



# POWERFUL DENSE 4-SOCKET SERVERS FOR NEXT-GENERATION DATA CENTERS AND CLOUDS

## Intel® Xeon® Processor E5-4600 v3 Product Family



Four-socket servers based on the Intel® Xeon® processor E5-4600 v3 product family provide high-density, energy-efficient compute resources to support larger workloads and high virtual machine densities in your data center or cloud. These servers deliver a major leap in performance versus previous generation systems, along with advanced Intel technologies that can help you monitor, secure, and orchestrate your data center resources more effectively. By extending the proven value of the Intel® Xeon® processor E5 v3 family into 4-socket server platforms, they give you more options and greater flexibility for scaling your infrastructure and growing your business.

### Up to 49% Higher Performance<sup>1</sup>

The Intel Xeon processor E5-4600 v3 product family delivers up to 49% average performance increase than previous generation<sup>1</sup> so you can deliver faster application response times and support heavier workloads on fewer servers. These processors provide up to 50 percent more cores, threads, and cache than the prior generation.<sup>2</sup> They also support DDR4 memory, for up to 1.4x higher memory bandwidth<sup>3</sup> and reduced power consumption.

Additional and dramatic performance gains can be achieved for many enterprise applications using Intel® Advanced Vector Extensions 2.0 (Intel® AVX2) with Fused Multiply Add (FMA) instructions. Intel AVX2 doubles the number of floating point operations that can be performed per second (flops). It also doubles the maximum width of vector integer instructions to 256 bits, so up to twice the amount of work can be performed in every clock cycle.

### Better Security for Your Data and Platforms

Security is more important than ever in today's virtualized data centers and clouds. The Intel Xeon processor E5 v3 family includes integrated security technologies that can help you protect your data, software, and hardware more effectively. With up to 2x faster encryption and decryption versus previous-generation processors,<sup>4</sup> you can encrypt data pervasively while maintaining fast application response times. You can also establish trusted infrastructure pools, ensuring that your servers and virtual machines only boot into cryptographically verified "known good states."

### Improved Power Efficiency

Minimizing power consumption is essential to keep rising utility costs under control.<sup>5</sup> Intel® Intelligent Power technology dynamically optimizes power across the CPU and memory, and now supports per-core P states (PCPS) that independently optimize power for each individual processor core. You can also take advantage of Intel® Node Manager and Intel® Data Center Manager to improve power and thermal management at multiple levels, from individual servers to racks, rows, and entire data centers.

## Smart, Flexible Resource Orchestration

IT organizations are moving toward software-defined infrastructure (SDI) to improve service levels and resource utilization. The Intel Xeon processor E5-4600 v3 product family provides advanced functionality and built-in intelligence that can help you deliver better results with less effort.

Cache monitoring, for example, provides visibility into one of the most critical shared resources in virtualized servers. You can now identify and move “noisy neighbor” virtual machines before they compromise performance. You can also take advantage of integrated telemetry and Intel Node Manager to access real-time data on server power, thermal, and utilization status, so you have better information for managing and orchestrating resources.

High performance virtualization lays the foundation for data center agility, and the Intel Xeon processor E5-4600 v3 product family provides new flexibility through hardware-acceleration for nested hypervisors. You can run a hypervisor in a virtual machine managed by another hypervisor. This tactic can improve security and isolation for ultra-sensitive workloads. It also provides greater flexibility for running test, development, and production workloads on the same server.

## Higher Value through Complete Platform Solutions

Optimizing performance and utilization in today's complex data centers and clouds requires a balanced platform to avoid bottlenecks. Intel offers complete storage and networking solutions that can help you unleash the full capability of each server.

**The Intel® Solid-State Drive Data Center Family for PCIe\* (Intel® SSD)** delivers up to 5x the throughput of SATA SSDs,<sup>6</sup> with enterprise-class reliability, endurance, and data protection.

**The Intel® Ethernet Controller XL710 (40 GbE)** provides flexible, high-performance network connectivity to keep data flowing more quickly, 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.

**INTEL® XEON® PROCESSOR E5-4600 v3 PRODUCT FAMILY SPECIFICATIONS**

Intel® Xeon® processor SKU	Frequency (GHz)	Cache	Power	Cores	Intel® Turbo Boost Technology	Intel® HT Technology	Intel® QPI Link Speed
E5-4669 v3	2.1	45M	135 W	18	●	●	9.6 GT/s
E5-4667 v3	2.0	40M	135 W	16	●	●	9.6 GT/s
E5-4660 v3	2.1	35M	120 W	14	●	●	9.6 GT/s
E5-4655 v3	2.9	30M	135 W	6	●	●	9.6 GT/s
E5-4650 v3	2.1	30M	105 W	12	●	●	9.6 GT/s
E5-4648 v3**	1.7	30M	105 W	12	●	●	8.0 GT/s
E5-4640 v3	1.9	30M	105W	12	●	●	8.0 GT/s
E5-4620 v3	2.0	25M	105 W	10	●	●	8.0 GT/s
E5-4610 v3	1.7	25M	105 W	10	No Turbo	●	6.4 GT/s
E5-4627 v3	2.6	25M	135 W	10	●	HT Off	9.6 GT/s

\*\* This is a storage and comms SKU.



