

## Product Brief

Dual-Core Intel® Xeon® Processor 5000 Series



# Dual-Core Intel® Xeon® Processor 5000 Series

Enabling New Levels of Performance, Efficiency,  
and Reliability for Dual Processor Platforms



Intel's advanced dual-core processor for dual processor (DP) servers and workstations enhances virtual environments, builds in greater capabilities for security and availability, and incorporates new tools for efficient manageability.

The Dual-Core Intel® Xeon® processor 5000<sup>1</sup> series enables next-generation platforms with the capabilities to get more done on fewer systems, optimize data center density, and improve business continuity, redefining what DP servers and workstations should deliver to help businesses be more efficient, dependable, and agile.

The Dual-Core Intel Xeon processor 5000 series, with 64-bit, dual-core computing and greater power efficiency, is ideal for intense computing environments, business-critical applications, and high-end workstations. Powered by the Intel® 5000 chipset family and Fully Buffered DIMM (FBDIMM) technology, new Intel Xeon processor 5000 series-based platforms are expected to deliver up to 2 times the performance and up to 70% the performance/watt of previous single-core Intel® Xeon® processors.









### **Beyond balanced platforms: New technologies to help balance computing resources and operating costs**

Intel recognizes that IT and business need high-performance platforms that deliver on their company's daily business demands. Platforms based on the Dual-Core Intel Xeon processor 5000 series support many new Intel® technologies that help companies enhance operations, reduce costs, and improve business continuity:

- Intel® I/O Acceleration Technology<sup>2</sup> (Intel I/OAT), hardware- and software-supported I/O acceleration that improves data throughput.
- Intel® Virtualization Technology<sup>3</sup> provides hardware assistance for software-based virtual environments to support new capabilities, including 64-bit operating systems (OSs) and applications.

**With the Dual-Core Intel Xeon processor 5000 series, you know you're getting the most advanced processor for your platforms. One that can help transform your operations and take you into the future.**

The Dual-Core Intel Xeon processor 5000 series helps IT and business operations deliver more services and work more efficiently with a faster system bus, greater power efficiency, and new capabilities that enhance virtual environments. With a targeted 70% performance/watt improvement over previous single-core Intel Xeon processors, platforms based on this new 64-bit dual-core processor can enable greater density in data centers. Virtualization and density optimization allows businesses to concentrate more services in less space and fewer systems.

The proven 64-bit computing of the Dual-Core Intel Xeon processor 5000 series gives you additional application headroom, proven reliability, lower power consumption, memory flexibility, and increased security. By supporting larger data sets and both 32- and 64-bit applications, 64-bit Dual-Core Intel Xeon processor-based servers and workstations allow the smooth migration of your business to 64-bit applications. And, with over six million 64-bit processors already shipped, you know you can depend on Intel's proven track record to help you make a smooth transition to the next-generation of computing.

For more information on server performance, please visit [www.intel.com/performance/server](http://www.intel.com/performance/server)

For information on workstation performance, please visit [www.intel.com/performance/workstation](http://www.intel.com/performance/workstation)



