Platform Brief
Intel® Xeon® Processor E5-2600 v3
Product Family and Intel® C612 Chipset
Communications, Storage, and Embedded Infrastructures

Intel® Xeon® Processor E5-2600 v3-Based Platforms for Communications, Storage, and Embedded Infrastructures

These Intel® Xeon® processors, paired with the Intel® C612 chipset, provide a scalable platform for single- and dual-socket designs that are ideal for a wide range of communications, storage, and embedded devices that connect seamlessly to networks, clouds, storage systems, and each other.

Platform Overview

Manufactured on industry-leading 22nm process technology with 3D Tri-Gate transistors, these processors provide significant performance and power efficiency improvement over the previous-generation Intel® Xeon® processors E5-2600 v2 product family. Utilizing the Intel® microarchitecture, codename Haswell, it is the first Intel® Xeon® processor family with extended life cycle support to offer 12-core/single-socket to 24-core/dual-socket configurations.

The platform provides performance, I/O, and memory capabilities for a wide range of compute-intensive communications and embedded applications, including: servers, blades, and appliances for communications and storage infrastructures; industrial and medical storage systems, and security applications; carrier-grade rack-mount servers; and proprietary form factors, such as router modules. The Intel® Data Plane Development Kit (Intel® DPDK) complements the platform by improving packet processing speeds to handle increasing network traffic data rates and associated infrastructure control and signaling requirements. Intel® Intelligent Storage Acceleration Library (ISA-L) improves storage efficiency through utilization of algorithms that improve performance of intelligent storage services, such as data de-duplication, erasure coding, CRC, or error checking and encryption.

Low-power, high-reliability, and robust thermal profile processor options make this platform ideal for thermally constrained designs utilizing the Advanced-TCA* form factor and solutions requiring compliance with NEBS Level 3 thermal specifications. Up to 30 MB Intel® Smart Cache, (12-core SKU) and 2133 MHz DDR4 memory speed contribute to increased performance.

A range of processor options allows developers to create a family of products based on one design. Processors with twelve cores (24 threads), ten cores (20 threads), eight cores (16 threads), and six cores (12 threads) provide not only core scalability but also a thermal design power range of 52 W to 120 W. Single- or dual-socket configurations, when paired with the Intel® C612 chipset, maintain compatibility with enterprise platform requirements.

The Intel Xeon processors E5-2600 v3 product family features Intel® Advanced Vector Extensions 2.0 (Intel® AVX 2.0). Cache Allocation and Monitoring, and DDR4 Memory support, are designed to provide higher compute performance, faster and more secure encryption, and greater protection against malware. To deliver top performance for bandwidth-intensive applications, all processors feature Intel® Virtualization Technology[1] for flexible virtualization, two Intel® QuickPath Interconnect (Intel® QPI) links, Intel® Turbo Boost Technology[2] and Intel® Hyper-Threading Technology.[3]

The following independent operating system and BIOS vendors provide support for this platform:

SOFTWARE OVERVIEW

OPERATING SYSTEM	CONTACT	BIOS
Microsoft Windows Server* 2008 R2 Enterprise (x86 and x64)	Intel provides drivers[4]	American Megatrends
Microsoft Windows Server 2012 (x64)	Intel provides drivers[4]	Phoenix Technologies
Microsoft Windows Server 2012 R2 (x64)	Intel provides drivers[4]	Insyde Software
Red Hat Enterprise Linux* Server (x86 and x64)	Red Hat	
SUSE Linux* Enterprise Server (x86 and x64)	Novell	

INTEL® C612 CHIPSET

- 10 SATA Gen 3 ports (6 Gb/s)
- 6 USB 3.0 ports and 8 USB 2.0 ports
- x8 PCI Express* Gen 2.0
- Integrated Gigabit Ethernet Controller (MAC) compatible with Intel® 82579LM Gigabit Ethernet PHY
- 7 W TDP

