



SPC BENCHMARK 2™
FULL DISCLOSURE REPORT

SUN MICROSYSTEMS, INC.
SUN STORAGE TEK 3320 SCSI ARRAY

SPC-2™ V1.1

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AUDIT CERTIFICATION



Leah Schoeb
Sun Microsystems, Inc.
5300 Riata Park Court AUS08
Austin, TX 78721

August 7, 2006

The SPC Benchmark 2™ results listed below for the Sun StorageTek 3320 SCSI Array were produced in compliance with the SPC Benchmark 2™ V1.1 Onsite Audit requirements.

SPC Benchmark 2™ V1.1 Results	
Tested Storage Configuration (TSC) Name: Sun StorageTek 3320 SCSI Array	
Metric	Reported Result
SPC-2 MBPS™	237.43
SPC-2 Price-Performance	\$171.92/SPC-2 MBPS™
Total ASU Capacity	1,127,429 GB
Data Protection Level	Mirroring
Total Price (including three-year maintenance)	\$40,819

The following SPC Benchmark 2™ Onsite Audit requirements were reviewed and found compliant with V1.1 of the SPC Benchmark 2™ specification:

- A Letter of Good Faith, signed by a senior executive.
- The following Data Repository storage items were verified by physical inspection and information supplied by Sun Microsystems, Inc.:
 - ✓ Physical Storage Capacity and related requirements.
 - ✓ Configured Storage Capacity and related requirements.
 - ✓ Addressable Storage Capacity and related requirements.
 - ✓ Capacity of each Logical Volume and related requirements.
 - ✓ Capacity of the Application Storage Unit (ASU) and related requirements.
- An appropriate diagram of the Benchmark Configuration (BC)/Tested Storage Configuration (TSC).
- Physical verification of the components to match the above diagram.
- Listings and commands to create and configure the Benchmark Configuration/Tested Storage Configuration, including each customer tunable parameter or option that was changed from its default value.

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

AUDIT CERTIFICATION (CONT.)

Sun StorageTek 3320 SCSI Array
SPC-2 Audit Certification

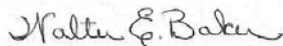
Page 2

- The following Host System items were verified by physical inspection and information supplied by Sun Microsystems, Inc.:
 - ✓ Required Host System configuration information.
 - ✓ The TSC boundary within each Host System.
- The following SPC-2 Workload Generator information was verified by physical inspection and information supplied by Sun Microsystems, Inc.:
 - ✓ The presence and version number of the Workload Generator on each Host System.
 - ✓ Commands and parameters used to configure the SPC-2 Workload Generator.
- The execution of each Test, Test Phase, and Test Run was observed and found compliant with all of the requirements and constraints of Clauses 5 and 6 of the SPC-2 Benchmark Specification.
- The Test Results Files and resultant Summary Results Files received for each of the following were authentic, accurate, and compliant with all of the requirements and constraints of Clauses 5 and 6 of the SPC-2 Benchmark Specification:
 - ✓ Data Persistence Test
 - ✓ Large File Processing Test
 - ✓ Large Database Query Test
 - ✓ Video on Demand Delivery Test
- There were no differences between the Tested Storage Configuration (TSC) used for the benchmark and Priced Storage Configuration.
- The final version of the pricing spreadsheet met all of the requirements and constraints of Clause 9 of the SPC-2 Benchmark Specification.
- The Full Disclosure Report (FDR) met all of the requirements in Clause 10 of the SPC-2 Benchmark Specification.

Audit Notes:

There were no additional audit notes or exceptions.

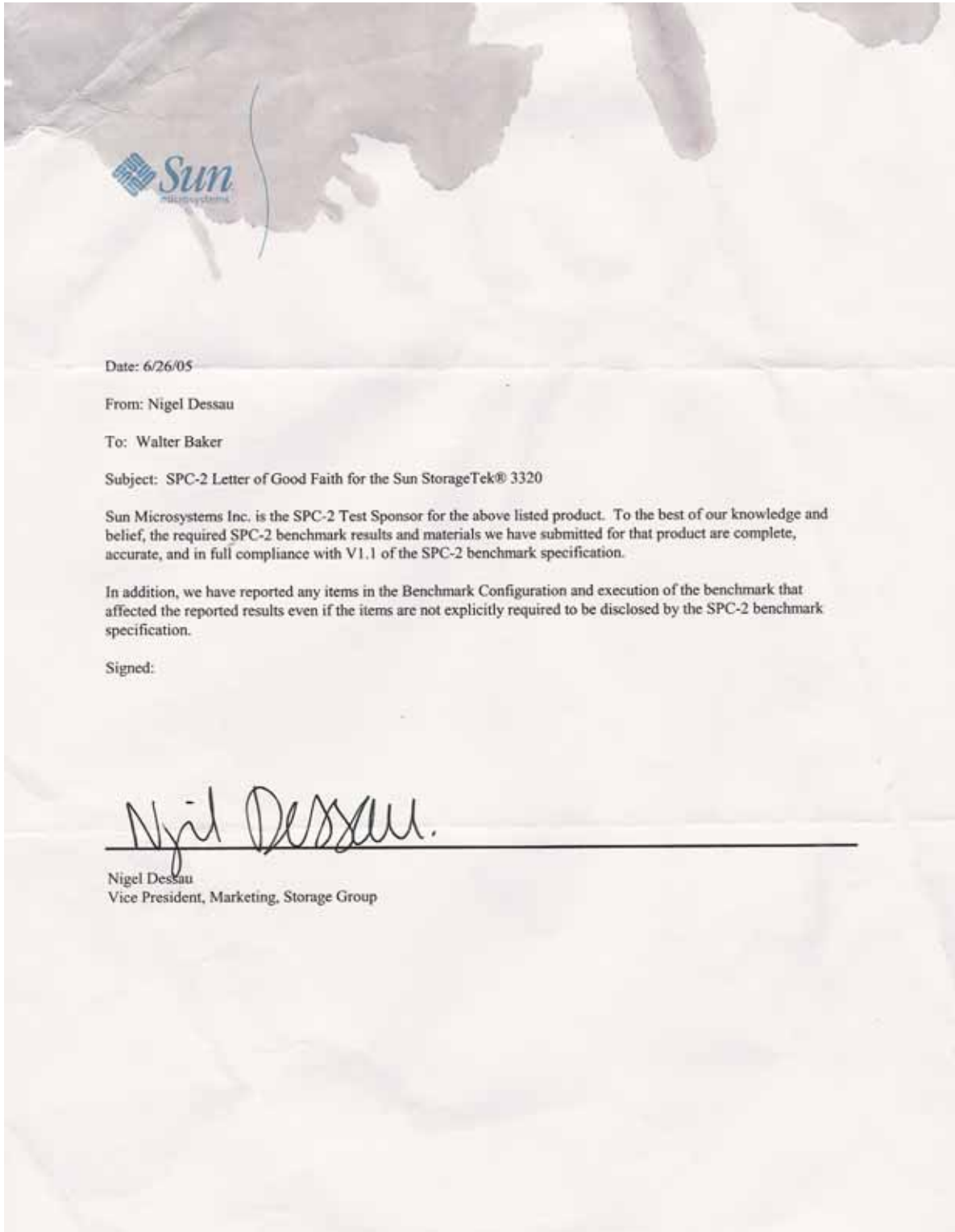
Respectfully,



Walter E. Baker
SPC Auditor

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

LETTER OF GOOD FAITH



EXECUTIVE SUMMARY

Test Sponsor and Contact Information

Test Sponsor and Contact Information	
Test Sponsor Primary Contact	Sun Microsystems, Inc. – http://www.sun.com Leah Schoeb – leah.schoeb@sun.com 5300 Riata Park Court AUS08 Austin, TX 78721 Phone: (512) 401-1227 FAX: (512) 266-2523
Test Sponsor Alternate Contact	Sun Microsystems, Inc. – http://www.sun.com Tom Scheffield – tom.sheffield@sun.com 500 Eldorado Blvd. UBRM05 Broomfield, CO 80021 Phone: (303) 558-3112 FAX: (303) 272-7491
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-2 Specification revision number	V1.1
SPC-2 Workload Generator revision number	spc2rc9f
Date Results were first used publicly	August 7, 2006
Date FDR was submitted to the SPC	August 7, 2006
Date the TSC will be available for shipment to customers	currently available
Date the TSC completed audit certification	August 7, 2006

SPC-2 Reported Data

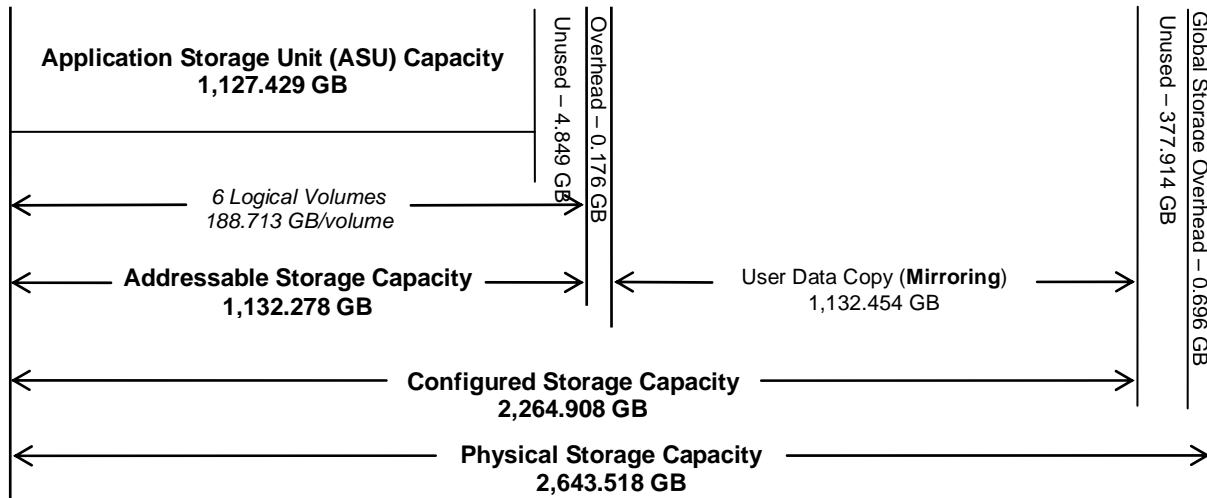
SPC-2 Reported Data consists of three groups of information:

- The following SPC-2 Primary Metrics, which characterize the overall benchmark result:
 - SPC-2 MBPS™
 - SPC-2 Price Performance
 - Application Storage Unit (ASU) Capacity
- Supplemental data to the SPC-2 Primary Metrics.
 - Total Price
 - Data Protection Level
- Reported Data for each SPC Test: Large File Processing (LFP), Large Database Query (LDQ), and Video on Demand Delivery (VOD) Test.

Sun StorageTek 3320 SCSI Array				
SPC-2 MBPS™	SPC-2 Price-Performance	ASU Capacity (GB)	Total Price	Data Protection Level
237.43	\$171.92	1,127.429	\$40,819	Mirroring
<i>The above SPC-2 MBPS™ value represents the aggregate data rate of all three SPC-2 workloads: Large File Processing (LFP), Large Database Query (LDQ), and Video On Demand (VOD)</i>				
SPC-2 Large File Processing (LFP) Reported Data				
	Data Rate (MB/second)	Number of Streams	Data Rate per Stream	Price-Performance
LFP Composite	217.25			\$187.89
Write Only:				
1024 KiB Transfer	164.50	28	5.88	
256 KiB Transfer	154.12	22	7.01	
Read-Write:				
1024 KiB Transfer	240.50	16	15.03	
256 KiB Transfer	207.87	16	12.99	
Read Only:				
1024 KiB Transfer	275.92	20	13.80	
256 KiB Transfer	260.58	14	18.61	
<i>The above SPC-2 Data Rate value for LFP Composite represents the aggregate performance of all three LFP Test Phases: (Write Only, Read-Write, and Read Only).</i>				
SPC-2 Large Database Query (LDQ) Reported Data				
	Data Rate (MB/second)	Number of Streams	Data Rate per Stream	Price-Performance
LDQ Composite	247.31			\$165.05
1024 KiB Transfer Size				
4 I/Os Outstanding	274.56	12	22.88	
1 I/O Outstanding	273.84	12	22.82	
64 KiB Transfer Size				
4 I/Os Outstanding	220.78	14	15.77	
1 I/O Outstanding	220.07	12	18.34	
<i>The above SPC-2 Data Rate value for LDQ Composite represents the aggregate performance of the two LDQ Test Phases: (1024 KiB and 64 KiB Transfer Sizes).</i>				
SPC-2 Video On Demand (VOD) Reported Data				
	Data Rate (MB/second)	Number of Streams	Data Rate per Stream	Price-Performance
	247.73	315	0.79	\$164.78

Storage Capacities and Relationships

The following diagram (not to scale) documents the various storage capacities and their relationships, used in this SPC-2 benchmark measurement.



Tested Storage Configuration Pricing (Priced Storage Configuration)

Part Number	Description	Quantity	US List	Disc.	Ave. Price
See below	Sun StorEdge 3320 Fibre Channel Array	1	\$23,387	38%	\$14,500
	2 FC-AL HW RAID Controllers				
	1GB Std cache per Controller				
	2 AC power supplies				
	Sun StorEdge Configuration Service				
	Rack Ready				
See below	73 GB/15K Drives	12	\$14,537	38%	\$18,026
	Sun StorEdge 3320 Fibre Channel Array JBOD	2			
	Rack Ready				
	2 DC power supplies				
W9D-SE3320-3G	3-Year Maintenance Agreement Gold	3	\$4,212.00	40%	\$7,582
	SGXPCI2SCSILM320-Z	2	\$445.00	20%	\$712
Total					\$40,819

One 3320 RAID UNIT:

2 RAID XATO AC Parts/Descriptions:

qty 1 TA3320R01N00DISK SE3320-RAID CHASSIS-RR
 qty 1 TA-3000-2UAC-KIT 2 * AC PWR Supply/Fan Mod, 2U
 qty 2 TB-3320-CTRL-512M 3320 CTRL, U320 RAID, 512MB Cache
 qty 12 TB-SC1NC-73G15K Drive, 73GB/15K U320 SCSI
 qty 1 TA-3320-2RAID-ACSK 3320-2RAID-AC-SHIP KIT

US List Price (ea)

Ext US List

\$2,547.00 \$2,547.00
 \$900.00 \$900.00
 \$4,300.00 \$8,600.00
 \$945.00 \$11,340.00
 \$0.00 \$0.00

Total Ext: \$23,387.00
Discount: Cat P = 38%
Avg.Price: \$14,499.94

Two 3320 JBOD UNITS:

JBOD XATO AC Parts/Descriptions:

qty 1 TA3320R00N00DISK SE3320-JBOD CHASSIS-RR
 qty 1 TA-3000-2UAC-KIT 2 * AC PWR Supply/Fan Mod, 2U
 qty 12 TB-SC1NC-73G15K Drive, 73GB/15K U320 SCSI
 Qty 1 TA-3320-JBOD-ACSK 3320-JBOD-AC-SHIP KIT

US List Price (ea)

Ext US List

\$2,297.00 \$2,297.00
 \$900.00 \$900.00
 \$945.00 \$11,340.00
 \$0.00 \$0.00

Total Ext One Unit: \$14,537.00
Discount: Cat P = 38%
Avg.Price: \$9,012.94

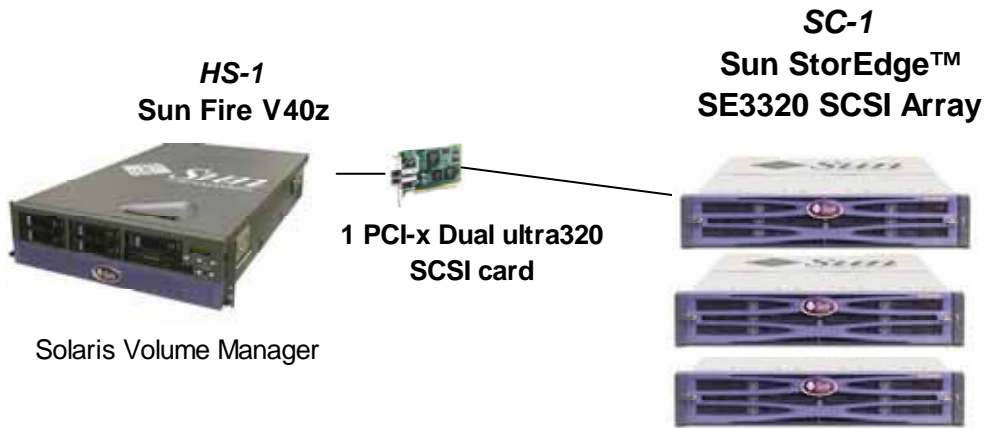
Two Unit Pricing: \$29,074.00
Discount: Cat P = 38%
Avg.Price: \$18,026

The above pricing (three year Gold maintenance) provides maintenance/support for 24 hours per day, 7 days per week for three years with four hour acknowledgement and four hour subsequent response (support engineer onsite or customer replaceable part available).

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

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

Benchmark Configuration/Tested Storage Configuration Diagram



Host System(s) and Tested Storage Configuration Components

Host System:	Tested Storage Configuration (TSC):
UID=HS-1 Sun Fire V40z	1 – PCI-X Dual U320 SCSI HBA
4 - AMD Opteron 2.4 GHz CPUs 1 MB Level 2 cache per CPU	UID=SC-1: Sun StorEdge™ SE3320 SCSI Array
4 GB main memory	2 – Controllers with 1 GB cache each
Solaris 10 FCS Volume Manager	2 channel ports
Solaris 10 FCS	2 JBOD Expansion Units
PCI-X	36 – 73 GB 15K RPM disk drives
WG	

CONFIGURATION INFORMATION

This portion of the Full Disclosure Report documents and illustrates the detailed information necessary to recreate the Benchmark Configuration (BC), including the Tested Storage Configuration (TSC), so that the SPC-2 benchmark result produced by the BC may be independently reproduced.

In each of the following sections of this document, the appropriate Full Disclosure Report requirement, from the SPC-2 benchmark specification, is stated in italics followed by the information to fulfill the stated requirement.

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

Clause 10.6.5.7

The Executive Summary will contain a one page BC/TSC diagram that illustrates all major components of the BC/TSC.

The Benchmark Configuration (BC)/Tested Storage Configuration (TSC) is illustrated on page 16 (*Benchmark Configuration/Tested Storage Configuration Diagram*).

Storage Network Configuration

Clause 9.2.4.4.2

If a storage network was configured as a part of the Tested Storage Configuration and the Benchmark Configuration described in Clause 10.6.5.7 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 10.8.

The storage network configured as a part of the Tested Storage Configuration is illustrated on page 16 (*Benchmark Configuration/Tested Storage Configuration Diagram*).

Host System and Tested Storage Configuration Table

Clause 10.6.5.9

The Executive Summary will contain a table that lists the major components of each Host System and the Tested Storage Configuration.

The components that comprise each Host System and the Tested Storage Configuration are listed in the table that appears on page 16 (*Host System(s) and Tested Storage Configuration Components*).

Customer Tunable Parameters and Options

Clause 10.6.6.1

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 94 contains the customer tunable parameters and options that have been altered from their default values for this benchmark.

Tested Storage Configuration (TSC) Description

Clause 10.6.6.2

The Full Disclosure Report must include sufficient information to recreate the logical representation of the Tested Storage Configuration (TSC). In addition to customer tunable parameters and options (Clause 10.6.6.1), 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 10.6.5.7 and the Storage Network Configuration Diagram in Clause 10.6.5.8.
 - The logical representation of the TSC, configured from the above components that will be presented to the SPC-2 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 95 contains the detailed information that describes how to create and configure the logical TSC.

SPC-2 Workload Generator Storage Configuration

Clause 10.6.6.3

The Full Disclosure Report will include all SPC-2 Workload Generator storage configuration commands and parameters used in the SPC-2 benchmark measurement.

The SPC-2 Workload Generator storage configuration commands and parameters for this measurement appear in “Appendix D: SPC-2 Workload Generator Storage Commands and Parameters” on page 95.

SPC-2 DATA REPOSITORY

This portion of the Full Disclosure Report presents the detailed information that fully documents the various SPC-2 storage capacities and mappings used in the Tested Storage Configuration. “SPC-2 Data Repository Definitions” on page 89 contains definitions of terms specific to the SPC-2 Data Repository.

In each of the following sections of this document, the appropriate Full Disclosure Report requirement, from the SPC-2 benchmark specification, is stated in italics followed by the information to fulfill the stated requirement.

SPC-2 Storage Capacities and Relationships

Two tables and an illustration documenting the storage capacities and relationships of the SPC-2 Storage Hierarchy (Clause 2.1) shall be included in the FDR.

SPC-2 Storage Capacities

SPC-2 Storage Capacities		
Storage Hierarchy Component	Units	Capacity
Total ASU Capacity	Gigabytes (GB)	1,127.429
Addressable Storage Capacity	Gigabytes (GB)	1,132,278
Configured Storage Capacity	Gigabytes (GB)	2,264.908
Physical Storage Capacity	Gigabytes (GB)	2,643.518
Data Protection Overhead (mirror)	Gigabytes (GB)	1,132.454
Required Storage	Gigabytes (GB)	0.176
Global Storage Overhead	Gigabytes (GB)	0.696
Total Unused Storage	Gigabytes (GB)	382.763

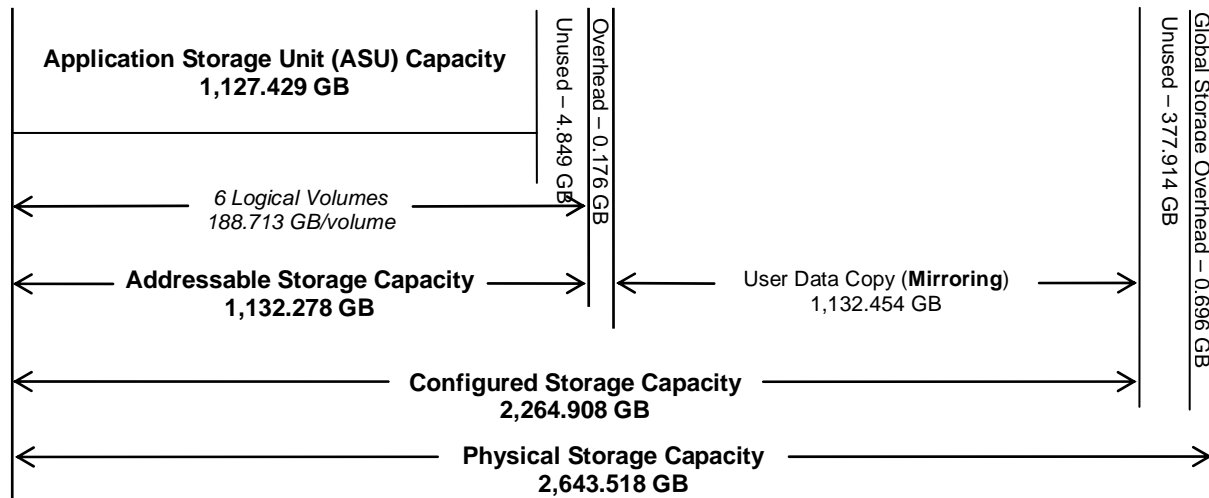
SPC-2 Storage Hierarchy Ratios

	Addressable Storage Capacity	Configured Storage Capacity	Physical Storage Capacity
Total ASU Capacity	99.57%	49.78%	42.65%
Required for Data Protection (Mirroring)		50.00%	42.84%
Addressable Storage Capacity		49.99%	42.83%
Required Storage		0.01%	0.01%
Configured Storage Capacity			85.68%
Global Storage Overhead			0.03%
Unused Storage:			
Addressable	0.43%		
Configured		0.00%	
Physical			14.30%

The Physical Storage Capacity consisted of 2,643.518 GB distributed over 36 disk drives each with a formatted capacity of 73.431 GB. There was 377.91 GB (14.30%) of Unused Storage within the Physical Storage Capacity. Global Storage Overhead consisted of 0.696 GB (0.03%) of Physical Storage Capacity. There was 0.000 GB (0.00%) of Unused Storage within the Configured Storage Capacity. The Total ASU Capacity utilized 99.57% of the Addressable Storage Capacity resulting in 4.849 GB (0.43%) of Unused Storage within the Addressable Storage Capacity.

SPC-2 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 10.6.7.2

A table illustrating the capacity of the Application Storage Unit (ASU) and the mapping of Logical Volumes to ASU will be provided in the FDR. Capacity must be stated in gigabytes (GB) as a value with a minimum of two digits to the right of the decimal point. Each Logical Volume will be sequenced in the table from top to bottom per its position in the contiguous address space of the ASU. Each Logical Volume entry will list its total capacity, the portion of that capacity used for the ASU, and any unused capacity.

Logical Volume (LV) Capacity and Mapping			
ASU (1,127.429 GB)			
	Total Capacity (GB)	Capacity Used (GB)	Capacity Unused (GB)
Logical Volumes 1-6	188.713 per LV	187.905 per LV	0.808 per LV

See the Storage Definition (sd) entries in “Appendix D: SPC-2 Workload Generator Storage Commands and Parameters” on page 95 for more detailed configuration information.

SPC-2 TEST EXECUTION RESULTS

This portion of the Full Disclosure Report documents the results of the various SPC-2 Test, Test Phases, Test Run Sequences, and Test Runs. “SPC-2 Test Execution Definitions” on page 90 contains definitions of terms specific to the SPC-2 Data Repository.

In each of the following sections of this document, the appropriate Full Disclosure Report requirement, from the SPC-2 benchmark specification, is stated in italics followed by the information to fulfill the stated requirement.

SPC-2 Tests, Test Phases, Test Run Sequences, and Test Runs

The SPC-2 benchmark consists of the following Tests, Test Phases, Test Run Sequences, and Test Runs:

- **Data Persistence Test**
 - Data Persistence Test Run 1
 - Data Persistence Test Run 2

- **Large File Processing Test**
 - WRITE ONLY Test Phase
 - Test Run Sequence 1
 - ✓ Test Run 1 – 1024 KiB Transfer – maximum number of Streams
 - ✓ Test Run 2 – 1024 KiB Transfer – 50% of Test Run 1’s Streams value
 - ✓ Test Run 3 – 1024 KiB Transfer – 25% of Test Run 1’s Streams value
 - ✓ Test Run 4 – 1024 KiB Transfer – 12.5% of Test Run 1’s Streams value
 - ✓ Test Run 5 – 1024 KiB Transfer – single (1) Stream
 - Test Run Sequence 2
 - ✓ Test Run 6 – 256 KiB Transfer – maximum number of Streams
 - ✓ Test Run 7 – 256 KiB Transfer – 50% of Test Run 6’s Streams value
 - ✓ Test Run 8 – 256 KiB Transfer – 25% of Test Run 6’s Streams value
 - ✓ Test Run 9 – 256 KiB Transfer – 12.5% of Test Run 6’s Streams value
 - ✓ Test Run 10 – 256 KiB Transfer – single (1) Stream
 - READ-WRITE Test Phase
 - Test Run Sequence 3
 - ✓ Test Run 11 – 1024 KiB Transfer – maximum number of Streams
 - ✓ Test Run 12 – 1024 KiB Transfer – 50% of Test Run 11’s Streams value
 - ✓ Test Run 13 – 1024 KiB Transfer – 25% of Test Run 11’s Streams value
 - ✓ Test Run 14 – 1024 KiB Transfer – 12.5% of Test Run 11’s Streams value
 - ✓ Test Run 15 – 1024 KiB Transfer – single (1) Stream
 - Test Run Sequence 4
 - ✓ Test Run 16 – 256 KiB Transfer – maximum number of Streams
 - ✓ Test Run 17 – 256 KiB Transfer – 50% of Test Run 16’s Streams value
 - ✓ Test Run 18 – 256 KiB Transfer – 25% of Test Run 16’s Streams value
 - ✓ Test Run 19 – 256 KiB Transfer – 12.5% of Test Run 16’s Streams value
 - ✓ Test Run 20 – 256 KiB Transfer – single (1) Stream

- **Large File Processing Test (continued)**
 - READ ONLY Test Phase
 - Test Run Sequence 5
 - ✓ Test Run 21 – 1024 KiB Transfer – maximum number of Streams
 - ✓ Test Run 22 – 1024 KiB Transfer – 50% of Test Run 21's Streams value
 - ✓ Test Run 23 – 1024 KiB Transfer – 25% of Test Run 21's Streams value
 - ✓ Test Run 24 – 1024 KiB Transfer – 12.5% of Test Run 21's Streams value
 - ✓ Test Run 25 – 1024 KiB Transfer – single (1) Stream
 - Test Run Sequence 6
 - ✓ Test Run 26 – 256 KiB Transfer – maximum number of Streams
 - ✓ Test Run 27 – 256 KiB Transfer – 50% of Test Run 26's Streams value
 - ✓ Test Run 28 – 256 KiB Transfer – 25% of Test Run 26's Streams value
 - ✓ Test Run 29 – 256 KiB Transfer – 12.5% of Test Run 26's Streams value
 - ✓ Test Run 30 – 256 KiB Transfer – single (1) Stream
- **Large Database Query Test**
 - 1024 KiB TRANSFER SIZE Test Phase
 - Test Run Sequence 1
 - ✓ Test Run 1 – 4 I/O Requests Outstanding – maximum number of Streams
 - ✓ Test Run 2 – 4 I/O Requests Outstanding – 50% of Test Run 1's Streams value
 - ✓ Test Run 3 – 4 I/O Requests Outstanding – 25% of Test Run 1's Streams value
 - ✓ Test Run 4 – 4 I/O Requests Outstanding – 12.5% of Test Run 1's Streams value
 - ✓ Test Run 5 – 4 I/O Requests Outstanding – single (1) Stream
 - Test Run Sequence 2
 - ✓ Test Run 6 – 1 I/O Request Outstanding – maximum number of Streams
 - ✓ Test Run 7 – 1 I/O Request Outstanding – 50% of Test Run 6's Streams value
 - ✓ Test Run 8 – 1 I/O Request Outstanding – 25% of Test Run 6's Streams value
 - ✓ Test Run 9 – 1 I/O Request Outstanding – 12.5% of Test Run 6's Streams value
 - ✓ Test Run 10 – 1 I/O Request Outstanding – single (1) Stream
 - 64 KiB TRANSFER SIZE Test Phase
 - Test Run Sequence 3
 - ✓ Test Run 11 – 4 I/O Requests Outstanding – maximum number of Streams
 - ✓ Test Run 12 – 4 I/O Requests Outstanding – 50% of Test Run 11's Streams value
 - ✓ Test Run 13 – 4 I/O Requests Outstanding – 25% of Test Run 11's Streams value
 - ✓ Test Run 14 – 4 I/O Requests Outstanding – 12.5% of Test Run 11's Streams value
 - ✓ Test Run 15 – 4 I/O Requests Outstanding – single (1) Stream
 - Test Run Sequence 4
 - ✓ Test Run 16 – 1 I/O Request Outstanding – maximum number of Streams
 - ✓ Test Run 17 – 1 I/O Request Outstanding – 50% of Test Run 16's Streams value
 - ✓ Test Run 18 – 1 I/O Request Outstanding – 25% of Test Run 16's Streams value
 - ✓ Test Run 19 – 1 I/O Request Outstanding – 12.5% of Test Run 16's Streams value
 - ✓ Test Run 20 – 1 I/O Request Outstanding – single (1) Stream
- **Video on Demand Delivery Test**
 - Video on Demand Delivery Test Run

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 Tests may be executed in any sequence.

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

Large File Processing Test

Clause 6.4.2.1

The Large File Processing Test consists of the I/O operations associated with the type of applications, in a wide range of fields, which require simple sequential processing of one or more large files. Specific examples of those types of applications include scientific computing and large-scale financial processing

Clause 6.4.2.2

The Large File Processing Test has three Test Phases, which shall be executed in the following uninterrupted sequence:

1. *WRITE ONLY*
2. *READ-WRITE*
3. *READ ONLY*

The BC shall not be restarted or manually disturbed, altered, or adjusted during the execution of the Large File Processing Test. If power is lost to the BC during this Test all results shall be rendered invalid and the Test re-run in its entirety.

Clause 10.6.8.1

The Full Disclosure Report will contain the following content for the Large File Processing Test:

1. *A listing of the SPC-2 Workload Generator commands and parameters used to execute each of the Test Runs in the Large File Processing Test.*
2. *The human readable SPC-2 Test Results File for each of the Test Runs in the Large File Processing Test.*
3. *A table that contains the following information for each Test Run in all three Test Phases of the Large File Processing Test:*
 - *The number Streams specified.*
 - *The Ramp-Up duration in seconds.*
 - *The Measurement Interval duration in seconds.*
 - *The average data rate, in MB per second, for the Measurement Interval.*
 - *The average data rate, in MB per second, per Stream for the Measurement Interval.*
4. *Average Data Rate and Average Data Rate per Stream graphs as defined in Clauses 10.1.1 and 10.1.2.*

SPC-2 Workload Generator Commands and Parameters

The SPC-2 Workload Generator commands and parameters for the Large File Processing Test Runs are documented in “Appendix E: SPC-2 Workload Generator Execution Commands and Parameters” on Page 112.

SPC-2 Test Results File

A link to the SPC-2 Test Results file generated from the Large File Processing Test Runs is listed below.

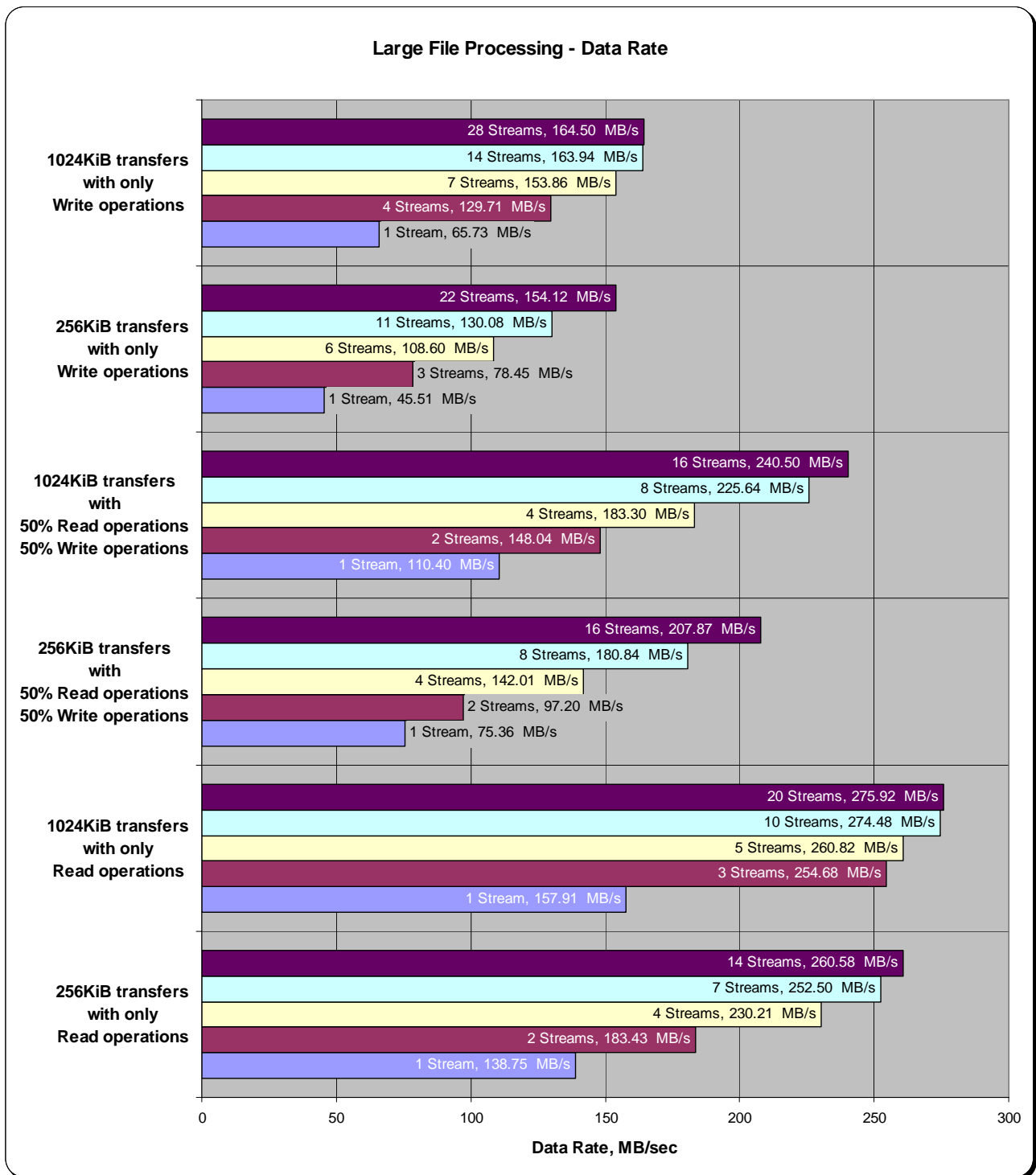
[SPC-2 Large File Processing Test Results File](#)

SPC-2 Large File Processing Average Data Rates (MB/s)

The average Data Rate (MB/s) for each Test Run in the three Test Phases of the SPC-2 Large File Processing Test is listed in the table below as well as illustrated in the following graph.

Test Run Sequence	1 Stream	4 Streams	7 Streams	14 Streams	28 Streams
Write 1024KiB	65.73	129.71	153.86	163.94	164.50
Test Run Sequence	1 Stream	3 Streams	6 Streams	11 Streams	22 Streams
Write 256KiB	45.51	78.45	108.60	130.08	154.12
Test Run Sequence	1 Stream	2 Streams	4 Streams	8 Streams	16 Streams
Read/Write 1024KiB	110.40	148.04	183.30	225.64	240.50
Test Run Sequence	1 Stream	2 Streams	4 Streams	8 Streams	16 Streams
Read/Write 256KiB	75.36	97.20	142.01	180.84	207.87
Test Run Sequence	1 Stream	3 Streams	5 Streams	10 Streams	20 Streams
Read 1024KiB	157.91	254.68	260.82	274.48	275.92
Test Run Sequence	1 Stream	2 Streams	4 Streams	7 Streams	14 Streams
Read 256KiB	138.75	183.43	230.21	252.50	260.58

SPC-2 Large File Processing Average Data Rates Graph

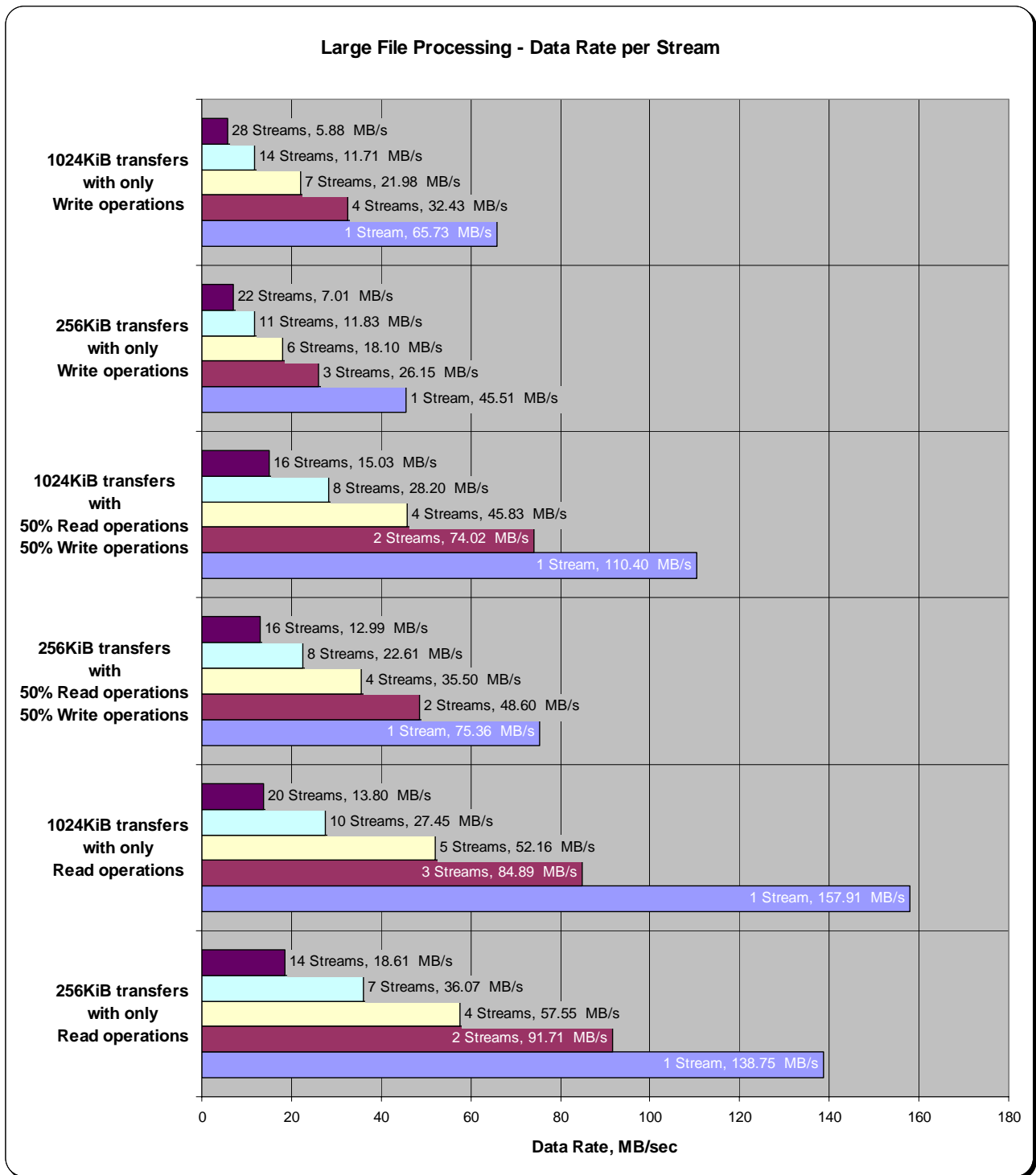


SPC-2 Large File Processing Average Data Rate per Stream

The average Data Rate per Stream for each Test Run in the three Test Phases of the SPC-2 Large File Processing Test is listed in the table below as well as illustrated in the following graph.

