

Virtual Desktop

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Leveraging Desktop Virtualization to Gain Greater Control, Security, Efficiency

As public sector organizations strive to grant employees access to internal information resources when and where they need it while simultaneously reducing costs, desktop virtualization is one alternative that may help meet those goals, in addition to providing both greater control over PC resources and stronger IT security.

According to industry observers, interest in desktop virtualization remains high despite the ongoing sluggish economy. Research from IDC indicates the market may reach \$1.7 billion in revenue by 2011. And similar research from Gartner Inc., projects 49 million desktop computers will be virtualized by 2013, up from 500,000 today.

Key Drivers and Benefits

Several market drivers spurring the growth of desktop virtualization were outlined in a June webinar sponsored by GTSI, Citrix, Microsoft and Hewlett-Packard, including:

- A recent survey by the 1105 Government Information Group reported 60% of federal IT managers plan to migrate to Windows 7 in six months or more, as part of their normal PC and laptop refresh cycles. It's anticipated many organizations will start evaluating desktop virtualization when engaged in the multiple-month rollout of the operating system, because the need to replace aging OS software and desktop PCs will provide an opportunity to introduce thin clients and virtualization.
- At the same time, federal IT organizations will be challenged by Windows XP 'end of life' issues. Microsoft has reported its XP extended support will end in 2014. By 2012, Gartner analysts have reported most independent software developers will stop producing XP applications.
- Public sector organizations also face new mandates designed to help move government organizations toward cloud computing services. In addition, an OMB directive encourages the use of virtualization by 2011, to help meet data center consolidation and energy reduction requirements. Virtualization is now considered a stepping stone to cloud computing, and desktop virtualization, while only a subset, is also considered a step in the right direction toward achieving federal regulatory compliance.

- The advent of Windows 7 is viewed by many industry observers as Microsoft's expansion of desktop virtualization features into the mainstream. Windows 7 delivers granular control through group policies that allow, for example, organizations to set when desktops go to 'hibernate' mode, which could help reduce enterprise-wide energy consumption. Other enhancements in desktop support capabilities, easier patch management, application management and improved security, among other features highlight the ways Windows 7 and desktop virtualization can work hand in hand.
- Research from Forrester Inc., in Cambridge, Mass., early in 2010 on the economics of migrating to Windows 7, included survey information from 12 'early adopter' companies with 5,000 or more employees. The improvements reported by these organizations in terms of administration and management capabilities, security features and centralized management of branch office and remote users, led Forrester to estimate an average 129% return on investment, in seven months.

Desktop Virtualization Benefits

According to industry supplier GTSI, the primary benefits of migrating to desktop virtualization include the ability for public sector organizations to:

- Reduce costs and complexity;
- Migrate easily to new software with available tools;
- Consume less power;
- Enhance security and control;
- Protect data on PCs and portable devices;
- Protect users and infrastructure;
- Increase user productivity by performing everyday tasks faster and easier;
- Enable access to information from anywhere quickly.

One of the June webinar sponsors, GTSI, is currently investigating a migration to desktop virtualization as the organization plans its migration from XP to Windows 7. "We have a large population of users located on a single campus with some additional employees who function remotely. Our goal is to gain confidence that data is secure,

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New York's Division of Housing and Community Renewal Goes Thin Client

Gains Greater Control, Efficiency

The New York State Division of Housing and Community Renewal (NYS DHCR) decided to “go thin client” about three years ago, implementing desktop virtualization primarily because the organization was unable to adequately manage and control desktop computers spread throughout seven (now five) separate borough offices located throughout the state.

Prior to migration, updates pushed to PCs were sporadic, as anti-virus and operating system updates simply couldn't be verified. Users had local administrator control over desktop systems and installed software on their own. There was also no control over licensing, said Duane Averill, assistant director of IT technical services for NYS DHCR.

Worst of all, virus attacks were prolific. More than 350 PCs were infected by a virus at once five years ago, and the effort required to re-clone every machine took six weeks. This became the catalyst for DHCR to seek some way to effectively lock down desktop computers. DHCR first put Cisco Security Agents on every PC, which proved a difficult rollout as the agents blocked everything and required the use of ‘whitelisting’ to allow users to run daily operational applications. Following ongoing problems with desktop configurations and the general lack of centralized control over desktop operations, DHCR decided to pilot Citrix's desktop virtualization solution, XEN App, replacing 60 PCs with thin clients. While undergoing that migration, the New York State governor's office signed a mandate dictating that state services must cut 15% of energy consumption by 2015. That prompted Averill to further justify the move to desktop virtualization, citing the following energy-related drivers:

- A University of Pennsylvania study found the approximate savings from implementing thin clients for a 1,000 computer network was \$29,291 per year, or a 45% savings in energy costs. The total five year savings was \$146,455.
- Traditional desktop PCs consume a maximum of 280 watts of power compared to most thin client devices, which consume approximately 30 watts of power in the same time frame, an energy savings of 90 percent.

