Quad-Core Intel® Xeon® Processor-based 3200/3210 Chipset Server Platforms

Entry-level server platforms with outstanding dependability, performance, and value
With nearly 40 million Intel® processor-based servers shipped since 1996 and a 21-year track record of proven performance worldwide, you know you can count on Intel to deliver superior quality and reliability. Today, that tradition of excellence continues with the introduction of server platforms based on the Intel® Xeon® processor 3000 sequence and Intel® 3200/3210 chipsets.

Designed with utility and versatility in mind, Intel® technology-based entry-level servers give you the key features needed to support and grow your business. Entry-level servers are ideal for running server applications such as file and print sharing, low-volume e-mail, web serving, and business automation applications. For value-conscious business users, these entry-level servers deliver impressive computing performance with compromising speed, affordability or system reliability – a substantial improvement over desktop PCs.

Entry-level server platforms based on the Intel Xeon processor 3000 sequence and the Intel 3200/3210 chipsets offer cost-effective features and are ideally suited for small businesses looking for their first server. These platforms are engineered to handle your computing workloads while providing reliable and trouble-free operation, ensuring that your operational needs are met at every stage of your business growth.
Server Platform Architecture

Intel® Xeon® processor 3000 sequence and Intel® 3200/3210 chipsets
Cost-effective solutions to grow your business

Whether your business is starting up or expanding, entry-level server platforms based on Intel® Xeon® processors and Intel 3200/3210 chipsets can help you do more for your business than ever before. These platforms boost productivity by providing greater reliability and connectivity with your customers, supplier, and employees. With the ability to choose from dual- or quad-core Intel processors, you can get the performance you need at an affordable price.

Cost-effective, personal supercomputing
Entry-level, dual-core Intel server platforms are ideal for building small, cost-effective HPC clusters that create high performance, personal supercomputing solutions and workgroup clusters. Dual-core, 64-bit computing, up to 8 GB of high-speed DDR2 memory, and gigabit Ethernet LAN connectivity enable rapid resolution the large, complex problems found in technical computing.

These new platforms provide energy-efficient performance, so you get high-end performance for thin or teach nodes at low power levels, keeping the costs of running your personal cluster low.

Dual- and Quad-Core Intel Xeon processor 3000 sequence-based servers give you Intel server technologies for reliability, data protection, and easy management. You can solve tough problems for less cost than traditional cluster technologies with the dependability and integrity of Intel’s 20-year track record of delivering reliable, high-performance solutions.

Platforms based on the Intel 3200/3210 chipsets support the Dual- and Quad-Core Intel Xeon processor 3000 sequence. Intel Xeon processor 3000 sequence are based on Intel Core micro-architecture, with Intel® 64 architecture and up to a 1333 MHz front-side bus for dual-core processors. These platforms deliver outstanding performance for today's business applications, with capabilities to run a broad range of 32-bit and 64-bit applications, with plenty of headroom for growth for tomorrow.

Save on power costs with Enhanced Intel SpeedStep® Technology
Enhanced Intel SpeedStep® technology, a feature of Intel Xeon processor 3000 sequence, allows the server to dynamically adjust processor voltage and core frequency while maintaining application performance, which can result in decreased average power consumption and decreased average heat production.

Improve security and reduce virus-related downtime and repairs
Today, most business are appropriately concerned about the decrty of their business information. Security issues come in many forms: viruses, works, and Trojan horses. These risks increase your IT resource demands and, in some cases, could destroy data.

One type of invasion is called a “buffer overflow” attack. In a typical attack, a malicious worm creates a flood of code that overwhelms the processor, allowing to worm to propagate itself to the network and other computers. Intel® Execute Disable Bit functionality, a feature of Intel Xeon processor 3000 sequence, can prevent many types of buffer overflow attacks by limiting application code execution to only specific areas of memory. This, when combined with a supporting operating system, helps stop the worm in its track and minimizes data loss and large-scale system infection.
Capitalize on power-efficient performance

Power-efficient performance designed into the platform to reduce operating costs while delivering higher performance than previous-generation Intel® Pentium® processor-based server platforms. Lower power consumption can also result in slower fans and quieter servers.

For more information on performance, please visit: www.intel.com/performance

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The ideal entry-level server

Our entry-level server platforms with quad-core and dual-core processors and the Intel 3200/3210 chipsets are ideal for value-conscious organizations looking for their first server or small HPC cluster with a close eye on the budget. These platforms offer industry-leading performance coupled with Intel reliability to help drive your big ideas non-stop, while providing low-cost, dependable and efficient performance. Our entry-level server platforms integrate the most advanced technologies:

**Intel® Virtualization Technology for Directed I/O**

Intel® Virtualization Technology provides hardware assist to virtualization software, enabling your servers to support both 32-bit and 64-bit operating systems and applications on the same server. Implementing virtualization enables businesses to get most out of server investment by running more applications on each server.

