



Intel® Xeon™ Processor-based Workstations:

Meeting the most demanding workstation environments



Why Intel® Architecture-Based Workstations?

The Intel® Xeon™ processor delivers compelling features that make it ideal for demanding performance and mid-range workstation applications in areas such as manufacturing, digital media, digital content creation, and financial analysis. In addition to the processor's high frequency, the large integrated cache enables higher levels of performance for compute-intensive graphics, visual Internet applications, scientific analysis, and engineering design. Intel Xeon processor-based workstations give you:

- Leading performance and compelling value
- Ability to cost-effectively scale up performance for faster response times or more complex analysis
- Support for a broad range of standard applications
- Ability to run both technical and productivity applications on the same platform

Target Applications

In general, workstations based on dual Intel® Xeon™ processors deliver the best scalability and performance for heavy multitasking and multithreaded applications.

Application Category	Application Software Examples
ASIC design	Design Compiler*, Calibre*, Verilog-XL*, VCS*, ModelSim*, SeedSim*, QuickSim*, TeraForm*, IC Station*, Seamless*, Celaro*, LeonardoSpectrum*
Compositing/Effects	Avid*/Softimage*, Discreet*, Eyeson Software*, Adobe*, Nothing Real*
Custom IC CAD design	Si/Gate Ensemble*, Dracula*, Hercules*, Blast*, Grandmaster*, Dolphin*, EPIC Tools*
Digital content creation	Toxik*, 3D Studio Max*, Renderman*, Socratto*, Lightwave*, Maya*
FPGA and PLD creation	Accel*, Design Book*, Altera Quartus*, Protel*, Summit*, Minc*, FPGA Express*
Life sciences	CHARMm*, Blast*, d2_Cluster*, DGauss*
Mechanical CAD	Pro/Engineer*, Parasolid*, Unigraphics*
Mechanical CAE	Pam Crash*, Abaqus*, LS-Dyna*, Nastran*, Permas*, Multiphysics*
Non-linear video editing	Avid*, Discreet*, Adobe*, NewTek*
Printed circuit board design	Boardstation*, Allegro* (Spectra), Interconnect Synthesis*, Viewlogic*, P-Cad*, OrCad*, Veribest*
3D modeling/animation	Alias/Wavefront*, Avid*/Softimage*, 3D Studio Max*, NewTek*
3D network rendering	Mental Images*, Pixar*, Blue Moon*, Play-Electric Image*



Choosing the Right Workstation

Workload/Applications	Requirements	Platform
Compute-Intensive <ul style="list-style-type: none"> ■ High-performance computing ■ Engineering analysis ■ Composition/rendering ■ Spatial data analysis ■ Imaging 	Highest Performance <ul style="list-style-type: none"> ■ Powerful floating-point ■ Best graphics performance ■ Scalable I/O capacity 	High-End <ul style="list-style-type: none"> ■ Dual Intel® Xeon™ processors 3.20 GHz with 1 MB or 2 MB cache and the Intel® E7505 chipset ■ Advanced graphics card ■ 4 GB or more of memory
Heavy Workload <ul style="list-style-type: none"> ■ 2-D/3-D design visualization ■ 3-D animation ■ Integrated circuit design ■ Economic modeling ■ ISV development 	Performance <ul style="list-style-type: none"> ■ Memory size and bandwidth ■ Scalable I/O capacity ■ Excellent 3-D graphics 	Mid-Range <ul style="list-style-type: none"> ■ Uni or dual Intel Xeon processors with the Intel E7505 chipset ■ Mid-range graphics card ■ Up to 4 GB of memory performance
Moderate Workload <ul style="list-style-type: none"> ■ 2-D drafting ■ Web design ■ Board design ■ Map and data viewing 	Balance Performed <ul style="list-style-type: none"> ■ Expanded I/O capabilities ■ Entry-level graphics card ■ Excellent 2-D graphics 	Entry <ul style="list-style-type: none"> ■ Single Intel Xeon processor with the Intel E7505 chipset or single Intel® Pentium® 4 processor with the Intel® 875P chipset ■ Up to 4 GB of memory

Innovative Technologies to Enhance Your Business Productivity

Large Integrated Cache

The Intel Xeon processor family is available with three different integrated cache sizes: 512KB, 1MB, and 2MB. A large integrated cache means that more data can be stored closer to the execution units in the processor for faster access to needed data, resulting in higher system throughput and shorter turnaround times. The 512KB version is targeted for the value DP workstations, whereas the 1MB version is intended for performance DP workstations. Life science oriented applications that require heavy floating point computations as well as integer intensive scientific applications will benefit further from the 2MB integrated cache by up to 20% performance improvement.¹

Hyper-Threading Technology

Intel Xeon processors support simultaneous multithreading. Groundbreaking Hyper-Threading Technology from Intel delivers performance boosts in numerous multithreaded applications and multitasking usages and workloads. By using processor on-die resources that would otherwise be idle, Hyper-Threading Technology provides a performance boost on multithreading and multitasking operations.

