

# The Foundation for Better Business Intelligence



Big data is changing the way organizations make business decisions. To transform petabytes of data into strategic insights, organizations need systems that can quickly handle their current data-demanding workloads, in addition to those yet to be developed. By using fast, reliable servers that are optimized for the Intel® Xeon® processor E7 v2 family, you can process and analyze vast quantities of data in real-time, extract value, make smart business decisions, and gain competitive advantage. The Intel Xeon processor E7 v2 family offers leadership performance that allows you to outpace the speed of today's business, the scalability to handle virtually any workload, and advanced reliability, availability, and serviceability (RAS) features for maximum system uptime.

## Elevated Performance for Faster Time-to-Insight

Today's data centers require top-of-the-line performance to handle critical workloads for business intelligence (BI), business analytics, virtualization, and traditional large enterprise databases,

such as those for customer relationship management (CRM), enterprise resource planning (ERP), and supply chain management (SCM). The Intel Xeon processor E7-8800/4800/2800 v2 product families use native In-Memory analytics to bring substantial amounts of data to the processors' CPUs, significantly reducing latency and leading to faster data analysis.

With up to 15 cores and 30 threads per socket and 25% more cache, the Intel Xeon processor E7 v2 family delivers up to double the average performance<sup>+1</sup> of previous versions (see Figure 1). Three times the memory capacity of previous versions also enables advanced BI and analytics with their transaction-intensive workloads.<sup>2</sup>

To learn more about how processor performance can boost BI capabilities, please see the Intel® Xeon® E7 processor v2 family [solution brief](#).

## The Reliability to Handle Mission-Critical Systems

A company's systems—especially for demanding workloads—are only as good as they are dependable. Even a little

FIGURE 1: INCREASE PERFORMANCE TO ACCELERATE CRITICAL BUSINESS PROCESSES AND ANALYTICS<sup>+1</sup>

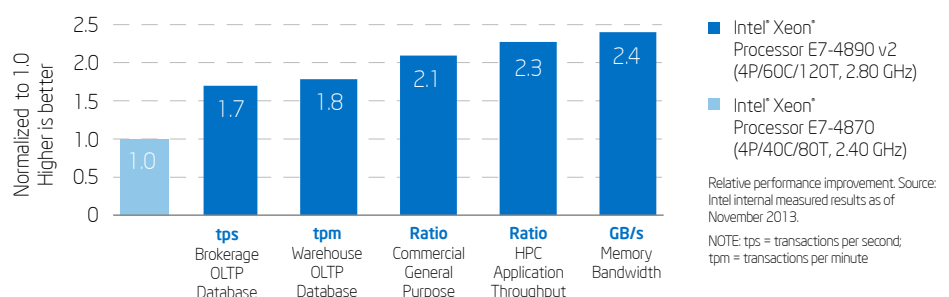
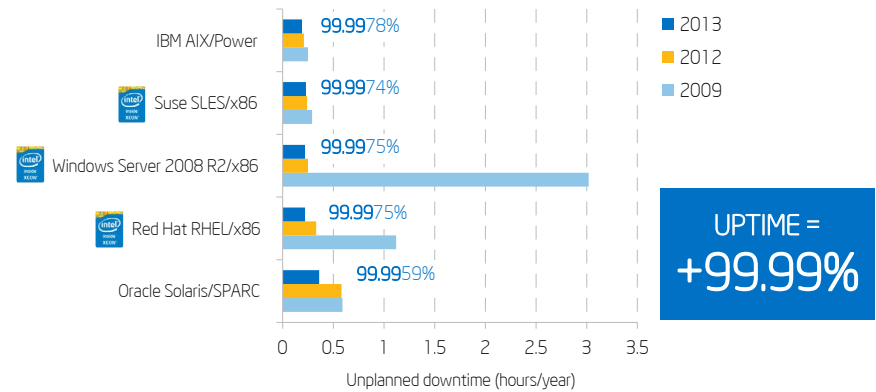


FIGURE 2: UPTIME EVOLUTION<sup>\*,4</sup>



downtime adds up: ITIC's May/June 2013 Technology Trends and Deployment Survey polled 600 businesses worldwide. Of those surveyed, 63% of the large enterprises with 1,000 or more workers reported that one hour of downtime costs their business from \$101,000 to \$400,000 per hour, exclusive of any litigation or compliance penalties.<sup>3</sup>

According to industry analysts, more and more enterprises are migrating their mission-critical systems from proprietary RISC-based platforms to industry standards-based Intel architecture.<sup>4</sup> The Intel Xeon processor E7 v2 family offers uptime equivalent to best-in-class RISC-based platforms (see Figure 2).<sup>5</sup> At the same time, it delivers considerable cost savings on overall total cost of ownership and maintains operating system flexibility. That combination of performance and cost-effectiveness makes the Intel Xeon processor E7 v2 family the right choice for your highest-priority systems.

