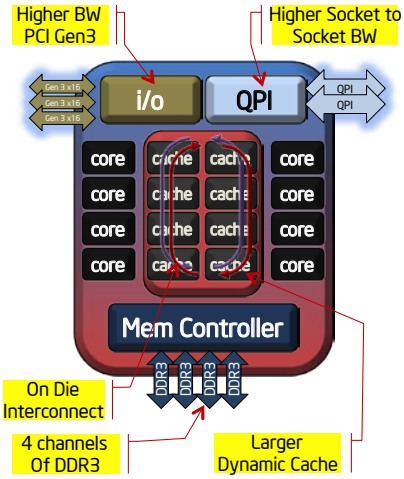
PRODUCT BRIEF
Intel® Xeon® Processor E5-2600/1600
Product Families

Technical desktops and workstations with Intel® Xeon® "uncore" technologies deliver the performance you need to innovate faster.



At Intel, there are an assortment of technologies affectionately known as the "uncore." The place to find these latest innovative technologies is in the recently announced Intel® Xeon® processor E5-1600/2600[1] product family. They help provide a significant advantage to power users seeking more performance and agility than what might be available on a typical desktop solution.

At the heart of things, Intel® Core™ and Intel® Xeon® E5 processors are very similar.

Intel Core processor-based desktops and Intel Xeon processor E5-1600/2600 product family-based workstations are both rooted on the same Intel Sandy Bridge microarchitecture, and they both support an array of processing cores that go from as few as 2 to as many as 8 or 16, if you are using a dual processor-based workstation.

They both support Intel® Advanced Vector Extensions (Intel® AVX); and depending on which Intel Core processor-based desktop you use, it will support either Intel® Hyperthreading Technology or Intel® Turbo Boost Technology, or both. These technologies are standard issue on all but one Intel Xeon processor-based workstation.

So where are Intel Core and Intel Xeon E5 processors different?

To understand the differences between Intel Core processor-based desktops and Intel Xeon processor E5 product family-based workstations, you can start by looking at uncore technologies. The differences can be tremendous.

Seymour Cray, the father of supercomputing, once said, "Anyone can build a fast CPU, the trick is to build a fast system." The uncore technologies are the building blocks of a fast system, and that is why you find Intel Xeon E5 processors powering some of the world's fastest supercomputers. They are also at the heart of the workstations that professionals use to invent tomorrow's future.

The uncore technologies found in the new Intel Xeon processor E5-1600/2600 product families help you move your data through our processors faster than ever before. These uncore technologies are what is behind our increase in processor efficiency—the time processors actually spend computing—to new heights. The uncore technologies include:

Intel® Xeon® Processor E5-2600/1600 Product Families

THE KEY TAKEAWAY

Technical desktops with Intel's uncore technology deliver the performance you need to innovate faster. If you need to find your answers quickly, explore the advantages available to you with workstations and high performance computing solutions based on the new Intel® Xeon® processor E5-1600/2600 product families.

- Intel® Direct I/O technology, increases I/O performance by up to 2.3x
- Intel Integrated I/O, increases available bandwidth by up to 2x and is the first Intel Xeon processor product to integrate PCI Gen 3 on the processor die
- Two Additional Memory Channels. Intel Xeon processor-based workstation will benefit from 2X as many memory channels than either Intel Xeon E3 1200 or Intel Core-based desktop solutions. This helps to provide faster and more efficient access to data stored in memory.

Two other technologies worth noting as part of the new Intel Xeon processor E5-1600/2600 product families are:

- Intel® AVX—a new 256-bit instruction set extension to Intel Streaming SIMD Extensions that is designed for applications that are floating point (FP) intensive. Intel AVX improves floating performance due to wider vectors, new extensible syntax, and rich functionality. This results in better management of data. General-purpose applications like image, audio/video processing, scientific simulations, financial analytics, and 3D modeling and analysis can see some amazing speed-ups.
- Intel® vPro Technology—This is the first time Intel has a complete workstation processor lineup. Intel vPro Technology gives your organization an opportunity to efficiently and securely manage a workstation client environment in the same way you manage a business client desktop solution.

Intel vPro Technology also protects assets on your workstation through hardware-enhanced identity protection, theft protection, and execution protection.

The payoff of uncore technologies

The Intel uncore technologies found in the Intel Xeon processor E5-1600/2600 product families combine to deliver some amazing performance differences and increased processor efficiency. When compared to the Intel® Xeon® E3-1200 product family or desktop-based solutions that are not supported by these uncore technologies we found:

Manufacturing workloads benefit from uncore technologies

- ANSYS* Fluent simulation employed uncore technologies on a single Intel Xeon processor E5-2687 (3.1GHZ) to realize up to a 4.2X increase[2,3,7] in performance over an Intel Xeon E3-1290 (3.6Ghz) processor
- The same design model's performance tested on an Intel Xeon E5-1660 (3.2Ghz) was up to 1.8X faster[2,3,7] than an Intel Xeon E3-1290 (3.6Ghz) processor

FSI Black Shoals and Monte Carlo workloads benefit from uncore technologies

- Financial Services simulation kernels employed uncore technologies on a single Intel Xeon processor E5-2687 (3.1GHZ) to up to a 3.5X increase[2,3,7] in performance over an Intel Xeon E3-1290 (3.6Ghz) processor
- The same simulations model's performance tested on an Intel Xeon E5-1660 (3.2Ghz) was up to 1.4X faster[2,3,7] than an Intel Xeon E3-1290 (3.6Ghz) processor

