Product Brief

High-Performance Computing Cluster Platforms

Entry-Level Dual-Core Intel® Xeon® Processor 3000 Series-Based High-Performance Computing Cluster Platforms

Economical High-Performance Computing (HPC) Platforms with Outstanding Reliability and Value

With the introduction of more powerful multi-core processors and the move towards clustering, high-performance computing (HPC) is expanding from large-scale computing machines toward workgroups and departmental clusters in many research and science industries. Breakthroughs in absolute performance and price/performance have made it possible for single processor platforms to enter new, low-end HPC applications.

Cost-effective Clustering and Personal Supercomputing

Dual-core Intel® Xeon® processor 3000 series-based server platforms are ideal for building small, cost-sensitive, high-density, yet powerful HPC clusters that create high-performance personal supercomputing solutions and workgroup clusters. Based on the new Intel® Core™ microarchitecture and Intel® 3000/3010 chipset, these platforms offer balanced computing that enables fast time-to-solution for complex, data-intensive problems. This state-of-the-art, multi-core optimized microarchitecture delivers a number of new and innovative features such as:

Intel® Wide Dynamic Execution, enabling delivery of more instructions per clock cycle to improve execution time and energy efficiency

Intel® Intelligent Power Capability, designed to deliver more energy-efficient performance

Intel® Smart Memory Access, improving system performance by optimizing the use of the available data bandwidth

Intel® Advanced Smart Cache, providing a higher-performance, more efficient cache subsystem. Optimized for multi-core and dual-core processors

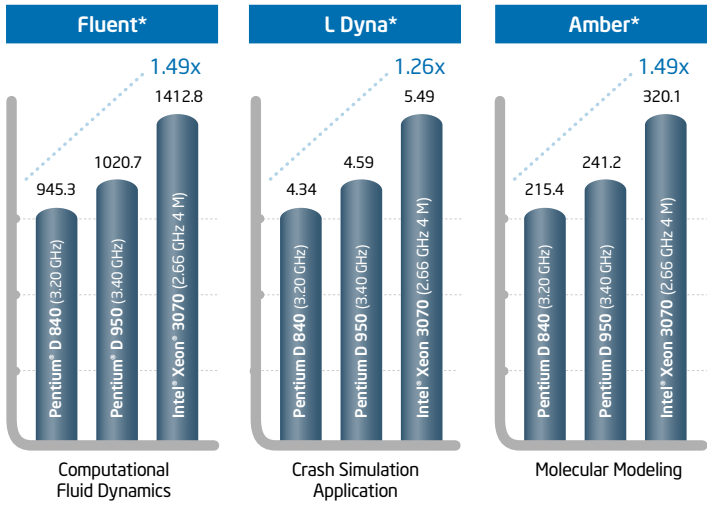
Intel® Advanced Digital Media Boost, accelerating a broad range of applications, including video, speech, image, photo processing, encryption, financial, engineering, and scientific applications

- Dependable server platform with dual-core, 64-bit computing based on dual-core Intel® Xeon® processor 3000 series delivers up to 16.7 Gflops[4] of computing power—power your applications and complete you simulations quickly
- Up to 1066 MHz front-side bus for fast throughput solutions
- Up to 8 GB of dual-channel, DDR2 667 MHz ECC memory delivers up to 4.7 GB/s[5] of effective bandwidth to reduce or eliminate memory bottlenecks
- High performance/watt enables energy-efficient performance and low-cost operation
- PCI Express* I/O supports HPC high bandwidth/low-latency interconnects
- Gigabit Ethernet LAN connectivity (Intel® PRO/1000 PM/PL network connections) for cost-effective networking
- 4 channels of Serial ATA deliver high-speed disk access and large capacity
- Intel® Matrix Storage Technology[1] boosts hard drive performance and provides data protection with RAID 1, 5, and 10
- Intel® Active Management Technology[2] simplifies system management

Personal or workgroup clusters based on the dual-core Intel Xeon Processor 3000 series offer an alternative for scientists and researchers who normally have to share supercomputer or large-scale computing power within a laboratory or a company. Personal or workgroup clusters allow scientists and researchers to be more productive by allowing them to complete tasks on a local cluster more efficiently and conveniently than on larger, shared, computer clusters. In addition to both convenience and productivity, scientists and researchers gain performance capability to process their applications or simulations at a fraction of the cost of a full-scale supercomputer.