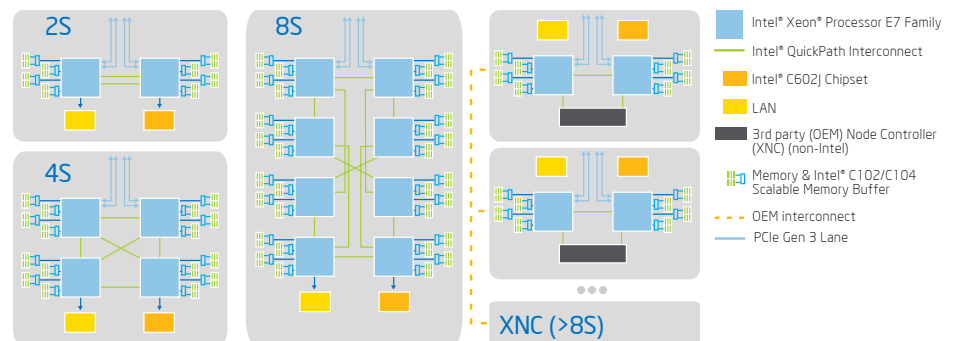
With Intel® Run Sure Technology<sup>6</sup> and advanced RAS features, you can reduce

the frequency and cost of planned and unplanned downtime while protecting data integrity. For example, the Machine Check Architecture (MCA) Recovery Execution Path feature takes advantage of software layers to assist in system recovery from data errors and avoid fatal errors. The Enhanced MCA Gen 1 feature provides augmented error log information for better diagnostics and productive failure analysis for higher levels of uptime. Increasingly broad industry support for RAS means that you receive the full benefit from your RAS adoption.

### Memory and Scalability to Handle Virtually Any Workload

The Intel Xeon processor E7 v2 family represents a dramatic improvement in memory, with triple the memory capacity of previous versions. It delivers up to 6 TB in a four-socket platform and up to 12 TB in an eight-socket platform<sup>7</sup>—and you can even scale beyond 8 sockets by using innovative OEM-developed node controllers, referred to as XNC (see Figure 3).

FIGURE 3: SCALABILITY TO HANDLE ANY WORKLOAD



## INTEL XEON PROCESSOR E7-8800/4800/2800 V2 PRODUCT FAMILIES OVERVIEW



### Up to 2x average performance increase<sup>+1</sup>

- Up to 50% more cores/threads and up to 25% more cache to boost performance for fast processing of data-intensive systems
- Ideal for business intelligence-related workloads, such as Analytics, ERP, CRM, SCM, and In-Memory databases
- Plus the integrated memory controller can switch between two modes: performance (for higher I/O and bandwidth) and lockstep for more sophisticated reliability capabilities that are required for certain business-critical applications



### 3x the memory capacity for delivering real-time business insights<sup>+</sup>

- Up to 6 TB in 4 sockets and 12 TB in 8 sockets of DDR3 memory<sup>7</sup>, to support even more data-demanding, transaction-intensive In-Memory workloads
- Flexibility to support a variety of configurations and workloads
- CPU native scaling across 2, 4, and 8 sockets and beyond with XNC node controllers
- Up to 4x increased bandwidth with integrated PCI Express\* (PCIe) 3.0<sup>8</sup>



### Better system uptime with advanced RAS features<sup>+</sup>

- Intel® Run Sure Technology<sup>+6</sup> to reduce the frequency and cost of planned and unplanned downtime
- MCA Recovery Execution Path to allow the system to recover from certain errors that would otherwise be fatal
- Enhanced MCA Gen 1 to provide enhanced error log information for better diagnostic and predictive failure analysis
- MCA I/O for diagnosis information on uncorrected I/O errors to the operating system
- PCIe\* Live Error Recovery (LER)<sup>9</sup> to increase system uptime by extending recovery and containment from PCIe\* errors that would otherwise cause the system to crash



