



**SPC BENCHMARK 1™
EXECUTIVE SUMMARY**

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

SPC-1 V1.12

**Submitted for Review: March 22, 2012
Submission Identifier: A00114**

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

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Revision Information and Key Dates

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SPC-1 Specification revision number	V1.12
SPC-1 Workload Generator revision number	V2.2.0
Date Results were first used publicly	March 22, 2012
Date the FDR was submitted to the SPC	March 22, 2012
Date the Priced Storage Configuration is available for shipment to customers	currently available
Date the TSC completed audit certification	March 22, 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-1 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.

Summary of Results

SPC-1 Reported Data	
Tested Storage Product (TSP) Name: SGI® InfiniteStorage 5500-SP	
Metric	Reported Result
SPC-1 IOPS™	82,519.75
SPC-1 Price-Performance	\$3.52/SPC-1 IOPS™
Total ASU Capacity	13,457.424 GB
Data Protection Level	Protected (<i>Mirroring</i>)
Total TSC Price (including three-year maintenance)	\$290,492.00

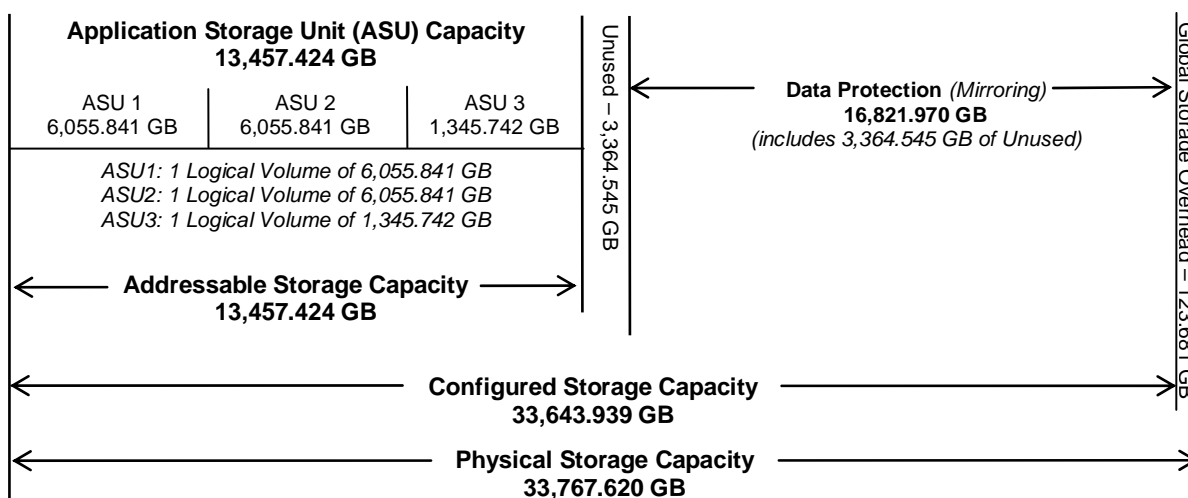
SPC-1 IOPS™ represents the maximum I/O Request Throughput at the 100% load point.

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 (*Mirroring*)** configures two or more identical copies of user data.

Storage Capacities, Relationships, and Utilization

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	39.85%
Protected Application Utilization	79.71%
Unused Storage Ratio	19.93%

Application Utilization: Total ASU Capacity (*13,457.424 GB*) divided by Physical Storage Capacity (*33,767.620 GB*)

Protected Application Utilization: Total ASU Capacity (*13,457.424 GB*) plus total Data Protection Capacity (*6,729.090 GB*) minus unused Data Protection Capacity (*3,364.545 GB*) divided by Physical Storage Capacity (*33,767.620 GB*)

