SPC BENCHMARK 1™
EXECUTIVE SUMMARY

HUAWEI TECHNOLOGIES CO., LTD.
HUAWEI OCEANSTOR™ S5500T

SPC-1 V1.13

Submitted for Review: November 12, 2012
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EXECUTIVE SUMMARY

Test Sponsor and Contact Information

Test Sponsor and Contact Information	
Test Sponsor Primary Contact	Huawei Technologies Co., Ltd. – http://www.huawei.com/en/ Eric He – eric.heji@huawei.com Tianchen Road 88# Chengdu, Sichuan, P.R. China 611711 Phone: 86 28 62905595 FAX: 86 28 62905793
Test Sponsor Alternate Contact	Huawei Technologies Co., Ltd. – http://www.huawei.com/en/ Tao Dang – dangtao@huawei.com Tianchen Road 88# Chengdu, Sichuan, P.R. China 611711 Phone: 86 28 62905591 FAX: 86 28 62905793
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

Revision Information and Key Dates	
SPC-1 Specification revision number	V1.13
SPC-1 Workload Generator revision number	V2.3.0
Date Results were first used publicly	November 12, 2012
Date the FDR was submitted to the SPC	November 12, 2012
Date the Priced Storage Configuration is available for shipment to customers	currently available
Date the TSC completed audit certification	November 11, 2012

Tested Storage Product (TSP) Description

Huawei OceanStor T series unified storage system (T series) is a new-generation storage product for mid-range and high-end storage applications. It boasts integration of block-level and file-level data storage, support for a variety of storage protocols, and GUI-based central storage management. Delivering leading performance, enhanced efficiency, maximized return on investment, and all-in-one solutions, the T series is ideally applicable to scenarios such as large-database OLTP/OLAP, high-performance computing, digital media, Internet applications, central storage, backup, disaster recovery, and data migration.

Summary of Results

SPC-1 Reported Data	
Tested Storage Product (TSP) Name: Huawei OceanStor™ S5500T	
Metric	**Reported Result**
SPC-1 IOPS™	60,242.22
SPC-1 Price-Performance™	$2.96/SPC-1 IOPS™
Total ASU Capacity	21,367.462 GB
Data Protection Level	Protected 1 *(Mirroring)*
Total Price	$178,191.00
Currency Used	U.S. Dollars
Target Country for availability, sales and support	USA

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

SPC-1 Price-Performance™ is the ratio of **Total Price** to **SPC-1 IOPS™**.

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

A **Data Protection Level** of **Protected 1** using ***Mirroring*** configures two or more identical copies of user data.

> ***Protected 1:*** *The single point of failure of any* ***storage device*** *in the configuration will not result in permanent loss of access to or integrity of the SPC-1 Data Repository.*

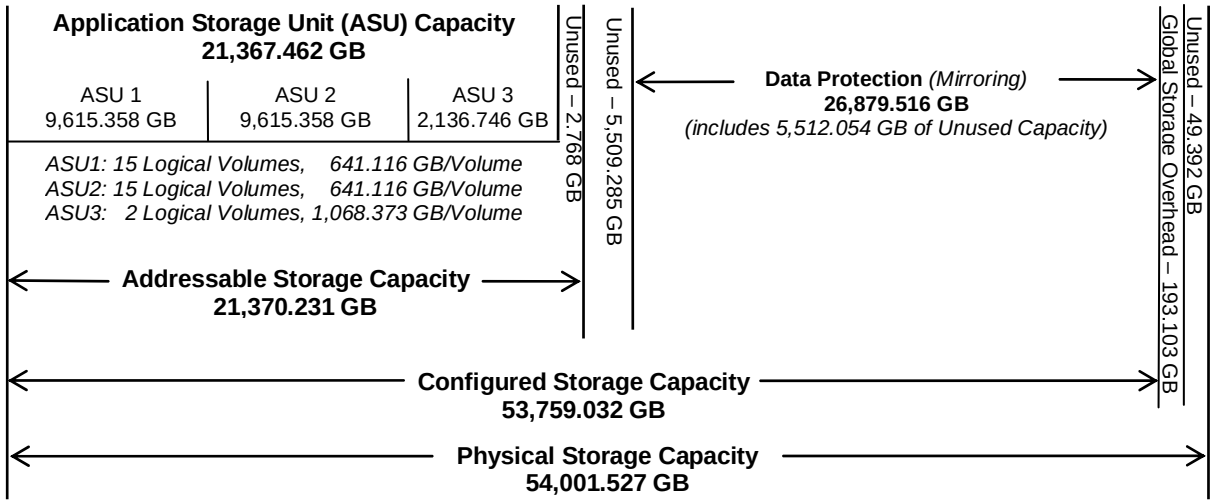
Total Price includes the cost of the Priced Storage Configuration plus three years of hardware maintenance and software support as detailed on page 6.

