



SPC BENCHMARK 1™
DRAFT EXECUTIVE SUMMARY
HUAWEI TECHNOLOGIES CO., LTD.
HUAWEI OCEANSTOR™ S2600T

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	
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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 9, 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™ S2600T	
Metric	Reported Result
SPC-1 IOPS™	40,266.25
SPC-1 Price-Performance™	\$2.77/SPC-1 IOPS™
Total ASU Capacity	11,811.160 GB
Data Protection Level	Protected 1 (<i>Mirroring</i>)
Total Price	\$111,415.00
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.*

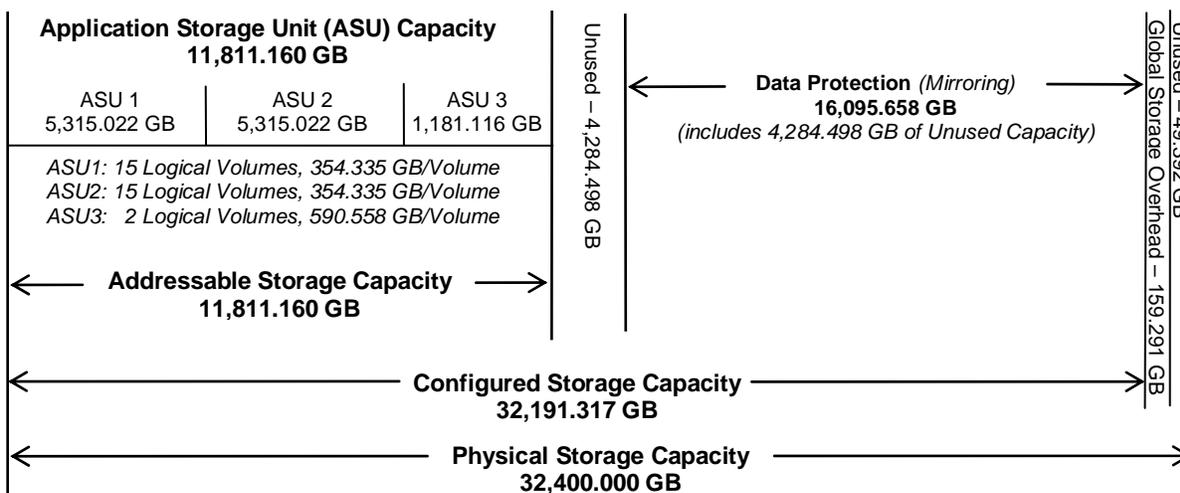
Total Price includes the cost of the Priced Storage Configuration plus three years of hardware maintenance and software support as detailed on page 6.

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	36.45%
Protected Application Utilization	72.91%
Unused Storage Ratio	26.60%

Application Utilization: Total ASU Capacity (11,881.160 GB) divided by Physical Storage Capacity (32,400.000 GB)

Protected Application Utilization: Total ASU Capacity (11,881.160 GB) plus total Data Protection Capacity (16,095.658 GB) minus unused Data Protection Capacity (4,284.498 GB) divided by Physical Storage Capacity (32,400.000 GB)

