SPC BENCHMARK 1™
FULL DISCLOSURE REPORT

SILICON GRAPHICS INTERNATIONAL CORP.
SGI® INFINITESTORAGE 5000-SP

SPC-1 V1.12

Submitted for Review: January 31, 2011
Submission Identifier: A00102

First Edition – January 2011

Trademarks

Table of Contents

AUDIT CERTIFICATION

Jerry Lohr
Silicon Graphics International Corp.
4660 Landing Parkway
Fremont, CA 94538

January 28, 2011

The SPC Benchmark 1™ results listed below for the SGI® InfiniteStorage 5000 SP 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: SGI® InfiniteStorage 5000 SP	
Metric	**Reported Result**
SPC-1 IOPS™	24,555.54
SPC-1 Price-Performance	$3.61/SPC-1 IOPS™
Total ASU Capacity	6,706.440 GB
Data Protection Level	Protected *(Mirroring)*
Total TSC Price (including three-year maintenance)	$88,530.00

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 Silicon Graphics International Corp.:
  - ✓ 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.

Storage Performance Council
643 Bair Island Road, Suite 103
Redwood City, CA 94062
AuditService@storageperformance.org
650.556.9384

AUDIT CERTIFICATION *(CONT.)*

- The following Host System requirements, based on information supplied by Silicon Graphics International Corp.:
  - ✓ 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 the Host System.
  - ✓ The TSC boundary within the Host System.
- The Test Results Files and resultant Summary Results Files received from Silicon Graphics International Corp. 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
- There were no differences between the Tested Storage Configuration and the Priced Storage Configuration.
- 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

Walter E. Baker
SPC Auditor

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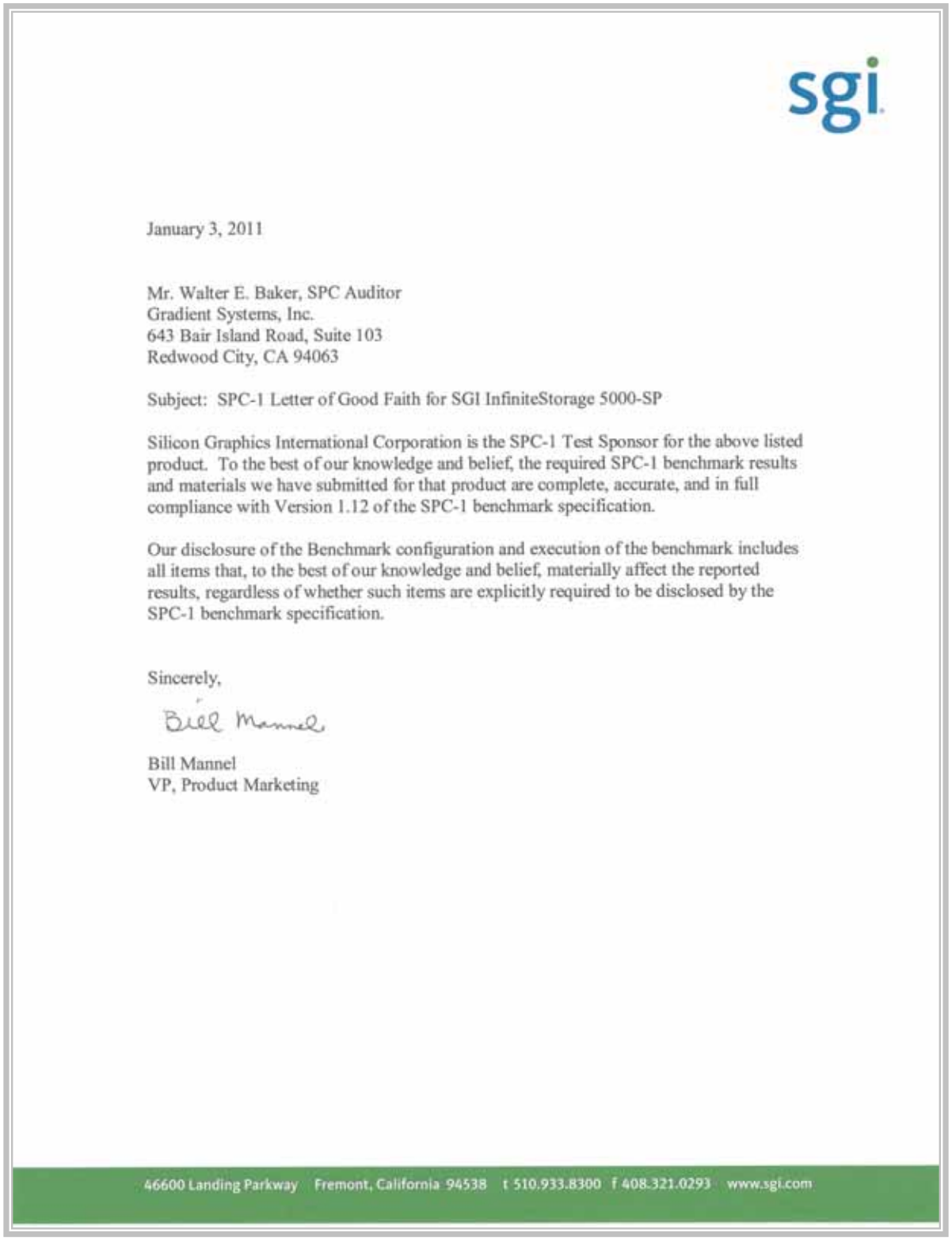
LETTER OF GOOD FAITH



January 3, 2011

Mr. Walter E. Baker, SPC Auditor
Gradient Systems, Inc.
643 Bair Island Road, Suite 103
Redwood City, CA 94063

Subject: SPC-1 Letter of Good Faith for SGI InfiniteStorage 5000-SP

Silicon Graphics International Corporation is the SPC-1 Test Sponsor for the above listed product. To the best of our knowledge and belief, the required SPC-1 benchmark results and materials we have submitted for that product are complete, accurate, and in full compliance with Version 1.12 of the SPC-1 benchmark specification.

Our disclosure of the Benchmark configuration and execution of the benchmark includes all items that, to the best of our knowledge and belief, materially affect the reported results, regardless of whether such items are explicitly required to be disclosed by the SPC-1 benchmark specification.

Sincerely,

Bill Mannel

Bill Mannel
VP, Product Marketing

46600 Landing Parkway Fremont, California 94538 t 510.933.8300 f 408.321.0293 www.sgi.com

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

Test Sponsor and Contact Information	
Test Sponsor Primary Contact	Silicon Graphics International Corp. – http://www.sgi.com Jerry Lohr – glohr@sgi.com 46600 Landing Parkway Fremont, CA 94538 Phone: (510) 933-5238 FAX: (510) 933-5121
Test Sponsor Alternate Contact	Silicon Graphics International Corp. – http://www.sgi.com Kurt Kuckein – kuckein@sgi.com 46600 Landing Parkway Fremont, CA 94538 Phone: (510) 933-5336 FAX: (510) 933-5121
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	January 31, 2011
Date the FDR was submitted to the SPC	January 31, 2011
Date the priced storage configuration is available for shipment to customers	currently available
Date the TSC completed audit certification	January 28, 2011

Tested Storage Product (TSP) Description

IS5000-SP is the newest addition to a complete selection of SGI storage hardware and software solutions, and the first to employ 6 Gb/s SAS technology. The system provides customers with improved performance and scalability, multi-protocol host connectivity, flexible drive support, and advanced energy saving and data security features. Delivering a balanced mix of IOPS and throughput, IS5000 provides sustainable performance that is a considerable improvement over previous generation technology. With the optional High Performance Feature Key, the IS5000 is equally adept at delivering throughput to bandwidth-intensive and IOPS demanding applications.

Summary of Results

SPC-1 Results	
Tested Storage Configuration (TSC) Name: SGI® InfiniteStorage 5000-SP	
Metric	**Reported Result**
SPC-1 IOPS™	24,555.54
SPC-1 Price-Performance	$3.61/SPC-1 IOPS™
Total ASU Capacity	6,543.785 GB
Data Protection Level	Protected *(Mirroring)*
Total TSC Price (including three-year maintenance)	$88,530.00

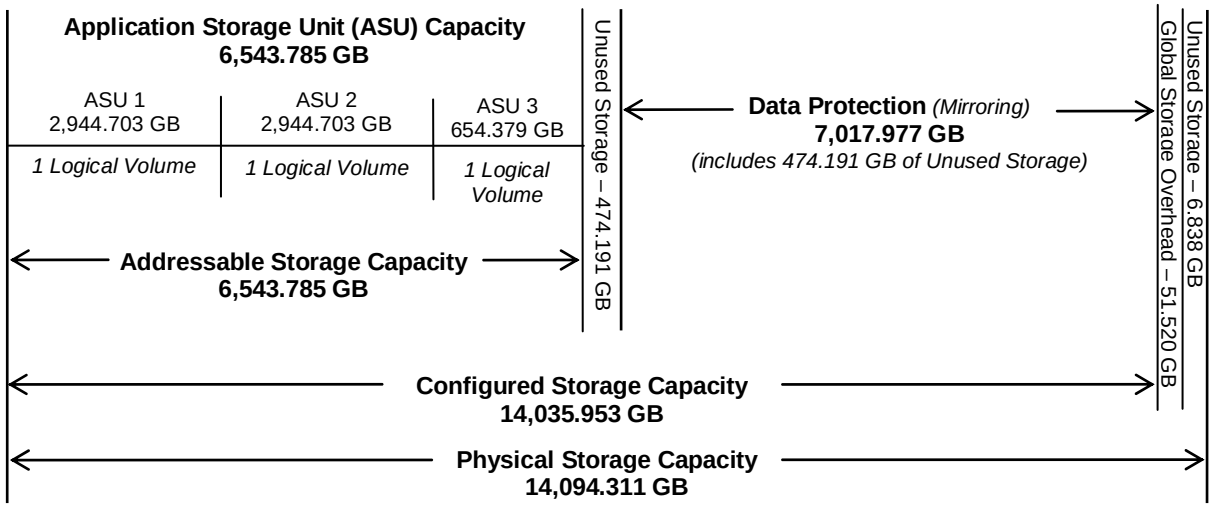
SPC-1 IOPS™ represents the maximum I/O Request Throughput at the 100% load point.

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	46.43%
Protected Application Utilization	92.86%
Unused Storage Ratio	6.78%

Application Utilization: Total ASU Capacity *(6,543.785 GB)* divided by Physical Storage Capacity *(14,094.311 GB)*

Protected Application Utilization: Total ASU Capacity *(6,543.785 GB)* plus total Data Protection Capacity *(7,017.977 GB)* minus unused Data Protection Capacity *(474.191 GB)* divided by Physical Storage Capacity *(14,094.311 GB)*

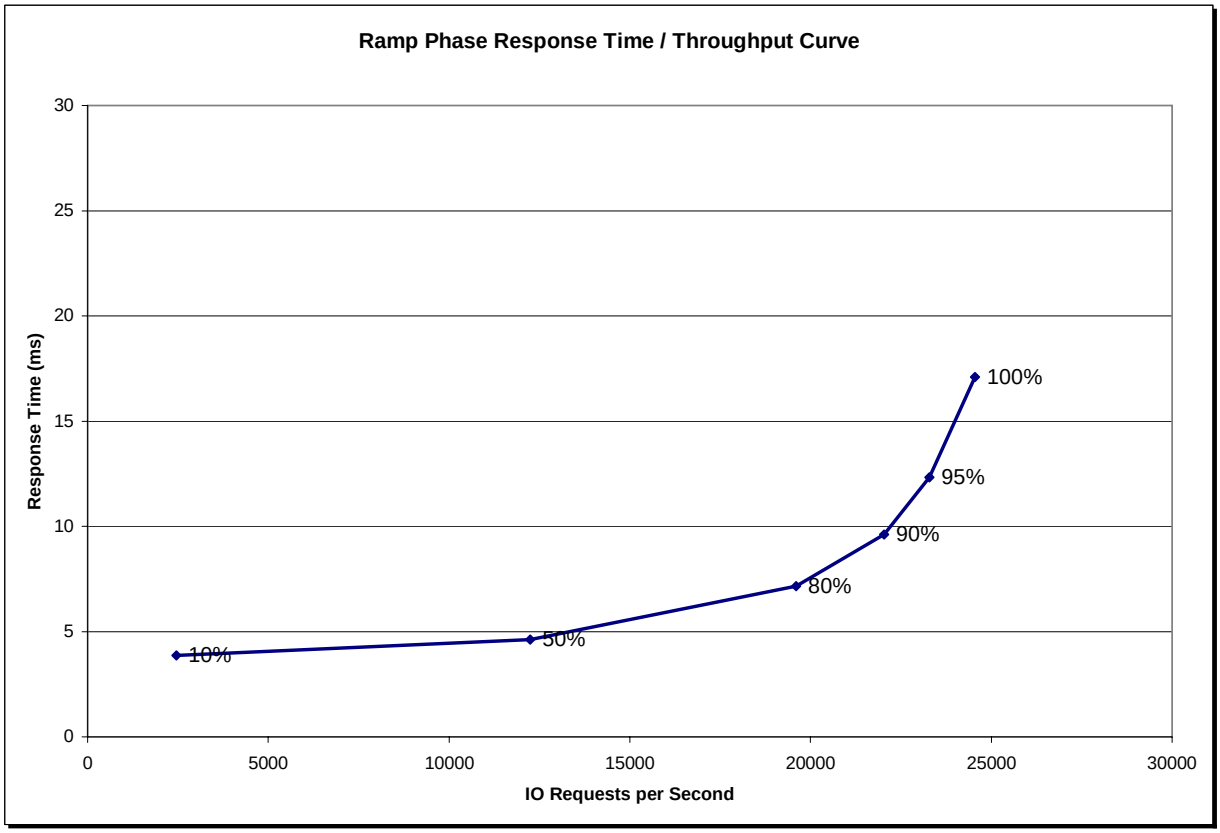
Unused Storage Ratio: Total Unused Capacity *(955.220 GB)* divided by Physical Storage Capacity *(14,094.311 GB)* and may not exceed 45%.

Detailed information for the various storage capacities and utilizations is available on pages 21-22 in the Full Disclosure Report.

Response Time – Throughput Curve

The Response Time-Throughput Curve illustrates the Average Response Time (milliseconds) and I/O Request Throughput at 100%, 95%, 90%, 80%, 50%, and 10% of the workload level used to generate the SPC-1 IOPS™ metric.

The Average Response Time measured at 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	2,452.87	12,239.88	19,601.75	22,039.02	23,291.47	24,555.54
Average Response Time (ms):						
All ASUs	3.86	4.63	7.16	9.61	12.32	17.11
ASU-1	4.06	6.12	8.94	11.24	13.64	17.84
ASU-2	4.60	6.15	10.70	14.54	18.58	24.63
ASU-3	3.12	0.79	1.85	3.97	6.80	12.27
Reads	6.39	10.58	15.48	18.56	21.34	25.58
Writes	2.22	0.75	1.75	3.78	6.46	11.59

Priced Storage Configuration Pricing

Part Number	Description	Quantity	Unit Price	Ext. Price	Support Price	Ext. Support
PCIE-6G-SAS-8E	6Gb SAS PCIE HBA with two x4 Mini-SAS external connectors	2	$815.00	$1,630.00	$0.00	$0.00
X-SAS-2M-Z	2 meter SAS cable, MiniSAS to MiniSAS	4	$170.00	$680.00	N/A	N/A
SP13005	Universal rail kit for IS220 and IS5000 12-bay and 24-bay drive modules, 23.5"-32.5"	4	$200.00	$800.00	$0.00	$0.00
SP10034	IS5024-SP - Simplex Four 6Gbps SAS ports, 1 dual-ported Host Interface Card, 2 GB cache	1	$7,790.00	$7,790.00	$2,405.00	$2,405.00
SP10035	FACTORY ADD: SECOND IS5000-SP RAID Controller, Four 6Gbps SAS ports 1 dual-ported Host Interface Card, 2 GB cache	1	$3,700.00	$3,700.00	$1,161.00	$1,161.00
SP12047	Premium feature key, IS5000-SP: Base to "Hyper" Performance (96disks)	1	$6,500.00	$6,500.00	$4,172.00	$4,172.00
SP10048	24-bay drive module for IS5000-SP - DUPLEX: SAS ESM for dual controller with 2 SAS cables	3	$4,695.00	$14,085.00	$2,074.00	$6,222.00
SP11068	146 GB 10K SAS Disk for IS5000-SP	96	$390.00	$37,440.00	$0.00	$0.00
SP12044	SANTRICITY ES 10.7xFOR WINDOWS	1	$1,175.00	$1,175.00	$770.00	$770.00
FEX7X24-EW3	FULLEXPRESS 7X24 3-YR EXTENDED WARR	1	$0.00	$0.00		
Totals				***$73,800.00***		***$14,730.00***

Grand Total **$88,530.00**

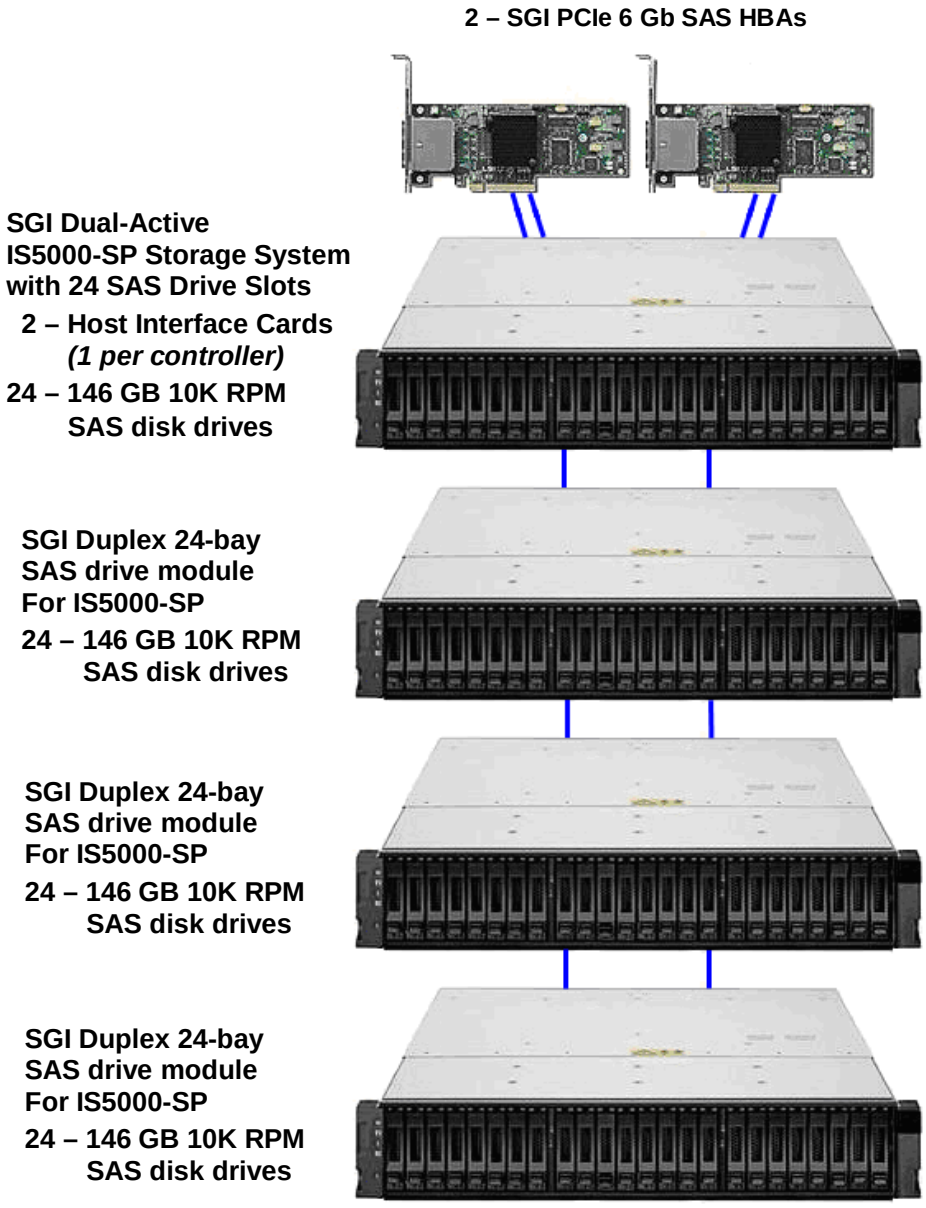
The above pricing includes hardware maintenance and software support for three years, 7 days per week, 24 hours per day. The hardware maintenance and software support provides the following:

