SPEC SFS 1 Summary (Side 1 of 2)

097.LADDIS

Auspex Systems, Inc.

NS 7000 NetServer 650

Server Hardware

CPU, Memory, & Power

Model No.	NS 7000 Model 650
Network Processor (NP	66MHz dual CPU HyperSPARC
# of NPs	4
Host Processor	n/a for NFS
Memory	1024MB
Other Cache	4 2MB NVRAM Write Accelerators
UPS	None
Other hardware	None

Disk Subsystem & Filesystems

(Full Configuration on Side 2)

Num Disk Controllers	4 Storage Processors (SP)
Num Disks	122
Num File Systems	20 (F1 through F20)

Network Subsystem

(Full Configuration On Side 2)

Num Net Controllers	4 Network Processors (NP)
Num Networks	4 (N1 through N4)
Type Network	FDDI

Server Software

OS Version	Release 1.8
Other software	None
File system	Auspex LFS (BSD FFS)

Server Tuning

(Also see Notes/Tuning below)

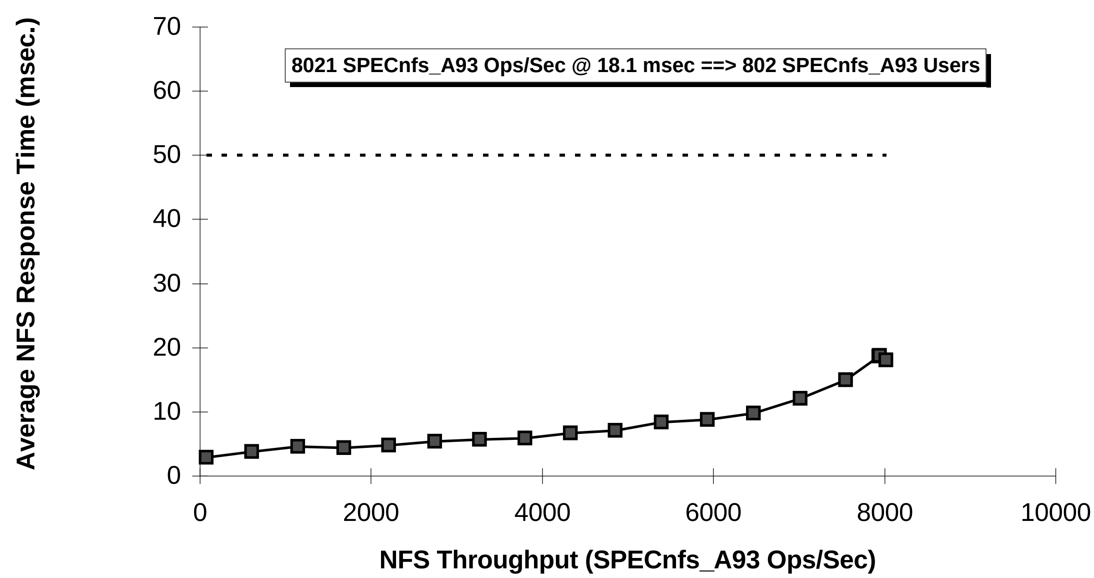
Buffer Cache Size	720MB (Data Cache)
Num NFS Daemons	48 per NP
Fileset Size	43.7GB

Load Generators (LGs)

Number of Load Generators:	16
Processes Per Load Generator:	8
Biod_Max_Reads:	2
Biod_Max_Writes:	2

Hardware Availability:	Nov-95	**Software Availability:**	Nov-95
License #: 29	**Tested:** Oct-95	**By:** Auspex	**Of:** Santa Clara, CA

NFS Throughput SPECnfs_A93 Ops/Sec	Avg. Response Time (NFS) Milliseconds
76	2.9
609	3.8
1143	4.6
1680	4.4
2210	4.8
2742	5.4
3272	5.7
3800	5.9
4332	6.7
4857	7.1
5392	8.4
5932	8.8
6467	9.8
7014	12.1
7547	15.0
7937	18.7
7945	18.8
8021	18.1



Notes/Summary Of Tuning Parameters: (Continued on Side 2 of 2)

The adb tool was used to enable UDP checksumming on all load generators:

```
adb -w /vmunix /dev/kmem
udp_cksum?W1
udp_cksum/W1
```

The Auspex NetServer responds to checksummed requests with checksummed replies, by default.

