



By Richard Thwaites

DELL PRECISION R5400 RACK WORKSTATIONS OFFER POWERFUL PERFORMANCE AND SECURE REMOTE ACCESS

Organizations in manufacturing, energy, digital content creation, and other industries require workstation-class performance for compute- and graphics-intensive applications. The Dell Precision™ R5400 rack workstation and optional Dell™ FX100 remote access device enable secure access to applications and data with outstanding performance for an increasingly mobile workforce.

Although desktop systems excel at a wide range of tasks, some compute- and graphics-intensive applications demand more processing power than these systems are equipped to handle. Whether an automaker needs to accelerate the analysis of crash test simulations, an energy firm needs to increase the detail of reservoir models, or a digital production studio wants to enhance the realism of animated characters—organizations are increasingly turning to workstations to achieve performance that surpasses what desktops can offer without incurring the cost or complexity of a large-scale infrastructure.

Such organizations need workstations with high-performance processors, chipsets, and memory to process large data sets quickly. And they require graphics performance that can provide high-resolution models and deliver creative output quickly. Failing to meet those requirements can result in lost productivity, missed revenue opportunities, and failed designs.

At the same time, organizations are challenged to extend workstation-class performance to an increasingly remote workforce. By enabling remote designers, geographically dispersed oil exploration groups, or remote teams of scientists to access

high-performance systems in a centralized location, organizations can optimize resources without having to deploy and manage systems in distant locations. Remote access can also help organizations protect workers and foster productivity by moving employees out of dangerous or difficult work environments such as oil well heads or factory floors. Whatever the goals, achieving secure remote access can be difficult using traditional remote access solutions. Organizations need to provide easy access to shared data and deliver performance that is on par with local workstation access (one-to-one access) while keeping data secure.

Together, the Dell Precision R5400 rack workstation and the optional Dell FX100 remote access device are designed to provide the performance required for compute- and graphics-intensive applications along with secure access for remote employees. The Dell Precision R5400 workstation and Dell FX100 remote access device are also key components of the Dell Flexible Computing Solutions offering, a suite of solutions designed to help organizations meet the demands of distributed workforces while maintaining security and manageability through centralized control of user data and images.¹

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¹ For more information on Dell Flexible Computing Solutions, see "Flexible Computing: Advancing End-User Productivity with Centralized Control" by Jeremy Ford and Roberto Ayala, in *Dell Power Solutions*, November 2008, DELL.COM/Downloads/Global/Power/ps4q08-20090139-Flex.pdf.

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DELIVERING POWERFUL PERFORMANCE IN HIGH-DENSITY RACK ENVIRONMENTS

The Dell Precision R5400 rack workstation combines powerful processors and large-memory configurations to help deliver the performance required for compute-intensive tasks. Equipped with a two-socket motherboard, the Dell Precision R5400 can be configured with either dual- or quad-core Intel® Xeon® processors for up to eight total cores. Compared with single-core systems, the multi-core architecture of the Dell Precision R5400 can dramatically increase performance for multi-threaded applications and multitasking environments. The quad-channel, fully buffered dual in-line memory module (DIMM) architecture supports large-memory configurations—with up to 32 GB of total memory—that enable users to work with large data sets.

The Dell Precision R5400 can also provide enterprises in computer-aided design (CAD), animation, energy, and other fields with outstanding graphics performance to view high-resolution models and see creative output quickly. The Dell Precision R5400 is designed to deliver uncompromised OpenGL 3D performance and reliable 2D performance with industry-standard workstation graphics cards. The Dell Precision R5400 offers dual full-height, full-length x16 PCI Express (PCIe) graphics slots to provide a broad range of graphics card choices while also enabling organizations to scale up to high-end 150 W graphics cards for rigorous visualization tasks.

To help optimize workstation resources, organizations can take advantage

of general-purpose graphics processing unit (GPU) capabilities to use the processing power of high-end graphics cards for general-purpose floating-point-intensive computing in a clustered environment. For example, by using the Dell Precision R5400 in conjunction with an established rendering solution such as the multi-processor NVIDIA Tesla GPU computing processor, designed to provide up to a teraflop of parallel computation, organizations can create an energy- and space-efficient high-performance computing (HPC) system.

With a standards-based design, Dell Precision R5400 rack workstations offer standards-based I/O for simple expandability and flexibility for integrating the workstations into an existing IT environment. A 2U rack form factor allows the Dell Precision R5400 to be placed at the desk side or in a dense rack infrastructure. The Dell Precision R5400 workstation can deliver a highly scalable, cost-effective architecture that is easily housed in a rack, which offers a choice of PCI, PCIe, and PCI Extended (PCI-X) slot combinations that help IT administrators and



The Dell FX100 remote access device (center) enables secure remote access to the Dell Precision R5400 rack workstation (left)

support technicians add cards easily. Because the Dell Precision R5400 shares a common design with standards-based Dell PowerEdge™ servers, IT organizations can use Dell server racks and accessories for installation. The Dell Precision R5400 can be configured as part of a high-performance render farm or HPC cluster, enabling enhanced performance without the complexity of deploying and configuring an HPC system.