Currency Used is formal name for the currency used in calculating the **Total Price** and **SPC-1 Price-Performance™**. That currency may be the local currency of the **Target Country** or the currency of a difference country *(non-local currency).*

The **Target Country** is the country in which the Priced Storage Configuration is available for sale and in which the required hardware maintenance and software support is provided either directly from the Test Sponsor or indirectly via a third-party supplier.

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	39.57%
Protected Application Utilization	79.14%
Unused Storage Ratio	20.51%

Application Utilization: Total ASU Capacity *(21,367.462 GB)* divided by Physical Storage Capacity *(54,001.527 GB)*

Protected Application Utilization: Total ASU Capacity *(21,367.462 GB)* plus total Data Protection Capacity *(26,879.516 GB)* minus unused Data Protection Capacity *(5,512.054 GB)* divided by Physical Storage Capacity *(54,001.527 GB)*

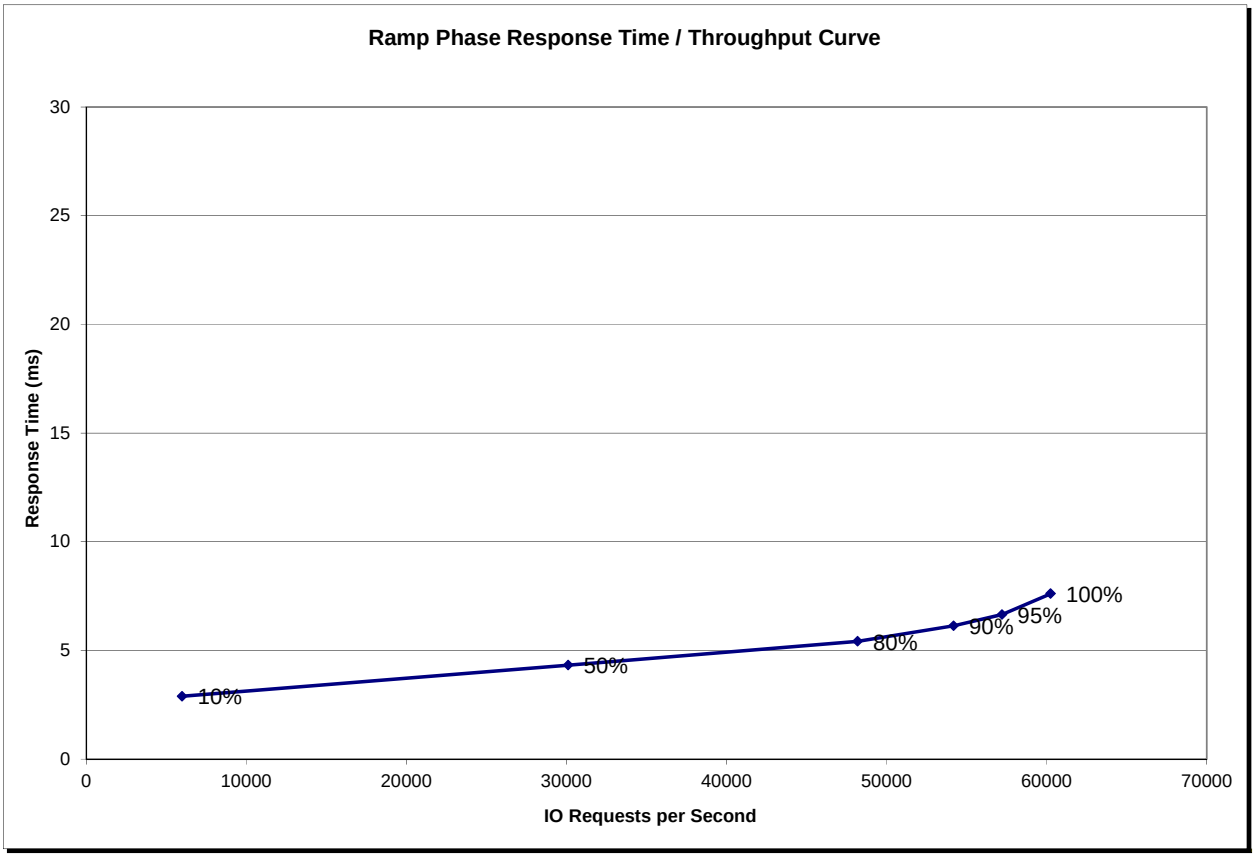
Unused Storage Ratio: Total Unused Capacity *(11,073.499 GB)* divided by Physical Storage Capacity *(54,001.527 GB)* and may not exceed 45%.

