



NEED WORKSTATION-CLASS  
PERFORMANCE AND AFFORDABILITY?  
YOU CAN GET BOTH



For years, workstations were used only for very specialized applications that required ultra-high performance and carried a high-value work product that justified a hefty price tag. But while performance demands have intensified, you may be surprised to learn that your budget can, in fact, support workstation investments. Read this paper to learn why you need performance that goes beyond even today's highest-end personal computers and how to make the business case for workstations that are more affordable than ever.

The impressive surge in personal computer performance and functionality has allowed that class of system to be deployed in a much wider range of use cases than probably could have been imagined even a few years ago. Lightning-fast processors, high-capacity/low-latency flash storage and built-in high-bandwidth networking have allowed PCs to be used in many applications far beyond spreadsheets and web browsing, such as photo editing and financial modeling.

But even today's most sophisticated desktop and notebook PCs have their limitations, especially as use cases become turbocharged by big data tools, machine learning, virtual reality, cloud services and the internet of things (IoT). For more and more applications, even higher levels of performance and functionality are required to do everything from storing and managing a lifetime of a patient's medical images to modeling an entire species' DNA composition over billions of years.

In those and many other cases, organizations have craved the capabilities of workstations—both fixed and mobile—to attack sophisticated applications and turn mountains of raw data into truly actionable insights. Certainly, power users like engineers, graphics designers, genetic researchers and data architects have craved workstations' tremendous capabilities, only to be jolted into a sense of reality by IT decision-makers and financial gatekeepers because workstations were, well, just too expensive.

No more.

Instead of carrying five- and six-figure price tags like their ancestors, today's class of workstations delivers workhorse performance and power at price points often only marginally higher than today's high-end PCs—and sometimes even at the same level. That's why many industry analysts and researchers point out that high-performance workstations are the fastest-growing segment in the client computing spectrum.

For power users, application developers and IT professionals, this trend has opened up untold new opportunities for improved employee productivity, faster project completion timelines, greater economic value, an enhanced user experience and even more robust cybersecurity. And, since modern workstations are equally applicable in fixed/desktop and mobile form factors, organizations have the ultimate flexibility in outfitting their employees with the right tool for ever-more-demanding jobs.

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This paper looks at some of the reasons why workstations are not only a great technical fit for mission-critical workloads, but also are a great economic fit. It also provides insights into what to look for in an application- and budget-appropriate workstation platform, and offers a suggestion on where to turn for your next workstation purchase.

## NEW USE CASES AND APPLICATIONS FOR WORKSTATIONS

It wasn't that long ago that workstation deployments were limited to highly technical applications and use cases where computing power was measured in teraflops and utilized primarily by engineers. Seismic modeling, energy exploration, CAD/CAM and genetic sequencing demanded top-of-the-line compute, graphics and storage, and the work products generated by those systems could cost-justify very large Capex investments for workstations. For nearly all other applications, personal computers were sufficient, especially given their much more affordable price points.

But new applications have emerged that have pushed the edge of the envelope in terms of compute and graphics processing demands, spurred by such technologies as 3-D visualization, analytics, data warehousing, artificial intelligence and machine learning, IoT and rich media. And other, non-technical factors have reshaped many users' needs for more performance, such as how compliance in the healthcare field has created an explosion in medical imaging that requires more robust systems.



The resulting massive data sets and the need for faster processing, greater systems availability and stunning graphics now mean that even "traditional" commercial applications such as multimedia content creation and decision support systems need more performance than even the ever-advancing capabilities a top-of-the-line PC can provide.

These new applications include:

- Medical imaging
- Social media analytics
- Visualization
- Multi-media editing and production
- Weather forecasting
- Financial modeling
- DevOps
- Data warehousing/business intelligence/big data
- Smart cities
- Telemedicine
- Military defense planning and battlefield operations
- Biochemical research
- Human genome sequencing
- E-sports and gaming applications
- SCADA and Industrial IoT
- Cybersecurity threat detection and remediation

## WHY YOUR ORGANIZATION CAN AFFORD WORKSTATIONS

For many IT executives and financial gatekeepers, the idea of buying workstations for performance-intensive applications has long seemed like overkill—or, just a pipe dream. That's understandable, given that workstations historically carried price tags well into five digits—and sometimes higher.

But today's new generation of workstations come with price tags more reminiscent of the fully loaded PCs of 20 years ago—and with a lot more functionality and performance. How has that happened?

First, the inexorable forward march of technology has brought with it a fundamental truth about price/performance: Each new generation of technology inevitably results in better performance for the same price, or equivalent performance for a lower price. For instance, workstation CPUs are far more powerful than ever, but their pricing—largely as a function of manufacturing volumes and R&D improvements—has held steady or, in some cases, even dropped. Graphics processors have followed a similar path, and that is vitally important in the graphics-rich use cases where workstations shine, such as 3-D visualization and modeling.

Of course, memory pricing has dropped over the years, thanks to huge jumps in manufacturing volumes and economies of scale.

And, although workstations' most popular use cases are not necessarily as storage-dependent as they are processor-dependent, the dramatic price/performance improvements in storage—especially next-generation solid-state drives (SSDs)—have also contributed to the lower price points for workstations.

