hard disk completely into the drive bay and seat it securely against the back plane of the server.
   b  Swing the silver drive handle closed until it latches.

      Note: When you latch the silver drive handle, it engages the hard disk with its back plane connector.

4  Is the green LED for the newly installed hard disk illuminated?
- If yes, you have installed the hard disk correctly. Go to step 5.
- If no, contact Cisco Services for help with troubleshooting the hard disk installation.

5 Close the drive bay door on the front of the server.

6 Press Enter. The computer incorporates the new disk drive into the operating system.

Note: This process takes a couple of minutes to complete.


```
Chapter 1    Replace a Disk Drive on a Sun Fire V880 and V890 Server

7   Type the following command and press Enter:
luxadm display [enclosure name]

Example: luxadm display FCloop

Result: The disk status appears.

    SUNWGS INT FCBPL
    DISK STATUS

    SLOT  DISKS             (Node WWN)
    0     On (O.K.)         2000002037f87099
    1     On (O.K.)         2000002037f39796
    2     On (Login ok)
    3     On (O.K.)         2000002037ffab19
    4     On (O.K.)         2000002037ff9ca5
    5     On (O.K.)         2000002037ffa3c8
    6     On (O.K.)         20000000870ebeda
    7     On (O.K.)         200000008709f9e8f
    8     On (O.K.)         200000008709d47
    9     On (O.K.)         20000000870f9eb6
   10    On (O.K.)         20000000870f9d47
   11    On (O.K.)         20000000870ea2ad

    SUBSYSTEM STATUS
    FW Revision:9218   Box ID:0
    Node WWN:508002000011d7d8   Enclosure Name:FCloop
    SSC100's - 0=Base Bkpln, 1=Base LoopB, 2=Exp Bkpln, 3=Exp LoopB
    SSC100 #0:    O.K.(11.A)
    SSC100 #1:    O.K.(11.A)
    SSC100 #2:    Not Installed
    SSC100 #3:    Not Installed

    Temperature Sensors - 0 Base, 1 Expansion
    0:21ºC
    1:Not Installed

Note: In this example, notice the status of slot 2 changed from Login failed to Login ok, indicating that Slot 2 is the disk drive that was replaced.
```

8   Does the system list disks 0 through 11?

- If **yes**, the system recognizes the newly installed hard disk; go to step 9.
- If **no**, contact Cisco Services for assistance.
12-Disk Configuration
9 Type the following command and press Enter:

```
prtvtoc /dev/rdsk/<device of drive mirror> > /tmp/[device of drive mirror].vtoc
```

**Example:** `prtvtoc /dev/rdsk/c2t10d0s2 > /tmp/c2t10d0.vtoc`

**Note:** Refer to the V880/V890 12-Disk Diagram and Configuration Table (on page 45) to determine the drive mirror. For example, c2t9 is mirrored to c1t1.

**Result:** The mirrored drive format is copied to use on the new drive.

10 Type the following command and press Enter:

```
fmthard -s /tmp/[mirrored device name].vtoc /dev/rdsk/[device name of replaced drive]
```

**Example:** `fmthard -s /tmp/c2t10d0.vtoc /dev/rdsk/c1t2d0s2`

**Result:** The replacement hard disk is formatted. The replacement hard disk is c1t2d0s2.

**Note:** If formatting the hard drive is unsuccessful, contact Cisco Services.

11 Did the hard disk drive have a meta database?

- If **yes**, go to *Add a Meta Database to the New Drive (12-Disk Setup)* (on page 42).
- If **no**, go to the *Using the Meta Replace Utility to Resynchronize Mirrors* (on page 35).

### Add a Meta Database to the New Drive (12-Disk Setup)

A V880 or a V890 server with a 12-disk setup has meta databases in slot numbers 0, 1, 2, 6, 7, and 8, only. If the defective drive has a meta database, you must add a meta database to the new drive.

**Note:** If the new disk drive did not have a meta database, go to *Using the Meta Replace Utility to Resynchronize Mirrors* (on page 35).

#### Adding a Meta Database to the Disk Drive

Use the following instructions to add a meta database to the new disk drive.

**Note:** If you have been following the procedures in this chapter in order, you should still be logged in to an xterm window as root user.

1 Type the following command and press **Enter**:

```
metadb -a [new disk drive]
```

**Example:** `metadb -a c1t2d0s7`

**Note:** The new disk drive name is the device name that you recorded on a separate piece of paper during the *Deleting a Meta Database* (on page 33)
procedure.

Result: The meta database is added to the new disk drive.

2 Go to *Using the Meta Replace Utility to Resynchronize Mirrors* (on page 35).
Using the Meta Replace Utility to Resynchronize Mirrors

Use the following instructions to resynchronize the mirrors on the new disk drive.

