Conversant VIS
SCSI Mirroring

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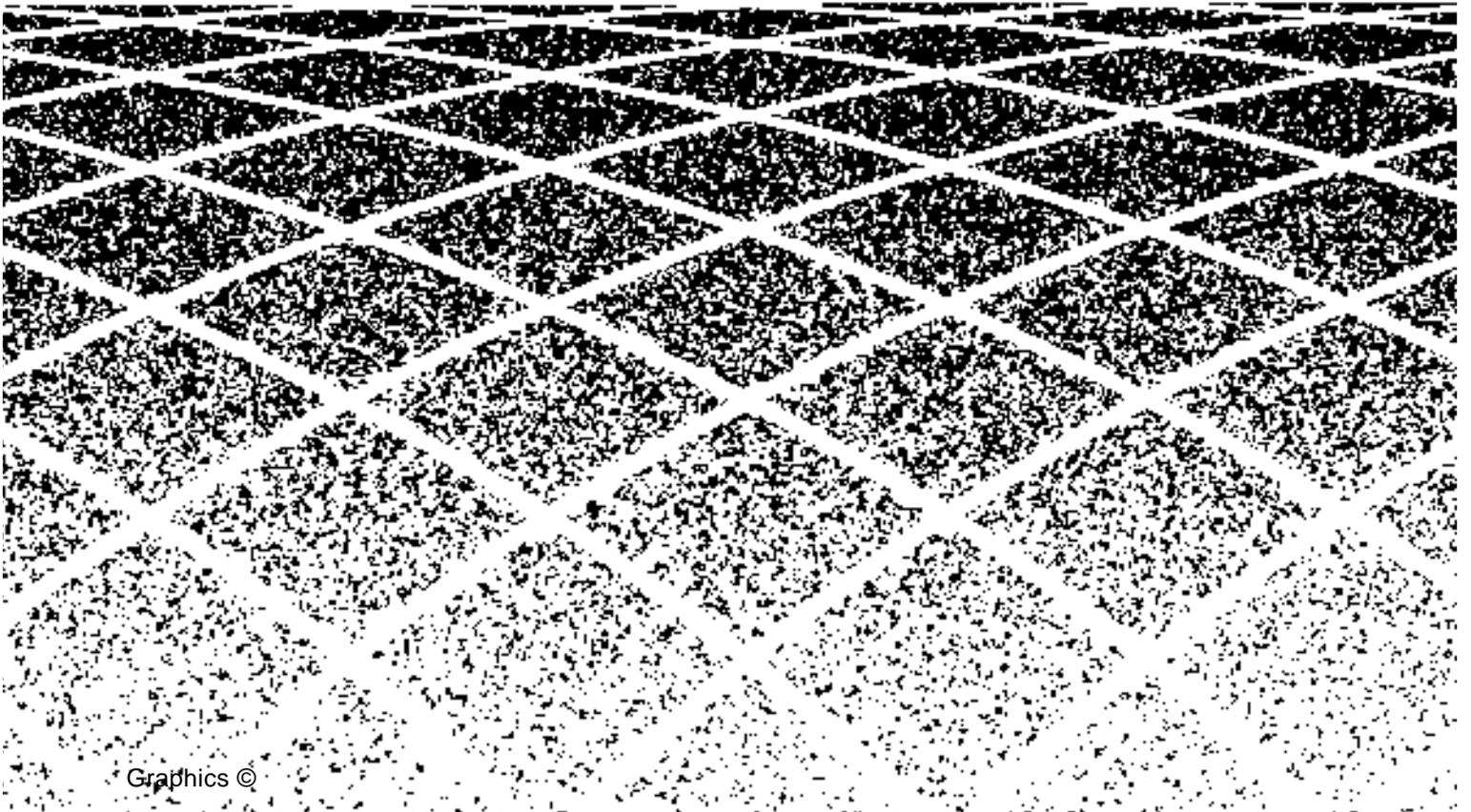
Contents

Contents

Introduction to SCSI Mirroring

1

Introduction

The AT&T SCSI Support Package provides an added high-reliability and data integrity feature for SCSI disks called mirroring. Since hard disks are the most vulnerable part of a system, mirroring helps solve any reliability problems by allowing one driver to write to two separate disk sections at once.