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

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

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

Priced Storage Configuration Diagram



Priced Storage Configuration Components

Priced Storage Configuration
2 – SGI PCIe 6 Gb SAS dual-ported HBAs
Santricity ES 10.7x for Windows
SGI® InfiniteStorage 5000-SP Storage System **SGI IS5000-SP dual controllers with:** 2 GB cache per controller *(4 GB total)* High Performance Tier Enabled 2 – Host Interface Cards (HIC) *(1 HIC/controller)* *(2 – 6 GB SAS host connections per HIC, 4 total, 4 used)* 2 – 6 Gb SAS baseboard host connections per controller *(4 total, 0 used))* 1 – 6 Gb SAS drive connections per controller *(2 total, 2 used)*
4 – 2m SAS cables
3 – SGI 24-bay drive module for IS5000-SP – DUPLEX each drive module includes 2 SAS cables
96 – 146 GB 10K RPM SAS disk drives 24 disk drives in the base unit 24 disk drives in each 24-bay drive module

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 18 *(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 storage network configuration is illustrated on page 18 *(Benchmark Configuration/Tested Storage Configuration Diagram).*

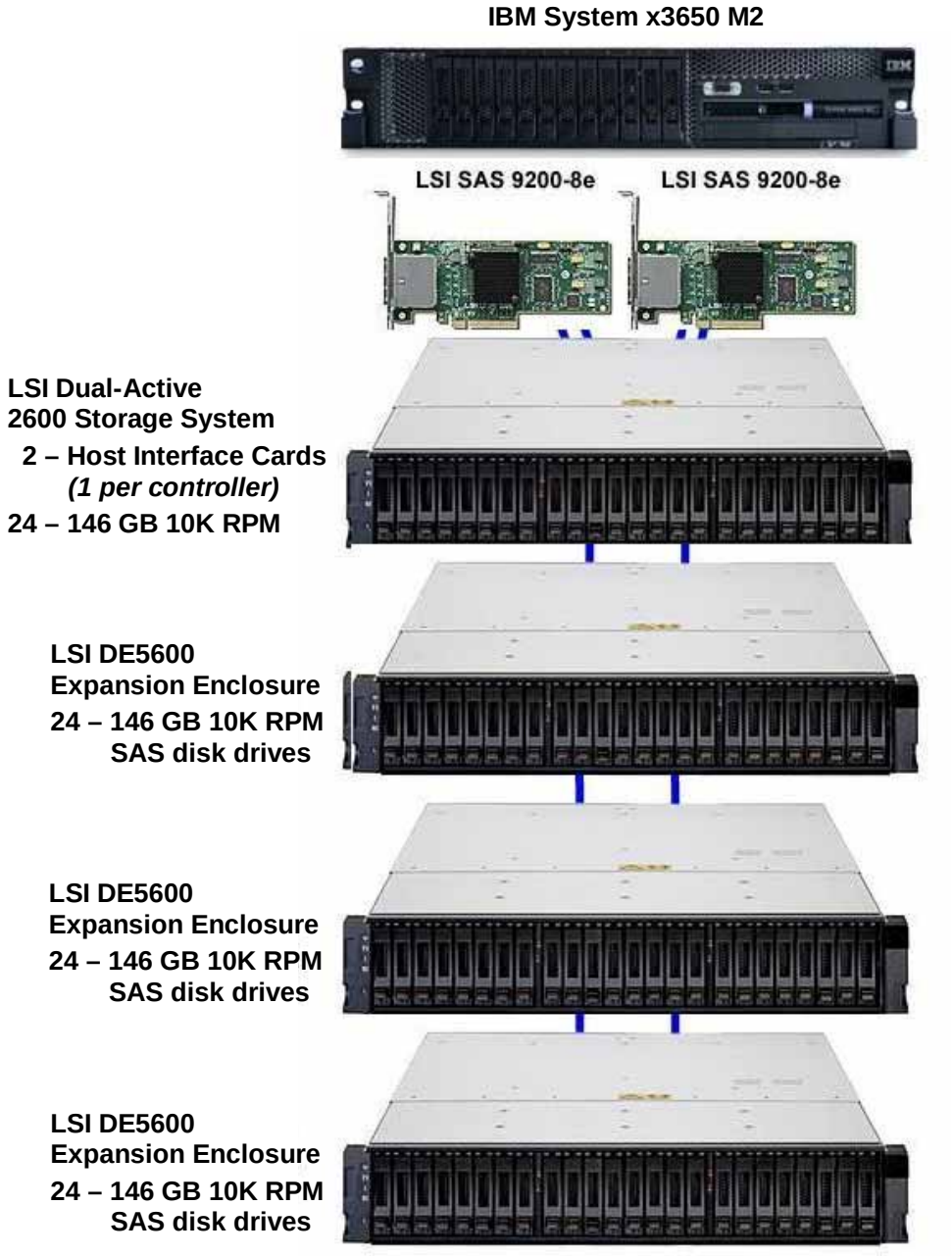
Host System and Tested Storage Configuration (TSC) Table of Components

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 19 *(Host System(s) and Tested Storage Configuration Components).*

Benchmark Configuration/Tested Storage Configuration Diagram



Host System(s) and Tested Storage Configuration Components

Host System:	Tested Storage Configuration (TSC):
IBM System x3650 M2	2 – LSI 9200-8e 6Gb SAS HBAs *(dual-ported)*
2 – 2.8 GHz Dual Xeon Processors with 8 MB L2 cache/CPU	**LSI 26000 Storage System** **2 – LSI 2660 SAS dual-active controllers with:** 2 GB cache per controller *(4 GB total)* High Performance Tier enabled 2 – Host Interface Cards (HIC) *(1 HIC/controller)* *(2 – 6 GB SAS host connections per HIC, 4 total, 4 used)* 2 – 6 Gb SAS baseboard host connections per controller *(4 total, 0 used)* 1 – 6 Gb SAS drive connections per controller *(2 total, 2 used)*
12 GB main memory	10 – 1m SAS cables
Windows Server 2003 Enterprise Edition with SP2	3 – LSI DE5600 24-slot expansion units
PCIe	96 – 146 GB 10K RPM SAS disk drives 24 disk drives in the base unit 24 disk drives in each expansion unit

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 63 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 70.

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 59 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)	6,543.785
Addressable Storage Capacity	Gigabytes (GB)	6,543.785
Configured Storage Capacity	Gigabytes (GB)	14,035.953
Physical Storage Capacity	Gigabytes (GB)	14,094.311
Data Protection *(Mirroring)*	Gigabytes (GB)	7,017.977
Required Storage	Gigabytes (GB)	0.000
Global Storage Overhead	Gigabytes (GB)	51.520
Total Unused Storage	Gigabytes (GB)	955.220

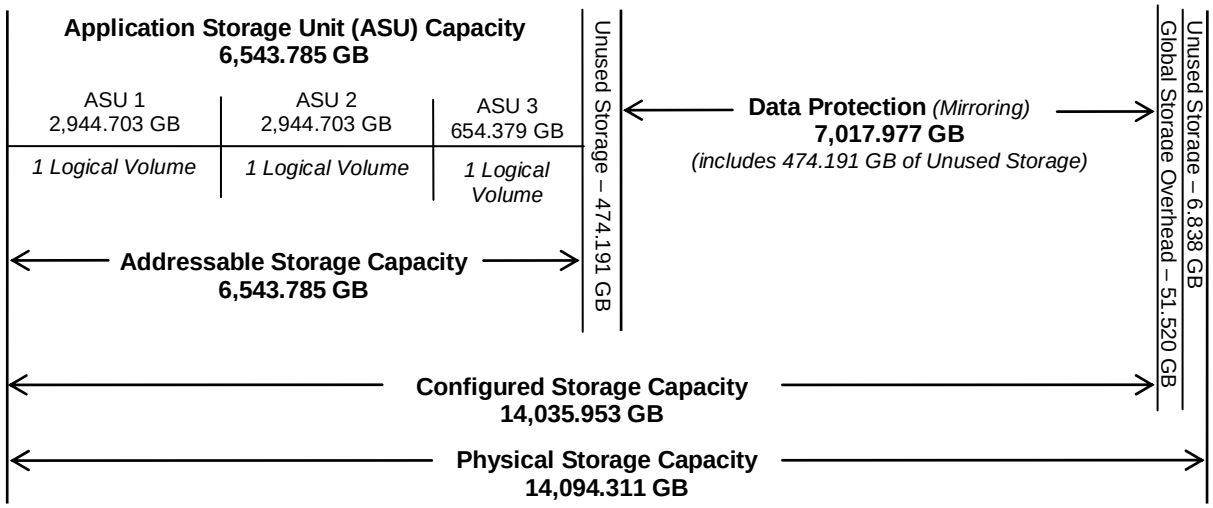
SPC-1 Storage Hierarchy Ratios

	Addressable Storage Capacity	**Configured Storage Capacity**	**Physical Storage Capacity**
Total ASU Capacity	100.00%	46.62%	46.43%
Required for Data Protection *(Mirrored)*		50.00%	49.79%
Addressable Storage Capacity		46.62%	46.43%
Required Storage		0.00%	0.00%
Configured Storage Capacity			99.59%
Global Storage Overhead			0.37%
Unused Storage:			
Addressable	0.00%		
Configured		6.76%	
Physical			0.05%

The Physical Storage Capacity consisted of 14,094.311 GB distributed over 96 disk drives each with a formatted capacity of 146.816 GB. There was 6.838 GB (0.05%) of Unused Storage within the Physical Storage Capacity. Global Storage Overhead consisted of 51.520 GB (0.37%) of Physical Storage Capacity. There was 948.382 GB (6.76%) of Unused Storage within the Configured Storage Capacity. The Total ASU Capacity utilized 100.00% of the Addressable Storage Capacity resulting in 0.000 GB (0.00%) of Unused Storage within the Addressable Storage Capacity. The Data Protection *(mirroring)* capacity was 7,017.977 GB of which 6,543.785 GB was utilized. The total Unused Storage was 955.220 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 (2,944.703 GB)	**ASU-2 (2,944.703 GB)**	**ASU-3 (654.379 GB)**
1 Logical Volume 2,944.703 GB per Logical Volume (2,944.703 GB used per Logical Volume)	1 Logical Volume 2,944.703 GB per Logical Volume (2,944.703 GB used per Logical Volume)	1 Logical Volume 654.379 GB per Logical Volume (654.379 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	46.43%
Protected Application Utilization	92.96%
Unused Storage Ratio	6.78%

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 60 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 71.

Sustainability Test Results File

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

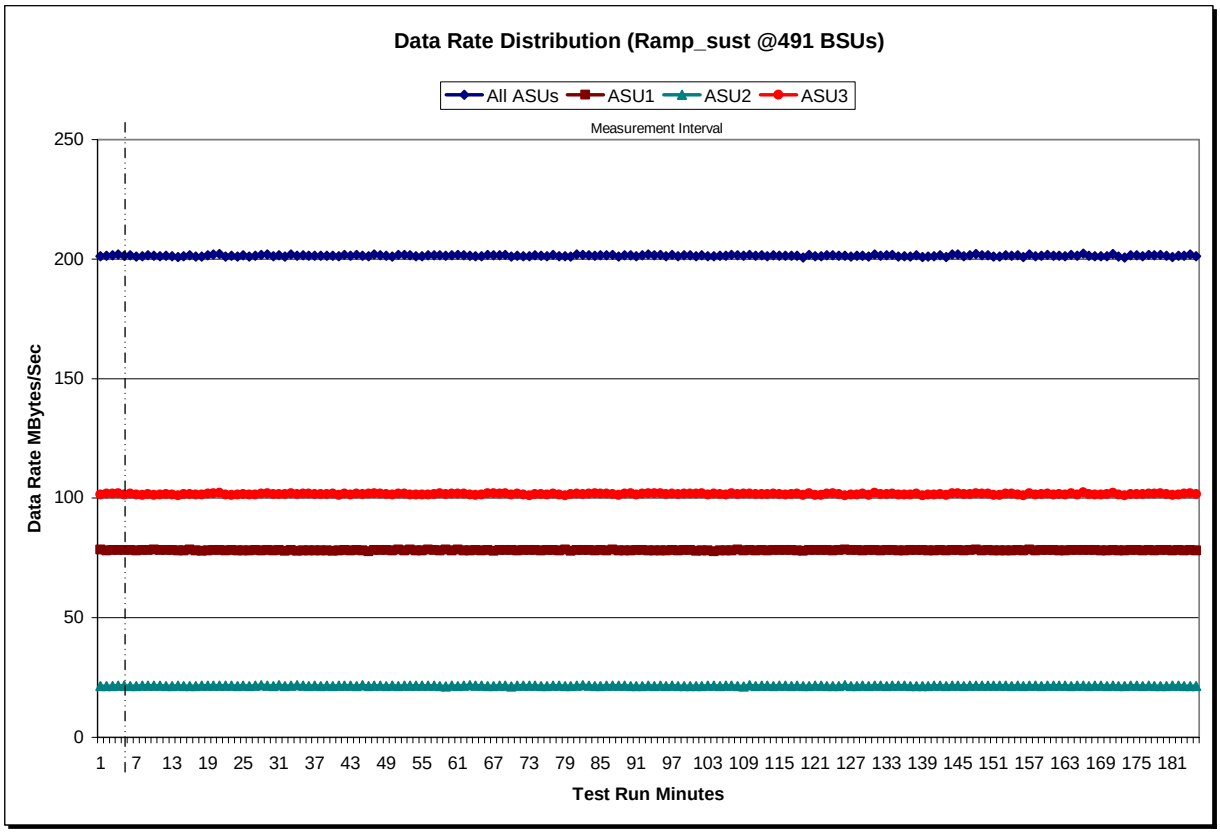
Sustainability Test Results File

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

	Start	Stop	Interval	Duration
Ramp-Up/Start-Up	14:35:58	14:40:58	0-4	0:05:00
Measurement Interval	14:40:58	17:40:58	4-184	3:00:00

Interval	All ASUs	ASU1	ASU2	ASU3	Interval	All ASUs	ASU1	ASU2	ASU3	Interval	All ASUs	ASU1	ASU2	ASU3
0	201.30	78.38	21.45	101.47	63	201.20	78.28	21.56	101.36	126	201.13	78.23	21.45	101.45
1	201.37	78.11	21.47	101.79	64	201.28	78.14	21.62	101.52	127	201.38	78.37	21.44	101.57
2	201.59	78.31	21.45	101.83	65	201.76	78.28	21.50	101.99	128	201.42	78.09	21.53	101.80
3	201.96	78.30	21.65	102.02	66	201.60	77.98	21.48	102.14	129	201.11	78.31	21.44	101.36
4	201.38	78.37	21.58	101.42	67	201.65	78.30	21.54	101.81	130	201.99	78.24	21.61	102.14
5	201.60	78.25	21.41	101.94	68	201.82	78.21	21.56	102.05	131	201.37	78.16	21.55	101.67
6	201.06	78.13	21.46	101.47	69	201.02	78.27	21.30	101.44	132	201.54	78.29	21.50	101.75
7	201.17	78.23	21.56	101.39	70	201.48	78.05	21.55	101.89	133	201.72	78.29	21.53	101.90
8	201.51	78.27	21.56	101.68	71	201.29	78.30	21.51	101.48	134	201.13	78.09	21.51	101.53
9	201.35	78.39	21.55	101.41	72	201.16	78.35	21.59	101.22	135	201.23	78.13	21.55	101.55
10	201.30	78.25	21.51	101.54	73	201.61	78.33	21.52	101.76	136	201.05	78.21	21.39	101.46
11	201.38	78.23	21.50	101.65	74	201.34	78.14	21.44	101.76	137	201.64	78.28	21.47	101.90
12	201.18	78.27	21.42	101.48	75	201.29	78.35	21.41	101.52	138	200.85	78.24	21.37	101.24
13	200.92	78.18	21.65	101.09	76	201.78	78.36	21.56	101.86	139	201.11	78.19	21.36	101.57
14	201.29	78.19	21.49	101.61	77	201.27	78.18	21.51	101.58	140	201.27	78.16	21.57	101.54
15	201.58	78.49	21.35	101.75	78	201.18	78.52	21.46	101.20	141	201.52	78.35	21.56	101.61
16	200.96	78.07	21.41	101.48	79	200.98	77.95	21.41	101.62	142	200.91	78.15	21.45	101.31
17	201.03	78.01	21.52	101.50	80	201.89	78.38	21.67	101.84	143	201.95	78.23	21.63	102.10
18	201.59	78.18	21.51	101.90	81	201.69	78.30	21.70	101.69	144	201.95	78.33	21.58	102.04
19	201.94	78.28	21.64	102.02	82	201.67	78.25	21.60	101.82	145	201.27	78.06	21.50	101.72
20	202.06	78.28	21.57	102.22	83	201.49	78.04	21.43	102.02	146	201.59	78.24	21.58	101.77
21	201.12	78.06	21.63	101.43	84	201.61	78.28	21.49	101.84	147	202.09	78.54	21.56	101.99
22	201.32	78.35	21.56	101.41	85	201.57	78.09	21.57	101.90	148	201.60	78.04	21.62	101.94
23	201.09	78.19	21.33	101.56	86	201.76	78.49	21.56	101.70	149	201.67	78.33	21.52	101.82
24	201.52	78.18	21.56	101.78	87	200.99	78.06	21.58	101.35	150	201.06	78.15	21.65	101.26
25	201.00	78.13	21.40	101.47	88	201.56	78.05	21.62	101.89	151	201.10	78.16	21.62	101.32
26	201.35	78.29	21.51	101.56	89	201.67	78.19	21.44	102.04	152	201.65	78.18	21.65	101.82
27	201.71	78.12	21.73	101.87	90	201.22	78.31	21.42	101.49	153	201.35	78.07	21.47	101.80
28	202.00	78.37	21.66	101.97	91	201.53	78.24	21.44	101.85	154	201.61	78.35	21.67	101.59
29	201.23	78.10	21.44	101.69	92	201.87	78.15	21.58	102.13	155	200.92	78.20	21.49	101.24
30	201.65	78.33	21.71	101.60	93	201.56	78.12	21.36	102.08	156	201.98	78.44	21.53	102.01
31	201.04	77.99	21.43	101.62	94	201.69	78.05	21.55	102.09	157	201.18	78.09	21.51	101.58
32	202.03	78.26	21.65	102.11	95	201.22	78.08	21.48	101.65	158	201.47	78.37	21.40	101.69
33	201.37	77.91	21.82	101.64	96	201.73	78.36	21.58	101.79	159	201.68	78.29	21.52	101.86
34	201.67	78.19	21.56	101.93	97	201.26	78.14	21.41	101.72	160	201.46	78.22	21.66	101.58
35	201.34	78.06	21.50	101.78	98	201.67	78.27	21.46	101.95	161	201.41	78.13	21.61	101.67
36	201.36	78.06	21.64	101.65	99	201.53	78.29	21.41	101.82	162	201.14	78.12	21.52	101.49
37	201.39	78.16	21.48	101.76	100	201.28	77.96	21.46	101.86	163	201.81	78.29	21.43	102.09
38	201.32	78.13	21.57	101.61	101	201.61	78.18	21.45	101.98	164	201.42	78.33	21.55	101.54
39	201.34	77.94	21.47	101.93	102	201.14	78.04	21.52	101.58	165	202.27	78.32	21.62	102.32
40	201.19	78.20	21.61	101.38	103	201.30	77.83	21.62	101.85	166	201.49	78.31	21.46	101.72
41	201.70	78.38	21.53	101.79	104	201.34	78.19	21.47	101.68	167	201.24	78.23	21.51	101.50
42	201.33	78.17	21.57	101.59	105	201.33	78.19	21.61	101.53	168	201.28	78.17	21.53	101.59
43	201.71	78.34	21.45	101.92	106	201.85	78.20	21.57	102.07	169	201.16	78.16	21.40	101.61
44	201.48	78.11	21.70	101.67	107	201.50	78.41	21.41	101.68	170	202.12	78.31	21.61	102.19
45	201.15	77.81	21.48	101.87	108	201.35	78.12	21.29	101.93	171	201.10	78.18	21.38	101.54
46	201.86	78.20	21.57	102.09	109	201.83	78.23	21.72	101.89	172	200.70	78.13	21.43	101.15
47	201.64	78.29	21.56	101.79	110	201.34	78.18	21.43	101.73	173	201.55	78.36	21.59	101.60
48	201.43	78.30	21.43	101.70	111	201.56	78.35	21.54	101.67	174	201.51	78.33	21.55	101.62
49	201.13	78.11	21.58	101.44	112	201.31	78.06	21.63	101.63	175	201.22	78.08	21.37	101.78
50	201.71	78.47	21.43	101.81	113	201.49	78.33	21.34	101.83	176	201.74	78.28	21.63	101.83
51	201.68	78.10	21.63	101.95	114	201.41	78.20	21.54	101.67	177	201.51	78.16	21.42	101.94
52	201.61	78.46	21.57	101.59	115	201.43	78.36	21.57	101.50	178	201.80	78.22	21.50	102.08
53	201.17	78.12	21.53	101.51	116	201.49	78.37	21.44	101.68	179	201.40	78.24	21.39	101.76
54	201.14	78.07	21.51	101.56	117	201.45	78.09	21.52	101.83	180	200.95	78.13	21.51	101.31
55	201.60	78.39	21.61	101.59	118	200.77	78.02	21.46	101.29	181	201.47	78.24	21.64	101.59
56	201.52	78.27	21.58	101.66	119	201.72	78.31	21.44	101.97	182	201.45	78.12	21.48	101.85
57	201.64	78.19	21.48	101.98	120	201.21	78.26	21.56	101.39	183	201.86	78.38	21.47	102.01
58	201.43	78.40	21.30	101.73	121	201.19	78.27	21.55	101.37	184	201.24	78.16	21.43	101.65
59	201.64	78.07	21.68	101.89	122	201.57	78.25	21.47	101.85					
60	201.69	78.46	21.41	101.83	123	201.54	78.07	21.42	102.05					
61	201.50	78.07	21.58	101.85	124	201.49	78.28	21.49	101.72					
62	201.47	78.18	21.72	101.58	125	201.32	78.43	21.70	101.19					

