ORACLE

SPC BENCHMARK 1™
FULL DISCLOSURE REPORT

ORACLE CORPORATION
SUN STORAGE 6780 ARRAY *(8 GB)*

SPC-1 V1.12

Submitted for Review: June 1, 2010
Submission Identifier: A00094

First Edition – June 2010

Trademarks

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AUDIT CERTIFICATION

Steven A. Johnson
Oracle Corporation
500 Eldorado Blvd., UBRM05-194
Broomfield, CO 80021

June 1, 2010

The SPC Benchmark 1™ Reported Data listed below for the Sun Storage 6780 Array *(8 Gb)* were produced in compliance with the SPC Benchmark 1™ 1.12 Remote Audit requirements.

SPC Benchmark 1™ 1.12 Results	
Tested Storage Configuration (TSC) Name: Sun Storage 6780 Array *(8 Gb)*	
Metric	**Reported Result**
SPC-1 IOPS™	62,261.80
SPC-1 Price-Performance	$6.89/SPC-1 IOPS™
Total ASU Capacity	13,742.218 GB
Data Protection Level	Protected *(Mirroring)*
Total TSC Price (including three-year maintenance)	$429,294

The following SPC Benchmark 1™ Remote Audit requirements were reviewed and found compliant with 1.12 of the SPC Benchmark 1™ specification:

- A Letter of Good Faith, signed by a senior executive.
- The following Data Repository storage items, based on information supplied by Oracle Corporation:
  - ✓ Physical Storage Capacity and requirements.
  - ✓ Configured Storage Capacity and requirements.
  - ✓ Addressable Storage Capacity and requirements.
  - ✓ Capacity of each Logical Volume and requirements.
  - ✓ Capacity of each Application Storage Unit (ASU) and requirements.
- An appropriate diagram of the Benchmark Configuration (BC)/Tested Storage Configuration (TSC).
- Listings and commands to configure the Benchmark Configuration/Tested Storage Configuration, including customer tunable parameters that were changed from default values.
- SPC-1 Workload Generator commands and parameters used for the audited SPC Test Runs.

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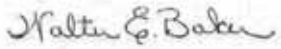
AUDIT CERTIFICATION *(CONT.)*

- The following Host System requirements, based on information supplied by Oracle Corporation:
  - ✓ The type of Host System including the number of processors and main memory.
  - ✓ The presence and version number of the SPC-1 Workload Generator on each Host System.
  - ✓ The TSC boundary within each Host System.
- The Test Results Files and resultant Summary Results Files received from Oracle Corporation for each of following were authentic, accurate, and compliant with all of the requirements and constraints of Clauses 4 and 5 of the SPC-1 Benchmark Specification:
  - ✓ Data Persistence Test
  - ✓ Sustainability Test Phase
  - ✓ IOPS Test Phase
  - ✓ Response Time Ramp Test Phase
  - ✓ Repeatability Test
- The differences between the Tested Storage Configuration (TSC) used for the benchmark and Priced Storage Configuration were documented and, if applied to the TSC, would not have an impact on the reported SPC-1 performance.
- The submitted pricing information met all of the requirements and constraints of Clause 8 of the SPC-1 Benchmark Specification.
- The Full Disclosure Report (FDR) met all of the requirements in Clause 9 of the SPC-1 Benchmark Specification.
- This successfully audited SPC measurement is not subject to an SPC Confidential Review.

Audit Notes:

There were no audit notes or exceptions.

Respectfully,



Walter E. Baker
SPC Auditor

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LETTER OF GOOD FAITH

ORACLE

Date: April 15, 2010

From: Lisa Sieker

To: Walter Baker, SPC Auditor

Subject: SPC-1 Letter of Good Faith for Oracle's Sun Storage 6780 Array

Oracle Corporation is the SPC-1 Test Sponsor of the above listed product. To the best of our knowledge and belief, the required SPC-1 benchmarks results and materials we have submitted for that product are complete, accurate and in full compliance with V1.12 of the SPC-1 benchmark specification.

In addition, we have reported any items in the Benchmark Configuration and execution of the benchmark necessary to reproduce the reported results even if the items are not explicitly required to be disclosed by the above SPC-1 benchmark specification.

Signed

Lisa K. Sieker
VP, Systems Product Management

4/15/10
Date

Oracle Corporation
4150 Network Circle
Santa Clara, CA 95054

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

Test Sponsor and Contact Information	
Test Sponsor Primary Contact	Oracle Corporation – http://www.oracle.com Steven A. Johnson – steven.a.johnson@oracle.com 500 Eldorado Blvd. UBRM05-194 Broomfield, CO 80021 Phone: (303) 272-9476 FAX: (303) 272-4886
Test Sponsor Alternate Contact	Oracle Corporation – http://www.oracle.com Jason Schaffer – Jason.schaffer@oracle.com 500 Eldorado Blvd. Broomfield, CO 80021 Phone: (303) 272-4743 FAX: (303) 272-9704
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	V1.12
SPC-1 Workload Generator revision number	V2.1.0
Date Results were first used publicly	June 1, 2010
Date the FDR was submitted to the SPC	June 1, 2010
Date the priced storage configuration is available for shipment to customers	currently available
Date the TSC completed audit certification	June 1, 2010

Tested Storage Product (TSP) Description

The Sun Storage 6780 array is a modular, rack mounted and scalable array designed specifically to grow with your applications, lowering acquisition and expansion costs. and when requirements change, the The Sun Storage 6780 array consists of a minimum of one controller tray and up to 16 expansion trays (maximum of 28 expansion trays available Q2 CY2009). The Sun Storage 6780 controller tray (1 x 1) has three cache options — 8 GB, 16 GB or 32* GB (32 GB available Q3 CY2009) – and two host port options – 8 or 16 – 4 Gb per second fibre channel (8 Gb per second fibre channel available Q2CY2009). The Sun Storage 6780 leverages the existing Common Storage Modules (CSM200) expansion trays for primary and secondary storage requirements. With redundant components, automated path failover and extensive online configuration, re-configuration and maintenance capabilities, the Sun Storage 6780 is designed to ensure your data is available 24x7x365.

Summary of Results

SPC-1 Results	
Tested Storage Configuration (TSC) Name: Sun Storage 6780 Array *(8 Gb)*	
Metric	**Reported Result**
SPC-1 IOPS™	62,261.80
SPC-1 Price-Performance	$6.89/SPC-1 IOPS™
Total ASU Capacity	13,742.218 GB
Data Protection Level	Protected *(Mirroring)*
Total TSC Price (including three-year maintenance)	$429,294

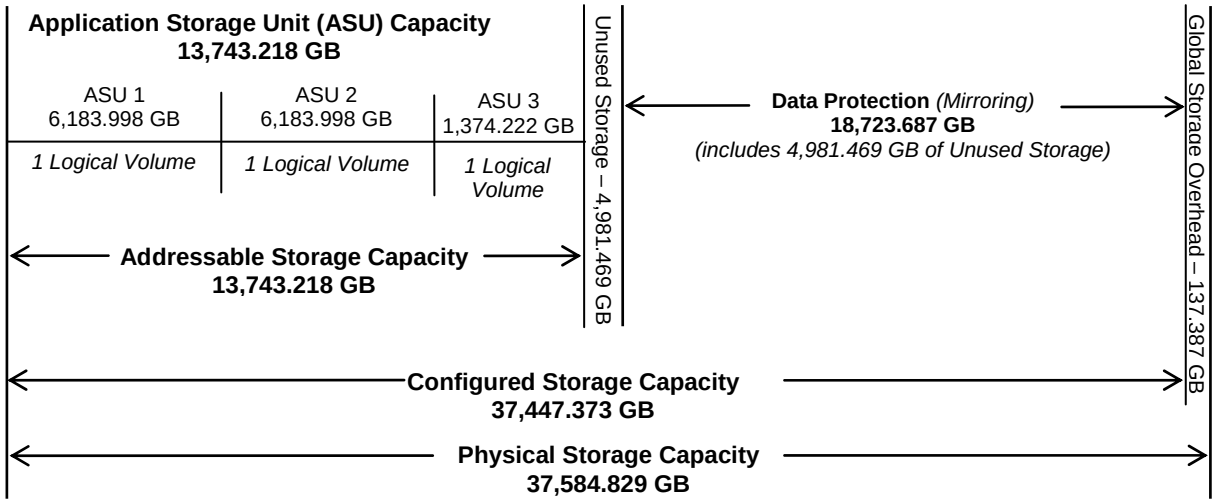
SPC-1 IOPS™ represents the maximum I/O Request Throughput at the 100% load point.

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** using ***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	36.56%
Protected Application Utilization	73.13%
Unused Storage Ratio	26.51%

Application Utilization: Total ASU Capacity *(13,742.218 GB)* divided by Physical Storage Capacity *(37,854.829 GB)*

Protected Application Utilization: (Total ASU Capacity *(13,742.218 GB)* plus total Data Protection Capacity *(18,723.687 GB)* minus unused Data Protection Capacity *(4,981.469 GB)* divided by Physical Storage Capacity *(37,854.829 GB)*

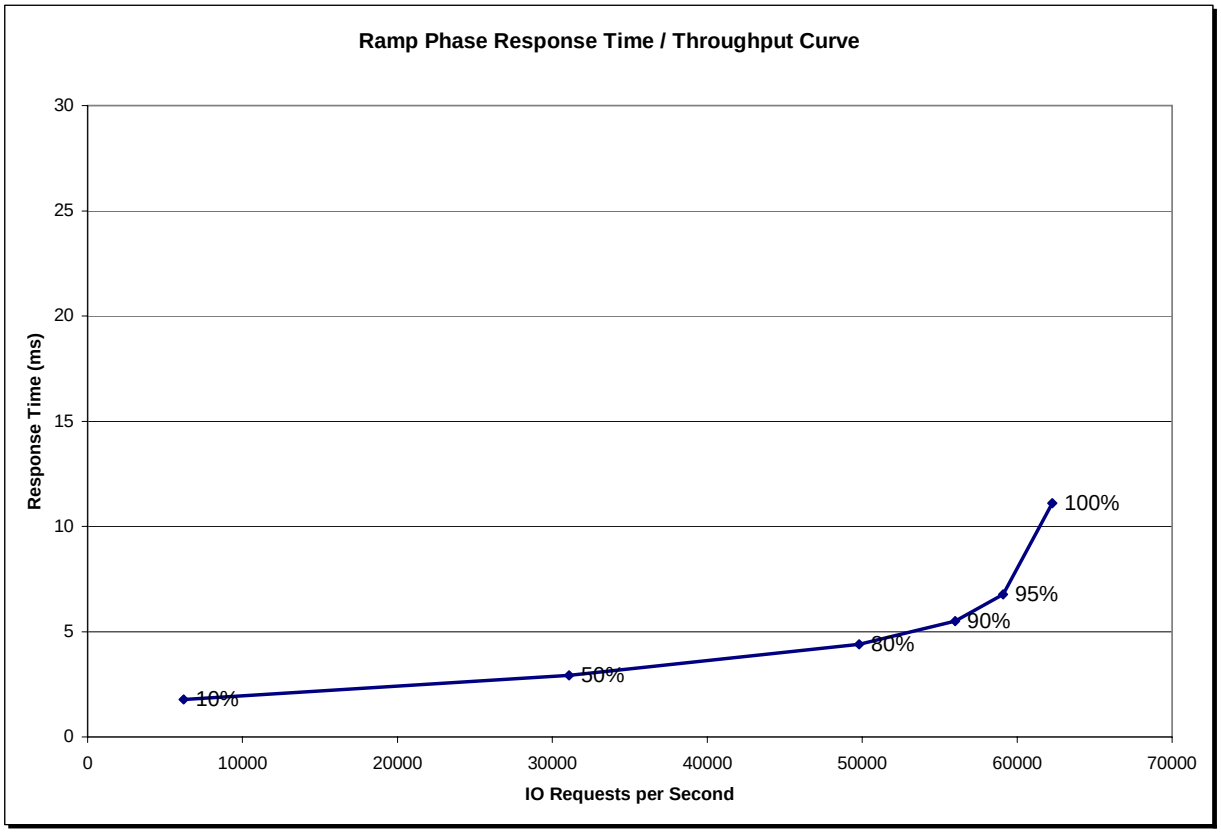
Unused Storage Ratio: Total Unused Capacity *(9,962.938 GB)* divided by Physical Storage Capacity *(37,854.829 GB)* and may not exceed 45%.

Detailed information for the various storage capacities and utilizations is available on pages 20-21 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 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	6,202.06	31,086.00	49,802.32	55,997.68	59,100.81	62,261.80
Average Response Time (ms):						
All ASUs	1.78	2.93	4.39	5.50	6.77	11.11
ASU-1	2.43	3.97	5.66	6.79	8.02	12.07
ASU-2	2.23	3.76	6.37	8.20	9.84	14.42
ASU-3	0.18	0.34	0.82	1.56	2.78	7.65
Reads	4.25	6.93	9.91	11.60	13.02	16.80
Writes	0.16	0.32	0.79	1.52	2.70	7.41

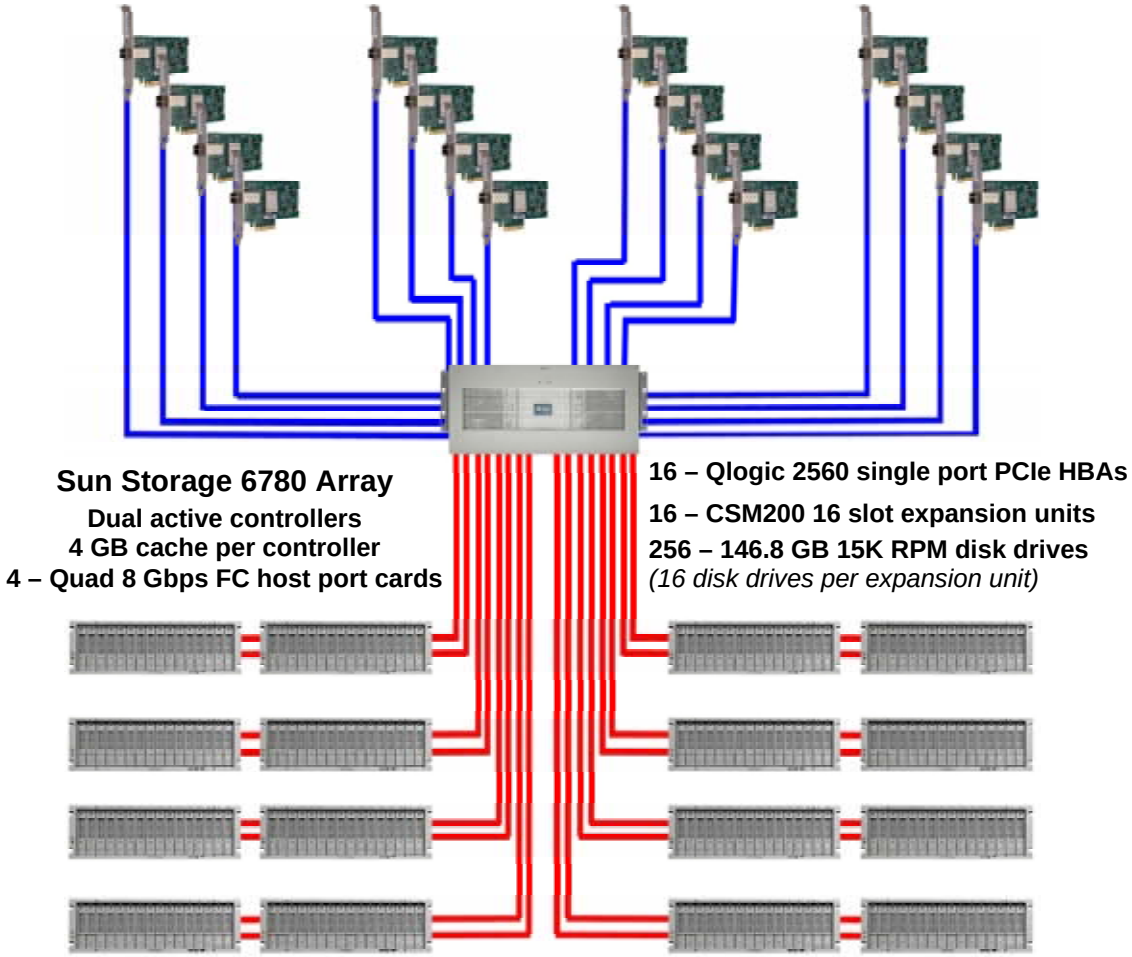
Priced Storage Configuration Pricing

Part Number	Description	Quantity	US List	Total	discount	Ave. Price
XTA6780R11D8EA2-08	Sun Storage 6780 Array, 1x1, 8 GB, 8x8Gb/s FC Host ports	1	$107,495	$107,495	38%	$66,647
	- 2 Controllers w/ 4GB cache each					
	- 2 Quad 8 Gbps FC host ports cards					
	- 8 x 8Gb/s FC SFPs included					
	- 2 x 5M LC-LC Fiber Optic cables included					
	- CAM Management Software included					
XTA6780HIC-D8F-UPG	2 Quad 8 Gbps FC host port cards	1	$37,895	$37,895	38%	$23,495
	- 8 x 8Gb/s FC SFPs included					
X9733A-Z	5M LC-LC Fiber Optic cable	14	$80	$1,120	38%	$694
XTCCSM2R01A0C2336Z	STK CSM200 RM 0x1x16x146G15k	16	$29,915	$478,640	38%	$296,757
	- 16 x 146GB 15k rpm 4Gb drives					
	- 2 x 5M LC-LC Fiber Optic cables included					
	- 4 x 4Gb/s FC SFPs included					
SG-XPCIE1FC-QF8-Z	8Gb PCIe single port FC Host Based Adapter	16	$1,249	$19,984	38%	$12,390
XTCTIER2-BASE16	16 Storage Domains	1	$7,495	$7,495	38%	$4,647
IWU-ST6780-6-24-3G	3-yr Gold Service Maintainance for controller tray	1	$9,700	$9,700	38%	$6,014
	- 7/24 coverage					
	- 4 hour resonse time					
	- 4 hour resolution					
IWU-STCSM2-24-3G	3-yr Gold Service Maintainance for CSM200 expansion tray	16	$1,880	$30,080	38%	$18,650
	- 7/24 coverage					
	- 4 hr response time					
	- 4 hour resolution					
				$692,409		**$429,294**

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

The only difference was between the number of 4 Gbps SFPs configured in the TSC and the number included in the Priced Storage Configuration. The TSC was configured with 77 of the 4 Gbps SFPs of which 64 were used. The Priced Storage Configuration included only the required 64 SFPs.

Priced Storage Configuration Diagram



Priced Storage Configuration Components

Priced Storage Configuration:
16 – 8Gb PCIe single port FC HBAs
SC-1/SC-2: Sun Storage 6780 Array **2 – dual-active controllers with:** 8 GB cache total, 4 GB per controller 4 –Quad 8 Gbps FC Host Port Cards *2 pair, includes 16 SFPs (8 Gbps))* 16 – 8 Gb Fibre Channel front-end connections 16 – 4 Gb Fibre Channel backend connection
16 – CSM200 16 slot expansion units *(each expansion unit includes 4 SFPs (4 Gbps))*
256 – 146.8 GB 15K RPM disk drives

In each of the following sections of this document, the appropriate Full Disclosure Report requirement, from the SPC-1 benchmark specification, is stated in italics followed by the information to fulfill the stated requirement.

CONFIGURATION INFORMATION

Benchmark Configuration (BC)/Tested Storage Configuration (TSC) Diagram

Clause 9.4.3.4.1

A one page Benchmark Configuration (BC)/Tested Storage Configuration (TSC) diagram shall be included in the FDR…

The Benchmark Configuration (BC)/Tested Storage Configuration (TSC) is illustrated on page 17 *(*Benchmark Configuration/Tested Storage Configuration Diagram*).*

Storage Network Configuration

Clause 9.4.3.4.1

…

5. *If the TSC contains network storage, the diagram will include the network configuration. If a single diagram is not sufficient to illustrate both the Benchmark Configuration and network configuration in sufficient detail, the Benchmark Configuration diagram will include a high-level network illustration as shown in Figure 9-8. In that case, a separate, detailed network configuration diagram will also be included as described in Clause 9.4.3.4.2.*

Clause 9.4.3.4.2

If a storage network was configured as a part of the Tested Storage Configuration and the Benchmark Configuration diagram described in Clause 9.4.3.4.1 contains a high-level illustration of the network configuration, the Executive Summary will contain a one page topology diagram of the storage network as illustrated in Figure 9-9.

The TSC did not utilize network storage.

Host System and Tested Storage Configuration (TSC) Table of Components

Clause 9.4.3.4.3

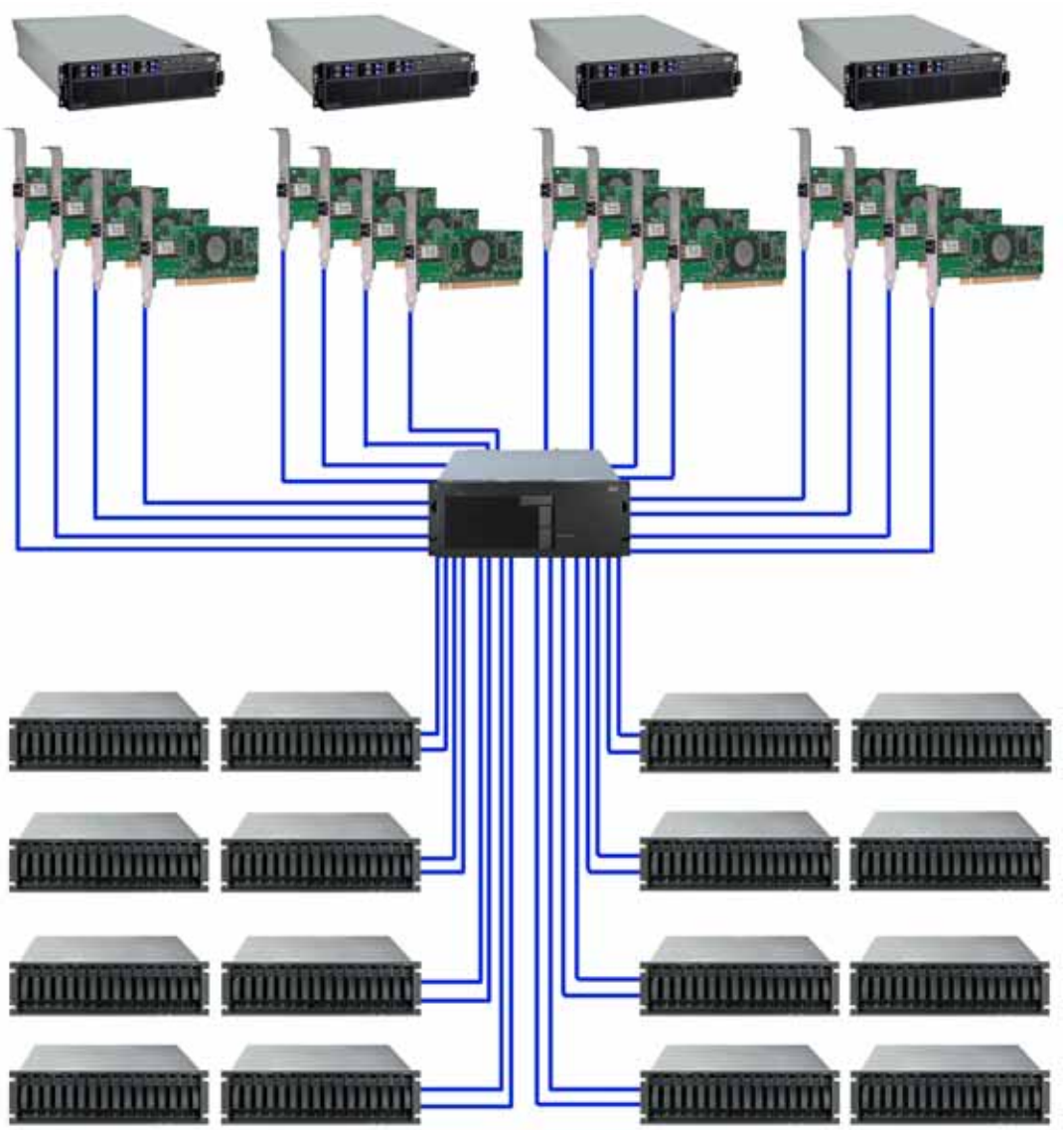
The FDR will contain a table that lists the major components of each Host System and the Tested Storage Configuration (TSC). Table 9-10 specifies the content, format, and appearance of the table.

