# Dell Virtual Labs:

## Providing a simple and affordable end-to-end solution for desktop virtualization in K-12 education

### How Can K-12 Leaders Solve the Technology Challenges of Today?

The K-12 educational landscape is morphing. Students have greater access to the Internet, expanding how they can learn and creating a more mobile environment. The static model of classroom instruction and regular homework is giving way to more adaptive methods of teaching and studying — such as blended learning and flipped classroom models — largely due to the accessibility of knowledge via technology. Teachers looking to capitalize on digital learning techniques need to have reliable computing options available, and both students and teachers need more flexible access to digital resources.

The challenge is how to improve efficiency and provide digital learning opportunities without increasing headcount or budget. K-12 leaders are looking for ways to adeptly manage the extensive list of administrative and educational responsibilities across school classrooms and districts while also experiencing resource constraints. The high cost of managing older IT infrastructure can be a major deterrent for overburdened IT staff, especially when many IT infrastructures weren't built to support the demands of newer technology and need to be upgraded.

Fortunately, virtualized desktop technology is gaining traction as a feasible way for

K-12 education to better meet increasing instructional demands and funding challenges. Desktop virtualization allows schools to provide students, faculty and administrators with anywhere, anytime computing that is secure, reliable and centrally managed. Many school districts are choosing to leverage virtual desktop infrastructure (VDI) to expand learning opportunities, simplify management of digital content, reduce low-level IT administrative tasks and promote greater cost efficiencies. In fact, virtual desktop adoption in K-12 is expected to increase at a relatively high rate, with the annual growth

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rate over the next three years predicted to be 35 to 40 percent.[1]

While virtualized desktops hold great promise for education, it is important to have a clear understanding of what is involved with implementing VDI. Choosing, deploying and managing virtualized desktop environments can be confusing and complicated, and often, the educational institution is left to figure out how to implement with little guidance.

K-12 education leaders are looking for simple, affordable and reliable IT solutions. Dell Virtual Labs — which offers several desktop virtualization solutions depending on K-12 education needs — removes traditional complexity from virtualized desktop deployments, thereby enabling educational institutions to implement the VDI solution that is right for them.

This white paper examines how desktop virtualization helps solve many of the challenges that K-12 education leaders are facing today. It shows how Dell Virtual Labs — in particular, Desktop Virtualization Solutions (DVS) Simplified Appliance — offers thoroughly tested architectures to consider and provides tangible benefits for schools looking for a reliable VDI solution.

## Desktop Virtualization Offers Simplicity, Affordability and High Reliability

Traditional computing scenarios save files and applications directly onto individual computers. Desktop virtualization takes each user's desktop and separates — or decouples — the operating system, the applications and data from the actual computer hardware, and moves these components into the data center where they can be securely and centrally managed. With this approach, the desktop is delivered over the network in real time to the user's PC, which functions as an input/output (IO) terminal. The data processing is

safely handled in the server, rather than within a classroom or computer lab.

This procedure allows end users to have the full personal computing experience across various devices — smartphones, tablets and laptops — or locations, without regard to how their data is delivered or from where it comes. VDI combines the efficiencies of a centralized processing environment with the flexibility and simplicity of using a traditional personal computer.

While virtual desktop technologies are relatively new to K-12 education, the benefits continue to materialize. Desktop virtualization can increase efficiency in myriad ways, including simplified remote access, improved data security and easier methods for provisioning services. It also helps extend the time between hardware refresh periods, enables faster software updates, lowers maintenance costs and centralizes management.