INTEL® XEON® PROCESSOR E5-2600 V3-BASED PLATFORMS FOR COMMUNICATIONS, STORAGE, AND EMBEDDED

FEATURES	BENEFITS
Supports Key Embedded and Storage Platform Requirements	Ideal for compute-intensive communications, storage, and embedded applications.
Compatible with Intel® enterprise server solutions	Maximizes design reuse potential between enterprise and embedded solutions.
Extended life cycle product support	Protects system investment by enabling extended product availability for embedded, communications, and storage customers.
Low-power, high-reliability and robust thermal profile processor options	• Ideal for NEBS Level 3 ambient operating temperature specifications. • Ideal for applications with thermal constraints (blades), especially solutions requiring compliance with AdvancedTCA* form factor specifications (PICMG 3.0).
Ecosystem support	From modular components to market-ready systems, Intel and the 250+ global member companies of the Intel® Network Builder (networkbuilders.intel.com/) and Intel® IOT Solutions Alliance (intel.com/go/intelligentsystems-alliance), provide the performance, connectivity, manageability, and security developers need to create smart, connected systems.
Intelligent Performance	Delivers optimum efficiency by adapting performance to embedded application needs.
Support for Next-generation Memory Technology DDR4	Provides higher bandwidth versus previous generation platforms with 3 DIMMs per channel. DDR4 improves platform performance on memory intensive workloads, while delivering solutions to meet energy efficiency requirements.
Large Intel® Smart Cache (L3)	Up to 30 MB cache accelerates processing by bringing and keeping more data closer to the cores, reducing memory reads.
Intel® Turbo Boost Technology[2]	Boosts performance for specific workloads by increasing processor frequency.
Intel® QuickPath Interconnect	Supports up to 9.6 GT/s[5] to enable high-performance, dual-socket designs.
Intel® Hyper-Threading Technology[3]	Helps boost performance for parallel, multi-threaded applications.
Intel® Advanced Vector Extensions 2.0	CPU instructions that: • Accelerate floating point operations used in technical computing applications. • Improve compute-intensive performance with Fused Multiply Add (FMA). • Accelerate integer vector operations used by storage workloads (including tiering and thin provisioning). • Provides instructions useful for compression and encryption.
Intel® Intelligent Storage Acceleration Library (Intel® ISA-L)	• Algorithmic Library to address key storage market segment needs. • Enhances storage efficiency, data integrity, security/encryption. Benefits of using Intel ISA-L: • Allows maximum utilization of additional cores. • Increases data availability. • Reduces expensive capacity requirements.
Intel® Data Directed I/O Enhancements	Allow targeting of the last level cache (LLC) for IO traffic, and controlling the LLC way assignment to specific cores without hitting the memory first. This increases the Last Level Cache performance and improves the I/O latency while saving power.

INTEL® XEON® PROCESSOR E5-2600 V3-BASED PLATFORMS FOR COMMUNICATIONS, STORAGE, AND EMBEDDED (CONT.)

FEATURES	BENEFITS
Intelligent Performance (Cont.)	Delivers optimum efficiency by adapting performance to embedded application needs.
Asynchronous DRAM Refresh (ADR)	Operates DIMMs in self-refresh mode to retain cached memory even through power failure.
Non-Transparent Bridging (NTB)	Enables high-speed connectivity between one Intel Xeon processor-based platform to another.
PCIe* Dual-Cast	For applications that require high-speed data transmission and redundancy, PCIe Dual Cast helps alleviate bottlenecks by providing the ability to write data to multiple locations using one write transaction. This reduces CPU overhead, improving system performance and scalability.
Intel® QuickData Technology	Hardware acceleration to deliver faster workloads that use less computing resources and power for RAID 5/6.
Secure Computing	Establishes a more secure computing environment to protect data and assets.
Intel® Data Protection Technology[6] with Secure Key	Provides faster and more secure encryption to help protect data and assets from loss.
Intel® Platform Protection Technology[6] with OS Guard	Enhances protection against malware by preventing execution of calls to the OS from compromised applications in the user mode or code pages.
Intel® Trusted Execution Technology[6]	Delivers a more secure boot and launch environment.
Intel® AES New Instructions[7] (Intel® AES-NI)	• Improves security without slowing response time and delivers more efficient cryptographic performance. • Accelerates AES encryption and decryption used in multiple communications workloads.
Automated Energy Efficiency	Reduces idle power consumption.
Integrated power gates	Allows idling cores to be reduced to near-zero power, independent of other cores.
Automated low-power states	Puts processor, memory, and I/O controller into the lowest available power states that will meet the current workload requirements.
Per-core P states (PCPS)	Dynamically adapts and improves power for each core, resulting in optimized workload processing.
Flexible Virtualization	Enhances virtualization performance.
Intel® Virtualization Technology[1] (Intel® VT)	• Hardware assists boost virtualization performance by allowing OS more direct access to the hardware. • Intel® VT FlexMigration enables seamless migration of running applications among current and future Intel® processor-based servers. • Intel® VT FlexPriority improves virtualization performance by allowing guest OSs to read and change task priorities without virtual machine monitor (VMM) intervention. • Extended Page Tables provide better performance by reducing the overhead caused by page table utilization of virtual machines.
Advanced Programmable Interrupt Controller virtualization (APICv)	Decreases overhead in the handling of instruction interrupts in the core. Virtual machines (VMs) no longer need to wait for thousands of instruction cycles per every exit to the VMM.
Cache Monitoring and Allocation	• Improves platform efficiency via greater insight into resource utilization. • The processor assists to monitor last level cache space utilization per VM. • Addresses “noisy neighbor” issues that can occur in virtualized environments. • Cache Monitoring and Allocation increases deterministic behavior.
Intel® Virtual Machine Control Structure (VMCS) shadowing	Enables efficient nested virtualization usages with reduced overhead by eliminating majority of nesting-induced VM exits and entries.

