



**SPC BENCHMARK 1™
EXECUTIVE SUMMARY**

**SUN MICROSYSTEMS, INC.
SUN STORAGE TEK® 6140 ARRAY**

SPC-1 V1.10.1

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EXECUTIVE SUMMARY

Test Sponsor and Contact Information

Test Sponsor and Contact Information	
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Auditor	Storage Performance Council – http://www.storageperformance.org Walter E. Baker – AuditService@StoragePerformance.org 643 Bair Island Road, Suite 103 Redwood City, CA 94063 Phone: (650) 556-9384 FAX: (650) 556-9385

Revision Information and Key Dates

Revision Information and Key Dates	
SPC-1 Specification revision number	V1.10.1
SPC-1 Workload Generator revision number	V2.00.04a
Date Results were first used publicly	October 16, 2006
Date the FDR was submitted to the SPC	October 16, 2006
Date revised FDR was submitted to the SPC: Revised Total Price and SPC-1 Price-Performance	February 19, 2007
Date the TSP is available for shipment to customers	August 10, 2006
Date the TSP completed audit certification	October 16, 2006

Tested Storage Product (TSP) Description

The Sun StorageTek® 6140 Array is one of the first products in the Sun StorageTek modular storage family. The StorageTek modular storage family is designed for customers seeking to support business-critical applications and for Service Providers looking for a cost-effective, easy-to-use enterprise-class platform with the ability to confidently handle large data sets. Through common storage modules, common array management, and common data services, Sun's new modular storage helps customers preserve the investments they've made in people, processes and infrastructure.

The Sun StorageTek® 6140 Array is a ROHS-compliant, 4 gigabits-per-second (Gb/sec) Fibre Channel (FC) array designed for both direct attached and SAN attached storage. The system features a fully redundant architecture with drive intermixing (FC or SATA-2 disk drives), 8 x 4 Gb FC ports, 4 GB cache, application-oriented management, switched drive connectivity and a maximum capacity of 112 disk drives.

Summary of Results

SPC-1 Results	
Tested Storage Configuration (TSC) Name: Sun StorageTek® 6140 Array	
Metric	Reported Result
SPC-1 IOPS™	17,395.53
SPC-1 Price-Performance	\$4.93/SPC-1 IOPS™
Total ASU Capacity	1,963.269 GB
Data Protection Level	Mirroring
Total TSC Price (including three-year maintenance)	\$85,823

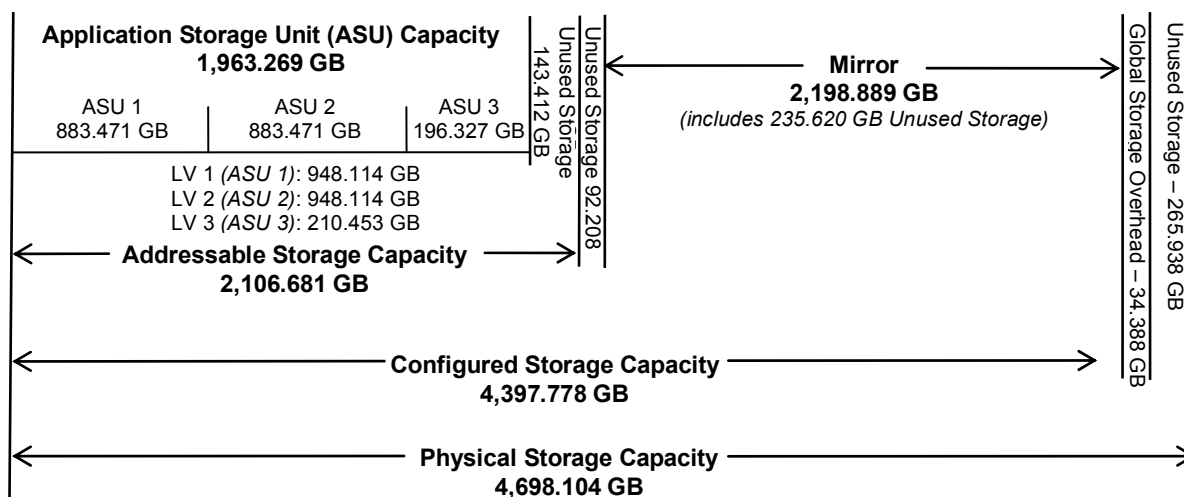
SPC-1 IOPS™ represents the maximum I/O Request Throughput at the 100% load point.

