
intel
Leap ahead™
Dual-Core Intel® Xeon® Processor
7000 Sequence-based Platforms
Ideal Choice for Demanding Enterprise
Applications and Consolidation
intel
Xeon®
inside™

A New Level of Reliability and Scalable Performance

Intel® Architecture-based server platforms continue to drive the world's data centers. For good reason. We keep innovating with new capabilities and technologies in our platforms that give you the tools to help your business stay competitive. And, with over 40 million Intel® processor-based servers shipped since 1996,[1] and a 20-year track record of delivering industry-leading performance, you know you can count on Intel to deliver superior quality and reliability.

A scalable, reliable multi-processor platform

For critical data center services, new Dual-Core Intel® Xeon® processor 7100[2] series-based platforms deliver scalable performance for your demanding enterprise applications. These new platforms deliver up to twice[3] the performance compared to our previous dual-core processor-based MP platforms,[3] making them the best choice for business processing, databases, and e-commerce.

Enhanced reliability features built into the platform, including new Intel® Cache Safe Technology, help you improve availability, while new processor power efficiency with higher performance per watt reduces energy usage and heat generation.

Our new platforms are designed with virtualization in mind, with the performance, headroom, and reliability virtual environments require. Plus, Intel® Virtualization Technology[4] built into the processor make our new server platforms ideal for consolidating applications and migrating to a more flexible, available infrastructure.

Architected for multiple dual-core processors to run intensive 32-bit and 64-bit workloads, Dual-Core Intel® Xeon® processor 7100 series-based systems help solve the toughest IT challenges with the scalability, flexibility, and reliability needed to make the most of any IT budget.

Ideal Platforms for Demanding Enterprise Workloads

Designed with the technologies and features enterprise workloads demand and the reliability your business needs, Dual-Core Intel Xeon processor 7100 series-based platforms can support your critical business operations into the future.

Support business growth

Dual-Core Intel Xeon processor 7100 series-based solutions give your data centers the scalable performance they need for sustainable business growth.

- Up to 60 percent performance improvement for enterprise resource planning (ERP), supply chain management (SCM), and customer relationship management (CRM); up to 70 percent performance improvement for transaction processing; over twice the performance for e-commerce applications.[3]
- Up to 2.8x performance per watt improvement compared to previous generation.[3]
- Up to 16 MB of shared, on-die cache, plus 64-bit, dual-core processing with Hyper-Threading Technology[A] deliver both processing capacity and performance for today and headroom for the future.
- 4 to 32 dual-core processor[5] solutions offer headroom for demanding enterprise applications and business growth.

Boost system utilization

Software-based virtualization helps IT managers consolidate applications to boost system utilization, enhance service availability, and improve IT operational efficiency. Dual-Core Intel Xeon processor 7100 series-based platforms are ideal for virtualization.

- Designed for virtualization, with built-in scalable performance, extended headroom, and enhanced reliability features, plus Intel Virtualization Technology hardware assistance for virtual environments.
- Broadest industry software support for virtual environments from leading virtualization software vendors.
- Intel is the first company to introduce hardware assistance for virtual environments.
- Dual-core processing and Hyper-Threading Technology provide more processing capacity for more threads in virtual environments.

Maintain critical services

Processor and chipset enhancements of our new server platforms deliver the reliability that enables IT departments to improve the security and integrity of business data and services.

- Intel Cache Safe Technology maintains processor availability in the event of cache errors.
- Intel® E8501 chipset reliability enhancements include advanced redundancy and error checking, memory (DIMM) sparing and mirroring, and hot plugging.
- Proven track record of the most widely deployed and industry-supported servers in the world.

With 16 MB of on-die, shared cache, Dual-Core Intel Xeon processor 7100 series-based platforms deliver the performance enterprise workloads demand for a new level of business processing, transaction processing, and e-commerce to help sustain business growth.

Intel-based servers support hardware-assisted virtualization, a wide range of operating systems, and thousands of applications, all validated and optimized for high-availability, performance, and reliability.

