A s technology becomes an integral part of a school district’s infrastructure, many schools are moving toward personalized instruction, where students get to learn at their own pace within the classroom environment. To accomplish true personalized learning, however, “we have to move beyond textbooks,” says Michael King, vice president of IBM’s global education industry. “And the PC, as it stands today, is the wrong model for that.”

King points to the complexity of having thousands of computers throughout a school district. Between administering patches and software upgrades, implementing security updates, manually installing new applications, and simply managing the upkeep of those computers, the IT staff hours can mount sky high.

And because IT support is already stretched thin at most schools—in a recent eSchool News survey, nearly three out of four school leaders said they don’t have enough IT staff to support their needs effectively—those staff hours can be difficult, if not impossible, to come by. Often, schools simply fail to manage their machines adequately, and the computers end up being underutilized.

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Software Virtualization...  
*continued from page 25*

But a game-changing movement is afoot that allows school districts to centralize the management of their computers and dramatically reduce the number of staff hours used on service calls. Called “software virtualization,” the movement allows for applications to be delivered from a central server, without having to be installed at the client, or end-user, level. Essentially, the computer’s desktop resides on a server.

“All you’re doing is just working on the server through your keyboard, mouse, and monitor,” says Brad Rudnai, network systems manager for Georgia’s Rockdale County Schools.

With software virtualization, end-users can run applications on network-connected devices that do not support the native operating system. In other words, a Windows-based machine could support a software application designed for use on an Apple computer, or on a Linux-based machine, and vice versa. Users also can run multiple operating systems at one time on a single computer and switch between them as easily as switching applications—instantly, with a mouse click.

That can be a huge advantage for schools in particular, which often contain a patchwork of machines running various operating systems and must grapple with software compatibility issues. Another key advantage is that students and staff members don’t have to use fully equipped desktop computers: Instead, they can use stripped-down or “thin client” machines with less processing power and hard drive space, because software applications are stored and run at the server level. This allows schools to leverage their existing resources by keeping older—and slower—computers running longer.

Not your older brother’s thin-client computing

Desktop virtualization can solve a key set of IT challenges for schools, says Toby Ford, services leader for IBM’s global technology services division, because it allows for school IT departments to improve the manageability of varied and widespread computing devices, lower the total cost of ownership of those devices, and enhance security.

IBM acts as a virtualization integrator for school districts, helping to identify their particular needs and deliver appropriate solutions with the help of virtualization partner Mainline Information Systems.

“One of the challenges that school districts face that is different from a traditional business enterprise is that they have a lot of distributed sites spread across large geographical areas,” Ford explains. Many districts don’t have the resources to keep tech-support staff at each school and must send technicians to solve problems and apply patches or upgrades.

“With desktop virtualization, tech support at those schools pretty much goes to nil,” Ford says. “Because you’re pulling all the smarts of the system, all of the applications, the data, the processing, back to the central location, all you have at school sites is the thin client, or ‘dumb,’ terminal.” And that means software administration can be handled from this central location.

The “thin client” can be an actual thin-client device—one without a hard drive, specifically meant for use with desktop virtualization—or it can be a PC or Macintosh computer, cleared of applications, that simply operates as a thin client.
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Software Virtualization...

continued from page 25

such as multimedia much better than before. They also have more processing power for about the same price.

Benefits of software virtualization

The point of implementing any technology is how the teachers, the students, and the administrators benefit, says Chris Lewis, IT desktop manager for the Fairfax County, Va., Public Schools. All other benefits are just icing on the cake.

But in the case of software virtualization, the benefits to IT staff are also felt by end users, supporters of the movement say.

One of the primary benefits of software virtualization is application stability. Because applications reside not on the desktop but on the server, users cannot damage them. Virtualization is a self-healing technology, meaning that any changes made to applications or the operating system can be wiped clean at the server level, easily and cost-effectively. This leads to a more consistent user experience for students and staff.

“In schools, you get the smart kids who are able to bypass security systems set up by administrators,” says Aaron Cockerill, senior manager at Citrix.

With virtualization solutions from Citrix—which whose latest product, XenDesktop, was released in April—users only have access to the streamed operating system, not a stored copy of the image.

Virtualization is about “being able to deliver a superior desktop experience, and being able to ensure that it’s repeatable, that the people who get to it don’t change anything,” says Chris Kawalek, manager of virtualization product marketing for Sun Microsystems.