Test Run Sequence	1 Stream	4 Streams	7 Streams	14 Streams	28 Streams
Write 1024KiB	65.73	32.43	21.98	11.71	5.88
Test Run Sequence	1 Stream	3 Streams	6 Streams	11 Streams	22 Streams
Write 256KiB	45.51	26.15	18.10	11.83	7.01
Test Run Sequence	1 Stream	2 Streams	4 Streams	8 Streams	16 Streams
Read/Write 1024KiB	110.40	74.02	45.83	28.20	15.03
Test Run Sequence	1 Stream	2 Streams	4 Streams	8 Streams	16 Streams
Read/Write 256KiB	75.36	48.60	35.50	22.61	12.99
Test Run Sequence	1 Stream	3 Streams	5 Streams	10 Streams	20 Streams
Read 1024KiB	157.91	84.89	52.16	27.45	13.80
Test Run Sequence	1 Stream	2 Streams	4 Streams	7 Streams	14 Streams
Read 256KiB	138.75	91.71	57.55	36.07	18.61

SPC-2 Large File Processing Average Data Rate per Stream Graph

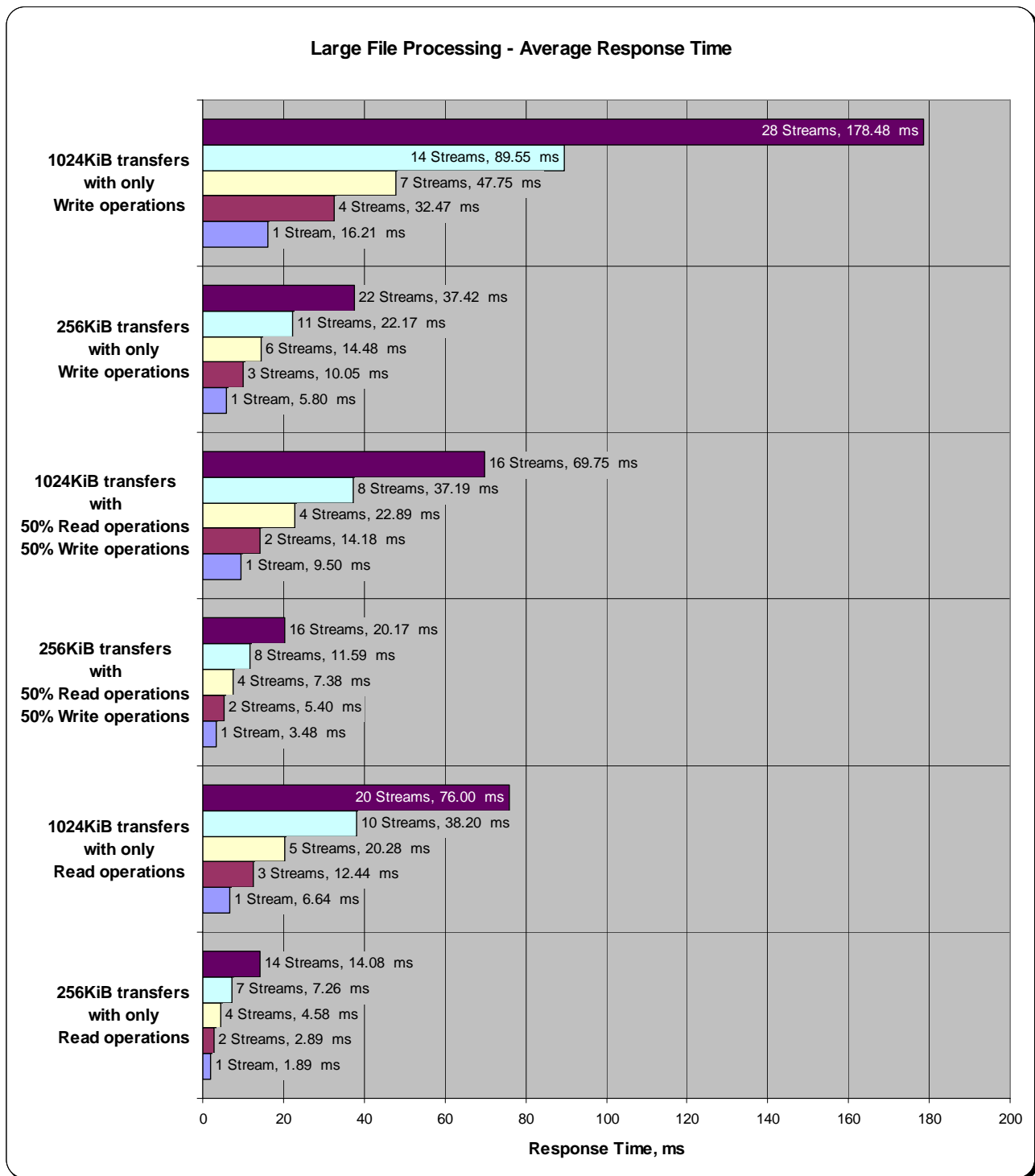


SPC-2 Large File Average Response Time

The average Response Time, milliseconds (ms), for each Test Run in the three Test Phases of the SPC-2 Large File Processing Test is listed in the table below as well as illustrated in the following graph.

Test Run Sequence	1 Stream	4 Streams	7 Streams	14 Streams	28 Streams
Write 1024KiB	16.21	32.47	47.75	89.55	178.48
Test Run Sequence	1 Stream	3 Streams	6 Streams	11 Streams	22 Streams
Write 256KiB	5.80	10.05	14.48	22.17	37.42
Test Run Sequence	1 Stream	2 Streams	4 Streams	8 Streams	16 Streams
Read/Write 1024KiB	9.50	14.18	22.89	37.19	69.75
Test Run Sequence	1 Stream	2 Streams	4 Streams	8 Streams	16 Streams
Read/Write 256KiB	3.48	5.40	7.38	11.59	20.17
Test Run Sequence	1 Stream	3 Streams	5 Streams	10 Streams	20 Streams
Read 1024KiB	6.64	12.44	20.28	38.20	76.00
Test Run Sequence	1 Stream	2 Streams	4 Streams	7 Streams	14 Streams
Read 256KiB	1.89	2.89	4.58	7.26	14.08

SPC-2 Large File Processing Average Response Time Graph



Large File Processing Test – WRITE ONLY Test Phase

Clause 10.6.8.1.1

1. A table that will contain the following information for each "WRITE ONLY, 1024 KiB Transfer Size" Test Run:
 - The number of Streams specified.
 - The average data rate, average data rate per stream, and average Response Time reported at five second intervals.
2. Average Data Rate (intervals), Average Data Rate per Stream (intervals), and Average Response Time (intervals) graphs for the "WRITE ONLY, 1024 KiB Transfer Size" Test Runs as specified in Clauses 10.1.4 – 10.1.6.
3. A table that will contain the following information for each "WRITE ONLY, 256 KiB Transfer Size" Test Run:
 - The number of Streams specified.
 - The average data rate, average data rate per stream, and average Response Time reported at five second intervals.
4. Average Data Rate (intervals), Average Data Rate per Stream (intervals), and Average Response Time (intervals) graphs for the "WRITE ONLY, 256 KiB Transfer Size" Test Runs as specified in Clauses 10.1.4 – 10.1.6.

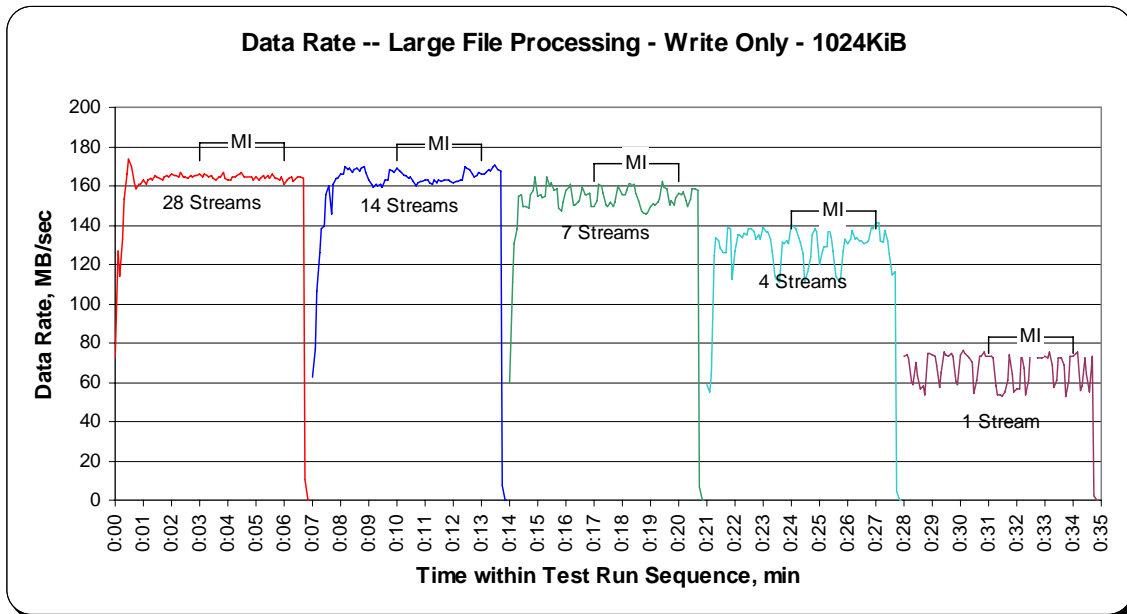
The SPC-2 "Large File Processing/WRITE ONLY/1024 KiB Transfer Size" Test Run data is contained in the table that appears on the next page. That table is followed by graphs illustrating the average Data Rate, average Data Rate per Stream, and average Response Time produced by the same Test Runs. The table and graphs present the data at five-second intervals.

Immediately following the SPC-2 "Large File Processing/WRITE ONLY/1024 KiB Transfer Size" table and graphs will be the SPC-2 "Large File Processing/WRITE ONLY/64 KiB Transfer Size" table and graphs. The table contains the Test Run data and the graphs illustrate the average Data Rate, average Data Rate per Stream, and average Response Time produced by the Test Runs.

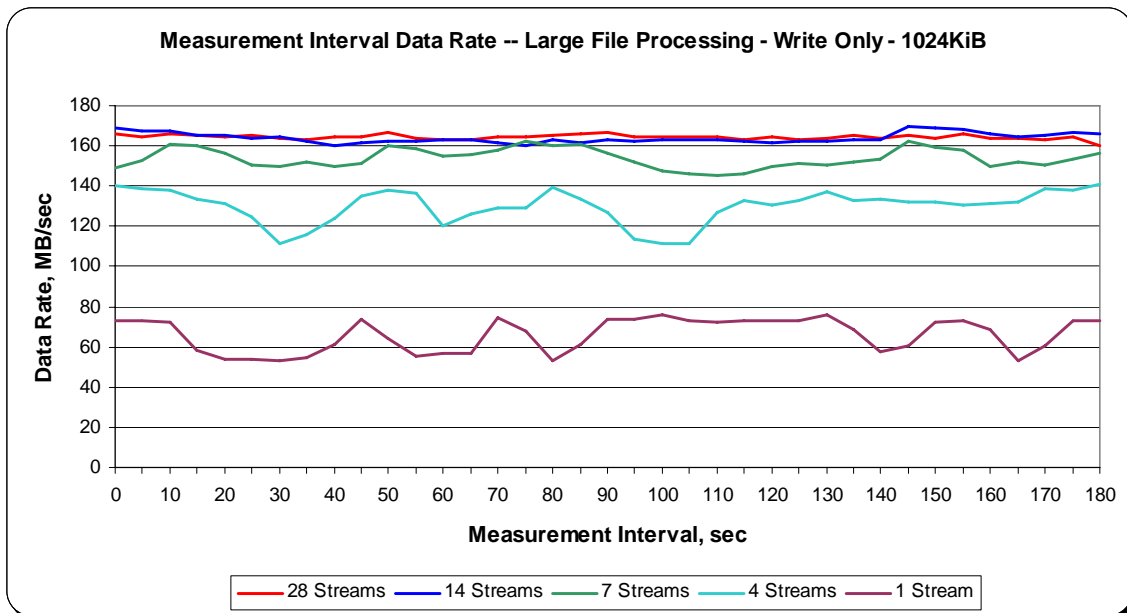
SPC-2 “Large File Processing/WRITE ONLY/1024 KiB Transfer Size” Test Run Data – Ramp-Up Period

TR1				TR2				TR3				TR4				TR5			
Test Run Sequence Time	28 Streams			Test Run Sequence Time	14 Streams			Test Run Sequence Time	7 Streams			Test Run Sequence Time	4 Streams			Test Run Sequence Time	1 Stream		
	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms
0:00:00	72.35	14.47	24.23	0:07:00	62.50	31.25	19.74	0:14:00	59.98	59.98	16.88	0:21:00	58.93	58.93	17.21	0:28:00	73.40	73.40	13.81
0:00:05	126.67	12.67	59.45	0:07:05	77.18	25.73	27.37	0:14:05	110.94	27.73	26.43	0:21:05	55.36	55.36	18.93	0:28:05	74.24	74.24	14.14
0:00:10	114.09	10.37	94.28	0:07:10	106.75	21.35	35.60	0:14:10	130.86	32.72	31.99	0:21:10	64.38	32.19	19.18	0:28:10	72.35	72.35	14.49
0:00:15	132.96	8.86	97.20	0:07:15	125.83	20.97	46.06	0:14:15	138.41	23.07	39.48	0:21:15	124.15	31.04	26.98	0:28:15	60.61	60.61	17.30
0:00:20	153.30	8.52	106.09	0:07:20	137.78	19.68	51.81	0:14:20	154.35	22.05	45.37	0:21:20	133.38	33.34	31.45	0:28:20	58.93	58.93	17.69
0:00:25	166.30	7.56	127.58	0:07:25	139.67	17.46	52.76	0:14:25	155.61	22.23	47.02	0:21:25	132.33	33.08	31.73	0:28:25	70.25	70.25	15.00
0:00:30	173.64	7.55	138.04	0:07:30	155.19	17.24	56.28	0:14:30	149.74	21.39	49.18	0:21:30	128.56	32.14	32.58	0:28:30	63.33	63.33	16.55
0:00:35	170.08	7.09	143.00	0:07:35	159.80	17.76	59.20	0:14:35	149.11	21.30	49.09	0:21:35	126.04	31.51	33.20	0:28:35	56.83	56.83	18.42
0:00:40	161.48	6.73	155.69	0:07:40	145.54	16.17	64.74	0:14:40	148.90	21.27	49.37	0:21:40	126.25	31.56	33.31	0:28:40	58.30	58.30	18.00
0:00:45	158.54	6.34	160.62	0:07:45	160.64	16.06	63.48	0:14:45	155.40	22.20	47.06	0:21:45	139.04	34.76	30.14	0:28:45	53.90	53.90	19.37
0:00:50	161.06	6.44	162.87	0:07:50	163.58	14.87	68.50	0:14:50	157.92	22.56	46.68	0:21:50	138.41	34.60	30.24	0:28:50	74.45	74.45	14.15
0:00:55	160.64	6.43	163.20	0:07:55	164.00	14.91	70.25	0:14:55	164.42	23.49	44.67	0:21:55	112.62	28.15	37.27	0:28:55	75.08	75.08	13.96
0:01:00	163.16	6.28	166.64	0:08:00	165.88	15.08	69.73	0:15:00	154.35	22.05	47.51	0:22:00	126.88	31.72	32.96	0:29:00	74.03	74.03	14.17
0:01:05	160.43	5.94	170.67	0:08:05	166.30	13.86	73.28	0:15:05	155.19	22.17	47.26	0:22:05	135.06	33.76	31.18	0:29:05	72.98	72.98	14.38
0:01:10	162.74	6.03	173.75	0:08:10	169.66	13.05	79.65	0:15:10	153.93	21.99	47.72	0:22:10	135.06	33.76	31.08	0:29:10	68.37	68.37	15.30
0:01:15	164.00	5.86	175.33	0:08:15	167.98	12.92	81.21	0:15:15	154.77	22.11	47.38	0:22:15	133.38	33.34	31.33	0:29:15	57.46	57.46	18.27
0:01:20	162.95	5.82	180.69	0:08:20	169.24	12.09	84.09	0:15:20	164.42	23.49	44.70	0:22:20	135.69	33.92	31.04	0:29:20	64.59	64.59	16.22
0:01:25	165.05	5.89	177.28	0:08:25	167.14	11.94	87.72	0:15:25	160.01	22.86	45.75	0:22:25	134.85	33.71	30.98	0:29:25	75.50	75.50	13.88
0:01:30	164.63	5.88	179.02	0:08:30	167.98	12.00	87.45	0:15:30	161.48	23.07	45.48	0:22:30	137.78	34.45	30.53	0:29:30	73.61	73.61	14.26
0:01:35	163.79	5.85	178.91	0:08:35	169.24	12.09	87.06	0:15:35	157.50	22.50	46.62	0:22:35	137.78	34.45	30.46	0:29:35	73.19	73.19	14.34
0:01:40	162.95	5.82	180.39	0:08:40	167.77	11.98	86.86	0:15:40	158.33	22.62	46.31	0:22:40	136.94	34.24	30.62	0:29:40	75.08	75.08	13.95
0:01:45	164.21	5.86	178.71	0:08:45	169.24	12.09	86.92	0:15:45	148.69	21.24	49.44	0:22:45	133.17	33.29	31.42	0:29:45	72.98	72.98	14.36
0:01:50	165.26	5.90	177.58	0:08:50	169.45	12.10	86.62	0:15:50	146.80	20.97	49.88	0:22:50	134.85	33.71	31.16	0:29:50	60.40	60.40	17.26
0:01:55	164.84	5.89	178.49	0:08:55	166.72	11.91	88.28	0:15:55	151.83	21.69	48.49	0:22:55	132.54	33.14	31.58	0:29:55	58.93	58.93	17.90
0:02:00	165.88	5.92	176.82	0:09:00	163.16	11.65	89.75	0:16:00	157.92	22.56	46.35	0:23:00	138.62	34.66	30.23	0:30:00	73.61	73.61	14.23
0:02:05	165.05	5.89	177.82	0:09:05	161.06	11.50	91.13	0:16:05	159.59	22.80	46.03	0:23:05	136.31	34.08	30.83	0:30:05	76.55	76.55	13.70
0:02:10	165.47	5.91	177.26	0:09:10	159.59	11.40	92.08	0:16:10	160.43	22.92	45.71	0:23:10	136.52	34.13	30.71	0:30:10	75.08	75.08	13.98
0:02:15	164.84	5.89	177.81	0:09:15	160.43	11.46	91.45	0:16:15	150.16	21.45	48.87	0:23:15	132.75	33.19	31.62	0:30:15	72.98	72.98	14.36
0:02:20	166.51	5.95	176.95	0:09:20	160.22	11.44	91.73	0:16:20	150.37	21.48	48.90	0:23:20	126.46	31.61	33.09	0:30:20	72.77	72.77	14.41
0:02:25	164.84	5.89	177.27	0:09:25	160.64	11.47	91.62	0:16:25	152.04	21.72	48.21	0:23:25	113.67	28.42	36.93	0:30:25	69.84	69.84	15.01
0:02:30	164.42	5.87	178.83	0:09:30	159.59	11.40	91.75	0:16:30	152.46	21.78	48.22	0:23:30	112.83	28.21	37.14	0:30:30	54.11	54.11	19.35
0:02:35	164.00	5.86	178.94	0:09:35	162.74	11.62	90.29	0:16:35	159.17	22.74	46.07	0:23:35	110.94	27.73	37.76	0:30:35	61.45	61.45	17.08
0:02:40	165.47	5.91	177.38	0:09:40	163.37	11.67	89.54	0:16:40	155.40	22.20	47.18	0:23:40	131.28	32.82	32.03	0:30:40	72.98	72.98	14.37
0:02:45	164.84	5.89	178.31	0:09:45	168.19	12.01	87.53	0:16:45	155.40	22.20	47.26	0:23:45	130.23	32.56	32.16	0:30:45	72.98	72.98	14.35
0:02:50	165.26	5.90	177.57	0:09:50	167.77	11.98	87.57	0:16:50	156.24	22.32	47.05	0:23:50	131.91	32.98	31.85	0:30:50	75.29	75.29	13.93
0:02:55	165.05	5.89	177.82	0:09:55	167.14	11.94	87.70	0:16:55	149.74	21.39	49.02	0:23:55	130.65	32.66	32.07	0:30:55	73.40	73.40	14.31

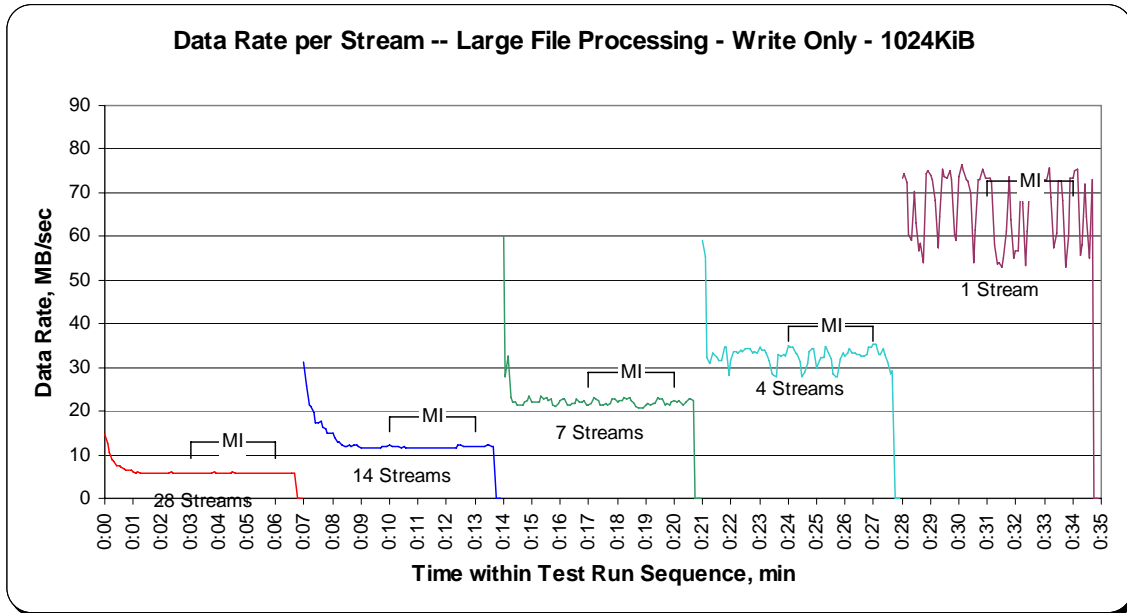
SPC-2 “Large File Processing/WRITE ONLY/1024 KiB Transfer Size” Average Data Rate Graph – Complete Test Run



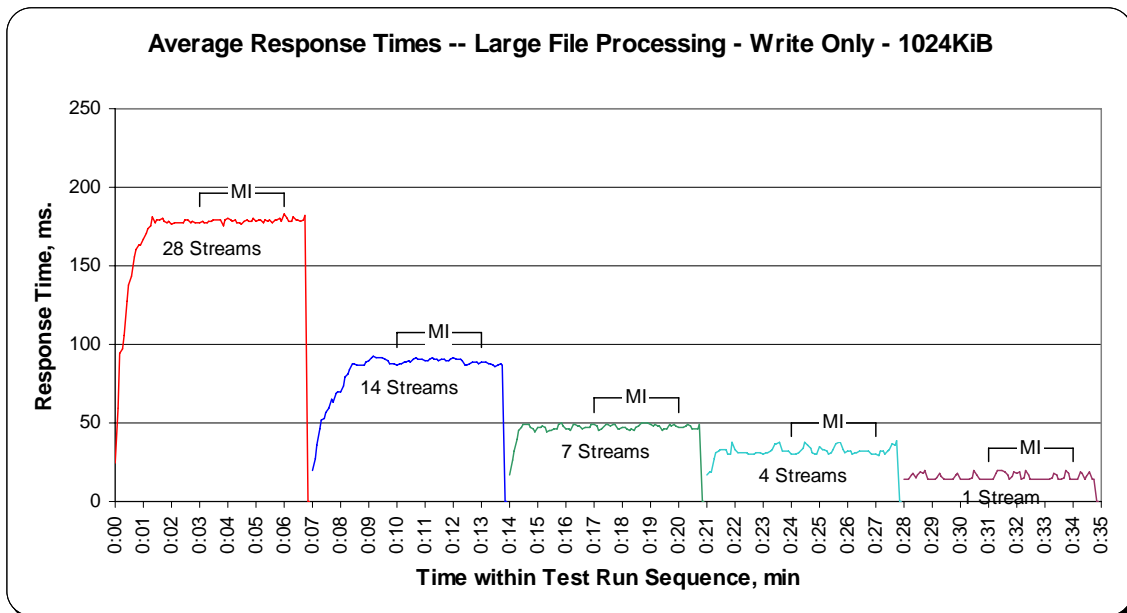
SPC-2 “Large File Processing/ WRITE ONLY /1024 KiB Transfer Size” Average Data Rate Graph – Measurement Interval (MI) Only



SPC-2 “Large File Processing/ WRITE ONLY /1024 KiB Transfer Size” Average Data Rate per Stream Graph



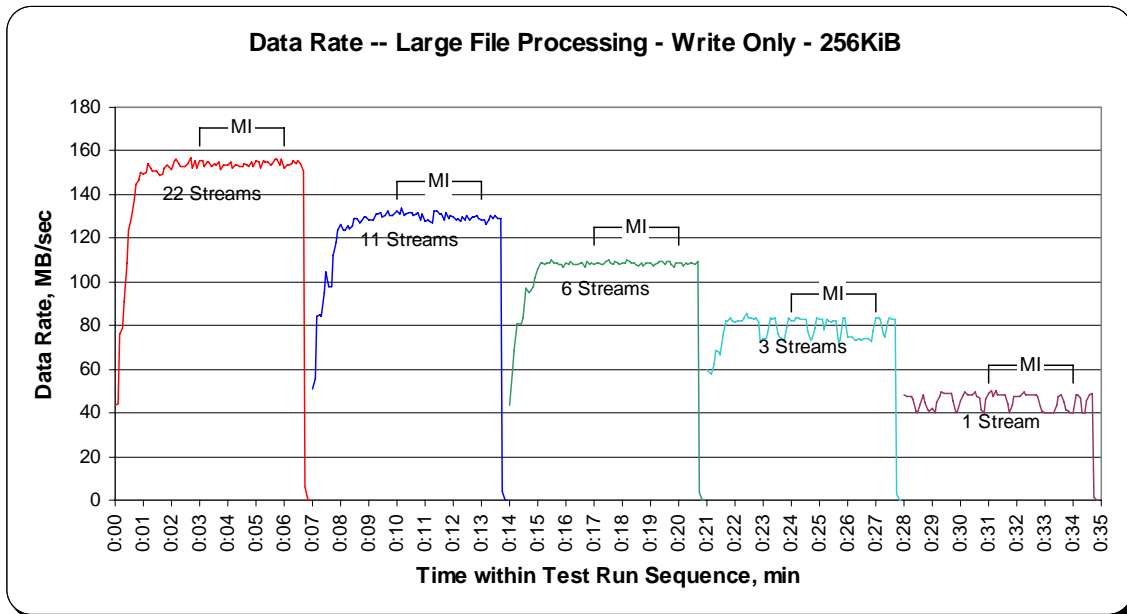
SPC-2 “Large File Processing/ WRITE ONLY /1024 KiB Transfer Size” Average Response Time Graph



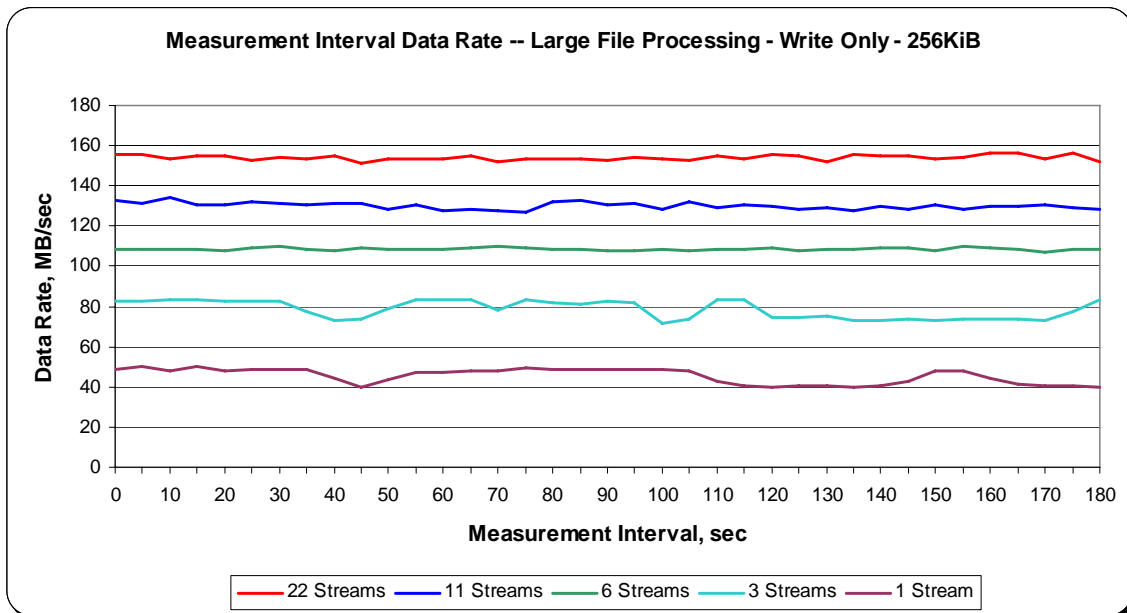
SPC-2 “Large File Processing/ WRITE ONLY /256 KiB Transfer Size” Test Run Data – Ramp-Up Period

TR6				TR7				TR8				TR9				TR10			
Test Run Sequence Time	22 Streams		Response Time, ms	Test Run Sequence Time	11 Streams		Response Time, ms	Test Run Sequence Time	6 Streams		Response Time, ms	Test Run Sequence Time	3 Streams		Response Time, ms	Test Run Sequence Time	1 Stream		Response Time, ms
	Data Rate, MB/sec	Data Rate / Stream, MB/sec			Data Rate, MB/sec	Data Rate / Stream, MB/sec			Data Rate, MB/sec	Data Rate / Stream, MB/sec			Data Rate, MB/sec	Data Rate / Stream, MB/sec			Data Rate, MB/sec	Data Rate / Stream, MB/sec	
0:00:00	43.57	43.57	5.83	0:07:00	51.22	25.61	7.97	0:14:00	43.62	43.62	5.82	0:21:00	59.51	29.75	8.24	0:28:00	48.13	48.13	5.28
0:00:05	43.99	14.66	7.34	0:07:05	55.57	18.52	10.05	0:14:05	59.72	29.86	7.20	0:21:05	58.35	29.18	8.98	0:28:05	47.76	47.76	5.49
0:00:10	76.39	19.10	12.53	0:07:10	84.36	21.09	11.72	0:14:10	68.73	22.91	8.63	0:21:10	57.93	28.97	9.04	0:28:10	47.82	47.82	5.48
0:00:15	78.75	19.69	13.28	0:07:15	84.72	21.18	12.32	0:14:15	80.95	26.98	9.71	0:21:15	62.29	31.14	8.42	0:28:15	47.66	47.66	5.50
0:00:20	91.23	11.40	15.52	0:07:20	84.36	21.09	12.47	0:14:20	81.16	27.05	9.68	0:21:20	68.47	34.24	7.65	0:28:20	46.03	46.03	5.69
0:00:25	108.58	10.86	21.89	0:07:25	95.16	19.03	13.73	0:14:25	81.16	27.05	9.69	0:21:25	68.26	34.13	7.69	0:28:25	40.63	40.63	6.45
0:00:30	123.42	9.49	24.07	0:07:30	104.60	17.43	14.93	0:14:30	83.41	20.85	10.06	0:21:30	66.64	33.32	7.85	0:28:30	39.74	39.74	6.60
0:00:35	129.81	8.65	27.54	0:07:35	97.67	16.28	16.00	0:14:35	97.15	24.29	10.79	0:21:35	76.23	25.41	9.18	0:28:35	44.15	44.15	5.93
0:00:40	137.78	8.10	30.46	0:07:40	97.83	13.98	16.26	0:14:40	95.21	23.80	11.00	0:21:40	82.21	27.40	9.57	0:28:40	48.18	48.18	5.44
0:00:45	144.60	7.61	33.03	0:07:45	112.30	14.04	17.20	0:14:45	95.63	23.91	10.97	0:21:45	82.47	27.49	9.53	0:28:45	45.09	45.09	5.81
0:00:50	147.01	7.74	33.84	0:07:50	118.44	13.16	19.51	0:14:50	97.78	19.56	11.61	0:21:50	83.36	27.79	9.42	0:28:50	41.31	41.31	6.35
0:00:55	150.21	7.15	36.02	0:07:55	123.63	12.36	19.80	0:14:55	101.97	20.39	12.87	0:21:55	82.42	27.47	9.55	0:28:55	40.79	40.79	6.23
0:01:00	149.32	7.11	36.90	0:08:00	126.25	12.62	20.75	0:15:00	106.22	17.70	13.79	0:22:00	81.74	27.25	9.61	0:29:00	41.94	41.94	6.44
0:01:05	150.26	6.83	36.50	0:08:05	123.73	12.37	21.17	0:15:05	108.68	18.11	14.45	0:22:05	82.16	27.39	9.57	0:29:05	40.11	40.11	6.54
0:01:10	154.09	7.00	37.60	0:08:10	123.94	12.39	21.17	0:15:10	108.58	18.10	14.48	0:22:10	82.52	27.51	9.53	0:29:10	44.83	44.83	5.84
0:01:15	151.83	6.90	38.00	0:08:15	125.99	12.60	20.77	0:15:15	108.06	18.01	14.57	0:22:15	82.16	27.39	9.57	0:29:15	47.55	47.55	5.51
0:01:20	151.10	6.87	38.11	0:08:20	124.62	12.46	21.00	0:15:20	108.48	18.08	14.49	0:22:20	83.41	27.80	9.41	0:29:20	49.28	49.28	5.32
0:01:25	150.63	6.85	38.31	0:08:25	125.99	11.45	21.51	0:15:25	108.95	18.16	14.44	0:22:25	85.62	28.54	9.20	0:29:25	48.76	48.76	5.37
0:01:30	150.99	6.86	38.09	0:08:30	129.03	11.73	22.37	0:15:30	109.84	18.31	14.33	0:22:30	83.26	27.75	9.43	0:29:30	48.81	48.81	5.37
0:01:35	148.95	6.77	38.82	0:08:35	128.87	11.72	22.39	0:15:35	108.58	18.10	14.47	0:22:35	83.52	27.84	9.42	0:29:35	48.60	48.60	5.39
0:01:40	149.42	6.79	38.61	0:08:40	127.03	11.55	22.68	0:15:40	108.48	18.08	14.51	0:22:40	82.58	27.53	9.52	0:29:40	48.92	48.92	5.36
0:01:45	152.31	6.92	37.80	0:08:45	128.03	11.64	22.49	0:15:45	108.21	18.04	14.52	0:22:45	83.31	27.77	9.44	0:29:45	45.35	45.35	5.76
0:01:50	153.83	6.99	37.50	0:08:50	129.97	11.82	22.19	0:15:50	108.21	18.04	14.53	0:22:50	81.79	27.26	9.62	0:29:50	40.16	40.16	6.54
0:01:55	152.78	6.94	37.78	0:08:55	129.45	11.77	22.28	0:15:55	106.69	17.78	14.74	0:22:55	72.82	24.27	10.80	0:29:55	40.48	40.48	6.48
0:02:00	151.57	6.89	38.03	0:09:00	128.08	11.64	22.51	0:16:00	109.00	18.17	14.43	0:23:00	74.03	24.68	10.61	0:30:00	45.56	45.56	5.75
0:02:05	155.82	7.08	36.92	0:09:05	128.35	11.67	22.51	0:16:05	107.85	17.97	14.58	0:23:05	73.98	24.66	10.63	0:30:05	48.18	48.18	5.44
0:02:10	156.19	7.10	37.02	0:09:10	128.45	11.68	22.45	0:16:10	109.16	18.19	14.42	0:23:10	76.44	25.48	10.28	0:30:10	49.44	49.44	5.30
0:02:15	154.19	7.01	37.32	0:09:15	131.28	11.93	21.95	0:16:15	108.27	18.04	14.52	0:23:15	83.47	27.82	9.43	0:30:15	48.44	48.44	5.41
0:02:20	152.83	6.95	37.76	0:09:20	130.91	11.90	22.01	0:16:20	108.11	18.02	14.54	0:23:20	83.10	27.70	9.46	0:30:20	48.34	48.34	5.42
0:02:25	152.78	6.94	37.77	0:09:25	131.60	11.96	21.92	0:16:25	108.16	18.03	14.55	0:23:25	83.31	27.77	9.44	0:30:25	48.39	48.39	5.41
0:02:30	153.14	6.96	37.67	0:09:30	129.97	11.82	22.18	0:16:30	108.79	18.13	14.45	0:23:30	76.39	25.46	10.27	0:30:30	49.91	49.91	5.25
0:02:35	154.30	7.01	37.26	0:09:35	130.55	11.87	22.09	0:16:35	108.48	18.08	14.49	0:23:35	74.66	24.89	10.55	0:30:35	47.66	47.66	5.50
0:02:40	157.13	7.14	36.80	0:09:40	132.23	12.02	21.80	0:16:40	106.85	17.81	14.71	0:23:40	73.77	24.59	10.65	0:30:40	47.03	47.03	5.57
0:02:45	152.46	6.93	37.79	0:09:45	130.08	11.83	22.16	0:16:45	109.21	18.20	14.42	0:23:45	72.98	24.33	10.78	0:30:45	41.68	41.68	6.29
0:02:50	155.24	7.06	37.21	0:09:50	130.44	11.86	22.10	0:16:50	108.16	18.03	14.53	0:23:50	79.53	26.51	9.88	0:30:50	39.95	39.95	6.56
0:02:55	152.36	6.93	37.81	0:09:55	131.33	11.94	21.95	0:16:55	108.68	18.11	14.47	0:23:55	83.57	27.86	9.41	0:30:55	46.40	46.40	5.65

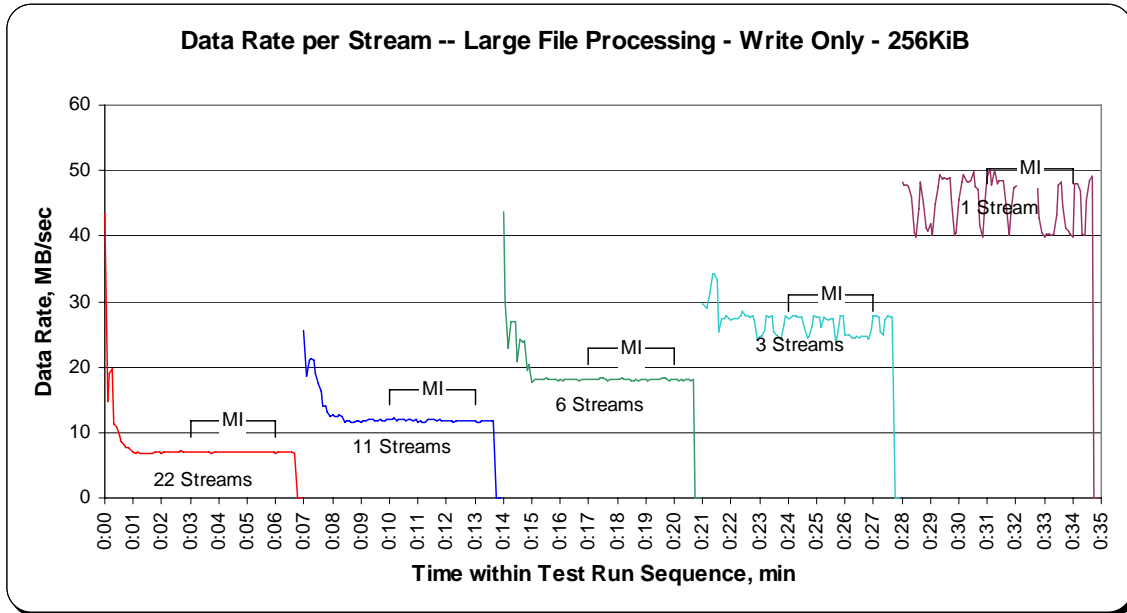
SPC-2 “Large File Processing/ WRITE ONLY /256 KiB Transfer Size” Average Data Rate Graph – Complete Test Run



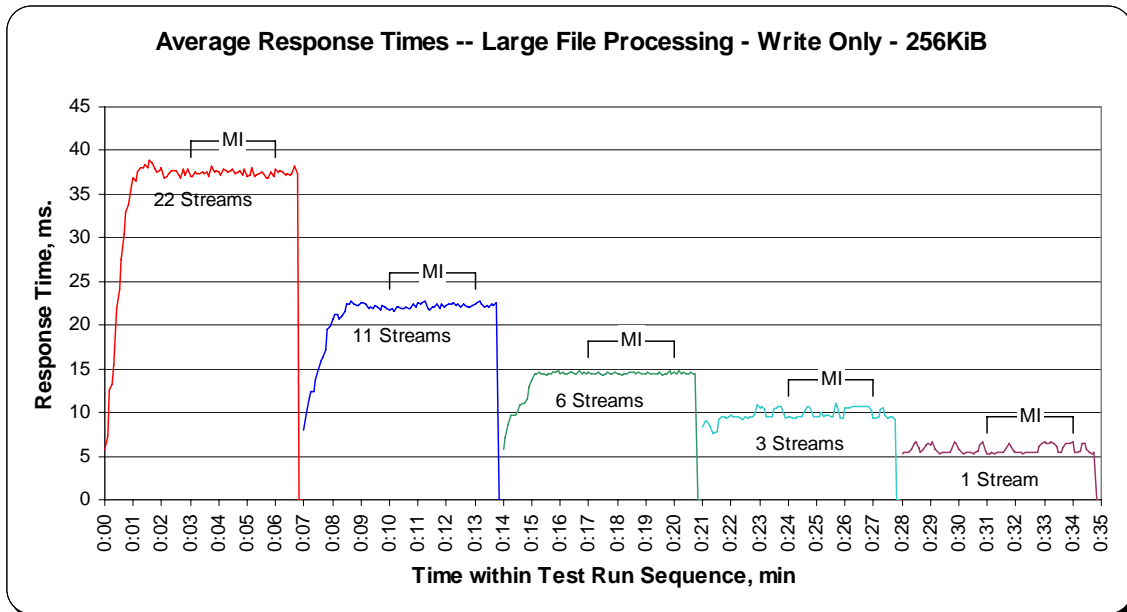
SPC-2 “Large File Processing/ WRITE ONLY /256 KiB Transfer Size” Average Data Rate Graph – Measurement Interval (MI) Only



SPC-2 “Large File Processing/ WRITE ONLY /256 KiB Transfer Size” Average Data Rate per Stream Graph



SPC-2 “Large File Processing/ WRITE ONLY /256 KiB Transfer Size” Average Response Time Graph



Large File Processing Test – READ-WRITE Test Phase

Clause 10.6.8.1.2

1. A table that will contain the following information for each "READ-WRITE, 1024 KiB Transfer Size" Test Run:
 - The number of Streams specified.
 - The average data rate, average data rate per stream, and average Response Time reported at five second intervals.
2. Average Data Rate (intervals), Average Data Rate per Stream (intervals), and Average Response Time (intervals) graphs for the "READ-WRITE, 1024 KiB Transfer Size" Test Runs as specified in Clauses 10.1.4 – 10.1.6.
3. A table that will contain the following information for each "READ-WRITE, 256 KiB Transfer Size" Test Run:
 - The number of Streams specified.
 - The average data rate, average data rate per stream, and average Response Time reported at five second intervals.
4. Average Data Rate (intervals), Average Data Rate per Stream (intervals), and Average Response Time (intervals) graphs for the "READ-WRITE, 256 KiB Transfer Size" Test Runs as specified in Clauses 10.1.4 – 10.1.6.

