SPC BENCHMARK 1™
EXECUTIVE SUMMARY

DATACORE SOFTWARE CORPORATION
DATACORE SANSYMPHONY-V 10.0

SPC-1 V1.14

Submitted for Review: November 30, 2015
Submission Identifier: A00164

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

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Test Sponsor Primary Contact	DataCore Software Corporation – http://www.datacore.com Ben Treiber – ben.treiber@datacore.com Worldwide Headquarters Corporate Park 6300 NW 5th Way Ft. Lauderdale, FL 33309 Phone: (954) 377-6000 FAX: (954) 938-7953
Test Sponsor Alternate Contact	DataCore Software Corporation – http://www.datacore.com Roni Putra – roni.putra@datacore.com Worldwide Headquarters Corporate Park 6300 NW 5th Way Ft. Lauderdale, FL 33309 Phone: (954) 377-6000 FAX: (954) 938-7953
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	V1.14
SPC-1 Workload Generator revision number	V2.3.0
Date Results were first used publicly	November 30, 2015
Date the FDR was submitted to the SPC	November 30, 2015
Date the Priced Storage Configuration is available for shipment to customers	currently available
Date the TSC completed audit certification	November 30, 2015

Tested Storage Product (TSP) Description

SANsymphony-V provides a flexible platform that has been proven in enterprise environments. Because it is designed from the outset as parallel storage software, SANsymphony-V is uniquely able to scale to its underlying hardware environment and to do so in both conventional storage topologies and in more recent converged environments.

Summary of Results

SPC-1 Reported Data	
Tested Storage Product (TSP) Name: DataCore SANsymphony-V 10.0	
Metric	**Reported Result**
SPC-1 IOPS™	459,290.87
SPC-1 Price-Performance™	$0.08/SPC-1 IOPS™
Total ASU Capacity	2,924.873 GB
Data Protection Level	Protected 1 *(Mirroring)*
Total Price	$38.400.29
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.*

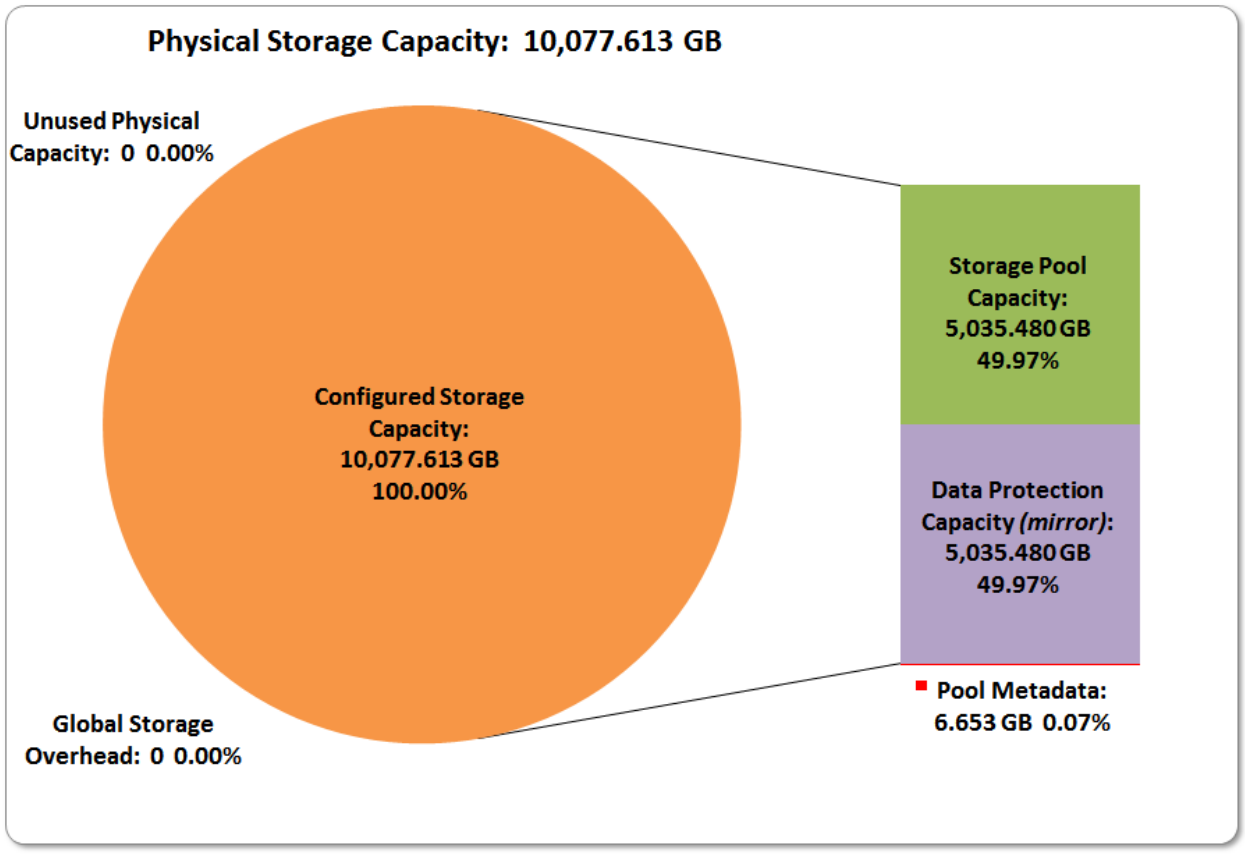
Total Price includes the cost of the Priced Storage Configuration plus three years of hardware maintenance and software support as detailed on page 8.

