

A Guide to Workstations

Why workstations with Intel® Xeon® processors excel over PCs for architecture, product development, and media and entertainment



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Table of Contents

Introduction	3
Chapter 1.....	4
PCs vs. Workstations	
Chapter 2.....	7
IT Challenges with PCs	
Chapter 3.....	10
Why Workstations are Best for Users and IT	
Chapter 4.....	13
Choosing the Right Tools: HP Z Workstations	
Conclusion.....	16



Introduction

It's a classic question that many IT organizations will face at one time or another: Do we need workstations, or will PCs do? The short answer is that it depends on user needs and the work users must accomplish on a daily basis—and the value the organization places on productivity, cost-efficiency, and speed.

A typical office worker running standard office applications will get all the performance needed from a standard business PC. But that's not true for designers, engineers, financial analysts, researchers, and others running more demanding applications. These users may be involved in rendering complex graphics, digital content creation, and financial and other database analyses and computations—and organizations can expect them to be more productive, creative, and satisfied using a workstation. Even an entry-level workstation will enable new capabilities that can help increase cost-effectiveness and productivity, improve reliability, and limit downtime.

In this eBook, we'll present Spiceworks research providing insights into the challenges IT professionals face when their organizations' professional staffers use PCs instead of workstations. We'll explore the differences between hardware types, the challenges IT faces, and the solutions that make the most sense for users in these industries—regardless of organization size.

Chapter 1

PCs vs. Workstations





Workstations are purpose-built tools that can handle the extremely high demands of high-end graphics work, video editing, number-crunching, Computer Aided Design (CAD), and more. The hardware itself is specifically designed for longer life when run at higher capacities than even business PCs. Not every user needs a workstation. But for those who work in compute-intensive industries—like architecture, engineering, media and entertainment, finance or design—selecting hardware is especially crucial. And more often than not, workstations can be an integral element to accomplishing the goals of the organization.

Designed for high performance and heavy workloads, workstations can be tailored and matched to application requirements easily for end-users or IT teams.

Basic differences between workstations and PCs



Value

Today's business PCs can be purchased at a low cost, but have a relatively short lifespan. Because workstations have the built-in power and durability to withstand high-demand workloads, they can be kept in service for far longer than PCs. Since workstations have the hard drive options, high-end graphics, and robust processors to handle compute-intensive applications, they help increase productivity and reduce downtime—resulting in significant, ongoing value for organizations.



Performance

PCs can easily handle tasks like email, web surfing, and word processing, while workstations easily handle workloads that demand more power, such as CAD, animation, data analysis, video and more. Powered by Intel® Xeon® processors, workstations offer significant processor gains over standard PC core processors to support more and better memory, security, and performance management. Professional-grade graphics cards offer tangible speed, anti-aliasing, and performance improvements through rigorous build quality and driver certification.



Durability

Like other commercial-grade equipment, the guts of a workstation are typically stronger than a consumer PC in that each element of the hardware is built to a higher standard—including parts that are often failure points in PCs, such as the motherboard, internal drives, video cards, CPU, and RAM. It's understood that the hardware will be pushed hard, day after day, and may continue to run project work even after people have left the office.



Workstation advantages

Anyone working with detailed 2D or 3D graphics can expect to see dramatic improvements in system responsiveness when using a workstation. Workstations are designed to support one or more professional-grade graphics cards, delivering faster performance for a wide range of design tasks. Rendering of complex graphics on a workstation is simply faster than on a PC.