Dual-Core Intel® Xeon® Processor 3000 Serie

Dual-Core Intel® Xeon® Processor 3000 Series-Based Platforms
(Results on HPC Application Benchmarks)



Computational Fluid Dynamics | Crash Simulation Application | Molecular Modeling

Data Source: Intel Internal measurement TR#626 June 2006.

Fluent

- Intel® Xeon® Processor 3070-based platform details: Intel preproduction customer reference board "Whitney A1" BIOS EXTWM210 with Intel Xeon processor 3070 (B0), 2.66 GHz with 4 M L2 Cache, 1066 MHz system bus, 4 GB (4 x 1 GB) 667 MHz DD R2 MT18HTF12872AY CL5 memory; HW Prefetch Enabled. Red Hat* Enterprise AS Linux* 4, Update 3, Intel® 64, Fluent version 6.2.
- Intel® Pentium® D Processor 950-based platform details: Intel® SR1475NH1-E E7230 chipset server with Intel Pentium D Processor 950, 3.40 GHz with 2 x 2 M L2 Cache, 800 MHz system bus, 4 GB (4 x 1 GB) 533 MHz DDR2 M391T2593BG0 memory; Red Hat Enterprise AS Linux 4, Update 3, Intel® 64, Fluent version 6.2.
- Intel Pentium D Processor 840-based platform details: Intel SR1475NH1-E E7230 chipset server with Intel Pentium D Processor 840, 3.20 GHz with 2 x 1 M L2 Cache, 800 MHz system bus, 4 GB (4 x 1 GB) 533 MHz DDR2 M391T2593BG0 CL4 memory; Red Hat Enterprise AS Linux 4, Update 3, Intel 64, Fluent version 6.2.

LS-Dyna

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Amber

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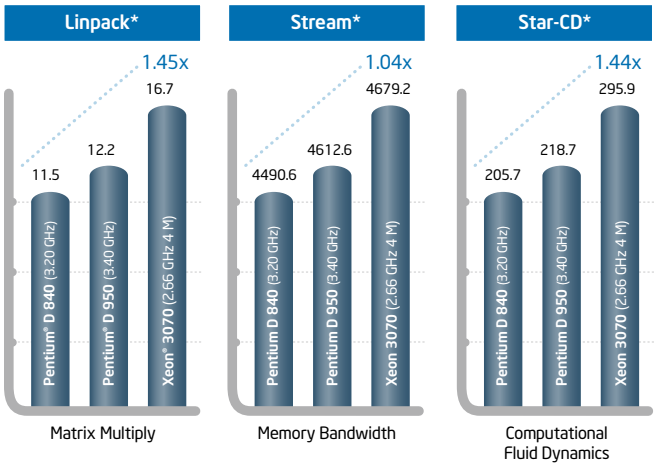
s with Intel® 3000/3010 Chipset Performance

Dual-Core Intel® Xeon® Processor 3000 Series-Based Platforms
(Results on HPC Synthetic Benchmarks and CFD Application)



Data Source: Intel Internal measurement TR#624, 625, and 626 June 2006.

STREAM[5]

- Intel® Xeon® Processor 3070-based platform details: Intel preproduction customer reference board "Whitney A1" BIOS EXTWM210 with Intel Xeon processor 3070 (B0), 2.66 GHz with 4 M L2 Cache, 1066 MHz system bus, 4 GB (4 x 1 GB) 667 MHz DDR2 MT18HTF12872AY CL5 memory; HW Prefetch Enabled. Red Hat Enterprise AS Linux 4, Update 3, Intel® 64, STREAM version 5.6.
- Intel® Pentium® D Processor 950-based platform details: Intel® SR1475NH1-E E7230 chipset server with Intel Pentium D Processor 950, 3.40 GHz with 2 x 2 M L2 Cache, 800 MHz system bus, 4 GB (4 x 1 GB) 533 MHz DDR2 M391T2593BG0 CL4 memory; Red Hat Enterprise AS Linux 4, Update 3, Intel 64, STREAM version 5.6.
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LINPACK[4]

