

# Sales Brief

Standard Enterprise Server

Intel® Xeon® Processor 7500 Series



# Unprecedented Reliability and Scalability in a Multi-Processor Server with the Intel® Xeon® Processor 7500 Series

The new Intel® Xeon® processor 7500 series delivers up to 3.7x<sup>1</sup> greater performance along with expanded scalability and a greatly enhanced suite of reliability features.

Whether you've got data-demanding applications, are deploying a private cloud, or are using virtualization to consolidate your data center or develop a robust data recovery plan, the Intel® Xeon® processor 7500 series, with Next-Generation Intel® Microarchitecture (Nehalem), expands server capabilities with world-record-breaking performance. With enhanced 45nm technology, Next-Generation Intel Microarchitecture (Nehalem) and Intel® Virtualization Technology<sup>4</sup> the Intel Xeon processor 7500 series-based servers help drive your data-demanding enterprise applications faster. Delivering a quantum leap in enterprise computing performance, the Intel Xeon processor 7500 series features eight cores supporting up to 16 processing threads and 24 MB of cache per processor, and four advanced, high-bandwidth interconnect links that allow multiple processors to be directly connected to each other. In fact, the Intel Xeon processor 7500 series delivers up to 20x<sup>2</sup> greater performance per server over 4-socket single-core servers, enabling up to 20:1 server consolidation<sup>3</sup>, up to 90 percent<sup>3</sup> lower operating costs, and an estimated return on investment in as little as one year.<sup>3</sup>

## Maximizing Your Data Center Resources and Meeting Changing Requirements with Ease

With up to 8x the memory bandwidth<sup>4</sup> and integrated virtualization support, the Intel Xeon processor 7500 series helps you keep up by optimizing server productivity and efficiency, and supports more virtual machines per server. On an eight-socket platform processing up to 128 threads simultaneously, you can use industry-leading virtualization performance to help maximize the resources of your data center and keep your data center flexible and able to respond to changing business priorities. Servers powered by the Intel Xeon processor 7500 series deliver up to 3.7x percent better virtualization performance,<sup>1</sup> allowing you to run the most demanding applications while still maintaining the peak load responsiveness needed for the

## The Intel® Xeon® Processor 7500 Series: Highly Intelligent. Massively Scalable.

### Scalable Performance

- Up to 3x the database performance of prior generations<sup>5</sup>
- Up to 3.7x better performance in a virtualized environment<sup>1</sup>
- Up to 8x the memory bandwidth of previous generations<sup>4</sup>
- Up to 20:1 server consolidation<sup>3</sup>

unpredictability of virtualized applications. And with the reliability and scalability of the Intel Xeon processor 7500 series, you can use virtualized machines to ensure business continuity and disaster-recovery objectives are met with ease.

## Meeting Mission-Critical Requirements and Reducing Your RISC

Servers built on the Intel Xeon processor 7500 series feature Intel® Machine Check Architecture Recovery which provides automatic detection, isolation and recovery from many types of errors. The Intel Xeon processor 7500 series also provides many new reliability features including SMI lane failover and QPI self-healing which enable the platform to identify problems and fail over or modify itself to keep running. In essence, it delivers everything you need to maintain data integrity, minimize downtime, and maximize productivity. Built to handle your most processor-intensive, mission-critical applications, the Intel Xeon processor 7500 series provides a cost-effective alternative to expensive, proprietary RISC-processor-based systems.



## Intel® Xeon® Processor 7500 Series Overview

Features	Benefits
8-Core Processing	<ul style="list-style-type: none"> <li>Up to 8 cores and 16 threads per socket with Intel® Hyper-Threading Technology,<sup>®</sup> the Intel® Xeon® processor 7500 series offers increased performance with 45nm manufacturing technology and increased headroom for multi-threaded applications and data-demanding applications.</li> </ul>
Next-Generation Intel® Microarchitecture (Nehalem)	<ul style="list-style-type: none"> <li>Boosts performance on multiple applications/user environments and data-demanding workloads, while enabling denser data center deployments through improved performance-per-watt.</li> <li>45nm Hi-k process technology enables larger on-die cache for better performance, and reduced transistor gate leakage for greater energy efficiency.</li> </ul>
24 MB of L3 Cache	<ul style="list-style-type: none"> <li>Increases efficiency of cache-to-core data transfers, maximizing main memory-to-processor bandwidth.</li> <li>Reduces latency by storing larger data sets closer to the processor, reducing the number of trips to main memory.</li> </ul>
Intel® QuickPath Interconnect	<ul style="list-style-type: none"> <li>High-speed (up to 25.6 GB/s), point-to-point connections between processors, and between processors and the I/O hub.</li> <li>Enables scaling of processors from 2- to 8-sockets, and higher with use of third-party node controllers.</li> </ul>
Quad Channel Integrated Memory Controller	<ul style="list-style-type: none"> <li>Up to 1 Terabyte of memory with 16 GB DIMMs in a 4-socket system (up to 2 terabytes in an 8-socket system).</li> <li>Intel® Scalable Memory Interconnect results in up to 8x the memory bandwidth of prior generations.<sup>4</sup></li> <li>Intel Scalable Memory Buffers are used to achieve the highest memory capacity per socket for an X86 architecture.</li> <li>Up to 16 memory DIMM slots per processor socket.</li> <li>Support for up to 16 GB DDR3 DIMMs.</li> </ul>
Advanced Reliability Features	<ul style="list-style-type: none"> <li>Intel® Machine Check Architecture Recovery lets the operating system continue running even after otherwise uncorrectable errors are detected.</li> <li>SMI lane failover and QPI self-healing boost availability through automatic interconnect error detection and recovery.</li> <li>SMI lane failover and QPI self-healing which enable the platform to identify problems and fail over or modify itself to keep running.</li> </ul>
Intel® Virtualization Technology <sup>®</sup>	<ul style="list-style-type: none"> <li>A suite of processor hardware enhancements that assists virtualization software to deliver more efficient virtualization solutions and greater capabilities including 64-bit guest OS support.</li> <li>Intel® VT FlexPriority optimizes virtualization software efficiency by improving interrupt handling.</li> <li>Intel® VT FlexMigration enables Intel Xeon processor 7500 series-based systems to be added to the existing virtualization pool with single, two, 4-socket, or 4+ socket Intel-based servers.</li> </ul>
Intel® 64 Architecture <sup>®</sup>	<ul style="list-style-type: none"> <li>Flexibility for 64-bit and 32-bit applications and operating systems.</li> </ul>

