



**SPC BENCHMARK 2™
EXECUTIVE SUMMARY**

**SUN MICROSYSTEMS, INC.
SUN STORAGE 6780 ARRAY (*RAID-6*)**

SPC-2™ V1.2.1

**Submitted for Review: February 3, 2009
Submission Identifier: B00040**

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

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Test Sponsor Primary Contact	Sun Microsystems, Inc. – http://www.sun.com Leah Schoeb – leah.schoeb@sun.com 5300 Riata Park Court Bldg B Austin, TX 78727 Phone: (877) 319-0457 FAX: (512) 266-2523
Test Sponsor Alternate Contact	Sun Microsystems, Inc. – http://www.sun.com Jason Schaffer – jason.schaffer@sun.com 500 Eldorado Blvd. Broomfield, CO 80021 Phone: (303) 272-4743 FAX: (303) 272-9704
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

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SPC-2 Specification revision number	V1.2.1
SPC-2 Workload Generator revision number	V1.0
Date Results were first used publicly	February 3, 2009
Date FDR was submitted to the SPC	February 3, 2009
Date the TSC will be available for shipment to customers	February 3, 2009
Date the TSC completed audit certification	February 2, 2009

Tested Storage Product (TSP) Description

The Sun Storage 6780 Array is a modular, rack mounted and scalable array designed specifically to grow with your applications, lowering acquisition and expansion costs. The Sun Storage 6780 Array consists of a minimum of one controller tray and up to 16 expansion trays. The Sun Storage 6780 controller tray (1 x 1) currently has two cache options — 8 GB and 16 GB – and two host port options – 8 or 16 – 4 Gb per second fibre channel.

The Sun Storage 6780 Array leverages the existing Common Storage Modules (CSM200) expansion trays for primary and secondary storage requirements. With redundant components, automated path failover and extensive online configuration, re-configuration and maintenance capabilities, the Sun Storage 6780 is designed to ensure your data is available 24x7x365.

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 Storage 6780 Array (RAID-6)				
SPC-2 MBPS™	SPC-2 Price-Performance	ASU Capacity (GB)	Total Price	Data Protection Level
4,675.50	\$55.25	14,042.731	\$258,329	Other (RAID-6)
<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	4,664.54			\$55.38
Write Only:				
1024 KiB Transfer	3,209.27	48	66.86	
256 KiB Transfer	3,194.12	48	66.54	
Read-Write:				
1024 KiB Transfer	4,508.71	48	93.93	
256 KiB Transfer	4,493.12	48	93.61	
Read Only:				
1024 KiB Transfer	6,300.41	48	131.26	
256 KiB Transfer	6,281.63	48	130.87	
<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	5,351.15			\$48.28
1024 KiB Transfer Size				
4 I/Os Outstanding	6,360.93	48	132.52	
1 I/O Outstanding	6,272.04	48	130.67	
64 KiB Transfer Size				
4 I/Os Outstanding	3,580.89	48	74.60	
1 I/O Outstanding	5,190.73	48	108.14	
<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
	4,010.82	5,100	0.79	\$64.41

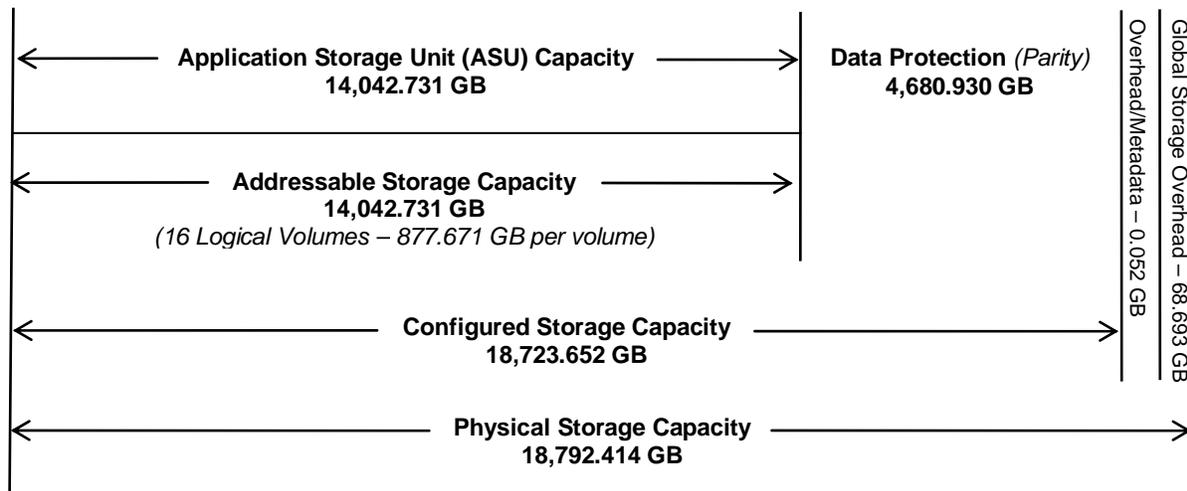
SPC-2 MBPS™ represents the aggregate data rate, in megabytes per second, of all three SPC-2 workloads: Large File Processing (LFP), Large Database Query (LDQ), and Video on Demand (VOD).

