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[Where VDI works best p.2](#) | [8 steps to virtual desktop ROI p.12](#)
[Focus on people, not devices p.16](#)

InformationWeek

THE BUSINESS VALUE OF TECHNOLOGY

JUNE 7, 2010

A SPECIAL ALL-DIGITAL, GREEN ISSUE

Double Down On Virtualization

Virtualizing servers is the safe bet. But CIOs who ignore desktop virtualization may be leaving money on the table. [p.4](#)

By Joseph Brown



practical Analysis

ART WITTMANN



Virtual desktop infrastructures have been slow to catch on, our survey finds, but consider them for these two sets of applications

The Business Case For VDI

Virtual desktop infrastructures have been slow to catch on. In our December 2009 survey, respondents reported that just 3% of end users were primarily using VDI or terminal services, though 36% reported the technology in use and another 23% reported plans to implement it in the next 18 months. While these numbers seem low, and the nature of VDI and other thin client technologies makes it extremely unlikely that they will emerge as the main means of delivering applications, that doesn't mean VDI doesn't have a place in your app delivery arsenal.

That same survey found the primary barriers to adoption to be users' need to work disconnected from the network, cited by 50%, and the investment required to make the technology work, cited by 47%. The first is a legitimate concern, but if your users can manage to be well-enough connected to use software-as-a-service apps, they can use your internally hosted applications as well. That leaves the second concern: What's the business case for VDI?

The first and most obvious is for apps that just won't run on whatever device your end users want to use. One senior IT manager I spoke with recently talked about how his company was stuck with an expense report management app that could be used only with Internet Explorer 6. Now, no one in his right mind would leave IE 6 installed on end-user devices. So rather than run the gauntlet of proposing a new application, vetting it, configuring it, and retraining users, his IT team installed IE 6 in a VDI environment and let users access the expense app that way.

This probably amounts to just kicking the can down the street; sooner or later you'll have to deal with that app. But there are upsides. Where non-Windows users such as those with Macs and iPads couldn't get at the app previously, they now can using some Citrix magic. Citrix showed its iPad client at the Interop show in Las Vegas in April, and it was surprisingly responsive. It's also one way to get Flash-based apps to run on an iPad—so take that, Mr. Jobs.

Particularly as organizations move to Windows 7, these sorts of application problems are bound to come up, so it's good to have this solution available. Just don't forget to eventually deal with those problems, which means finding well-supported Web-based alternatives.

The second use I had in mind is for systems whose access must be controlled in an auditable fashion, or whose data is so sensitive it really can't leave the data center. There are a lot of apps out there that don't authenticate users and that don't provide a rich audit trail. Using VDI is one way to get that data, so that you know who accessed an application and when he or she used it. Data protection and regulatory compliance issues like these have been the main reason to use terminal-services-style solutions, and they're a good reason to use VDI, too.

The point here is to view VDI as the tactical technology it is. And as you evaluate alternative products, keep in mind the varied device requirements of your end users. While delivering Windows apps to Macs and iPads makes more sense to me than delivering them to BlackBerrys and iPhones, you just never know what's going to make sense a few months from now. Having VDI available also can open up a world of options as you plan your upgrade to Win 7. Users who used to need both a Mac and Windows system can likely make do with just the Mac. The same goes for Linux. Executive types who are enamored of the iPad and who want to make it their only device may be able to do so.

Art Wittmann is director of InformationWeek Analytics, a portfolio of decision-support tools and analyst reports. You can write to him at awittmann@techweb.com. More than 100 major reports will be released this year. Sign up or upgrade your membership at analytics.informationweek.com/join.

IN THIS ISSUE

[High Stakes Of VDI p.4](#)

[8 Steps To A VDI Payoff p. 12](#)

[Forget The Device p. 16](#)

High Stakes

By Joseph Brown

Server virtualization is a sure bet for boosting efficiency, flexibility, and savings, and desktop virtualization promises to pay off just as big. Here's how to select the best architecture for your company.