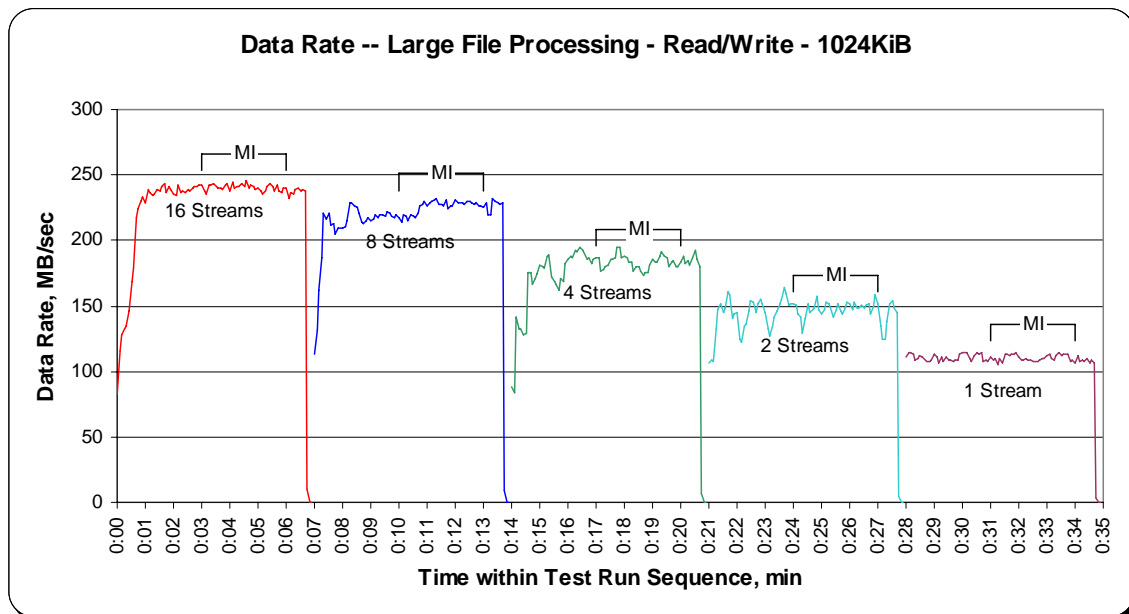
The SPC-2 "Large File Processing/READ-WRITE/1024 KiB Transfer Size" Test Run data is contained in the table that appears on the next page. That table is followed by graphs illustrating the average Data Rate, average Data Rate per Stream, and average Response Time produced by the same Test Runs. The table and graphs present the data at five-second intervals.

Immediately following the SPC-2 "Large File Processing/ READ-WRITE /1024 KiB Transfer Size" table and graphs will be the SPC-2 "Large File Processing/ READ-WRITE /64 KiB Transfer Size" table and graphs. The table contains the Test Run data and the graphs illustrate the average Data Rate, average Data Rate per Stream, and average Response Time produced by the Test Runs.

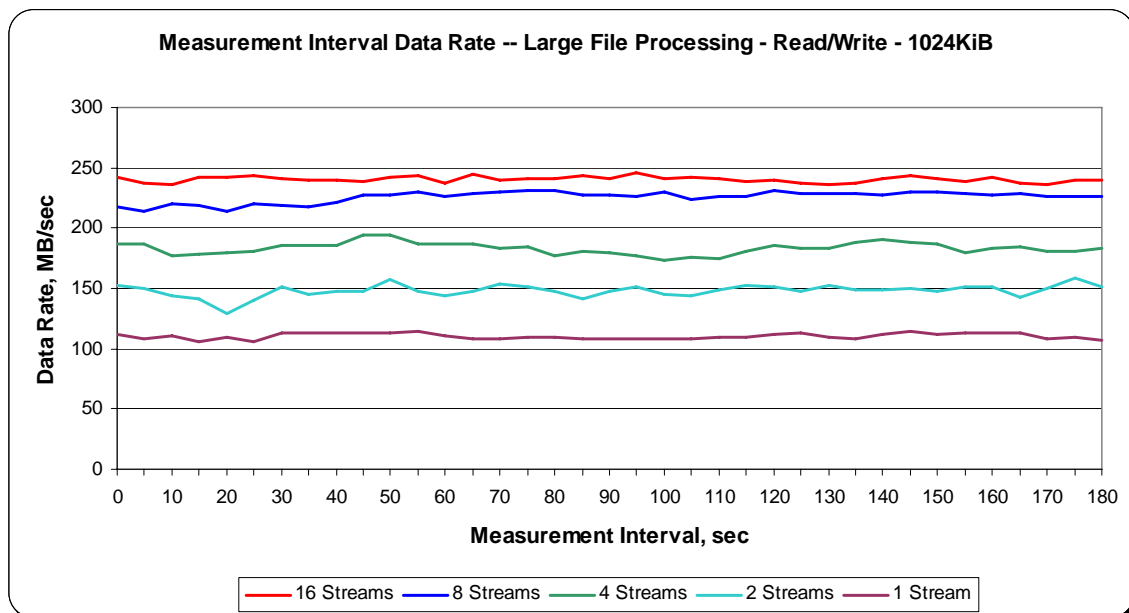
SPC-2 “Large File Processing/READ-WRITE/1024 KiB Transfer Size” Test Run Data – Ramp-Up Period

TR11 16 Streams				TR12 8 Streams				TR13 4 Streams				TR14 2 Streams				TR15 1 Stream			
Test Run Sequence Time	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms	Test Run Sequence Time	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms	Test Run Sequence Time	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms	Test Run Sequence Time	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms	Test Run Sequence Time	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms
0:00:00	82.42	82.42	12.27	0:07:00	113.67	56.83	13.77	0:14:00	88.71	88.71	11.43	0:21:00	105.91	105.91	9.58	0:28:00	111.15	111.15	9.14
0:00:05	114.92	28.73	21.70	0:07:05	131.70	32.93	21.41	0:14:05	83.47	41.73	12.51	0:21:05	108.63	108.63	9.66	0:28:05	114.09	114.09	9.18
0:00:10	128.35	32.09	32.54	0:07:10	161.69	40.42	25.88	0:14:10	141.14	70.57	14.85	0:21:10	107.58	107.58	9.75	0:28:10	113.88	113.88	9.20
0:00:15	132.75	26.55	32.08	0:07:15	186.86	26.69	31.12	0:14:15	132.96	66.48	15.78	0:21:15	131.91	65.96	11.79	0:28:15	112.83	112.83	9.29
0:00:20	135.06	27.01	38.83	0:07:20	220.83	31.55	33.33	0:14:20	132.54	66.27	15.82	0:21:20	147.22	73.61	14.25	0:28:20	108.63	108.63	9.67
0:00:25	146.17	24.36	41.49	0:07:25	216.64	30.95	33.82	0:14:25	128.35	64.17	16.35	0:21:25	151.41	75.71	13.84	0:28:25	109.47	109.47	9.58
0:00:30	168.82	21.10	45.83	0:07:30	220.20	31.46	33.34	0:14:30	129.60	43.20	18.08	0:21:30	144.91	72.46	14.47	0:28:30	112.20	112.20	9.35
0:00:35	178.68	17.87	51.62	0:07:35	211.39	30.20	34.70	0:14:35	175.53	58.51	17.86	0:21:35	148.48	74.24	14.12	0:28:35	110.94	110.94	9.45
0:00:40	217.26	19.75	52.79	0:07:40	212.65	30.38	34.57	0:14:40	175.53	58.51	18.00	0:21:40	161.27	80.64	13.01	0:28:40	108.63	108.63	9.63
0:00:45	224.19	17.25	56.43	0:07:45	204.89	29.27	35.77	0:14:45	166.30	55.43	18.84	0:21:45	158.96	79.48	13.17	0:28:45	107.79	107.79	9.72
0:00:50	229.85	16.42	59.44	0:07:50	209.09	29.87	35.13	0:14:50	170.50	56.83	18.52	0:21:50	140.51	70.25	14.93	0:28:50	108.00	108.00	9.72
0:00:55	233.62	16.69	62.84	0:07:55	209.30	29.90	35.06	0:14:55	174.69	43.67	23.11	0:21:55	143.86	71.93	14.57	0:28:55	108.84	108.84	9.62
0:01:00	229.22	15.28	64.51	0:08:00	209.72	29.96	34.98	0:15:00	181.19	45.30	23.23	0:22:00	144.70	72.35	14.50	0:29:00	113.04	113.04	9.29
0:01:05	238.45	14.90	69.86	0:08:05	210.34	30.05	34.93	0:15:05	180.36	45.09	23.25	0:22:05	124.99	62.50	16.78	0:29:05	110.73	110.73	9.47
0:01:10	236.98	14.81	70.78	0:08:10	214.96	26.87	36.27	0:15:10	179.31	44.83	23.37	0:22:10	121.84	60.92	17.14	0:29:10	106.75	106.75	9.82
0:01:15	234.88	14.68	71.51	0:08:15	228.17	28.52	36.76	0:15:15	187.49	46.87	22.41	0:22:15	134.64	67.32	15.59	0:29:15	111.15	111.15	9.42
0:01:20	235.51	14.72	71.02	0:08:20	228.17	28.52	36.78	0:15:20	188.53	47.13	22.21	0:22:20	136.11	68.05	15.42	0:29:20	107.37	107.37	9.77
0:01:25	238.87	14.93	70.36	0:08:25	226.07	28.26	37.14	0:15:25	172.60	43.15	24.22	0:22:25	146.17	73.09	14.37	0:29:25	111.15	111.15	9.42
0:01:30	237.40	14.84	70.84	0:08:30	225.23	28.15	37.27	0:15:30	168.82	42.21	24.95	0:22:30	153.51	76.76	13.65	0:29:30	109.05	109.05	9.62
0:01:35	241.59	15.10	68.86	0:08:35	220.41	27.55	37.96	0:15:35	166.72	41.68	25.14	0:22:35	153.30	76.65	13.68	0:29:35	108.63	108.63	9.66
0:01:40	242.85	15.18	69.55	0:08:40	213.70	26.71	39.30	0:15:40	161.90	40.48	25.79	0:22:40	144.91	72.46	14.47	0:29:40	107.58	107.58	9.75
0:01:45	236.56	14.78	70.80	0:08:45	212.44	26.56	39.44	0:15:45	171.34	42.83	24.54	0:22:45	151.20	75.60	13.86	0:29:45	109.05	109.05	9.57
0:01:50	241.17	15.07	69.35	0:08:50	215.17	26.90	39.05	0:15:50	168.61	42.15	24.92	0:22:50	154.56	77.28	13.56	0:29:50	108.84	108.84	9.67
0:01:55	238.45	14.90	70.35	0:08:55	217.26	27.16	38.55	0:15:55	182.03	45.51	22.99	0:22:55	152.25	76.13	13.79	0:29:55	113.04	113.04	9.27
0:02:00	235.72	14.73	71.24	0:09:00	215.59	26.95	38.96	0:16:00	185.18	46.29	22.67	0:23:00	145.33	72.67	14.37	0:30:00	114.29	114.29	9.17
0:02:05	234.25	14.64	71.85	0:09:05	215.80	26.97	38.81	0:16:05	187.49	46.87	22.36	0:23:05	132.96	66.48	15.84	0:30:05	114.09	114.09	9.19
0:02:10	241.80	15.11	69.51	0:09:10	219.15	27.39	38.33	0:16:10	187.07	46.77	22.44	0:23:10	126.88	63.44	16.46	0:30:10	114.71	114.71	9.14
0:02:15	236.35	14.77	70.46	0:09:15	217.06	27.13	38.50	0:16:15	192.10	48.02	21.80	0:23:15	135.27	67.63	15.56	0:30:15	109.68	109.68	9.54
0:02:20	237.19	14.82	70.80	0:09:20	219.99	27.50	38.20	0:16:20	191.47	47.87	21.92	0:23:20	141.56	70.78	14.80	0:30:20	107.37	107.37	9.76
0:02:25	236.14	14.76	71.10	0:09:25	219.15	27.39	38.33	0:16:25	194.20	48.55	21.61	0:23:25	146.38	73.19	14.30	0:30:25	111.57	111.57	9.41
0:02:30	239.29	14.96	70.23	0:09:30	218.73	27.34	38.30	0:16:30	192.52	48.13	21.73	0:23:30	151.20	75.60	13.87	0:30:30	113.88	113.88	9.21
0:02:35	237.19	14.82	70.58	0:09:35	221.46	27.68	37.88	0:16:35	190.00	47.50	22.10	0:23:35	155.61	77.80	13.47	0:30:35	113.04	113.04	9.26
0:02:40	239.70	14.98	70.23	0:09:40	220.62	27.58	38.02	0:16:40	185.39	46.35	22.63	0:23:40	164.21	82.10	12.76	0:30:40	114.09	114.09	9.20
0:02:45	241.59	15.10	69.27	0:09:45	218.10	27.26	38.43	0:16:45	186.23	46.56	22.48	0:23:45	159.17	79.59	13.19	0:30:45	107.79	107.79	9.72
0:02:50	241.38	15.09	69.67	0:09:50	217.26	27.16	38.67	0:16:50	182.03	45.51	23.09	0:23:50	150.58	75.29	13.87	0:30:50	108.84	108.84	9.63
0:02:55	242.43	15.15	69.10	0:09:55	219.57	27.45	38.15	0:16:55	185.81	46.45	22.56	0:23:55	152.04	76.02	13.81	0:30:55	107.58	107.58	9.75

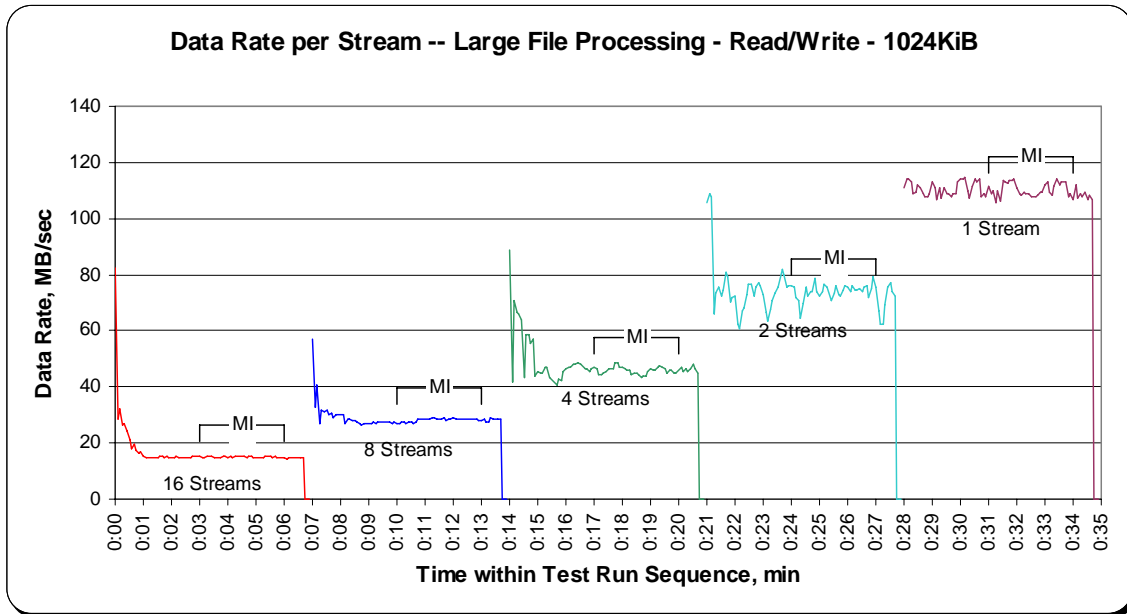
SPC-2 “Large File Processing/ READ-WRITE/1024 KiB Transfer Size” Average Data Rate Graph – Complete Test Run



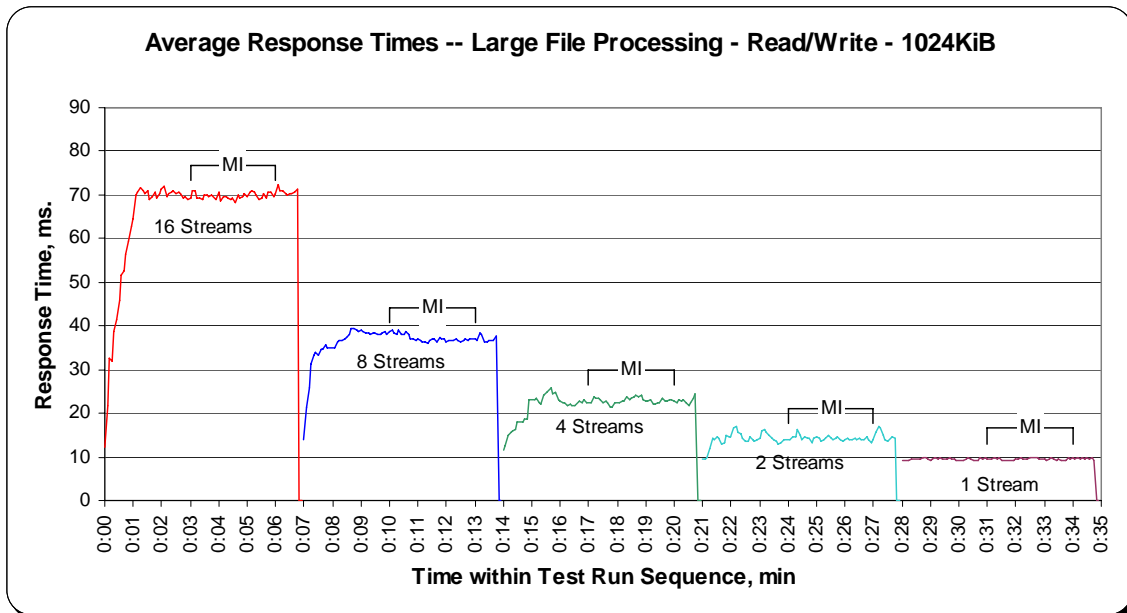
SPC-2 “Large File Processing/ READ-WRITE/1024 KiB Transfer Size” Average Data Rate Graph – Measurement Interval (MI) Only



SPC-2 “Large File Processing/READ-WRITE/1024 KiB Transfer Size” Average Data Rate per Stream Graph



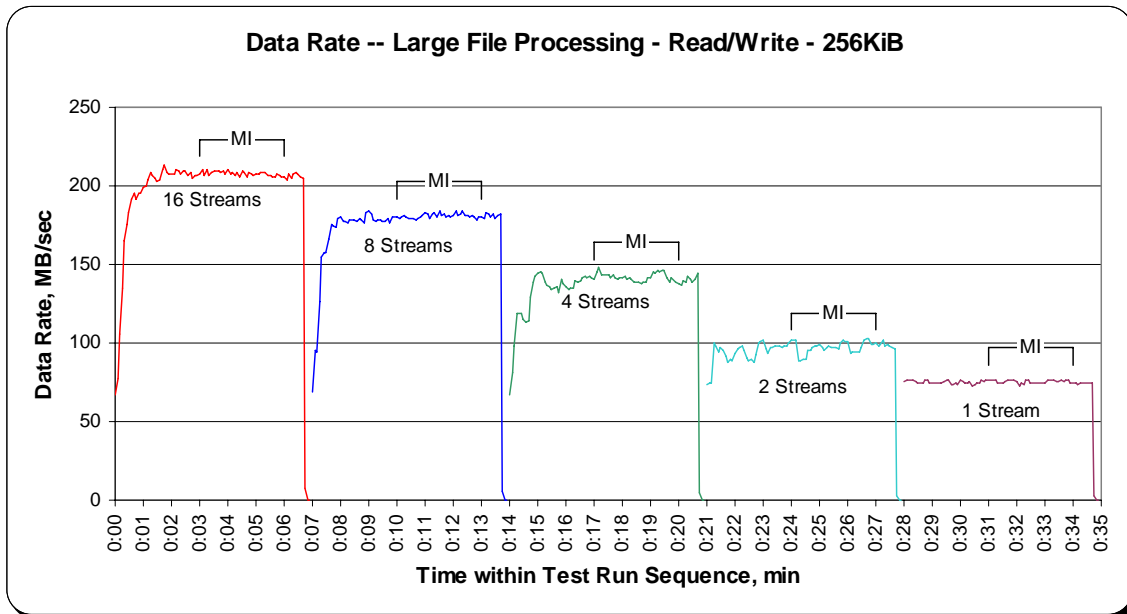
SPC-2 “Large File Processing/READ-WRITE/1024 KiB Transfer Size” Average Response Time Graph



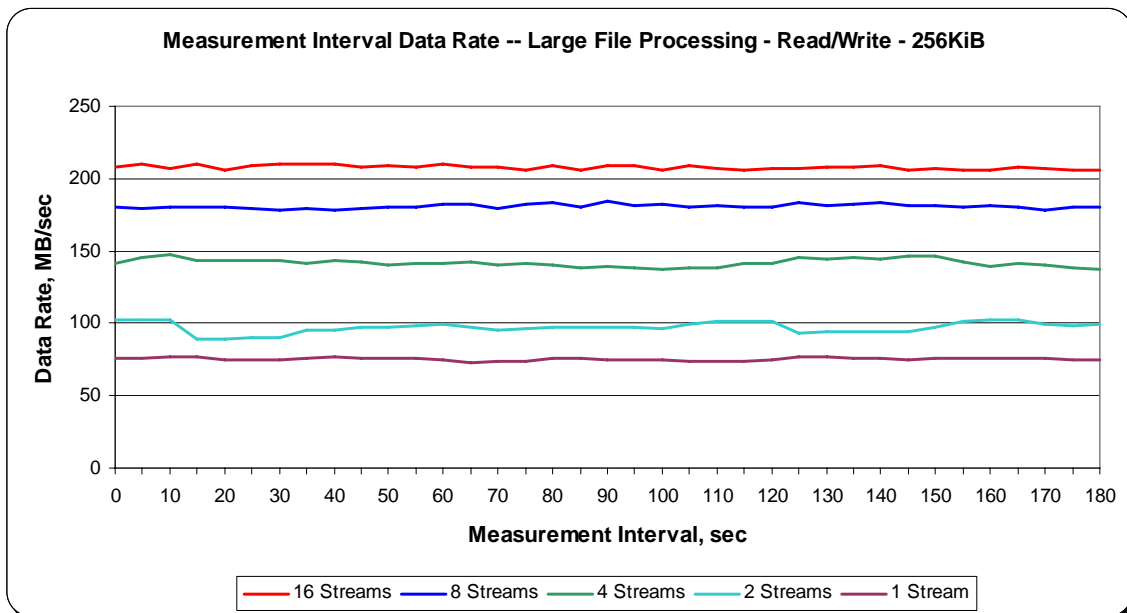
SPC-2 “Large File Processing/READ-WRITE/256 KiB Transfer Size” Test Run Data - Ramp-Up Period

TR16 Test Run Sequence Time	16 Streams			TR17 Test Run Sequence Time	8 Streams			TR18 Test Run Sequence Time	4 Streams			TR19 Test Run Sequence Time	2 Streams			TR20 Test Run Sequence Time	1 Stream		
	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms
0:00:00	67.32	33.66	4.50	0:07:00	68.58	34.29	4.12	0:14:00	67.27	67.27	3.77	0:21:00	73.77	73.77	3.44	0:28:00	75.50	75.50	3.36
0:00:05	76.97	38.48	6.79	0:07:05	95.11	47.55	5.51	0:14:05	80.90	40.45	5.04	0:21:05	74.34	74.34	3.52	0:28:05	76.81	76.81	3.41
0:00:10	105.91	21.18	7.79	0:07:10	94.37	47.19	5.55	0:14:10	98.30	32.77	5.83	0:21:10	74.13	37.07	3.53	0:28:10	76.44	76.44	3.43
0:00:15	134.85	19.26	11.61	0:07:15	126.83	25.37	7.34	0:14:15	118.91	39.64	6.61	0:21:15	99.77	49.89	5.26	0:28:15	76.34	76.34	3.43
0:00:20	165.52	18.39	12.92	0:07:20	155.14	31.03	8.44	0:14:20	118.96	39.65	6.61	0:21:20	97.94	48.97	5.35	0:28:20	76.76	76.76	3.41
0:00:25	175.90	19.54	13.42	0:07:25	157.34	31.47	8.33	0:14:25	119.22	39.74	6.58	0:21:25	94.69	47.34	5.53	0:28:25	75.60	75.60	3.46
0:00:30	183.08	16.64	14.40	0:07:30	157.60	26.27	8.83	0:14:30	115.08	38.36	6.83	0:21:30	96.99	48.50	5.41	0:28:30	74.76	74.76	3.50
0:00:35	191.68	15.97	15.15	0:07:35	166.09	23.73	9.94	0:14:35	113.04	37.68	6.95	0:21:35	95.16	47.58	5.49	0:28:35	74.76	74.76	3.50
0:00:40	195.45	15.03	16.92	0:07:40	175.85	25.12	10.44	0:14:40	114.40	38.13	6.88	0:21:40	91.91	45.95	5.71	0:28:40	74.66	74.66	3.51
0:00:45	191.63	13.69	17.92	0:07:45	174.75	24.96	10.49	0:14:45	128.97	32.24	7.46	0:21:45	87.29	43.65	5.99	0:28:45	76.23	76.23	3.44
0:00:50	195.61	13.97	18.79	0:07:50	173.85	24.84	10.54	0:14:50	139.09	34.77	7.53	0:21:50	90.07	45.04	5.83	0:28:50	76.55	76.55	3.42
0:00:55	195.56	13.97	18.75	0:07:55	179.46	22.43	11.59	0:14:55	142.92	35.73	7.34	0:21:55	88.81	44.41	5.91	0:28:55	74.55	74.55	3.51
0:01:00	199.12	14.22	18.41	0:08:00	180.36	22.54	11.64	0:15:00	143.92	35.98	7.28	0:22:00	93.69	46.85	5.59	0:29:00	74.45	74.45	3.52
0:01:05	199.60	14.26	18.38	0:08:05	177.26	22.16	11.81	0:15:05	145.02	36.25	7.23	0:22:05	96.10	48.05	5.46	0:29:05	74.87	74.87	3.50
0:01:10	203.95	12.75	19.31	0:08:10	177.37	22.17	11.83	0:15:10	143.92	35.98	7.28	0:22:10	96.78	48.39	5.41	0:29:10	74.50	74.50	3.52
0:01:15	208.14	13.01	20.13	0:08:15	176.27	22.03	11.88	0:15:15	138.78	34.69	7.55	0:22:15	98.41	49.20	5.33	0:29:15	74.71	74.71	3.50
0:01:20	206.62	12.91	20.32	0:08:20	178.47	22.31	11.74	0:15:20	136.73	34.18	7.67	0:22:20	95.00	47.50	5.51	0:29:20	74.55	74.55	3.51
0:01:25	204.58	12.79	20.49	0:08:25	178.00	22.25	11.78	0:15:25	135.63	33.91	7.73	0:22:25	90.60	45.30	5.78	0:29:25	75.39	75.39	3.48
0:01:30	202.69	12.67	20.67	0:08:30	178.62	22.33	11.74	0:15:30	133.90	33.48	7.83	0:22:30	89.02	44.51	5.89	0:29:30	76.70	76.70	3.42
0:01:35	204.21	12.76	20.51	0:08:35	176.95	22.12	11.83	0:15:35	135.27	33.82	7.75	0:22:35	89.29	44.64	5.87	0:29:35	76.76	76.76	3.41
0:01:40	210.45	13.15	19.96	0:08:40	179.04	22.38	11.73	0:15:40	136.00	34.00	7.70	0:22:40	87.66	43.83	5.98	0:29:40	73.98	73.98	3.54
0:01:45	213.12	13.32	19.69	0:08:45	178.57	22.32	11.73	0:15:45	132.44	33.11	7.91	0:22:45	92.43	46.22	5.66	0:29:45	73.92	73.92	3.54
0:01:50	208.35	13.02	20.11	0:08:50	176.58	22.07	11.88	0:15:50	140.30	35.07	7.47	0:22:50	99.93	49.96	5.25	0:29:50	74.97	74.97	3.49
0:01:55	207.46	12.97	20.23	0:08:55	183.13	22.89	11.44	0:15:55	138.15	34.54	7.59	0:22:55	100.98	50.49	5.19	0:29:55	73.61	73.61	3.56
0:02:00	207.62	12.98	20.17	0:09:00	183.61	22.95	11.43	0:16:00	135.95	33.99	7.70	0:23:00	101.61	50.80	5.16	0:30:00	76.49	76.49	3.43
0:02:05	207.88	12.99	20.14	0:09:05	181.77	22.72	11.53	0:16:05	133.90	33.48	7.83	0:23:05	96.36	48.18	5.42	0:30:05	75.76	75.76	3.46
0:02:10	210.29	13.14	19.99	0:09:10	178.52	22.32	11.74	0:16:10	135.11	33.78	7.76	0:23:10	93.32	46.66	5.63	0:30:10	74.55	74.55	3.52
0:02:15	208.98	13.06	20.09	0:09:15	177.42	22.18	11.80	0:16:15	134.64	33.66	7.79	0:23:15	96.78	48.39	5.42	0:30:15	74.76	74.76	3.50
0:02:20	207.30	12.96	20.22	0:09:20	178.73	22.34	11.74	0:16:20	139.20	34.80	7.52	0:23:20	97.20	48.60	5.39	0:30:20	75.39	75.39	3.48
0:02:25	209.56	13.10	19.99	0:09:25	178.62	22.33	11.73	0:16:25	138.73	34.68	7.56	0:23:25	98.46	49.23	5.32	0:30:25	72.98	72.98	3.59
0:02:30	209.35	13.08	20.06	0:09:30	177.10	22.14	11.84	0:16:30	139.20	34.80	7.53	0:23:30	98.36	49.18	5.33	0:30:30	73.98	73.98	3.54
0:02:35	206.83	12.93	20.28	0:09:35	177.52	22.19	11.81	0:16:35	141.51	35.38	7.41	0:23:35	98.57	49.28	5.32	0:30:35	74.24	74.24	3.53
0:02:40	208.72	13.04	20.08	0:09:40	179.31	22.41	11.70	0:16:40	142.82	35.70	7.31	0:23:40	97.41	48.71	5.38	0:30:40	74.55	74.55	3.51
0:02:45	204.63	12.79	20.49	0:09:45	176.32	22.04	11.89	0:16:45	141.98	35.49	7.41	0:23:45	97.88	48.94	5.35	0:30:45	76.02	76.02	3.45
0:02:50	206.46	12.90	20.28	0:09:50	179.94	22.49	11.64	0:16:50	142.71	35.68	7.34	0:23:50	97.88	48.94	5.36	0:30:50	75.39	75.39	3.47
0:02:55	206.94	12.93	20.30	0:09:55	180.25	22.53	11.63	0:16:55	141.35	35.34	7.42	0:23:55	99.77	49.89	5.25	0:30:55	76.13	76.13	3.44

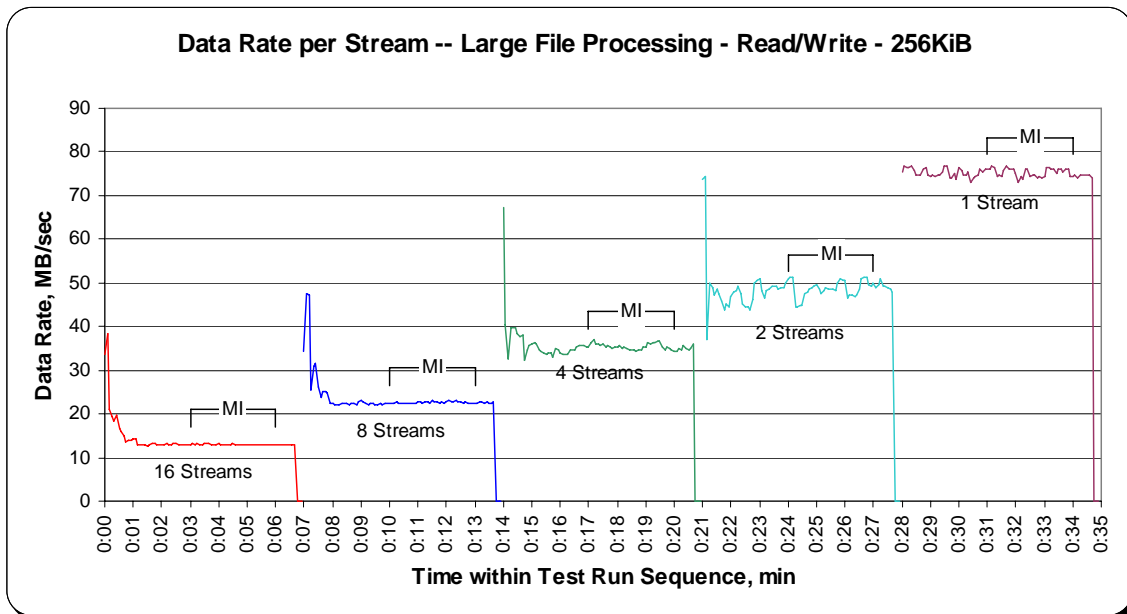
SPC-2 “Large File Processing/READ-WRITE/256 KiB Transfer Size” Average Data Rate Graph – Complete Test Run



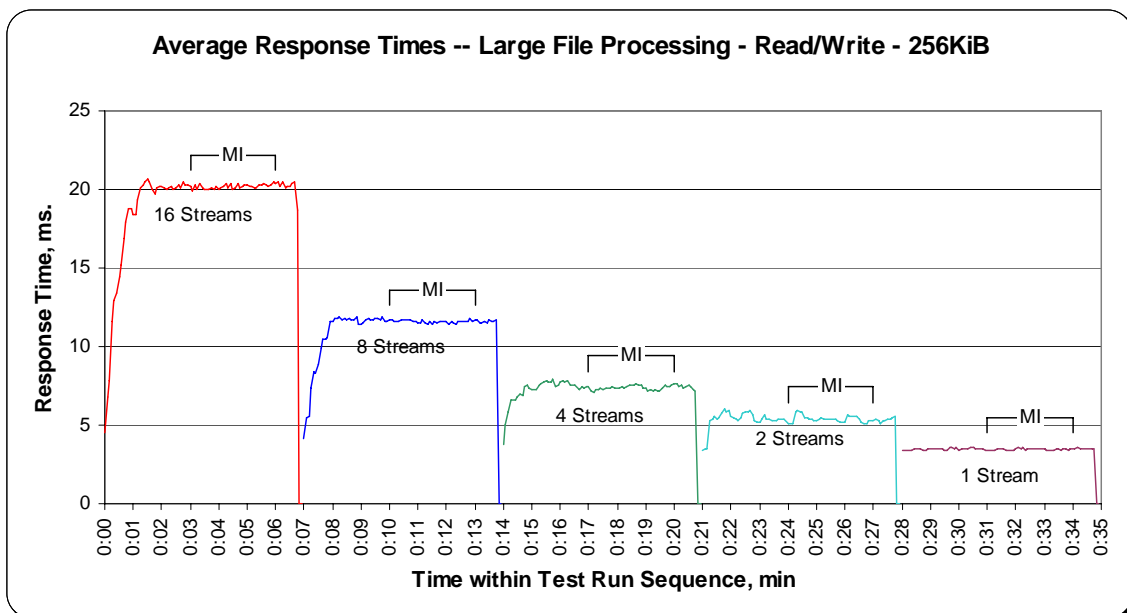
SPC-2 “Large File Processing/READ-WRITE/256 KiB Transfer Size” Average Data Rate Graph – Measurement Interval (MI) Only



SPC-2 “Large File Processing/READ-WRITE/256 KiB Transfer Size” Average Data Rate per Stream Graph



SPC-2 “Large File Processing/READ-WRITE/256 KiB Transfer Size” Average Response Time Graph



Large File Processing Test – READ ONLY Test Phase

Clause 10.6.8.1.3

1. A table that will contain the following information for each "READ ONLY, 1024 KiB Transfer Size" Test Run:
 - The number of Streams specified.
 - The average data rate, average data rate per stream, and average Response Time reported at five second intervals.
2. Average Data Rate (intervals), Average Data Rate per Stream (intervals), and Average Response Time (intervals) graphs for the "READ ONLY, 1024 KiB Transfer Size" Test Runs as specified in Clauses 10.1.4 – 10.1.6.
3. A table that will contain the following information for each "READ ONLY, 256 KiB Transfer Size" Test Run:
 - The number of Streams specified.
 - The average data rate, average data rate per stream, and average Response Time reported at five second intervals.
4. Average Data Rate (intervals), Average Data Rate per Stream (intervals), and Average Response Time (intervals) graphs for the "READ ONLY, 256 KiB Transfer Size" Test Runs as specified in Clauses 10.1.4 – 10.1.6.

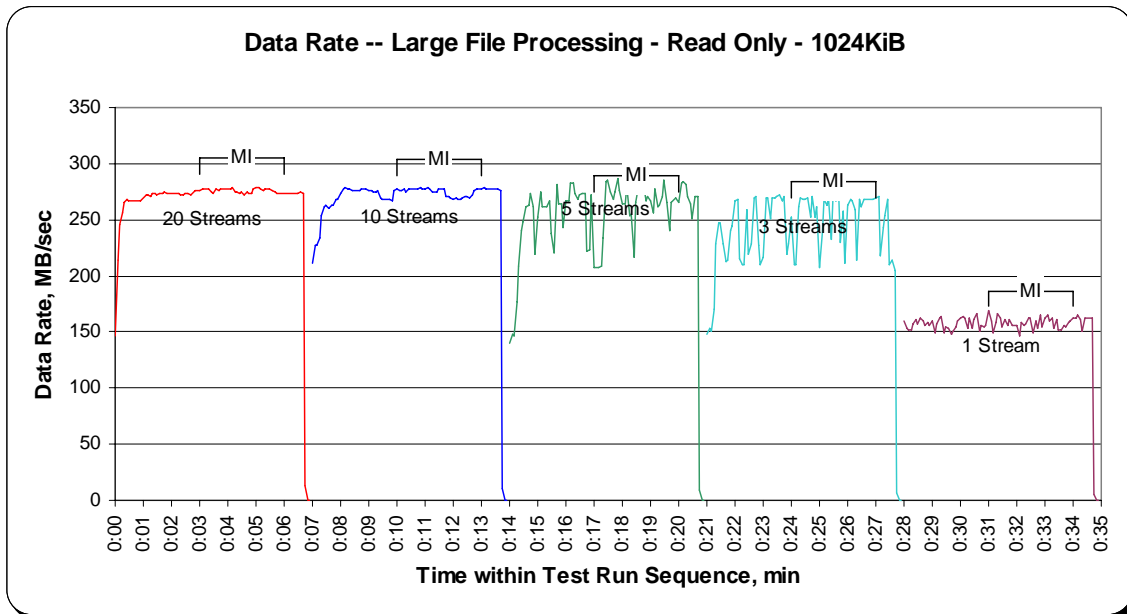
The SPC-2 "Large File Processing/READ ONLY/1024 KiB Transfer Size" Test Run data is contained in the table that appears on the next page. That table is followed by graphs illustrating the average Data Rate, average Data Rate per Stream, and average Response Time produced by the same Test Runs. The table and graphs present the data at five-second intervals.