The LADDIS Prime Client was the Server's Host Processor (no router was needed).

All load generators used the same LADDIS mount points list with the same /etc/fstab entries.

The filesystems were mounted across the 4 NP's in a round-robin fashion (eg. F1 on NP0, F2 on NP1 etc.).

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Detailed Server Description

Network Subsystem

Network Processor (Model NP-III):
- Dual HyperSPARC (66MHz), 256MB
- One processor does protocol processing, and the other processor does filesystem processing
- 4MB Static RAM
- 1 MLT3 FDDI Adapter

Number of NP-III processors: 4

Disk Subsystem & Filesystems

Storage Processor (Model SP-V):
- M68030 (50MHz), 1MB local memory
- 2MB NVRAM Write Accelerator
- 6 SCSI Channels
- 30 data disks (4.29GB Seagate "Barracuda") configured
- 5 Virtual Partitions: Each Virtual Partition stripes across 6 disks (unit=128KB) on 6 different channels
- 5 Filesystems (1 Virtual Partition each)

Number of SP-V processors: 4

SP0: Disks: 2 - 31; Filesystems: 1, 2, 3, 4, 5
SP1: Disks: 32 - 61; Filesystems: 6, 7, 8, 9, 10
SP2: Disks: 62 - 91; Filesystems: 11, 12, 13, 14, 15
SP3: Disks: 92 - 121; Filesystems: 16, 17, 18, 19, 20

SP0 also supported Disk0 (OS, Swap space) and Disk1 (Laddis files).

Detailed Load Generator (LG) Description

Load Gen. Type	*Model*	*# of CPUs*	*RAM*	*OS*	*Compiler*
LG1	Sun SPARCstation 20 (Model 71)	1	64MB	SunOS 4.1.3	/bin/cc

Testbed Configuration

Load Gen. #	*Load Gen. Type*	*Network*	*Target File Systems*	*Notes*
1	LG1	N1	F1, F6, F11, F16, F2, F7, F12, F17	
2	LG1	N1	F3, F8, F13, F18, F4, F9, F14, F19	
3	LG1	N1	F5, F10, F15, F20, F1, F6, F11, F16	
4	LG1	N1	F2, F7, F12, F17, F3, F8, F13, F18	
5	LG1	N2	F4, F9, F14, F19, F5, F10, F15, F20	
6	LG1	N2	F1, F6, F11, F16, F2, F7, F12, F17	
7	LG1	N2	F3, F8, F13, F18, F4, F9, F14, F19	
8	LG1	N2	F5, F10, F15, F20, F1, F6, F11, F16	
9	LG1	N3	F2, F7, F12, F17, F3, F8, F13, F18	
10	LG1	N3	F4, F9, F14, F19, F5, F10, F15, F20	
11	LG1	N3	F1, F6, F11, F16, F2, F7, F12, F17	
12	LG1	N3	F3, F8, F13, F18, F4, F9, F14, F19	
13	LG1	N4	F5, F10, F15, F20, F1, F6, F11, F16	
14	LG1	N4	F2, F7, F12, F17, F3, F8, F13, F18	
15	LG1	N4	F4, F9, F14, F19, F5, F10, F15, F20	
16	LG1	N4	F1, F6, F11, F16, F2, F7, F12, F17	

Notes/Summary Of Tuning Parameters: (Continued from Side 1 of 2)

Each load generator mounted filesystems from 4 different NPs and 4 different SPs.
Network Processors: NP0, NP1, NP2, NP3; Storage Processors: SP0, SP1, SP2, SP3
On all the load generators, udp_sendspace = 32768 and udp_recvspace = 32768.