



Dual-Core Intel® Xeon® Processor-based Platforms

Energy-Efficient Performance
to Boost Business Benefits



Respond Faster to New Business Opportunities

Your IT and business challenges are relentless. So are our passion and drive to deliver the right technology solutions to you. Whether your focus is on reliability, cost reduction, or a more responsive, flexible infrastructure, Intel has a platform solution that can meet your needs. With Intel's advanced technologies built into your infrastructure, you build success into your IT services and your business.

Intel continues to build more capabilities into platforms so you can do much more. We combine effective technologies, software services, and industry alliances, so you can optimize your servers to deliver the right business services more efficiently and at low cost. With nearly 40 million Intel® processor-based servers shipped since 1996, and a 20-year track record of delivering enterprise-class performance, you know you can count on Intel to deliver superior quality and reliability.

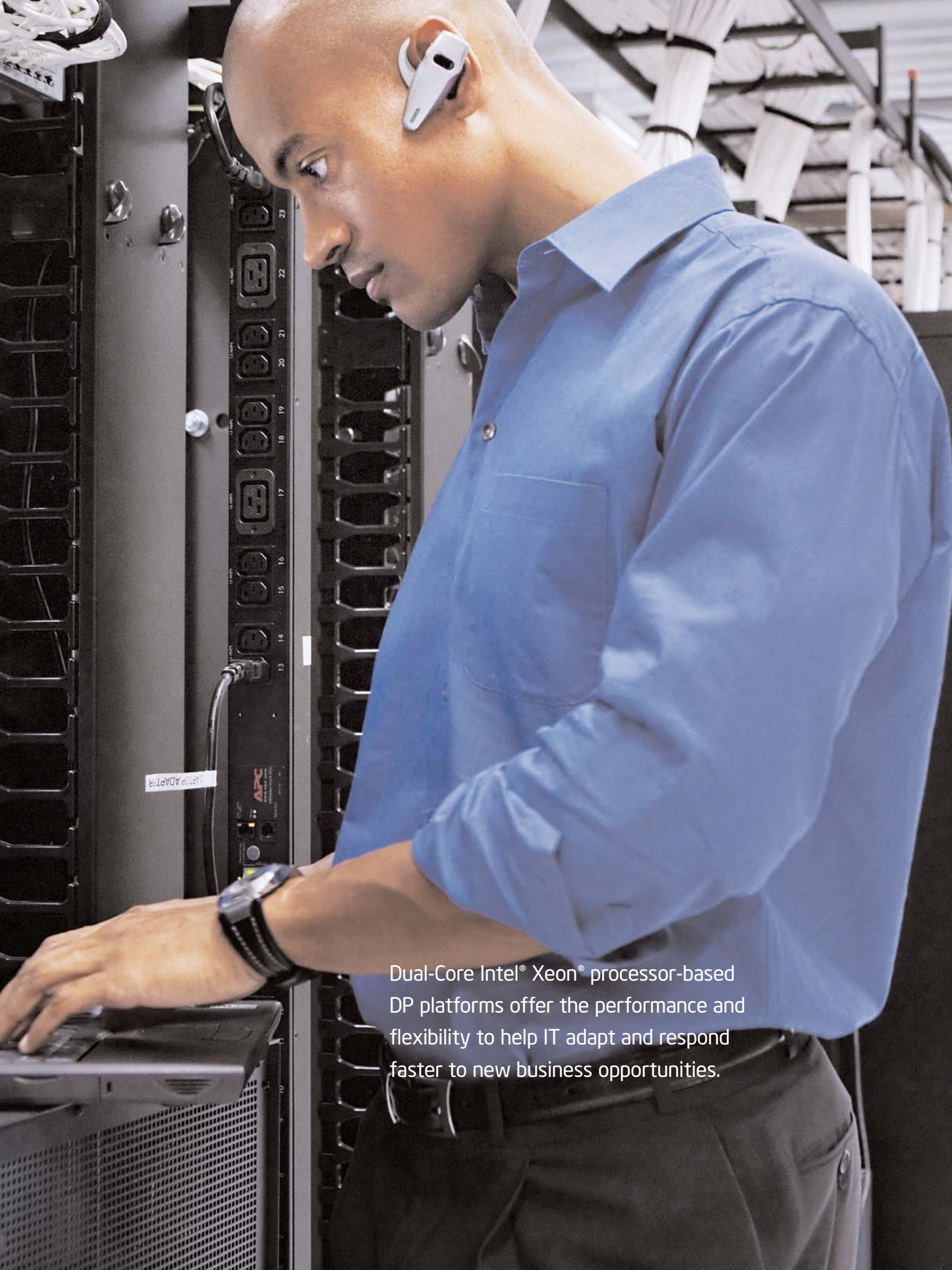
Our next step helps you move, and stay, ahead

New dual-processor (DP) platforms based on power-efficient Dual-Core Intel® Xeon® processors help your data center be more available and more responsive to changing business needs, while improving operational efficiency. Innovation throughout the server and enabled across the industry provides IT departments with advanced platforms that deliver exciting new capabilities for business.