**Note:** This step could take from 1 to 7 hours to complete, based on your system.

1. Type the following command and press **Enter**:
   
   ```bash
   metareplace -e [mirror device] [disk device]
   ```
   
   **Example:** `metareplace -e d520 c1t2d0s0`
   
   **Result:** The mirrors on the new disk drive are synchronized.

   **Important:** You must run the `metareplace -e` command for every disk slice on the disk drive that you replaced. Refer to the **V880/V890 Meta Replace Commands** (on page 47) table to determine the `metareplace -e` commands you must run.

2. Go to **Using the Meta Check Utility to Monitor Disk Activity** (on page 44).

Using the Meta Check Utility to Monitor Disk Activity

Performing a meta replace results in extensive disk activity. After you resynchronize the mirrors, perform `check_metadevices` to monitor the disk activity.

**Note:** The `check_metadevices` utility automatically runs upon reload of the DBDS.

Go to **Install a Boot Block on a Mirrored Disk Drive (12-Disk Setup)** (on page 44).

**Install a Boot Block on a Mirrored Disk Drive (12-Disk Setup)**

**Installing a Boot Block on a Mirrored Disk Drive**

If the replaced disk is an OS disk, you must install a boot block on the hard drive to make the hard drive bootable.

**Note:** A boot block is a portion of computer code that makes the hard drive on which it is installed able to start itself.

Use the following instructions to install a boot block on a mirrored disk drive of the V880 or V890 server. You should still be logged in to an xterm window as root user.

1. Type the following command and press **Enter**:
   
   ```bash
   installboot /usr/platform/sun4u/lib/fs/ufs/bootblk /dev/rdsk/[replaced drive device name]
   ```
   
   **Example:** `installboot /usr/platform/sun4u/lib/fs/ufs/bootblk /dev/rdsk/c1t0d0s0`
   
   **Result:** The system installs the boot block on the replaced disk drive.

2. Type **exit** and then press **Enter** to log out the root user.
## V880/V890 12-Disk Configuration Details

### V880/V890 12-Disk Diagram and Configuration Table

The following diagram and table describe the configuration of a 12-disk V880 and V890 server.

![Diagram of 12-disk configuration](image)

<table>
<thead>
<tr>
<th>Physical Slot #</th>
<th>Devices</th>
<th>Enclosure, Slot #</th>
<th>MetaDB Location</th>
<th>*Disk Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>c1t0</td>
<td>FCloop, s0</td>
<td>c1t0d0s7</td>
<td>OS</td>
</tr>
<tr>
<td></td>
<td>c2t0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>c1t1</td>
<td>FCloop, s1</td>
<td>c1t1d0s7</td>
<td>/disk1</td>
</tr>
<tr>
<td></td>
<td>c2t1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>c1t2</td>
<td>FCloop, s2</td>
<td>c1t2d0s7</td>
<td>DB Stripe</td>
</tr>
<tr>
<td></td>
<td>c2t2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>c1t3</td>
<td>FCloop, s3</td>
<td>N/A</td>
<td>DB Stripe</td>
</tr>
<tr>
<td></td>
<td>c2t3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>c1t4</td>
<td>FCloop, s4</td>
<td>N/A</td>
<td>DB Stripe</td>
</tr>
<tr>
<td></td>
<td>c2t4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>c1t5</td>
<td>FCloop, s5</td>
<td>N/A</td>
<td>DB Stripe</td>
</tr>
<tr>
<td></td>
<td>c2t5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>c1t8</td>
<td>FCloop, s6</td>
<td>c2t8d0s7</td>
<td>OS</td>
</tr>
<tr>
<td></td>
<td>c2t8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>c1t9</td>
<td>FCloop, s7</td>
<td>c2t9d0s7</td>
<td>/disk1</td>
</tr>
<tr>
<td></td>
<td>c2t9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>c1t10</td>
<td>FCloop, s8</td>
<td>c2t10d0s7</td>
<td>DB Stripe</td>
</tr>
<tr>
<td></td>
<td>c2t10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>c1t11</td>
<td>FCloop, s9</td>
<td>N/A</td>
<td>DB Stripe</td>
</tr>
<tr>
<td></td>
<td>c2t11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>c1t12</td>
<td>FCloop, s10</td>
<td>N/A</td>
<td>DB Stripe</td>
</tr>
<tr>
<td></td>
<td>c2t12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>c1t13</td>
<td>FCloop, s11</td>
<td>N/A</td>
<td>DB Stripe</td>
</tr>
<tr>
<td></td>
<td>c2t13</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

- In the diagram, arrows indicate the mirrored disks (0 to 8, 1 to 9, and 2, 3, 4, 5 to 10, 11, 12, 13).