The Host System and TSC table of components may be found on page 18 *(Host System(s) and Tested Storage Configuration Components).*

Benchmark Configuration/Tested Storage Configuration Diagram

HS 1/2/3/4

IBM System x3650



SC 1/SC-2

LSI 7999 Storage System

dual active controllers w/4 GB cache each

4 - Quad 8 Gbps FC host port cards

16 – LSI FC4600 16 slot disk drive enclosures

256 – 146.8 GB 15K RPM disk drives

(16 disk drives per enclosure)

16 – Qlogic 2560 single port PCIe HBAs

Host System(s) and Tested Storage Configuration Components

Host System:	Tested Storage Configuration (TSC):
HS-1/2/3/4: IBM System x3650	16 –Qlogic 2650 single port PCIe HBAs
Each Host System with:	**SC-1/SC-2: LSI 7999 Storage System** **2 – dual-active controllers with:** 8 GB cache total, 4 GB per controller 4 – Quad 8 Gbps FC Host Port Cards *2 pair, includes 16 SFPs (8 Gbps))* 16 – 8 Gb Fibre Channel front-end connections 16 – 4 Gb Fibre Channel backend connections
2 – 3.00 GHz Dual Xeon Processors with 4 MB L2 cache	
5 GB main memory	
Windows Server 2003 Enterprise Edition 32-bit with SP2	
PCIe:	
WG	16 – LSI FC4600 16 slot disk drive enclosures *(each enclosure includes 4 SFPs (4 Gbps))*
	256 – 146.8 GB 15K RPM disk drives

Customer Tunable Parameters and Options

Clause 9.4.3.5.1

All Benchmark Configuration (BC) components with customer tunable parameter and options that have been altered from their default values must be listed in the FDR. The FDR entry for each of those components must include both the name of the component and the altered value of the parameter or option. If the parameter name is not self-explanatory to a knowledgeable practitioner, a brief description of the parameter's use must also be included in the FDR entry.

"Appendix B: Customer Tunable Parameters and Options" on page 62 contains the customer tunable parameters and options that have been altered from their default values for this benchmark.

Tested Storage Configuration (TSC) Description

Clause 9.4.3.5.2

The FDR must include sufficient information to recreate the logical representation of the TSC. In addition to customer tunable parameters and options (Clause 4.2.4.5.3), that information must include, at a minimum:

- *A diagram and/or description of the following:*
  - *All physical components that comprise the TSC. Those components are also illustrated in the BC Configuration Diagram in Clause 9.2.4.4.1 and/or the Storage Network Configuration Diagram in Clause 9.2.4.4.2.*
  - *The logical representation of the TSC, configured from the above components that will be presented to the Workload Generator.*
- *Listings of scripts used to create the logical representation of the TSC.*
- *If scripts were not used, a description of the process used with sufficient detail to recreate the logical representation of the TSC.*

"Appendix C: Tested Storage Configuration (TSC) Creation" on page 64 contains the detailed information that describes how to create and configure the logical TSC.

SPC-1 Workload Generator Storage Configuration

Clause 9.4.3.5.3

The FDR must include all SPC-1 Workload Generator storage configuration commands and parameters.

The SPC-1 Workload Generator storage configuration commands and parameters for this measurement appear in "Appendix D: SPC-1 Workload Generator Storage Commands and Parameters" on page 69.

SPC-1 DATA REPOSITORY

This portion of the Full Disclosure Report presents the detailed information that fully documents the various SPC-1 storage capacities and mappings used in the Tested Storage Configuration. "SPC-1 Data Repository Definitions" on page 58 contains definitions of terms specific to the SPC-1 Data Repository.

Storage Capacities and Relationships

Clause 9.4.3.6.1

Two tables and an illustration documenting the storage capacities and relationships of the SPC-1 Storage Hierarchy (Clause 2.1) shall be included in the FDR.

SPC-1 Storage Capacities

SPC-1 Storage Capacities		
Storage Hierarchy Component	**Units**	**Capacity**
Total ASU Capacity	Gigabytes (GB)	13,742.218
Addressable Storage Capacity	Gigabytes (GB)	13,742.218
Configured Storage Capacity	Gigabytes (GB)	36,447.373
Physical Storage Capacity	Gigabytes (GB)	37,584.829
Data Protection *(Mirroring)*	Gigabytes (GB)	18,723.687
Required Storage *(overhead/metadata)*	Gigabytes (GB)	0.000
Global Storage Overhead	Gigabytes (GB)	137.387
Total Unused Storage	Gigabytes (GB)	9,962.938

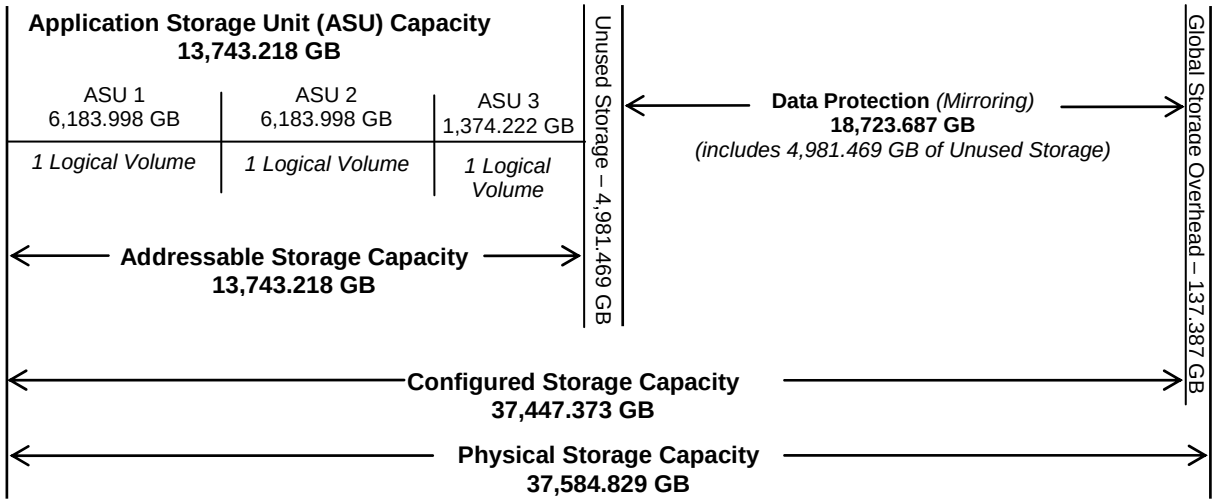
SPC-1 Storage Hierarchy Ratios

	Addressable Storage Capacity	**Configured Storage Capacity**	**Physical Storage Capacity**
Total ASU Capacity	100.00%	36.70%	36.56%
Required for Data Protection *(Mirrored)*		50.00%	49.82%
Addressable Storage Capacity		36.70%	36.56%
Required Storage		0.00%	0.00%
Configured Storage Capacity			99.63%
Global Storage Overhead			0.37%
Unused Storage:			
Addressable	0.00%		
Configured		26.61%	
Physical			0.00%

The Physical Storage Capacity consisted of 37,584.829 GB distributed over 256 disk drives each with a formatted capacity of 146.816 GB. There was 0.00 GB (0.00%) of Unused Storage within the Physical Storage Capacity. Global Storage Overhead consisted of 137.387 GB (0.37%) of Physical Storage Capacity. There was 9,962.938 GB (26.61%) of Unused Storage within the Configured Storage Capacity. The Total ASU Capacity utilized 100% of the Addressable Storage Capacity resulting in 0.00 GB (0.00%) of Unused Storage within the Addressable Storage Capacity. The Data Protection *(mirroring)* capacity was 18,723.687 GB of which 13,742.281 GB was utilized. The total Unused Storage was 9,962.938 GB.

SPC-1 Storage Capacities and Relationships Illustration

The various storage capacities configured in the benchmark result are illustrated below (not to scale).



Logical Volume Capacity and ASU Mapping

Clause 9.4.3.6.3

A table illustrating the capacity of each ASU and the mapping of Logical Volumes to ASUs shall be provided in the FDR. … Logical Volumes shall be sequenced in the table from top to bottom per its position in the contiguous address space of each ASU. The capacity of each Logical Volume shall be stated. … In conjunction with this table, the Test Sponsor shall provide a complete description of the type of data protection (see Clause 2.4.5) used on each Logical Volume.

Logical Volume Capacity and Mapping		
ASU-1 (6,183.998 GB)	**ASU-2 (6,183.998 GB)**	**ASU-3 (1,374.222 GB)**
1 Logical Volume 6,183.998 GB per Logical Volume (6,183.998 GB used per Logical Volume)	1 Logical Volume 6,183.998 GB per Logical Volume (6,183.998 GB used per Logical Volume)	1 Logical Volume 1,374.222 GB per Logical Volume (1,374.222 GB used per Logical Volume)

The Data Protection Level used for all Logical Volumes was "Mirrored" as described on page 11. See "ASU Configuration" in the **IOPS Test Results File** for more detailed configuration information.

Storage Capacity Utilization

Clause 9.4.3.6.2

The FDR will include a table illustrating the storage capacity utilization values defined for Application Utilization (Clause 2.8.1), Protected Application Utilization (Clause 2.8.2), and Unused Storage Ratio (Clause 2.8.3).

Clause 2,8.1

Application Utilization is defined as Total ASU Capacity divided by Physical Storage Capacity.

Clause 2,8.2

Protected Application Utilization is defined as (Total ASU Capacity plus total Data Protection Capacity minus unused Data Protection Capacity) divided by Physical Storage Capacity.

Clause 2,8.3

Unused Storage Ratio is defined as Total Unused Capacity divided by Physical Storage Capacity and may not exceed 45%.

SPC-1 Storage Capacity Utilization	
Application Utilization	36.56%
Protected Application Utilization	73.13%
Unused Storage Ratio	26.51%

SPC-1 BENCHMARK EXECUTION RESULTS

This portion of the Full Disclosure Report documents the results of the various SPC-1 Tests, Test Phases, and Test Runs. "SPC-1 Test Execution Definitions" on page 59 contains definitions of terms specific to the SPC-1 Tests, Test Phases, and Test Runs.

Clause 5.4.3

The Tests must be executed in the following sequence: Primary Metrics, Repeatability, and Data Persistence. That required sequence must be uninterrupted from the start of Primary Metrics to the completion of Persistence Test Run 1. Uninterrupted means the Benchmark Configuration shall not be power cycled, restarted, disturbed, altered, or adjusted during the above measurement sequence. If the required sequence is interrupted other than for the Host System/TSC power cycle between the two Persistence Test Runs, the measurement is invalid.

SPC-1 Tests, Test Phases, and Test Runs

The SPC-1 benchmark consists of the following Tests, Test Phases, and Test Runs:

- **Primary Metrics Test**
  - Sustainability Test Phase and Test Run
  - IOPS Test Phase and Test Run
  - Response Time Ramp Test Phase
    - 95% of IOPS Test Run
    - 90% of IOPS Test Run
    - 80% of IOPS Test Run
    - 50% of IOPS Test Run
    - 10% of IOPS Test Run (LRT)
- **Repeatability Test**
  - Repeatability Test Phase 1
    - 10% of IOPS Test Run (LRT)
    - IOPS Test Run
  - Repeatability Test Phase 2
    - 10% of IOPS Test Run (LRT)
    - IOPS Test Run
- **Data Persistence Test**
  - Data Persistence Test Run 1
  - Data Persistence Test Run 2

Each Test is an atomic unit that must be executed from start to finish before any other Test, Test Phase, or Test Run may be executed.

The results from each Test, Test Phase, and Test Run are listed below along with a more detailed explanation of each component.

Primary Metrics Test – Sustainability Test Phase

Clause 5.4.4.1.1

The Sustainability Test Phase has exactly one Test Run and shall demonstrate the maximum sustainable I/O Request Throughput within at least a continuous three (3) hour Measurement Interval. This Test Phase also serves to insure that the TSC has reached Steady State prior to reporting the final maximum I/O Request Throughput result (SPC-1 IOPS™).

Clause 5.4.4.1.2

The computed I/O Request Throughput of the Sustainability Test must be within 5% of the reported SPC-1 IOPS™ result.

Clause 5.4.4.1.4

The Average Response Time, as defined in Clause 5.1.1, will be computed and reported for the Sustainability Test Run and cannot exceed 30 milliseconds. If the Average Response time exceeds that 30-milliseconds constraint, the measurement is invalid.

Clause 9.4.3.7.1

For the Sustainability Test Phase the FDR shall contain:

1. *A Data Rate Distribution graph and data table.*
2. *I/O Request Throughput Distribution graph and data table.*
3. *A Response Time Frequency Distribution graph and table.*
4. *An Average Response Time Distribution graph and table.*
5. *The human readable Test Run Results File produced by the Workload Generator (may be included in an appendix).*
6. *A listing or screen image of all input parameters supplied to the Workload Generator (may be included in an appendix).*
7. *The Measured Intensity Multiplier for each I/O stream.*
8. *The variability of the Measured Intensity Multiplier, as defined in Clause 5.3.13.3.*

SPC-1 Workload Generator Input Parameters

The SPC-1 Workload Generator input parameters for the Sustainability, IOPS, Response Time Ramp, Repeatability, and Persistence Test Runs are documented in "Appendix E: SPC-1 Workload Generator Input Parameters" on Page 70.

Sustainability Test Results File

A link to the test results file generated from the Sustainability Test Run is listed below.

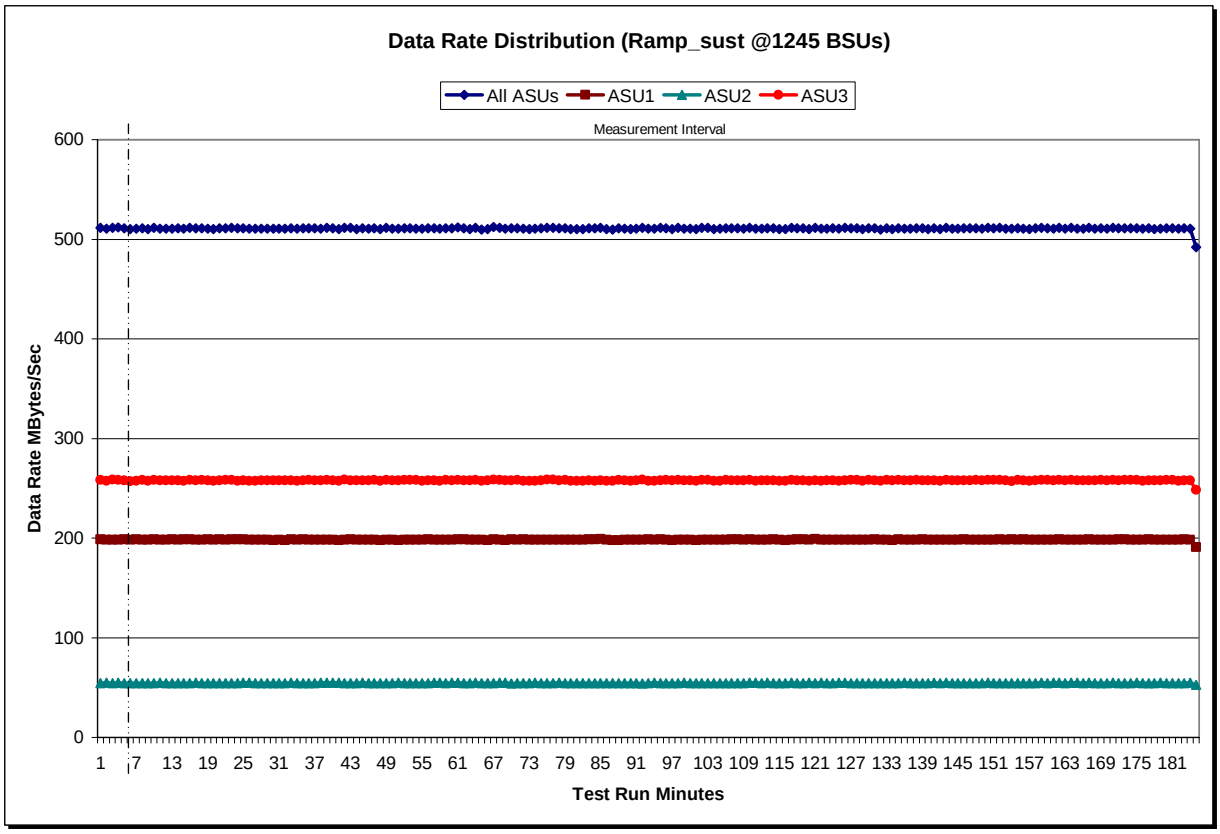
Sustainability Test Results File

Sustainability – Data Rate Distribution Data *(MB / second)*

	Start	Stop	Interval	Duration
Ramp-Up/Start-Up	19:15:44	19:20:44	0-4	0:05:00
Measurement Interval	19:20:44	22:20:44	4-184	3:00:00

Interval	All ASUs	ASU1	ASU2	ASU3	Interval	All ASUs	ASU1	ASU2	ASU3	Interval	All ASUs	ASU1	ASU2	ASU3
0	511.59	198.76	54.44	258.39	63	511.65	198.46	54.75	258.43	126	511.04	198.18	54.49	258.37
1	510.38	198.12	54.78	257.48	64	509.80	198.11	54.36	257.33	127	511.02	198.14	54.47	258.42
2	511.60	198.46	54.54	258.60	65	510.01	197.89	54.33	257.80	128	510.32	198.26	54.58	257.47
3	511.69	198.34	54.85	258.50	66	512.26	198.87	54.60	258.79	129	511.09	198.44	54.54	258.12
4	511.04	198.53	54.47	258.04	67	511.46	198.48	54.70	258.28	130	511.09	198.70	54.44	257.95
5	509.95	198.20	54.53	257.22	68	510.75	197.94	54.81	258.01	131	509.76	198.31	54.21	257.24
6	510.56	198.51	54.61	257.44	69	510.90	198.71	54.21	257.98	132	510.88	198.17	54.60	258.12
7	510.83	198.10	54.57	258.16	70	511.21	198.37	54.60	258.23	133	510.27	197.75	54.63	257.89
8	510.15	198.30	54.61	257.25	71	510.45	198.54	54.56	257.35	134	511.21	198.65	54.43	258.12
9	511.35	198.53	54.39	258.43	72	510.28	198.28	54.58	257.43	135	510.76	198.41	54.66	257.69
10	510.79	198.29	54.72	257.78	73	510.66	198.35	54.72	257.59	136	510.51	198.16	54.45	257.90
11	510.44	198.35	54.31	257.78	74	510.84	198.48	54.35	258.02	137	510.96	198.32	54.48	258.16
12	510.76	198.52	54.35	257.90	75	511.50	198.34	54.62	258.54	138	510.96	198.50	54.44	258.02
13	510.93	198.37	54.63	257.94	76	511.44	198.45	54.27	258.72	139	510.32	198.10	54.29	257.92
14	510.44	198.54	54.48	257.42	77	510.95	198.39	54.76	257.81	140	510.93	198.35	54.65	257.93
15	511.61	198.54	54.61	258.46	78	510.98	198.27	54.41	258.30	141	509.97	198.26	54.47	257.24
16	510.91	198.34	54.69	257.89	79	510.14	198.33	54.50	257.31	142	511.31	198.40	54.73	258.17
17	510.93	198.37	54.45	258.12	80	510.21	198.38	54.55	257.28	143	510.74	198.25	54.58	257.91
18	510.80	198.50	54.60	257.69	81	510.14	198.44	54.26	257.44	144	510.70	198.25	54.37	258.09
19	510.27	198.29	54.34	257.65	82	510.98	198.54	54.60	257.85	145	511.08	198.56	54.62	257.90
20	510.82	198.49	54.54	257.79	83	510.96	198.71	54.62	257.62	146	510.89	198.25	54.61	258.03
21	510.93	198.06	54.58	258.30	84	511.64	198.96	54.63	258.05	147	511.10	198.37	54.62	258.12
22	511.41	198.62	54.63	258.16	85	510.18	198.12	54.47	257.59	148	510.73	198.16	54.58	257.99
23	510.91	198.84	54.58	257.50	86	509.59	197.84	54.39	257.36	149	511.24	198.40	54.67	258.17
24	511.22	198.50	54.69	258.04	87	510.99	198.05	54.60	258.35	150	510.93	198.42	54.39	258.12
25	510.59	198.30	54.77	257.52	88	510.38	198.21	54.23	257.95	151	511.51	198.63	54.50	258.38
26	510.58	198.40	54.58	257.60	89	510.29	198.32	54.56	257.41	152	510.78	198.48	54.48	257.82
27	510.61	198.28	54.25	258.08	90	510.60	198.19	54.58	257.82	153	510.49	198.76	54.52	257.21
28	510.76	198.16	54.55	258.05	91	511.42	198.48	54.06	258.87	154	510.95	198.38	54.42	258.16
29	510.49	198.01	54.44	258.04	92	510.79	198.65	54.52	257.62	155	510.65	198.51	54.41	257.72
30	510.76	198.31	54.64	257.81	93	510.42	198.36	54.65	257.41	156	510.15	198.35	54.26	257.53
31	510.67	198.04	54.59	258.04	94	511.36	198.72	54.60	258.04	157	510.96	198.37	54.52	258.07
32	511.01	198.57	54.68	257.75	95	511.08	198.41	54.45	258.21	158	511.35	198.28	54.79	258.28
33	510.48	198.33	54.59	257.57	96	510.31	197.99	54.56	257.75	159	511.00	198.20	54.47	258.32
34	511.12	198.84	54.48	257.80	97	511.32	198.27	54.59	258.46	160	510.70	198.37	54.65	257.68
35	510.86	198.26	54.43	258.17	98	510.68	198.27	54.71	257.70	161	511.43	198.51	54.65	258.27
36	510.95	198.33	54.60	258.03	99	510.75	198.13	54.59	258.03	162	510.62	198.33	54.51	257.78
37	510.73	198.36	54.66	257.71	100	510.07	198.01	54.51	257.55	163	511.24	198.19	54.74	258.31
38	511.62	198.46	54.65	258.51	101	511.35	198.30	54.62	258.44	164	510.80	198.11	54.65	258.03
39	510.98	198.37	54.78	257.83	102	511.33	198.47	54.40	258.46	165	510.62	198.08	54.62	257.92
40	510.09	197.92	54.87	257.30	103	510.24	198.22	54.62	257.41	166	511.36	198.61	54.68	258.08
41	511.62	198.46	54.62	258.54	104	510.44	198.23	54.58	257.64	167	510.74	198.29	54.53	257.92
42	511.24	198.76	54.45	258.03	105	510.87	198.33	54.37	258.18	168	510.86	198.29	54.25	258.33
43	510.33	198.08	54.56	257.69	106	511.03	198.82	54.41	257.80	169	510.72	198.36	54.38	257.98
44	510.92	198.33	54.69	257.90	107	511.07	198.50	54.57	258.00	170	511.52	198.36	54.89	258.28
45	510.57	198.38	54.50	257.69	108	510.54	198.35	54.32	257.88	171	510.97	198.66	54.42	257.89
46	511.04	198.22	54.46	258.36	109	511.59	198.56	54.69	258.35	172	511.06	198.56	54.37	258.13
47	510.03	197.99	54.46	257.59	110	510.74	198.31	54.83	257.60	173	510.94	198.28	54.48	258.19
48	511.29	198.47	54.63	258.20	111	510.55	198.15	54.55	257.85	174	511.22	198.19	54.80	258.23
49	510.46	198.13	54.35	257.98	112	511.16	198.38	54.68	258.10	175	510.51	198.38	54.57	257.56
50	510.67	198.02	54.70	257.95	113	510.92	198.59	54.55	257.78	176	511.02	198.54	54.59	257.89
51	510.91	198.32	54.48	258.11	114	510.15	198.39	54.50	257.26	177	510.15	198.11	54.28	257.76
52	510.84	198.18	54.47	258.19	115	509.99	197.94	54.41	257.64	178	510.72	198.13	54.66	257.93
53	510.78	198.18	54.49	258.11	116	511.59	198.13	55.03	258.43	179	511.01	198.30	54.58	258.14
54	510.47	198.39	54.46	257.62	117	511.09	198.63	54.56	257.90	180	511.06	198.20	54.57	258.29
55	510.82	198.57	54.52	257.74	118	511.07	198.58	54.64	257.85	181	510.43	198.32	54.51	257.60
56	511.00	198.28	54.72	258.01	119	510.33	198.23	54.77	257.33	182	511.05	198.51	54.58	257.97
57	510.49	198.15	54.74	257.60	120	511.42	198.92	54.63	257.87	183	510.65	198.18	54.65	257.83
58	511.04	198.30	54.56	258.18	121	510.40	198.42	54.67	257.30	184	491.99	190.89	52.67	248.43
59	510.95	198.25	54.67	258.03	122	510.63	198.21	54.58	257.84					
60	511.75	198.75	54.89	258.11	123	511.02	198.39	54.59	258.03					
61	510.97	198.61	54.52	257.83	124	510.64	198.39	54.79	257.46					
62	509.99	198.07	54.22	257.70	125	511.27	198.36	54.86	258.04					

