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Issue Brief

Real Learning, Virtual Desktops

Desktop Virtualization Provides Access and Support for BYOD in Higher Education

Introduction

Laptops, tablets and smartphones are must-have items for students today. Nearly 75 percent of U.S. teens ages 12–17 have a desktop or laptop computer,¹ and 31 percent of teens ages 14–17 have a smartphone.² And when those teens get to college, they expect to run their lives — including accessing educational resources and applications — from any or all of those devices.

At all levels of education — but particularly in higher education — campuses are revamping their IT environments and policies to accommodate, manage and support this trend, known as “bring your own device,” or BYOD.

Desktop virtualization is an approach that addresses many of the challenges campus leaders face today, including BYOD. Many desktop virtualization solutions are efficient and flexible to administer, and can scale to meet changing needs. Higher education institutions are already recognizing desktop virtualization as a viable solution — 60 percent of respondents to the Center for Digital Education’s 2011 Digital Community Colleges Survey have desktop virtualization in place. Desktop virtualization also earns high marks in higher education for efficient energy usage, low maintenance costs and reliability compared with traditional systems — all benefits that free up resources for the educational mission.

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Understanding Desktop Virtualization

With desktop virtualization, the workload traditionally handled by a user's computer is done instead in a virtual computer in a central data center. Like a conventional, physical computer, a virtual desktop computer can run software, save documents and data, print, and communicate with servers and the Internet. The user of a virtual desktop computer sees the same interface regardless of the access device he or she uses, which can range from a thin client to a tablet to a high-powered PC. However, a virtual desktop computer does not shoehorn a user into a one-size-fits-all solution; it can be tailored to the user's needs, with a unique bundle of software and services, and that tailored environment can follow the user from device to device.

On the technical side, there are two parts to desktop virtualization: server software, sometimes referred to as a "connection broker," which manages all of the virtual desktops and connections throughout their lifecycles; and client software, or the "front end," that runs on the users' devices. (Note that providers sometimes use different terms for these components.) Several delivery mechanisms can be used to connect the hypervisor with the client, including virtual desktop infrastructure (VDI) and terminal server/remote desktop session host (TS/RDSH). Another approach to virtualized delivery of Windows applications is called "application virtualization," in which applications run inside virtual containers or sandboxes on every device. Using a blended model can enable desktop virtualization at a low cost without sacrificing the user experience. In any arrangement, successful desktop virtualization requires a robust server, storage and network environment.

In higher education, desktop virtualization is used both to create virtual computers and computer labs for student and faculty use, and for use by office workers in administrative and business environments. This issue brief focuses particularly on the instructional environment.

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The Supporting Role of Desktop Virtualization in Higher Education

Desktop virtualization supports many of the most important trends facing colleges and universities today.

- **It supports BYOD efforts.** Empowering students to use their own devices, weaning them from university-run computer labs, and freeing them to move between locations and devices seamlessly can help educational institutions save money on IT. It also offers students flexibility in choosing devices, operating systems, screen sizes and more. BYOD is no longer an option for colleges and universities; indeed, one organization of IT leaders in education declared: "Supporting the trends toward IT consumerization and bring-your-own-device" as its No. 2 IT issue for 2012.³
- **It improves and equalizes access to resources.** With desktop virtualization, the same applications and reference materials are available to all students, whether they're working in on-campus computer labs, libraries, coffee shops or their own bedrooms. Through desktop virtualization, students can access specialized software they might not otherwise have, and can access library resources when the physical library is unavailable. Applications and resources available through virtual desktops are managed centrally, so IT departments can ensure that users adhere to software licenses.
- **It enforces user authentication and security.** Privacy and data security concerns are top-of-mind for IT leaders in higher education. The ability to manage user authentication and security in a centralized manner, and manage user data centrally, protects both the student and the institution. Desktop virtualization's server-centric operations also enable students to store their work securely in the institution's data center and access it from any device and any location, reducing headaches related to lost, damaged or incomplete work.

The IT Department Perks

In addition to supporting a college or university's educational mission, desktop virtualization can also help an institution's IT department perform its job more efficiently. Consider the routine tasks involved in operating a computer laboratory of physical PCs. In a traditional environment, dozens of individual computers must be physically maintained, have their software and operating systems patched, be kept free of malware, and be re-imaged when they crash or become corrupted. But with

desktop virtualization, any endpoint can be used, and management of the virtual desktop is centralized and standardized — freeing up IT to focus on strategic IT projects.

Another perk for IT staffers comes from the management tools built into many desktop virtualization packages. With these tools, the computing environment can automatically adjust to spikes in usage by making more processing power, memory, disk space and network resources available to the virtual desktops. Management tools can also log usage (by user, application, time and other criteria) and can deliver reports and analysis based on those logs. Perhaps most importantly, desktop virtualization management tools can be tied to a network's domain controllers to provide network administration and security management.

