intel®

Intel® Processor-based Workstation Selection Guide

Product Brief

Intel® Workstation Processor

intel® inside™
Xeon®

intel® inside™
CORE™ i7

Get the Intelligent Performance You Need by Using the Right Workstation for the Right Job
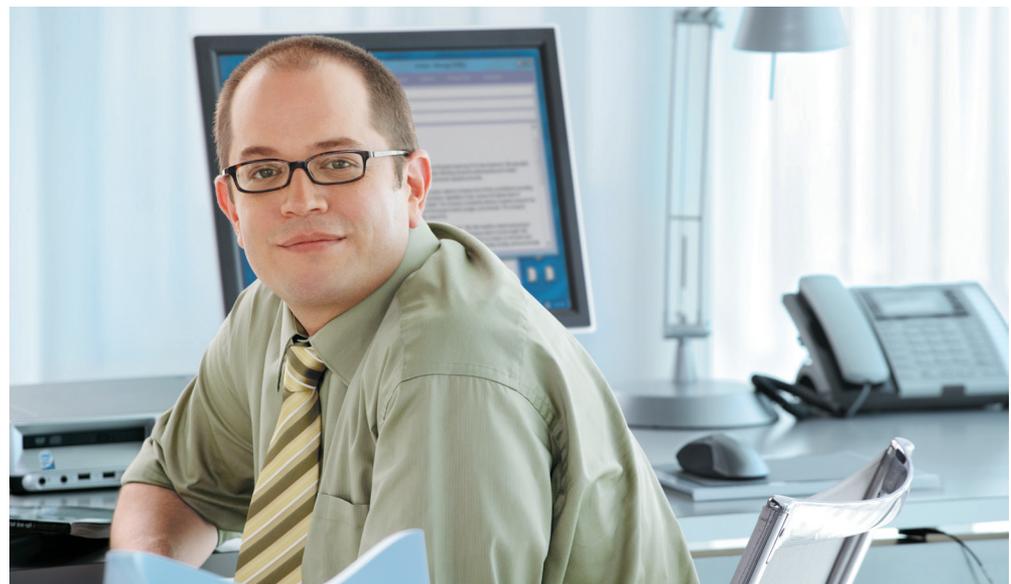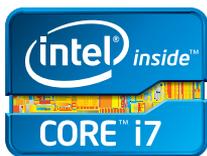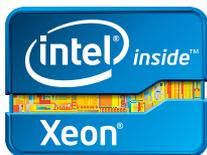
Choosing the right workstation is a smart investment. Many engineers, designers, researchers, financial analysts and other highly trained professionals depend on their workstations more than any other single tool to support their creative efforts. A sufficiently powerful system is essential to get the most out of their abilities, and to avoid the difficulties that can result when a workstation cannot keep up with its workload, introducing delays that can stall and even derail the creative process.

Intel® processor-based workstations are the most widely deployed 64-bit workstation platforms in the world. You can count on them to deliver the performance, stability and reliability you need to move forward with confidence. They come in a wide variety of configurations. Whether you need near-supercomputing performance on the desktop for digital prototyping, a mobile workstation for customer collaboration and designing on the go, or an entry-level workstation for office power-users, this guide can help you choose the right system for the job to maximize your creativity and innovation.

Who Needs A Workstation and Why?

Typical office workers running standard office applications will get all the performance they need from a standard business PC. Anyone running more demanding applications can expect to be more productive, creative and satisfied using a workstation. The additional cost for an entry-level system is small and the performance gains can be stunning. A true workstation will offer dramatic gains across each of the parameters listed below.

- **Superior Reliability –** All Intel® Xeon® processor-based workstations support Error-Correcting Code Memory (ECC Memory), which automatically detects and corrects up to 99.9998 percent of memory errors to improve data integrity and system uptime. Since the probability of data errors increases with the size of memory footprints, this is an essential feature for anyone working with large and complex designs.

- **Faster Rendering for Complex 2D and 3D Graphics –** With integrated Intel® HD Graphics P3000 available on the Intel Xeon processor E3 family-based workstations and the ability of Intel Xeon processor 5600 series-based workstations to support one or more professional-grade graphics cards, workstations provide dramatic improvements in system responsiveness for anyone working with detailed 2D or 3D graphics. PCs typically support consumer-grade graphics cards, which are simply not designed for graphics-intensive workloads.

- **Processing Power for Compute-intensive Applications –** A workstation can be configured with more processors, and with more powerful processors. Users can churn through complex calculations in a fraction of the time to improve performance for computer-aided design, animation, digital content creation, financial analysis and other demanding applications. With the right workstation, users can also run multiple workloads simultaneously – without performance loss – to further increase productivity.