The new Dual-Core Intel Xeon processor 5000¹ and 5100¹ series deliver breakthrough energy-efficient performance, boosting system performance while lowering processor power consumption. Servers based on the new Dual-Core Intel Xeon processor 5000 and 5100 series are best-in-class for deploying virtualization solutions to enable improved compute density, higher utilization, and lower maintenance costs. Embedded capabilities, such as enhanced I/O, advanced memory, and new security features combine to accelerate data processing and improve IT service continuity, providing a stable platform for long-range data center standardization and optimization.

Dual-core was just the beginning. At Intel, we recognize that business requirements mean more than creating processors that deliver great performance. That's why we continue to provide and advance server solutions that optimize performance and power efficiency, plus add new technologies to help IT infrastructures remain adaptable to changing business needs.





Dual-Core Intel® Xeon® processor-based DP platforms offer the performance and flexibility to help IT adapt and respond faster to new business opportunities.

Improve Efficiency and Service Uptime

New Dual-Core Intel Xeon processor-based DP platforms better help you meet your IT and business challenges head-on with energy-efficient performance and powerful data-intensive computing. They allow you to expand new services, manage more systems efficiently, and secure your data and infrastructure more effectively.

Boost utilization

New Dual-Core Intel Xeon processor-based servers are best-in-class platforms for virtualization. The added performance of 64-bit, dual-core computing and enhanced reliability features combined with proven software-based virtualization let you confidently pool hardware resources to boost utilization and build out critically needed business services. In addition, you can achieve greater flexibility by simultaneously hosting 64-bit and 32-bit operating systems and applications and Linux* on Windows* and Windows on Xen*, using Intel® Virtualization Technology². Integrated into Dual-Core Intel Xeon processor 5000 and 5100 series, and supported by the industry's leading virtualization software providers, Intel Virtualization Technology enhances software-based virtual environments with hardware assistance.

Optimize data center density

Our energy-efficient platforms take a comprehensive approach to power and thermal challenges, while simultaneously more than doubling the performance customers expect from Intel® servers. With up to 3 times the performance and over 3 times higher performance/watt over the previous-generation single-core processors³, Dual-Core Intel Xeon processor 5000 and 5100 series establish a new level of thermal efficiency, stability, and performance for data center planning and optimization. Our new platforms allow you to improve space and asset utilization and safely increase computing density, so you can deliver more services in the same amount of space, or even less.

Improve business continuity and compliance

Our new server platforms build in rock-solid reliability and enhanced security to help improve the integrity of business data and services. Processor chipset enhancements, plus Fully Buffered DIMM (FBDIMM) and PCI Express* (PCIe*) reliability features, help create a server you can rely on to build stable, available virtual environments. You'd expect nothing less given Intel's proven track record for delivering reliable systems.



Increase Flexibility and Performance with Innovative Platform Technologies

Flexible platforms for an agile business

Dual-Core Intel Xeon processor-based DP platforms enable flexibility and adaptability, helping your infrastructure scale with changing business needs. Performance enhancements, coupled with hardware-assisted virtualization, Intel embedded technologies, and Intel® software optimization tools help improve business services and user productivity.

- Dual-core, 64-bit computing for intensive workloads and large datasets.
- New dual independent buses, with up to 3 times peak bandwidth (21 GB/s @ 1333 MHz),⁴ between processors and chipset at up to 1333⁴ MHz enhance platform throughput.
- Broad choice of sub-100 watt performance-optimized processors, plus rack-optimized versions at 65 watts and low-voltage processors at 40 watts for ultra-dense deployments, provides options for data center optimization to meet any demand.
- FBDIMM technology provides greater system throughput and reliability.
- Up to 64 GB of memory capacity enables processing of larger data sets, keeps more critical data closer to the processing cores, and enables enhanced memory-based reliability and availability capabilities.

Take the next leap in server memory performance and capacity with FBDIMM technology

New FBDIMM technology is widely recognized as the next leap in memory technology, with broad support by industry memory manufacturers and original equipment manufacturers (OEMs). FBDIMM's ability to simultaneously boost memory throughput, bandwidth, capacity, and reliability offers new potential and flexibility to IT. FBDIMM technology delivers 4 times the memory capacity (up to 64 GB) and 3 times peak bandwidth (up to 21 GB/sec with 1333 MHz system bus⁴) of previous-generation Intel E7520 chipset platforms with DDR2-400 memory. FBDIMM removes the memory access bottlenecks with higher data rates and lower latency and breaks the memory limitation barrier typically found in today's servers. Dual-Core Intel Xeon processor 5000 and 5100 series-based DP platforms with FBDIMMs boost system responsiveness for data-intensive applications and business-critical services.

