

Desktop Virtualization: A Buyer's Guide

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TABLE OF CONTENTS

INTRODUCTION	2
A BRIEF OVERVIEW OF THE “DESKTOP DELIVERY” APPROACH	3
<i>User experience must be better</i>	3
<i>Ensures Operational Scalability for Rapid Rollout</i>	4
<i>Avoids infrastructure lock-in</i>	5
QUICK CHECKLIST	6
<i>User Experience</i>	6
<i>Operational Scalability</i>	6
<i>Solution Ecosystem</i>	6
SCORECARD	7

Introduction

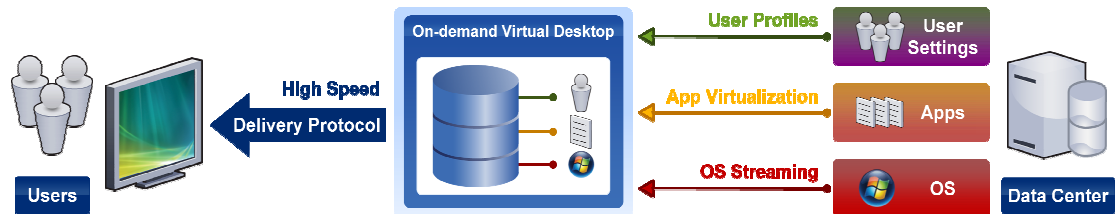
The next frontier in the virtualization landscape is the virtualization and centralization of desktop PCs. Desktop virtualization can be broadly defined as the physical separation of the end user from the execution of the operating system (OS) and applications, which will be centralized in data centers. Virtualization addresses the challenges of manageability, security and supporting a global workforce, three of the toughest desktop computing challenges. Globalization, outsourcing and increased mobility are decentralizing business processes. On the other hand, shrinking IT budgets, and increasing IT accountability for information security and service-level agreements underscore centralization. IT systems complexity hinders business agility and resilience – critical success factors in today's businesses. This need for simplified management systems is the first trend behind the interest in desktop virtualization.

Corporate desktops cost more every year to support, working at cross purposes to the ongoing spending squeeze imposed on IT departments. Current approach to desktop management involves providing end users with a hardware device upon which IT departments install a "standard" image. It has been estimated that desktop hardware and software acquisition expenditures typically account for only 20-30% of the total cost of the device, while the remaining 70-80% consists of IT maintenance. Furthermore, if local equipment is destroyed, lost or stolen, sensitive corporate or government data disappears along with the desktop PC.

The promise of desktop virtualization technology is to centralize the operating system at the data center to make managing desktops significantly easier. While desktop virtualization puts desktops into the data center, it is not a complete answer to solve existing desktop management challenges. Desktop virtualization works best as part of Citrix's Desktop Delivery approach which focuses on the most efficient way to get applications to the end user and meet business and IT needs, not just centralizing a PC equivalent. Desktop Delivery proposes the dynamic assembly of a 'new and pristine' high performing desktop with personalized set of applications and settings every time a user logs on.

A Brief Overview of the “Desktop Delivery” Approach

Citrix’s Desktop Delivery solutions builds upon Desktop Virtualization as a key component technology, adding the ability to dynamically assemble virtual desktops on-demand, providing users a new, pristine, personalized, high performance desktop each time they log on. This greatly simplifies image and application management.



Desktop Delivery addresses the challenges of desktop image management with the following approach:

1. Take the core operating system and separate it from applications and user preferences. By doing so, we achieve a ubiquitous, easily managed operating system image that can be used as a base image for all users.
2. Provide that single OS image via Desktop Provisioning.
3. On delivery of the core operating system to the virtual desktop, dynamically apply user personalization to the OS image.
4. Deliver applications, only as needed and in the most appropriate way as isolated, de-coupled, elements on top of the standard core operating system.
5. Present the complete desktop to the end user on any device over any network.

To follow this Desktop Delivery approach, a desktop virtualization product must have the following attributes.

User experience must be *better*

End users are used to having an experience supported by local computing resources. They are used to fast CPU response, to multi-media and to use of peripherals. It is important that the end-user not feel that they are losing out by moving to a Desktop Virtualization solution, lest they build up resistance to the solution.