Sustainability – Data Rate Distribution Graph

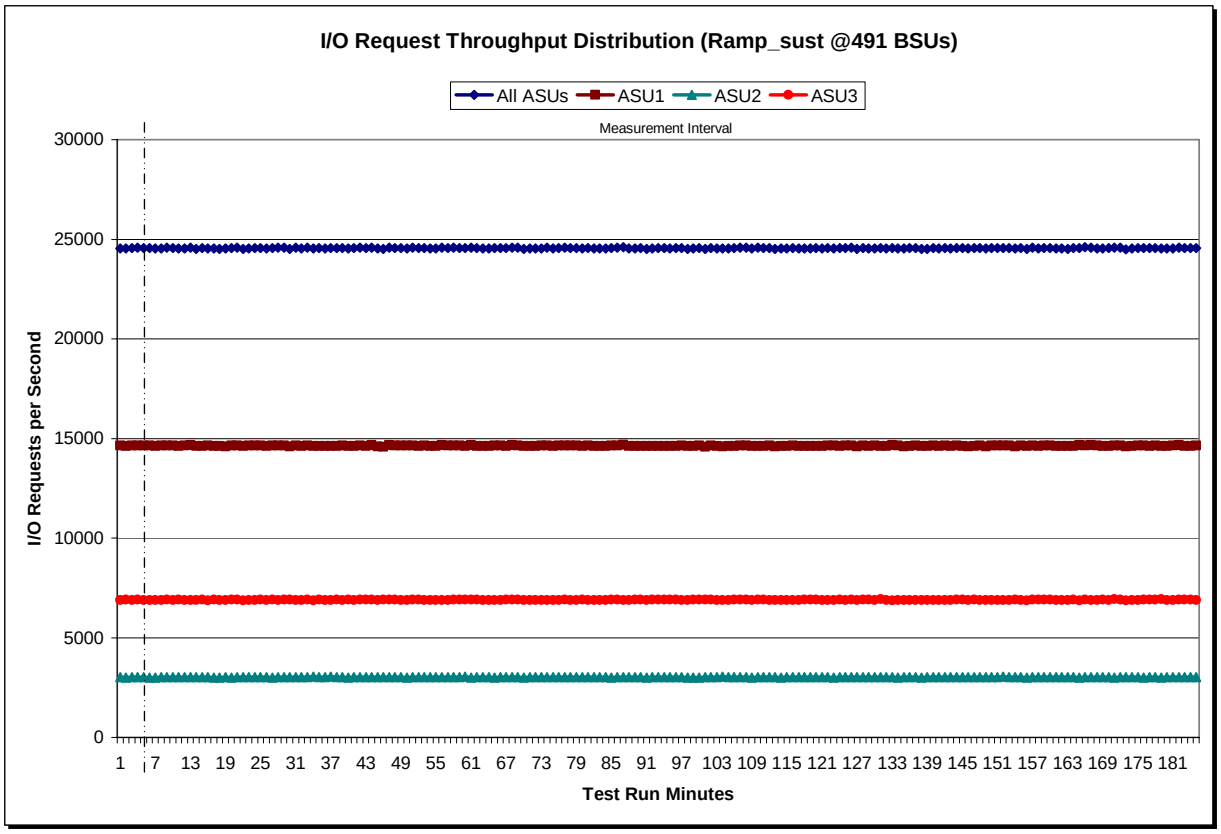


Sustainability – I/O Request Throughput Distribution Data

	Start	Stop	Interval	Duration
Ramp-Up/Start-Up	14:35:58	14:40:58	0-4	0:05:00
Measurement Interval	14:40:58	17:40:58	5-184	3:00:00

Interval	All ASUs	ASU1	ASU2	ASU3	Interval	All ASUs	ASU1	ASU2	ASU3	Interval	All ASUs	ASU1	ASU2	ASU3
0	24,545.95	14,642.48	3,015.45	6,888.02	63	24,536.88	14,631.32	3,017.57	6,888.00	126	24,515.92	14,607.47	3,017.23	6,891.22
1	24,533.63	14,619.12	3,008.50	6,906.02	64	24,559.38	14,648.32	3,011.05	6,900.02	127	24,562.05	14,645.48	3,014.00	6,902.57
2	24,557.42	14,646.18	3,020.32	6,890.92	65	24,565.10	14,650.85	3,018.35	6,895.90	128	24,532.35	14,611.55	3,015.77	6,905.03
3	24,572.25	14,641.85	3,025.68	6,904.72	66	24,555.48	14,623.60	3,016.18	6,915.70	129	24,544.13	14,640.13	3,021.18	6,882.82
4	24,561.63	14,637.43	3,029.62	6,894.58	67	24,582.47	14,655.62	3,024.05	6,902.80	130	24,566.25	14,619.02	3,020.40	6,926.83
5	24,553.77	14,643.65	3,009.87	6,900.25	68	24,574.15	14,646.55	3,023.65	6,903.95	131	24,531.07	14,626.45	3,014.17	6,890.45
6	24,526.50	14,625.50	3,011.17	6,889.83	69	24,516.35	14,632.50	3,002.85	6,881.00	132	24,561.85	14,662.78	3,021.03	6,878.03
7	24,539.63	14,644.68	3,015.62	6,879.33	70	24,535.25	14,622.48	3,014.87	6,897.90	133	24,542.58	14,639.08	3,012.35	6,891.15
8	24,577.22	14,649.35	3,024.20	6,903.67	71	24,532.45	14,618.55	3,025.45	6,888.45	134	24,529.55	14,607.75	3,027.62	6,894.18
9	24,567.45	14,641.55	3,027.15	6,898.75	72	24,545.28	14,645.82	3,014.23	6,885.23	135	24,555.35	14,630.00	3,025.98	6,899.37
10	24,537.35	14,621.93	3,013.70	6,901.72	73	24,569.33	14,649.47	3,022.07	6,897.80	136	24,555.60	14,649.58	3,019.10	6,886.92
11	24,546.28	14,633.07	3,020.83	6,892.38	74	24,526.93	14,621.03	3,013.90	6,892.00	137	24,522.28	14,619.80	3,009.73	6,892.75
12	24,578.93	14,661.28	3,020.92	6,896.73	75	24,556.38	14,645.33	3,015.53	6,895.52	138	24,520.03	14,622.08	3,013.35	6,884.60
13	24,518.35	14,613.92	3,024.70	6,879.73	76	24,578.65	14,635.62	3,022.67	6,920.37	139	24,552.10	14,642.12	3,013.02	6,896.97
14	24,564.38	14,632.25	3,022.52	6,909.62	77	24,549.45	14,640.05	3,014.62	6,894.78	140	24,534.33	14,617.28	3,029.07	6,887.98
15	24,543.88	14,651.00	3,014.15	6,878.73	78	24,562.85	14,637.12	3,026.43	6,899.30	141	24,548.57	14,641.48	3,016.57	6,890.52
16	24,527.60	14,615.15	3,009.75	6,902.70	79	24,540.05	14,616.63	3,014.30	6,909.12	142	24,528.27	14,625.82	3,023.20	6,879.25
17	24,519.68	14,627.85	3,010.98	6,880.85	80	24,567.73	14,640.05	3,029.27	6,898.42	143	24,548.85	14,633.45	3,014.72	6,900.68
18	24,527.85	14,610.15	3,021.67	6,896.03	81	24,546.07	14,627.20	3,027.62	6,891.25	144	24,567.05	14,631.58	3,027.72	6,907.75
19	24,554.50	14,637.63	3,012.62	6,904.25	82	24,544.38	14,630.48	3,020.95	6,892.95	145	24,526.08	14,611.12	3,015.22	6,899.75
20	24,583.52	14,643.18	3,032.32	6,908.02	83	24,545.85	14,623.72	3,027.02	6,895.12	146	24,560.32	14,620.80	3,027.35	6,912.17
21	24,520.38	14,618.33	3,024.37	6,877.68	84	24,553.45	14,634.57	3,012.28	6,906.60	147	24,559.30	14,633.17	3,025.67	6,900.47
22	24,539.98	14,633.30	3,019.63	6,887.05	85	24,583.33	14,650.20	3,027.82	6,905.32	148	24,528.60	14,601.23	3,030.50	6,896.87
23	24,552.27	14,650.18	3,013.38	6,888.70	86	24,591.35	14,676.77	3,017.28	6,897.30	149	24,567.98	14,647.28	3,022.62	6,898.08
24	24,552.07	14,633.78	3,016.60	6,901.68	87	24,534.03	14,624.33	3,028.40	6,881.30	150	24,564.92	14,648.52	3,031.35	6,885.05
25	24,530.00	14,626.18	3,022.67	6,881.15	88	24,546.17	14,614.68	3,023.02	6,908.47	151	24,558.87	14,639.08	3,036.63	6,883.15
26	24,558.98	14,646.47	3,010.50	6,902.02	89	24,562.77	14,629.68	3,016.38	6,916.70	152	24,563.85	14,634.10	3,029.83	6,899.92
27	24,580.68	14,647.28	3,032.78	6,900.62	90	24,521.07	14,627.38	3,010.43	6,883.25	153	24,542.27	14,607.28	3,024.23	6,910.75
28	24,575.75	14,642.68	3,018.00	6,915.07	91	24,544.98	14,623.42	3,019.72	6,901.85	154	24,557.38	14,642.10	3,022.22	6,893.07
29	24,523.15	14,598.65	3,020.12	6,904.38	92	24,551.43	14,619.43	3,021.80	6,910.20	155	24,506.02	14,624.22	3,010.78	6,871.02
30	24,573.68	14,649.77	3,024.65	6,899.27	93	24,555.58	14,625.13	3,016.53	6,913.92	156	24,586.28	14,646.05	3,019.47	6,920.77
31	24,534.77	14,618.38	3,019.73	6,896.65	94	24,539.28	14,613.65	3,021.65	6,903.98	157	24,536.78	14,613.92	3,016.85	6,906.02
32	24,584.68	14,647.05	3,030.97	6,906.67	95	24,556.87	14,622.87	3,026.32	6,907.68	158	24,560.42	14,643.00	3,014.52	6,902.90
33	24,532.83	14,616.10	3,039.28	6,877.45	96	24,556.93	14,640.52	3,021.15	6,895.27	159	24,567.88	14,641.72	3,019.90	6,906.27
34	24,557.13	14,629.77	3,025.48	6,901.88	97	24,517.90	14,614.42	3,005.38	6,898.10	160	24,541.60	14,630.50	3,020.42	6,890.68
35	24,537.70	14,613.78	3,024.58	6,899.33	98	24,545.45	14,627.28	3,012.45	6,905.72	161	24,538.17	14,617.73	3,022.08	6,898.35
36	24,550.12	14,620.85	3,035.28	6,893.98	99	24,549.85	14,632.95	3,006.80	6,910.10	162	24,520.63	14,611.87	3,017.88	6,890.88
37	24,558.07	14,626.22	3,025.40	6,906.45	100	24,518.30	14,583.38	3,018.43	6,916.48	163	24,552.25	14,622.02	3,013.50	6,916.73
38	24,554.95	14,633.80	3,026.43	6,894.72	101	24,566.43	14,638.37	3,023.80	6,904.27	164	24,555.98	14,669.78	3,009.15	6,877.05
39	24,543.45	14,617.43	3,008.37	6,917.65	102	24,530.83	14,617.98	3,015.73	6,897.12	165	24,592.87	14,653.55	3,021.45	6,917.87
40	24,546.92	14,631.22	3,024.33	6,891.37	103	24,533.07	14,599.60	3,035.82	6,897.65	166	24,571.40	14,655.37	3,016.03	6,900.00
41	24,582.37	14,643.37	3,028.17	6,910.83	104	24,539.93	14,631.05	3,022.45	6,886.43	167	24,540.47	14,636.13	3,017.02	6,887.32
42	24,557.08	14,628.27	3,019.60	6,909.22	105	24,554.73	14,627.88	3,017.55	6,909.30	168	24,539.12	14,617.38	3,020.52	6,901.22
43	24,586.93	14,661.52	3,014.55	6,910.87	106	24,586.32	14,643.75	3,022.70	6,919.87	169	24,551.37	14,629.90	3,024.18	6,897.28
44	24,534.22	14,600.90	3,032.88	6,900.43	107	24,582.52	14,650.48	3,018.23	6,913.80	170	24,569.47	14,636.35	3,009.05	6,924.07
45	24,504.52	14,586.17	3,014.63	6,903.72	108	24,530.07	14,631.00	3,003.62	6,895.45	171	24,576.52	14,643.37	3,022.87	6,910.28
46	24,576.68	14,655.13	3,013.88	6,907.67	109	24,569.70	14,629.13	3,031.62	6,908.95	172	24,495.43	14,610.22	3,013.02	6,872.20
47	24,566.75	14,637.17	3,018.75	6,910.83	110	24,558.50	14,629.97	3,023.80	6,904.73	173	24,535.55	14,622.87	3,018.88	6,893.80
48	24,553.97	14,644.40	3,016.95	6,892.62	111	24,559.00	14,643.28	3,016.03	6,899.68	174	24,566.33	14,643.47	3,023.27	6,899.60
49	24,543.72	14,633.53	3,010.85	6,899.33	112	24,517.32	14,609.60	3,018.38	6,889.33	175	24,562.40	14,637.98	3,010.53	6,913.88
50	24,577.95	14,651.35	3,024.00	6,902.60	113	24,529.02	14,623.32	3,008.05	6,897.65	176	24,559.65	14,629.33	3,027.20	6,903.12
51	24,561.95	14,626.00	3,026.07	6,909.88	114	24,539.33	14,619.78	3,024.58	6,894.97	177	24,557.55	14,634.90	3,018.00	6,904.65
52	24,549.90	14,636.78	3,025.22	6,887.90	115	24,566.67	14,653.25	3,027.35	6,886.07	178	24,541.73	14,612.48	3,004.97	6,924.28
53	24,525.55	14,614.55	3,015.98	6,895.02	116	24,527.43	14,626.48	3,017.78	6,883.17	179	24,528.63	14,618.57	3,017.98	6,892.08
54	24,541.42	14,616.08	3,033.32	6,892.02	117	24,546.38	14,617.62	3,023.38	6,905.38	180	24,544.40	14,633.50	3,021.42	6,889.48
55	24,584.52	14,660.65	3,025.93	6,897.93	118	24,537.72	14,612.25	3,021.00	6,904.47	181	24,575.50	14,656.13	3,017.13	6,902.23
56	24,561.72	14,644.88	3,026.77	6,890.07	119	24,546.57	14,619.52	3,016.58	6,910.47	182	24,553.25	14,629.93	3,021.12	6,902.20
57	24,572.65	14,633.33	3,028.53	6,910.78	120	24,539.45	14,629.60	3,020.28	6,889.57	183	24,548.78	14,625.73	3,021.27	6,901.78
58	24,551.08	14,634.38	3,014.62	6,902.08	121	24,564.53	14,638.13	3,025.90	6,900.50	184	24,553.90	14,633.67	3,019.83	6,900.40
59	24,556.48	14,611.37	3,040.88	6,904.23	122	24,543.08	14,635.23	3,012.00	6,895.85	***Average***	***24,550.43***	***14,631.30***	***3,020.18***	***6,898.94***
60	24,575.93	14,658.40	3,008.25	6,909.28	123	24,554.62	14,611.73	3,025.52	6,917.37					
61	24,559.30	14,618.02	3,029.40	6,911.88	124	24,550.38	14,639.93	3,015.93	6,894.52					
62	24,537.57	14,628.08	3,027.27	6,882.22	125	24,569.03	14,634.83	3,033.40	6,900.80					

Sustainability – I/O Request Throughput Distribution Graph

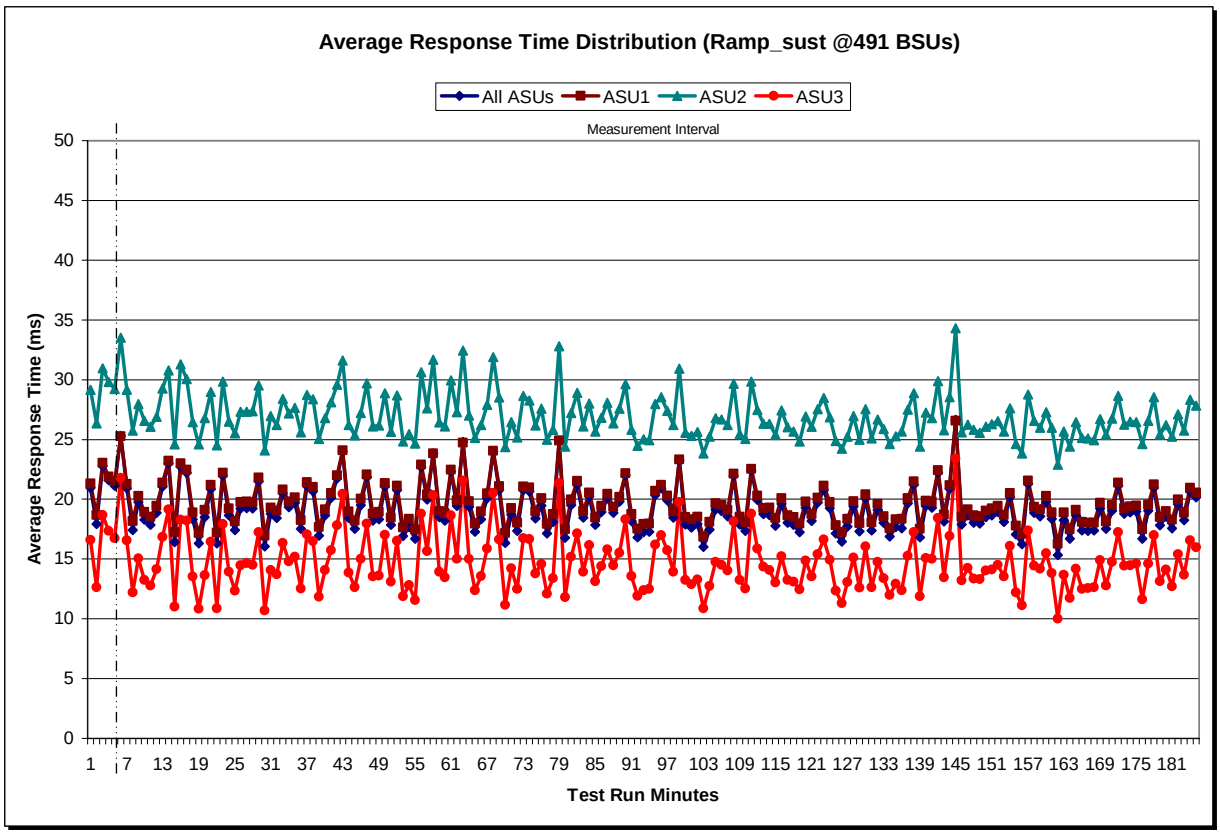


Sustainability – Average Response Time (ms) Distribution Data

	Start	Stop	Interval	Duration
Ramp-Up/Start-Up	14:35:58	14:40:58	0-4	0:05:00
Measurement Interval	14:40:58	17:40:58	4-184	3:00:00

