



SPC BENCHMARK 1™
EXECUTIVE SUMMARY

SILICON GRAPHICS INTERNATIONAL CORP.
SGI® INFINITESTORAGE 5000-SP

SPC-1 V1.12

Submitted for Review: January 31, 2011
Submission Identifier: A00102

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

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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-1 Specification revision number	V1.12
SPC-1 Workload Generator revision number	V2.1.0
Date Results were first used publicly	January 31, 2011
Date the FDR was submitted to the SPC	January 31, 2011
Date the priced storage configuration is available for shipment to customers	currently available
Date the TSC completed audit certification	January 28, 2011

Tested Storage Product (TSP) Description

IS5000-SP is the newest addition to a complete selection of SGI storage hardware and software solutions, and the first to employ 6 Gb/s SAS technology. The system provides customers with improved performance and scalability, multi-protocol host connectivity, flexible drive support, and advanced energy saving and data security features. Delivering a balanced mix of IOPS and throughput, IS5000 provides sustainable performance that is a considerable improvement over previous generation technology. With the optional High Performance Feature Key, the IS5000 is equally adept at delivering throughput to bandwidth-intensive and IOPS demanding applications.

Summary of Results

SPC-1 Results	
Tested Storage Configuration (TSC) Name: SGI® InfiniteStorage 5000-SP	
Metric	Reported Result
SPC-1 IOPS™	24,555.54
SPC-1 Price-Performance	\$3.61/SPC-1 IOPS™
Total ASU Capacity	6,543.785 GB
Data Protection Level	Protected (<i>Mirroring</i>)
Total TSC Price (including three-year maintenance)	\$88,530.00

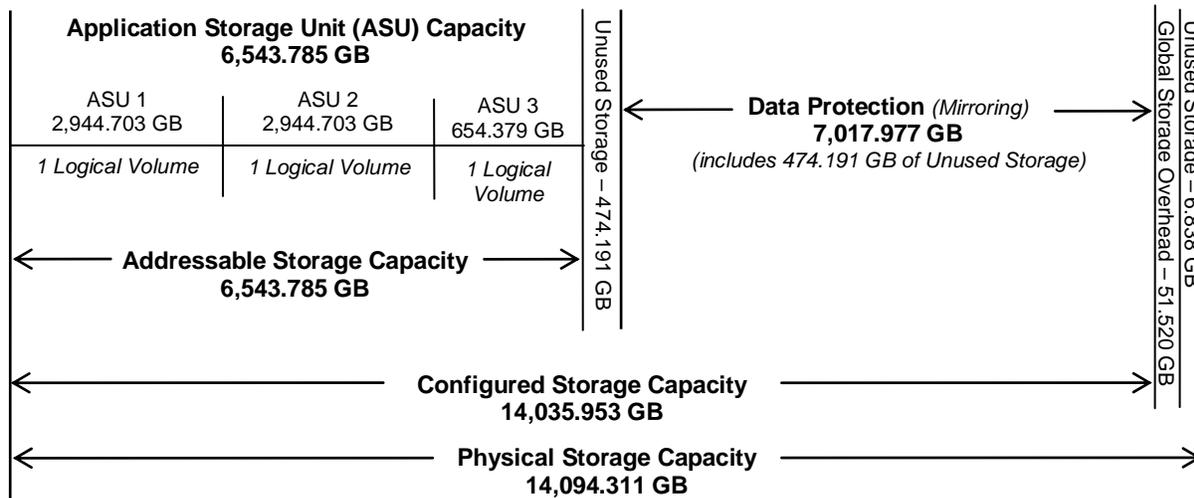
SPC-1 IOPS™ represents the maximum I/O Request Throughput at the 100% load point.

Total ASU (Application Storage Unit) Capacity represents the total storage capacity read and written in the course of executing the SPC-1 benchmark.

A **Data Protection Level of Protected** using *Mirroring* configures two or more identical copies of user data.