- Thin clients boast a longer product lifespan than typical PCs, lasting five to seven years. Less heat is also produced using thin clients. And because they are lighter than PCs, these devices take less energy to ship.

Benefits Derived

The NYS DHCR was able to gain numerous advantages from the migration to desktop virtualization, including:

- DHCR's IT organization now controls which users have what application resources, and manages all software licenses for the division, boosting efficiency and reducing software maintenance costs.
- All user data is now stored on network storage, which is centrally controlled and regularly backed up.
- All configuration details are managed by administrators on centralized servers. There's no need to push applications or upgrades to desktop computers anymore.
- There are no lost user files or hard drive crashes. Data is secured.
- Users can access applications and data from any location with a web connection, which makes this a strong disaster recovery solution to meet COOP requirements.
- No thin client devices have failed since installation, which has increased reliability and reduced service costs.
- Provisioning services provides consistency of operations.
- Use of thin clients has produced energy savings and a reduction in the division's carbon footprint.
- Thin clients are a noticeably less attractive target (than PCs) for theft.

Once implemented, Averill said, “The difference in support services was immediate, as we went from several help desk calls per day to virtually none.”

The pilot was expanded to replace 350 aging PCs at the division's Jamaica Queens office. After analyzing the application programs in use, DHCR decided to consolidate applications as part of a division-wide effort to institute an enterprise architecture. This decision didn't fare well with some users who lost applications they were accustomed to

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using. Several others also expressed dissatisfaction about the loss of CD-ROM drives. That's when DHCR officials decided to allow individual users to write a business case for the use of such drives. In the end, no one was able to justify a 'permanent' requirement for the drives, and DHCR purchased a few external CD/DVD drives for loaner use only, Averill explained.

Because the DHCR has already invested in virtual servers and storage, removing tape subsystems and performing all backups using disk-based SANs, Averill's new goal is to consolidate the division's three current data centers down to one, with an offsite failover facility for continuity of operations/disaster recovery. This will likely create a dramatic reduction in energy costs. The consolidation plan calls for

moving all servers and storage to the division's Albany location, which will speed processing and reduce energy costs, Averill explained. DHCR is also investigating broader use of Microsoft's Windows 7 along with Citrix's XEN Desktop for the users who require more robust functionality.

Based on the implementation of desktop virtualization, DHCR now has 50 or more users on a single server running the division's standard virtual applications. In addition to the benefits derived (see infobox), Averill sums up the advantages in this way. "Ultimately, we've found that users don't really need CD-ROM drives to do their jobs. Instead, what they need is the ability to do their jobs from any location, and that's what desktop virtualization brings." □

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even as users seek access to information both on campus and remotely," said Denise Harrison, CIO and Vice President, GTSI.

After only seven months of availability, Windows 7 reportedly garners 13 percent of global operating system market share, according to market research from Net Applications, in Aliso Viejo, Ca.

Noteworthy Challenges

Complexity issues predominate, as no single desktop virtualization provider can yet address each customer's unique desktop computing challenges. "It's important to investigate the differing solutions available, as desktop virtualization is about much more than just virtual desktop integration (VDI) or hosted virtual desktops," said Miguel Sian, Sr. Enterprise Solutions Consultant for GTSI, who explained that organizations with many mobile users, for example, may find VDI isn't a good fit, while a virtual client or an application solution that allows them to work offline and later dock their systems to synch up might work more appropriately to meet those needs.

Also in many cases, industry observers said the smaller start up suppliers are moving fastest to provide innovative, simplistic management solutions for desktop services. "Government agencies must try to pay equal attention to all desktop virtualization suppliers, to avoid spending too much on a solution that may not perfectly fit requirements, as there are often less expensive alternatives available that might fit better into the organization's requirements," said Ian Song, Research Analyst for IDC in Framingham, Mass.