In particular, creating a virtualized desktop environment allows K-12 leaders to:

**Create Simpler Anytime
Access to Learning**
Mobile computing is growing in popularity. According to Pew Research, about 75 percent of teenagers aged 12 to 17 have cell phones.[2] A Project Tomorrow/Speak Up survey issued in May 2011 reports that 10 percent of high school students and 13 percent of middle school students have access to tablet PCs, and this number is only going to grow.[3] By 2014, the total number of computing devices in K-12 schools is estimated to reach over 22 million.[4] Students now expect anytime, anywhere access to information from their mobile devices. Giving students this freedom to learn at any place and any time is significant to their success in the information age, and is causing more schools to turn to desktop virtualization. Desktop virtualization allows schools

## Focus for Many K-12 Organizations

- Embrace digital and mobile learning environments
- Improve cost efficiencies and meet budget
- Simplify computer support while enabling computer access
- Safeguard data assets and privacy

to simplify how mobile device usage is managed and how services are provided. It helps K-12 schools reduce the costs related to managing devices, and provides greater mobility to access education materials from any device. This is becoming increasingly important as bring-your-own-device (BYOD) programs grow in popularity in K-12 and students start bringing in their personal devices, ranging from tablets to smartphones to gaming devices to laptops.

**Reduce IT Administrative
Requirements and Costs**
Virtual desktop infrastructure offers advantages for K-12 education organizations

The IDC cites an estimated 67 percent cost reduction in maintaining virtual desktops over traditional desktops.

seeking to provide digital learning opportunities on tight budgets. Managing computer equipment has usually meant that IT professionals must physically travel between schools, classrooms or computers to add software, upgrade firmware and fix problems. This labor-intensive approach escalates the burden on IT to cost-effectively keep systems updated and running.

One of the biggest advantages of VDI is the ability to centralize control over distributed data and desktop images, which allows for unified, automated changes to end-user software and fast client deployment. Information backups can be automated and the amount of time it takes to deploy updates decreases. Scaling to meet growth becomes quick and easy, as does access to virtual resources at distributed sites. The IDC cites an estimated 67 percent cost reduction in maintaining virtual desktops over traditional desktops.[5]

### Better Safeguard Valuable Data

Protecting school records and important information is vital to the safety and privacy of students, and is mandated by federal laws such as FERPA. Loss of data from corruption, disaster or theft is an issue every IT professional can face and no K-12 leader wants to see occur. The consequences can include legal and regulatory sanctions, productivity and financial issues, and bad publicity.

By centralizing the control of data and security protocols, virtualized desktop environments offer strong protection against these types of threats, and help to fortify disaster recovery plans. Virtual desktop solutions equip IT with the means to manage the data instead of the devices. Rather than data residing on individual machines in classrooms, VDI allows IT to control digital records from a secure, central data center.

As a result, schools achieve higher levels of data protection and accessibility. Meeting compliance for records retention is also simplified when data is housed securely in one location, and an automated policy management approach is in place.

### Enhance Staff Productivity and Work Flexibility

Virtual desktop environments are earning high marks for meeting productivity and flexibility goals in budget-conscious organizations. In K-12, more leaders are encouraging teachers and staff to produce their best results by giving them the flexibility to work where, when and how they choose. Teachers are not limited to the physical classroom anymore, they can post homework assignments or grades to the learning management system from home, for instance. To realize those results, however, districts need to supply better, faster access to applications and data. Desktop virtualization garners agility and speed by allowing IT to make updates from a central management system to a variety of devices. This reduces downtime and increases access to data for teachers and staff.

The right VDI also fosters greater uptime because software across the computing environment can easily be standardized, and unauthorized software installations are blocked, helping to minimize end-user device issues. From increasing access to data to better protecting intellectual property, virtualized desktop environments make working smarter a reality for K-12.

### Facilitate Tracking and Reporting Capabilities

One of the benefits of implementing virtualized desktops is the ability to better manage resources. Most VDI solutions provide high-level dashboards and detailed reporting of systems by user-defined criteria, including time intervals, applications, user groups and peak

usage. Having the ability to track metrics and usage patterns allows districts to accurately forecast future spending and focus on precise needs for systemic improvement.

Comprehensive reports allow K-12 leaders to make more informed decisions. Organizations will be able to better manage valuable hardware and software resources, more confidently meet compliance and strategic goals, and stay on target for budget requirements.

## Need-to-Knows for K-12 Virtual Desktop Deployments

To fully realize these benefits and get the most out of the virtualized desktop implementation, K-12 leaders need to know what questions to ask about potential solutions.