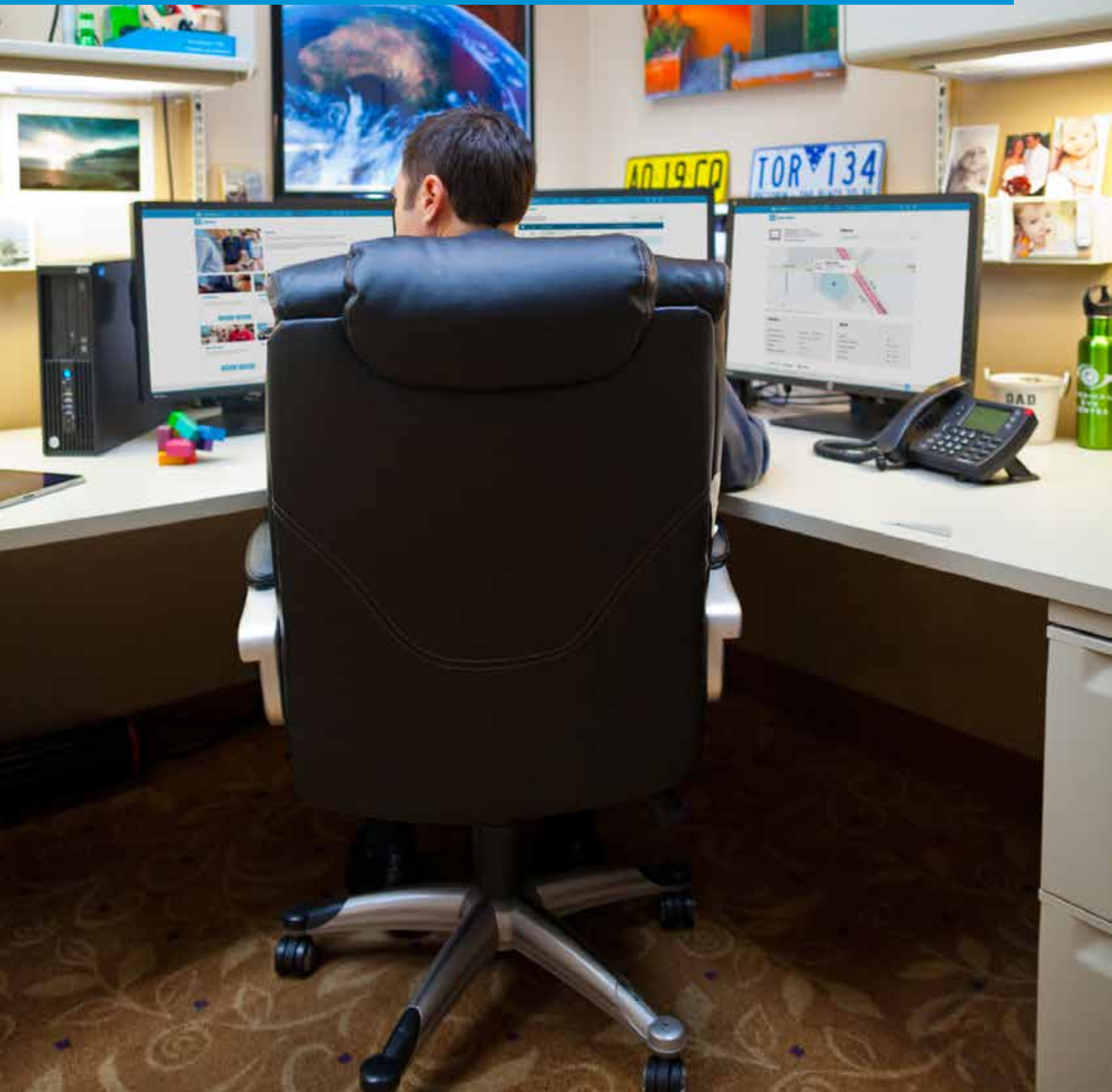
Workloads like interactive design, database analyses and CAD projects require far more memory than is available on a PC. More memory onboard workstations enables designers and artists to create on larger canvasses and larger assemblies, and users can expect to see improvements in creative workflows, productivity, and the ability to more quickly identify design flaws earlier in the process, when they're easier and less costly to correct.

One of the most frustrating challenges for users—and biggest wastes of time—is waiting for computers to respond. For compute-intensive applications commonly used in engineering, architecture and product development, workstations will respond more quickly than PCs. In addition, multiple applications can run simultaneously on a workstation without losing performance. This provides faster access to information and increases end-user productivity—resulting in overall savings for the organization.

Workstations are designed to support multi-terabytes of internal storage, so their hard drives can accommodate the kind of massive projects associated with high-performance computing. Some workstations can also be configured to include affordable solid state drives (SSDs) that use less power and deliver data even faster—and with higher reliability than traditional spinning drives.

Chapter 2

IT Challenges with PCs



Making the right computing choice for the type of work performed at your organization can not only boost productivity for end-users, but can save the IT team from the headaches that inevitably result when users don't have the tools they need to do their jobs efficiently.

“Laptops aren't powerful enough to run the software we need. We're currently upgrading them to mobile workstations.”

