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Why Buy a Workstation vs. Desktop for Your Business

Tom Gerencer | March 8, 2021

Reading time: 10 minutes

When should you buy a workstation for your business, and when will a desktop or standard laptop deliver the performance you need? A workstation can add substantial productivity gains to your workflow.

Determining whether you need the added computing power will depend on your business and the roles within that business. You may find that some employees, such as engineers and content creators, need a workstation due

to the intensity and complexity of the work they do. Others, even within the same company, can accomplish everything they need to do with a more entry-level desktop PC or even a laptop.

There's no universal answer to the workstation vs. desktop (vs. laptop) question, so you can consider your company's needs as we take a look at the differences between workstations and PCs. We'll also cover the types of employees and workflows that demand a workstation, and the advantages these beefed-up computers bring to your workflow.

What is a workstation?

Workstations are desktop PCs designed to handle demanding workflows such as data science, 3D design, video editing, and engineering. A workstation is more robust than the typical PC, with enhanced specs like a faster CPU and GPU, more memory, increased storage, software certification, and the ability to withstand constant usage.

Often they will have a discrete GPU so the CPU does not have to double up on visual tasks. Because there are more configuration choices available, you can build a system matched exactly to your needs and budget.

Traditionally, workstations were available in a tower chassis. Today, workstations are available in a wide variety of form factors such as Tower, Small Form Factor Desktop, and Mini as well as mobile workstations.

Workstation vs. desktop vs. laptop

The primary [difference between a workstation, a laptop](#), and a desktop is performance. To be considered a workstation, a computer needs specific base specs. You can always go up from there.

- CPU: Intel® i7 or i9, Xeon, AMD Ryzen, or Threadripper
- Single or dual CPUs
- Up to 128GB of nECC or ECC memory
- 8 cores for an entry-level workstation, 16 cores for a mid-range workstation, 28 to 64 cores for a high-end workstation
- Discrete GPU, either NVIDIA® or AMD® with 4GB to 16GB of VRAM
- Single or multiple GPUs
- 1TB or more of storage
- ISV certifications

Workstations used to be bigger, heavier, and pricier than standard PCs, thanks to their industrial-quality components. Today's workstations use innovations in components to bring down the weight and the cost of many high-powered options, while still holding up to constant, intense use.

Many workstations generate higher louder fan noise due to the power they harness, although advancements like HP VaporForce thermals keep things cooler and quieter with a vapor chamber, 3-sided venting, and razor-thin liquid-crystal polymer fans.

Investing in a workstation is worth it for the right kinds of professionals. We'll take a closer look into those below, but first, let's review the features of a workstation.

What are the features of a workstation?

To understand what makes a computer a workstation, you'll need to look under the hood for key specs that differentiate workstation PCs from other laptops and desktops.

1. ECC (ERROR-CORRECTING CODE) RAM

The risk of memory errors increases with resource-intensive computing which can result in lag, BSOD (black screen of death), and application hangs. To minimize these types of errors, workstations use ECC Memory that can spot and fix data corruption without interrupting sensitive processes.

These powerful computers generally have at least 16GB of RAM, which may be more than their standard counterparts. But it's the kind of memory that really makes the difference in workstations.

2. MULTIPLE CORES

All workstations have multiple processor cores, letting them handle several operations in more than one program at once. Eight cores are considered entry-level, with mid-level workstations containing 16 cores, and high-level ones ranging from 28 to 64 cores.

The multi-core setup is especially helpful for applications that use massive amounts of memory, such as data modeling, CAD design, or 3D rendering software. Look for workstations to have at least an 8th Generation Intel i7 processor or a similar processor from another manufacturer.

3. HIGH-END GPUS

Workstations are most often used for tasks like video editing, 3D graphics, engineering design, and data science visualization, so their graphics processing cards matter. Higher-end GPUs are engineered specifically for CAD and 3D rendering jobs. They also have more cores, which come in handy for [accelerated data science solutions](#).

4. RAID STORAGE

A [RAID system](#) (or redundant array of independent disks) backs up your data in the event of a crash. That way, during Tableau modeling or a massive Adobe Premiere edit, there's less worry that a rare hardware issue will wipe out your progress.

5. SSD STORAGE

Today's PCs increasingly rely on solid-state drives (SSD) to store data. These hard drives have no moving parts or spinning disks but, instead, rely on flash drive-type technology. SSDs use less power and tend to run at higher speeds with more reliability than spinning disk-based hard drives.

While you can find them on most modern laptops and desktop PCs, an SSD is a must for workstations. Where [hybrid hard drives](#) are used, a significant portion of the workstation's 1TB hard drive must be SSD.

Workstations may cost more

Workstation computers can have higher price points than traditional laptops and desktops because of their expanded specs. However, [that's not always the case](#). Recent advancements in CPUs, GPUs, and other components have blurred the lines between PCs and workstations.

