



PRODUCT BRIEF

Intel® Xeon® Processor E7-8800/4800 v3 Product Families
Data Center



Accelerate Big Data Insights

With the Intel® Xeon® Processor E7-8800/4800 v3 Product Families

Today's advanced analytics solutions are fundamentally changing the speed with which businesses can extract insights from large data sets. With results delivered in seconds or minutes rather than hours or days, business intelligence can be integrated into critical, real-time processes to drive better results, improve decision making, deliver new services and experiences, and implement new revenue-generating business models.

Four-socket, eight-socket, and larger servers based on the Intel® Xeon® processor E7-8800/4400 v3 product families provide exceptional performance and scalability for real-time analytics operating on multi-terabyte and even petabyte-scale datasets. With their massive execution resources, large memory capacity, and advanced reliability features, these servers also provide best-in-class support for traditional enterprise applications, such as enterprise resource planning (ERP), data warehousing, and online transaction processing (OLTP).

As workloads continue to grow, these powerful servers can help you expand your IT capabilities to support faster, smarter, more data-driven business models. They can also help you virtualize demanding workloads and move them into private or hybrid clouds, so you can bring new agility, efficiency, and resilience into your mission-critical environments.

Up to 5.9X Higher Performance^{1,2} for Critical Workloads

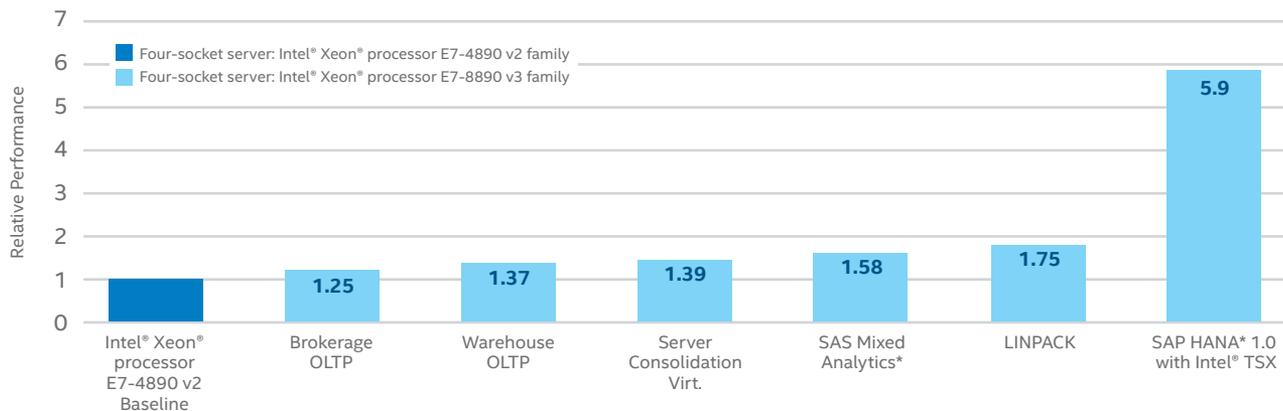
With up to 20 percent more cores, threads, cache, and system bandwidth than previous generation processors, the Intel Xeon processor E7 v3 family makes fast work of complex, high-volume transactions and queries. These processors also support both DDR4 and DDR3 memory technologies, so you can balance cost versus performance more flexibly as your workloads grow.

These and other enhancements deliver up to 1.37X¹ the performance for traditional OLTP workloads versus previous-generation processors and up to 1.58X¹ higher performance for

business intelligence and analytics. Two new technologies provide additional and dramatic gains for many critical enterprise applications.

- Intel® Transactional Synchronization Extensions³ (Intel® TSX) introduced in the Intel Xeon processor E7 v3 family, provides up to 5.9X higher OLTP performance^{1,2} for optimized database solutions, via a flexible and easy-to-use mechanism that accelerates multi-threaded workloads by dynamically exposing otherwise hidden parallelism.
- Intel® Advanced Vector Extensions³ 2.0 (Intel® AVX 2.0) with new Fused Multiply Add (FMA) instructions doubles both the maximum number of floating point operations per second (Flops) and the maximum width of vector integer instructions (to 256 bits)—to extend the performance benefits of Intel AVX into enterprise computing.

4S Intel® Xeon® Processor E7 v3 Product Family Current Generational Performance Measurements



Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors.¹ Performance tests 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. Configurations: 4x Intel Xeon processor E7-8890 v3 compared to E7-4890 v2. For more complete information, visit <http://www.intel.com/performance>.