Sustainability – Data Rate Distribution Graph

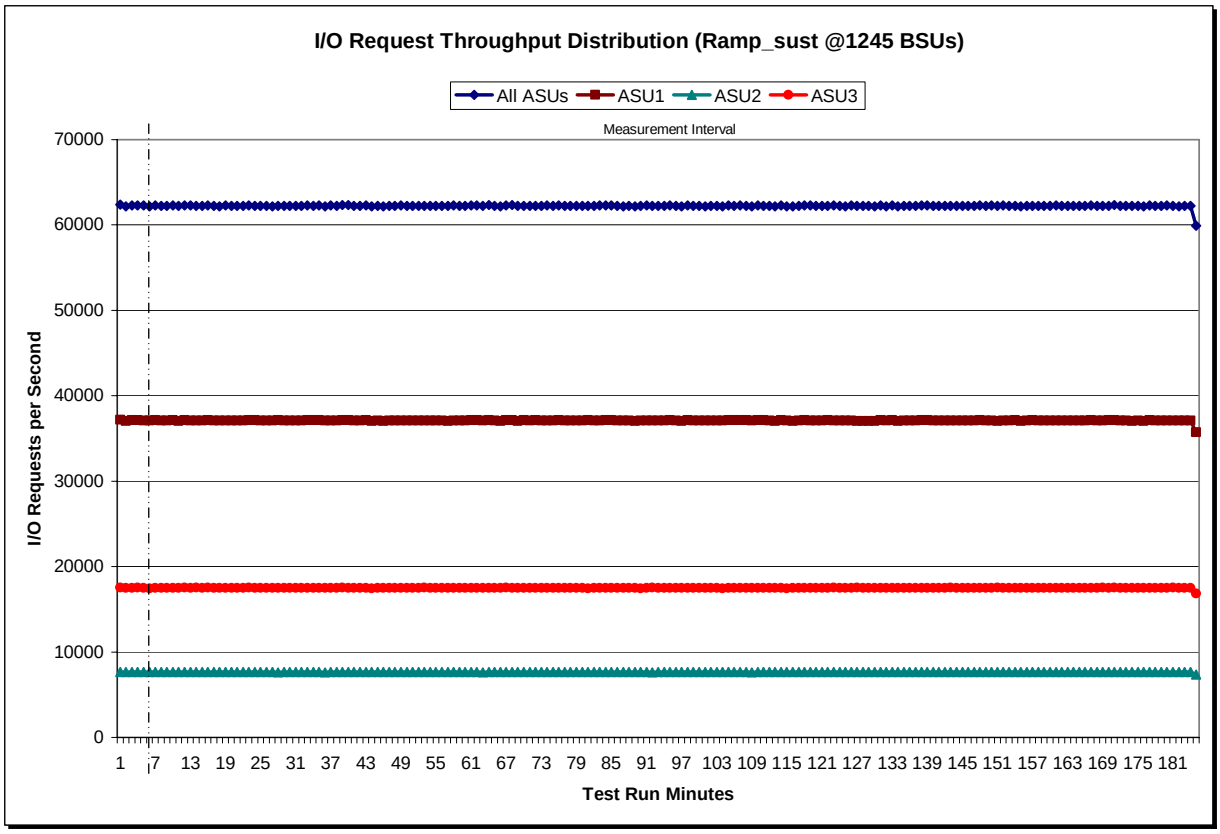


Sustainability – I/O Request Throughput Distribution Data

	Start	Stop	Interval	Duration
Ramp-Up/Start-Up	19:15:44	19:20:44	0-4	0:05:00
Measurement Interval	19:20:44	22:20:44	5-184	3:00:00

Interval	All ASUs	ASU1	ASU2	ASU3	Interval	All ASUs	ASU1	ASU2	ASU3	Interval	All ASUs	ASU1	ASU2	ASU3
0	62,369.12	37,180.35	7,661.48	17,527.28	63	62,318.13	37,149.22	7,669.27	17,499.65	126	62,249.77	37,066.12	7,662.27	17,521.38
1	62,182.95	37,052.62	7,666.53	17,463.80	64	62,326.48	37,102.27	7,643.87	17,490.35	127	62,220.98	37,058.28	7,654.55	17,508.15
2	62,305.52	37,139.40	7,665.72	17,500.40	65	62,167.02	37,061.37	7,635.58	17,470.07	128	62,227.67	37,065.55	7,662.40	17,499.72
3	62,307.05	37,116.72	7,672.77	17,517.57	66	62,309.87	37,136.25	7,653.03	17,520.58	129	62,188.43	37,033.67	7,666.93	17,487.83
4	62,265.68	37,100.40	7,661.95	17,503.33	67	62,327.08	37,147.63	7,671.48	17,507.97	130	62,284.83	37,144.48	7,648.27	17,492.08
5	62,196.20	37,081.67	7,654.13	17,460.40	68	62,227.92	37,060.48	7,674.15	17,493.28	131	62,212.67	37,077.20	7,655.52	17,479.95
6	62,276.18	37,128.00	7,661.85	17,486.33	69	62,249.32	37,139.97	7,635.05	17,474.30	132	62,274.33	37,120.80	7,642.58	17,510.95
7	62,235.95	37,090.27	7,652.47	17,493.22	70	62,257.77	37,096.70	7,668.02	17,493.05	133	62,167.92	37,039.80	7,638.30	17,489.82
8	62,262.18	37,115.03	7,659.82	17,487.33	71	62,241.20	37,118.07	7,646.93	17,476.20	134	62,240.50	37,103.70	7,652.87	17,483.93
9	62,292.48	37,139.23	7,648.53	17,504.72	72	62,224.20	37,089.83	7,657.78	17,476.58	135	62,248.32	37,109.57	7,646.22	17,492.53
10	62,220.27	37,054.08	7,667.87	17,498.32	73	62,266.48	37,105.38	7,669.12	17,491.98	136	62,234.05	37,111.80	7,646.50	17,475.75
11	62,292.08	37,126.80	7,645.50	17,519.78	74	62,241.08	37,096.85	7,650.67	17,493.57	137	62,279.58	37,120.13	7,655.47	17,503.98
12	62,272.80	37,115.75	7,654.17	17,502.88	75	62,274.48	37,124.13	7,656.85	17,493.50	138	62,285.83	37,139.47	7,646.48	17,499.88
13	62,253.38	37,099.35	7,637.73	17,516.30	76	62,226.08	37,092.65	7,647.87	17,485.57	139	62,263.33	37,109.75	7,651.53	17,502.05
14	62,240.93	37,115.18	7,657.90	17,467.85	77	62,253.82	37,100.43	7,655.77	17,497.62	140	62,257.45	37,105.55	7,668.08	17,483.82
15	62,303.48	37,129.30	7,656.87	17,517.32	78	62,250.98	37,110.62	7,653.25	17,487.12	141	62,217.12	37,073.13	7,652.85	17,491.13
16	62,242.58	37,093.10	7,657.20	17,492.28	79	62,216.48	37,097.55	7,654.82	17,464.12	142	62,257.80	37,078.17	7,662.68	17,516.95
17	62,204.45	37,075.97	7,636.95	17,491.53	80	62,243.37	37,130.67	7,662.28	17,450.42	143	62,218.87	37,069.63	7,668.80	17,480.43
18	62,265.15	37,093.48	7,674.60	17,497.07	81	62,224.27	37,103.92	7,640.78	17,479.57	144	62,253.93	37,101.07	7,645.23	17,507.63
19	62,227.65	37,093.87	7,653.48	17,480.30	82	62,276.23	37,113.85	7,669.12	17,493.27	145	62,242.95	37,110.38	7,647.15	17,485.42
20	62,226.97	37,083.02	7,651.13	17,492.82	83	62,287.93	37,145.72	7,670.10	17,472.12	146	62,259.58	37,089.48	7,666.45	17,503.65
21	62,258.62	37,080.68	7,667.67	17,510.27	84	62,286.60	37,142.28	7,652.35	17,491.97	147	62,292.55	37,129.70	7,660.98	17,501.87
22	62,310.33	37,119.75	7,666.47	17,524.12	85	62,227.58	37,085.95	7,662.70	17,478.93	148	62,225.03	37,084.02	7,658.38	17,482.63
23	62,252.77	37,143.47	7,638.45	17,470.85	86	62,208.45	37,085.88	7,648.23	17,474.33	149	62,274.48	37,106.13	7,665.37	17,502.98
24	62,237.30	37,090.38	7,644.42	17,502.50	87	62,239.57	37,083.83	7,668.87	17,486.87	150	62,228.95	37,064.85	7,650.65	17,513.45
25	62,237.65	37,075.45	7,662.42	17,499.78	88	62,192.48	37,058.58	7,647.25	17,486.65	151	62,265.32	37,114.92	7,645.45	17,504.95
26	62,212.77	37,070.87	7,655.97	17,485.93	89	62,226.57	37,114.15	7,656.45	17,455.97	152	62,249.72	37,092.15	7,665.88	17,491.68
27	62,223.98	37,121.70	7,630.82	17,471.47	90	62,266.43	37,099.03	7,662.35	17,505.05	153	62,255.35	37,128.28	7,661.72	17,465.35
28	62,233.05	37,069.35	7,662.73	17,500.97	91	62,240.47	37,101.88	7,616.37	17,522.22	154	62,205.57	37,046.30	7,652.65	17,506.62
29	62,219.05	37,085.17	7,657.73	17,476.15	92	62,239.23	37,111.32	7,653.85	17,474.07	155	62,242.08	37,106.57	7,654.90	17,480.62
30	62,242.18	37,085.57	7,653.37	17,503.25	93	62,227.78	37,100.03	7,652.92	17,474.83	156	62,261.98	37,130.03	7,645.15	17,486.80
31	62,241.30	37,109.07	7,658.58	17,473.65	94	62,291.73	37,146.50	7,654.98	17,490.25	157	62,256.68	37,089.78	7,658.63	17,508.27
32	62,272.33	37,122.20	7,666.47	17,483.67	95	62,248.48	37,089.55	7,655.88	17,503.05	158	62,260.87	37,092.97	7,673.92	17,493.98
33	62,256.42	37,149.02	7,642.63	17,464.77	96	62,198.47	37,046.52	7,655.65	17,496.30	159	62,240.30	37,094.57	7,650.42	17,495.32
34	62,291.25	37,152.72	7,645.23	17,493.30	97	62,279.18	37,119.78	7,656.92	17,502.48	160	62,270.52	37,116.62	7,662.10	17,491.80
35	62,200.62	37,069.22	7,632.33	17,499.07	98	62,249.95	37,111.63	7,665.98	17,472.33	161	62,255.62	37,108.50	7,657.13	17,489.98
36	62,275.07	37,112.67	7,668.12	17,494.28	99	62,234.10	37,083.97	7,666.45	17,483.68	162	62,233.03	37,093.40	7,665.05	17,474.58
37	62,247.63	37,101.15	7,656.27	17,490.22	100	62,206.02	37,074.73	7,663.00	17,468.28	163	62,244.45	37,071.12	7,664.95	17,508.38
38	62,343.13	37,159.73	7,662.55	17,520.85	101	62,262.52	37,093.83	7,660.63	17,508.05	164	62,252.30	37,082.62	7,661.00	17,508.68
39	62,314.75	37,132.52	7,675.15	17,507.08	102	62,244.62	37,114.27	7,636.77	17,493.58	165	62,214.00	37,081.58	7,662.13	17,470.28
40	62,226.10	37,090.62	7,669.52	17,465.97	103	62,204.97	37,090.45	7,653.12	17,461.40	166	62,302.88	37,147.52	7,659.70	17,495.67
41	62,239.22	37,079.08	7,653.42	17,506.72	104	62,279.32	37,128.58	7,670.25	17,480.48	167	62,261.38	37,113.98	7,656.42	17,490.98
42	62,298.37	37,147.00	7,654.93	17,496.43	105	62,250.18	37,131.22	7,652.05	17,466.92	168	62,246.13	37,088.13	7,642.10	17,515.90
43	62,181.37	37,059.82	7,660.97	17,460.58	106	62,274.27	37,135.20	7,646.70	17,492.37	169	62,247.12	37,125.38	7,644.65	17,477.08
44	62,216.05	37,102.55	7,647.53	17,465.97	107	62,246.57	37,123.07	7,650.93	17,472.57	170	62,325.78	37,122.02	7,679.28	17,524.48
45	62,176.03	37,055.20	7,642.57	17,478.27	108	62,197.52	37,088.88	7,630.57	17,478.07	171	62,249.68	37,111.82	7,651.38	17,486.48
46	62,227.85	37,092.37	7,643.85	17,491.63	109	62,308.12	37,134.20	7,675.68	17,498.23	172	62,218.15	37,095.65	7,641.50	17,481.00
47	62,221.72	37,068.45	7,666.88	17,486.38	110	62,260.90	37,120.95	7,655.82	17,484.13	173	62,215.75	37,062.13	7,641.38	17,512.23
48	62,267.55	37,094.07	7,668.93	17,504.55	111	62,246.07	37,108.67	7,645.82	17,491.58	174	62,249.08	37,113.37	7,660.67	17,475.05
49	62,244.25	37,112.50	7,637.53	17,494.22	112	62,197.55	37,064.63	7,658.02	17,474.90	175	62,206.08	37,055.38	7,660.25	17,490.45
50	62,243.77	37,074.97	7,672.25	17,496.55	113	62,276.37	37,139.82	7,652.22	17,484.33	176	62,276.37	37,135.77	7,650.08	17,490.52
51	62,232.58	37,092.87	7,653.40	17,486.32	114	62,199.75	37,093.72	7,650.02	17,456.02	177	62,240.07	37,094.50	7,649.05	17,496.52
52	62,254.52	37,099.90	7,639.23	17,515.38	115	62,185.82	37,064.78	7,650.50	17,470.53	178	62,246.67	37,080.03	7,663.37	17,503.27
53	62,227.78	37,075.53	7,648.72	17,503.53	116	62,253.25	37,076.20	7,678.65	17,498.40	179	62,269.62	37,092.15	7,670.92	17,506.55
54	62,216.72	37,066.53	7,658.02	17,492.17	117	62,271.38	37,127.65	7,645.72	17,498.02	180	62,260.90	37,077.47	7,669.55	17,513.88
55	62,244.48	37,086.62	7,662.65	17,495.22	118	62,267.07	37,100.40	7,657.12	17,509.55	181	62,198.68	37,068.93	7,659.85	17,469.90
56	62,225.75	37,064.33	7,679.97	17,481.45	119	62,229.18	37,085.85	7,668.70	17,474.63	182	62,215.77	37,081.10	7,654.55	17,480.12
57	62,266.10	37,103.93	7,670.12	17,492.05	120	62,243.00	37,110.58	7,655.30	17,477.12	183	62,219.82	37,074.37	7,655.08	17,490.37
58	62,229.48	37,096.23	7,648.72	17,484.53	121	62,260.15	37,139.33	7,652.77	17,468.05	184	59,913.38	35,717.63	7,371.05	16,824.70
59	62,239.75	37,090.43	7,658.10	17,491.22	122	62,278.90	37,099.00	7,665.55	17,514.35	***Average***	***62,233.85***	***37,092.48***	***7,654.41***	***17,486.96***
60	62,291.55	37,119.98	7,673.05	17,498.52	123	62,250.18	37,085.40	7,662.98	17,501.80					
61	62,278.07	37,154.87	7,651.82	17,471.38	124	62,210.92	37,074.47	7,666.22	17,470.23					
62	62,217.52	37,091.30	7,630.97	17,495.25	125	62,283.08	37,112.43	7,676.53	17,494.12					

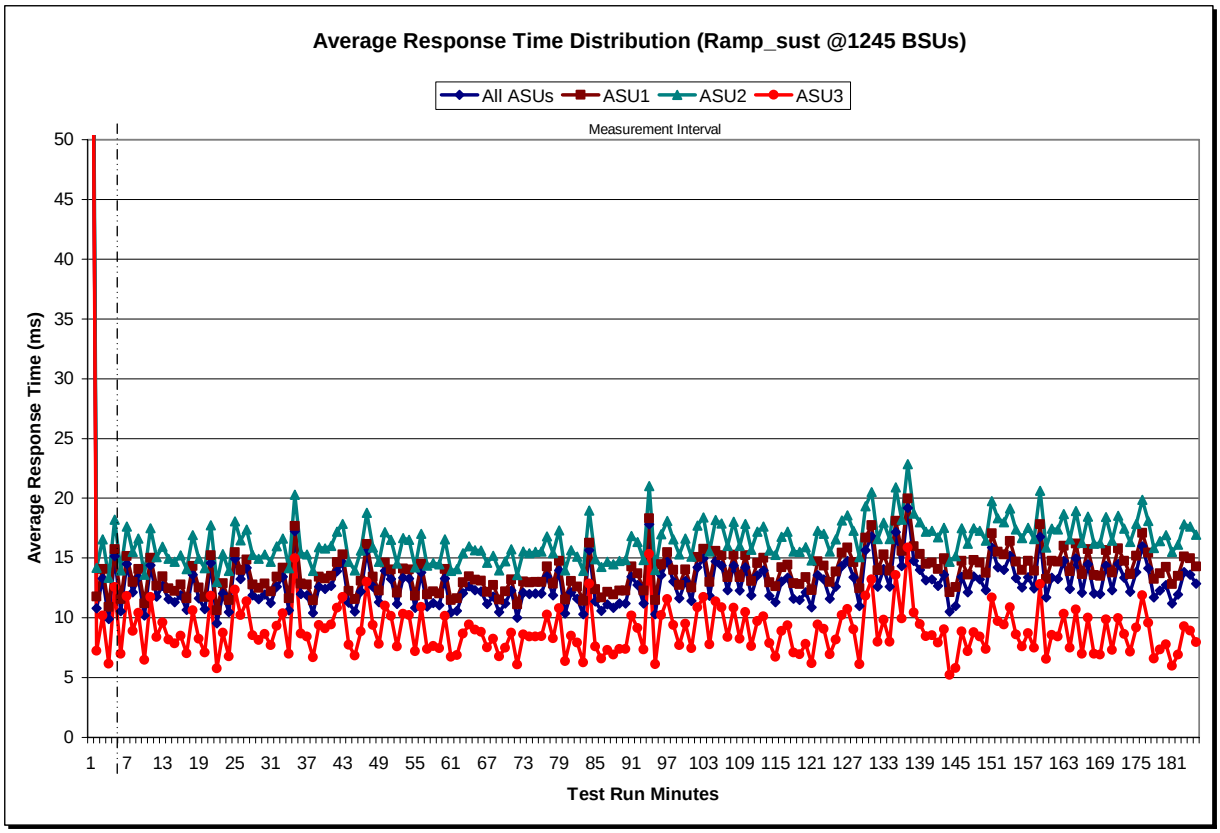
Sustainability – I/O Request Throughput Distribution Graph