Mobility is another area of particular importance to schools. Because users can simply log onto the network to get their applications and data, they are not tied to any single workstation. Teachers don’t have to carry laptops around with them as they search for an empty room in which to do their planning. They can simply log on in the library or a computer lab to access their data.

This also gives school leaders more flexibility with classroom use. In the past, school schedule makers had to have impeccable logistical skills: Foreign language classes had to be held in classrooms that had computers equipped with applications useful to those classes, math classes had to be taught in classrooms that had computers equipped with math-related applications, and so on. Now, because applications can be streamed to any machines on the network, a classroom can be used for any type of class, regardless of the applications needed to teach that class. This kind of mobility is called “hoteling.”

A word about licensing

Despite advances in technology, software virtualization is nowhere near maturity. While one of the potentially exciting aspects of virtualization, in the early days, was that it could shift the focus of the entire software industry from a licensing model to a more subscription-based approach, that has not happened yet.

“A lot of times, what you’re going to find is that vendors who are selling software may not be ready to try to understand what application virtualization means,” says Fairfax County’s IT staffer Chris Lewis.

Adobe, he says, is one of the few vendors that understand the concept of “concurrent usage.” That is, if you buy a 50-seat concurrent license, that means you can install the software on 500 computers as long as you promise you are only running it on 50 machines concurrently. With virtualization, “you can tell the virtual application server that only 50 people can run this app” at any given time, Lewis explains.

This type of licensing model, called software metering, is the direction some think the industry is heading. But it has a long way to go—JN.

Virtualization allows students and teachers to retrieve software programs from any networked computer.

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Software Virtualization...
continued from page 25

Potential cost savings

"If it’s a security patch to the operating system, you don’t want it to be a long process, and you want to be sure it works," says Cockerill. "Eighty percent of the time patches work, but 20 percent of the time you get failures, either because the patch doesn’t take or because the desktop becomes inoperable—then you have the cost of an IT call."

Computer users tend to turn to their co-workers when applications aren’t working correctly or when programs crash. Staff members who are knowledgeable about technology often end up trouble-shooting, which is a hidden cost.

With virtualization, the need for tech support at the school level is practically non-existent, advocates of the technology often end up trouble-shooting, which is a hidden cost.

Virtualization requires powerful servers—but the benefits can be powerful as well.

"Depending on the scope and the scale [of the project], there may be cost savings on the capital purchase side, but those aren’t necessarily as dramatic, or the reason to move in that direction," says Ford. But in terms of operating costs, advocates of software virtualization tell a different story.

According to Mainline, the total cost of ownership within a virtual desktop environment is 35 percent less than in a typically managed, traditional PC environment. There is less time spent on setting up, deploying, and repairing individual machines, the company explains; and, because data are stored on the server, no data are lost from hard drive failures. There is also a 75-percent reduction in power consumption, Mainline claims, which can save districts thousands of dollars per year.

Fairfax County’s experience seems to support this idea. Since moving to a virtual desktop environment recently, the district’s largest high school has seen a marked reduction in application-related help-desk tickets, Lewis says. (See "Fairfax County has success with desktop virtualization.").

Because operating systems and applications are run on the server rather than on the client device, the end-user’s device does not need to be as robust as in the past. School IT administrators, then, can choose to run older machines, spending less money to buy new PCs or Macs, or may purchase thinnest clients.

"We tell [our customers], ‘Use your PC to death,’" says Sun’s Kawai. "If you have a Vista application and you have a computer not capable of using Vista, you put Vista on the server and you can use it on your PC. When PCs start to die, then [you can] begin replacing them with thin clients.”

There are places where thin clients are particularly well-suited, such as computer labs. “A lot of schools are outfitting labs with 60 or 80 thin clients, so they can have a server that serves that lab, and they can have 80 virtual machines. Then, at the end of the class, they can click one button and revert all those machines back to the way they were to get ready for the next class,” he says.

Thin clients can cost anywhere from $150 to $700. School districts tend to spend between $150 and $250, says Ford. But, he reiterates, schools can use the machines they already have and are not required to purchase thin clients.

According to Mainline, school districts can implement desktop virtualization starting at $600 per seat. The company says the life cycle of a thin-client machine is eight years or more—about twice that of a traditional desktop system.

Looking to the future

"I don’t necessarily see application virtualization as a panacea that will solve all problems," says Fairfax County’s Lewis. “Technology changes too rapidly to have one single solution. My view is that [virtualization] is just one of several tools that any organization is likely going to have to employ to get applications.”