Storage Capacities and Relationships

The following diagram 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	46.43%
Protected Application Utilization	92.86%
Unused Storage Ratio	6.78%

Application Utilization: Total ASU Capacity (6,543.785 GB) divided by Physical Storage Capacity (14,094.311 GB)

Protected Application Utilization: Total ASU Capacity (6,543.785 GB) plus total Data Protection Capacity (7,017.977 GB) minus unused Data Protection Capacity (474.191 GB) divided by Physical Storage Capacity (14,094.311 GB)

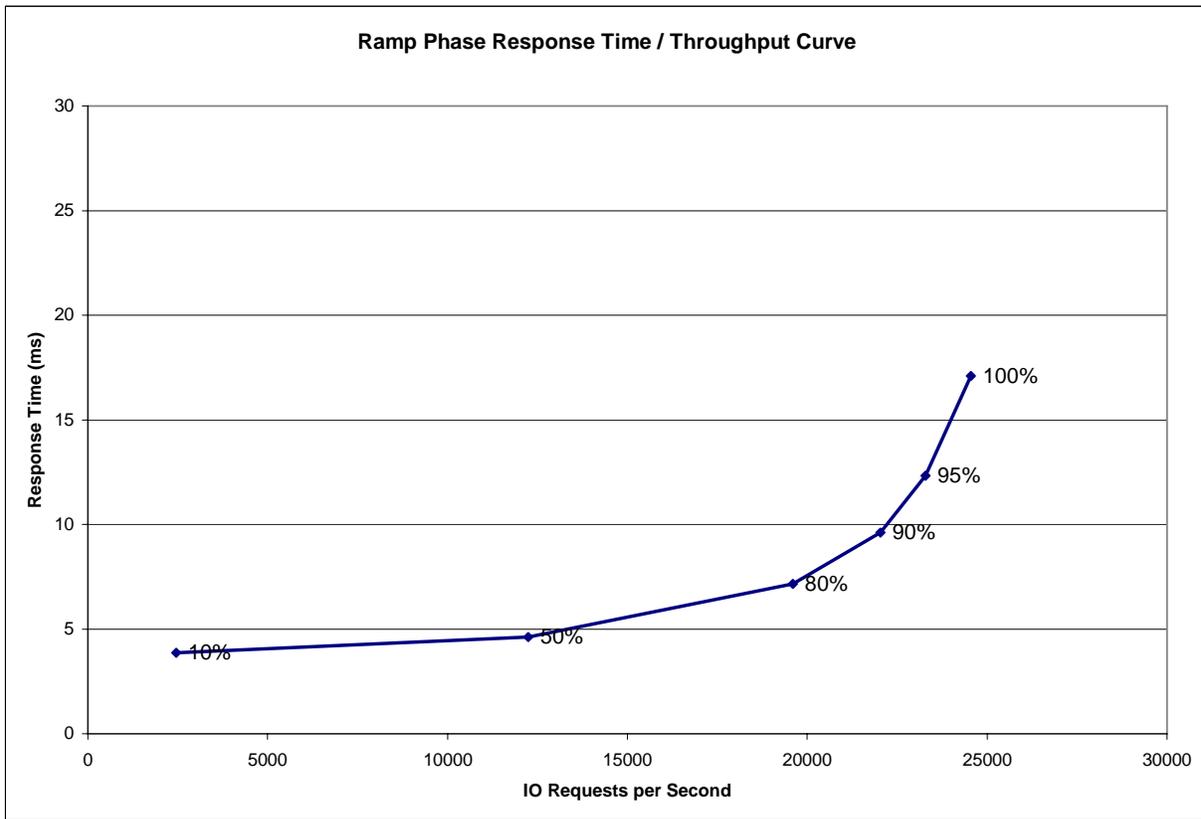
Unused Storage Ratio: Total Unused Capacity (955.220 GB) divided by Physical Storage Capacity (14,094.311 GB) and may not exceed 45%.

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

Response Time - Throughput Curve

The Response Time-Throughput Curve illustrates the Average Response Time (milliseconds) and I/O Request Throughput at 100%, 95%, 90%, 80%, 50%, and 10% of the workload level used to generate the SPC-1 IOPS™ metric.

