



IBM, Intel Post Top Results for SAP Transaction Banking

IBM System x with Intel Xeon E7 Processors and IBM DB2 Deliver Record Results for Day and Night Processing in the SAP TRBK Benchmark

New, record-setting performance by IBM systems running IBM® DB2® on the Intel® Xeon® processor E7 product family is good news for banks and other businesses striving to meet the needs of today's busy, demanding, and tech-savvy customers.

With millions of people depending on automated teller machine (ATM) networks to meet their banking needs, financial institutions face three key challenges. First, their supporting systems must be continuously available—customers expect convenient banking services to be there when they need them, and any withdrawal or deposit a customer makes must be quickly reflected in the central database. Second, as a bank grows the database must scale to accommodate thousands or even millions of new customers. Third, the system must deliver responsive performance that keeps customers coming back.

Simultaneously meeting all three requirements can be a daunting challenge. But recent tests prove that enterprises using the SAP Banking Services* application with IBM DB2 database technology can rest easy, secure in the knowledge that they can more than satisfy customer needs. The test results were made possible by a combination of IBM DB2 pureScale® clustering capabilities, IBM System x® servers, and the Intel Xeon processor E7-2870. Together, IBM and Intel achieved:

- 56,518,000 postings to bank accounts per hour for SAP Transaction Banking (TRBK) day processing
- 22,382,000 balanced accounts per hour for SAP TRBK night processing

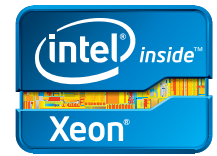
Testing Real-World Business Scenarios

SAP TRBK is a particularly useful benchmark because of the realistic way it reflects how banks use the SAP Banking Services application in their day-to-day operations. The first part of the benchmark, the day processing scenario, focuses on the posting of transactions—for example, the continuous flow of ATM transactions—that generally occurs during the daytime. The night processing scenario reflects the balancing of accounts that generally occurs overnight in batch mode.

The test was based on 90 million accounts, an amount equivalent to the number of accounts representative of a large international bank. For day processing, the number of postings to bank accounts per hour was 56,518,000 at 89 percent CPU utilization for the database servers. For night processing, the number of balanced accounts per hour was 22,382,000 at 36 percent CPU utilization for the database servers.¹

Delivering a First-Ever Clustered Benchmark Result

This is the first time that the SAP TRBK benchmark has been published using a cluster of database servers. DB2 offers application cluster transparency through its DB2 pureScale feature, providing continuous availability and extreme capacity that can scale up as the enterprise grows. With this feature, if one server fails, the users connected to that server are automatically moved to the remaining machines. By offering seamless recovery, DB2 mitigates risk and



As seen in IBM Data Management magazine



Teaming Up Technologies for Optimum Performance

DB2 pureScale on the 2-processor IBM System x3690 X5 system leverages the business benefits of IBM xArchitecture® and the latest Intel Xeon processor technology. Together, they provide an open and cost-effective environment that can easily scale to help meet changing workload demands. For example, IBM MAX5 technology allows businesses to double the memory capacity of the System x3690 X5 system to 64 DIMM slots.

The combination of System x3690 X5 servers and Intel Xeon E7 processors is also designed to better handle database transaction performance and memory demands than other 2-processor servers:²

- IBM System x3690 X5 servers and Intel Xeon E7-2870 processors work together to deliver the performance and memory capacity of previous 4-processor, 4U servers in a 2-processor, 2U system.
- The Intel Xeon E7 processors are available in 6-core, 8-core, and 10-core processor options—the SAP TRBK benchmark test configuration used 10-core processors, for a total of 20 cores and 40 threads per server.

The synergy doesn't stop there. IBM DB2 is an excellent fit for SAP Banking Services and other SAP software as DB2 is uniquely optimized for SAP applications. DB2 helps organizations lower the overall cost for SAP environments and can improve overall performance. In fact, SAP has standardized on DB2 for many of its own major business systems.³

delivers the transactional uptime banks and their customers expect.

