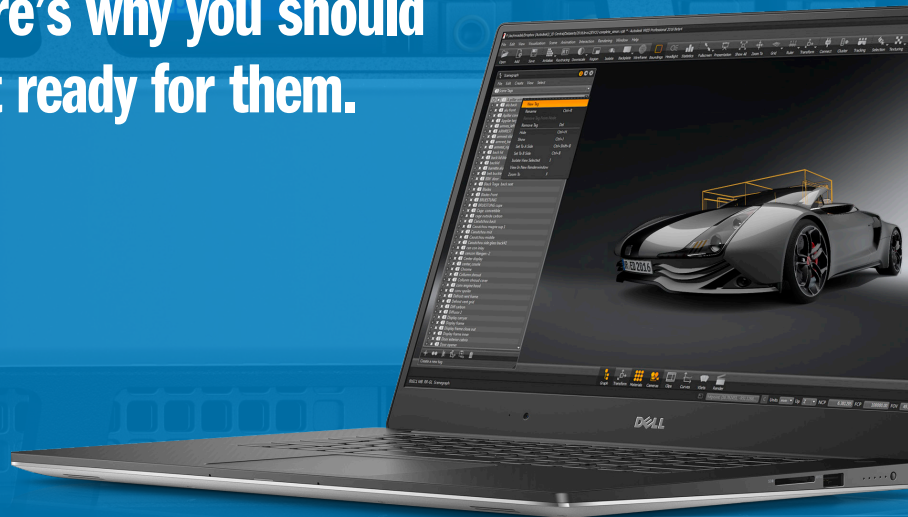# DE

MAKING THE CASE

FOR VIRTUAL WORKSTATIONS

Virtual workstations are ready for demanding engineering use cases. **Here's why you should get ready for them.**

Screen images courtesy of Autodesk.

NO COMPROMISE

Virtual workstations will meet and exceed the demands of a hardcore engineering environment.

"Don't take away my workstation."

Some gauge their value to an organization by the size or location of their office. For engineers, the measuring stick has long been their workstation specs. The more bells, whistles and horsepower under their desks, the higher their rank in the pecking order. Those days are rapidly fading as engineering teams realize mobility and collaboration not only improve their productivity, but unchain them from their desks. Thin and light have become the new bragging rights, but engineers still require high-octane workstation muscle. That's where virtual workstations come in.

All the benefits of mobile computing and collaboration without their computing and security compromises are now available to engineers. Thanks to a slew of new technology advances, including virtual graphics processing units (GPUs), compression capabilities and next-generation secure endpoints, organizations can finally tap into the benefits of virtualized environments for hardcore engineering work as an alternative or a complement to traditional workstation hardware.

Freedom and Security
Similar to other workloads migrating to a virtualized environment, virtual workstations centralize compute and graphics processing on a single platform or appliance, allowing users direct access to its resources through a thin client, entry-level laptop or even their old tower or mobile workstation.

This computing model has a number of advantages particularly well suited for engineering workflows. In a virtualized environment, engineers are no longer tethered to their desks to work with CAD and simulation models or other critical intellectual property (IP). Instead, they can tap into powerful centralized infrastructure resources and collaborate from wherever they are working as long as they have an internet connection. For engineers, the flexibility to conduct design reviews or iterate concepts from a client site or from home is a boon to work-life balance and effective communication.

Because everything resides in a centralized location rather than dispersed individual engineering workstations, critical IP, such as product designs, remain in sync in a