Sustainability – Average Response Time (ms) Distribution Data

Interval	All ASUs	ASU1	ASU2	ASU3	Interval	All ASUs	ASU1	ASU2	ASU3	Interval	All ASUs	ASU1	ASU2	ASU3
0	96.55	95.06	101.61	97.50	63	12.65	13.48	15.97	9.44	126	14.75	15.86	18.59	10.73
1	10.80	11.78	14.17	7.25	64	12.31	13.19	15.65	8.99	127	13.40	14.65	17.29	9.05
2	13.28	14.07	16.55	10.19	65	12.22	13.11	15.61	8.84	128	10.99	12.44	15.08	6.13
3	9.88	10.92	13.34	6.17	66	11.15	12.16	14.60	7.52	129	15.65	16.70	19.33	11.83
4	15.14	15.72	18.22	12.56	67	11.78	12.74	15.20	8.25	130	16.82	17.75	20.53	13.22
5	10.56	11.55	13.97	6.97	68	10.49	11.52	13.96	6.78	131	12.61	13.97	16.60	7.99
6	14.52	15.15	17.65	11.80	69	11.19	12.20	14.71	7.51	132	14.07	15.29	17.96	9.81
7	12.14	12.98	15.51	8.89	70	12.26	13.21	15.73	8.74	133	12.58	13.93	16.61	7.98
8	13.37	14.09	16.64	10.41	71	10.01	11.14	13.56	6.08	134	17.19	18.12	20.93	13.57
9	10.17	11.21	13.62	6.48	72	12.09	13.02	15.54	8.61	135	14.32	15.58	18.23	9.95
10	14.40	15.03	17.50	11.73	73	11.98	12.95	15.42	8.41	136	19.18	19.97	22.87	15.87
11	11.75	12.65	15.08	8.40	74	12.01	12.99	15.51	8.41	137	14.76	15.97	18.70	10.45
12	12.68	13.45	15.95	9.59	75	12.03	12.99	15.55	8.45	138	14.01	15.34	18.01	9.46
13	11.55	12.45	14.94	8.18	76	13.46	14.29	16.81	10.24	139	13.14	14.52	17.19	8.45
14	11.30	12.22	14.70	7.85	77	11.88	12.85	15.42	8.27	140	13.23	14.60	17.29	8.53
15	11.88	12.77	15.22	8.51	78	13.96	14.76	17.31	10.80	141	12.67	14.07	16.75	7.91
16	10.64	11.64	14.06	7.03	79	10.37	11.51	13.98	6.38	142	13.61	14.96	17.54	9.03
17	13.61	14.34	16.90	10.62	80	12.12	13.08	15.65	8.50	143	10.50	12.12	14.70	5.21
18	11.63	12.53	14.96	8.26	81	11.60	12.61	15.12	7.92	144	10.98	12.56	15.17	5.79
19	10.72	11.72	14.15	7.10	82	10.28	11.42	13.92	6.28	145	13.44	14.77	17.50	8.85
20	14.58	15.22	17.76	11.85	83	15.66	16.29	18.97	12.86	146	12.12	13.62	16.18	7.18
21	9.55	10.64	13.00	5.75	84	11.36	12.40	14.92	7.61	147	13.46	14.84	17.48	8.78
22	12.03	12.89	15.35	8.76	85	10.59	11.71	14.25	6.60	148	13.22	14.63	17.29	8.43
23	10.46	11.47	13.95	6.78	86	11.12	12.18	14.68	7.31	149	12.31	13.77	16.45	7.40
24	14.92	15.49	18.07	12.34	87	10.84	11.94	14.46	6.91	150	15.89	17.08	19.75	11.68
25	13.25	14.01	16.47	10.21	88	11.20	12.27	14.76	7.37	151	14.23	15.52	18.31	9.72
26	14.19	14.86	17.39	11.36	89	11.21	12.27	14.82	7.37	152	13.99	15.31	17.99	9.44
27	11.88	12.76	15.25	8.54	90	13.44	14.28	16.86	10.18	153	15.19	16.41	19.14	10.87
28	11.56	12.49	14.94	8.12	91	12.76	13.73	16.33	9.15	154	13.31	14.68	17.38	8.62
29	11.97	12.85	15.29	8.64	92	11.21	12.29	14.82	7.33	155	12.53	14.00	16.66	7.60
30	11.23	12.19	14.69	7.69	93	17.82	18.34	21.03	15.32	156	13.40	14.76	17.52	8.71
31	12.60	13.44	15.98	9.33	94	10.29	11.49	14.00	6.13	157	12.44	13.93	16.59	7.49
32	13.42	14.19	16.63	10.37	95	13.58	14.47	17.00	10.21	158	16.76	17.82	20.64	12.82
33	10.64	11.64	14.16	6.97	96	14.70	15.48	18.11	11.55	159	11.69	13.25	15.87	6.54
34	17.24	17.67	20.30	14.99	97	13.02	13.99	16.57	9.40	160	13.34	14.75	17.44	8.57
35	11.98	12.84	15.41	8.66	98	11.63	12.73	15.28	7.70	161	13.26	14.68	17.39	8.44
36	11.86	12.77	15.28	8.44	99	13.08	14.03	16.62	9.51	162	14.76	16.02	18.67	10.35
37	10.41	11.44	13.94	6.68	100	11.42	12.52	15.11	7.45	163	12.43	13.91	16.57	7.48
38	12.59	13.42	15.93	9.38	101	14.22	15.09	17.70	10.86	164	14.99	16.19	18.95	10.71
39	12.42	13.28	15.79	9.09	102	14.96	15.76	18.41	11.75	165	12.10	13.65	16.28	6.99
40	12.67	13.51	16.02	9.42	103	11.83	12.98	15.56	7.77	166	14.46	15.74	18.48	9.99
41	13.89	14.64	17.19	10.85	104	14.72	15.58	18.19	11.37	167	12.04	13.57	16.19	6.98
42	14.60	15.28	17.84	11.74	105	14.35	15.24	17.90	10.89	168	11.99	13.51	16.22	6.91
43	11.27	12.23	14.68	7.74	106	12.30	13.38	16.00	8.38	169	14.36	15.64	18.43	9.85
44	10.53	11.55	13.97	6.84	107	14.37	15.28	18.03	10.83	170	12.29	13.78	16.46	7.32
45	12.21	13.09	15.61	8.84	108	12.27	13.40	16.00	8.26	171	14.51	15.81	18.52	9.98
46	15.60	16.18	18.80	12.98	109	14.21	15.21	17.86	10.49	172	13.37	14.76	17.47	8.62
47	12.59	13.41	15.87	9.39	110	11.87	13.06	15.71	7.65	173	12.15	13.66	16.33	7.16
48	11.30	12.26	14.68	7.80	111	13.53	14.58	17.22	9.71	174	13.83	15.18	17.86	9.17
49	13.92	14.62	17.18	11.02	112	13.96	15.01	17.65	10.13	175	15.97	17.10	19.86	11.87
50	13.25	14.03	16.53	10.17	113	11.86	12.96	15.61	7.88	176	14.13	15.46	18.11	9.59
51	11.15	12.11	14.56	7.60	114	11.30	12.63	15.27	6.74	177	11.70	13.25	15.85	6.59
52	13.36	14.12	16.66	10.33	115	13.04	14.22	16.79	8.90	178	12.26	13.73	16.42	7.33
53	13.28	14.05	16.54	10.22	116	13.36	14.45	17.20	9.36	179	12.75	14.25	16.91	7.77
54	10.82	11.83	14.21	7.19	117	11.60	12.90	15.56	7.09	180	11.21	12.80	15.50	5.97
55	13.80	14.50	17.01	10.92	118	11.50	12.81	15.50	6.96	181	11.97	13.49	16.13	6.91
56	10.95	11.93	14.36	7.37	119	12.13	13.40	15.93	7.80	182	13.81	15.12	17.83	9.27
57	11.22	12.20	14.60	7.64	120	10.89	12.29	14.78	6.20	183	13.60	14.97	17.64	8.92
58	11.04	12.02	14.48	7.46	121	13.56	14.73	17.29	9.42	184	12.84	14.29	16.97	7.95
59	13.27	14.07	16.57	10.14	122	13.21	14.38	17.03	9.06	***Average***	***12.76***	***13.84***	***16.42***	***8.87***
60	10.45	11.49	13.91	6.73	123	11.61	12.99	15.54	6.97					
61	10.59	11.62	14.09	6.87	124	12.59	13.85	16.57	8.16					
62	12.04	12.94	15.40	8.67	125	14.32	15.46	18.15	10.22					

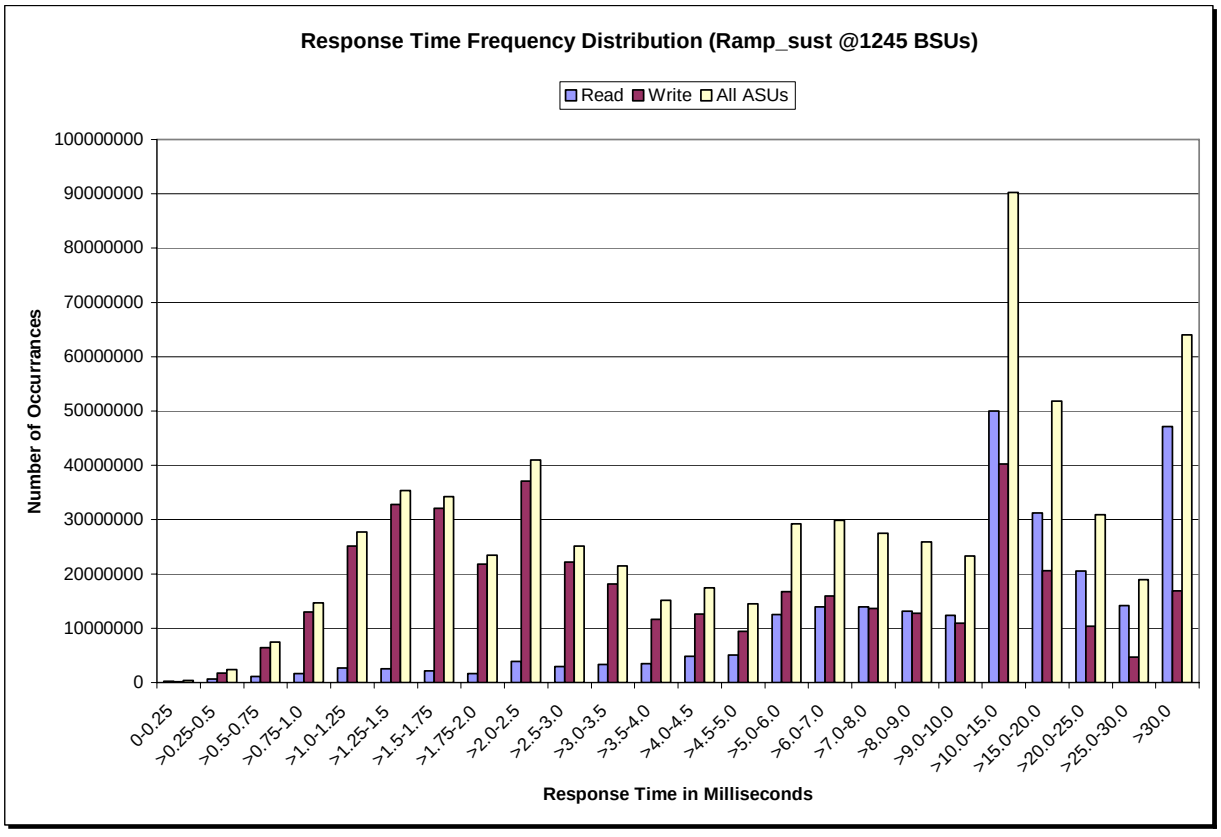
Sustainability – Average Response Time (ms) Distribution Graph



Sustainability – Response Time Frequency Distribution Data

Response Time (ms)	0-0.25	>0.25-0.5	>0.5-0.75	>0.75-1.0	>1.0-1.25	>1.25-1.5	>1.5-1.75	>1.75-2.0
Read	236,348	629,278	1,071,203	1,692,240	2,664,098	2,571,697	2,105,072	1,671,938
Write	149,043	1,778,946	6,416,883	12,987,120	25,089,811	32,775,122	32,129,230	21,782,702
All ASUs	385,391	2,408,224	7,488,086	14,679,360	27,753,909	35,346,819	34,234,302	23,454,640
ASU1	310,044	1,472,404	3,947,546	7,368,915	13,577,791	16,743,486	15,786,796	10,676,843
ASU2	36,595	278,122	931,850	1,841,935	3,418,984	4,166,139	3,884,850	2,639,360
ASU3	38,752	657,698	2,608,690	5,468,510	10,757,134	14,437,194	14,562,656	10,138,437
Response Time (ms)	**>2.0-2.5**	**>2.5-3.0**	**>3.0-3.5**	**>3.5-4.0**	**>4.0-4.5**	**>4.5-5.0**	**>5.0-6.0**	**>6.0-7.0**
Read	3,869,536	2,940,181	3,316,484	3,499,425	4,794,325	5,074,986	12,499,275	13,943,464
Write	37,069,774	22,170,829	18,181,721	11,644,078	12,609,254	9,426,700	16,753,681	15,914,165
All ASUs	40,939,310	25,111,010	21,498,205	15,143,503	17,403,579	14,501,686	29,252,956	29,857,629
ASU1	18,914,936	11,800,914	10,602,180	8,071,570	9,700,449	8,634,826	18,467,937	19,289,271
ASU2	4,669,067	2,790,799	2,343,677	1,593,279	1,758,906	1,428,338	2,901,069	3,044,830
ASU3	17,355,307	10,519,297	8,552,348	5,478,654	5,944,224	4,438,522	7,883,950	7,523,528
Response Time (ms)	**>7.0-8.0**	**>8.0-9.0**	**>9.0-10.0**	**>10.0-15.0**	**>15.0-20.0**	**>20.0-25.0**	**>25.0-30.0**	**>30.0**
Read	13,911,238	13,128,901	12,341,954	50,032,077	31,224,911	20,504,956	14,215,728	47,154,412
Write	13,590,987	12,785,404	10,959,818	40,223,891	20,592,513	10,413,435	4,690,552	16,896,143
All ASUs	27,502,225	25,914,305	23,301,772	90,255,968	51,817,424	30,918,391	18,906,280	64,050,555
ASU1	18,159,514	16,961,643	15,474,990	60,308,873	35,284,717	21,618,540	13,780,164	43,644,392
ASU2	2,905,232	2,864,835	2,601,513	10,639,843	6,572,631	4,254,834	2,884,151	12,216,781
ASU3	6,437,479	6,087,827	5,225,269	19,307,252	9,960,076	5,045,017	2,241,965	8,189,382

Sustainability – Response Time Frequency Distribution Graph



Sustainability – Measured Intensity Multiplier and Coefficient of Variation

Clause 3.4.3

IM – Intensity Multiplier: *The ratio of I/Os for each I/O stream relative to the total I/Os for all I/O streams (ASU1-1 – ASU3-1) as required by the benchmark specification.*

Clauses 5.1.10 and 5.3.13.2

MIM – Measured Intensity Multiplier: *The Measured Intensity Multiplier represents the ratio of measured I/Os for each I/O stream relative to the total I/Os measured for all I/O streams (ASU1-1 – ASU3-1). This value may differ from the corresponding Expected Intensity Multiplier by no more than 5%.*

Clause 5.3.13.3

COV – Coefficient of Variation: *This measure of variation for the Measured Intensity Multiplier cannot exceed 0.2.*

	ASU1-1	ASU1-2	ASU1-3	ASU1-4	ASU2-1	ASU2-2	ASU2-3	ASU3-1
IM	***0.0350***	***0.2810***	***0.0700***	***0.2100***	***0.0180***	***0.0700***	***0.0350***	***0.2810***
MIM	0.0350	0.2810	0.0700	0.2100	0.0180	0.0700	0.0350	0.2810
COV	0.003	0.001	0.002	0.001	0.004	0.002	0.003	0.001

Primary Metrics Test – IOPS Test Phase

Clause 5.4.4.2

The IOPS Test Phase consists of one Test Run at the 100% load point with a Measurement Interval of ten (10) minutes. The IOPS Test Phase immediately follows the Sustainability Test Phase without any interruption or manual intervention.

The IOPS Test Run generates the SPC-1 IOPS™ primary metric, which is computed as the I/O Request Throughput for the Measurement Interval of the IOPS Test Run.

The Average Response Time is computed for the IOPS Test Run and cannot exceed 30 milliseconds. If the Average Response Time exceeds the 30 millisecond constraint, the measurement is invalid.

Clause 9.4.3.7.2

For the IOPS Test Phase the FDR shall contain:

1. *I/O Request Throughput Distribution (data and graph).*
2. *A Response Time Frequency Distribution.*
3. *An Average Response Time Distribution.*
4. *The human readable Test Run Results File produced by the Workload Generator.*
5. *A listing or screen image of all input parameters supplied t the Workload Generator.*
6. *The total number of I/O Requests completed in the Measurement Interval as well as the number of I/O Requests with a Response Time less than or equal to 30 milliseconds and the number of I/O Requests with a Response Time greater than 30 milliseconds.*

SPC-1 Workload Generator Input Parameters

The SPC-1 Workload Generator input parameters for the Sustainability, IOPS, Response Time Ramp, Repeatability, and Persistence Test Runs are documented in "Appendix E: SPC-1 Workload Generator Input Parameters" on Page 70.

IOPS Test Results File

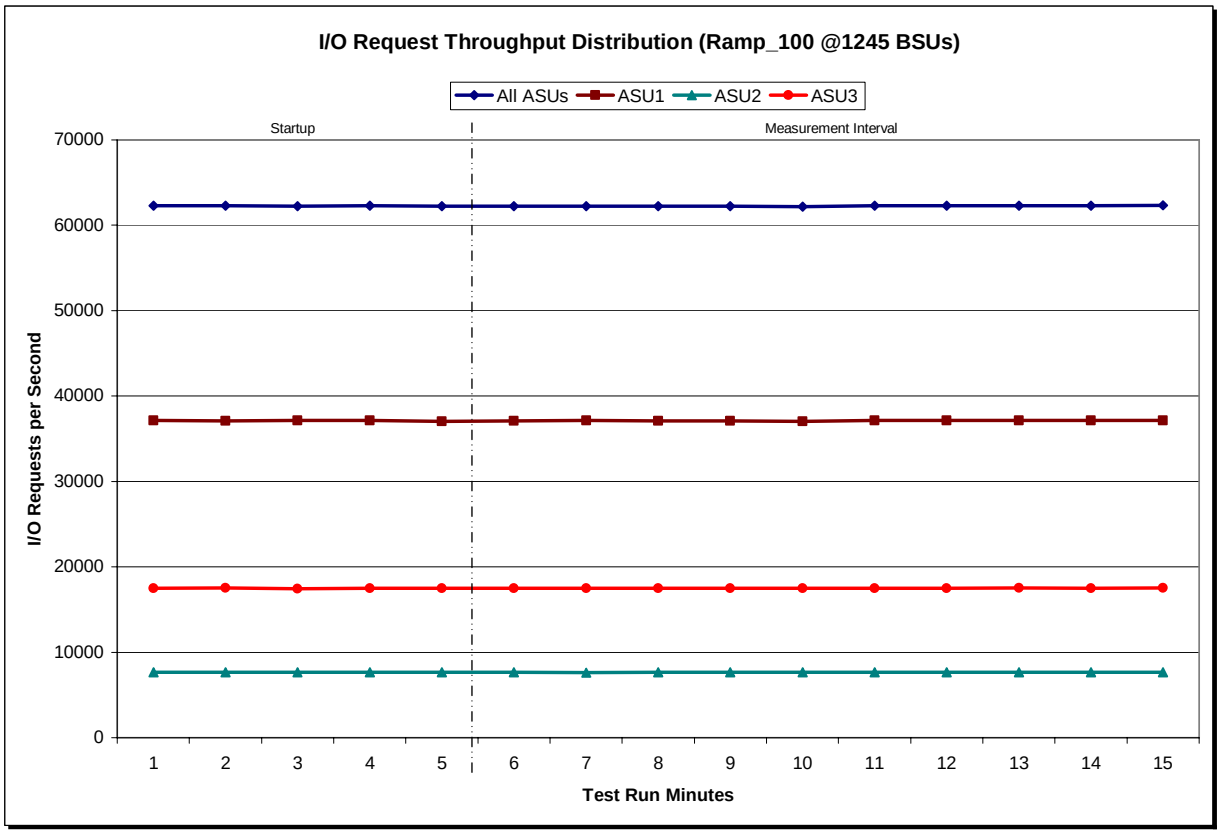
A link to the test results file generated from the IOPS Test Run is listed below.

IOPS Test Results File

IOPS Test Run – I/O Request Throughput Distribution Data

1245 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	22:21:27	22:26:28	0-4	0:05:01
Measurement Interval	22:26:28	22:36:28	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	62,274.23	37,118.20	7,652.60	17,503.43
1	62,285.05	37,107.08	7,657.87	17,520.10
2	62,259.00	37,142.45	7,655.78	17,460.77
3	62,286.80	37,134.48	7,675.73	17,476.58
4	62,218.25	37,063.68	7,661.40	17,493.17
5	62,235.97	37,100.58	7,641.93	17,493.45
6	62,248.65	37,135.73	7,630.45	17,482.47
7	62,248.20	37,108.77	7,648.85	17,490.58
8	62,260.00	37,090.45	7,677.40	17,492.15
9	62,209.87	37,065.15	7,662.55	17,482.17
10	62,270.97	37,144.77	7,647.08	17,479.12
11	62,274.13	37,117.78	7,659.10	17,497.25
12	62,287.90	37,117.38	7,655.52	17,515.00
13	62,265.28	37,125.12	7,649.05	17,491.12
14	62,317.03	37,138.10	7,665.63	17,513.30
Average	***62,261.80***	***37,114.38***	***7,653.76***	***17,493.66***

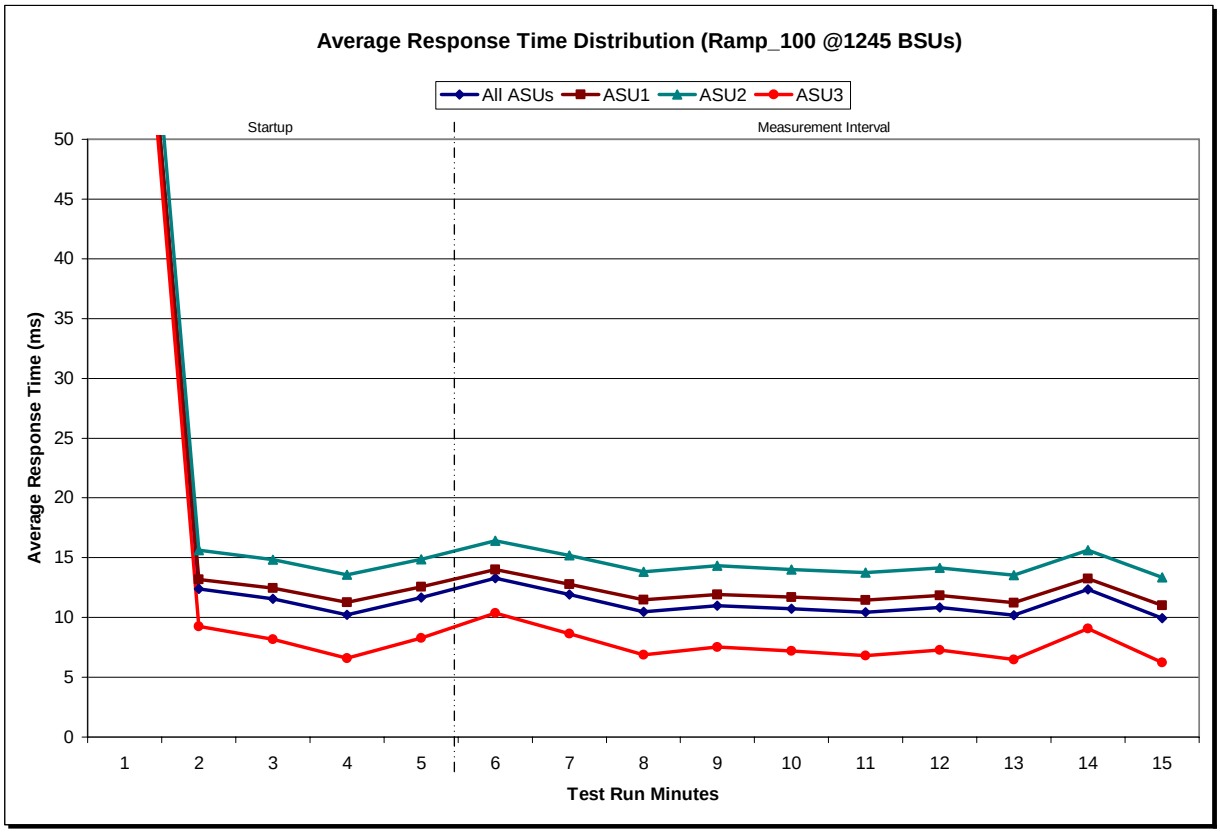
IOPS Test Run – I/O Request Throughput Distribution Graph



IOPS Test Run – Average Response Time (ms) Distribution Data

1245 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	22:21:27	22:26:28	0-4	0:05:01
Measurement Interval	22:26:28	22:36:28	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	84.53	84.15	89.09	83.34
1	12.38	13.19	15.63	9.26
2	11.55	12.46	14.81	8.18
3	10.23	11.25	13.57	6.58
4	11.65	12.58	14.86	8.27
5	13.27	13.99	16.42	10.36
6	11.92	12.79	15.20	8.65
7	10.47	11.47	13.81	6.89
8	10.99	11.93	14.33	7.52
9	10.72	11.69	14.02	7.20
10	10.42	11.45	13.76	6.79
11	10.84	11.84	14.15	7.28
12	10.18	11.24	13.55	6.49
13	12.36	13.25	15.64	9.06
14	9.95	11.01	13.34	6.24
Average	***11.11***	***12.07***	***14.42***	***7.65***