Total ASU (Application Storage Unit) Capacity represents the total storage capacity read and written in the course of executing the SPC-1 benchmark.

A Data Protection Level of Mirroring configures two or more identical copies of user data.

Storage Capacities and Relationships

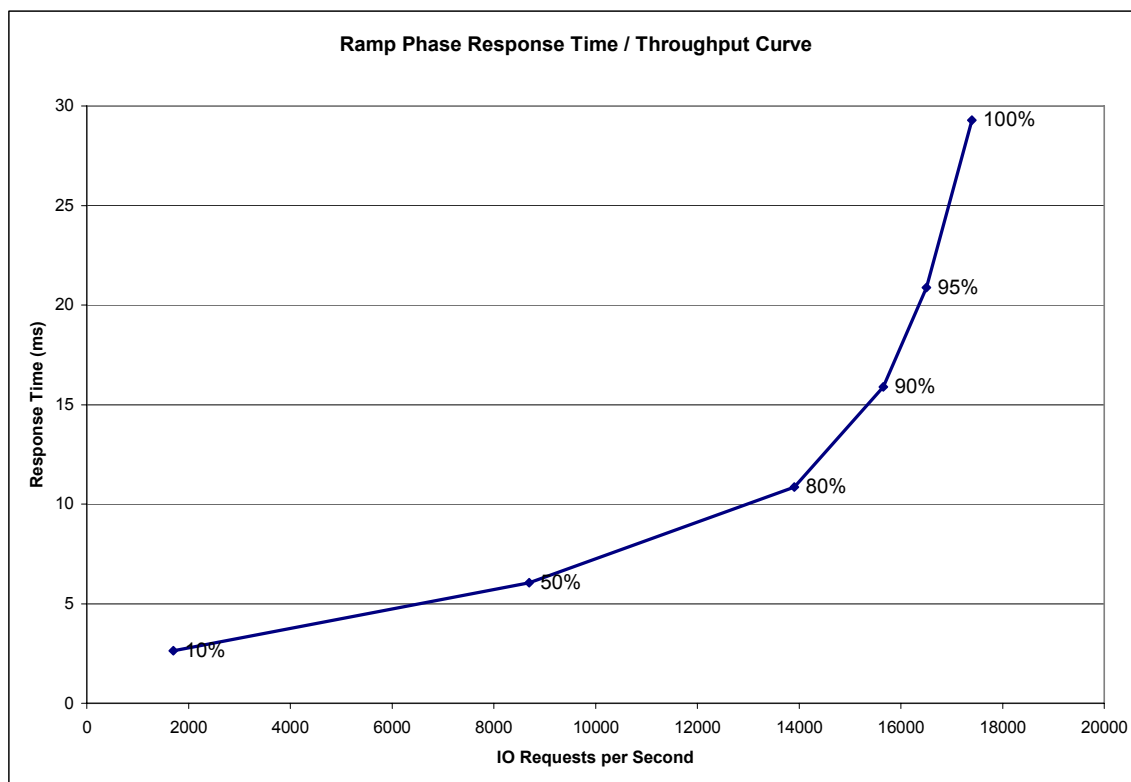
The following diagram documents the various storage capacities, used in this benchmark, and their relationships.



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 any of the above load points 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	1,700.48	8,698.24	13,904.91	15,652.90	16,499.34	17,395.53
Average Response Time (ms):						
All ASUs	2.64	6.05	10.87	15.90	20.88	29.29
ASU-1	3.18	6.67	11.58	16.45	21.21	29.49
ASU-2	3.10	7.78	16.19	23.29	29.57	39.55
ASU-3	1.30	3.98	7.02	11.51	16.37	24.37
Reads	4.77	9.33	16.90	22.82	28.12	37.25
Writes	1.26	3.91	6.94	11.39	16.16	24.10