MAKING THE CASE TO
THE RELUCTANT ENGINEER

REBUTTAL: Implementing virtual workstations doesn't mean you have to stop using your existing mobile or tower workstation. Physical and virtual workstations can be run in parallel so you can try it out and evaluate how different your user experience is between both models. You might like being able to easily access the power of a workstation from anywhere.
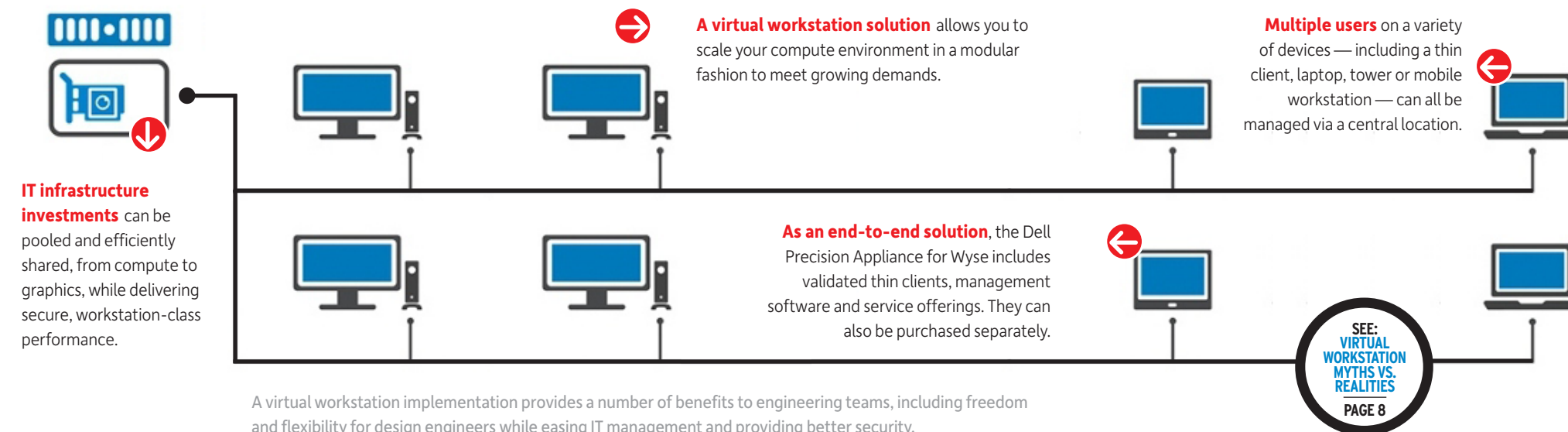
virtualized environment, ensuring that all contributors have access to the most current information, regardless of where they are working. This simplifies data management and eliminates version control issues.

Along with the promise of mobility and better collaboration, enhanced security is another upside. In a virtual workstation environment, secure compressed pixels are being streamed to endpoints, which are sending back secure compressed keystrokes and mouse movements. There is no data resident on the endpoint itself, so if it is lost or stolen, valuable data is not compromised. In addition, data central-

IT infrastructure investments can be pooled and efficiently shared, from compute to graphics, while delivering secure, workstation-class performance.

A virtual workstation solution allows you to scale your compute environment in a modular fashion to meet growing demands.

Multiple users on a variety of devices — including a thin client, laptop, tower or mobile workstation — can all be managed via a central location.

As an end-to-end solution, the Dell Precision Appliance for Wyse includes validated thin clients, management software and service offerings. They can also be purchased separately.

SEE: VIRTUAL WORKSTATION MYTHS VS. REALITIES PAGE 8

A virtual workstation implementation provides a number of benefits to engineering teams, including freedom and flexibility for design engineers while easing IT management and providing better security.

ization enables organizations to establish need-based access to IP based on enterprise governance and security policies, further ensuring that critical IP is properly safeguarded.

Ready for Engineering Work

Unlike early virtualization environments that weren't fully equipped to handle the robust graphics requirements of 3D design and engineering software, new technologies such as virtual GPUs and compression techniques now ensure that virtual workstations perform on par with their traditional, physical counterparts. In addition, the leading independent software vendors, including Autodesk, Dassault Systèmes, Siemens and PTC, have taken steps to certify and optimize their CAD and PLM software to run on virtual workstations. As a result, engineers will find it difficult to distinguish between a virtual and physical workstation environment, stamping out any lingering concerns about system degradation or a compromised user experience.

Despite these well-documented benefits, many organizations will still bump up against cultural and organizational challenges as they contemplate a move to virtual workstations. Some engineers will dig in their heels, not wanting to give up what they perceive as more control and better performance with the familiar physical workstation environment. Top level execs have to budget for an initial upfront expense even if they are clearly convinced of the ROI resulting from streamlined IT management, improved worker productivity and greater IP protection.

A smart virtualization strategy, led by the right business champions, can allay cultural concerns and conquer organizational challenges. By moving to virtual workstations, engineers get the horsepower they need to streamline complex product development and design on a global scale with all the flexibility, security and simplicity of a modern computing experience.