Call it one of the smartest bets in IT: Virtual desktop infrastructure technology can help most companies do business more securely and efficiently. Sure, there are exceptions, but you need to at least evaluate the

IN THIS ISSUE

[Where VDI Works Best p. 2](#)

[8 Steps To A VDI Payoff p. 12](#)

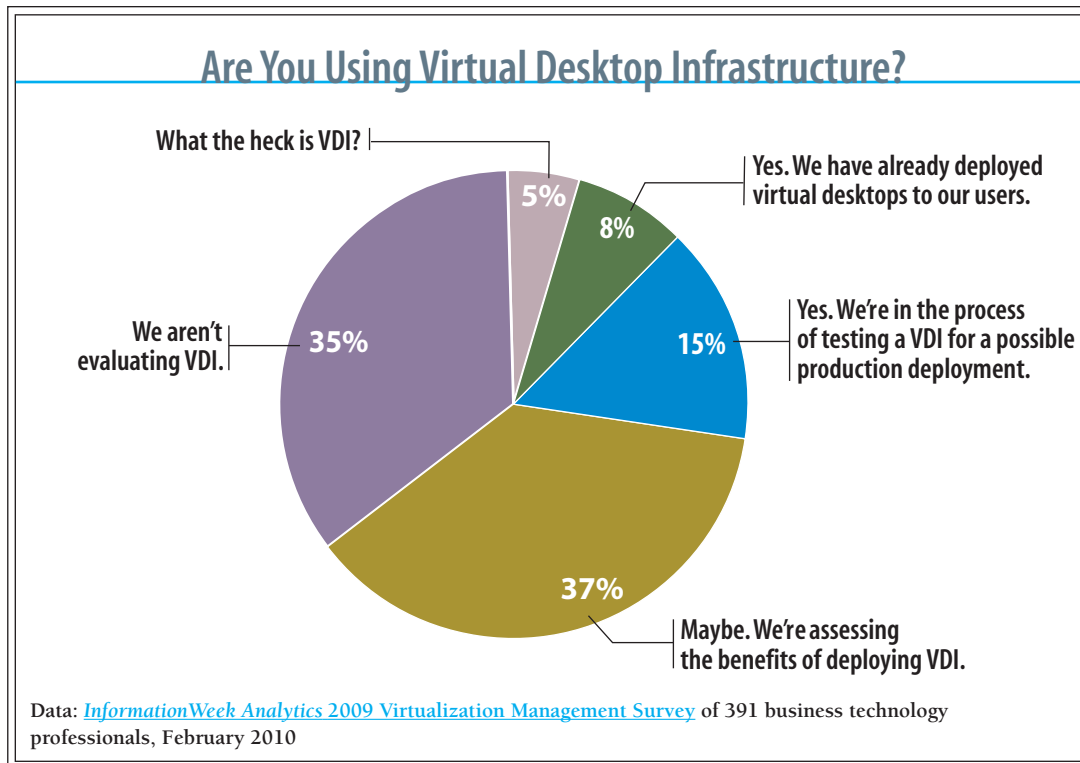
[Forget The Device p. 16](#)

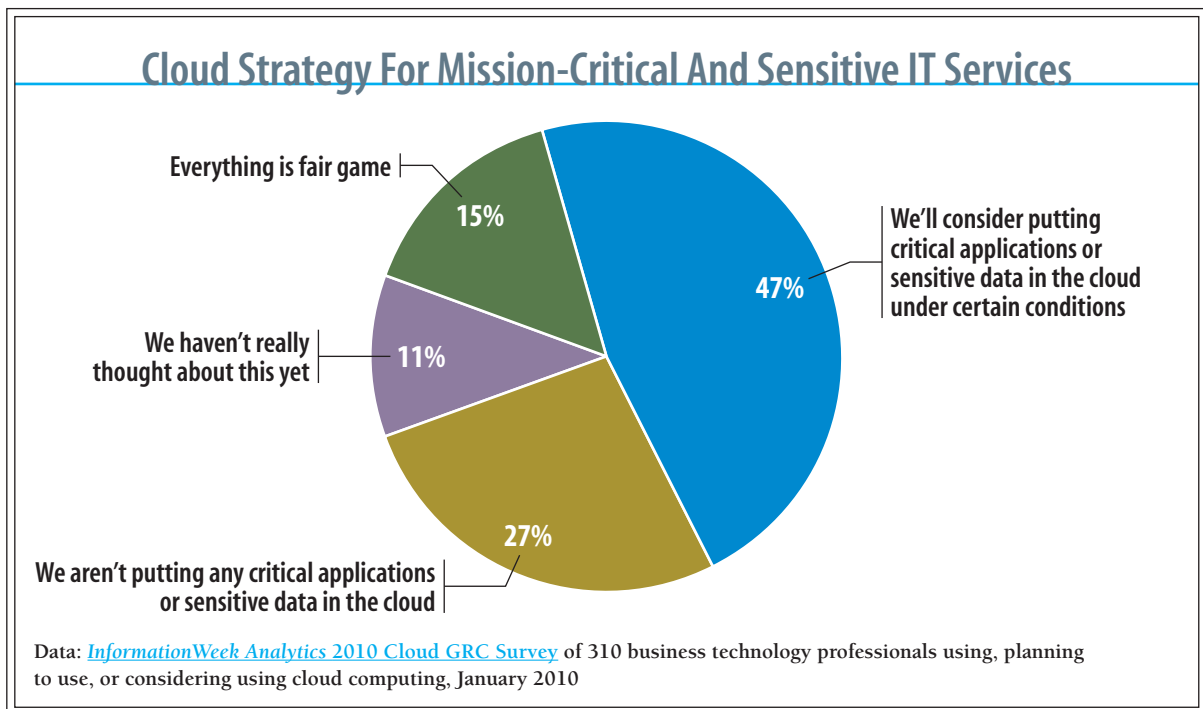
benefits of VDI. So why are some CIOs hesitating? Top fears we hear involve cost, confusion about outsourcing options, and the potential for end-user revolt. But hey, no one ever hit it big by playing it safe.

