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Six Desktop
Virtualization
Pain-points and How
XenDesktop 5 Helps
Overcome Them

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Introduction

Today, an increase in the number of datacenter resources and solutions — from networking to storage — offers a wide array of sometimes confusing choices. In the case of desktop virtualization, more efficient virtualization architectures and the proliferation of new end-user devices (smartphones, tablets, etc.) are fueling enterprise interest, providing an array of choices, and setting the stage for wider adoption.

Desktop virtualization centralizes the desktop environment to enable simpler, more cost-effective management that significantly reduces the total cost of ownership TCO over traditional approaches to managing desktops. It represents a considerable resource because it offers a new standard for accessing desktops. Earlier virtualization models were based on the technology's limitations in regards to where and how users could gain computing access. This has given way to the current definition in which the needs of users define the processing approach, no matter where they are or the device being used.

Currently many IT departments see the benefits of virtualization and are in the early planning stages of developing various solutions. While desktop virtualization provides the look-and-feel with which users are comfortable, it still involves a range of management issues or pain-points for IT. These extend from application coverage and storage to security and networking, to name a few. In this white paper, we'll look at some of the key pain-points that administrators deal with in regards to virtualizing desktops. More specifically, we'll look at how XenDesktop 5 alleviates those pain-points and offers administrators versatility and key options when confronting desktop virtualization growing pains.

1. Management Pain-points

Desktop virtualization presents IT with a number of technology choices and solutions, especially for delivering desktops to users. These include MS Remote Desktop Services, client-based VMs, Application Virtualization, operating system (OS) streaming, and many others. Client management tools such as these allow IT to facilitate a number of processes, such as OS deployment, patch management and client deployment, service desk integration, and remote control. However, while desktop virtualization can streamline delivery, it can also further complicate IT management issues.

First, it's important to mention the two main platforms used in standard desktop virtualization scenarios. In general, a server-based computing (SBC) solution that's closely managed with minimal personalization can achieve cost savings in many use cases. A more stringent 1-to-1 virtual desktop infrastructure (VDI) offers further ben-

efits: centralization, agility, and flexibility. Any cost increases are justified by the added performance features, for example, Windows applications on smart devices.

Today, the average VDI deployment still consists of a hybrid of SBC and VDI: SBC for workers who can use a simplified desktop, and VDI for those who require the additional features. But those IT groups who offer both VDI and SBC solutions often encounter serious challenges with management requirements. Add smartphone and tablet users into the mix and that means an additional environment to manage. Moreover, travelling and remote users represent moving targets that pose their own kinds of service challenges. For IT, managing multiple kinds of hardware or shared desktop machines can be a time-consuming and tedious process.

Ultimately, with desktop virtualization, ensuring that users experience acceptable application performance is a key management concern. Inadequate performance levels quickly create user productivity issues. Invariably, some aspect of the infrastructure will be blamed for the deficiency, whether it's IT management or the hardware.

XenDesktop 5 alleviates these kinds of management pain-points with key new features:

- **Desktop Studio:** This new tool enables IT to perform OS provisioning securely and quickly. The console focuses on creating an area for architects to build, test, deploy, and roll back images. For example, administrators can deploy a single master image of Windows 7 and associated applications to dozens of users and update them all simultaneously.
- **Desktop Director:** Helpdesk administrators and application specialists can use this Web-based management console to perform daily, low-level tasks. It enables real-time status views, session restarts, message sending, and remote assistance. The console gives application owners direct access to the virtual machines (VMs) for which they're responsible and can be accessed from any Web browser for simple daily management tasks.
- **Installation:** In the past, both the management and installation of desktop virtualization solutions was cumbersome and time-consuming. Now, XenDesktop 5 provides an application wizard that substantially simplifies the installation process.

2. Administration Pain-points

In terms of desktop virtualization administration, the assumption is that IT managers can easily set up a single master image and deliver it quickly to large groups of users. In the case of VDI-based virtualization, however, multiple implementations exist for every layer of the architecture. This translates into a range of different products that perform similar functions. As a result, it can be cumbersome to calibrate and fine-tune the virtualized environment to achieve the desired result. Moreover, it has become increasingly difficult to choose the right solution.

The nature of providing virtualized desktops to users means bridging distances. Yet remotely located machines that require physical access can complicate system administration tasks. While remote management offers some solutions, significant time and effort can be expended trying to physically keep systems optimally configured.

In addition, when administering group policy, change control is another pain-point IT administrators often encounter. Any change a group policy administrator makes immediately affects the production environment. If there's a lack of history maintained, then it's difficult to know when the changes were made and by whom.

Finally, without accountability and a history that's easily audited, administrators are faced with having to second-guess and perform time-consuming tasks, such as regression testing and license verification. Moreover, other pain-points that administrators frequently encounter include: authenticating users, assembling the desktop environment, and brokering connections between the user and the virtual desktop.

In regards to administration, earlier versions of XenDesktop were considered difficult to manage due to its IMA-based management architecture. The multiple components along with the command line console made initial set-up more complex than other solutions. XenDesktop 5 alleviates those issues by utilizing a relational database structure.