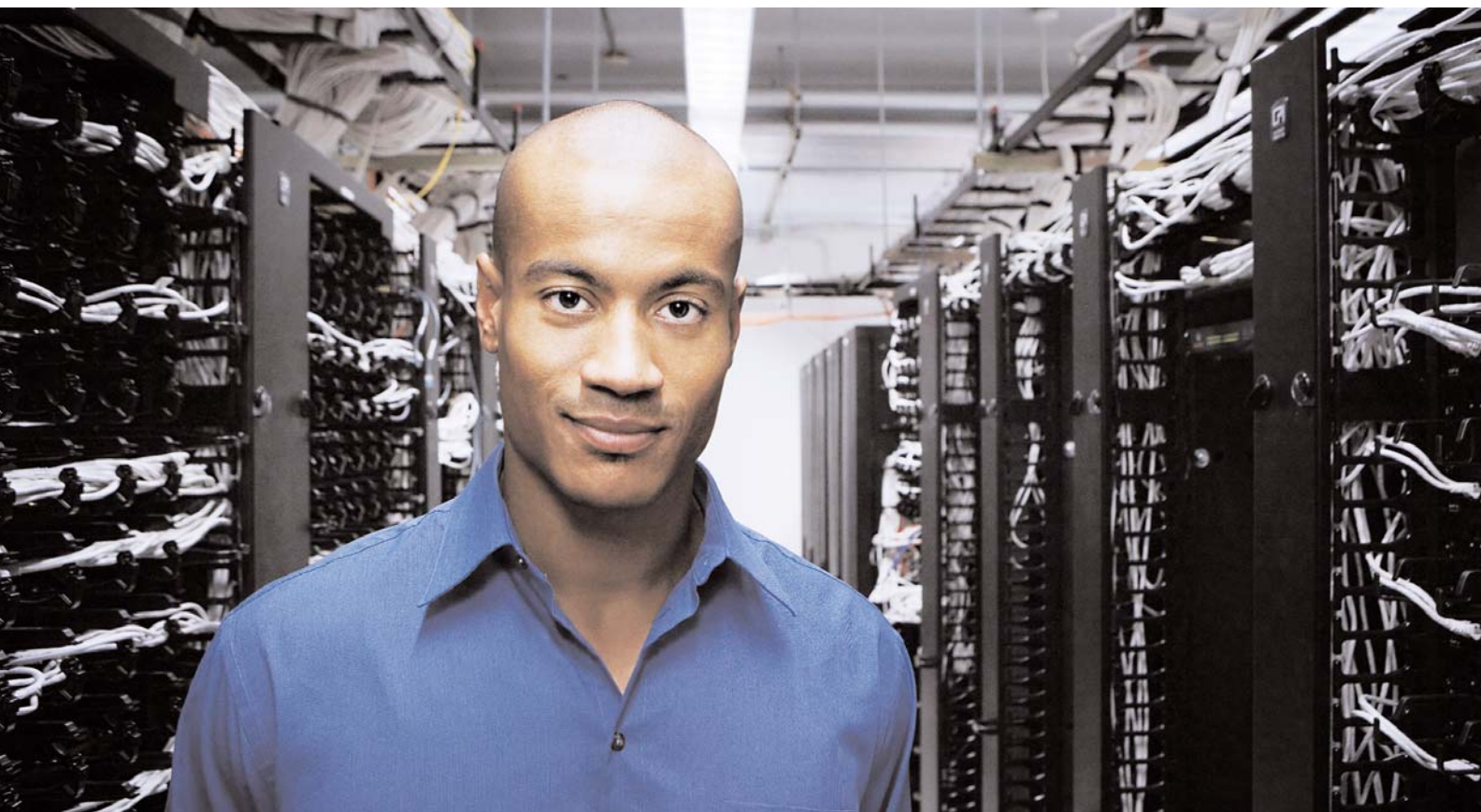
# Intel Xeon Processor 5000 Series Overview

Dual processor servers and workstations based on the Dual-Core Intel Xeon processor 5000 series deliver performance, reliability, versatility, and low ownership costs at a variety of price-points.

## Features

## Benefits

Dual-core processing	▪ Significant performance headroom, especially for multi-threaded applications, helps boost system utilization through virtualization and application responsiveness.
2 MB integrated L2 cache per core (2x2M)	▪ More data can be stored closer to processor execution units for faster data access, resulting in higher system throughput and shorter system latency.
1066 MHz system bus	▪ Faster system bus speeds than previous generations for increased throughput.
Intel® Virtualization Technology <sup>3</sup>	▪ New processor hardware enhancements that support software-based virtualization, enabling migration of more environments – including 64-bit OSs and applications – to virtual environments.
Power-optimized SKUs at 95W	▪ Several SKUs available at reduced power envelopes will deliver even higher performance per watt – helps reduce power/thermal operating costs and improve data center density.
Intel® Hyper-Threading Technology <sup>4</sup>	▪ Enables up to 8 logical threads in a dual-processor platform to improve processor utilization and system responsiveness.
Intel® Extended Memory 64 Technology (Intel® EM64T) <sup>5</sup>	▪ Flexibility for 64-bit and 32-bit applications and operating systems.
Demand-Based Switching (DBS) with Enhanced Intel SpeedStep® technology	▪ Helps reduce average system power consumption and potentially improves system acoustics.