Interval	All ASUs	ASU1	ASU2	ASU3	Interval	All ASUs	ASU1	ASU2	ASU3	Interval	All ASUs	ASU1	ASU2	ASU3
0	20.95	21.30	29.17	16.60	63	19.36	19.83	27.00	15.01	126	17.73	18.37	25.24	13.07
1	17.92	18.68	26.33	12.62	64	17.26	17.95	25.11	12.39	127	19.39	19.84	26.95	15.12
2	22.78	23.04	30.95	18.67	65	18.33	18.95	26.22	13.56	128	17.33	17.98	24.98	12.60
3	21.60	21.90	29.81	17.36	66	20.09	20.48	27.88	15.89	129	20.06	20.40	27.52	16.05
4	21.13	21.51	29.22	16.75	67	24.01	24.03	31.89	20.53	130	17.40	18.07	25.09	12.64
5	25.30	25.28	33.50	21.76	68	20.76	21.09	28.51	16.65	131	19.12	19.61	26.69	14.77
6	20.92	21.28	29.17	16.55	69	16.36	17.16	24.39	11.16	132	18.02	18.58	25.87	13.39
7	17.43	18.18	25.74	12.20	70	18.72	19.26	26.45	14.20	133	16.87	17.57	24.61	11.99
8	19.75	20.26	27.96	15.06	71	17.36	18.03	25.16	12.50	134	17.66	18.31	25.28	12.93
9	18.27	18.93	26.58	13.24	72	20.77	21.04	28.65	16.75	135	17.58	18.35	25.67	12.40
10	17.85	18.55	26.08	12.77	73	20.66	20.97	28.26	16.68	136	19.64	20.09	27.49	15.25
11	18.86	19.42	26.87	14.15	74	18.41	18.98	26.17	13.80	137	21.20	21.49	28.86	17.23
12	21.08	21.37	29.27	16.86	75	19.46	20.08	27.59	14.59	138	16.80	17.54	24.40	11.88
13	23.00	23.20	30.78	19.13	76	17.14	17.92	24.97	12.09	139	19.43	19.86	27.27	15.10
14	16.40	17.24	24.58	11.03	77	18.11	18.76	25.82	13.38	140	19.30	19.78	26.79	15.00
15	22.70	23.01	31.27	18.28	78	24.88	24.91	32.81	21.36	141	22.22	22.43	29.87	18.43
16	22.20	22.47	30.06	18.21	79	16.76	17.51	24.42	11.82	142	18.12	18.73	25.78	13.48
17	18.31	18.88	26.46	13.52	80	19.53	19.98	27.22	15.18	143	20.88	21.17	28.54	16.92
18	16.29	17.16	24.59	10.82	81	21.21	21.54	28.90	17.12	144	26.62	26.56	34.30	23.39
19	18.51	19.11	26.77	13.65	82	18.46	19.01	26.11	13.95	145	17.91	18.54	25.58	13.22
20	20.82	21.20	28.96	16.46	83	20.23	20.54	28.00	16.16	146	18.65	19.16	26.26	14.25
21	16.32	17.19	24.50	10.88	84	17.84	18.46	25.67	13.13	147	18.03	18.64	25.80	13.34
22	21.95	22.22	29.86	17.93	85	18.95	19.46	26.81	14.41	148	17.95	18.56	25.54	13.32
23	18.63	19.23	26.50	13.92	86	20.08	20.44	28.08	15.82	149	18.51	19.05	26.06	14.04
24	17.42	18.15	25.53	12.35	87	18.85	19.35	26.34	14.47	150	18.66	19.22	26.27	14.12
25	19.22	19.76	27.34	14.48	88	19.79	20.21	27.56	15.51	151	18.93	19.43	26.52	14.51
26	19.27	19.79	27.31	14.66	89	22.00	22.17	29.63	18.33	152	18.11	18.69	25.66	13.55
27	19.23	19.78	27.35	14.50	90	18.16	18.75	25.83	13.56	153	20.15	20.53	27.59	16.08
28	21.47	21.81	29.53	17.25	91	16.80	17.53	24.47	11.91	154	17.05	17.77	24.61	12.20
29	16.06	16.94	24.06	10.70	92	17.24	17.93	25.02	12.40	155	16.25	17.10	23.83	11.12
30	18.78	19.30	26.96	14.09	93	17.29	17.97	24.96	12.50	156	21.27	21.57	28.76	17.37
31	18.42	19.03	26.21	13.73	94	20.33	20.70	27.96	16.19	157	18.85	19.35	26.55	14.43
32	20.49	20.82	28.41	16.32	95	20.91	21.19	28.54	16.97	158	18.59	19.15	25.98	14.18
33	19.32	19.80	27.17	14.81	96	19.89	20.30	27.39	15.72	159	19.79	20.27	27.28	15.49
34	19.69	20.16	27.64	15.19	97	18.45	18.99	26.22	13.93	160	18.35	18.90	25.99	13.82
35	17.54	18.25	25.60	12.52	98	23.26	23.32	30.92	19.77	161	15.33	16.28	22.89	10.02
36	21.09	21.40	28.74	17.07	99	17.87	18.49	25.54	13.24	162	18.26	18.90	25.66	13.68
37	20.65	21.02	28.38	16.50	100	17.65	18.33	25.32	12.88	163	16.71	17.48	24.41	11.73
38	16.94	17.67	25.06	11.85	101	17.94	18.55	25.61	13.29	164	18.65	19.13	26.45	14.20
39	18.66	19.15	26.76	14.09	102	16.04	16.86	23.84	10.87	165	17.38	18.11	25.12	12.48
40	20.12	20.53	28.10	15.73	103	17.47	18.09	25.22	12.74	166	17.36	18.04	25.08	12.56
41	21.76	22.00	29.61	17.80	104	19.15	19.64	26.76	14.77	167	17.37	18.05	24.93	12.62
42	23.99	24.10	31.61	20.45	105	18.99	19.52	26.67	14.52	168	19.22	19.70	26.71	14.90
43	18.42	18.98	26.22	13.84	106	18.57	19.13	26.19	14.06	169	17.53	18.14	25.37	12.80
44	17.53	18.22	25.34	12.63	107	21.95	22.15	29.65	18.16	170	19.05	19.51	26.74	14.76
45	19.52	20.07	27.23	15.00	108	17.90	18.53	25.46	13.25	171	21.12	21.40	28.64	17.24
46	21.85	22.07	29.69	17.96	109	17.36	18.05	25.04	12.52	172	18.78	19.27	26.25	14.45
47	18.20	18.79	26.09	13.52	110	22.39	22.54	29.84	18.80	173	18.90	19.42	26.51	14.47
48	18.33	18.93	26.18	13.62	111	19.94	20.30	27.47	15.89	174	18.96	19.46	26.46	14.62
49	21.05	21.33	28.88	17.03	112	18.75	19.25	26.30	14.37	175	16.71	17.49	24.62	11.63
50	17.85	18.47	25.63	13.12	113	18.70	19.30	26.33	14.08	176	19.03	19.56	26.56	14.63
51	20.76	21.12	28.70	16.52	114	17.77	18.42	25.37	13.05	177	20.94	21.24	28.55	16.98
52	16.92	17.64	24.86	11.89	115	19.63	20.09	27.44	15.22	178	17.83	18.49	25.41	13.13
53	17.69	18.37	25.47	12.83	116	18.04	18.65	26.03	13.24	179	18.52	19.01	26.21	14.12
54	16.69	17.47	24.66	11.54	117	17.87	18.51	25.66	13.11	180	17.58	18.29	25.24	12.72
55	22.69	22.88	30.64	18.79	118	17.25	17.96	24.84	12.44	181	19.57	19.97	27.12	15.41
56	19.97	20.41	27.62	15.66	119	19.28	19.80	26.93	14.85	182	18.26	18.86	25.75	13.69
57	23.82	23.83	31.69	20.35	120	18.18	18.75	26.05	13.53	183	20.61	20.93	28.33	16.56
58	18.49	19.01	26.43	13.92	121	19.72	20.14	27.55	15.41	184	20.15	20.55	27.81	15.96
59	18.22	18.82	26.09	13.47	122	20.76	21.12	28.49	16.64	***Average***	***19.14***	***19.65***	***26.91***	***14.66***
60	22.30	22.46	29.96	18.64	123	19.28	19.77	26.85	14.92					
61	19.43	19.90	27.30	15.00	124	17.15	17.83	24.86	12.34					
62	24.79	24.73	32.45	21.56	125	16.44	17.23	24.24	11.32					

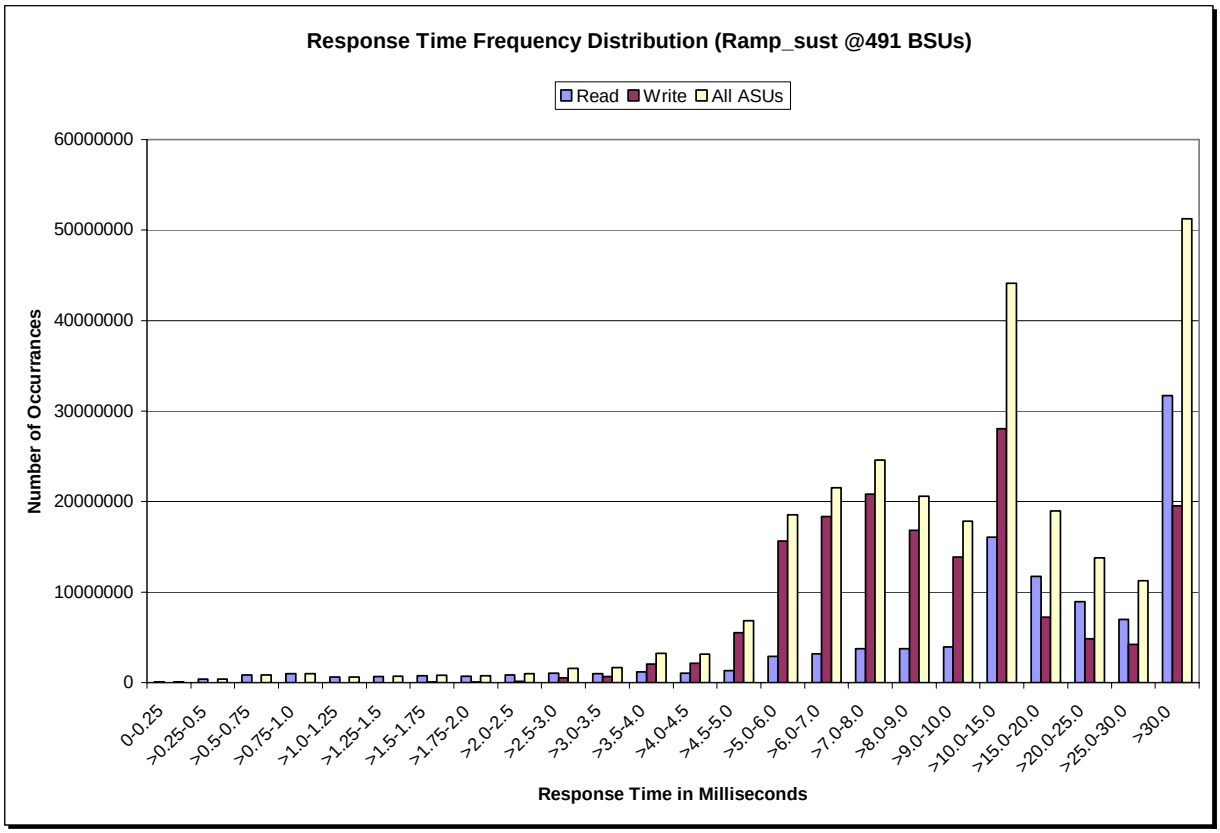
Sustainability – Average Response Time (ms) Distribution Graph



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	86,014	368,587	849,948	988,122	620,979	679,356	782,556	702,455
Write	-	19	851	5,584	5,690	20,065	38,553	70,481
All ASUs	86,014	368,606	850,799	993,706	626,669	699,421	821,109	772,936
ASU1	79,835	303,807	641,449	738,157	467,145	517,710	601,653	561,482
ASU2	6,179	64,791	209,082	253,689	157,593	174,732	204,920	184,160
ASU3	-	8	268	1,860	1,931	6,979	14,536	27,294
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	877,693	1,058,129	982,244	1,173,395	1,024,880	1,340,129	2,914,134	3,173,684
Write	126,301	504,493	664,607	2,056,846	2,123,254	5,503,637	15,647,847	18,342,725
All ASUs	1,003,994	1,562,622	1,646,851	3,230,241	3,148,134	6,843,766	18,561,981	21,516,409
ASU1	726,932	1,086,737	1,123,484	2,023,057	1,924,670	3,928,531	10,345,052	11,732,327
ASU2	226,696	284,848	275,744	428,323	410,057	776,976	2,044,469	2,311,037
ASU3	50,366	191,037	247,623	778,861	813,407	2,138,259	6,172,460	7,473,045
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	3,771,755	3,747,249	3,928,540	16,092,665	11,753,123	8,936,240	7,010,219	31,718,233
Write	20,814,660	16,834,908	13,898,133	28,028,993	7,220,296	4,854,064	4,247,574	19,553,842
All ASUs	24,586,415	20,582,157	17,826,673	44,121,658	18,973,419	13,790,304	11,257,793	51,272,075
ASU1	13,141,327	10,921,407	9,436,212	24,892,586	12,945,882	9,684,664	7,736,818	32,456,607
ASU2	2,540,071	2,054,474	1,707,641	4,160,300	2,071,735	1,643,459	1,424,704	9,002,194
ASU3	8,905,017	7,606,276	6,682,820	15,068,772	3,955,802	2,462,181	2,096,271	9,813,274

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	0.004	0.001	0.003	0.002	0.007	0003	0.004	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 71.

IOPS Test Results File

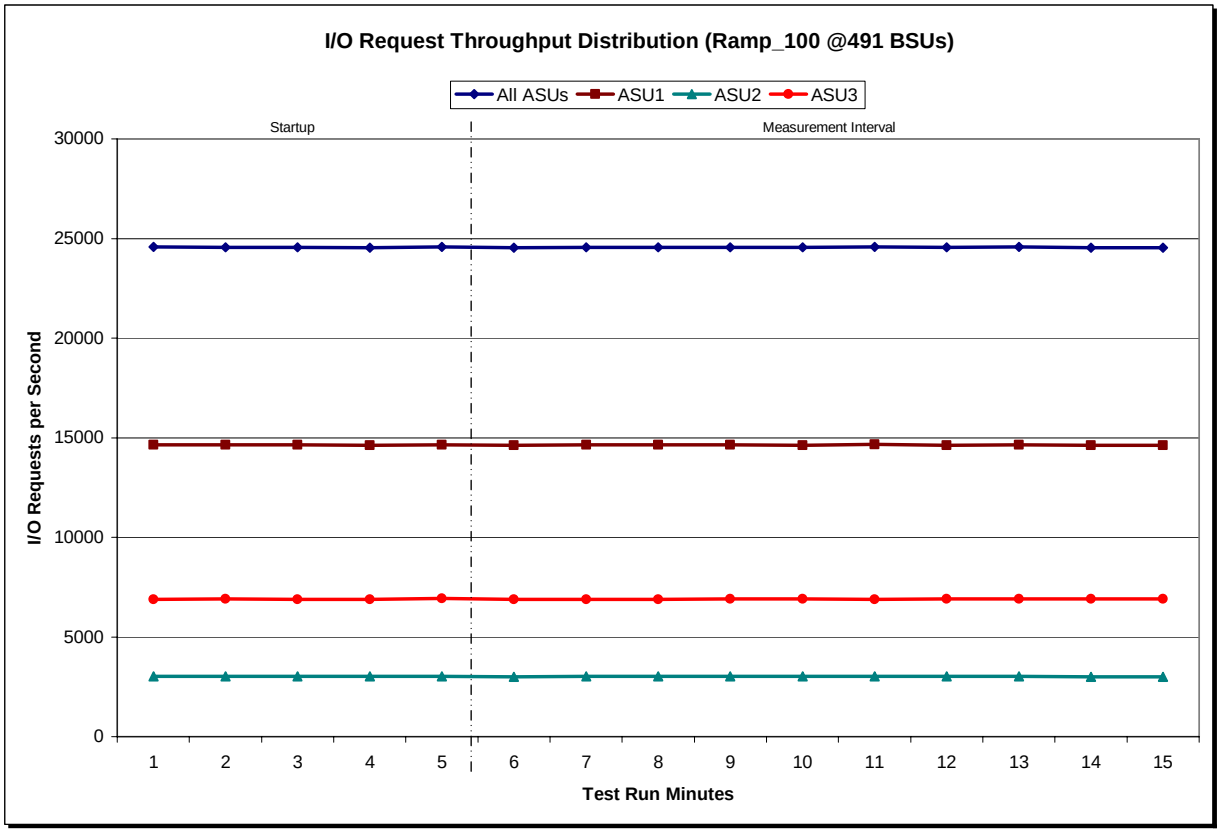
A link to the test results file generated from the IOPS Test Run is listed below.

IOPS Test Results File

IOPS Test Run – I/O Request Throughput Distribution Data

491 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	17:41:00	17:46:01	0-4	0:05:01
Measurement Interval	17:46:01	17:56:01	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	24,572.93	14,653.65	3,023.83	6,895.45
1	24,557.67	14,633.48	3,016.65	6,907.53
2	24,567.93	14,645.27	3,023.12	6,899.55
3	24,536.05	14,632.67	3,016.18	6,887.20
4	24,586.73	14,633.30	3,029.02	6,924.42
5	24,528.82	14,621.52	3,008.15	6,899.15
6	24,554.10	14,649.88	3,022.33	6,881.88
7	24,552.75	14,635.27	3,018.53	6,898.95
8	24,564.65	14,637.98	3,017.67	6,909.00
9	24,550.15	14,627.18	3,014.32	6,908.65
10	24,581.03	14,671.88	3,016.98	6,892.17
11	24,555.80	14,625.98	3,023.07	6,906.75
12	24,581.25	14,645.22	3,023.65	6,912.38
13	24,545.88	14,617.13	3,012.23	6,916.52
14	24,540.97	14,631.07	3,008.23	6,901.67
Average	***24,555.54***	***14,636.31***	***3,016.52***	***6,902.71***

IOPS Test Run – I/O Request Throughput Distribution Graph

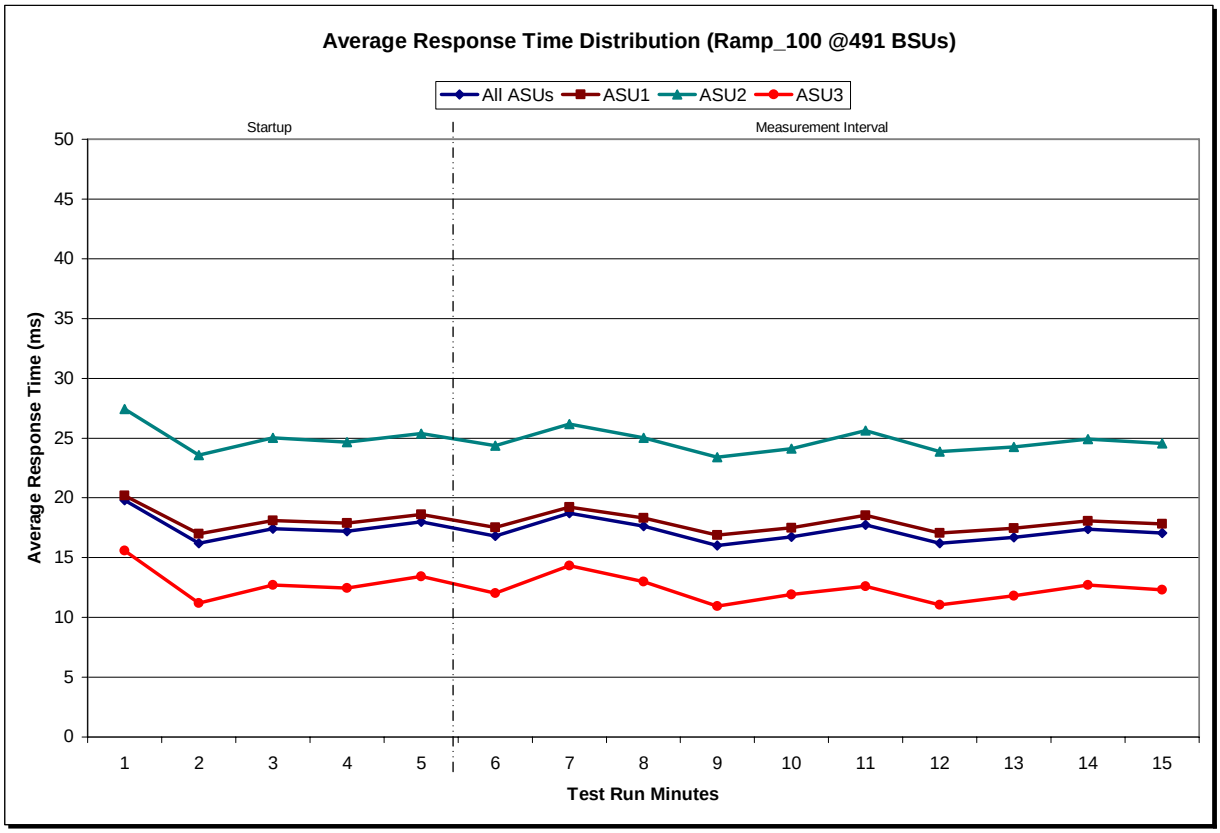


IOPS Test Run – Average Response Time (ms) Distribution Data

491 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	17:41:00	17:46:01	0-4	0:05:01
Measurement Interval	17:46:01	17:56:01	3-14	0:10:00