Now, configuration and management data are stored in the SQL-style database, making administration of the desktop environment considerably easier and more intuitive than competing desktop virtualization products. Delivery controllers are stateless, with all configuration and management data stored in the database. In addition, XenDesktop 5 has substantially enhanced scripting capabilities and automation, easing administration tasks.

IT managers can create nodes at each satellite or agency site to distribute VMs locally and optimize performance. The XenVault tool then allows administrator to secure corporate data when working with outside contractors in remote locations using personal devices.

In addition, Citrix Xen Server, the XenDesktop server base, includes protection and recovery features for scheduling automatic snapshots of the virtual machine disk and memory states for long-term archiving. And Desktop Studio enables IT administrators to design, provision, and manage new desktops through its GUI-based console.

3. Application Pain-points

It's been said that when it comes to desktop virtualization, application performance is the key benchmark for user satisfaction. For IT administrators, deploying and managing desktop applications can be a struggle. A number of issues, such as application compatibility, license usage monitoring, and system patching present unique challenges to IT.

As mentioned previously, both VDI and SBC solutions replace a relatively simple environment, that is, a personal desktop PC with a very complex, shared back-end infrastructure. Often managers are confronted with striking a balance between achieving a necessary level of control and providing the flexibility users need.

In general, desktop virtualization enables applications to be accessed without changing the local operating system or installing application software at a specific workplace. Users execute the application as if it had been installed locally and can save data and print without need of any modifications to the local client. However, for

administrators, one of the more painful aspects of deploying is testing and remediating applications. Regression testing requires sustained focus as well as a certain level of expertise on the part of the administrator.

It's well known that resolving software licensing in a desktop virtualization environment can be laborious. Often, understanding exactly what programs are covered in a software licensing agreement that extends to a virtualized environment is another pain-point. As much as administrators struggle with this issue, vendors do as well, and it's a problem that's being resolved gradually as more companies virtualize.

Some of the other problems administrators face include: adequate application packaging as well as isolating the OS and other applications while still maintaining inter-application communication.

A constant challenge is the ability to achieve a performance measurement that lives up to end-users' expectations as well as proactively ensuring that performance level and capability meet expectations. Add to this the desire of most users to download custom applications, which presents its own set of challenges.

XenDesktop 5 offers administrators a clear set of tools for managing applications in virtualized desktop environments. For example, the new System Center console supports the Microsoft System Center and makes it easier to test and deploy applications on both physical and virtual desktops. The Enterprise App Store plug-in offers an authentication and an app store service that are automatically installed on the user's desktop.

Getting access to Web and SaaS applications via the cloud with NetScaler Cloud Gateway as opposed to hosting applications in-house is another plus for managers and eliminates regression testing. This service leverages a network-based approach to coordinate credentials for easy log-in access, essentially making a user's identity borderless. Finally, XenVault enables administrators to deliver on-demand corporate applications. It offers automatic encryption and transparent desktop archiving to ensure that data is secure, regardless of the device being used.

4. Security Pain-points

Adequate security is often a key concern in virtualized settings for organizations of all sizes. It's generally accepted that a virtualized desktop environment increases company security because it provides IT with direct control over a large number of users. For example, any change to the master image, such as disabling USB ports or blocking the download of executable files, applies to all members of a group.

However, while technology managers are continually looking to garner more control over the computing environment, new technologies, such as the explosion of mobile devices used in-house, constantly threaten that control. IT always needs to have a good overview of the workplace and application delivery scenarios. This enables greater transparency, both in regards to how users work as well as to the requirements of various applications. It's no secret that IT administrators see desktop virtualization as a means to exert control over technology usage for increased corporate security and data protection.

But IT departments continue to battle new security threats all the time, such as DDoS attacks and malware. To effectively fight off these threats, companies in the future will increasingly rely on third-party security specialists

to provide the level of sophistication, software, and expertise to thwart these attacks. However, providing secure, usable access to desktop virtualization clients via mobile devices is happening now. And managing the security of both those devices as well as the range of downloadable applications is an extremely tall order.

XenDesktop 5 provides XenVault to specifically address BYOC (Bring Your Own Computer), mobile, and laptop users. It enables administrators to deliver safe, on-demand corporate applications. Automatic encryption and transparent desktop archiving provides a level of security ensuring that data is safe, regardless of the device being used. Administrators can also remotely wipe corporate data from any lost, stolen, or temporary XenDesktop 5-supported device.

XenDesktop 5 also offers improvements for client-based security. To represent these client-based improvements, Citrix has renamed its desktop client to Citrix Receiver. Its Flexcast architecture allows laptops to be mobile and to become virtual desktops that can be accessed from anywhere. Users can also execute virtual workloads, disconnect any time, and reconnect with built-in synchronization. Moreover, administrators can still secure corporate data and centrally manage all operations on these remote machines.