ASU (Application Storage Unit) Capacity represents the total storage capacity read and written in the course of executing the SPC-2 benchmark.

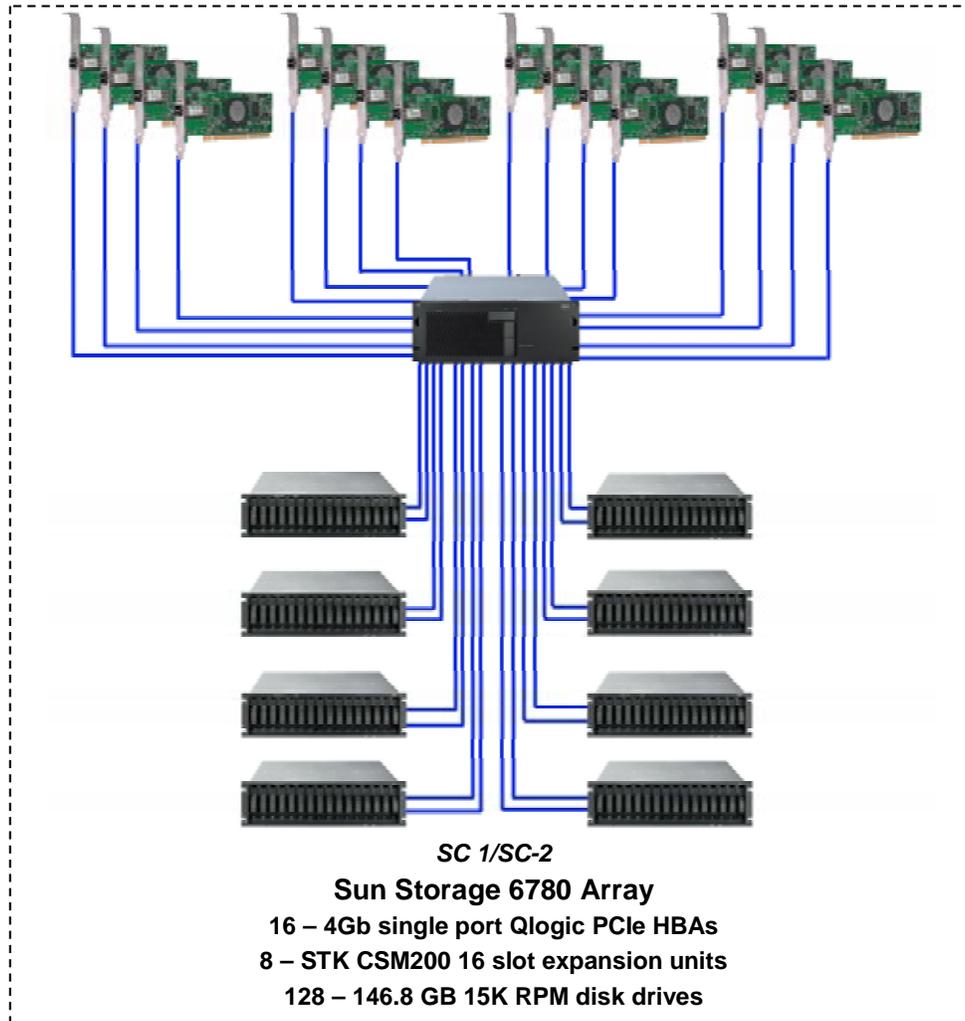
A **Data Protection Level of Other Protection Level** utilized a RAID-6 implementation. Disk arrays with RAID-6 provide simultaneous drive failure protection. RAID 6 stripes both user data and redundancy data (parity) across the drives. RAID 6 uses the equivalent of the capacity of two drives (in a volume group) for redundancy data. RAID 6 protects against simultaneous failure of two volume group member drives by using two independent error-correction schemes.

Storage Capacities and Relationships

The following diagram (*not to scale*) documents the various storage capacities, used in this benchmark, and their relationships.



Priced Storage Configuration Diagram



Priced Configuration Components

Priced Storage Configuration:
16 – 4Gb single port Qlogic PCIe HBAs
SC-1/SC-2: Sun Storage 6780 Array
2 – dual-active controllers with:
8 GB cache per controller
2 – Two Quad 4 Gbps FC Host Port Cards
16 – 4 Gb Fibre Channel front-end connections
16 – 4 Gb Fibre Channel backend connection
16 – STK CSM200 16 slot expansion units
128 – 146.8 GB 15K RPM disk drives