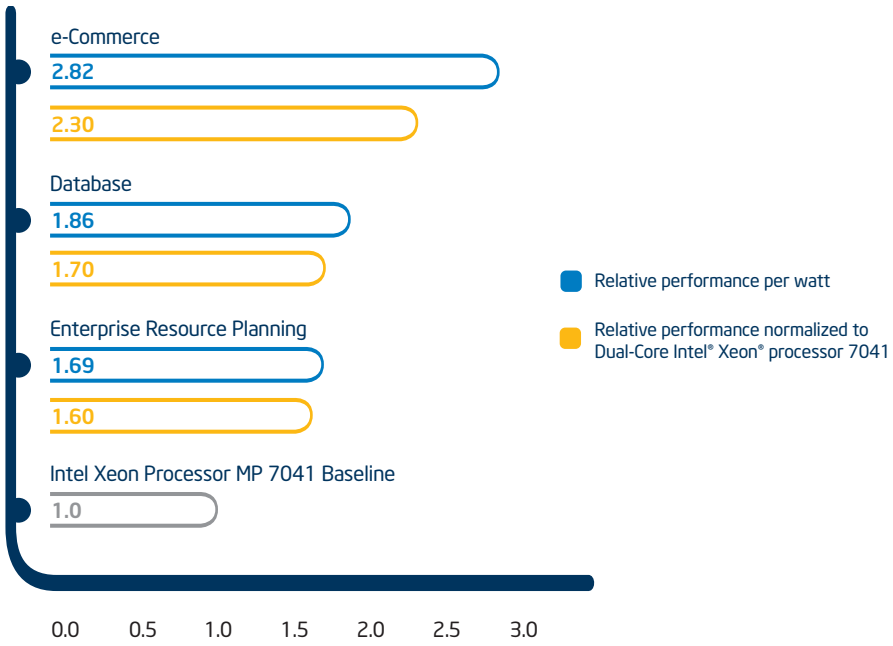
Dual-Core Intel Xeon Processor 7100 Series-based Platforms Overview

Platform Feature	User Benefit
Dual-Core Intel® Xeon® processor 7100[2] series	▪ Up to 2 times the performance of previous-generation Dual-Core Intel® Xeon® processor 7000 series[3] ▪ Based on Intel's 65 nm process with power-saving features for lower energy consumption and heat generation ▪ Up to 2.8x performance per watt improvement compared to previous generation[3] ▪ Choice of performance-optimized versions at 150-watt and rack-optimized versions at 95-watt for data center optimization ▪ Dual front-side buses running at 667 MHz or 800 MHz for high throughput ▪ 64-bit processor, supporting 32-bit applications and enabling migration to 64-bit computing
Up to 16 MB, shared, on-die, L3 cache	▪ Keeps more needed data closer to the cores for access faster than off-chip memory ▪ Improves performance by up 60 percent for business processing (ERP, SCM, CRM), 70 percent for transaction processing, and over twice the performance for e-commerce applications[3]
Intel® Cache Safe Technology	▪ Improves processor reliability ▪ Allows processor and server to continue normal operation in the event of a rare L3 cache error; automatically detects and disables cache lines ▪ Helps reduce downtime and processor replacements, improving TCO
Intel® Virtualization Technology[4]	▪ Processor enhancements supporting virtualization, enabling consolidation of more applications to virtual environments ▪ Enables 64-bit OSs and applications to run over today's popular virtualization software ▪ Enables running Linux* over Windows* and Windows over Xen* ▪ Developed with virtualization software providers to enable greater capabilities compared to non-hardware-assisted virtual environments ▪ Intel is first to offer hardware-assisted virtualization
Hyper-Threading Technology[A]	▪ Allows each core to function as two logical processors ▪ 16 threads for a dual-core, 4 processor (8 cores) platform provide more headroom and throughput capacity for threaded applications ▪ Improves processor utilization and system responsiveness for better user experience[6]
Intel® 64 Technology[7]	▪ Enables extended memory addressability for server applications ▪ Run both 32-bit and 64-bit applications
Demand-Based Switching (DBS) with Enhanced Intel SpeedStep® technology[8]	▪ Enables platform and software power-management features to help lower average power consumption and heat generation while helping to maintain application performance and acoustics
PCI Express* (PCIe*) serial I/O	▪ Industry-standard serial I/O capable of up to 8 GB/s peak bandwidth ▪ Improved RAS features compared to PCI-X* ▪ Lower latency compared to PCI-X to help improve I/O performance ▪ Software-compatible with PCI-X to simplify parallel-to-serial transition
DDR2-400 memory	▪ Up to 128 GB of memory capacity for demanding workloads ▪ Provides increased memory bandwidth over DDR1-333 ▪ Lower power consumption than DDR1-333 on systems tested[9] ▪ Increased DIMMs per system for enhanced memory scalability
Enhanced reliability and manageability	▪ Many memory controller features, together with PCI Express reliability, availability, and serviceability (RAS) features combine to help improve platform reliability over previous-generation platforms ▪ Features include Error Correcting Code (ECC) system bus, memory mirroring, and I/O and memory hot-plug
High-speed, 3-load, front-side system bus (800 MHz)	▪ 12.8 GB/s system throughput for demanding workloads