The mirroring feature provides the computer with data storage that has a greater reliability than a single disk. When the boot disk is taken out of service, you can have a exact duplicate of a specific partition, or of the entire disk, already on-line and immediately accessible.

Mirroring is the use of a disk array technology called redundant array of independent disks (RAID). RAID works by using several inexpensive disks linked together in various configurations. The result of this linking is the disks achieve fault-tolerances and improved performance. The AT&T SCSI Utilities support RAID level 1.

⟹ NOTE:
This feature was integrated with Intuity CONVERSANT VIS to support a specific configuration; mirroring the boot disk. This feature contains commands that support other types of mirroring. Inuity CONVERSANT VIS does *not* support those other types of mirroring. See Chapter 3, ''Using SCSI Mirroring'' for details on mirroring the boot disk.

How Mirroring Works

Actual mirroring is performed by a mirror driver residing in the **/etc/conf/pack.d/ mirror** directory. The mirror driver interfaces at one end with the user via the normal UNIX operating system calls (open, close, read, write, and ioctl) and on the other end, with the SCSI disk driver. The mirror driver is a software module that is responsible for maintaining information about all mirrored partitions and for accessing the disk partitions that are mirrored. It also provides the ioctl function to do such things as restore, verify, mirror and unmirror disk partitions.

Once the two disks are mirrored, their separate disk special device files are changed to point to the mirror driver. Therefore, direct access to either partition results in accessing both disks. If, for instance, you want to create and mount a file system on a currently mirrored disk partition, you must use either disk's special file name. The file system would then be created on both partitions at the same time.

All write operations are performed to both partitions through either disk's special file. Read operations are alternated between the two partitions. Read performance of the mirrored disks will be equivalent to that for nonmirrored disks. For small configurations write performance for a mirrored disk configuration is equivalent to that of a nonmirrored configuration.

Installing SCSI Mirroring

2

Applying SCSI Mirroing

If you want to use mirroring, you must first install the SCSI Mirroring Support Package on your system. Use the following procedure to install this package:

1. If you are not already logged in, do so now.

   a. Enter **root** at the `Welcome to the AT&T 386 UNIX System` prompt.

      System response:

      `Password:`

   b. Enter your password. The system responds by starting the UNIX system. You eventually see the UNIX system prompt #.

2. Enter **installpkg**

   System response:

   ```
   Please indicate the installation medium you intend to
   use.  Strike 'C' to install from CARTRIDGE TAPE or 'F'
   to install from FLOPPY DISKETTE.
   ```

   ```
   Strike ESC to stop.
   ```

3. Press F.

   System response:

   ```
   Please insert the floppy disk.
   ```

If the program installation requires more than one floppy disk, be sure to insert the disks in the proper order, starting with disk number 1. After the first floppy disk, instructions will be provided for inserting the remaining floppy disks.

```
Strike ENTER when ready
or ESC to stop.
```

4. Insert the SCSI Mirroring floppy disk and press ENTER.

   System response:

   ```
   Installation in progress.
   Copyright (C) 1989, 1990, 1992 AT&T All Rights Reserved

   Installing SCSI Mirroring Support Package - Version 2.3

   The UNIX Operating System will now be rebuilt.
   This will take approximately 2 minutes.  Please wait.

   The UNIX kernel has been rebuilt.
   ```

5. Make sure that the light on the floppy disk drive is off. When it is off, remove the floppy disk.

Using SCSI Mirroring

3

Using FACE to Mirror Disk 0 root, swap, and /usr

Use the following procedure to mirror the **root**, **swap**, and **/usr** file system:

1. If you are not already logged in, do so now.

   a. Enter **root** at the `Welcome to the AT&T 386 UNIX System` prompt.

      System response:

      `Password:`

   b. Enter your password. The system responds by starting the UNIX system. You eventually see the UNIX system prompt #.

2. Enter **face**

   The system displays the AT&T FACE screen.

3. Highlight System Administration and press (ENTER). The system displays the System Administration screen.

4. Highlight Bus Administration and press (ENTER). The system displays the Bus Administration screen.

5. Press (ENTER) to select the SCSI screen. The system diplays the SCSI screen.

6. Highlight Add Peripheral and press (ENTER). The system displays the Add Peripheral screen.

7. Highlight Disk and press (ENTER).

System response:

```
     6     Adding Disk
Enter Device Name
in the form c?t?d?.  _____
```

8. Enter the device name for the hard disk to which you are going to mirror, **c0t1d0**. Enter this device name and press (SAVE) (F3).