Workstation components are designed, tested, and certified to deliver higher performance and reliability than similar standard desktop and laptop components. But as technology advances, costs have lowered. Additionally, many workstations are customizable, so you can choose upgraded components for your use case, without adding those you don't need.

When to buy a standard PC: If your workflows are more geared toward everyday business, consider sticking with a standard machine instead.

Workstations perform better

Because of their enhanced specs, workstations handle more demanding jobs, like healthcare modeling or AutoCAD design, faster than traditional PCs. The performance difference stands out mostly with processor-heavy applications like Blender or Apache Spark. If you use programs like that frequently, consider getting a workstation.

When to buy a standard PC: When it comes to ordinary business tasks like running an Excel pivot table, word processing, or fielding Zoom calls, most users will notice little difference between a workstation and an ordinary laptop. Also, a standard desktop or laptop can handle video streaming and even gaming just as well as a workstation in many cases.

Workstations are more durable

Workstations are more durable than standard business laptops and desktops because they use higher quality components. Additionally, while most of today's computers are built increasingly with solid-state components, with few moving parts to wear down over time, workstations are put through strenuous testing so they can hold up to the most demanding workloads.

HP computers, for example, are put through military-grade testing procedures, including tests for dropping, sand, vibration, extreme temperatures, altitude, and humidity. [Mil-spec testing](#) was created by the U.S. government and adopted by HP® in all its business PCs. That means if durability is a key concern, both workstations and everyday HP PCs are equally good choices.

Workstations are expandable

Cutting-edge workflows like data science and 3D design evolve constantly, and a PC should evolve with them. Expandability is key in this fast-changing environment, providing the ability to upgrade to newer and more powerful memory, hard disks, and GPUs.

Most workstations are more expandable than traditional PCs, with entries like the HP Z6 workstation consistently ranked among the most expandable machines on the market. If you or your employees are engineers, 3D designers, video editors, or data scientists, you'll appreciate the expandability of workstations.

What workflows and job titles need workstations?

The real answer to the question of workstation vs desktop or laptop depends on the workflow. We've mentioned engineers, data scientists, video editors, and 3D designers several times in this article. Now let's look more closely at why each of those employees benefits from a workstation, and why other kinds of workflows do just fine with standard PCs.

1. DATA SCIENTISTS

Data scientists who work with massive data sets and complex modeling need a workstation's extra power. Deep learning tools like TensorFlow and Keras and parallel computing with CUDA call for robust CPUs and GPUs, and even a tiny glitch can scuttle key business insights before they're hatched.

Workstations with the [Z by HP Data Science Software Preload](#) give data science engineers the power to pull business-steering insights from a sea of data without running into IT roadblocks.

2. 3D DESIGNERS

Workstations are the tool of choice for artists and designers who do complex 3D modeling. Rendering designs in three dimensions takes massive amounts of processing power. A workstation's advanced graphics card ensures accurate rendering, but it also saves employee time by doing complex renders in real-time.

A workstation's larger SSD storage (generally 1TB or more) and memory space can handle and store big projects internally, which translates to quicker access to your work.

3. ENGINEERS

A workstation's faster processors with multiple cores and more powerful GPUs give engineers the ability to process detailed CAD jobs worry-free. A workstation can [increase an engineer's productivity](#) by speeding up tasks without requiring additional office space.

With design computing requirements growing by 45% per year, workstations are a necessity for engineers across all industries. The engineer who designs your next fixture or product will be hamstrung without one.

4. VIDEO EDITORS

Today's high-resolution displays and cameras work with massive file sizes

that require the added power of a workstation. Consider that consumer-level 4K video packs over [8 million pixels](#) into each frame. That makes today's file sizes almost 20 times bigger than the SD video of yesteryear.

To process video projects with those massive file sizes, video editors need workstations to maintain productivity. A workstation helps a video editor focus on creating great video rather than on battling hardware and software deficits.

5. MARKETING PROFESSIONALS

Working with big files from the graphic design or photo team requires an abundance of processing power. Graphic designers and photo editors can ramp up their efficiency with a workstation.

6. HEALTHCARE PROS

[Healthcare professionals](#) who dig into big datasets shouldn't have to wait for cloud apps or business-level components to crunch the numbers. [Hiring top healthcare talent](#), then saddling them with standard PCs creates an everyday bottleneck for them to suffer through.

Employees who don't need a workstation

Some applications are much less processor and memory-intensive than the ones used regularly by the kinds of employees we've called out in the list above. Any employee who works mainly with standard applications like the ones below will be productive with a standard computer.

- MS Office (Word, Teams, PowerPoint)
- Google Drive (Docs, Sheets)
- Zoom
- QuickBooks
- WordPress
- Web browsers
- Other daily tools.

