SPC BENCHMARK 2™
EXECUTIVE SUMMARY

SUN MICROSYSTEMS, INC.
SUN STORAGETEK® 2530 ARRAY *(MIRRORING)*

SPC-2™ V1.2.1

Submitted for Review: August 16, 2007
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Certified
SPC Result

www.storageperformance.org

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

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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	August 16, 2007
Date FDR was submitted to the SPC	August 16, 2007
Date revised FDR was submitted to the SPC Revised pricing and SPC-2 Price-Performance	April 11, 2008
Date the TSC will be available for shipment to customers	July 1, 2007
Date the TSC completed audit certification	August 16, 2007

Tested Storage Product (TSP) Description

With up to six host-side three Gbps SAS interfaces, the Sun StorageTek 2530 array can provide support for up to three servers with redundant connections — enabling capacity-efficient storage consolidation without the need of a storage network.

The Sun StorageTek 2530 array's modular design creates an affordable entry point without sacrificing future scalability — enabling customers to start small and scale incrementally when they are ready to address data growth. Dual-active controllers and up to 12 drives combine to create a feature-rich and highly available storage system within a space-efficient 2U enclosure. When capacity or performance requirements change, the Sun StorageTek 2530 array supports up to a total of 36 drives, allowing further investment protection and flexibility without the need to move to another platform architecture.

The Sun StorageTek 2530 array is ideal for a server clustering environment. By utilizing up to two active/active RAID controllers with mirrored cache — redundant components including power and cooling, hot-spare drive that can be available as a spare to any virtual disk in any tray, and automated I/O path failover—the array is well suited for clusters where continuous application and data availability are key requirements.
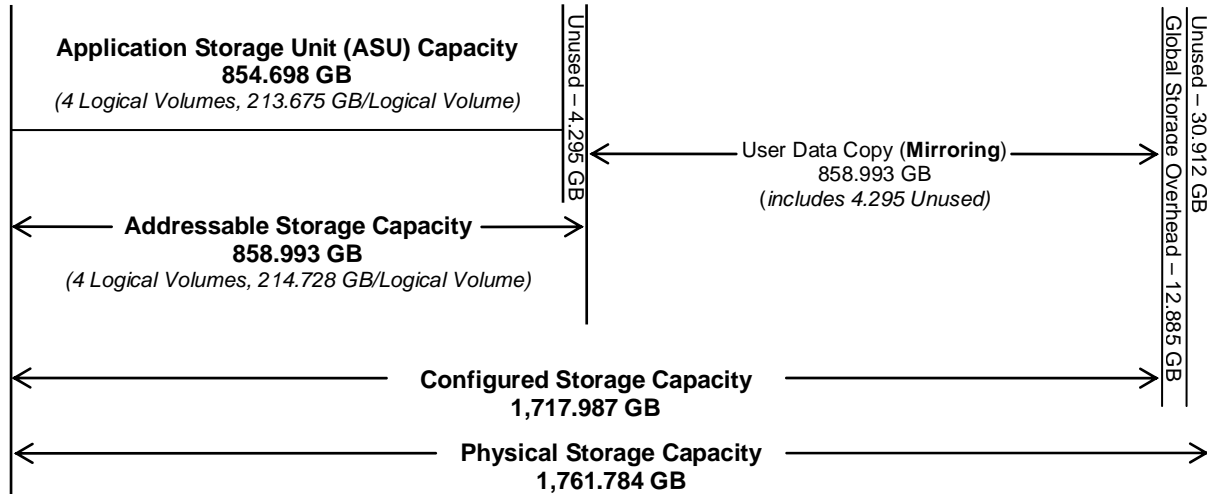
SPC-2 Reported Data