System response:

```
     6     Adding Disk
Enter Device Name
in the form c?t?d?.   c0t1d0
```

```
     7     Warning
This is a destructive operation that will destroy the
contents of the disk.
```

```
Strike CONT to continue or strike CANCEL to cancel
```

9. Press (CONT) (F3).

System response:

```
Do you want to setup this disk to allow for mirroring of
the boot device (y or n)
```

10. Enter **y**

System response:

```
Hard Disk partitioning complete.
```

```
Do you want to perform a surface analysis on this disk
(y/n)?
```

11. Enter **n**

System response:

```
Checking for bad sectors in the UNIX System Partition
A root filesystem will now be created on your hard
disk...
A usr filesystem will now be created on your hard
disk...
A usr2 filesystem will now be created on your hard
disk...
```

```
New /etc/partitions entry of disk010 added.
```

```
Diskadd for disk010 DONE at <date time>
```

```
The UNIX Operating System will now be rebuilt.
This will take approximately 2 minutes.  Please wait.
```

```
The UNIX kernel has been rebuilt.
```

```
The system must be rebooted for mirroring of the boot
disk to take effect.  Please shutdown the system as soon
as possible.
```

```
Press RETURN to continue
```

12. Press (ENTER). The system now returns to the FACE screen.

13. Press (CANCEL) (F6) 4 consecutive times. You are now at the AT&T FACE screen.

14. Using the arrow keys, move the cursor to Exit and press (ENTER).

    System response:

    ```
    You are about to exit AT&T FACE.

    Press CONT to exit or CANCEL to cancel the exit.
    ```

15. Press (CONT) (F3). You are now out of FACE.

16. Enter **shutdown -y -g**

    System response:

    ```
    Reboot the system now.
    ```

17. Press the reset button to reboot the system.

> **NOTE:**
> The next time the voice starts, the following error appear during the speech file system audit:
>
> ```
> ERROR:  fsslice mismatch (was 0x xxx is 0x xxx) starting
> REBUILDING OF FILE SYSTEM.
> ```
>
> The error is normal and occurs the first time the voice system is started a change to the mirroring configuration.

Using FACE to Verify Mirrors

> ⚠ **WARNING:**
> *Do not attempt to verify mirrors while mirror restore operations are underway. Verify only ACTIVE partitions.*

Use the following procedure to verify mirrors:

1. If you are not already logged in, do so now.

    a. Enter **root** at the `Welcome to the AT&T 386 UNIX System` prompt.

       System response:

       ```
       Password:
       ```

    b. Enter your password. The system responds by starting the UNIX system. You eventually see the UNIX system prompt #.

2. Enter **face**

The system displays the AT&T FACE screen.

3. Highlight System Administration and press $\boxed{\text{ENTER}}$. The system displays the System Administration screen.

4. Highlight Peripheral Setup and press $\boxed{\text{ENTER}}$. The system displays the Peripheral Setup screen.

5. Press $\boxed{\text{ENTER}}$ to select the Mirror Operations screen. The system diplays the Mirror Operations screen.

6. Highlight Verify Disk and press $\boxed{\text{ENTER}}$.

System response:

```
5    Verify Disk
```

This operation allows for verifying that both sections of a mirror are identical.

```
6    Select the Mirror
```

_____

7. Type **/dev/rdsk/c0t0d0s4 /dev/rdsk/c0t1d0s4** and press $\boxed{\text{ENTER}}$.

System response:

```
Confirm
```

The mirror of Disk /dev/rdsk/c0t0d0s4 and Disk /dev/rdsk/c0t1d0s4 will be verified.

```
Confirm
```

The mirror has been verified.

Maintaining SCSI Mirroring

4

Backing Up and Restoring Mirrored Disks

Back up and restore mirrored disk systems in the same manner you back,up and restore non-mirrored disks. See your maintenance guide for further information.