With virtualization technology, leading edge desktop delivery (brokering) solutions, and an advanced remote display protocol, we see several immediate wins in user experience, including:

1. Instant On: Today, many end users complain that their computers take a long time (2-3 minutes or more) to boot up. Virtual desktops can be configured to be significantly faster to startup and provide users with an “Instant On” experience. Once users are connected to the virtual desktop, the virtual display technology can adapt dynamically to the available bandwidth and network latency to provide a superior user experience.
2. Simplifying Branch Office and Work-from-Home Desktops: Given the ability of ICA to manage low bandwidth and high latency WAN connections, branch office and work at home employees can access the full corporate desktop using any endpoint available to them. Updates and new applications will be available to every corporate employee immediately, wherever they may be.

3. **Proactive Support:** Desktop Virtualization can be combined with technologies to maintain and improve the user experience. Good examples are monitoring performance, compliance with minimum service levels and efficient tools to quickly diagnose and resolve user issues.

Ensures Operational Scalability for Rapid Rollout

To be fully effective and exploit the full value of the infrastructure investment, Desktop Virtualization should be driven to all office-based knowledge workers which implies scalability to 1000's of users. The incremental cost of adding a new user in this scenario needs to be very low and the process needs to be consistent and repeatable.

Desktop Provisioning and Management

This can be achieved by integration with an orchestration engine to automate new user setup as well as intelligent provisioning of the datacenter infrastructure to handle the desktop computing workloads.

Using the desktop delivery approach described above, when we add these new users, we are able to maintain the same OS and application infrastructure, capturing personalization settings as the new users modify their environment. This same approach simplifies rollbacks, where there may have been a decision to remove a patch or update. So there is now a methodology in place to rapidly grow virtual desktop user base and easily support them once delivered.

Integrated Application Delivery

Application memory and processor footprint can be unpredictable, requiring IT administrators to over-resource the PC to support the application for a heavy use scenario. This can have a significant impact on the overall system when considering replicating this footprint on thousands of Virtual Machines.

A best practice for Desktop Virtualization is to decouple the operating system from user personalization, applications and data. In this way, desktops can be "dynamically assembled", which greatly simplifies image and application management and ensures that the right technology is applied to each component of the complete user desktop. To achieve separation of applications from the OS, a desktop virtualization solution should be equipped with application virtualization technology which can be run separately from the virtual machines or blade computing environment.

A virtual desktop environment with separation of desktops and applications scales better and is more easily managed for much lower TCO than the "unseparated" scenario. For the end user, this ensures the delivery of a newly assembled, pristine desktop on each log-in and provides a less complicated, better supported, better performing desktop environment.

Desktop Access Management

Reliability and HA support are also essential pieces required in order to scale and manage a virtual desktop solution. A session must be able to survive server failure and there must be HA mechanisms in place to failover to a healthy server. Remote access solutions must also be secured and scalable to support a large number of users who will often be located outside of the corporate firewall.

Desktop Optimization and Support

Since virtual desktops are dependent on quality of the network connection, IT staff need to be able to monitor the quality of the desktop experience for all users and ensure that remote office workers have a LAN-like experience. When there is an issue with the virtual desktop, a remote support environment is required to provide excellent help desk service to the globally dispersed workforce.

Avoids infrastructure lock-in

With the sheer number of users dependent upon the Desktop Virtualization solution, vendor lock-in should be avoided where possible. Key areas to consider:

- **Hypervisor** – It is important to choose a hypervisor technology that supports the Microsoft VHD file format. VHD specifies a virtual machine hard disk that can reside on a native host file system encapsulated within a single file. This format will be used by a future version of Microsoft Windows Server that includes hypervisor-based virtualization technology.
- **Desktop Endpoints** – Some Desktop Virtualization solutions specify a limited number of end points, such as Windows-based PCs. To maximize the scope of the Desktop Delivery solution, it is important that it supports all manner of user-side OS's (Windows, Linux, Mac,...) and hardware (PC, Thin Client).
- **Blade PCs** – Most Desktop Virtualization solutions do not take into account the requirement that some applications and users have for customized or dedicated PC hardware. The solution chosen must be able to address those users with the same infrastructure as those who can be served by virtual machine technology.

The ultimate goal is that as the market develops and customer needs change, infrastructure can be adapted as needed, without recourse to 'rip and replace' type of approaches.