### Open Standards

Is the desktop virtualization solution based on open standards, without reliance on proprietary hardware or software? Open standards allow for the multi-vendor reality of most IT environments, enabling easier integration of applications and devices, while increasing IT cost efficiencies.

### Validation

Has the solution been thoroughly validated using a carefully planned methodology, which included hardware and software stress testing in configurations that replicate K-12 environments? Pre-purchase validation of the application provides one of the greatest assurances that the proposed solution will meet all of the design goals with a smooth implementation.

### Scalability

How easy is it to scale the solution up to accommodate growth? Is the solution limited by fixed hardware and software

## Key benefits of selecting Dell Virtual Labs for your desktop virtualization solution:

- One-stop solution
- Fast implementation
- Choice of reliable architectures
- Thoroughly tested

configurations, or will it require a rip-and-replace of components to meet future modifications? Often, deploying 10 to 50 users in a virtual environment is a lot simpler than trying to scale out, and going from pilot to production can be the biggest challenge in rolling out this technology. Easy, modular, affordable scalability is critical to supporting these progressions.

**Flexible Delivery Model**

How much of the solution can be implemented and managed in house, and are there external resources and expertise available? The virtual desktop implementation of choice should be a good fit for the K-12 organization, depending on IT proficiency, budget and services needed. Knowing how the implementation can be managed into the future needs to be a part of the decision-making process.

## DVS Simplified Appliance Combines VDI Advantages with Expertise

One of the desktop virtualization solutions offered by Dell Virtual Labs, DVS Simplified Appliance, brings together the advantages of desktop virtualization with proven skills, experience and knowledge-based practices to provide K-12 with an end-to-end solution. It was developed with thorough research and practical applications,

garnering a strong foundation to support K-12 organizations.

DVS Simplified Appliance allows K-12 educators to access desktop virtualization solutions without a lot of the traditional barriers to execution. It provides a unique, right-sized feature set for education environments without complex integration needs. Specifically, DVS Simplified Appliance:

- can be deployed in as little as an afternoon;
- does not require any specialized expertise to deploy or operate, because of wizard-based software;
- is 50 percent of the cost of other desktop virtualization solutions;
- has an exceptional end-user experience — even when using multimedia — and supports a wide range of devices, because it uses Citrix HDX communication protocol and Citrix Receiver;

- completes automated provisioning and n+1 redundancy, so it scales linearly and predictably in a grid architecture;
- does not require shared storage;
- is validated by Dell, and is delivered as a fully integrated solution from the Dell factory;
- has one-stop solution support from Dell; and
- has been extensively tested by Dell and specialty education applications have been validated on this solution, including: Adobe Creative Suite (Photoshop, Illustrator, Premiere Pro CS5); Autodesk (AutoCAD 2DLT); Wolfram Mathmatica 7; MathWorks (MATLAB); SAS; and IBM SPSS.

## Dell Virtual Labs Builds on Reliable Architectures

In addition to DVS Simplified Appliance, Dell Virtual Labs offers DVS Enterprise configuration solutions as well, based on Citrix XenDesktop and VMware View platforms, as well as cloud-hosted desktop solutions. These are ideal for districts that want to service multiple user types from a central data center, and those that want richer feature sets around availability and redundancy, or complex technology integrations.

Dell has identified resilient, tested architectures ideal for K-12 organizations seeking to maximize IT control, minimize costs and enhance the end-user experience. Partnering with leading VDI technology suppliers and using industry standards, Dell is able to offer full support throughout the lifecycle of these open solutions without sacrificing choice or flexibility.