Immediately following the SPC-2 "Large File Processing/READ ONLY/1024 KiB Transfer Size" table and graphs will be the SPC-2 "Large File Processing/READ ONLY/64 KiB Transfer Size" table and graphs. The table contains the Test Run data and the graphs illustrate the average Data Rate, average Data Rate per Stream, and average Response Time produced by the Test Runs.

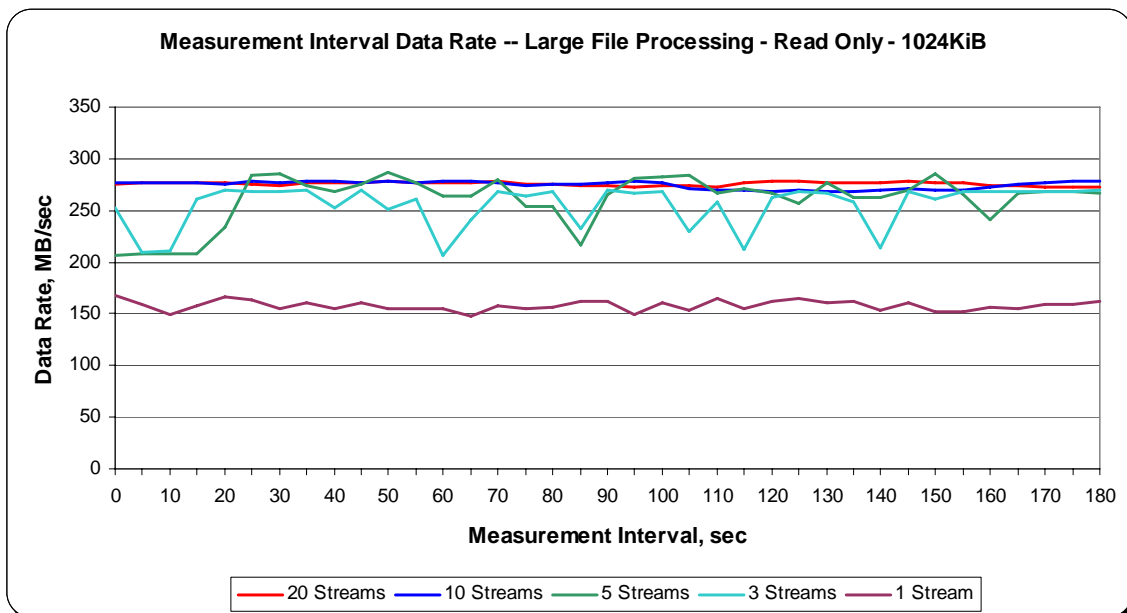
SPC-2 “Large File Processing/READ ONLY/1024 KiB Transfer Size” Test Run Data – Ramp Up Period

TR21 Test Run Sequence Time	20 Streams Data Rate			TR22 Test Run Sequence Time	10 Streams Data Rate			TR23 Test Run Sequence Time	5 Streams Data Rate			TR24 Test Run Sequence Time	3 Streams Data Rate			TR25 Test Run Sequence Time	1 Stream Data Rate		
	Data Rate, MB/sec	/ Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	/ Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	/ Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	/ Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	/ Stream, MB/sec	Response Time, ms
0:00:00	146.17	73.09	8.59	0:07:00	211.39	70.46	9.82	0:14:00	139.67	139.67	7.27	0:21:00	147.85	147.85	6.88	0:28:00	159.80	159.80	6.36
0:00:05	213.91	35.65	21.84	0:07:05	226.91	75.64	13.83	0:14:05	148.48	148.48	7.07	0:21:05	153.72	153.72	6.81	0:28:05	153.09	153.09	6.85
0:00:10	245.58	27.29	31.36	0:07:10	227.33	75.78	13.85	0:14:10	145.96	145.96	7.18	0:21:10	150.37	150.37	6.97	0:28:10	151.83	151.83	6.90
0:00:15	256.48	21.37	43.70	0:07:15	234.04	46.81	15.28	0:14:15	177.42	88.71	9.10	0:21:15	170.29	85.14	7.34	0:28:15	152.04	152.04	6.89
0:00:20	264.87	20.37	48.12	0:07:20	253.76	50.75	20.65	0:14:20	208.04	104.02	10.08	0:21:20	228.80	114.40	9.17	0:28:20	157.08	157.08	6.66
0:00:25	268.44	17.90	55.49	0:07:25	261.31	37.33	24.47	0:14:25	240.96	80.32	11.71	0:21:25	246.42	123.21	8.50	0:28:25	161.06	161.06	6.51
0:00:30	266.76	17.78	58.97	0:07:30	262.98	37.57	27.91	0:14:30	248.09	82.70	12.69	0:21:30	247.46	123.73	8.47	0:28:30	157.50	157.50	6.65
0:00:35	266.97	17.80	58.96	0:07:35	260.26	32.53	29.71	0:14:35	261.10	65.27	14.97	0:21:35	228.59	114.29	9.17	0:28:35	162.32	162.32	6.46
0:00:40	266.55	17.77	58.97	0:07:40	262.35	32.79	32.02	0:14:40	263.40	65.85	15.94	0:21:40	213.07	106.54	9.84	0:28:40	160.43	160.43	6.54
0:00:45	266.55	17.77	59.01	0:07:45	262.98	29.22	32.57	0:14:45	272.84	68.21	15.34	0:21:45	213.49	106.75	9.81	0:28:45	155.19	155.19	6.75
0:00:50	266.55	16.66	61.97	0:07:50	268.02	29.78	35.27	0:14:50	262.14	65.54	16.00	0:21:50	240.54	80.18	11.43	0:28:50	158.54	158.54	6.61
0:00:55	267.18	15.72	63.64	0:07:55	267.81	29.76	35.20	0:14:55	219.57	54.89	19.08	0:21:55	243.69	81.23	12.91	0:28:55	156.45	156.45	6.70
0:01:00	269.48	14.18	68.54	0:08:00	273.47	27.35	38.28	0:15:00	251.66	62.91	16.68	0:22:00	266.34	88.78	11.80	0:29:00	160.43	160.43	6.53
0:01:05	271.79	14.30	73.21	0:08:05	277.03	27.70	37.82	0:15:05	275.15	68.79	15.23	0:22:05	268.23	89.41	11.73	0:29:05	149.74	149.74	7.00
0:01:10	272.63	14.35	73.21	0:08:10	278.08	27.81	37.74	0:15:10	261.51	65.38	16.06	0:22:10	215.80	71.93	14.57	0:29:10	157.71	157.71	6.64
0:01:15	271.37	14.28	73.40	0:08:15	277.66	27.77	37.76	0:15:15	260.89	65.22	16.07	0:22:15	209.92	69.97	14.98	0:29:15	162.95	162.95	6.44
0:01:20	273.26	13.66	75.56	0:08:20	276.82	27.68	37.79	0:15:20	261.31	65.33	16.02	0:22:20	210.34	70.11	14.96	0:29:20	163.79	163.79	6.40
0:01:25	273.68	13.68	76.77	0:08:25	276.40	27.64	37.96	0:15:25	267.18	53.44	19.25	0:22:25	259.42	86.47	12.13	0:29:25	148.69	148.69	7.04
0:01:30	272.63	13.63	76.85	0:08:30	276.19	27.62	38.02	0:15:30	238.24	47.65	21.98	0:22:30	219.15	73.05	14.35	0:29:30	154.98	154.98	6.76
0:01:35	273.47	13.67	76.66	0:08:35	276.19	27.62	37.93	0:15:35	220.83	44.17	23.79	0:22:35	228.38	76.13	13.76	0:29:35	153.30	153.30	6.84
0:01:40	273.89	13.69	76.54	0:08:40	275.57	27.56	38.06	0:15:40	281.44	56.29	18.63	0:22:40	269.06	89.69	11.68	0:29:40	148.06	148.06	7.08
0:01:45	274.52	13.73	76.37	0:08:45	277.03	27.70	37.84	0:15:45	264.45	52.89	19.80	0:22:45	271.16	90.39	11.60	0:29:45	150.99	150.99	6.93
0:01:50	273.68	13.68	76.61	0:08:50	277.24	27.72	37.82	0:15:50	264.66	52.93	19.80	0:22:50	226.70	75.57	13.87	0:29:50	154.98	154.98	6.77
0:01:55	273.26	13.66	76.78	0:08:55	276.82	27.68	37.85	0:15:55	242.85	48.57	21.57	0:22:55	210.55	70.18	14.93	0:29:55	159.38	159.38	6.58
0:02:00	273.47	13.67	76.75	0:09:00	276.61	27.66	37.85	0:16:00	266.34	53.27	19.72	0:23:00	216.85	72.28	14.52	0:30:00	162.74	162.74	6.44
0:02:05	273.05	13.65	76.76	0:09:05	275.99	27.60	37.99	0:16:05	267.39	53.48	19.60	0:23:05	269.69	89.90	11.65	0:30:05	163.79	163.79	6.40
0:02:10	273.05	13.65	76.82	0:09:10	274.94	27.49	38.15	0:16:10	283.12	56.62	18.50	0:23:10	269.27	89.76	11.68	0:30:10	162.32	162.32	6.45
0:02:15	272.84	13.64	76.95	0:09:15	275.36	27.54	38.07	0:16:15	282.91	56.58	18.53	0:23:15	250.82	83.61	12.55	0:30:15	153.09	153.09	6.85
0:02:20	272.42	13.62	76.88	0:09:20	275.99	27.60	38.02	0:16:20	273.05	54.61	19.20	0:23:20	269.69	89.90	11.65	0:30:20	161.90	161.90	6.47
0:02:25	272.42	13.62	77.01	0:09:25	269.06	26.91	38.96	0:16:25	268.02	53.60	19.54	0:23:25	269.27	89.76	11.67	0:30:25	152.88	152.88	6.86
0:02:30	273.68	13.68	76.56	0:09:30	268.44	26.84	39.04	0:16:30	272.63	54.53	19.24	0:23:30	270.32	90.11	11.64	0:30:30	160.85	160.85	6.51
0:02:35	273.05	13.65	76.84	0:09:35	268.23	26.82	39.10	0:16:35	273.89	54.78	19.16	0:23:35	271.58	90.53	11.59	0:30:35	166.72	166.72	6.29
0:02:40	272.63	13.63	76.83	0:09:40	268.44	26.84	39.09	0:16:40	273.05	54.61	19.16	0:23:40	267.39	89.13	11.75	0:30:40	151.20	151.20	6.92
0:02:45	273.26	13.66	76.76	0:09:45	267.81	26.78	39.16	0:16:45	222.51	44.50	23.56	0:23:45	270.11	90.04	11.65	0:30:45	156.24	156.24	6.72
0:02:50	275.78	13.79	76.10	0:09:50	267.39	26.74	39.15	0:16:50	222.72	44.54	23.58	0:23:50	219.78	73.26	14.29	0:30:50	154.98	154.98	6.76
0:02:55	276.61	13.83	75.84	0:09:55	275.99	27.60	38.08	0:16:55	272.21	54.44	19.25	0:23:55	228.17	76.06	13.79	0:30:55	156.03	156.03	6.72

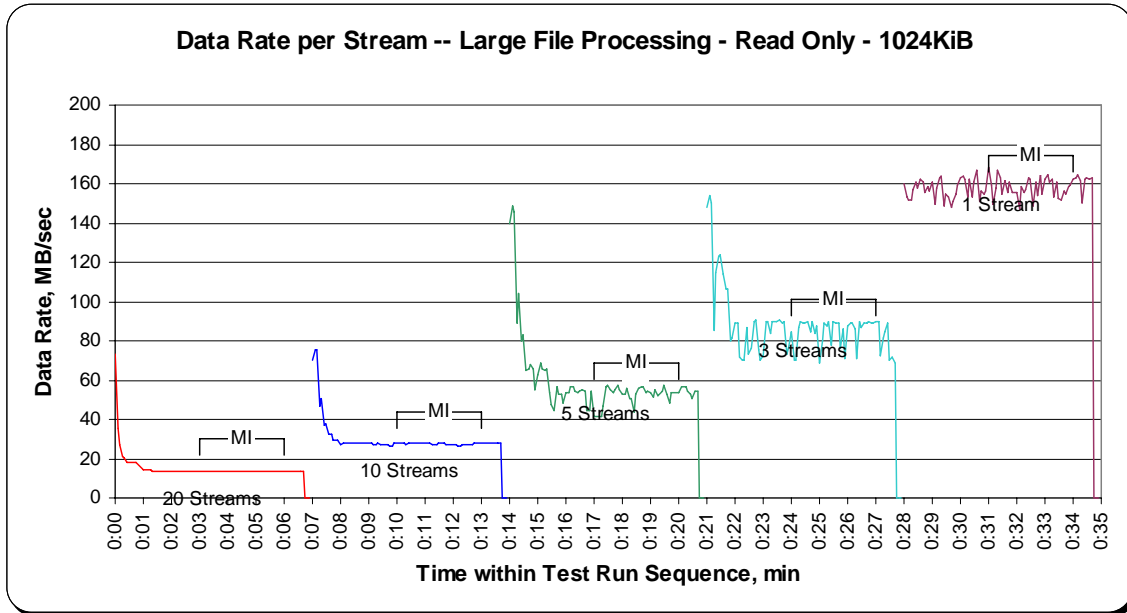
SPC-2 “Large File Processing/READ ONLY/1024 KiB Transfer Size” Average Data Rate Graph – Complete Test Run



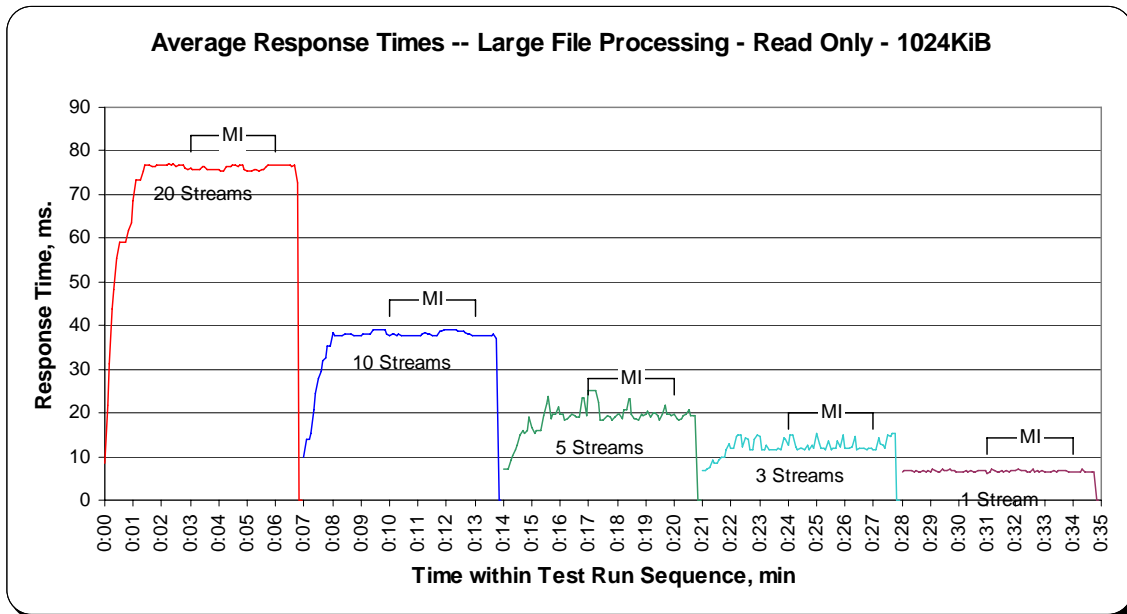
SPC-2 “Large File Processing/READ ONLY/1024 KiB Transfer Size” Average Data Rate Graph – Measurement Interval (MI) Only



SPC-2 “Large File Processing/READ ONLY/1024 KiB Transfer Size” Average Data Rate per Stream Graph



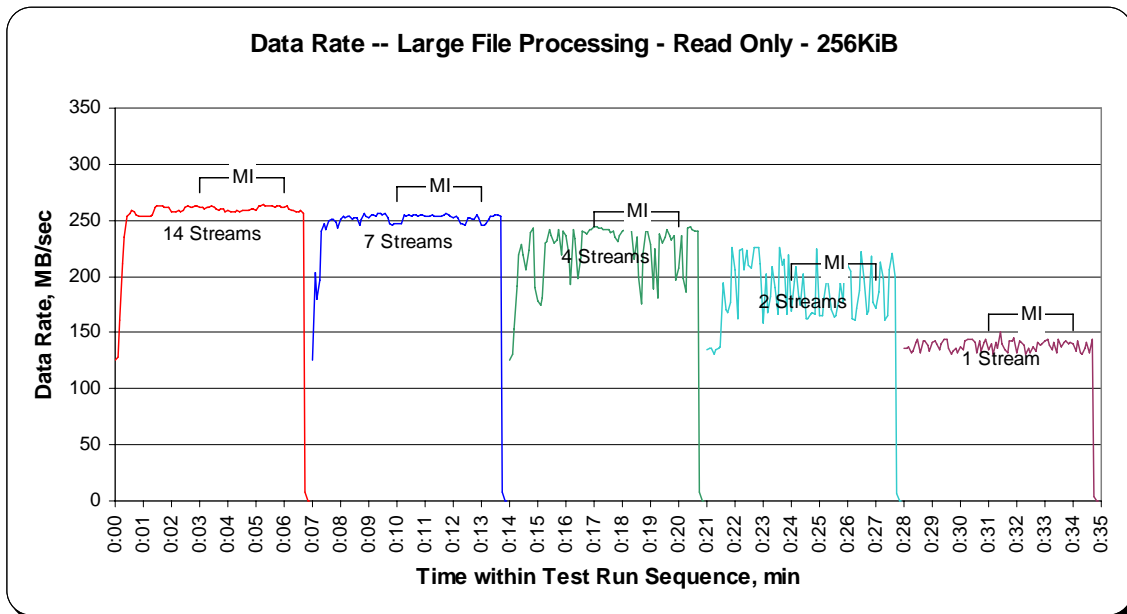
SPC-2 “Large File Processing/READ ONLY/1024 KiB Transfer Size” Average Response Time Graph



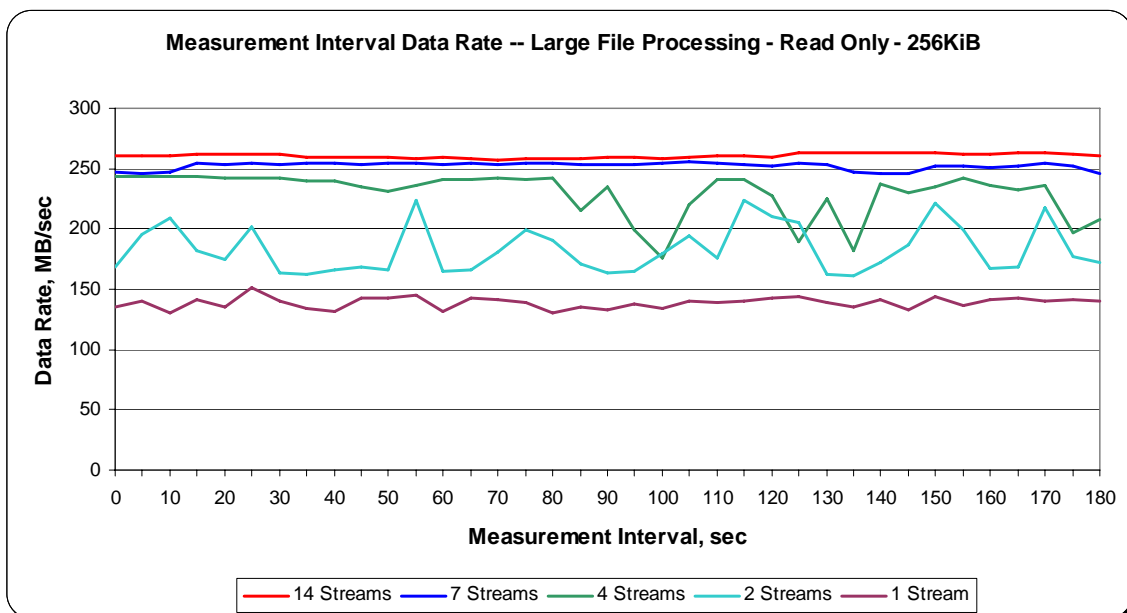
SPC-2 “Large File Processing/READ ONLY/256 KiB Transfer Size” Test Run Data – Ramp-Up Period

TR26 Test Run Sequence Time	14 Streams			TR27 Test Run Sequence Time	7 Streams			TR28 Test Run Sequence Time	4 Streams			TR29 Test Run Sequence Time	2 Streams			TR30 Test Run Sequence Time	1 Stream		
	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms
0:00:00	125.72	62.86	2.22	0:07:00	125.88	125.88	2.02	0:14:00	125.93	125.93	2.02	0:21:00	134.85	134.85	1.88	0:28:00	135.48	135.48	1.87
0:00:05	128.66	64.33	4.08	0:07:05	203.53	67.84	3.10	0:14:05	130.76	130.76	2.00	0:21:05	136.21	136.21	1.92	0:28:05	136.47	136.47	1.92
0:00:10	161.22	40.30	4.40	0:07:10	179.36	59.79	4.38	0:14:10	153.04	76.52	2.25	0:21:10	136.31	136.31	1.92	0:28:10	137.00	137.00	1.91
0:00:15	211.45	52.86	4.96	0:07:15	196.50	49.13	4.29	0:14:15	192.15	64.05	2.78	0:21:15	131.28	131.28	1.99	0:28:15	131.70	131.70	1.99
0:00:20	235.09	29.39	7.16	0:07:20	240.02	40.00	6.36	0:14:20	219.52	73.17	3.58	0:21:20	134.22	134.22	1.95	0:28:20	132.80	132.80	1.97
0:00:25	253.28	25.33	9.89	0:07:25	247.15	41.19	6.36	0:14:25	228.22	76.07	3.44	0:21:25	136.58	136.58	1.92	0:28:25	141.19	141.19	1.85
0:00:30	256.64	23.33	10.80	0:07:30	241.17	40.20	6.52	0:14:30	219.89	73.30	3.57	0:21:30	137.89	137.89	1.90	0:28:30	143.86	143.86	1.82
0:00:35	258.68	23.52	11.14	0:07:35	250.14	41.69	6.29	0:14:35	206.10	68.70	3.81	0:21:35	194.04	97.02	2.44	0:28:35	132.07	132.07	1.98
0:00:40	257.95	23.45	11.17	0:07:40	250.92	41.82	6.26	0:14:40	223.56	55.89	3.92	0:21:40	169.82	84.91	3.09	0:28:40	143.18	143.18	1.83
0:00:45	254.28	23.12	11.34	0:07:45	250.77	41.79	6.27	0:14:45	239.18	59.80	4.38	0:21:45	167.30	83.65	3.13	0:28:45	143.13	143.13	1.83
0:00:50	253.13	23.01	11.38	0:07:50	248.15	41.36	6.33	0:14:50	243.43	60.86	4.30	0:21:50	177.05	88.53	2.96	0:28:50	138.94	138.94	1.88
0:00:55	253.13	23.01	11.38	0:07:55	242.80	40.47	6.48	0:14:55	190.26	47.57	5.51	0:21:55	225.39	112.70	2.32	0:28:55	133.43	133.43	1.96
0:01:00	253.18	23.02	11.40	0:08:00	251.08	35.87	6.48	0:15:00	178.00	44.50	5.89	0:22:00	206.25	103.13	2.54	0:29:00	141.45	141.45	1.85
0:01:05	253.49	23.04	11.37	0:08:05	254.12	36.30	7.21	0:15:05	173.85	43.46	6.02	0:22:05	162.16	81.08	3.23	0:29:05	142.61	142.61	1.84
0:01:10	253.18	21.10	12.04	0:08:10	252.92	36.13	7.25	0:15:10	180.72	45.18	5.80	0:22:10	222.72	111.36	2.35	0:29:10	140.56	140.56	1.86
0:01:15	253.39	21.12	12.41	0:08:15	253.02	36.15	7.25	0:15:15	230.37	57.59	4.55	0:22:15	223.98	111.99	2.34	0:29:15	134.90	134.90	1.94
0:01:20	255.17	18.23	12.90	0:08:20	253.44	36.21	7.23	0:15:20	230.84	57.71	4.54	0:22:20	206.67	103.34	2.53	0:29:20	140.30	140.30	1.87
0:01:25	261.51	18.68	14.03	0:08:25	251.03	35.86	7.31	0:15:25	241.28	60.32	4.34	0:22:25	223.40	111.70	2.34	0:29:25	143.55	143.55	1.82
0:01:30	262.98	18.78	13.96	0:08:30	252.55	36.08	7.26	0:15:30	236.66	59.17	4.42	0:22:30	209.66	104.83	2.50	0:29:30	144.34	144.34	1.81
0:01:35	262.20	18.73	13.99	0:08:35	251.66	35.95	7.28	0:15:35	229.17	57.29	4.57	0:22:35	207.62	103.81	2.52	0:29:35	135.90	135.90	1.93
0:01:40	262.46	18.75	13.97	0:08:40	245.63	35.09	7.46	0:15:40	232.73	58.18	4.50	0:22:40	225.71	112.85	2.32	0:29:40	130.86	130.86	2.00
0:01:45	262.14	18.72	14.00	0:08:45	251.13	35.88	7.31	0:15:45	241.70	60.42	4.33	0:22:45	226.49	113.25	2.31	0:29:45	133.64	133.64	1.96
0:01:50	262.14	18.72	13.98	0:08:50	256.64	36.66	7.15	0:15:50	218.94	54.74	4.78	0:22:50	226.18	113.09	2.32	0:29:50	135.84	135.84	1.93
0:01:55	261.62	18.69	14.03	0:08:55	253.55	36.22	7.24	0:15:55	240.91	60.23	4.35	0:22:55	211.86	105.93	2.47	0:29:55	131.60	131.60	1.99
0:02:00	257.53	18.40	14.25	0:09:00	252.18	36.03	7.27	0:16:00	236.82	59.21	4.43	0:23:00	157.86	78.93	3.32	0:30:00	136.84	136.84	1.91
0:02:05	257.79	18.41	14.22	0:09:05	254.70	36.39	7.20	0:16:05	219.68	54.92	4.75	0:23:05	201.90	100.95	2.60	0:30:05	134.79	134.79	1.94
0:02:10	257.22	18.37	14.27	0:09:10	254.70	36.39	7.20	0:16:10	192.57	48.14	5.46	0:23:10	167.67	83.83	3.12	0:30:10	142.13	142.13	1.84
0:02:15	258.37	18.45	14.20	0:09:15	254.02	36.29	7.22	0:16:15	241.12	60.28	4.34	0:23:15	182.77	91.38	2.87	0:30:15	143.50	143.50	1.82
0:02:20	258.05	18.43	14.21	0:09:20	256.27	36.61	7.15	0:16:20	234.30	58.58	4.47	0:23:20	209.19	104.60	2.50	0:30:20	143.86	143.86	1.82
0:02:25	259.21	18.51	14.17	0:09:25	256.06	36.58	7.17	0:16:25	198.44	49.61	5.28	0:23:25	190.21	95.11	2.75	0:30:25	144.18	144.18	1.82
0:02:30	261.99	18.71	14.00	0:09:30	254.28	36.33	7.21	0:16:30	217.00	54.25	4.83	0:23:30	166.99	83.49	3.14	0:30:30	141.98	141.98	1.84
0:02:35	262.51	18.75	13.99	0:09:35	255.64	36.52	7.18	0:16:35	239.81	59.95	4.37	0:23:35	225.39	112.70	2.32	0:30:35	132.12	132.12	1.98
0:02:40	261.67	18.69	14.00	0:09:40	251.66	35.95	7.29	0:16:40	239.49	59.87	4.37	0:23:40	209.66	104.83	2.50	0:30:40	142.24	142.24	1.84
0:02:45	262.04	18.72	14.01	0:09:45	246.47	35.21	7.44	0:16:45	237.50	59.38	4.41	0:23:45	215.06	107.53	2.44	0:30:45	134.01	134.01	1.95
0:02:50	263.30	18.81	13.94	0:09:50	245.73	35.10	7.46	0:16:50	241.12	60.28	4.34	0:23:50	165.94	82.97	3.16	0:30:50	141.14	141.14	1.85
0:02:55	262.35	18.74	13.97	0:09:55	247.31	35.33	7.41	0:16:55	241.43	60.36	4.34	0:23:55	219.41	109.71	2.39	0:30:55	143.71	143.71	1.82

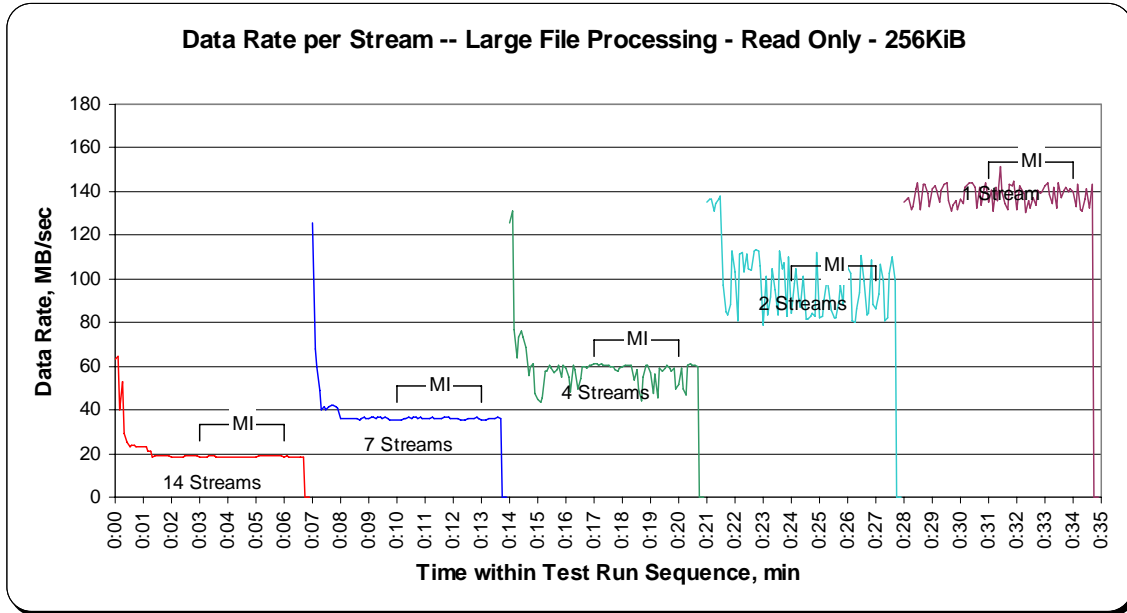
SPC-2 “Large File Processing/READ ONLY/256 KiB Transfer Size” Average Data Rate Graph – Complete Test Run



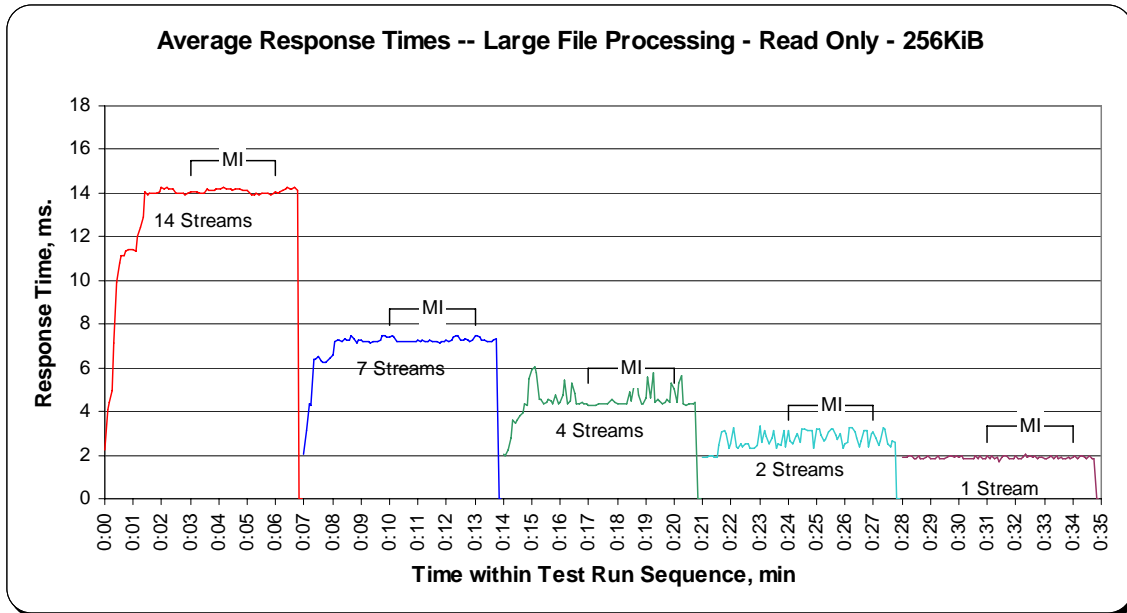
SPC-2 “Large File Processing/READ ONLY/256 KiB Transfer Size” Average Data Rate Graph – Measurement Interval (MI) Only



SPC-2 “Large File Processing/READ ONLY/256 KiB Transfer Size” Average Data Rate per Stream Graph



SPC-2 “Large File Processing/READ ONLY/256 KiB Transfer Size” Average Response Time Graph



Large Database Query Test

Clause 6.4.3.1

The Large Database Query Test is comprised of a set of I/O operations representative of scans or joins of large relational tables such as those performed for data mining or business intelligence.

Clause 6.4.3.2

The Large Database Query Test has two Test Phases, which shall be executed in the following uninterrupted sequence:

- 1. 1024 KiB TRANSFER SIZE*
- 2. 64 KiB TRANSFER SIZE*

The BC shall not be restarted or manually disturbed, altered, or adjusted during the execution of the Large File Processing Test. If power is lost to the BC during this Test all results shall be rendered invalid and the Test re-run in its entirety.

Clause 10.6.8.2

The Full Disclosure Report will contain the following content for the Large Database Query Test:

- 1. A listing of the SPC-2 Workload Generator commands and parameters used to execute each of the Test Runs in the Large Database Query Test.*
- 2. The human readable SPC-2 Test Results File for each of the Test Runs in the Large Database Query Test.*
- 3. A table that contains the following information for each Test Run in the two Test Phases of the Large Database Query Test:*
 - The number Streams specified.*
 - The Ramp-Up duration in seconds.*
 - The Measurement Interval duration in seconds.*
 - The average data rate, in MB per second, for the Measurement Interval.*
 - The average data rate, in MB per second, per Stream for the Measurement Interval.*
- 4. Average Data Rate and Average Data Rate per Stream graphs as defined in Clauses 10.1.1 and 10.1.2.*

SPC-2 Workload Generator Commands and Parameters

The SPC-2 Workload Generator commands and parameters for the Large Database Query Test Runs are documented in “Appendix E: SPC-2 Workload Generator Execution Commands and Parameters” on Page 112.

SPC-2 Test Results File

A link to the SPC-2 Test Results file generated from the Large Database Query Test Runs is listed below.

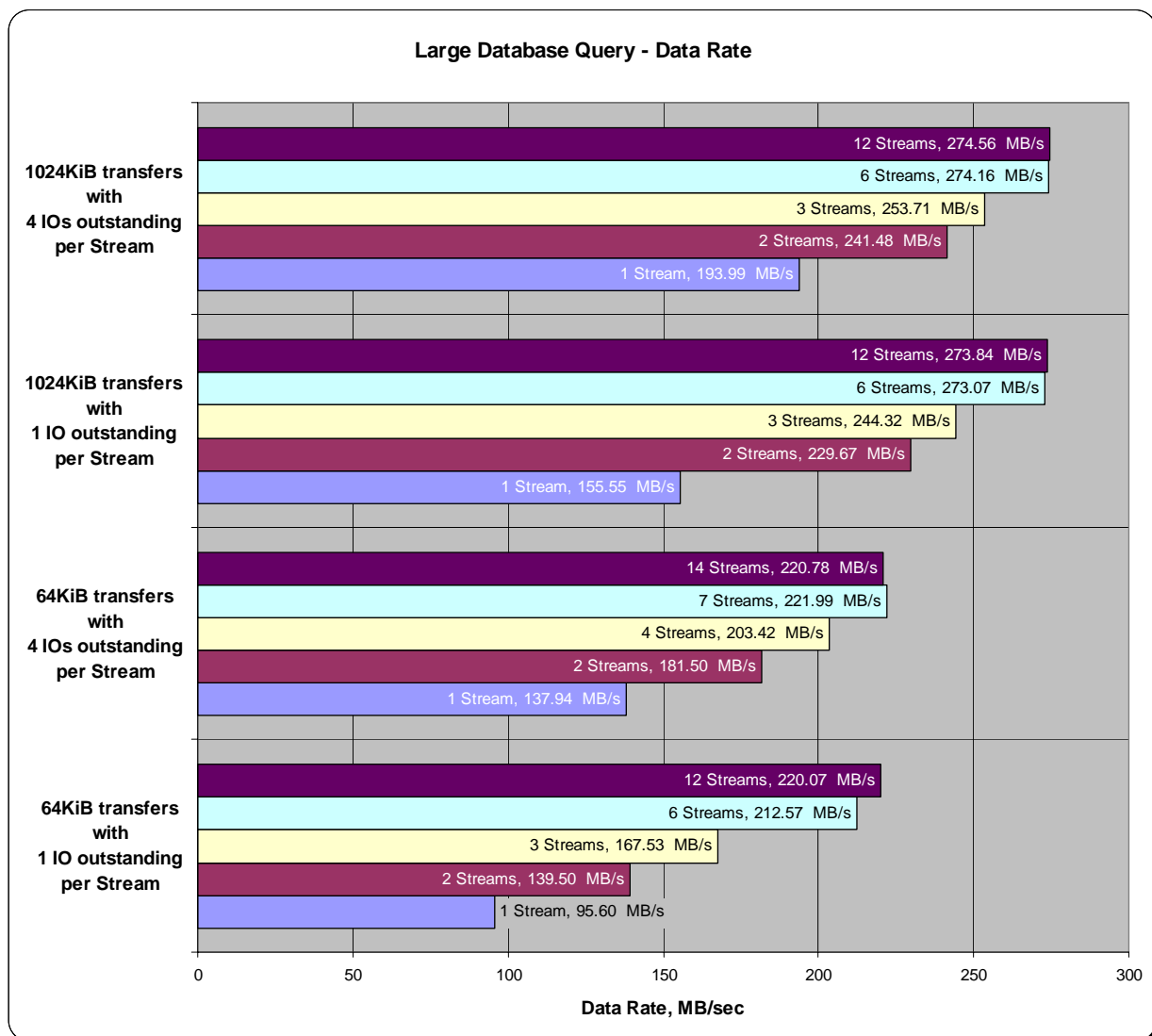
[SPC-2 Large Database Query Test Results File](#)

SPC-2 Large Database Query Average Data Rates (MB/s)

The average Data Rate (MB/s) for each Test Run in the two Test Phases of the SPC-2 Large Database Query Test is listed in the table below as well as illustrated in the following graph.