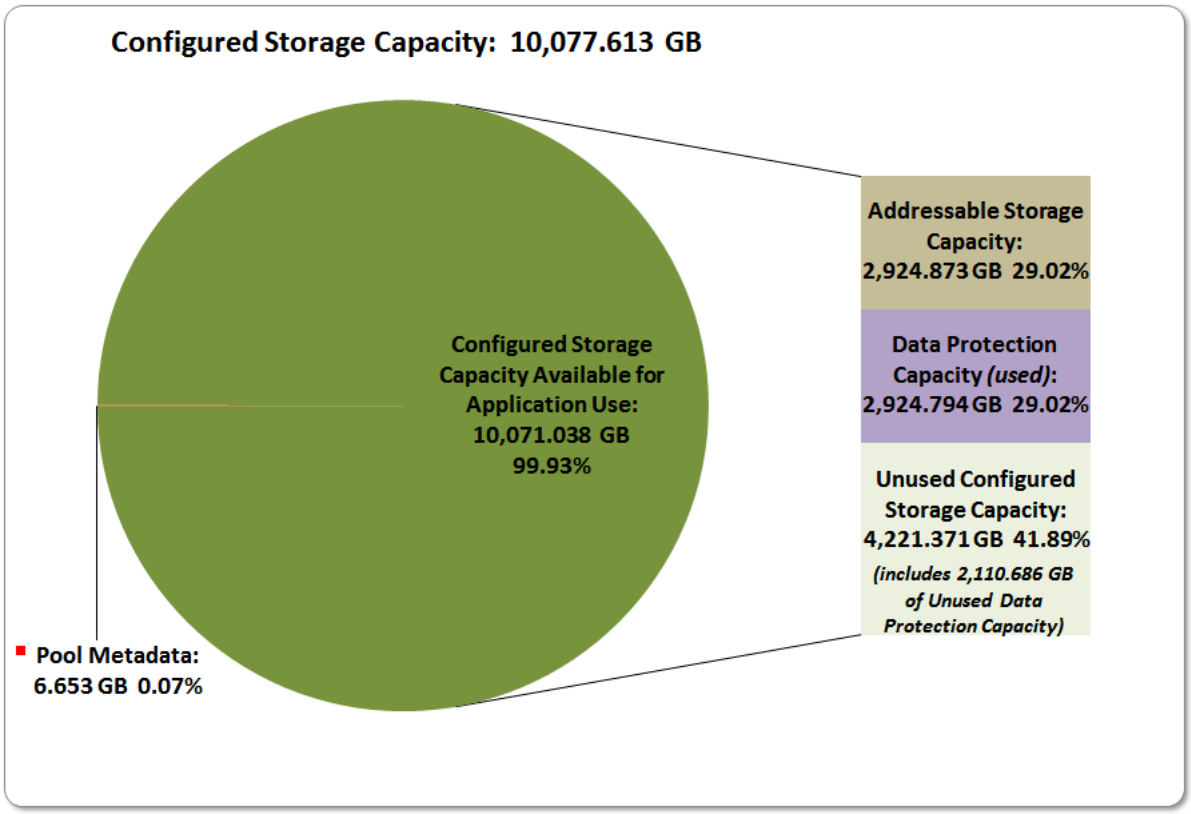
Currency Used is formal name for the currency used in calculating the **Total Price** and **SPC-1 Price-Performance™**. That currency may be the local currency of the **Target Country** or the currency of a difference country *(non-local currency)*.