Server platforms based on the latest Dual-Core Intel Xeon processors with FBDIMMs are optimized for fast data access and processing. Coupled with the new Intel® I/O Acceleration Technology,⁵ (Intel® I/OAT) overall system performance and response is further improved, creating a balanced, high-performance platform for even the most demanding IT services and business-critical applications.

Energy-efficient performance with new Intel® Core™ microarchitecture²

Combining high-performance design with power-efficient technologies, the Intel® Core™ microarchitecture is a foundation for new energy-efficient platforms. Intel Core microarchitecture technologies deliver higher performance/watt compared to previous Intel® microarchitectures, enabling new capabilities for IT.³

Intel® Wide Dynamic Execution. Executes more instructions per clock with as much as a 33 percent wider execution path for each processor core.

Macro Fusion. Combines some discrete instructions into a single instruction for execution, delivering more efficient processing.

Intel® Intelligent Power Capability. Manages power consumption of all execution units in the core to optimize energy usage.

Intel® Advanced Smart Cache. A power-optimized cache that reduces latency to data, improving performance and power efficiency.

Intel® Smart Memory Access. Optimizes use of data bandwidth, hiding memory latency and improving system performance.

Intel® Advanced Digital Media Boost. Doubles performance of streaming instructions (SSE/SSE2/SSE3) by executing complete 128-bit instructions in one clock cycle, instead of two cycles as in previous microarchitectures.

Take advantage of energy-efficient performance to grow business services using your existing power and cooling capacity

Today's businesses demand more computing capacity and performance, but data centers are limited by their existing physical infrastructures and IT departments by their budgets. Energy-efficient Dual-Core Intel Xeon processor-based server platforms increase your computing capacity, without added power density. You can put more compute power into your existing power and cooling envelopes, expanding services and reducing pressure to expand or build new facilities.

The Dual-Core Intel Xeon processor 5000 series offers a broad choice of sub-100 watt performance-optimized processors. The Dual-Core Intel Xeon processor 5100 series includes a full stack of processors with the majority of SKUs shipping at 65 watts. An even lower power ultra-dense SKU will also be available at 40 watts. You can easily match your computing needs with your facility's power and cooling capacities, from platforms based on ultra-low-power processors for high-density blade servers to performance-optimized processors for your most intense computing demands.

Combining enhanced server virtualization with Intel Virtualization Technology, Intel® Software tools, and new energy-efficient Dual-Core Intel Xeon processor-based server platforms enables you to truly optimize your data center for computing capacity, performance, and power and cooling demands.

Embedded technologies improve performance, manageability, reliability, and security

Enhance virtual environments with Intel® Virtualization Technology

Intel has worked with the leading operating system and virtualization software companies, such as VMWare, Microsoft, and XenSource, to enhance software-based virtual environments with hardware-assistance from Intel Virtualization Technology. This new technology expands support for combining more operating systems onto a single virtual environment to help data centers be more responsive with a more scalable, flexible IT infrastructure. Intel's hardware-assistance is built into the processor and enabled by operating systems and virtualization software designed to support Intel Virtualization Technology.

Enhance performance for data-intensive applications with PCI Express*

PCI Express (PCIe) has become the mainstream I/O technology for balanced platforms. It provides the necessary bandwidth and lower latency to keep up with the capabilities of dual-core computing. A PCIe x1 link delivers a bi-directional peak bandwidth of 500 MB/s, while x4 and x8 links provide 2 GB/s and 4 GB/s, respectively. The lower latency and the increased bandwidth help deliver the throughput required to fully utilize the processor's improved capabilities.

Boost overall system performance with Intel® I/O Acceleration Technology

Intel I/OAT improves network responsiveness through more efficient network data movement and reduced system overhead. Intel multiport network adapters with Intel I/OAT provide high-performance I/O for server consolidation and virtualization. Stateless network acceleration seamlessly scales across multiple ports and virtual machines. Intel I/OAT provides safe and flexible network acceleration through tight integration into popular operating systems and virtualization software, avoiding the support risks of third-party network stacks and preserving existing network requirements such as teaming and failover.

Compared to standard Gigabit Ethernet, Intel I/OAT can deliver up to twice the data movement and reduce CPU overhead by up to 40 percent for faster application response, compared to 64-bit Intel Xeon processor-based servers and Intel 7520 chipset. Intel I/OAT is a platform innovation that includes the following:

- Processor acceleration: protocol stacks optimized for Intel® architecture improves data access.
- Intel® 5000 Series chipsets enhancements: data copying offloaded from the CPU to the chipset moves data faster.
- Intel® 82563EB Dual Port adapter and Intel® 82564EB Single Port adapter: parallel processing of data and commands supports better data flow to and from the network.
- Software-enabled: BIOS and operating systems⁵ unlock the capabilities of Intel I/OAT.

For more information, please visit www.intel.com/go/ioat.