Intel NetBurst® Microarchitecture

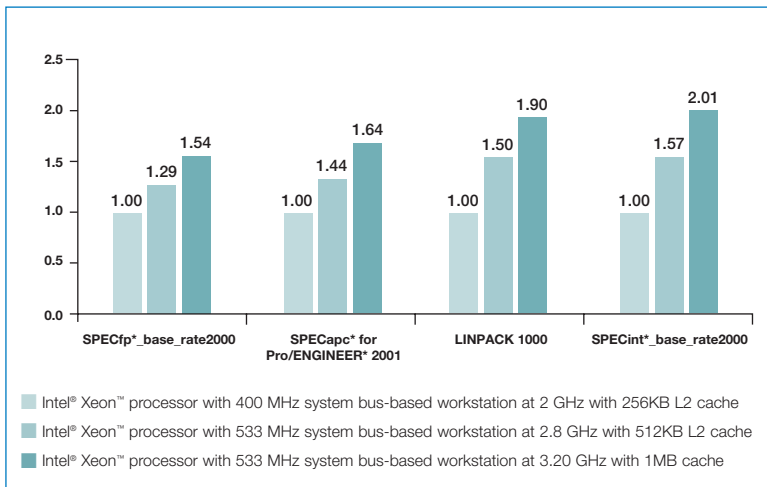
The Intel NetBurst® microarchitecture offers several innovations that allow the Intel Xeon processor family of workstations to deliver world-class workstation performance. Features include high-frequency capabilities, integrated cache, a Rapid Execution Engine, and an Execution Trace Cache.

Advanced Graphics and Improved I/O

AGP 8X delivers increased graphics bandwidth and headroom for graphics-intensive workstation applications and backward-compatibility with AGP 4X. Integrated Hi-Speed USB 2.0* provides versatile expandability that's easy to use and is also backward-compatible with USB 1.1.

Superior Scaling of Intel® Xeon™ Processor 3.20 GHz with 1MB Cache

Relative Performance Improvement



Source: Intel internal measurements using Intel® Compiler 8.0. (December 19, 2003)

NOTE: SPECcap* for Pro/ENGINEER* 2001 measured on uni-processor platform – all other tests measured on dual processor platforms.

System Configurations

- Dell Precision* 530 i860-chipset platform using Intel® Xeon™ processor 2 GHz and 2GB RAMBUS PC800-45 memory.
- Dell Precision* 650 E7505-chipset platform using Intel® Xeon™ processor 2.8 GHz and 2GB DDR PC3200 memory.
- Dell Precision* 650 E7505-chipset platform using Intel® Xeon™ processor 3.20 GHz with 1M cache and 2GB DDR PC3200 memory.

Common to three system configurations: 36GB Seagate 15K U320 SCSI*, Adaptec 29320 SCSI*, nVidia Quadro4* Pro 980XGL 128MB AGP 8x video card, driver 52.14, Microsoft Windows* XP Professional SP1.

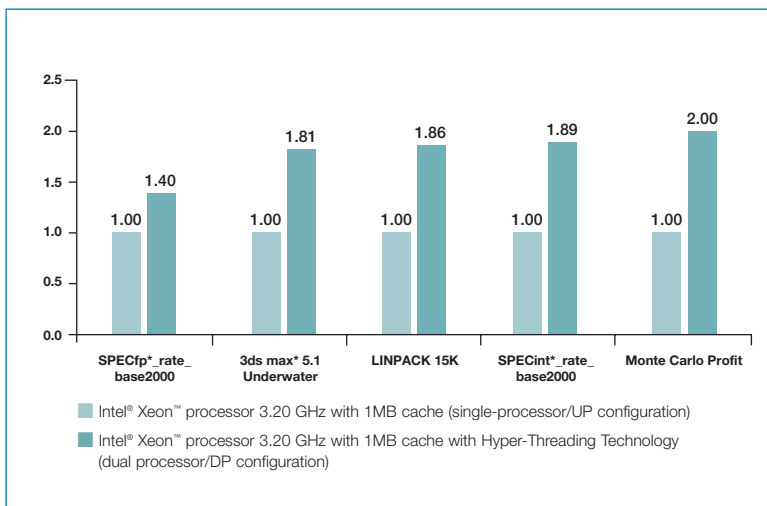
SPECint*2000 and SPECfp*2000 benchmark tests reflect the performance of the microprocessor, memory architecture and compiler of a computer system on compute-intensive, 32-bit applications. SPEC* benchmark tests results for Intel microprocessors are determined using particular, well-configured systems based on an input problem size (N), reporting results in billions of floating point operations per second (GFLOPS). These results 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 they are considering purchasing.