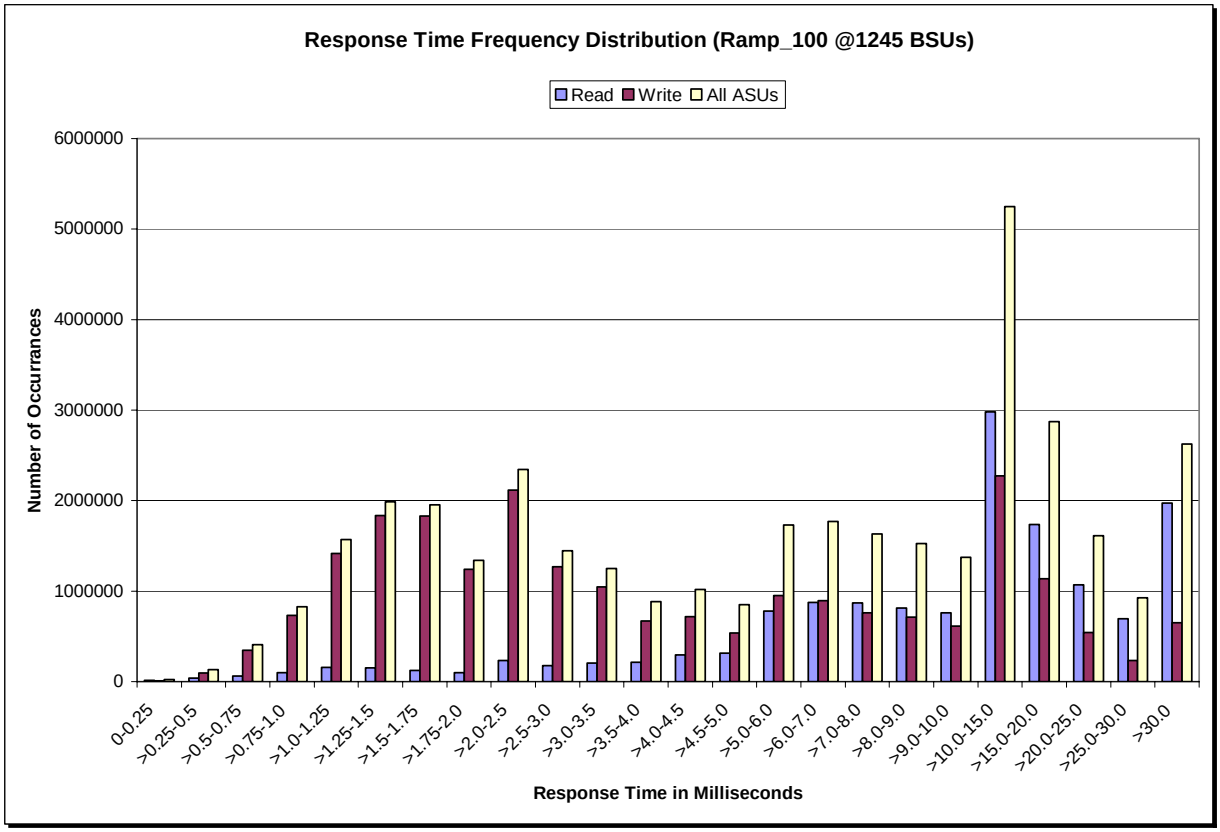
IOPS Test Run – Average Response Time (ms) Distribution Graph



IOPS Test Run – Response Time Frequency Distribution Data

Response Time (ms)	0-0.25	>0.25-0.5	>0.5-0.75	>0.75-1.0	>1.0-1.25	>1.25-1.5	>1.5-1.75	>1.75-2.0
Read	14214	37,240	63,292	98,294	155,377	151,926	123,855	98,467
Write	7838	93,546	347,735	731,121	1,415,326	1,837,363	1,828,773	1,242,751
All ASUs	22052	130,786	411,027	829,415	1,570,703	1,989,289	1,952,628	1,341,218
ASU1	18097	81,225	218,507	418,142	768,650	943,417	900,920	610,938
ASU2	2012	14,987	51,361	104,465	193,819	235,523	222,448	150,891
ASU3	1943	34,574	141,159	306,808	608,234	810,349	829,260	579,389
Response Time (ms)	**>2.0-2.5**	**>2.5-3.0**	**>3.0-3.5**	**>3.5-4.0**	**>4.0-4.5**	**>4.5-5.0**	**>5.0-6.0**	**>6.0-7.0**
Read	230,724	177,010	203,200	214,987	296,745	313,887	781,361	873,273
Write	2,115,235	1,270,398	1,047,094	671,479	719,956	537,705	948,628	893,194
All ASUs	2,345,959	1,447,408	1,250,294	886,466	1,016,701	851,592	1,729,989	1,766,467
ASU1	1,085,871	684,100	621,929	477,483	575,313	515,322	1,113,313	1,164,189
ASU2	267,598	160,108	136,019	92,380	101,479	83,262	169,747	180,204
ASU3	992,490	603,200	492,346	316,603	339,909	253,008	446,929	422,074
Response Time (ms)	**>7.0-8.0**	**>8.0-9.0**	**>9.0-10.0**	**>10.0-15.0**	**>15.0-20.0**	**>20.0-25.0**	**>25.0-30.0**	**>30.0**
Read	869,562	814,566	759,638	2,978,910	1,735,158	1,071,211	696,261	1,973,800
Write	759,167	712,476	614,711	2,270,416	1,136,290	540,727	232,076	649,642
All ASUs	1,628,729	1,527,042	1,374,349	5,249,326	2,871,448	1,611,938	928,337	2,623,442
ASU1	1,095,322	1,016,508	925,292	3,527,176	1,948,657	1,122,481	669,662	1,765,797
ASU2	174,551	171,561	156,841	632,512	372,557	227,699	147,417	542,711
ASU3	358,856	338,973	292,216	1,089,638	550,234	261,758	111,258	314,934

IOPS Test Run –Response Time Frequency Distribution Graph



IOPS Test Run – I/O Request Information

I/O Requests Completed in the Measurement Interval	I/O Requests Completed with Response Time = or < 30 ms	I/O Requests Completed with Response Time > 30 ms
37,356,605	34,733,163	2,623,442

IOPS Test Run – Measured Intensity Multiplier and Coefficient of Variation

Clause 3.4.3

IM – Intensity Multiplier: *The ratio of I/Os for each I/O stream relative to the total I/Os for all I/O streams (ASU1-1 – ASU3-1) as required by the benchmark specification.*

Clauses 5.1.10 and 5.3.13.2

MIM – Measured Intensity Multiplier: *The Measured Intensity Multiplier represents the ratio of measured I/Os for each I/O stream relative to the total I/Os measured for all I/O streams (ASU1-1 – ASU3-1). This value may differ from the corresponding Expected Intensity Multiplier by no more than 5%.*

Clause 5.3.13.3

COV – Coefficient of Variation: *This measure of variation for the Measured Intensity Multiplier cannot exceed 0.2.*

	ASU1-1	ASU1-2	ASU1-3	ASU1-4	ASU2-1	ASU2-2	ASU2-3	ASU3-1
IM	***0.0350***	***0.2810***	***0.0700***	***0.2100***	***0.0180***	***0.0700***	***0.0350***	***0.2810***
MIM	0.0350	0.2810	0.0700	0.2101	0.0180	0.0699	0.0350	0.2810
COV	0.003	0.001	0.001	0.001	0.004	0.002	0.003	0.000

Primary Metrics Test – Response Time Ramp Test Phase

Clause 5.4.4.3

The Response Time Ramp Test Phase consists of five Test Runs, one each at 95%, 90%, 80%, 50%, and 10% of the load point (100%) used to generate the SPC-1 IOPS™ primary metric. Each of the five Test Runs has a Measurement Interval of ten (10) minutes. The Response Time Ramp Test Phase immediately follows the IOPS Test Phase without any interruption or manual intervention.

The five Response Time Ramp Test Runs, in conjunction with the IOPS Test Run (100%), demonstrate the relationship between Average Response Time and I/O Request Throughput for the Tested Storage Configuration (TSC) as illustrated in the response time/throughput curve on page 13.

In addition, the Average Response Time measured during the 10% Test Run is the value for the SPC-1 LRT™ metric. That value represents the Average Response Time of a lightly loaded TSC.

Clause 9.4.3.7.3

The following content shall appear in the FDR for the Response Time Ramp Phase:

1. *A Response Time Ramp Distribution.*
2. *The human readable Test Run Results File produced by the Workload Generator for each Test Run within the Response Time Ramp Test Phase.*
3. *For the 10% Load Level Test Run (SPC-1 LRT™ metric) an Average Response Time Distribution.*
4. *A listing or screen image of all input parameters supplied to the Workload Generator.*

SPC-1 Workload Generator Input Parameters

The SPC-1 Workload Generator input parameters for the Sustainability, IOPS, Response Time Ramp, Repeatability, and Persistence Test Runs are documented in "Appendix E: SPC-1 Workload Generator Input Parameters" on Page 70.

Response Time Ramp Test Results File

A link to each test result file generated from each Response Time Ramp Test Run list listed below.

95% Load Level

90% Load Level

80% Load Level

50% Load Level

10% Load Level

Response Time Ramp Distribution (IOPS) Data

The five Test Runs that comprise the Response Time Ramp Phase are executed at 95%, 90%, 80%, 50%, and 10% of the Business Scaling Unit (BSU) load level used to produce the SPC-1 IOPS™ primary metric. The 100% BSU load level is included in the following Response Time Ramp data tables and graphs for completeness.

Start-Up/Ramp-Up	22:21:27	22:26:28	0-4	0:05:01
Measurement Interval	22:26:28	22:36:28	5-14	0:10:00
(60 second intervals)	**All ASUs**	**ASU-1**	**ASU-2**	**ASU-3**
0	62,274.23	37,118.20	7,652.60	17,503.43
1	62,285.05	37,107.08	7,657.87	17,520.10
2	62,259.00	37,142.45	7,655.78	17,460.77
3	62,286.80	37,134.48	7,675.73	17,476.58
4	62,218.25	37,063.68	7,661.40	17,493.17
5	62,235.97	37,100.58	7,641.93	17,493.45
6	62,248.65	37,135.73	7,630.45	17,482.47
7	62,248.20	37,108.77	7,648.85	17,490.58
8	62,260.00	37,090.45	7,677.40	17,492.15
9	62,209.87	37,065.15	7,662.55	17,482.17
10	62,270.97	37,144.77	7,647.08	17,479.12
11	62,274.13	37,117.78	7,659.10	17,497.25
12	62,287.90	37,117.38	7,655.52	17,515.00
13	62,265.28	37,125.12	7,649.05	17,491.12
14	62,317.03	37,138.10	7,665.63	17,513.30
Average	62,261.80	37,114.38	7,653.76	17,493.66

Start-Up/Ramp-Up	22:37:06	22:42:07	0-4	0:05:01
Measurement Interval	22:42:07	22:52:07	5-14	0:10:00
(60 second intervals)	**All ASUs**	**ASU-1**	**ASU-2**	**ASU-3**
0	59,123.80	35,253.33	7,277.65	16,592.82
1	59,138.90	35,246.13	7,293.18	16,599.58
2	59,089.32	35,238.00	7,276.03	16,575.28
3	59,094.15	35,211.42	7,268.18	16,614.55
4	59,105.10	35,213.47	7,273.77	16,617.87
5	59,102.65	35,217.62	7,267.37	16,617.67
6	59,077.73	35,207.93	7,264.55	16,605.25
7	59,127.52	35,239.45	7,264.95	16,623.12
8	59,075.07	35,215.30	7,276.97	16,582.80
9	59,142.58	35,269.87	7,284.03	16,588.68
10	59,062.72	35,246.37	7,251.28	16,565.07
11	59,091.78	35,231.07	7,277.22	16,583.50
12	59,107.20	35,244.45	7,262.90	16,599.85
13	59,114.35	35,233.78	7,279.02	16,601.55
14	59,106.53	35,216.73	7,260.27	16,629.53
Average	59,100.81	35,232.26	7,268.86	16,599.70

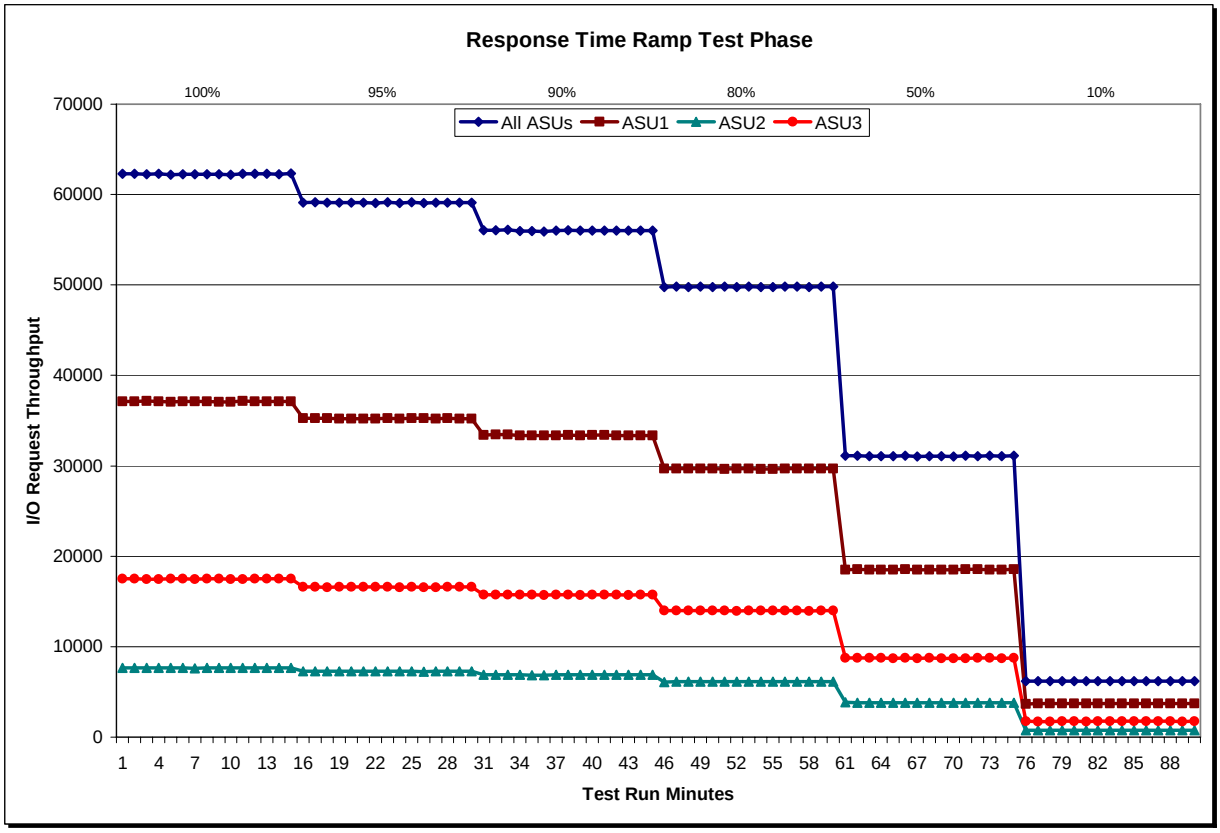
90% Load Level - 1120 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	22:52:45	22:57:46	0-4	0:05:01
Measurement Interval	22:57:46	23:07:46	5-14	0:10:00
(60 second intervals)	**All ASUs**	**ASU-1**	**ASU-2**	**ASU-3**
0	56,048.53	33,417.05	6,900.93	15,730.55
1	56,072.77	33,436.92	6,896.27	15,739.58
2	56,095.93	33,445.38	6,899.83	15,750.72
3	55,971.92	33,356.17	6,886.00	15,729.75
4	55,955.90	33,338.37	6,869.95	15,747.58
5	55,917.38	33,335.57	6,867.33	15,714.48
6	55,997.85	33,368.78	6,901.50	15,727.57
7	56,037.57	33,398.78	6,885.85	15,752.93
8	56,001.72	33,380.83	6,901.98	15,718.90
9	56,008.40	33,382.43	6,889.10	15,736.87
10	56,031.47	33,396.50	6,889.87	15,745.10
11	55,987.57	33,352.00	6,889.63	15,745.93
12	55,989.43	33,378.78	6,888.15	15,722.50
13	56,002.23	33,373.22	6,876.83	15,752.18
14	56,003.22	33,375.40	6,886.95	15,740.87
Average	55,997.68	33,374.23	6,887.72	15,735.73

80% Load Level - 996 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	23:08:23	23:13:24	0-4	0:05:01
Measurement Interval	23:13:24	23:23:24	5-14	0:10:00
(60 second intervals)	**All ASUs**	**ASU-1**	**ASU-2**	**ASU-3**
0	49,780.02	29,671.17	6,112.38	13,996.47
1	49,826.30	29,691.38	6,142.75	13,992.17
2	49,794.97	29,679.63	6,123.02	13,992.32
3	49,823.25	29,683.55	6,131.08	14,008.62
4	49,795.33	29,691.75	6,126.03	13,977.55
5	49,815.38	29,670.12	6,139.28	14,005.98
6	49,774.47	29,685.22	6,130.98	13,958.27
7	49,822.38	29,689.85	6,128.47	14,004.07
8	49,769.82	29,638.67	6,126.93	14,004.22
9	49,773.02	29,663.12	6,117.87	13,992.03
10	49,817.48	29,699.72	6,131.60	13,986.17
11	49,835.77	29,699.87	6,132.10	14,003.80
12	49,769.33	29,683.58	6,123.78	13,961.97
13	49,821.57	29,711.98	6,122.70	13,986.88
14	49,823.93	29,703.42	6,116.02	14,004.50
Average	49,802.32	29,684.55	6,126.97	13,990.79

50% Load Level - 622 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	23:23:59	23:29:00	0-4	0:05:01
Measurement Interval	23:29:00	23:39:00	5-14	0:10:00
(60 second intervals)	**All ASUs**	**ASU-1**	**ASU-2**	**ASU-3**
0	31,130.82	18,534.95	3,840.65	8,755.22
1	31,126.33	18,546.85	3,822.20	8,757.28
2	31,096.93	18,530.72	3,826.38	8,739.83
3	31,062.53	18,500.87	3,824.43	8,737.23
4	31,089.67	18,530.83	3,829.68	8,729.15
5	31,131.72	18,566.65	3,819.20	8,745.87
6	31,048.32	18,496.20	3,821.62	8,730.50
7	31,092.93	18,527.43	3,820.78	8,744.72
8	31,060.90	18,516.82	3,818.90	8,725.18
9	31,039.90	18,513.28	3,815.47	8,711.15
10	31,102.23	18,563.33	3,815.03	8,723.87
11	31,089.52	18,536.60	3,818.63	8,734.28
12	31,110.23	18,533.95	3,805.90	8,770.38
13	31,054.15	18,518.63	3,803.45	8,732.07
14	31,130.13	18,545.55	3,827.12	8,757.47
Average	31,086.00	18,531.85	3,816.61	8,737.55

10% Load Level - 124 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	23:39:34	23:44:35	0-4	0:05:01
Measurement Interval	23:44:35	23:54:35	5-14	0:10:00
(60 second intervals)	**All ASUs**	**ASU-1**	**ASU-2**	**ASU-3**
0	6,177.47	3,677.68	761.02	1,738.77
1	6,184.73	3,696.03	755.05	1,733.65
2	6,193.70	3,702.25	756.75	1,734.70
3	6,204.98	3,693.15	765.15	1,746.68
4	6,200.30	3,692.33	767.32	1,740.65
5	6,201.18	3,695.55	769.00	1,736.63
6	6,207.20	3,697.68	763.07	1,746.45
7	6,195.17	3,693.25	758.50	1,743.42
8	6,207.83	3,698.75	763.87	1,745.22
9	6,210.03	3,707.52	763.98	1,738.53
10	6,205.23	3,696.30	764.63	1,744.30
11	6,203.15	3,688.83	767.87	1,746.45
12	6,188.85	3,691.12	760.73	1,737.00
13	6,199.32	3,704.08	765.48	1,729.75
14	6,202.60	3,691.42	763.55	1,747.63
Average	6,202.06	3,696.45	764.07	1,741.54

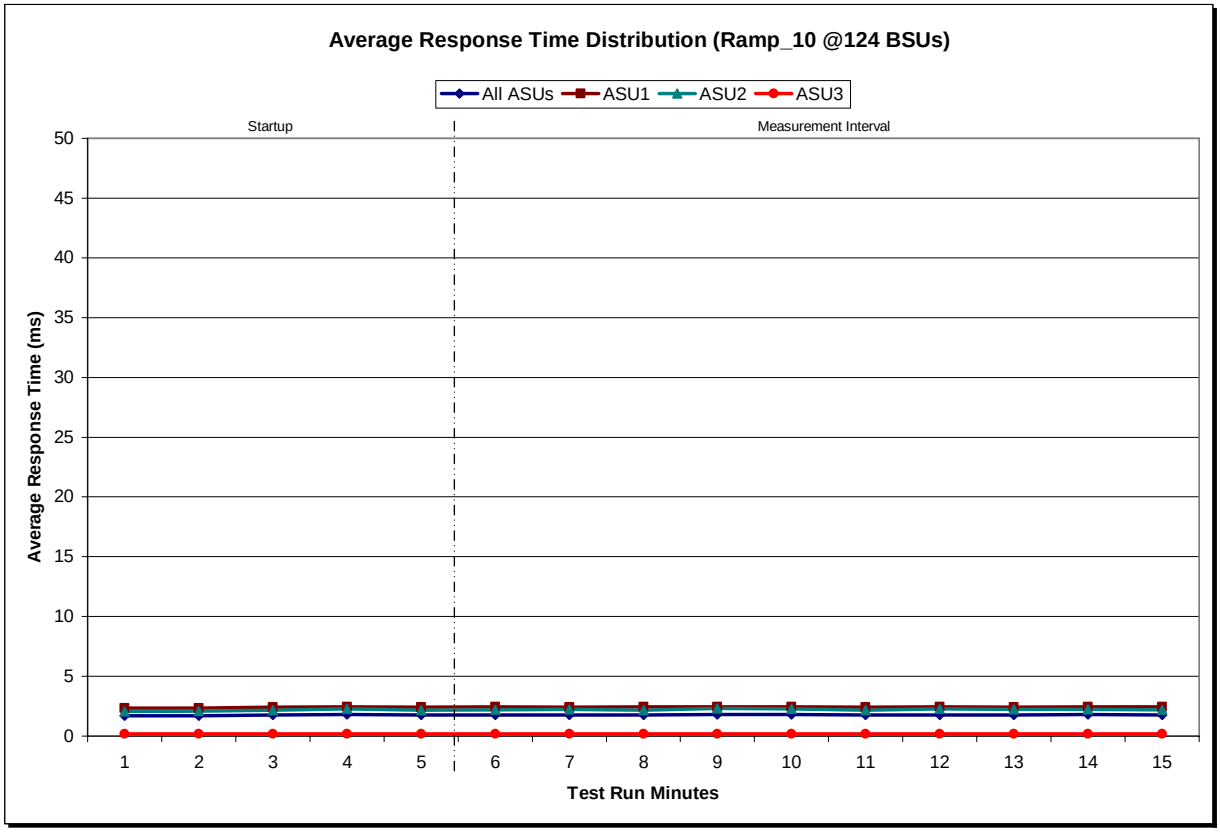
Response Time Ramp Distribution (IOPS) Graph



SPC-1 LRT™ Average Response Time (ms) Distribution Data

124 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	23:39:34	23:44:35	0-4	0:05:01
Measurement Interval	23:44:35	23:54:35	5-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	1.68	2.32	2.03	0.17
1	1.71	2.35	2.10	0.17
2	1.77	2.43	2.18	0.18
3	1.79	2.45	2.28	0.18
4	1.76	2.41	2.17	0.18
5	1.78	2.44	2.20	0.18
6	1.78	2.43	2.24	0.19
7	1.77	2.43	2.17	0.18
8	1.79	2.45	2.31	0.17
9	1.79	2.44	2.26	0.18
10	1.75	2.40	2.17	0.19
11	1.78	2.43	2.27	0.18
12	1.76	2.42	2.22	0.18
13	1.79	2.45	2.22	0.18
14	1.77	2.43	2.20	0.18
Average	***1.78***	***2.43***	***2.23***	***0.18***

SPC-1 LRT™ Average Response Time (ms) Distribution Graph



SPC-1 LRT™ (10%) – Measured Intensity Multiplier and Coefficient of Variation

Clause 3.4.3

IM – Intensity Multiplier: *The ratio of I/Os for each I/O stream relative to the total I/Os for all I/O streams (ASU1-1 – ASU3-1) as required by the benchmark specification.*

Clauses 5.1.10 and 5.3.13.2

MIM – Measured Intensity Multiplier: *The Measured Intensity Multiplier represents the ratio of measured I/Os for each I/O stream relative to the total I/Os measured for all I/O streams (ASU1-1 – ASU3-1). This value may differ from the corresponding Expected Intensity Multiplier by no more than 5%.*

Clause 5.3.13.3

COV – Coefficient of Variation: *This measure of variation for the Measured Intensity Multiplier cannot exceed 0.2.*

	ASU1-1	ASU1-2	ASU1-3	ASU1-4	ASU2-1	ASU2-2	ASU2-3	ASU3-1
IM	***0.0350***	***0.2810***	***0.0700***	***0.2100***	***0.0180***	***0.0700***	***0.0350***	***0.2810***
MIM	0.0349	0.2810	0.0700	0.2101	0.0181	0.0700	0.0351	0.2808
COV	0.009	0.003	0.007	0.003	0.012	0.005	0.009	0.003

Repeatability Test

Clause 5.4.5

The Repeatability Test demonstrates the repeatability and reproducibility of the SPC-1 IOPS™ primary metric and SPC-1 LRT™ metric generated in earlier Test Runs.