The Average Response Time measured at the any of the above load points cannot exceed 30 milliseconds or the benchmark measurement is invalid.



Response Time - Throughput Data

	10% Load	50% Load	80% Load	90% Load	95% Load	100% Load
I/O Request Throughput	2,452.87	12,239.88	19,601.75	22,039.02	23,291.47	24,555.54
Average Response Time (ms):						
All ASUs	3.86	4.63	7.16	9.61	12.32	17.11
ASU-1	4.06	6.12	8.94	11.24	13.64	17.84
ASU-2	4.60	6.15	10.70	14.54	18.58	24.63
ASU-3	3.12	0.79	1.85	3.97	6.80	12.27
Reads	6.39	10.58	15.48	18.56	21.34	25.58
Writes	2.22	0.75	1.75	3.78	6.46	11.59

Priced Storage Configuration Pricing

Part Number	Description	Quantity	Unit Price	Ext. Price	Support Price	Ext. Support
PCIE-6G-SAS-8E	6Gb SAS PCIE HBA with two x4 Mini-SAS external connectors	2	\$815.00	\$1,630.00	\$0.00	\$0.00
X-SAS-2M-Z	2 meter SAS cable, MiniSAS to MiniSAS	4	\$170.00	\$680.00	N/A	N/A
SP13005	Universal rail kit for IS220 and IS5000 12-bay and 24-bay drive modules, 23.5"-32.5"	4	\$200.00	\$800.00	\$0.00	\$0.00
SP10034	IS5024-SP - Simplex Four 6Gbps SAS ports, 1 dual-ported Host Interface Card, 2 GB cache	1	\$7,790.00	\$7,790.00	\$2,405.00	\$2,405.00
SP10035	FACTORY ADD: SECOND IS5000-SP RAID Controller, Four 6Gbps SAS ports 1 dual-ported Host Interface Card, 2 GB cache	1	\$3,700.00	\$3,700.00	\$1,161.00	\$1,161.00
SP12047	Premium feature key, IS5000-SP: Base to "Hyper" Performance (96disks)	1	\$6,500.00	\$6,500.00	\$4,172.00	\$4,172.00
SP10048	24-bay drive module for IS5000-SP - DUPLEX: SAS ESM for dual controller with 2 SAS cables	3	\$4,695.00	\$14,085.00	\$2,074.00	\$6,222.00
SP11068	146 GB 10K SAS Disk for IS5000-SP	96	\$390.00	\$37,440.00	\$0.00	\$0.00
SP12044	SANTRICITY ES 10.7xFOR WINDOWS	1	\$1,175.00	\$1,175.00	\$770.00	\$770.00
FEX7X24-EW3	FULLEXPRESS 7X24 3-YR EXTENDED WARR	1	\$0.00	\$0.00		
Totals				\$73,800.00		\$14,730.00
Grand Total					\$88,530.00	