- IT professional surveyed by Spiceworks

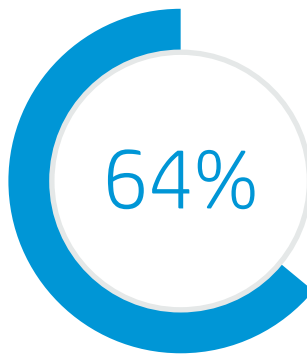
PC-related pain points

Following are common pain points related to running professional applications typically used in engineering, architecture, product development, and other performance-intensive industries on a business PC:

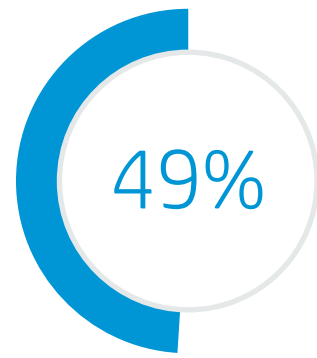
- Decelerating the speed of business. When hardware is not built for or optimized for heavy workloads, everything slows down. Powerful business and creative applications aren't as responsive as they were designed to be.
- Insufficient processing power. It may take many long minutes rather than seconds for files to open on a business PC or for 3D models or video edits to compile, and IT has to deal with frustrated users who can't get their work done.
- The dreaded blue screen. Hardware components and memory inadequacies result in sluggish processing and lagging response to mouse and pen inputs, and risk maxing out the available memory store completely.
- Shorter equipment lifespan. When employees run demanding applications on hardware not built for that purpose, the machine's expected life will be reduced and need replacement—usually at the most inopportune time.

Spiceworks research found that fewer than half of the IT professionals surveyed feel their organization's PCs are fully equipped to run the necessary software for end-users. The most common technical problems for which end-users seek help are software-related—such as software glitches, updates and licenses.

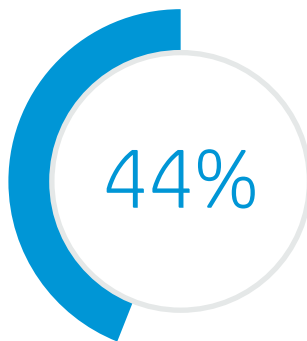
Slow performance is the most common challenge with PCs, according to the Spiceworks research. Nearly two-thirds of organizations experience issues with slow PC performance. Other common issues experienced include software compatibility, crashes, and reboots. The specific breakdown includes:



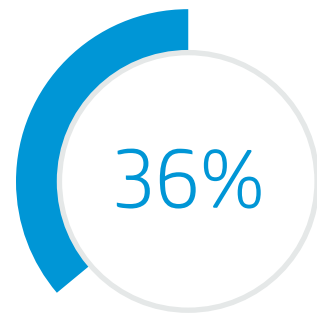
Slow performance or lag time



Software compatibility with advanced programs



Freezing/crashes



Frequent reboots required

Chapter 3

Why Workstations are Best for Users and IT



Comparing a workstation to a PC is a bit like comparing a Formula One race car to a family sedan on a racetrack. Both vehicles will move around the track and get you to the finish line, but the purpose-built race car will be faster and smoother on the turns, and will more quickly deliver the win. Just as with the two vehicles in this analogy, purpose-built design and more robust components are key factors that differentiate workstations from business PCs.

Does this mean workstations require a lot of tending by the IT team? Absolutely not. Here are some reasons why:

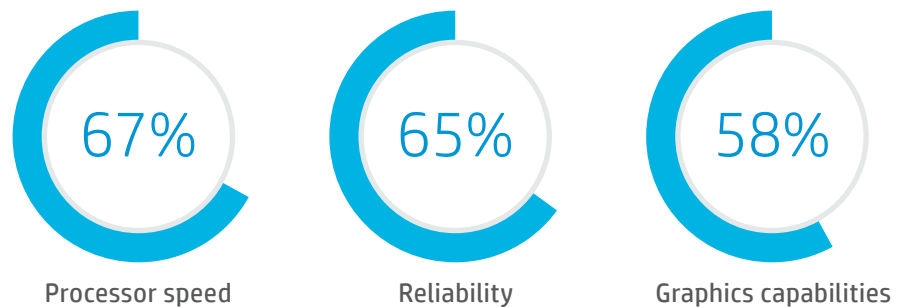
- Workstations are built for extreme reliability and intense workloads
- Error-Correcting Code (ECC) Memory can automatically detect and correct memory errors to improve data integrity and system uptime
- Adding multiple monitors is a simple plug-and-play task
- Workstations have long lifecycles so there's none of the hassle and cost experienced with replacing PCs every couple of years
- Workstations can include robust warranty and protection plan offerings that make maintenance quick and easy
- Workstations can be built with all metal cabinets that ground out electrostatic discharge, extending life
- Workstations can be energy-conscious, resulting in significant power supply efficiencies—a financial benefit that can reduce operating costs for organizations
- Some manufacturers certify that their workstations will run—at the optimal performance level—the high-end applications that so many designers and analysts require
- Featuring Intel® Xeon® processors and professional-grade graphics, workstations are designed for compute-intensive projects and work environments so both IT and end-users will have less down time waiting for rendering or computing to take place



Spiceworks asked IT professionals about the top factors their organizations consider when evaluating new workstation solutions for professional staffers. It makes sense that their considerations align with the challenges they've experienced with PCs—processor speed, reliability and graphics capabilities.