LINPACK is an industry recognized benchmark that measures performance of floating-point computation capability by solving a system of linear equations based on an input problem size (N), reporting results in billions of floating point operations per second (GFLOPS).

3-D Mechanical Computer-Aided Design (MCAD) relies on processor speed, memory and graphics performance to obtain maximum results in optimal time. The 3.2 GHz Intel® Xeon™ processor with 1MB cache delivers world-class performance on key benchmarks like SPECcap* for Pro/Engineer* 2001.

Uni-Processor to Dual-Processor Scaling

Take full advantage of your workstation’s capability by adding a second processor.



Source: Intel internal measurements using Intel® Compiler 8.0. (December 19, 2003)

System Configurations

Intel® Xeon™ processor 3.20 GHz/533 MHz system bus with 1MB L3 cache and Hyper-Threading Technology, Intel® E7505 chipset-based Dell Precision* Workstation 650, 2GB PC3200 DDR CAS2-2-2, 36GB Seagate Cheetah* 15K Ultra320 SCSI hard drive using Adaptec 29320 SCSI adapter BIOS 4.12.0*, nVidia Quadro4* Pro 980XGL 128MB AGP 8x graphics card with driver version 52.14, Windows* XP Professional build 2600 SP1.

SPECint*2000 and SPECfp*2000 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.

Intel® Xeon™ Processor

Features

Benefits

Integrated Cache	<ul style="list-style-type: none"> ■ Significant increase in DP platform performance compared to earlier Intel® Xeon™ processor-based workstations
<ul style="list-style-type: none"> ■ 512KB cache: 3.06, 2.80, 2.66, 2.40 and 2 GHz ■ 1MB cache: 3.20, 3.06, 2.80 and 2.40 GHz ■ 2MB cache: 3.20 GHz only 	<ul style="list-style-type: none"> ■ Broad processor family that meets the needs of a wide range of workstation users
533 MHz System Bus	<ul style="list-style-type: none"> ■ Higher throughput when accessing memory and I/O devices for greater system responsiveness and seamless user interaction ■ Allows for faster data transfer and improved performance
Hyper-Threading Technology	<ul style="list-style-type: none"> ■ Enables support for more users, improving business productivity ■ Provides faster response times for many Internet and e-Business applications, enhancing your customers' experience
Rapid Execution Engine	<ul style="list-style-type: none"> ■ Improves throughput and reduces latency
Enhanced Floating-Point and Multimedia Unit	<ul style="list-style-type: none"> ■ Accelerates demanding application performance and multimedia units
Streaming SIMD Extensions 2 (SSE2)	<ul style="list-style-type: none"> ■ 144 instructions to accelerate video and encryption/decryption and support next-generation Internet applications; supports newer, more computationally intensive graphics

Intel® E7505 Chipset

The Intel® E7505 chipset supports all Intel® Xeon™ processors with 533 MHz system bus and Hyper-Threading Technology for state-of-the-art DP workstation platforms incorporating dual-channel DDR-266 memory, next-generation AGP 8X graphics, and improved I/O.

Features

Benefits

533 MHz system bus capability	<ul style="list-style-type: none"> ■ Provides up to 4.3 GB/s of system bus bandwidth that can support greater memory, graphics, and I/O performance
Dual-channel system DDR-266	<ul style="list-style-type: none"> ■ Provides 4.3 GB/s of memory bandwidth for balanced performance on the Intel® Xeon™ processor with 533 MHz bus platforms
AGP 8X interface	<ul style="list-style-type: none"> ■ Next-generation graphics interface, delivering 2.1 GB/s of graphics bandwidth directly from the MCH, for use with the most advanced AGP 8X graphics cards ■ Backward-compatible with AGP 4X cards based on AGP 2.0
Integrated Hi-Speed USB 2.0*	<ul style="list-style-type: none"> ■ Six ports offer up to 40x greater bandwidth over USB 1.1 for the most demanding I/O peripherals

Boxed Processors

Intel also offers Boxed Intel® Xeon™ processors, which include Intel-designed thermal solutions and a three-year limited warranty. For more information contact your Intel sales representative or Intel authorized distributor, or visit the Intel® Reseller Center at: <http://intel.com/reseller>

For More Information

Contact your Intel® products representative to discover how workstations based on the Intel® Xeon™ processor with 1MB cache can enhance your business productivity. Or, visit the Intel® Business Computing Web site at: www.intel.com/eBusiness

¹ For the latest Intel Xeon processor performance details, please refer to http://www.intel.com/products/server/processors/server/xeon/index.htm?id=ipp_srvr+proc_xeonwrkstn& and select the "Intel processor performance benchmarks" link in the "Tools" box.

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