Test Run Sequence	1 Stream	2 Streams	3 Streams	6 Streams	12 Streams
1024KiB w/ 4 IOs/Stream	193.99	241.48	253.71	274.16	274.56
Test Run Sequence	1 Stream	2 Streams	3 Streams	6 Streams	12 Streams
1024KiB w/ 1 IO/Stream	155.55	229.67	244.32	273.07	273.84
Test Run Sequence	1 Stream	2 Streams	4 Streams	7 Streams	14 Streams
64KiB w/ 4 IOs/Stream	137.94	181.50	203.42	221.99	220.78
Test Run Sequence	1 Stream	2 Streams	3 Streams	6 Streams	12 Streams
64KiB w/ 1 IO/Stream	95.60	139.50	167.53	212.57	220.07

SPC-2 Large Database Query Average Data Rates Graph

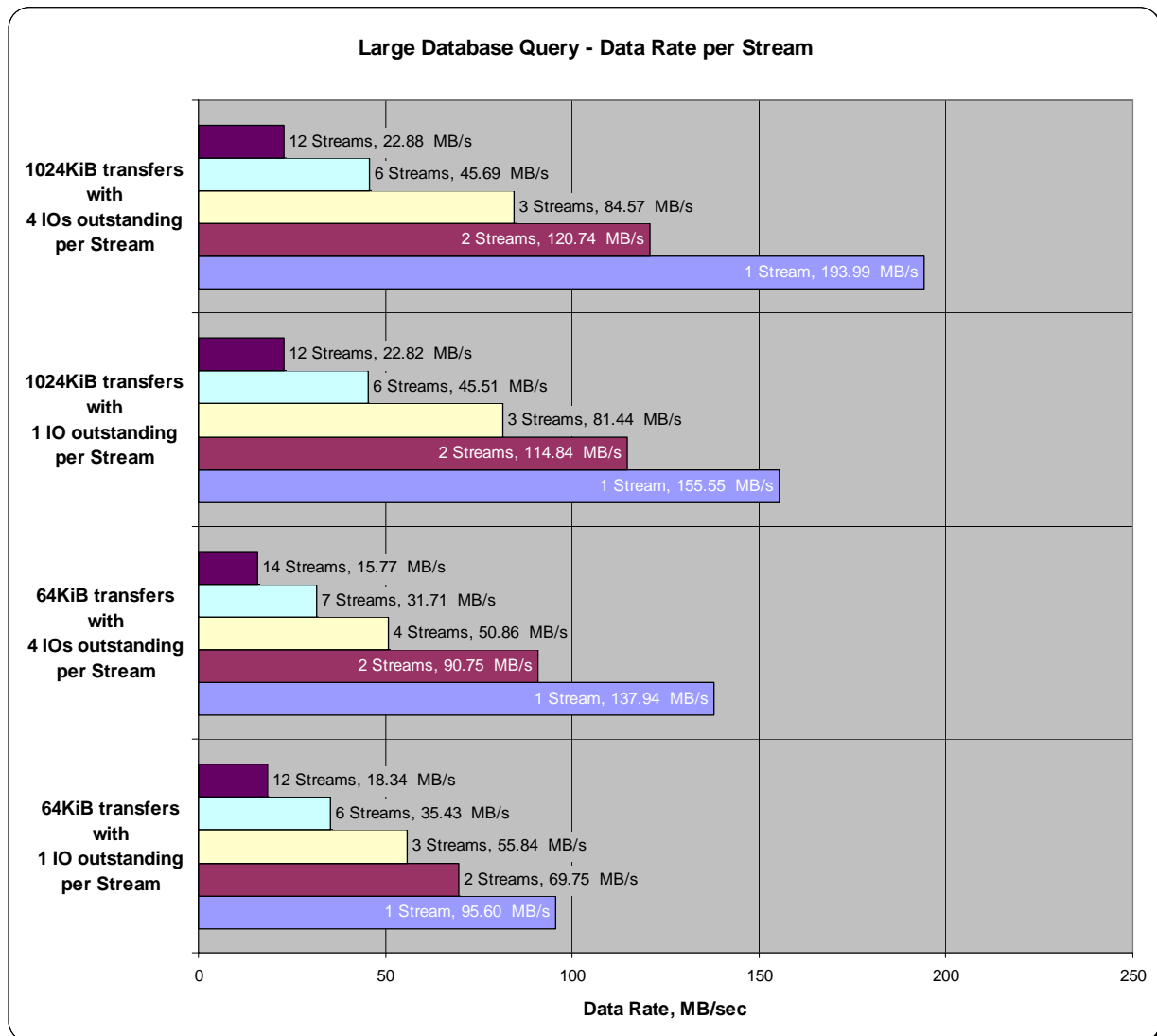


SPC-2 Large Database Query Average Data Rate per Stream

The average Data Rate per Stream for each Test Run in the two Test Phases of the SPC-2 Large Database Query Test is listed in the table below as well as illustrated in the following graph.

Test Run Sequence	1 Stream	2 Streams	3 Streams	6 Streams	12 Streams
1024KiB w/ 4 IOs/Stream	193.99	120.74	84.57	45.69	22.88
Test Run Sequence	1 Stream	2 Streams	3 Streams	6 Streams	12 Streams
1024KiB w/ 1 IO/Stream	155.55	114.84	81.44	45.51	22.82
Test Run Sequence	1 Stream	2 Streams	4 Streams	7 Streams	14 Streams
64KiB w/ 4 IOs/Stream	137.94	90.75	50.86	31.71	15.77
Test Run Sequence	1 Stream	2 Streams	3 Streams	6 Streams	12 Streams
64KiB w/ 1 IO/Stream	95.60	69.75	55.84	35.43	18.34

SPC-2 Large Database Query Average Data Rate per Stream Graph

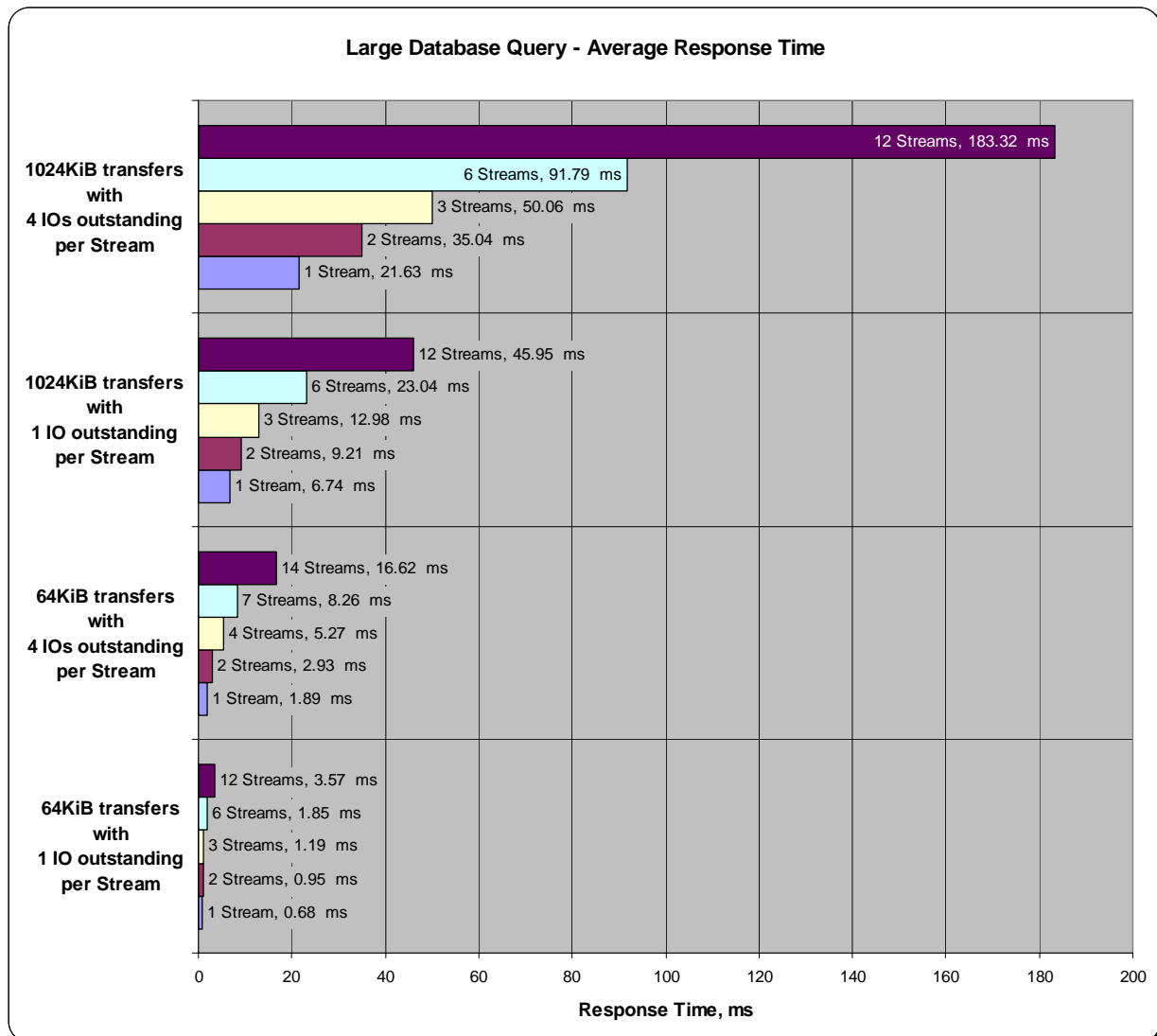


SPC-2 Large Database Query Average Response Time

The average Response Time, in milliseconds, for each Test Run in the two Test Phases of the SPC-2 Large Database Query Test is listed in the table below as well as illustrated in the following graph.

Test Run Sequence	1 Stream	2 Streams	3 Streams	6 Streams	12 Streams
1024KiB w/ 4 IOs/Stream	21.63	35.04	50.06	91.79	183.32
Test Run Sequence	1 Stream	2 Streams	3 Streams	6 Streams	12 Streams
1024KiB w/ 1 IO/Stream	6.74	9.21	12.98	23.04	45.95
Test Run Sequence	1 Stream	2 Streams	4 Streams	7 Streams	14 Streams
64KiB w/ 4 IOs/Stream	1.89	2.93	5.27	8.26	16.62
Test Run Sequence	1 Stream	2 Streams	3 Streams	6 Streams	12 Streams
64KiB w/ 1 IO/Stream	0.68	0.95	1.19	1.85	3.57

SPC-2 Large Database Query Average Response Time Graph



Large Database Query Test – 1024 KiB TRANSFER SIZE Test Phase

Clause 10.6.8.2.1

1. A table that will contain the following information for each "1024 KiB Transfer Size, 4 Outstanding I/Os" Test Run:
 - The number of Streams specified.
 - The average data rate, average data rate per stream, and average Response Time reported at five second intervals.
2. Average Data Rate (intervals), Average Data Rate per Stream (intervals), and Average Response Time (intervals) graphs for the "1024 KiB Transfer Size, 4 Outstanding I/Os" Test Runs as specified in Clauses 10.1.4 – 10.1.6.
3. A table that will contain the following information for each "1024 KiB Transfer Size, 1 Outstanding I/O" Test Run:
 - The number of Streams specified.
 - The average data rate, average data rate per stream, and average Response Time reported at five second intervals.
4. Average Data Rate (intervals), Average Data Rate per Stream (intervals), and Average Response Time (intervals) graphs for the "1024 KiB Transfer Size, 1 Outstanding I/O" Test Runs as specified in Clauses 10.1.4 – 10.1.6.

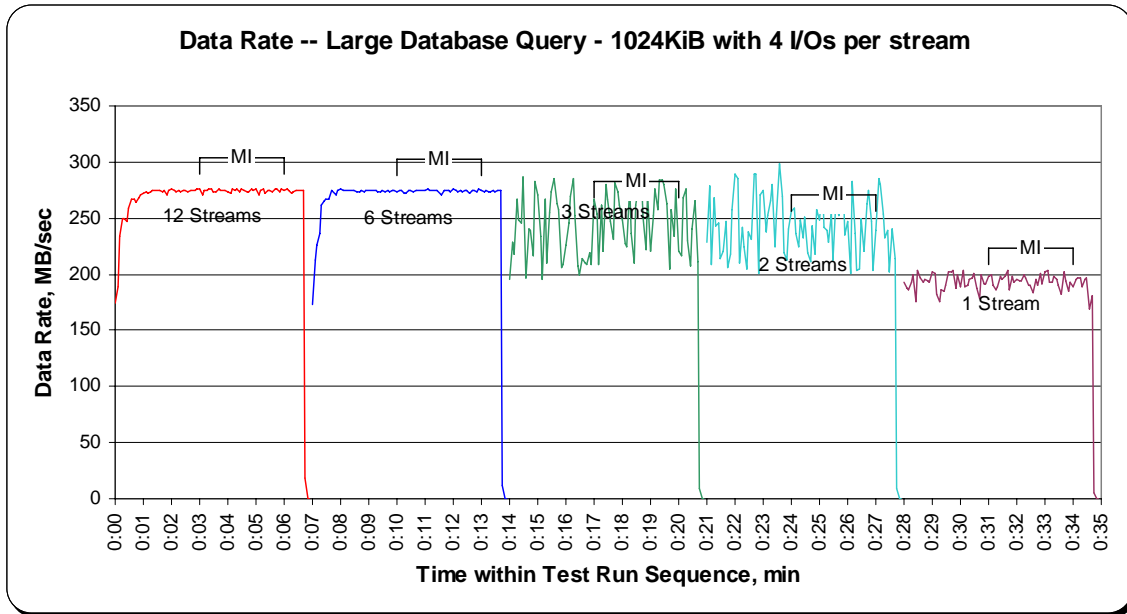
The SPC-2 "Large DatabaseQuery/1024 KiB TRANSFER SIZE/4 Outstanding I/Os" Test Run data is contained in the table that appears on the next page. That table is followed by graphs illustrating the average Data Rate, average Data Rate per Stream, and average Response Time produced by the same Test Runs. The table and graphs present the data at five-second intervals.

Immediately following the SPC-2 "Large DatabaseQuery/1024 KiB TRANSFER SIZE/4 Outstanding I/Os" table and graphs will be the SPC-2 "Large DatabaseQuery/1024 KiB TRANSFER SIZE/1 Outstanding I/O" table and graphs. The table contains the Test Run data and the graphs illustrate the average Data Rate, average Data Rate per Stream, and average Response Time produced by the Test Runs.

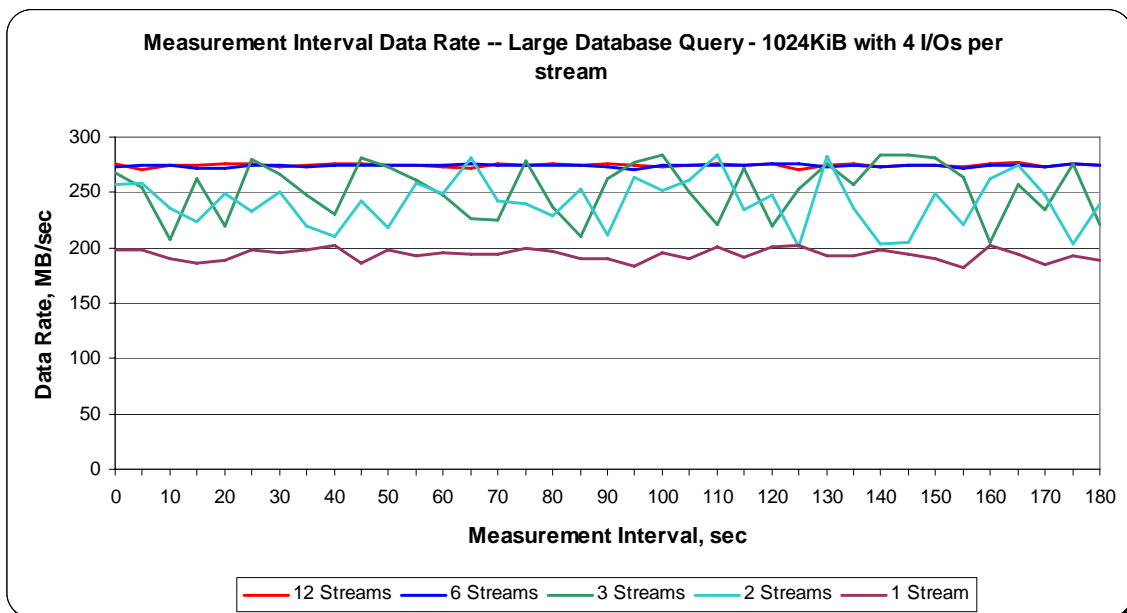
SPC-2 “Large Database Query/1024 KiB Transfer Size/4 Outstanding I/Os” Test Run Data - Ramp-Up Period

TR1 Test Run Sequence Time	12 Streams			TR2 Test Run Sequence Time	6 Streams			TR3 Test Run Sequence Time	3 Streams			TR4 Test Run Sequence Time	2 Streams			TR5 Test Run Sequence Time	1 Stream		
	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms
0:00:00	174.90	174.90	23.17	0:07:00	173.43	173.43	23.33	0:14:00	196.08	98.04	34.35	0:21:00	228.17	114.09	24.21	0:28:00	192.94	192.94	21.03
0:00:05	188.95	62.98	33.32	0:07:05	212.02	106.01	31.04	0:14:05	228.38	114.19	36.73	0:21:05	278.50	139.25	30.11	0:28:05	188.11	188.11	22.27
0:00:10	233.20	46.64	58.30	0:07:10	226.28	113.14	37.06	0:14:10	218.52	109.26	38.43	0:21:10	208.04	104.02	40.31	0:28:10	185.81	185.81	22.58
0:00:15	249.56	41.59	94.32	0:07:15	236.56	78.85	44.04	0:14:15	267.18	89.06	37.07	0:21:15	268.02	134.01	31.34	0:28:15	192.73	192.73	21.76
0:00:20	249.56	41.59	100.82	0:07:20	261.93	65.48	62.70	0:14:20	248.72	82.91	50.62	0:21:20	242.43	121.22	34.46	0:28:20	199.44	199.44	21.01
0:00:25	247.04	35.29	104.01	0:07:25	265.08	66.27	63.22	0:14:25	245.16	81.72	51.46	0:21:25	245.79	122.89	34.26	0:28:25	175.95	175.95	23.81
0:00:30	259.00	32.37	116.09	0:07:30	266.76	53.35	70.42	0:14:30	286.47	95.49	43.88	0:21:30	214.12	107.06	39.11	0:28:30	202.79	202.79	20.70
0:00:35	266.34	33.29	126.57	0:07:35	266.97	53.39	78.32	0:14:35	196.50	65.50	63.68	0:21:35	220.41	110.21	38.03	0:28:35	196.92	196.92	21.26
0:00:40	266.55	29.62	126.24	0:07:40	274.52	45.75	90.63	0:14:40	240.75	80.25	52.43	0:21:40	247.25	123.63	33.91	0:28:40	193.36	193.36	21.71
0:00:45	264.24	29.36	141.54	0:07:45	273.89	45.65	91.80	0:14:45	238.87	79.62	52.67	0:21:45	206.57	103.28	40.57	0:28:45	195.24	195.24	21.48
0:00:50	268.44	26.84	152.45	0:07:50	271.16	45.19	92.76	0:14:50	216.43	72.14	58.12	0:21:50	217.68	108.84	38.50	0:28:50	194.20	194.20	21.58
0:00:55	270.11	24.56	164.65	0:07:55	274.94	45.82	91.44	0:14:55	282.49	94.16	44.55	0:21:55	256.90	128.45	32.69	0:28:55	192.94	192.94	21.73
0:01:00	271.79	24.71	169.80	0:08:00	275.99	46.00	91.40	0:15:00	270.53	90.18	46.51	0:22:00	289.62	144.81	28.94	0:29:00	202.17	202.17	20.72
0:01:05	273.05	24.82	169.10	0:08:05	274.31	45.72	91.63	0:15:05	233.83	77.94	53.73	0:22:05	285.84	142.92	29.34	0:29:05	201.12	201.12	20.85
0:01:10	271.79	24.71	169.52	0:08:10	274.94	45.82	91.50	0:15:10	195.66	65.22	63.72	0:22:10	210.13	105.07	39.92	0:29:10	182.24	182.24	23.01
0:01:15	273.47	22.79	172.84	0:08:15	274.73	45.79	91.76	0:15:15	267.39	89.13	47.48	0:22:15	242.22	121.11	34.62	0:29:15	175.32	175.32	23.91
0:01:20	274.94	22.91	183.24	0:08:20	275.36	45.89	91.22	0:15:20	209.72	69.91	59.91	0:22:20	223.98	111.99	37.44	0:29:20	186.02	186.02	22.53
0:01:25	274.94	22.91	182.87	0:08:25	274.52	45.75	91.63	0:15:25	255.22	85.07	49.40	0:22:25	205.31	102.66	40.88	0:29:25	184.55	184.55	22.72
0:01:30	274.73	22.89	183.07	0:08:30	274.94	45.82	91.65	0:15:30	273.89	91.30	45.94	0:22:30	237.40	118.70	35.32	0:29:30	190.00	190.00	22.08
0:01:35	274.31	22.86	182.94	0:08:35	273.68	45.61	91.88	0:15:35	285.42	95.14	44.00	0:22:35	230.48	115.24	36.40	0:29:35	201.54	201.54	20.79
0:01:40	273.05	22.75	185.19	0:08:40	273.26	45.54	92.24	0:15:40	263.19	87.73	47.82	0:22:40	288.99	144.49	29.00	0:29:40	202.38	202.38	20.73
0:01:45	275.36	22.95	182.51	0:08:45	274.52	45.75	91.58	0:15:45	257.53	85.84	48.91	0:22:45	289.41	144.70	28.91	0:29:45	203.21	203.21	20.62
0:01:50	271.37	22.61	185.36	0:08:50	273.89	45.65	91.70	0:15:50	206.15	68.72	60.94	0:22:50	201.33	100.66	41.72	0:29:50	187.70	187.70	22.33
0:01:55	274.31	22.86	183.22	0:08:55	274.73	45.79	91.78	0:15:55	208.04	69.35	60.50	0:22:55	270.32	135.16	31.02	0:29:55	199.23	199.23	21.05
0:02:00	275.78	22.98	182.74	0:09:00	274.10	45.68	91.63	0:16:00	225.65	75.22	55.76	0:23:00	275.15	137.57	30.52	0:30:00	189.16	189.16	22.18
0:02:05	275.36	22.95	183.08	0:09:05	275.15	45.86	91.60	0:16:05	246.21	82.07	51.00	0:23:05	238.24	119.12	35.22	0:30:05	203.42	203.42	20.59
0:02:10	273.89	22.82	182.86	0:09:10	274.10	45.68	91.65	0:16:10	268.85	89.62	46.85	0:23:10	252.08	126.04	33.17	0:30:10	188.32	188.32	22.24
0:02:15	275.15	22.93	183.57	0:09:15	274.73	45.79	91.71	0:16:15	284.79	94.93	44.16	0:23:15	265.08	132.54	31.67	0:30:15	189.79	189.79	22.12
0:02:20	273.89	22.82	183.42	0:09:20	273.26	45.54	92.01	0:16:20	251.87	83.96	50.02	0:23:20	280.60	140.30	29.89	0:30:20	195.04	195.04	21.53
0:02:25	275.15	22.93	183.45	0:09:25	273.89	45.65	91.87	0:16:25	207.83	69.28	60.53	0:23:25	224.60	112.30	37.33	0:30:25	196.92	196.92	21.26
0:02:30	274.73	22.89	182.95	0:09:30	274.10	45.68	91.77	0:16:30	198.81	66.27	63.29	0:23:30	253.55	126.77	33.13	0:30:30	200.28	200.28	20.92
0:02:35	272.84	22.74	184.25	0:09:35	273.89	45.65	91.90	0:16:35	213.70	71.23	58.86	0:23:35	298.22	149.11	28.10	0:30:35	187.28	187.28	22.40
0:02:40	274.10	22.84	183.39	0:09:40	274.31	45.72	91.86	0:16:40	209.72	69.91	59.99	0:23:40	269.27	134.64	31.13	0:30:40	178.68	178.68	23.46
0:02:45	275.15	22.93	182.94	0:09:45	273.89	45.65	91.71	0:16:45	208.88	69.63	60.23	0:23:45	219.57	109.79	38.14	0:30:45	200.07	200.07	20.94
0:02:50	274.31	22.86	183.80	0:09:50	274.10	45.68	91.82	0:16:50	219.57	73.19	57.34	0:23:50	212.02	106.01	39.62	0:30:50	191.89	191.89	21.79
0:02:55	275.99	23.00	182.38	0:09:55	275.15	45.86	91.40	0:16:55	208.88	69.63	60.19	0:23:55	240.33	120.17	34.87	0:30:55	191.26	191.26	22.02

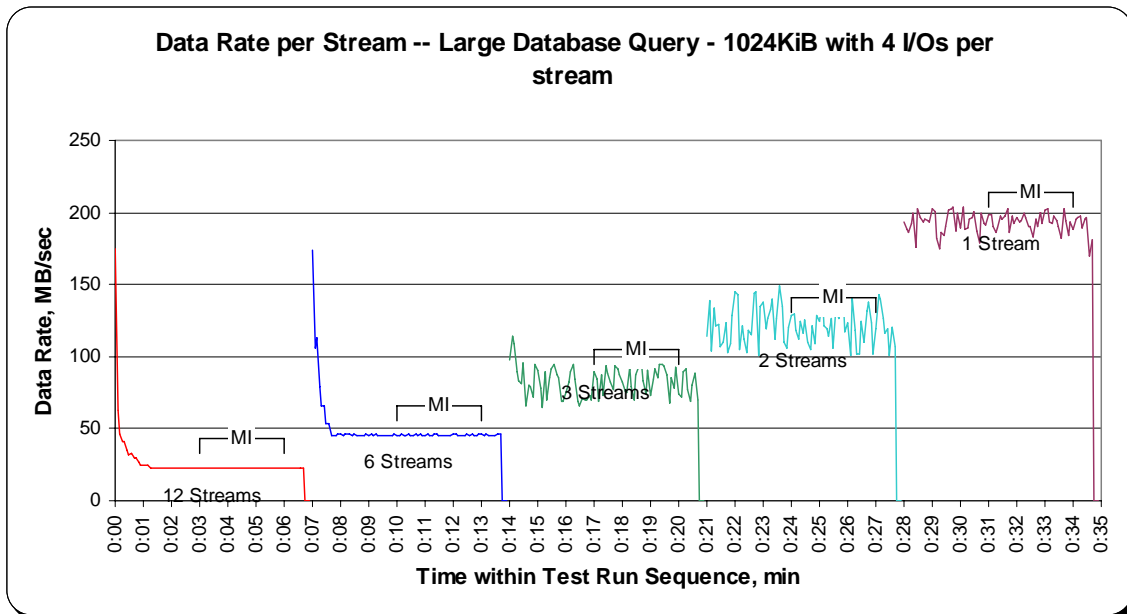
**SPC-2 “Large Database Query/1024 KiB Transfer Size/4 Outstanding I/Os”
 Average Data Rate Graph – Complete Test Run**



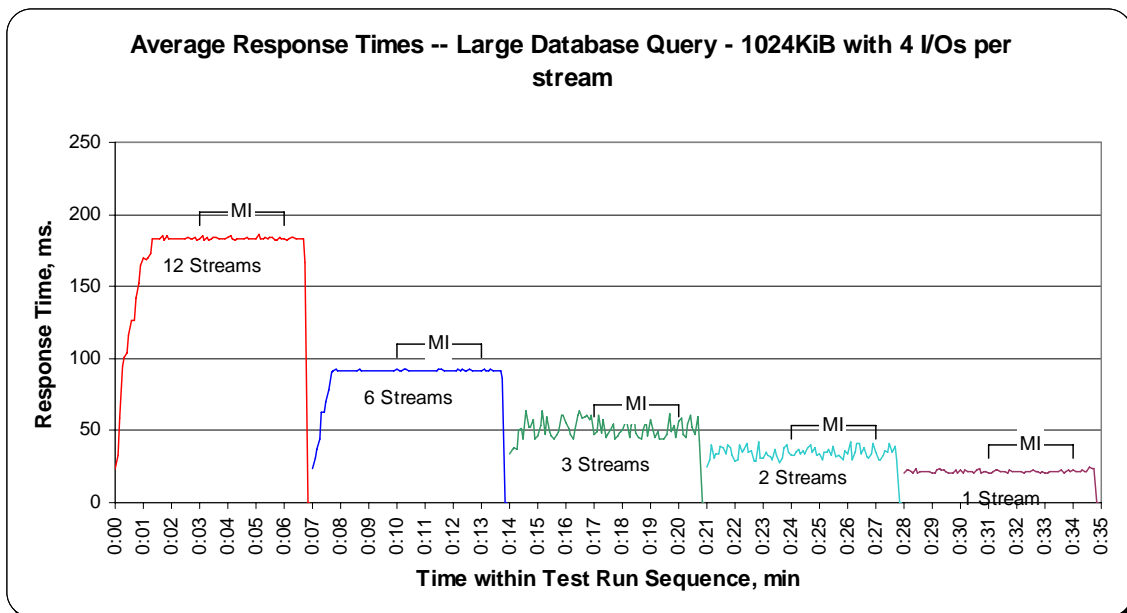
**SPC-2 “Large Database Query/1024 KiB Transfer Size/4 Outstanding I/Os”
 Average Data Rate Graph – Measurement Interval (MI) Only**



SPC-2 “Large Database Query/1024 KiB Transfer Size/4 Outstanding I/Os” Average Data Rate per Stream Graph



SPC-2 “Large Database Query/1024 KiB Transfer Size/4 Outstanding I/Os” Average Response Time Graph



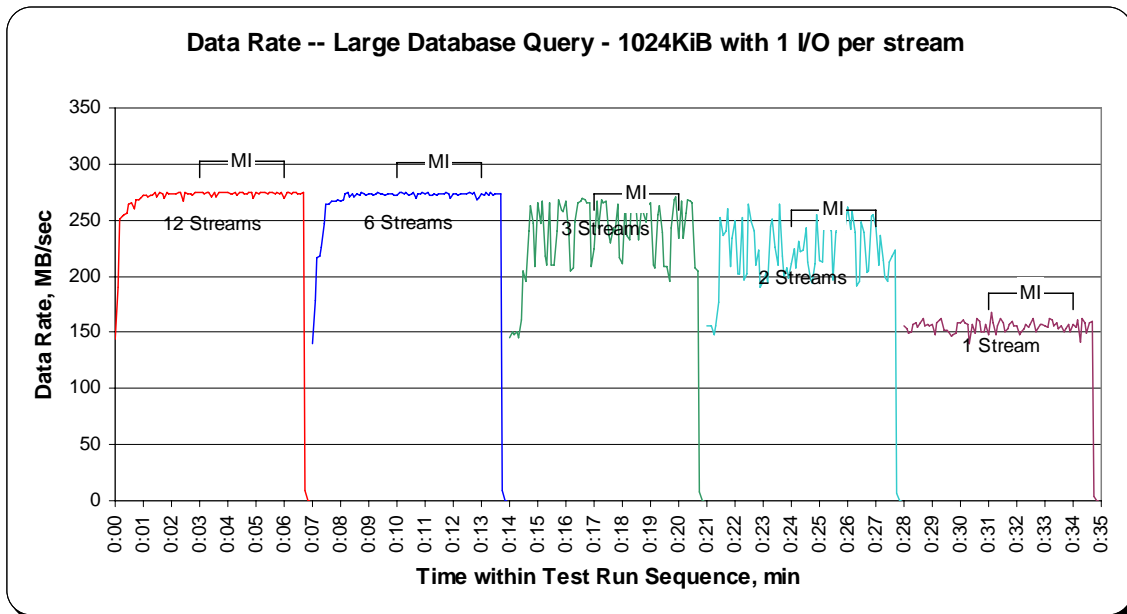
SPC-2 “Large Database Query/1024 KiB Transfer Size/1 Outstanding I/O” Test Run Data – Ramp-Up Period

TR6				TR7				TR8				TR9				TR10			
Test Run Sequence Time	12 Streams Data Rate		Response Time, ms	Test Run Sequence Time	6 Streams Data Rate		Response Time, ms	Test Run Sequence Time	3 Streams Data Rate		Response Time, ms	Test Run Sequence Time	2 Streams Data Rate		Response Time, ms	Test Run Sequence Time	1 Stream Data Rate		Response Time, ms
	MB/sec	/ Stream, MB/sec			MB/sec	/ Stream, MB/sec			MB/sec	/ Stream, MB/sec			MB/sec	/ Stream, MB/sec			MB/sec	/ Stream, MB/sec	
0:00:00	143.86	71.93	9.12	0:07:00	139.46	139.46	7.30	0:14:00	145.12	145.12	7.01	0:21:00	156.45	156.45	6.50	0:28:00	155.61	155.61	6.54
0:00:05	189.58	37.92	16.86	0:07:05	178.05	89.02	8.33	0:14:05	150.58	150.58	6.96	0:21:05	156.03	156.03	6.72	0:28:05	153.09	153.09	6.84
0:00:10	250.61	41.77	21.98	0:07:10	216.01	108.00	9.70	0:14:10	147.85	147.85	7.09	0:21:10	156.03	156.03	6.71	0:28:10	148.90	148.90	7.04
0:00:15	253.76	42.29	24.77	0:07:15	217.47	108.74	9.63	0:14:15	151.20	151.20	6.93	0:21:15	147.64	147.64	7.10	0:28:15	150.79	150.79	6.95
0:00:20	255.43	42.57	24.62	0:07:20	226.07	75.36	9.74	0:14:20	145.12	145.12	7.22	0:21:20	155.61	155.61	6.73	0:28:20	157.50	157.50	6.65
0:00:25	256.06	32.01	27.18	0:07:25	247.46	82.49	12.70	0:14:25	160.85	80.43	8.17	0:21:25	177.00	88.50	7.53	0:28:25	158.96	158.96	6.59
0:00:30	264.66	33.08	31.66	0:07:30	263.61	52.72	17.66	0:14:30	205.31	102.66	10.22	0:21:30	251.66	125.83	8.33	0:28:30	154.56	154.56	6.79
0:00:35	265.29	29.48	32.17	0:07:35	264.03	52.81	19.83	0:14:35	195.45	97.73	10.74	0:21:35	236.56	118.28	8.86	0:28:35	158.33	158.33	6.62
0:00:40	260.68	28.96	36.23	0:07:40	267.18	53.44	19.63	0:14:40	240.54	80.18	11.46	0:21:40	240.12	120.06	8.72	0:28:40	161.90	161.90	6.47
0:00:45	268.23	29.80	35.24	0:07:45	266.55	53.31	19.66	0:14:45	263.19	87.73	11.94	0:21:45	259.63	129.81	8.07	0:28:45	156.24	156.24	6.70
0:00:50	268.02	26.80	38.56	0:07:50	266.34	53.27	19.68	0:14:50	247.46	82.49	12.70	0:21:50	208.25	104.12	10.07	0:28:50	157.08	157.08	6.68
0:00:55	269.06	24.46	40.38	0:07:55	267.81	53.56	19.58	0:14:55	208.46	69.49	15.09	0:21:55	233.41	116.71	8.98	0:28:55	156.24	156.24	6.70
0:01:00	271.58	24.69	42.41	0:08:00	266.76	53.35	19.65	0:15:00	265.50	88.50	11.86	0:22:00	249.14	124.57	8.42	0:29:00	157.50	157.50	6.66
0:01:05	272.21	24.75	42.42	0:08:05	268.23	53.65	19.55	0:15:05	246.83	82.28	12.73	0:22:05	201.75	100.87	10.39	0:29:05	148.48	148.48	7.06
0:01:10	270.95	24.63	42.50	0:08:10	272.84	45.47	22.84	0:15:10	267.39	89.13	11.75	0:22:10	201.96	100.98	10.39	0:29:10	158.33	158.33	6.61
0:01:15	272.42	24.77	42.40	0:08:15	274.52	45.75	22.89	0:15:15	217.47	72.49	14.46	0:22:15	252.29	126.14	8.31	0:29:15	161.69	161.69	6.47
0:01:20	271.79	22.65	45.47	0:08:20	271.37	45.23	23.20	0:15:20	210.34	70.11	14.95	0:22:20	196.92	98.46	10.63	0:29:20	162.74	162.74	6.45
0:01:25	274.31	22.86	45.93	0:08:25	273.68	45.61	22.94	0:15:25	265.08	88.36	11.87	0:22:25	202.38	101.19	10.36	0:29:25	152.46	152.46	6.87
0:01:30	271.37	22.61	46.31	0:08:30	271.16	45.19	23.22	0:15:30	209.92	69.97	14.98	0:22:30	264.24	132.12	7.93	0:29:30	151.83	151.83	6.90
0:01:35	274.73	22.89	45.81	0:08:35	273.68	45.61	22.99	0:15:35	209.51	69.84	15.01	0:22:35	248.93	124.47	8.42	0:29:35	150.58	150.58	6.97
0:01:40	273.89	22.82	45.90	0:08:40	272.63	45.44	23.06	0:15:40	240.33	80.11	13.07	0:22:40	240.12	120.06	8.72	0:29:40	146.59	146.59	7.15
0:01:45	269.69	22.47	46.65	0:08:45	274.31	45.72	22.95	0:15:45	267.60	89.20	11.76	0:22:45	210.13	105.07	9.98	0:29:45	148.27	148.27	7.06
0:01:50	275.15	22.93	45.77	0:08:50	273.26	45.54	23.01	0:15:50	259.42	86.47	12.13	0:22:50	223.56	111.78	9.37	0:29:50	149.53	149.53	7.01
0:01:55	273.47	22.79	46.00	0:08:55	272.42	45.40	23.09	0:15:55	257.53	85.84	12.20	0:22:55	190.00	95.00	11.04	0:29:55	158.54	158.54	6.61
0:02:00	273.05	22.75	46.03	0:09:00	273.89	45.65	22.93	0:16:00	267.39	89.13	11.74	0:23:00	195.87	97.94	10.70	0:30:00	158.54	158.54	6.61
0:02:05	273.68	22.81	46.07	0:09:05	272.84	45.47	23.11	0:16:05	236.56	78.85	13.31	0:23:05	202.79	101.40	10.34	0:30:05	161.69	161.69	6.49
0:02:10	273.26	22.77	45.97	0:09:10	272.42	45.40	23.08	0:16:10	205.31	68.44	15.32	0:23:10	194.62	97.31	10.77	0:30:10	158.96	158.96	6.59
0:02:15	274.94	22.91	45.77	0:09:15	273.26	45.54	23.00	0:16:15	207.20	69.07	15.17	0:23:15	244.74	122.37	8.56	0:30:15	156.66	156.66	6.69
0:02:20	274.31	22.86	45.83	0:09:20	274.52	45.75	22.93	0:16:20	248.72	82.91	12.65	0:23:20	251.45	125.72	8.34	0:30:20	139.67	139.67	7.50
0:02:25	266.76	22.23	47.18	0:09:25	272.84	45.47	23.03	0:16:25	265.50	88.50	11.84	0:23:25	226.49	113.25	9.26	0:30:25	157.71	157.71	6.65
0:02:30	274.31	22.86	45.88	0:09:30	273.26	45.54	23.04	0:16:30	266.34	88.78	11.80	0:23:30	209.92	104.96	9.98	0:30:30	149.53	149.53	7.00
0:02:35	273.47	22.79	46.06	0:09:35	272.63	45.44	23.04	0:16:35	269.27	89.76	11.67	0:23:35	264.24	132.12	7.93	0:30:35	162.11	162.11	6.47
0:02:40	273.05	22.75	46.03	0:09:40	273.89	45.65	23.00	0:16:40	268.02	89.34	11.74	0:23:40	217.47	108.74	9.64	0:30:40	159.17	159.17	6.58
0:02:45	272.42	22.70	46.20	0:09:45	273.05	45.51	23.03	0:16:45	265.92	88.64	11.84	0:23:45	199.23	99.61	10.52	0:30:45	151.20	151.20	6.93
0:02:50	274.52	22.88	45.77	0:09:50	273.47	45.58	23.02	0:16:50	265.08	88.36	11.85	0:23:50	207.83	103.91	10.09	0:30:50	150.16	150.16	6.98
0:02:55	274.31	22.86	45.87	0:09:55	272.00	45.33	23.10	0:16:55	208.25	69.42	15.05	0:23:55	197.97	98.99	10.60	0:30:55	157.08	157.08	6.68

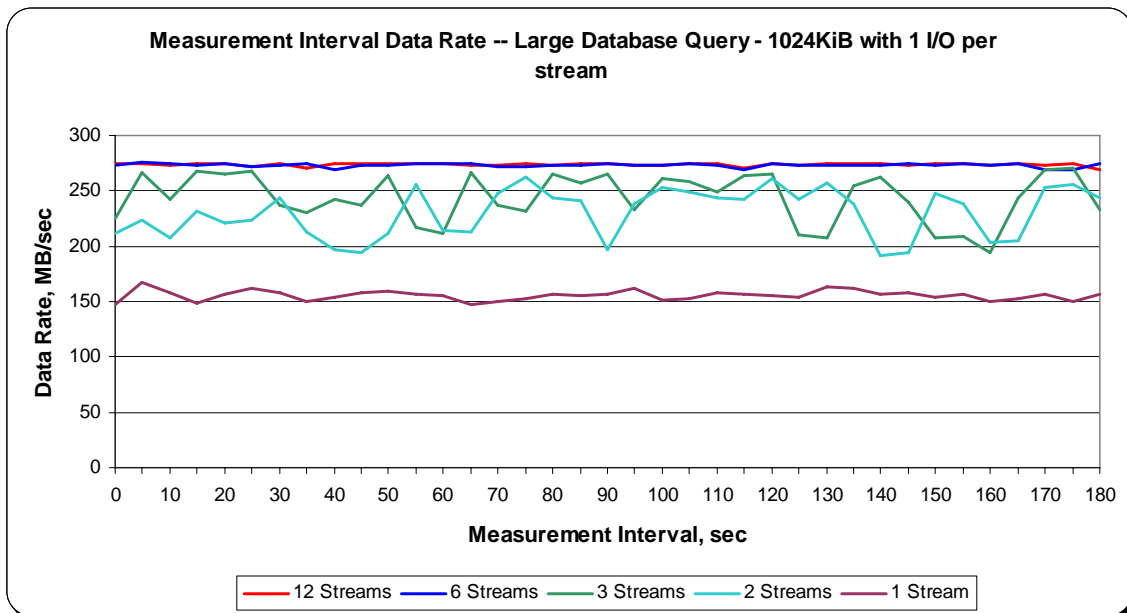
**SPC-2 "Large Database Query/1024 KiB Transfer Size/1 Outstanding I/O" Test Run Data
Measurement Interval, Run-Out, and Ramp-Down Periods**