### Security features for enhanced data integrity

- Improved hardware-embedded security for an even safer environment for your enterprise data
- Intel® Data Protection Technology with Secure Key<sup>10</sup> for faster and more secure encryption through a chipset-independent digital random number generator (DRNG)
- Intel® Platform Protection Technology with OS Guard<sup>11</sup> for improved protection against malware by preventing execution calls to the OS from compromised apps in the user mode or code pages

**INTEL® XEON® PROCESSOR E7 V2 FAMILY SPECIFICATIONS**

PROCESSOR NUMBER <sup>12</sup>	CPU FREQUENCY (GHZ)	INTEL® TURBO BOOST TECHNOLOGY <sup>13</sup>	INTEL® HT TECHNOLOGY <sup>14</sup>	L3 CACHE	NUMBER OF CORES	POWER	INTEL® QPI LINK SPEED
<b>For 8, 4 &amp; 2 Socket Scalable Servers</b>							
Intel® Xeon® Processor E7-8893 v2	3.4	✓	✓	37.5MB	6	155 W	8.0 GT/s
Intel® Xeon® Processor E7-8891 v2	3.2	✓	✓	37.5 MB	10	155 W	8.0 GT/s
Intel® Xeon® Processor E7-8880L v2	2.2	✓	✓	37.5 MB	15	105 W	8.0 GT/s
Intel® Xeon® Processor E7-8857 v2	3.0	✓	—	30 MB	12	130 W	8.0 GT/s
Intel® Xeon® Processor E7-8890 v2	2.8	✓	✓	37.5 MB	15	155 W	8.0 GT/s
Intel® Xeon® Processor E7-8880 v2	2.5	✓	✓	37.5 MB	15	130 W	8.0 GT/s
Intel® Xeon® Processor E7-8870 v2	2.3	✓	✓	30 MB	15	130 W	8.0 GT/s
Intel® Xeon® Processor E7-8850 v2	2.3	✓	✓	24 MB	12	105 W	7.2 GT/s
<b>For 4 &amp; 2 Socket Scalable Servers</b>							
Intel® Xeon® Processor E7-4890 v2	2.8	✓	✓	37.5 MB	15	155 W	8.0 GT/s
Intel® Xeon® Processor E7-4880 v2	2.5	✓	✓	37.5 MB	15	130 W	8.0 GT/s
Intel® Xeon® Processor E7-4870 v2	2.3	✓	✓	30 MB	15	130 W	8.0 GT/s
Intel® Xeon® Processor E7-4860 v2	2.6	✓	✓	30 MB	12	130 W	8.0 GT/s
Intel® Xeon® Processor E7-4850 v2	2.3	✓	✓	24 MB	12	105 W	7.2 GT/s
Intel® Xeon® Processor E7-4830 v2	2.2	✓	✓	20 MB	10	105 W	7.2 GT/s
Intel® Xeon® Processor E7-4820 v2	2.0	✓	✓	16 MB	8	105 W	7.2 GT/s
Intel® Xeon® Processor E7-4809 v2	1.9	—	✓	12 MB	6	105 W	6.4 GT/s
<b>For 2 Socket Scalable Servers</b>							
Intel® Xeon® Processor E7-2890 v2	2.8	✓	✓	37.5 MB	15	155 W	8.0 GT/s
Intel® Xeon® Processor E7-2880 v2	2.5	✓	✓	37.5MB	15	130 W	8.0 GT/s
Intel® Xeon® Processor E7-2870 v2	2.3	✓	✓	30 MB	15	130 W	8.0 GT/s
Intel® Xeon® Processor E7-2850 v2	2.3	✓	✓	24 MB	12	105 W	7.2 GT/s

<sup>a</sup> GT/s = giga-transfers/second

To learn more about the Intel Xeon processor E7-8800/4800/2800 v2 product families, visit [www.intel.com/xeonE7](http://www.intel.com/xeonE7)

Visit us at:



+ Software and workloads used in performance tests may have been optimized for performance only on Intel(r) microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products.