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® 2530 Array *(Mirroring)*				
SPC-2 MBPS™	SPC-2 Price-Performance	ASU Capacity (GB)	Total Price	Data Protection Level
663.51	$26.48	854.698	$17,572	Mirroring
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)				
SPC-2 Large File Processing (LFP) Reported Data				
	Data Rate *(MB/second)*	Number of Streams	Data Rate per Stream	Price-Performance
LFP Composite	495.36			$35.47
Write Only:				
1024 KiB Transfer	284.83	10	28.48	
256 KiB Transfer	272.32	10	27.23	
Read-Write:				
1024 KiB Transfer	385.93	10	38.59	
256 KiB Transfer	396.66	10	39.67	
Read Only:				
1024 KiB Transfer	822.42	10	82.24	
256 KiB Transfer	810.01	10	81.00	
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).				
SPC-2 Large Database Query (LDQ) Reported Data				
	Data Rate *(MB/second)*	Number of Streams	Data Rate per Stream	Price-Performance
LDQ Composite	759.85			$23.13
1024 KiB Transfer Size				
4 I/Os Outstanding	816.66	10	81.67	
1 I/O Outstanding	811.96	10	81.20	
64 KiB Transfer Size				
4 I/Os Outstanding	708.34	10	70.83	
1 I/O Outstanding	702.45	10	70.24	
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).				
SPC-2 Video On Demand (VOD) Reported Data				
	Data Rate *(MB/second)*	Number of Streams	Data Rate per Stream	Price-Performance
	735.32	935	0.79	$23.90

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)*

Part Number	Description	Quantity	US List	Total	discount	Ave. Price
XTA2530R01A2D876	Sun StorageTek(TM) 2530 SAS Array, Rack- Ready Controller Tray	1	$10,640	$10,640	22%	$8,299
	- 2 SAS Controllers w/ 512MB cache each					
	- 12 73GB 15Krpm SAS drives					
	- 2 redundant AC power supplies					
	- 2 redundant cooling fans					
	- 4 shortwave SFPs					
	- Common Array Management S/W					
	- RoHS-5					
	- All required cables included					
XTA2501R01A2D876	Sun StorageTek(TM) 2501 SAS Array, Rack-Ready Expansion Tray	1	$7,040.00	$7,040	22%	$5,491
	- 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					
SG-XPCI8SAS-E-Z	Sun StorageTek (TM) PCI-X SAS Host Bus Adapter, Eight Port, RoHS 6	2	$550	$1,100	22%	$858
XTA25X0-1.0M-SAS-Z	1m, Mini, shielded, SAS cable (to connect to host)	4	$110	$440	22%	$343
IWU-ST2530NW-24-3G	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					
IWU-ST2501NW-24-3G	Expansion unit upgrade 3 year Gold Service Maintenance	1	$1,512.00	$1,512	44%	$847
	- 7/24 coverage					
	- 4 hr response time					
	- 4 hour resolution					
Total			**$22,948**	**$23,828**		**$17,572**

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

HS-1
Sun Fire X4600
(Windows 2003 Server)

2 - SAS PCI-X 8-lane 3Gb HBAs

1 Dual Controller Tray
12 - 73GB 15k RPM SAS drives

1 Expansion Tray
12 - 73GB 15k RPM SAS drives

SC-1
Sun StorageTek®
2530 Disk Array

Host System(s) and Tested Storage Configuration Components

Host System:	Tested Storage Configuration (TSC):	
UID=HS-1 **Sun Fire X4600**	2 – SAS PCI-X 8-lane 3Gb HBAs	
	UID=SC-1: **Sun StorageTek® 2530 Array**	

8 – 2.6 GHz dual core
    AMD Opteron™ Processor 885,
    1 MB L2
	1 Dual Controller
	    512 MB cache per controller *(1 GB total)*
	    12 – 73 GB, 15K RPM, Seagate SAS disk drives	

4 GB main memory	6 host connections available, 4 used *(front end)*	
Windows 2003 Server	2 drive connections to expansion tray *(backend)*	
PCI-X	1 –Expansion Tray (12 drives/tray)	
WG	24 – 73 GB, 15K RPM, Seagate SAS disk drives *(total)*	