> "Virtual workstations are too expensive compared to physical workstations."

MAKING THE CASE TO
THE COST-CONSCIOUS EXECUTIVE

REBUTTAL: The investment in virtual workstations is not significant compared to their benefits. They increase the productivity of your highest-value employees while helping to streamline IT management and avoid catastrophic security breaches. Virtual workstations allow for a mobile workforce that can be leveraged to increase productivity, attract the best employees and win more business.

The Dell Precision Appliance for Wyse is available in R7910- or R730-based configurations to support from four to 32 users per appliance.

GET TO KNOW DELL VIRTUAL WORKSTATION SPECIFICATIONS PAGE 7

BURNS ENGINEERING FIRES UP PRODUCTIVITY

BURNS ENGINEERING INC. is 200 employees strong, and its pipeline is mighty with more than 500 projects going at any one time with CAD designers, structural engineers and project managers collaborating across the company's Philadelphia headquarters and 10-plus remote branch offices.

With projects and people spread out across the country, maintaining control over design data and making it easily accessible to project teams was a constant challenge, according to Bill Coffield, IT manager for the engineering and construction management firm. Moreover, each branch site (whether an individual job location or a full office) required its own IT infrastructure to support engineers and project managers, which meant that Coffield was constantly deploying gear to individual sites and connecting everything back through an Internet router to the main office. The hardware alone cost about $50,000, not to mention, the weeks of travel time and expenses associated with deploying the on-site hardware.

Managing scalability

Maintaining all this disparate IT infrastructure was also a burden. Coffield and his limited team were always on the run, patching, updating, issuing new licenses and replicating data across all of the sites. As the amount of data managed by the system swelled, so did the scalability problems. Users working at remote locations or from home were constantly frustrated by file replication latencies, which resulted in incomplete or inaccurate data. "I never knew if someone else was working on a file," recalls Alex Krause, CAD operator. "If they made file changes needing replication across servers at headquarters and the branch sites, the file wouldn't be synched for a long time."

Working with Dell partner BOLDER Designs, Burns Engineering turned to a virtual workstation approach — the Dell Precision Appliance for Wyse. The platform delivers a cost-effective, end-to-end virtual desktop infrastructure that has dramatically eased the company's IT burden, while providing greater scalability and business agility. The near-zero latency of the solution, which features PC-over-IP technology to transfer compressed display pixels over a LAN or WAN as opposed to actual CAD files, means engineers and project managers get the same experience as they have previously experienced with physical workstations — even those who have slow internet connections.

"One person who works from his home in the Virginia mountains, hundreds of miles away from the company headquarters, has just a 1Mbps connection, but he is using the Dell Wyse 5030 zero client for VMware there to run AutoCAD as if he is sitting in the office," Coffield says.

Thanks to the virtual workstation approach, Burns Engineering has reduced deployment costs by $50,000 per branch site while streamlining IT management by cutting back deskside visits. Virtual workstations have also bolstered engineering productivity by improving collaboration and positioned the company for modern-day engineering workflows by allowing for mobility. "I can confidently say our company is ready for the future," Coffield says.

Burns Engineering Inc. used virtualization to centralize its IT infrastructure and management while improving collaboration among engineers in its nationwide branch offices.

VIRTUAL WORKSTATIONS

VIRTUALLY EMPOWERING IT

ENGINEERS, GRAPPLING WITH THE OPPOSING FORCES OF INCREASED PRODUCT COMPLEXITY and decreased development time, aren't the only ones being pulled in multiple directions. IT managers are being tasked to support an increasingly global and mobile workforce while maintaining higher levels of security, all at a time when they have less available resources. Under the weight of this constant pressure, it's become clear to many in IT that something has to give.

For many enterprises, the necessary change comes by way of virtualization. By consolidating computing and storage resources into a centralized environment, end users benefit from greater flexibility and mobility, but IT also hits the jackpot in the form of a more streamlined management experience. As opposed to physically roaming buildings on a corporate campus — or even jetting off between remote facilities — to manage individual machines, a virtualized workstation environment lets IT staffers handle all of the deployment, configuration and updating tasks from one place. By doing so, IT can vastly cut back on travel time and expenses, shifting limited resources away from mundane provisioning and software update tasks to focus on higher value activities and innovation.

