CLIENT VIRTUALIZA

Greater security, better manageability and lower costs all result when moving from the traditional distributed PC environment.

In the last few years, businesses have experienced tremendous strides in virtualization. Server virtualization is practically a given in enterprise data centers, and storage virtualization is fast becoming a standard as well.

The next frontier is client or desktop virtualization. That is replacing the installed operating system on users' computers with virtualized operating systems (OSs) delivered from a centralized server or server cluster.

Virtualization at the desktop level offers a multitude of benefits to harried IT chiefs. These include easier management, extended lifecycles for older computers, standardization of the

on top of a hypervisor platform allowed several functions to be hosted on the same machine," Bramfitt notes.

Client virtualization builds on the same technology, using a host program to run a desktop workload alongside another OS, but to different ends. Generally, virtualization is not used to maximize usage of a computer's resources but to simplify the management of employees' computers.

There are situations where client virtualization is not an optimal solution. However, these situations are becoming increasingly less common as the technology becomes better understood and easier to implement.

"Managing distributed PCs takes time and resources," says Jeff Groudan, director of thin clients and client virtualization for HP. "If you have 5,000 devices, that's 5,000 devices that can break,

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work environment thereby easing support, centralized data storage and, often most important, greater data and network security.

Best of all, it does these things without affecting the end-user experience. In fact, done well, most workers do not even notice that they're working on a virtual machine rather than using an OS installed on their local hard drive.

From Server to Desktop

The story of virtualization starts with server virtualization," says analyst Simon Bramfitt of the Burton Group. "It has today become a well-understood and widely implemented technology."

In fact, a January 2010 "CDW Server Virtualization Life Cycle Report: Medium and Large Business" shows virtualization moving "down market" with 59 percent of enterprise companies deploying the technology in or before 2007 versus 34 percent of large and 42 percent of medium-sized organizations.

In the days before virtualization, though, if a company wanted to add a new function, it needed to install new physical servers. Consequently, most physical servers rarely reached their full capacity. "Hosting a server workload

5,000 devices that have software to manage and maintain, 5,000 devices with data that needs to be backed up and secured. The excitement of virtualization has to do with the ability to address and fix some of those issues."

Although there are variations, virtualization typically consists of a preconfigured OS image served over the network to a client system. The client might be a fully functional PC running Microsoft Windows or other OS, or a stripped-down thin client hosting only the software necessary to run the virtual environment.

Depending on the use, the image might be saved on the client system and run locally. Or it might be run on the server and accessed entirely remotely.

Managing the Virtual Desktop

From the perspective of IT managers responsible for maintaining a company's fleet of desktop and notebook systems, virtualization offers two critical benefits over traditional end-user setups: ease of management and more stringent security.

With the number of devices — and the number of locations in which they're used — typical of today's business environments, keeping tabs on everything IT can be a monumental challenge. Different departments have different software needs, and each program comes with its own idiosyncratic licensing rules.

In addition, computers move in and out of corporate offices at an alarming rate. They sometimes remain disconnected for days, weeks or even longer while necessary updates remain uninstalled.

And then there's the employees themselves, who can be ill equipped or even oblivious to the subtleties of security. For example,

innocently clicking on a popup that installs a rootkit that downloads a keylogger that opens the network to whoever wants access.

In addition, virtualization lets the IT manager responsible for the company's systems create and configure users' computers exactly the way they're needed. That includes exactly the right software and connectivity for each user deployed.

Instead of managing 5,000 computers, each with unique hardware and software configura-

"Virtualization allows IT to manage just the virtual device, not the computer," says Raj Mellempati, director of product marketing for VMware. "With virtualization, you don't really care what happens to the physical device."

This is especially important in today's mobile workforce, where employees often use their own computers or use company equipment in their off-hours for non-work-related purposes. "Instead of giving them a device, you can just roll out the virtual machine to their computers," continues Mellempati.

Virtualization also gives IT managers the ability to control the flow of sensitive data into and out of the network. In contexts

Thick and Thin of It

Both traditional desktop systems and thin clients offer strengths and weaknesses that make each better suited to some tasks than others. The choice depends on the tasks at hand and the computing resources needed to carry them out.

	Traditional desktop	Thin client
Deployment	Difficult and expensive to deploy	Easy and inexpensive to deploy; requires minimal configuration
Network connectivity	Virtual machine image can run locally; requires only intermittent connection with server for updates and data backup	Constant connection with server required
Security	Underlying operating system can be infected; although virtual machines are typically well protected against infection from host, malware can capture keystrokes or displayed data	Little or no risk of infection; embedded operating system generally cannot be modified and external programs cannot run
Business continuity and data loss	Data stored locally subject to loss until backed up; configuration information typically stored locally as well; in the event of damage to the machine, user access to personal configuration lost	All data and configuration information stored on server; in the event of loss or damage, can failover to another thin client
Server resources	Little demand on server beyond deployment of desktop image and backup; most processing done on the client's CPU	All processing done on the server, which increases server workload

tions, IT can manage a handful of virtualized computers. And each is tailored to the department they'll be used in or the tasks they'll perform.