Even peripheral technologies such as high-resolution displays add to the pricing trend, as crystal-clear displays now can be integrated into both fixed and mobile form factors less expensively than ever.

Finally, there's another “soft” economic benefit in moving from a high-end PC to an affordable workstation: Your technical and business professionals will inevitably get their jobs done faster and will be able to tackle even more challenging—and rewarding—applications that yield even better results for the organization.

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## WHAT TO LOOK FOR IN AN AFFORDABLE WORKSTATION SOLUTION

Once you've decided that workstations should be part of your overall client computing portfolio, particularly for performance-intensive workloads, it's time to build your wish list of features and functionality that engineers, designers, technical experts and business stakeholders need in an affordable workstation.

These should include:

- **Customizable, configurable, expandable solutions.** One size doesn't fit all in any computing format, and that's particularly true for workstations. Your electrical engineers designing a gene-splicing solution are going to need something different than your marketing team that is creating an animated, full-length movie for your organization's Facebook page.
- **World-class, laser-sharp displays.** So many workstation applications are highly visual, so be sure you're getting best-in-class display technology.
- **Scalable solutions along a wide range of price points.** The term "affordable" means different things to different people, such as IT organizations and financial types. Be sure to work with a partner that can offer a full line of workstation solutions across a wide pricing spectrum.
- **Multiple form factors for different user requirements.** The days of workstations only coming in clunky desktop formats are long gone. Many applications now require mobility as well as workstation-class performance; why sacrifice?
- **Designed for easy, fast remote deployment, management and troubleshooting.** Even though many workstation users are technically savvy, you don't want them—or your overburdened IT department—spending their time managing systems or trying to identify and remediate problems.
- **ECC memory for improved availability and reliability.** Memory has always been a big factor in driving the PC-or-workstation choice, and ECC memory helps to ensure the highest possible stability.
- **Robust security and data protection.** Workstations are no different from PCs in that they are ripe targets for bad actors, so your security profile and toolkits must align with the fact that these workstations are being used for mission-critical applications.



## HOW DELL DELIVERS WORKSTATION-CLASS POWER FOR ANY BUDGET

For more than three decades, Dell has been a global leader in personal computers. Dell's desktops and notebooks have received hundreds of industry awards over the years, and the company's status as a market leader has allowed it make major commitments to engineering excellence and R&D. The result has been a consistent advance toward more performance, more capability, more functionality and more utility in its PCs.

But as customers continue to demand even more performance and "oomph" from their desktop and notebook systems, Dell has aggressively embraced workstations as the next logical step in its attempt to provide the broadest possible range of computing solutions. And, as use cases for workstations continue to expand—and as the technology becomes more affordable—Dell has stepped up its development and delivery of new workstation models.

An excellent example of how Dell bridges the gap from high-end PCs to value-centric workstations is the Precision 3000 Series of workstations. Many sophisticated applications, such as AutoCAD, Photoshop and more, have been deployed on high-end PCs, only for users to discover that their new use cases, such as drafting, photo editing, financial modeling and multi-media design, need even more. The Precision 3000 Series is the next logical step up for these and other use cases.

Available in a variety of form factors—mobile, tower, desktop and rack-based—the Precision 3000 is user-configurable for customized requirements, including multiple options for CPUs, GPUs and SSD storage. Dell's patented Reliable Memory Technology Pro delivers higher availability and reliability for mission-critical applications, and nearly 100 third-party applications for Precision workstations are certified by more than 25 different software vendors.

Dell also kicks up performance by a notch or two with Dell Precision Optimizer, an AI-based performance optimizer software tool that automatically tunes Precision workstations through machine learning. Dell Precision Optimizer<sup>1</sup> automatically configures workstation settings to maximize application performance and delivers performance gains of up to 394%<sup>2</sup> beyond factory standard settings.

Finally, Dell Client Command Suite is a free toolkit that automates BIOS and system configuration management, taking the onus for systems management off already-burdened IT administrators. And Dell Data Security solutions provide enterprise-class data protection and cybersecurity defense—critical requirements as workstations are increasingly deployed in mission-critical environments.

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1 Dell Precision Optimizer is available for download now and will be factory-installed on the new line of Dell Precision workstations expected to launch on October 2017.

2 Based on Dell internal testing, July 2017, using the SPECcapc Creo 3.0 Wireframe Graphics benchmark test comparing a Dell Precision 7920 Rack with Dell Precision Optimizer vs. the same system with factory standard settings. Actual performance will vary based on usage, configuration, and manufacturing variability.

## CONCLUSION

Applications and workloads that demand more and more power have been stretching the limits of traditional desktop and notebook PCs. But increased use of analytics, machine learning, edge computing and the internet of things has put tremendous pressure on those systems' graphics, computing and storage components, requiring power users in both commercial and technical roles to consider moving to workstations.

Fortunately, a new breed of workstations has emerged that combines cutting-edge performance and functionality with affordability to give enterprise decision-makers new options and flexibility in their computing platforms. Dell's line of fixed and mobile workstations has set a new standard for price/performance that gives demanding users the ability to use the right tool for the right use cases, without busting the budget.

For more information on Dell's Precision workstations,  
please visit [DellEMC.com/Precision](https://DellEMC.com/Precision).