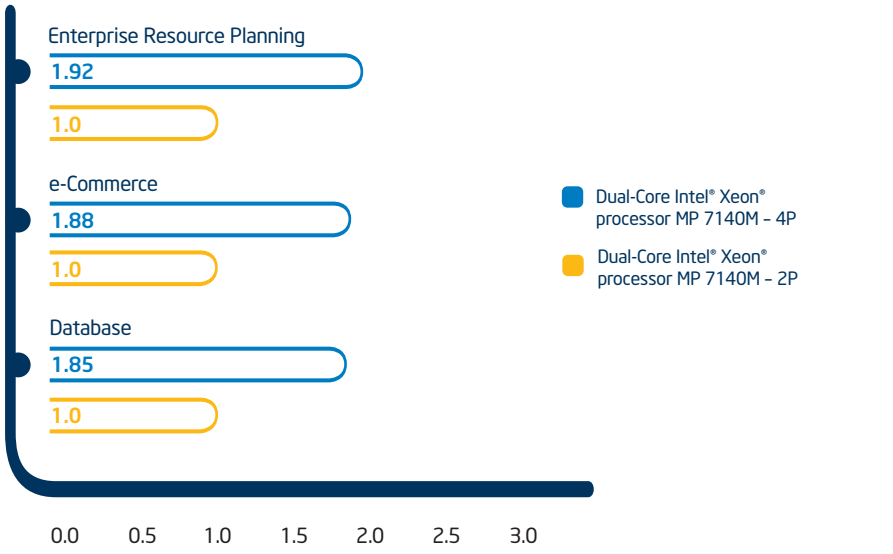
Server Platform Performance and Performance Per Watt

Dual-Core Intel® Xeon® processor 7100 series compared to the prior-generation Dual-Core Intel® Xeon® processor 7000 series

Dual-Core Intel® Xeon® processor MP 7140M (3.40 GHz, 16 MB L3) vs. Dual-Core Intel® Xeon® processor MP 7041 (3.00 GHz, 2 x 2 MB L2)



Dual-Core Intel® Xeon® processor MP 7140M (3.40 GHz, 16 MB L3) processor scaling



Intel internal measurements as of August 1, 2006.
For latest performance information, please visit **www.intel.com/performance/server/xeon/index.htm**

Reliable Uptime

Intel® E8501 chipset RAS features

The Intel E8501 chipset builds in enhanced reliability with a high degree of memory error detection and correction, data protection, serviceability, and manageability.

Reliability Feature	Benefit
Hot-plug I/O and memory	▪ Add I/O or memory after installation without service interruption
Memory mirroring	▪ Lets you split and duplicate system memory, protecting against uncorrectable errors or DRAM failure
Memory (DIMM) sparing	▪ Allows you to reserve spare memory capacity for use if current memory fails
Demand and patrol scrubbing	▪ The system proactively searches the system memory, repairing correctable errors or permanently marking the memory location as unreadable
X8 Single Device Data Correction (X8 SDDC)[10]	▪ Allows you to remove a single DRAM from the memory map and recover its data into a new device
Error Correcting Code (ECC)	▪ The system detects single-bit and double-bit errors, automatically corrects single-bit errors on internal data paths, and retries transactions on double-bit errors
SMBus port	▪ Enables remote management operation and support for a variety of third-party BMC (baseboard management controller) and BIOS solutions
PIROM and thermal sensor	▪ Allows for scheduled service in the event of a system manufacturing defect or cooling device failure

PCI Express* RAS features

PCI Express (PCIe*) is rich in RAS capabilities critical to maintaining system uptime, including the following:

- Built-in clocking for data integrity checking.
- Advanced error logging and reporting through the Intelligent Platform Management Initiative-based (IPMI) interface.
- Hot-plug capability simplifies replacement of failed devices and helps reduce system downtime, while allowing mix and match of peripherals and systems or I/O chassis from different vendors.
- A high-performance, cost-effective RAID can be implemented on the server board using the Intel® IOP333 I/O processor, designed to connect directly to the chipset's memory controller via PCI Express.