TR6				TR7				TR8				TR9				TR10			
Test Run Sequence Time	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms	Test Run Sequence Time	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms	Test Run Sequence Time	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms	Test Run Sequence Time	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms	Test Run Sequence Time	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms
0:03:00	274.31	22.86	45.90	0:10:00	272.63	45.44	23.04	0:17:00	224.40	74.80	14.08	0:24:00	210.97	105.49	9.93	0:31:00	147.43	147.43	7.11
0:03:05	274.52	22.88	45.87	0:10:05	275.36	45.89	22.88	0:17:05	266.55	88.85	11.79	0:24:05	224.19	112.09	9.36	0:31:05	167.14	167.14	6.27
0:03:10	273.26	22.77	45.99	0:10:10	274.31	45.72	22.93	0:17:10	242.64	80.88	12.96	0:24:10	207.41	103.70	10.11	0:31:10	158.33	158.33	6.62
0:03:15	274.10	22.84	45.87	0:10:15	273.26	45.54	23.01	0:17:15	268.02	89.34	11.74	0:24:15	231.53	115.76	9.05	0:31:15	148.48	148.48	7.06
0:03:20	274.94	22.91	45.79	0:10:20	274.31	45.72	22.93	0:17:20	265.29	88.43	11.84	0:24:20	221.25	110.62	9.48	0:31:20	156.03	156.03	6.72
0:03:25	271.37	22.61	46.32	0:10:25	271.79	45.30	23.15	0:17:25	267.39	89.13	11.77	0:24:25	223.56	111.78	9.38	0:31:25	162.11	162.11	6.47
0:03:30	274.31	22.86	45.88	0:10:30	273.68	45.61	22.95	0:17:30	236.56	78.85	13.29	0:24:30	243.27	121.63	8.61	0:31:30	157.92	157.92	6.63
0:03:35	270.11	22.51	46.54	0:10:35	274.73	45.79	22.93	0:17:35	230.27	76.76	13.65	0:24:35	212.86	106.43	9.85	0:31:35	150.37	150.37	6.97
0:03:40	274.31	22.86	45.86	0:10:40	268.85	44.81	23.37	0:17:40	243.06	81.02	12.94	0:24:40	196.29	98.15	10.68	0:31:40	153.51	153.51	6.82
0:03:45	274.52	22.88	45.88	0:10:45	273.68	45.61	22.98	0:17:45	237.61	79.20	13.23	0:24:45	194.41	97.20	10.78	0:31:45	157.50	157.50	6.65
0:03:50	274.31	22.86	45.90	0:10:50	273.68	45.61	23.01	0:17:50	264.45	88.15	11.91	0:24:50	211.39	105.70	9.93	0:31:50	159.17	159.17	6.59
0:03:55	274.52	22.88	45.88	0:10:55	274.10	45.68	22.95	0:17:55	216.64	72.21	14.50	0:24:55	255.43	127.72	8.21	0:31:55	156.24	156.24	6.71
0:04:00	274.73	22.89	45.82	0:11:00	273.89	45.65	22.97	0:18:00	210.97	70.32	14.92	0:25:00	213.70	106.85	9.81	0:32:00	155.82	155.82	6.73
0:04:05	273.68	22.81	45.87	0:11:05	274.10	45.68	22.94	0:18:05	266.97	88.99	11.78	0:25:05	213.07	106.54	9.83	0:32:05	147.85	147.85	7.09
0:04:10	273.05	22.75	46.09	0:11:10	271.58	45.26	23.14	0:18:10	236.56	78.85	13.28	0:25:10	247.25	123.63	8.48	0:32:10	150.16	150.16	6.97
0:04:15	274.52	22.88	45.91	0:11:15	271.58	45.26	23.19	0:18:15	231.95	77.32	13.57	0:25:15	262.14	131.07	8.00	0:32:15	153.09	153.09	6.85
0:04:20	272.63	22.72	46.05	0:11:20	273.26	45.54	23.03	0:18:20	265.71	88.57	11.84	0:25:20	243.90	121.95	8.59	0:32:20	157.08	157.08	6.67
0:04:25	274.31	22.86	45.89	0:11:25	272.63	45.44	23.08	0:18:25	257.53	85.84	12.22	0:25:25	240.96	120.48	8.70	0:32:25	154.98	154.98	6.76
0:04:30	274.31	22.86	45.86	0:11:30	273.89	45.65	22.92	0:18:30	264.87	88.29	11.87	0:25:30	197.13	98.57	10.64	0:32:30	157.08	157.08	6.67
0:04:35	273.68	22.81	45.97	0:11:35	273.68	45.61	22.99	0:18:35	232.57	77.52	13.51	0:25:35	238.87	119.43	8.77	0:32:35	162.32	162.32	6.44
0:04:40	273.68	22.81	45.86	0:11:40	273.47	45.58	23.00	0:18:40	261.72	87.24	12.02	0:25:40	252.50	126.25	8.26	0:32:40	151.20	151.20	6.95
0:04:45	274.52	22.88	45.94	0:11:45	274.73	45.79	22.93	0:18:45	257.95	85.98	12.18	0:25:45	249.77	124.89	8.43	0:32:45	153.30	153.30	6.83
0:04:50	274.94	22.91	45.80	0:11:50	273.68	45.61	22.98	0:18:50	248.93	82.98	12.64	0:25:50	243.48	121.74	8.61	0:32:50	157.71	157.71	6.64
0:04:55	269.90	22.49	46.57	0:11:55	268.85	44.81	23.36	0:18:55	263.19	87.73	11.95	0:25:55	242.22	121.11	8.65	0:32:55	157.08	157.08	6.68
0:05:00	274.10	22.84	45.91	0:12:00	273.89	45.65	22.98	0:19:00	264.87	88.29	11.88	0:26:00	260.89	130.44	8.03	0:33:00	155.61	155.61	6.73
0:05:05	273.47	22.79	45.94	0:12:05	273.05	45.51	23.03	0:19:05	210.13	70.04	14.94	0:26:05	242.22	121.11	8.65	0:33:05	154.35	154.35	6.80
0:05:10	274.10	22.84	45.92	0:12:10	272.63	45.44	23.07	0:19:10	207.62	69.21	15.15	0:26:10	257.74	128.87	8.14	0:33:10	162.95	162.95	6.42
0:05:15	275.15	22.93	45.79	0:12:15	273.47	45.58	22.98	0:19:15	254.80	84.93	12.36	0:26:15	238.87	119.43	8.77	0:33:15	161.48	161.48	6.49
0:05:20	274.31	22.86	45.87	0:12:20	272.84	45.47	23.06	0:19:20	262.77	87.59	11.96	0:26:20	191.47	95.73	10.94	0:33:20	156.03	156.03	6.72
0:05:25	273.47	22.79	45.94	0:12:25	273.89	45.65	22.97	0:19:25	239.70	79.90	13.12	0:26:25	194.83	97.41	10.77	0:33:25	157.92	157.92	6.64
0:05:30	274.73	22.89	45.89	0:12:30	273.47	45.58	22.98	0:19:30	208.25	69.42	15.10	0:26:30	248.30	124.15	8.44	0:33:30	153.51	153.51	6.83
0:05:35	274.10	22.84	45.69	0:12:35	275.15	45.86	22.91	0:19:35	208.67	69.56	15.06	0:26:35	238.66	119.33	8.78	0:33:35	156.03	156.03	6.72
0:05:40	273.26	22.77	46.23	0:12:40	273.68	45.61	22.96	0:19:40	194.83	64.94	16.17	0:26:40	204.05	102.03	10.29	0:33:40	150.16	150.16	6.97
0:05:45	274.73	22.89	45.78	0:12:45	274.31	45.72	22.95	0:19:45	243.27	81.09	12.93	0:26:45	204.68	102.34	10.24	0:33:45	152.67	152.67	6.87
0:05:50	273.47	22.79	45.98	0:12:50	268.65	44.77	23.42	0:19:50	268.65	89.55	11.69	0:26:50	253.76	126.88	8.25	0:33:50	156.66	156.66	6.69
0:05:55	274.73	22.89	45.83	0:12:55	269.69	44.95	23.32	0:19:55	270.32	90.11	11.64	0:26:55	255.22	127.61	8.22	0:33:55	150.58	150.58	6.96
0:06:00	269.48	22.46	46.56	0:13:00	273.89	45.65	22.94	0:20:00	233.41	77.80	13.48	0:27:00	244.32	122.16	8.58	0:34:00	157.08	157.08	6.67
0:06:05	274.10	22.84	46.01	0:13:05	272.63	45.44	23.09	0:20:05	266.76	88.92	11.79	0:27:05	210.34	105.17	9.97	0:34:05	154.35	154.35	6.79
0:06:10	274.52	22.88	45.79	0:13:10	274.52	45.75	22.91	0:20:10	233.62	77.87	13.46	0:27:10	236.98	118.49	8.84	0:34:10	161.27	161.27	6.50
0:06:15	273.47	22.79	46.06	0:13:15	272.00	45.33	23.12	0:20:15	255.64	85.21	12.30	0:27:15	213.91	106.95	9.80	0:34:15	141.77	141.77	7.39
0:06:20	274.10	22.84	45.81	0:13:20	274.10	45.68	22.98	0:20:20	267.81	89.27	11.74	0:27:20	198.81	99.41	10.54	0:34:20	162.11	162.11	6.46
0:06:25	274.73	22.89	45.83	0:13:25	272.63	45.44	23.07	0:20:25	266.55	88.85	11.80	0:27:25	195.87	97.94	10.70	0:34:25	158.13	158.13	6.63
0:06:30	273.89	22.82	45.97	0:13:30	273.26	45.54	22.99	0:20:30	265.29	88.43	11.86	0:27:30	213.07	106.54	9.85	0:34:30	149.53	149.53	7.02
0:06:35	273.47	22.79	45.96	0:13:35	273.68	45.61	22.99	0:20:35	206.78	68.93	15.21	0:27:35	218.31	109.16	9.60	0:34:35	158.75	158.75	6.60
0:06:40	275.15	22.93	45.80	0:13:40	273.68	45.61	22.98	0:20:40	205.31	68.44	15.31	0:27:40	222.72	111.36	9.42	0:34:40	160.43	160.43	6.53
0:06:45	9.65	0.00	43.45	0:13:45	8.60	0.00	22.44	0:20:45	8.39	0.00	11.54	0:27:45	7.13	0.00	8.30	0:34:45	4.40	0.00	6.99
0:06:50	0.00	0.00	0.00	0:13:50	0.00	0.00	0.00	0:20:50	0.00	0.00	0.00	0:27:50	0.00	0.00	0.00	0:34:50	0.00	0.00	0.00
0:06:55	0.00	0.00	0.00	0:13:55	0.00	0.00	0.00	0:20:55	0.00	0.00	0.00	0:27:55	0.00	0.00	0.00	0:34:55	0.00	0.00	0.00

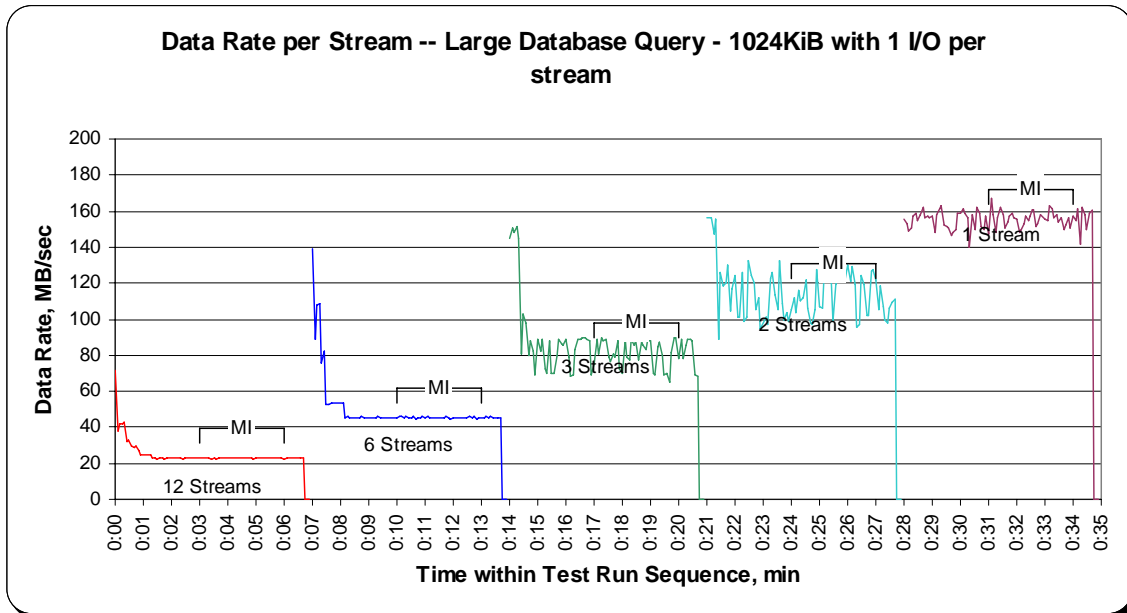
SPC-2 “Large Database Query/1024 KiB Transfer Size/1 Outstanding I/O” Average Data Rate Graph – Complete Test Run



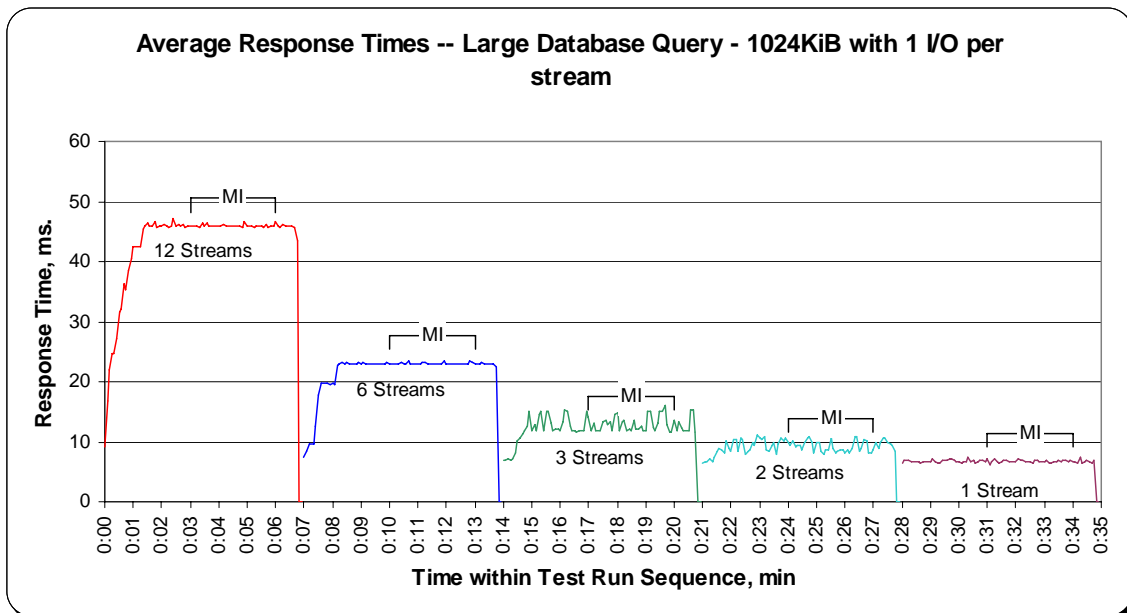
SPC-2 “Large Database Query/1024 KiB Transfer Size/1 Outstanding I/O” Average Data Rate Graph – Measurement Interval (MI) Only



SPC-2 “Large Database Query/1024 KiB Transfer Size/1 Outstanding I/O” Average Data Rate per Stream Graph



SPC-2 “Large Database Query/1024 KiB Transfer Size/1 Outstanding I/O” Average Response Time Graph



Large Database Query Test – 64 KiB TRANSFER SIZE Test Phase

Clause 10.6.8.2.1

5. A table that will contain the following information for each "64 KiB Transfer Size, 4 Outstanding I/Os" Test Run:
 - The number of Streams specified.
 - The average data rate, average data rate per stream, and average Response Time reported at five second intervals.
6. Average Data Rate (intervals), Average Data Rate per Stream (intervals), and Average Response Time (intervals) graphs for the "64 KiB Transfer Size, 4 Outstanding I/Os" Test Runs as specified in Clauses 10.1.4 – 10.1.6.
7. A table that will contain the following information for each "64 KiB Transfer Size, 1 Outstanding I/O" Test Run:
 - The number of Streams specified.
 - The average data rate, average data rate per stream, and average Response Time reported at five second intervals.
8. Average Data Rate (intervals), Average Data Rate per Stream (intervals), and Average Response Time (intervals) graphs for the "64 KiB Transfer Size, 1 Outstanding I/O" Test Runs as specified in Clauses 10.1.4 – 10.1.6.

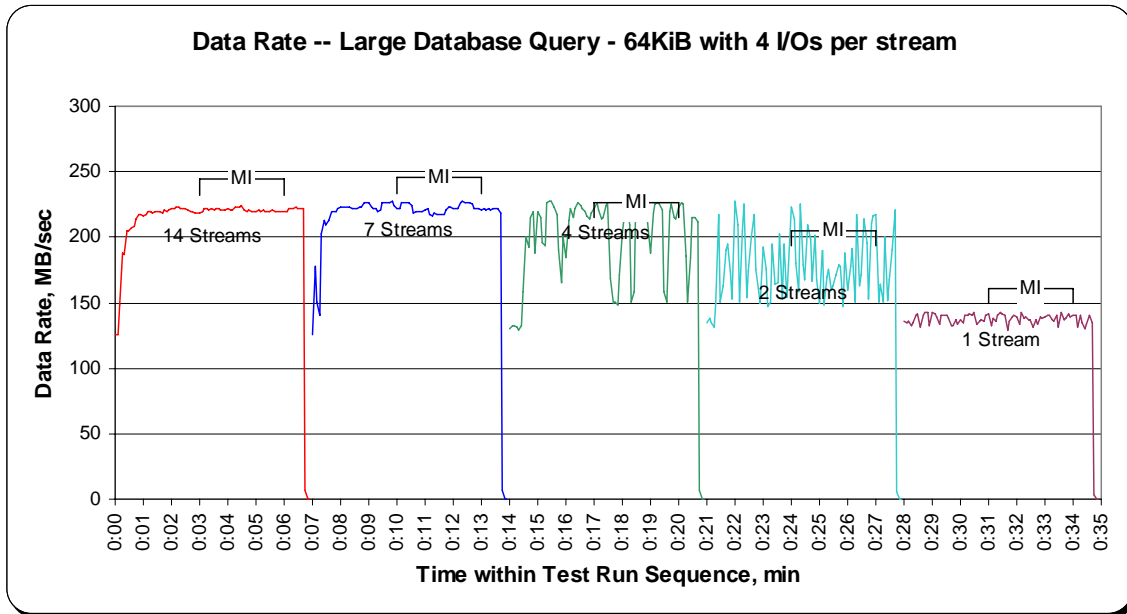
The SPC-2 "Large DatabaseQuery/64 KiB TRANSFER SIZE/4 Outstanding I/Os" Test Run data is contained in the table that appears on the next page. That table is followed by graphs illustrating the average Data Rate, average Data Rate per Stream, and average Response Time produced by the same Test Runs. The table and graphs present the data at five-second intervals.

Immediately following the SPC-2 "Large DatabaseQuery/64 KiB TRANSFER SIZE/4 Outstanding I/Os" table and graphs will be the SPC-2 "Large DatabaseQuery/64 KiB TRANSFER SIZE/1 Outstanding I/O" table and graphs. The table contains the Test Run data and the graphs illustrate the average Data Rate, average Data Rate per Stream, and average Response Time produced by the Test Runs.

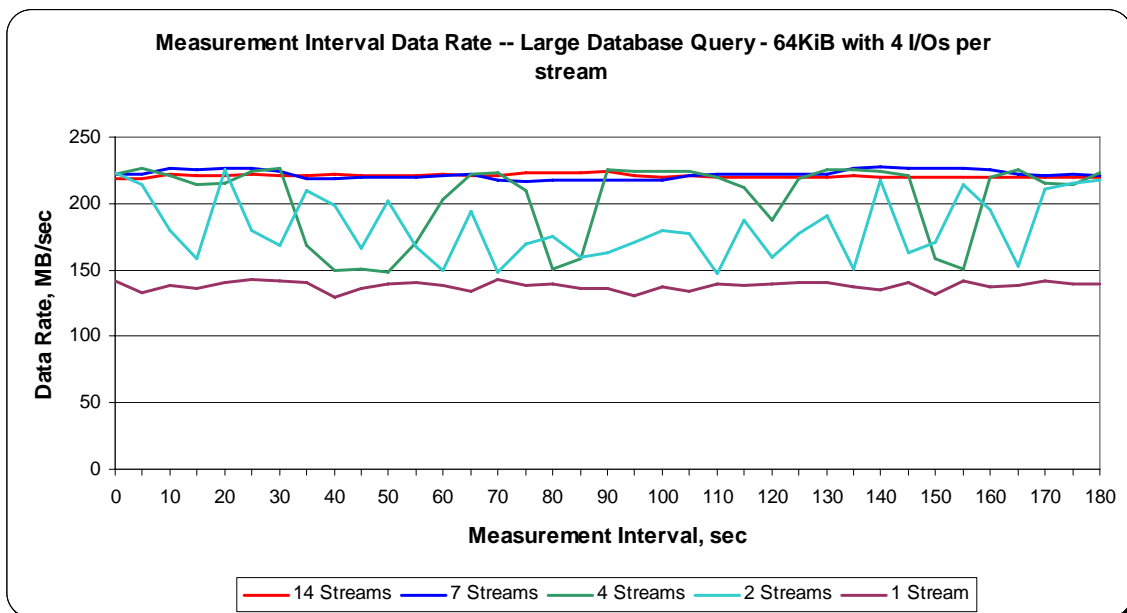
SPC-2 “Large Database Query/64 KiB Transfer Size/4 Outstanding I/Os” Test Run Data – Ramp-Up Period

TR11 Test Run Sequence Time	14 Streams			TR12 Test Run Sequence Time	7 Streams			TR13 Test Run Sequence Time	4 Streams			TR14 Test Run Sequence Time	2 Streams			TR15 Test Run Sequence Time	1 Stream		
	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms		Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms
0:00:00	125.24	62.62	2.10	0:07:00	125.56	125.56	2.02	0:14:00	129.75	129.75	1.95	0:21:00	134.93	134.93	1.88	0:28:00	135.50	135.50	1.87
0:00:05	125.50	62.75	4.17	0:07:05	177.82	88.91	2.44	0:14:05	132.70	132.70	1.97	0:21:05	137.95	137.95	1.89	0:28:05	134.96	134.96	1.93
0:00:10	148.80	49.60	4.03	0:07:10	150.64	75.32	3.47	0:14:10	132.32	132.32	1.97	0:21:10	135.21	135.21	1.93	0:28:10	135.64	135.64	1.93
0:00:15	187.54	62.51	4.18	0:07:15	140.67	46.89	5.13	0:14:15	130.90	130.90	2.00	0:21:15	131.64	131.64	1.98	0:28:15	131.95	131.95	1.98
0:00:20	187.13	46.78	5.23	0:07:20	203.13	50.78	4.88	0:14:20	128.83	128.83	2.03	0:21:20	149.31	74.65	2.12	0:28:20	134.72	134.72	1.94
0:00:25	204.79	51.20	5.11	0:07:25	212.96	53.24	4.92	0:14:25	132.87	132.87	1.97	0:21:25	217.57	108.78	2.40	0:28:25	139.83	139.83	1.87
0:00:30	204.72	40.94	5.17	0:07:30	209.86	41.97	5.45	0:14:30	158.70	52.90	2.49	0:21:30	150.25	75.13	3.48	0:28:30	141.52	141.52	1.85
0:00:35	207.70	41.54	6.30	0:07:35	213.28	30.47	6.81	0:14:35	199.94	66.65	3.92	0:21:35	162.93	81.46	3.21	0:28:35	131.69	131.69	1.98
0:00:40	208.52	29.79	6.81	0:07:40	219.79	31.40	8.34	0:14:40	192.02	48.00	5.36	0:21:40	189.83	94.92	2.76	0:28:40	140.43	140.43	1.86
0:00:45	213.92	23.77	9.70	0:07:45	219.52	31.36	8.35	0:14:45	215.07	53.77	4.87	0:21:45	194.52	97.26	2.69	0:28:45	142.35	142.35	1.83
0:00:50	217.90	21.79	11.91	0:07:50	219.80	31.40	8.34	0:14:50	219.20	54.80	4.78	0:21:50	171.65	85.83	3.05	0:28:50	142.61	142.61	1.83
0:00:55	217.01	19.73	12.79	0:07:55	221.89	31.70	8.26	0:14:55	187.37	46.84	5.59	0:21:55	152.95	76.47	3.42	0:28:55	131.97	131.97	1.98
0:01:00	216.05	18.00	13.67	0:08:00	222.87	31.84	8.23	0:15:00	219.20	54.80	4.78	0:22:00	227.21	113.60	2.30	0:29:00	142.52	142.52	1.83
0:01:05	217.49	15.53	15.36	0:08:05	222.73	31.82	8.23	0:15:05	214.66	53.67	4.88	0:22:05	209.76	104.88	2.49	0:29:05	141.18	141.18	1.85
0:01:10	219.52	15.68	16.71	0:08:10	222.62	31.80	8.24	0:15:10	195.60	48.90	5.35	0:22:10	150.25	75.13	3.48	0:29:10	139.55	139.55	1.87
0:01:15	219.45	15.67	16.72	0:08:15	223.37	31.91	8.21	0:15:15	193.82	48.45	5.40	0:22:15	204.39	102.19	2.56	0:29:15	133.64	133.64	1.96
0:01:20	218.44	15.60	16.79	0:08:20	222.93	31.85	8.22	0:15:20	226.19	56.55	4.63	0:22:20	225.54	112.77	2.32	0:29:20	140.41	140.41	1.86
0:01:25	219.10	15.65	16.74	0:08:25	222.03	31.72	8.25	0:15:25	227.31	56.83	4.61	0:22:25	154.19	77.10	3.39	0:29:25	140.11	140.11	1.86
0:01:30	219.15	15.65	16.75	0:08:30	221.47	31.64	8.28	0:15:30	227.92	56.98	4.59	0:22:30	173.84	86.92	3.01	0:29:30	140.61	140.61	1.86
0:01:35	219.47	15.68	16.72	0:08:35	222.34	31.76	8.25	0:15:35	223.54	55.88	4.68	0:22:35	200.05	100.02	2.61	0:29:35	137.91	137.91	1.89
0:01:40	218.90	15.64	16.75	0:08:40	222.63	31.80	8.23	0:15:40	217.46	54.37	4.81	0:22:40	217.79	108.89	2.40	0:29:40	132.44	132.44	1.97
0:01:45	220.25	15.73	16.65	0:08:45	223.49	31.93	8.21	0:15:45	190.11	47.53	5.51	0:22:45	175.96	87.98	2.97	0:29:45	132.41	132.41	1.97
0:01:50	219.91	15.71	16.68	0:08:50	226.29	32.33	8.10	0:15:50	164.88	41.22	6.35	0:22:50	158.67	79.34	3.30	0:29:50	136.67	136.67	1.91
0:01:55	220.95	15.78	16.61	0:08:55	226.83	32.40	8.08	0:15:55	199.86	49.96	5.24	0:22:55	149.25	74.63	3.51	0:29:55	133.47	133.47	1.96
0:02:00	221.79	15.84	16.54	0:09:00	226.64	32.38	8.09	0:16:00	184.50	46.12	5.68	0:23:00	192.35	96.18	2.72	0:30:00	136.76	136.76	1.91
0:02:05	222.07	15.86	16.51	0:09:05	223.49	31.93	8.20	0:16:05	213.02	53.25	4.92	0:23:05	175.57	87.79	2.98	0:30:05	134.97	134.97	1.94
0:02:10	222.68	15.91	16.48	0:09:10	222.41	31.77	8.25	0:16:10	222.36	55.59	4.71	0:23:10	146.85	73.43	3.56	0:30:10	140.01	140.01	1.87
0:02:15	222.77	15.91	16.48	0:09:15	221.97	31.71	8.26	0:16:15	215.10	53.78	4.87	0:23:15	150.66	75.33	3.48	0:30:15	140.56	140.56	1.86
0:02:20	221.47	15.82	16.56	0:09:20	219.87	31.41	8.34	0:16:20	222.15	55.54	4.71	0:23:20	194.18	97.09	2.69	0:30:20	141.56	141.56	1.84
0:02:25	221.89	15.85	16.53	0:09:25	220.77	31.54	8.30	0:16:25	226.48	56.62	4.62	0:23:25	164.06	82.03	3.19	0:30:25	140.03	140.03	1.87
0:02:30	221.84	15.85	16.53	0:09:30	226.19	32.31	8.11	0:16:30	224.34	56.09	4.67	0:23:30	165.11	82.55	3.17	0:30:30	142.33	142.33	1.83
0:02:35	220.79	15.77	16.61	0:09:35	226.79	32.40	8.08	0:16:35	221.50	55.38	4.72	0:23:35	202.88	101.44	2.58	0:30:35	133.33	133.33	1.96
0:02:40	219.78	15.70	16.70	0:09:40	226.68	32.38	8.09	0:16:40	219.41	54.85	4.77	0:23:40	152.65	76.33	3.43	0:30:40	136.22	136.22	1.92
0:02:45	219.69	15.69	16.68	0:09:45	226.49	32.36	8.09	0:16:45	216.61	54.15	4.83	0:23:45	195.18	97.59	2.68	0:30:45	136.99	136.99	1.91
0:02:50	218.50	15.61	16.79	0:09:50	227.00	32.43	8.08	0:16:50	214.18	53.55	4.89	0:23:50	153.91	76.95	3.40	0:30:50	135.78	135.78	1.92
0:02:55	218.98	15.64	16.76	0:09:55	224.14	32.02	8.18	0:16:55	218.58	54.64	4.79	0:23:55	178.61	89.31	2.93	0:30:55	140.30	140.30	1.86

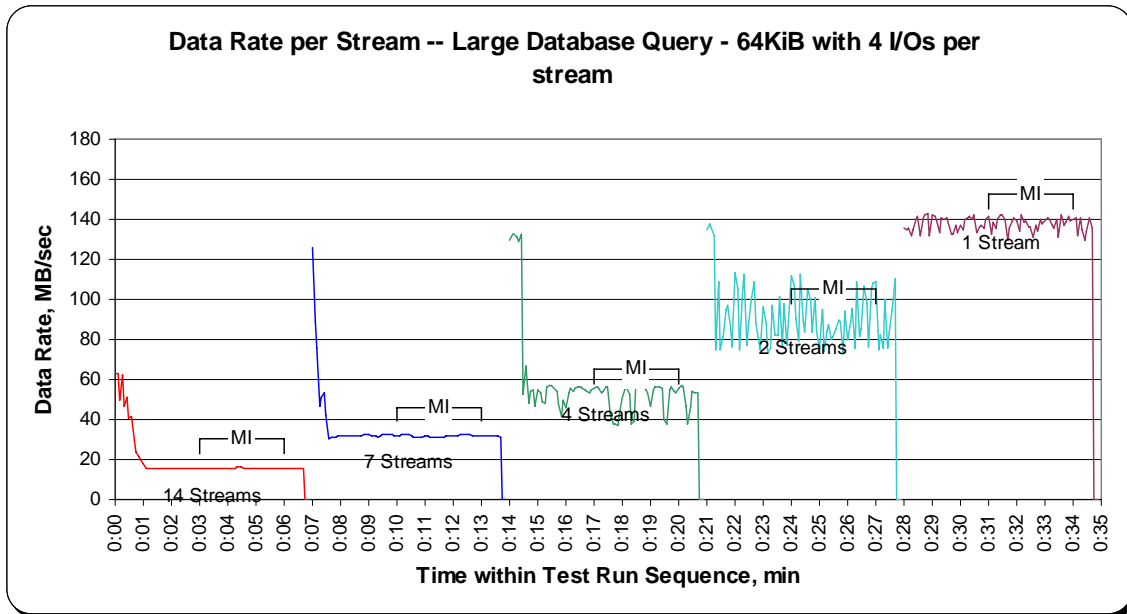
SPC-2 “Large Database Query/64 KiB Transfer Size/4 Outstanding I/Os” Average Data Rate Graph – Complete Test Run



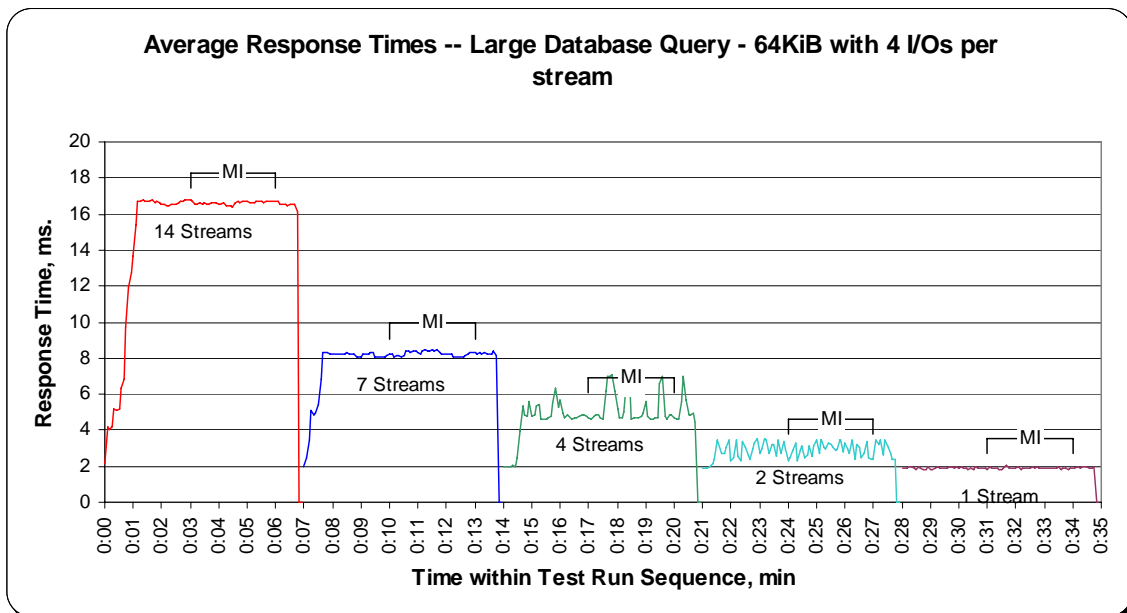
SPC-2 “Large Database Query/64 KiB Transfer Size/4 Outstanding I/Os” Average Data Rate Graph – Measurement Interval (MI) Only



SPC-2 “Large Database Query/64 KiB Transfer Size/4 Outstanding I/Os” Average Data Rate per Stream Graph



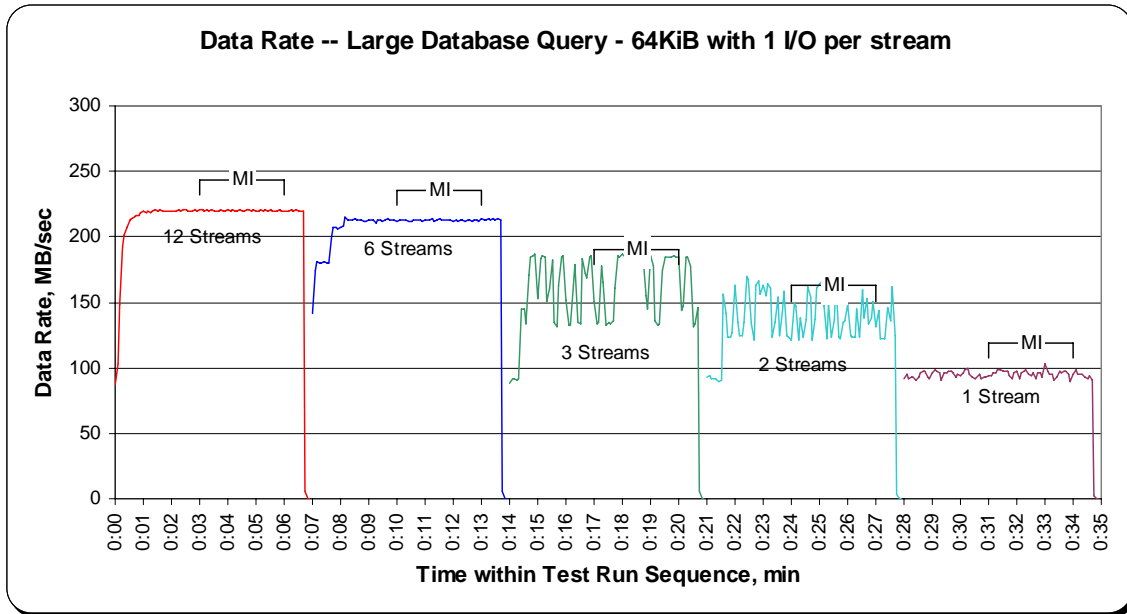
SPC-2 “Large Database Query/64 KiB Transfer Size/4 Outstanding I/Os” Average Response Time Graph



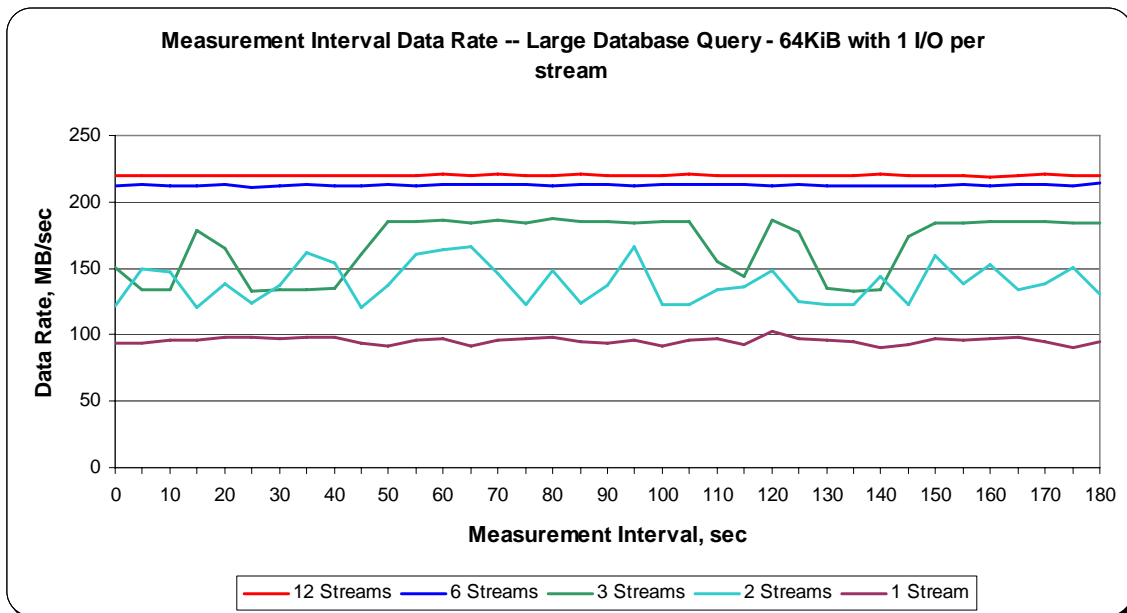
SPC-2 “Large Database Query/64 KiB Transfer Size/1 Outstanding I/O” Test Run Data – Ramp-Up Period