- *Disk Role:
  - **OS** is the Solaris operating system drive
  - **/disk** 1 is file system containing the Cisco software
- **DB Stripe** is one of four disks that makeup the Informix database

### V880/V890 12-Disk Device Assignments

The following table describes the metadevice assignments to the physical disk devices for the 12-disk V880/V890. This information is provided as a reference tool for understanding the disk slice assignments.

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Metadevice</th>
<th>Submirrors</th>
<th>Physical Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>/</td>
<td>d500</td>
<td>d400</td>
<td>c1t0d0s0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d700</td>
<td>c2t0d0s0</td>
</tr>
<tr>
<td>swap</td>
<td>d501</td>
<td>d401</td>
<td>c1t0d0s1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d701</td>
<td>c2t0d0s1</td>
</tr>
<tr>
<td>/var</td>
<td>d503</td>
<td>d403</td>
<td>c1t0d0s3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d703</td>
<td>c2t0d0s3</td>
</tr>
<tr>
<td>/export/home</td>
<td>d507</td>
<td>d407</td>
<td>c1t0d0s5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d707</td>
<td>c2t0d0s5</td>
</tr>
<tr>
<td>/disk1</td>
<td>d510</td>
<td>d410</td>
<td>c1t1d0s0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d710</td>
<td>c2t1d0s0</td>
</tr>
<tr>
<td>soft partitions</td>
<td>d520</td>
<td>d420</td>
<td>c1t2d0s0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>c1t3d0s0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>c1t4d0s0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>c1t5d0s0</td>
</tr>
<tr>
<td></td>
<td>d720</td>
<td>c2t10d0s0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>c2t11d0s0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>c2t12d0s0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>c2t13d0s0</td>
<td></td>
</tr>
</tbody>
</table>
**V880/V890 Meta Replace Commands**

The following table contains the `metareplace -e` commands for each disk slice on the 12-disk V880 or V890 server. Use the information in this table when performing the resynchronize mirrors procedure. See Using the Meta Replace Utility to Resynchronize Mirrors (on page 35) for details.

**Important:** You must run the `metareplace -e` command for *every* disk slice on the disk drive that you replaced.

<table>
<thead>
<tr>
<th>Disk Replaced</th>
<th>Meta Replace Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot 0</td>
<td><code>metareplace -e d500 c1t0d0s0</code></td>
</tr>
<tr>
<td></td>
<td><code>metareplace -e d501 c1t0d0s1</code></td>
</tr>
<tr>
<td></td>
<td><code>metareplace -e d503 c1t0d0s3</code></td>
</tr>
<tr>
<td></td>
<td><code>metareplace -e d507 c1t0d0s5</code></td>
</tr>
<tr>
<td>Slot 1</td>
<td><code>metareplace -e d510 c1t1d0s0</code></td>
</tr>
<tr>
<td>Slot 2</td>
<td><code>metareplace -e d520 c1t2d0s0</code></td>
</tr>
<tr>
<td>Slot 3</td>
<td><code>metareplace -e d520 c1t3d0s0</code></td>
</tr>
<tr>
<td>Slot 4</td>
<td><code>metareplace -e d520 c1t4d0s0</code></td>
</tr>
<tr>
<td>Slot 5</td>
<td><code>metareplace -e d520 c1t5d0s0</code></td>
</tr>
<tr>
<td>Slot 6</td>
<td><code>metareplace -e d500 c2t8d0s0</code></td>
</tr>
<tr>
<td></td>
<td><code>metareplace -e d501 c2t8d0s1</code></td>
</tr>
<tr>
<td></td>
<td><code>metareplace -e d503 c2t8d0s3</code></td>
</tr>
<tr>
<td></td>
<td><code>metareplace -e d507 c2t8d0s5</code></td>
</tr>
<tr>
<td>Slot 7</td>
<td><code>metareplace -e d510 c2t9d0s0</code></td>
</tr>
<tr>
<td>Slot 8</td>
<td><code>metareplace -e d520 c2t10d0s0</code></td>
</tr>
<tr>
<td>Slot 9</td>
<td><code>metareplace -e d520 c2t11d0s0</code></td>
</tr>
<tr>
<td>Slot 10</td>
<td><code>metareplace -e d520 c2t12d0s0</code></td>
</tr>
<tr>
<td>Slot 11</td>
<td><code>metareplace -e d520 c2t13d0s0</code></td>
</tr>
</tbody>
</table>
Introduction

This chapter provides instructions for removing and replacing a hard disk drive on the Sun Fire V445 server.

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- Verify Disk Drive Status ......................................................... 51
- Prepare to Replace the Hard Drive ......................................... 62
- Avoid Electrostatic Discharge ............................................... 65
- Remove the Hard Drive ......................................................... 66
- Install the Hard Drive ............................................................ 68
- Reconnect the New Hard Drive ............................................. 69
### Hard Disk Layout

Depending on your system, the Sun Fire V445 server is configured with either 4 or 8 disk drives. For the purpose of this document, the logical drive layout on the 4-disk and 8-disk systems are the same with the following exception: slots 2, 3, 6, and 7 on the 8-disk server are used as extra storage for database slices.