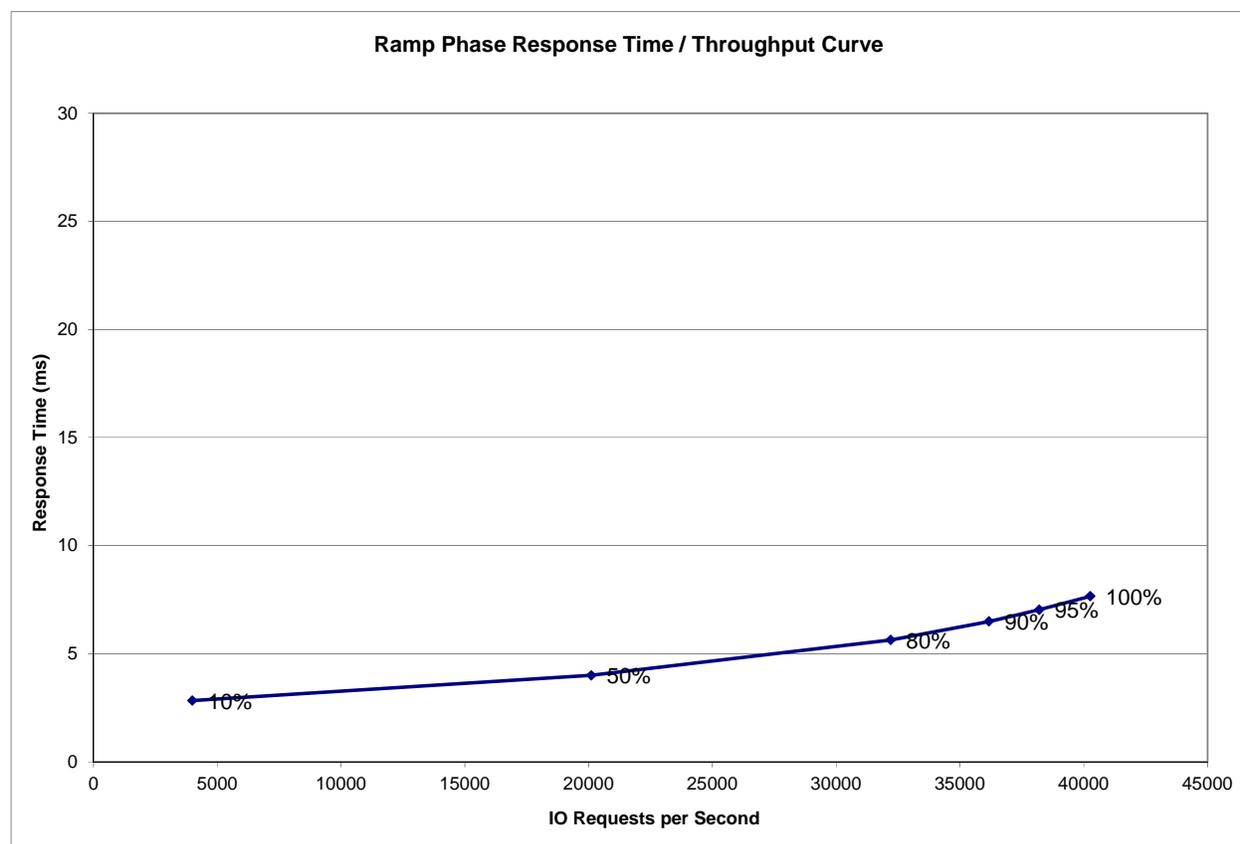
Unused Storage Ratio: Total Unused Capacity (8,618.389 GB) divided by Physical Storage Capacity (32,400.000 GB) and may not exceed 45%.

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	3,996.98	20,109.37	32,206.02	36,180.71	38,204.08	40,266.25
Average Response Time (ms):						
All ASUs	2.83	4.00	5.64	6.49	7.03	7.65
ASU-1	3.85	5.13	7.13	8.15	8.79	9.47
ASU-2	3.59	5.46	8.64	10.47	11.71	13.26
ASU-3	0.34	0.95	1.15	1.23	1.27	1.34
Reads	6.69	8.88	12.75	14.81	16.12	17.59
Writes	0.32	0.81	1.00	1.07	1.12	1.18