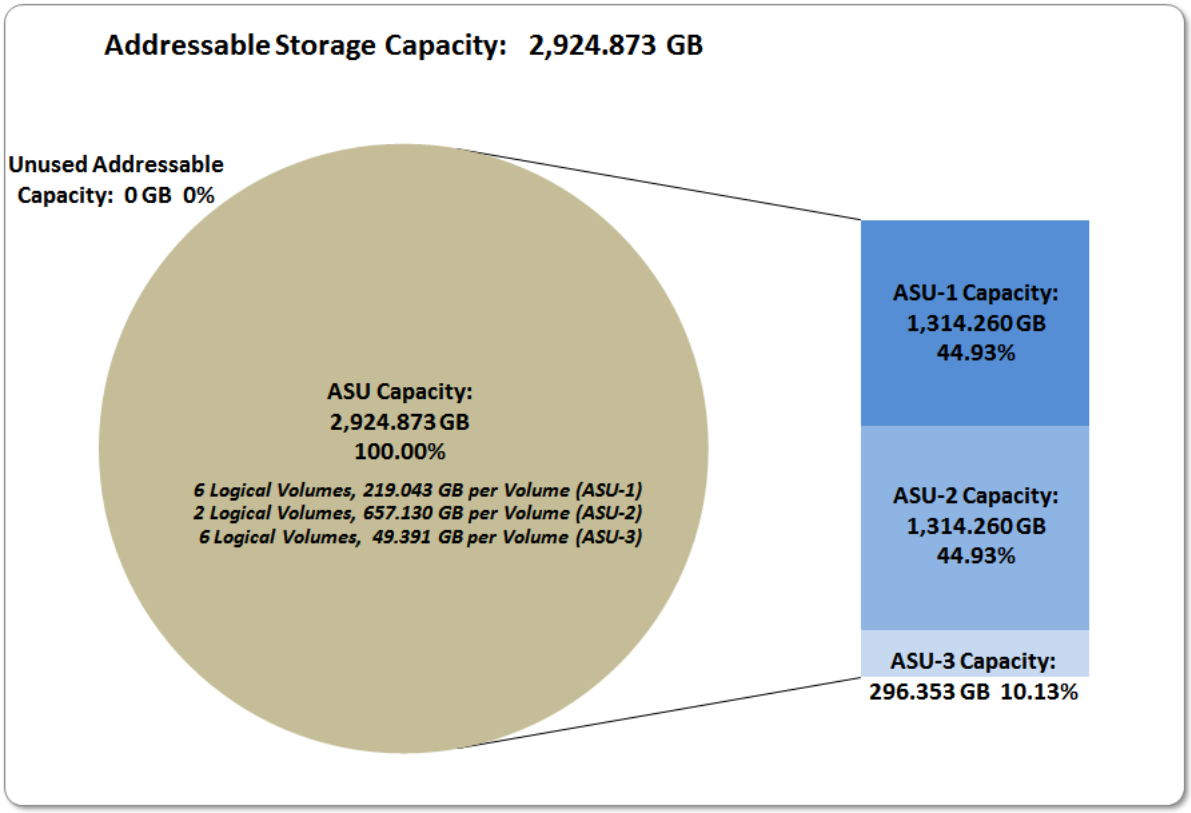
The **Target Country** is the country in which the Priced Storage Configuration is available for sale and in which the required hardware maintenance and software support is provided either directly from the Test Sponsor or indirectly via a third-party supplier.