- Intel® Xeon® Processor 3070-based platform details: Intel preproduction customer reference board "Whitney A1" BIOS EXTWM210 with Intel Xeon processor 3070 (B0), 2.66 GHz with 4 M L2 Cache, 1066 MHz system bus, 4 GB (4 x 1 GB) 667 MHz DDR2 MT18HTF12872AY CL5 memory; HW Prefetch Enabled. Red Hat* Enterprise AS Linux* 4, Update 3, Intel 64, LINPACK version 3.0.1.
- Intel® Pentium® D Processor 950-based platform details: Intel® SR1475NH1-E E7230 chipset server with Intel Pentium D Processor 950, 3.40 GHz with 2 x 2 M L2 Cache, 800 MHz system bus, 4 GB (4 x 1 GB) 533 MHz DDR2 M391T2593BG0 CL4 memory; Red Hat Enterprise AS Linux 4, Update 3, Intel 64, LINPACK version 3.0.1.
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STAR-CD

- Intel® Xeon® Processor 3070-based platform details: Intel preproduction customer reference board "Whitney A1" BIOS EXTWM210 with Intel Xeon processor 3070 (B0), 2.66 GHz with 4 M L2 Cache, 1066 MHz system bus, 4 GB (4 x 1 GB) 667 MHz DDR2 MT18HTF12872AY CL5 memory; HW Prefetch Enabled. Red Hat* Enterprise AS Linux* 4, Update 3, Intel® 64, STAR-CD version 3.22.
- Intel® Pentium® D Processor 950-based platform details: Intel® SR1475NH1-E E7230 chipset server with Intel Pentium D Processor 950, 3.40 GHz with 2 x 2 M L2 Cache, 800 MHz system bus, 4 GB (4 x 1 GB) 533 MHz DDR2 M391T2593BG0 CL4 memory; Red Hat Enterprise AS Linux 4, Update 3, Intel 64, STAR-CD 3.22.
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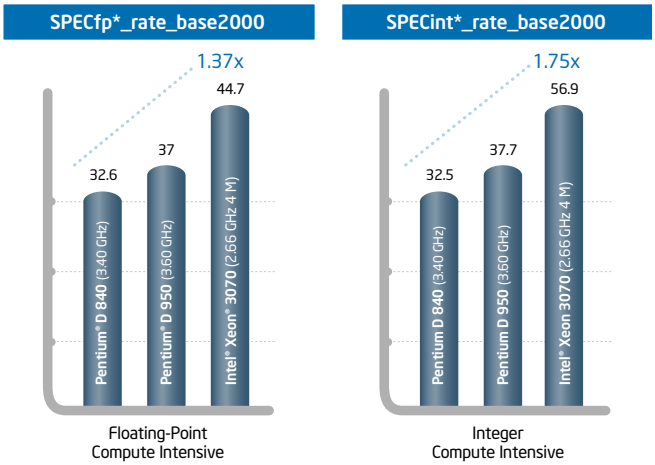
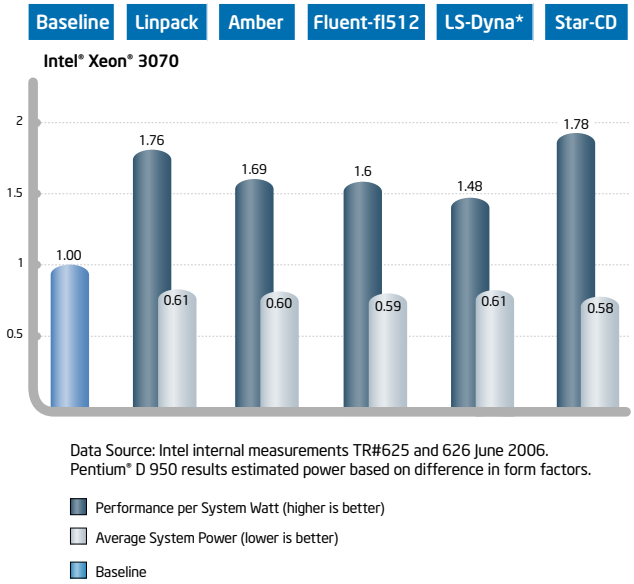
Dual-Core Intel® Xeon® Processor 3070
(Results on Integer and Floating Point Benchmarks)



Data Source: Principled Technologies June 2006.