Mirrored Disk States

If an error occurs while accessing either one of the disk partitions, the operating system can remove the offending disk from service and continue to operate using the other partition. The disk partitions can be in either the *ACTIVE* or *OUT-OF-DATE* state. If a disk partition is ACTIVE, this mean that reads and writes to the mirrored partition are also being made to the disk partition. If the disk partition is OUT-OF-DATE, this means that the accesses are not being made to the disk partition.

Using FACE to Check the Mirror States

Use the following procedure to check the mirror states:

1. If you are not already logged in, do so now.

    a. Enter **root** at the `Welcome to the AT&T 386 UNIX System` prompt.

    System response:

    `Password:`

b. Enter your password. The system responds by starting the UNIX system. You eventually see the UNIX system prompt #.

2. Enter **face**

   The system displays the AT&T FACE screen.

3. Highlight System Administration and press (ENTER). The system displays the System Administration screen.

4. Highlight Peripheral Setup and press (ENTER). The system displays the Peripheral Setup screen.

5. Highlight Mirror Operations and press (ENTER). The system displays the Mirror Operations screen.

6. Highlight Display Mirror Configuration and press (ENTER). The system displays a list of all the mirrored partitions. All partitions listed as ACTIVE are running, active mirrors. All partitions listed as OUT-OF-DATE are no longer mirrored.

Removing a Failed Mirrored Boot Disk

When one of the disks containing the partitions for **root**, **swap**, and **/usr** fails, no immediate action is required. When the disk fails, the mirrored partition that caused the failure will automatically be taken out of service. The system will continue to operate in the state without any problems, however, some partitions may no longer be mirrored.

To remove a failed disk, use the following procedure:

1. Unmirror the book disk. Follow the procedure detailed below to unmirror the book disk using FACE:

   a. Enter **face** at the UNIX system prompt #. The system displays the AT&T FACE screen.

   b. Highlight System Administration and press (ENTER). The system displays the System Administration screen.

   c. Highlight Peripherals Setup and press (ENTER). The system displays the Peripherals Setup screen.

   d. Highlight Mirror Operations and press (ENTER). The system displays the Mirror Operations screen.

   e. Highlight Unmirror Boot Disk and press (ENTER).

      System response:

      ```
      The UNIX Operating System will now be rebuilt.
      This will take approximately 2 minutes.  Please
      wait.
      ```

2. Return to the AT&T FACE screen by pressing (CANCEL) (F6) 3 consecutive times.

3. Highlight System Administration and press (ENTER). The system displays the System Administration screen.

4. Highlight Bus Administration and press (ENTER). The system displays the Bus Administration screen.

5. Highlight SCSI and press (ENTER). The system displays the SCSI screen.

6. Highlight Remove Peripheral and press (ENTER). The system displays the Remove Peripheral screen.

7. Highlight Disk and press (ENTER).

   System response:

   ```
        6     Removing Disk
   Enter Device Name
   in the form c?t?d?.   _____
   ```

8. Enter the name of the failed disk (either **c0t0d0** or **c0t1d0**) and press (ENTER).

   System response:

   ```
        6     Removing Disk
   Enter Device Name
   in the form c?t?d?.   your entry
   ```

9. Press (CANCEL) (F6) 5 consecutive times. You are now in the AT&T FACE screen.

10. Using the arrow keys, move the cursor to Exit and press (ENTER).

    System response:

    ```
    You are about to exit AT&T FACE.
    Press CONT to exit or CANCEL to cancel the exit.
    ```

11. Press (CONT) (F3). You are now out of FACE.

12. Enter **shutdown -y -g**

    System response:

    ```
    Reboot the system now.
    ```

13. Turn *OFF* the system.

14. Physically remove the failed disk. Replace it if desired. Refer to the appropriate appendix pertaining to your platform in the maintenance book.

    ⇒ **NOTE:**

    If you do not replace the disk, you will need to redo the settings in the platform's Setup screen. Refer to "Accessing the Setup Screen" found in Chapter 3, "Connecting Peripherals and Powering Up" in your hardware installation book.

15. Boot the system from the remaining good boot disk. There are two cases:

- if disk 0 is still good, then boot from it.

- if disk 0 was bad, change the ID address setting on the remaining boot device (disk 1) to 0 and boot from it. Refer to the Chapter 10, of your hardware installation book for information on ID address settings on the SCSI hard disk drive.

Once the system has restarted, you may set up a new mirrored disk as described in Chapter 3 of this book.