Media & entertainment workloads benefit from uncore technologies

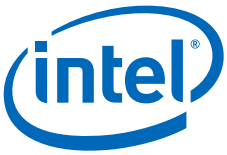
- Photo realistic ray traced images with Luxology software employed uncore technologies on a single Intel Xeon processor E5-2687 (3.1GHZ) to realize up to a 2.1X increase[2,3,7] in performance over an Intel Xeon E3-1290 (3.6Ghz) processor
- The same image was ray traced with an Intel Xeon E5-1660 (3.2Ghz) was up to 1.3X faster[2,3,7] than an Intel Xeon E3-1290 (3.6Ghz) processor

Comparing available memory bandwidth

- A 3.1-GHz Intel Xeon E5-2600 processor provided 4.2x more[2,3,7] memory bandwidth than a 3.6-GHz Intel Xeon E3-1200 processor
- A 3.3-GHz Intel Xeon® E5-1600 processor provided 2.1x more[2,3,7] memory bandwidth than a 3.6-GHz Intel Xeon E3-1200 processor

Intel® Xeon® Processor E5-2600/1600 Product Families	Intel® Direct I/O	Intel® Integrated I/O	Professional Processor-Based Graphics	Larger Cache	ECC Memory	Max Memory	Memory Channels	Max PCI Lanes	Certified/Tested Applications
Intel® Xeon® Processor E5-2600 Product Family	**Yes**	**Yes**	No	**20MB**	**Yes**	**768GB^**	**8^**	**80^**	**Yes**
Intel® Xeon® Processor E5-1600 Product Family	**Yes**	**Yes**	No	15MB	**Yes**	384GB	4	40	**Yes**
Intel® Xeon® Processor E3-1200 Product Family	No	No	**Yes**	8MB	**Yes**	32GB	2	20	**Yes**
Professional Desktop	No	No	No	8MB	No	32GB	2	20	No

^Requires Two Processors



1. Intel® processor numbers are not a measure of performance.

2. Processor numbers differentiate features within each processor family, not across different processor families. See www.intel.com/products

3. Intel® performance comparison using geometric mean of SPECint*_rate_base2006, SPECfp*_rate_base2006, STREAM*_MP Triad, and Linpack* benchmark results. Baseline geometric mean score of 166.75 on prior generation 2S Intel® Xeon® Processor X5690 platform based on best published SPECrate* scores to www.spec.org and best Intel internal measurements on STREAM*_MP Triad and Linpack as of 5 December 2011. New geometric mean score of 306.74 based on Intel internal measured estimates using an Intel® Rose City platform with two Intel® Xeon® processor E5-2690, Turbo and EIST Enabled, with Hyper-Threading, 128 GB RAM, Red Hat* Enterprise Linux Server 6.1 beta for x86_6, Intel® Compiler 12.1, THP disabled for SPECfp_rate_base2006 and enabled for SPECint*_rate_base2006.

4. Intel measurements of average time for an I/O device read to local system memory under idle conditions. Improvement compares Xeon® processor E5-2600 product family (230 ns) vs. Xeon® processor 5500 series (340 ns). Baseline Configuration: Green City system with two Intel® Xeon® processor E5520 (2.26GHz, 4C), 12GB memory @ 1333, C-States Disabled, Turbo Disabled, SMT Disabled, Rubicon* PCIe* 2.0 x8. New Configuration: Meridian system with two Intel® Xeon® processor E5-2665 (C0 stepping, 2.4GHz, 8C), 32GB memory @1600 MHz, C-States Enabled, Turbo Enabled. The measurements were taken with a LeCroy* PCIe* protocol analyzer using Intel internal Rubicon (PCIe* 2.0) and Florin (PCIe* 3.0) test cards running under Windows* 2008 R2 w/SP1.

5. Intel® vPro™ Technology is sophisticated and requires setup and activation. Availability of features and results will depend upon the setup and configuration of your hardware, software and IT environment. To learn more visit: http://www.intel.com/technology/vpro.

6. Requires an Intel® HT Technology enabled system, check with your PC manufacturer. Performance will vary depending on the specific hardware and software used. Not available on Intel® Core™ i5-750. For more information including details on which processors support HT Technology, visit http://www.intel.com/info/hyperthreading.

7. Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel® products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. For more information on performance tests and on the performance of Intel products, reference www.intel.com/software/products.

8. 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.

9. Intel may make changes to specifications and product descriptions at any time, without notice. Designers must not rely on the absence or characteristics of any features or instructions marked “reserved” or “undefined.” Intel reserves these for future definition and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to them. The information here is subject to change without notice. Do not finalize a design with this information. The products described in this document may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request. Contact your local Intel sales office or your distributor to obtain the latest specifications and before placing your product order. Copies of documents which have an order number and are referenced in this document, or other Intel literature, may be obtained by calling 1-800-548-4725, or by visiting Intel’s Website www.intel.com/.

This document and the information given are for the convenience of Intel’s customer base and are provided “AS IS” WITH NO WARRANTIES WHATSOEVER, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NONINFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. Receipt or possession of this document does not grant any license to any of the intellectual property described, displayed, or contained herein. Intel® products are not intended for use in medical, lifesaving, life-sustaining, critical control, or safety systems, or in nuclear facility applications.

Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Intel may make changes to specifications, product descriptions, and plans at any time, without notice.

© 2012, Intel Corporation. All rights reserved. Intel, the Intel logo, Intel Xeon, Xeon Inside, and Intel vPro are trademarks of Intel Corporation in the U.S. and/or other countries.

*Other names and brands may be claimed as the property of others.

Printed in USA 0312/LM/CMD/PDF ♻ Please Recycle 327053-001US