

XenApp and XenDesktop: Application Virtualization and Desktop Virtualization are Better Together

This document is designed to help Citrix XenApp customers understand how and when Citrix XenDesktop can be used with Citrix XenApp to deliver virtual desktops to further reduce application and desktop computing costs and provide greater IT and user flexibility compared to traditional application and desktop management models.

Installing applications on a local OS has always been problematic. While users are most familiar with local applications, IT must deploy applications, manage updates, and apply patches to each desktop device *individually*. Citrix solved that application delivery problem 19 years ago, introducing hosted applications, where applications are installed on servers in the data center and then accessed via any client device. Then, with the shared desktops capability in XenApp, Citrix gave IT managers the ability to provide a standardized, server OS desktop with installed applications to users, providing a consistent workspace from anywhere. Most recently, application streaming in XenApp extended application virtualization to the client device by providing offline application use while giving IT centralized management of applications. With these three technologies provided by XenApp, it seems that IT has the best of both worlds: centralized application and desktop management with offline application use. However, for most use cases, each desktop is still managed in the traditional way: the OS is running on the physical PC, increasing desktop management costs.

With Citrix XenDesktop, a Windows XP or Vista OS is delivered as a virtual desktop running in the data center. Applications are delivered to XenDesktop virtual desktops using XenApp. To IT administrators, this means they no longer manage individual instances of the OS and all of the continual updates, patches, and security fixes, on *each* physical PC. Instead, they manage a single instance of the OS in the data center, which is combined with user settings and applications delivered by XenApp at the time of logon, to provide users with their own personalized desktop and applications delivered from the data center. By using XenApp with XenDesktop, organizations dramatically lower the TCO and improve IT agility for managing physical PCs compared to traditional desktop management models.

Desktop virtualization is an appealing solution, however, desktop virtualization solutions that do not separate applications from desktop PCs, unnecessarily increase costs and reduce desktop management flexibility.

Best Practice: Separate Apps from Desktops

Early Desktop virtualization models, which first became available a couple of years ago, simply replicate a copy of the user's OS and installed applications in the data center. They typically don't solve the core issue; they just mask the problem by moving it from the physical to the virtual. From a hardware perspective, this is not a problem given the availability of fast, multi-core, multiprocessor 64-bit servers, dozens of desktop sessions can be efficiently hosted on a single machine. However, managing the SAN infrastructure became cost-prohibitive. For each user, a separate instance of the OS and their respective applications were stored in the data center. Image cloning, where a single OS image is created and then delivered to virtual desktops, saved storage space and was simple to maintain until an OS patch or

update was required. When the original OS image was updated, the image persistence was lost and new clones were regenerated and distributed to the virtual desktops. From an IT administration perspective, little has changed. Individual OS instances are still managed, only this time the numerous instances are running centrally, simply moving the existing “PC problem” into the data center.

Manage a single application instance

First, by separating the OS from the applications using application virtualization technology, a single instance of an application is managed in a central application repository and then delivered to the end user. With an application in a central repository, policy-based decisions can be made using the application virtualization technology to determine how that application should be delivered. For example, if a user clicks on a desktop icon for a streamed version of Excel 2007, that application will be streamed to the user on first use and then be available offline. Alternatively, if a user selects a hosted version of Excel 2007, accessed via a desktop icon on a physical PC or a shared desktop (e.g., XenApp published desktop), a Citrix XenApp session would be initiated. Finally, if a user initiates a virtual desktop session using XenDesktop, that application is delivered to the virtual desktop and then a complete Windows desktop, including applications, is delivered to the end user. In all three scenarios, IT manages only a single instance of the application, which can be made available on-demand to thousands of users.

Manage a single OS instance

Secondly, by maintaining a single, clean, updated OS image for all desktop clients in the data center, policy-based decision can be made on how to best deliver the OS. By using OS streaming or virtual OS provisioning, storage and support issues are reduced by eliminating the need to maintain a separate OS image for *each* virtual desktop. Instead, a single, optimized Windows XP or Vista image is maintained on the network and made available on-demand across the organization. All virtual desktops “pixie” boot (Preboot eXecution Environment) this same image over the network, applying user-specific settings and profiles at run-time. Since all OS images are delivered by reference via streaming, users always run the most up-to-date, patched OS version. Gone are the days of updating hundreds or thousands of desktop PCs. Instead, a single golden OS image is delivered to each user the next time they logon.

The traditional desktop virtualization model simply replicates a copy of the user’s OS and installed applications in the data center, requiring IT to manage multiple instances of the same application and OS. This results in significant SAN storage costs. It’s no wonder that many companies found traditional desktop virtualization cost-prohibitive.

