



**SPC BENCHMARK 2™**  
**EXECUTIVE SUMMARY**

**SUN MICROSYSTEMS, INC.**  
**SUN STORAGE 6780 ARRAY (RAID-5)**

**SPC-2™ V1.2.1**

**Submitted for Review: February 2, 2009**  
**Submission Identifier: B00039**

## **EXECUTIVE SUMMARY**

### **Test Sponsor and Contact Information**

<b>Test Sponsor and Contact Information</b>	
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### **Revision Information and Key Dates**

<b>Revision Information and Key Dates</b>	
<b>SPC-2 Specification revision number</b>	V1.2.1
<b>SPC-2 Workload Generator revision number</b>	V1.0
<b>Date Results were first used publicly</b>	February 2, 2009
<b>Date FDR was submitted to the SPC</b>	February 2, 2009
<b>Date the TSC will be available for shipment to customers</b>	February 3, 2009
<b>Date the TSC completed audit certification</b>	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-5)				
SPC-2 MBPS™	SPC-2 Price-Performance	ASU Capacity (GB)	Total Price	Data Protection Level
4,818.43	\$53.61	16,383.186	\$258,329	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	4,987.30			\$51.80
Write Only:				
1024 KiB Transfer	3,648.97	48	76.02	
256 KiB Transfer	3,638.54	48	75.80	
Read-Write:				
1024 KiB Transfer	4,960.35	48	103.34	
256 KiB Transfer	4,948.28	48	103.09	
Read Only:				
1024 KiB Transfer	6,368.09	48	132.67	
256 KiB Transfer	6,359.55	48	132.49	
<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	5,457.17			\$47.34
1024 KiB Transfer Size				
4 I/Os Outstanding	6,377.55	48	132.87	
1 I/O Outstanding	6,351.40	48	132.32	
64 KiB Transfer Size				
4 I/Os Outstanding	3,770.59	48	78.55	
1 I/O Outstanding	5,329.14	48	111.02	
<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

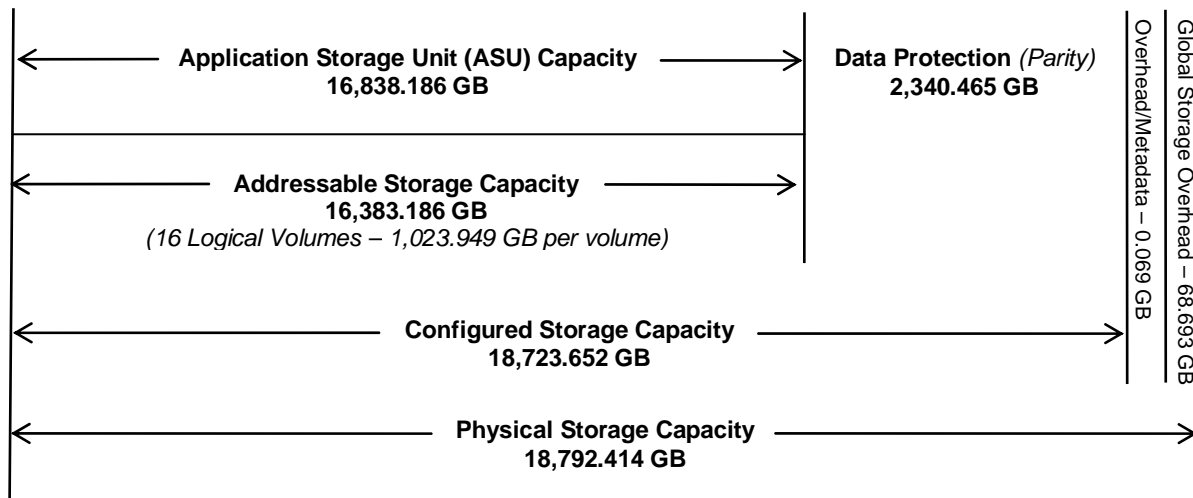
**SPC-2 MBPS™** represents the aggregate data rate, in megabytes per second, of all three SPC-2 workloads: Large File Processing (LFP), Large Database Query (LDQ), and Video on Demand (VOD).

**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 RAID-5** provides data protection by distributing check data corresponding to user data across multiple disks in the form of bit-by-bit parity.

