



**SPC BENCHMARK 1™
EXECUTIVE SUMMARY**

**SUN MICROSYSTEMS, INC.
SUN STOREEDGE™ 6320 (12 TRAY)**

SPC-1 V1.6

Submitted for Review: April 7, 2003

Accepted: June 5, 2003



EXECUTIVE SUMMARY**Test Sponsor and Contact Information**

Test Sponsor and Contact Information	
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Revision Information and Key Dates

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SPC-1 Specification revision number	V1.6
SPC-1 Workload Generator revision number	V2.1
Date Results were first used publicly	April 7, 2003
Date FDR was submitted to the SPC	April 7, 2003
Date the TSC is/was available for shipment to customers	April 7, 2003
Date the TSC completed audit certification	April 4, 2003

Summary of Results

SPC-1 Results	
Tested Storage Configuration (TSC) Name: Sun StorEdge™ 6320 (12 tray)	
Metric	Reported Result
SPC-1 IOPS™	25,340.29
SPC-1 Price-Performance	\$15.40/SPC-1 IOPS™
Total ASU Capacity	1,960.13 GB
Data Protection Level	Mirroring
SPC-1 LRT™	3.75 ms
Total TSC Price (including three-year maintenance)	\$390,189

SPC-1 IOPS™ represents the maximum I/O Request Throughput at the 100% load point.

Total ASU (Application Storage Unit) Capacity represents the total storage capacity read and written in the course of executing the SPC-1 benchmark. The Addressable Storage Capacity, which contains the Total ASU Capacity, was 1,960.13 GB. The Total ASU Capacity utilized 100% of the Addressable Storage Capacity. The actual Configured Storage Capacity was 3,920.25 GB, which included the multiple copies of user data required by a Data Protection Level of Mirroring. The Configured Storage Capacity utilized 64.09% of the priced Physical Storage Capacity of 6,116.98.456 GB.

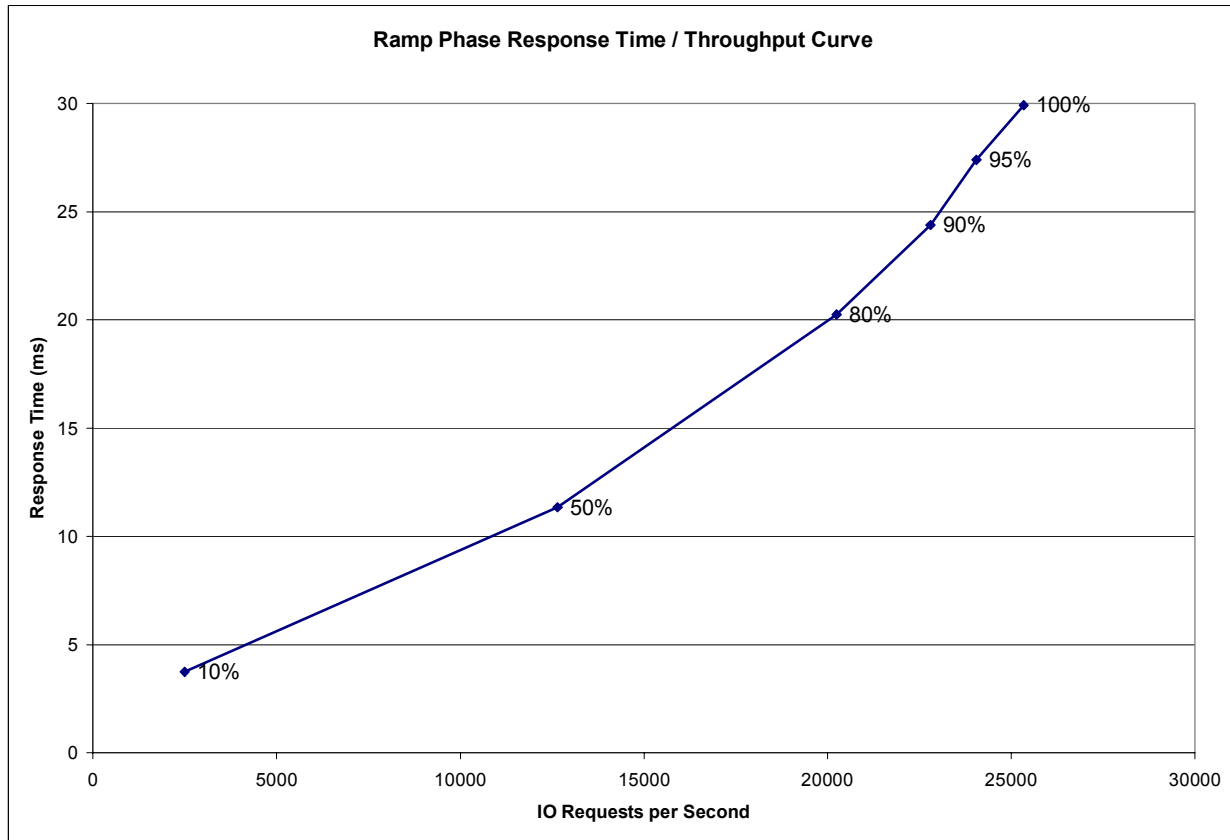
A **Data Protection Level** of Mirroring configures two or more identical copies of user data, maintained on separate disks.