60 second intervals	All ASUs	ASU1	ASU2	ASU3
0	19.79	20.20	27.43	15.58
1	16.19	17.01	23.59	11.21
2	17.43	18.10	25.00	12.70
3	17.21	17.91	24.67	12.45
4	17.99	18.62	25.37	13.43
5	16.82	17.53	24.35	12.02
6	18.71	19.23	26.18	14.33
7	17.64	18.31	25.00	12.99
8	16.01	16.88	23.40	10.93
9	16.74	17.50	24.12	11.93
10	17.75	18.55	25.62	12.60
11	16.21	17.06	23.86	11.06
12	16.70	17.46	24.25	11.80
13	17.40	18.06	24.92	12.72
14	17.08	17.80	24.55	12.29
Average	***17.11***	***17.84***	***24.63***	***12.27***

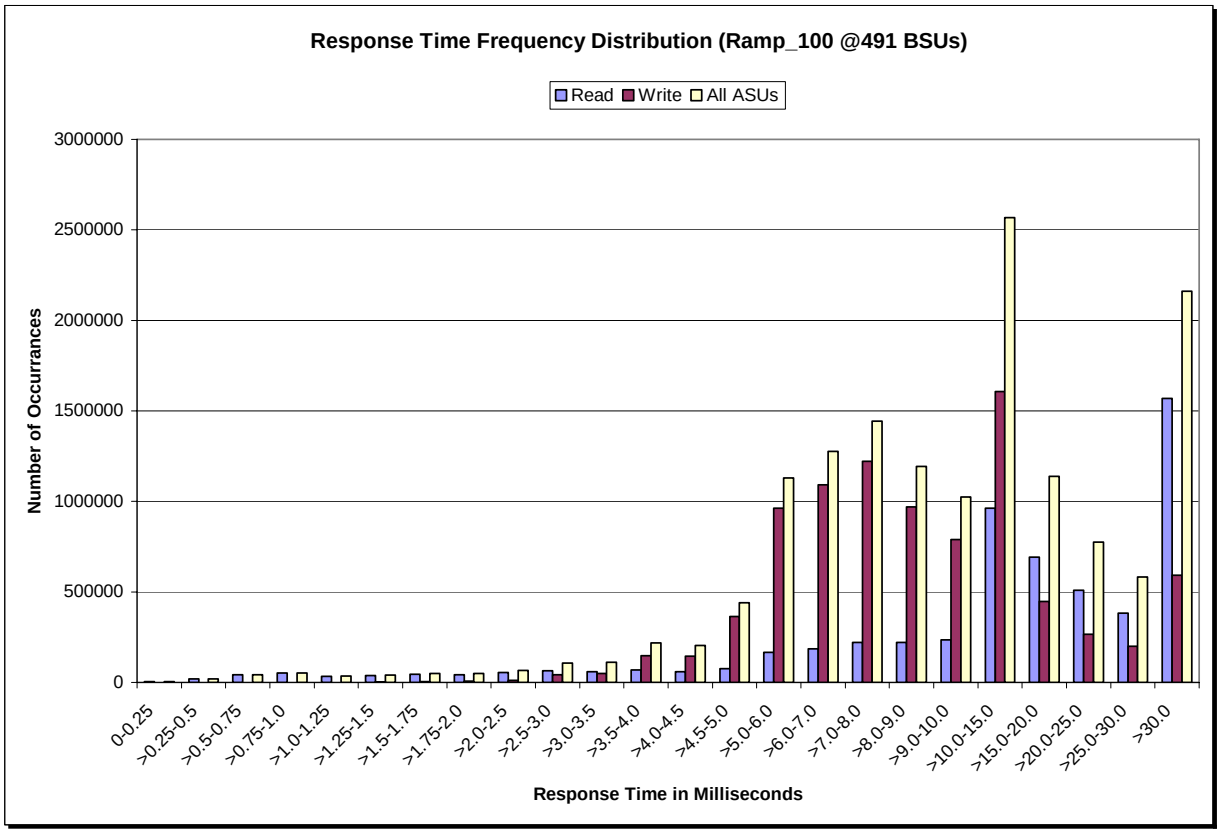
IOPS Test Run – Average Response Time (ms) Distribution Graph



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	4639	19,626	43,416	52,592	34,230	38,354	45,580	42,994
Write	0	4	101	658	684	2,159	4,183	7,054
All ASUs	4639	19,630	43,517	53,250	34,914	40,513	49,763	50,048
ASU1	4326	16,433	33,328	39,830	26,268	29,978	36,109	35,640
ASU2	313	3,196	10,156	13,215	8,409	9,803	12,058	11,600
ASU3	0	1	33	205	237	732	1,596	2,808
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	54,700	64,981	59,930	69,611	59,978	76,461	167,135	184,756
Write	11,423	42,522	50,893	148,157	145,535	363,367	962,891	1,091,322
All ASUs	66,123	107,503	110,823	217,768	205,513	439,828	1,130,026	1,276,078
ASU1	47,007	71,751	73,243	132,144	122,710	247,375	623,343	688,801
ASU2	14,529	19,323	18,447	29,334	27,261	51,024	126,355	137,590
ASU3	4,587	16,429	19,133	56,290	55,542	141,429	380,328	449,687
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	221,277	222,037	234,635	961,819	690,842	507,553	382,102	1,569,014
Write	1,221,146	970,151	788,894	1,606,425	447,617	267,241	200,771	591,555
All ASUs	1,442,423	1,192,188	1,023,529	2,568,244	1,138,459	774,794	582,873	2,160,569
ASU1	763,596	628,860	542,382	1,460,061	771,483	543,552	407,580	1,435,782
ASU2	148,974	118,826	97,459	241,388	122,344	91,447	74,372	422,427
ASU3	529,853	444,502	383,688	866,795	244,632	139,795	100,921	302,360

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
14,733,015	12,572,446	2,160,569

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	0.0351	0.2810	0.0700	0.2100	0.0180	0.0699	0.0350	0.2811
COV	0.003	0.001	0.003	0.002	0.005	0.002	0.005	0.002

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 71.

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.

100% Load Level - 491 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	17:41:00	17:46:01	0-4	0:05:01
Measurement Interval	17:46:01	17:56:01	5-14	0:10:00

(60 second intervals)	All ASUs	ASU-1	ASU-2	ASU-3
0	24,572.93	14,653.65	3,023.83	6,895.45
1	24,557.67	14,633.48	3,016.65	6,907.53
2	24,567.93	14,645.27	3,023.12	6,899.55
3	24,536.05	14,632.67	3,016.18	6,887.20
4	24,586.73	14,633.30	3,029.02	6,924.42
5	24,528.82	14,621.52	3,008.15	6,899.15
6	24,554.10	14,649.88	3,022.33	6,881.88
7	24,552.75	14,635.27	3,018.53	6,898.95
8	24,564.65	14,637.98	3,017.67	6,909.00
9	24,550.15	14,627.18	3,014.32	6,908.65
10	24,581.03	14,671.88	3,016.98	6,892.17
11	24,555.80	14,625.98	3,023.07	6,906.75
12	24,581.25	14,645.22	3,023.65	6,912.38
13	24,545.88	14,617.13	3,012.23	6,916.52
14	24,540.97	14,631.07	3,008.23	6,901.67
Average	24,555.54	14,636.31	3,016.52	6,902.71

95% Load Level - 466 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	17:56:03	18:01:04	0-4	0:05:01
Measurement Interval	18:01:04	18:11:04	5-14	0:10:00

(60 second intervals)	All ASUs	ASU-1	ASU-2	ASU-3
0	23,305.33	13,897.55	2,869.15	6,538.63
1	23,296.00	13,895.42	2,868.32	6,532.27
2	23,293.48	13,885.37	2,857.07	6,551.05
3	23,265.18	13,867.07	2,862.55	6,535.57
4	23,317.45	13,898.93	2,866.15	6,552.37
5	23,311.23	13,896.97	2,855.00	6,559.27
6	23,295.30	13,893.58	2,863.12	6,538.60
7	23,287.90	13,886.92	2,857.28	6,543.70
8	23,291.32	13,874.27	2,859.35	6,557.70
9	23,266.03	13,861.65	2,867.08	6,537.30
10	23,298.53	13,871.97	2,875.03	6,551.53
11	23,306.18	13,891.23	2,867.25	6,547.70
12	23,274.27	13,878.70	2,862.53	6,533.03
13	23,276.27	13,874.27	2,862.85	6,539.15
14	23,307.62	13,879.15	2,866.20	6,562.27
Average	23,291.47	13,880.87	2,863.57	6,547.03

90% Load Level - 441 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	18:11:06	18:16:07	0-4	0:05:01
Measurement Interval	18:16:07	18:26:07	5-14	0:10:00

(60 second intervals)	All ASUs	ASU-1	ASU-2	ASU-3
0	22,043.80	13,145.48	2,710.62	6,187.70
1	22,061.48	13,149.17	2,704.35	6,207.97
2	22,066.88	13,166.62	2,719.52	6,180.75
3	22,026.32	13,132.15	2,703.77	6,190.40
4	22,068.13	13,163.63	2,695.68	6,208.82
5	22,006.42	13,114.58	2,696.43	6,195.40
6	22,046.78	13,131.47	2,720.32	6,195.00
7	22,065.93	13,149.93	2,723.17	6,192.83
8	22,031.15	13,138.23	2,715.00	6,177.92
9	22,027.33	13,123.08	2,706.40	6,197.85
10	22,058.17	13,137.98	2,719.77	6,200.42
11	22,039.67	13,134.38	2,712.63	6,192.65
12	22,040.28	13,131.20	2,702.48	6,206.60
13	22,035.02	13,115.35	2,727.97	6,191.70
14	22,039.45	13,138.78	2,703.73	6,196.93
Average	22,039.02	13,131.50	2,712.79	6,194.73

80% Load Level - 392 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	18:26:09	18:31:10	0-4	0:05:01
Measurement Interval	18:31:10	18:41:10	5-14	0:10:00

(60 second intervals)	All ASUs	ASU-1	ASU-2	ASU-3
0	19,594.80	11,664.45	2,415.82	5,514.53
1	19,587.95	11,661.93	2,404.68	5,521.33
2	19,595.30	11,675.03	2,426.55	5,493.72
3	19,620.23	11,687.92	2,415.42	5,516.90
4	19,607.45	11,702.92	2,403.27	5,501.27
5	19,608.05	11,697.00	2,412.10	5,498.95
6	19,587.33	11,677.90	2,403.00	5,506.43
7	19,622.52	11,702.38	2,405.57	5,514.57
8	19,595.33	11,696.20	2,405.93	5,493.20
9	19,609.33	11,678.62	2,415.60	5,515.12
10	19,599.75	11,671.47	2,411.22	5,517.07
11	19,599.45	11,675.85	2,409.93	5,513.67
12	19,600.53	11,693.57	2,415.03	5,491.93
13	19,601.02	11,676.80	2,422.73	5,501.48
14	19,594.15	11,669.05	2,411.13	5,513.97
Average	19,601.75	11,683.88	2,411.23	5,506.64

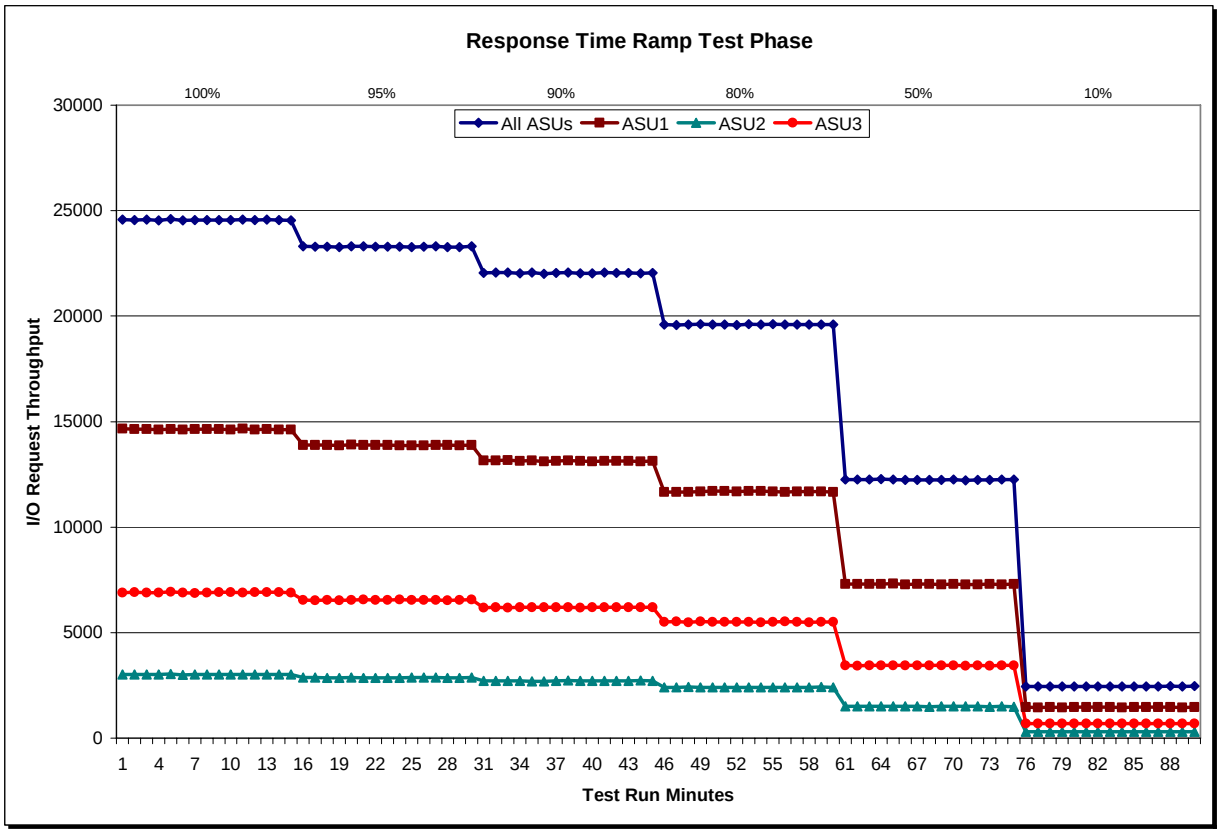
50% Load Level - 242 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	18:41:11	18:46:12	0-4	0:05:01
Measurement Interval	18:46:12	18:56:12	5-14	0:10:00

(60 second intervals)	All ASUs	ASU-1	ASU-2	ASU-3
0	12,264.93	7,306.25	1,504.13	3,454.55
1	12,248.12	7,306.13	1,505.98	3,436.00
2	12,262.52	7,299.92	1,509.22	3,453.38
3	12,272.42	7,306.08	1,518.02	3,448.32
4	12,262.80	7,312.78	1,510.10	3,439.92
5	12,240.73	7,288.63	1,513.92	3,438.18
6	12,245.67	7,300.58	1,504.60	3,440.48
7	12,235.72	7,299.02	1,492.68	3,444.02
8	12,232.48	7,275.80	1,509.97	3,446.72
9	12,247.75	7,305.45	1,500.40	3,441.90
10	12,222.30	7,281.88	1,507.80	3,432.62
11	12,236.88	7,286.58	1,507.80	3,442.50
12	12,236.60	7,309.72	1,497.98	3,428.90
13	12,248.98	7,286.67	1,509.08	3,453.23
14	12,251.67	7,305.37	1,498.97	3,447.33
Average	12,239.88	7,293.97	1,504.32	3,441.59

10% Load Level - 49 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	18:56:13	19:01:14	0-4	0:05:01
Measurement Interval	19:01:14	19:11:14	5-14	0:10:00

(60 second intervals)	All ASUs	ASU-1	ASU-2	ASU-3
0	2,453.32	1,464.75	302.15	686.42
1	2,448.57	1,457.33	306.90	684.33
2	2,453.18	1,463.07	301.33	688.78
3	2,442.03	1,451.35	301.03	689.65
4	2,450.63	1,462.80	301.37	686.47
5	2,456.10	1,464.82	301.28	690.00
6	2,454.47	1,460.27	301.47	692.73
7	2,455.05	1,464.97	301.30	688.78
8	2,444.70	1,456.37	303.07	685.27
9	2,447.63	1,465.80	295.85	685.98
10	2,452.72	1,461.85	301.28	689.58
11	2,451.23	1,460.38	302.78	688.07
12	2,463.05	1,468.82	302.55	691.68
13	2,443.28	1,457.07	300.38	685.83
14	2,460.42	1,461.02	303.80	695.60
Average	2,452.87	1,462.14	301.38	689.35

Response Time Ramp Distribution (IOPS) Graph

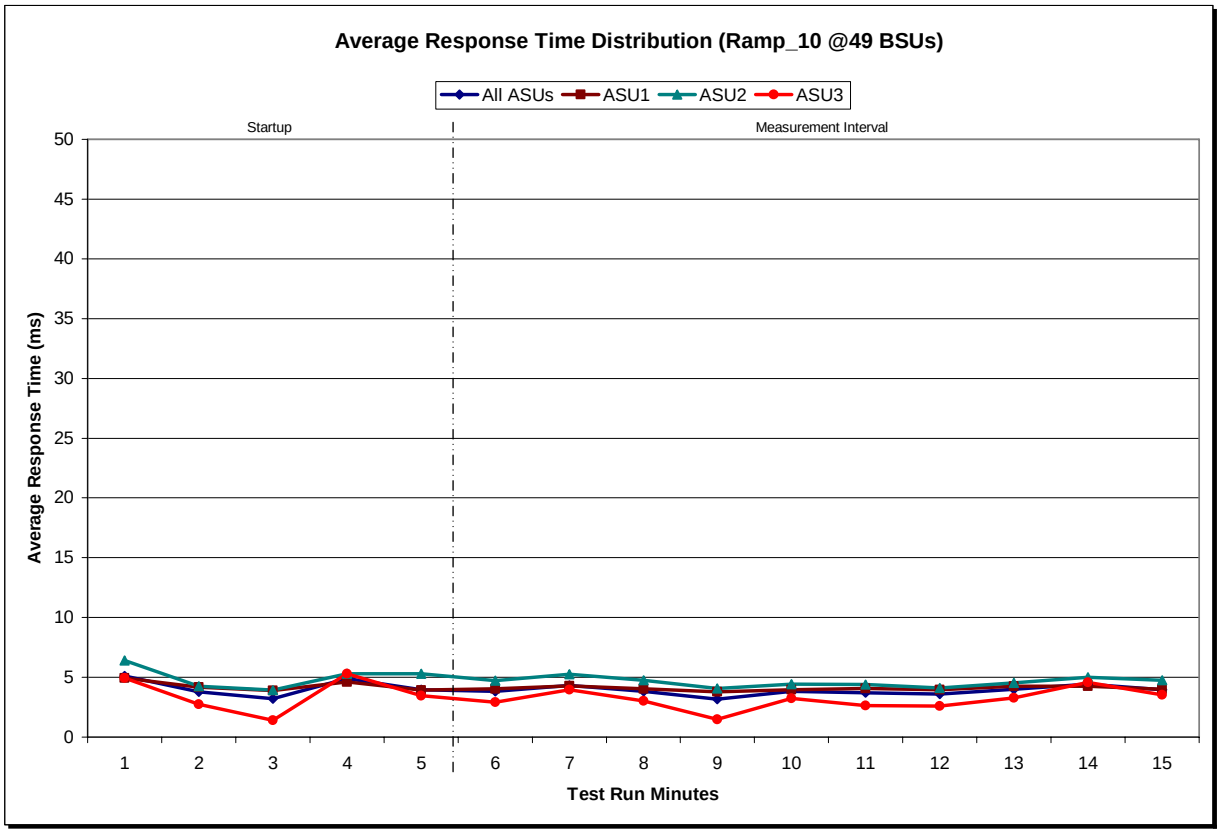


SPC-1 LRT™ Average Response Time (ms) Distribution Data

49 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	18:56:13	19:01:14	0-4	0:05:01
Measurement Interval	19:01:14	19:11:14	5-14	0:10:00

60 second intervals	All ASUs	ASU1	ASU2	ASU3
0	5.12	4.94	6.39	4.93
1	3.79	4.19	4.25	2.74
2	3.19	3.88	3.94	1.39
3	4.88	4.60	5.30	5.29
4	3.95	3.91	5.27	3.45
5	3.81	4.04	4.72	2.92
6	4.31	4.28	5.27	3.96
7	3.83	4.02	4.77	3.02
8	3.17	3.77	4.06	1.49
9	3.82	3.97	4.42	3.22
10	3.70	4.06	4.39	2.61
11	3.60	3.97	4.10	2.60
12	4.01	4.24	4.55	3.28
13	4.44	4.26	5.00	4.57
14	3.96	3.99	4.76	3.53
Average	***3.86***	***4.06***	***4.60***	***3.12***

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	0.0352	0.2812	0.0696	0.2101	0.0180	0.0697	0.0352	0.2810
COV	0.019	0.004	0.014	0.006	0.011	0.010	0.014	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 71.

