



THE NEXT LEAP IN PERFORMANCE, OPTIMIZED FOR YOUR BUSINESS

The pace of technology innovation just keeps getting faster. From real-time business and big data analytics, to software-defined infrastructure and hybrid cloud computing, organizations now have unprecedented opportunities to transform the speed, intelligence, and efficiency with which they run their business, develop their products, and connect with their customers.

The latest Intel® Xeon® processor E5-2600 v4 product family offers a powerful new compute engine built specifically to power these transformative changes. Yet hardware advances deliver full value only when they are combined with innovative software. From 3-D data visualization and virtual prototyping, to personalized content delivery and advanced cloud orchestration, new software capabilities provide the foundation for smarter, faster, and more agile business solutions.

Of course, innovative software functionality is not enough. Speed and scale are also competitive differentiators. Manufacturers gain critical time-to-market advantages by completing more and larger simulations in less time. Trading organizations gain an edge in volatile markets by analyzing more risk scenarios per microsecond. Businesses across every sector gain competitive advantage when they can analyze larger volumes of data fast enough to support critical, real-time processes throughout their business. The Intel Xeon processor E5-2600 v4 product family delivers value across all these scenarios, and many more.

Higher Performance Meets Powerful Innovation

The new Intel Xeon processor E5-2600 v4 product family is ideal for next-generation application workloads. Higher core counts, enhanced virtualization capabilities, and increased memory bandwidth provide the resources that are necessary to drive improvements in performance across a wide range of workloads. These processors also include technologies that can help IT organizations and cloud providers orchestrate resources more intelligently in software-defined data centers, so they can optimize performance, agility, and efficiency.

Even with these powerful new processors, however, application performance gains are not always automatic. To help address this challenge, Intel provides leading independent software vendors (ISVs) with access to pre-launch platforms, Intel® software tools, and Intel's technical experts. As a result, many ISVs may be quicker to market with applications that are optimized, tested, and benchmarked on the Intel Xeon processor E5-2600 v4 product family.

Proven Gains for Critical Applications

The Intel Xeon Processor E5-2600 v4 Product Family Applications Showcase documents dozens of performance results in many of today's most important software categories. A few of the many highlights are described below. (Note: The cited performance improvements depend on the specific processors and platform ingredients used on baseline and test configurations, which vary among the reported benchmarks. For detailed test configurations, click the links below.)

- **Technical computing (up to 5.5x faster¹).** Whether you're designing a new product, identifying a disease marker, or exploring the subsurface, faster access to deeper insight offers fundamental advantages. More than 10 leading software vendors are delivering double-digit or higher performance gains today through a combination of software optimization, the Intel Xeon processor E5-2600 v4 product family, and, in some cases, the Intel® Solid State Drive Data Center Family or other Intel platform ingredients. For an example, see the [Paradigm solution brief](#).
- **Telecommunications and cloud (up to 2.2x faster²).** From core business infrastructure to high-speed image processing, multiple cloud service providers have optimized their code to deliver better customer experiences using the Intel Xeon processor E5-2600 v4 product family. One ISV is taking advantage of Intel® Resource Director Technology (Intel® RDT) to improve performance for high priority workloads by dynamically managing the consumption of shared platform resources, such as L3 cache and system memory. Watch the [AppFormix video](#).

