Almost everything you do in your business life generates tangible data that can be captured and analyzed. Every screen tap, every key stroke, every sensor reading contributes to the unending river of data flooding your servers. Organizations are placing more emphasis on business-intelligence (BI) strategies because being able to extract insights from data in real-time is crucial to maintaining a competitive edge. You might have a BI strategy in place, but is your hardware and database software capable of handling a daily deluge of data? In 2013, the world generated 5 exabytes—that’s five billion gigabytes—of data per day. Imagine the sheer quantity of data that will be surging into your company in five years, when 25 billion devices are connected to the Internet.

The physical components of computing can limit processing speeds, memory capacity, and error-correction capabilities and can create bottlenecks in your data stream. As such, complex queries can take hours or days to derive the insights with the biggest business impact—and data grows stale fast. If your databases can’t analyze data as fast as the data is gathered, your business risks losing vital information. Mission-critical insights can make all the difference between developing a competitive advantage or losing business to the competition.

Fast, Flexible Performance with Intel and IBM

Running enterprise applications like enterprise resource planning (ERP) or online transaction processing (OLTP) requires a server that can scale to fit the workload. To ensure that businesses have the best tools to drive success, Intel and IBM have collaborated closely to bring you a hardware and software combination that can accommodate any size workload and can help you to uncover the critical insights hidden in big data.

Generational Gains

The last five years have seen a consistently tremendous performance gain with each new generation of Intel® hardware and IBM software. The latest combination of hardware and software is 246 times faster than the first pairing of the Intel® Xeon® processor E7 family with IBM DB2®, four years ago. Big-data workloads also benefit from scalable processing power, abundant memory, and high, consistent throughput.

More Memory, Scalable Processing, and Streamlined Throughput

IBM DB2 with BLU Acceleration® is the next generation of database technology, and it’s changing the game for in-memory computing. IBM DB2 with BLU Acceleration optimizes CPU cache and system memory to deliver
breakthrough performance for speed-of-thought analytics. The four-socket Intel Xeon processor E7 v3 family can support up to 6 TB of memory, whereas the eight-socket versions can use up to 12 TB. This makes it possible to put large, primary databases directly into memory to radically boost performance. The Intel Xeon processor E7 v3 family natively uses two, four, or eight sockets without any additional work, and third-party node controllers enable you to scale up to 256 sockets.

The Intel Xeon processor E7 v3 family scales up to 18 cores to increase CPU scalability and throughput. This increase not only delivers faster query-response times, but it enables you to run more concurrent queries in a multi-user environment. More cores also means that you need fewer processors, so you can halve the size of your server stack while increasing its performance.

**Improved Memory Support**

In addition to DDR3 memory, the Intel Xeon processor E7 v3 family supports DDR4 memory, which can increase your memory bandwidth and lower power consumption. DDR4 memory improves the scalability of your servers so that your business can balance the discovery of critical business intelligence with the speed at which data is created. The latest generation of Intel Xeon processors introduces lockstep mode, which can halve memory bandwidth to increase error recovery.

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*Figure 1. Overall performance gains during five years of the Intel® Xeon® processor E7 family and IBM DB2® software collaboration*

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**The Intel® Xeon® processor E7 v3 family enables you to:**

- Deliver faster query-response times
- Run more concurrent queries in a multi-user environment
- Reduce the size of your server stack while increasing its performance
- Increase your memory bandwidth
- Uncover mission-critical insights as fast as data is created

**More Reliability, Availability, and Serviceability Features**

The Intel Xeon processor E7 v3 family adds two new features to Intel® Run Sure Technology, which was introduced with the Intel Xeon processor E7 v2 family. Enhanced Machine Check Architecture (eMCA) recovery Gen 2 expands automatic error recovery and enables firmware to recover from uncorrectable errors without impacting uptime. Address Range Memory Mirroring allows you to control which memory ranges are mirrored rather than having to mirror all memory. By mirroring critical data, you can avoid uncorrectable memory errors that might have otherwise caused a platform failure.
to fail while leaving more memory available for other workloads.

The new reliability, availability, and serviceability (RAS) features built into the Intel Xeon processor E7 v3 family help improve uptime and reduce maintenance costs. Multiple rank sparing provides a second level of dynamic fail-over behind the same memory controller and supports two spare ranks per DDR channel. DDR4 recovery enables your system to recover from parity errors found in command and address features, lessening the risk of a system crash.

**Better Energy Efficiency**

Servers running Intel Xeon processors benefit from a number of features that lessen power consumption, and the Intel Xeon processor E7 v3 family introduces one more: Per Core P-states (PCPS). PCPS enables the CPU to control the power consumption of individual CPU cores, so your servers can remain energy efficient even when workload demands are high.

**IBM DB2 with BLU Acceleration**

IBM DB2 with BLU Acceleration combines innovations from IBM Research and Development Labs to dramatically simplify and speed-up the discovery of insights hidden in big data. DB2 BLU with Acceleration is easy to deploy and improves performance and storage efficiency by eliminating the need for indexes, aggregates, and constant fine-tuning.

While other in-memory databases rely solely on in-memory data storage, IBM DB2 with BLU Acceleration automatically optimizes the flow of data between storage, system memory, and the CPU cache. This patented IBM design enables DB2 with BLU Acceleration to maintain the performance of in-memory computing even when datasets exceed system memory capacity. This allows businesses to derive insights faster from bigger chunks of data, which translates to better customer experiences, new market opportunities, reduced risk, and more efficient operations.

The increased core count and scalable sockets of the Intel Xeon processor E7 v3 family boost the flexibility and features of IBM DB2 with BLU Acceleration to help you find real-time insights faster and make more informed business decisions.