The benefits of separating applications from the desktop OS as compared to the traditional desktop virtualization and desktop management models are summarized as follows:

- **TCO** – Maintaining a single instance of each OS and application for the entire organization significantly reduces SAN storage and IT administration costs.
- **Agility** – Roll-out new versions and updates of applications, Windows XP, and Vista to 100’s or 1,000’s of users in minutes, not days or weeks.
- **Manageability** – With fewer application and OS instances to manage, there are fewer parts for IT to manage and troubleshoot.

Only Citrix provides integrated application delivery, whether provided by any edition of XenApp or XenApp for Virtual Desktops functionality available in XenDesktop Enterprise and Platinum editions.

Now it is important to determine if the true IT problem is an application or desktop problem.

Step 1: Is it an app or desktop problem?

To correctly determine the problem, it is important to understand the common ways applications are run and types of desktop environments. Applications are commonly run in one of three ways:

- **Physical** – Applications are installed on the physical PC and must be compatible with the OS. Any application updates and patches are also installed on the same physical PC.
- **Hosted** – Using server-side application virtualization, applications are installed on servers in the data center and then made available to users through any client device. These applications are stored in the XenApp Application Hub.
- **Streamed** – Applications are packaged, which produces an image of the application in a way that predictively optimizes delivery to the client, and then are stored on a streaming server. In the case of XenApp, streamed applications are stored in the Application Hub. When users first select a streamed application, it is delivered on-demand to the client and is run in an isolation environment. On subsequent use, the streamed application is nearly indistinguishable from a locally-installed application.

There are also three common types of desktop environments:

- **Physical** – The OS runs on the local desktop device. Users are able to personalize their desktop and settings are stored locally.
- **Shared** – Previously known as “published desktops”, XenApp is used to deliver a Windows Server OS desktop with applications to end users. This desktop can be customized by IT administrators, but doing so for each person is impractical. The shared desktop is a common desktop for multiple users. Windows Server 2003 and Windows Server 2008 desktops are similar but not identical to Windows XP and Windows Vista desktops, respectively.
- **Personalized** – Also known as “virtual desktops”, XenDesktop can be used to deliver a Windows XP or Windows Vista desktop from the data center while providing users the ability to personalize it. User settings are abstracted from the OS golden image and both are assembled at run-time. This enables IT to use a single OS image, which reduces storage requirements, and users are able to personalize their desktop.

Now that the common types of applications and desktops have been defined, what is the fundamental problem you are trying to solve for your organization? Are you providing a new line-of-business application to users, whether at headquarters or to remote offices? Do you intend to simplify management and reduce application lifecycle costs? Or do you intend to simplify and reduce the costs of desktop management? Common application and desktop management problems include:

- **Application problems**
 - Slow performance of client/server applications over the WAN
 - Remote access to applications
 - Security of locally-installed applications
 - Incompatibility of co-resident applications
 - Frequent patching or application updates to 100's or 1000's of PCs
 - Maintaining user data in the data center, not on the PC

- **Desktop problems**
 - Reduce the desktop lifecycle management cost
 - Desktop management flexibility

Now that the problem has been defined as an application or desktop problem, the next step is to determine which type of workers has this problem.

Step 2: Which workers have this problem?

Depending on usage scenario and business need, getting the right level of balance between user flexibility and centralized control is different across user groups within each organization. Therefore, it is important to identify the target workers and their usage scenarios to best meet the needs of the business.

Knowledge workers, which account for up to 55%¹ of an organization's workforce, require more personalization and control of their desktops. Moreover, they demand using the more familiar Windows XP or Windows Vista desktop OS. In the past, there was no cost-effective way to centralize and manage the delivery of XP or Vista desktops for these workers. Desktop virtualization changes that.

- **Task Worker** -- Call center representatives and retail employees are examples of task workers. They use bank branch teller software, terminal-based applications, CRM or even line-of-business applications. They usually do not have a dedicated work station and must be able to access their applications and data from any device within their workplace. From the organization's standpoint, the most important capabilities for task worker scenarios are ensuring a highly secure, low-cost solution and enabling roaming in an always-connected environment so that users can work productively from shared client devices, while data is stored securely and centrally.
- **Office Worker** – Financial analysts, lawyers, and designers typically run applications which require a rich user experience to ensure high productivity. These applications run on the local PC. To provide greater productivity for these workers, it is important that organizations enable them to have access to their highly personalized set of applications and data. It is also important to provide the same applications from different PCs across organization or in situations where the workers need to continue uninterrupted work as in the case of bad weather, natural disasters, etc.
- **Mobile Worker** – Workers who must work from different locations on the corporate campus, visit branch office locations, or work from hotel rooms, require access to their data and applications anywhere, anytime when online or disconnected from the network. These users expect to have their data with them wherever they go. It is IT's role to make sure data are available anywhere, whether securely stored on the local device or accessed from the corporate network, and to reduce downtime.

