SPC Benchmark 1™
Executive Summary

IBM Corporation
IBM TotalStorage Enterprise Storage Server Model 800

SPC-1 V1.6

Submitted for Review: December 7, 2002
Accepted: February 5, 2003
Executive Summary

Test Sponsor and Contact Information

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Revision Information and Key Dates

<table>
<thead>
<tr>
<th>Revision Information and Key Dates</th>
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</thead>
</table>
| SPC-1 Specification revision number | V1.6  
| SPC-1 Workload Generator revision number | V1.1  
| Date Results were first used publicly | December 7, 2002  
| Date FDR was submitted to the SPC | December 7, 2002  
| Date the TSC Is/ was available for shipment to customers | November 22, 2002  
| Date the TSC completed audit certification | December 7, 2002  

SPC BENCHMARK 1™ V1.6  
IBM Corporation  
IBM TotalStorage Enterprise Storage Server Model 800
## Summary of Results

<table>
<thead>
<tr>
<th>SPC-1 Results</th>
<th>Reported Result</th>
</tr>
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<tbody>
<tr>
<td><strong>Tested Storage Configuration (TSC) Name:</strong> IBM TotalStorage Enterprise Storage Server Model 800</td>
<td></td>
</tr>
<tr>
<td><strong>Metric</strong></td>
<td><strong>Reported Result</strong></td>
</tr>
<tr>
<td>SPC-1 IOPS™</td>
<td>22,999.27</td>
</tr>
<tr>
<td>SPC-1 Price-Performance</td>
<td>$34.88/SPC-1 IOPS™</td>
</tr>
<tr>
<td>Total ASU Capacity</td>
<td>3,206.66 GB</td>
</tr>
<tr>
<td>Data Protection Level</td>
<td>RAID5</td>
</tr>
<tr>
<td>SPC-1 LRT™</td>
<td>2.53ms</td>
</tr>
<tr>
<td>Total TSC Price (including three-year maintenance)</td>
<td>$802,116</td>
</tr>
</tbody>
</table>

**SPC-1 IOPS™** represents the maximum I/O Request Throughput at the 100% load point. The SPC-1 IOP™ metric reported was achieved while also ensuring full data integrity of all data written to cache, through the use of non-volatile storage to record a redundant copy of the written data.

**Total ASU (Application Storage Unit) Capacity** represents the total storage capacity read and written in the course of executing the SPC-1 benchmark. The actual Configured Storage Capacity was 4,211.2 GB, which included the parity required by a Data Protection Level of RAID5. The Configured Storage Capacity utilized 89.40% of the priced Physical Storage Capacity of 4,710.4 GB.

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 Curve

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

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

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Description</th>
<th>Unit List Price</th>
<th>Quantity</th>
<th>Quantity List Price</th>
<th>Quantity Field Delegation Price</th>
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<tbody>
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<td>ENTERPRISE STORAGE SERVER</td>
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<td>2110</td>
<td>EXPANSION RACK</td>
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<td>128,000.00</td>
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<td>3606</td>
<td>TURBO PROCESSOR</td>
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<td>208,000.00</td>
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<tr>
<td>2717</td>
<td>ESS MASTER CONSOLE</td>
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<td>5,000.00</td>
<td>2,100.00</td>
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<td>4014</td>
<td>16 GB CACHE</td>
<td>80,000.00</td>
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<td>80,000.00</td>
<td>33,600.00</td>
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<td>6228</td>
<td>EMULEX 9000 Adapter for p-series 7040</td>
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</tbody>
</table>

Tested Storage Configuration (TSC) Cost 802,116.00

The above pricing includes 3 year, 24x7 maintenance
Benchmark Configuration/Tested Storage Configuration Diagram

Host System: | Storage System: |
---|---|
IBM p-series 690 7040 | IBM TotalStorage ESS 800 |
UID=HS-1 | UID=SC-A |
24 1.30GHz POWER4 CPUs | 16 GB Cache |
2 CPUs per chip | 8 front-end fibre channels |
-1.5 MB L2 cache/chip | 8 - back-end SSA loops |
32 MB L3 cache/chip | 256 - 18.4 GB 15K RPM disks |
64 GB Main Memory | Fibre Channel |
AIX 5.1 | |