## INTEL® XEON® PROCESSOR E5-4600 v3 PRODUCT FAMILY OVERVIEW

FEATURES	BENEFITS
Advanced multi-core, multi-threaded processing	Up to 18 cores and 36 threads per socket for running more and heavier workloads per server
Larger cache and faster memory	<ul style="list-style-type: none"> <li>Up to 45 MB of last level cache for fast access to frequently used data</li> <li>Up to 48 DIMMS per four-socket server for memory-intensive applications</li> <li>Faster maximum memory speeds with DDR4 memory (2133 versus 1866 MHz)</li> </ul>
Higher performance for demanding workloads	<ul style="list-style-type: none"> <li>Intel® Advanced Vector Extensions 2.0 (Intel® AVX 2.0) supports wider vector units and new instructions to perform more work per clock cycle</li> <li>Intel® Turbo Boost Technology 2.0 takes advantage of power and thermal headroom to automatically increase core frequencies during peak workloads</li> </ul>
New Standard RAS features	<ul style="list-style-type: none"> <li>Multiple rank sparing</li> <li>DDR4 recovery for command and address parity errors</li> </ul>
Flexible, high-performance virtualization	Intel® Virtual Machine Control Structure (VMCS) shadowing enables fast performance for nested hypervisors to improve flexibility and workload isolation
Stronger, faster data encryption	Intel® Data Protection Technology with: <ul style="list-style-type: none"> <li>Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI) for pervasive data encryption without sacrificing application response times</li> <li>Secure Key for high-quality encryption keys that provide better protection against sophisticated side channel attacks</li> </ul>
A better foundation for secure multitenancy	Intel® Platform Protection Technology with: <ul style="list-style-type: none"> <li>Intel® Trusted Execution Technology (Intel® TXT) for establishing trusted infrastructure that can only launch into known good states</li> <li>OS Guard and BIOS Guard for stronger platform-level security</li> </ul>
Industry-leading energy efficiency	Intel® Intelligent Power Technology and Per-Core P States dynamically manage CPU and memory energy states to reduce power without slowing performance
Smarter resource orchestration	<ul style="list-style-type: none"> <li>Cache monitoring helps to solve “noisy neighbor” performance issues</li> <li>Intel® Node Manager takes advantage of advanced platform telemetry to provide better visibility and control over platform power and utilization</li> <li>Intel® Data Center Manager extends power management from individual servers to racks, rows, and entire data centers</li> </ul>

## 4-SOCKET Server Platforms

Intel®  
QuickAssist  
Technology

**2x** faster  
encryption

## HIGHER MEMORY Bandwidth



To learn more about the Intel Xeon processor E5-4600 v3 product family,  
**visit [www.intel.com/xeonE5](http://www.intel.com/xeonE5).**

<sup>1</sup> 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. Up to 49% average performance gain claim based on six workload estimated results (STREAM Triad, SPECint\*\_rate\_base2006, SPECfp\*\_rate\_base2006, Brokerage Firm OLTP, Warehouse Supply Chain OLTP and LINPACK MP) as of 5/29. Configurations (see Appendix for more details):

4x Intel Xeon processor E5-4657L v2 (12C, 2.4 GHz) with DDR3-1866 1DPC (OLTP 2DPC @ 1600 MHz)

4x Intel Xeon processor E5-4669 v3 (18C, 2.1 GHz) with DDR4-2133 1DPC (OLTP 2DPC @ 1866)

For more information go to <http://www.intel.com/performance/datacenter>

<sup>2</sup> Intel® Xeon® Processor E5-4669 v3 (18 cores, 36 threads, 45M cache) compared to Intel® Xeon® Processor E5-4657L v2 (12 cores, 24 threads, 30M cache).

<sup>3</sup> Source as of August 2014 TR#3044 on STREAM (triad): Intel® Server Board S2600CP with two Intel® Xeon® Processor E5-2697 v2, 24x16GB DDR3-1866 @1066MHz DR-RDIMM, score: 58.9 GB/sec. New Configuration: Intel® Server System R2208WTTYS with two Intel® Xeon® Processor E5-2699 v3, 24x16GB DR4-2133 @ 1600MHz DR-RDIMM, score: 85.2 GB/sec.

<sup>4</sup> Source as of June 2014 on AES-128-GCM Encryption algorithm: Intel internal measurements using Intel® Server Board S2600CW2S with two Intel® Xeon® Processor E5-2658 v3, DDR4-2133, CentoOS v3.8.4, Open SSL v1.0.2-beta1. Baseline Configuration: Intel internal measurements with two E5-2658 v2, DDR3-1866, CentoOS v3.8.4, Open SSL v1.0.2-beta1.

<sup>5</sup> Compared to previous generation 2-D transistors on 32nm planar transistors. Source: Intel internal testing

<sup>6</sup> Based on the Intel® Solid-State Drive Data Center P3700 and the Intel® Solid-State Drive Data Center S3700 Series Product Specifications. For more information, visit <http://www.intel.com/content/www/us/en/solid-state-drives/intel-ssd-dc-family-for-pcie.html> For more complete information visit <http://www.intel.com/performance/datacenter>.

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