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	6,003.11	30,109.86	48,194.42	54,190.96	57,211.51	60,242.22
Average Response Time (ms):						
All ASUs	2.88	4.32	5.41	6.13	6.65	7.60
ASU-1	3.84	5.37	6.88	7.72	8.31	9.29
ASU-2	3.41	5.63	8.08	9.51	10.46	11.98
ASU-3	0.61	1.50	1.14	1.27	1.46	2.11
Reads	6.49	8.82	12.13	13.78	14.85	16.42
Writes	0.54	1.39	1.04	1.15	1.31	1.86

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 Pricing

Part Number	Description	Quantity	Unit Price	Total Price
Control module				**10,401.00**
SPE31C0212-S33-2C32G-8F8-AC-BASE	SPE31C0212-33 Controller Enclosure(2U,3.5",Dual Controller,AC,32GB Cache,2*4*8G FC Front-End Port,2*2*24G SAS Back-End Port(Wide Port),UPS Cache Protected Module,HS Storage Array Control System Software)	1	10,401.00	10,401.00
Hard Disk Drives				**73,236.00**
SAS300-15K-2	300GB 15K RPM SAS Disk Unit(3.5")	156	418.00	65,208.00
SAS600-15K-2	600GB 15K RPM SAS Disk Unit(3.5")	12	669.00	8,028.00
Disk Enclosure				**21,042.00**
DAE12435U4-AC	DAE12435U4-03 Disk Enclosure(4U,3.5",AC,SAS Expansion Module,without Disk Unit,with HS SAS in Band Management Software)	7	3,006.00	21,042.00
Accessory				**289.00**
SS-OP-D-LC-M-3	Patchcord,DLC/PC-DLC/PC,Multimode,2mm Parallel,3m	8	11.00	88.00
MINI-SAS-3	Purchased Cable,MiniSAS Cable,Key246,3m	3	67.00	201.00
Storage management software				**3,554.00**
LIC-UltraPath02-V1R5	OceanStor HS UltraPath Software License	1	1,938.00	1,938.00
LIC-S3A-ISM02-BLOCK	HS Integrated Storage Manager-Device Management License for OceanStor Block S5500T	1	1,616.00	1,616.00
Third Party				**1,698.00**
N8GHBA000	QLOGIC QLE2562 HBA Card,PCIE,8Gbps DualPort ,Fiber Channel Multimode LC Optic Interface,English Manual,Driver CD	1	1,698.00	1,698.00
Total of Product				**110,220.00**
Maintenance Support Service				**67,971.00**
Hi-Care Premier On-Site Service (3 years)		1	67,971.00	67,971.00
Total of Service (3 years)				**67,971.00**
Total Price				**178,191.00**
Notes: Hi-Care Premier On-Site Service include: 7*24 Technical Assistance Center Access. Access to all new software updates and Online Support. 24*7*4 Hours Onsite Hardware Replacement				

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.

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 *"Appendix F: Third-Party Quotation"* in the Full Disclosure Report for a copy of the third-party reseller quotation.

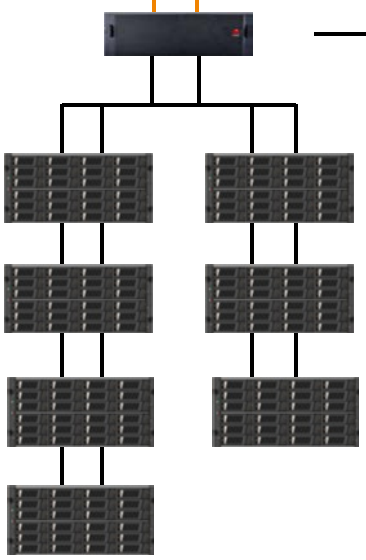
Priced Storage Configuration Diagram

1 - Qlogic dual-port QLE 2562 FC HBA

2 Fiber Channel Connections

8 Gbps FC

6 Gbps SAS



Huawei OceanStor™ S5500T

dual controllers - Active-Active

16 GB cache per controller (32GB total)

12 - disk drives

7 - disk enclosures

168- 15K RPM SAS disk drives

12 - 300GB 15K RPM SAS disk drives in the controller enclosure

144 - 300GB 15K RPM SAS disk drives in disk enclosures 1 - 6

12 - 600GB 15K RPM SAS disk drives in disk enclosure 7

Priced Storage Configuration Components

Priced Storage Configuration:
1 – Qlogic dual-port QLE2562 FC HBA
Huawei OceanStor™ S5500T **dual controllers – Active-Active** 16 GB cache per controller *(32 GB total)* 4 – 8 Gbps front-end connection per controller *(8 total, 2 used)* 2 –2x24 Gbps SAS backend connections per controller *(4 total, 4 used)* 12 – 300 GB, 15K RPM disk drives
7 – Disk Enclosures 24 – 3.5” HD slots per enclosure
156 – 300 GB, 15K RPM SAS disk drives 12 disk drives in the controller enclosure 24 disk drives/enclosure in enclosures1-6 12 – 600 GB, 15K RPM SAS disk drives 12 disk drives in enclosure 7