Intel® Xeon® Processor 3070 vs. Intel® Pentium® D Processor 950
(HPC Performance Per System Watt Comparison)



Data Source: Intel internal measurements TR#625 and 626 June 2006.
Pentium® D 950 results estimated power based on difference in form factors.

Performance per System Watt (higher is better)

Average System Power (lower is better)

Baseline

System Configuration : Dual-Core Intel® Xeon® Processor 3070

Intel® preproduction customer reference board "Whitney A1" BIOS: Ver. 08.00.11, build 05-23-06, ID EXTWM210 with Intel® Xeon® processor 3070 (B1), 2.66 GHz with 4 M L2 cache, 1066 MHz system bus; Intel® Pentium® D processor 950 (3.40 GHz, 2 x 2 MB L2 cache, 800 MHz FSB); Intel Pentium D processor 840 (3.20 GHz, 2 x 1 MB L2 cache, 800 MHz FSB; Memory: Kingston* KVR533D2E4/2G 4 x 2 GB PC2-4200 (533 MHz) CL4 (8 GB total); Western Digital* WD1600YD SATA HDD; Microsoft Windows Server 2003 Enterprise Edition SP1*; On-board ATI* ES1000 video using default MS driver; On-board Intel® PRO/1000PM Dual-Port NIC

Benchmarks Tested

Reports to be published at launch day at www.principledtechnologies.com/clients/reports/Intel/Intel.htm. SPECint*_rate2000 (geometric mean score of 12 benchmarks) – 32-bit OS, Intel® C/C++ Compiler 9.0, MS Visual Studio .NET* 2003, SmartHeap Library* v8 Benchmarks Tested) – 32-bit OS, Intel C/C++ Compiler 9.1, Intel® Fortran Compiler 9.1, MS Visual Studio .NET 2003, SmartHeap Library v8

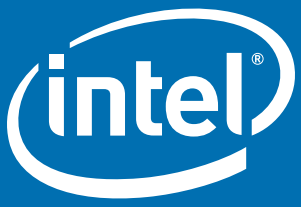
Intel Entry-Level HPC High-Density Server Board Solution

Combine the dual-core Intel® Xeon® processor 3000 series with an Intel® Server Board S3000PT to deliver exceptional performance and reduced footprint for essential applications requiring high density and performance. The Server Board S3000PT, with its unique footprint, makes it ideal for cost-effective high-performance computing and other high-density applications, as well as scalable web and applications server deployments. The unique form factor enables double board density over existing boards in 1U chassis and adds more flexibility and horsepower in small form factor designs.

You Can Rely on Intel Processor-Based HPC Solutions

Intel's leadership across the full range of server technologies is continually pushing the limits of performance, affordability, and choice for HPC. The majority of the world's 500 most powerful supercomputers now run on Intel® processors.[3] With a 20-year track record of delivering proven performance worldwide, you can count on Intel to deliver superior quality and reliability to drive your HPC solutions—large and small.

For more information visit ***www.intel.com/go/hpc***



www.intel.com/go/hpc

1. Intel® Matrix Storage Technology requires a motherboard with the Intel® 82801FR (ICH6R or Intel® 82801GR (ICH7R) I/O Controller Hub System. The system must also have the RAID controller in the BIOS enabled and the Intel Matrix Storage Technology software driver installed. Please consult your system vendor for more information.
2. Intel® Active Management Technology requires a system with an Intel® E7230 Chipset or Intel® 955 Express Chipset or Intel® 945 Express Chipset; an Intel® PRO/1000 PM Network Connection; Intel® 3000 Chipset; Intel® 3010 Chipset; and appropriate third-party software. The system must be plugged into a power source and connected to a LAN.
3. Source: Top 500 Supercomputer Sites, published November 2005, www.top500.org.

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