1. Intel internal measurements as of November 2013

Configuration Details

- OLTP brokerage workload results using Microsoft SQL Server\* (transactions per second) – Intel Technical Report (TR) #1371.
  - Baseline configuration: 4-Socket Intel® 7500 Chipset-based Server with four Intel® Xeon® processors E7-4870 (30M Cache, 2.40 GHz, 10 Cores) using 64x 8 GB DDR3-1066 memory (512 GB) scoring 3008 with SQL Server\* 2012.
  - New Intel configuration: 4-Socket Intel® C602J Chipset-based Server with four Intel® Xeon® processors E7-4890 v2 (37.5M Cache, 2.80 GHz, 15 Cores) using 64x 16 GB DDR3-1333 (running at 2666MHz) memory (1 TB) scoring 5216 with SQL Server\* 2012 (+1.73x).
- OLTP warehouse workload results using Oracle® 11g R2 (transactions per minute) – Intel Technical Report (TR) #1346.
  - Baseline configuration: 4-Socket Intel® 7500 Chipset-based Server with four Intel® Xeon® processors E7-4870 (30M Cache, 2.40 GHz, 10 Cores) using 64x 8 GB DDR3-1066 memory (512 GB) scoring 2740K.
  - New Intel configuration: 4-Socket Intel® C602J Chipset-based Server with four Intel® Xeon® processors E7-4890 v2 (37.5M Cache, 2.80 GHz, 15 Cores) using 64x 16 GB DDR3-1333 (running at 2666MHz) memory (1 TB) scoring 4789K (+1.75x).
- Commercial General Purpose Throughput (Integer Compute) using SPECint\*\_rate\_base2006 benchmark results compiled with Intel Compiler Parallel Studio XE 2014.1 – Intel Technical Report (TR) #1339.
  - Baseline configuration: 4-Socket Intel® 7500 Chipset-based Server with four Intel® Xeon® processors E7-4870 (30M Cache, 2.40 GHz, 10 Cores) using 64x 8 GB DDR3-1066 memory (512 GB) scoring estimated 11006 baseline.
  - New Intel configuration: 4-Socket Intel® C602J Chipset-based Server with four Intel® Xeon® processors E7-4890 v2 (37.5M Cache, 2.80 GHz, 15 Cores) using 64x 8 GB DDR3-1333 (running at 2666MHz) memory (1 TB) scoring estimated 2288 baseline (+2.08x).
- HPC Application Throughput (Floating-Point Compute) using SPECfp\*\_rate\_base2006 benchmark results compiled with Intel Compiler Parallel Studio XE 2014.1 – Intel Technical Report (TR) #1339.
  - Baseline configuration: 4-Socket Intel® 7500 Chipset-based Server with four Intel® Xeon® processors E7-4870 (30M Cache, 2.40 GHz, 10 Cores) using 64x 8 GB DDR3-1066 memory (512 GB) with Intel Compiler Fortran 13.1 scoring estimated 741 baseline.
  - New Intel configuration: 4-Socket Intel® C602J Chipset-based Server with four Intel® Xeon® processors E7-4890 v2 (37.5M Cache, 2.80 GHz, 15 Cores) using 64x 8 GB DDR3-1333 (running at 2666MHz) memory (1TB) Intel Compiler Fortran 14.0 scoring estimated 1675 baseline (+2.26x).
- Memory bandwidth using STREAM\_OMP TRIAD benchmark results – Intel Technical Report (TR) #1344.
  - Baseline configuration: 4-Socket Intel® 7500 Chipset-based Server with four Intel® Xeon® processors E7-4870 (30M Cache, 2.40 GHz, 10 Cores) using 32x 8 GB DDR3-1066 memory (256 GB) scoring 101 GB/s.
  - New Intel configuration: 4-Socket Intel® C602J Chipset-based Server with four Intel® Xeon® processors E7-4890 v2 (37.5M Cache, 2.80 GHz, 15 Cores) using 64x 8 GB DDR3-1333 (running at 2666MHz) memory (512 GB) scoring 243 GB/s (+2.41x).
- Matrix multiplication using LINPACK\_MP benchmark results based on Intel Math Kernel Library (MKL) (GFLOPs) – Intel Technical Report (TR) #1157b and 1372.
  - Baseline configuration: 4-Socket Intel® 7500 Chipset-based Server with four Intel® Xeon® processors E7-4870 (30M Cache, 2.40 GHz, 10 Cores) using 64x 4 GB DDR3-1066 memory (512 GB), Intel MKL 10.3.0 scoring 353.6 GFLOPs.
  - New Intel configuration: 4-Socket Intel® C602J Chipset-based Server with four Intel® Xeon® processors E7-4890 v2 (37.5M Cache, 2.80 GHz, 15 Cores) using 64x 8 GB DDR3-1333 (running at 2666MHz) memory (1TB) scoring 1235 GFLOPs (+3.50x).