**Intel® Matrix Storage Technology**

Intel® Matrix Storage Technology with integrated RAID 0, 1, 5 or 10 accelerates data access to support high user productivity, and protects business operations by allowing recovery of data in the event of a hard drive failure. Intel Matrix Storage Technology is built into the Intel® 82801IR I/O controller hub (ICH9R). The ICH9R also supports Serial ATA (SATA) at 3 GB/s, with Native Command Queuing for high-speed disk access in a high-performance, low-cost server platform.

**DDR2 memory**

Intel 3200/3210 chipsets feature higher speed DDR2 memory (up to 800 MHz) than previous-generation platforms to maximize system bandwidth and performance. Up to 8 GB of memory capacity helps eliminate slowdowns from memory bottlenecks.

**PCI Express**

PCI Express, today’s mainstream I/O technology, helps enable fast I/O transactions to assist peripherals to keep up with our high-performance processors and chipsets today with built-in scalability for the future. The Intel 3210 chipset offers an additional PCI Express port for even more expansion possibilities.

**Data Protection**

Platforms based on the Intel 3200/3210 chipsets support Error Correction Code memory for a high level of data integrity, reliability, and system uptime. ECC can detect multiple-bit memory errors and locate and correct single bit errors to keep business applications running smoothly and prevent stealth data corruption.

**Intel® 64 Architecture**

All of the processors supported with the Intel 3200/3210 chipsets also support Intel 64 architecture. It allows servers to handle larger data sets, more complex applications, and larger amounts of memory. In addition, Intel 64 architecture allows you to run both 32- and 64-bit applications, helping to ensure the smooth migration of your business to 64-bit computing.
<table>
<thead>
<tr>
<th>Platform Feature</th>
<th>User Benefit</th>
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<tr>
<td>Quad-Core Intel® Xeon® 3000¹ processor-based 3200/3210 chipsets</td>
<td>• Based on Intel Core microarchitecture&lt;br&gt;• 64-bit, quad-core computing with large 8 MB on-die cache&lt;br&gt;• 1066 MHz front-side bus</td>
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<tr>
<td>Dual-Core Intel® Xeon® processor 3000 sequence</td>
<td>• Based on Intel Core microarchitecture&lt;br&gt;• Breakthrough performance at up to 3 times the performance versus previous-generation single-core processors&lt;br&gt;• Enhanced power-efficient technologies for over 3 times performance/watt²&lt;br&gt;• New 1333 and 1066 MHz front-side bus</td>
</tr>
<tr>
<td>Intel® Core™ microarchitecture</td>
<td>• Better performance on multiple application types and user environments at a substantially reduced power envelope</td>
</tr>
<tr>
<td>Intel® Virtualization Technology³ for Directed I/O</td>
<td>• Enables more operating systems and software to run in today’s virtual environments&lt;br&gt;• Developed with virtualization software providers to enable greater functionality and compatibility compared to non-hardware-assisted virtual environments</td>
</tr>
<tr>
<td>Intel® Matrix Storage Technology</td>
<td>• Accelerates system performance&lt;br&gt;• Protects against hard drive failure and loss of critical business data</td>
</tr>
<tr>
<td>Enhanced Intel SpeedStep® Technology</td>
<td>• Dynamically adjusts processor voltage and frequency to meet application performance demands while minimizing power consumption and thermal dissipation</td>
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<tr>
<td>Intel® 64 Architecture²</td>
<td>• Enables extended memory addressability for server applications</td>
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<tr>
<td>PCI Express* serial I/O</td>
<td>• Industry-standard serial I/O capable of up to 4 GB/s peak bandwidth with x8 link</td>
</tr>
<tr>
<td>Enhanced reliability and manageability</td>
<td>• Memory Error Correcting Code (ECC) memory that checks and corrects system memory errors&lt;br&gt;• Execute disable bit protects the system from viruses</td>
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**Server and HPC Performance**

- Benchmark Description for SPECcpu2006 suite (SPECint_rate_base2006 & SPECfp_rate_base2006): SPEC CPU2006 is the industry-adopted, CPU-intensive benchmark which simulates the real-world processor, memory subsystem, and compiler. Derived from 29 real-world user applications, CPU2006 provides a comparison across the widest practical range of hardware reporting a geometric mean ratio score on a baseline compiled binary.

- **Best 1-socket server SPECint_rate_base2006** (score) benchmark results as of 15 Oct 2007:
  - Dual-Core Intel® Xeon® Processor 3700 platform (score 37.3): Intel® SR1530SH using Intel Xeon processor 3830 (3.00 GHz, 4 MB L2 cache, 1333 MHz bus, 8 GB (4x 2GB DDR2-800), SUSE Linux 10 SP1 R5 RC3, Intel® O+C Compiler and Forth Compiler version 10.1. Source: Intel internal measurements TR#824.
  - Quad-Core Intel® Xeon® Processor X3230 platform (score 48.5): Intel® SR1530SH using Intel Xeon processor X3230 (2.66 GHz, 8 MB L2 cache, 1333 MHz bus, 8 GB (4x 2GB DDR2-800), SUSE Linux 10 SP1 R5 RC3, Intel® O+C Compiler and Forth Compiler version 10.1. Source: Intel internal measurements TR#824.