<table>
<thead>
<tr>
<th>Physical Slot</th>
<th>Device</th>
<th>metadb</th>
<th>Disk Role</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>c1t0</td>
<td>c1t0d0s4</td>
<td>OS</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>c1t1</td>
<td>c1t1d0s4</td>
<td>DB</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>c1t2</td>
<td>c1t2d0s4</td>
<td>DB</td>
<td>8-disk configuration only</td>
</tr>
<tr>
<td>3</td>
<td>c1t3</td>
<td>c1t3d0s4</td>
<td>DB</td>
<td>8-disk configuration only</td>
</tr>
<tr>
<td>4</td>
<td>c1t4</td>
<td>c1t4d0s4</td>
<td>OS</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>c1t5</td>
<td>c1t5d0s4</td>
<td>DB</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>c1t6</td>
<td>c1t6d0s4</td>
<td>DB</td>
<td>8-disk configuration only</td>
</tr>
<tr>
<td>7</td>
<td>c1t7</td>
<td>c1t7d0s4</td>
<td>DB</td>
<td>8-disk configuration only</td>
</tr>
</tbody>
</table>
Verify Disk Drive Status

Follow these instructions to determine whether one or more metadevices have failed on the system.

1. If necessary, open an xterm window on the DNCS.
2. Type the following command and press Enter.
   
   ```
   metastat
   ```

   **Result:** Lengthy output, similar to the following, appears. As you examine the output, notice devices that have a **State** of **Needs maintenance**.

   ```
   d510: Mirror
   Submirror 0: d410
     State: Okay
   Submirror 1: d710
     State: Needs maintenance
   Pass: 1
   Read option: roundrobin (default)
   Write option: parallel (default)
   Size: 50340672 blocks (24 GB)
   d410: Submirror of d510
   State: Okay
   Size: 50340672 blocks (24 GB)
   Stripe 0:
     Device     Start Block  Dbase        State Reloc Hot Spare
     clt0d0s5          0     No            Okay   Yes
   d710: Submirror of d510
   State: Needs maintenance
   Invoke: metareplace d510 clt4d0s5 <new device>
   Size: 50340672 blocks (24 GB)
   Stripe 0:
     Device     Start Block  Dbase        State Reloc Hot Spare
     clt4d0s5          0     No     Maintenance   Yes
   d507: Mirror
   Submirror 0: d407
     State: Okay
   Submirror 1: d707
     State: Needs maintenance
   Pass: 1
   Read option: roundrobin (default)
   Write option: parallel (default)
   Size: 16780224 blocks (8.0 GB)
   d407: Submirror of d507
   State: Okay
   ```
### Size: 16780224 blocks (8.0 GB)

### Stripe 0:

<table>
<thead>
<tr>
<th>Device</th>
<th>Start Block</th>
<th>Dbase</th>
<th>State</th>
<th>Reloc</th>
<th>Hot Spare</th>
</tr>
</thead>
<tbody>
<tr>
<td>clt0d0s7</td>
<td>0</td>
<td>No</td>
<td>Okay</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>
Verify Disk Drive Status

<table>
<thead>
<tr>
<th>d707: Submirror of d507</th>
</tr>
</thead>
<tbody>
<tr>
<td>State: Needs maintenance</td>
</tr>
<tr>
<td>Invoke: metareplace d507 clt4d0s7 &lt;new device&gt;</td>
</tr>
<tr>
<td>Size: 16780224 blocks (8.0 GB)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stripe 0:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device</td>
</tr>
<tr>
<td>clt4d0s7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>d503: Mirror</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submirror 0: d403</td>
</tr>
<tr>
<td>State: Okay</td>
</tr>
<tr>
<td>Submirror 1: d703</td>
</tr>
<tr>
<td>State: Needs maintenance</td>
</tr>
<tr>
<td>Pass: 1</td>
</tr>
<tr>
<td>Read option: roundrobin (default)</td>
</tr>
<tr>
<td>Write option: parallel (default)</td>
</tr>
<tr>
<td>Size: 16780224 blocks (8.0 GB)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>d403: Submirror of d503</th>
</tr>
</thead>
<tbody>
<tr>
<td>State: Okay</td>
</tr>
<tr>
<td>Size: 16780224 blocks (8.0 GB)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stripe 0:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device</td>
</tr>
<tr>
<td>clt0d0s3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>d703: Submirror of d503</th>
</tr>
</thead>
<tbody>
<tr>
<td>State: Needs maintenance</td>
</tr>
<tr>
<td>Invoke: metareplace d503 clt4d0s3 &lt;new device&gt;</td>
</tr>
<tr>
<td>Size: 16780224 blocks (8.0 GB)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stripe 0:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device</td>
</tr>
<tr>
<td>clt4d0s3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>d501: Mirror</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submirror 0: d401</td>
</tr>
<tr>
<td>State: Okay</td>
</tr>
<tr>
<td>Submirror 1: d701</td>
</tr>
<tr>
<td>State: Needs maintenance</td>
</tr>
<tr>
<td>Pass: 1</td>
</tr>
<tr>
<td>Read option: roundrobin (default)</td>
</tr>
<tr>
<td>Write option: parallel (default)</td>
</tr>
<tr>
<td>Size: 16780224 blocks (8.0 GB)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>d401: Submirror of d501</th>
</tr>
</thead>
<tbody>
<tr>
<td>State: Okay</td>
</tr>
<tr>
<td>Size: 16780224 blocks (8.0 GB)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stripe 0:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device</td>
</tr>
<tr>
<td>clt0d0s1</td>
</tr>
</tbody>
</table>
d701: Submirror of d501
State: Needs maintenance
Invoke: metareplace d501 clt4d0s1 <new device>
Size: 16780224 blocks (8.0 GB)