	INTEL® XEON® PROCESSOR E5-2680 V3[Δ]	INTEL® XEON® PROCESSOR E5-2658 V3	INTEL® XEON® PROCESSOR E5-2648L V3	INTEL® XEON® PROCESSOR E5-2640 V3	INTEL® XEON® PROCESSOR E5-2628L V3	INTEL® XEON® PROCESSOR E5-2620 V3	INTEL® XEON® PROCESSOR E5-2618L V3	INTEL® XEON® PROCESSOR E5-2609 V3	INTEL® XEON® PROCESSOR E5-2608L V3
Cores	12	12	12	8	10	6	8	6	6
CPU Core Frequency	2.5 GHz	2.2 GHz	1.8 GHz	2.6 GHz	2.0 GHz	2.6 GHz	2.3 GHz	1.9 GHz	2.0 GHz
Intel® Smart Cache (L3)	30 MB	30 MB	30 MB	20 MB	25 MB	15 MB	20 MB	15 MB	15 MB
Thermal Design Power	120 W	105 W	75 W	90 W	75 W	85 W	75 W	85 W	52 W
Robust Thermal Profile (High Tcase)	Standard	87° C[8]	87° C[8]	Standard	87° C[8]	Standard	87° C[8]	Standard	88° C[8]
DDR4 Memory (4 Channels)	2133	2133	2133	1866	1866	1866	1866	1600	1866
PCI Express* Gen 3.0 Lanes	40	40	40	40	40	40	40	40	40
Intel® Turbo Boost Technology	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Intel® Hyper-Threading Technology	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Intel® QuickPath Interconnect Link Speed (2 Links)	9.6 GT/s[5]	9.6 GT/s	9.6 GT/s	8.0 GT/s	8.0 GT/s	8.0 GT/s	8.0 GT/s	6.4 GT/s	6.4 GT/s
Package	LGA 2011	LGA 2011	LGA 2011	LGA 2011	LGA 2011	LGA 2011	LGA 2011	LGA 2011	LGA 2011
Cache Monitoring Technology[+]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cache Allocation Technology[+]	No	Yes	Yes	No	Yes	No	Yes	No	Yes

Intel in Communications: **intel.com/go/commsinfrastructure**

Intel in Storage: **intel.com/go/storage**

Intel in IoT: **intel.com/IoT**

[Δ] Intel® processor numbers are not a measure of performance. Processor numbers differentiate features within each processor series, not across different processor sequences. See http://www.intel.com/products/processor_number for details.

[+] Communication SKUs only.

[1] Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, and virtual machine monitor (VMM). Functionality, performance, or other benefits will vary depending on hardware and software configurations. Software applications may not be compatible with all operating systems. Consult your PC manufacturer. For more information, visit http://www.intel.com/go/virtualization.

[2] 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 PC manufacturer. Performance varies depending on hardware, software, and system configuration. For more information, visit http://www.intel.com/go/turbo.

[3] Requires an Intel® HT Technology-enabled system. Consult your PC manufacturer. Performance will vary depending on the specific hardware and software used. For more information, including details on which processors support HT Technology, visit http://www.intel.com/info/hyperthreading. 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.

[4] Drivers available at: downloadcenter.intel.com (enter chipset name).

[5] GT/s = Giga Transfers/second.

[6] No computer system can provide absolute security. Requires an enabled Intel® processor, enabled chipset, firmware, and software, and 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.

[7] Intel® AES-NI requires a computer system with an AES-NI-enabled processor, as well as non-Intel software to execute the instructions in the correct sequence. AES-NI is available on select Intel® processors. For availability, consult your reseller or system manufacturer. For more information, see http://software.intel.com/en-us/articles/intel-advanced-encryption-standard-instructions-aes-ni/.

[8] Not to exceed 360 hours per year.

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