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	***24,555.54***
Repeatability Test Phase 1	24,545.85
Repeatability Test Phase 2	24,547.36

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	***3.86 ms***
Repeatability Test Phase 1	4.01 ms
Repeatability Test Phase 2	4.01 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)..

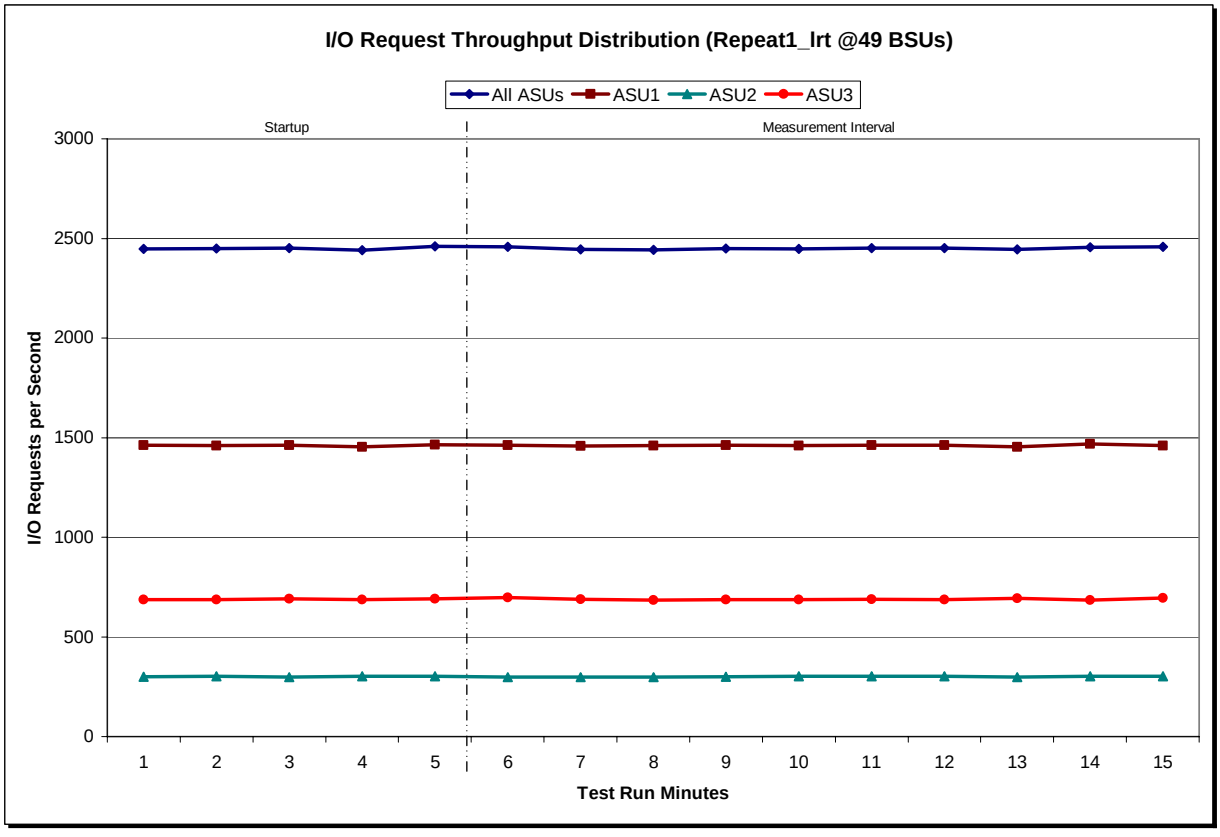
A link to the test result file generated from each Repeatability Test Run is listed below.

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

49 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	19:11:18	19:16:18	0-4	0:05:00
Measurement Interval	19:16:18	19:26:18	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	2,447.62	1,462.52	299.30	685.80
1	2,449.62	1,459.72	302.25	687.65
2	2,452.05	1,462.28	298.78	690.98
3	2,441.40	1,452.87	301.38	687.15
4	2,459.45	1,465.18	302.58	691.68
5	2,457.58	1,461.80	297.48	698.30
6	2,445.20	1,458.27	298.55	688.38
7	2,443.50	1,459.53	299.12	684.85
8	2,449.27	1,462.18	299.68	687.40
9	2,447.27	1,459.52	301.33	686.42
10	2,452.20	1,461.72	302.17	688.32
11	2,451.20	1,461.50	302.28	687.42
12	2,444.65	1,453.58	297.60	693.47
13	2,455.60	1,468.97	301.30	685.33
14	2,457.75	1,459.38	302.50	695.87
Average	***2,450.42***	***1,460.65***	***300.20***	***689.58***

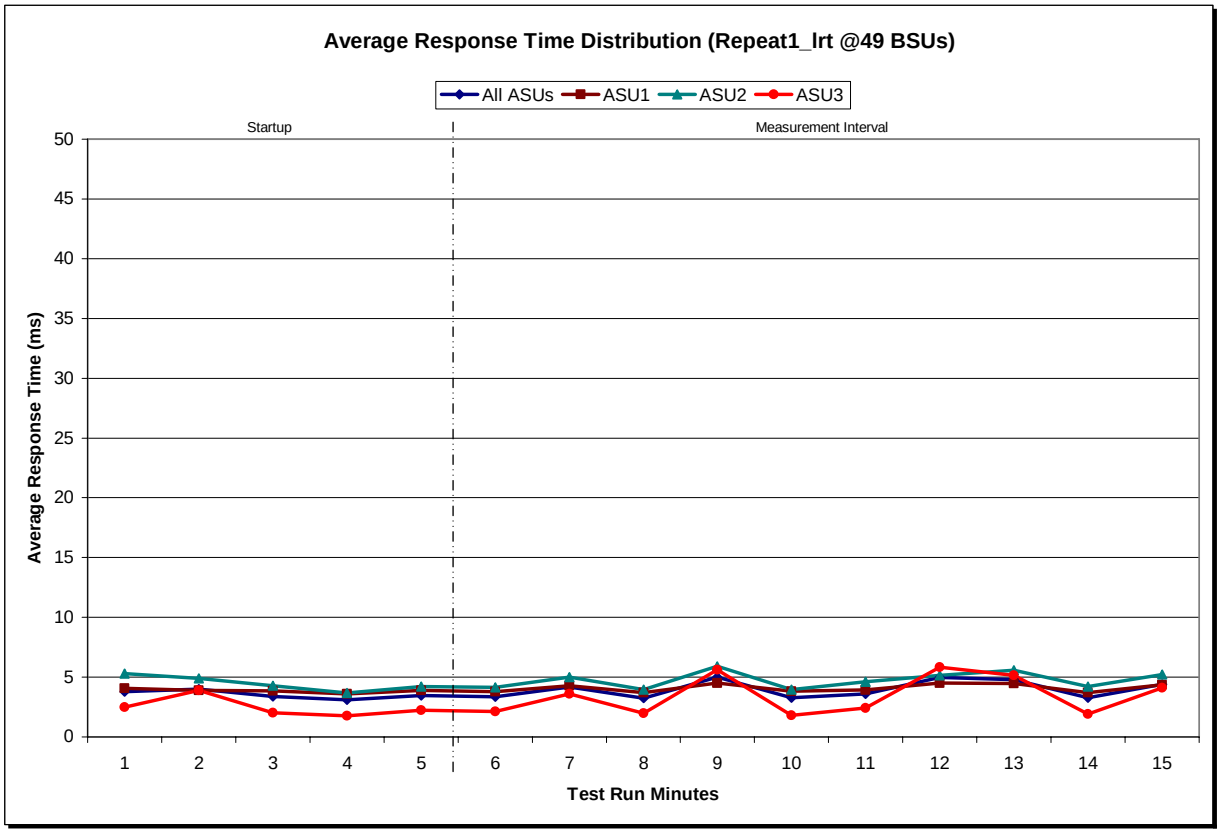
Repeatability 1 LRT – I/O Request Throughput Distribution Graph



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

49 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	19:11:18	19:16:18	0-4	0:05:00
Measurement Interval	19:16:18	19:26:18	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	3.78	4.08	5.29	2.49
1	4.01	3.89	4.88	3.88
2	3.39	3.85	4.30	2.02
3	3.09	3.60	3.66	1.78
4	3.47	3.89	4.21	2.23
5	3.35	3.78	4.15	2.12
6	4.18	4.28	5.02	3.61
7	3.25	3.70	3.97	1.98
8	4.99	4.51	5.91	5.61
9	3.27	3.82	3.95	1.82
10	3.59	3.94	4.60	2.41
11	4.95	4.49	5.16	5.84
12	4.80	4.47	5.57	5.16
13	3.28	3.72	4.22	1.91
14	4.38	4.35	5.22	4.09
Average	***4.01***	***4.11***	***4.78***	***3.46***

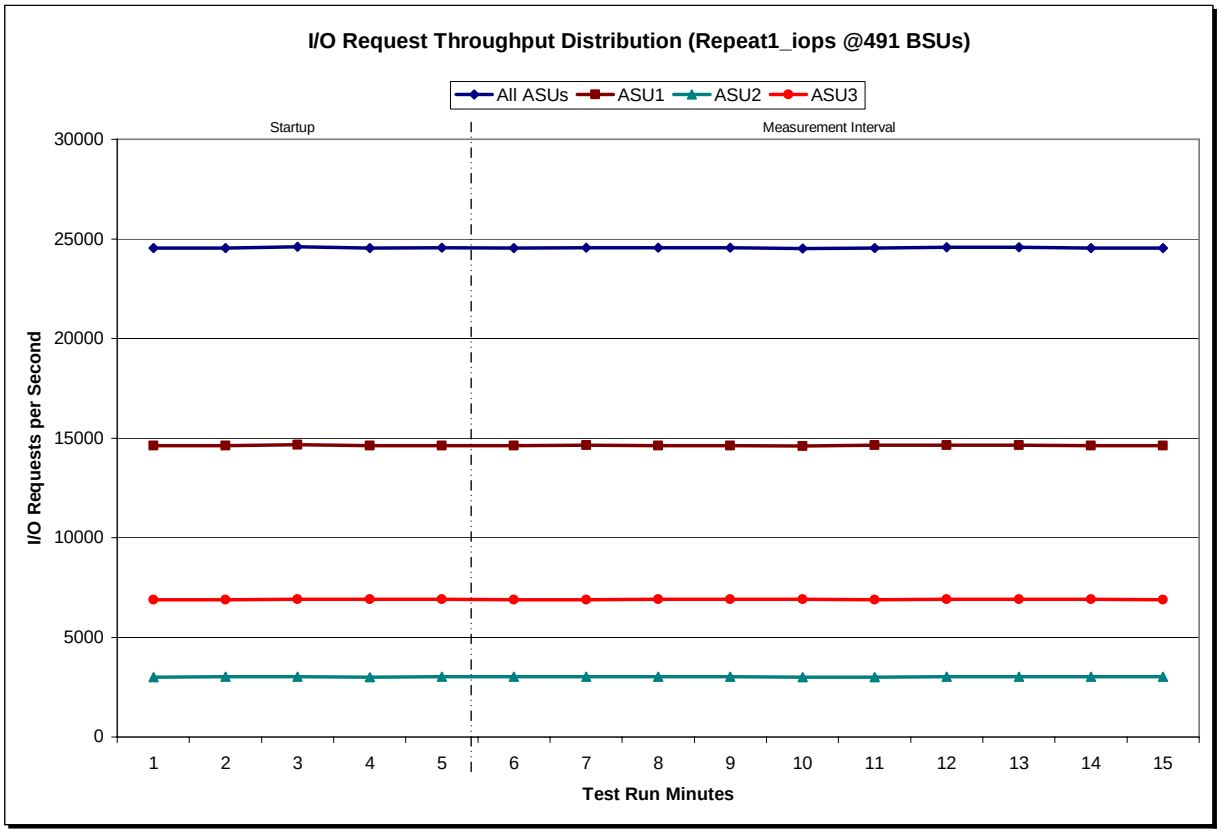
Repeatability 1 LRT –Average Response Time (ms) Distribution Graph



Repeatability 1 IOPS – I/O Request Throughput Distribution Data

491 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	19:26:20	19:31:21	0-4	0:05:01
Measurement Interval	19:31:21	19:41:21	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	24,534.98	14,628.53	3,011.10	6,895.35
1	24,528.28	14,631.40	3,014.82	6,882.07
2	24,592.50	14,667.95	3,023.37	6,901.18
3	24,530.87	14,620.42	3,008.62	6,901.83
4	24,553.50	14,628.50	3,022.38	6,902.62
5	24,529.47	14,620.23	3,015.43	6,893.80
6	24,548.20	14,633.13	3,024.60	6,890.47
7	24,548.18	14,620.23	3,025.77	6,902.18
8	24,555.87	14,613.30	3,022.12	6,920.45
9	24,513.27	14,603.75	3,008.63	6,900.88
10	24,537.30	14,640.77	3,000.17	6,896.37
11	24,585.52	14,649.95	3,026.43	6,909.13
12	24,570.60	14,651.40	3,018.03	6,901.17
13	24,537.85	14,616.15	3,018.50	6,903.20
14	24,532.25	14,621.13	3,013.37	6,897.75
Average	***24,545.85***	***14,627.01***	***3,017.31***	***6,901.54***

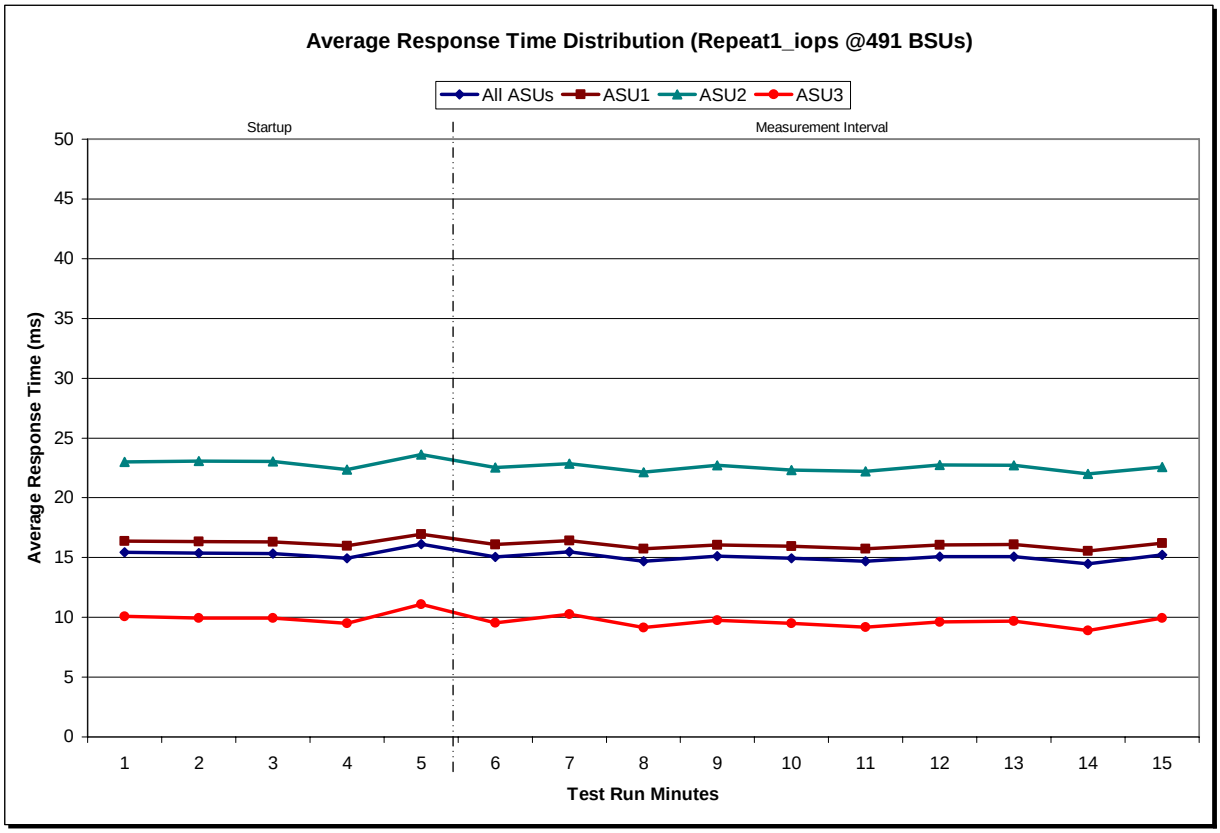
Repeatability 1 IOPS – I/O Request Throughput Distribution Graph



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

491 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	19:26:20	19:31:21	0-4	0:05:01
Measurement Interval	19:31:21	19:41:21	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	15.43	16.39	22.99	10.09
1	15.38	16.35	23.09	9.93
2	15.35	16.30	23.05	9.95
3	14.94	15.98	22.36	9.49
4	16.12	16.94	23.61	11.09
5	15.04	16.09	22.55	9.53
6	15.48	16.41	22.86	10.25
7	14.67	15.74	22.13	9.13
8	15.11	16.06	22.73	9.76
9	14.92	15.96	22.32	9.51
10	14.70	15.75	22.20	9.20
11	15.07	16.06	22.75	9.62
12	15.10	16.08	22.72	9.68
13	14.47	15.55	22.00	8.90
14	15.23	16.21	22.57	9.94
Average	***14.98***	***15.99***	***22.48***	***9.55***

