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Shopping for a New Workstation?

Speeds and feeds matter, but Dell offers a lot more.

By Alex Herrera

Editor's note: Through a sponsorship by Dell and Intel, Cadalyst editors bring you this feature, part of a special series of articles designed to educate CAD users and managers about the benefits and realities of professional workstations. Find even more information at the [CADspeed blog](#).

We're all guilty of it. . . vendors, analysts, and customers alike. A new generation of workstation comes around, and we focus on how much performance the underlying technology delivers. Be it GHz, core count, or floating-point operations per second (FLOPS), speeds and feeds get the lion's share of the ink. Of course, that's not totally unwarranted, as application spaces such as CAD have insatiable appetites for compute and render cycles. And, nothing boosts a designer's productivity — and delivers a more direct boost to the bottom line — than speeding up a computation workflow or eliminating a nagging bottleneck.

Yes, they are important, but there's a lot more that can contribute to our ultimate end-goal — getting more done in less time. What about craftsmanship? Clean design? Simple ergonomics? Cutting-edge silicon is essential, but cutting-edge silicon delivered in the most useful package is even better. Sometimes even the simplest touch, such as a handle in the right place, can have a huge impact on your day-to-day productivity.

Never Skimp on Raw Performance

Driving the current generation of performance-oriented workstations, the new Intel® Xeon® processor E5 family from Intel sets the bar when it comes to raw performance and functionality. It sets itself apart from a run-of-the-mill upgrade, with attention to performance on many levels. The platform's Turbo Boost 2.0 technology carefully monitors average power to occasionally and temporarily exceed the system's Thermal Design Power (TDP), resulting in impressive boosts of compute power under heavy, short-term loads, an ideal acceleration technique for performance of the type of single-thread execution common in CAD modeling packages, for example.

Then, consider that the Intel Xeon processor E5 offers up to a third more cores than previous generations — up to eight in the single socket T3600 or sixteen in the dual-socket T5600 and T7600. Because faster, more plentiful cores won't do much good if the rest of the system can't keep up, Dell and Intel made sure that Intel Xeon processor E5 and Precision can, with up to 512 GB (16 x 32GB) of 1333 MHz memory (or 256GB (16 x 16GB) 1600MHz memory).

CAD applications from modeling to simulation all stand to benefit. For example, Ansys is

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reporting up to a 60% overall performance boost¹ using the Intel Xeon processor E5. In a space where shaving a bit of time here and there is a big deal, 60% is about as compelling a time-saving opportunity as CAD professionals will ever see.

More Than a Pretty Box

Still, powerful silicon alone does not a workstation make. Don't underestimate the features, design, and attention to detail in the box. What's the big deal about workstation design? After all, computers have turned into commodities, non-descript wrappers around the same silicon technology, haven't they? Well, that might be true for other machines, but for workstations, the system ought to do more than simply house and power chips.

More than just a delivery vehicle for new chip technology, the workstation is a tool, the most indispensable tool for CAD professionals faced with increasingly more diverse and demanding challenges. Performance is paramount, but as customers invariably report, there are many other ways to deliver just-as-measurable improvements in productivity. Toward those ends, Dell has invested a lot of engineering time and dollars in its completely redesigned line of Precision workstations to make sure the box is as valuable as what's inside.



Figure 1. Re-thought, re-designed, and built from scratch, Dell's new Precision line exemplifies the attention to detail that today's vendors strive for, and CAD professionals demand.

Reliability Is King

With workstations, reliability should always start with system certification performed in conjunction with all major CAD and manufacturing focused ISVs, including Autodesk, Dassault Systèmes, Bentley, PTC, UGS, and Ansys. But, certification is just the start — there's a lot more to consider. For instance, how well does the system tolerate bit errors or failures in components? And, how effectively is the machine cooled?

Managing data errors or data component failures is one fundamental way the workstation sets itself apart from mainstream PCs. Many workstations, including the entire new Dell Precision line, support Error Correction Code (ECC) memory and RAID configurations that offer redundancy. But some workstations, like the new Precision line, take that reliability a step further. Dell's new Reliable Memory Technology (RMT) exploits ECC memory to disable persistent, isolated areas of memory so that the machine can continue to function indefinitely.

