SPC BENCHMARK 1™
EXECUTIVE SUMMARY

IBM CORPORATION
IBM ENTERPRISE STORAGE SERVER F20

SPC-1 V1.4

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Test Sponsor and Contact Information	
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Revision Information and Key Dates	
SPC-1 Specification revision number	V1.4
SPC-1 Workload Generator revision number	V1.0
Date Results were first used publicly	May 1, 2002
Date FDR was submitted to the SPC	May 20, 2002
Date the TSC is/was available for shipment to customers	May 15, 2002
Date the TSC completed audit certification	May 1, 2002

SPC-1 Results	
TSC Configuration Name: IBM Enterprise Storage Server F20	
Metric	**Reported Result**
SPC-1 IOPS™	8,009.44
SPC-1 Price-Performance	$44.58/SPC-1 IOPS™
Total ASU Capacity	1,201.49 GB
Data Protection Level	RAID5
SPC-1 LRT™	2.99 ms
Price	$357,100.00

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

Total ASU (Application Storage Unit) **Capacity** represents the total storage capacity read and written in the course of executing the SPC-1 benchmark.

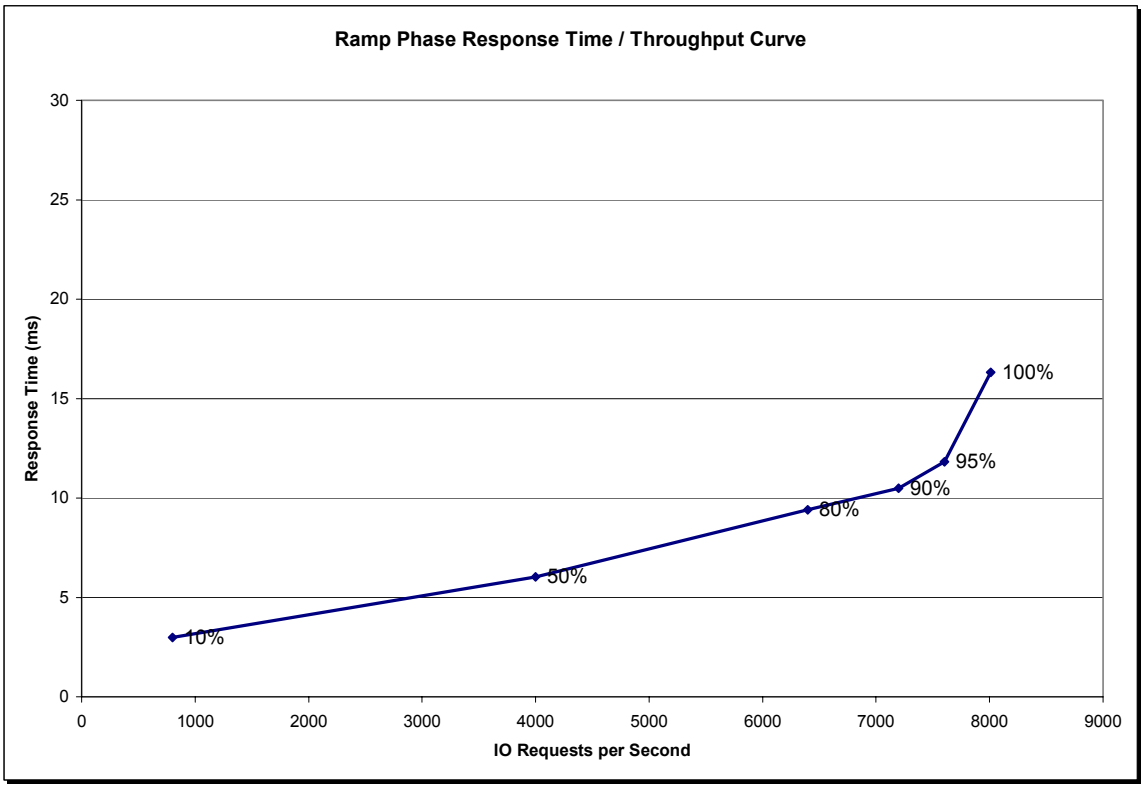
A **Data Protection Level** of RAID5 has user data distributed across disks in an array. Check data corresponding to user data is distributed across multiple disks in the form of bit-by-bit parity.

The **SPC-1 LRT™** metric is the Average Response Time measured at the 10% load point, as illustrated on the next page. SPC-1 LRT™ represents the Average Response Time measured on a lightly loaded Tested Storage Configuration (TSC).

Response Time – Throughput

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

The Average Response Time measured at the 100% load point cannot exceed 30 milliseconds or the benchmark measurement is invalid.