There are two identical Repeatability Test Phases. Each Test Phase contains two Test Runs. Each of the Test Runs will have a Measurement Interval of no less than ten (10) minutes. The two Test Runs in each Test Phase will be executed without interruption or any type of manual intervention.

The first Test Run in each Test Phase is executed at the 10% load point. The Average Response Time from each of the Test Runs is compared to the SPC-1 LRT™ metric. Each Average Response Time value must be less than the SPC-1 LRT™ metric plus 5% or less than the SPC-1 LRT™ metric plus one (1) millisecond (ms).

The second Test Run in each Test Phase is executed at the 100% load point. The I/O Request Throughput from the Test Runs is compared to the SPC-1 IOPS™ primary metric. Each I/O Request Throughput value must be greater than the SPC-1 IOPS™ primary metric minus 5%. In addition, the Average Response Time for each Test Run cannot exceed 30 milliseconds.

If any of the above constraints are not met, the benchmark measurement is invalid.

Clause 9.4.3.7.4

The following content shall appear in the FDR for each Test Run in the two Repeatability Test Phases:

1. *A table containing the results of the Repeatability Test.*
2. *An I/O Request Throughput Distribution graph and table.*
3. *An Average Response Time Distribution graph and table.*
4. *The human readable Test Run Results File produced by the Workload Generator.*
5. *A listing or screen image of all input parameters supplied to the Workload Generator.*

SPC-1 Workload Generator Input Parameters

The SPC-1 Workload Generator input parameters for the Sustainability, IOPS, Response Time Ramp, Repeatability, and Persistence Test Runs are documented in "Appendix E: SPC-1 Workload Generator Input Parameters" on Page 70.

Repeatability Test Results File

The values for the SPC-1 IOPS™, SPC-1 LRT™, and the Repeatability Test measurements are listed in the tables below.

	SPC-1 IOPS™
Primary Metrics	***62,261.80***
Repeatability Test Phase 1	62,247.92
Repeatability Test Phase 2	62,241.54

The SPC-1 IOPS™ values in the above table were generated using 100% of the specified Business Scaling Unit (BSU) load level. Each of the Repeatability Test Phase values for SPC-1 IOPS™ must greater than 95% of the reported SPC-1 IOPS™ Primary Metric.

	SPC-1 LRT™
Primary Metrics	***1.78 ms***
Repeatability Test Phase 1	1.77 ms
Repeatability Test Phase 2	1.80 ms

The average response time values in the SPC-1 LRT™ column were generated using 10% of the specified Business Scaling Unit (BSU) load level. Each of the Repeatability Test Phase values for SPC-1 LRT™ must be less than 105% of the reported SPC-1 LRT™ Primary Metric or less than the reported SPC-1 LRT™ Primary Metric minus one (1) millisecond (ms)..

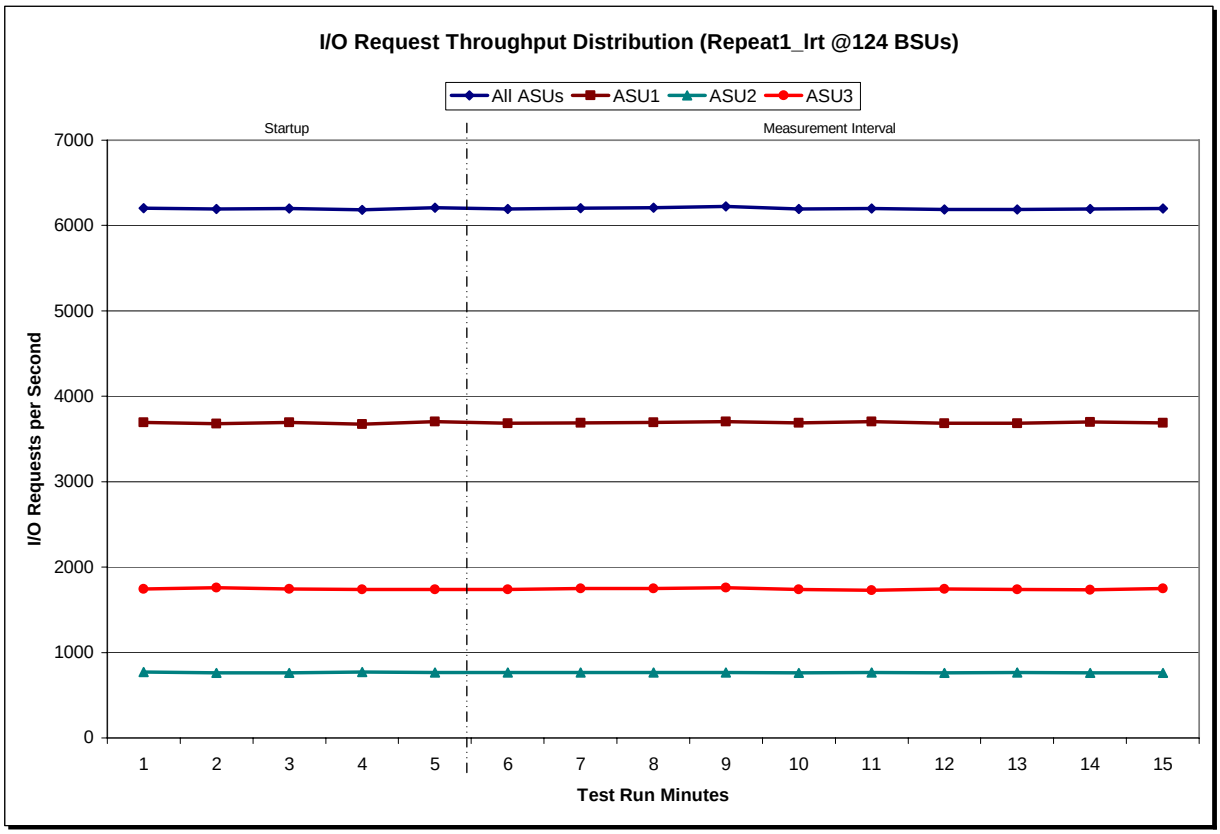
A link to the test result file generated from each Repeatability Test Run is listed below.

Repeatability Test Phase 1, Test Run 1 (LRT)
Repeatability Test Phase 1, Test Run 2 (IOPS)
Repeatability Test Phase 2, Test Run 1 (LRT)
Repeatability Test Phase 2, Test Run 2 (IOPS)

Repeatability 1 LRT – I/O Request Throughput Distribution Data

124 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	23:55:12	0:00:12	0-4	0:05:00
Measurement Interval	0:00:12	0:10:12	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	6,205.52	3,693.12	768.97	1,743.43
1	6,193.83	3,676.88	759.07	1,757.88
2	6,199.22	3,695.28	762.63	1,741.30
3	6,181.65	3,673.97	769.02	1,738.67
4	6,208.28	3,701.83	767.92	1,738.53
5	6,191.87	3,685.90	765.15	1,740.82
6	6,202.90	3,690.92	764.27	1,747.72
7	6,209.67	3,695.48	766.35	1,747.83
8	6,225.05	3,704.72	763.50	1,756.83
9	6,191.22	3,690.38	763.13	1,737.70
10	6,198.82	3,702.12	765.93	1,730.77
11	6,190.85	3,685.73	762.73	1,742.38
12	6,188.40	3,681.83	767.58	1,738.98
13	6,194.00	3,699.32	759.37	1,735.32
14	6,196.33	3,688.88	760.90	1,746.55
Average	***6,198.91***	***3,692.53***	***763.89***	***1,742.49***

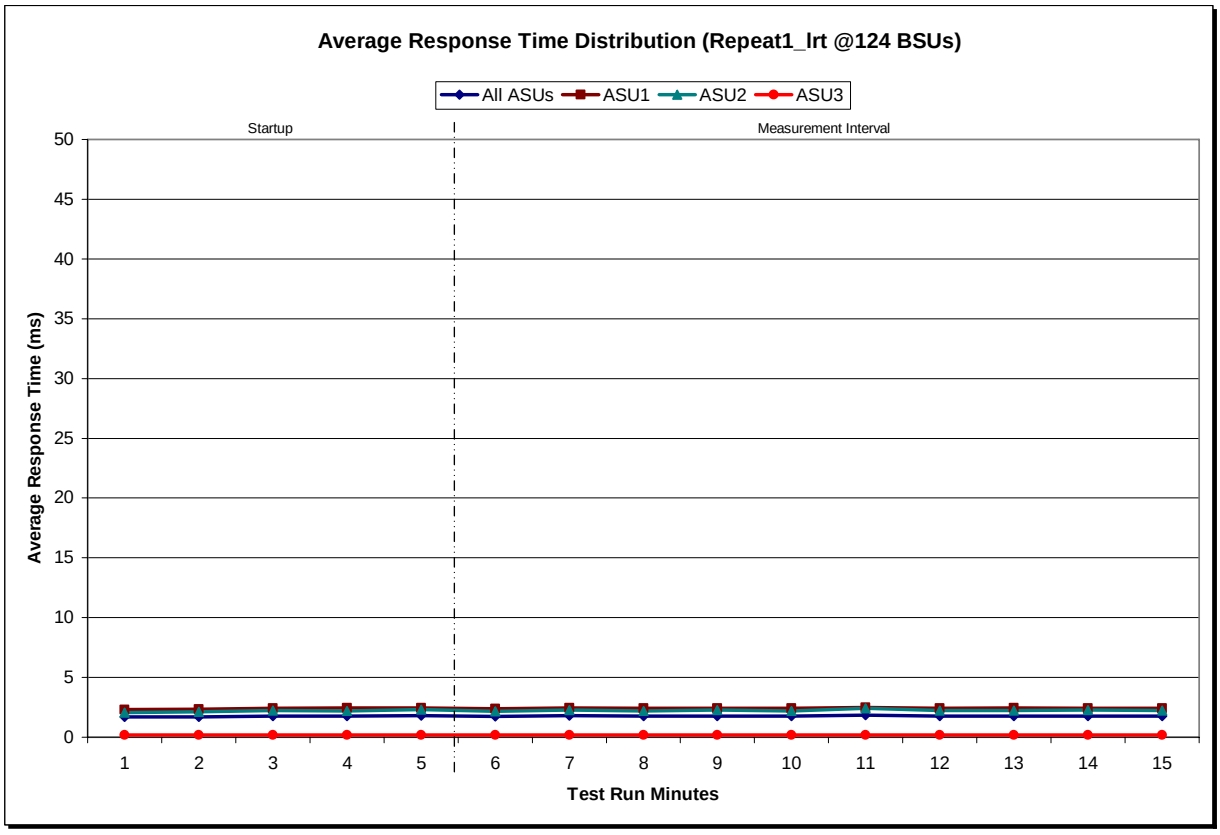
Repeatability 1 LRT – I/O Request Throughput Distribution Graph



Repeatability 1 LRT –Average Response Time (ms) Distribution Data

124 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	23:55:12	0:00:12	0-4	0:05:00
Measurement Interval	0:00:12	0:10:12	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	1.68	2.31	2.05	0.17
1	1.70	2.35	2.11	0.17
2	1.77	2.42	2.22	0.18
3	1.77	2.43	2.20	0.18
4	1.80	2.46	2.30	0.19
5	1.74	2.39	2.15	0.18
6	1.78	2.45	2.25	0.18
7	1.76	2.41	2.19	0.18
8	1.76	2.42	2.25	0.18
9	1.76	2.41	2.21	0.18
10	1.84	2.50	2.43	0.18
11	1.76	2.41	2.25	0.18
12	1.78	2.44	2.22	0.18
13	1.76	2.40	2.28	0.18
14	1.76	2.41	2.23	0.18
Average	***1.77***	***2.42***	***2.25***	***0.18***

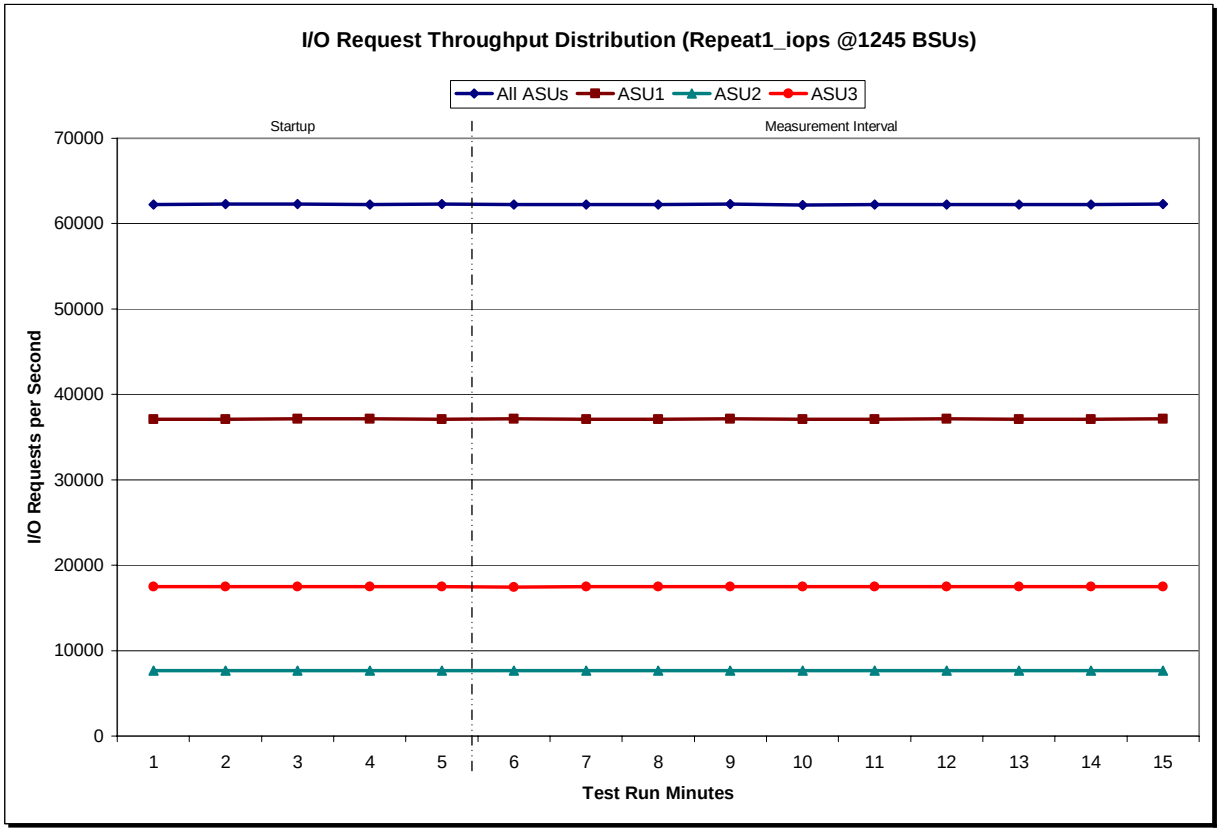
Repeatability 1 LRT –Average Response Time (ms) Distribution Graph



Repeatability 1 IOPS – I/O Request Throughput Distribution Data

1245 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	0:10:50	0:15:51	0-4	0:05:01
Measurement Interval	0:15:51	0:25:51	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	62,222.82	37,104.07	7,646.83	17,471.92
1	62,267.92	37,106.92	7,657.97	17,503.03
2	62,295.78	37,140.17	7,668.32	17,487.30
3	62,247.62	37,130.32	7,638.73	17,478.57
4	62,268.97	37,102.02	7,658.52	17,508.43
5	62,249.43	37,132.15	7,662.88	17,454.40
6	62,232.27	37,092.70	7,672.78	17,466.78
7	62,243.18	37,097.78	7,655.47	17,489.93
8	62,264.82	37,119.78	7,658.38	17,486.65
9	62,212.07	37,069.48	7,661.10	17,481.48
10	62,256.33	37,104.33	7,652.50	17,499.50
11	62,262.60	37,122.57	7,666.45	17,473.58
12	62,233.67	37,069.85	7,675.93	17,487.88
13	62,215.17	37,080.67	7,661.37	17,473.13
14	62,309.65	37,134.22	7,673.90	17,501.53
Average	***62,247.92***	***37,102.35***	***7,664.08***	***17,481.49***

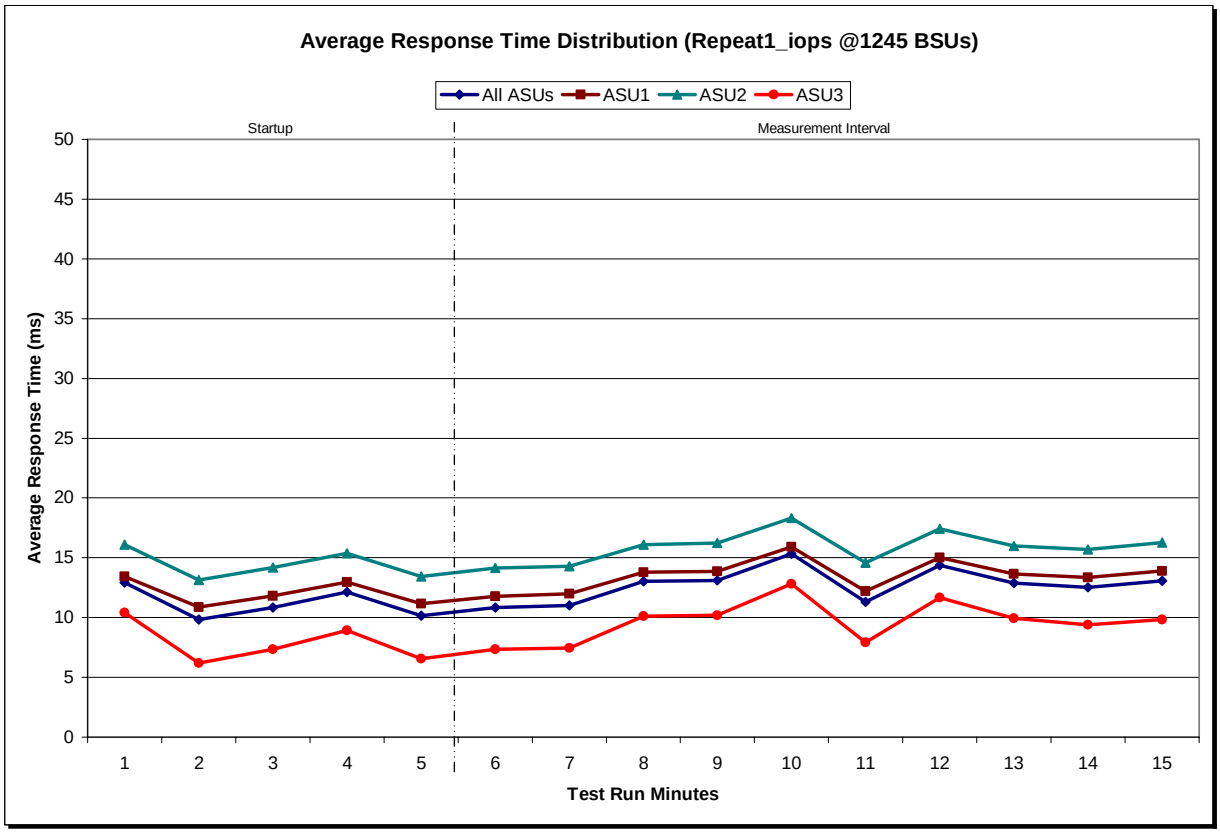
Repeatability 1 IOPS – I/O Request Throughput Distribution Graph



Repeatability 1 IOPS –Average Response Time (ms) Distribution Data

1245 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	0:10:50	0:15:51	0-4	0:05:01
Measurement Interval	0:15:51	0:25:51	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	12.91	13.42	16.11	10.41
1	9.84	10.89	13.13	6.19
2	10.84	11.80	14.18	7.33
3	12.13	12.96	15.36	8.94
4	10.15	11.17	13.43	6.54
5	10.83	11.79	14.14	7.35
6	11.00	11.99	14.28	7.46
7	13.03	13.78	16.10	10.10
8	13.12	13.85	16.22	10.20
9	15.33	15.91	18.31	12.80
10	11.29	12.20	14.56	7.92
11	14.36	15.00	17.43	11.67
12	12.90	13.66	15.99	9.93
13	12.52	13.35	15.68	9.38
14	13.05	13.90	16.27	9.84
Average	***12.74***	***13.54***	***15.90***	***9.66***

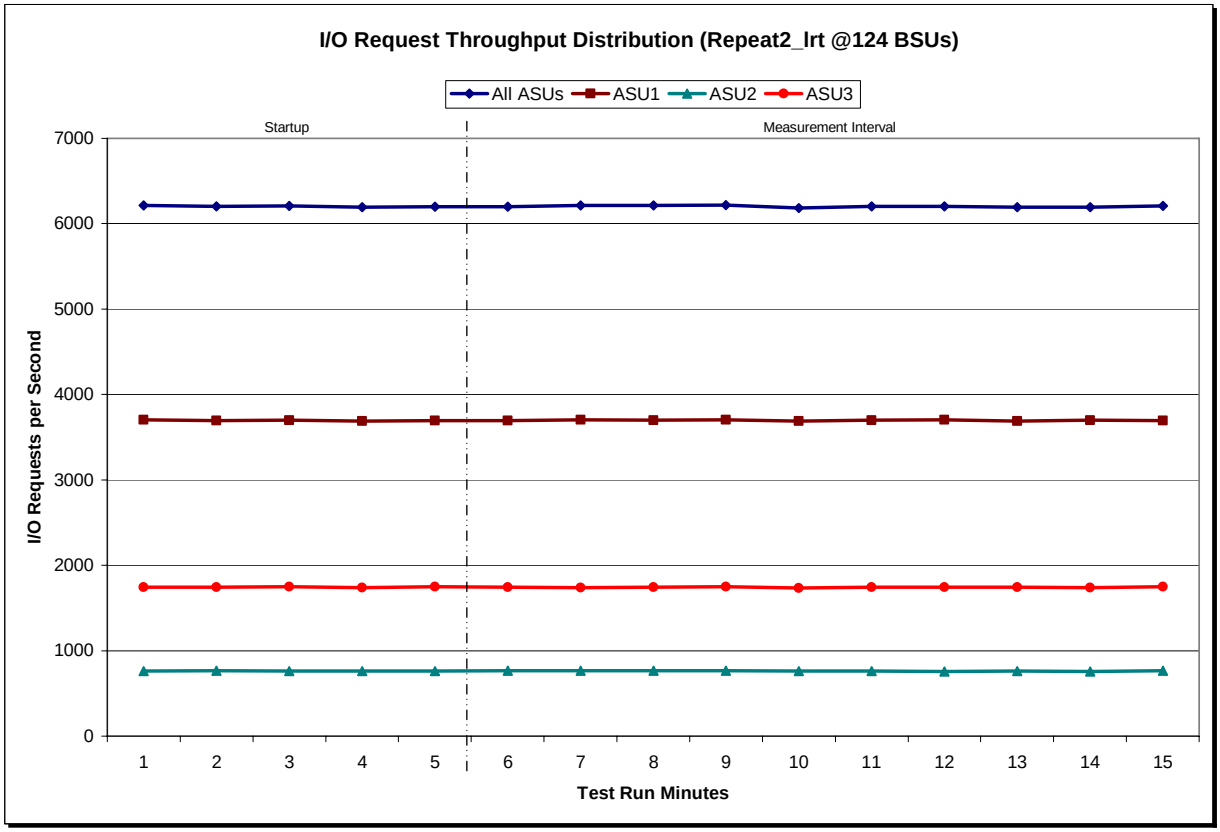
Repeatability 1 IOPS –Average Response Time (ms) Distribution Graph