Manage more efficiently and reduce costs with Intel® Active Server Manager

Intel® Active Server Manager⁶ provides advanced tools to efficiently manage servers – regardless of power or system state – helping you reduce management and maintenance costs and refocus your staff's efforts on more critical tasks. Even with a crashed hard drive or locked operating system, your technical staff can access the platform from a remote console for diagnostics, recovery, and inventory control using Intel Active Server Manager's integrated hardware, firmware, and out-of-band communications.

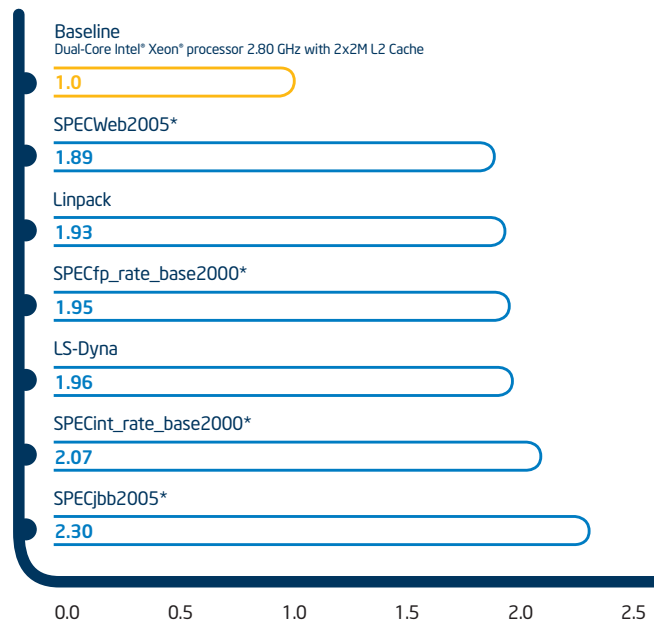
For more information on Dual-Core Intel® Xeon® processor-based DP server platforms, please go to www.intel.com/server



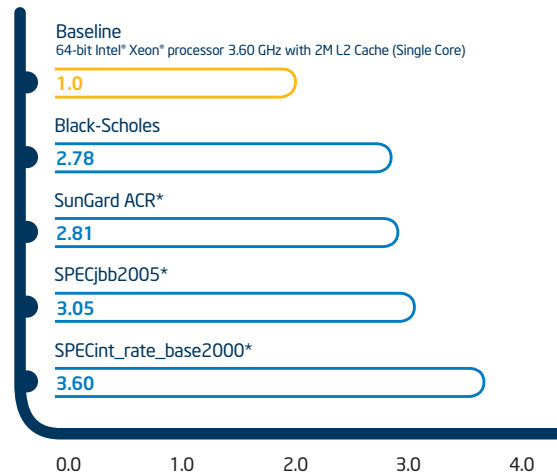
Dual-Core Intel® Xeon® Processor-based Platforms Overview

Platform Feature	User Benefit
Dual-Core Intel® Xeon® processor 5000 ¹ series	<ul style="list-style-type: none"> ▪ 64-bit, dual-core computing ▪ Up to twice the performance versus previous-generation single-core processors ▪ Up to 3 times the performance/watt³ ▪ Performance-optimized, sub-100 watt SKUs
Dual-Core Intel® Xeon® processor 5100 ¹ series	<ul style="list-style-type: none"> ▪ Based on new Intel® Core™ microarchitecture ▪ Breakthrough performance at up to 3 times the performance versus previous-generation single-core processors ▪ Enhanced power-efficient technologies for over 3 times performance/watt³ ▪ Wide range of 65 watt SKUs for rack-optimized deployments, plus 40 watt SKUs for ultra-dense deployments
Intel® Core™ microarchitecture ³	<ul style="list-style-type: none"> ▪ Energy-efficient performance with new technologies that improve execution efficiency and power consumption
Intel® Virtualization Technology ²	<ul style="list-style-type: none"> ▪ Enables more operating systems and software to run in today's virtual environments ▪ Developed with virtualization software providers to enable greater functionality and compatibility compared to non-hardware-assisted virtual environments
Hyper-Threading Technology ⁴	<ul style="list-style-type: none"> ▪ Allows each core to function as two logical processors for better compute throughput when used with threaded applications. Improves processor utilization and system responsiveness for better user experience compared to previous generations.
Dual Independent buses (1066 MHz and 1333 ⁴ MHz)	<ul style="list-style-type: none"> ▪ Up to 17 GB/s with 1066 MHz and up to 21 GB/s with 1333 MHz
Intel® Extended Memory 64 Technology ⁷ (Intel® EM64T)	<ul style="list-style-type: none"> ▪ Enables extended memory addressability for server applications
Fully Buffered DIMM technology	<ul style="list-style-type: none"> ▪ Provides up to 3 times the increase in memory bandwidth over previous memory technology ▪ Up to 4 times the memory capacity up to 64 GB ▪ Enhanced reliability, availability, and serviceability features
Intel® Active Server Manager ⁶	<ul style="list-style-type: none"> ▪ Enables more efficient management of servers
Intel® I/O Acceleration Technology ⁵ (Intel® I/OAT)	<ul style="list-style-type: none"> ▪ Delivers up to twice the data movement ▪ Cuts CPU overhead by as much as 40 percent
PCI Express* serial I/O	<ul style="list-style-type: none"> ▪ Industry-standard serial I/O capable of up to 4 GB/s peak bandwidth with x8 link ▪ Improved RAS features compared to PCI-X* ▪ Lower latency compared to PCI-X for improved I/O performance ▪ Software compatible with PCI-X to simplify parallel-to-serial transition
Enhanced reliability and manageability	<ul style="list-style-type: none"> ▪ Many memory controller features, together with PCI Express RAS features combine to help improve platform reliability vs. previous-generation platforms ▪ New features include Error Correcting Code (ECC) system bus, new memory mirroring and I/O hot-plug ▪ The Intel® 5000V/P chipsets include an SMBus port for remote management operation and support for a variety of third-party BMC (base management controller) and BIOS solutions