## What is the 5000 Sequence?

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.

### Intel offers four processor number sequences for server applications

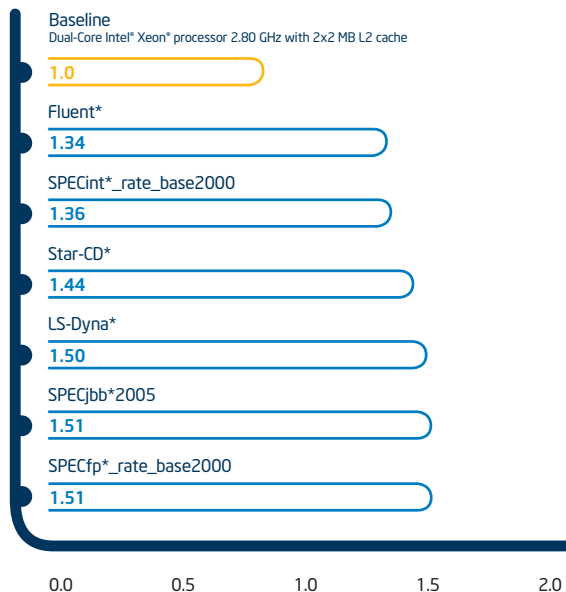
Processor Sequence <sup>1</sup>	Used For
Intel® Pentium® 4/Pentium® D processor	Small business, entry, or first server
Dual-Core Intel® Xeon® processor 5000 sequence	Volume DP servers/workstations based on the Intel Xeon processor
Dual-Core Intel® Xeon® processor 7000 sequence	Greater scalability than DP platforms with MP enterprise servers based on the Intel Xeon processor MP
Intel® Itanium® 2 processor 9000 sequence	Maximum performance and scalability for RISC replacement usage

### Dual-Core Intel Xeon processor 5000 series

Processor Number <sup>1</sup>	Speed	Cache Size	Front-Side Bus	Total Dissipated Power	Hyper-Threading Technology <sup>1</sup>	Virtualization Technology <sup>2</sup>	Extended Memory 64 Technology <sup>4</sup>	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 <sup>1</sup>	2.67 GHz	2x2M	667 MHz	95W	Yes	Yes	Yes	Yes	LGA 771

<sup>1</sup>Available in boxed version only

# Up to an Additional 51% Performance Improvement with Dual-Core Intel Xeon Processor 5000 Series



## Benchmark notes:

SPECint\*\_rate\_base2000: This benchmark evaluates the integer throughput of the measured system. Comparison based on published result.

Baseline Platform Configuration: IBM eServer xSeries\* 346 Server platform with two Dual-Core Intel Xeon processors 2.80 GHz with 2x2 MB L2 Cache 4 GB DDR2, Microsoft Windows Server\* 2003, standard Edition, Intel C/C++ Compiler 9.0, Referenced as published at <http://www.spec.org/cpu2000/results/res2005q4/cpu2000-20051006-04904.html>

New Platform Configuration: Fujitsu Siemens Computers PRIMERGY\* RX300 S3 server platform with two Intel Xeon processors 5080, 8x1 GB FBDIMM memory, Microsoft Windows Server\* 2003, Intel C/C++ Compiler 9.0, Referenced as published, March 2006. For more information see <http://www.spec.org/cpu2000/results/res2006q1/cpu2000-20060306-05674.html>

SPECfp\*\_rate\_base2000: This benchmark evaluates the integer throughput of the measured system. Comparison based on published result.