<table>
<thead>
<tr>
<th>Stripe 0:</th>
<th>Device</th>
<th>Start Block</th>
<th>Dbase</th>
<th>State</th>
<th>Reloc</th>
<th>Hot Spare</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>clt4d0s1</td>
<td>0</td>
<td>No</td>
<td>Maintenance</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>
d500: Mirror
Submirror 0: d400
  State: Okay
Submirror 1: d700
  State: Needs maintenance
Pass: 1
Read option: roundrobin (default)
Write option: parallel (default)
Size: 16780224 blocks (8.0 GB)
d400: Submirror of d500
  State: Okay
Size: 16780224 blocks (8.0 GB)
Stripe 0:
  Device     Start Block  Dbase        State Reloc Hot Spare
  clt0d0s0      0     No            Okay   Yes
d700: Submirror of d500
  State: Needs maintenance
Invoke: metareplace d500 clt4d0s0 <new device>
Size: 16780224 blocks (8.0 GB)
Stripe 0:
  Device     Start Block  Dbase        State Reloc Hot Spare
  clt4d0s0      0     No     Maintenance   Yes
d367: Soft Partition
  Device: d520
  State: Okay
Size: 4194304 blocks (2.0 GB)
  Extent              Start Block              Block count
  0                 71313920                  4194304
d520: Mirror
Submirror 0: d420
  State: Okay
Submirror 1: d720
  State: Okay
Pass: 1
Read option: roundrobin (default)
Write option: parallel (default)
Size: 402603264 blocks (191 GB)
d420: Submirror of d520
  State: Okay
Size: 402603264 blocks (191 GB)
Stripe 0: (interlace: 32 blocks)
  Device     Start Block  Dbase        State Reloc Hot Spare
  clt1d0s0      0     No            Okay   Yes
  clt2d0s0    10176     No            Okay   Yes
## Replace a Disk Drive on a Sun Fire V445 Server

<table>
<thead>
<tr>
<th>Drive</th>
<th>Time (ms)</th>
<th>Status</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>clt3d0s0</td>
<td>10176</td>
<td>No</td>
<td>Okay</td>
</tr>
</tbody>
</table>
d720: Submirror of d520
State: Okay
Size: 402603264 blocks (191 GB)
Stripe 0: (interlace: 32 blocks)

<table>
<thead>
<tr>
<th>Device</th>
<th>Start Block</th>
<th>Dbase</th>
<th>State</th>
<th>Reloc</th>
<th>Hot Spare</th>
</tr>
</thead>
<tbody>
<tr>
<td>c1t5d0s0</td>
<td>0</td>
<td>No</td>
<td>Okay</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>c1t6d0s0</td>
<td>10176</td>
<td>No</td>
<td>Okay</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>c1t7d0s0</td>
<td>10176</td>
<td>No</td>
<td>Okay</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

d366: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>67119584</td>
<td>4194304</td>
</tr>
</tbody>
</table>

d365: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>62925248</td>
<td>4194304</td>
</tr>
</tbody>
</table>

d364: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>58730912</td>
<td>4194304</td>
</tr>
</tbody>
</table>

d363: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>54536576</td>
<td>4194304</td>
</tr>
</tbody>
</table>

d362: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>50342240</td>
<td>4194304</td>
</tr>
</tbody>
</table>

d361: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>46147904</td>
<td>4194304</td>
</tr>
</tbody>
</table>
d360: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>41953568</td>
<td>4194304</td>
</tr>
</tbody>
</table>
d359: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>37759232</td>
<td>4194304</td>
</tr>
</tbody>
</table>