Superior Performance and Performance Per Watt with New Dual-Core Intel® Xeon® Processor 5100 Series



Server and HPC Performance



Performance Per Watt Comparison

Benchmarks for Server and HPC Performance

Benchmark Description for SPECweb*2005: SPECweb2005 evaluates the performance of World Wide Web Servers. SPECweb2005 consists of three separate, distinct workloads Banking, Ecommerce, and Support. The result is the geometric mean of the three submetrics, normalized to a reference platform score.

Configuration Details: Data Source—Published/Submitted results as of May 23, 2006.

Dual-Core Intel Xeon Processor 2.80 GHz-based platform details: Dell PowerEdge* 2850 server platform with Two Dual-Core Intel® Xeon® processors 2.80 GHz with 2x2 MB L2 Cache 16 GB DDR2, SUSE Linux® Enterprise Server 9 SP2 (default kernel 2.6.5-7.191-smp) Zeus Web Server* 4.2r4 (x86-64). Referenced as published at <http://www.spec.org/web2005/results/res2005q4/web2005-20051107-00017.html>

Dual-Core Intel Xeon Processor 5160-based platform details: IBM System x3650* Server platform with two Dual-Core Intel Xeon Processor 5160, 3.00 GHz with 4 MB L2 Cache, 1333 MHz system bus, 24 GB (12x2 GB) FBDIMM memory, 64-bit Red Hat Enterprise Linux* 4 AS Update 3 operating system, 64-bit Accoria Rock Web Server* 1.3.3 HTTPS software, and Apache Tomcat* 5.5.9. Result submitted to www.spec.org for review at 9182 as of May 23, 2006.

Benchmark Description for Linpack: Linpack is a floating-point benchmark that solves a dense system of linear equations in parallel. The metric produced is Giga-FLOPS or billions of floating point operations per second. The benchmark is used to determine the world's fastest computers at the website <http://www.top500.org/>

Configuration Details: Data Source—Published/Measured results as of May 19, 2006.

Dual-Core Intel Xeon Processor 2.80 GHz-based platform details: Intel preproduction software development platform with two Dual-Core Intel® Xeon® processors 2.80 GHz with 2x2 MB L2 Cache and 800 MHz system bus and 8 GB (8x1024 MB) DDR2-400 memory, Red Hat Enterprise Linux* 3, Update 3, Intel® EM64T, Intel Linpack 2.1.2

Dual-Core Intel Xeon Processor 5160-based platform details: Intel preproduction customer reference board with two Dual-Core Intel Xeon Processor 5160, 3.00 GHz with 4 MB L2 Cache, dual 1333 MHz system bus, 8 GB (8x1 GB) 667 MHz FBDIMM memory, Red Hat Enterprise Linux* 4, Update 2, Intel® EM64T, Intel Linpack 3.0.1

Benchmark Description for SPECfp*_rate_base2000: SPECfp*_rate_base2000 is a compute-intensive benchmark that measures the floating point throughput performance of a computer system carrying out a number of parallel tasks.

Configuration Details for SPECfp*_rate_base2000: Data Source—Published/Submitted results as of May 23, 2006.

Dual-Core Intel Xeon Processor 2.80 GHz-based platform details: FSC Primergy RX300* S2 Server platform with two Dual-Core Intel® Xeon® processors 2.80 GHz with 2x2 MB L2 Cache 800 MHz system bus, 4 GB DDR2, 64-Bit Red Hat Enterprise Linux* AS release 4 update 1 Kernel 2.6.9-11.ELsmp on an x86_64 Intel C++ and Fortran Compiler 9.0 for Intel® EM64T Build 20050914 (for 64-bit applications). Referenced as published at 42.5. For more information see <http://www.spec.org/cpu2000/results/res2005q4/cpu2000-20051004-04899.html>

Dual-Core Intel Xeon Processor 5160-based platform details: Dell PowerEdge* 2950 Server platform with two Dual-Core Intel Xeon Processor 5160, 3.00 GHz with 4 MB L2 Cache, 1333 MHz system bus, 8GB (8x1GB) FB-DIMM memory, Red Hat Enterprise Linux* 4 Advanced Server Update 3 Intel® EM64T. SPEC binaries built with Intel C/C++ Compiler 9.0. Result submitted to www.spec.org for review at 83 as of May 23, 2006.