5. Storage Pain-points

When it comes to storage-related issues, desktop virtualization poses some unique challenges. Implementing a virtual infrastructure presents a whole new set of considerations around managing storage. These issues range from basic questions on configuring/provisioning storage and storage management to backup strategies and disaster recovery. In addition, ensuring that data remains continuously protected on all devices is a demanding task, as mentioned above. Even when using backup agents, administrative mistakes and errors can occur not to mention the nearly constant uphill battle of convincing users to save their important files.

Yet it's important to note that OS data and files that might typically reside on internal storage in physical server environments are often moved to shared storage in virtual environments. This can result in a rapid increase in the number of files and the size of the storage network. IT managers and CIOs then need to consider the additional costs. For example, the relative cost of SANs (storage area networks) and NAS (network-attached storage) systems is significant when compared to the cheaper internal storage used with desktop PCs.

But perhaps an even bigger concern is I/O performance. In this case, it's not the CPU or memory usage that dictates performance issues, or the lack thereof. More often, it's unpredictable workloads, such as company-wide Monday morning boot-ups. Even recurring patch management tasks can add to the unpredictability of the workload. But addressing the I/O aspects of desktop virtualization can entail a whole different set of tasks.

These can include categorizing usage patterns and classifying user groups. Often third-party providers can be enlisted to assist in deduplicating data and optimizing traffic patterns. A hidden cost in VDI infrastructures is this requirement for high-performance storage. Generally, it's not so much an issue of capacity. Rather it's IOPS-related (Input/Output Operations Per Second) or the ability to read and write small bits of data quickly, which requires a stable storage infrastructure.

XenDesktop 5 now supports XenServer Intellicache. This new feature intelligently caches virtual desktop storage on local SSD storage in the host. By caching ninety-nine percent of the reads and writes of the virtual desktop locally rather than out over the storage network, the IOPS requirements of the host server are cut by half.

The centralized management allows administrators to migrate VMs across hosts as needed. Another unique feature of XenDesktop 5 is the ability to deploy a wide array of desktop scenarios using a common infrastructure. For example, administrators can use the same master image to thin provision both shared/pooled and persistent/assigned VMs. XenDesktop 5 offers the Machine Creation Services (MCS) as part of the Desktop Studio to perform these tasks.

6. Network Pain-points

In the area of networking, a key consideration is to understand that creating virtualized user nodes or clients does not immediately simplify the various network processes. If anything, the desktop virtualization environment can be slowed down considerably with an inadequate network or WAN infrastructure in place. Administrators must contend with often competing requirements for the systems they support. These can consist of SBI-based desktops that require graphics and real-time applications as well as VDI-based clients requiring the fast delivery of a whole operating image at the beginning of each user session.

In addition, for SBI-based virtualized desktops, network bandwidth requirements are typically limited to carrying keyboard-mouse commands to the server and returning screen refreshes to the end-point. At a minimum level, multiplying the keystroke/mouse bandwidth by hundreds or thousands of desktops, along with application additions, and network bandwidth can suffer.

Maintaining smooth, crystalline graphics is the single biggest issue for VDI-based virtualization. Due to the need for a high display-refresh rate, these heavy graphics intensive environments require extra consideration. Limitations of bandwidth and network latency are doubly challenged by the increased distance between users and servers as well as dependence on remote servers. In most cases, WAN optimization can ameliorate the root causes of these problems and allow administrators to reach the targets they're aiming for.

While several of these issues are characteristic of the transition to a virtualized desktop environment, XenDesktop 5 significantly eases the burden for administrators with these features:

- dynamic color compression automatically adjusts color compression based on network conditions
- 32-bit color session support improves application ability
- HDX optimizes network and server resources via print compression as well as plug-and-play video conferencing

In addition, Adaptive Orchestration, another HDX feature, inspects client and server load. It also monitors Citrix Receiver capabilities to dynamically tune HDX for optimal user experience without administrative intervention.

Finally, the XenServer 5.6 FeaturePack offers networking features via the IntelliCache technology, which also optimizes storage capabilities as mentioned above. In addition to branch caching for hosted applications (which

caches common application display data), IntelliCache can also store isolated applications locally in the branch office, eliminating the need to stream applications multiple times over the WAN.

Conclusion

This white paper outlines some of the ways that XenDesktop 5 can remove the major obstacles confronting desktop virtualization implementation. An increasing number of companies are turning to this new solution and the need for streamlined efficiency is unrelenting. As illustrated here, every area of the datacenter is affected upon implementation. While desktop virtualization offers an essential solution for increasing enterprise-wide computing power, implementation can still seem like a daunting exercise. Today, the focus on finding cost-effective solutions that address all users' needs, as well as IT departments, is more intense than ever. XenDesktop 5 offers the kinds of features and versatility that can make achieving those goals a reality.

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Kerry Doyle writes for a diverse group of companies based in technology, business and higher education. As an educator and former editor at PCComputing, reporter for *PCWeek Magazine* and Associate Editor at ZDNet.com, he has written extensively on high tech issues for over 15 years. He specializes in computing trends vital to SMBs and enterprises alike, from virtualization and cloud computing to disaster recovery and network storage.