[COVER STORY]

One result of the recent economic downturn is a cultural shift in the way we do business. Companies willing to take risks and slash overhead while finding ways to maintain or even increase output are the ones that survive, maybe even thrive, when times are tough. In an effort to become recession-proof, CIOs are re-evaluating legacy systems and procedures, looking to identify ways to cut costs and increase productivity.

The resulting demand for more efficient and secure IT systems has created a perfect environment for virtualization to proliferate. In our recent [InformationWeek Analytics Virtualization Management](#) survey, one-third of the 391 business technology professionals polled said 75% or more of their companies' production servers would be virtualized by the end of 2011. Now, CIOs looking for the next round of efficiency gains must start investigating application, storage, and desktop virtualization. In our survey, 60% of respondents said they're using or evaluating VDI, and 8% of those have already deployed. The companies we work with in our practice confirm that, over the next few years, we'll see a steady increase in the number of organizations adopting desktop virtualization.



[COVER STORY] VDI ARCHITECTURE

For IT teams considering VDI, our key piece of advice is that executive-level buy-in is critical. Your end users may not even realize you're virtualizing servers, but they'll be very aware of VDI. You need business leaders squarely behind the project. On a related note, be prepared to educate users about how VDI will benefit them; this is no place to skimp on communications and training. On the back end, take into account your IT staff's size and skill set when deciding which architectural model—in-house or cloud—and SLA level are best for your needs.

There's no one-size-fits-all approach: Any mix of applications and operating systems can be packaged and delivered to a range of end users. One exception is data- or CPU-intensive apps like CAD or Photoshop, but trust us, vendors are working on this.

Virtual desktops can be served up privately, from an on-premises data center, or in the cloud via a hosted model. And every day, more players deal themselves into the VDI game, broadening the range of verticals served and enabling technologies supported. For example, one of our clients, Mosaic Technologies, a managed network services

IN THIS ISSUE[Where VDI Works Best p. 2](#)[8 Steps To A VDI Payoff p. 12](#)[Forget The Device p. 16](#)