- **Financial services (up to 1.4x faster³).** Volatile markets and growing regulatory demands are placing ever-higher demands on trading, risk management, and other financial services platforms. By optimizing their code for the Intel Xeon processor E5-2600 v4 product family, (and, in some cases, for Intel AVX 2.0), ISVs are helping their customers churn through more computations faster to enable quicker, smarter decision making in high-volume markets. Read the [Ltiviti solution brief](#).
- **Core business applications (up to 1.4x faster⁴).** Your applications should not limit your ability to innovate—they should drive it. From deep neural network and machine learning to fast, accurate searches, optimized software running on the Intel Xeon processor E5-2600 v4 product family is helping vendors deliver better response times for powerful new business capabilities.
- **Enterprise database (up to 1.5x faster⁵).** With today's high-volume transactions and real-time analytics, data platforms have to do more and do it faster. The Intel Xeon processor E5-2600 v4 product family is helping database vendors meet the challenge by processing more simultaneous transactions and queries while delivering faster response times.
- **Big data analytics (up to 1.3x faster⁵).** Leading ISVs are redefining what's possible in data-driven industries, with fast, highly-reliable data platforms that help organizations turn all their data—from core business data to social media posts—into instant intelligence. Many leading ISVs are taking advantage of the Intel Xeon processor E5-2600 v4 product family, often in combination with Intel storage and networking solutions, to deliver faster response times and high scalability per server. Read the [Aerospike solution brief](#) or the [MarkLogic solution brief](#) for more information.

Learn More

To get a closer look at these and dozens of other ISV performance benchmarks, take a few minutes to explore the [Intel® Xeon® Processor E5-2600 v4 Product Family – Software Solutions page](#).

¹ **LAMMPS:** LAMMPS Stillinger-Weber Silicon Benchmark – 512K atoms workload. Testing by Intel, 3/21/2016

BASELINE: Intel® Xeon® Processor E5-2697 v3 on Grantley-EP (Wellsburg), with 64 GB Total Memory, 8 slots / 8 GB / 2133MT/s / DDR4 RDIMM, HT on, on Red Hat EnterpriseLinux* 6.5 kernel 2.6.32-431, LAMMPS: (25 Sep 2015+ LOCAL), compilers_and_libraries_2016.0.109,mpi5.1.2.RC1, Request Number: 2196

NEW: Intel® Xeon® Processor E5-2697 v4 on Grantley-EP (Wellsburg), with 64 GB Total Memory, 8 slots / 8 GB / 2400MT/s / DDR4 RDIMM, HT on, on Red Hat EnterpriseLinux* 6.5 kernel 2.6.32-431, LAMMPS: (25 Sep 2015+ LOCAL), compilers_and_libraries_2016.0.109,mpi5.1.2.RC1, Request Number: 2196

² **AppFormix:** **Baseline configuration:** NGINX web server connected to external load generation system (below) based on 2x Intel® Xeon® processor E5-2699 v4, 2.2GHz, 22 cores, 64GB DDR4-2133, Gb link via X540-AT2 NICs. Ubuntu14.04, Kernel v4.4 + RDT Patches. C1E disabled and turbo disabled for test repeatability. Source is AppFormixas of March 3rd, 2016.

New configuration: Intel's Cache Allocation Technology (CAT) enabled to restrict the "noisy neighbor" applications to 10% of the L3 cache (effective CAT mask 0x00003)

"Noisy neighbor" applications: 11 processes per socket of stream set to array size e6

External load generation system: wg/WRK running 22 threads on Ubuntu 14.04, dbase on 2x Intel Xeon L5520@.27GHz CPUs, 24GB DDR3-1067 with 10Gb networking (Intel X540-AT2 NICs)

Results: Worst-case web server response times improved by up to 2.2X (from 467 to 210ms) and average response times improved by up to 1.5X (from 33 to 21.8ms).

³ **TCS Risk Management:** Incremental Risk Charge Computation application, workload of 150 scenarios, simulating aggregation of credit losses due to random events involving approximately 5 TB of data processing. Testing by Intel, 2/23/2016. The estimated improvement in performance for the Intel® Xeon® processor E5-2697 v4 compared to E5-2697 v3 is 1.24X.

BASELINE: 1-Node, 2 x Intel® Xeon® processor E5-2697 v3 on Grantley-EP (Wellsburg) with 64 GB total memory, 8 slots / 8 GB / 2133 MT/s / DDR4 RDIMM, 1TB 2.5-inch SATA HDD 6GB/s, HT and turbo on, on Red Hat Enterprise Linux* 6.5 kernel 2.6.32-431. Data source: Request Number: 1969.