TR16				TR17				TR18				TR19				TR20			
Test Run Sequence Time	12 Streams Data Rate		Response Time, ms	Test Run Sequence Time	6 Streams Data Rate		Response Time, ms	Test Run Sequence Time	3 Streams Data Rate		Response Time, ms	Test Run Sequence Time	2 Streams Data Rate		Response Time, ms	Test Run Sequence Time	1 Stream Data Rate		Response Time, ms
	Data Rate, MB/sec	/ Stream, MB/sec			Data Rate, MB/sec	/ Stream, MB/sec			Data Rate, MB/sec	/ Stream, MB/sec			Data Rate, MB/sec	/ Stream, MB/sec			Data Rate, MB/sec	/ Stream, MB/sec	
0:00:00	87.49	87.49	0.72	0:07:00	141.30	70.65	0.83	0:14:00	88.75	88.75	0.72	0:21:00	92.96	92.96	0.68	0:28:00	91.73	91.73	0.69
0:00:05	103.33	51.66	1.07	0:07:05	173.96	57.99	1.00	0:14:05	91.92	91.92	0.71	0:21:05	94.39	94.39	0.69	0:28:05	95.59	95.59	0.68
0:00:10	148.00	37.00	1.30	0:07:10	180.78	60.26	1.09	0:14:10	91.53	91.53	0.71	0:21:10	91.60	91.60	0.71	0:28:10	91.69	91.69	0.71
0:00:15	192.60	32.10	1.74	0:07:15	179.60	59.87	1.09	0:14:15	90.48	90.48	0.72	0:21:15	91.17	91.17	0.72	0:28:15	92.64	92.64	0.71
0:00:20	201.65	33.61	1.95	0:07:20	179.93	59.98	1.09	0:14:20	91.97	91.97	0.71	0:21:20	92.17	92.17	0.71	0:28:20	93.12	93.12	0.70
0:00:25	206.61	29.52	2.07	0:07:25	180.83	60.28	1.08	0:14:25	144.48	72.24	0.79	0:21:25	88.98	88.98	0.73	0:28:25	90.35	90.35	0.72
0:00:30	212.57	26.57	2.33	0:07:30	179.98	59.99	1.09	0:14:30	144.48	72.24	0.91	0:21:30	90.01	90.01	0.73	0:28:30	93.06	93.06	0.70
0:00:35	213.48	23.72	2.49	0:07:35	180.21	60.07	1.09	0:14:35	133.18	66.59	0.98	0:21:35	155.92	77.96	0.78	0:28:35	96.20	96.20	0.68
0:00:40	215.58	23.95	2.73	0:07:40	200.48	40.10	1.43	0:14:40	170.62	56.87	0.89	0:21:40	141.03	70.52	0.93	0:28:40	97.47	97.47	0.67
0:00:45	215.88	23.99	2.73	0:07:45	207.31	41.46	1.58	0:14:45	184.53	61.51	1.06	0:21:45	123.08	61.54	1.06	0:28:45	97.67	97.67	0.67
0:00:50	216.59	24.07	2.72	0:07:50	207.14	41.43	1.58	0:14:50	186.06	62.02	1.05	0:21:50	123.77	61.89	1.06	0:28:50	93.38	93.38	0.70
0:00:55	217.98	19.82	3.09	0:07:55	206.58	41.32	1.58	0:14:55	186.63	62.21	1.05	0:21:55	127.18	63.59	1.03	0:28:55	91.96	91.96	0.71
0:01:00	219.25	19.93	3.29	0:08:00	207.35	41.47	1.58	0:15:00	153.28	51.09	1.28	0:22:00	163.36	81.68	0.80	0:29:00	95.75	95.75	0.68
0:01:05	218.86	19.90	3.29	0:08:05	208.69	34.78	1.65	0:15:05	183.88	61.29	1.07	0:22:05	134.80	67.40	0.97	0:29:05	98.84	98.84	0.66
0:01:10	219.87	19.99	3.28	0:08:10	214.59	35.77	1.83	0:15:10	185.43	61.81	1.06	0:22:10	124.79	62.40	1.05	0:29:10	96.95	96.95	0.67
0:01:15	218.58	19.87	3.29	0:08:15	213.32	35.55	1.84	0:15:15	184.28	61.43	1.06	0:22:15	124.14	62.07	1.05	0:29:15	95.93	95.93	0.68
0:01:20	219.58	18.30	3.28	0:08:20	212.90	35.48	1.84	0:15:20	151.12	50.37	1.30	0:22:20	134.87	67.43	0.97	0:29:20	91.00	91.00	0.72
0:01:25	220.49	18.37	3.56	0:08:25	212.81	35.47	1.84	0:15:25	160.54	53.51	1.22	0:22:25	169.32	84.66	0.77	0:29:25	96.20	96.20	0.68
0:01:30	219.15	18.26	3.59	0:08:30	213.79	35.63	1.84	0:15:30	182.70	60.90	1.07	0:22:30	167.77	83.89	0.78	0:29:30	96.51	96.51	0.68
0:01:35	220.85	18.40	3.56	0:08:35	212.27	35.38	1.85	0:15:35	134.32	44.77	1.46	0:22:35	133.85	66.93	0.98	0:29:35	97.88	97.88	0.67
0:01:40	219.34	18.28	3.58	0:08:40	213.07	35.51	1.84	0:15:40	131.62	43.87	1.49	0:22:40	120.68	60.34	1.08	0:29:40	97.90	97.90	0.67
0:01:45	219.30	18.27	3.58	0:08:45	212.69	35.45	1.85	0:15:45	163.33	54.44	1.20	0:22:45	163.16	81.58	0.80	0:29:45	96.76	96.76	0.67
0:01:50	220.11	18.34	3.57	0:08:50	212.14	35.36	1.85	0:15:50	184.56	61.52	1.06	0:22:50	166.33	83.16	0.79	0:29:50	92.51	92.51	0.71
0:01:55	220.04	18.34	3.57	0:08:55	212.02	35.34	1.85	0:15:55	185.70	61.90	1.06	0:22:55	155.99	77.99	0.84	0:29:55	94.69	94.69	0.69
0:02:00	219.98	18.33	3.57	0:09:00	212.75	35.46	1.85	0:16:00	151.75	50.58	1.29	0:23:00	162.57	81.29	0.80	0:30:00	94.49	94.49	0.69
0:02:05	220.03	18.34	3.57	0:09:05	212.35	35.39	1.85	0:16:05	132.21	44.07	1.48	0:23:05	155.13	77.56	0.84	0:30:05	95.69	95.69	0.68
0:02:10	219.32	18.28	3.58	0:09:10	212.85	35.48	1.84	0:16:10	132.87	44.29	1.48	0:23:10	164.11	82.06	0.80	0:30:10	98.40	98.40	0.66
0:02:15	220.20	18.35	3.57	0:09:15	211.04	35.17	1.86	0:16:15	163.32	54.44	1.20	0:23:15	160.21	80.11	0.82	0:30:15	99.50	99.50	0.66
0:02:20	219.84	18.32	3.57	0:09:20	213.01	35.50	1.84	0:16:20	178.98	59.66	1.10	0:23:20	123.95	61.98	1.06	0:30:20	94.57	94.57	0.69
0:02:25	220.24	18.35	3.57	0:09:25	212.88	35.48	1.84	0:16:25	134.89	44.96	1.45	0:23:25	134.69	67.34	0.97	0:30:25	92.82	92.82	0.70
0:02:30	220.32	18.36	3.57	0:09:30	211.25	35.21	1.86	0:16:30	134.09	44.70	1.46	0:23:30	153.84	76.92	0.85	0:30:30	92.05	92.05	0.71
0:02:35	219.79	18.32	3.57	0:09:35	212.77	35.46	1.84	0:16:35	183.33	61.11	1.07	0:23:35	124.28	62.14	1.05	0:30:35	93.38	93.38	0.70
0:02:40	219.84	18.32	3.57	0:09:40	213.41	35.57	1.84	0:16:40	171.95	57.32	1.14	0:23:40	142.90	71.45	0.92	0:30:40	95.16	95.16	0.69
0:02:45	219.66	18.30	3.58	0:09:45	213.28	35.55	1.84	0:16:45	168.35	56.12	1.17	0:23:45	158.32	79.16	0.83	0:30:45	92.19	92.19	0.71
0:02:50	220.20	18.35	3.57	0:09:50	212.44	35.41	1.85	0:16:50	184.47	61.49	1.06	0:23:50	124.57	62.29	1.05	0:30:50	92.89	92.89	0.70
0:02:55	219.62	18.30	3.58	0:09:55	212.39	35.40	1.85	0:16:55	185.85	61.95	1.06	0:23:55	123.42	61.71	1.06	0:30:55	93.03	93.03	0.70

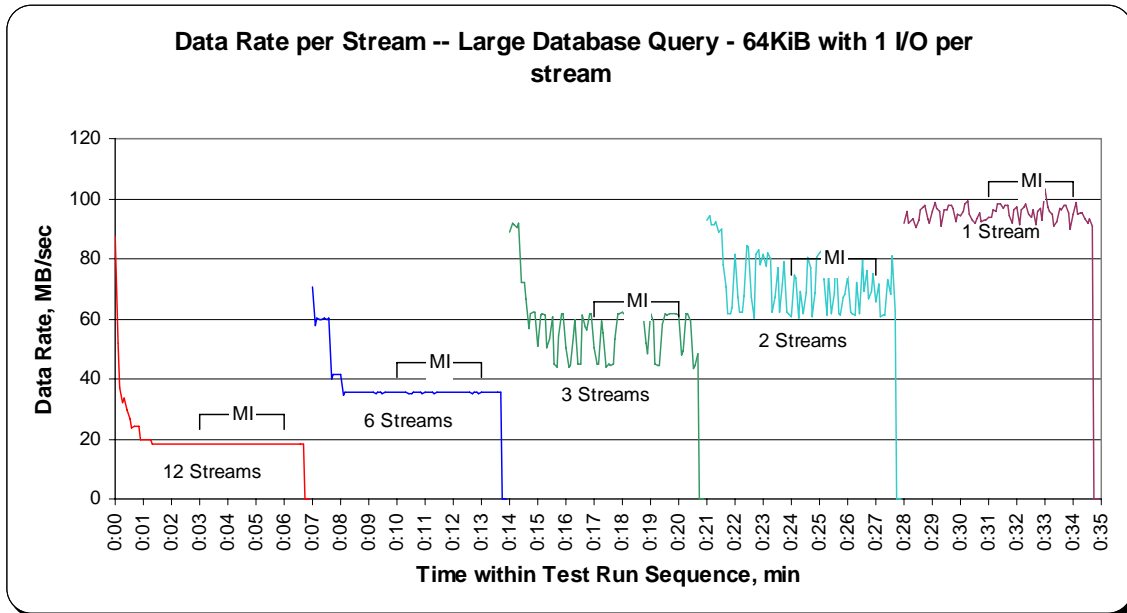
SPC-2 “Large Database Query/64 KiB Transfer Size/1 Outstanding I/O” Average Data Rate Graph – Complete Test Run



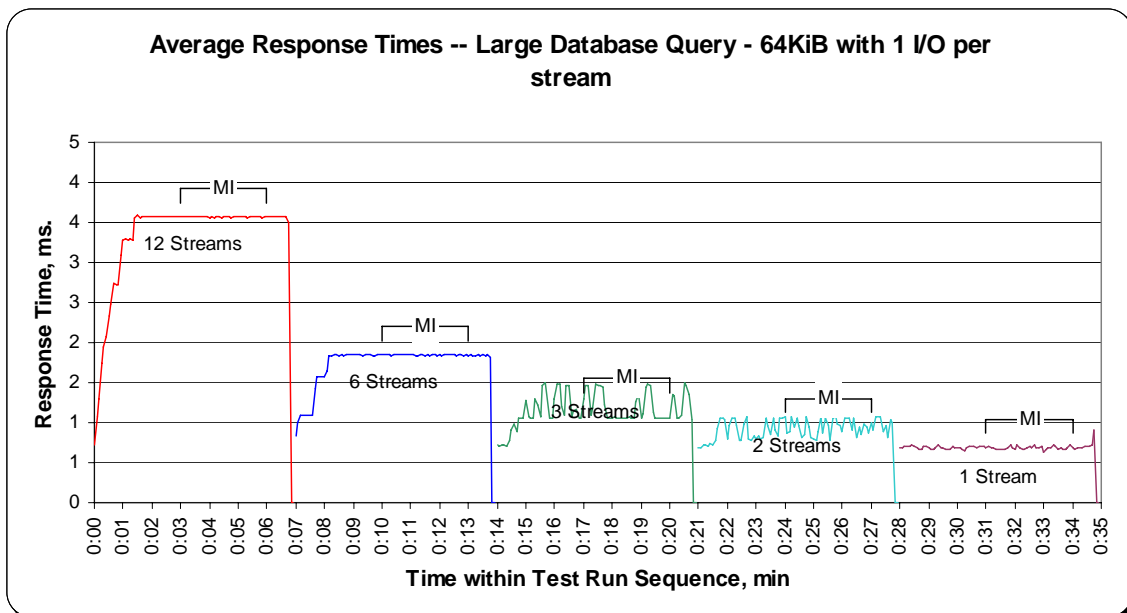
SPC-2 “Large Database Query/64 KiB Transfer Size/1 Outstanding I/O” Average Data Rate Graph – Measurement Interval (MI) Only



SPC-2 “Large Database Query/64 KiB Transfer Size/1 Outstanding I/O” Average Data Rate per Stream Graph



SPC-2 “Large Database Query/64 KiB Transfer Size/1 Outstanding I/O” Average Response Time Graph



Video on Demand Delivery Test

Clause 6.4.4.1

The Video on Demand Delivery Test represents the I/O operations required to enable individualized video entertainment for a community of subscribers, which draw from a digital film library.

Clause 6.4.2.2

The Video on Demand Delivery Test consists of one (1) Test Run.

The BC shall not be restarted or manually disturbed, altered, or adjusted during the execution of the Video on Demand Delivery Test. If power is lost to the BC during this Test all results shall be rendered invalid and the Test re-run in its entirety.

Clause 10.6.8.3

The Full Disclosure Report will contain the following content for the Video on Demand Delivery Test:

- 1. A listing of the SPC-2 Workload Generator commands and parameters used to execute the Test Run in the Video on Demand Delivery Test.*
- 2. The human readable SPC-2 Test Results File for the Test Run in the Video on Demand Delivery Test.*
- 3. A table that contains the following information for the Test Run in the Video on Demand Delivery Test:*
 - The number Streams specified.*
 - The Ramp-Up duration in seconds.*
 - The Measurement Interval duration in seconds.*
 - The average data rate, in MB per second, for the Measurement Interval.*
 - The average data rate, in MB per second, per Stream for the Measurement Interval.*
- 4. A table that contains the following information for the single Video on Demand Delivery Test Run:*
 - The number Streams specified.*
 - The average data rate, average data rate per stream, average Response Time, and Maximum Response Time reported at 60 second intervals.*
- 5. Average Data Rate (intervals), Average Data Rate per Stream (intervals), and Average Response Time (intervals) graphs for the single Video on Demand Delivery Test Run as specified in Clauses 10.1.4-2-10.1.6.*
- 6. A Maximum Response Time (intervals) graph, which will utilize the format defined in Clause 10.1.6, substituting maximum Response Time data for average Response Time data.*

SPC-2 Workload Generator Commands and Parameters

The SPC-2 Workload Generator commands and parameters for the Video on Demand Delivery Test Run are documented in “Appendix E: SPC-2 Workload Generator Execution Commands and Parameters” on Page 112.

SPC-2 Test Results File

A link to the SPC-2 Test Results file generated from the Video on Demand Delivery Test Run is listed below.

[SPC-2 Video on Demand Delivery Test Results File](#)

SPC-2 Video on Demand Delivery Test Run Data

The number of Streams specified, Ramp-Up duration in seconds, Measurement Interval duration in seconds, average Data Rate for the Measurement Interval, and average Data Rate per Stream for the Measurement Interval are listed in the following table.

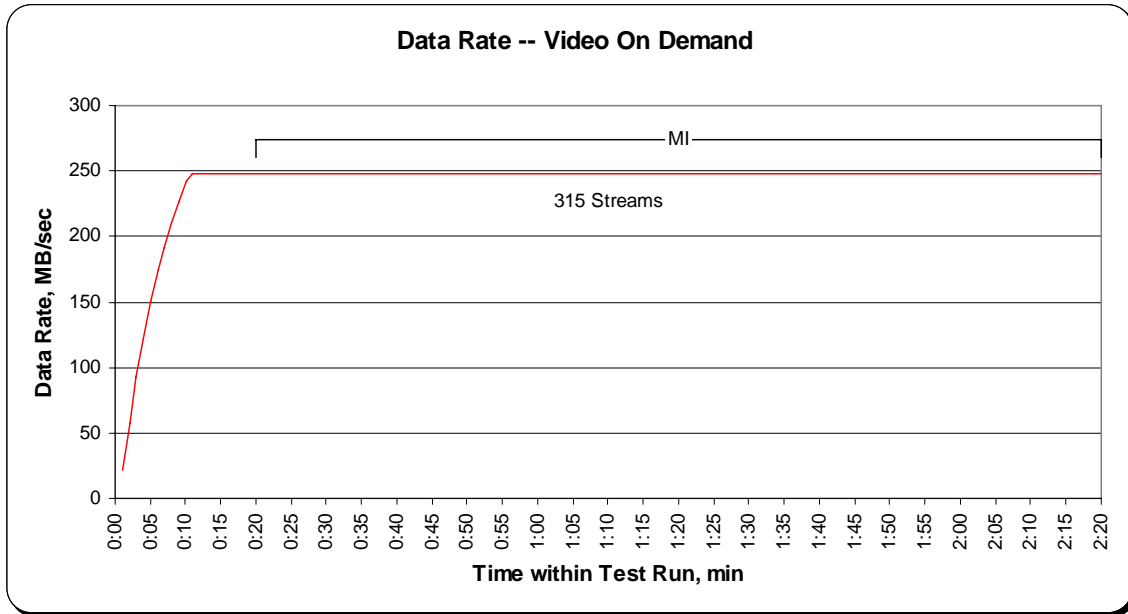
SPC-2-VOD	TR1
Number of Streams	315
Ramp-up Time, sec	1,200
Measurement Interval, sec	7,200
Average Data Rate, MB/sec	247.73
Per Stream Data Rate, MB/sec	0.79
Average Response Time, ms	48.30
Average Max Response Time, ms	182.36

Video on Demand Delivery Test – TEST RUN DATA BY INTERVAL

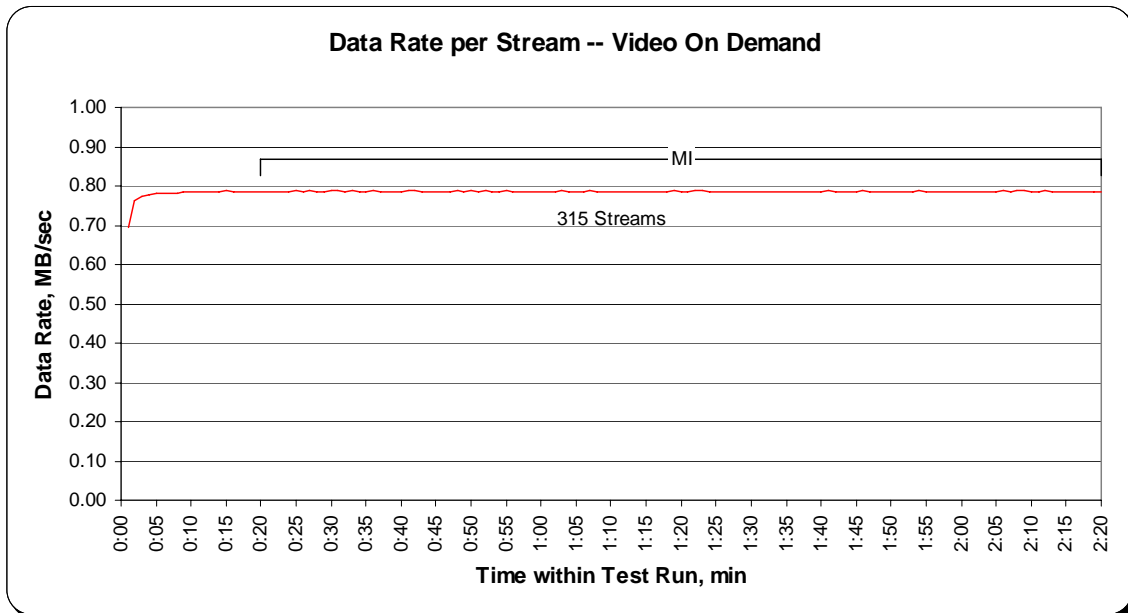
The SPC-2 Video on Demand Delivery Test Run data is contained in the table that appears on the next page. That table is followed by graphs illustrating the average Data Rate and average Data Rate per Stream produced by the same Test Runs. The table and graphs present the data at sixty second intervals.

Test Run Sequence Time	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms	Maximum Response Time, ms	Test Run Sequence Time	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms	Maximum Response Time, ms	Test Run Sequence Time	Data Rate, MB/sec	Data Rate / Stream, MB/sec	Response Time, ms	Maximum Response Time, ms
0:01:00	21.37	0.69	2.64	14.33	0:51:00	247.73	0.79	42.88	168.70	1:41:00	247.88	0.79	45.14	174.51
0:02:00	58.25	0.76	3.48	18.39	0:52:00	247.86	0.79	41.89	165.45	1:42:00	247.55	0.79	48.21	184.29
0:03:00	92.52	0.77	4.71	20.04	0:53:00	247.63	0.79	44.08	182.19	1:43:00	247.76	0.79	48.87	163.28
0:04:00	122.77	0.78	5.76	23.38	0:54:00	247.53	0.79	47.62	189.26	1:44:00	247.78	0.79	53.70	203.93
0:05:00	151.03	0.78	7.04	24.26	0:55:00	247.85	0.79	41.18	177.01	1:45:00	247.48	0.79	54.41	207.86
0:06:00	174.36	0.78	8.40	26.20	0:56:00	247.78	0.79	44.10	191.67	1:46:00	247.84	0.79	53.06	193.38
0:07:00	191.63	0.78	10.73	51.87	0:57:00	247.75	0.79	43.13	180.29	1:47:00	247.72	0.79	54.17	191.25
0:08:00	211.00	0.78	18.73	112.26	0:58:00	247.60	0.79	45.63	213.02	1:48:00	247.68	0.79	55.49	181.45
0:09:00	226.90	0.78	27.19	136.57	0:59:00	247.73	0.79	40.75	167.65	1:49:00	247.58	0.79	56.96	200.25
0:10:00	242.67	0.78	38.02	152.80	1:00:00	247.47	0.79	44.09	194.98	1:50:00	247.67	0.79	59.34	200.23
0:11:00	247.82	0.79	45.25	174.95	1:01:00	247.72	0.79	45.27	169.81	1:51:00	247.72	0.79	53.46	179.56
0:12:00	247.57	0.79	47.03	175.71	1:02:00	247.65	0.79	48.68	198.94	1:52:00	247.83	0.79	50.47	182.34
0:13:00	247.73	0.79	44.85	175.57	1:03:00	248.03	0.79	45.88	174.63	1:53:00	247.73	0.79	50.63	189.65
0:14:00	247.80	0.79	42.19	152.70	1:04:00	247.51	0.79	56.79	227.77	1:54:00	247.95	0.79	55.16	196.06
0:15:00	247.91	0.79	43.74	174.16	1:05:00	247.46	0.79	48.83	179.73	1:55:00	247.68	0.79	52.83	181.48
0:16:00	247.61	0.79	46.82	178.47	1:06:00	247.64	0.79	73.09	256.64	1:56:00	247.68	0.79	55.31	173.58
0:17:00	247.68	0.79	46.14	175.43	1:07:00	247.91	0.79	58.45	230.51	1:57:00	247.64	0.79	49.25	167.01
0:18:00	247.73	0.79	42.07	157.86	1:08:00	247.52	0.79	50.64	183.59	1:58:00	247.42	0.79	51.34	178.89
0:19:00	247.68	0.79	43.94	154.48	1:09:00	247.64	0.79	68.05	251.99	1:59:00	247.82	0.79	48.13	179.34
0:20:00	247.57	0.79	41.75	167.17	1:10:00	247.79	0.79	42.03	160.67	2:00:00	247.62	0.79	50.19	178.85
0:21:00	247.64	0.79	44.06	172.23	1:11:00	247.80	0.79	46.88	191.00	2:01:00	247.71	0.79	51.34	168.45
0:22:00	247.61	0.79	50.58	173.81	1:12:00	247.76	0.79	43.20	154.71	2:02:00	247.71	0.79	49.30	169.61
0:23:00	247.73	0.79	51.71	199.63	1:13:00	247.64	0.79	47.10	166.24	2:03:00	247.70	0.79	49.52	193.09
0:24:00	247.65	0.79	60.25	227.44	1:14:00	247.56	0.79	46.59	192.74	2:04:00	247.55	0.79	51.87	201.01
0:25:00	247.97	0.79	60.70	214.51	1:15:00	247.83	0.79	46.94	182.13	2:05:00	247.73	0.79	56.67	206.34
0:26:00	247.69	0.79	55.01	201.07	1:16:00	247.73	0.79	46.76	177.12	2:06:00	247.87	0.79	46.49	182.97
0:27:00	247.85	0.79	49.04	167.79	1:17:00	247.71	0.79	46.82	183.42	2:07:00	247.49	0.79	45.81	174.54
0:28:00	247.74	0.79	47.99	189.21	1:18:00	247.72	0.79	44.74	167.15	2:08:00	247.90	0.79	48.69	182.91
0:29:00	247.54	0.79	46.12	168.95	1:19:00	248.08	0.79	61.29	251.80	2:09:00	247.84	0.79	45.80	192.92
0:30:00	247.86	0.79	43.56	164.43	1:20:00	247.56	0.79	49.35	191.31	2:10:00	247.74	0.79	43.13	160.61
0:31:00	247.91	0.79	48.50	175.07	1:21:00	247.71	0.79	52.58	191.18	2:11:00	247.62	0.79	45.53	181.93
0:32:00	247.77	0.79	46.98	175.84	1:22:00	247.89	0.79	53.25	189.81	2:12:00	247.96	0.79	43.72	178.45
0:33:00	247.89	0.79	47.00	174.08	1:23:00	247.88	0.79	52.99	185.82	2:13:00	247.58	0.79	42.48	172.97
0:34:00	247.81	0.79	45.18	162.39	1:24:00	247.78	0.79	57.09	192.82	2:14:00	247.67	0.79	42.90	169.23
0:35:00	247.75	0.79	46.66	165.97	1:25:00	247.65	0.79	47.56	185.12	2:15:00	247.54	0.79	43.20	174.05
0:36:00	247.86	0.79	45.08	158.62	1:26:00	247.72	0.79	46.53	181.99	2:16:00	247.81	0.79	41.45	150.21
0:37:00	247.70	0.79	48.28	183.04	1:27:00	247.64	0.79	46.64	167.15	2:17:00	247.58	0.79	45.43	174.28
0:38:00	247.77	0.79	50.18	193.69	1:28:00	247.50	0.79	44.60	171.82	2:18:00	247.81	0.79	44.94	163.20
0:39:00	247.60	0.79	44.48	147.61	1:29:00	247.41	0.79	50.96	183.51	2:19:00	247.71	0.79	44.28	176.71
0:40:00	247.48	0.79	44.44	164.63	1:30:00	247.55	0.79	47.30	176.76	2:20:00	247.74	0.79	42.68	166.76
0:41:00	247.87	0.79	44.29	169.62	1:31:00	247.70	0.79	49.65	176.90					
0:42:00	247.89	0.79	44.24	160.17	1:32:00	247.71	0.79	46.41	181.69					
0:43:00	247.60	0.79	51.28	221.61	1:33:00	247.54	0.79	43.18	154.15					
0:44:00	247.80	0.79	42.22	189.99	1:34:00	247.75	0.79	42.48	152.06					
0:45:00	247.79	0.79	39.43	168.70	1:35:00	247.75	0.79	44.48	162.10					
0:46:00	247.67	0.79	41.19	156.22	1:36:00	247.62	0.79	43.18	155.17					
0:47:00	247.80	0.79	42.05	176.92	1:37:00	247.56	0.79	47.85	182.07					
0:48:00	247.97	0.79	41.02	155.53	1:38:00	247.47	0.79	48.98	192.53					
0:49:00	247.71	0.79	45.68	176.71	1:39:00	247.74	0.79	46.98	176.43					
0:50:00	247.86	0.79	46.97	184.19	1:40:00	247.76	0.79	46.78	167.86					

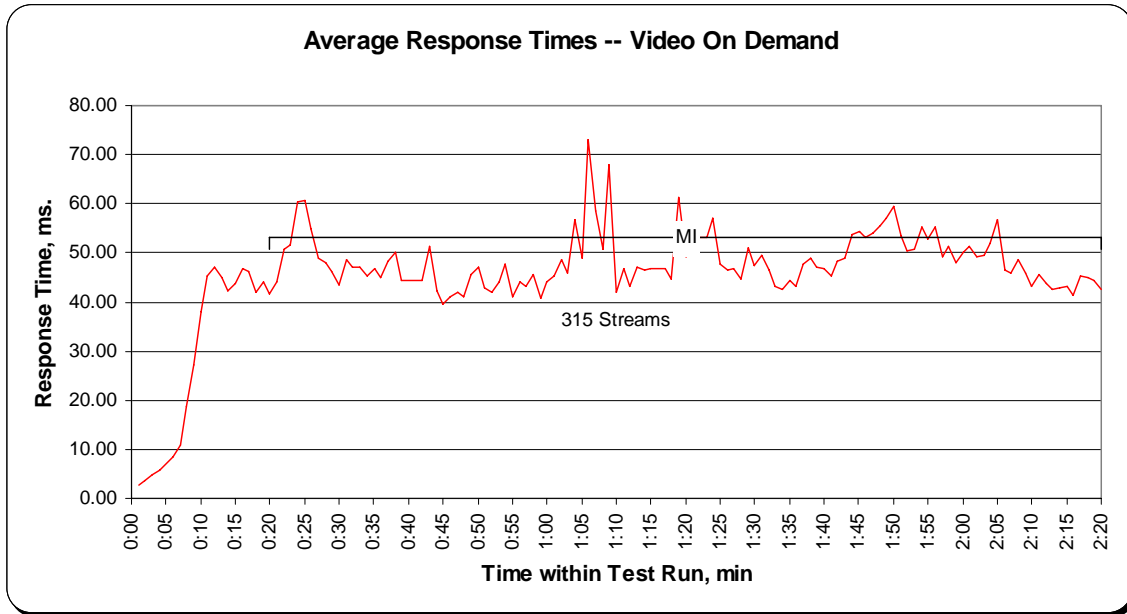
SPC-2 Video on Demand Delivery Average Data Rate Graph



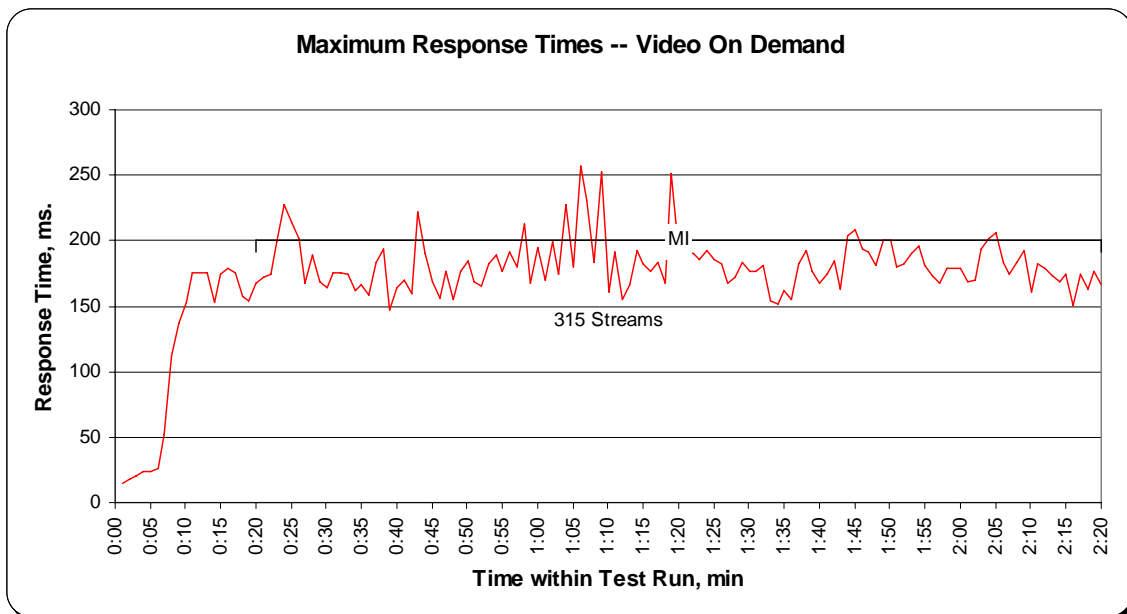
SPC-2 Video on Demand Delivery Average Data Rate per Stream Graph



SPC-2 Video on Demand Delivery Average Response Time Graph



SPC-2 Video on Demand Delivery Maximum Response Time Graph



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-2 Workload Generator will write a specific pattern at randomly selected locations throughout the Total ASU Capacity (Persistence Test Run 1). The SPC-2 Workload Generator will retain the information necessary to later validate the pattern written at each location.

The Tested Storage Configuration 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.

Restart the TSC, and if the Host System(s) were shutdown and powered off, restart the Host System(s).

The SPC-2 Workload Generator will utilize the retained data from Persistence Test Run 1 to verify (Persistence Run 2) the bit patterns written in Persistence Test Run 1 and their corresponding location.

Clause 10.6.8.4

The Full Disclosure Report will contain the following content for the Data Persistence Test:

1. *A listing of the SPC-2 Workload Generator commands and parameters used to execute each of the Test Runs in the Persistence Test.*
2. *The human readable SPC-2 Test Results File for each of the Test Runs in the Data Persistence Test.*
3. *A table from the successful Persistence Test, which contains the results from the test.*

SPC-2 Workload Generator Commands and Parameters

The SPC-2 Workload Generator commands and parameters for the Persistence Test Runs are documented in “Appendix E: SPC-2 Workload Generator Execution Commands and Parameters” on Page 112.

Data Persistence Test Results File

A link to the 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 Number: 1	
Total Number of Logical Blocks Written	73,886
Total Number of Logical Blocks Re-referenced	2,444
Total Number of Logical Blocks Verified	73,886
Total Number of Logical Blocks that Failed Verification	0
Number of Failed I/O Requests in the process of the Test	0

PRICED STORAGE CONFIGURATION AVAILABILITY DATE

Clause 10.6.9

The committed delivery date 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 must be the date at which all components are committed to be available. All availability dates, whether for individual components or for the Priced Storage Configuration as a whole, must be disclosed to a precision of one day.

*The FDR shall state: "The **Priced Storage Configuration**, as documented in this Full Disclosure Report will be available for shipment to customers on MMMM DD, YYYY." Where **Priced Storage Configuration** is the Priced Storage Configuration Name as described in Clause 10.6.5.3, #1 and MM is month, DD is the day, and YY is the year of the date that the Priced Storage Configuration, as documented, is available for shipment to customers as described above.*

The Sun StorageTek 3320 SCSI Array, as documented in this SPC-2 Full Disclosure Report is currently available available for customer purchase and shipment.

ANOMALIES OR IRREGULARITIES

Clause 10.6.11

The FDR shall include a clear and complete description of any anomalies or irregularities encountered in the course of executing the SPC-2 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-2 Onsite Audit of the Sun StorageTek 3320 SCSI Array.

APPENDIX A: SPC-2 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 gibibyte (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-2 Data Repository Definitions

Total ASU Capacity: The total storage capacity read and written in the course of executing the SPC-2 benchmark.

Application Storage Unit (ASU): The logical interface between the storage and SPC-2 Workload Generator. The ASU is 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-2 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-2 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 ASU.

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 sum of unused storage capacity within the Physical Storage Capacity, Configured Storage Capacity, and Addressable Storage Capacity.

SPC-2 Data Protection Levels

RAID5: User data is distributed across the disks in the array. Check data corresponding to user data is distributed across multiple disks in the form of bit-by-bit parity.

Mirroring: Two or more identical copies of user data are maintained on separate disks.

Other Protection Level: Any data protection other than **RAID5** or **Mirroring**.

Unprotected: There is no data protection provided.

SPC-2 Test Execution Definitions

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

Completion Time: The time recorded by the Workload Generator when an I/O Request is completed by the Tested Storage Configuration (TSC) as signaled by System Software.

Data Rate: The data volume, in MB, transferred by all Measured I/O Requests in an SPC-2 Test Run divided by the length of the Test Run in seconds.

Failed I/O Request: Any I/O Request issued by the SPC-2 Workload Generator that meets one of the following conditions (*see "I/O Completion Types" illustrated below*):

- The I/O Request was signaled as failed by System Software.
- The I/O Request started within the Measurement Interval, but did not complete prior to the end of the appropriate Run-Out period..
- The I/O Request started within the Run-Out period, but did not complete prior to the end of the appropriate Ramp-Down period.

I/O Request Throughput: The total number of Measured I/O Requests in an SPC-2 Test Run divided by the duration of the Measurement Interval in seconds.

Measured I/O Request: A Completed I/O Request that begins (Start Time) within a Measurement Interval and completes (Completion Time) prior to the end of the appropriate Ramp Down (see “I/O Completion Types” illustrated below).

Measurement Interval: A specified, contiguous period of time, after the TSC has reached Steady State, when data is collected by the Workload Generator to produce the test results for a SPC-2 Test Run (see “SPC-2 Test Run Components” illustrated below, Test Run 1: T_2-T_3 and Test Run 2: T_7-T_8).

Outstanding I/O Requests: The Outstanding I/O Requests parameter specifies the maximum number of concurrent I/O Requests, associated with a give Stream, which have been issued but not yet completed. (Clause 3.4.4 of the SPC-2 Benchmark Specification).

Ramp-Down: A specified, contiguous period of time in which the TSC is required to complete I/O Requests started but not completed during the preceding Run-Out period. Ramp-Down begins at the end of the preceding Run-Out period (see “SPC-2 Test Run Components” illustrated below, Test Run 1: T_4-T_5 and Test Run 2: T_9-T_{10}). The Workload Generator will not submit any I/O Requests during the Ramp-Down.

Ramp-Up: A specified, contiguous period of 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. The Ramp-Up period ends at the beginning of the Measurement Interval (see “SPC-2 Test Run Components” illustrated below, Test Run 1: T_0-T_2 and Test Run 2: T_5-T_7).

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

Run-Out: A specified, contiguous period of time in which the TSC is required to complete I/O Requests started but not completed during the preceding Measurement Interval. The Run-Out period begins at the end of the preceding Measurement Interval and is a component of the Steady State period (see “SPC-2 Test Run Components” illustrated below, Test Run 1: T_3-T_4 and Test Run 2: T_9-T_{10}). The Workload Generator will continue to submit I/O Requests at the Test Run’s specified rate during the Run-Out period.

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 TSC.

Steady State: The period during which the workload presented to the TSC by the SPC-2 Workload Generator is constant and the resulting TSC I/O Request Throughput is both consistent and sustainable. The Steady State period includes both the Measurement Interval and Run-Out periods (see “SPC-2 Test Run Components” illustrated below, Test Run 1: T_1-T_4 and Test Run 2: T_6-T_9).

Steady State is achieved only after caches in the TSC have filled and as a result the I/O Request Throughput of the TSC has stabilized.

Stream: A collection of Stream Segments that started within a Test Run.

Stream Segment: A sequentially organized pattern of I/O requests, which transfers a contiguous range of data.

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

Test Phase: A collection of one or more SPC-2 Test Runs sharing a common objective and intended to be run in a specific sequence.

Test Run: The execution of SPC-2 that produces specific SPC-2 test results. SPC-2 Test Runs have specified, measured Ramp-Up, Measurement Interval, Run-Out and Ramp-Down periods. "SPC-2 Test Run Components" (*see below*) illustrates the Ramp-Up, Steady State, Measurement Interval, Run-Out, and Ramp-Down components contained in two uninterrupted SPC-2 Test Runs (*Test Run 1: T_0 - T_5 and Test Run 2: T_5 - T_{10}*).

Test Run Sequence: A related sequence of Large File Processing (LFP) or Large Database Query (LDQ) Test Runs. Each Test Run Sequence will consist of five Test Runs, which vary the number of Streams as follows:

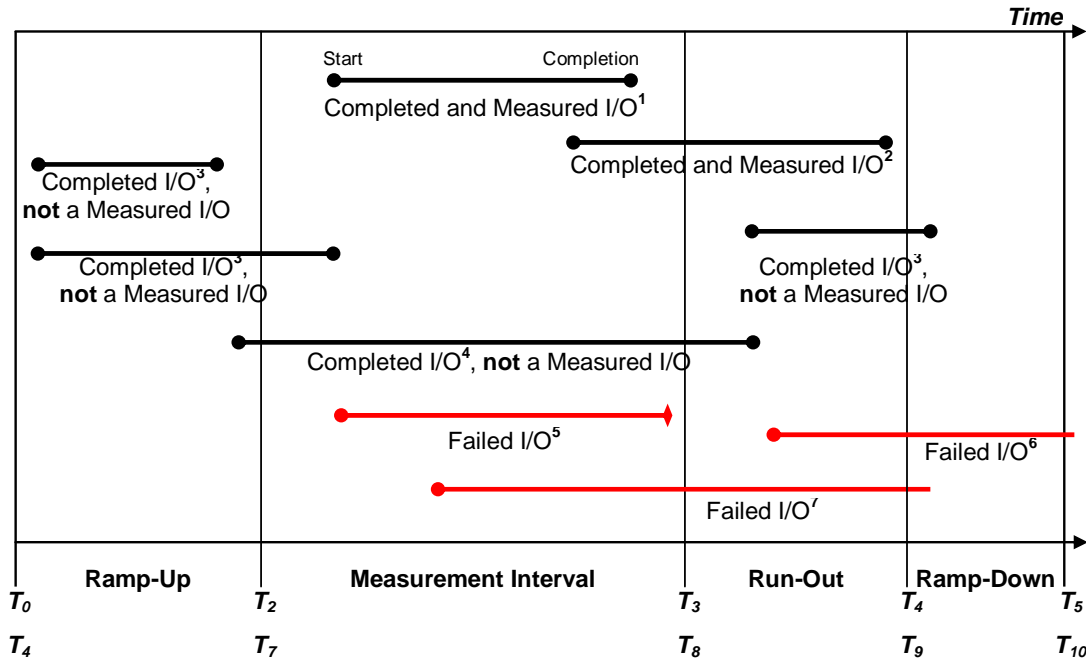
- Test Run 1: Maximum number of Streams, which is selected by the Test Sponsor
- Test Run 2: 50% of the maximum number of Streams used in Test Run 1.
- Test Run 3: 25% of the maximum number of Streams used in Test Run 1.
- Test Run 4: 12.5% of the maximum number of Streams used in Test Run 1.
- Test Run 5: 1 Stream.

Each of the five Test Runs in a Test Run Sequence will share the same attributes with the exception of the number of Streams. For example:

- Large File Processing, Read, 1024 KiB Transfer Size: Maximum Streams
- Large File Processing, Read, 1024 KiB Transfer Size: 50% of Maximum Streams
- Large File Processing, Read, 1024 KiB Transfer Size: 25% of Maximum Streams
- Large File Processing, Read, 1024 KiB Transfer Size: 12.5% of Maximum Streams
- Large File Processing, Read, 1024 KiB Transfer Size: 1 Stream

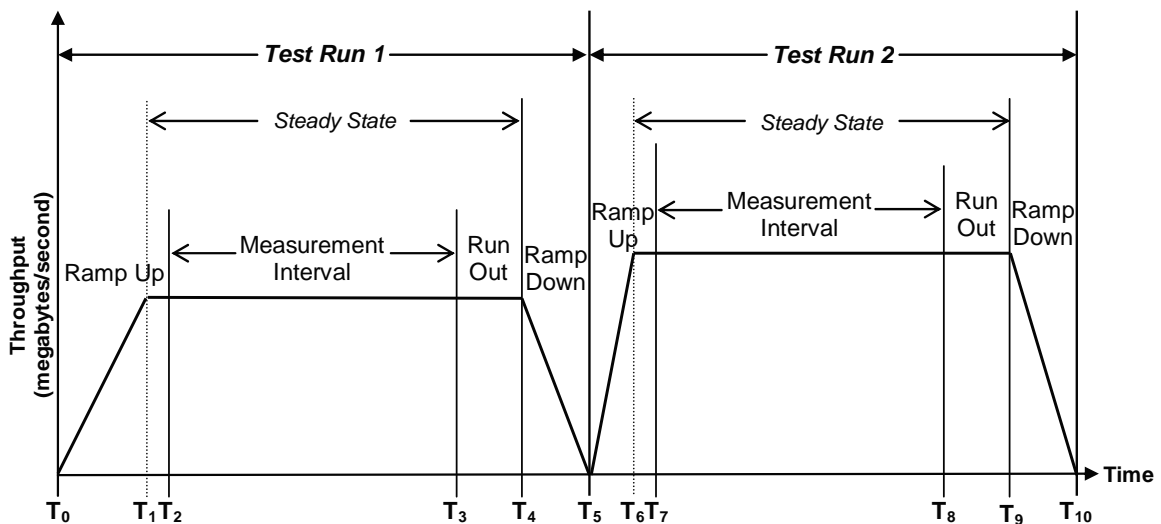
Transfer Size: The Transfer Size parameter specifies the number of bytes in KiB to transfer. (*Clause 3.4.7 of the SPC-2 Benchmark Specification*)

I/O Completion Types



Completed and Measured I/O¹: I/O started and completed within the Measurement Interval.
Completed and Measured I/O²: I/O started within the Measurement Interval and completed within Ramp Down.
Completed I/O³: I/O started before or after the Measurement Interval – not measured.
Completed I/O⁴: I/O started before and completed after the Measurement Interval – not measured.
Failed I/O⁵: Signaled as failed by System Software.
Failed I/O⁶: I/O did not complete prior to the end of Ramp-Down.
Failed I/O⁷: I/O did not complete prior to the end of Run-Out.

