Redundant System Using Novell SFT III and RAID Array 200

StorageWorks™

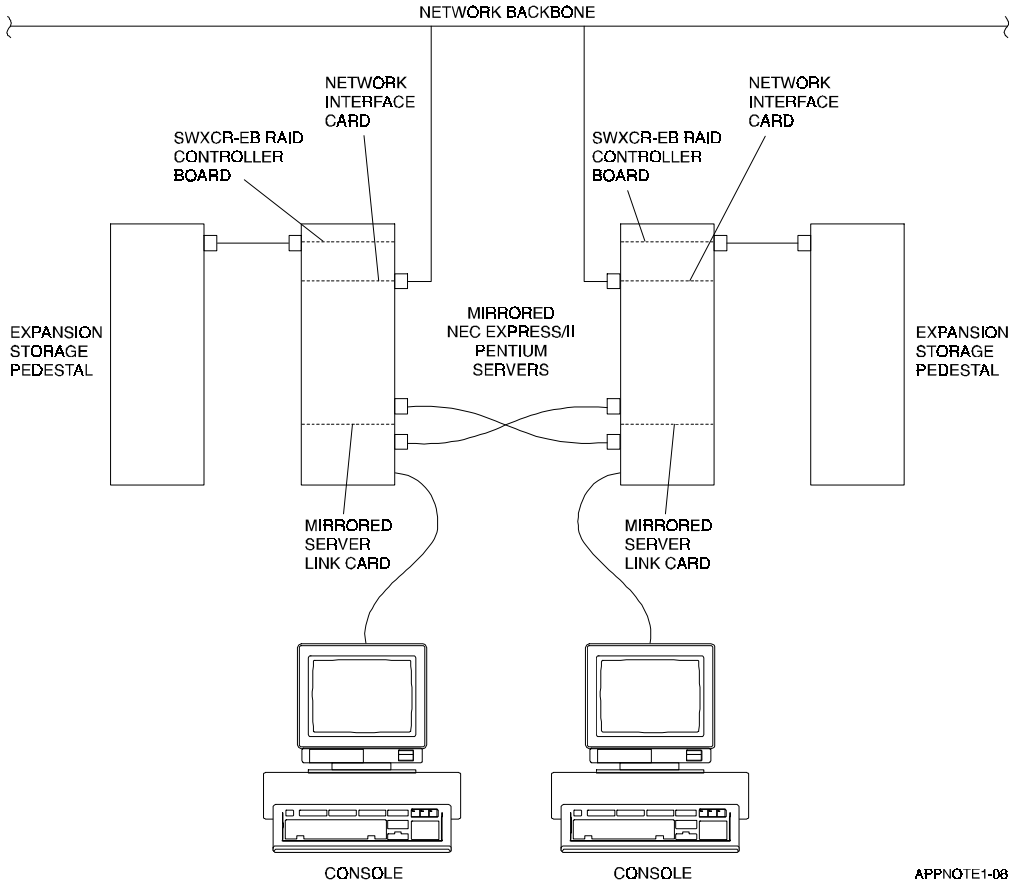
Application Note

EK–SMA02–AN. A01

The StorageWorks Compatibility Test Laboratory has completed testing a mirrored data storage system using Novell's NetWare SFT III network operating system with StorageWorks RAID Array 200 System. The mirrored system provides a redundant storage system where data availability to the network is critical and data storage requirements are high. In addition NetWare SFT III provides:

- fault tolerance by maintaining the same memory image and disk content on a second server,
- the ability to perform on-line maintenance by allowing routine maintenance and hardware upgrades by simply taking one server off-line and,
- disaster protection by simply placing the servers in different geographical locations.

When SFT III is used with the StorageWorks RAID Array 200 System, the added ability to utilize RAID levels 0, 1, 0 + 1, 5, or just a bunch of drives (JBOD) enhances the functionality of both systems.



The tests performed are from the Novell Certification procedure for certifying systems with Novell Netware. As stated by Novell, a storage device that is certified under Netware 3.11 or 3.12 is supported by SFT III. The Novell procedures were used as a guideline for fault isolation and recovery procedures.

SFT III uses three separate "engines" to bring up the system. The primary and secondary server each have a separate IOengine but share the same MSengine. The IOengine handles the physical processes such as network and disk I/O, hardware interrupts, device drivers, timing, and routing. The MSengine activates the mirror server link and appears as one system. It handles the nonphysical processes such as the file system, queue management, and the bindery.