Processor Numbering[2]

At Intel, our processor series numbers help differentiate processor features beyond front-side bus speed and brand name. New advancements in our processors – other than bus speed – like architecture, cache, power dissipation, and embedded Intel® technologies, contribute significantly to performance, power efficiency, and other end-user benefits. Our processor sequences will help developers decide on the best processor for their platform designs, and help end-users understand all the characteristics that contribute to their overall experience.

Processor Sequence[2]	Used For
Dual-Core Intel® Xeon® processor 3000 sequence	Small business, entry, or first server
Dual-Core Intel® Xeon® processor 5000 sequence	Volume DP servers/workstations based on the Intel Xeon processor
Dual-Core Intel® Xeon® processor 7000 sequence	Greater scalability than DP platforms with multi-processor enterprise servers
Intel® Itanium® 2 processor 9000 sequence	Maximum performance and scalability for RISC replacement

Dual-Core Intel Xeon processor 7100 series[2]

All processor packages are FCPGA Socket 604.

FSB = 800 MHz		FSB = 667 MHz									
Processor Number[2]	Speed	Processor Number[2]	Speed	Cache size	Power	Intel® Cache Safe Technology	Intel® HT Tech[A]	Intel® VT[4]	Intel® 64[7]	Cores/ Threads (4P platform)	DBS[8]
NA	NA	7150N	3.5 GHz	2x1M L2, 16M L3	150 W	▪	▪	▪	▪	8C/16T	▪
7140M	3.40 GHz	7140N	3.33 GHz	2x1M L2, 16M L3	150 W	▪	▪	▪	▪	8C/16T	▪
7130M	3.20 GHz	7130N	3.16 GHz	2x1M L2, 8M L3	150 W	▪	▪	▪	▪	8C/16T	▪
7120M	3.0 GHz	7120N	3.0 GHz	2x1M L2, 4M L3	95 W	▪	▪	▪	▪	8C/16T	
7110M	2.60 GHz	7110N	2.50 GHz	2x1M L2, 4M L3	95 W	▪	▪	▪	▪	8C/16T	

For more information on Dual-Core Intel® Xeon® processor-based MP server platforms, please go to **www.intel.com/server**

Benchmark notes:

Source: Intel® internally measured results as of August 1, 2006.

Dual-Core Intel® Xeon® Processor 7100 series: Performance and Performance Per Watt plus Server Platform Scaling

Basis for comparison: Performance measured using internal server-side Java* ("e-commerce"), internal database transaction processing, and internal enterprise resource planning workloads. Intel internal measurement (1 August 2006) comparing system configurations of 4x Intel® processor 7140M platform, 3.40 GHz w/ 16M L3/ Intel® E8501Chipset / 800 MHz FSB to 4x Intel® Xeon® Dual-Core processors 3.00 GHz w/ 2x2M L2 / Intel® E8501Chipset/ 800 MHz FSB.

Scaling performance measuring performance gains of one to two to four Intel Xeon processor(s) MP 7140M configured in an 4P Intel E8501 chipset-based Server platform.

Actual performance may vary. For further information see: http://www.intel.com/performance/server/xeon_mp/index.htm

Server-Side Java Application. This workload evaluates the performance of Server-side Java Application. Measured in Operations Per Second. Performance estimates based on Intel internal measurement recorded in TR#622.

Baseline Platform configuration: Intel® Server System pre-production hardware with four Dual-Core Intel® Xeon® Processors 7041, 3.0 GHz with 2x2MB L2 Cache, E8501 Chipset, 800 MHz FSB; 16 GB memory; Hyper Threading ON; Windows* 2003 Enterprise Edition x64 SP1, BEA* Internal JRockit* 5.0 64-bit, large page enabled, Hardware Prefetch / Adjacent Sector Prefetch = OFF, 4 JVM instances.

New Platform Configuration: Intel® Server System pre-production hardware with four Dual-Core Intel® Xeon® Processor MP 3.40 GHz with 16 MB L3 Cache, E8501 Chipset, 800 MHz FSB; 16 GB memory; Hyper Threading ON; Windows* 2003 Enterprise Edition x64 SP1, BEA* Internal JRockit* 5.0 64-bit, large page enabled, Hardware Prefetch = OFF, Adjacent Sector Prefetch = ON, 4 JVM instances.