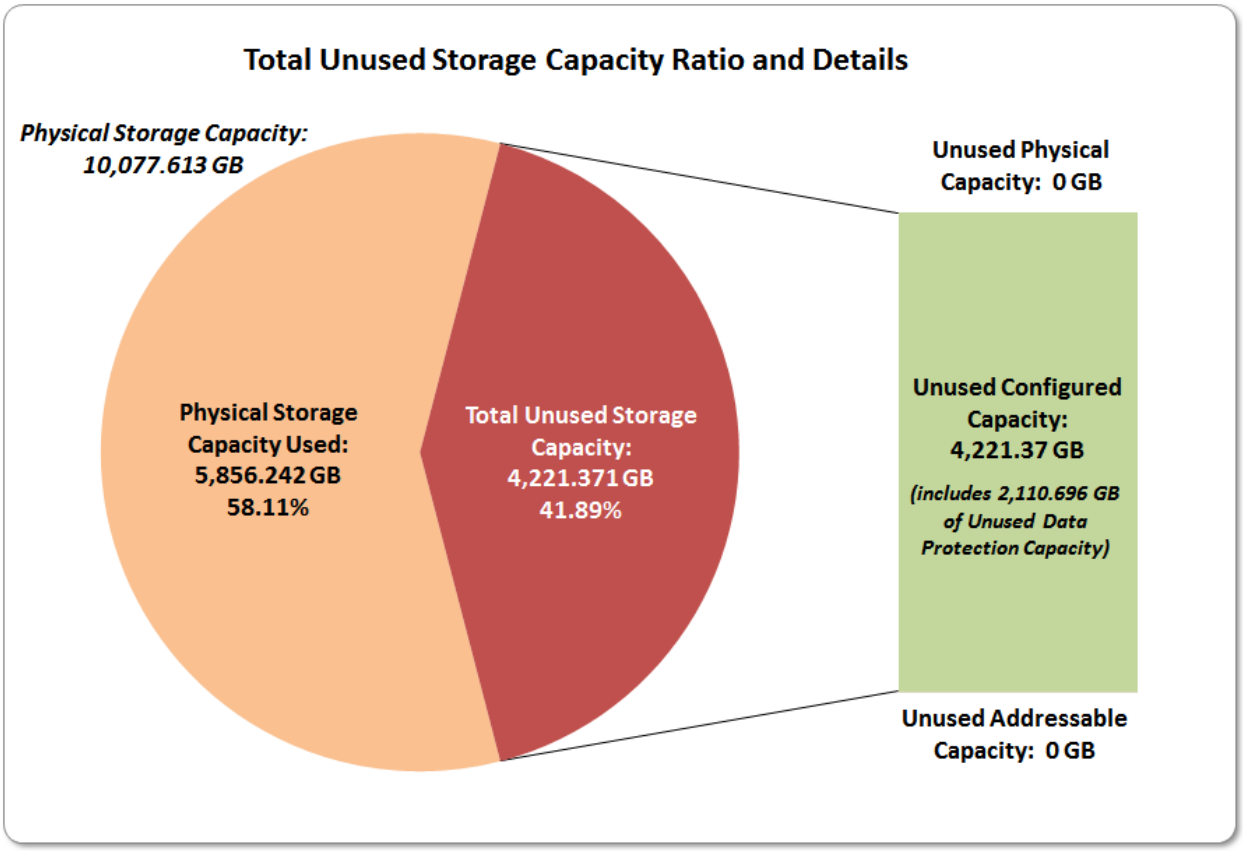
Storage Capacities, Relationships, and Utilization

The following four charts 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.




