



**SPC BENCHMARK 1™
EXECUTIVE SUMMARY**

**HUAWEI TECHNOLOGIES CO., LTD.
HUAWEI OCEANSTOR™ S5600T**

SPC-1 V1.12

Submitted for Review: August 25, 2011

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Revised: December 13, 2012

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

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Revision Information and Key Dates

Revision Information and Key Dates	
SPC-1 Specification revision number	V1.12
SPC-1 Workload Generator revision number	V2.1.0
Date Results were first used publicly	August 25, 2011
Date the FDR was submitted to the SPC	August 25, 2011
Date revised FDR was submitted to the SPC Updated company name, logo and product name to reflect the complete acquisition of Huawei Symantec by Huawei Technologies Co., Ltd.	December 13, 2012
Date the Priced Storage Configuration is available for shipment to customers	currently available
Date the TSC completed audit certification	August 25, 2011

Tested Storage Product (TSP) Description

Huawei's OceanStor™ S5000T series (T for short) are new generation of middle-range storage systems. Based on powerful hardware specifications, it consolidates multiple industry leading technologies including TurboModule that provides high density and hot swap I/O modules, and TurboBoost, which includes high-performance enhancements such as the new generation PCI-E 2.0 bus technology, SAS 2.0 high-speed I/O channel technology, multi-core CPUs, and multi-channel memory. The T series products can meet the requirements of large scale database including OLTP/OLAP, HPC, digital media, internet service providers, backup, disaster recovery, data migration and other scenarios.

Summary of Results

SPC-1 Reported Data	
Tested Storage Product (TSP) Name: Huawei OceanStor™ S5600T	
Metric	Reported Result
SPC-1 IOPS™	102,471.66
SPC-1 Price-Performance	\$2.73/SPC-1 IOPS™
Total ASU Capacity	35,945.185 GB
Data Protection Level	Protected (<i>Mirroring</i>)
Total TSC Price (including three-year maintenance)	\$279,914.53

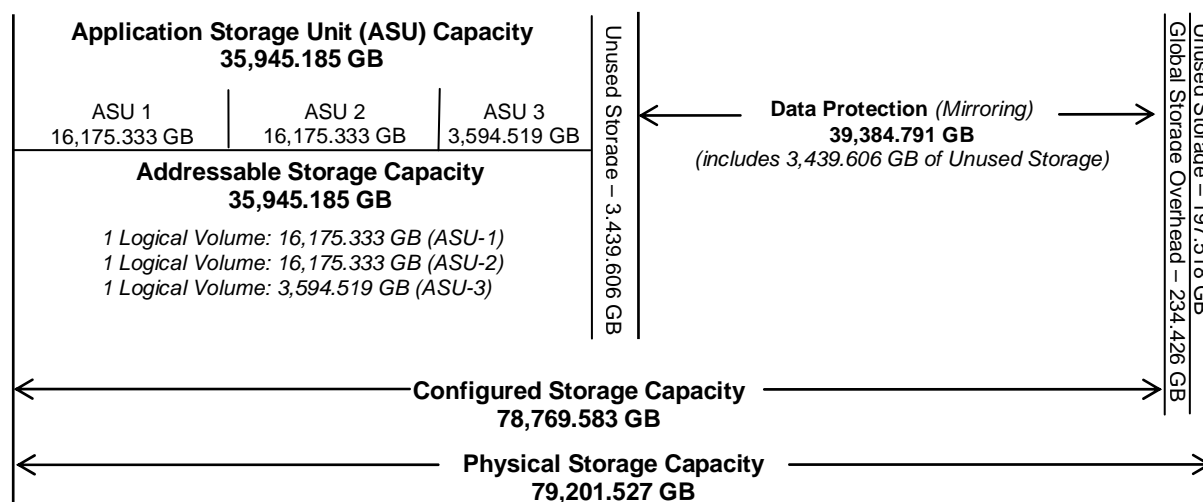
SPC-1 IOPS™ represents the maximum I/O Request Throughput at the 100% load point.