### Storage Capacities and Relationships

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



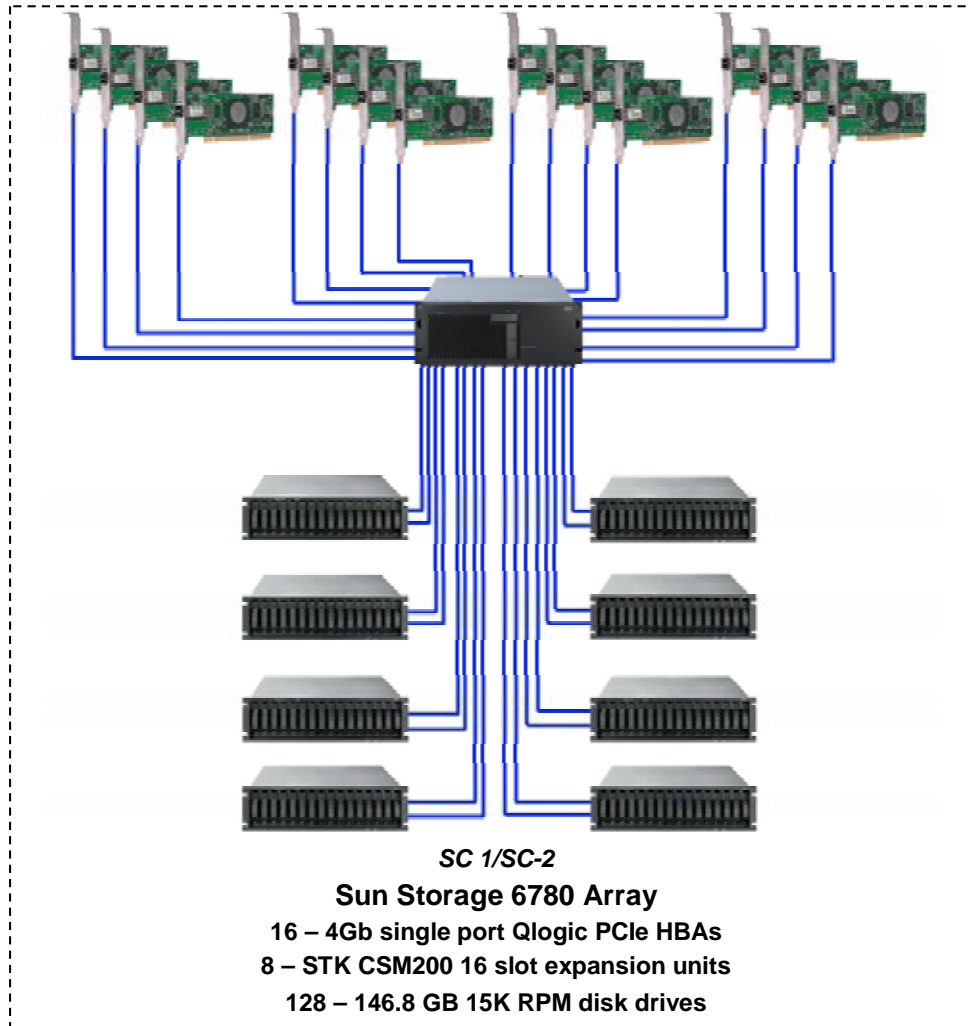
**Tested Storage Configuration Pricing (Priced Storage Configuration)**

XTA6780R11Q4SA2-16	Sun Storage 6780 Array, 1x1, 16 GB, 16 Host ports	1	\$124,999	\$124,999	38%	\$77,499
	- 2 Controllers w/ 8GB cache each		\$0	\$0	38%	\$0
	- All required cables included		\$0	\$0	38%	\$0
	- Quad 4 Gbps FC Host Port cards	2	\$0	\$0	38%	\$0
	- Short wave 4Gbps SFP transeiver Pair	8	\$0	\$0	38%	\$0
XTCCSM2R01A0C2336Z	STK CSM200 RM 0x1x16x146G15k	8	\$29,915	\$239,320	38%	\$148,378
	- 16 146GB 15k rpm 4Gb drives					
	- All required cables included (5M LC-LC Fiber Optic Cable)					
SN599-1030-99A9	CAM Management Software	1	\$0	\$0	38%	\$0
SG-XPCI1FC-EM4	4Gb PCI single port FC Host Based Adapter	16	\$1,100	\$17,600	38%	\$10,912
XTC6x80-DOM8-ARY	8 Storage Domains	1	\$10,000	\$10,000	38%	\$6,200
IWU-ST6780-6-24-3G	3-yr Gold Service Maintainance for controller tray	1	\$9,700	\$9,700	38%	\$6,014
	- 7/24 coverage					
	- 4 hour resonse time					
	- 4 hour resolution					
IWU-STCSM2-24-3G	3-yr Gold Service Maintainance for CSM200 expansion tray	8	\$1,880	\$15,040	38%	\$9,325
	- 7/24 coverage					
	- 4 hr response time					
	- 4 hour resolution					
					<b>\$416,659</b>	<b>\$258,329</b>

**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.

### Priced Storage Configuration Diagram



### Priced Configuration Components

<b>Priced Storage Configuration:</b>
16 – 4Gb single port Qlogic PCIe HBAs
<b>SC-1/SC-2: Sun Storage 6780 Array</b>
<b>2 – dual-active controllers with:</b>
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