SPC-2 Test Run Components



APPENDIX B: CUSTOMER TUNABLE PARAMETERS AND OPTIONS

No customer tunable parameters or options were changed from their default values. All of the parameter values listed in the `a3320-scli-config.txt` command file (Appendix C: Tested Storage Configuration (TSC) Creation) represent default values.

APPENDIX C: TESTED STORAGE CONFIGURATION (TSC) CREATION

Create RAID 1 Storage Groups

The Sun StorageTek 3320 SCSI Array is configured with six RAID 1 storage groups with one LUN per group. The configuration file `a3320-sccli-config.txt` is used to configure the Sun StorageTek 3320 SCSI Array via the `sccli` command. The `sccli` command is accessed via the `SUNWsscs` package found in the CD that ships with the Sun StorageTek 3320 SCSI Array.

```
sccli upload controller-configuration a3320-sccli-config.txt a3320
```

Note: a3320 is the hostname assigned to the Sun StorageTek 3320 SCSI Array.

The content of the configuration file, `a3320-sccli-config.txt`, used in the above `sccli` command is listed below.

a3320-sccli-config.txt

```
Sun StorEdge 3000 Family CLI
Copyright 2002-2005 Dot Hill Systems Corporation.
All rights reserved. Use is subject to license terms.
sccli version 2.1.0
built 2005.07.07.10.12
build 17 for solaris-x86
```

```
* inquiry-data
```

```
Vendor: SUN
Product: StorEdge 3320
Revision: 412E
NVRAM Defaults: 412E 3320 S441U
Bootrecord Version: 1.31K
Serial Number: 09E087
IP Address: 172.20.106.115
Ethernet Address: 00:C0:FF:09:E0:87
unique-identifier: 9E087
controller-name: "sbm-3320a"
```

```
* network-parameters
```

```
ip-address: 172.20.106.115
netmask: 255.255.255.0
gateway: 172.20.106.248
mode: static
```

```
* host-parameters
```

```
max-luns-per-id: 4
queue-depth: 512
inband-management: enabled
```

```
* drive-parameters
```

```
spin-up: disabled
disk-access-delay: 15s
scsi-io-timeout: 30s
```

```
queue-depth: 32
polling-interval: disabled
enclosure-polling-interval: disabled
auto-detect-swap-interval: disabled
smart: disabled
auto-global-spare: disabled
```

* redundant-controller-configuration

```
Redundant Controller Configuration:      primary
Cache Synchronization:                  enabled
Host Channel Failover Mode:             shared
Local/Remote Redundant Mode:            local
Write-Through Data Synchronization:     enabled
Secondary RS-232 Port Status:           disabled
Communication Channel Type:             SCSI
```

* redundancy-mode

```
Primary controller serial number: 300843
Primary controller location: N/A
Redundancy mode: Active-Active
Redundancy status: Enabled
Secondary controller serial number: 300671
```

* cache-parameters

```
mode: write-back
optimization: sequential
sync-period: disabled
```

* RS232-configuration

```
COM1 speed: 38400bps
```

* channels

Ch	Type	Media	Speed	Width	PID / SID
0	Drive	SCSI	160M	Wide	6 / 7
1	Host	SCSI	ASYNC	Narrow	0 / 1
2	Drive	SCSI	160M	Wide	6 / 7
3	Drive	SCSI	160M	Wide	6 / 7
4	RCCOM	FC(L)	N/A	Narrow	N/A / N/A
5	RCCOM	FC(L)	ASYNC	Narrow	N/A / N/A
6	Host	LAN	N/A	Serial	N/A / N/A

* disks

Ch	Id	Size	Speed	LD	Status	IDs	Rev
0	0	68.37GB	320MB	ld0	ONLINE	M HITACHI HUS15733ASUN72G S/N 41P3HJGK	PA01
0	1	68.37GB	320MB	ld0	ONLINE	M HITACHI HUS15733ASUN72G S/N 41P3J8VK	PA01
0	2	68.37GB	320MB	ld0	ONLINE	M HITACHI HUS15733ASUN72G	PA01

APPENDIX C:
TESTED STORAGE CONFIGURATION (TSC) CREATION

							S/N 41P3J94K		
0	3	68.37GB	320MB	1d0	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P3JEVK		
0	4	68.37GB	320MB	1d0	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P3AM7K		
0	5	68.37GB	320MB	1d0	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P3HXHK		
0	8	68.37GB	320MB	1d1	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P3JE6K		
0	9	68.37GB	320MB	1d1	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P3JEAK		
0	10	68.37GB	320MB	1d1	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P23HUK		
0	11	68.37GB	320MB	1d1	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P3E78K		
0	12	68.37GB	320MB	1d1	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P3JG3K		
0	13	68.37GB	320MB	1d1	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P38H2K		
2	0	68.37GB	320MB	1d2	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P23J7K		
2	1	68.37GB	320MB	1d2	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P3HXXK		
2	2	68.37GB	320MB	1d2	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P3E33K		
2	3	68.37GB	320MB	1d2	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P3HR9K		
2	4	68.37GB	320MB	1d2	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P3JKHK		
2	5	68.37GB	320MB	1d2	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P3E6XK		
2	8	68.37GB	320MB	1d3	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P385PK		
2	9	68.37GB	320MB	1d3	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P38AMK		
2	10	68.37GB	320MB	1d3	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P389RK		
2	11	68.37GB	320MB	1d3	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P38JZK		
2	12	68.37GB	320MB	1d3	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P38MNK		
2	13	68.37GB	320MB	1d3	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P38KJK		
3	0	68.37GB	320MB	1d4	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P27PXX		
3	1	68.37GB	320MB	1d4	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P3AMUK		
3	2	68.37GB	320MB	1d4	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P3JKJK		
3	3	68.37GB	320MB	1d4	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P381KK		
3	4	68.37GB	320MB	1d4	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P27V7K		
3	5	68.37GB	320MB	1d4	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	
							S/N 41P3A9JK		
3	8	68.37GB	320MB	1d5	ONLINE	M	HITACHI HUS15733ASUN72G	PA01	

Port	Slot	Capacity	Cache	Format	State	Model	S/N	Serial	Path
							41P3HH8K		
3	9	68.37GB	320MB	ld5	ONLINE	M HITACHI	HUS15733ASUN72G	PA01	
							41P3HZSK		
3	10	68.37GB	320MB	ld5	ONLINE	M HITACHI	HUS15733ASUN72G	PA01	
							41P3AMLK		
3	11	68.37GB	320MB	ld5	ONLINE	M HITACHI	HUS15733ASUN72G	PA01	
							41P3HB4K		
3	12	68.37GB	320MB	ld5	ONLINE	M HITACHI	HUS15733ASUN72G	PA01	
							41P3AL0K		
3	13	68.37GB	320MB	ld5	ONLINE	M HITACHI	HUS15733ASUN72G	PA01	
							41P38NKK		

* logical-drives

LD	LD-ID	Size	Assigned	Type	Disks	Spare	Failed	Status
ld0	140BFC3F	204.35GB	Primary	RAID1	6	0	0	Good
			Write-Policy	Default				StripeSize 256KB
ld1	34F77751	204.35GB	Secondary	RAID1	6	0	0	Good
			Write-Policy	Default				StripeSize 256KB
ld2	686CB973	204.35GB	Primary	RAID1	6	0	0	Good
			Write-Policy	Default				StripeSize 256KB
ld3	0C314D6C	204.35GB	Secondary	RAID1	6	0	0	Good
			Write-Policy	Default				StripeSize 256KB
ld4	4B9746E1	204.35GB	Primary	RAID1	6	0	0	Good
			Write-Policy	Default				StripeSize 256KB
ld5	52939F7F	204.35GB	Secondary	RAID1	6	0	0	Good
			Write-Policy	Default				StripeSize 256KB

* logical-volumes

* partitions

LD/LV	ID-Partition	Size
ld0-00	140BFC3F-00	175.78GB
ld0-01	140BFC3F-01	28.57GB
ld1-00	34F77751-00	175.78GB
ld1-01	34F77751-01	28.57GB
ld2-00	686CB973-00	175.78GB
ld2-01	686CB973-01	28.57GB
ld3-00	0C314D6C-00	175.78GB
ld3-01	0C314D6C-01	28.57GB
ld4-00	4B9746E1-00	175.78GB
ld4-01	4B9746E1-01	28.57GB
ld5-00	52939F7F-00	175.78GB
ld5-01	52939F7F-01	28.57GB

* lun-maps

Ch	Tgt	LUN	ld/lv	ID-Partition	Assigned	Filter	Map
1	0	0	ld0	140BFC3F-00	Primary		
1	0	1	ld2	686CB973-00	Primary		
1	0	2	ld4	4B9746E1-00	Primary		

```

1 1 0 ld1 34F77751-00 Secondary
1 1 1 ld3 0C314D6C-00 Secondary
1 1 2 ld5 52939F7F-00 Secondary

```

* protocol

Identifier	Status	Port	Parameters
telnet	enabled	23	inactivity-timeout=disabled
http	enabled	80	n/a
https	disabled	n/a	n/a
ftp	enabled	21	n/a
ssh	disabled	n/a	n/a
priagent	enabled	58632	n/a
snmp	disabled	n/a	n/a
dhcp	enabled	68	n/a
ping	enabled	n/a	n/a

* auto-write-through-trigger

```

controller-failure: enabled
battery-backup-failure: enabled
ups-ac-power-loss: disabled
power-supply-failure: enabled
fan-failure: enabled
temperature-exceeded-delay: 30min

```

* peripheral-device-status

Item	Value	status
CPU Temp Sensor(primary)	57.00C	within safety range
Board1 Temp Sensor(primary)	59.50C	within safety range
Board2 Temp Sensor(primary)	68.00C	within safety range
+3.3V Value(primary)	3.432V	within safety range
+5V Value(primary)	5.126V	within safety range
+12V Value(primary)	12.320V	within safety range
Battery-Backup Battery(primary)	--	OK
CPU Temp Sensor(secondary)	47.50C	within safety range
Board1 Temp Sensor(secondary)	56.00C	within safety range
Board2 Temp Sensor(secondary)	67.00C	within safety range
+3.3V Value(secondary)	3.432V	within safety range
+5V Value(secondary)	5.126V	within safety range
+12V Value(secondary)	12.320V	within safety range
Battery-Backup Battery(secondary)	--	OK

* enclosure-status

Ch	Id	Chassis	Vendor	Product	ID	Rev	Package	Status	
0	14	09E0A4	SUN	StorEdge	3320	A	1180	1180	OK

Enclosure Component Status:

Type	Unit	Status	FRU P/N	FRU S/N	Add'l Data
Fan	0	OK	371-0108	GK008E	--

```

Fan 1      OK      371-0108  GK008A      --
PS 0      OK      371-0108  GK008E      --
PS 1      OK      371-0108  GK008A      --
Temp 0     OK      371-0106  09E0A4      temp=27
Temp 1     OK      371-0106  09E0A4      temp=27
Temp 2     OK      371-0108  GK008E      temp=26
Temp 3     OK      371-0107  JS00DR      temp=33
Temp 4     OK      371-0107  JS00FA      temp=31
Temp 5     OK      371-0106  09E0A4      temp=27
Temp 6     OK      371-0108  GK008A      temp=30
EMU 0     OK      371-0107  JS00DR
EMU 1     OK      371-0107  JS00FA
DiskSlot 0 OK      371-0106  09E0A4      addr=0,led=off
DiskSlot 1 OK      371-0106  09E0A4      addr=1,led=off
DiskSlot 2 OK      371-0106  09E0A4      addr=2,led=off
DiskSlot 3 OK      371-0106  09E0A4      addr=3,led=off
DiskSlot 4 OK      371-0106  09E0A4      addr=4,led=off
DiskSlot 5 OK      371-0106  09E0A4      addr=5,led=off
DiskSlot 6 OK      371-0106  09E0A4      addr=8,led=off
DiskSlot 7 OK      371-0106  09E0A4      addr=9,led=off
DiskSlot 8 OK      371-0106  09E0A4      addr=10,led=off
DiskSlot 9 OK      371-0106  09E0A4      addr=11,led=off
DiskSlot 10 OK     371-0106  09E0A4      addr=12,led=off
DiskSlot 11 OK     371-0106  09E0A4      addr=13,led=off

```

Enclosure SCSI Channel Type: single-bus

Ch	Id	Chassis	Vendor	Product	ID	Rev	Package	Status
2	15	09D0FE	SUN	StorEdge	3320 D	1180	1180	OK

Enclosure Component Status:

Type	Unit	Status	FRU P/N	FRU S/N	Add'l Data
Fan	0	OK	371-0108	GKY02U	--
Fan	1	OK	371-0108	GKY02X	--
PS	0	OK	371-0108	GKY02U	--
PS	1	OK	371-0108	GKY02X	--
Temp	0	OK	371-0105	09D0FE	temp=26
Temp	1	OK	371-0105	09D0FE	temp=27
Temp	2	OK	371-0108	GKY02U	temp=26
Temp	3	OK	371-0107	JS012L	temp=30
Temp	4	OK	371-0107	JS013J	temp=30
Temp	5	OK	371-0105	09D0FE	temp=27
Temp	6	OK	371-0108	GKY02X	temp=27
EMU	0	OK	371-0107	JS012L	
EMU	1	OK	371-0107	JS013J	
DiskSlot	0	OK	371-0105	09D0FE	addr=0,led=off
DiskSlot	1	OK	371-0105	09D0FE	addr=1,led=off
DiskSlot	2	OK	371-0105	09D0FE	addr=2,led=off
DiskSlot	3	OK	371-0105	09D0FE	addr=3,led=off
DiskSlot	4	OK	371-0105	09D0FE	addr=4,led=off
DiskSlot	5	OK	371-0105	09D0FE	addr=5,led=off
DiskSlot	6	OK	371-0105	09D0FE	addr=8,led=off
DiskSlot	7	OK	371-0105	09D0FE	addr=9,led=off
DiskSlot	8	OK	371-0105	09D0FE	addr=10,led=off

```
DiskSlot 9    OK        371-0105  09D0FE    addr=11,led=off
DiskSlot 10   OK        371-0105  09D0FE    addr=12,led=off
DiskSlot 11   OK        371-0105  09D0FE    addr=13,led=off
```

Enclosure SCSI Channel Type: single-bus

Ch	Id	Chassis	Vendor	Product ID	Rev	Package	Status
3	15	09D108	SUN	StorEdge 3320 D	1180	1180	OK

Enclosure Component Status:

Type	Unit	Status	FRU P/N	FRU S/N	Add'l Data
Fan	0	OK	371-0108	GK001N	--
Fan	1	OK	371-0108	GK005V	--
PS	0	OK	371-0108	GK001N	--
PS	1	OK	371-0108	GK005V	--
Temp	0	OK	371-0105	09D108	temp=26
Temp	1	OK	371-0105	09D108	temp=26
Temp	2	OK	371-0108	GK001N	temp=25
Temp	3	OK	371-0107	JS00SK	temp=28
Temp	4	OK	371-0107	JS00QL	temp=27
Temp	5	OK	371-0105	09D108	temp=26
Temp	6	OK	371-0108	GK005V	temp=22
EMU	0	OK	371-0107	JS00SK	
EMU	1	OK	371-0107	JS00QL	
DiskSlot	0	OK	371-0105	09D108	addr=0,led=off
DiskSlot	1	OK	371-0105	09D108	addr=1,led=off
DiskSlot	2	OK	371-0105	09D108	addr=2,led=off
DiskSlot	3	OK	371-0105	09D108	addr=3,led=off
DiskSlot	4	OK	371-0105	09D108	addr=4,led=off
DiskSlot	5	OK	371-0105	09D108	addr=5,led=off
DiskSlot	6	OK	371-0105	09D108	addr=8,led=off
DiskSlot	7	OK	371-0105	09D108	addr=9,led=off
DiskSlot	8	OK	371-0105	09D108	addr=10,led=off
DiskSlot	9	OK	371-0105	09D108	addr=11,led=off
DiskSlot	10	OK	371-0105	09D108	addr=12,led=off
DiskSlot	11	OK	371-0105	09D108	addr=13,led=off

Enclosure SCSI Channel Type: single-bus

* SAF-TE

Ch	Id	Chassis	Vendor	Product ID	Rev	Package
0	14	09E0A4	SUN	StorEdge 3320 A	1180	1180
2	15	09D0FE	SUN	StorEdge 3320 D	1180	1180
3	15	09D108	SUN	StorEdge 3320 D	1180	1180

* FRUs

```
Name: PRI RAID CONTROLLER
Description: SE3320 RAID CTLR,w/512 MEM/BAT
Part Number: 370-7714
Serial Number: 300843
Revision: 02
```

Manufacturing Date: Sat Aug 27 09:59:30 2005
Manufacturing Location: Penang, Malaysia
Manufacturer JEDEC ID: 0x0301
FRU Location: PRIMARY CONTROLLER SLOT
Chassis Serial Number: 09E0A4
FRU Status: OK

Name: SEC RAID CONTROLLER
Description: SE3320 RAID CTLR,w/512 MEM/BAT
Part Number: 370-7714
Serial Number: 300671
Revision: 02
Manufacturing Date: Thu Aug 18 22:04:22 2005
Manufacturing Location: Penang, Malaysia
Manufacturer JEDEC ID: 0x0301
FRU Location: SECONDARY CONTROLLER SLOT
Chassis Serial Number: 09E0A4
FRU Status: OK

7 FRUs found in chassis SN#09E0A4 at ch 0 id 14

Name: RAID_CHASSIS_BKPLN
Description: SE3320 CHASSIS, RAID, LVD
Part Number: 371-0106
Serial Number: 09E0A4
Revision: 01
Manufacturing Date: Tue Nov 8 02:37:45 2005
Manufacturing Location: Suzhou,China
Manufacturer JEDEC ID: 0x0301
FRU Location: SCSI RAID MIDPLANE SLOT
Chassis Serial Number: 09E0A4
FRU Status: OK

Name: RAID_IO_BOARD
Description: SE3320 HOST, DRV I/O, RAID
Part Number: 370-7655
Serial Number: JQ003K
Revision: 02
Manufacturing Date: Sun Sep 25 09:56:13 2005
Manufacturing Location: Suzhou,China
Manufacturer JEDEC ID: 0x0301
FRU Location: SCSI RAID IO BOARD SLOT
Chassis Serial Number: 09E0A4
FRU Status: OK

Name: TERMINATOR_BOARD
Description: SE3320 TERMINATOR MOD
Part Number: 371-0110
Serial Number: JR0022
Revision: 01
Manufacturing Date: Tue Dec 28 19:42:21 2004
Manufacturing Location: Suzhou,China
Manufacturer JEDEC ID: 0x0301
FRU Location: SCSI TERMINATOR SLOT
Chassis Serial Number: 09E0A4
FRU Status: OK

Name: AC_POWER_SUPPLY
Description: SE3XXX AC PWR SUPPLY/FAN, 2U
Part Number: 371-0108
Serial Number: GK008E
Revision: 01
Manufacturing Date: Wed Aug 17 05:36:15 2005
Manufacturing Location: Irvine California, USA
Manufacturer JEDEC ID: 0x048F
FRU Location: AC PSU SLOT #0 (LEFT)
Chassis Serial Number: 09E0A4
FRU Status: OK

Name: AC_POWER_SUPPLY
Description: SE3XXX AC PWR SUPPLY/FAN, 2U
Part Number: 371-0108
Serial Number: GK008A
Revision: 01
Manufacturing Date: Wed Aug 17 07:14:39 2005
Manufacturing Location: Irvine California, USA
Manufacturer JEDEC ID: 0x048F
FRU Location: RIGHT AC PSU SLOT #1 (RIGHT)
Chassis Serial Number: 09E0A4
FRU Status: OK

Name: EMU_BOARD
Description: SE3320 EMU, MOD
Part Number: 371-0107
Serial Number: JS00DR
Revision: 01
Manufacturing Date: Fri Oct 28 08:18:58 2005
Manufacturing Location: Suzhou,China
Manufacturer JEDEC ID: 0x0301
FRU Location: EMU BOARD SLOT #0 (LEFT)
Chassis Serial Number: 09E0A4
FRU Status: OK

Name: EMU_BOARD
Description: SE3320 EMU, MOD
Part Number: 371-0107
Serial Number: JS00FA
Revision: 01
Manufacturing Date: Fri Oct 28 11:48:53 2005
Manufacturing Location: Suzhou,China
Manufacturer JEDEC ID: 0x0301
FRU Location: EMU BOARD SLOT #1 (RIGHT)
Chassis Serial Number: 09E0A4
FRU Status: OK

6 FRUs found in chassis SN#09D0FE at ch 2 id 15

Name: JBOD_CHASSIS_BKPLN
Description: SE3320 CHASSIS, JBOD, LVD
Part Number: 371-0105
Serial Number: 09D0FE
Revision: 01

Manufacturing Date: Sat Nov 19 05:39:50 2005
Manufacturing Location: Suzhou,China
Manufacturer JEDEC ID: 0x0301
FRU Location: SCSI JBOD MIDPLANE SLOT
Chassis Serial Number: 09D0FE
FRU Status: OK

Name: JBOD_IO_BOARD
Description: SE3320 HOST, DRV I/O, JBOD
Part Number: 370-7713
Serial Number: JI006Z
Revision: 02
Manufacturing Date: Tue Nov 15 19:55:04 2005
Manufacturing Location: Milpitas,CA,USA
Manufacturer JEDEC ID: 0x0301
FRU Location: SCSI JBOD IO BOARD SLOT
Chassis Serial Number: 09D0FE
FRU Status: OK

Name: AC_POWER_SUPPLY
Description: SE3XXX AC PWR SUPPLY/FAN, 2U
Part Number: 371-0108
Serial Number: GKY02U
Revision: 01
Manufacturing Date: Thu Nov 10 02:04:55 2005
Manufacturing Location: Irvine California, USA
Manufacturer JEDEC ID: 0x048F
FRU Location: AC PSU SLOT #0 (LEFT)
Chassis Serial Number: 09D0FE
FRU Status: OK

Name: AC_POWER_SUPPLY
Description: SE3XXX AC PWR SUPPLY/FAN, 2U
Part Number: 371-0108
Serial Number: GKY02X
Revision: 01
Manufacturing Date: Thu Nov 10 02:06:13 2005
Manufacturing Location: Irvine California, USA
Manufacturer JEDEC ID: 0x048F
FRU Location: RIGHT AC PSU SLOT #1 (RIGHT)
Chassis Serial Number: 09D0FE
FRU Status: OK

Name: EMU_BOARD
Description: SE3320 EMU, MOD
Part Number: 371-0107
Serial Number: JS012L
Revision: 01
Manufacturing Date: Sat Oct 29 07:55:44 2005
Manufacturing Location: Suzhou,China
Manufacturer JEDEC ID: 0x0301
FRU Location: EMU BOARD SLOT #0 (LEFT)
Chassis Serial Number: 09D0FE
FRU Status: OK

Name: EMU_BOARD

Description: SE3320 EMU, MOD
Part Number: 371-0107
Serial Number: JS013J
Revision: 01
Manufacturing Date: Sat Oct 29 07:54:04 2005
Manufacturing Location: Suzhou,China
Manufacturer JEDEC ID: 0x0301
FRU Location: EMU BOARD SLOT #1 (RIGHT)
Chassis Serial Number: 09D0FE
FRU Status: OK

6 FRUs found in chassis SN#09D108 at ch 3 id 15

Name: JBOD_CHASSIS_BKPLN
Description: SE3320 CHASSIS, JBOD, LVD
Part Number: 371-0105
Serial Number: 09D108
Revision: 01
Manufacturing Date: Thu Nov 17 03:48:40 2005
Manufacturing Location: Suzhou,China
Manufacturer JEDEC ID: 0x0301
FRU Location: SCSI JBOD MIDPLANE SLOT
Chassis Serial Number: 09D108
FRU Status: OK

Name: JBOD_IO_BOARD
Description: SE3320 HOST, DRV I/O, JBOD
Part Number: 370-7713
Serial Number: JI004L
Revision: 02
Manufacturing Date: Sat Oct 29 00:58:18 2005
Manufacturing Location: Milpitas,CA,USA
Manufacturer JEDEC ID: 0x0301
FRU Location: SCSI JBOD IO BOARD SLOT
Chassis Serial Number: 09D108
FRU Status: OK

Name: AC_POWER_SUPPLY
Description: SE3XXX AC PWR SUPPLY/FAN, 2U
Part Number: 371-0108
Serial Number: GK001N
Revision: 01
Manufacturing Date: Wed Jul 20 02:35:45 2005
Manufacturing Location: Irvine California, USA
Manufacturer JEDEC ID: 0x048F
FRU Location: AC PSU SLOT #0 (LEFT)
Chassis Serial Number: 09D108
FRU Status: OK

Name: AC_POWER_SUPPLY
Description: SE3XXX AC PWR SUPPLY/FAN, 2U
Part Number: 371-0108
Serial Number: GK005V
Revision: 01
Manufacturing Date: Wed Aug 17 05:06:34 2005
Manufacturing Location: Irvine California, USA

Manufacturer JEDEC ID: 0x048F
FRU Location: RIGHT AC PSU SLOT #1 (RIGHT)
Chassis Serial Number: 09D108
FRU Status: OK

Name: EMU_BOARD
Description: SE3320 EMU, MOD
Part Number: 371-0107
Serial Number: JS00SK
Revision: 01
Manufacturing Date: Sat Oct 29 18:22:27 2005
Manufacturing Location: Suzhou,China
Manufacturer JEDEC ID: 0x0301
FRU Location: EMU BOARD SLOT #0 (LEFT)
Chassis Serial Number: 09D108
FRU Status: OK

Name: EMU_BOARD
Description: SE3320 EMU, MOD
Part Number: 371-0107
Serial Number: JS00QL
Revision: 01
Manufacturing Date: Sat Oct 29 15:44:45 2005
Manufacturing Location: Suzhou,China
Manufacturer JEDEC ID: 0x0301
FRU Location: EMU BOARD SLOT #1 (RIGHT)
Chassis Serial Number: 09D108
FRU Status: OK

* access-mode

access-mode: out-of-band

* controller-date

Boot time : Fri Feb 17 00:28:29 2006
Current time : Fri Feb 17 00:39:06 2006
Time Zone : GMT

* disk-array

init-verify: disabled
rebuild-verify: disabled
normal-verify: disabled
rebuild-priority: low

LUN discovery via Solaris

The script `config-spc2-3320.sh` is used on the host to discover and configure the LUNs in Solaris. It also creates a file named "disks" which is a text file containing a list of logical devices used in all the workload parameter files.

The `config-spc2-3320.sh` script is listed below.

config-spc2-3320.sh

```
#!/bin/ksh
#
# Label all new drives
#
clear
echo " "
echo " "
echo "Removing old Disk links and Meta devices"
echo " "
echo " "
sleep 2
metaclear dl d2 d3

# Probe server and remove all old device links
devfsadm -C
echo " "
echo " "
echo " Configuring new disks"
echo " "
echo " Configuring `ls /dev/rdisk/c5*d*s2 | wc -l ` disks"
sleep 5
echo " "
ls /dev/rdisk/c5*d*s2 > disks
echo " "
echo " Starting to Label all new disks"
sleep 5
cat disks | sed 's/s2\@/s2/g' > disk1
# disk1 contains the list of devices used in spc2
rm disks

C_disks=disk1
#
for f in `cat $C_disks`
do
format $f << EOFF
ty
0
y
label
y
quit
EOFF
done
clear
####
```

APPENDIX D: SPC-2 WORKLOAD GENERATOR STORAGE COMMANDS AND PARAMETERS

Large File Processing Test ("*spc2-lfp-SH.txt*")

* Large File Processing Test (LFP)

```
host=localhost,jvms=1,maxstreams=100
sd=default,host=localhost,size=175g
sd=sd1,lun=/dev/rdsk/c5t0d0s2
sd=sd2,lun=/dev/rdsk/c5t1d0s2
sd=sd3,lun=/dev/rdsk/c5t0d1s2
sd=sd4,lun=/dev/rdsk/c5t1d1s2
sd=sd5,lun=/dev/rdsk/c5t0d2s2
sd=sd6,lun=/dev/rdsk/c5t1d2s2
```

```
maxlatestart=1
reportinginterval=5
segmentlength=512m
```

```
rd=default,rampup=180,periods=90,measurement=180,runout=45,rampdown=15,buffers=1
```

* LFP, "write" Test Phase

* Test Run Sequence 1

```
rd=default,rdpct=0,xfersize=1024k
rd=TR1-s12_SPC-2-FP,streams=28
rd=TR2-s6_SPC-2-FP,streams=14
rd=TR3-s3_SPC-2-FP,streams=7
rd=TR4-s2_SPC-2-FP,streams=4
rd=TR5-s1_SPC-2-FP,streams=1
```

* Test Run Sequence 2

```
rd=default,xfersize=256k
rd=TR6-s12_SPC-2-FP,streams=22
rd=TR7-s6_SPC-2-FP,streams=11
rd=TR8-s3_SPC-2-FP,streams=6
rd=TR9-s2_SPC-2-FP,streams=3
rd=TR10-s1_SPC-2-FP,streams=1
```

* LFP, "read-write" Test Phase

* Test Run Sequence 3

```
rd=default,rdpct=50,xfersize=1024k
rd=TR11-s12_SPC-2-FP,streams=16
rd=TR12-s6_SPC-2-FP,streams=8
rd=TR13-s3_SPC-2-FP,streams=4
rd=TR14-s2_SPC-2-FP,streams=2
rd=TR15-s1_SPC-2-FP,streams=1
```

* Test Run Sequence 4

```
rd=default,xfersize=256k
rd=TR16-s12_SPC-2-FP,streams=16
rd=TR17-s6_SPC-2-FP,streams=8
rd=TR18-s3_SPC-2-FP,streams=4
rd=TR19-s2_SPC-2-FP,streams=2
rd=TR20-s1_SPC-2-FP,streams=1
```

* LFP, "read" Test Phase

```
* Test Run Sequence 5
rd=default,rdpct=100,xfersize=1024k
rd=TR21-s12_SPC-2-FP,streams=20
rd=TR22-s6_SPC-2-FP,streams=10
rd=TR23-s3_SPC-2-FP,streams=5
rd=TR24-s2_SPC-2-FP,streams=3
rd=TR25-s1_SPC-2-FP,streams=1

* Test Run Sequence 6
rd=default,xfersize=256k
rd=TR26-s12_SPC-2-FP,streams=14
rd=TR27-s6_SPC-2-FP,streams=7
rd=TR28-s3_SPC-2-FP,streams=4
rd=TR29-s2_SPC-2-FP,streams=2
rd=TR30-s1_SPC-2-FP,streams=1
```

Large Database Query Test (“*spc2-ldq-SH.txt*”)

```
* Large Database Query Test (LDQ)

host=localhost,jvms=2,maxstreams=100

sd=default,host=localhost,size=175g
sd=sd1,lun=/dev/rdisk/c5t0d0s2
sd=sd2,lun=/dev/rdisk/c5t1d0s2
sd=sd3,lun=/dev/rdisk/c5t0d1s2
sd=sd4,lun=/dev/rdisk/c5t1d1s2
sd=sd5,lun=/dev/rdisk/c5t0d2s2
sd=sd6,lun=/dev/rdisk/c5t1d2s2

maxlatestart=0
reportinginterval=5
segmentlength=512m

rd=default,rdpct=99,rampup=180,periods=90,measurement=180,runout=45,rampdown=15

* LDQ, 1024 KiB Test Phase

* Test Run Sequence 1
rd=default,xfersize=1024k,buffers=4
rd=TR1-s12_SPC-2-DQ,streams=12
rd=TR2-s6_SPC-2-DQ,streams=6
rd=TR3-s3_SPC-2-DQ,streams=3
rd=TR4-s2_SPC-2-DQ,streams=2
rd=TR5-s1_SPC-2-DQ,streams=1

* Test Run Sequence 2
rd=default,buffers=1
rd=TR6-s12_SPC-2-DQ,streams=12
rd=TR7-s6_SPC-2-DQ,streams=6
rd=TR8-s3_SPC-2-DQ,streams=3
rd=TR9-s2_SPC-2-DQ,streams=2
rd=TR10-s1_SPC-2-DQ,streams=1

* LDQ, 64 KiB Test Phase

* Test Run Sequence 3
rd=default,xfersize=64k,buffers=4
rd=TR11-s12_SPC-2-DQ,streams=14
```

```
rd=TR12-s6_SPC-2-DQ,streams=7
rd=TR13-s3_SPC-2-DQ,streams=4
rd=TR14-s2_SPC-2-DQ,streams=2
rd=TR15-s1_SPC-2-DQ,streams=1

* Test Run Sequence 4
rd=default,buffers=1
rd=TR16-s12_SPC-2-DQ,streams=12
rd=TR17-s6_SPC-2-DQ,streams=6
rd=TR18-s3_SPC-2-DQ,streams=3
rd=TR19-s2_SPC-2-DQ,streams=2
rd=TR20-s1_SPC-2-DQ,streams=1
```

Video on Demand Delivery Test ("*spc2-vod-SH.txt*")

```
* Video on Demand Test (VOD)

host=localhost,jvms=2,maxstreams=550
sd=default,host=localhost,size=175g
sd=sd1,lun=/dev/rdisk/c5t0d0s2
sd=sd2,lun=/dev/rdisk/c5t1d0s2
sd=sd3,lun=/dev/rdisk/c5t0d1s2
sd=sd4,lun=/dev/rdisk/c5t1d1s2
sd=sd5,lun=/dev/rdisk/c5t0d2s2
sd=sd6,lun=/dev/rdisk/c5t1d2s2

maxlatestart=0
videosegmentduration=1200
maxlatevod=0
reportinginterval=5

rd=default,rampup=1200,periods=600,measurement=7200,runout=45,rampdown=15,buffers=8
#rd=default,rampup=300,periods=150,measurement=720,runout=45,rampdown=15,buffers=8

rd=TR1-s315_SPC-2-VOD,streams=315
```

Persistence Test Run 1 ("*spc2-persist1-SH.txt*")

```
* Persist 1

host=localhost,jvms=1,maxstreams=500
sd=default,host=localhost,size=175g
sd=sd1,lun=/dev/rdisk/c5t0d0s2
sd=sd2,lun=/dev/rdisk/c5t1d0s2
sd=sd3,lun=/dev/rdisk/c5t0d1s2
sd=sd4,lun=/dev/rdisk/c5t1d1s2
sd=sd5,lun=/dev/rdisk/c5t0d2s2
sd=sd6,lun=/dev/rdisk/c5t1d2s2

maxlatestart=1
reportinginterval=5
segmentlength=512m

rd=default,rampup=180,periods=90,measurement=300,runout=0,rampdown=0,buffers=1

rd=default,rdpct=0,xfersize=1024k
rd=TR1-30s_SPC-2-persist-w,streams=30
```

Persistence Test Run 2 (“”)

* Persistence Test Run 2

```
host=localhost,jvms=2,maxstreams=100
sd=default,host=localhost,size=175g
sd=sd1,lun=/dev/rdsk/c5t0d0s2
sd=sd2,lun=/dev/rdsk/c5t1d0s2
sd=sd3,lun=/dev/rdsk/c5t0d1s2
sd=sd4,lun=/dev/rdsk/c5t1d1s2
sd=sd5,lun=/dev/rdsk/c5t0d2s2
sd=sd6,lun=/dev/rdsk/c5t1d2s2

maxlatestart=1
reportinginterval=5
segmentlength=512m

maxpersistenceerrors=10
*corruptstreams=3

rd=default,buffers=1,rdpct=100,xfersize=1024k
rd=TR1-30s_SPC-2-persist-r
```

APPENDIX E: SPC-2 WORKLOAD GENERATOR EXECUTION COMMANDS AND PARAMETERS

The following script, `runSPC2-3320.sh`, was used to execute the Large File Processing and Large Database Query Tests, as well as, Persistence Test Run 1.

runSPC2-3320.sh

```
#!/usr/bin/ksh
#
script=runSPC2-3320.sh
#
output=Audit
basedir=/spc/output/spc2/3320-3T-6LD-1P/v40e
outdir=$basedir/$output
config=/spc/config/spc2/3320/v40e
#
mkdir -p $outdir
cp $script $outdir
#
mailx -s Started-$script theman@sun.com,leah.schoeb@sun.com,
AuditService@storageperformance.org < $script
#
java vdbench -f $config/spc2-lfp-SH.txt -o $outdir/lfp-SH/
sleep 5
cp $config/spc2-lfp-SH.txt $outdir
sleep 5
#
java vdbench -f $config/spc2-ldq-SH.txt -o $outdir/ldq-SH/
sleep 5
cp $config/spc2-ldq-SH.txt $outdir
sleep 5
#
java vdbench -f $config/spc2-vod-SH.txt -o $outdir/vod-SH/
sleep 5
cp $config/spc2-vod-SH.txt $outdir
sleep 5
#
java vdbench -f $config/spc2-persist1-SH.txt -o $outdir/persist1/
sleep 5
cp $config/spc2-persist1-SH.txt $outdir
sleep 5
mailx -s Finished-$script theman@sun.com,leah.schoeb@sun.com,
AuditService@storageperformance.org < $outdir/persist1/summary.html
#
#java vdbench -f $config/spc2-persist2-SH.txt -o $outdir/persist2/
#sleep 5
#cp $config/spc2-persist2-SH.txt $outdir
#sleep 5
#
cd $basedir ; /usr/bin/zip -r $output.zip $output
touch $basedir/link ; echo " " >> $basedir/link
echo "      Use the link below to download the zipped file" >> $basedir/link
echo " " >> $basedir/link
echo http://sbm-220a.central.sun.com/export/$basedir/$output.zip >> $basedir/link
mailx -s $script-is-finished theman@sun.com,leah.schoeb@sun.com < $basedir/link
rm $basedir/link
```


The following script, **runSPC2-3320.sh-P2R**, was used to execute Persistence Test Run 2.

runSPC2-3320.sh-P2R

```
#!/usr/bin/ksh
#
script=runSPC2-3320.sh
#
output=Audit
basedir=/spc/output/spc2/3320-3T-6LD-1P/v40e
outdir=$basedir/$output
config=/spc/config/spc2/3320/v40e
#
#mkdir -p $outdir
cp $script $outdir/$script-P2R
#
#mailx -s Started-$script theman@sun.com,leah.schoeb@sun.com,
AuditService@storageperformance.org < $script
#
#java vdbench -f $config/spc2-lfp-SH.txt -o $outdir/lfp-SH/
#sleep 5
#cp $config/spc2-lfp-SH.txt $outdir
#sleep 5
#
#java vdbench -f $config/spc2-ldq-SH.txt -o $outdir/ldq-SH/
#sleep 5
#cp $config/spc2-ldq-SH.txt $outdir
#sleep 5
#
#java vdbench -f $config/spc2-vod-SH.txt -o $outdir/vod-SH/
#sleep 5
#cp $config/spc2-vod-SH.txt $outdir
#sleep 5
#
#java vdbench -f $config/spc2-persist1-SH.txt -o $outdir/persist1/
#sleep 5
#cp $config/spc2-persist1-SH.txt $outdir
#sleep 5
#mailx -s Finished-$script theman@sun.com,leah.schoeb@sun.com,
AuditService@storageperformance.org < $outdir/persist1/summary.html
#
mailx -s Start-Persist2-spc2-se3320 theman@sun.com,leah.schoeb@sun.com,
AuditService@storageperformance.org < $outdir/persist2/summary.html
java vdbench -f $config/spc2-persist2-SH.txt -o $outdir/persist2/
sleep 5
cp $config/spc2-persist2-SH.txt $outdir
sleep 5
mailx -s Finished-Persist2-spc2-se3320 theman@sun.com,leah.schoeb@sun.com,
AuditService@storageperformance.org < $outdir/persist2/summary.html
#
#cd $basedir ; /usr/bin/zip -r $output.zip $output
#touch $basedir/link ; echo " " >> $basedir/link
#echo " Use the link below to download the zipped file" >> $basedir/link
#echo " " >> $basedir/link
#echo http://sbm-220a.central.sun.com/export/$basedir/$output.zip >> $basedir/link
#mailx -s $script-is-finished theman@sun.com,leah.schoeb@sun.com < $basedir/link
rm $basedir/link
```