d358: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>33564896</td>
<td>4194304</td>
</tr>
</tbody>
</table>

d357: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>29370560</td>
<td>4194304</td>
</tr>
</tbody>
</table>

d356: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>25176224</td>
<td>4194304</td>
</tr>
</tbody>
</table>

d355: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>20981888</td>
<td>4194304</td>
</tr>
</tbody>
</table>

d354: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>16787552</td>
<td>4194304</td>
</tr>
</tbody>
</table>

d353: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>12593216</td>
<td>4194304</td>
</tr>
</tbody>
</table>

d352: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>8398880</td>
<td>4194304</td>
</tr>
</tbody>
</table>
d351: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4204544</td>
<td>4194304</td>
</tr>
</tbody>
</table>

d350: Soft Partition
Device: d520
State: Okay
Size: 4194304 blocks (2.0 GB)

<table>
<thead>
<tr>
<th>Extent</th>
<th>Start Block</th>
<th>Block count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10208</td>
<td>4194304</td>
</tr>
</tbody>
</table>

Device Relocation Information:
Device  Reloc Device ID
---     ------ -------------------------------
c1t5d0   Yes  id1,sd@SSEAGATE_ST973401LSUN72G_3510Y65J____________3LB0Y65J
c1t6d0   Yes  id1,sd@n500000e01822f150

c1t7d0   Yes  id1,sd@n5000c50006f495d3

c1t4d0   Yes  id1,sd@n5000c50006f49527

c1t1d0   Yes  id1,sd@n500000e012994210

c1t2d0   Yes  id1,sd@SSEAGATE_ST973401LSUN72G_3510Y69E____________3LB0Y69E
c1t3d0   Yes  id1,sd@n500000e017d4f470

c1t0d0   Yes  id1,sd@n500000e0129cf6e0

$  

**Note:** Notice that device d510 (and others) has a submirror that is in a **Needs maintenance** state. For device d510, the c1t4d0 component has failed and needs to be replaced. Each device with a component in a **Needs maintenance** state needs to have the underlying target drive replaced. The metadevices for each mirror in a **Needs maintenance** state will also need to be resynchronized.

**Important:** For the rest of this chapter, we will focus on the c1t4d0 defective component and will use that component in the examples that are developed in this chapter.
Prepare to Replace the Hard Drive

Note: All the commands in this section should be executed as root user.

Identify the Device That Needs to be Replaced

1. If necessary, open an xterm window on the DNCS.
2. Type the following command and press Enter.
   ```
   metastat | grep Maintenance
   ```
   Result: Using the example established in Verify Disk Drive Status (on page 51), output should look similar to the following:

<table>
<thead>
<tr>
<th>Device</th>
<th>Status</th>
<th>Failed</th>
<th>Maintenance</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>c1t4d0s5</td>
<td>0</td>
<td>No</td>
<td>Maintenance</td>
<td>Yes</td>
</tr>
<tr>
<td>c1t4d0s7</td>
<td>0</td>
<td>No</td>
<td>Maintenance</td>
<td>Yes</td>
</tr>
<tr>
<td>c1t4d0s3</td>
<td>0</td>
<td>No</td>
<td>Maintenance</td>
<td>Yes</td>
</tr>
<tr>
<td>c1t4d0s1</td>
<td>0</td>
<td>No</td>
<td>Maintenance</td>
<td>Yes</td>
</tr>
<tr>
<td>c1t4d0s0</td>
<td>0</td>
<td>No</td>
<td>Maintenance</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Observations: Though multiple component devices have failed, they are all on the same physical drive. The defective drive is c1t4.

Unconfigure the Defective Drive

1. From an xterm window on the DNCS, type the following command and press Enter.
   ```
   metadb
   ```
   Result: Output should look similar to the following:

<table>
<thead>
<tr>
<th>flags</th>
<th>first blk</th>
<th>block count</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>a m p luo</td>
<td>16</td>
<td>8192</td>
<td>/dev/dsk/c1t0d0s4</td>
</tr>
<tr>
<td>a p luo</td>
<td>16</td>
<td>8192</td>
<td>/dev/dsk/c1t1d0s4</td>
</tr>
<tr>
<td>a p luo</td>
<td>16</td>
<td>8192</td>
<td>/dev/dsk/c1t2d0s4</td>
</tr>
<tr>
<td>a p luo</td>
<td>16</td>
<td>8192</td>
<td>/dev/dsk/c1t3d0s4</td>
</tr>
<tr>
<td>W p l</td>
<td>16</td>
<td>8192</td>
<td>/dev/dsk/c1t4d0s4</td>
</tr>
<tr>
<td>a p luo</td>
<td>16</td>
<td>8192</td>
<td>/dev/dsk/c1t5d0s4</td>
</tr>
<tr>
<td>a p luo</td>
<td>16</td>
<td>8192</td>
<td>/dev/dsk/c1t6d0s4</td>
</tr>
<tr>
<td>a p luo</td>
<td>16</td>
<td>8192</td>
<td>/dev/dsk/c1t7d0s4</td>
</tr>
</tbody>
</table>