Configured Storage Capacity: 10,077.613 GB
Configured Storage Capacity Available for Application Use: 10,071.038 GB 99.93%
Pool Metadata: 6.653 GB 0.07%
Addressable Storage Capacity: 2,924.873 GB 29.02%
Data Protection Capacity (used): 2,924.794 GB 29.02%
Unused Configured Storage Capacity: 4,221.371 GB 41.89%
(includes 2,110.686 GB of Unused Data Protection Capacity)


Addressable Storage Capacity: 2,924.873 GB
Unused Addressable Capacity: 0 GB 0%
ASU Capacity: 2,924.873 GB 100.00%
6 Logical Volumes, 219.043 GB per Volume (ASU-1)
2 Logical Volumes, 657.130 GB per Volume (ASU-2)
6 Logical Volumes, 49.391 GB per Volume (ASU-3)
ASU-1 Capacity: 1,314.260 GB 44.93%
ASU-2 Capacity: 1,314.260 GB 44.93%
ASU-3 Capacity: 296.353 GB 10.13%



SPC-1 Storage Capacity Utilization	
Application Utilization	29.02%
Protected Application Utilization	58.05%
Unused Storage Ratio	41.89%

Application Utilization:

Total ASU Capacity *(2,924.873 GB)* divided by Physical Storage Capacity *(10,077.613 GB)*.

Protected Application Utilization: (Total ASU Capacity *(2,924.873 GB)* plus total Data Protection Capacity *(5,035.480 GB)* minus unused Data Protection Capacity *(2,110.686 GB)*) divided by Physical Storage Capacity *(10,077.613 GB)*.

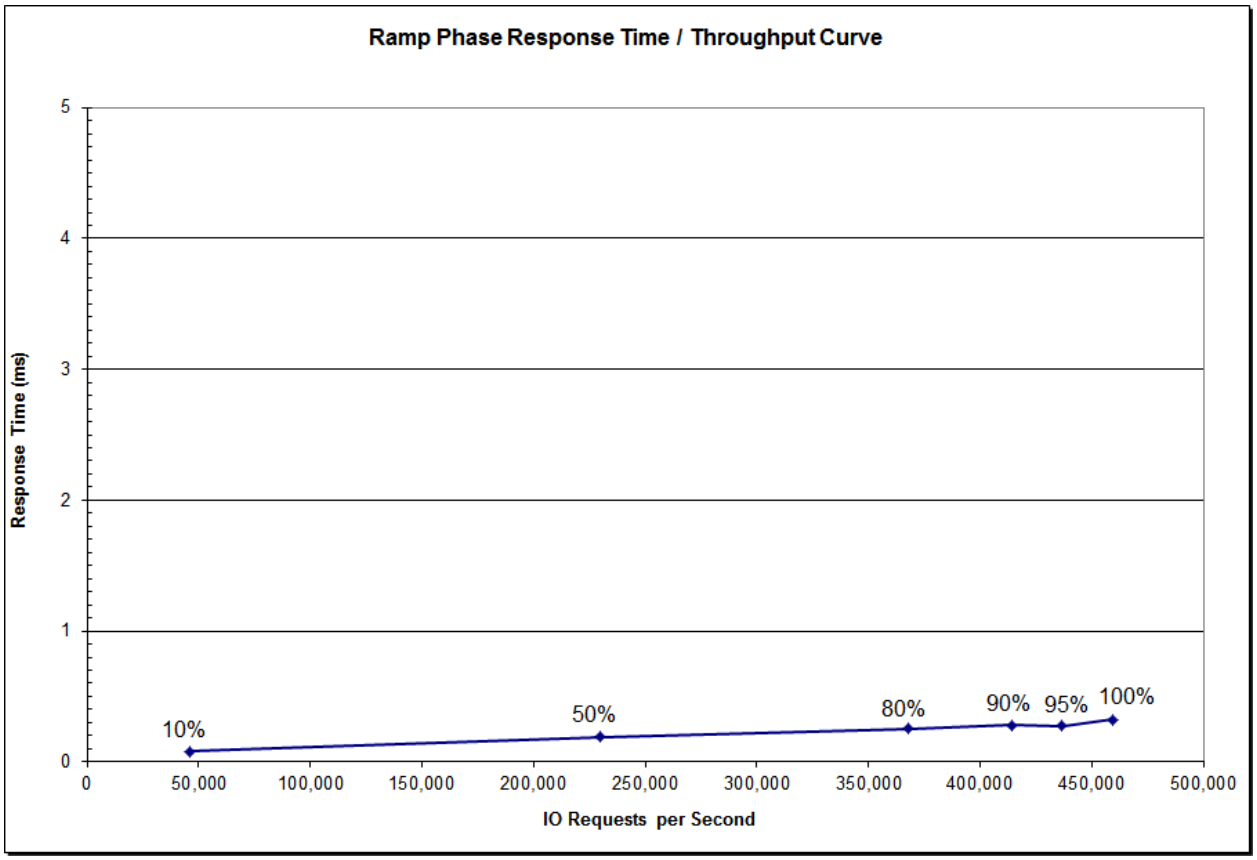
Unused Storage Ratio: Total Unused Capacity *(4,221.371 GB)* divided by Physical Storage Capacity *(10,077.613 GB)* and may not exceed 45%.

