Dual-Core Intel® Xeon® Processor 7100 Series

Enabling Scalable Performance, Enhanced Virtualization, and Reliable Uptime in Multi-Processor Platforms

Intel’s dual-core processor, designed specifically for multi-processor server platforms, delivers scalable performance, hardware-assisted virtualization, and reliable uptime for demanding enterprise workloads and business operations.
Scalable Performance — 16 MB, Shared, On-die Cache

With two 64-bit cores, Hyper-Threading Technology, and up to 16 MB of shared, on-die cache, our latest MP processor enables new levels of scalability and performance:

• Up to 60 percent improvement on business processing — enterprise resource planning (ERP), supply chain management (SCM), and customer relationship management (CRM).¹
• Up to 70 percent improvement on transaction processing.¹
• Over to twice the performance on e-commerce applications.²
• Up to 2.8x performance per watt improvement compared to previous generation.¹
• 4 to 32 dual-core processor solutions offer headroom for demanding enterprise applications and business growth in traditional and virtual environments.

When combined with the Intel® E8501 chipset and DDR2-400 memory, the scalable performance of the Dual-Core Intel® Xeon® processor 7100 series and enhanced reliability features of the chipset and memory create the ideal MP platform for enterprise workloads and virtualization.
Ideal for Virtualization — Intel® Virtualization Technology

Scalable performance, added headroom, and enhanced reliability, plus Intel® Virtualization Technology® built in, enable platforms ideal for virtualization.

- Intel Virtualization Technology brings complex software operations encountered in virtual environments into the processor silicon and enables additional new capabilities.
- Run Linux* on Windows* and Windows on Xen* on the same platform, giving you added flexibility to optimize your business operations.
- Host 64-bit and 32-bit virtual environments.
- Intel worked with leading virtualization software vendors, including VMware, Microsoft, and XenSource, to develop Intel Virtualization Technology.

Reliable Platform Solutions — Intel® Cache Safe Technology

Server platforms built on the Dual-Core Intel Xeon processor 7100 series, Intel E8501 chipset, PCI Express® serial I/O, and DDR2-400 memory technology, offer performance, flexibility, and availability for enterprise applications and the reliability and headroom needed for effective virtualization.

- Intel® Cache Safe Technology keeps L3 cache available, even in the event of rare cache failures, reducing expensive downtime and processor replacements.
- Intel E8501 chipset reliability features, such as memory (DIMM) sparing, memory mirroring, and enhanced memory error detection and correction capabilities improve uptime and serviceability.
- Rich PCI Express reliability features keep I/O available and simplify serviceability.
- DDR2-400 memory reduces power consumption and heat generation.5
## Dual-Core Intel Xeon Processor 7100 Series Overview

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
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</table>
| Dual-Core Intel® Xeon® processor 7100 series | • Up to 2 times the performance of previous-generation Dual-Core Intel® Xeon® processor 7000 series²  
  • 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 generation¹  
  • Choice of performance-optimized versions at 150-watt and rack-optimized versions at 95-watt for data center optimization  
  • 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 applications¹  |
| 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 Technology⁴ | • 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 Technology⁴ | • 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 experience⁶  |
| Intel® 64 Technology⁷ | • Enables extended memory addressability for server applications  
  • Run both 32-bit and 64-bit applications  |
| Demand-Based Switching (DBS) with Enhanced Intel SpeedStep® technology⁸ | • Enables platform and software power management features to help lower average power consumption and heat generation while helping to maintain application performance and acoustics  |
| 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)

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

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

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

### Dual-Core Intel® Xeon® processor 7100 Series

All processor packages are FCPGA Socket 604.

<table>
<thead>
<tr>
<th>FSB = 800 MHz</th>
<th>FSB = 667 MHz</th>
<th>Cache size</th>
<th>Power</th>
<th>Intel® Cache Safe Technology</th>
<th>Intel® HT Technology</th>
<th>Intel® VT</th>
<th>Intel® 64</th>
<th>Cores/Threads (4P platform)</th>
<th>DBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
<td>Speed</td>
<td>Processor Number</td>
<td>Speed</td>
<td>Processor Cache</td>
<td>Cache Size</td>
<td>2x1M L2, 16M L3</td>
<td>150 W</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>NA</td>
<td>NA</td>
<td>7150N</td>
<td>3.5 GHz</td>
<td>2x1M L2, 16M L3</td>
<td>150 W</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>7140M</td>
<td>3.40 GHz</td>
<td>7140N</td>
<td>3.33 GHz</td>
<td>2x1M L2, 16M L3</td>
<td>150 W</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>7130M</td>
<td>3.20 GHz</td>
<td>7130N</td>
<td>3.16 GHz</td>
<td>2x1M L2, 16M L3</td>
<td>150 W</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>7120M</td>
<td>3.00 GHz</td>
<td>7120N</td>
<td>3.00 GHz</td>
<td>2x1M L2, 16M L3</td>
<td>95 W</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>7110M</td>
<td>2.60 GHz</td>
<td>7110N</td>
<td>2.50 GHz</td>
<td>2x1M L2, 16M L3</td>
<td>95 W</td>
<td>•</td>
<td>•</td>
<td>•</td>
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</table>
Benchmarks:

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

Baseline Platform Configuration: Intel® Server System pre-production hardware with four Dual-Core Intel® Xeon® Processors 7041 (3.00 GHz, 800 MHz FSB, 16 MB L3 cache), HW/ADJSECT PREFETCH=ON, Adjacent Sector Prefetch = ON, 4 JVM instances.

New Platform Configuration: Intel® Server System pre-production hardware with four Dual-Core Intel® Xeon® Processor MP 7140M (3.40 GHz, 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.

Storage Configuration:
- 8x4 146 GB Seagate 7K RPM Seagate SAS disks
- 4 QLE2362 PCI-E QLogic Dual-port adapters
- 1 QLA2432 PCI-X QLogic Dual-port adapters

Enterprise Resource Planning, Workload emulates a SAP-based Sales and Distribution application and helps ERP.

Performance measured using internal server-side Java* (“e-commerce”), internal database transactions (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® Server System pre-production hardware with four Dual-Core Intel® Xeon® Processor MP 7041 (3.00 GHz, 800 MHz FSB, 16 MB L3 cache), HW/ADJSECT PREFETCH=OFF, 4 JVM instances.

New Platform Configuration: Intel® Server System pre-production hardware with four Dual-Core Intel® Xeon® Processor MP 7140M (3.40 GHz, 800 MHz FSB, 16 MB L3 cache), HW/ADJSECT PREFETCH=OFF, 4 JVM instances.

Storage Configuration:
- 994 15K RPM Seagate SAS disks
- 3 QLA 2342 PO-X QLogic Dual-port adapters
- 4 QLA 2362 PO-E QLogic Dual-port adapters

Enterprise Resource Planning, Workload emulates a SAP-based Sales and Distribution application and helps ERP.

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Performance Per Watt is calculated by dividing the actual benchmark result for the first platform tested 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.

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.

Find out more about Dual-Core Intel® Xeon® processors at www.intel.com/server
Based on internal Intel benchmarks. See benchmarks page.

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

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.

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.

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.


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.

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

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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