



Desktop virtualization: Flexible access to campus learning resources

By Patrick May and Erica Hilgeman

Simplified IT management is critical to efficiently support students who expect anywhere, anytime access to school computing resources. Dell™ Virtual Labs enables students to use learning resources from their own devices—while easing administration.

Today's students, educators, and administrators require constant, reliable access to a school's computing resources using their own devices, which include laptops, tablets, and smartphones. Desktop virtualization is designed to provide a cost-efficient, secure means of delivering these computing resources. In a virtualized desktop environment, a physical desktop system is converted into a virtual one, allowing application processing to take place in the data center.

This technology helps simplify the process of delivering applications to many different types of devices and empowers distance learning. At the same time, it frees IT administrators from basic support tasks, allowing them to focus instead on strategic opportunities. Desktop virtualization also gives IT staff tight control over access, security, and storage of campus data. And it allows campus leaders to provision services in an increasingly complex and dynamic environment.

While they promise to yield huge benefits, desktop virtualization deployments must be managed effectively to avoid incurring unnecessary complications. And components of the IT infrastructure must be sized properly to support the needs of a virtual desktop infrastructure (VDI), for example. (For more information, see the sidebar, "Understanding storage and networking requirements.") To help educational institutions bring the various pieces together, Dell Virtual Labs combines tested reference architectures with

Dell service and expertise to provide an end-to-end desktop virtualization solution.

Dell Virtual Labs enables anywhere, any-device computing, ranging from low-power, low-footprint thin clients to full-featured, intelligent clients with Intel® Core™ I processors for demanding tasks. This desktop virtualization solution is designed to work equally well for school-owned clients and the multitude of devices students bring to campus every day.

Building on reliable, validated architectures

Dell Virtual Labs expands on Dell Desktop Virtualization Solutions (DDVS), leveraging prepackaged and configured hardware, software, and services to enable fast, simplified implementations. Dell Virtual Labs is available in three tested and validated reference architectures that are based on established industry virtualization platforms:

- **Dell DVS Simplified Appliance VDI** provides a simple, all-in-one package that is well suited for small institutions with limited budgets. A Dell PowerEdge™ server powered by Intel Xeon® processors comes pre-installed with Citrix® VDI-in-a-Box software. The appliance integrates the necessary capabilities—connection brokering, load balancing, desktop provisioning, high availability, and management functions—into a single package that runs on the server with local storage. This integration



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University of Maryland pilots virtual desktops

Students live in a wireless world and expect online access to campus resources from their own devices. Find out how Dell Virtual Labs helps the University of Maryland embrace IT consumerization, enabling members of this academic community to access campus resources from anywhere, at any time.

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enables IT staff to get a virtual lab up and running in as little as an afternoon. This solution supports end-user devices ranging from low-power, low-footprint thin clients to full-featured, intelligent clients with Intel Core I processors for demanding tasks.

- **Citrix XenDesktop® VDI** delivers virtual desktops for Microsoft® Windows® XP, Windows Vista®, or Windows 7 operating systems to end users on a variety of endpoint devices. Virtual desktops are dynamically assembled on demand, providing students, educators, and administrators with pristine yet personalized desktops each time they log on.
- **VMware View™ VDI** centrally delivers desktop services from the cloud to help simplify IT management and increase security and control of end users while decreasing costs. Dell Virtual Labs with VMware View has received the VMware® Ready designation—the first educational solution to do so.

The Dell Solutions Laboratory, along with Citrix and VMware, has spent over 50,000 staff-hours testing configurations to identify the right scenarios and develop stable and scalable solutions that address

specific educational needs. Six frequently used applications have undergone extensive testing and have been validated on all three platforms:¹

- Adobe® Creative Suite® software, which includes Adobe Photoshop®, Adobe Illustrator®, and Adobe Premiere® Pro CS5 software
- Autodesk AutoCAD LT drafting software
- Wolfram Mathematica 7 technical computing software
- MathWorks MATLAB technical computing software
- SAS analytics software
- IBM® SPSS® analytics software

Achieving cost-effective, secure lab access

Desktop virtualization helps education leaders and IT staff address the complex challenges of academic computing. It offers flexible access to an increasingly mobile student population, while allowing IT departments to deploy and upgrade software quickly and efficiently—freeing IT to develop strategic goals. And because data and applications are centralized, desktop virtualization helps control costs

¹ For more information on the architectures and testing results, see "Dell Virtual Labs with Citrix XenDesktop," content.dell.com/us/en/corp/d/public-solutions-hied-en/Documents-virtual-labs-with-citrix-xendesktop.pdf.aspx; "Dell Virtual Labs with Citrix VDI-in-a-Box," content.dell.com/us/en/corp/d/public-solutions-hied-en/Documents-virtual-labs-with-citrix-vdi-in-a-box.pdf.aspx; and "Dell Virtual Labs with VMware View," content.dell.com/us/en/corp/d/public-solutions-hied-en/Documents-virtual-labs-with-vmware-view.pdf.aspx.