Database. On-Line Transaction Processing; represents the transaction throughput of a database server in an OLTP client/server environment measuring the power and capacity of database software and server hardware in transactions per minute. Performance estimates based on Intel internal measurement recorded in TR#579.

Baseline Platform Configuration: Intel® SR6850HW4/M Server System using 4x Dual-Core Intel® Xeon® processor MP 7041 (3.00 GHz, 800 MHz FSB, 2x 2 MB L2 cache), HW/ADJSECT PREFETCH=OFF, 64GB DDR2-400 (16x 4 GB PC2-3200R-333), Microsoft* Windows* Server 2003 Enterprise Edition SP1 x64, Microsoft* SQL Server* 2005 SP1(64-bit).

Storage Configuration
– 854 15K RPM Seagate SCSI disks
– 4 QLE2362 PCI-E QLogic Dual-port adapters
– 1 QLA2342 PCI-X QLogic Dual-port adapters

New Platform configuration: Intel® SR6850HW4/M Server System (Harwich with 800MT/s) using 4x Dual-Core Intel® Xeon® processor MP 7140M (3.40 GHz, 800 MHz FSB, 16 MB L3 cache), HW/ADJSECT PREFETCH=OFF, 64GB DDR2-400 (16x4GB PC2-3200R-333), Microsoft* Windows* Server 2003 Enterprise Edition SP1 x64, Microsoft* SQL Server* 2005 SP1(64-bit).

Storage Configuration
– 994 15K RPM Seagate SCSI disks
– 3 QLA 2342 PCI-X QLogic Dual-port adapters
– 4 QLA 2362 PCI-E QLogic Dual-port adapters

Enterprise Resource Planning. Workload emulates a SAP-based Sales and Distribution application and helps ERP. Measured in number of concurrent users supported. Performance estimates based on Intel internal measurement recorded in TR# 573.

Baseline Platform Configuration: Intel® S3E3134 Server System using 4x Dual-Core Intel® Xeon® processor MP 7041 (3.00 GHz, 800 MHz FSB, 2x 2 MB L2 cache), HW/ADJSECT PREFETCH=ON, 32GB DDR2-400 (16x2 GB PC2-3200R), SuSE* LINUX* Enterprise 9 x86_64 SP2 2.6.5-191-smp, SAP* R/3 Enterprise ECC4.7 SR1 x86_64, Oracle9i* Enterprise Edition release 9.2.0.6.0 64-bit.

New Platform configuration: Intel® S3E3134 Server System using 4x Dual-Core Intel® Xeon® processor 7140M (3.40 GHz, 800 MHz FSB, 16 MB L3 cache), HW/ADJSECT PREFETCH=OFF, 8GB DDR2-400 (8x1GB PC2-3200R), SuSE* LINUX* Enterprise 9 x86_64 SP2 2.6.5-191-smp, SAP* R/3 Enterprise ECC5.0 SR1 x86_64, Oracle9i* Enterprise Edition release 9.2.0.6.0 64-bit.