Notes:

- Any metadb that has a flag consisting of a capital letter (like "W" in this example) needs to be removed and then re-added when the condition has been corrected.
Prepare to Replace the Hard Drive

- Should there be multiple metadbs with flags consisting of a capital letter, never remove more than one more than half of the metadbs at any one time. Replace a single drive at a time and resynchronize the mirror to which it belongs before removing more than one more than half of the metadbs.

2 Type the following command and press Enter to remove the metadb from the defective drive (c1t4d0s4, in the example we have developed).

```bash
metadb -d /dev/dsk/c1t4d0s4
```

3 Type the following command and press Enter to unconfigure the drive, which prepares it for physical removal.

```bash
cfgadm -a c1
```

**Result:** Output should look similar to the following example:

<table>
<thead>
<tr>
<th>Ap_Id</th>
<th>Type</th>
<th>Receptacle</th>
<th>Occupant</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>c1</td>
<td>scsi-bus</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t0d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t1d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t2d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t3d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t4d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t5d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t6d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t7d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
</tbody>
</table>

**Note:** This output shows that all drives are currently connected, even though we know that our target drive is defective.

4 Type the following command and press Enter to unconfigure the defective drive.

```bash
cfgadm -f -c unconfigure c1::dsk/c1t4d0
```

5 Type the following command and press Enter to confirm the success of the unconfigure command.

```bash
cfgadm -a c1
```

**Result:** Output should look similar to the following example:

<table>
<thead>
<tr>
<th>Ap_Id</th>
<th>Type</th>
<th>Receptacle</th>
<th>Occupant</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>c1</td>
<td>scsi-bus</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t0d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t1d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t2d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t3d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t4d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t5d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t6d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t7d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
</tbody>
</table>

**Note:** Notice that device c1t4d0 is now unconfigured.
Avoid Electrostatic Discharge

CAUTION:
The electronic components of printed circuit boards and hard drives are sensitive to static electricity. Do not touch the components or any metal parts without taking proper antistatic precautions.

1 Leave the AC power cord connected to the server.
   **Note:** AC power cords provide a discharge path for static electricity. They should remain connected UNLESS you are performing one of the following procedures:
   - Removing and installing the motherboard
   - Removing and installing the power distribution board (PDB)
   - Removing and installing the Advanced Lights Out Manager (ALOM) card
   - Removing and installing the front input/output (I/O) card
   - Removing and installing the front indicator board
   - Removing and installing the hard drive backplane

2 Place the new hard drive on an antistatic mat.

3 Attach the appropriate end of an antistatic wrist strap to the sheet metal on the system chassis and attach the other end to your wrist.
Remove the Hard Drive

You are now ready to physically remove the hard drive. If the drive has not failed to the point where there are no LED indicators on the front, then the failed drive will have a blue indicator light illuminated, indicating that this is the drive that we unconfigured. If no LED is lit, then remove the device according to the chart from *Hard Disk Layout* (on page 50). Reference the following illustration for an example of drive indicator lights.

1. Identify the hard drive to be removed and note the bay in which it is installed.
2. Press the button that releases the hard drive handle.
3 Hold the hard drive by the handle and slide it out of the hard drive bay.

**Note:** Note these important points about the removal of the hard drive:

- When you reinstall the hard drive (or a replacement drive for the hard drive you just removed), be certain to install it into the same bay from which the hard drive was just removed.
- Should you intend to operate the server without replacing the hard drive, be certain to install a hard drive blank so that the cooling system of the server can function as intended.
Install the Hard Drive

1. Press the button to release the handle on the new hard drive.
2. Orient that hard drive so that the latch of the hard drive is on the bottom.
3. Insert the hard drive into the bay until it makes light contact with the backplane.

**Important:** If you are replacing the hard drive that you removed in *Remove the Hard Drive* (on page 66), be certain that you are installing the new hard drive into the bay from which the other hard drive was just removed.