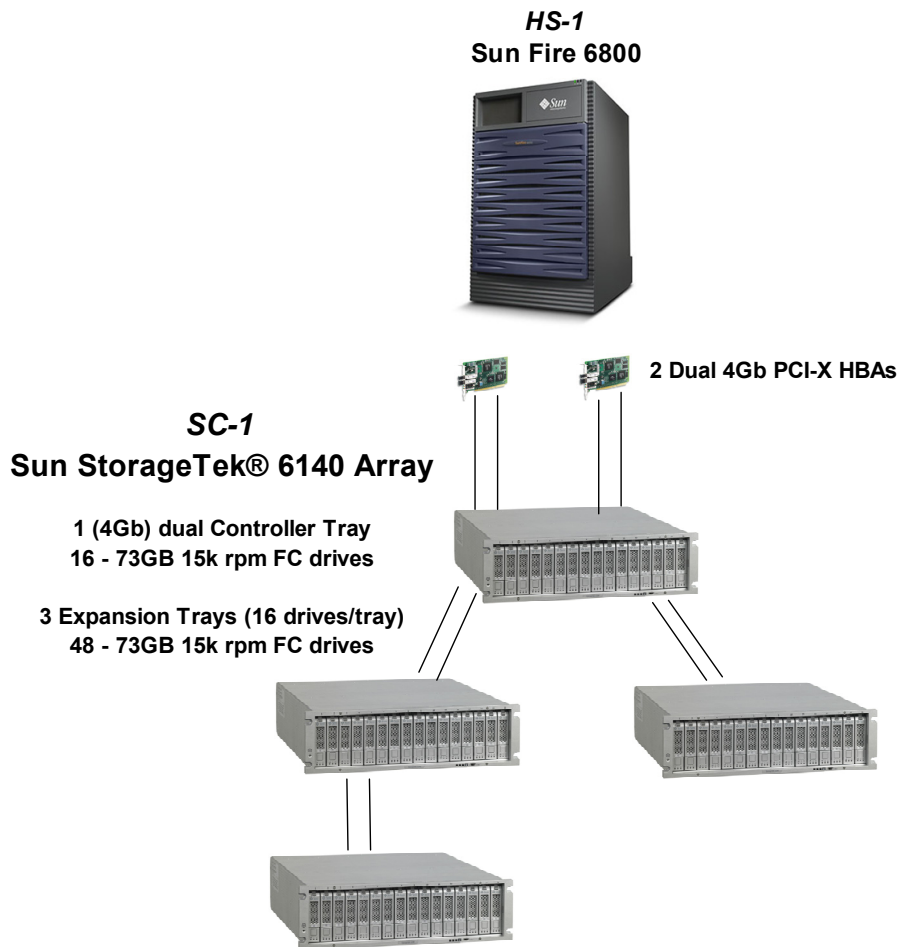
Tested Storage Configuration Pricing (*Priced Storage Configuration*)

XTC6140R11A2B1168	Dual Controller with 1x1x16x73G15K	1	\$48,895	\$48,895	39%	\$29,826
	- 2 Controllers w/ 2GB cache each					
	- 16 73GB 15k rpm drives					
	- All required cables included					
XTCCSM2R01A0B1168	FC Expansion tray 0x1x16x73G15K	3	\$26,395	\$79,185	39%	\$48,303
	- 16 73GB 15k rpm drives					
	- All required cables included					
SG-XPCI2FC-QF4	4Gb PCI-X Dual FC Host Based Adapter	2	\$2,530	\$5,060	39%	\$3,087
W9D-ST6140-4-3G	Controller unit upgrade 3 year Gold Service Maintenance	1	\$2,988	\$2,988		\$2,988
	- 7/24 coverage					
	- 4 hr response time					
	- 4 hour resolution					
W9D-ST6140-4-3G	Expansion unit upgrade 3 year Gold Service Maintenance	1	\$1,620	\$1,620		\$1,620
	- 7/24 coverage					
	- 4 hr response time					
	- 4 hour resolution					
Total				\$137,748		\$85,823

Differences between the Tested Storage Configuration (TSC) and Priced Storage Configuration

There were no differences between the Tested Storage Configuration and the Priced Storage Configuration.

Benchmark Configuration/Tested Storage Configuration Diagram



Benchmark Configuration/Tested Storage Configuration Components

Host System:	Tested Storage Configuration (TSC):
UID=HS-1 SunFire 6800	2 – 4 Gb dual port FC PCI-X HBAs
12 – 1.2 GHz dual core UltraSPARC-IV processors 64 KB L1 cache per core, 2 MB L2 shared per dual core 32 MB L3 shared per dual core	UID=SC-1: Sun StorageTek® 6140 Array 1 Dual Controller 2 GB cache per controller (4 GB total)
48 GB main memory	4 host connections (<i>front end</i>) 2 drive connections (<i>backend</i>)
Solaris 10 FCS	3 – FC Expansion Trays
PCI-X	64 – 73 GB 15K RPM disk drives
WG	