Next>>

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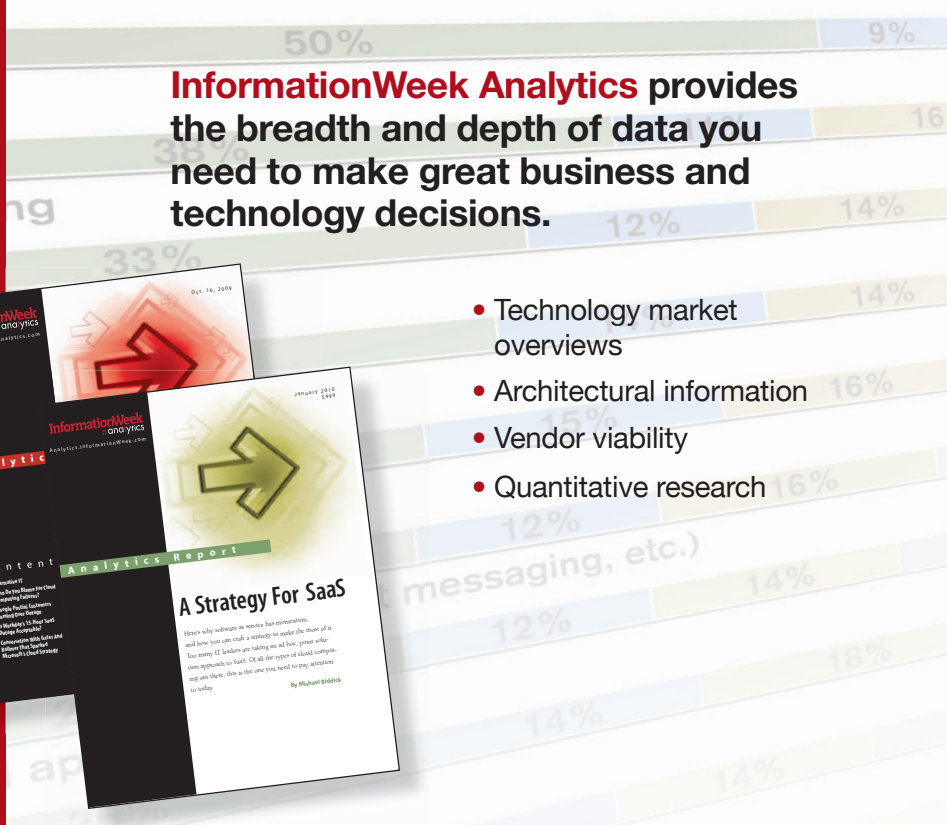
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[COVER STORY] VDI ARCHITECTURE

provider, uses cloud-based VDI to deliver an electronic health records application on demand without any client-side configuration. Patient data is secure as it never leaves the cloud data center, and the service also features built-in telework and disaster recovery capabilities.

Time To Build

With business support in hand, the next step is to answer architectural and security questions. First, decide what service level you need and what your security posture must be.

Service level: Both in-house and outsourced VDI offers IT the ability to provision desktops and operating systems from a standard image. How fast you can react to problems and how flexibly you can adapt to changing business needs depends on the skill level of your IT group, or in a hosted situation, the service-level agreement you've negotiated.

As we discuss in our [InformationWeek Analytics Cloud Contracts and SLAs](#) report, cloud service providers typically have standard SLAs; they generally won't negotiate custom agreements unless there's significant money on the table, and as you turn the dial up on SLA penalties, be ready for the cloud service to get more expensive. Critical items to include in your SLA are recovery time objectives for systems, servers, and data. Service availability parameters also are an absolute must; the SLA should specify that you'll receive credits if the service is unavailable for any time beyond agreed-on terms. Response time limits within which technical support calls must be answered and issues solved also are critical.

Security: Protecting sensitive information is the top priority for most of us, and since the cloud is Internet-facing, security will be a concern for the foreseeable future. We've been tracking this phenomenon for a few years. More than half of the 547 business technology professionals who

responded to our February 2009 [InformationWeek Analytics Cloud Governance, Risk, and Compliance](#) survey worried about security defects and loss of proprietary data. One year later, this dynamic still held true: In our [February 2010 poll](#) of 518 business technology professionals, security concerns again led the list of primary reasons not to use cloud services.

IN THIS ISSUE

[Where VDI Works Best p. 2](#)

[8 Steps To A VDI Payoff p. 12](#)

[Forget The Device p. 16](#)

FEDERAL TEST

VDI Weathers The Storm

BUSINESS JUSTIFICATION: In February, most of the mid-Atlantic was pummeled by record-breaking snowstorms. "Snowmageddon," as it was called, took the federal workforce by surprise; it was ill-prepared for the havoc wreaked on Washington's transportation infrastructure. However, agencies with well-defined telework policies and remote-access strategies, including VDI, minimized the effects of the storms compared with past closures. For this reason, the government has set a goal to increase the number of people able to telework by 20% by the end of fiscal year 2011. Virtual desktop technology is a key enabler of these initiatives.

TECH BENEFIT: Agencies are starting to use VDI, with its increased security, control, and disaster recovery/business continuity benefits, to accommodate expanding mobile workforces. Virtual desktops make it easier to do system updates and security checks, as well as other management tasks.

DRAG FACTOR: Public-sector CIOs must overcome security and budget constraints, as well as complex, bureaucratic processes that tend to make adoption of any relatively new technology difficult. Some federal agencies we work with report a disconnect in the awareness of potential savings versus up-front costs associated with VDI.