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

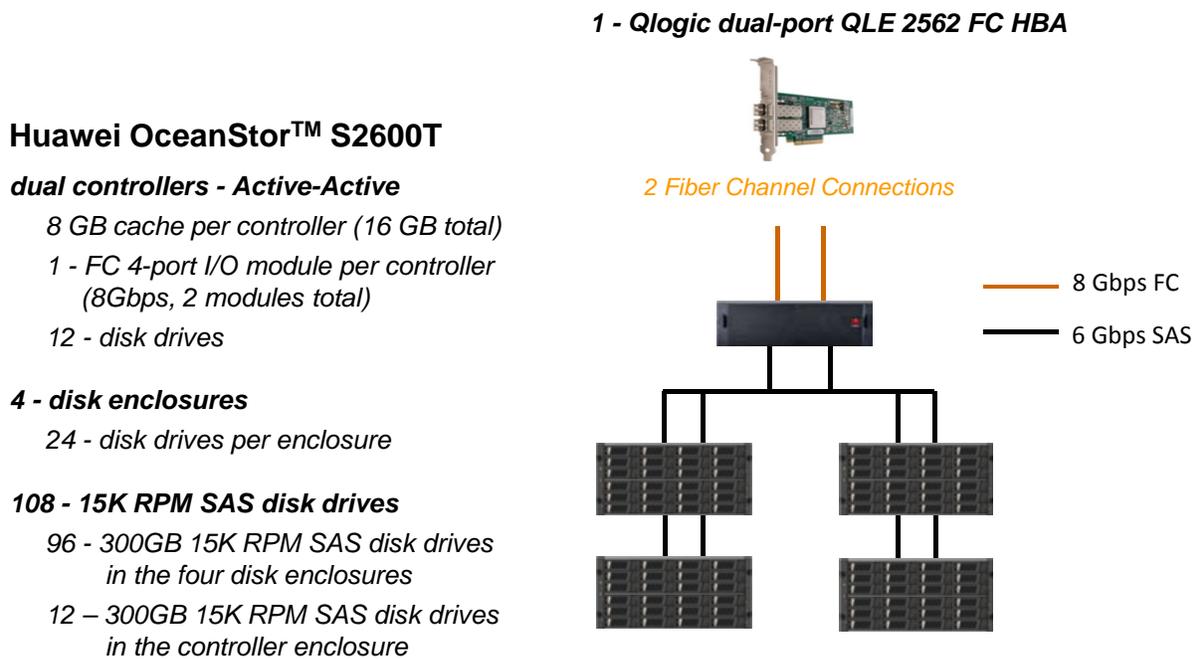
Part Number	Description	Quantity	Unit Price	Total Price
Control module				8,029.00
2C16G-1211-AC-BASE	OceanStor S2600T Controller Enclosure(Dual Controller,AC,16GB Cache,2*6*GE iSCSI Front-End Port,2*2*24G SAS Back-End Port(Wide Port),with UPS Cache Protected Module,HS Storage Array Control System Software,SPE32C0212)	1	8,029.00	8,029.00
Hard Disk Drives				44,064.00
SAS300-15K-2	300GB 15K RPM SAS Disk Unit(3.5")	108	408.00	44,064.00
Disk Enclosure				11,908.00
DAE12435U4-AC-2	OceanStor DAE12435U4 Disk Enclosure(4U,3.5",AC,SAS Expansion Module,without Disk Unit,with HS SAS in Band Management Software)	4	2,977.00	11,908.00
IO Interface				2,438.00
LPU4F8	4*8Gbps Fibre Channel I/O modules(Total 4 ports)	2	1,219.00	2,438.00
Accessory				155.00
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	1	67.00	67.00
Storage management software				1,351.00
LIC-S2A-ISM02-BLOCK	HS Integrated Storage Manager-Device Management License for OceanStor Block S2600T	1	1,351.00	1,351.00
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				69,643.00
Maintenance Support Service				41,772.00
Hi-Care Premier On-Site Service (3 years)		1	41,772.00	41,772.00
Total of Service (3 years)				41,772.00
Total Price				111,415.00
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



Priced Storage Configuration Components

Priced Storage Configuration:
1 – Qlogic dual-port QLE2562 FC HBA
Huawei OceanStor™ S2600T dual controllers – Active-Active 8 GB cache per controller (16 GB total) 1 – FC 4-port I/O module per controller (8 Gbps, 2 modules total) 4 – 8 Gbps front-end connections per controller (8 total) (2 used, 1 per controller) 2 – 2x24 Gbps SAS backend connections per controller (4 total, 4 used) 12 – 300 GB disk drives
4 – Disk Enclosures 24 – 3.5" HD slots per enclosure 24 – disk drives in each enclosures
108 – 15K RPM SAS disk drives