



**SPC BENCHMARK 2™
EXECUTIVE SUMMARY**

**SILICON GRAPHICS INTERNATIONAL CORP.
SGI® INFINITESTORAGE 5500-SP**

SPC-2™ V1.3

**Submitted for Review: May 31, 2012
Submission Identifier: B00059**

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

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Revision Information and Key Dates

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SPC-2 Specification revision number	V1.3
SPC-2 Workload Generator revision number	V1.0
Date Results were first used publicly	May 31, 2012
Date FDR was submitted to the SPC	May 31, 2012
Date the TSC will be available for shipment to customers	currently available
Date the TSC completed audit certification	April 30, 2012

Tested Storage Product (TSP) Description

SGI® InfiniteStorage 5500 (IS5500) storage system meets both an organization's demanding performance and capacity requirements while not sacrificing simplicity or efficiency. This sixth-generation storage system offers ultimate flexibility. It comes in the IS5500-SP version used in the SPC-2 Tested Storage Configuration, with standard firmware compatible with a broad range of heterogeneous environments. In addition, the platform comes in the IS5500 custom version, with specially tuned firmware for high performance SGI environments.

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				
SGI® InfiniteStorage 5500-SP				
SPC-2 MBPS™	SPC-2 Price-Performance	ASU Capacity (GB)	Total Price	Data Protection Level
4,064.49	\$28.57	7,021.366	\$116,109.00	Protected (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	4,370.96			\$26.56
Write Only:				
1024 KiB Transfer	3,091.71	48	64.41	
256 KiB Transfer	2,894.88	48	60.31	
Read-Write:				
1024 KiB Transfer	4,374.75	48	91.14	
256 KiB Transfer	4,441.93	48	92.54	
Read Only:				
1024 KiB Transfer	5,851.93	48	121.92	
256 KiB Transfer	5,570.56	48	116.05	
<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	5,148.63			\$22.55
1024 KiB Transfer Size				
4 I/Os Outstanding	5,930.97	48	123.56	
1 I/O Outstanding	5,868.46	48	122.26	
64 KiB Transfer Size				
4 I/Os Outstanding	3,902.09	48	81.29	
1 I/O Outstanding	4,892.99	48	101.94	
<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
	2,673.87	3,400	0.79	\$43.42

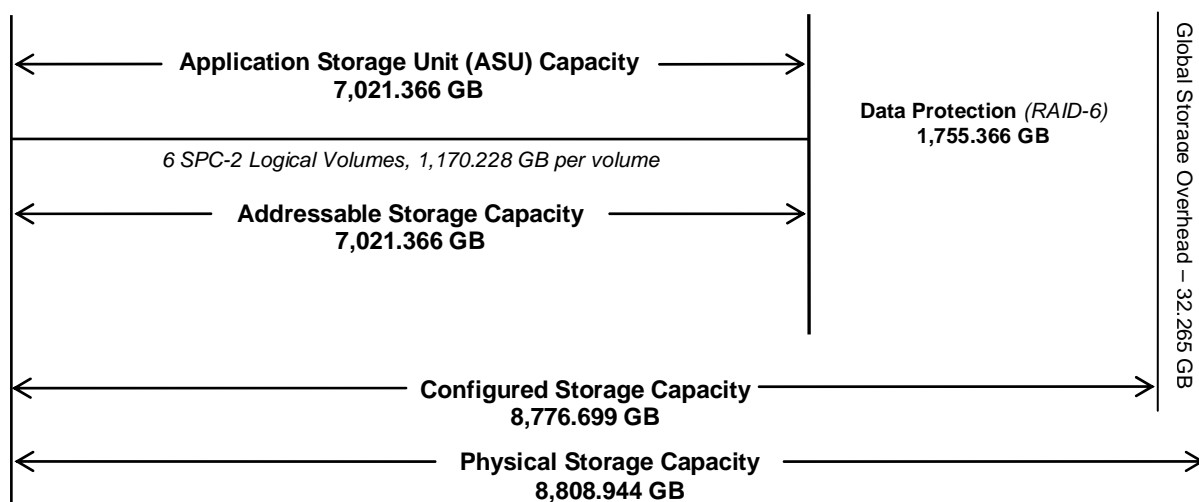
SPC-2 MBPS™ represents the aggregate data rate, in megabytes per second, of all three SPC-2 workloads: Large File Processing (LFP), Large Database Query (LDQ), and Video on Demand (VOD).

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 Protected** using **RAID-6**, which provides double-parity RAID protection against data loss.

Storage Capacities and Relationships

The following diagram (*not to scale*) and table document the various storage capacities, used in this benchmark, and their relationships, as well as the storage utilization values required to be reported.



SPC-1 Storage Capacity Utilization	
Application Utilization	79.71%
Protected Application Utilization	99.63%
Unused Storage Ratio	0.00%

Application Utilization: Total ASU Capacity (*7,021.366 GB*) divided by Physical Storage Capacity (*8,808.944 GB*)

Protected Application Utilization: Total ASU Capacity (*7,021.366 GB*) plus total Data Protection Capacity (*1,755.336 GB*) minus unused Data Protection Capacity (*0,.000 GB*) divided by Physical Storage Capacity (*8,808.944 GB*).