Detailed information for the various storage capacities and utilizations is available on pages 25-26 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	46,003.40	230,023.79	367,984.28	413,959.19	436,570.42	459,290.87
Average Response Time (ms):						
All ASUs	0.08	0.19	0.25	0.28	0.27	0.32
ASU-1	0.08	0.20	0.26	0.29	0.29	0.35
ASU-2	0.14	0.38	0.48	0.48	0.46	0.49
ASU-3	0.04	0.09	0.14	0.17	0.17	0.20
Reads	0.14	0.37	0.47	0.51	0.49	0.58
Writes	0.04	0.08	0.11	0.13	0.13	0.16

Priced Storage Configuration Pricing

Part ID	Description	Qty	List Price	Total List Price	Curvature Price	Total Price
5462AC1	IBM SYSTEM X3650 M5 2.5 SFF 8 BAY HOT SWAP	1	$ 3,150.00	$ 3,150.00	$ 2,205.00	$ 2,205.00
E5-2695V3	INTEL XEON PROCESSOR E5-2695 V3 (2.30 GHZ/14- CORE/35MB/2133MHZ)	2	$ 3,499.00	$ 6,998.00	$ 2,449.30	$ 4,898.60
HEATSINK	LENOVO HEATSINK	2	$ 150.00	$ 300.00	$ 105.00	$ 210.00
SYSTEM FAN	LENOVO SYSTEM FAN	6	$ 95.00	$ 570.00	$ 66.50	$ 399.00
46W0796	IBM 16GB TRUDDR4 MEMORY 2RX4 1.2V PC4-17000 CL15 2133MHZ LP RDIMM	2	$ 399.00	$ 798.00	$ 279.30	$ 558.60
46W0800	32GB (1X32GB), PC4-17000, DDR4, 1.2V, LRDIMM	16	$ 999.00	$ 15,984.00	$ 699.30	$ 11,188.80
MBF2300RC	300GB 10K SAS 2.5" 6G HDD	1	$ 269.00	$ 269.00	$ 188.30	$ 188.30
MZ-75E500B/AM	SAMSUNG 850 EVO 500 GB 2.5" INTERNAL SOLID STATE DRIVE - SATA	1	$ 349.00	$ 349.00	$ 244.30	$ 244.30
HUC156030CSS200	HDD, 300GB, 12G, SAS, 15K, SFF, WESTERN DIGITAL	8	$ 289.75	$ 2,318.00	$ 202.83	$ 1,622.64
46C9114	SERVER RAID M1215 SAS/SATA CONTROLLER	2	$ 225.00	$ 450.00	$ 157.50	$ 315.00
HSX-EWR-100-008	SANSYMPHONY-V VIRTUAL SAN HS8 LICENSE F/ 1 SERVER W/ UP TO 8 TBS	1	$ 4,000.00	$ 4,000.00	$ 3,600.00	$ 3,600.00
4XI0E51561	WINDOWS SVR 2012 R2 STANDARD ROK 2 CPUS/2 VMS (SEE NOTE 2)	1	$ 700.00	$ 700.00	$ 630.00	$ 630.00
HSX-EWR-TGD-008	3YR SUP SANSYMPHONY-V HS8 VIRTUAL SAN LICS FOR 1 SERVER	1	$ 2,000.00	$ 2,000.00	$ 1,800.00	$ 1,800.00
00FK936	LENOVO SYSTEM X 900W HIGH EFFICIENCY PLATINUM AC POWER SUPPLY 900 W - 120 V AC, 230 V AC	2	$ 399.00	$ 798.00	$ 279.30	$ 558.60
00NR851	LENOVO SERVICE/SUPPORT - 3 YEAR EXTENDED SERVICE SERVICE - 24 X 7 X 4 HOUR - ON-SITE - MAINTENANCE PARTS & LABOR - PHYSICAL SERVICE (SEE NOTE 3)	1	$ 810.00	$ 810.00	$ 688.50	$ 688.50
00LW731	LENOVO REMOTE TECHNICAL SUPPORT 3 YEAR - 24 X 7 X 2 HOUR TECHNICAL - ELECTRONIC SERVICE (SEE NOTE 3)	1	$ 1,375.00	$ 1,375.00	$ 1,168.75	$ 1,168.75
00FK661	LENOVO SYSTEM X3650 M5 PLUS 8X 2.5" HS HDD ASSEMBLY KIT WITH EXPANDER	1	$ 659.00	$ 659.00	$ 461.30	$ 461.30
00FK676	LENOVO SYSTEM X3650 M5 PLUS 8X2.5' HDD ASSEMBLY KIT	1	$ 249.00	$ 249.00	$ 174.30	$ 174.30
00FK658	LENOVO SYSTEM X3650 M5 REAR 2X2.5' HDD KIT	1	$ 379.00	$ 379.00	$ 265.30	$ 265.30
MZ-7KM480E	SSD, 480GB, 6GB, SATA, SFF, SAMSUNG	16	$ 459.00	$ 7,344.00	$ 321.30	$ 5,140.80
00E7600 L38552	2.5-INCH SFF DRIVE TRAY CADDY FOR IBM/LENOVO X3650 M5 (SEE NOTE 4)	25	$ 119.00	$ 2,975.00	$ 83.30	$ 2,082.50
			Net List Price:	$ 52,475.00	Net Cost:	$ 38,400.29
					Tax:	$ -
					Freight:	$ -
					Grand Total:	$ 38,400.29