Understanding storage and networking requirements

To successfully deploy a desktop virtualization implementation such as Dell Virtual Labs, educational institutions must first understand the requirements of the supporting IT infrastructure. Desktop virtualization strongly affects two key infrastructure components: storage and networking.

Storage plays a critical role in the overall performance of a virtual desktop infrastructure (VDI). In VDI, each instance of a virtual desktop and related user data is connected to back-end storage. A large number of virtual desktops requires a robust infrastructure to support the corresponding amount of network traffic. For example, at the beginning of a class, hundreds of students might log in at the same time, causing a boot storm—a scenario that must be anticipated in the virtualization architecture. Also, storage for VDI must support different types of users running different types of workloads, which access the same shared disks but have different I/Os per second (IOPS) and read/write ratio requirements based on their respective applications.

Dell Fluid Data™-based storage, including Dell EqualLogic™ PS Series storage area networks (SANs) and the Dell Compellent™ Storage Center™ SAN, is well suited to VDI environments. These Dell storage offerings are built on Fluid Data architecture, which is designed to manage and protect growing data volumes by intelligently and automatically storing data in the right place, at the right time, for the right cost.

Dell Fluid Data-based storage can be virtualized to create one centralized storage resource pool for running virtual desktops. It provides on-demand balancing of capacity, allowing data to span multiple drives and using additional spindles on the fly to help ensure high performance during events such as boot storms. To support fast-growing virtual workloads, Dell storage is easily scalable; added arrays or disks automatically join the storage pool. Dell storage is also integrated with virtualization platforms from VMware and Citrix that enable built-in disaster recovery capabilities and simplified storage

management through a single console. Moreover, Intel Xeon processors, which power the Dell Compellent Storage Center SAN, enable energy-efficient performance for power-hungry storage software, high availability and enhanced data encryption features for added security, and new usage models with scale-out architectures.

Because VDI taps into the full performance and software capabilities of the IT infrastructure, the required number of physical servers and storage arrays can be decreased—which in turn causes a reduction in the physical connections that the applications use to access stored information. This decrease in the number of physical connections may lead to an increase in bandwidth requirements.

As a result, high-speed interconnects are required to help ensure the performance and flexibility necessary to support a successful VDI deployment. A growing number of educational institutions are migrating from Gigabit Ethernet (GbE) to 10 Gigabit Ethernet (10GbE) and 40 Gigabit Ethernet (40GbE) networking, which helps lower port density, reduce the number of switches and cables required, and simplify network management.


The Dell Force10 data center networking portfolio offers open, standards-based networking resources for virtualized environments. By standardizing the network framework, IT organizations can deploy open configurations for optimal scalability and performance—without locking themselves into proprietary architectures. Dell Force10 networking includes high-density, line-rate GbE, 10GbE, and 40GbE connectivity and open, standards-based Layer 2 and Layer 3 feature sets.

For institutions considering a desktop virtualization deployment, Dell Services helps assess the current IT framework, determine an appropriate implementation, and transition the existing environment into a robust, scalable infrastructure designed to accommodate growth quickly and flexibly.

related to IT security and management while helping to reduce overall security risks for students and the institution.

Dell Virtual Labs helps simplify the desktop virtualization adoption process from discovery to deployment to support, enabling an institution to make the most suitable choices for its specific infrastructure, challenges, and opportunities. As part of the discovery phase, a virtual appliance and agent software is deployed on the network to gather detailed data from each desktop

targeted for virtualization. The outcome is an expansive and detailed report of the desktop environment and user profiles. This data-driven feedback is used as the basis for creating a productive virtual desktop environment.

Dell Virtual Labs incorporates open, industry-standard components so that educational institutions have a clear path to expedient upgrades and comprehensive support throughout the life cycle of the deployment, while advancing flexibility and agility. 

Authors

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