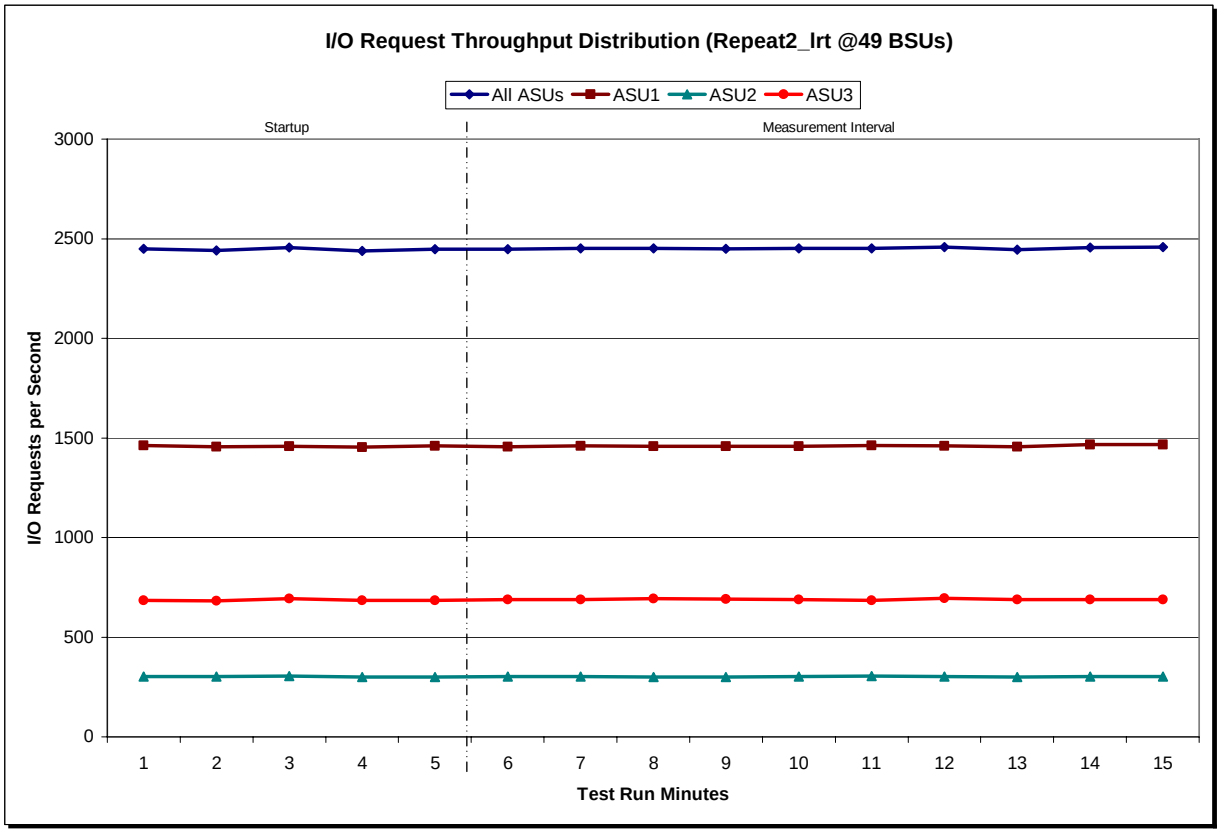
Repeatability 1 IOPS –Average Response Time (ms) Distribution Graph



Repeatability 2 LRT – I/O Request Throughput Distribution Data

49 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	19:41:25	19:46:25	0-4	0:05:00
Measurement Interval	19:46:25	19:56:25	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	2,449.88	1,462.77	302.73	684.38
1	2,441.17	1,456.02	301.75	683.40
2	2,454.82	1,458.33	303.83	692.65
3	2,439.22	1,453.22	300.75	685.25
4	2,446.88	1,460.43	300.75	685.70
5	2,447.33	1,455.03	302.47	689.83
6	2,451.63	1,460.08	303.17	688.38
7	2,452.00	1,458.27	300.45	693.28
8	2,450.03	1,458.63	299.25	692.15
9	2,450.45	1,457.98	302.75	689.72
10	2,451.43	1,462.07	304.18	685.18
11	2,458.40	1,460.15	302.80	695.45
12	2,445.03	1,455.77	299.92	689.35
13	2,456.23	1,465.52	301.62	689.10
14	2,458.77	1,466.72	302.73	689.32
Average	***2,452.13***	***1,460.02***	***301.93***	***690.18***

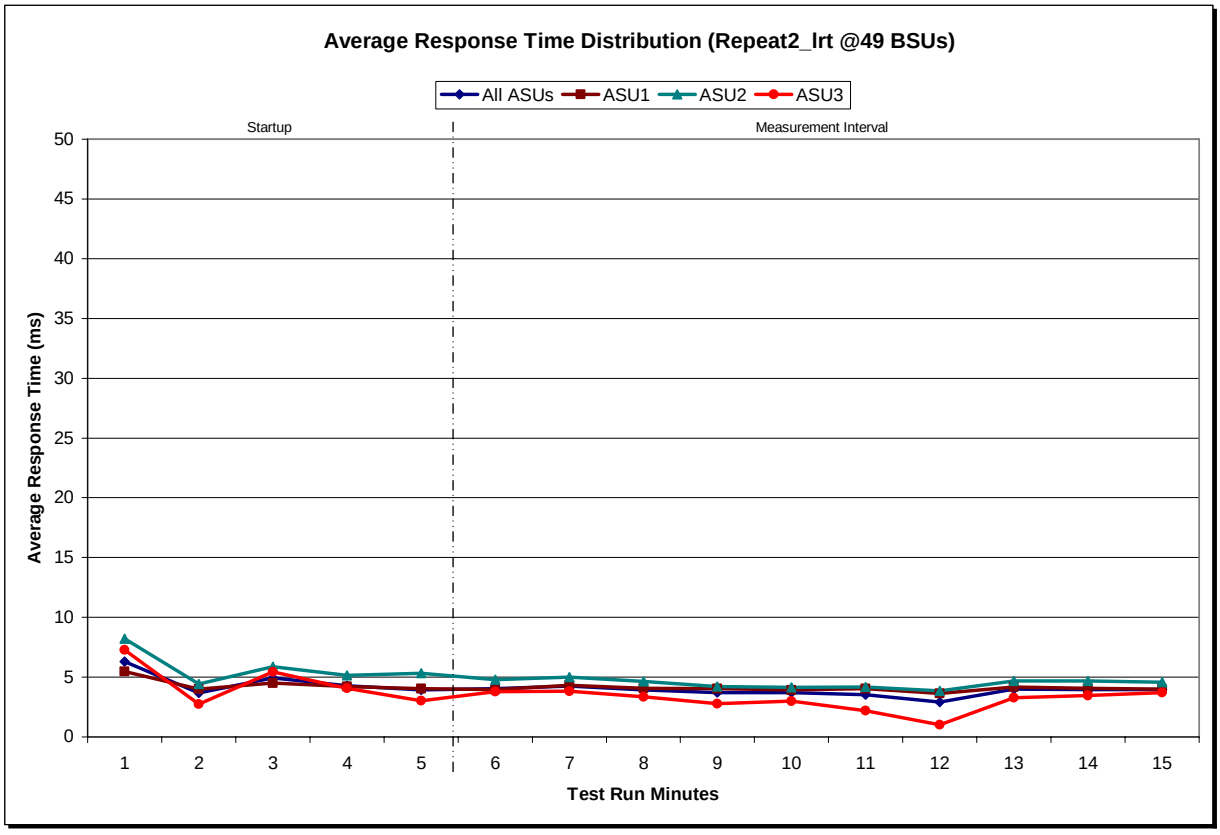
Repeatability 2 LRT – I/O Request Throughput Distribution Graph



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

49 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	19:41:25	19:46:25	0-4	0:05:00
Measurement Interval	19:46:25	19:56:25	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	6.31	5.47	8.20	7.27
1	3.69	3.99	4.43	2.72
2	4.93	4.49	5.88	5.42
3	4.30	4.23	5.16	4.07
4	3.92	4.04	5.33	3.03
5	4.02	3.97	4.78	3.78
6	4.25	4.31	4.99	3.82
7	3.94	4.08	4.65	3.33
8	3.69	4.03	4.19	2.77
9	3.70	3.94	4.15	3.00
10	3.54	4.05	4.19	2.18
11	2.91	3.62	3.84	1.00
12	3.98	4.17	4.69	3.28
13	3.96	4.05	4.69	3.44
14	3.98	3.98	4.56	3.70
Average	***3.80***	***4.02***	***4.47***	***3.03***

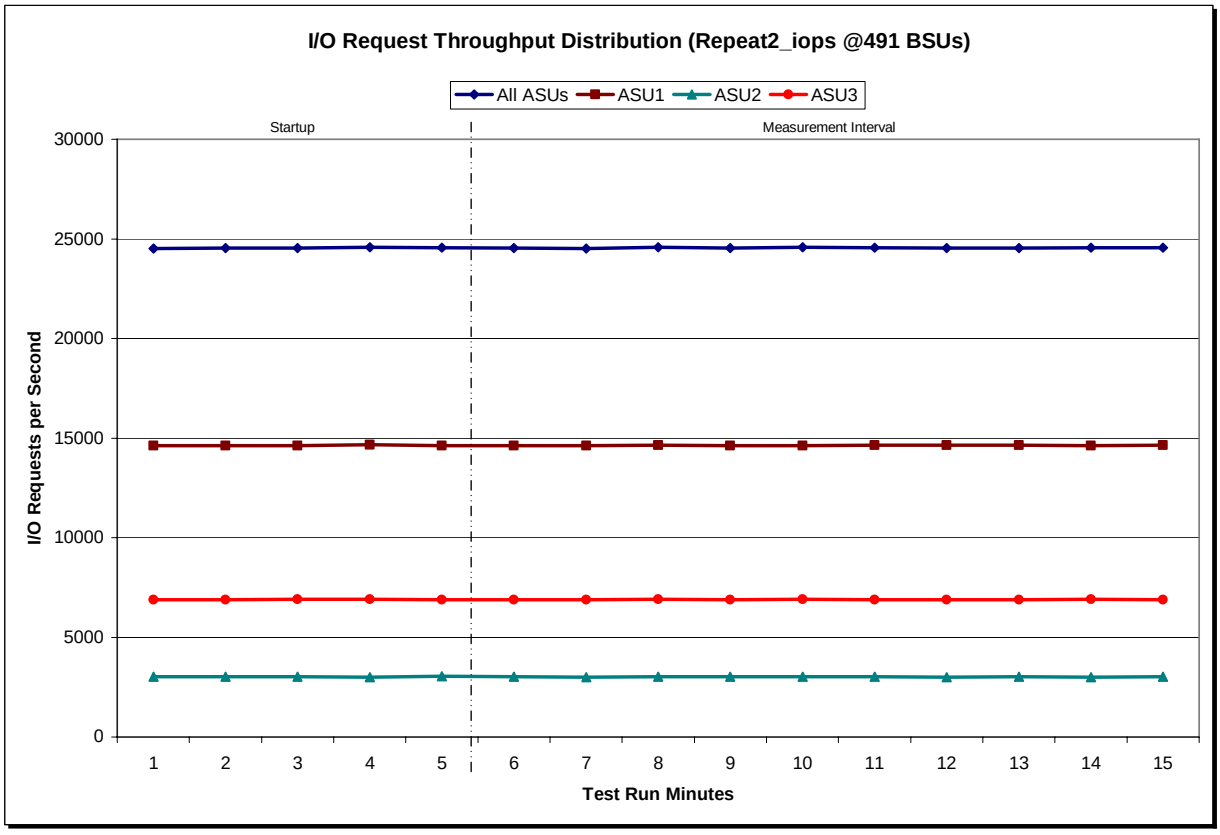
Repeatability 2 LRT –Average Response Time (ms) Distribution Graph



Repeatability 2 IOPS – I/O Request Throughput Distribution Data

491 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	19:56:27	20:01:28	0-4	0:05:01
Measurement Interval	20:01:28	20:11:28	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	24,509.03	14,611.42	3,018.50	6,879.12
1	24,538.23	14,632.20	3,020.00	6,886.03
2	24,542.70	14,626.20	3,013.15	6,903.35
3	24,587.57	14,661.75	3,012.87	6,912.95
4	24,566.43	14,630.23	3,036.35	6,899.85
5	24,534.13	14,615.48	3,025.97	6,892.68
6	24,513.95	14,618.95	3,007.92	6,887.08
7	24,569.43	14,645.98	3,017.15	6,906.30
8	24,530.15	14,620.43	3,013.02	6,896.70
9	24,579.10	14,631.27	3,034.15	6,913.68
10	24,557.17	14,640.20	3,020.18	6,896.78
11	24,545.53	14,643.68	3,006.42	6,895.43
12	24,533.05	14,634.28	3,016.35	6,882.42
13	24,551.12	14,632.60	3,011.15	6,907.37
14	24,559.97	14,639.80	3,019.97	6,900.20
Average	***24,547.36***	***14,632.27***	***3,017.23***	***6,897.87***

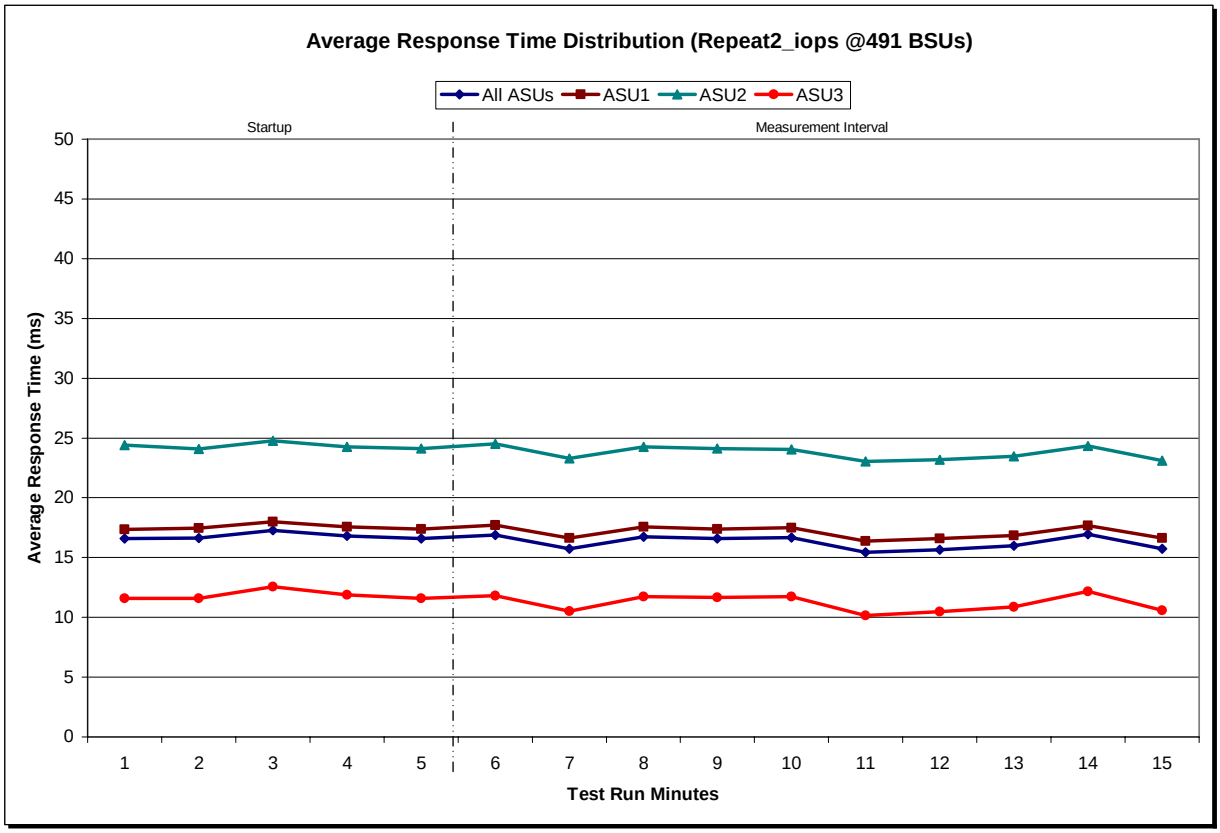
Repeatability 2 IOPS – I/O Request Throughput Distribution Graph



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

491 BSUs	Start	Stop	Interval	Duration
Start-Up/Ramp-Up	19:56:27	20:01:28	0-4	0:05:01
Measurement Interval	20:01:28	20:11:28	3-14	0:10:00
60 second intervals	**All ASUs**	**ASU1**	**ASU2**	**ASU3**
0	16.60	17.34	24.39	11.59
1	16.62	17.44	24.09	11.59
2	17.29	17.99	24.77	12.56
3	16.80	17.58	24.27	11.88
4	16.59	17.38	24.12	11.59
5	16.90	17.73	24.50	11.79
6	15.73	16.64	23.30	10.50
7	16.75	17.57	24.27	11.73
8	16.61	17.39	24.12	11.68
9	16.67	17.48	24.03	11.74
10	15.46	16.39	23.02	10.15
11	15.67	16.58	23.18	10.47
12	15.98	16.84	23.46	10.87
13	16.94	17.67	24.34	12.16
14	15.73	16.63	23.12	10.57
Average	***16.24***	***17.09***	***23.73***	***11.17***

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	0.0348	0.2812	0.0700	0.2101	0.0180	0.0699	0.0346	0.2814
COV	0.023	0.005	0.009	0.004	0.016	0.006	0.011	0.006

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	0.0349	0.2809	0.0700	0.2101	0.0180	0.0700	0.0350	0.2812
COV	0.005	0.001	0.002	0.002	0.006	0.002	0.005	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	0.0347	0.2810	0.0700	0.2097	0.0181	0.0703	0.0348	0.2815
COV	0.017	0.004	0.008	0.005	0.013	0.007	0.017	0.004

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	0.0351	0.2810	0.0700	0.2100	0.0180	0.0700	0.0349	0.2810
COV	0.003	0.001	0.003	0.002	0.004	0.003	0.005	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.*

The SPC-1 Workload Generator will write 16 block I/O requests at random over the total Addressable Storage Capacity of the TSC for ten (10) minutes at a minimum of 25% of the load used to generate the SPC-1 IOPS™ primary metric. The bit pattern selected to be written to each block as well as the address of the block will be retained in a log file.

The Tested Storage Configuration (TSC) will be 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.

The SPC-1 Workload Generator will then use the above log file to verify each block written contains the correct bit pattern.

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 71.

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	30,917,488
Total Number of Logical Blocks Verified	28,958,208
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 SGI® InfiniteStorage 5000-SP 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 SGI® InfiniteStorage 5000-SP.

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.

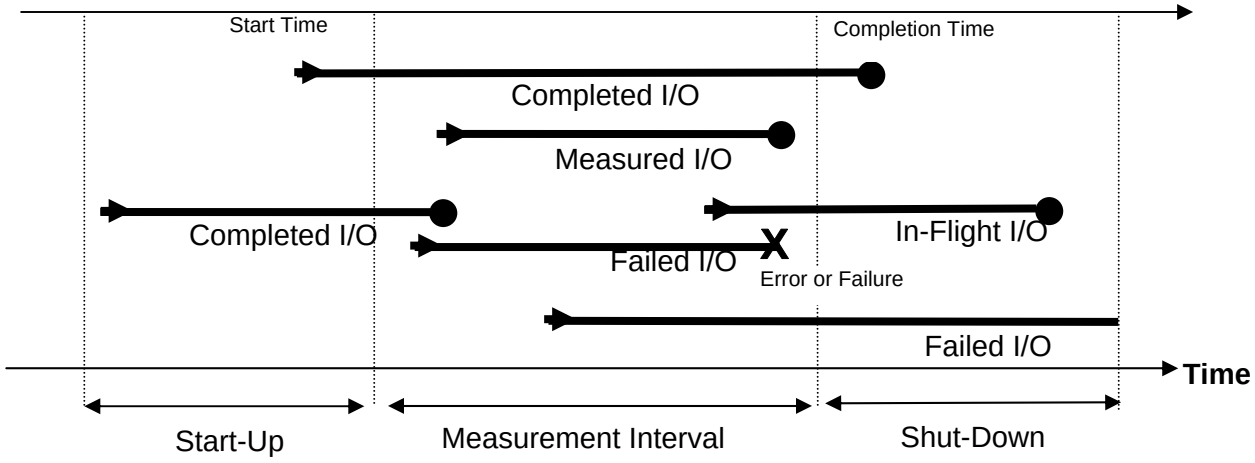
Test: A collection of Test Phases and or Test Runs sharing a common objective.