NEW: 1-Node, 2 x Intel® Xeon® processor E5-2699 v4 on Grantley-EP (Wellsburg) with 64 GB total memory, 8 slots / 8 GB / 2133 MT/s / DDR4 RDIMM, 1 TB 2.5-inch SATA HDD 6GB/s, HT and turbo on, on Red Hat Enterprise Linux* 6.5 kernel 2.6.32-431. Data Source: Request Number: 1969.

⁴ **Naver* Search Engine:** Naver search engine response/second. Testing done by Naver and Intel, 2/4/2016. The estimated improvement in performance for the Intel® Xeon® processor E5-2697 v4 compared to E5-2697 v3 is 1.2X.

BASELINE: 1-Node, 2 x Intel® Xeon® processor E5-2697 v3 (35 M cache, 2.60 GHz) on Grantley-EP (Wellsburg) with 128 GB total memory, 8 slots / 16 GB / 2133 MT/s / DDR4 RDIMM, HDD SAS 300G*3 (10,000 rpm), HT and turbo on, on Red Hat Enterprise Linux* 6.4 kernel 2.6.32-358. Data source: Request Number: 1949.

NEW: 1-Node, 2 x Intel® Xeon® processor E5-2699 v4 (55 M cache, 2.20 GHz) on Grantley-EP (Wellsburg) with 128 GB total memory, 8 slots / 16 GB / 2400 MT/s / DDR4 RDIMM, HDD SAS 300G*3 (15,000 rpm), HT and turbo on, on Red Hat Enterprise Linux* 6.7 kernel 2.6.32-573. Data source: Request Number: 1949.

⁵ **Oracle MySQL*:** Sysbench OLTP, transactions per second (TPS) workload. Testing by Intel, 3/3/2016. The estimated improvement in performance for the Intel® Xeon® processor E5-2697 v4 compared to E5-2697 v3 is 1.34X.

BASELINE: 1-Node, 2 x Intel® Xeon® processor E5-2697 v3 on Grantley-EP (Wellsburg) with 64 GB total memory, 8 slots / 8 GB / 2133 MT/s / DDR4 RDIMM, in-memory storage (RAM disk), disk I/O is not a bottleneck, CPU bound, default BIOS settings, HT and turbo on, on Ubuntu* 15.10 using Oracle's MySQL 5.7, Sysbench OLTP* 0.4.12. Data source: Request Number: 1952.

NEW: 1-Node, 2 x Intel® Xeon® processor E5-2699 v4 on Grantley-EP (Wellsburg) with 64 GB total memory, 8 slots / 8 GB / 2133 MT/s / DDR4 RDIMM, in-memory storage (RAM disk), disk I/O is not a bottleneck, CPU bound, default BIOS settings, HT and turbo on, on Ubuntu 15.10 using Oracle's MySQL 5.7, Sysbench OLTP 0.4.12. Data source: Request Number: 1952.

⁶ **eMudhra Prism:** Social media data sentiment analysis workload. Testing by Intel, 2/23/2016. The estimated improvement in performance for the Intel® Xeon® processor E5-2697 v4 compared to E5-2697 v3 is 1.14X.

BASELINE: 1-Node, 2 x Intel® Xeon® Processor E5-2697 v3 on Grantley-EP (Wellsburg) with 64 GB Total Memory, 8 slots / 8 GB / 2133 MT/s / DDR4 RDIMM, 1TB 2.5" SATA HDD 6GB/s, HT and turbo on, on CentOS*. Data Source: Request Number: 1974

NEW: 1-Node, 2 x Intel® Xeon® Processor E5-2699 v4 on Grantley-EP (Wellsburg) with 64 GB Total Memory, 8 slots / 8 GB / 2133 MT/s / DDR4 RDIMM, 1TB 2.5" SATA HDD 6GB/s, HT and turbo on, on CentOS*. Data Source: Request Number: 1974

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

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