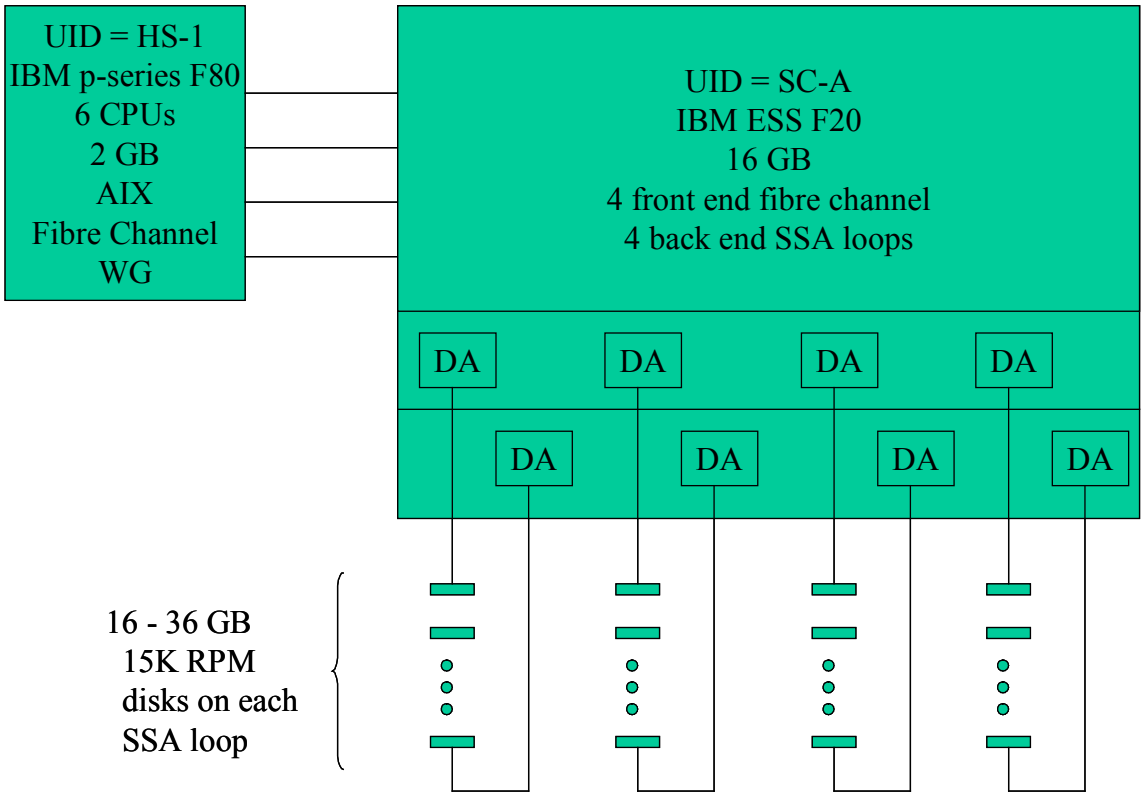
Response Time – Throughput Data

	10% Load	50% Load	80% Load	90% Load	95% Load	100% Load
I/O Request Throughput	799.30	3999.84	6399.11	7198.20	7604.09	8009.44
Average Response Time (ms):						
All ASUs	2.99	6.03	9.40	10.49	11.83	16.33
ASU-1	3.87	7.98	12.01	13.36	14.29	15.66
ASU-2	2.68	5.37	8.57	9.57	10.33	11.71
ASU-3	1.29	2.19	4.26	4.81	7.27	19.73
Reads	6.00	12.51	18.63	20.55	21.42	21.78
Writes	1.04	1.81	3.40	3.94	14.29	12.77

Tested Storage Configuration Pricing

Product Number	Description	Qty	List Price	Field Delegation Price	Monthly Maintenance
2105-F20	ENTERPRISE STORAGE SERVER	1	$208,000	$91,520	$913
2123	DISK EIGHT PACK 36.4 GB	8	330,400	145,376	816
3023	FIBRE CHAN/FICON SHORT WV.ADAP	1	32,000	14,080	N/C
4004	16 GB Cache	1	80,000	35,200	N/C
9008	DISK EIGHT-PACK COUNT = 8	1	N/C	N/C	N/C
9082	1.051-2.170 TB CAPACITY	2	N/C	N/C	N/C
9101	DISK EIGHT-PACK MOUNTING KIT	1	N/C	N/C	N/C
9152	MOUNTING KIT COUNT = 2	1	N/C	N/C	N/C
9301	MODEM COUNTRY GROUP M01	1	N/C	N/C	N/C
9401	CONVENIENCE CORD C01	1	N/C	N/C	N/C
9600	FLEXIBLE CAPACITY OPTION	2	N/C	N/C	N/C
9760	50 MICRON FIBRE CAB SC CON	1	N/C	N/C	N/C
9854	THREE PHASE 50/60 HZ 60 AMP	1	N/C	N/C	N/C
9870	NOMINAL AC VOLTAGE 200V-240V	1	N/C	N/C	N/C
6228	Emulex 9000 Adapter for p-series F80	4	12,400	8,680	N/C
Totals				294,856	1,729
Total Cost including three-year maintenance - $357.100 (294,856 + (1,729 * 36))					

Benchmark Configuration



Host System:	**Storage System:**
IBM M p-series F80	IBM Enterprise Storage Server F20
UID=F80 7025-6F1	UID=SC-A
6 RS64 III 668 MHz CPUs	16 GB Cache
128 KB L1 Cache, 8 MB L2 Cache	4 Front-end fibre channel
2 GB RAM	4 Back-end SSA loops
AIX 4.3.3	8 Disk Eight-Packs
4 Emulex 9000 Adapter for p-series F80	64 x 36 GB 15,000 RPM disk