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 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	45.38%
Protected Application Utilization	95.11%
Unused Storage Ratio	8.94%

Application Utilization: Total ASU Capacity (35,945.185 GB) divided by Physical Storage Capacity (79,201.527 GB)

Protected Application Utilization: (Total ASU Capacity (35,945.185 GB) plus total Data Protection Capacity (39,384.791 GB) minus unused Data Protection Capacity (2.894 GB) divided by Physical Storage Capacity (79,201.527 GB)

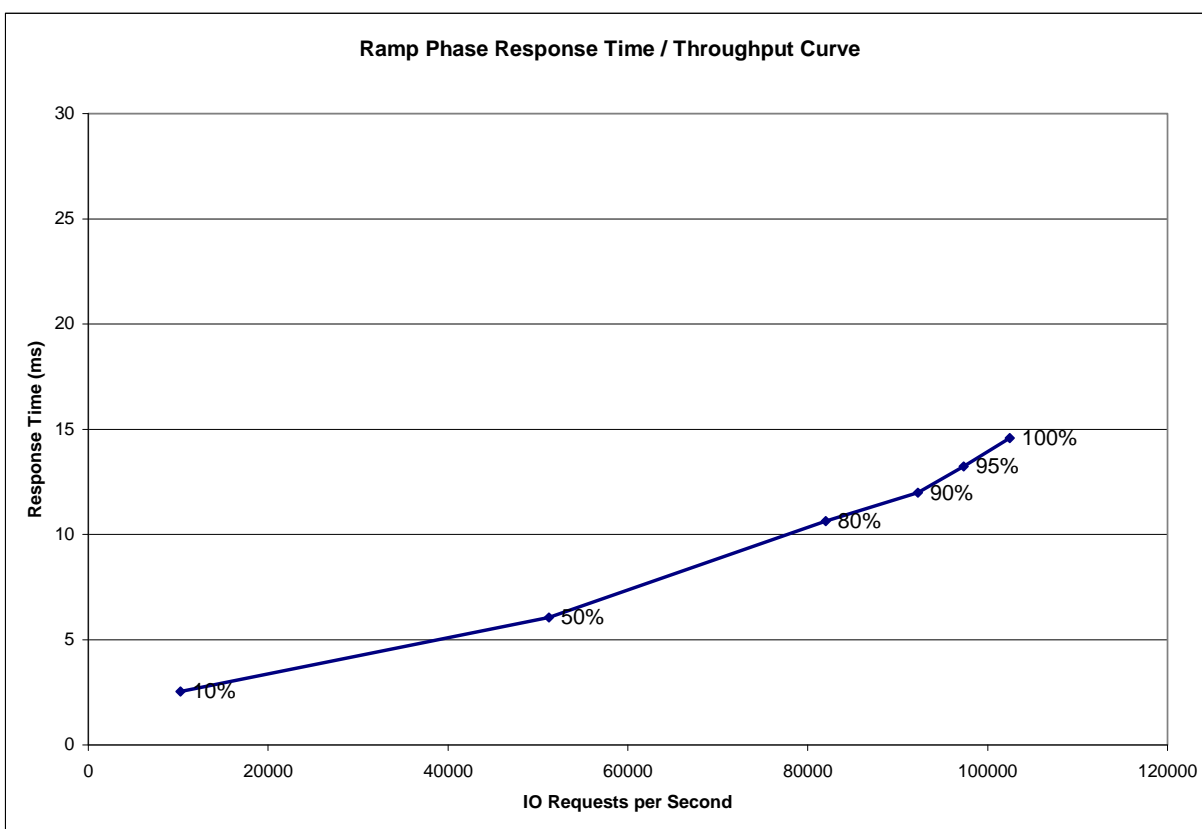
Unused Storage Ratio: Total Unused Capacity (7,076.730 GB) divided by Physical Storage Capacity (79,201.527 GB) and may not exceed 45%.