Learning from the Users

The University of Texas — Pan American (UTPA) has used a pure virtual desktop infrastructure (VDI) environment since 2010. The primary motivator for adopting VDI at the 19,000-student public university, according to Assistant Director of Application and Computing Services Richard Rodriguez, was to save students money. "Students often have to purchase software that's really expensive," Rodriguez explains. "Or they have to come to campus to use it in our labs. Since the majority of our students are commuters, we wanted to save them money on gas and provide them with software they could use at home."

VDI was put into production at UTPA after a grant-funded proof of concept (PoC) was complete. Engineering, mathematics and statistical analysis applications were installed on virtual desktops along with standard office software; some applications were licensed on a campus-wide basis, while others were licensed for 50 or 100 virtual desktops.

Usage of VDI among students has grown with each semester, Rodriguez says. "We see each new influx of students adopting it even quicker than the last," he notes, adding that users are accessing the virtual desktops via a range of devices.

Logs show that most UTPA users who access virtual desktops on computers (as opposed to tablets) are doing so off campus. In effect, the university's computer lab is now virtually open 24/7 — a big improvement, since only one on-campus computer lab operates until 10 p.m. Monday through Thursday and for four hours on both Saturday and Sunday. Two years ago, the computer labs were open from 8 a.m. to 7 p.m. Sunday through Friday, with Saturday hours being from 8 a.m. to 5 p.m. The virtual computer labs allowed UTPA to shorten the operating hours, saving the university money on power and staff costs. Furthermore, students can access online library resources and use specialized software for their class assignments through the virtual desktops.

Because performance of the virtual desktops is essential for student acceptance, Jonathan Peña, UTPA's computer user services specialist III, has configured the university's VDI so at least 25 virtual desktops are always running. When the number of available virtual desktops drops below 10, the hypervisor automatically creates them as needed. Most virtual desktops at UTPA are loaded with the same suite of applications, but students in the university's School of Business get a specific software suite. "It's set so anybody in a specific Active Directory (AD) group has access to a particular pool of machines," Peña explains. "The people who manage the software also manage the AD group, and can add or remove users as they see fit."

Professors are catching on to the benefits of VDI, Rodriguez says. They're increasingly encouraging students to take advantage of VDI, and some have asked the university's IT team to set up virtual desktops for their research collaboration. The data that is generated is used to further collaborate with other institutions. "Having our students and faculty use virtual desktops keeps things secure here, because we don't have to provide them with direct access to campus computers and servers," says Rodriguez.⁴

Questions to Ask When Exploring Desktop Virtualization

Colleges and universities that are considering desktop virtualization have many choices. They should ask serious questions of potential solution vendors before selecting one.

- **Infrastructure.** Robust server hardware, networking and storage are must-haves for successful desktop virtualization, whether an institution chooses pure VDI or a blended model. Some vendors

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offer free assessment tools that can help gauge infrastructure needs and suggest which desktop virtualization deployment options are appropriate based on current users, applications and hardware.

- **Performance and scalability.** If desktop virtualization doesn't perform, educators and students will avoid it — or worse, work around it. Make sure that the infrastructure automatically dedicates computing resources as the workload demands, yet offers the IT staff tools to control and manage virtual system deployment directly.
- **Flexibility.** Does the front-end support multiple endpoint operating systems? Will it support multiple, different hypervisors? (This is not a hypothetical question; UTPA changed hypervisors a year after adopting VDI, but users didn't see a change because the university's chosen front-end worked with multiple hypervisors.)
- **Security.** Is security centrally managed, device-independent, and able to integrate with your institution's existing domain controllers and other security infrastructure? Does the virtual infrastructure include tools that can locate or wipe clean a device that is lost or stolen?
- **Offline access.** Not all education happens on campus, or even within range of a Wi-Fi hotspot. Some desktop virtualization solutions allow users to access their desktops and applications even when the client is not connected to the Internet.
- **Price.** What's the total cost of desktop virtualization, including the hypervisor? As noted earlier, what physical infrastructure will you need — servers, networking and storage — to make it work successfully? What skills and training will your team need?



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Conclusion

As higher education becomes more dependent on technology, and as students become increasingly tied to their own devices, it's important for campus IT departments to look at ways they can make their institutions' technology available to their students anywhere, and on a variety of devices. Desktop virtualization helps to meet that need. "It's all about the students," concludes Rodriguez of UTPA. "We want to provide them with the best possible experience, learning-wise. We want them to have the most resources, at minimal cost."⁵

Endnotes

1. Pew Internet & American Life Project 2011 Teen/Parent Survey, [http://pewinternet.org/Static-Pages/Trend-Data-\(Teens\)/Teen-Gadget-Ownership.aspx](http://pewinternet.org/Static-Pages/Trend-Data-(Teens)/Teen-Gadget-Ownership.aspx)
2. Pew Internet & American Life Project: Teens, Smartphones & Texting, <http://pewinternet.org/Reports/2012/Teens-and-smartphones.aspx>
3. EDUCAUSE Review, May/June 2012 issue, www.educause.edu/ero/article/top-ten-it-issues-2012
4. Center for Digital Education interview with Richard Rodriguez and Jonathan Peña, August 21, 2012
5. Ibid.



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