Benchmark Description for LS-DYNA: LS-DYNA is a commercial engineering application used in finite element analysis such as a car collision. The workload used in these comparisons is called 3 Vehicle Collision.

Configuration Details: Data Source: Published/Measured results as of May 19, 2006.

Dual-Core Intel Xeon Processor 2.80 GHz-based platform details: Intel preproduction software development platform with two Dual-Core Intel® Xeon® processors 2.80 GHz with 2x2 MB L2 Cache and 800 MHz system bus and 8 GB (8x1024 MB) DDR2-400 memory, Red Hat Enterprise Linux* 3, Update 3, Intel® EM64T, LS-DYNA mpp970.5434a*

Dual-Core Intel Xeon Processor 5160-based platform details: Intel preproduction customer reference board with two Dual-Core Intel Xeon Processor 5160, 3.00 GHz with 4 MB L2 Cache, dual 1333 MHz system bus, 8 GB (8x1 GB) 667 MHz FBDIMM memory, Red Hat Enterprise Linux* 4, Update 2, Intel® EM64T, LS-DYNA mpp970.5434a*. Result Submitted to www.topcrunch.org as of 5/23/06.

Benchmark Description for SPECint*_rate_base2000: SPECint*_rate_base2000 is a compute-intensive benchmark that measures the integer throughput performance of a computer system carrying out a number of parallel tasks.

Configuration Details: Data Source—Published/Submitted results as of May 23, 2006.

Dual-Core Intel Xeon Processor 2.80 GHz-based platform details: IBM eServer xSeries* 346 Server platform with two Dual-Core Intel® Xeon® processors 2.80 GHz with 2x2 MB L2 Cache, and 800 MHz system bus 8 GB (8x1 GB) DDR2 memory, Microsoft Windows Server* 2003, standard Edition. SPEC binaries built with Intel C/C++ Compiler 9.0. Referenced as published at 59.5. For more information see <http://www.spec.org/cpu2000/results/res2005q4/cpu2000-20051006-04904.html>

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Improve Service Uptime with Superior Reliability and Availability

Dual-Core Intel Xeon processor-based platforms with FBDIMM technology take reliability and availability to a new level.

Intel® 5000 Series chipsets RAS features

Enhanced reliability is integrated in the Intel 5000 Series chipsets, offering a high degree of memory error detection and correction, data protection, and serviceability.

Memory mirroring. Lets you split and duplicate system memory, protecting against uncorrectable errors or DRAM failure.

Memory sparing. Allows you to reserve spare memory capacity that can be used if current memory fails.

X8 Single Device Data Correction (X8 SDDC). 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 and automatically corrects single-bit errors on internal data paths.

Hot-plug I/O. Add I/O after installation without service interruption.

FBDIMM technology RAS features

Incorporating a new Advanced Memory Buffer between the chipset and memory, FBDIMM technology adds new RAS features that make the platform even more robust, helping companies improve service uptime.

Fault or Function	Action by FBDIMM
Integrity check on data	ECC, SDDC, and CRC
Integrity check on address and control	CRC
Upon an uncorrectable error on a transaction (without FBDIMM, this kind of error shuts down the system)	Retry upon error, then log and continue if no error upon retry; escalate to OS only if hard error
Pass-through for AMB (DIMM) fault tolerance	Same if error on DRAM or AMB core; less if whole AMB chip fails

PCI Express RAS enhances I/O availability

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 IPMI.
- 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.

Dual-Core Intel® Xeon® Processor-based Server Platform

A range of processors in the Dual-Core Intel Xeon processor 5000 and 5100 series enables you to optimize your IT environment with the right server platforms to meet your business needs. From performance-optimized versions at 130 watts to low-power 40 watt versions for ultra-dense blade and rack-mount deployments, you can easily match your computing needs with your facility's power and cooling capacities.

Dual-Core Intel Xeon processor 5000 series

Processor Number ¹	Speed	Cache Size	Front-Side Bus	Total Dissipated Power	Hyper-Threading Technology ¹	Virtualization Technology ²	Extended Memory 64 Technology ⁷	Demand-Based Switching	Package
Dual-Core Intel® Xeon® processor 5080	3.73 GHz	2x2M	1066 MHz	130W	Yes	Yes	Yes	Yes	LGA 771
Dual-Core Intel® Xeon® processor 5063	3.20 GHz	2x2M	1066 MHz	95W	Yes	Yes	Yes	No	LGA 771
Dual-Core Intel® Xeon® processor 5060	3.20 GHz	2x2M	1066 MHz	130W	Yes	Yes	Yes	No	LGA 771
Dual-Core Intel® Xeon® processor 5050	3.00 GHz	2x2M	667 MHz	95W	Yes	Yes	Yes	Yes	LGA 771
Dual-Core Intel® Xeon® processor 5030 ¹	2.67 GHz	2x2M	667 MHz	95W	Yes	Yes	Yes	Yes	LGA 771