For more information on the Intel Xeon processor, visit [www.intel.com/xeon](http://www.intel.com/xeon).

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

<sup>1</sup> 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.

<sup>2</sup> Hyper-Threading Technology requires a computer system with a 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 [www.intel.com/info/hyperthreading/](http://www.intel.com/info/hyperthreading/) for more information including details on which processors support HT Technology.

<sup>3</sup> 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.

<sup>4</sup> Intel comparison replacing one X7460 based server with one new X7560 processor-based server up to 3.7x better virtualized environment claim: Virtualization Performance on internal tiled consolidation profile 2 benchmark Comparison based on Intel internally measured results (TR#1096) as of 12 February 2010. 4S Intel® Xeon® processor X7460-based platform details Intel 7300 Chipset-based server system with four Intel Xeon processors X7460 (16M cache, 2.66 GHz, 1066 MHz FSB, 6C), 128GB (32x 4GB PC2-5300 667MHz Registered ECC DDR2 DIMMs, VMware ESX® 3.5.0 U3 GA, 4S Intel® Xeon® processor X7560-based platform details Intel® 7500 Chipset-based reference server platform with four Intel® Xeon® Processor X7560 (24M cache, 2.26GHz, 6.40GT/s Intel QPI), Intel EIST Enabled, Turbo Boost enabled, Hyper-Threading enabled, NUMA enabled, Prefetchers enabled, 512 GB (64x 8 GB DDR3-1066) memory, VMware® ESX 4.0 Update 1 development build, 2x Intel® 10 Gb CX4 Dual-Port Server Adapter, FC SAN 2x QLogic QLA2462, 16x32 GB SSD disk storage system.

<sup>5</sup> Intel performance comparison using SPECint\_rate\_base2006<sup>®</sup> business operations per second between 5-year-old single-core Intel® Xeon® processor 3.33GHz based servers and one new Intel Xeon processor X7560 based server. 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, visit [www.intel.com/performance/server](http://www.intel.com/performance/server).

<sup>6</sup> Claim based on comparison between 4S Intel® Xeon® MP CPU 3.3 GHz (Single core w/ HT, 1MB L2, 8MB L3, Potomac) and 4S Intel® Xeon® X7560 (8 core, 2.26GHz) based servers. Calculation includes analysis based on performance, power, cooling, electricity rates, operating system annual license costs and estimated server costs. This assumes 42U racks, \$0.10 per kWh, cooling costs are 2x the server power consumption costs, operating system license cost of \$900/year per server, per server cost of \$36,000 based on estimated list prices, and estimated server utilization rates. All dollar figures are approximate. SPECint\_rate\_base2006<sup>®</sup> performance and power results are measured for X7560 and Xeon 3.3GHz based servers. Platform power was measured during the steady state window of the benchmark run and at idle. Performance gain compared to baseline was 20x. Baseline platform (measured score of 33.8): Intel server with four Intel® Xeon® MP CPU 3.3 GHz (Single core w/ HT, 1MB L2, 8MB L3) processors, 16GB memory (8x2GB DDR2-400), 2 hard drives, 1 power supply, using Redhat EL 5.3 x86\_64 operating system. New platform (measured score of 705): Intel internal reference server with four Intel® Xeon® Processor X7560 (24M Cache, 2.26 GHz, 6.40 GT/s Intel® QPI, Intel Hyper-Threading Technology, Intel Turbo Boost Technology), 256GB memory (64x 4GB QR DDR3-1333), 1 hard drive, 2 power supplies, using SUSE® LINUX 11, cpu2006.1.1.ic11.1.linux64.binaries.nov242009.tar.bz2 binaries. Costs and return on investment (payback) have been estimated based on internal Intel analysis and are provided for informational purposes only.

<sup>7</sup> 8.2x memory bandwidth claim based on Feb '10 Intel internal measurement using Intel internal memory bandwidth workload on comparable 4S Intel® Xeon® processor X7560 and 4S Intel® Xeon® processor X7460 servers.

<sup>8</sup> Based on Feb '10 internal measurement using OLTP workload. 4-socket Intel® Xeon® processor 7560-based platform vs 4-socket Intel Xeon processor X7460-based platform.

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