

TPC Benchmark E for IBM[®] System x[™] 3950 M2

Featuring Emulex[®] LightPulse[®] LPe12000 Fibre Channel HBA,
Microsoft[®] Windows[®] Server 2008 and Microsoft SQL Server[®] 2008

AT A GLANCE

Next generation Storage Area Networks (SAN) are taking advantage of new software and hardware products that improve overall server and storage performance. IT professionals deploying a new SAN or upgrading an existing one will find TPC data very useful for their evaluation, planning and purchasing processes. With the industry's largest compilation of computer performance information, TPC benchmarks can help IT professionals shorten evaluation cycles and support purchasing decisions.

This White Paper provides details on the recently completed TPC Benchmark E featuring IBM System x server platform, configured with Emulex LightPulse LPe12000 single-port Fibre Channel HBAs, running Microsoft Windows Server 2008 and SQL Server 2008.

PRODUCTS

Hardware

- Server Platform: IBM System x platform configured with 3950 M2 servers
- Fibre Channel HBAs: Emulex LightPulse LPe12000 (Emulex 8Gb FC single-port HBA for System x)

Software

- Operating System: Microsoft Windows Server 2008
- Database Application: Microsoft SQL Server 2008

IT professionals can leverage Transaction Processing Performance Council (TPC) benchmark results when planning for a new SAN deployment or an upgrade to an existing SAN. The published TPC benchmarks provide detailed compatibility and performance information that are accepted throughout the industry. They provide objective data to IT professionals helping to plan, support and justify IT purchasing decisions.

The TPC creates numerous benchmarking tests which are used to calibrate the performance of the latest software and hardware components available to IT professionals. The TPC Benchmark E (TPC-E) is composed of a set of transactional operations designed to exercise system functionalities in a manner representative of complex On-Line Transaction Processing (OLTP) application environments, such as those found at a brokerage firm.

A detailed TPC-E benchmark was completed by IBM in 2008, resulting in 804 transactions completed per second (referred to as "tpsE"). This White Paper describes the 2008 TPC-E benchmark of the IBM System x3950 test configuration, its hardware and software enhancements, the results, and explores the decisions to upgrade. Detailed benchmark information is available at www.tpc.org.

Test Configuration and Results

In 2008, IBM sponsored a TPC-E Benchmark that simulated a brokerage firm's business operations with simultaneous transaction executions to process a trade. While the benchmark test focuses on the central database that executes transactions related to the firm's customer accounts, the test design (i.e. database schema, data population, transactions, and implementation rules) is representative of typical Fortune 100 OLTP systems.

The 2008 TPC transactions per second E (tpsE) score was 804. The benchmark consisted of the hardware and software components detailed in Table 1 and Table 2.

Table 1—System Information

TPC-E Throughput	804
Database Manager	Microsoft SQL Server 2008 x64 Enterprise
Operating System	Microsoft Windows Server 2008 Enterprise x64
Fibre Channel HBAs	Emulex LightPulse LPe12000 (Emulex 8Gb/s Fibre Channel HBA for System x)
Initial Database Size	3,171 (GB)
Memory Size	256 (GB)
Spindle Count	155

Table 2—Server Information

CPU Type	Intel® Xeon® Quad-Core X7350 2.93GHz
Total Number of Processors	8
Total Number of Cores	32
Total Number of Threads	32

The high tpsE value of 804 can be attributed to the increased collaboration between software and hardware vendors which yield better interoperability and better system level performance. For example, the Emulex LightPulse LPe12000 Fibre Channel HBAs for System x provides support for the Message-Signaled Interrupts (MSI) and MSI-X (MSI eXtended) standards, a Windows Server 2008 feature. MSI and MSI-X are interrupt handling mechanisms, which enable improved application performance, reduce host CPU utilization and allow greater I/O scalability by allocating each Fibre Channel HBA with its own set of interrupts. The LPe12000 is also designed to deliver excellent performance across a wide range of application environments with varying server workloads. High transaction applications, such as Microsoft SQL Server 2008, also benefit from enhanced overall system performance by leveraging the LPe12000's greater data throughput capabilities.

Upgrade Criteria

The decision to integrate new technologies and products into existing SANs or into new SAN deployments is more a question of “when” than “if”. There may always be some level of hesitation when considering upgrades to a SAN's hardware and software components; however, it is important to consider the benefits that can be gained in the form of new functionalities and better system level performance. For example, by integrating Emulex LightPulse LPe12000 Fibre Channel HBAs for System x, the maximum throughput of the SAN is doubled and by upgrading to Microsoft Windows Server 2008, IT administrators will be able to leverage its Hyper-V feature which helps to reduce costs, increase hardware utilization, optimize infrastructure, and improve server availability. These features alone could be the reason to upgrade.

The 2008 TPC Benchmark E shows that high throughput can be attained with newly available, higher performance, more efficient SAN elements. If your data and business requirements are quickly outstripping the performance of your SAN, an upgrade path should be explored. New SAN deployments should also consider the latest technology available. Questions to consider are:

- ▶ How fast are your data and/or throughput requirements growing?
- ▶ Are your business processes stable or growing?
- ▶ What is your budget for upgrading/deploying your SAN?
- ▶ What areas should or can be upgraded first?

Your responses to these and other pertinent questions will determine upgrade and deployment decisions.

Summary

When new SAN elements become available, it is often difficult to immediately assess their benefits for a given business environment. The TPC tries to help make upgrade decisions easier through their many benchmark tests. Next generation hardware and software, such as Emulex's LPe12000 Fibre Channel HBAs and Microsoft's Windows Server 2008 and SQL Server 2008, can indeed make a difference in the overall performance of a SAN.

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09-195 · 9/08