



**SPC BENCHMARK 2™
EXECUTIVE SUMMARY**

**SUN MICROSYSTEMS, INC.
SUN STORAGE TEK® 2540 ARRAY (RAID-5)**

SPC-2™ V1.2.1

Submitted for Review: April 10, 2007

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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-2 Specification revision number	V1.2.1
SPC-2 Workload Generator revision number	spc2rc9g
Date Results were first used publicly	April 10, 2007
Date FDR was submitted to the SPC	April 10, 2007
Date revised FDR was submitted to the SPC Revised pricing and SPC-2 Price-Performance	April 14, 2008
Date the TSC will be available for shipment to customers	April 3, 2007
Date the TSC completed audit certification	April 9, 2007

Tested Storage Product (TSP) Description

The affordable Sun StorageTek 2540 array is ideal for primary workgroup and enterprise-class tier 2 storage. The array delivers reliable RAID functionality and the highest availability in its class. The flexible, high-density array is easy to deploy with Fibre Channel and optimized for rack-intensive environments.

With up to four host-side 4 Gb/sec Fibre Channel interfaces, the Sun StorageTek 2540 array can provide up to two servers with redundant connections, enabling capacity-efficient storage consolidation without a storage network. The affordable, reliable solution improves productivity through higher performance, availability, scalability, and functionality.

The software's Web-based task management interface puts you in control of the array and significantly reduces the complexity of installation, configuration, and management. Online capacity expansion, data volume control creation, and host-to-volume mapping are just a click away, making it easy to make changes quickly and efficiently.

SPC-2 Reported Data

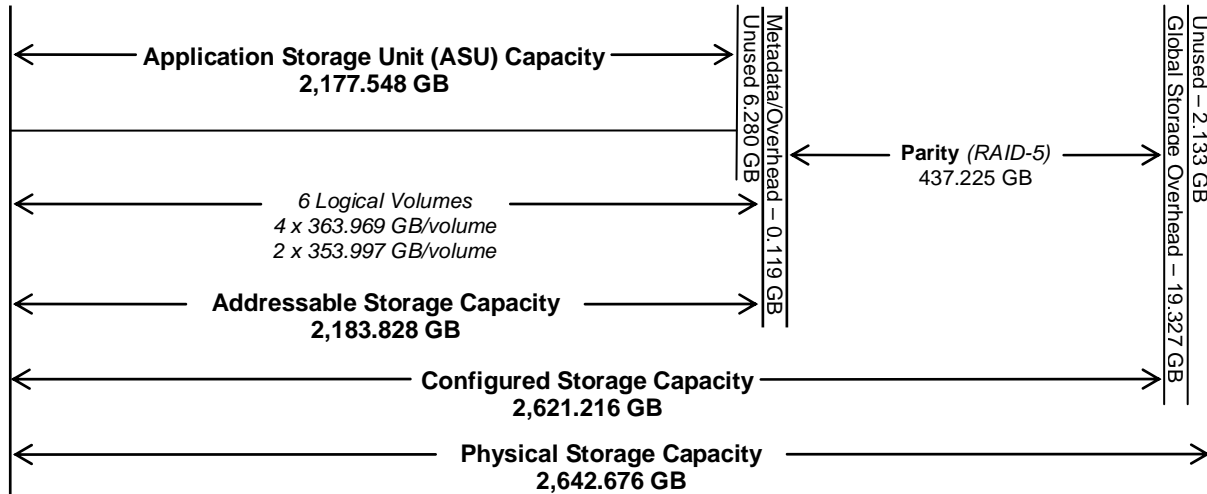
SPC-2 Reported Data consists of three groups of information:

- The following SPC-2 Primary Metrics, which characterize the overall benchmark result:
 - SPC-2 MBPS™
 - SPC-2 Price Performance
 - Application Storage Unit (ASU) Capacity
- Supplemental data to the SPC-2 Primary Metrics.
 - Total Price
 - Data Protection Level
- Reported Data for each SPC Test: Large File Processing (LFP), Large Database Query (LDQ), and Video on Demand Delivery (VOD) Test.

SPC-2 Reported Data				
Sun StorageTek® 2540 Array (RAID-5)				
SPC-2 MBPS™	SPC-2 Price-Performance	ASU Capacity (GB)	Total Price	Data Protection Level
735.62	\$37.32	2,177.548	\$27,451	RAID-5
<i>The above SPC-2 MBPS™ value represents the aggregate data rate of all three SPC-2 workloads: Large File Processing (LFP), Large Database Query (LDQ), and Video On Demand (VOD)</i>				
SPC-2 Large File Processing (LFP) Reported Data				
	Data Rate (MB/second)	Number of Streams	Data Rate per Stream	Price-Performance
LFP Composite	546.22			\$50.26
Write Only:				
1024 KiB Transfer	291.27	10	29.13	
256 KiB Transfer	279.55	10	27.96	
Read-Write:				
1024 KiB Transfer	394.11	10	39.41	
256 KiB Transfer	392.03	10	39.20	
Read Only:				
1024 KiB Transfer	959.67	10	95.97	
256 KiB Transfer	960.72	10	96.07	
<i>The above SPC-2 Data Rate value for LFP Composite represents the aggregate performance of all three LFP Test Phases: (Write Only, Read-Write, and Read Only).</i>				
SPC-2 Large Database Query (LDQ) Reported Data				
	Data Rate (MB/second)	Number of Streams	Data Rate per Stream	Price-Performance
LDQ Composite	795.56			\$34.51
1024 KiB Transfer Size				
4 I/Os Outstanding	932.39	10	93.24	
1 I/O Outstanding	912.99	10	91.30	
64 KiB Transfer Size				
4 I/Os Outstanding	611.02	10	61.10	
1 I/O Outstanding	725.85	10	72.59	
<i>The above SPC-2 Data Rate value for LDQ Composite represents the aggregate performance of the two LDQ Test Phases: (1024 KiB and 64 KiB Transfer Sizes).</i>				
SPC-2 Video On Demand (VOD) Reported Data				
	Data Rate (MB/second)	Number of Streams	Data Rate per Stream	Price-Performance
	865.08	1,100	0.79	\$31.73