2. On a 4-socket natively-connected platform: Intel® Xeon® processor E7 family supports 64DIMMs, max memory per DIMM of 32GB LRDIMM; Intel® Xeon® processor E7 v2 family supports 96DIMMs, max memory per DIMM of 64GB RDIMM. This enables a 3x increase in memory.

3. ITIC Blog "One Hour of Downtime Costs > \$100K For 95% of Enterprises" July 24, 2013; <http://itic-corp.com/blog/2013/07/one-hour-of-downtime-costs-100k-for-95-of-enterprises/>

4. IDC Whitepaper "Following Downturn, Platform Migration Accelerates" February 2011; <http://www.computerwoche.de/filesserver/idgwpcw/files/1974.pdf>;

Weiss, George J. and Jeffrey Hewitt, 3 June 2010, R3598 07042011 Gartner RAS Core Research Note G002012320, "Impact of the New Generation of x86 on the Server Market"; <http://www.intel.com/content/dam/doc/white-paper/performance-xeon-7500-next-gen-x86-paper.pdf>

5. ITIC "Intel Xeon Processor E7 Family Reaches Reliability Parity with RISC/UNIX, Delivers 99.999% Reliability, Availability and Serviceability" July 2013;

<http://www.intel.com/content/dam/www/public/us/en/documents/white-papers/xeon-e7-ras-itic-paper.pdf>

6. No computer system can provide absolute reliability, availability or serviceability. Requires an Intel® Run Sure Technology-enabled system, including an enabled Intel processor and enabled technology(ies). Built-in reliability features available on select Intel® processors may require additional software, hardware, services and/or an Internet connection. Results may vary depending upon configuration. Consult your system manufacturer for more details.

7. Memory capacity possible by populating all (96 for 4S; 192 for 8S) DIMMs with 64 GB DDR3 LR-DIMMs.

8. Up to 4x I/O bandwidth claim based on Intel internal estimates of the Intel Xeon processor E7-4890 v2 performance normalized against the improvements over dual-I/OH Intel Xeon processor E7-4870 based on internal bandwidth tool running the 1R1W test.

9. Implementation is OEM-dependent; check with your OEM for recovery capabilities.

10. No computer system can provide absolute security. Requires an enabled Intel® processor and software optimized for use of the technology. Consult your system manufacturer and/or software vendor for more information.

11. No computer system can provide absolute security. Requires an enabled Intel® processor, enabled chipset, firmware, software, may require a subscription with a capable service provider (may not be available in all countries). Intel assumes no liability for lost or stolen data and/or systems or any other damages resulting thereof. Consult your Service Provider for availability and functionality. For more information, visit <http://www.intel.com/go/anti-theft>. Consult your system manufacturer and/or software vendor for more information.

12. Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. See [http://www.intel.com/products/processor\\_number](http://www.intel.com/products/processor_number) for details.

13. Requires a system with Intel® Turbo Boost Technology. Intel Turbo Boost Technology and Intel Turbo Boost Technology 2.0 are only available on select Intel® processors. Consult your system manufacturer. Performance varies depending on hardware, software, and system configuration. For more information, visit <http://www.intel.com/go/turbo>.

14. Available on select Intel® processors. Requires an Intel® Hyper-Threading Technology-enabled system; consult with your system manufacturer. Performance will vary depending on the specific hardware and software used. For more information, including details on which processors support Intel HT Technology, visit <http://www.intel.com/info/hyperthreading>.

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Intel does not control or audit the design or implementation of third party benchmarks or Web sites referenced in this document. Intel encourages all of its customers to visit the referenced Web sites or others where similar performance benchmarks are reported and confirm whether the referenced benchmarks are accurate and reflect performance of systems available for purchase.

- Relative performance is calculated by assigning a baseline value of 1.0 to one benchmark result, and then dividing the actual benchmark result for the baseline platform into each of the specific benchmark results of each of the other platforms, and assigning them a relative performance number that correlates with the performance improvements reported.
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