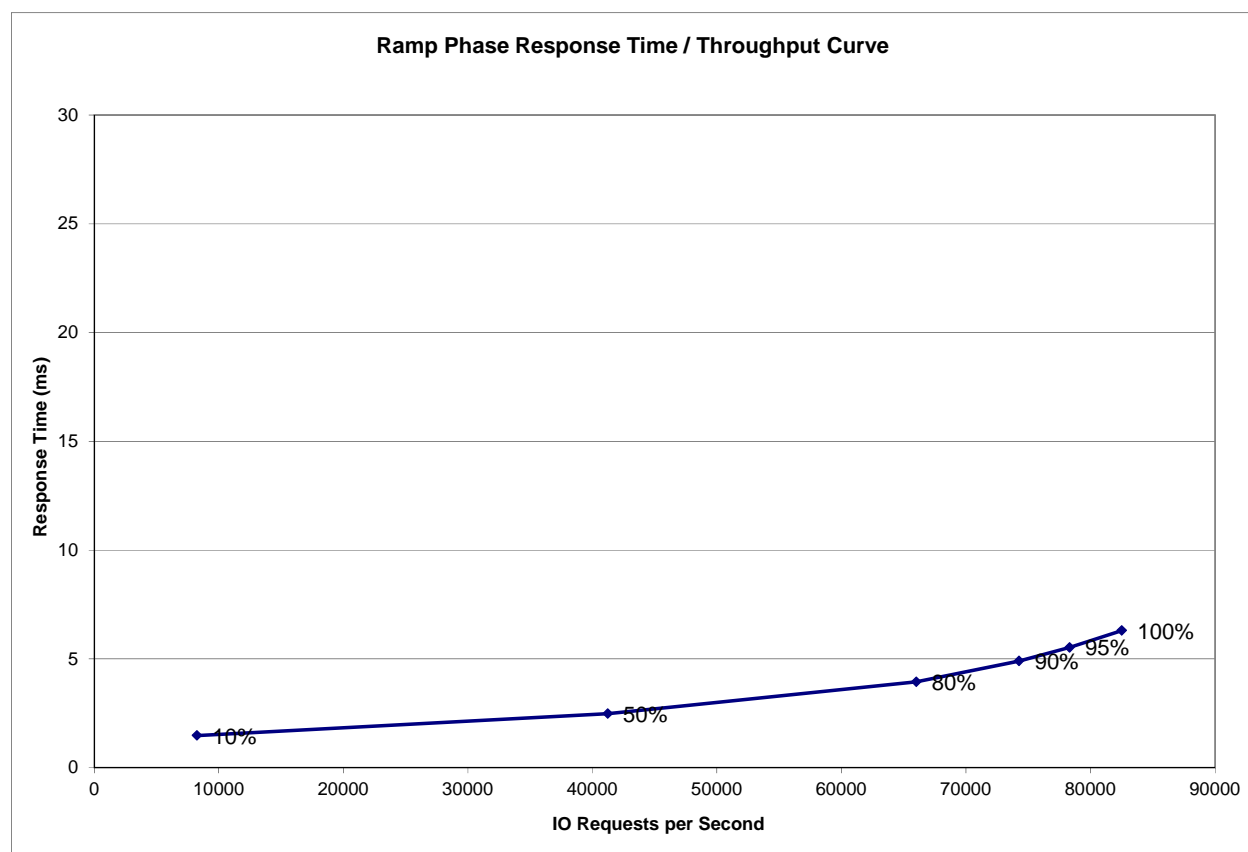
Unused Storage Ratio: Total Unused Capacity (*6,729.090 GB*) divided by Physical Storage Capacity (*33,767.620 GB*) and may not exceed 45%.

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	8,253.08	41,245.12	66,012.74	74,266.49	78,326.05	82,519.75
Average Response Time (ms):						
All ASUs	1.48	2.48	3.95	4.91	5.53	6.30
ASU-1	2.07	3.35	5.16	6.27	6.97	7.80
ASU-2	1.70	3.32	6.12	8.41	10.02	12.17
ASU-3	0.14	0.28	0.41	0.47	0.50	0.54
Reads	3.56	5.90	9.42	11.77	13.30	15.20
Writes	0.12	0.26	0.38	0.43	0.47	0.51

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
SP10062	60-bay drive module for IS5000-SP Family Duplex ESM for dual controllers	3	\$21,595.00	\$5,123.00	\$80,154.00
IS-D146-160-G-10	146GB 15K SAS 2.5" PI&FDE 60bay 10 pack for IS5000/IS5000-SP Family	23	\$5,229.00	\$0.00	\$120,267.00
SP12087	IS5500-SP, High Performance feature key	1	\$14,888.00	\$0.00	\$14,888.00
SP12088	IS5500-SP, Advanced software feature to unlock between 193 - 240 slots	1	\$4,586.00	\$0.00	\$4,586.00
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	4	\$250.00	\$0.00	\$1,000.00
	<i>all required SFPs and SAS cables are included with each appropriate component</i>				
Total					\$290,492.00

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:

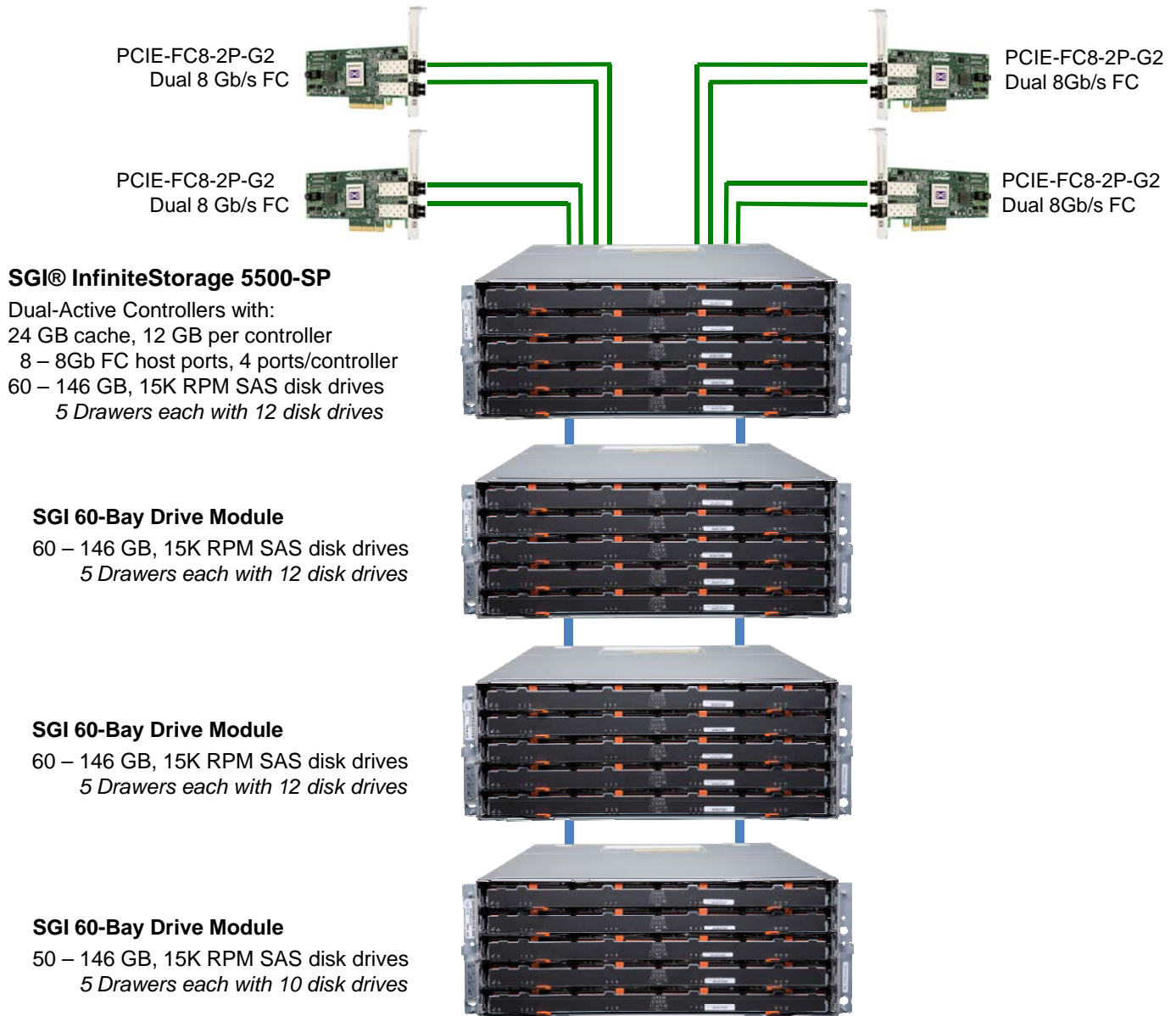
- Acknowledgement of new and existing problems with four (4) hours.
- Onsite presence of a qualified maintenance engineer or provision of a customer replaceable part within four (4) hours of the above acknowledgement for any hardware failure that results in an inoperative Priced Storage Configuration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

- 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-1 performance.

Priced Storage Configuration Diagram



Priced Storage 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
3 – SGI 60-Bay Drive Modules
230 - 146 GB, 15K RPM SAS disk drives 60 disk drives in the controller module 60 disk drives in two 60-Bay Drive Modules 50 disk drives in one 60-Bay Drive Module