- **Memory for Large Tasks –** With far more memory capacity than a desktop PC, artists and designers can work on larger canvases and engineers can work on larger assemblies. This can improve workflows in fundamental ways. It can also allow designers to identify interferences and conflicts earlier in the process, when they are far easier and less costly to fix.

- **Large Hard Drives and RAID Storage Technology for Massive Jobs –** Workstations are designed to support up to terabytes of internal storage, so jobs of almost any size can be stored on the system. In addition, Intel® Rapid Storage Technology can also improve the performance of disk-intensive retrieval applications such as editing video. By combining two to six drives in a RAID 0 configuration, data can be accessed on each drive simultaneously, speeding up response time on data-intensive applications.

Why Choose an Intel® Processor-based Workstation?

Intelligent Performance and Reliability in a Cost-efficient and Energy-efficient System

The Performance You Need for Demanding Workloads in the Office and On-the-Go

The Performance You Need for Demanding Workloads in the Office and On-the-go Intel processors scale performance by adapting intelligently to your workloads, so you can design, model, create and visualize faster. They include a number of unique, next-generation technologies that help push workstation performance and energy-efficiency to new heights.

Intel® Advanced Vector Extensions (Intel® AVX) improves the performance of image, video, and audio processing applications, as well as 3D modeling applications, by nearly doubling floating-point computation performance. Intel AVX also improves the code execution efficiency, which considerably improves multimedia operations, giving even entry-level workstation users the intelligent performance they demand.

- **Intel® Turbo Boost Technology 2.0**[1] increases core frequencies beyond rated values during peak workloads. The latest generation enables dynamic technology that either improves processor or graphics performance. If neither is needed, the workstation cycles more quickly into a sleep state, improving energy efficiency.

- **Intel® Hyper-Threading Technology**[2] doubles the number of execution threads to increase processing efficiency and overall performance for complex workloads including financial analysis such as Monte Carlo* simulations, ray tracing and rendering, and digital prototyping.

- **Intel® Smart Cache** dynamically allocates cache resources based on the demands of each core, so data is managed more efficiently to optimize execution across all available resources.

Near-native Virtualization Performance for Breakthrough Flexibility

Intel® Virtualization Technology[3] gives you complete control over workstation resources by enabling near-native performance and full graphics acceleration in virtual machines. This is a breakthrough capability that delivers tremendous value, both to individual users and the business.

Add virtualization software and a 64-bit host OS and you can access all your 64-bit and 32-bit data and applications from a single workstation, run multiple workloads concurrently and switch instantly among environments without rebooting. You can also deploy new applications instantly in virtual machines, or cluster spare workstation resources to run large simulations on demand, without waiting for HPC batch jobs or slowing interactive design tasks.

Intel® HD Graphics P3000[4]

Intel processor-based workstations are tested and validated across a wide range of workstation-class applications and professional graphics cards, not only by Intel, but also by an enormous community of third-party hardware and software developers. You can count on optimized and reliable performance across the broadest choice of applications. In addition, entry-level workstations based on the Intel Xeon processor E3 family have Intel HD Graphics P3000, which reduces the need for third-party graphic cards, and delivering the graphics performance and quality demanded by many CAD and media and entertainment applications.

Making Downtime a Thing of the Past

Now available on mobile and entry-level workstations, Intel® vPro™ technology[5] helps keep your system up, running, and more secure. Your IT staff can take advantage of Intel vPro technology to help them update or patch your workstation at night, even if it's powered down or use the technology to remotely diagnose and resolve problems without requiring a desk-side visit, even when the OS is down. There are also proactive security features, such as agent presence checking to protect your workstation against malware and other attacks to help keep your productivity high and downtime to a minimum.

Stronger Security for Critical Assets

Intel continues to enhance systems so that they run more securely and can handle growing workloads more efficiently. That's why we strive to provide more robust, vulnerability-resistant platforms. This is increasingly important as attackers start targeting base components such as firmware and controllers. Features such as Intel® AES New Instructions (Intel® AES-NI)[6] and Intel® Trusted Execution Technology[7] (Intel® TXT) can help you keep your data and your workstation more secure.

Intel AES-NI adds new instructions to accelerate data encryption and decryption for Intel Xeon processor-based workstations. It implements in hardware, sub-steps of the AES algorithm which results in a speed up over previous generations of workstations. Intel TXT is a hardware solution that validates the behavior of key components within a server at startup. Known as the "root of trust," the system checks the consistency in behaviors and launch-time configurations against a "known good" sequence. Using this verified benchmark, the system can quickly assess whether any attempts to alter or tamper with the launch-time environment have been made.