Security, which has become a critical corporate mandate, is also much easier to facilitate in a virtualized environment. Instead of attending to security settings on individual machines and desktops, and worrying about possible breaches on individual physical workstations, a virtual environment gives IT better control over valuable intellectual property. Critical data remains safeguarded behind firewalls and the security parameters established in the data center so nothing is compromised if an endpoint is lost, stolen or damaged. Moreover, IT can leverage enterprise governance and security policies to establish need-based access to applications and data, another stopgap in making sure collaborators only have access to the applications and data they need to get their job done.

From a workflow standpoint, virtual workstations can help IT better empower engineering users. Because all IP — CAD models, design intent, simulation data, renderings, etc. — are housed in a secured, central repository, data management headaches are vastly reduced. Users are working off the same data set at all times. There is no need to pull down files, make changes and then push them back while praying you didn't create a version control issue. Virtual workstations mean fewer engineering users knocking on IT's door looking for help recovering a lost file or dialing back to a subsequent version.

Not Just for the Big Guys
While virtualization has become a staple of larger organizations, small and mid-sized shops have been more cautious, concerned that the complexity of the technology puts it out of reach for firms with limited IT resources. Likewise, smaller design teams within larger organizations may wonder if they have the scale and expertise to implement virtualization on their own. The latest generation of virtual workstation appliances removes any such roadblocks by eliminating much of the complexity and the requirement for in-house virtualization experts. For example, the Dell Precision Appliance for Wyse is a turnkey solution that provides the necessary hardware and a wizard-based Quick Start Tool that streamlines deployment. The Quick Start Tool essentially takes 120 or more manual steps and, through a wizard-based approach, accomplishes the same configuration through three multi-

part steps. In addition, VMware Horizon and Citrix XenDesktop management consoles, combined with the centralization of resources, enables IT to more efficiently manage user workspaces, provision or de-provision users and scale infrastructure resources up or down depending on need. Even smaller firms and teams with under 10 users can benefit from a virtual workstation appliance, each of which can be easily configured to support between four and 32 users.

Get Everyone Onboard
Given that many people in an organization are well acquainted with the virtues of virtualization, getting engineers on board could be the toughest task. Identifying an executive to serve as champion for the initiative and instituting a formal campaign that leverages key end users to promote the benefits will go a long way in alleviating concerns and fostering buy-in in the engineering ranks.

Also critical to making the business case is giving engineers a chance to use virtual workstations when doing real-world engineering work. Implementing pilot projects that showcase the virtual workstation experience in comparison to work done on traditional physical hardware will prove there is little to no distinction between the two environments. Dell has established Workstation Virtualization Centers of Excellence where IT departments can test drive virtual workstations running their own engineering workloads to get a firsthand glimpse at the performance and user experience.

As IT finds itself juggling many roles and responsibilities, any opportunity to simplify the complex computing environment is welcome. Virtual workstation appliances like those from Dell finally allow virtualization technology, so prevalent in other areas of business, to transform engineering workflows and make the job of IT just a little bit easier.

DELL VIRTUAL WORKSTATION SPECIFICATIONS

The Dell Precision Appliance for Wyse is available in two configurations, one based on the Dell Precision Rack 7910 workstation and the other based on the Dell PowerEdge R730 rack server. Both configurations feature the VMware ESXi6 hypervisor, WAN support, 128–512GB of DDR4 memory, the NVIDIA GRID vGPU graphics architecture and maximum display resolutions for three at 2560x1600 or one at 4K (3840x2160).

Features	R7910 Based Configuration	R730 Based Configuration
Users per Appliance	4 or 8	4-32
Desktop Virtualization Broker	VMware Horizon 6.1	VMware Horizon 7 or Citrix XenDesktop 7.9
CUDA Support	No	Yes (select vGPU profiles)
Processors	(2) Intel Xeon E5-2643 v3 (6C, 3.4 GHz, 20M, 135W) or (2) Intel Xeon E5-2687W v3 (10C, 3.1GHz, 25M, 160W) or (2) Intel Xeon E5-2680 v3 (12C, 2.5 GHz, 30M, 120W)	(2) Intel Xeon E5-2698 v4 (20C, 2.2 GHz, 50M, 135W) or (2) Intel Xeon E5-2667 v4 (8C, 3.2GHz, 25M, 135W)
GPUs	(2) NVIDIA GRID K2A	(2) NVIDIA Tesla M60

MYTHS VS. REALITIES

"I don't have time to implement a new system."