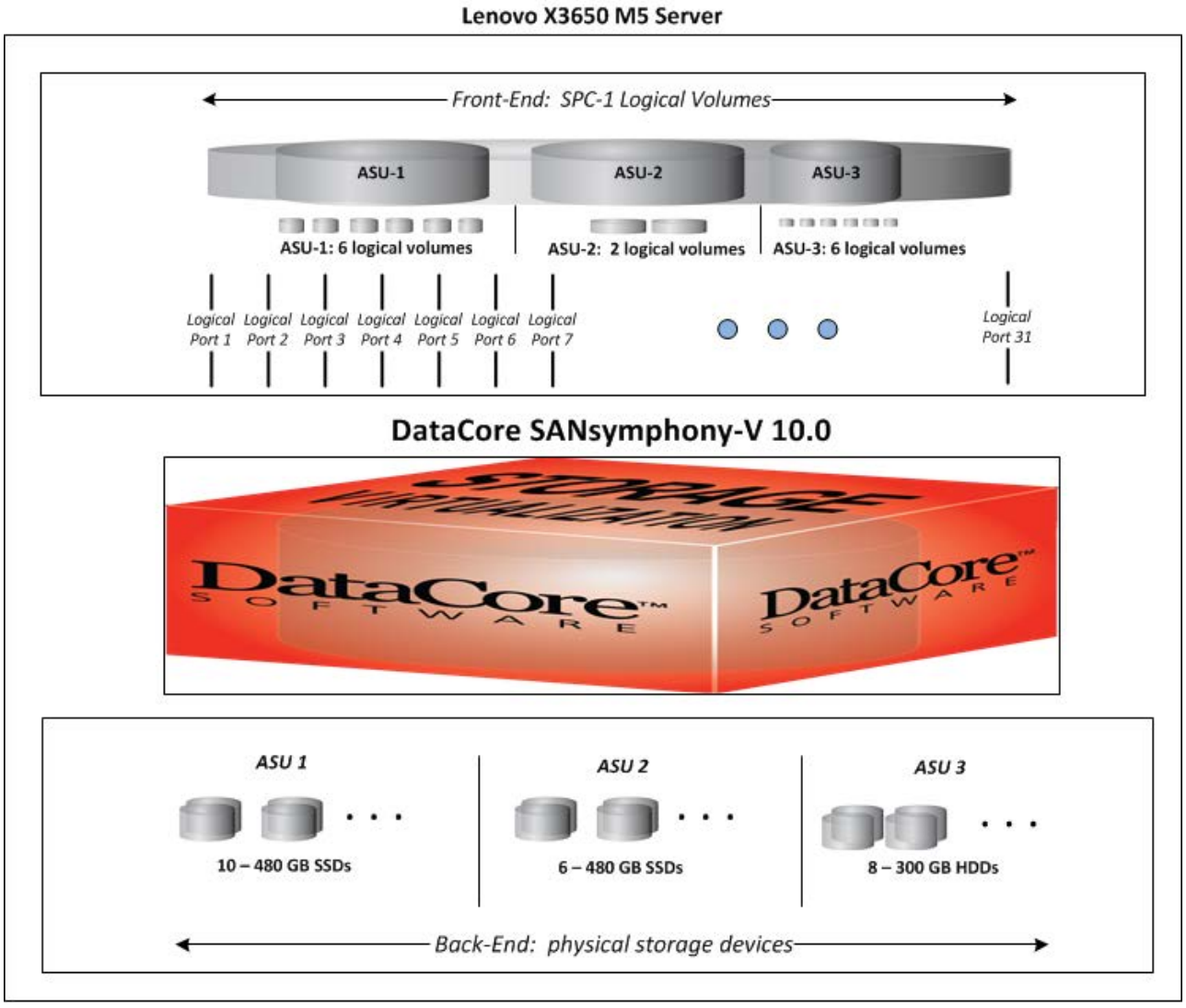
The above pricing includes hardware maintenance and software support for three years, 7 days per week, 24 hours per day. The hardware maintenance and software support provides the following:

- Acknowledgement of new and existing problems within 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

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

Priced Storage Configuration Diagram



Key	
Front-End: SPC-1 Logical Volumes	**ASU-1:** 6 logical volumes *(ASU_1_1 - ASU_1_6)*, 219.043 GB per logical volume **ASU-2:** 2 logical volumes *(ASU_2_1 - ASU_2_2)*, 657.130 GB per logical volume **ASU-3:** 6 logical volumes *(ASU_3_1 - ASU_3_6)*, 49.392 GB per logical volume
Back-End: physical storage devices	**Pool type ASU1:** 1 pool *(4MB_ASU1)*, 5 mirrored SSDs *(10 SSDs total)* **Pool type ASU2:** 1 pool *(4MB_ASU2)*, 3 mirrored SSDs *(6 SSDs total)* **Pool type ASU3:** 4 pools *(32MB_ASU3.1 - 32MB_ASU3.4)*, 1 mirrored HDD per pool *(8 HDDs total)*

Priced Storage Configuration Components

Priced Storage Configuration
DataCore SANsymphony-V 10.0
1 – Lenovo X3650 M5 server, with: 2 – Intel® Xeon® 2.30 GHz E5-2695 V3 processors each with 14 cores, 35 MB Intel Smart Cache 544 GB main memory *(418,652 MiB configured for SANsymphony-V server software)* Windows 2008 R2 Enterprise Server w/SP1 PCIe
1 – Server RAID M1215 SAS/SATA internal controller
2 – Server RAID M1215 SAS/SATA Controllers *(external)*
1 – 300 GB 10K SAS 2.5” 6G HDD *(system HDD)*
1 – 500 GB 2.5” SSD *(page/swap)* *(Samsung 850 EVO MZ-75E500)*
16 – 480 GB, 6 Gb SATA SFF SSDs *(Samsung SM863 MZ-7KM480E)*
8 – 300 GB 12Gb 15K SAS SFF HDDs *(Utrastar C15K600)*