World-Class Reliability, Availability, and Security

Servers based on the Intel Xeon processor E7 v3 family include Intel® Run Sure Technology³ which provides Resilient System and Resilient Memory technologies to support mission-critical uptime and advanced data integrity. These systems have been delivering uptime levels comparable to high-end RISC-based systems for several years,⁴ and the Intel Xeon processor E7 v3 family adds valuable new Intel Run Sure technologies.

- **Enhanced Machine Check Architecture Recovery Gen2** helps to improve system resilience by extending automatic error recovery to the core execution engine.
- **Address Range Memory Mirroring** helps to improve memory resilience by providing granular control over which memory regions are mirrored. You can mirror critical data for extreme reliability, while leaving more memory available for other workloads.

Other new reliability features include multiple rank sparing, which enables increased memory redundancy, and DDR4 recovery for command and address parity errors. These technologies provide additional support for increasing system uptime and data integrity, while reducing service costs.

The Intel Xeon processor E7 v3 family also includes integrated security technologies that help to protect data, software, and hardware more effectively. Capabilities such as hardware-accelerated encryption and trusted platform launches (based on cryptographically verified “known good states”) support stronger security with less impact on application performance.

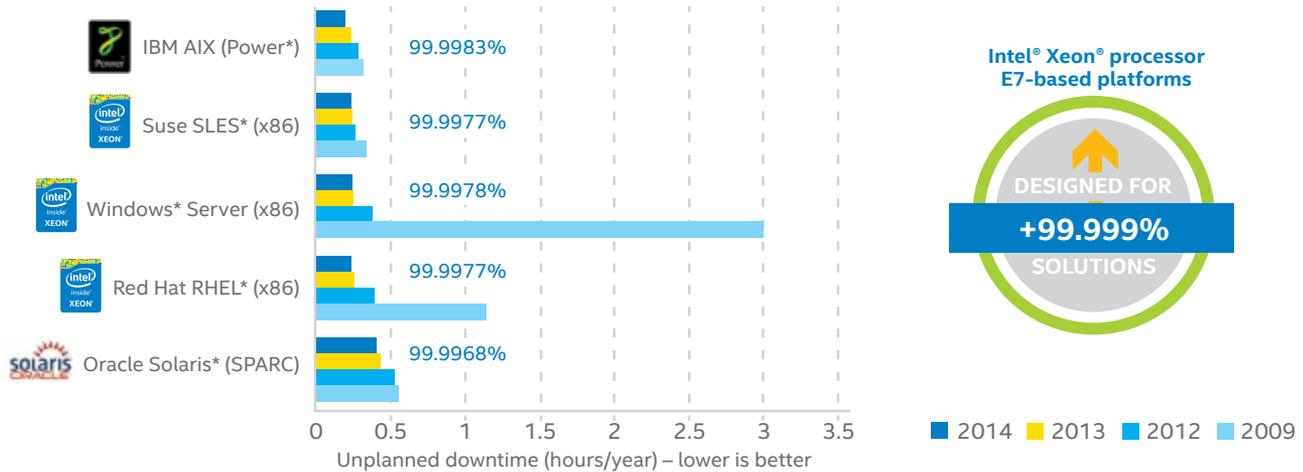
Scalability for Any Workload

The Intel Xeon processor E7 v3 family provides a powerful engine for both in-memory and traditional workloads, with up to 18 cores, 36 threads, and 45 MB of last-level cache per socket—plus support for up to 6 TB of memory in a four-socket system and up to 12 TB in an 8-socket system. Even larger configurations are available from select server vendors.

Optimizing platform scalability requires a balanced platform to avoid performance-limiting bottlenecks. Intel offers high-performance storage and networking solutions for the most demanding workloads.

- **The Intel® Solid-State Drive Data Center Family for PCIe* (Intel® SSD)** delivers up to 5x the throughput of SATA SSDs, with enterprise-class reliability, endurance, and data protection.
- **The Intel® Ethernet Controller XL710 (40GbE)** provides flexible, high-performance network solutions to keep data flowing more quickly and reliably, even in dense, virtualized environments.
- **Intel® QuickAssist Technology** offloads cryptographic and data compression workloads to dedicated accelerators to improve performance, while freeing up CPU cycles for improved scalability.