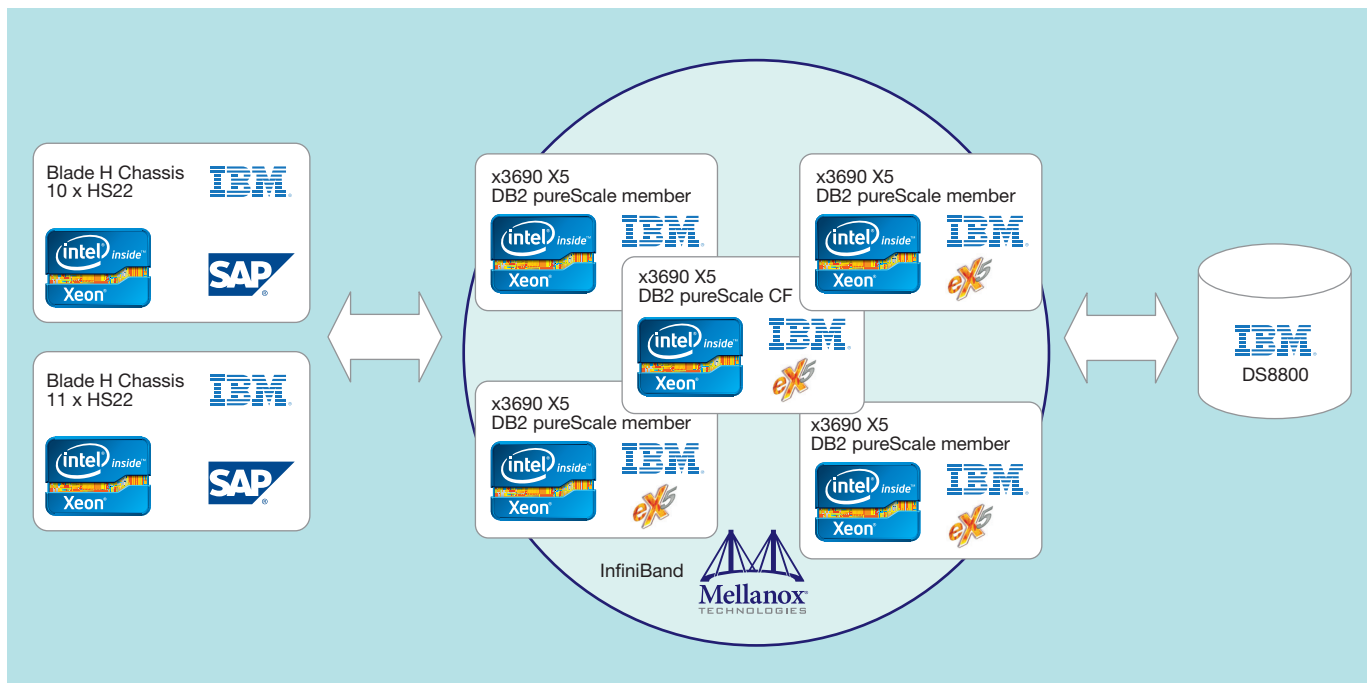
While some distributed, shared-disk database clusters can take minutes to resume processing after host failure, DB2 is designed to simply continue operating. Centralized locking and cache management features allow the remaining hosts in the cluster to access critical information promptly if one server fails. During planned outages, administrators can perform rolling maintenance on individual servers without affecting the overall availability of the cluster.

As an organization grows and new servers are added, some database clustering technologies also require code changes, database realignment, and recertification.

This can cause weeks of coordination efforts across the enterprise and inevitably drains the infrastructure of resources that can be better used elsewhere. However, DB2 provides transparent application scaling that eliminates this problem.

At the same time, DB2 helps businesses meet today's cost-cutting demands. The system can detect and recover from failures automatically, without manual intervention. When a company needs more servers, scaling out is as simple as sliding another member into the cluster while the entire database continues to operate. There is no downtime required for database tuning—reducing administrative requirements and freeing administrators to focus on value-added tasks.

As seen in IBM Data Management magazine



Configuring a Winning Combination of IBM Servers and Intel Processors

The first-place SAP TRBK benchmark results were obtained with a powerful combination of IBM servers and Intel processors (see Figure 1). Five System x3690 X5 database servers were used, each containing two Intel Xeon E7-2870 processors at 2.40 GHz with 30 MB shared L3 cache per processor and 256 GB of memory. Each server was also configured with IBM DB2 Enterprise Server Edition, V9.7, with the DB2 pureScale feature, SUSE Linux* Enterprise Server 11 SP1, and the SAP TRBK Release Deposits Management 4.0 application.