Repeatability 2 LRT – I/O Request Throughput Distribution Data

124 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	0:26:29	0:31:29	0-4	0:05:00
Measurement Interval	0:31:29	0:41:29	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	6,211.75	3,704.32	762.68	1,744.75
1	6,203.10	3,695.07	765.75	1,742.28
2	6,209.13	3,700.92	760.22	1,748.00
3	6,191.88	3,687.88	763.17	1,740.83
4	6,201.18	3,692.85	761.35	1,746.98
5	6,200.55	3,694.20	764.88	1,741.47
6	6,211.67	3,704.27	767.92	1,739.48
7	6,214.07	3,700.43	768.53	1,745.10
8	6,218.65	3,704.80	763.77	1,750.08
9	6,182.65	3,687.40	759.35	1,735.90
10	6,202.82	3,699.48	761.05	1,742.28
11	6,205.02	3,705.10	756.50	1,743.42
12	6,193.78	3,689.53	760.40	1,743.85
13	6,192.78	3,699.37	756.73	1,736.68
14	6,206.73	3,695.00	763.67	1,748.07
Average	***6,202.87***	***3,697.96***	***762.28***	***1,742.63***

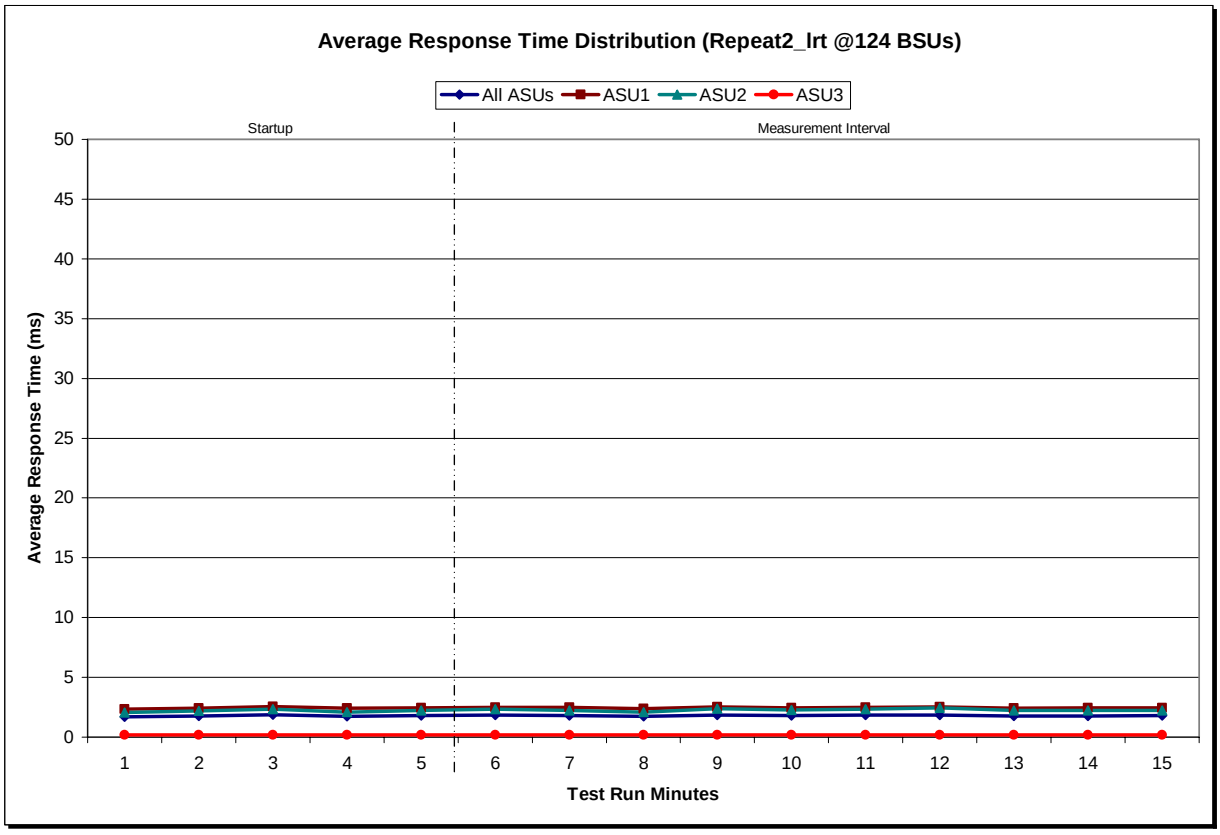
Repeatability 2 LRT – I/O Request Throughput Distribution Graph



Repeatability 2 LRT –Average Response Time (ms) Distribution Data

124 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	0:26:29	0:31:29	0-4	0:05:00
Measurement Interval	0:31:29	0:41:29	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	1.70	2.35	2.07	0.17
1	1.76	2.41	2.19	0.19
2	1.85	2.54	2.35	0.18
3	1.74	2.40	2.10	0.18
4	1.79	2.46	2.24	0.18
5	1.83	2.50	2.33	0.20
6	1.81	2.49	2.24	0.19
7	1.73	2.38	2.10	0.18
8	1.85	2.52	2.36	0.19
9	1.79	2.45	2.25	0.18
10	1.82	2.48	2.33	0.19
11	1.85	2.52	2.45	0.18
12	1.77	2.43	2.23	0.17
13	1.77	2.43	2.22	0.18
14	1.79	2.46	2.25	0.18
Average	***1.80***	***2.47***	***2.28***	***0.18***

Repeatability 2 LRT –Average Response Time (ms) Distribution Graph

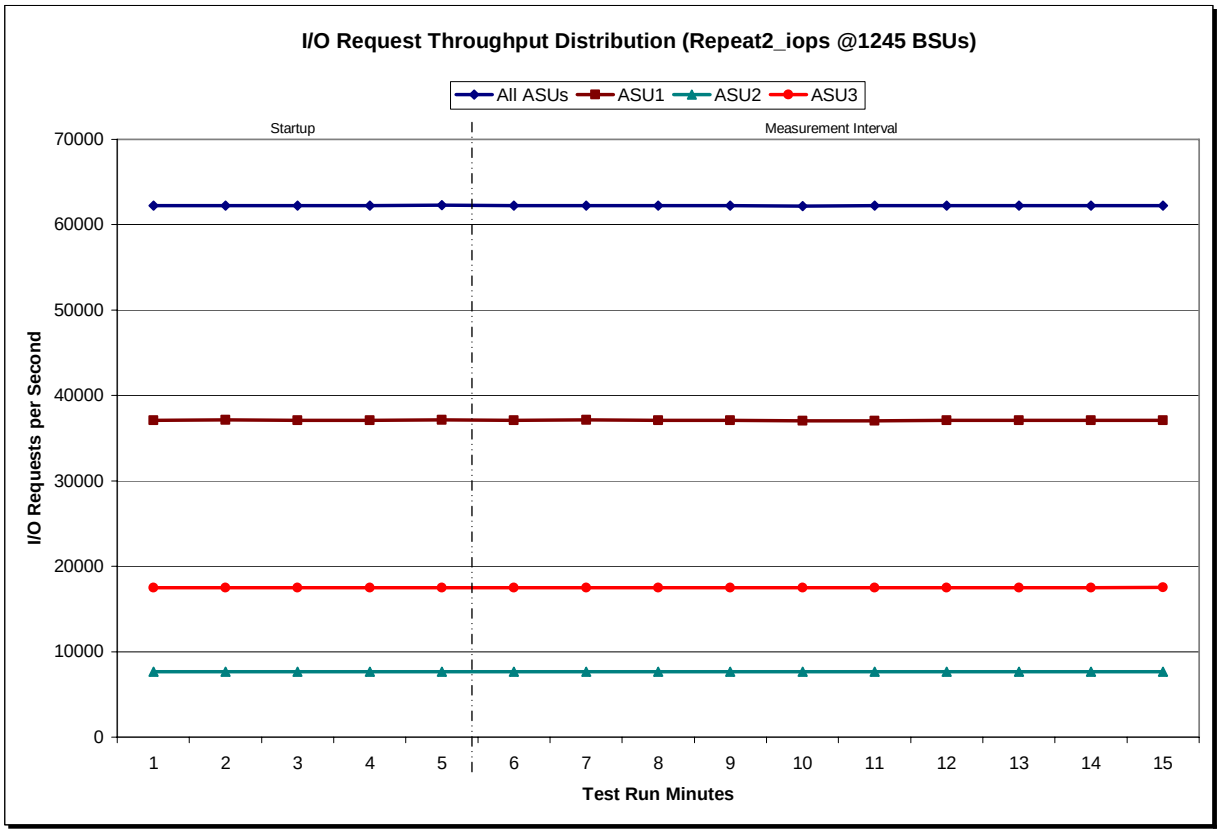


Repeatability 2 IOPS – I/O Request Throughput Distribution Data

1245 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	0:42:07	0:47:08	0-4	0:05:01
Measurement Interval	0:47:08	0:57:08	3-14	0:10:00

60 second intervals	All ASUs	ASU1	ASU2	ASU3
0	62,261.60	37,087.83	7,663.05	17,510.72
1	62,246.93	37,121.68	7,643.23	17,482.02
2	62,249.23	37,073.12	7,669.10	17,507.02
3	62,260.70	37,083.33	7,676.57	17,500.80
4	62,294.20	37,140.73	7,664.98	17,488.48
5	62,261.78	37,107.13	7,662.63	17,492.02
6	62,256.75	37,124.42	7,663.20	17,469.13
7	62,259.97	37,114.90	7,658.92	17,486.15
8	62,230.60	37,087.38	7,656.48	17,486.73
9	62,194.82	37,058.02	7,666.15	17,470.65
10	62,216.60	37,047.77	7,661.52	17,507.32
11	62,233.40	37,093.03	7,663.22	17,477.15
12	62,259.93	37,080.15	7,676.17	17,503.62
13	62,253.87	37,092.90	7,651.73	17,509.23
14	62,247.68	37,069.58	7,659.05	17,519.05
Average	***62,241.54***	***37,087.53***	***7,661.91***	***17,492.11***

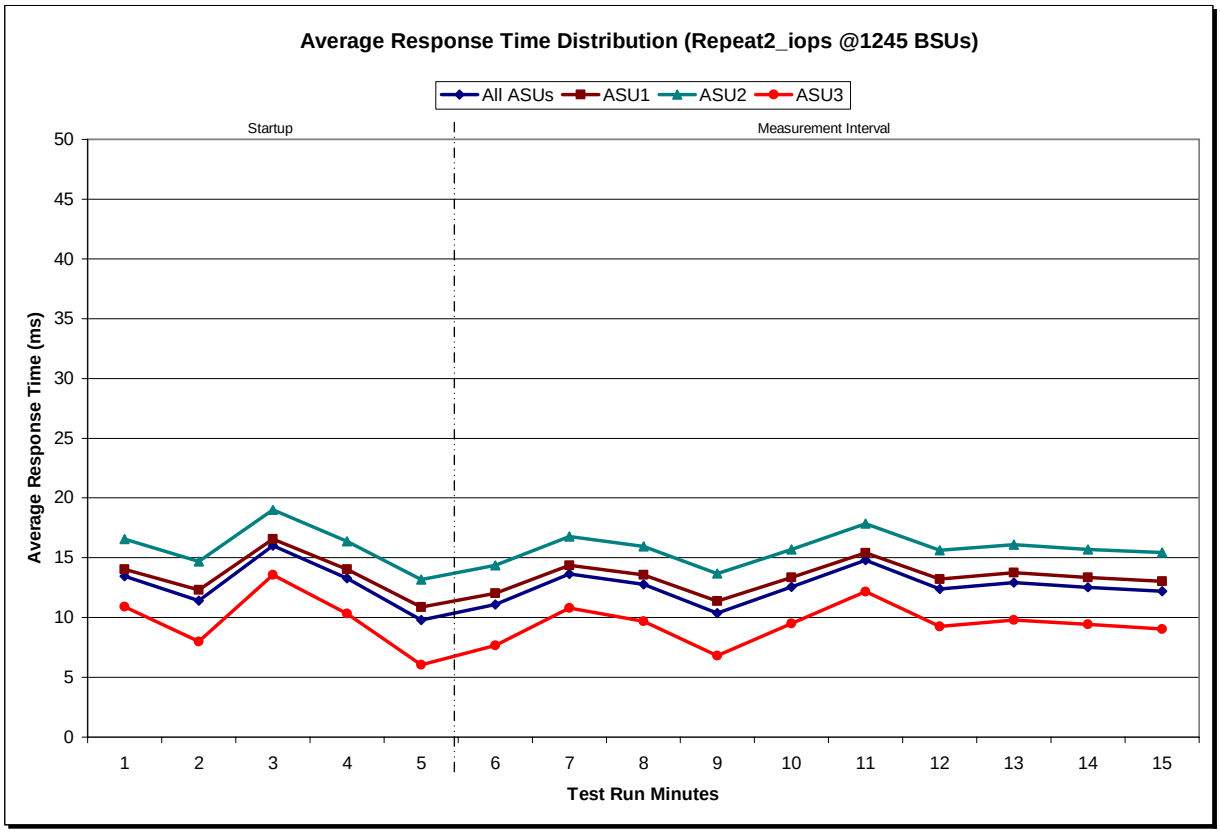
Repeatability 2 IOPS – I/O Request Throughput Distribution Graph



Repeatability 2 IOPS –Average Response Time (ms) Distribution Data

1245 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	0:42:07	0:47:08	0-4	0:05:01
Measurement Interval	0:47:08	0:57:08	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	13.47	14.03	16.54	10.92
1	11.39	12.31	14.70	8.01
2	16.02	16.56	19.01	13.56
3	13.28	14.04	16.38	10.31
4	9.79	10.86	13.16	6.03
5	11.10	12.04	14.36	7.67
6	13.65	14.35	16.78	10.79
7	12.76	13.55	15.95	9.68
8	10.38	11.39	13.68	6.80
9	12.56	13.36	15.70	9.49
10	14.79	15.40	17.87	12.16
11	12.39	13.20	15.64	9.25
12	12.93	13.74	16.10	9.80
13	12.54	13.35	15.70	9.43
14	12.19	13.02	15.43	9.02
Average	***12.53***	***13.34***	***15.72***	***9.41***

Repeatability 2 IOPS –Average Response Time (ms) Distribution Graph



Repeatability 1 (LRT)
Measured Intensity Multiplier and Coefficient of Variation

Clause 3.4.3

IM – Intensity Multiplier: *The ratio of I/Os for each I/O stream relative to the total I/Os for all I/O streams (ASU1-1 – ASU3-1) as required by the benchmark specification.*

Clauses 5.1.10 and 5.3.13.2

MIM – Measured Intensity Multiplier: *The Measured Intensity Multiplier represents the ratio of measured I/Os for each I/O stream relative to the total I/Os measured for all I/O streams (ASU1-1 – ASU3-1). This value may differ from the corresponding Expected Intensity Multiplier by no more than 5%.*

Clause 5.3.13.3

COV – Coefficient of Variation: *This measure of variation for the Measured Intensity Multiplier cannot exceed 0.2.*

	ASU1-1	ASU1-2	ASU1-3	ASU1-4	ASU2-1	ASU2-2	ASU2-3	ASU3-1
IM	***0.0350***	***0.2810***	***0.0700***	***0.2100***	***0.0180***	***0.0700***	***0.0350***	***0.2810***
MIM	0.0351	0.2808	0.0698	0.2099	0.0180	0.0702	0.0351	0.2811
COV	0.010	0.003	0.006	0.003	0.012	0.005	0.008	0.003

Repeatability 1 (IOPS)
Measured Intensity Multiplier and Coefficient of Variation

	ASU1-1	ASU1-2	ASU1-3	ASU1-4	ASU2-1	ASU2-2	ASU2-3	ASU3-1
IM	***0.0350***	***0.2810***	***0.0700***	***0.2100***	***0.0180***	***0.0700***	***0.0350***	***0.2810***
MIM	0.0350	0.2810	0.0700	0.2101	0.0180	0.0700	0.0351	0.2808
COV	0.003	0.000	0.002	0.001	0.003	0.002	0.004	0.001

Repeatability 2 (LRT)
Measured Intensity Multiplier and Coefficient of Variation

	ASU1-1	ASU1-2	ASU1-3	ASU1-4	ASU2-1	ASU2-2	ASU2-3	ASU3-1
IM	***0.0350***	***0.2810***	***0.0700***	***0.2100***	***0.0180***	***0.0700***	***0.0350***	***0.2810***
MIM	0.0349	0.2812	0.0701	0.2100	0.0180	0.0700	0.0349	0.2809
COV	0.011	0.001	0.007	0.003	0.011	0.007	0.012	0.002

Repeatability 2 (IOPS)
Measured Intensity Multiplier and Coefficient of Variation

	ASU1-1	ASU1-2	ASU1-3	ASU1-4	ASU2-1	ASU2-2	ASU2-3	ASU3-1
IM	***0.0350***	***0.2810***	***0.0700***	***0.2100***	***0.0180***	***0.0700***	***0.0350***	***0.2810***
MIM	0.0350	0.2810	0.0700	0.2099	0.0180	0.0701	0.350	0.2810
COV	0.003	0.001	0.002	0.001	0.003	0.001	0.002	0.001

Data Persistence Test

Clause 6

The Data Persistence Test demonstrates the Tested Storage Configuration (TSC):

- *Is capable of maintain data integrity across a power cycle.*
- *Ensures the transfer of data between Logical Volumes and host systems occurs without corruption or loss.*

Persistence Test Run 1 consists of the SPC-1 Workload Generator writing a specific pattern at randomly selected locations throughout the Total ASU Capacity. The SPC-1 Workload Generator retains the information necessary to later validate the patter written at each location.

The Tested Storage Configuration (TSC) is shutdown and restarted using a power off/power on cycle at the end of the above sequence of write operations. In addition, any caches employing battery backup must be flushed/emptied. If the TSC does not include the Host System(s), there is no requirement for the Host System configuration to be shutdown and power cycled.

The TSC is restarted and Host System(s), if also shutdown.

Persistence Test Run 2 utilizes the retained data from Persistence Test Run 1 to verify the specific patterns written in Persistence Test Run 1 and their corresponding locations. If the results of Persistence Test Run 2 verify the specific patterns are correct and at the proper location, the Persistence Test completes successfully. If Persistence Test Run 2 reports any verification error, the Persistence Test fails

Clause 9.4.3.8

The following content shall appear in this section of the FDR:

1. *A listing or screen image of all input parameters supplied to the Workload Generator.*
2. *For the successful Data Persistence Test Run, a table illustrating key results. The content, appearance, and format of this table are specified in Table 9-12. Information displayed in this table shall be obtained from the Test Run Results File referenced below in #3.*
3. *For the successful Data Persistence Test Run, the human readable Test Run Results File produced by the Workload Generator.*

SPC-1 Workload Generator Input Parameters

The SPC-1 Workload Generator input parameters for the Sustainability, IOPS, Response Time Ramp, Repeatability, and Persistence Test Runs are documented in "Appendix E: SPC-1 Workload Generator Input Parameters" on Page 70.

Data Persistence Test Results File

A link to each test result file generated from each Data Persistence Test is listed below.

Persistence 1 Test Results File

Persistence 2 Test Results File

Data Persistence Test Results

Data Persistence Test Results	
Data Persistence Test Run Number: 1	
Total Number of Logical Blocks Written	54,3233,728
Total Number of Logical Blocks Verified	48,437,936
Total Number of Logical Blocks that Failed Verification	0
Time Duration for Writing Test Logical Blocks	10 minutes
Size in Bytes of each Logical Block	512
Number of Failed I/O Requests in the process of the Test	0

In some cases the same address was the target of multiple writes, which resulted in more Logical Blocks Written than Logical Blocks Verified. In the case of multiple writes to the same address, the pattern written and verified must be associated with the last write to that address.

PRICED STORAGE CONFIGURATION AVAILABILITY DATE

Clause 9.2.4.9

The committed delivery data for general availability (Availability Date) of all products that comprise the Priced Storage Configuration must be reported. When the Priced Storage Configuration includes products or components with different availability dates, the reported Availability Date for the Priced Storage Configuration must be the date at which all components are committed to be available.

The Sun Storage 6780 Array *(8 Gb)* as documented in this Full Disclosure Report is currently available for customer purchase and shipment.

PRICING INFORMATION

Clause 9.4.3.3.6

The Executive Summary shall contain a pricing spreadsheet as documented in Clause 8.3.1.

Pricing information may found in the Priced Storage Configuration Pricing section on page 14.

TESTED STORAGE CONFIGURATION (TSC) AND PRICED STORAGE CONFIGURATION DIFFERENCES

Clause 9.4.3.3.7

The Executive Summary shall contain a pricing a list of all differenced between the Tested Storage Configuration (TSC) and the Priced Storage Configuration.

A list of all differences between the Tested Storage Configuration (TSC) and Priced Storage Configuration may be found in the Executive Summary portion of this document on page 14.

ANOMALIES OR IRREGULARITIES

Clause 9.4.3.10

The FDR shall include a clear and complete description of any anomalies or irregularities encountered in the course of executing the SPC-1 benchmark that may in any way call into question the accuracy, verifiability, or authenticity of information published in this FDR.

There were no anomalies or irregularities encountered during the SPC-1 Remote Audit of the Sun Storage 6780 Array *(8 Gb)*.

APPENDIX A: SPC-1 GLOSSARY

"Decimal" *(powers of ten)* Measurement Units

In the storage industry, the terms "kilo", "mega", "giga", "tera", "peta", and "exa" are commonly used prefixes for computing performance and capacity. For the purposes of the SPC workload definitions, all of the following terms are defined in "powers of ten" measurement units.

- A kilobyte (KB) is equal to 1,000 (10^3) bytes.
- A megabyte (MB) is equal to 1,000,000 (10^6) bytes.
- A gigabyte (GB) is equal to 1,000,000,000 (10^9) bytes.
- A terabyte (TB) is equal to 1,000,000,000,000 (10^{12}) bytes.
- A petabyte (PB) is equal to 1,000,000,000,000,000 (10^{15}) bytes
- An exabyte (EB) is equal to 1,000,000,000,000,000,000 (10^{18}) bytes

"Binary" *(powers of two)* Measurement Units

The sizes reported by many operating system components use "powers of two" measurement units rather than "power of ten" units. The following standardized definitions and terms are also valid and may be used in this document.

- A kibibyte (KiB) is equal to 1,024 (2^{10}) bytes.
- A mebibyte (MiB) is equal to 1,048,576 (2^{20}) bytes.
- A gigibyte (GiB) is equal to 1,073,741,824 (2^{30}) bytes.
- A tebibyte (TiB) is equal to 1,099,511,627,776 (2^{40}) bytes.
- A pebibyte (PiB) is equal to 1,125,899,906,842,624 (2^{50}) bytes.
- An exbibyte (EiB) is equal to 1,152,921,504,606,846,967 (2^{60}) bytes.

SPC-1 Data Repository Definitions

Total ASU Capacity: The total storage capacity read and written in the course of executing the SPC-1 benchmark.

Application Storage Unit (ASU): The logical interface between the storage and SPC-1 Workload Generator. The three ASUs (Data, User, and Log) are typically implemented on one or more Logical Volume.

Logical Volume: The division of Addressable Storage Capacity into individually addressable logical units of storage used in the SPC-1 benchmark. Each Logical Volume is implemented as a single, contiguous address space.

Addressable Storage Capacity: The total storage (sum of Logical Volumes) that can be read and written by application programs such as the SPC-1 Workload Generator.

Configured Storage Capacity: This capacity includes the Addressable Storage Capacity and any other storage (parity disks, hot spares, etc.) necessary to implement the Addressable Storage Capacity.

Physical Storage Capacity: The formatted capacity of all storage devices physically present in the Tested Storage Configuration (TSC).

Data Protection Overhead: The storage capacity required to implement the selected level of data protection.

Required Storage: The amount of Configured Storage Capacity required to implement the Addressable Storage Configuration, excluding the storage required for the three ASUs.