Furthermore, these images can be locked down, so the user — or an intruder — cannot modify them. If by some chance a computer does become corrupted, the IT manager can remove the virtual machine (VM) off the computer and roll out a fresh, uninfected version within minutes.

Likewise, updates can be applied once, on the central server. And they can be pushed out instantly whenever a client attaches to the network.

where security is paramount, such as working with medical data or corporate trade secrets, data can be retained on the server with virtualization offering only a "window" through which to view or manipulate it, without permitting data to be copied to a remote device.

Saving Budget Dollars

As a server-centric computing model, client virtualization or a virtual desktop infrastructure (VDI) can save precious budget dollars. This can be especially attractive to the enterprise during capricious economic times.

The research firm IDC estimates that the total cost of managing a PC can run up to $1,000 per year or more. In even a relatively small office, it's easy to see how support can eat up as much as 80 percent of the IT budget.

According to IDC and the virtualization software firm VMware, client virtualization can lower maintenance costs by 40 percent. Since operating systems and software reside on a central server, any updates and patches can be installed once and then appear immediately to all users on the network. In this scenario, IT can much more effectively monitor, quarantine and combat viruses, malware and other attacks.

Should problems occur, VMs can be fixed, rebooted or taken offline remotely. This requires far fewer hands-on visits by IT support staff. In large business environments, with multiple locations and buildings, the move to a virtualized desktop can also lead to a drop in travel expenses for major application rollouts and upgrades.

Client Virtualization Tools

Virtualization gives the IT department the flexibility to "deliver the right experience to the right user," says James Millington, principal product marketing manager for Citrix Systems. "What are you trying to accomplish? What are the security implications? Is this something we want to be able to go offsite or something we need more control of?"

The kind of virtualization a company wants to deploy will depend on the answers to those questions. Generally speaking, virtualization solutions can be reduced to two different approaches: fat and thin client.

Fat Client — Tools such as VMware View 4 and Citrix XenDesktop run the VM on the user's computer. In this fat client setup, the virtualization tools can take full advantage of the computer's physical resources. For example, graphics-heavy programs such as video editing and photo manipulation software can leverage the local RAM and video card.

Often the virtualization client runs alongside or on top of the PC's installed OS. This allows users to segregate work-critical functions from personal computing on a single machine. For instance, Citrix's virtualization application for mobile workers, XenClient, runs directly on the local hardware using images saved locally, allowing it to run whether or not a WAN connection is present.

"Every time the user connects to the Internet, the client creates a secure connection into the data center and backs everything up," Millington says. For a mobile user, this blend of local virtualization and remote storage allows continuous productivity regardless if a notebook is broken, lost or stolen. "If something happens, the user can connect back to the data center on any new machine and pull all the data back," Millington adds.

Thin Client — This approach, on the other hand, typically relies on the bare minimum computing power needed to sustain the VM. It depends instead on the server to do all, or nearly all, of the core processing work.

Often thin client devices lack hard drives. Instead, they rely on an embedded OS — such as Windows CE Linux, or custom solution such as Wyse Technology's ThinOS — to provide just enough local infrastructure to boot up and run the virtualization client.

Such stripped-down devices obviously offer tremendous initial cost savings over full-featured desktops and notebooks because they often have few moving parts and low-power CPUs. These same factors also make them rugged and energy efficient compared to traditional desktop and notebook units.

However, this flexibility does not come without a cost. Obviously, thin clients are dependent on their connection to the server, making them ill suited to remote use without adequate bandwidth and vulnerable to network outages even when deployed locally. The lack of local computing power also makes them less than ideal for some demanding applications such graphics editing.

But manufacturers are addressing the trade-offs. Already next-generation thin clients have begun to overcome some of these limitations. Wyse thin clients, for example, use a technology called "live collaborative processing" to automatically determine the best location for data processing.

"Instead of, for instance, screen-scraping a 60 frame-per-second video image, it sends that video image directly to the thin client," says Hector Angulo, product manager for alternative computing practices for Wyse. "There the thin client decodes it locally,"

Mapping Virtualization Gains

Client virtualization is a relatively new technology that requires a significant investment of time and expertise to plan and deploy. There also may be significant up-front costs if new infrastructure needs to be installed in the corporate data center or to fortify the network backbone.

It is important to determine what the company expects to gain through virtualization and then to map out investment strategies accordingly. When rethinking client architecture design, determine how to simplify management, increase worker productivity and mitigate business risks.

There are some situations where virtualization is a no-brainer, such as a call center where employees perform very limited functions and nothing else, or for a support staff whose needs center on a few core applications. Other situations will require careful balancing of employees' needs, corporate policies and expected productivity gains to determine the value proposition and return-on-investment timeline. ◊

Let CDW develop a comprehensive client virtualization approach that will prove highly successful for your business.