Tier 1 factors of consideration:

(up to seven selections per respondent permitted)



Tier 2 factors of consideration:

(up to seven selections per respondent permitted)

Ease of deployment/integration with existing infrastructure



Display quality



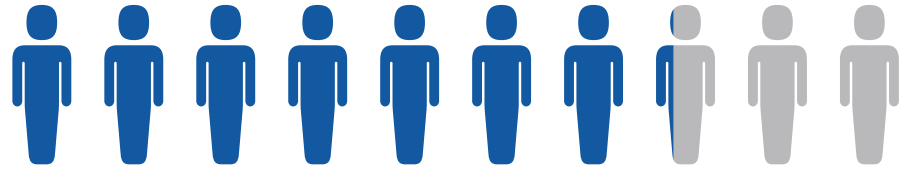
Hard drive performance



Configurability



In fact, **73%** of surveyed IT professionals say they would transition to workstations to save time and money.



Top five benefits of transitioning to workstations for IT professionals:

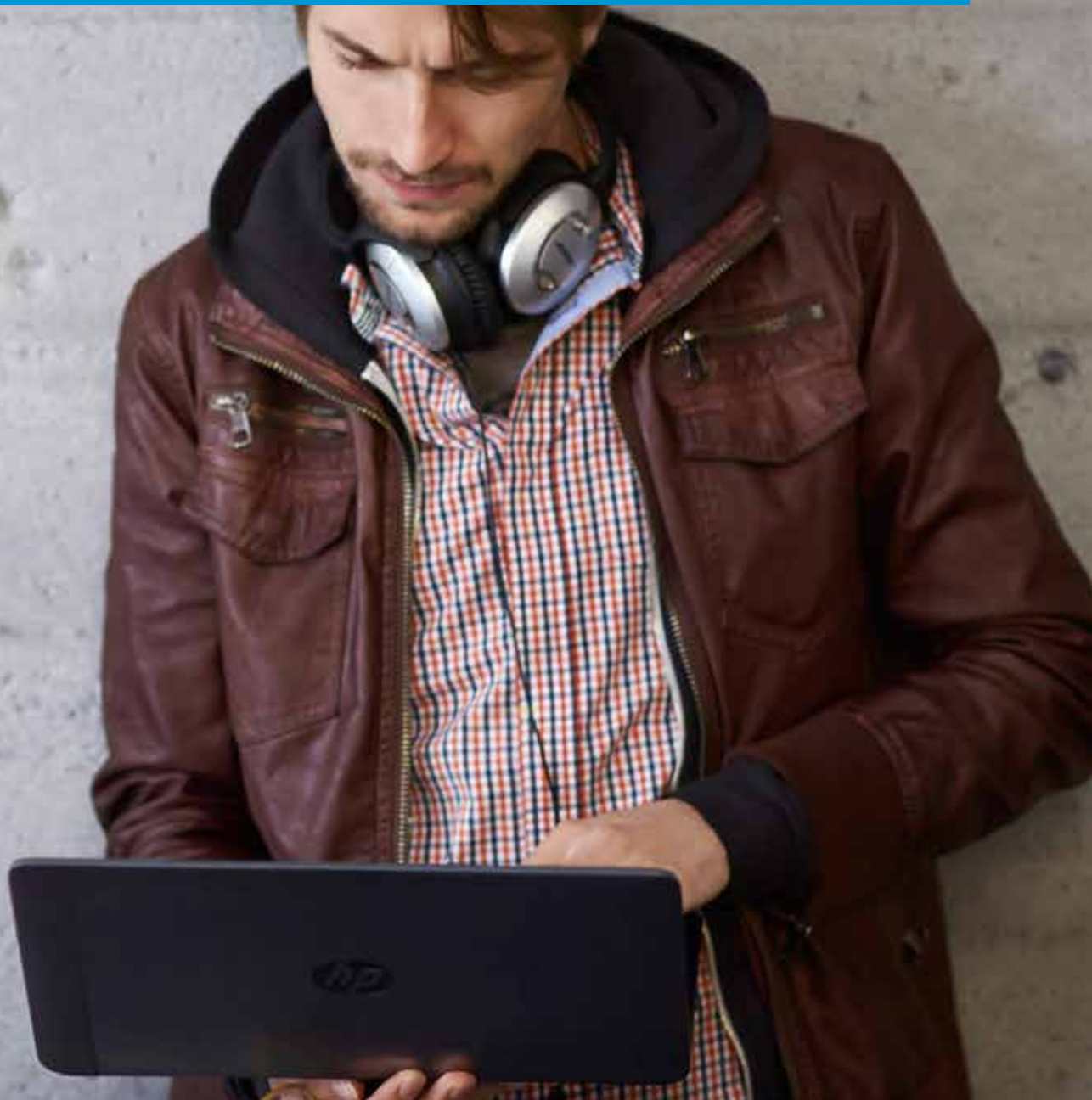
1. Less time diagnosing performance issues
2. Less frustration with technical issues
3. Less general support time
4. Less time troubleshooting software issues
5. Lower hardware costs