Dual-Core Intel Xeon processor 5100 series

Processor Number ¹	Speed	Cache Size	Front-Side Bus	Total Dissipated Power	Virtualization Technology ²	Extended Memory 64 Technology ⁷	Demand-Based Switching	Package
Dual-Core Intel® Xeon® processor 5160	3.00 GHz	4M	1333 MHz ⁴	80W	Yes	Yes	Yes	LGA 771
Dual-Core Intel® Xeon® processor 5150	2.66 GHz	4M	1333 MHz	65W	Yes	Yes	Yes	LGA 771
Dual-Core Intel® Xeon® processor LV 5148	2.33 GHz	4M	1333 MHz	40W	Yes	Yes	Yes	LGA 771
Dual-Core Intel® Xeon® processor 5140	2.33 GHz	4M	1333 MHz	65W	Yes	Yes	Yes	LGA 771
Dual-Core Intel® Xeon® processor 5130 ¹	2.00 GHz	4M	1333 MHz	65W	Yes	Yes	No	LGA 771
Dual-Core Intel® Xeon® processor 5120	1.86 GHz	4M	1066 MHz	65W	Yes	Yes	No	LGA 771
Dual-Core Intel® Xeon® processor 5110	1.60 GHz	4M	1066 MHz	65W	Yes	Yes	No	LGA 771

¹Available in boxed version only

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Dual-Core Intel Xeon Processor 5160-based platform details: Dell PowerEdge® 2950 Server platform with two Dual-Core Intel Xeon Processor 5160, 3.00 GHz with 4 MB L2 Cache, 1333 MHz system bus, 8GB (8x1 GB) FB-DIMM memory, Microsoft Windows Server® 2003. SPEC binaries built with Intel C/C++ Compiler 9.1. Result submitted to www.spec.org for review at 123 as of May 23, 2006.

Benchmark Description for SPECjbb®2005: SPEC Java Business Benchmark 2005 (jbb2005). Written in Java, this multi-threaded benchmark emulates an order processing environment in a company with multiple warehouses serving multiple customers. Measures average transaction throughput of a heavily loaded server. Performance reported in Business Operations per Second (BOPS).

Configuration Details: Data Source—Published/Submitted results as of May 23, 2006.

Dual-Core Intel Xeon Processor 2.80 GHz-based platform details: Fujitsu Siemens Computers PRIMERGY® RX300 S2 server platform: Two Dual-Core Intel® Xeon® processors 2.80 GHz with 2x2 MB L2 cache 800 MHz system bus, 4 GB DDR2, Microsoft Windows Server® 2003. Java HotSpot® Server VM (build 1.5.0_06-b05). Referenced as published at 41986 bops and 41986 bops/jvm For more information see <http://www.spec.org/jbb2005/results/res2005q4/jbb2005-20051206-00040.html>

Dual-Core Intel Xeon Processor 5160-based platform details: Fujitsu Siemens PRIMERGY® RX200 S3 Server platform with two Dual-Core Intel Xeon Processor 5160, 3.00 GHz with 4 MB L2 Cache, 1333 MHz system bus, 8 GB (8x1 GB) FB-DIMM memory, Windows 2003 Enterprise Edition*. BEA JRockit® 5.0 P26.4.0. Result submitted to www.spec.org for review at 96404 bops and 96404 bops/jvm as of May 21, 2006.

Benchmarks for Performance Per Watt Comparison

Benchmark Description for Black-Scholes: The Black-Scholes kernel workload is based on a financial modeling algorithm for the pricing of European-style options. The benchmark consists of a kernel that implements a derivative of the Black and Scholes technique.

Configuration Details: Data Source—Results published by Principled Technologies at http://www.principledtechnologies.com/clients/reports/Intel/WBlack_Scholes_0506.pdf as of May 23, 2006.

Intel Xeon Processor 3.60 GHz-based platform details: Intel preproduction Server platform with two 64-bit Intel® Xeon® processors 3.60 GHz with 2 MB L2 Cache and 800 MHz system bus and 8 GB (8x1024 MB) DDR2-400 memory, Microsoft Windows Server® x32 Enterprise Edition. Black-Scholes 64-bit version kernel workload.

Dual-Core Intel Xeon Processor 5160-based platform details: Intel preproduction Server platform with two Dual-Core Intel Xeon Processor 5160, 3.00 GHz with 4 MB L2 Cache, dual 1333 MHz system bus, 8 GB (8x1 GB) 667 MHz FB-DIMM memory, Microsoft Windows Server® x32 Enterprise Edition. Black-Scholes 64-bit version kernel workload.