TEST SYSTEM CONFIGURATION

The two servers were configured identically with a 3COM Network Interface Card (3C503), a StorageWorks RAID Array 200 RAID 3-channel RAID Array Controller Card (SWCXR-EB), and a Novell Mirrored Server Link (NMSL/C) installed in each.

Installation of the hardware and software components was performed using the instructions in the *StorageWorks RAID Array 200 Subsystem Family Installation and Configuration Guide* (Digital Order Number: EK-SWRA2-IG. A01) and the *Novell Mirror Server Link Installation Guide* (Novell Documentation Part Number 100-001322-001).

Some of the SFT III parameters were modified to reflect the configuration being tested. The lines modified in each file are shown below:

IOSTART.NCF (DOS partition)

```
ioengine name SFT_2
ioengine ipx internal net 456
load c:swxcrdrv
load "3C503" port=300 mem=dc000 int=3
bind ipx to "3C503" net=abc
load nmsl
```

IOAUTO.NCF (DOS partition)

```
load c:swxdcdb
load c:swxcr_ml
load c:swxcrmgr
```

MSSTART.NCF (DOS partition)

```
set concurrent remirror requests = 30
```

MSAUTO.NCF (Netware partition)

```
msengine name SFT_TEST
msengine ipx internal net ABCD
set maximum alloc short term memory = 8000000
```

StorageWorks Expansion Storage Pedestals were used and each contained five 2.10 GB Hard Disk Drives (StorageWorks SWSD3-SB) for a total capacity in each pedestal in excess of 10 GBs. The full 10 GB of storage available in each RAID Array was used at RAID level 0. Each volume was created using a block size of 32.

RAID 0 stripes data across the drives in the array, one segment at a time. RAID 0 offers a high I/O rate, but is a nonredundant configuration. No array parity information is generated for reconstructing data if a drive fails. RAID Array 200 also supports RAID Levels 1, 0 + 1, and 5.

TEST METHOD

Two COMPAQ Pentium clients were connected to the network backbone. Novell's Disk Test Routine (DTR) was loaded onto each client. DTR is a standalone program designed to be run from a client to test the various capabilities of the servers that are on the network.

Two separate sets of tests were run. One with the StorageWorks SWXCRDRV driver loaded on each server and the second with the Mylex DAC960 driver loaded on each server. The following test suite was run against each driver.

- 15 hour duration test
- Primary Server power down
- Primary Server halt I/O command
- Drive deactivate/activate
- Mirror Server Link disconnect
- LAN disconnect
- One drive removed from the Expansion Storage Pedestal to simulate a drive failure.

TEST RESULTS

All the tests ran successfully. The servers recovered from the introduced errors and re-mirrored successfully. As noted above, the SWXCRMGR and the SWXCR_M1 were loaded on each IOengine and the Manager and Monitor worked correctly for the IOengine screens.

With a Netware partition size of 10 GB, MSengine, when activated, displayed the following message:

```
There is an inactive device with the associated mirror set.
Do you want to mount the volume anyway?
```

With an answer of yes, SYS and VOL1 modules loaded and another message was displayed stating;

```
The partition is not fully mirrored
```

However, after 5 to 10 seconds, both partitions were fully mirrored, the system operated correctly, and the full suite of tests ran successfully.

This message did not appear when the Netware partition size was set at 5.5 GB or less.

CONCLUSION

The StorageWorks RAID Array 200 RAID 3-channel Controller Card (SWCXR-EB) works in the SFT III configuration. If a Netware partition size of greater that 5.5 GB is specified, messages are displayed but the mirrored partitions will remirror correctly approximately 10 seconds after the MSengine activates and the volumes mount.

In the full suite of test performed, the server that was faulted successfully remirrored with the other server and the Novell DTR tests kept running on the clients.

DETAILED SYSTEM CONFIGURATION

NEC® Express/II
Phoenix BIOS® E438 V1.00.11.AM0
P601LT Motherboard
60 Mhz Intel Pentium CPU
32 MB RAM
DOS 6.0

Two 3-channel Controller Cards (SWCXR-EB)
IRQ 11
Memory CC000

Two 3COM® 3C503 Ethernet Cards
IRQ 3
IO 300
Memory Dc000

Two Novell® Mirror Server Link Cards V1.0
IRQ 10
Memory D0000

Two StorageWorks Expansion Storage Pedestals each with
five StorageWorks SWSD3-SB (2.10 GB Hard Disk Drives)

SWXCRDRV.DSK 1.14
SWXDCDB.NLM 1.23
SWXCRMGR.NLM 1.44
SWXCR_M1.NLM 1.36
DAC960.DSK 1.31