HP workstations to consider

If you or your employees fall into the "definitely needs a workstation"

If you or your employees fall into the category that definitely needs a workstation category, and you'd like to take advantage of today's perks like better CPUs and GPUs with failsafe ECC memory, we've curated a list of fan-favorite HP workstations.

DESKTOP WORKSTATIONS

- [HP Z2 mini workstation](#): The world's most powerful mini-workstation, with high-end performance in a tiny package.
- [HP Z2 workstation](#): Server-grade power in a desktop. Cut complex rendering and visualization projects down to size at a surprisingly affordable price point.
- [HP Z4 workstation](#): HP's best-selling workhorse speeds up a wide range of pro apps. It's everything designers and engineers need.
- [HP Z6 workstation](#): A future-proof, mega-expandable powerhouse for data science, visualization, and rapidly-changing industries.
- [HP Z8 workstation](#): The endlessly-customizable workstation for advanced machine learning and engineering, with up to 3TB of high-speed memory.

MOBILE WORKSTATIONS

- [HP ZBook Studio mobile workstation](#): The ultimate portable office for product developers, architects, and other creative pros.
- [HP ZBook Power mobile workstation](#): Professional workstation performance at an unbelievably low price.
- [HP ZBook Create mobile workstation](#): Real-time rendering in a sleek design, for deeply-customizable performance.
- [HP ZBook Firefly mobile workstation](#): Lightest HP ZBook for ultra-mobile heavy-duty computing.

Summary

While workstations are vital to some employees in your office, not everyone needs one. In fact, most employees who use MS Office and Google Drive apps do just fine with everyday PCs. However, engineers, data scientists, and the front-line expert putting together the marketing materials or mapping designs in AutoCAD may be lost without the power of a workstation at their fingertips.

About the Author: Tom Gerencer is a contributing writer for [HP Tech@Work](#). Tom is an ASJA journalist, career expert at [Zety.com](#), and a regular contributor to *Boys' Life* and *Scouting* magazines. His work is featured in *Costco Connection*, *FastCompany*, and many more.

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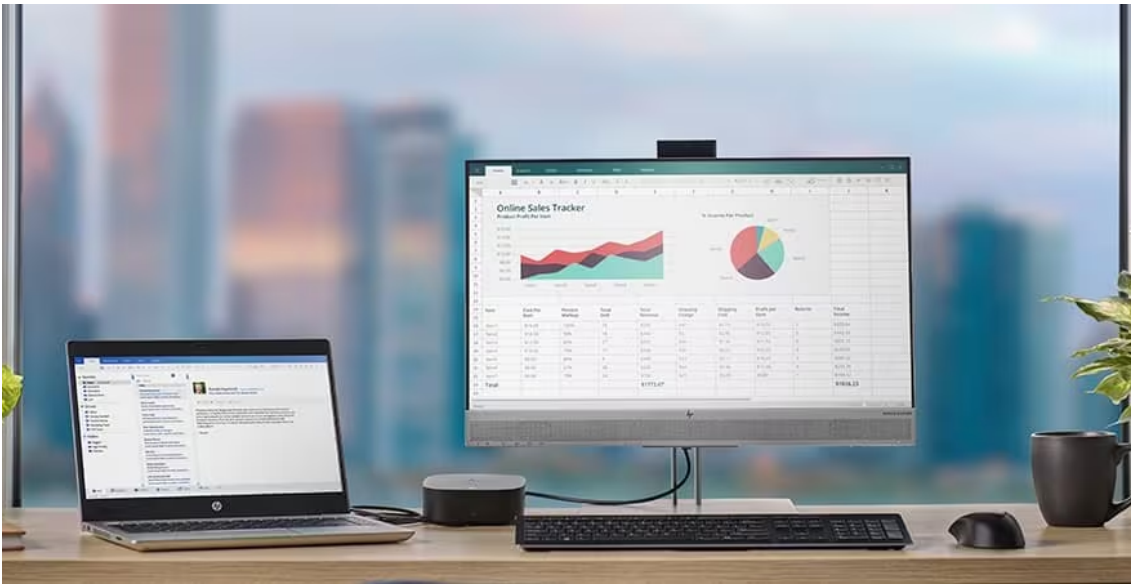
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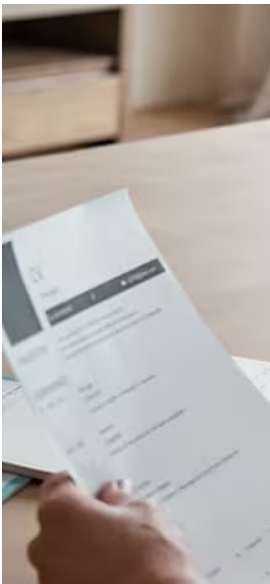
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