We hold a somewhat contrarian view. Top cloud providers take extreme measures to protect their interests. Strict authentication and auditing standards are complemented by multiple layers of physical and logical security. Does your company take similar steps to protect data from internal and external threats?

When deciding between on-premises and outsourced VDI, questions to ask include: Where is our data located? What sort of access will we have to apps and logs? And, what type of device protection is provided? In the cloud, data resides in a shared storage environment, segmented by volume and secured by host-based authentication. On-premises, IT also leverages a SAN or NAS, but the entire physical storage environment is private. Large cloud providers do offer dedicated hardware, for a price. Those subject to compliance mandates also must ask about geographic location. Both in the cloud and on-premises, granular application permissions should be in place to ensure authenticated users are served only relevant apps. It's much easier to limit application and data access when using VDI versus a traditional fat-client setup. In a hosted

[COVER STORY] VDI ARCHITECTURE

model, only the hosting provider has access to your VDI data records and logs. In most cases, you'll have almost no maintenance responsibility for your IT assets in the cloud, but you may specify in your contract that authorized individuals from your organization may review logs.

As for device protection, both on-premises and hosted VDI provides more layers of security than traditional desktops or portable devices, since all data and images reside in a data center. Users may be required to perform two-factor authentication to access hosted virtual desktops. In addition, a browser is opened to create a tunnel where encrypted data is transmitted through an SSL VPN, adding an additional layer of protection. Some VDI vendors also offer a "remote kill" function to disable a virtual desktop in case of a lost device.

IT must do its part by requiring use of strong authentication methods, such as smartcards. At the data center, a firewall must protect the network, authenticating users with passwords or active directory IDs. In our rundown of [eight top ROI considerations](#), we'll address the fact that with VDI, costs shift from maintaining fat clients to maintaining additional servers on the back end devoted to virtual desktop images. If your on-site data center is at or near capacity, that can be a strong argument in favor of going with VDI as a service.

IN THIS ISSUE[Where VDI Works Best p. 2](#)[8 Steps To A VDI Payoff p. 12](#)[Forget The Device p. 16](#)

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[ROI OF VDI]

8 Keys To Getting Value From VDI

By Jake McTigue

Pervasive desktop virtualization *will* change the way your employees interact. What's less certain is whether it also will save your company money—or merely become a pricey replacement for fat desktops.

Virtualization engineers can list multiple ways virtual desktops can cut costs while solving a host of problems. While we're not questioning the operational benefits of virtual desktop infrastructure—in fact, we think VDI will eventually deliver much better security and data management—CIOs must realize that ROI is entirely dependent on IT's ability to integrate business processes with VDI's unique features. If you have the right dynamic, VDI will yield significant returns. But roll out the technology without proper planning, and you may end up spending more while fending off disgruntled users.

Fortunately, we have an eight-step process to help you gauge the potential returns on a VDI deployment by examining organizational structure, existing virtualization adoption, security, employee productivity, support, disaster recovery, and power savings.

1. Determine whether the cost of a more-expert data center staff can be offset by needing fewer people to administer desktops. One thing most early adopters we've worked with agree on is that building and maintaining virtual desktop images and troubleshooting VDI problems require a well-trained IT staff. Deploying a limited number of identical workstation images en masse will reduce the overall *amount* of labor required to maintain desktops, but the technical expertise of the people performing those functions must increase dramatically. If you now use machine-imaging techniques to simplify and homogenize workstation deployments, your

IN THIS ISSUE

[Where VDI Works Best p.2](#)

