



**SPC BENCHMARK 2™
EXECUTIVE SUMMARY**

**SUN MICROSYSTEMS, INC.
SUN STORAGE TEK 3320 SCSI ARRAY**

SPC-2™ V1.1

**Submitted for Review: August 7, 2006
Submission Identifier: B00007**

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

Test Sponsor and Contact Information	
Test Sponsor Primary Contact	Sun Microsystems, Inc. – http://www.sun.com Leah Schoeb – leah.schoeb@sun.com 5300 Riata Park Court AUS08 Austin, TX 78721 Phone: (512) 401-1227 FAX: (512) 266-2523
Test Sponsor Alternate Contact	Sun Microsystems, Inc. – http://www.sun.com Tom Scheffield – tom.sheffield@sun.com 500 Eldorado Blvd. UBRM05 Broomfield, CO 80021 Phone: (303) 558-3112 FAX: (303) 272-7491
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	V1.1
SPC-2 Workload Generator revision number	spc2rc9f
Date Results were first used publicly	August 7, 2006
Date FDR was submitted to the SPC	August 7, 2006
Date the TSC will be available for shipment to customers	currently available
Date the TSC completed audit certification	August 7, 2006

SPC-2 Reported Data

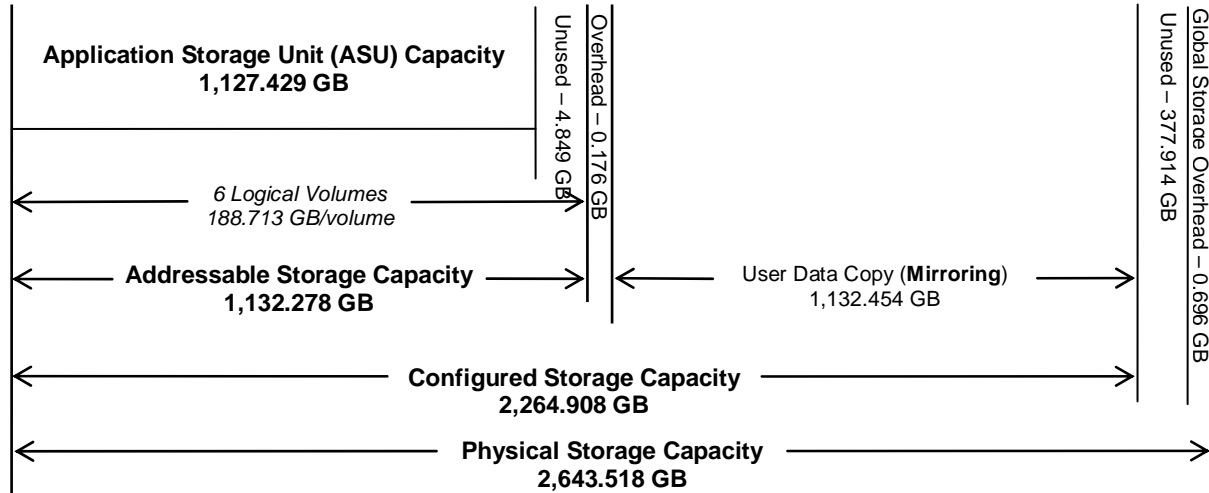
SPC-2 Reported Data consists of three groups of information:

- 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.

Sun StorageTek 3320 SCSI Array				
SPC-2 MBPS™	SPC-2 Price-Performance	ASU Capacity (GB)	Total Price	Data Protection Level
237.43	\$171.92	1,127.429	\$40,819	Mirroring
<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	217.25			\$187.89
Write Only:				
1024 KiB Transfer	164.50	28	5.88	
256 KiB Transfer	154.12	22	7.01	
Read-Write:				
1024 KiB Transfer	240.50	16	15.03	
256 KiB Transfer	207.87	16	12.99	
Read Only:				
1024 KiB Transfer	275.92	20	13.80	
256 KiB Transfer	260.58	14	18.61	
<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	247.31			\$165.05
1024 KiB Transfer Size				
4 I/Os Outstanding	274.56	12	22.88	
1 I/O Outstanding	273.84	12	22.82	
64 KiB Transfer Size				
4 I/Os Outstanding	220.78	14	15.77	
1 I/O Outstanding	220.07	12	18.34	
<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
	247.73	315	0.79	\$164.78