Industry Recognized Reliability



Intel® Xeon® processor E7 platform delivering equivalent reliability and uptime to the best-in-class RISC-based platforms.

Source: ITIC (Information Technology Intelligence Consulting) server reliability study, 2014.

Powerful Virtualization for Data Center Modernization

Servers based on the Intel Xeon processor E7 v3 family provide the performance, scalability, and reliability needed to virtualize enterprise workloads and move them into private or hybrid cloud environments. Platform-wide hardware assists for virtualization enable near-native performance in virtual machines, and advanced telemetry provides better insight for monitoring and orchestrating resources. Two new technologies bring additional flexibility and robustness.

- **Cache Monitoring** helps to eliminate cache contention among virtual machines. “Noisy neighbors” can be identified and moved before performance is compromised.
- **Intel® Virtual Machine Control Structure (VMCS) shadowing** allows one hypervisor to run in a virtual machine managed by another hypervisor, without compromising performance. VMCS provides greater security and isolation for ultra-sensitive workloads and for running development/test and production workloads on the same server.

Up to 5.9X higher performance^{1,2} for more responsive applications

- Up to 20 percent more cores, threads, cache, and system bandwidth compared with the previous-generation delivers platform-wide improvements for better overall performance.
- Intel® Transactional Synchronization Extensions³ (Intel® TSX) accelerate queries and database transactions by dynamically optimizing the execution of critical, lock-protected data sections.

- Intel® Advanced Vector Extensions³ 2.0 (Intel® AVX 2.0) improves performance for many applications, through wider vector units and new instructions that perform more work per clock cycle.

Scalable memory capacity for real-time analytics across large data sets

- Up to 6 TB per 4-socket server and 12 TB per 8-socket server, with larger scale-up configurations available from select server vendors.
- Support for both DDR4 or DDR3 memory provides flexibility and headroom for future growth.
- Memory performance mode for higher I/O and bandwidth (plus lockstep mode for higher data reliability).
- An integrated I/O controller and support for direct storage-to-cache data transfers help to increase performance for data-demanding applications.

The most advanced reliability features of any Intel Xeon processor family

- Intel® Run Sure Technology³ includes a robust set of advanced reliability, availability, and serviceability (RAS) technologies to help reduce the frequency and cost of unplanned downtime.
 - Enhanced Machine Check Architecture Recovery Gen 2 extends error recovery to the execution core for higher reliability.
 - Address range memory mirroring supports extreme data reliability for targeted needs without driving up system-wide memory requirements.
- Multiple DIMM rank sparing and DDR4 recovery for command and address parity errors help to improve uptime and reduce service costs even more.

Hardware-enhanced security to reduce risk

- **Intel® Data Protection Technology³** with Intel® Advanced Standard New Instructions (Intel® AES-NI) and Secure Key enable stronger data protection with less impact on application performance.⁵
- **Intel® Platform Protection Technology³** with Intel® Trusted Execution Technology (Intel® TXT), OS Guard, and BIOS Guard enable higher security, trust, and compliance.⁵

INTEL® XEON® PROCESSOR E7 v3 FAMILY SPECIFICATIONS

Intel® Xeon® processor SKU	Frequency (GHz)	Cache	Power	Cores	Intel® Turbo Boost Technology	Intel® HT Technology	Intel® QPI Link Speed
E7-8893 v3	3.2	45M	140 W	4	●	●	9.6 GT/s
E7-8891 v3	2.8	45M	165 W	10	●	●	9.6 GT/s
E7-8880L v3	2.0	45M	115 W	18	●	●	9.6 GT/s
E7-8867 v3	2.5	45M	165 W	16	●	●	9.6 GT/s
E7-8890 v3	2.5	45M	165 W	18	●	●	9.6 GT/s
E7-8880 v3	2.3	45M	150 W	18	●	●	9.6 GT/s
E7-8870 v3	2.1	45M	140 W	18	●	●	9.6 GT/s
E7-8860 v3	2.2	40M	140 W	16	●	●	9.6 GT/s
E7-4850 v3	2.2	35M	115 W	14	●	●	8.0 GT/s
E7-4830 v3	2.1	30M	115 W	12	●	●	8.0 GT/s
E7-4820 v3	1.9	25M	115 W	10	No Turbo	●	6.4 GT/s
E7-4809 v3	2.0	20M	115 W	8	No Turbo	●	6.4 GT/s

FOR MORE INFORMATION

on the Intel Xeon processor E7-8800/4800 v3 product families, visit www.intel.com/xeonE7.