Global Storage Overhead: The amount of Physical Storage Capacity that is required for storage subsystem use and unavailable for use by application programs.

Total Unused Storage: The amount of storage capacity available for use by application programs but not included in the Total ASU Capacity.

SPC-1 Data Protection Levels

Protected: This level will ensure data protection in the event of a single point of failure of any configured storage device. A brief description of the data protection utilized is included in the Executive Summary.

Unprotected: No claim of data protection is asserted in the event of a single point of failure.

SPC-1 Test Execution Definitions

Average Response Time: The sum of the Response Times for all Measured I/O Requests divided by the total number of Measured I/O Requests.

Completed I/O Request: An I/O Request with a Start Time and a Completion Time (see "I/O Completion Types" below).

Completion Time: The time recorded by the Workload Generator when an I/O Request is satisfied by the TSC as signaled by System Software.

Data Rate: The data transferred in all Measured I/O Requests in an SPC-1 Test Run divided by the length of the Test Run in seconds.

Expected I/O Count: For any given I/O Stream and Test Phase, the product of 50 times the BSU level, the duration of the Test Phase in seconds, and the Intensity Multiplier for that I/O Stream.

Failed I/O Request: Any I/O Request issued by the Workload Generator that could not be completed or was signaled as failed by System Software. A Failed I/O Request has no Completion Time (see "I/O Completion Types" below).

I/O Request Throughput: The total number of Measured I/O requests in an SPC-1 Test Run divided by the duration of the Measurement Interval in seconds.

In-Flight I/O Request: An I/O Request issued by the I/O Command Generator to the TSC that has a recorded Start Time, but does not complete within the Measurement Interval (see "I/O Completion Types" below).

Measured I/O Request: A Completed I/O Request with a Completion Time occurring within the Measurement Interval (see "I/O Completion Types" below).

Measured Intensity Multiplier: The percentage of all Measured I/O Requests that were issued by a given I/O Stream.

Measurement Interval: The finite and contiguous time period, after the TSC has reached Steady State, when data is collected by a Test Sponsor to generate an SPC-1 test result or support an SPC-1 test result.

Ramp-Up: The time required for the Benchmark Configuration (BC) to produce Steady State throughput after the Workload Generator begins submitting I/O Requests to the TSC for execution.

Ramp-Down: The time required for the BC to complete all I/O Requests issued by the Workload Generator. The Ramp-Down period begins when the Workload Generator ceases to issue new I/O Requests to the TSC.

Response Time: The Response Time of a Measured I/O Request is its Completion Time minus its Start Time.

Start Time: The time recorded by the Workload Generator when an I/O Request is submitted, by the Workload Generator, to the System Software for execution on the Tested Storage Configuration (TSC).

Start-Up: The period that begins after the Workload Generator starts to submit I/O requests to the TSC and ends at the beginning of the Measurement Interval.

Shut-Down: The period between the end of the Measurement Interval and the time when all I/O Requests issued by the Workload Generator have completed or failed.

Steady State: The consistent and sustainable throughput of the TSC. During this period the load presented to the TSC by the Workload Generator is constant.

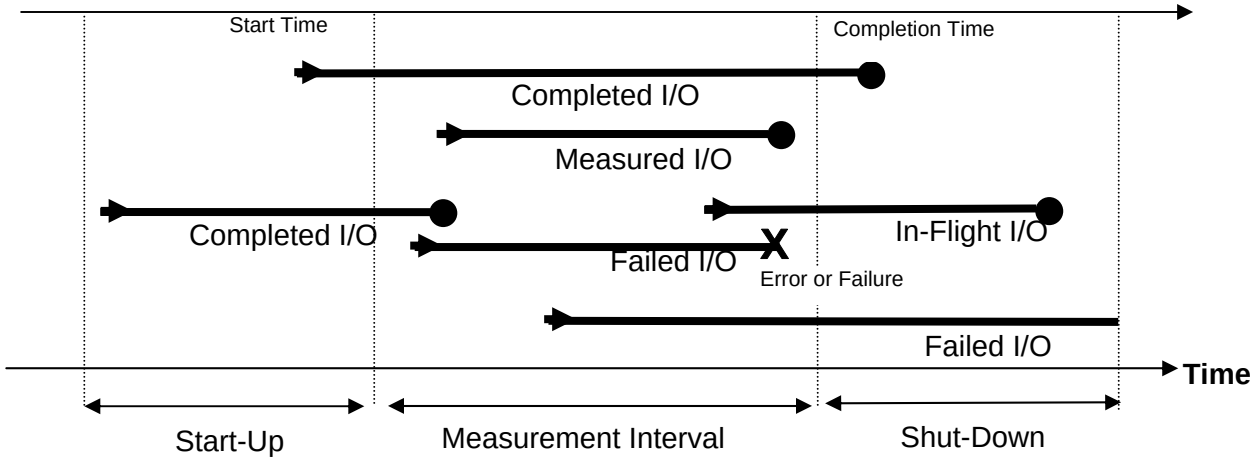
Test: A collection of Test Phases and or Test Runs sharing a common objective.

Test Run: The execution of SPC-1 for the purpose of producing or supporting an SPC-1 test result. SPC-1 Test Runs may have a finite and measured Ramp-Up period, Start-Up

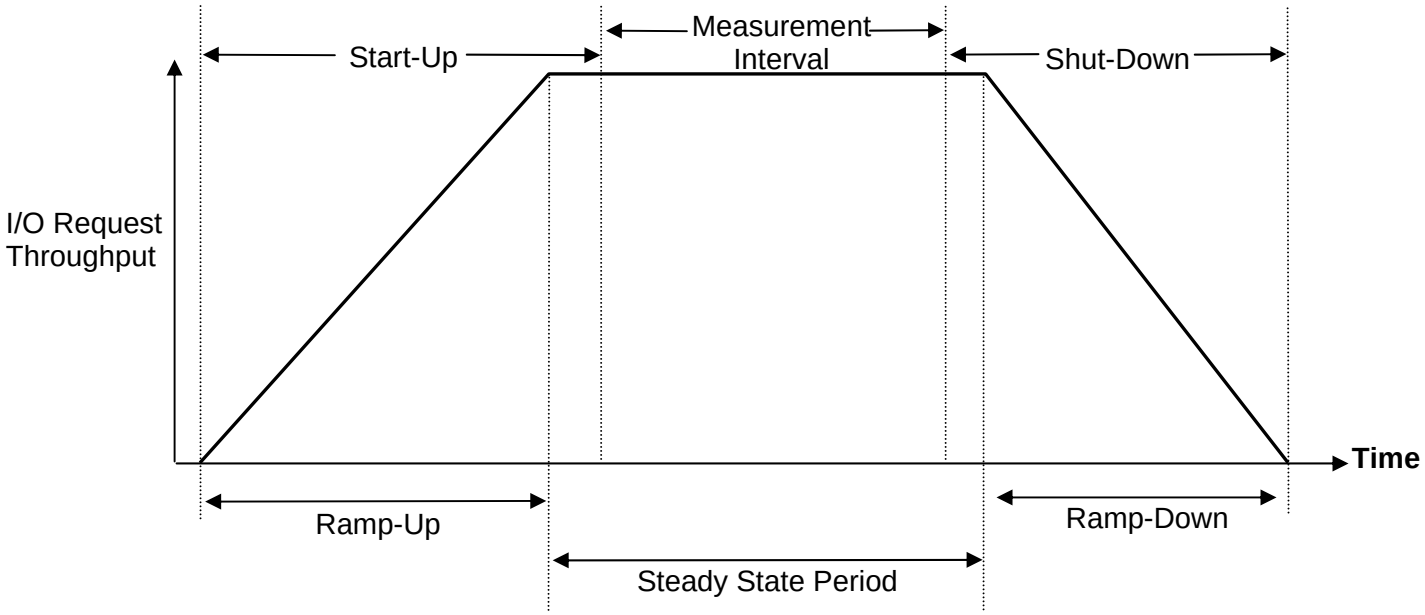
period, Shut-Down period, and Ramp-Down period as illustrated in the "SPC-1 Test Run Components" below. All SPC-1 Test Runs shall have a Steady State period and a Measurement Interval.

Test Phase: A collection of one or more SPC-1 Test Runs sharing a common objective and intended to be run in a specific sequence.

I/O Completion Types



SPC-1 Test Run Components



APPENDIX B: CUSTOMER TUNABLE PARAMETERS AND OPTIONS

Windows 2003 Registry Changes

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\
mppdsm\Parameters\DeviceSettings\Array#...\LoadBalancePolicy=0
```

Storage Array Cache Flush Settings

Start Flush: changed from default of 80 to new value of 50

Stop Flush: changed from default of 80 to new value of 50

Storage Array Cache Block Size

Changed from default of 8K to new value of 16K

RDAC Failover Options

Host Region	Offset	Default	New Value
3	0x24	1	0
9	0x24	1	0
10	0x24	1	0
11	0x24	1	0
12	0x24	1	0
13	0x24	1	0
14	0x24	1	0

Host Bus Adapter Options

The table below lists the Host Bus Adapter BIOS options that were changed from their default values.

Host Bus Adapter Settings		
Item	**Default**	**New Value**
Adapter Settings:		
Loop Reset Delay	5	8
Adapter Hard Loop ID	Disabled	Enabled
Hard Loop ID (unique for each)	0	Eg. 22
Fibre Channel Tape Support	Enabled	Disabled
Advanced Adapter Settings:		
Execution Throttle	16	510
LUNs per Target	8	0
Login Retry Count	8	30
Port Down Retry Count	8	70
Link Down Timeout	30	60

APPENDIX C: TESTED STORAGE CONFIGURATION (TSC) CREATION

The storage management utility, SANtricity, was used to create sixteen volume groups on the storage subsystem, each volume group contains a single volume. The SANtricity script is included in this section. These sixteen volumes are visible by each of the attached hosts. There are four hosts used in this benchmark. One host is the "master". The other three are "slave" hosts. Each host is configured with four JVM's. The steps that follow are required to define the Windows partitions, volumes, and stripe sets that will be used by the SPC-1 benchmark. Steps 1-8 below are performed on only one of the hosts.

1. Use diskpar.exe to set the starting offset for each of the storage system volumes. Starting offset is 65536. Use all of the remaining capacity in the partition.
2. Start Windows Disk Administrator.
3. Convert all of the storage system volumes to Dynamic Disks.
4. Create a Windows Striped (RAID 0) volume using all sixteen 32MB volumes.
5. Delete the large volume on each of the Dynamic Disks.
6. Create a Windows Striped (RAID 0) volume for ASU 3.
   a. Select all sixteen volumes.
   b. Set capacity to 81910MB.
   c. Assign drive letter "N" to the volume. Do not format the volume.
7. Create the Windows Striped (RAID0) volume for ASU 1.
   a. Select all sixteen volumes.
   b. Set capacity to 368595MB.
   c. Assign drive letter "L" to the volume. Do not format the volume.
8. Create the Windows Striped (RAID 0) volume for ASU 2.
   a. Select all sixteen volumes.
   b. Set capacity to 368595MB.
   c. Assign drive letter "M" to the volume. Do not format the volume.
9. Reboot all four host systems.
10. After reboot completes, start Disk Administrator on each of the host systems.
11. Import foreign disks, or reactivate the Windows stripe sets as necessary. On each host, assign drive letters to the stripe sets as they were assigned in steps 6, 7, and 8.

SPC1_XBB2_16_8plus8r1_128kseg_16tray

```
/* 08/28/09 - 16 8+8 drive groups */

create volume drives[ 10,1 10,2  30,1 30,2  50,1 50,2  70,1 70,2  10,3 10,4  30,3
30,4  50,3 50,4  70,3 70,4 ]
RAIDLevel=1
segmentSize=128
userLabel="LUN_0"
volumeGroupUserLabel="VolumeGroup_0"
capacity=899 gb
owner = A;

create volume drives[ 10,5 10,6  30,5 30,6  50,5 50,6  70,5 70,6  10,7 10,8  30,7
30,8  50,7 50,8  70,7 70,8 ]
RAIDLevel=1
segmentSize=128
userLabel="LUN_1"
volumeGroupUserLabel="VolumeGroup_1"
capacity=899 gb
owner = A;

create volume drives[ 10,9 10,10  30,9 30,10  50,9 50,10  70,9 70,10  10,11 10,12
30,11 30,12  50,11 50,12  70,11 70,12 ]
RAIDLevel=1
segmentSize=128
userLabel="LUN_2"
volumeGroupUserLabel="VolumeGroup_2"
capacity=899 gb
owner = A;

create volume drives[ 10,13 10,14  30,13 30,14  50,13 50,14  70,13 70,14  10,15
10,16  30,15 30,16  50,15 50,16  70,15 70,16 ]
RAIDLevel=1
segmentSize=128
userLabel="LUN_3"
volumeGroupUserLabel="VolumeGroup_3"
capacity=899 gb
owner = A;

create volume drives[ 11,1 11,2  31,1 31,2  51,1 51,2  71,1 71,2  11,3 11,4  31,3
31,4  51,3 51,4  71,3 71,4 ]
RAIDLevel=1
segmentSize=128
userLabel="LUN_4"
volumeGroupUserLabel="VolumeGroup_4"
capacity=899 gb
owner = A;

create volume drives[ 11,5 11,6  31,5 31,6  51,5 51,6  71,5 71,6  11,7 11,8  31,7
31,8  51,7 51,8  71,7 71,8 ]
RAIDLevel=1
segmentSize=128
userLabel="LUN_5"
volumeGroupUserLabel="VolumeGroup_5"
capacity=899 gb
owner = A;

create volume drives[ 11,9 11,10  31,9 31,10  51,9 51,10  71,9 71,10  11,11 11,12
31,11 31,12  51,11 51,12  71,11 71,12 ]
RAIDLevel=1
```

```
segmentSize=128
userLabel="LUN_6"
volumeGroupUserLabel="VolumeGroup_6"
capacity=899 gb
owner = A;

create volume drives[ 11,13 11,14  31,13 31,14  51,13 51,14  71,13 71,14  11,15
11,16  31,15 31,16  51,15 51,16  71,15 71,16 ]
RAIDLevel=1
segmentSize=128
userLabel="LUN_7"
volumeGroupUserLabel="VolumeGroup_7"
capacity=899 gb
owner = A;

create volume drives[ 20,1 20,2  40,1 40,2  60,1 60,2  80,1 80,2  20,3 20,4  40,3
40,4  60,3 60,4  80,3 80,4 ]
RAIDLevel=1
segmentSize=128
userLabel="LUN_8"
volumeGroupUserLabel="VolumeGroup_8"
capacity=899 gb
owner = b;

create volume drives[ 20,5 20,6  40,5 40,6  60,5 60,6  80,5 80,6  20,7 20,8  40,7
40,8  60,7 60,8  80,7 80,8 ]
RAIDLevel=1
segmentSize=128
userLabel="LUN_9"
volumeGroupUserLabel="VolumeGroup_9"
capacity=899 gb
owner = b;

create volume drives[ 20,9 20,10  40,9 40,10  60,9 60,10  80,9 80,10  20,11 20,12
40,11 40,12  60,11 60,12  80,11 80,12 ]
RAIDLevel=1
segmentSize=128
userLabel="LUN_10"
volumeGroupUserLabel="VolumeGroup_10"
capacity=899 gb
owner = b;

create volume drives[ 20,13 20,14  40,13 40,14  60,13 60,14  80,13 80,14  20,15
20,16  40,15 40,16  60,15 60,16  80,15 80,16 ]
RAIDLevel=1
segmentSize=128
userLabel="LUN_11"
volumeGroupUserLabel="VolumeGroup_11"
capacity=899 gb
owner = b;

create volume drives[ 21,1 21,2  41,1 41,2  61,1 61,2  81,1 81,2  21,3 21,4  41,3
41,4  61,3 61,4  81,3 81,4 ]
RAIDLevel=1
segmentSize=128
userLabel="LUN_12"
volumeGroupUserLabel="VolumeGroup_12"
capacity=899 gb
owner = b;

create volume drives[ 21,5 21,6  41,5 41,6  61,5 61,6  81,5 81,6  21,7 21,8  41,7
41,8  61,7 61,8  81,7 81,8 ]
RAIDLevel=1
```

```
segmentSize=128
userLabel="LUN_13"
volumeGroupUserLabel="VolumeGroup_13"
capacity=899 gb
owner = b;

create volume drives[ 21,9 21,10  41,9 41,10  61,9 61,10  81,9 81,10  21,11 21,12
41,11 41,12  61,11 61,12  81,11 81,12 ]
RAIDLevel=1
segmentSize=128
userLabel="LUN_14"
volumeGroupUserLabel="VolumeGroup_14"
capacity=899 gb
owner = b;

create volume drives[ 21,13 21,14  41,13 41,14  61,13 61,14  81,13 81,14  21,15
21,16  41,15 41,16  61,15 61,16  81,15 81,16 ]
RAIDLevel=1
segmentSize=128
userLabel="LUN_15"
volumeGroupUserLabel="VolumeGroup_15"
capacity=899 gb
owner = b;

set volume["LUN_0"]  mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;
set volume["LUN_1"]  mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;
set volume["LUN_2"]  mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;
set volume["LUN_3"]  mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;
set volume["LUN_4"]  mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;
set volume["LUN_5"]  mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;
set volume["LUN_6"]  mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;
set volume["LUN_7"]  mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;
set volume["LUN_8"]  mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;
set volume["LUN_9"]  mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;
set volume["LUN_10"] mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;
set volume["LUN_11"] mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;
set volume["LUN_12"] mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;
set volume["LUN_13"] mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;
set volume["LUN_14"] mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;
set volume["LUN_15"] mirrorEnabled = True writeCacheEnabled = True
cacheWithoutBatteryEnabled = True readAheadMultiplier = 0;

set storageArray cacheBlockSize  = 16;
set storageArray cacheFlushStart = 50 cacheFlushStop  = 50;

set storageArray defaultHostType = "Windows 2000/Server 2003/Server 2008 Non-
Clustered";
```

```
set controller[a] HostNVSRAMByte[0x01, 0x17]=0x01;
set controller[b] HostNVSRAMByte[0x01, 0x17]=0x01;

/* Setup for RDAC failover environment */

set controller[a] HostNVSRAMByte[0x00, 0x24]=0x00;
set controller[a] HostNVSRAMByte[0x01, 0x24]=0x00;
set controller[a] HostNVSRAMByte[0x02, 0x24]=0x00;
set controller[a] HostNVSRAMByte[0x03, 0x24]=0x00;
set controller[a] HostNVSRAMByte[0x04, 0x24]=0x00;
set controller[a] HostNVSRAMByte[0x05, 0x24]=0x00;
set controller[a] HostNVSRAMByte[0x06, 0x24]=0x00;
set controller[a] HostNVSRAMByte[0x07, 0x24]=0x00;
set controller[a] HostNVSRAMByte[0x08, 0x24]=0x00;
set controller[a] HostNVSRAMByte[0x09, 0x24]=0x00;
set controller[a] HostNVSRAMByte[0x0a, 0x24]=0x00;
set controller[a] HostNVSRAMByte[0x0b, 0x24]=0x00;
set controller[a] HostNVSRAMByte[0x0c, 0x24]=0x00;
set controller[a] HostNVSRAMByte[0x0d, 0x24]=0x00;
set controller[a] HostNVSRAMByte[0x0e, 0x24]=0x00;
set controller[a] HostNVSRAMByte[0x0f, 0x24]=0x00;

set controller[b] HostNVSRAMByte[0x00, 0x24]=0x00;
set controller[b] HostNVSRAMByte[0x01, 0x24]=0x00;
set controller[b] HostNVSRAMByte[0x02, 0x24]=0x00;
set controller[b] HostNVSRAMByte[0x03, 0x24]=0x00;
set controller[b] HostNVSRAMByte[0x04, 0x24]=0x00;
set controller[b] HostNVSRAMByte[0x05, 0x24]=0x00;
set controller[b] HostNVSRAMByte[0x06, 0x24]=0x00;
set controller[b] HostNVSRAMByte[0x07, 0x24]=0x00;
set controller[b] HostNVSRAMByte[0x08, 0x24]=0x00;
set controller[b] HostNVSRAMByte[0x09, 0x24]=0x00;
set controller[b] HostNVSRAMByte[0x0a, 0x24]=0x00;
set controller[b] HostNVSRAMByte[0x0b, 0x24]=0x00;
set controller[b] HostNVSRAMByte[0x0c, 0x24]=0x00;
set controller[b] HostNVSRAMByte[0x0d, 0x24]=0x00;
set controller[b] HostNVSRAMByte[0x0e, 0x24]=0x00;
set controller[b] HostNVSRAMByte[0x0f, 0x24]=0x00;
```

APPENDIX D: SPC-1 WORKLOAD GENERATOR STORAGE COMMANDS AND PARAMETERS

The content of SPC-1 Workload Generator command and parameter file, used in this benchmark to execute the Primary Metrics and Repeatability Tests, is listed below.

```
* spc1_iops.cfg

host=master
slaves=(bm3650a_s1,bm3650a_s2,bm3650a_s3,bm3650a_s4,bm3650b_s1,bm3650b_s2,bm
3650b_s3,bm3650b_s4,bm3650c_s1,bm3650c_s2,bm3650c_s3,bm3650c_s4,bm3650d_s1,b
m3650d_s2,bm3650d_s3,bm3650d_s4)

javaparms="-Xmx512m -Xms512m"

sd=asu1_1,lun=\\.\L:,size=6183997931520
sd=asu2_1,lun=\\.\M:,size=6183997931520
sd=asu3_1,lun=\\.\N:,size=1374221762560

eof
```

The content of SPC-1 Workload Generator command and parameter file, used in this benchmark to execute the Persistence Test, is listed below.

```
* spc1_persist.cfg

javaparms="-Xmx512m -Xms512m"

sd=asu1_1,lun=\\.\L:,size=6183997931520
sd=asu2_1,lun=\\.\M:,size=6183997931520
sd=asu3_1,lun=\\.\N:,size=1374221762560

eof
```

APPENDIX E: SPC-1 WORKLOAD GENERATOR INPUT PARAMETERS

Primary Metrics Test, Repeatability Test, and Persistence Test Run 1

The following script was used to execute the Primary Metrics Test *(Sustainability Test Phase, IOPS Test Phase, and Response Time Ramp Test Phase)*, Repeatability Test *(Repeatability Test Phase 1 and Repeatability Test Phase 2)*, and Persistence Test Run 1 in an uninterrupted sequence.

```
copy /Y spc1_iops.cfg spc1.cfg

java -Xmx640m -Xms640m metrics -b 1245 -s 300

java -Xmx640m -Xms640m repeat1 -b 1245 -s 300

java -Xmx640m -Xms640m repeat2 -b 1245 -s 300

copy /Y spc1_persist.cfg spc1.cfg

java -Xmx640m -Xms640m persist1 -b 1245

java -Xmx640m -Xms640m persist2
```

Persistence Test Run 2

The following script was used to execute Persistence Test Run 2.

```
rem copy /Y spc1_iops.cfg spc1.cfg

rem java -Xmx640m -Xms640m metrics -b 1245 -s 300

rem java -Xmx640m -Xms640m repeat1 -b 1245 -s 300

rem java -Xmx640m -Xms640m repeat2 -b 1245 -s 300

rem copy /Y spc1_persist.cfg spc1.cfg

rem java -Xmx640m -Xms640m persist1 -b 1245

java -Xmx640m -Xms640m persist2
```

Slave JVM Initiation

Each of the four Slave JVMs on each Host System was initiated by a command and corresponding parameter file. An example of the command and corresponding parameter file appear below. The Slave designation (slave1, slave2, etc.) and Host System designation (bm3650a, bm3650b, etc.) is differs appropriately in each specific pair of files.

Slave1.cmd

```
java –Xmx256m –Xms256m spc1 –fslave1.parm
```

Slave1.parm

```
*slave1.parm

host=bm3650a_s1
master=bm3650b

sd=asu1_1,lun=\\.\L:
sd=asu2_1,lun=\\.\M:
sd=asu3_1,lun=\\.\N:

eof
```