Looking ahead, Song said the current hot topic in desktop virtualization is the concept of a 'virtual computer,' which is essentially a thin client version that's more mature, less complex and works on most any hardware platform. Some agencies, meanwhile, are seeking local desktop computers that feature the ability to isolate users based on security clearance or the classification level of information to be accessed. The ability to do that on a single computer, with separate virtual machine images residing on the same physical hardware platform, would be extremely beneficial, Song explained. □

Q&A: Microsoft's David Kim

With the advent of Microsoft's Windows 7 operating system, all eyes are on the industry's software giant as it strives to further promote the concept of desktop virtualization into the mainstream of public sector operations.

This is why David Kim, Federal Solution Specialist, Desktop Virtualization took time to answer a few questions from 1105 Government Information Group Custom Media about the impact of this latest operating system release, Microsoft's relationship with Citrix, new licensing arrangements and of course, the benefits desktop virtualization brings to a federal IT audience.

Question: What are the key benefits of desktop virtualization for government?

Kim: Public sector organizations need to reduce the total cost of ownership of their IT infrastructure, increase operational agility and continuity of operations, enable anywhere access, and improve both security and compliance. Working in a highly regulated industry, just the concept of implementing greater mobility can be highly problematic. Using desktop virtualization technologies, public sector organizations can allow users to run their applications without installing the application on their computers or other devices. And in the event of an emergency, desktop virtualization can provide the ability for users to Telework, working remotely when agencies get shutdown, as they did during last winter's snow storms. The remote access capabilities provided by desktop virtualization can resolve key continuity of operations (COOP) challenges, delivering secure productivity that government organizations require.

Question: Why has it seemingly taken so long for Microsoft to drive desktop virtualization into the forefront?

Kim: Where other industry suppliers have viewed desktop virtualization as a product, we tend to think of it as a deployment strategy. Once an organization decides to virtualize desktops they must decide what they need from both a platform and a partnering perspective. The concepts behind desktop virtualization have been around for nearly 20 years, evolving from client server computing in the early 1990s to thin clients in recent years. Now virtual desktop integration is the sexy term, but its an ongoing evolution. With the advent of Windows 7, we are taking desktop

virtualization a step further. Because this isn't a traditional deployment model, it takes time, requires expertise. Organizations must virtualize applications first to gain the most benefits. Any potential customers must also decide on the endpoints, rich client devices, or remote desktop services or thin client computers. Desktop virtualization isn't just about applications. It's the customer's specific use requirements, access methods and end points that will connect to these services. There are multiple components, including a virtual operating system, virtual applications and depending on the organization's requirements various end points used to make it all work.

Question: Can you discuss the new licencing agreement/ changes aimed at aiding desktop virtualization in public sector environments?

Kim: We recently upgraded our licensing agreements to match the messaging for desktop virtualization. Where there were previously multiple products that each had to be separately licensed to gain full virtualized access to applications, we now offer a subscription based model, making it easier to add virtual desktop integration at either a base or premium level. And in July, Microsoft began offering improved pricing for Windows client customers who participate in Microsoft's Software Assurance volume licensing option. Under the new plan, customers no longer must buy a separate license to access Windows in a virtual desktop infrastructure (VDI) environment. VDI rights will be part of the Software Assurance agreement. We wanted to give Microsoft's customers more flexibility in how they deploy desktop virtualization, since many do not know in advance how many users they will have and when they will deploy VDI. Also in July, Microsoft rolled out Windows Virtual Desktop Access subscription for customers who use devices that don't qualify for Software Assurance, such as thin client devices. The license is priced at \$100 per year, per device. Finally, Microsoft also enabled a remote desktop access capability that allows a mobile client device to run a Windows virtual desktop. This capability is available to Windows client Software Assurance customers or to those who purchase the new Windows Virtual Desktop Access license.

Question: How is Microsoft's relationship with Citrix evolving?

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Deciphering the Many ‘Flavors’ of Desktop Virtualization

A range of virtualization software and delivery technologies promises to enable a new desktop computing model, which market researchers, including IDC, maintain may overcome many of the current limitations associated with distributed desktop computing.

Currently, there’s no one-size-fits-all desktop virtualization solution. Rather, each desktop virtualization supplier offers a number of options to deliver desktop capabilities to users. “What they all share is that they’re different from traditional desktop computing,” said Ian Song, Research Analyst for IDC in Framingham, Mass.