For more information on the core components of DVS Simplified Appliance or the DVS Enterprise solutions, and testing results, read the *Dell Virtual*



**Dell Virtual Labs raises the bar on desktop virtualization by simplifying the process from discovery to deployment and support.**
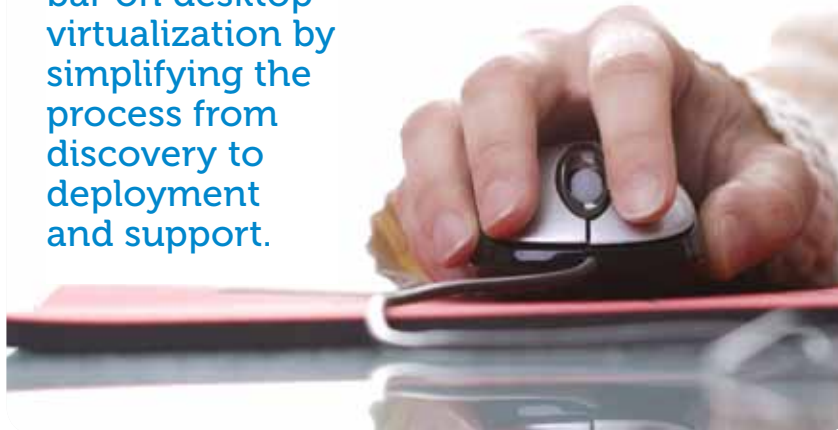
*Labs with DVS Simplified Appliance, Dell Virtual Labs with Citrix XenDesktop (DVS Enterprise Solution)* or *Dell Virtual Labs with VMware View (DVS Enterprise Solution)* papers, available on the Dell Virtual Labs website, www.dell.com/virtuallabs.

## How Was Solutions Testing Performed?

To ensure the performance and ease of use of DVS Simplified Appliance and the Citrix and VMware DVS Enterprise solutions, the software applications completed 10 testing cycles without issue on each of the three platforms. To maintain integrity and ensure results were not affected by system caching, each testing cycle included the creation of unique files with unique images and graphics imported.

Applications were tested on the following platforms:
- Dell OptiPlex 980 running Win7;
- Dell FX 160 running Win;
- Dell FX170 running De-TOS;
- Dell Latitude 13 running Windows XP;
- Dell Adamo 13 running Win7;
- iPad2 running iOS 4.2 and 4.3;
- Motorola Xoom running Android 3.0 with flash upgrade;

- iPhone running iOS 4.2; and
- iMac running OSX Snow Leopard.

In addition to the application testing, the Dell Solutions Laboratory has made recommendations for how to further optimize performance on these solutions. These recommendations, along with specific testing results and architecture considerations can be found at www.dell.com/virtuallabs.

## Conclusion

As K-12 organizations rethink how best to solve the challenges of meeting budgets and protecting data while improving the learning environment for today's students, Dell is there to help with simplified, tested virtualized desktop solutions. The benefits of desktop virtualization are many. K-12 institutions can increase efficiency with centralized control over distributed data, automated changes to end-user software, and easier methods for provisioning new devices and services. Desktop virtualization allows schools to simplify how computer usage is managed, strengthen how data is safeguarded, and scale to meet growth or change. Having access to high-level dashboards, detailed reports and data-driven feedback helps K-12 leaders make more informed decisions about the organization as a whole.

Learning the key questions and considerations for deploying virtualized desktop infrastructure is important in choosing the best solution for simplicity, affordability and reliability. Dell Virtual Labs raises the bar on desktop virtualization by simplifying the process from discovery to deployment and support. Knowing which VDI solutions are fully tested and proven to work will lead education leaders on the path to implementing, launching and adopting the right desktop strategy to fit their school or district's needs.

**Endnotes**

[1] Center for Digital Education, *Education Overview Report: An in-depth look at K-12 market trends, funding opportunities and emerging technology* (2011).

[2] http://pewresearch.org/pubs/1572/teens-cell-phones-text-messages

[3] http://www.tomorrow.org/speakup/pdfs/SU10_3EofEducation_Students.pdf

[4] Center for Digital Education, *Education Overview Report: An in-depth look at K-12 market trends, funding opportunities and emerging technology* (2011).

[5] IDC, *Understanding the Business Value of Centralized Virtual Desktops* (November 2009).
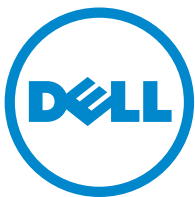
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