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	Disc.	Ave. Price
See below	Sun StorEdge 3320 Fibre Channel Array	1	\$23,387	38%	\$14,500
	2 FC-AL HW RAID Controllers				
	1GB Std cache per Controller				
	2 AC power supplies				
	Sun StorEdge Configuration Service				
	Rack Ready				
See below	73 GB/15K Drives	12	\$14,537	38%	\$18,026
	Sun StorEdge 3320 Fibre Channel Array JBOD	2			
	Rack Ready				
	2 DC power supplies				
W9D-SE3320-3G	73 GB/15K Drives	12	\$4,212.00	40%	\$7,582
	3-Year Maintenance Agreement Gold	3			
SGXPCI2SCSILM320-Z	SCSI adapters (PCI Dual Ultra320 SCSI HBA)	2	\$445.00	20%	\$712
Total					\$40,819

One 3320 RAID UNIT:

2 RAID XATO AC Parts/Descriptions:

qty 1 TA3320R01N00DISK SE3320-RAID CHASSIS-RR
 qty 1 TA-3000-2UAC-KIT 2 * AC PWR Supply/Fan Mod, 2U

 qty 2 TB-3320-CTRL-512M 3320 CTRL, U320 RAID, 512MB Cache
 qty 12 TB-SC1NC-73G15K Drive, 73GB/15K U320 SCSI
 qty 1 TA-3320-2RAID-ACSK 3320-2RAID-AC-SHIP KIT

US List Price (ea)

Ext US List

\$2,547.00 \$2,547.00
 \$900.00 \$900.00
 \$4,300.00 \$8,600.00
 \$945.00 \$11,340.00
 \$0.00 \$0.00

Total Ext: \$23,387.00
Discount: Cat P = 38%
Avg.Price: \$14,499.94

Two 3320 JBOD UNITS:

JBOD XATO AC Parts/Descriptions:

qty 1 TA3320R00N00DISK SE3320-JBOD CHASSIS-RR

 qty 1 TA-3000-2UAC-KIT 2 * AC PWR Supply/Fan Mod, 2U
 qty 12 TB-SC1NC-73G15K Drive, 73GB/15K U320 SCSI
 Qty 1 TA-3320-JBOD-ACSK 3320-JBOD-AC-SHIP KIT

US List Price (ea)

Ext US List

\$2,297.00 \$2,297.00
 \$900.00 \$900.00
 \$945.00 \$11,340.00
 \$0.00 \$0.00

Total Ext One Unit: \$14,537.00
Discount: Cat P = 38%
Avg.Price: \$9,012.94

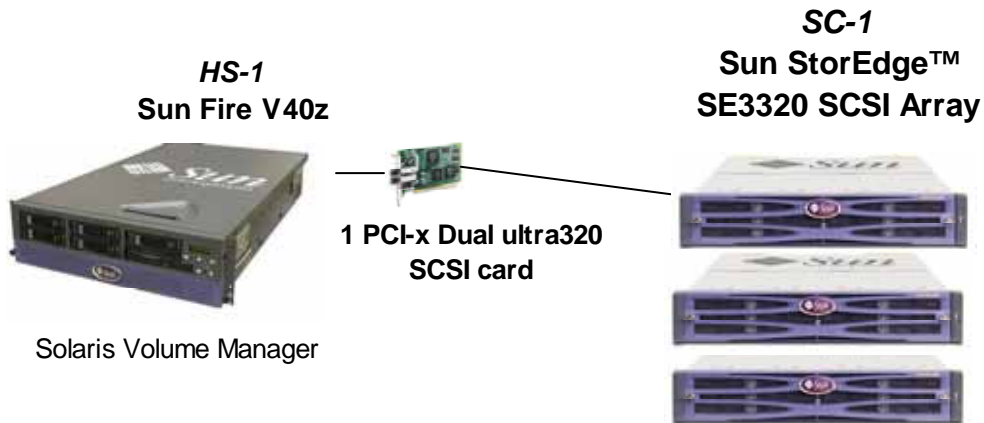
Two Unit Pricing: \$29,074.00
Discount: Cat P = 38%
Avg.Price: \$18,026

The above pricing (three year Gold maintenance) provides maintenance/support for 24 hours per day, 7 days per week for three years with four hour acknowledgement and four hour subsequent response (support engineer onsite or customer replaceable part available).

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 V40z	1 – PCI-X Dual U320 SCSI HBA
4 - AMD Opteron 2.4 GHz CPUs 1 MB Level 2 cache per CPU	UID=SC-1: Sun StorEdge™ SE3320 SCSI Array
4 GB main memory	2 – Controllers with 1 GB cache each
Solaris 10 FCS Volume Manager	2 channel ports
Solaris 10 FCS	2 JBOD Expansion Units
PCI-X	36 – 73 GB 15K RPM disk drives
WG	