**Benchmark Results**

Intel and IBM used the internal Proof of Performance and Scalability (POPS) benchmark to measure database-query performance between different combinations of the Intel Xeon processor family and IBM DB2. Combining the Intel Xeon processor E7 v3 family with IBM DB2 with BLU Acceleration showed performance improvements across the board. The tests demonstrated that IBM DB2 with BLU Acceleration running on the Intel Xeon processor E7-8890 v3, in four-socket mode, processed the same workload 246 times faster than IBM DB2 10.1 running on the Intel Xeon processor E7-4870 (Figure 1 and Figure 2).

A software-only upgrade, moving from IBM DB2 10.1 to IBM DB2 with BLU Acceleration, on the Intel Xeon processor E7-8890 v3 increased query speed 187 times (Figure 2). Tests reveal a 2.07x performance gain when servers running IBM DB2 with BLU Acceleration are upgraded from the Intel Xeon processor E7-4870 to the Intel Xeon processor E7-8890 v3 (Figure 3). Another test showed that switching from running IBM DB2 with BLU Acceleration on the Intel Xeon processor E7-4870 v2 to the Intel Xeon processor E7-8890 v3 boosted response times 1.21 times (Figure 3).

**Better Together**

Pairing the Intel Xeon processor E7 v3 family with IBM DB2 with BLU Acceleration produces a processing powerhouse that adeptly adjusts to workload size and CPU demand.

**More Speed, Less Cost**

IBM DB2 with BLU Acceleration is quick and easy to deploy, so you can fulfill business needs even as they change and evolve. With DB2 with BLU
Acceleration, you can house transaction processing and reporting and analysis capabilities in the same environment. This enables you to radically simplify your IT infrastructure and costs while gaining near-instant insight from real-time operational data. Simply create the table, load your data, and start the query.

DB2 with BLU Acceleration delivers the benefits of in-memory columnar processing without the continual demand for additional memory capacity, even as data volumes increase. Actionable compression preserves the order of data, so compressed data can be used across a broad range of operations. Data skipping enables the system to ignore irrelevant data, cutting down processing time.

Multi-core processing, Single Instruction Multiple Data (SIMD) processor support, and parallel data processing capitalize on CPU power, which can decrease system latency and bottlenecks. Running IBM DB2 with BLU Acceleration on servers powered by the Intel Xeon processor E7 v3 family provides an adaptive platform for mixed workloads in multi-user environments. Greater memory support in Intel Xeon processors and next-generation in-memory technology in IBM DB2 with BLU Acceleration enable real-time, in-memory business intelligence and analytics.

**Intel and IBM: Innovation for Enterprise**

For more than 20 years, Intel and IBM have nurtured a symbiotic relationship between their respective server hardware and software to complement and expand upon each other’s architecture and design. The fruit of their labor means that enterprises get optimized solutions that make it easier to do business better. By running IBM DB2 with BLU Acceleration on servers powered by the Intel Xeon processor E7 v3 family, you can more quickly and easily transform your torrent of data into valuable, contextualized business insights. New features of the Intel Xeon processor E7 v3 family can help increase performance and reliability while reducing your data center’s footprint and TCO.

IBM DB2 with BLU Acceleration running on the Intel Xeon processor E7 v3 family represents far more than a dramatic boost to performance—it enables you to unlock and uphold the competitive advantage hidden in your organization’s data stream. If you want faster access to data, faster results, and faster response times, upgrade your server hardware and software with the Intel Xeon processor E7 v3 family and IBM DB2 with BLU Acceleration.

For the full story on the Intel Xeon processor E7 v3 family and IBM DB2 with BLU Acceleration, visit:

- [www.intel.com/XeonE7](http://www.intel.com/XeonE7)
- [www.ibmbluhub.com](http://www.ibmbluhub.com)

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**Figure 3.** The performance of IBM DB2 with BLU Acceleration increases with each new generation of the Intel Xeon processor E7 family.
Intel technologies’ features and benefits depend on system configuration and may require enabled hardware, software, or service activation. Performance varies depending on system configuration. No computer software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors.

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**Configurations:**

a) **Previous Generation Software**—software baseline configuration: SuSE Linux Enterprise Server® 11 SP3 x86-64, IBM DB2® 10.1 + 4-socket Intel® Xeon® processor E7-4870 using IBM Gen3 XIV FC SAN solution completing the queries in about 3.58 hours.

b) SuSE Linux Enterprise Server® 11 SP3 x86-64, IBM DB2® 10.1 + 4-socket Intel® Xeon® processor E7-4890-v2 using IBM Gen3 XIV FC SAN solution completing the queries in about 3.23 hours.

c) Red Hat® Enterprise LINUX 6.5, IBM DB2® 10.1 + 4-socket Intel® Xeon® processor E7-8890-v3 using IBM Gen3 XIV FC SAN solution completing the queries in about 2.72 hours.

d) SuSE Linux Enterprise Server® 11 SP3 x86-64, IBM DB2® 10.5 with BLU Acceleration + 4-socket Intel® Xeon® processor E7-4870 using tables in-memory (1 TB total) completing the same queries in about 108.9 seconds.

e) SuSE Linux Enterprise Server® 11 SP3 x86-64, IBM DB2® 10.5 with BLU Acceleration + 4-socket Intel® Xeon® processor E7-4890-v2 using tables in-memory (1 TB total) completing the same queries in about 63.79 seconds.

f) **New Generation** new configuration: Red Hat® Enterprise LINUX 6.5, IBM DB2® 10.5 with BLU Acceleration + 4-socket Intel® Xeon® processor E7-8890-v3 using tables in-memory (1 TB total) completing the same queries in about 52.3 seconds.

For more complete information visit http://www.intel.com/performance/datacenter.

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