Chapter 4

Choosing the Right Tools: HP Z Workstations with Intel® Xeon® processors

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Despite entry price points that rival those of desktop PCs, workstations provide a level of performance, reliability and innovation that goes well beyond the capabilities of standard business computers. HP Z Workstations with Intel® Xeon® processors are designed for the demands of users who work with professional and technical applications, large and complex datasets, intricate 3D models, and other high-performance activities.

HP Z Workstations have been on the market for more than 30 years, and they're designed from the inside out to meet critical customer needs. Moreover, HP Z Workstations deliver both high performance and reliability with the latest innovation and industry-leading technologies. Entry-level HP Z Workstations are affordable and scalable, and like all HP Z Workstations, offer configurable features so you can quickly and easily grow your workstation at the pace of your organization.

HP Z Workstations offer advantages that include:

Improved performance



- Intel® Xeon® processors that offer significant performance gains over Intel® Core™ processors on HP Entry Workstations; a choice of single, dual or quad cores; greater memory bandwidth, larger cache and higher frequencies
- NVIDIA® professional-class graphics from integrated graphics to multiple 2D and 3D solutions
- HP Z Turbo Drive G2 PCIe SSD for up to 4x the performance of SATA SSDs and up to 14x faster sequential read performance over SATA HDDs

Mission-critical reliability



- Tested beyond industry standards for always-on operations
- HP Z Workstations are tested to a minimum of 368,000 total test hours
- ECC memory as well as storage options that use server-class technology
- Professional ISV application certification, including Autodesk AutoCAD, Dassault Systèmes SolidWorks, Adobe AfterEffects, and more
- Out-of-the-box compatibility between HP Z Workstations and professional applications
- A standard 3-3-3 limited warranty (three years parts, three years labor and three years next-business day onsite service), backed by US-based 24x7 technical support



Design

- HP Z Displays with a narrow bezel for seamless multi-display setups, as well as top-tier graphics resolution, HP DreamColor color accuracy and ultra-high definition (UHD) to bring images to life
- Tool-less chassis with intuitive touch points and handles allows for easy end-user upgrades or optional, removable and cleanable dust filter to help your workstation's internal components stay clean and cool—helping to optimize performance
- HP Z Cooler, an ultra-quiet cooling solution that's been designed to reduce system noise



Maximum expandability by design

- Up to 1 TB of memory (multi-threaded, multi-tasking)
- Up to 20 TB of storage for hard drives, 1 GB – 1 TB¹



Additional features

- Preloaded productivity-boosting software tools such as HP Performance Advisor, which helps users optimize their systems for each new application or driver, and HP Remote Graphics Software, for remote access to workstation applications with amazing, high-speed clarity
- Longer lifecycles than business PCs
- Support for Linux® OS



Conclusion

When it comes to running the professional applications used in architecture, engineering, product development and other compute-intensive environments, choosing the right tool for the job matters. Workstations offer many advantages over business PCs for these applications, and the benefits are felt throughout the organization—from end-users and IT to overall productivity gains and reduced operating and maintenance costs.

HP Z Workstations with Intel® Xeon® processors allow users to spend less time waiting and more time creating. They empower users to handle and do more, and provide limitless creative and analytic possibilities. Packed with the newest industry-leading processing, NVIDIA® professional-class graphics and innovative technologies, HP Z Workstations provide the tools users need to handle the toughest, most demanding applications with ease.

[Learn more](#)

“We chose HP because of the partnerships it has established with Autodesk and NVIDIA. It’s important to know that the HP workstations we’re working with are certified and optimized to run the applications we use every day.”

- Shaun Frazier, director of IT, Robert A.M. Stern Architects

[Get the whole story >](#)

References

Spiceworks survey of 153 IT decision-makers who influence PC/workstation purchases for their organizations in the United States, predominantly representing manufacturing, construction and engineering industries, on behalf of HPI, March 2016.

¹ For storage drives, GB = 1 billion bytes, TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB of disk is reserved for system recovery software.