Although client virtualization technologies have been maturing during the past two years, significant growth has yet to be realized, largely due to complexity and a lack of one-stop shopping for an entire spectrum of desktop virtualization technologies. Still most research firms, including IDC, predict an upswing in the adoption of desktop virtualization solutions in the coming months. Suppliers continue to work on improving and simplifying their solutions, and IDC just released a report written by Song, entitled 2010 Virtual Client Computing Taxonomy and Guidance, which is designed to help customers understand the various technologies involved, and how best each organization can extract value from the range of virtualized solutions currently available.

IDC uses the umbrella term client virtualization to describe all technologies associated with virtualizing the end user computing experience, as opposed to the widely acknowledged desktop virtualization, which Song said describes only the technologies used to virtualize end user desktops. While the entire exercise seems an enormous semantic challenge, IDC has categorized client virtualization into four primary components:

Desktop Virtualization – uses hypervisor technology (a type of software that allows multiple operating systems to run concurrently on a host computer) to decouple an operating system from its host hardware, and isolate the specific client environment from other operating systems running on a physical device. This model is generally recognized as virtual desktop integration (VDI). Within this category, Song maintains there are two types of desktop

virtualization technologies:

- **Centralized Virtual Desktop**, a form of server based computing that uses a ‘server grade’ hypervisor to host multiple unique and isolated client operating systems aboard a single server or group of servers in the datacenter. Virtual desktops are delivered to end-users devices via the network.
- **Distributed Virtual Desktop**, which runs on a ‘client grade’ hypervisor, in other words a virtual machine resides on the local client hardware, such as a laptop computer.

Application Virtualization – software technology that detaches an application from the underlying operating system. Song maintains that a virtualized application doesn’t need to be installed in the traditional sense, but can be executed just as a natively installed application. The environment that encapsulates a virtualized application is typically called a sandbox or virtualized container, designed to fool the enclosed application into believing it’s directly interfacing with the operating system and all associated resources. Virtual applications can either be executed on a PC, leveraging processing power from a traditional PC, or executed on the server-side, then streamed to an endpoint device, typically to a thin client or stateless PC. There are also managed services based on application virtualization that allow administrators to allow/disallow virtual application to run locally, set application expiration, control provisioning of applications according to user rights and grouping and enforce license compliance. Song explained that many organizations are currently evaluating application virtualization to provide application compatibility when migrating from Windows XP to Windows 7.

Virtual User Sessions – a mature server based computing model that creates a shared environment to host multiple users from a single operating system. Each user gets access to their own profile and instance of installed applications. Virtual user sessions can be delivered to any end user device via the network, the only requirement for the device would be support for the protocol rendering the virtual environment. The technology can also be used to deliver specific applications to users, allowing users to connect directly to a specific application rather than an entire desktop. Because virtual

user sessions require network connectivity to operate, Song said this works well for sensitive applications, where administrators can constantly monitor and regulate usage to ensure compliance. The limit on this technology is that it can only use a single copy of the operating system, forcing users to share a single environment. This creates a security flaw in that any devices connected at end points would be available for all connected users. Because virtual user sessions don't require an existing hypervisor infrastructure, organizations currently not utilizing server virtualization can implement a virtual user session solution without investing heavily in remediating the data center. The technology is currently offered by Microsoft as Remote Desktop Server or Citrix as XenApp, Song said.

User Virtualization – decouples the end user personal data and settings from the underlying operating system and applications, therefore creating portable user identity that can be applied to any connected end points. The traditional application of this technology has been mainly Microsoft Roaming Profile and Folder Redirection. With the emergence of virtual desktops, and the promise of 'anywhere, any device' access to the desktop environment, user virtualization solutions are becoming increasingly relevant, he said. Upcoming solutions are expected to offer more advanced user virtualization that can not only decouple user profiles, but personal applications as well. User virtualization can help organizations achieve cost savings by leveraging dynamic desktops, in which one golden image is used to

dynamically assemble multiple personalized desktops by applying layering technologies enabled by user virtualization. The result of dynamic virtual desktops is reduced storage requirement and management overhead, driving down the cost of ownership. Most desktop virtualization vendors already have certain user virtualization capabilities built-in, although certain user segments, such as knowledge workers, might require more advanced user virtualization solutions.