RUNNING APPLICATIONS THAT REQUIRE OPTIMIZED WORKSTATION COMPATIBILITY

Organizations that run crash test, reservoir modeling, airflow analysis, 3D animation, scientific, or other high-performance applications know that they

Dell also provides software vendors with hardware platforms to facilitate multi-threaded and 64-bit application development. Dell and application providers offer qualified technical support should problems arise.

SECURING REMOTE ACCESS WITH THE DELL FX100 REMOTE ACCESS DEVICE

The Dell FX100 remote access device is designed to help organizations offer remote access to applications and data while enabling remote employees to capitalize on the powerful performance of Dell Precision R5400 rack workstations. Used in conjunction with the Dell Precision R5400, the Dell FX100 enables a cost-effective, flexible, and secure

The Dell FX100 remote access device is designed to overcome the limitations of traditional remote access solutions, providing workstation-class performance with plug-and-play simplicity. It consists of a PCIe card housed in the host workstation and a compact remote portal device. By using Teradici PC-over-IP technology, it helps overcome distance restrictions—allowing organizations to capitalize on standard IP networks to reach anywhere with Internet access. The dedicated hardware performs the compression and encryption algorithms, freeing the host workstation to focus on running applications. The result is enhanced performance with minimized latency, typically limited only by network performance and bandwidth.

The Dell FX100 also provides the flexibility to support numerous types of applications and a wide variety of work environments. Designed to support any host OS and all image content (including 3D graphics, video, animation, Microsoft® ClearType® technology, the Microsoft Aero™ interface for the Windows Vista® OS, and Microsoft DirectX® technology), the Dell FX100 can accommodate a comprehensive range of application requirements. In addition, it supports two Digital Visual Interface (DVI) ports, with one DVI-Integrated (DVI-I)-to-VGA adapter supplied so organizations can use up to two screens per device. The remote unit also offers numerous I/O ports, including four USB ports and a 10/100/1,000 Mbps Ethernet jack as well as audio microphone in, audio headphone out, and audio line out jacks. An on-board audio controller enables use of standard audio codecs.

The Dell FX100 also incorporates security features designed to support remote access while helping ensure protection of intellectual property, assets, and data. The device includes a range of software security features, such as the Trusted Platform Module (TPM) specification and setup and BIOS passwords. Organizations can use USB port disabling,

“By enabling organizations to extend secure access to applications, data, and workstation-class performance to an increasingly remote workforce, the Dell Precision R5400 rack workstation supports a comprehensive range of usage models that can help maximize computing and personnel resources.”

cannot risk application or hardware compatibility problems with workstations. Even relatively minor compatibility issues could result in lost productivity and expensive, time-consuming hardware or software modifications. Critical applications must run successfully and consistently, and software must be backed with qualified technical support.

Dell works closely with application providers and other software vendors to help ensure reliable application performance on Dell Precision R5400 rack workstations. Both Dell and application providers conduct thorough testing to help ensure applications run successfully.

solution for sharing applications, data, and workstation-class performance with remote workers while helping avoid the limitations of traditional remote access solutions.

Many traditional remote access solutions have inherent restrictions that may limit their utility. For example, analog and digital KVM (keyboard, video, mouse) solutions and PCI/PCIe extender solutions can support solid performance, but only at short distances. Software-based KVM over IP works over long distances, but typically consumes valuable host processor cycles and generates latency in the process.

or filtering by device type or by user profile, to offer flexible user authorization methods. An internal front panel enclosure lock helps prevent tampering. With the Dell FX100 and Dell Precision R5400, organizations can keep the workstation in a secure data center or central location while facilitating secure access for a remote workforce.

Additionally, the Dell FX100 portal is a small, fanless device with minimal power consumption requirements. The simple architecture of the portal and host card helps organizations avoid the need for a second client—which would also require a second OS, specialized drivers, a graphics subsystem, and local IT support. By using PC-over-IP technology, the Dell FX100 provides a cost-effective alternative to wired KVM, digital KVM, or Category 5 (Cat 5) approaches.

OPTIMIZING WORKSTATION-CLASS PERFORMANCE AND REMOTE ACCESS

Whether working locally or remotely, professionals in manufacturing, energy, digital content creation, finance, science, software development, and other fields require uncompromising performance for compute- and graphics-intensive applications. The scalable Dell Precision R5400 rack workstation offers a flexible 2U rack form factor and optional Dell FX100 remote access device. By enabling organizations to extend secure access to applications, data, and workstation-class performance to an increasingly remote workforce, the Dell Precision R5400 rack workstation supports a comprehensive range of usage models that can help maximize computing and personnel resources. [u](#)

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