Baseline Platform Configuration: 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 2.6.9-1.1.EL.smp on an x86\_64 Intel C/C++ Compiler 9.0, Referenced as published, November 2005. For more information see <http://www.spec.org/cpu2000/results/res2005q4/cpu2000-20051004-04899.html>

New Platform Configuration: Fujitsu Siemens Computers PRIMERGY\* RX300 S3 server platform with two Intel Xeon processors 5080, 16GB (8x2GB) FBDIMM memory, 64-Bit SUSE LINUX Enterprise Server\* 9 with SP3 Kernel 2.6.5-7.244-smp on an x86\_64 Intel C/C++ Compiler 9.0, Referenced as published, March 2006. For more information see <http://www.spec.org/cpu2000/results/res2006q1/cpu2000-20060306-05672.html>

SPECjbb\*2005: This workload evaluates the performance of Server-side Java Application. Performance measured in Business Operations Per Second (Bops). Comparison based on published result.

Baseline Platform Configuration: Fujitsu Siemens Computers PRIMERGY\* TX300 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. Results at <http://www.spec.org/jbb2005/results/res2005q4/jbb2005-20051206-00040.html>

New Platform Configuration: Fujitsu Siemens Computers PRIMERGY\* TX300 S3 server platform with two Intel Xeon processors 5080, 16 GB (8x2 GB) FBDIMM memory, Microsoft Windows Server\* 2003, BEA JRockit\* 5.0 P26.0.0 (build P26.0.0-29-57671-1.5.0\_06-20060218-2127-win-x86\_64) Referenced as published, March 2006. For more information see <http://www.spec.org/jbb2005/results/res2006q1/jbb2005-20060228-00083.html>

Fluent\*: Version 6.2, geomean of 8 workloads. This HPC workload evaluates the performance of a Computational Fluid dynamics application. Performance measured in jobs/day.

Star-CD\*: Version 3.22 engine workload. This HPC workload evaluates the performance of a Computational Fluid dynamics application. Performance measured in jobs/day.

LS-Dyna\*: Version mpp970.5434a. 3 cars workload. This HPC workload evaluates the performance of a Car Crash Simulation application. Performance measured in jobs/day.

Same platform configuration for the above three (Fluent, Star-CD and LS-Dyna) workloads. Comparison based on Intel internal measurement (Feb. 2006)

Baseline Platform Configuration: Intel Server Pre-Production System with two Dual-Core Intel Xeon processors 2.80 GHz with 2x2 MB L2 Cache, Intel E7520 Chipset, 800 MHz FSB; 8 GB (8x1 GB) DDR2-400 memory (8x1 GB), OS - Red Hat Enterprise Linux\* AS release 4 (Nahant Update 1) Linux version 2.6.9-1.1.EL, Intel EM64T.

New Platform Configuration: Intel Server Pre-Production System with two Intel Xeon Dual-Core processor 5080, 8 GB (8x1 GB) FBDIMMs; Hyper Threading OFF; Red Hat Enterprise Linux\* AS release 4 2.6.9-5 EL x86\_64 GNU/Linux Workload.

## Disclaimers:

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.

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

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.

SPECint2000 and SPECfp2000 benchmark tests reflect the performance of the microprocessor, memory architecture and compiler of a computer system on compute-intensive, 32-bit applications. SPEC benchmark tests results for Intel microprocessors are determined using particular, well-configured systems. These results may or may not reflect the relative performance of Intel microprocessor in systems with different hardware or software designs or configurations (including compilers). Buyers should consult other sources of information, including system benchmarks, to evaluate the performance of systems they are considering purchasing.

## Platform Solutions

The following chipsets are optimized for the Dual-Core Intel Xeon Processor 5000 series. Compared to previous-generation chipsets, they deliver higher throughput with dual independent buses, faster memory and I/O bandwidth, and FBDIMM support. In addition, support for Intel® Active Server Manager<sup>s</sup> and Intel I/OAT help improve overall system performance and manageability.

### DP server-supported chipsets

Two chipset versions enable server configuration flexibility for unique business needs and market segments.

- **Intel® 5000P chipset:** For performance and volume server platforms, this chipset supports dual independent buses for dual-processor applications, 1066 MHz system bus speed, three PCI Express\* x8 links (each configurable as two x4 links), FBDIMM 533 and 667 technology, point-to-point connection for Intel® 6321 ESB I/O Controller Hub at 2 GB/s, and Intel® 6700PXH 64-bit PCI hub.
- **Intel® 5000V chipset:** For value platforms, this chipset supports dual independent buses for dual-processor applications, 1066 MHz system bus speed, one PCI Express x8 link (configurable as two x4 links), FBDIMM 533 and 667 technology, point-to-point connection for Intel 6321 ESB I/O Controller Hub at 2 GB/s, and Intel 6700PXH 64-bit PCI hub.

