Unlock the Value of Your Data with Intel and IBM Innovations

Extract near real-time insights from critical data using IBM* DB2* with BLU Acceleration running on the Intel® Xeon® processor E7 v2 family

Every sensor reading, every Web click, every social media post contributes to the torrent of data rushing at you. Just getting a handle on the volume and variety of data coming at you with ever-increasing velocity is challenging in itself, and that’s before trying to analyze it. But the value of big data isn’t the data itself—it’s uncovering the insights locked in your data that is important.

Even if you have your big data strategy in place, there’s still a lot of data to handle—and more of it all the time. According to the Harvard Review of Business, over 2.5 exabytes of data got created every day in 2012.¹ Put another way, in 2012, as much data was created daily as existed in the entire world in 1986.²

The physical limits of computing, such as the speed of accessing data from relational databases, have created bottlenecks in data analysis. Complex calculations could take hours or even days, and data could provide insights, but not always fast enough to maximize value. All of this is changing with the next-generation of processors and database software from Intel and IBM, which can help you extract near real-time insights from critical data.

**Scale Up Performance with Intel and IBM**

Not all workloads scale out well. Optimizing heavy database workloads or virtualizing tier-1 enterprise resource planning (ERP) or customer relationship management (CRM) workloads requires scaling up the performance of your servers. Intel and IBM provide the tools to do so on the hardware and software levels.

**Next-Generation Intel Xeon Processor E7 Family: Beyond Incremental**

The Intel® Xeon® processor E7 v2 family delivers an average of two times improved performance over the earlier generation Intel Xeon processor E7 family.³⁻⁴ But intensive workloads also benefit from more memory, CPU scale, and reductions to input/output (I/O) bottlenecks.

**Scale Memory, Processors, and Input/Output**

The next-generation Intel Xeon processor E7 v2 family supports up to three times more memory than previous generation Intel Xeon processors. The four-socket Intel Xeon processor E7 v2 family can support up to 6 TB of memory, whereas the eight-socket versions can use up to 12 TB. This enables you to put large primary databases directly in memory for orders of magnitude increased performance.

You can also dynamically scale CPUs in the next-generation Intel Xeon processor E7 v2 family, which natively uses two, four, or eight sockets without any additional work. And with third-party node controllers, you can scale this up to 256 sockets.
Intel® Integrated I/O (based on Peripheral Component Interconnect Express [PCIe] 3.0 standard) delivers up to two times more I/O over PCIe 2.0 in the previous generation Intel Xeon processor E7 family.\textsuperscript{5}

**Intel® Run Sure Technology**

High-availability features in the Intel Xeon processor E7 v2 family compound the value of next-generation performance. The Intel Xeon processor E7 v2 family provides world-class availability and uptime with more than 40 reliability, availability, and serviceability (RAS) features within the new Intel® Run Sure Technology.\textsuperscript{6} These include features designed to help ensure data integrity and keep systems running reliably over a longer period of time (resilient-system technologies). Intel Run Sure also includes technology integrating the processor, firmware, and software layers to enable systems to diagnose and recover from errors that would have been fatal in previous-generation processors (resilient-memory technologies).

IBM DB2 with BLU Acceleration: Revolutionary Performance

Scaling up database workloads also means getting more performance from your database software. Several advances in IBM* DB2* with BLU Acceleration provide impressive improvements over previous versions of DB2. These include:

- **Dynamic in-memory columnar technology**—Keep the most frequently accessed data in RAM to streamline query workloads even when the size of data sets exceed the size of the memory.
- **Actionable compression**—Run queries and evaluate data while it is compressed. In some cases this can provide query-processing rates 10 times greater than using uncompressed tables.\textsuperscript{7}
- **Parallel vector processing**—Take advantage of multi-core and multi-data parallelism based on single instruction, multiple data (SIMD) instructions to process data in parallel over different processors.
- **Data skipping**—Speed queries by not processing irrelevant data.