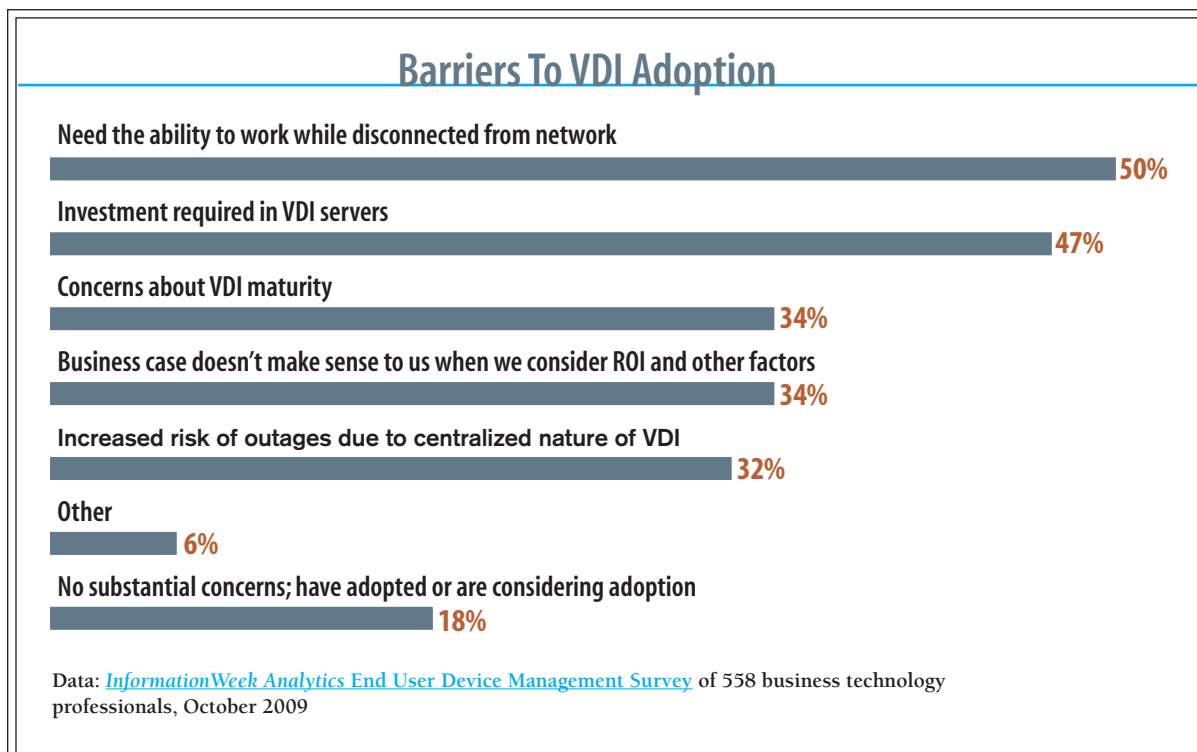
[High Stakes Of VDI p.4](#)

[Forget The Device p.16](#)

staff should easily adapt to VDI problem-solving and maintenance.

2. Determine how much desktop customization is required. The best candidates for VDI are organizations that don't have a lot of user groups and whose employees have uniform application requirements. At small companies, workers often fill multiple roles, so their desktops are highly customized; that means many images must be maintained. And this translates to management complexity in the data center.

3. Determine your current level of virtualization adoption. If you're already virtualized at the server level, desktop virtualization becomes a more attractive proposition for several reasons. Whether your vendor is Citrix, Microsoft, Sun, or VMware, odds are that your existing virtualized servers can be used to provide fault tolerance and better availability for your virtual desktops. In some cases, where the server environment is underutilized, it may even be possible to support VDI with minimal additional server purchases.



[ROI OF VDI]

4. Determine your security and compliance posture as it pertains to desktops. If security is of paramount importance, desktop virtualization can bring major, cost-effective improvements. By centralizing desktop resources in a secure data center, it's much easier to keep sensitive information from leaving the organization. Of course, depending on whether you use all thin clients or have some older PCs mixed in, data may still leak out through flash media, removable hard drives, and other peripherals, so standard endpoint security software should still be employed in tandem with VDI.

In addition, thin clients use only a few protocols to make and sustain connections to desktop images in the data center, in contrast with typical desktops that may use hundreds of different protocols, depending on applications. Fewer protocols always equals better security.

5. Determine if you'll buy thin clients or continue to use PCs. Yes, buying thin clients adds considerably to the cost of your VDI rollout. But using your existing PCs as virtual desktop endpoints has real downsides. First, it negates the security advances of VDI because data can be cached locally. Second, IT will still need to perform maintenance on physical PCs in addition to maintaining your virtual desktop images. And finally, you'll lose thin-client-related power savings, which can be significant in large companies.

The downside to thin clients, of course, is that the devices can't be used offline. While users of fat-client desktops who lose Internet connectivity may not be able to access network resources, they're still able to use some applications, work on local copies of files, and potentially get something done. For shops whose client endpoints are computers rather than thin clients, major vendors do offer offline virtual desktop technology, for an additional charge.