The servers accessed the DB2 database on storage managed by an IBM System Storage® DS8800 disk system, the most advanced model in the IBM DS8000 lineup. This fourth-generation system includes 2.5-inch, 6 gigabits per second (Gb/s) SAS drives and 8 Gb/s host adapters and RAID adapters, which enable higher performance throughput over prior DS8000 models. The new RAID

adapters also allow faster movement of data across storage tiers.

In addition, 21 IBM BladeCenter® HS22 application servers were used to support users running transactions against the database through SAP NetWeaver* 7.11 SP4 running SAP Banking Services 7.0. Each contained two Intel Xeon X5570 processors at 2.93 GHz with 8 MB shared L3 cache per processor and 48 GB of memory.

Keeping Up with Today's Business Demands

Today, response times for banking transactions are measured in seconds. To remain competitive in such an environment, enterprises need a continuously available, scalable, and high-performance infrastructure that can accommodate not only growth over time, but also peaks in activity and demand. With its ease and transparency of system and application scaling, the clustering technology of IBM DB2 is designed for these environments. DB2 provides the scale-out capabilities

Figure 1: DB2 pureScale SAP TRBK benchmark configuration.

Moving at the Speed of Business

One of the key elements of a DB2 server cluster is the high-speed fabric interconnect between the DB2 members and the central DB2 pureScale component, the DB2 Cluster Caching Facility (CF). The fabric of choice for the SAP TRBK benchmark was Mellanox QDR InfiniBand*.

Mellanox connectivity solutions enable DB2 pureScale to run at the highest performance and efficiency and achieve extreme scalability as demand grows. Mellanox InfiniBand and Ethernet products with remote direct memory access (RDMA) over Converged Ethernet (RoCE) capabilities are designed to deliver high-fabric bandwidth with low end-to-end latency while minimizing CPU utilization.

These capabilities help ensure optimal DB2 pureScale performance with:

- Up to 40 Gb/s fabric speed to support servers and storage connectivity in any configuration.
- As low as 1 µsec application latency leveraging the most efficient RDMA between servers and storage. Mellanox RDMA solutions maximize server utilization by fully offloading communication processing from the server CPU and operating system.
- Lossless transmission, ensuring that no packets are dropped, avoiding retransmissions of data and reducing unnecessary overhead.

Mellanox also provides virtual protocol interconnect (VPI) technology, which delivers both InfiniBand and Ethernet connectivity from the same adapter, giving IT managers the flexibility to attach servers to either network or both.

that enable enterprises to meet a full spectrum of processing requirements.

Combining DB2 and related clustering features, IBM System x servers, and the Intel Xeon processor E7-2870 delivers the availability, scalability, and performance businesses need to gain—and keep—a competitive edge. The results of the most recent SAP TRBK benchmark testing are welcome news not only for banking organizations, but for the many other businesses with similarly demanding online transaction processing (OLTP) requirements, from online retail operations to airline reservation systems. The sheer volume of transactions achieved during the tests—56 million transactions per hour—bode well for any organization that relies on OLTP.

Learn More

Benchmark results referenced are current as of September, 2011. For the latest SAP benchmark results, visit: www.sap.com/solutions/benchmark/trbk.epx

¹ Statements of comparison are based on highest-performing systems running the SAP Transaction Banking (TRBK) standard SAP for Banking application. Results referenced are current as of September, 2011. This benchmark fully complies with the SAP Benchmark Council regulations and has been audited and certified by SAP AG. The SAP certification number was not available at press time and can be found at the following web page: www.sap.com/benchmark. Details can be obtained from IBM and SAP. The benchmark was performed at IBM in Montpellier, France, by IBM engineers.

² Based on IBM comparison between a two-socket IBM System x3690 X5 without MAX5 and a two-socket IBM System x3690 X5 with MAX5.

³ See "SAP IT selects IBM DB2 as strategic database platform for internal business systems" at <http://public.dhe.ibm.com/common/ssi/ecm/en/spc03186usen/SPC03186USEN.PDF>.

Intel, the Intel logo, and Xeon are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. IBM, the IBM logo, ibm.com, BladeCenter, DB2, pureScale, System Storage, System x, and X-Architecture are trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. A current list of IBM trademarks is available on the web at "Copyright and trademark information" at www.ibm.com/legal/copytrade.shtml.

* Other product, company, or service names may be trademarks or service marks of others.