Benchmark Description for SunGard: SunGard ACR® is a financial services application. This workload analyzes a large portfolio of client assets and generates a credit risk evaluation.

Configuration Details: Data Source—Results published by Principled Technologies at http://www.principledtechnologies.com/clients/reports/Intel/WSunGard_ACR_0506.pdf as of May 23, 2006.

Intel Xeon Processor 3.60 GHz-based platform details: Intel preproduction Server platform with two 64-bit Intel® Xeon® processors 3.60 GHz with 2 MB L2 Cache and 800 MHz system bus and 8 GB (8x1024 MB) DDR2-400 memory, Microsoft Windows Server® x32 Enterprise Edition. SunGard Adaptiv® Credit Risk 64-bit version workload.

Dual-Core Intel Xeon Processor 5160-based platform details: Intel preproduction Server platform with two Dual-Core Intel Xeon Processor 5160, 3.00 GHz with 4 MB L2 Cache, dual 1333 MHz system bus, 8 GB (8x1 GB) 667 MHz FB-DIMM memory, Microsoft Windows Server® x32 Enterprise Edition. SunGard Adaptiv® Credit Risk 64-bit version workload.

Configuration Details for SPECjbb®2005*: Data Source—Results published by Principled Technologies at http://www.principledtechnologies.com/clients/reports/Intel/WSPECjbb2005_0506.pdf as of May 23, 2006.

Intel Xeon Processor 3.60 GHz-based platform details: Intel preproduction Server platform with two 64-bit Intel® Xeon® processors 3.60 GHz with 2 MB L2 Cache and 800 MHz system bus and 8 GB (8x1024 MB) DDR2-400 memory, Microsoft Windows Server® x32 Enterprise Edition. BEA JRockit® 5.0 P26.0.0.

Dual-Core Intel Xeon Processor 5160-based platform details: Intel preproduction Server platform with two Dual-Core Intel Xeon Processor 5160, 3.00 GHz with 4 MB L2 Cache, dual 1333 MHz system bus, 8 GB (8x1 GB) 667 MHz FB-DIMM memory, Microsoft Windows Server® x32 Enterprise Edition. BEA JRockit® 5.0 P26.0.0.

Configuration Details for SPECint_rate_base2000: Data Source: Results published by Principled Technologies at http://www.principledtechnologies.com/clients/reports/Intel/WSPECint_rate_0506.pdf as of May 23, 2006.

Intel Xeon Processor 3.60 GHz-based platform details: Intel preproduction Server platform with two 64-bit Intel® Xeon® processors 3.60 GHz with 2 MB L2 Cache and 800 MHz system bus and 8 GB (8x1024 MB) DDR2-400 memory, Microsoft Windows Server® x32 Enterprise Edition. SPEC binaries build with Intel compiler 9.0.

Dual-Core Intel Xeon Processor 5160-based platform details: Intel preproduction Server platform with two Dual-Core Intel Xeon Processor 5160, 3.00 GHz with 4 MB L2 Cache, dual 1333 MHz system bus, 8 GB (8x1 GB) 667 MHz FB-DIMM memory, Microsoft Windows Server® x32 Enterprise Edition. SPEC binaries build with Intel compiler 9.0.

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

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.

¹ 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.

² Intel® Virtualization Technology requires a computer system with a processor, chipset, BIOS, virtual machine monitor (VMM) and applications enabled for virtualization technology. Functionality, performance or other virtualization technology benefits will vary depending on hardware and software configurations. Virtualization technology-enabled BIOS and VMM applications are currently in development.

³ Performance comparison to Intel® Xeon® processor platforms with Intel® E7520 Chipset and DDR2-400 memory.

⁴ 1333 MHz bus available in 2nd half of 2006.

⁵ Microsoft will support Intel® I/OAT in future Microsoft Windows Server® releases.

⁶ Intel® Active Server Manager requires the computer to have additional hardware and software, connection with a power source, and a network connection. Check with your PC manufacturer for details.

⁷ 64-bit Intel® Xeon® processors with Intel® EM64T requires a computer system with a processor, chipset, BIOS, OS, device drivers and applications enabled for Intel EM64T. Processor will not operate (including 32-bit operation) without an Intel EM64T-enabled BIOS. Performance will vary depending on your hardware and software configurations. Intel EM64T-enabled OS, BIOS, device drivers and applications may not be available. Check with your vendor for more information.

⁸ Intel® Core™ microarchitecture in Dual-Core Intel Xeon processor 5100 series only.

⁹ Hyper-Threading Technology requires a computer system with an Intel® Xeon® processor supporting Hyper-Threading Technology (Dual-Core Intel® Xeon® processor 5100 series does not support HT Technology) and an HT Technology-enabled chipset, BIOS and operating system. Performance will vary depending on the specific hardware and software you use. Hyper-Threading Technology in Dual-Core Intel Xeon processor 5000 series only. See <http://www.intel.com/info/hypersupporting/> for more information including details on which processors support HT Technology.

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