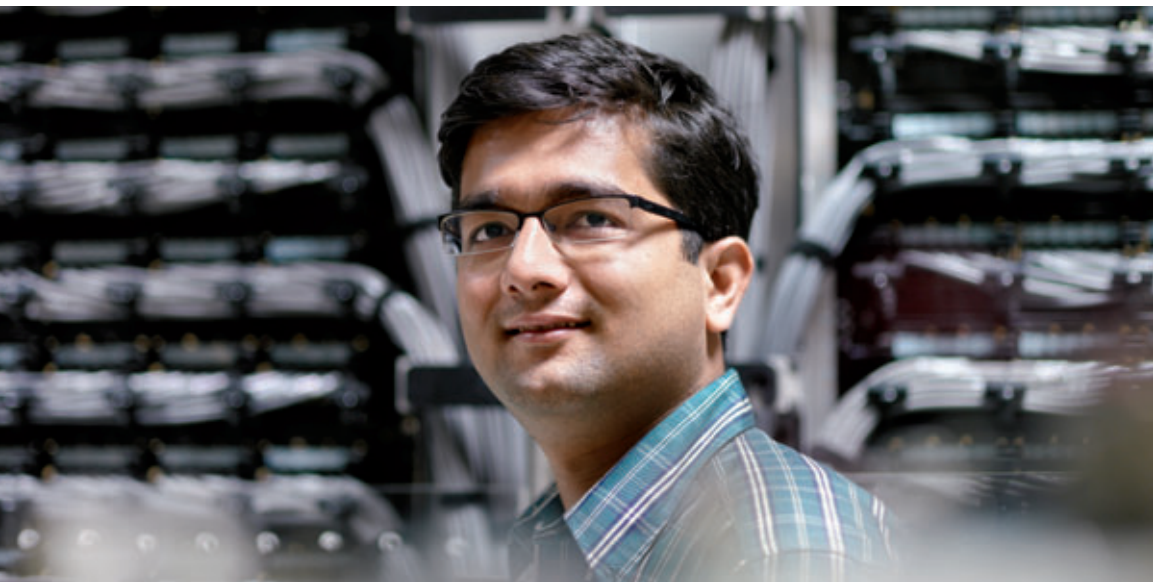
Performance Per Watt is calculated as peak performance result divided by watts measured at the system level. All system watt measurements may vary based on system configuration and silicon-level differences.

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, visit http://www.intel.com/performance/resources/limits.htm or call (U.S.) 1-800-628-8686 or 1-916-356-3104.

All dates and products specified are for planning purposes only and are subject to change without notice.

Relative performance for each benchmark is calculated by taking the actual benchmark result for the first platform tested and assigning it a value of 1.0 as a baseline. Relative performance for the remaining platforms tested was calculated by dividing the actual benchmark result for the baseline platform into each of the specific benchmark results of each of the other platforms and assigning them a relative performance number that correlates with the performance improvements reported.

www.intel.com/server



Contacts

United States and Canada
Intel Corporation
Robert Noyce Building
2200 Mission College Blvd.
P.O. Box 58119
Santa Clara, CA 95052-8119
USA

Europe
Intel Corporation (UK) Ltd.
Pipers Way
Swindon
Wiltshire SN3 1RJ
UK

Asia-Pacific
Intel Semiconductor Ltd.
32/F Two Pacific Place
88 Queensway, Central
Hong Kong, SAR

Japan
Intel Japan (Tsukuba HQ)
5-6
Tokodai Tsukuba-shi
300-2635 Ibaraki-ken
Japan

South America
Intel Semiconductores do Brasil LTDA
Av. Dr. Chucri Zaidan, 940-10° andar
04583-904 São Paulo, SP
Brazil

[1] Source: Cumulative Shipments of Intel-based Servers since 1996, IDC Q1'06 Server Tracker and Intel estimates.

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

[3] Based on internal Intel benchmarks. See benchmarks page.

[4] Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, virtual machine monitor (VMM) and, for some uses, certain platform software enabled for it. Functionality, performance or other benefits will vary depending on hardware and software configurations and may require a BIOS update. Software applications may not be compatible with all operating systems. Please check with your application vendor.

[5] Intel platforms based on the Intel® E8501 chipset scale to 4 processors. Other OEMs offer scalable platforms to 32 processors.

[6] Source: http://www.intel.com/technology/computing/htt/index.htm

[7] 64-bit computing on Intel architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers and applications enabled for Intel® 64 architecture. Processors will not operate (including 32-bit operation) without an Intel® 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. Consult with your system vendor for more information.

[8] Demand-based switching is not available on 95 watt SKUs.

[9] Based on Intel power testing utilizing Intel® Xeon® processor 3.66 GHz with 667 MHz system bus. Dual-Core Intel Xeon Processor 7XXX expected to exhibit similar power consumption characteristics. Actual power savings will vary based on system configuration and workloads.

[10] In a x8 DDR memory device, the Intel® x8 Single Device Data Correction (x8 SDDC) provides error detection and correction for 1 to 8 data bits within a single device.

[A] Hyper-Threading Technology requires a computer system with an Intel® Xeon® processor supporting Hyper-Threading Technology and an HT Technology-enabled chipset, BIOS and operating system. Performance will vary depending on the specific hardware and software you use. See http://www.intel.com/info/hyperthreading/ for more information including details on which processors support HT Technology.

Printed in USA 0906/TJH/OCG/XX/PDF ♻ Please Recycle 309985-004US