SPECsfs97 Result

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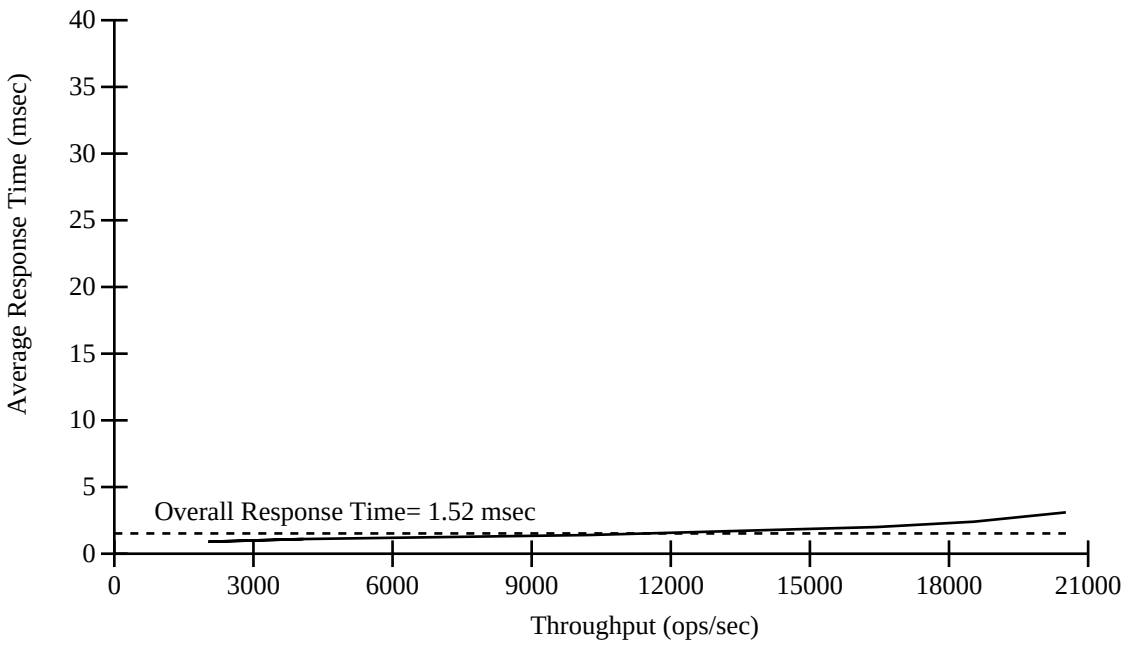
Network Appliance, Inc.
F840c Failover Cluster (UDP, 84x36GB FCAL, 2xGbE)

SPECsfs97_R1.v3 =
20520 Ops/Sec (Overall Response Time = 1.52 msec)

Tested:	September 2001	By:	Network Appliance, Inc.	License #:	33	Hardware Avail:	March 2001	Software Avail:	July 2001

Throughput (ops/sec)	Average Response (msec)
2031	0.9
4077	1.1
6121	1.2
8187	1.3
10219	1.4
12314	1.6
14370	1.8
16441	2.0
18535	2.4
20520	**3.1**



CPU, Memory and Power

Model Name:	F840c Failover Cluster (UDP, 84x36GB FCAL, 2xGbE)
Processor:	733-MHz Intel Pentium III Coppermine
# of Processors:	2 cores, 2 chips, 1 core/chip (1 per node)
Primary Cache:	16 KB I + 16 KB D
Secondary Cache:	256 KB on-die
Other Cache:	N/A
UPS:	none
Other Hardware:	X1920A cluster adapter card (see notes)
Memory Size:	6144 MB (3072 MB per node)
NVRAM Size:	256 MB (128 MB per node)
NVRAM Type:	DIMMs on PCI cards
NVRAM Description:	15-day battery-backed shelf-life

Server Software

OS Name and Version:	Data ONTAP 6.1.1
Other Software:	Cluster Option
File System:	WAFL
NFS version:	3

Network Subsystem

Network Type:	Gigabit Ethernet
Network Controller Desc.:	X1025B PCI adapter card
Number Networks:	1 (N1)
Number Network Controllers:	2 (1 per node)
Protocol Type:	UDP
Switch Type:	Extreme Summit4 (N1)
Bridge Type:	N/A
Hub Type:	N/A
Other Network Hardware:	N/A

Server Tuning

Buffer Cache Size:	default
# NFS Processes:	N/A
Fileset Size:	195.0 GB

Disk Subsystem

Number Disk Controllers:	8
Number of Disks:	84
Number of Filesystems:	2
File System Creation Ops:	default
File System Config:	5 RAID-groups of 8 disks each
Disk Controller:	X2040B FC-AL adapter card (128 KB RAM standard)
# of Controller Type:	8
Number of Disks:	7,7,7/7,7,7/7,7,7/7,7,7
Disk Type:	X231A 36GB FC-AL
File Systems on Disks:	F1/F1/F2/F2
Special Config Notes:	4 primary controllers, 4 secondaries (see notes)

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Load Generator (LG) Configuration

Number of Load Generators:	16
Number of Processes per LG:	6
Biod Max Read Setting:	2
Biod Max Write Setting:	2
LG Type:	LG1
LG Model:	Intel ISP1100 Internet Server Platform
Number and Type Processors:	1x700-MHz Pentium III
Memory Size:	512 MB
Operating System:	Linux 2.2.18 (Red Hat 6.2)
Compiler:	gcc version egcs-2.91.66
Compiler Options:	-static -O -DNO_T_TYPES -DUSE_INTTYPES
Network Type:	integrated Intel Pro/100+ 100BASE-T

Testbed Configuration

LG #	LG Type	Network	Target File Systems	Notes
1/2/../16	LG1	N1	F1,F2	N/A

Notes/Tuning Information

Other Notes
-NetApp's embedded operating system processes NFS requests from the network layer without any NFS daemons, and uses non-volatile memory to improve performance.
-The tested system was a failover cluster comprised of two nodes joined by a cluster interconnect.
-The cluster option was licensed and enabled.
-Each node was the owner of one filesystem, but the disks were dual-attached so that, in the event of a fault, they could be controlled by the other node via a secondary loop.
-The F1 filesystem was striped across both primary disk controllers of the first node. The F2 filesystem was striped across both primary disk controllers of the second node.
-Each filesystem was striped across five RAID-4 groups; each RAID-group was composed of 7 data disks and 1 parity disk. Four spare disks were present.
-Server tunings:
-options minra 1 -- minimize file read-ahead
-options raid.scrub.enable 0 -- disable periodic RAID scrubs for reproducibility
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