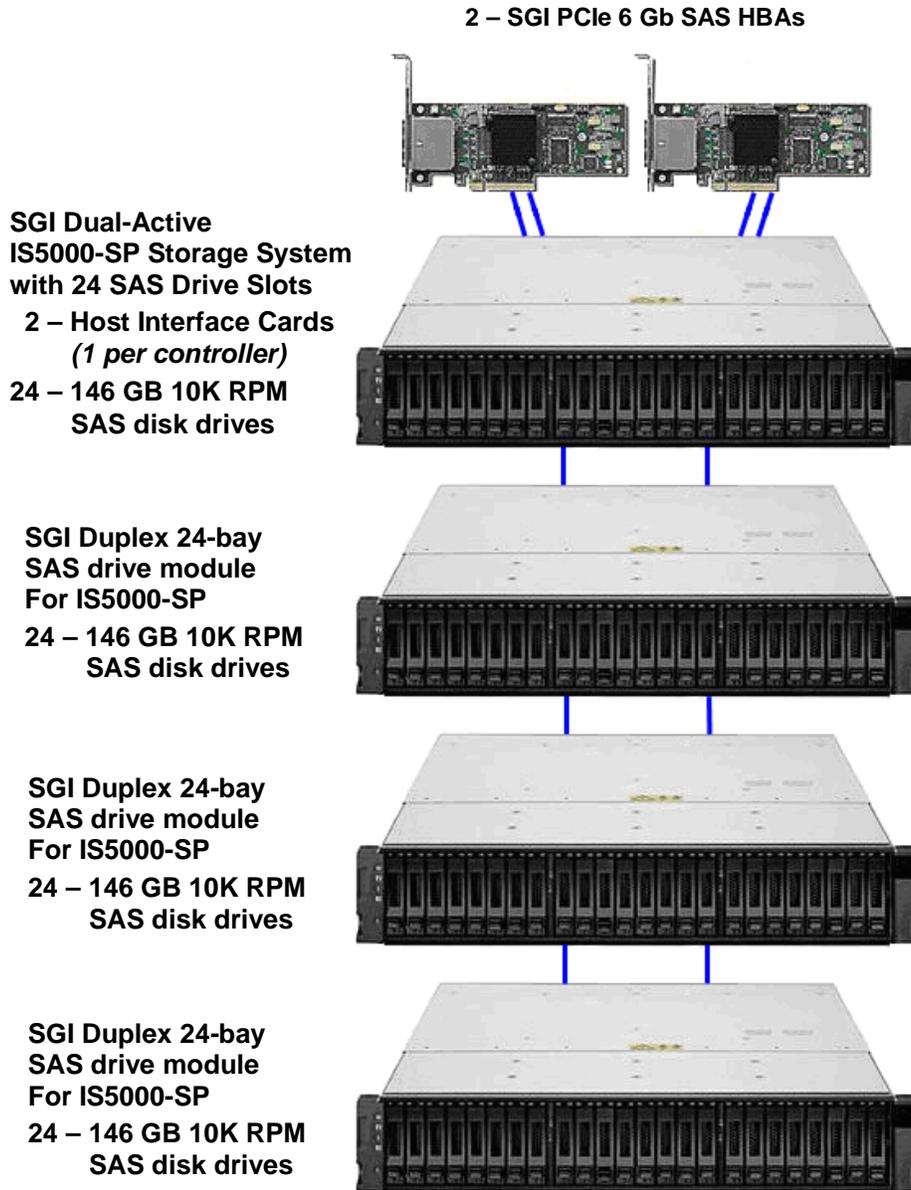
The above pricing includes hardware maintenance and software support for three years, 7 days per week, 24 hours per day. The hardware maintenance and software support provides the following:

- Acknowledgement of new and existing problems with four (4) hours.
- Onsite present of a qualified maintenance engineer or provision of a customer replaceable part within four (4) hours of the above acknowledgement for any hardware failure that results in an inoperative Price Storage Configuration that can be remedied by the repair or replacement of a Priced Storage Configuration component.

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

There were no differences between the TSC and Priced Storage Configuration.

Priced Storage Configuration Diagram



Priced Storage Configuration Components

Priced Storage Configuration
2 – SGI PCIe 6 Gb SAS dual-ported HBAs
Santricity ES 10.7x for Windows
SGI® InfiniteStorage 5000-SP Storage System SGI IS5000-SP dual controllers with: 2 GB cache per controller (<i>4 GB total</i>) High Performance Tier Enabled 2 – Host Interface Cards (HIC) (<i>1 HIC/controller</i>) (<i>2 – 6 GB SAS host connections per HIC,</i> <i>4 total, 4 used</i>) 2 – 6 Gb SAS baseboard host connections per controller (<i>4 total, 0 used</i>) 1 – 6 Gb SAS drive connections per controller (<i>2 total, 2 used</i>)
4 – 2m SAS cables
3 – SGI 24-bay drive module for IS5000-SP – DUPLEX each drive module includes 2 SAS cables
96 – 146 GB 10K RPM SAS disk drives 24 disk drives in the base unit 24 disk drives in each 24-bay drive module