Now that the problem has been identified as either an application or desktop problem and the worker type has been defined, the appropriate Citrix solution can be identified.

¹ Citrix Market Research, 2008

Step 3: Identify the solution

The optimal solution can be identified in the following table:

| | Hosted & Streamed Applications | Shared Desktop | Personalized Desktop |
|--------------------|---|--|---|
| Worker Type | Mobile Worker (traveling salesperson, doctor) | Task Worker (call center, retail sales) | Office Worker (financial analyst, lawyer, designer) |
| Description | <ul style="list-style-type: none"> Hosted apps are accessed from Web Interface, Start Menu, or the desktop on locally installed OS Streamed apps run in an isolation environment on locally installed XP or Vista | <ul style="list-style-type: none"> XenApp is used to deliver a WS2003 or WS2008 desktop. The <u>desktop</u> is accessed from Web Interface, Start Menu, or the desktop on the locally installed OS Applications are accessed <u>only</u> from the XenApp-delivered desktop | <ul style="list-style-type: none"> The OS, applications, and user settings are virtualized and then re-assembled at run-time XenApp used to create <u>hosted</u> applications which are delivered to the virtual desktop (XD-E, P only) XenApp used to <u>stream</u> applications, which run in an isolation environment on the PC (XD-E, P only) A golden OS image is shared across multiple users and is provisioned on-the-fly each time a virtual desktop session is started |
| Strengths | <ul style="list-style-type: none"> Fastest way to deliver and maintain applications in an organization Low TCO for delivery of applications Streamed apps provide offline access | <ul style="list-style-type: none"> Locked-down user environment Lowest TCO through desktop and app virtualization | <ul style="list-style-type: none"> <u>Better User Acceptance than XenApp-Delivered Desktop</u> -- “Feels like” a locally installed XP or Vista OS to users <u>Less Application Compatibility Testing</u> – if the app runs on XP or Vista, then it should run on an XP or Vista virtual desktop <u>OS Isolation</u> – OS corruptions/errors caused by one user do not affect other users <u>Personalization</u> – Users can select own wallpaper, browser favorites, mapped drives, etc. <u>Local App Installation</u> – allowed, but apps remain only for duration of session |
| Limitations | <ul style="list-style-type: none"> Traditional management of desktop OS | <ul style="list-style-type: none"> <u>Server OS Desktop</u> – WS2003/2008 desktop is different than familiar XP or Vista desktop <u>No OS Isolation</u> – OS corruption/errors caused by one user may affect all users | <ul style="list-style-type: none"> <u>Hardware Costs</u> -- Higher compared to XenApp-delivered desktops |
| TCO | \$ \$ | \$ | \$ \$ \$ |

Step 4: Justify with Cost Analysis

The total cost of acquisition and total cost of ownership of using XenApp and XenDesktop is summarized in the tables below.

Total Cost of Acquisition

(per user; based on 1,000 users)

| Required Items | XenApp Shared Desktops for Task Workers | XenDesktop Personalized Desktops for Office Workers | XenApp App Delivery to Office/Mobile Workers |
|------------------|---|---|--|
| Endpoint Device | \$300 | \$300 | \$1,000 |
| Monitor | \$200 | \$200 | \$200 |
| Server | \$50 | \$350 | \$50 |
| Storage | - | \$20 | - |
| Microsoft VECD | - | \$110 | - |
| Microsoft TS CAL | \$150 | \$150 | \$150 |
| Citrix Licensing | \$450 | \$295 | \$450 |
| TOTAL | \$1,150 | \$1,425 | \$1,550 |

Total Cost of Ownership

(per user; based on 1,000 users)

| Required Items | XenApp Shared Desktops for Task Workers | XenDesktop Personalized Desktops for Office Workers | XenApp App Delivery to Office/Mobile Workers | Traditional Desktops |
|--------------------------|---|---|--|----------------------|
| Support, Training | \$685 | \$780 | \$1,400 | \$2,730 |
| SW Admin Operations | \$215 | \$215 | \$440 | \$880 |
| Subscription Advantage | \$50 | \$45 | \$50 | - |
| Server and Storage Admin | \$10 | \$50 | \$10 | - |
| Microsoft VECD | - | \$110 | - | - |
| TOTAL | \$960 | \$1,200 | \$1,900 | \$3,610 |

Determining the best application delivery infrastructure involves understanding the total cost of ownership across solutions. XenApp continues to provide the lowest TCO for task workers, while XenDesktop with XenApp for Virtual Desktops, provides the best TCO for office workers. By separating applications and desktops, you benefit from improved application management, better capacity planning, and reduced storage and server requirements.