MAKING THE CASE TO
THE BUSY IT MANAGER

Virtual workstations are easier than ever to implement and manage, while virtual GPUs and compression technologies have made it feasible to deliver high-performance, workstation-class desktops remotely. Let's correct some common misconceptions.

Myth 1 — IT wants to take my workstation.

Reality Check: The truth is IT is bucking to shift engineering resources into a virtual environment along with the rest of critical enterprise systems. However, IT's interest in virtualization lies with its promise of better security, ease of management, pathway to mobility, and more efficient allocation of infrastructure resources. What IT is not interested in is wresting control over workstation resources and limiting engineering productivity in any way.

For engineers, the migration to virtual workstations can actually re-exert their control, specifically over critical engineering workflows. With design data, CAD models, and engineering tools all running from a centralized environment, engineers are empowered to work wherever they want to work, whether that's on a laptop at a remote client site or from a older PC at home running virtual desktop client software. Engineers can even keep their workstations at their desk and use them to access the virtual workstation if they want to compare the user experience against their existing tower or mobile workstation. Moreover, the workflow benefits of virtual workstations extend beyond pure mobility. Unlike a mobile workstation, engineers working remotely from a virtual workstation can practice real-time design workflows because everyone is working off the same data set and stays up to date on the latest changes.

Myth 2 — Our design engineering work is too graphically intense for a virtual workstation.

Reality Check: That may have been the case a few years ago, but things have dramatically changed. Major advances in virtualized graphics (or virtual GPUs), new compression technologies and secure endpoints have come together, allowing core engineering software such as CAD and simulation software to run in a virtual environment without compromising on the user experience or data security.

With the adoption of virtual workstations on the rise, leading independent software vendors (ISVs) have also stepped up to certify their design and engineering applications for the new environment. By doing so, engineers can be assured that their go-to design tools are optimized to run at comparable levels of performance on both virtual and traditional physical workstations.

Myth 3 — Our company is too small to use a virtual workstation solution.

Reality Check: Rewind a few years back, and virtualization was really aimed at the big leagues, typically out of reach for most smaller design teams. Today, that's no longer the case as nearly everyone can benefit from enhanced mobility. Virtualization vendors have made great strides democratizing their environments so that smaller shops or teams of engineers within larger enterprises can benefit. Even a small group of four engineers can thrive in a virtual workstation setup.

Virtual workstation environments make a lot of sense for smaller shops because they can now benefit from better mobility, enhanced security, version control and improved efficiencies like their larger competitors without having to invest in additional IT resources or tap into third-party virtualization experts.

Myth 4 — Virtual workstations will help us save money right away.

Reality Check: While virtual workstations are instrumental in achieving far greater flexibility and efficiency in engineering workflows, organizations will have to make an upfront investment in virtualization infrastructure — hardware, storage, networking capacity and software. Where the cost efficiency rubber meets the road, however, is in the ease of IT management and fewer equipment refreshes over time. IT will spend far less time tending to uptime and system administration tasks such as patching and upgrades because everything is centrally managed. Instead of having to physically make the rounds and attend to physical workstations for regular maintenance and management tasks, IT can administer desktops and endpoints centrally, which reduces desk-side visits and gives IT more time to focus on higher-value activities. A virtual workstation environment is also more secure, reducing the risk of having to manage a costly security breach.

Myth 5 — Virtual workstations are too difficult for our IT staff to setup and maintain.

Reality Check: This is another common assumption that no longer holds true. The actual virtualized workstation infrastructure has gotten far easier to deploy and manage courtesy of the appliance approach. Everything is designed to work together. There are also a variety of resources now widely available to help engineering teams and their IT support staffs expedite deployments.

Dell's Quick Start Tool, for example, guides users through the step-by-step process of configuring a virtual workstation, from host connection to graphics configuration, greatly reducing the time to deployment. The easy-to-use, wizard-based tool allows users

REBUTTAL: Do you have time not to? Thin clients and virtual workstations can be monitored, managed and patched from a central location, saving you a lot of time over the long run. Plus, security is enhanced in a virtual workstation environment because virus-immune thin clients have no data on them to breach.

to avoid 120 or more manual steps via a three-part, multi-step deployment process.