The **SPC-1 LRT™** metric is the Average Response Time measured at the 10% load point, as illustrated on the next page. SPC-1 LRT™ represents the Average Response Time measured on a lightly loaded Tested Storage Configuration (TSC).

Response Time - Throughput Curve

The Response Time-Throughput Curve illustrates the Average Response Time (milliseconds) and I/O Request Throughput at 100%, 95%, 90%, 80%, 50%, and 10% of the workload level used to generate the SPC-1 IOPS™ metric.

The Average Response Time measured at the 100% load point cannot exceed 30 milliseconds or the benchmark measurement is invalid.



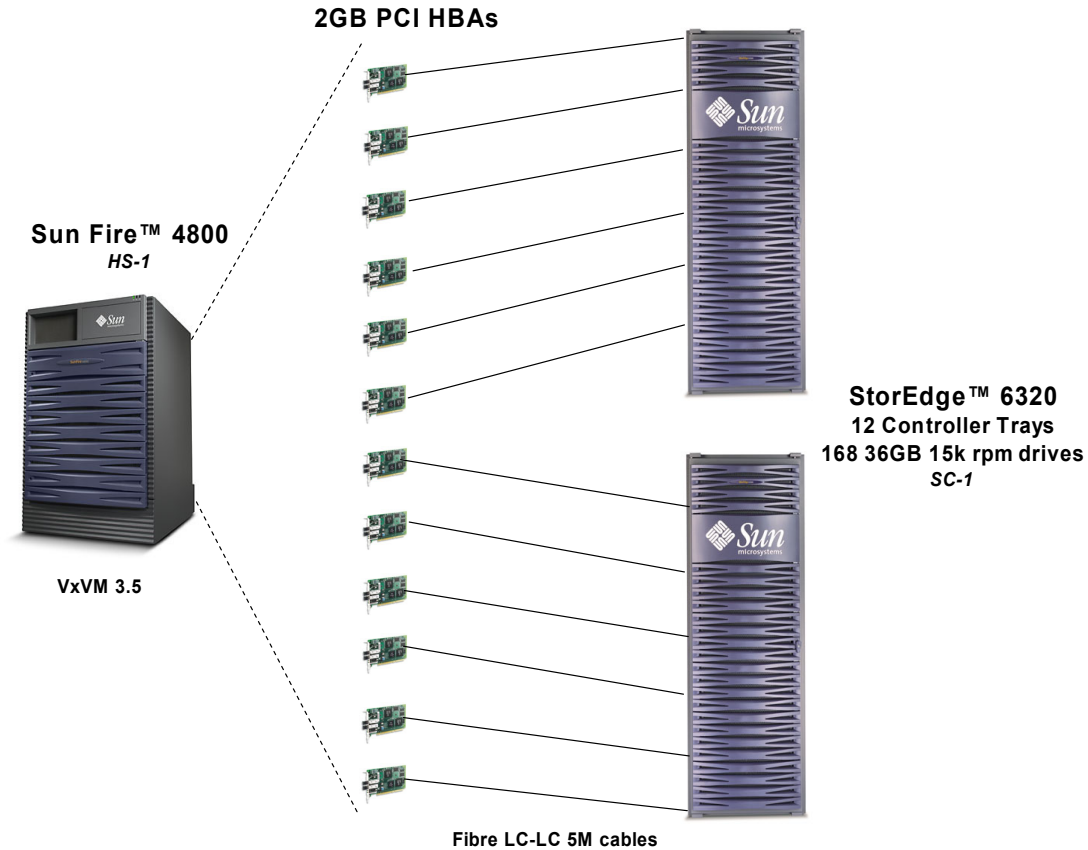
Response Time - Throughput Data

	10% Load	50% Load	80% Load	90% Load	95% Load	100% Load
I/O Request Throughput	2,499.14	12,649.72	20,239.34	22,799.07	24,050.58	25,340.29
Average Response Time (ms):						
All ASUs	3.75	11.33	20.24	24.39	27.38	29.91
ASU-1	4.18	11.29	19.78	23.76	26.64	29.06
ASU-2	3.97	11.57	20.25	24.29	27.03	29.59
ASU-3	2.75	11.33	21.23	25.77	29.09	31.85
Reads	5.64	12.35	20.27	23.99	26.67	28.91
Writes	2.53	10.67	20.23	24.65	27.83	30.56

Tested Storage Configuration Pricing

Part Number	Description	Quantity	US List	Disc.	Ave. Price
XTA6320-00-1226T06	Sun StorEdge 6320 System	1	\$365,500	15%	\$310,675
	2 cabinets				
	12 Controller Trays				
	12GB Cache Memory				