4. Firmly press the center of the hard drive handle towards the hard drive until the latch closes. This secures the hard drive in place.
Reconnect the New Hard Drive

1. As root user in an xterm window, type the following command and press **Enter**.
   `cfgadm -f -c configure c1::dsk/c1t4d0`

2. To confirm that the new drive is connected, type the following command and press **Enter**.
   `cfgadm -a c1`

   **Result:** Output should look similar to the following example:

<table>
<thead>
<tr>
<th>Ap_Id</th>
<th>Type</th>
<th>Receptacle</th>
<th>Occupant</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>c1</td>
<td>scsi-bus</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t0d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t1d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t2d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t3d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t4d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t5d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t6d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
<tr>
<td>c1::dsk/c1t7d0</td>
<td>disk</td>
<td>connected</td>
<td>configured</td>
<td>unknown</td>
</tr>
</tbody>
</table>

3. Type the following command and press **Enter**.
   `format`

   **Result:** Output should indicate a configuration similar to the configuration expressed in **Hard Disk Layout** (on page 50).

4. Did the system list all the disks?
   - If **yes**, the system recognizes the newly installed hard disk; go to step 5.
   - If **no**, contact Cisco Services for assistance.
5 Follow these instructions to determine which volume table of contents (VTOC) to apply to the new hard drive.

Note: A VTOC must be obtained by another drive in the enclosure that has a similar role as the hard drive you just replaced.

a Refer to Hard Disk Layout (on page 50) and locate the line with the bad device.

Note: In the example we have been developing, the bad device is c1t4 in slot 4.

b Note the Disk Role of the bad device.

Note: The Disk Role of the c1t4 device is OS.

c Locate another device that is not currently in a bad state and that has the same Disk Role as the c1t4 bad device.

Note: Device c1t0 in slot 0 meets this requirement.

d Type the following command and press Enter.

\texttt{prtvtoc /dev/rdsk/[device with same role] > /tmp/[device with same role].vtoc}

Example: \texttt{prtvtoc /dev/rdsk/c1t0d0 > /tmp/c1t0d0.vtoc}

Result: The system creates a file with the partition layout needed by the new disk.

6 Type the following command and press Enter to apply the vtoc to the new drive.

Note: In the example we have developed, the device with the same Disk Role of the defective c1t4 device is c1t0.

\texttt{fmthard -s /tmp/[device with same role].vtoc /dev/rdsk/[device name of replaced drive]}

Example: \texttt{fmthard -s /tmp/c1t0d0.vtoc /dev/rdsk/c1t4d0}

Result: The new drive now has the same partitioning as the drive with which it is most similar in the disk mirror.

7 Was the drive that you removed a boot drive (slots 0 or 4)?

- If yes, you need to add boot blocks. This procedure is similar to Install a Boot Block on a Mirrored Disk Drive (6-Disk Setup) (on page 21).
  
  Note: Then, continue with step 8.

- If no, go to step 8.

8 Type the following command and press Enter to restore the metadb.

\texttt{metadb -a c1t4d0s4}
9 Type the following command and press **Enter** to show each mirror and each subcomponent that needs to be resynchronized.

```
metastat | egrep "Mirror|Maintenance"
```

**Result:** Output should be similar to the following example:

```
d510: Mirror
c1t4d0s5  0  No  Maintenance  Yes

d507: Mirror
c1t4d0s7  0  No  Maintenance  Yes

d503: Mirror
c1t4d0s3  0  No  Maintenance  Yes

d501: Mirror
c1t4d0s1  0  No  Maintenance  Yes

d500: Mirror
c1t4d0s0  0  No  Maintenance  Yes

d520: Mirror
```

**Note:** The line above each indented line represents the mirror to which the component should be reattached.

10 To reattach the mirrors, type the following commands and press **Enter**.

```
metareplace -e d510 c1t4d0s5
metareplace -e d507 c1t4d0s7
metareplace -e d503 c1t4d0s3
metareplace -e d501 c1t4d0s1
metareplace -e d500 c1t4d0s0
```

11 Type the following command and press **Enter** to verify that there are no additional disk failures.

```
syncwait.ksh
```

**Result:** Output should be similar to the following example:

```
Checking Metadevice status... Please wait.
Disks Syncing... Please wait.
d510: Mirror
    Submirror 0: d410
    Submirror 1: d710
    State: Resyncing
    Resync in progress: 5 % done
d507: Mirror
    Submirror 0: d407
    Submirror 1: d707
```
State: Resyncing
Resync in progress: 4 % done
d503: Mirror
   Submirror 0: d403
   Submirror 1: d703
   State: Resyncing
   Resync in progress: 12 % done

d501: Mirror
   Submirror 0: d401
   Submirror 1: d701
   State: Resyncing
   Resync in progress: 6 % done

d500: Mirror
   Submirror 0: d400
   Submirror 1: d700
   State: Resyncing
   Resync in progress: 7 % done

d520: Mirror
   Submirror 0: d420
   Submirror 1: d720

3
Customer Information

If You Have Questions

If you have technical questions, call Cisco Services for assistance. Follow the menu options to speak with a service engineer.

Access your company's extranet site to view or order additional technical publications. For accessing instructions, contact the representative who handles your account. Check your extranet site often as the information is updated frequently.