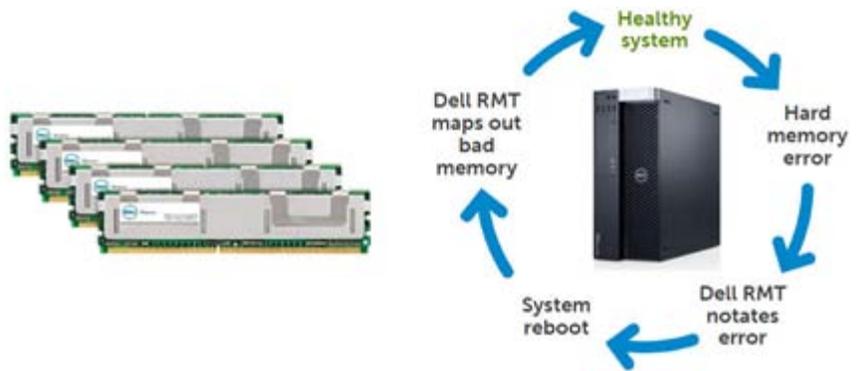


Figure 2. Dell Reliable Memory Technology (RMT) exploits ECC memory to automatically recover from single-bit memory errors and avoid them in the future.

Nothing can sabotage a computer more than heat. While it would be nice if the heat inside were evenly distributed, that's simply never the case. While 99% of your machine could be operating at an acceptable temperature, it only takes is one hot spot, and it will go down. To keep you working, the new Precision T3600, T5600, and T7600 have distributed temperature sensors around the interior, focusing on the most sensitive locations. Should any one spot become too hot, system controls will turn up the cooling, reduce the system output, or both. The result is that your machine keeps running so that you can, too.

Don't forget a valuable bonus from an efficiently cooled machine: less noise. Dell engineers invested serious design time into shaping the airflow within the interior of all the new Precision models. This not only does a better job of eliminating hot spots, but dramatically reduces the noise from fans and turbulence.

Then there is ease of use and service. You can't cut corners on reliability, and a workstation with sound design and manufacturing should deliver years of uninterrupted service. As remote as it might be for a failure, you must be up and running quickly if there is one. Toward those ends, Dell engineers designed the Precision power supplies to not only deliver high power at high efficiency, they are also quick and easy to remove and replace.

The same ease of use goes for Precision's hard drives, the first in the industry designed to be swapped via the front panel. This easy storage bay access allows for quick removal and replacement. For ultra-sensitive information, you can easily move it into the safe overnight. It also makes the option of sliding a Precision workstation into a 4U rack in the datacenter far more desirable, with all the drives facing out.



Figure 3. Easy access to supplies and drives offers several benefits.

Remember, you are running a business. In the end, you're not shopping for speeds and feeds or bells and whistles. You're shopping for a capital asset. The goal of any investment as a business asset should be about one thing: return on investment. Performance specifications are going to help make that case for ROI, but in today's competitive business climate, it's going to take more. The right workstation not only incorporates the right silicon, but should be purpose-built for the demands of professional use like CAD. That means attention to details such as reliability, ease of use, serviceability, and ergonomics are also important.

Generation to generation, processors and graphics from Intel, NVIDIA, and AMD continue to deliver amazing gains in performance per dollar and performance per watt. Properly unleashed, they're the lifeblood of your workstation.

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With more than 25 years of engineering, marketing, and management experience in the semiconductor industry, Alex Herrera is a consultant focusing on high-performance graphics and workstations. Author of frequent articles covering both the business and technology of graphics, he is also responsible for the Workstation Report series, published by Jon Peddie Research.

Footnotes/Disclaimers:

¹Numbers from Ansys Mechanical.

A banner advertisement for Dell Precision workstations. On the left is a 3D architectural rendering of a modern building. To the right of the building, the text reads: "Let your vision take shape. Dell Precision™ workstations have the power to bring your ideas to life. Build Yours >". On the far right, there is an image of a Dell workstation setup including a monitor, a tower PC, and a laptop, with the Dell logo to its right.

What's New at Cadalyst.com

CAD *speed* Blog Post:

Intel's Ivy Bridge Processors Hit the CAD Workstation Marketplace

The incessant pace of progress and innovation for workstation technology never slows.

Less than a quarter after every major workstation OEM launched a full trio of models based on Intel's Sandy Bridge-EP (a.k.a. Xeon E5), the industry leader in CPUs has already released its follow-on processor generation, code-named Ivy Bridge. And subsequently, we are now seeing the first Ivy Bridge workstations hitting the market.

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