	36GB/15K Drives	168			
NAVIS-310-1FNS	Sun StorEdge Availability Suite 3.1 (1TB Lic.)	1			
NEMIS-120-3FN9	Sun Enterprise Storage Manager 2.1 (6TB Lic.)	1			
NCSSS-210-9FN9	Sun StorEdge 6000 Family Host Installation CD	1			
W9D-632N12-3G	3-Year Maintenance Agreement	1	\$51,084	50%	\$25,542
VVMGS-999-3A99	VxVM 3.5 License Tier 3A	1	\$14,895	35%	\$9,682
VVMGS-3A99-LIC	VxVM 3.5 Maintenance Agreement (3 years)	1	\$15,300	0%	\$15,300
X6767A	2Gb PCI Single FC Network Adapter	6	\$14,400	35%	\$9,360
X6768A	2Gb PCI Dual FC Network Adapter	6	\$29,400	35%	\$19,110
X9733A	5M LC to LC FC Optical Cable	10	\$800	35%	\$520
Total			\$491,379		\$390,189

Benchmark Configuration/Tested Storage Configuration Diagram



Host System:	Storage System:
Sun Fire™ 4800	Sun StorEdge™ 6320
UID=HS-1	UID=SC-1
12 UltraSPARC™ III 900MHz CPU each 8MB EEC external cache per CPU	12 Controller Trays with 12 Controllers in 6 redundant pairs Each controller has: 1 GB of memory (12 GB total) 400MHZ PowerPC 750 with 1MB L2 cache 2 GB fibre channel interface – front-end 1GB fibre channel interface – back-end with 3 fibre channel loops
12 GB Main Memory	168 – 36.4 GB 15K RPM disk drives 14 disk drives per Controller Tray
Solaris™ 9 update 2	
Veritas Volume Manager 3.5	
6 – 2Gb PCI Single FC Network Adapters 6 – 2Gb PCI Dual FC Network Adapters	
WG	