And while the descriptions above still may not fully eliminate confusion about the various types of desktop virtualization technologies, there are other components involved in the selection of a desktop virtualization solution as well, including delivery technologies and the hardware to be used at endpoints. Delivery technologies include the protocols used for network communications, and perhaps even a connection broker, which is used to manage a pool of connections such as remote desktop computers or virtual machines. Song explained that some third party vendors offer connection broker solutions that can translate different networking protocols, supporting multiple platforms at once. Finally, end user hardware can range from full PCs, to repurposed or stateless PCs, thin clients to something called a zero client – an ultra thin client with no embedded operating system. There are even mobile clients that can be hardware or software based for use in notebook PCs and mobile phone devices. More detailed information including breakdowns of the leading industry supplier offerings is available at www.IDC.com. □

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Kim: As a relatively new Microsoft employee, having joined from Citrix earlier this year I'd say Microsoft's 10-year partnership with Citrix, providing terminal services is going strong. Microsoft and Citrix's HDX technology in the Citrix XenDesktop will be extended to tap into Microsoft's Remote FX platform. Microsoft will rollout the integrated XenDesktop product about six months after SP1 is released. Microsoft is also collaborating with Citrix by rolling out two

VDI special offers. One is called the "Rescue for VMware VDI program." Under this program, customers can trade in a VMware View license for a Microsoft VDI standard license and a Citrix XenDesktop VDI license at no additional cost. The other is a "VDI Kickstart program," which lets customer run VDI for \$7,000 for 250 devices. Both programs run through the end of 2010. □

New Deployment Roadmaps

Industry observers and suppliers are working to help reduce both the confusion and complexity involved in migrating to virtual desktop environments.

While the primary benefits of client virtualization, including a reduction in the total cost of ownership for end user computing, better security and improved desktop management are certainly appealing to public sector organizations, for now the transition from traditional distributed desktop environments to desktop virtualization remains complex. And as IDC reports, no two organizations' requirements are going to be the same.

During a recent 1105 Government Information Group webinar on desktop virtualization, Miguel Sian, a Senior Enterprise Solutions Consultant at GTSI outlined a detailed plan of action that any organization can use to help implement desktop virtualization. Listed below are the primary steps public sector organizations should consider when deploying desktop virtualization in their organizations.

Step 1: Assess the Environment – This requires fully investigating and understanding all of the hardware, software and end user workloads already in place on desktop computing platforms.

Step 2: Plan the Environment – Agencies must map out the operating system, application and desktop virtualization migration strategies, including selecting the tools and services the organization intends to use.

Step 3: Prepare Applications and Users – Each organization must test and validate the applications chosen for compatibility and delivery in a virtual environment. And the strategy must also be clearly communicated to users early on.

Step 4: Design Infrastructure – This step involves sizing the servers, storage and network infrastructure to support desktop virtualization. Organizations should also begin work on setting global group policies for access to virtual applications as well.

Step 5: Pilot to User Group – Testing the solution on a smaller group of pre-selected users can help an organization to validate assumptions regarding the operating system, applications and user configuration settings.

Step 6: Implement the Migration – Using milestones, goals and available resources, organizations can manage the migration to the new environment and be sure to maintain constant communications with users and other stakeholders during the transition.

Step 7: Optimize the Desktop Environment – Consolidate and centralize applications where possible, and leverage the investment in desktop virtualization to address other important issues, such as continuity of operations and energy reduction initiatives.

For more information on the details of deployment, public sector organizations can turn to GTSI at www.gtsi.com/windows7.

IDC Guidance

Meanwhile, Ian Song, Research Analyst for IDC in Framingham, Mass., offered his own advice for organizations considering a desktop virtualization migration.

In many situations, organizations will be forced to build their own client virtualization solutions by selecting elements from multiple vendors, leveraging multiple technologies, he said. Song agreed with GTSI officials that organizations must first carefully analyze their organizational needs and develop a specific client virtualization strategy, “and then adopt the most appropriate types of client virtualization technologies that fit their needs.”

It's important to note organizations should be careful not to limit choices to a single specific client virtualization technology, as more often than not, better results can be realized through combining one or more solutions, he said.

Finally, Song explained, client virtualization should be considered fundamentally different and separate from server virtualization, and organizations should not expect an immediate return on their investment. Cost savings are most likely to be realized through desktop management improvements, which may require changes in management's mindset, he said, as well as increased collaboration among IT departments. “A successful client virtualization implementation is a journey of continuous optimization and process improvements. Any expectation of quick and dirty cost reduction through client virtualization may not be realistic,” Song added. □

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