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Unlock the Value of Your Data with Intel and IBM Innovations
Testing undertaken by Intel and IBM using an internal proof of performance and scalability benchmark for measuring database query performance reveals breathtaking performance improvements for database queries with DB2 with BLU Acceleration running on an Intel Xeon processor E7-4890 v2. The tests demonstrated that DB2 with BLU Acceleration running on the previous-generation Intel Xeon processor E7-4870 achieved 77 times greater performance than DB2 10.1 with the same workload. Running DB2 with BLU Acceleration on the next-generation Intel Xeon processor E7-4890 v2 nearly doubled performance, logging a 1.9x increase. In total, running the latest software on the latest hardware provided 148 times greater performance than the combination of previous-generation software and hardware (see Figure 1).  

The performance improvements were not just limited to query speed. The database with 10 TB of raw data used in the testing was 4.55x smaller with DB2 with BLU Acceleration using actionable compression than the corresponding DB2 10.1 database with static compression (2,127 GB actionable compression versus 9,687 GB static compression).

### Take Advantage of Flexibility and Efficiency

The coupling of the Intel Xeon processor E7 v2 family with IBM DB2 with BLU Acceleration provides a flexible platform to run a variety of workloads efficiently.

### Speed and Cost Efficiency

DB2 is 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. DB2 further takes advantage of Intel® Advanced Vector Extensions (Intel® AVX) on the Intel Xeon processor E7 family. Intel AVX increases the throughput of floating-point, SIMD calculations like those used in highly parallelized computations. This enables DB2 to pack more data elements into the register of a single processor and then process all of those data elements with just one call. This optimizes both memory usage and processor I/O and can dramatically increase performance for computationally intense workloads like database queries.

While DB2 with BLU Acceleration capitalizes on the performance benefits of in-memory storage, it is not limited to main-memory capacity. DB2 with BLU Acceleration provides the performance of in-memory without being restricted to the capacity of main memory so you don’t need to continuously add more memory to meet growing demand.

### Easy Upgrade

DB2 with BLU Acceleration is an easy upgrade. All of the performance benefits come straight out of the box. You don’t need to tune DB2 to achieve these impressive performance results.

### Multiple Workloads

The combination of IBM DB2 with BLU Acceleration and the Intel Xeon processor E7 v2 family provides a flexible platform for multiple workloads. Performance improvements in both products can speed up complex online transaction processing (OLTP) queries. Greater memory support in Intel Xeon processors and columnar technology in IBM DB2 with BLU Acceleration enable real-time, in-memory business intelligence and analytics.

The Intel Xeon processor E7 v2 family can also boost your virtualized workloads. Many companies have not yet virtualized business-critical, tier-1 workloads like databases, ERP, or CRM, yet many of these workloads could benefit from virtualization. Intel® Virtualization Technology® for IA-32 and Intel® 64 architecture (Intel® VT-x) enhances key virtualization usages, like live migration and dynamic load balancing, while Advanced Programmable Interrupt Controller virtualization (APICv) can reduce virtualization performance penalties.
DB2 and Intel Xeon: Paired for Performance
For more than 15 years, IBM and Intel have collaborated to optimize enterprise solutions: complete, cost-effective, performance-optimized stacks of IBM Information Management software running on servers powered by Intel Xeon processors. By coupling the latest version of IBM DB2 with BLU Acceleration with servers running the latest Intel Xeon processor E7 v2 family, you can transform data into useful business insights more quickly and deliver all those insights into context, all while lowering costs and power consumption.

IBM DB2 with BLU Acceleration running on the Intel Xeon processor E7 v2 family represents far more than an incremental increase to performance. Coupling IBM’s advanced database software with next-generation Intel processors is ideal for many demanding workloads ranging from heavy OLTP to quick in-memory analytics. This opens the door to unlocking the competitive advantage hidden in the data that your organization creates and curates. Consider taking advantage of breakthrough technology in both your database and your hardware to realize the tremendous performance improvements provided by IBM DB2 with BLU Acceleration coupled with the Intel Xeon processor E7 v2 family.