Storage Capacities and Relationships

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



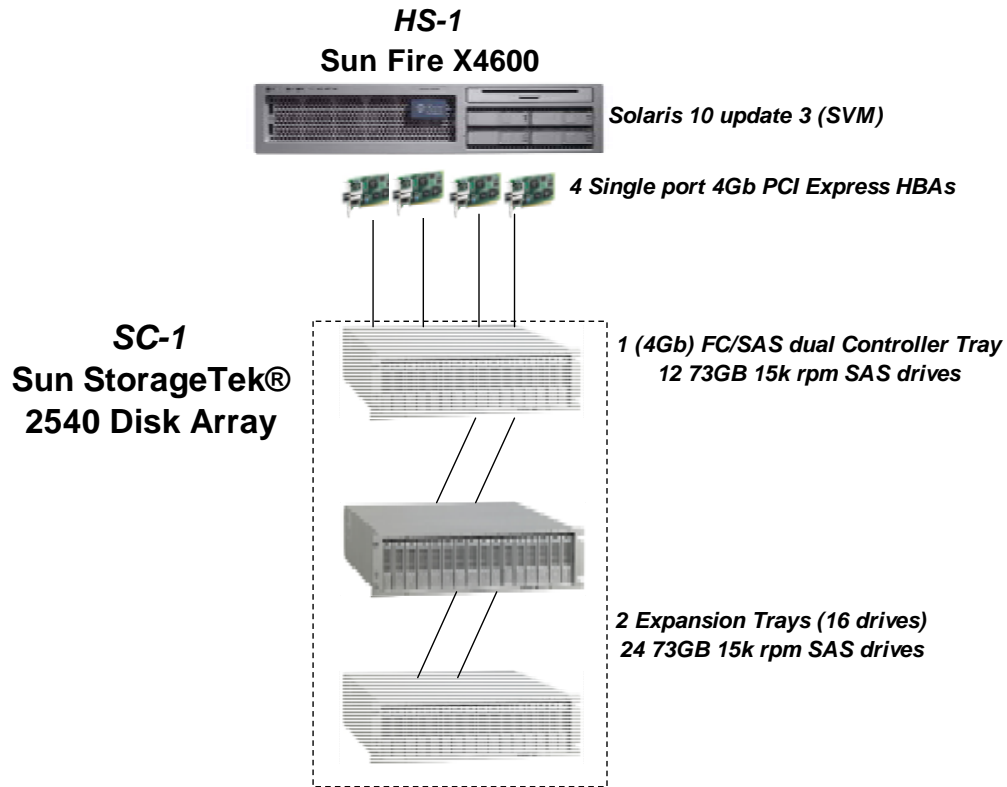
Tested Storage Configuration Pricing (*Priced Storage Configuration*)

Description	Quantity	US List	Total	discount	Ave. Price
Sun StorageTek(TM) 2540 FC Array, Rack- Ready Controller Tray	1	\$11,440	\$11,440	22%	\$8,923
- 2 Controllers w/ 512MB cache each					
- 12 73GB 15Krpm SAS drives					
- 2 redundant AC power supplies, 2 * redundant cooling fans					
- 2 redundant cooling fans					
- 4 shortwave SFPs					
- Common Array Management S/W					
- RoHS-5					
- All required cables included					
Sun StorageTek(TM) 2501 SAS Array, Rack-Ready Expansion Tray	2	\$7,040	\$14,080	22%	\$10,982
- 12 73GB 15Krpm SAS drives					
- 2 SAS I/O Modules					
- 2 redundant AC power supplies					
- 2 redundant cooling fans					
- Includes two 1m SAS host cables					
- RoHS-5					
- All required cables included					
4Gb PCI Express Single Port FC Host Based Adapter	4	\$1,320	\$5,280	22%	\$4,118
Controller unit upgrade 3 year Gold Service Maintenance	1	\$3,096.00	\$3,096	44%	\$1,734
- 7/24 coverage					
- 4 hr response time					
- 4 hour resolution					
Expansion unit upgrade 3 year Gold Service Maintenance	2	\$1,512.00	\$3,024	44%	\$1,693
- 7/24 coverage					
- 4 hr response time					
- 4 hour resolution					
		\$24,408	\$36,920		\$27,451

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

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

Benchmark Configuration/Tested Storage Configuration Diagram



Host System(s) and Tested Storage Configuration Components

Host System:	Tested Storage Configuration (TSC):
UID=HS-1 Sun Fire X4600	4 – 4 Gb single port FC PCI Express HBAs
8 – 2.6 GHz dual core AMD Opteron™ Processor 885, 1 MB L2	UID=SC-1: Sun StorageTek® 2540 Array
4 GB main memory	1 Dual Controller 512 MB cache per controller (1 GB total) 12 – 73 GB, 15K RPM, Seagate SAS disk drives
Solaris 10 update 3	4 host connections (front end)
PCI Express	2 drive connections (backend)
WG	2 –Expansion Trays (12 drives/tray)
	36 – 73 GB, 15K RPM, Seagate SAS disk drives