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- > Customizable ROI worksheet
- > The Top 9 hurdles to desktop virtualization, as rated by *InformationWeek Analytics* readers
- > Tips on how VDI can help with regulatory compliance

6. Are you willing to put policies in place—and enforce them? To realize the promise of reduced support costs, you'll need to tailor policies to VDI. For example, a user with administrative rights who installs software on top of the base image issued to her will find this software missing next time she checks out a virtual desktop. And, policies must be implemented to ensure data is never accumulated on desktop images, again, because it will be lost when the desktop is reissued. Document and desktop folders must be redirected to network shares, mail must be stored on mail servers, and users should be restricted from accessing local drives; otherwise, you risk data loss that no backup tape can solve.

7. Determine if an improved endpoint disaster recovery strategy can yield savings. Because desktop images and configuration settings are stored on your SAN with other critical business data, these images can be replicated or backed up directly from the data center. In the event of a disaster, workstation pools could be brought online in a secondary data center, possibly thousands of miles away, and employees wouldn't know the difference. Now that's what we call ROI.

8. Determine potential power savings. For large organizations with hundreds of desktops, power savings alone can justify the cost of desktop virtualization. Published energy consumption for an average thin client with an LCD monitor is about 100 watts. Desktop computers consume two to five times that amount of electricity. Now, vendors will tally these numbers and tell you that you'll save X watts of power per terminal, but that's not an accurate picture because your desktop application load will be consuming power on the server side instead. The good news is that by fine-tuning your data center workload, you can operate the servers dedicated to VDI at very high rates of utilization, which further maximizes power savings and efficiency.

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IN THIS ISSUE

[Where VDI Works Best p. 2](#)

[High Stakes Of VDI p. 4](#)

[Forget The Device p. 16](#)

Forget The Device

By Charles Babcock

Don't tailor a virtual desktop strategy to a particular device. It should focus on following the end user from device to device.

Desktop virtualization sounds like a simple follow-on to server virtualization. You put a hypervisor on the desktop, the way you did on the data center server, and run virtualized applications under it, right?

Well, no. As anyone who has taken this on knows, virtualizing the desktop is an entirely different breed of cat. Understanding it starts with the user—not focusing on the device that you're virtualizing. You need a desktop virtualization strategy that can follow employees around, regardless of where they are or the machines they're using. That, admittedly, isn't easy to implement.

IT teams that focus on devices and not people will eventually find themselves, after considerable expense, enmeshed in a series of moving parts that don't work well together. The predicted savings that came so readily on servers won't materialize.

Say, for example, that you initiate desktop virtualization with a standard desktop environment in mind. Once the first high-ranking power user complains, you're forced to customize his or her desktop, and the customization disease spreads faster than dengue fever. Your grand plan to serve all employees with a few master desktops is gone, and now you're storing a thousand custom desktops every night. The storage requirements alone eat up anticipated savings.

Or, you play hardball and define only a few roles, into which everyone must fit, each with a single master desktop. That keeps storage costs down—yet earns IT a reputation for being inflexible and out of touch.

A (seemingly) more savvy IT manager elicits role definitions from employees and lets them classify themselves, leading to more contented users. That is, until people need to travel, and IT gets bombarded with questions with no

IN THIS ISSUE

[Where VDI Works Best p.2](#)

[High Stakes Of VDI p.4](#)

[8 Steps To A VDI Payoff p.12](#)

good answers. Yes, they can use the old Office software on the laptop. But if they're looking for Excel spreadsheets they started while connecting to the network, that data's in the data center, not their machines.

Success in virtualizing desktops in the office turns into a liability as people go mobile. You'll need to provide mobile PC access, using a hypervisor on the machine for offline access that syncs to existing data the next time the machine hits the corporate network.

Done? Maybe, until employees stream back into the office after the holidays with new iPhones and Droids, and there's another strain of dengue fever running wild. If they use so many consumer apps on their phones, why can't they get to their virtual desktops from those same devices? Oh, and about this iPad ...

Once you tailor a virtual desktop to the needs of one high-ranking power user, the customization disease spreads faster than dengue fever.

The device options are only going to multiply. Thus, as part of your desktop virtualization strategy, you'll want to empower end users to do as much of the provisioning and maintenance themselves as possible. Your plan must enable the disconnected user.

The Smartphone Factor

Charles Kanavel, director of technology for Campbell Union High Schools, supplies 2,800 desktops to 8,000 students in seven high schools in the San Jose area. Each PC in its aging inventory serves at least five students a day.