¹ Software and workloads used in performance tests may have been optimized for performance only on Intel 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. a) Up to 25% performance gain claim based on OLTP brokerage workload using Windows® Server 2012. Configurations: 1) Baseline 1.0: 4S Intel Xeon processor E7-4890 v2, Microsoft SQL Server® 2014, 1 TB DDR3-1333 memory, 4x RS25N008 HBAs, 56x 800GB Intel S3700 SSDs. 2) 4S Intel Xeon processor E7-4890 v3, Microsoft SQL Server® 2012, 1 TB DDR4-1600 memory, 6x RS25N008 HBAs, 70x 800GB Intel S3700 SSDs. b) Up to 37% performance gain claim based on OLTP warehouse workload results measuring transactions per minute (tpm) using Oracle® 11g R2 on Red Hat Enterprise Linux 6.5. Configurations: 1) Baseline 1.0: 4S E7-4890 v2 using 1 TB DDR3-1333 memory, 60x 800GB Intel DC S3700 SSDs. Score: 4789K. 2) 4S E7-8890 v3 using 2 TB DDR4-1600 memory, 84x 800GB Intel DC S3700 SSDs. Score: 6602K. c) Up to 39% performance gain claim based on SPECvirt_sc®2013 workload, running VMware ESXi®5.5 measuring throughput (min. QOS), with 2x Intel RAID Controller RS2P1008, 2x Intel 82599EB 10GbE. Configurations: Baseline: 4S E7-4890 v2, RHEL® 6.2, 1 TB DDR3-1333 memory, 2x LSI and 2x NewSYS enclosures, 18x 400GB Intel SATA SSD, 16x 300GB SSD, 1x Intel 82576 Dual-port GbE; Score: 1150 @ 63 VMs. 2) 4S E7-8890 v3, RHEL 6.4, 1 TB DDR4-1600 memory, 4x LIS 620J, 48x 64GB X25-E Intel SATA SSD, 24x 100GB Intel 710 SATA SSD, 24x 800GB Intel DC S3700 SSD, 1 HP ProCurve 6400c; Score: 1606 @ 90 VMs. d) Up to 1.58 times increase claim based on SAS Mixed Analytics workload measuring sessions per hour using SAS Business Analytics® 9.4 M2 on Red Hat® Enterprise LINUX 7. Configurations: 1) Baseline 1.0: 4S Intel Xeon processor E7-4890 v2, 512 GB DDR3-1066 memory, 4x 2.0 TB Intel DC P3700 SSDs + 8x 800 GB Intel DC S3700 SSDs. 2) Up to 1.58x more sessions per hour: 4S Intel Xeon processor E7-8890 v3, 512 GB DDR4-1600 memory, 4x 2.0 TB Intel DC P3700 SSDs + 8x 800 GB Intel DC S3700 SSDs. e) Up to 75 percent additional floating point operations claim based on Intel Optimized MP LINPACK 11.1.1 workload, running Red Hat Enterprise Linux® (RHEL). Configurations: Baseline: 4S E7-4890 v2, RHEL 6.4, 512 GB DDR3-1333 memory, 75000 problem size; Score: 1247. 2) 4S E7-8890 v3, RHEL 7.0, 1 TB DDR4-1600 memory, 220000 problem size; Score: 2188. f) Up to 5.9 times performance improvement claim based on SAP® OLTP internal workload measuring transactions per minute (tpm) on SuSE® LINUX Enterprise Server 11 SP3. Configurations: 1) Baseline 1.0: 4S Intel Xeon processor E7-4890 v2, 512 GB memory, SAP HANA® 1 SPS08. 2) Up to 5.9x more tpm: 4S Intel Xeon processor E7-8890 v3, 512 GB memory, SAP HANA® 1 SPS09. For more complete information visit <http://www.intel.com/performance/datacenter>.

² Results have been estimated or simulated using internal Intel analysis or architecture simulation or modeling, and provided to you for informational purposes. Any differences in your system hardware, software or configuration may affect your actual performance.

³ Intel technologies may require enabled hardware, specific software, or services activation. Check with your system manufacturer or retailer.

⁴ ITIC 2014-2015 Global Server Hardware, Server OS Reliability Report; Information Technology Intelligence Consulting (ITIC) Corp

⁵ No computer system can be absolutely secure.

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