Matching the Workstation to the Job

Ideally, you should always choose the most affordable workstation that will fully meet your needs. If you are unsure, it is generally better to choose a higher performing system, since a one-time, incremental cost is preferable to an underperforming workstation that will limit productivity and creativity over the life of the system. Each of the following workstations can be configured to match specific needs.

Expert Workbench

Near-supercomputing performance for digital prototyping on the desktop

Powered by two Intel Xeon processors 5600 series, today's expert workbench can handle immense workloads and support new usage models that were simply not possible a few years back. With up to 12 computational cores, 24 threads and memory configurations as large as 192 GB[8], these powerful systems enable digital prototyping and analysis-driven design right on the desktop. You can run Microsoft Windows*-based design tools and complex Linux*-based simulation applications concurrently, securely and at full speed. Designers, engineers and scientists can run multiple simulations per day without slowing their interactive tasks, so they can play "what if?" with unprecedented speed and flexibility.

Essential Workstation

The power you need for large designs and high-performance multi-tasking

Based on the Intel® Xeon® processor 3600 series, these workstations empower designers, engineers, financial analysts and other power users who depend on advanced 2D and 3D model generation, complex CAD and other compute-, memory- and graphics-intensive applications.

This is Intel's most powerful single-processor workstation. It is optimized for heavy workloads and efficient multi-tasking so your mainstream workstation users can innovate faster and more effectively. It not only provides better performance than an entry workstation, but also better reliability to further reduce business risk.

Entry Workstation

Integrated, optimized graphics for 2D and simple 3D design

Built on 32nm process technology, entry-level workstations based on the new Intel Xeon processor E3 family with optimized, integrated graphics have the performance and capacity for basic interactive design and digital content creation, as well as moderate rendering and ray-tracing. With ECC memory for superior reliability, Intel AVX, and support for SATA 3.0, which you can pair with a Solid State Drive (SSD) to dramatically improve data delivery and reliability, you have the ability to truly multi-task and accomplish more in less time. Anyone used to a standard business PC will be amazed by the increased responsiveness.

Mobile Workstation

The performance you need for creativity on-the-go

Sometimes you need to be onsite and collaborate closely with your customers. Mobile workstations based on 2nd generation Intel® Core™ i7 vPro™ processors deliver performance nearly equal to the entry workstations, so you can design with your customer, not just for your customer. These powerful laptops include the advanced capabilities of Intel vPro technology that provides built-in security and manageability features.

Matching Your Needs to the Right Workstation

Computing System	Business Desktop	Mobile Workstation	Entry Workstation	Essential Workstation	Expert Workbench
Processor Options	2nd Gen Intel® Core™ i5 vPro™ or 2nd Gen Intel® Core™ i7 vPro™ Processor	2nd Gen Intel® Core™ i7 vPro™ Processor Family	Intel® Xeon® Processor E3 Family	Intel® Xeon® Processor 3600 Series	Two Intel® Xeon® Processors 5600 Series
Graphics Adapter	Integrated Intel® HD graphics optimized for business applications	Supports up to 1 discrete professional graphics adapter	Support for discrete professional graphics adapters with Intel® HD Graphics P3000	Supports up to 2 discrete professional graphics adapters	Supports up to 2 discrete professional graphics adapters
Memory Support	Up to 16 GB non-ECC	Up to 8 GB non-ECC	Up to 32 GB with ECC	Up to 48 GB with ECC	Up to 192 GB with ECC[8]
Application					
Business Applications (Typical User)	●	●●	●●	●●	●●
Business Applications (Power User)	○	●	●	●	●●
2D Design	○	●	●	●	●●
3D Design	○	●	●	●	●●
Model Generation	○	●	●	●	●●
Large Assemblies	○	○	○	○	●
Analysis-driven Design	○	○	○	○	●
Rapid Prototyping	○	○	○	○	●

●● Performance headroom for growth and innovation   ● Ideal system   ○ Not recommended

Learn More

Visit www.intel.com/go/workstation for more information and resources, including:

- **Technical Information –** Get detailed technical information on Intel processor-based workstations and related components and technologies.

- **Workstation Selector Guide –** Use this automated tool to determine the best workstation configuration for your particular needs. Just enter your profession and the category of workstation needed (Expert Workbench, Essential Workstation, etc.). The tool will recommend a specific configuration, provide detailed information, and guide you to a number of leading workstation vendors.

- **Workstation ROI Estimator –** Investing in high-performance workstations for selected employees can deliver exceptional returns on your investment. Use this tool to estimate your rate of return based your specific business needs and current workstation environment.

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