- **Best 1-socket server SPECfp_rate_base2006** (score) benchmark results as of 15 Oct 2007:
  - Dual-Core Intel® Xeon® Processor 3070 platform (score 25.3): Acer Altos* G330 using Intel Xeon processor 3085 (3.00 GHz, 4 MB L2 cache, 1333 MHz bus, 8 GB (4x 1 GB DDR2-800), SuSE Linux 10 SP1 R5 RC3, Intel® O+C Compiler and Forth Compiler version 10.1. Source: Intel internal measurements TR#824.
  - Quad-Core Intel® Xeon® Processor 3085 platform (score 29.7): Intel® SR1530SH using Intel Xeon processor 3085 (3.00 GHz, 4 MB L2 cache, 1333 MHz bus, 8 GB (4x 2GB DDR2-800), SUSE Linux 10 SP1 R5 RC3, Intel® O+C Compiler and Forth Compiler version 10.1. Source: Intel internal measurements TR#824.


- **Best 1-socket server SPECjb2005** (bops) benchmark results as of 15 Oct 2007:

• AMD Opteron® Processor platform (score 53.6): Intel® SR1530SH using Intel Xeon processor 3085 (3.00 GHz, 4 MB L2 cache, 1333 MHz bus, 8 GB (4x 2GB DDR2-800), SUSE Linux 10 SP1 R5 RC3, Intel® O+C Compiler and Forth Compiler version 10.1. Source: Intel internal measurements TR#824.

**Benchmark Description for LS-Dyna**: LS-DYNA is a commerical engineering application used in finite element analysis such as a car collision. The workload used in these comparisons is called 3 Vehicle Collision and is publicly available from www.topcrunch.org. The metric for the benchmark is elapsed time in seconds.

- **Best 1-socket LS-Dyna** metric version mpp97.7600.2.398 (3 cars/30ms) benchmark results as of 15 Oct 2007:
  - Intel® Xeon® Processor platform (score 3085 score 16.11/savg sys watts 131; X3230 score 2247.7y avg sys watts 192) Intel “Garlow” 3210 Chipset-based server platform BIOS B3/1/2007 using Intel® Xeon® Processor 3085 (3.00 GHz, 4 MB cache, 1333 FSB) and X3230 (2.66 GHz, 8 MB cache, 1066 FSB), 4x 2 GB DDR2-667 ECL CCS CL5, 120 GB SATA HDD, Red Hat Enterprise Linux* 64-bit. Source: Intel internal measurements TR#823.

- AMD Opteron® Processor platform (score 1287.2avg sys watts 164) Hewlett-Packard ML115G1 using AMD Opteron® Processor 1220SE (2.80 GHz, 4x 2 GB DDR2-667 ECL CCS CL5, 120 GB SATA HDD, Red Hat Enterprise Linux* 64-bit. Source: Intel internal measurements TR#823.

**Benchmark Description for Amber**: a package of molecular simulation programs. The workload measures the number of problems solved per day (PS) using eight standard molecular dynamic simulations. See the ftp://famber.ch.vu.nl/famber.html for more information.

- **Best 1-socket Amber** version 9 (8 standard, PS/day) benchmark results as of 15 Oct 2007:
  - Intel® Xeon® Processor platform (score 3085 score 305.5avg sys watts 134; X3230 score 491.2avg sys watts 204) Intel “Garlow” 3210 Chipset-based server platform BIOS B3/1/2007 using intel® Xeon® Processor 3085 (3.00 GHz, 4 MB cache, 1333 FSB) and X3230 (2.66 GHz, 8 MB cache, 1066 FSB), 4x 2 GB DDR2-667 ECL CCS CL5, 120 GB SATA HDD, Red Hat Enterprise Linux* 64-bit. Source: Intel internal measurements TR#823.

- AMD Opteron® Processor platform (score 212.8avg sys watts 164) Hewlett-Packard ML115G1 using AMD Opteron® Processor 1220SE (2.80 GHz, 4x 2 GB DDR2-667 ECL CCS CL5, 120 GB SATA HDD, Red Hat Enterprise Linux* 64-bit. Source: Intel internal measurements TR#823.

SPECint2006 and SPECfp2006 benchmark tests reflect the performance of the microprocessor, memory architecture and compiler of a computer system on compute-intensive, 32-bit or 64-bit applications. SPEC benchmark results for Intel microprocessors are determined using CAR. Well-configured systems may yield results that may or may not reflect the relative performance of Intel microprocessors 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 in configurations other than the one on which these SPEC benchmarks were run.