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

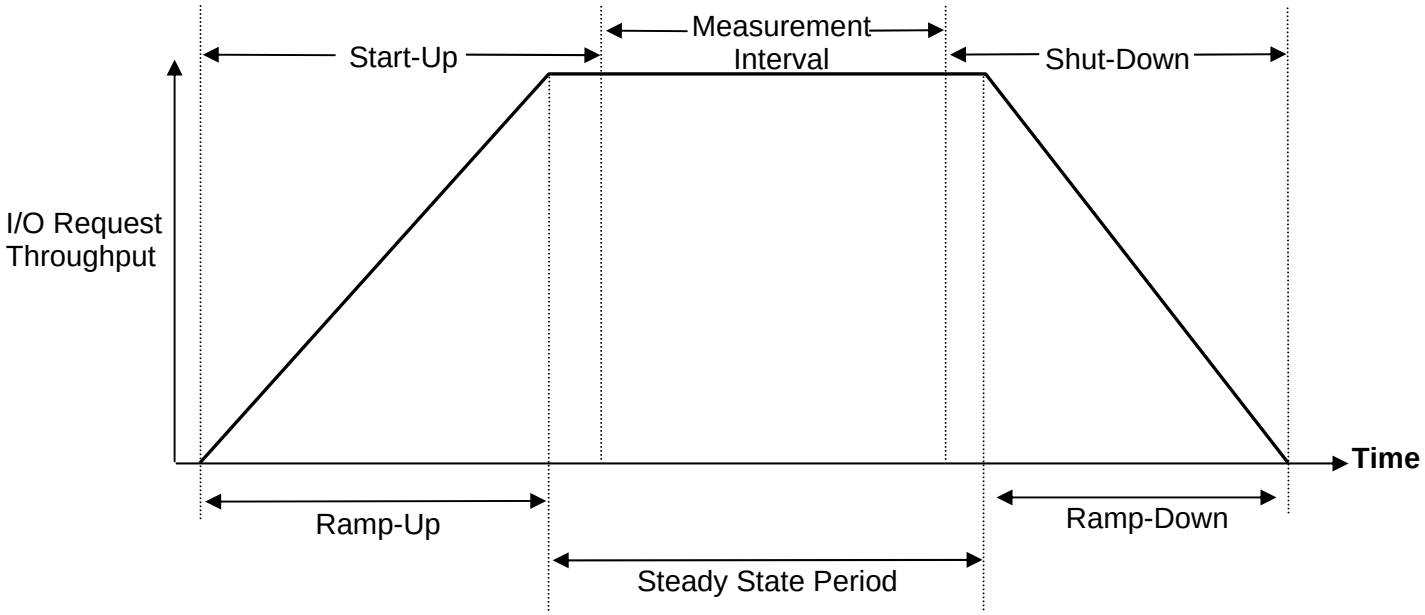
period, Shut-Down period, and Ramp-Down period as illustrated in the "SPC-1 Test Run Components" below. All SPC-1 Test Runs shall have a Steady State period and a Measurement Interval.

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 Server 2003 Registry Changes

Registry Parameter	Name	Type	Default Value	New Value
\HKEY_LOCAL_MACHINE\CurrentControlSet\Services\Lsi_sas2\Parameters\Device	DriverParameter	REG_SZ	32	MaximumTargetQueueDepth=254;
\HKEY_LOCAL_MACHINE\CurrentControlSet\Services\Disk	TimeOutValue	REG_DWORD	0x3C	0xa0

MaximumTargetQueueDepth - Change the SAS HBA driver maximum queue depth per device from 32 to 254.

TimeOutValue - Change the time that Windows will wait for a response to an IO command from 60 to 160 seconds.

LSI HBA BIOS Modifications

Configurable via **lsiutil** utility *(option 10 – Change IOC settings (interrupt coalescing))*:

Disable Interrupt Coalescing

Interrupt Coalescing - Disable the HBA feature to send multiple messages to the host processor during a single interrupt.

Configurable via **lsiutil** utility *(option 13 – Change SAS IO Unit settings)*:

Driver Parameter	Default Value	New Value
SAS Max Queue Depth, Narrow	0	65535
SAS Max Queue Depth, Wide	0	65535
Device Missing Report Delay	0	144
Device Missing I/O Delay	0	8

SAS Max Queue Depth, Narrow - Change the queue depth allowed for IO's to each narrow SAS device from 0 (device maximum) to 255.

SAS Max Queue Depth, Wide - Change the queue depth allowed for IO's to each wide SAS device from 0 (device maximum) to 255.

Device Missing Report Delay - Change the number of seconds that the HBA will delay reporting a target or expander as missing after it becomes unavailable from 10 to 144 seconds.

Device Missing I/O Delay - Change the number of seconds the HBA will delay replying to SCSI initiator messages when the addressed device is missing due to the inability to access the target device from 5 to 8 seconds.

APPENDIX C: TESTED STORAGE CONFIGURATION (TSC) CREATION

Before creating volumes on the storage array, please refer to Appendix B *(page 63)* for a listing of the required Windows Server 2003 registry and HBA BIOS modifications.

Storage Array Volume Creation

The storage management utility, **SANtricity**, was used to create 8 volume groups on the storage subsystem. Each volume group contains 1 RAID1 (mirrored) volumes. All eight RAID1 volumes are visible by the attached host.

The physical storage volumes are created on the storage array using the SANtricity Storage Manger script editor. Launch SANtricity Storage Manager. From the Enterprise Management window, right-click the name of the storage array that you will be creating volumes on and select ***Execute Script*** from the pop-up menu. In the Script Editor window load the **SPC1_96drive_HIC_turbo.cfg** script *(listed below)*. Once the script is loaded, select ***Execute*** from the Tools menu. The **SPC1_96drive_HIC_turbo.cfg** script appears at the end of the appendix.

SPC-1 Logical Volume Creation

The steps that follow are required to define the Windows partitions, volumes, and stripe sets that will be used by the SPC-1 benchmark and are executed on the host.

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 the Disk Management utility under Computer Management.
3. Convert all of the storage system volumes to Dynamic Disks.
4. Create a Windows Striped (RAID 0) volume using all eight 32MB partitions.
5. Delete the remaining large volume on each of the Dynamic Disks.
6. Create a Windows Striped (RAID 0) volume for ASU 3.
    a. Select all eight volumes.
    b. Set capacity to 78008 MB.
    c. Assign drive letter “N” to the volume. Do not format the volume.
7. Create a Windows Striped (RAID 0) volume for ASU 1.
    a. Select all eight volumes.
    b. Set capacity to 351036 MB.
    c. Assign drive letter “L” to the volume. Do not format the volume.
8. Create a Windows Striped (RAID 0) volume for ASU 2.
    a. Select all eight volumes.
    b. Set capacity to 351036 MB.
    c. Assign drive letter “M” to the volume. Do not format the volume.
9. Reboot the Host System.

SPC1_96drive_HIC_turbo.cfg

Using the SANtricity scripting utility and the following SMCLI script, configure the array as defined:

```
// Logical configuration information from Storage Array bmsmc1a.
// Firmware package version for Storage Array bmsmc1a = 07.70.16.00
// NVSRAM package version for Storage Array bmsmc1a = N26X0-770834-407

//on error stop;

// Uncomment the two lines below to delete the existing configuration.
show "Deleting the existing configuration.";
clear storageArray configuration;



// Storage Array global logical configuration script commands
show "Setting the Storage Array user label to bmsmc1a.";
set storageArray userLabel="bmsmc1a";

show "Setting the Storage Array media scan rate to disabled.";
set storageArray mediaScanRate=disabled;

// Uncomment the three lines below to remove the default volume (if exists). NOTE:
Default volume name is always = "Unnamed".
//on error continue;
show "Deleting the default volume created during the removal of the existing
configuration.";
delete volume["Unnamed"] removeVolumeGroup=true;
on error stop;

// Copies the hot spare settings
// NOTE: These statements are wrapped in on-error continue and on-error stop
statements to
// account for minor differences in capacity from the drive of the Storage Array on
which the
// configuration was saved to that of the drives on which the configuration will be
copied.
show "Setting the Storage Array cache block size to 32.";
set storageArray cacheBlockSize=32;

show "Setting the Storage Array to begin cache flush at 80% full.";
set storageArray cacheFlushStart=80;

show "Setting the Storage Array to end cache flush at 80% full.";
set storageArray cacheFlushStop=80;

// Creating Host Topology

show "Creating RAID 1 Volume LUN_0 on new Volume Group 0.";
//This command creates volume group <0> and the initial volume <LUN_0> with offset 0
on the volume group.
// NOTE: For Volume Groups that use all available capacity, the last Volume on this
group is
// created using all remaining capacity by omitting the capacity= volume creation
parameter.
create volume drives=(0,1 0,2 0,3 0,4 0,5 0,6 0,7 0,8 0,9 0,10 0,11 0,12)
raidLevel=1 userLabel="LUN_0" volumeGroupUserLabel="0" owner=A segmentSize=128
capacity=877247070208 Bytes dssPreAllocate=true securityType=none;
show "Setting additional attributes for Volume LUN_0.";
// Configuration settings that can not be set during Volume creation.
```

```
set volume["LUN_0"] cacheFlushModifier=10;
set volume["LUN_0"] cacheWithoutBatteryEnabled=false;
set volume["LUN_0"] mirrorEnabled=true;
set volume["LUN_0"] readCacheEnabled=true;
set volume["LUN_0"] writeCacheEnabled=true;
set volume["LUN_0"] mediaScanEnabled=false;
set volume["LUN_0"] redundancyCheckEnabled=false;
set volume["LUN_0"] readAheadMultiplier=0;
set volume["LUN_0"] modificationPriority=high;
set volume["LUN_0"] preReadRedundancyCheck=false;
show "Creating Volume-to-LUN Mapping for Volume LUN_0 to LUN 0.";
set volume ["LUN_0"] logicalUnitNumber=0 hostGroup=defaultGroup;

show "Creating RAID 1 Volume LUN_1 on new Volume Group 1.";
//This command creates volume group <1> and the initial volume <LUN_1> with offset 0
on the volume group.
// NOTE: For Volume Groups that use all available capacity, the last Volume on this
group is
// created using all remaining capacity by omitting the capacity= volume creation
parameter.
create volume drives=(0,13 0,14 0,15 0,16 0,17 0,18 0,19 0,20 0,21 0,22 0,23 0,24)
raidLevel=1 userLabel="LUN_1" volumeGroupUserLabel="1" owner=B segmentSize=128
capacity=877247070208 Bytes dssPreAllocate=true securityType=none;
show "Setting additional attributes for Volume LUN_1.";
// Configuration settings that can not be set during Volume creation.
set volume["LUN_1"] cacheFlushModifier=10;
set volume["LUN_1"] cacheWithoutBatteryEnabled=false;
set volume["LUN_1"] mirrorEnabled=true;
set volume["LUN_1"] readCacheEnabled=true;
set volume["LUN_1"] writeCacheEnabled=true;
set volume["LUN_1"] mediaScanEnabled=false;
set volume["LUN_1"] redundancyCheckEnabled=false;
set volume["LUN_1"] readAheadMultiplier=0;
set volume["LUN_1"] modificationPriority=high;
set volume["LUN_1"] preReadRedundancyCheck=false;
show "Creating Volume-to-LUN Mapping for Volume LUN_1 to LUN 1.";
set volume ["LUN_1"] logicalUnitNumber=1 hostGroup=defaultGroup;

show "Creating RAID 1 Volume LUN_2 on new Volume Group 2.";
//This command creates volume group <2> and the initial volume <LUN_2> with offset 0
on the volume group.
// NOTE: For Volume Groups that use all available capacity, the last Volume on this
group is
// created using all remaining capacity by omitting the capacity= volume creation
parameter.
create volume drives=(1,1 1,2 1,3 1,4 1,5 1,6 1,7 1,8 1,9 1,10 1,11 1,12)
raidLevel=1 userLabel="LUN_2" volumeGroupUserLabel="2" owner=A segmentSize=128
capacity=877247070208 Bytes dssPreAllocate=true securityType=none;
show "Setting additional attributes for Volume LUN_2.";
// Configuration settings that can not be set during Volume creation.
set volume["LUN_2"] cacheFlushModifier=10;
set volume["LUN_2"] cacheWithoutBatteryEnabled=false;
set volume["LUN_2"] mirrorEnabled=true;
set volume["LUN_2"] readCacheEnabled=true;
set volume["LUN_2"] writeCacheEnabled=true;
set volume["LUN_2"] mediaScanEnabled=false;
set volume["LUN_2"] redundancyCheckEnabled=false;
set volume["LUN_2"] readAheadMultiplier=0;
set volume["LUN_2"] modificationPriority=high;
set volume["LUN_2"] preReadRedundancyCheck=false;
show "Creating Volume-to-LUN Mapping for Volume LUN_2 to LUN 2.";
set volume ["LUN_2"] logicalUnitNumber=2 hostGroup=defaultGroup;
```

```
show "Creating RAID 1 Volume LUN_3 on new Volume Group 3.";
//This command creates volume group <3> and the initial volume <LUN_3> with offset 0
on the volume group.
// NOTE: For Volume Groups that use all available capacity, the last Volume on this
group is
// created using all remaining capacity by omitting the capacity= volume creation
parameter.
create volume drives=(1,13 1,14 1,15 1,16 1,17 1,18 1,19 1,20 1,21 1,22 1,23 1,24)
raidLevel=1 userLabel="LUN_3" volumeGroupUserLabel="3" owner=B segmentSize=128
capacity=877247070208 Bytes dssPreAllocate=true securityType=none;
show "Setting additional attributes for Volume LUN_3.";
// Configuration settings that can not be set during Volume creation.
set volume["LUN_3"] cacheFlushModifier=10;
set volume["LUN_3"] cacheWithoutBatteryEnabled=false;
set volume["LUN_3"] mirrorEnabled=true;
set volume["LUN_3"] readCacheEnabled=true;
set volume["LUN_3"] writeCacheEnabled=true;
set volume["LUN_3"] mediaScanEnabled=false;
set volume["LUN_3"] redundancyCheckEnabled=false;
set volume["LUN_3"] readAheadMultiplier=0;
set volume["LUN_3"] modificationPriority=high;
set volume["LUN_3"] preReadRedundancyCheck=false;
show "Creating Volume-to-LUN Mapping for Volume LUN_3 to LUN 3.";
set volume ["LUN_3"] logicalUnitNumber=3 hostGroup=defaultGroup;

show "Creating RAID 1 Volume LUN_4 on new Volume Group 4.";
//This command creates volume group <4> and the initial volume <LUN_4> with offset 0
on the volume group.
// NOTE: For Volume Groups that use all available capacity, the last Volume on this
group is
// created using all remaining capacity by omitting the capacity= volume creation
parameter.
create volume drives=(2,1 2,2 2,3 2,4 2,5 2,6 2,7 2,8 2,9 2,10 2,11 2,12)
raidLevel=1 userLabel="LUN_4" volumeGroupUserLabel="4" owner=A segmentSize=128
capacity=877247070208 Bytes dssPreAllocate=true securityType=none;
show "Setting additional attributes for Volume LUN_4.";
// Configuration settings that can not be set during Volume creation.
set volume["LUN_4"] cacheFlushModifier=10;
set volume["LUN_4"] cacheWithoutBatteryEnabled=false;
set volume["LUN_4"] mirrorEnabled=true;
set volume["LUN_4"] readCacheEnabled=true;
set volume["LUN_4"] writeCacheEnabled=true;
set volume["LUN_4"] mediaScanEnabled=false;
set volume["LUN_4"] redundancyCheckEnabled=false;
set volume["LUN_4"] readAheadMultiplier=0;
set volume["LUN_4"] modificationPriority=high;
set volume["LUN_4"] preReadRedundancyCheck=false;
show "Creating Volume-to-LUN Mapping for Volume LUN_4 to LUN 4.";
set volume ["LUN_4"] logicalUnitNumber=4 hostGroup=defaultGroup;

show "Creating RAID 1 Volume LUN_5 on new Volume Group 5.";
//This command creates volume group <5> and the initial volume <LUN_5> with offset 0
on the volume group.
// NOTE: For Volume Groups that use all available capacity, the last Volume on this
group is
// created using all remaining capacity by omitting the capacity= volume creation
parameter.
create volume drives=(2,13 2,14 2,15 2,16 2,17 2,18 2,19 2,20 2,21 2,22 2,23 2,24)
raidLevel=1 userLabel="LUN_5" volumeGroupUserLabel="5" owner=B segmentSize=128
capacity=877247070208 Bytes dssPreAllocate=true securityType=none;
show "Setting additional attributes for Volume LUN_5.";
// Configuration settings that can not be set during Volume creation.
set volume["LUN_5"] cacheFlushModifier=10;
```

```
set volume["LUN_5"] cacheWithoutBatteryEnabled=false;
set volume["LUN_5"] mirrorEnabled=true;
set volume["LUN_5"] readCacheEnabled=true;
set volume["LUN_5"] writeCacheEnabled=true;
set volume["LUN_5"] mediaScanEnabled=false;
set volume["LUN_5"] redundancyCheckEnabled=false;
set volume["LUN_5"] readAheadMultiplier=0;
set volume["LUN_5"] modificationPriority=high;
set volume["LUN_5"] preReadRedundancyCheck=false;
show "Creating Volume-to-LUN Mapping for Volume LUN_5 to LUN 5.";
set volume ["LUN_5"] logicalUnitNumber=5 hostGroup=defaultGroup;

show "Creating RAID 1 Volume LUN_6 on new Volume Group 6.";
//This command creates volume group <6> and the initial volume <LUN_6> with offset 0
on the volume group.
// NOTE: For Volume Groups that use all available capacity, the last Volume on this
group is
// created using all remaining capacity by omitting the capacity= volume creation
parameter.
create volume drives=(3,1 3,2 3,3 3,4 3,5 3,6 3,7 3,8 3,9 3,10 3,11 3,12)
raidLevel=1 userLabel="LUN_6" volumeGroupUserLabel="6" owner=A segmentSize=128
capacity=877247070208 Bytes dssPreAllocate=true securityType=none;
show "Setting additional attributes for Volume LUN_6.";
// Configuration settings that can not be set during Volume creation.
set volume["LUN_6"] cacheFlushModifier=10;
set volume["LUN_6"] cacheWithoutBatteryEnabled=false;
set volume["LUN_6"] mirrorEnabled=true;
set volume["LUN_6"] readCacheEnabled=true;
set volume["LUN_6"] writeCacheEnabled=true;
set volume["LUN_6"] mediaScanEnabled=false;
set volume["LUN_6"] redundancyCheckEnabled=false;
set volume["LUN_6"] readAheadMultiplier=0;
set volume["LUN_6"] modificationPriority=high;
set volume["LUN_6"] preReadRedundancyCheck=false;
show "Creating Volume-to-LUN Mapping for Volume LUN_6 to LUN 6.";
set volume ["LUN_6"] logicalUnitNumber=6 hostGroup=defaultGroup;

show "Creating RAID 1 Volume LUN_7 on new Volume Group 7.";
//This command creates volume group <7> and the initial volume <LUN_7> with offset 0
on the volume group.
// NOTE: For Volume Groups that use all available capacity, the last Volume on this
group is
// created using all remaining capacity by omitting the capacity= volume creation
parameter.
create volume drives=(3,13 3,14 3,15 3,16 3,17 3,18 3,19 3,20 3,21 3,22 3,23 3,24)
raidLevel=1 userLabel="LUN_7" volumeGroupUserLabel="7" owner=B segmentSize=128
capacity=877247070208 Bytes dssPreAllocate=true securityType=none;
show "Setting additional attributes for Volume LUN_7.";
// Configuration settings that can not be set during Volume creation.
set volume["LUN_7"] cacheFlushModifier=10;
set volume["LUN_7"] cacheWithoutBatteryEnabled=false;
set volume["LUN_7"] mirrorEnabled=true;
set volume["LUN_7"] readCacheEnabled=true;
set volume["LUN_7"] writeCacheEnabled=true;
set volume["LUN_7"] mediaScanEnabled=false;
set volume["LUN_7"] redundancyCheckEnabled=false;
set volume["LUN_7"] readAheadMultiplier=0;
set volume["LUN_7"] modificationPriority=high;
set volume["LUN_7"] preReadRedundancyCheck=false;
show "Creating Volume-to-LUN Mapping for Volume LUN_7 to LUN 7.";
set volume ["LUN_7"] logicalUnitNumber=7 hostGroup=defaultGroup;
```

```
// Disable Auto Volume Transfer (AVT) for all host types
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, Repeatability and Persistence Tests, is listed below.

```
javaparms="-Xms512m -Xmx1024m"

sd=asu1_1,lun=\\.\L:,size=2944703397888
sd=asu2_1,lun=\\.\M:,size=2944703397888
sd=asu3_1,lun=\\.\N:,size=654378532864

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.

```
REM Get storage array profile
"c:\program files\StorageManager\client\smcli" 172.22.201.161 172.22.201.162 -c
"show storageArray profile;" -o
"c:\bench\vdbench\spc1\output\spc1_profile_before_run.txt"

copy /y spc1_iops.cfg spc1.cfg
java metrics -b 491 -s 300
java repeat1 -b 491 -s 300
java repeat2 -b 491 -s 300

copy /y spc1_persist.cfg spc1.cfg
java persist1 -b 491
```

Persistence Test Run 2

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

```
copy /y spc1_persist.cfg spc1.cfg
java persist2

REM Get storage array profile
"c:\program files\StorageManager\client\smcli" 172.22.201.161 172.22.201.162 -c
"show storageArray profile;" -o
"c:\bench\vdbench\spc1\output\spc1_profile_after_run.txt"
```