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 Technology¹ for flexible virtualization, two Intel® QuickPath Interconnect (Intel® QPI) links, Intel® Turbo Boost Technology² and Intel® Hyper-Threading Technology.³
The following independent operating system and BIOS vendors provide support for this platform:

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<th>SOFTWARE OVERVIEW</th>
<th>CONTACT</th>
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<tr>
<td>Microsoft Windows Server 2008 R2 Enterprise (x86 and x64)</td>
<td>Intel provides drivers&lt;sup&gt;4&lt;/sup&gt;</td>
<td>American Megatrends</td>
</tr>
<tr>
<td>Microsoft Windows Server 2012 (x64)</td>
<td>Intel provides drivers&lt;sup&gt;4&lt;/sup&gt;</td>
<td>Phoenix Technologies</td>
</tr>
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<td>Microsoft Windows Server 2012 R2 (x64)</td>
<td>Intel provides drivers&lt;sup&gt;4&lt;/sup&gt;</td>
<td>Insyde Software</td>
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<tr>
<td>Red Hat Enterprise Linux Server (x86 and x64)</td>
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<td>Red Hat</td>
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<tr>
<td>SUSE Linux Enterprise Server (x86 and x64)</td>
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<td>Novell</td>
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<th>INTEL® C612 CHIPSET</th>
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<tr>
<td>• 10 SATA Gen 3 ports (6 Gb/s)</td>
</tr>
<tr>
<td>• 6 USB 3.0 ports and 8 USB 2.0 ports</td>
</tr>
</tbody>
</table>

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

#### FEATURES

- 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<sup>®</sup> 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.

#### BENEFITS

- 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<sup>2</sup>: Boosts performance for specific workloads by increasing processor frequency.
- Intel® QuickPath Interconnect: Supports up to 9.6 GT/s<sup>5</sup> to enable high-performance, dual-socket designs.
- Intel® Hyper-Threading Technology<sup>3</sup>: 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.
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<tr>
<th>FEATURES</th>
<th>BENEFITS</th>
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<tbody>
<tr>
<td>Intelligent Performance (Cont.)</td>
<td>Delivers optimum efficiency by adapting performance to embedded application needs.</td>
</tr>
<tr>
<td>Asynchronous DRAM Refresh (ADR)</td>
<td>Operates DIMMs in self-refresh mode to retain cached memory even through power failure.</td>
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<tr>
<td>Non-Transparent Bridging (NTB)</td>
<td>Enables high-speed connectivity between one Intel Xeon processor-based platform to another.</td>
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<tr>
<td>PCIe® Dual-Cast</td>
<td>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.</td>
</tr>
<tr>
<td>Intel® QuickData Technology</td>
<td>Hardware acceleration to deliver faster workloads that use less computing resources and power for RAID 5/6.</td>
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<tr>
<td>Secure Computing</td>
<td>Establishes a more secure computing environment to protect data and assets.</td>
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<tr>
<td>Intel® Data Protection Technology with Secure Key</td>
<td>Provides faster and more secure encryption to help protect data and assets from loss.</td>
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<tr>
<td>Intel® Platform Protection Technology with OS Guard</td>
<td>Enhances protection against malware by preventing execution of calls to the OS from compromised applications in the user mode or code pages.</td>
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<tr>
<td>Intel® Trusted Execution Technology with OS Guard</td>
<td>Delivers a more secure boot and launch environment.</td>
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</table>
| Intel® AES New Instructions (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 (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. |
<p>| 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. |</p>
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<tr>
<th>Core</th>
<th>LGA</th>
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**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
- 87° C
- Standard
- 87° C
- Standard
- 87° C
- Standard
- 88° C

**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
- Yes

**Intel® Hyper-Threading Technology**
- Yes
- Yes
- Yes
- Yes
- Yes
- Yes
- Yes
- No
- Yes

**Intel® QuickPath Interconnect Link Speed (2 Links)**
- 9.6 GT/s
- 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
- Yes
- No
- Yes
- Yes

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**Intel in Communications:** [intel.com/go/commsinfrastructure](https://intel.com/go/commsinfrastructure)

**Intel in Storage:** [intel.com/go/storage](https://intel.com/go/storage)

**Intel in IoT:** [intel.com/iot](https://intel.com/iot)

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