The traditional method of installing applications on a client machine isn’t going to disappear, he believes, because there will always be applications that can’t be virtualized. A third alternative is via imaging, where you install an operating system on the client machine, then capture a snapshot of what your hard drive should look like and deploy this image with the applications pre-installed.

“All of these [methods] are tools, and they should probably have a place in every organization,” Lewis says. Still, Jim Klein, technology director for the Saugus Union School District in California, says desktop virtualization is indispensable and makes for a more cost-effective computing model.

See Software Virtualization, page 27
Software Virtualization...
continued from page 25

“We do desktop virtualization mostly for our Macintosh computers,” he says. “Basically, we can put a full copy of Windows on [Mac users’] machines; it’s completely transparent to them, and they have all the access to the GUI goodness of a Macintosh and all the applications they need to run from Windows.”

His school district uses Macs in part, he says, because Windows is not as good at video editing. If end users need that capability, “we’ll buy them a Macintosh and give them access to both [operating systems]. We have a number of teachers doing that.”

He also makes Linux available to users as well. “It’s like having three [different] pieces of hardware,” he says, adding: “It’s not the type of thing we have a lot of trouble with. [Software virtualization] just works.”

LINKS:
IBM Virtualization
http://www-03.ibm.com/systems/virtualization/

Mainline Information Systems
http://www.mainline.com

Citrix XenDesktop

Sun Microsystems’ Sun Ray thin clients

NComputing
http://www.ncomputing.com

Microsoft Application Virtualization
http://www.microsoft.com/systemcenter/softgrid/default.mspx

Virtualization is growing in popularity

Software virtualization is here to stay—and its use is growing rapidly. According to an IBM white paper on virtualization, a recent survey of large organizations worldwide—those with 20,000 or more employees—found that 33 percent of the firms already maintaining virtual environments, and 13 percent had plans to pilot such environments within 12 months.

And smaller organizations aren’t far behind, the white paper said. Another study concluded that smaller firms might be more likely than their enterprise counterparts to adopt the widest range of virtualization solutions, because their environments are simpler and easier to manage.

IBM’s research suggests that the No. 1 reason organizations are turning to software virtualization is to reduce costs. Here are some other key reasons.

Two Georgia districts choose a twist on desktop virtualization

Georgia’s Putnam County School District is a rural district with limited resources. “We’ve never purchased as many computers as we would like out there, just because we don’t have the income that a metro district would,” says Brad Rudisail, who is on the county’s school board.

Rudisail, who also is the network systems manager for nearby Rockdale County School District, helped Putnam County envision a new computing model. District officials wanted more computers, and they wanted the low maintenance that software virtualization offers. But, because of the limitations of its personnel, Putnam County wanted a system that didn’t require an extensively knowledgeable tech-support staff.

The district also was not in a position to add new, more powerful servers at the time.

Rudisail suggested a solution from California-based NComputing. He describes it this way: Desktop virtualization from companies such as Citrix and VMware employs software that resides on a server, with users basically working on the server through a keyboard, mouse, and monitor. What NComputing offers is something Rudisail calls “peer-to-peer” virtualization. Rather than the desktops working from the server, they are working from another workstation.

“What you do is you buy them in one-to-three or one-to-six groups from NComputing. You’re buying one beefy workstation that six other terminals feed off of,” Rudisail explains.

The six “non-beefy” terminals are basically a box that you plug a keyboard, mouse, and monitor into.

The solution would have saved Putnam County money if district officials had done a one-to-one replacement of existing computers that needed to be switched out. Instead, the county opted to triple its replacements for the year and plans to continue doing that each year with its replacement budget.

Rockdale County also opted for NComputing’s solution to replace old computers in the district’s media centers. “We tried it at one media center for the year as a test, with probably about 20 computers. We had no problems with it, so we’ve now thrown it into our replacement program,” says Rudisail.

A drawback to the NComputing solution is the fact that users don’t get the “anytime, anywhere” access to software applications that other schools have found useful with their virtualization solutions.

Still, Rudisail says, it has been a perfect solution for both Putnam and Rockdale counties, particularly in terms of maintenance and support.

Rudisail tells the cautionary tale of one district he worked with as a consultant. “There was a rural district that had a grant to buy a whole bunch of workstations,” he says. “They didn’t have the money to [maintain] those, and they didn’t think about that. They just used [the whole] grant, got all the computers, then couldn’t support them. [The computers] weren’t fully utilized as a result.” —J.N.
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