



Highlights

- Deliver dramatic query response speeds to rapidly glean insights
 - Help ensure availability of critical applications
 - Manage, store and analyze data with ease
 - Help reduce data management, storage and processing costs
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Amplify DB2 performance with IBM and Intel innovations

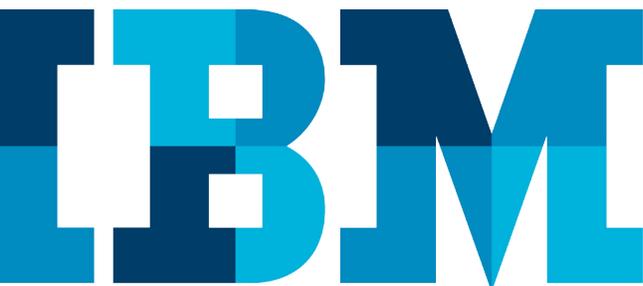
IBM DB2 10.5 running on the Intel Xeon processor E5 family delivers high performance, flexibility and cost savings

Big data offers tremendous potential for generating new insights, optimizing customer interactions and facilitating decisions that accelerate businesses. But to capitalize on big data, many organizations need to rethink the way they use and view information. They need new ways to quickly and efficiently analyze and manage the large volume and variety of information they are collecting. They need solutions that improve transaction performance and accelerate query results to capture time-sensitive opportunities, all while controlling costs.

IBM and Intel technologies are designed to take companies confidently into the future of big data analytics, enabling them to better manage and analyze their diverse information and increase their performance, all at a low cost. Businesses can leverage new insights while dramatically reducing costs with low power consumption, in-memory speed and simplicity.

A revolutionary pairing of technologies

Whether organizations are currently running IBM® DB2® 9.7 or DB2 10.1, order-of-magnitude performance gains can be attained by using DB2 with BLU Acceleration technology, newly implemented in DB2 10.5. In internal testing of DB2 with BLU Acceleration, some queries within an analytic workload achieved over 1,200 times performance improvement.¹



The speed-of-thought analytics start with dynamic in-memory columnar technology, actionable compression and other advances in DB2 with BLU Acceleration:

- **Dynamic in-memory columnar technology** loads terabytes of data in random access memory instead of storage, streamlining query workloads even when data sets exceed the size of the memory.
- **Actionable compression** enables data to be evaluated in compressed format, allowing query processing without costly decompression. Clients have reported compression rates of 10 times in DB2 with BLU Acceleration vs. uncompressed tables.²
- **Parallel vector processing** provides multi-core and multiple data parallelism—single instruction multiple data (SIMD)—allowing processing of data in parallel over different processors.
- **Data skipping** skips unnecessary processing of irrelevant data, touching only the information that is relevant for a particular query.

Organizations can use the multi-core parallel processing and vector processing in the Intel® Xeon® processor family to further enhance performance. As a result, DB2 10.5 with BLU Acceleration running on Intel Xeon processors enable businesses to perform queries faster, ask more questions and gain more insight than ever before.

New benchmarks for high performance

By upgrading to DB2 with BLU Acceleration, clients can enjoy tremendous performance gains on existing systems as a result of deeper processor exploitation. The results are even more impressive when DB2 with BLU Acceleration is coupled with the latest Intel Xeon processor, as shown in a recent performance benchmark test.

IBM and Intel conducted performance benchmark testing at the IBM Silicon Valley Lab and compared DB2 10.5 running on Intel Xeon processor E5-based systems to previous-generation software and processors. Using an internal proof of performance and scalability benchmark for measuring database query performance, the tests showed that

“Intel is excited to see greater than 88 times improvement in query processing performance using DB2 with BLU Acceleration over DB2 10.1 utilizing the latest Intel Xeon processor E5 v2 family of microprocessors. To achieve these amazing gains, IBM has taken advantage of the Intel® Advanced Vector Extensions (Intel® AVX) instruction set on Intel Xeon processor E5-based systems. Customers running this hardware can now immediately realize dramatically greater performance boost at lower cost per query.”

— Pauline Nist, Intel General Manager, Enterprise Software Alliances, Datacenter and Connected Systems Group

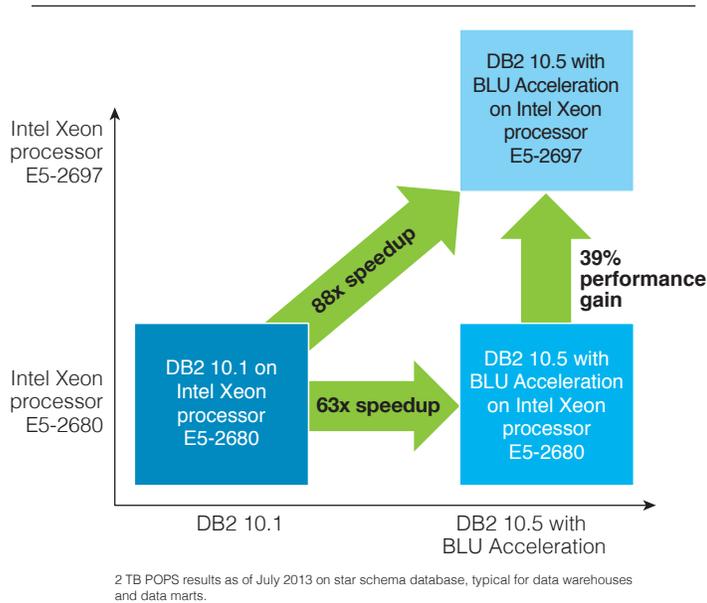


Figure 1. According to IBM internal tests, DB2 10.5 with BLU Acceleration on the Intel Xeon processor E5-2680 delivers impressive performance gains, but upgrading to the latest Intel Xeon processor boosts speed even further.