Unused Storage Ratio: Total Unused Capacity (*0.000 GB*) divided by Physical Storage Capacity (*8,808.944 GB*) and may not exceed 45%.

Detailed information for the various storage capacities and utilizations is available on pages 21-22 in the Full Disclosure Report.

Priced Storage Configuration Pricing

Marketing Code	Description	Quantity	Unit List price	Unit Maintenance	Extended Price
SP10066	IS5500-SP, 4U 60bay, 24GB cache, Duplex, eight 8Gb FC host ports	1	\$50,293.00	\$7,574.00	\$57,867.00
IS-D146-160-G-10	146GB 15K SAS 2.5" PI&FDE 60bay 10 pack for IS5000/IS5000-SP Family	6	\$5,229.00	\$0.00	\$31,374.00
SP12087	IS5500-SP, High Performance feature key	1	\$14,888.00	\$0.00	\$14,888.00
SP12081	SANtricity ES 10.XX FOR WINDOWS for IS5500-SP	1	\$1,888.00	\$770.00	\$2,658.00
PCIE-FC8-2P-G2	Dual port 8Gb FC PCIE Gen2 HBA	4	\$2,100.00	\$0.00	\$8,400.00
X-F44-OPT-3M-Z	3 meter optical 2/4/8Gbit FC 10Gb enet cable	8	\$84.00	\$0.00	\$672.00
IS-RMKIT-UNIV-Z	Rackmount kit for OEM racks, mounts to rails	1	\$250.00	\$0.00	\$250.00
Total					\$116,109.00
	<i>all required SFPs and SAS cables are included with each appropriate component</i>				

The following pricing includes the following:

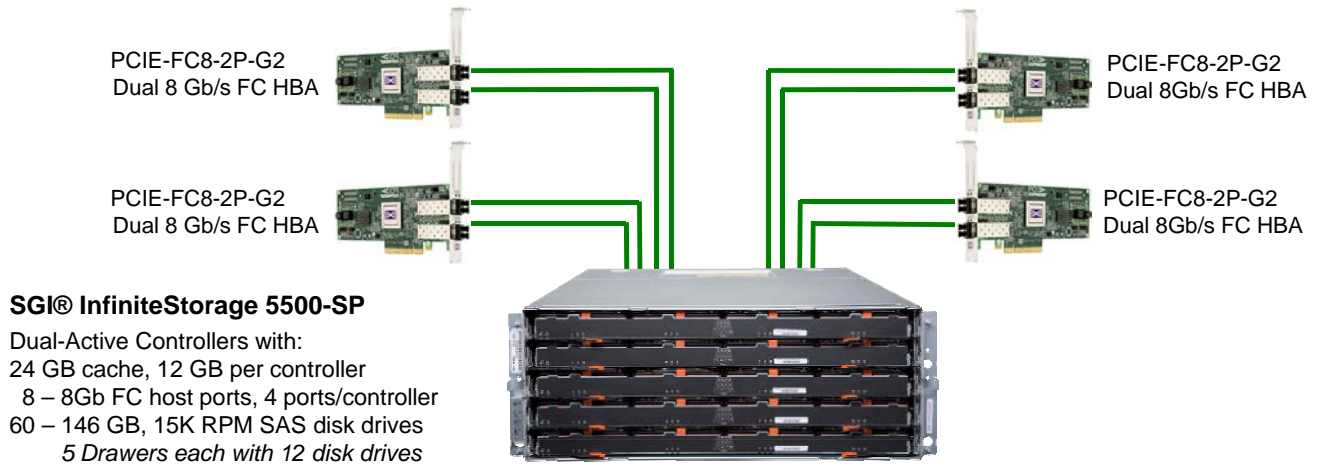
- Acknowledgement of new and existing hardware and/or software problems within four hours.
- Onsite presence of a qualified maintenance engineer or provision of a customer replaceable part within four hours of the above acknowledgement for any hardware failure that results in an inoperative Priced Storage Configuration component.

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

- A panel on the front bezel is silver with SGI logo and product name rather than black with NetApp logo and product name.
- An equivalent SGI-branded FC8 HBA is priced rather than the generic Emulex part.
- The TSC used an internal engineering feature code that included the High Performance Tier.
- The Priced Storage Configuration uses the base feature code and an optional feature key installed with the SANtricity GUI to enable the High Performance Tier.

The above differences, if applied to the TSC, would not have a negative impact on the reported SPC-2 performance.

Priced Storage Configuration Diagram



Priced Configuration Components

Priced Storage Configuration:
4 – SGI dual port 8 Gb FC PCIe Gen2 HBAs
SANtricity ES 10.XX for Windows for IS5500-SP
SGI® InfiniteStorage 5500-SP Dual-Active Controllers with: 24 GB cache , 12 GB per controller High Performance Tier Enabled 8 – 8 Gb FC host ports, 4 ports per controller 2 – 6 Gb SAS connections, 1 per controller 60 – 146 GB, 15K RPM SAS disk drives