One-fifth of Kanavel's budget, or \$550,000, is earmarked for hardware replacement. A year ago, he applied that amount to implementing desktop virtualization on existing PCs, spending \$300,000 of the hardware budget on virtualization and saving the cash-strapped school district \$250,000. The district then let students log into the virtual desktops from their home PCs and Macs.

Then came smartphones. A survey found that while 70% of students

[FOCUS ON PEOPLE]

had broadband at home, an astounding 95% carried browser-equipped, multimedia-capable phones. In January, Wi-Fi traffic jumped 30% as students returned to school with iPhones they got as gifts. Students tend to focus on applications rather than platforms (Windows or Mac). “Applications are what kids ask for,” Kanavel says. Students can “type 60 words a minute on the iPhone, write papers on them, and store them on the district’s central servers,” he says. “They’re constantly uploading content.”

Virtual desktops are the answer. Kanavel serves a mix of 600 different applications in use by the district via 18 distinct types of users. He ex-

Students aren’t Windows- or Mac-centric. They’re application centric. “Applications are what kids ask for.” —Charles Kanavel, Campbell Union High Schools

tends the virtual desktop to Windows PCs and Macs. For smartphones, the Citrix Receiver client software currently is limited to the iPhone; Kanavel has been told Blackberry support is coming this summer.

The investment breaks down like this: \$100,000 on server-attached storage, \$100,000 on blade servers, and \$100,000 on software to virtualize apps on central servers, to create virtual desktops that are streamed to end user machines, and to run the virtual applications. Citrix’s XenCenter is used to manage the life cycle of virtual desktops.

Kanavel serves 200 desktops from each \$6,000 blade server. He has virtualized 500 desktops since August and that will jump to 1,100 by mid-summer. The goal is to eventually replace all PCs in the district with thin clients and manage them from centralized servers. When done, he expects the district to save 40% per desktop in operating costs. Capital savings will be less impressive, since thin clients will need to be replaced about as often as PCs, at \$400 to \$600 a unit.

While Kanavel picked Citrix, VMware offers a similar lineup of desktop virtualization options, and Microsoft’s Hyper-V with Virtual Machine Manager management tools also is in the mix.

The biggest difference businesses face is security. Citrix recently added a plug-in to its Receiver client software that, if an employee’s working off-

line, stores data in an encrypted “safe zone” separate from personal data. That data’s transferred to the data center once the machine’s back on a network. Citrix is working on a “wipe” feature that would recognize when a laptop reported stolen connects to a network, and delete any remnant of the virtual desktop and its data from the machine.

The technology isn’t perfect for creating a device-agnostic virtual desktop strategy. VMware and Citrix have multimedia protocols that query what device is connecting and try to gear speed of presentation to that device. But the software recognizes a limited number of devices and doesn’t always adjust displays or format to the device.

Why bother with virtual desktops? IT efficiency is one reason. Kanavel supports 200 users per server, and new multicore servers employing six- and eight-core CPUs should be able to support more than 250 users. Cisco Systems says its new blades, designed for virtualization, will support 330 per blade.

Another reason is simplified desktop management. Software changes are implemented on central servers and streamed to machines the next time users log in. That simplifies migrations to new applications and operating system versions. The desktop becomes less rigid and less OS- and device-specific. It becomes a software entity capable of adapting to a user’s shifting location, need, and available computing instrument.

Companies have been slow to adopt desktop virtualization because the ROI can be hard to pin down. It’s not for everyone, but companies must look beyond the IT efficiencies and today’s devices.

As emerging, flexible forms of desktop virtualization adapt more easily to various devices, it will ease what seems a perpetual tension between users and IT managers in this age of consumer tech. Increasingly, the device will reflect user choice, while at the same time operating under the control of IT policy.

It’s not a cure-all, and new problems will emerge. But desktop virtualization is a technology whose time has come. The question is whether IT managers can implement it in a way that makes users eager to come along.

Write to Charles Babcock at cbabcock@techweb.com.

IN THIS ISSUE

[Where VDI Works Best p. 2](#)

[High Stakes Of VDI p. 4](#)

[8 Steps To A VDI Payoff p. 12](#)

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IN THIS ISSUE

[Where VDI Works Best p. 2](#)

[High Stakes Of VDI p. 4](#)

[8 Steps To A VDI Payoff p. 12](#)

[Forget The Device p. 16](#)