Dell has also established Workstation Virtualization Centers of Excellence, whose sole purpose is to enable organizations to get a first-hand evaluation of the benefits of running the engineering, oil and gas, and other 2D and 3D applications they use every day in a virtual workstation environment — all at no charge. The Workstation Virtualization Centers of Excellence are found in physical locations like Round Rock, TX, and Limerick, Ireland, but there are ways to access the capabilities remotely for those that don't have direct access to the locations.

ROI: BEYOND THE BOTTOM LINE

MANY INITIALLY WANT TO CHARACTERIZE virtualization as a hardware cost-cutting measure, but the move to virtual workstations is less about reducing hardware expenses and more about recouping savings via IT efficiencies, enhancing data security and increasing employee productivity. After the initial cost of hardware and other infrastructure, companies will save money over time as IT is relieved of mundane housekeeping chores, enabling it to do more with limited resources. At the same time, employees are empowered to work more efficiently and collaborate from anywhere, not just on their office workstation.

Here are four ways virtual workstations save time and money:

1 **Less time floor walking**. With traditional workstations, IT spends hours physically walking the floor (or traveling to remote offices) to tend to the mundane housekeeping chores of keeping workstations up and running. In a virtual environment, IT can centrally manage all workstation resources. Users can be added, software can be patched and hardware can be updated in one place. Even the endpoints can be managed more efficiently with the Dell Wyse Device Manager, a web-based tool.

2 **More control over software upgrades, infrastructure and user management**. Typically, a good percentage of IT's time is spent attending to the tasks associated with managing software patches or administering the upgrade process. Virtual workstations allow IT to more efficiently manage user workspaces, provision or de-provision users, and scale up or scale down infrastructure resources accordingly.

3 **Increased security**. When individual engineers are responsible for storing and safeguarding IP on their own workstations, all bets are off. In a virtual workstation environment, IT maintains control over critical IP, which is maintained in the data center, not at the end point. This approach minimizes the risk of losing valuable data, which can have a huge financial impact on an organization. Recovering from security breaches requires significant time and expense.

4 **Increased Productivity**. When employees can work anytime, anywhere, productivity increases. A virtualized environment also reduces downtime because if an endpoint goes down, it can easily be replaced. If the system as a whole goes down, restoring it is easier compared to the restoring the workstation of a lone employee who keeps everything on it and doesn't back it up. If that tower goes down, the employee could be out of work for days. Finally, time lost to version control headaches are eliminated because everyone is working from the same data.

CLOSING ARGUMENTS

We're living in a mobile world. International Data Corporation (IDC) predicts that the U.S. mobile worker population will increase from 96.2 million in 2015 to 105.4 million mobile workers in 2020. By the end of 2020, IDC expects mobile workers will account for nearly three quarters (72.3%) of the total U.S. workforce. Companies that fail to meet their employees' mobile expectations may have a tougher time retaining talent and appropriately serving their customer's needs.

Now, thanks to advances in virtualization technologies, such as the Dell Precision Appliance for Wyse featuring NVIDIA GRID technology, engineers can benefit from the same increased productivity and freedom that their colleagues in other departments enjoy. They can tap into their familiar workstation environment from just about anywhere — home, the factory floor, the airport or the branch office conference room — without compromising on a great user experience. At the same time, IT can meet its goals of efficiently and securely enabling a more mobile workforce.

Creating today's more complex products in an increasingly short time-frame requires a new way of safely accessing powerful, centrally managed computing resources from remote locations. Virtual workstations are the computing solution for companies, large and small, that want to mobilize engineers and reduce IT's burden without sacrificing security or the user experience.

LEARN MORE:

Best of breed Precision- and PowerEdge-based virtual workstation technology from Dell
dell.com/precisionappliance

Product Datasheet
http://goo.gl/gc0DqG

StorageReview: Dell Precision Appliance for Wyse Review
storagereview.com/dell_precision_appliance_for_wyse_review

***Desktop Engineering* magazine: "Making the Jump to Workstation Virtualization"**
http://goo.gl/yyLbwY