### DP workstation-supported chipset

DP workstations based on the Dual-Core Intel Xeon processor 5000 series are ideal for today's demanding applications in computer aided engineering (CAE), electronic design automation (EDA), digital media, financial analysis, oil and gas exploration, and software engineering. With its large cache size and Intel® Hyper-Threading Technology<sup>†</sup>, Dual-Core Intel Xeon processor 5000 series-based workstations provide superior performance for multi-threaded applications.

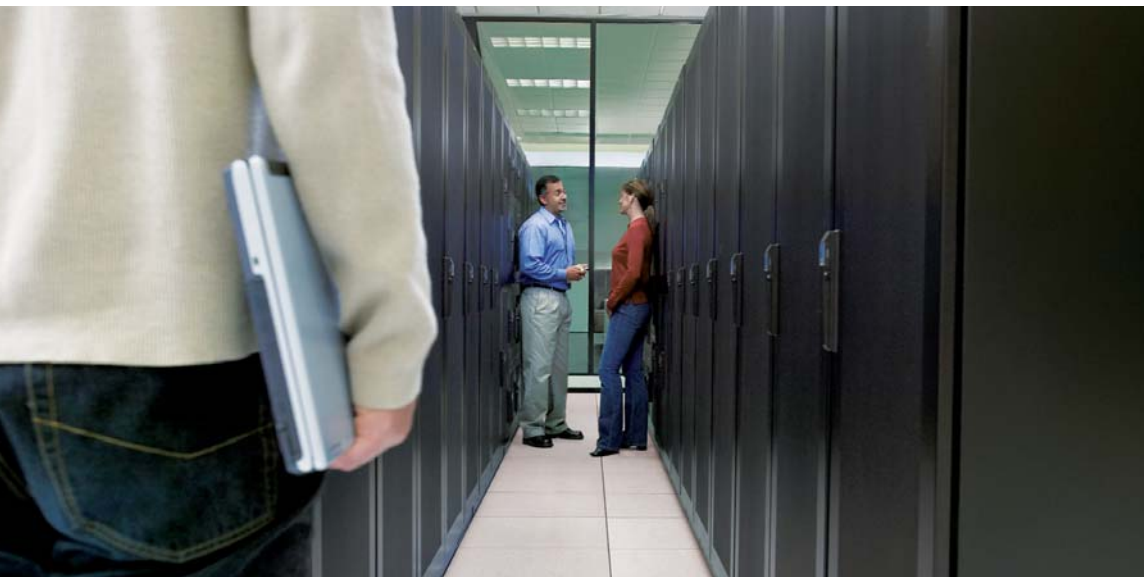
- **Intel® 5000X chipset:** For performance and volume workstation platforms, this chipset supports dual independent buses for dual-processor applications, 1066 MHz system bus speed, one PCI Express x8 link (configurable as two x4 links) and one configurable x16 link for graphics support, FBDIMM 533 and 667 technology, point-to-point connection for Intel 6321 ESB I/O Controller Hub at 2 GB/s, and Intel 6700PXH 64-bit PCI hub.

These platform configurations provide flexibility and headroom for future growth in high-end workstations and front-end, small/medium business (SMB), enterprise, and high-performance computing (HPC) server deployments, allowing right-sized solutions for today's environments while helping to protect investment in design, integration, and support.

Find out more about Dual-Core Intel® Xeon® processors at  
[www.intel.com/server](http://www.intel.com/server)







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<sup>1</sup> 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](http://www.intel.com/products/processor_number) for details.

<sup>2</sup> Intel® I/O Acceleration Technology (Intel® I/OAT) requires an operating system that supports Intel I/OAT.

<sup>3</sup> 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.

<sup>4</sup> 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.

<sup>5</sup> 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.

<sup>A</sup> 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.

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