Detailed information for the various storage capacities and utilizations is available on pages 22-23 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	10,257.85	51,241.49	81,999.01	92,264.61	97,341.69	102,471.66
Average Response Time (ms):						
All ASUs	2.53	6.05	10.64	11.98	13.24	14.59
ASU-1	3.14	6.62	11.28	12.84	14.28	15.76
ASU-2	3.04	8.36	16.89	21.24	25.75	29.86
ASU-3	1.02	3.82	6.56	6.10	5.56	5.42
Reads	5.42	12.01	21.12	24.50	27.64	30.54
Writes	0.66	2.17	3.82	3.83	3.86	4.20

Priced Storage Configuration Pricing

Part #	Description	Quantity	Unit Price(USD)	Total Price(USD)
S5600TBB	S5600T, dual controllers, AC, 48GB cache,with UPS Cache Protected Module,without Front-End & Back-End Port	1	20,474.00	20,474.00
SDE35U4BB	DAE12435U4-03 Disk Enclosure(4U,220V AC,SAS Expansion Module,24X3.5" HD Slots without Disk Unit,with HS SAS in Band Management Software),with 2 SAS 1M Cables	11	3,292.00	36,212.00
STIO6GSAS	2*24Gbps SAS-wide I/O modules(2 ports each) backend expansion for JBOD	6	1,052.00	6,312.00
STIO8GFC	4*8Gbps Fibre Channel I/O modules(4 ports each)	4	1,304.00	5,216.00
SHD35SA300	3.5 inch 300GB 15K RPM SAS	240	473.00	113,520.00
SHD35SA600	3.5 inch 600GB 15K RPM SAS	12	756.00	9,072.00
S5000MP	S5000T Multi-Path Software (specify WIN, LINUX, AIX)	1	682.00	682.00
S5600ISM	ISM Software License for S5600T (ESSENTIAL)	1	2,728.00	2,728.00
S5000SSLC	Storage Array Control System Software License for S5000T (ESSENTIAL) - No Charge	1	0.00	0.00
	Patch Cord,DLC/PC-DLC/PC,Multimode,2mm Parallel,3m - No Charge	12	0.00	0.00
	Purchased Cable,MiniSAS Cable,Key246,3m - No Charge	1	0.00	0.00
	External Mini-SAS Cable - 26-pin 4x Mini-SAS (SFF-8088) to 26-pin 4x Mini-SAS (SFF-8088)	2	147.00	294.00
Warranty Uplift Option(3 Years)				
TSGS5600AIO	Upgrade from Standard to Gold service package in warranty period (3 years). Gold service package include:7*24 Remote Support. Access to all new software updates. 4 Hours Parts Delivery. 4 Hours Engineer Onsite.	1	7,578.00	7,578.00
TSGSTJ4SA60	Upgrade from Standard to Gold service package in warranty period (3 years). Gold service package include:7*24 Remote Support. Access to all new software updates. 4 Hours Parts Delivery. 4 Hours Engineer Onsite.	11	4,823.00	53,053.00
Third Party				
QLE2562-CK	QLogic Dual Port 8Gb Fibre Channel to PCI Express Host Bus Adapter (QLE2562-CK)	6	2,598.00	15,588.00
5042A6U	Lenovo ThinkCentre M75e 5042 Tower	1	549.00	549.00
With Sales Tax (4.1%) Colorado Only			Total	279,914.53

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:

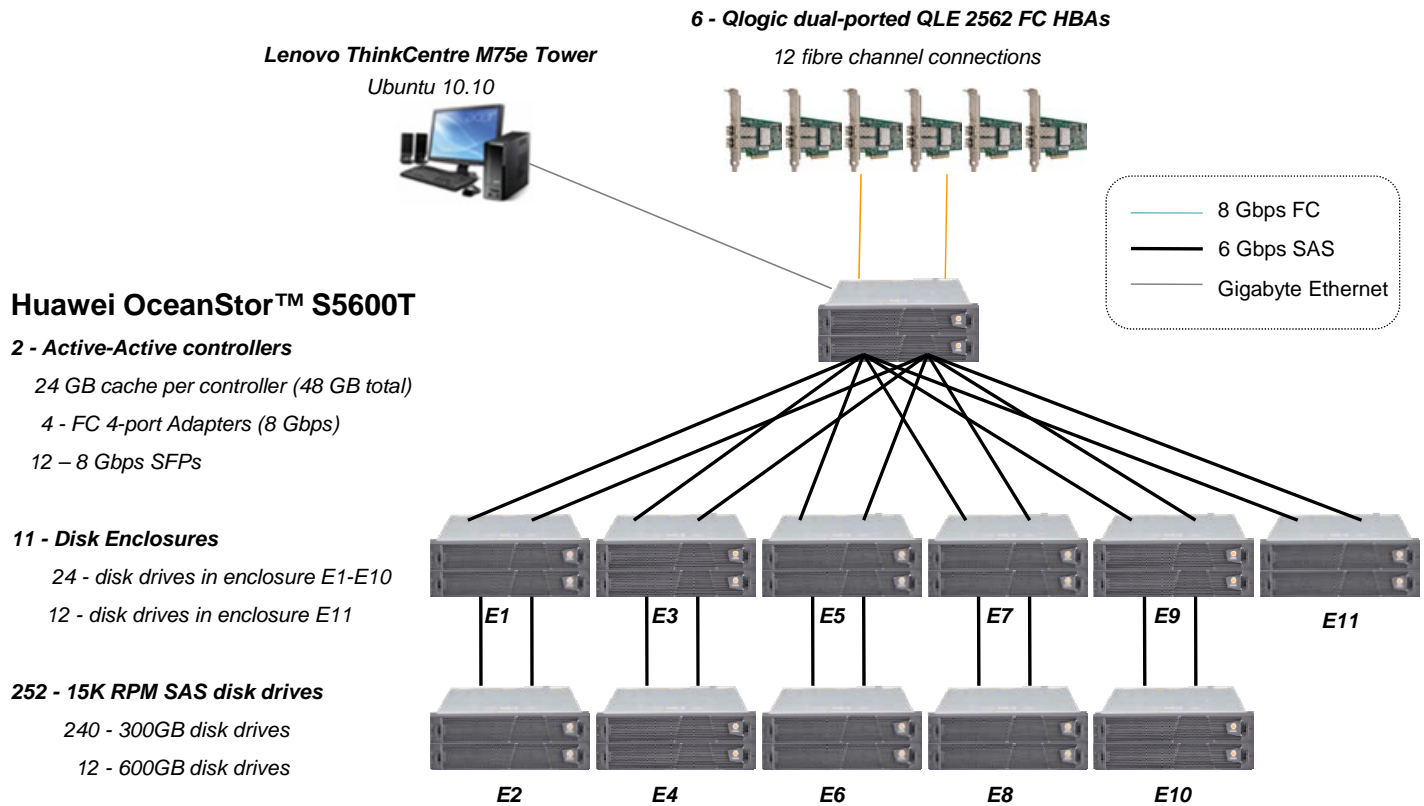
- Acknowledgement of new and existing problems with four (4) hours.
- Onsite present of a qualified maintenance engineer or provision of a customer replaceable part within four (4) hours of the above acknowledgement for any hardware failure that results in an inoperative Price Storage Configuration that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

Huawei Technologies Co., Ltd. only sells its products to third-party resellers, who in turn, sell those products to U.S. customers. The above pricing, which also includes the required three-year maintenance and support, was obtained from one of those third-party resellers. See page 81 (*“Appendix F: Third-Party Quotation”*) of the corresponding SPC-1 Full Disclosure Report for a copy of the third-party reseller quotation.

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

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

Priced Storage Configuration Diagram



Priced Storage Configuration Components

Priced Storage Configuration:
Lenovo ThinkCenter M75e Tower (Ubuntu 10.10) used for configuration management
6 – Qlogic dual-port QLE2562 FC HBAs
Huawei OceanStor™ S5600T
2 - Active-Active controllers
24 GB cache per controller (48 GB total)
4 – Fibre Channel 4-port adapters (8 Gbps)
16 – 8 Gbps front-end connections (12 used)
12 – 8 Gbps SFPs
6 – SAS backend connections per controller (12 total, 12 used)
11 – Disk Enclosures
24 – 3.5” HD slots per enclosure
2 –SAS 1m cables per enclosure
24 – disk drives in 10 enclosures
12 – disk drives in 1 enclosure
252 – 15K RPM SAS disk drives
240 – 300 GB disk drives
12 – 600 GB disk drives