DB2 10.5 with BLU Acceleration running on the Intel Xeon processor E5-2680 achieved 63 times higher performance than DB2 10.1 with the same workload. When DB2 10.5 with BLU Acceleration was upgraded to the new Intel Xeon processor E5-2697, the results demonstrated an additional 39 percent performance gain. This means the combined upgrade of both the software and processor yielded 88 times higher performance than DB2 10.1 on the Intel Xeon processor E5-2680.³ (See Figure 1.)

Accelerated query results without the high cost

DB2 with BLU Acceleration capitalizes on the performance advantages of in-memory data storage, placing the highest-value data in main memory where it can be accessed and processed quickly. But DB2 with BLU Acceleration is not limited to main memory capacity—it dynamically optimizes the utilization of in-memory data with on-disk data for overall query and workload performance while maximizing resources. There is no need to continuously add more memory to meet

growing demand. DB2 with BLU Acceleration goes beyond in-memory-only technology because it provides the performance of in-memory without being restricted to the capacity of main memory.

Flexibility for multiple workloads

DB2 10.5 provides multi-workload capabilities for the flexible options businesses are demanding. It is certified for SAP and contains workload optimization features and leverages BLU Acceleration to enable high performance for SAP applications. In addition, DB2 10.5 provides an average of 98 percent compatibility with Oracle Database applications⁴ allowing clients who upgrade to DB2 to cut costs even further. It comes future-ready with optimized capabilities for online transaction processing (OLTP) and data warehousing, as well as application flexibility and reach with business-grade NoSQL support. DB2 10.5 ships with an extensive package of components necessary to develop, implement, support and deploy a transactional or warehouse environment for organizations ranging from small businesses to enterprises. Organizations can easily choose their deployment preference.

Speed and cost efficiency with Intel processors

IBM DB2 takes advantage of the SIMD capabilities of Intel Xeon processor E5-based systems. Organizations running this hardware can immediately realize dramatic performance boosts at low cost per query. The SIMD instructions available on Intel processors pack multiple data elements into a single register and then act on all of those data elements with just one instruction to perform work much more quickly. DB2 is also designed for highly parallel processing, and uses multiple cores within an Intel Xeon processor to divide up the query processing into multiple threads that work simultaneously.

A highly secure virtualization platform

Not only do Intel Xeon processors work to amplify the benefits of DB2 with BLU Acceleration, they also provide a highly secure platform for running OLTP and analytic workloads in virtual instances. The Intel Xeon E5 processor family provides extensive memory to support virtualization, as well as Intel® Virtualization Technology (Intel® VT)

to reduce the overhead of a virtual machine. Integrated technology also protects data through detection and correction of errors and the logical replacement of failing data paths, so critical DB2 data remains available for business users.

Scalability for growth and change

Intel Xeon processors provide the scalable performance, memory and I/O capacity to help businesses adapt to changes in short-term demands and scale for long-term growth. Intel and IBM have also collaborated to optimize DB2 pureScale® on Intel Xeon processors, dramatically simplifying the task of scaling a database cluster with no application changes required.

Integrated with DB2 high-availability disaster recovery (HADR) functionality, DB2 pureScale also allows organizations to mirror data from a primary pureScale cluster to a second standby cluster. In the event of failure, the standby cluster is designed to take over in seconds to ensure minimal impact to the business.

The power of collaboration

Intel and IBM have a long history of developing industry-leading technologies—and together can help you solve your data management and analysis challenges. Each company is deeply committed to research and development, and the collaborative relationship between their laboratories and researchers is ongoing and extensive.

Advantages from Intel include outstanding processor performance and innovations in security and virtualization technology. IBM DB2 10.5 running on servers powered by the Intel Xeon processor E5 family represents another milestone in the history of the Intel and IBM collaboration—and the key to high-speed performance, exceptional simplicity and rapid return on investment for organizations that need to extract more business value from their data.

For more information

To learn more about IBM DB2 10.5, Intel Xeon processors and the IBM-Intel partnership, contact your IBM sales representative or IBM Business Partner, or visit: ibm.com/db2/intel



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¹ Based on internal IBM tests of analytic workloads comparing queries accessing row-based tables on DB2 10.1 vs. columnar tables on DB2 10.5. Results not typical. Individual results will vary depending on individual workloads, configurations and conditions, including size and content of the table, and number of elements being queried from a given table.

² Client-reported testing results in DB2 10.5 early release program. Individual results will vary depending on individual workloads, configurations and conditions, including table size and content.

³ The test results were based on an internal 2 TB database performance and scalability benchmark with DB2 10.1 running on a 2-socket Intel Xeon processor E5-2680 with 256 GB of memory, and DB2 10.5 running on a 2-socket Intel Xeon processor E5-2697 with 256 GB of memory. Both systems were configured with IBM DS5300 (32x600 GB) 4 Gbps FC storage. Performance improvement figures are cumulative of all queries in the workload. Individual results will vary depending on individual workloads, configurations and conditions.

⁴ DB2 achieves an average of 98 percent compatibility with Oracle PL/SQL, based on internal tests and reported client experience from 28 September 2011 to 07 March 2012.



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