Quick Checklist

In the previous section, we looked at the critical criteria that should be used to frame the evaluation of desktop virtualization products. This section provides a quick checklist of the top-line questions to consider in each of those five key criteria. For more in-depth questions that enable a side-by-side comparison of different solutions, refer to the detailed Buyer's Checklist that follows this section.

User Experience

- Benchmarked against typical traditional PC environment, will users will notice any degradation in 2D Graphics performance, screen response, mouse/keyboard response?
- Benchmarked against typical traditional PC environment, does the solution provide acceptable quality of User Experience with media streaming eg. Windows Media, Adobe Flash?
- Will the user experience benchmarks be maintained when on a Wide Area Network (WAN)?
- Is there support for standard local USB peripherals?
- Is there support via user interface to manage aspects of their individual virtual desktop connection?
- Will the user session be maintained when roaming between multiple end point devices?
- Can the solution virtualize blade-based PCs?
- Are multiple monitors supported?

Operational Scalability

- Desktop Provisioning and Management
 - How much storage is required to support volume rollout of virtual desktops?
 - Is the virtual desktop configuration process fast enough to support mass rollout?
 - How does product deal with patching, updates, and rollbacks?
 - Is independent application virtualization technology included?
- Desktop Access Management
 - How does solution provide secure remote access?
 - How does solution address session reliability?
 - How does solution support HA?
- Desktop Optimization and Support
 - How can IT Admin monitor virtual desktop performance?
 - How will IT department provide specialized support for virtual desktop users?
 - How can WAN facilities be managed to support virtual desktop rollout.

Solution Ecosystem

- Which Thin / Thick Client Devices are supported?
- Which Virtual Machine hosting infrastructures are supported?
- Which OS's are virtualized?

Scorecard

User Experience	XenDesktop	Other
Provides "Instant-On" experience, can have user desktop functional within 10 seconds of login.		
Smooth, undelayed 2D Graphic Object manipulation in a LAN Environment		
Smooth, undelayed 2D Graphic Object manipulation in a WAN Environment (latency >100ms).		
Undelayed, continuous keyboard response when typing text in a LAN Environment.		
Undelayed, continuous keyboard response when typing text in a WAN Environment (latency >100ms).		
Acceptable video/audio quality (no significant delays, freezing, pixillation when playing Windows Media in a LAN Environment.)		
Acceptable video/audio quality (no significant delays, freezing, pixillation when playing Windows Media in a WAN Environment (latency >100ms)).		
Acceptable video/audio quality (no significant delays, freezing, pixillation when playing Adobe Flash in a LAN Environment).		
Acceptable video/audio quality (no significant delays, freezing, pixillation when playing Adobe Flash in a WAN Environment (latency >100ms)).		
USB Peripheral Support: Instantly maps local USB mass storage devices to drive letters.		

User Experience	XenDesktop	Other
USB Peripheral Support: Local USB printers available without needing local drivers on endpoint device.		
USB Peripheral Support: PDA Active Sync operates identically to traditional PC.		
USB Peripheral Support: Interfaces to and provides adequate performance for high speed streaming devices (ie. Video cameras, IP Phones)		
Users have the ability to control resolution, window sizing, full screen/shared screen during session.		
Support for blade-based PC's hosted in the data center.		
Automatic multiple monitor support		
Operational Scalability		
<i>Desktop Provisioning and Management</i>		
Low storage requirements for Desktop images. Storage needs do not grow linearly with number of users.		
Allows rapid deployment of 100's of virtual desktops via automated image provisioning.		
Provides integrated user profile management capabilities.		
Supports automated, rapid updates, patching and rollbacks.		
Provides simple, integrated administrator interfaces.		

<i>Integrated Application Delivery</i>	XenDesktop	Other
Provides independent application virtualization functionality as part of product.		
Provides server-side application virtualization. The applications run on a remote server and are delivered via multi-channel protocol to the virtual machine or blade PC.		
Provides client-side application virtualization. The applications reside on a remote server but are run locally on the virtual machine or blade PC.		
<i>Desktop Access Management</i>	XenDesktop	Other
Integrated SSL VPN/Secure remote access.		
If network lost, session environment is maintained for reconnect.		
No single point of failure for server-side software components.		
Provides integrated HA/Failover mechanisms.		
<i>Desktop Optimization and Support</i>		
Provides desktop performance monitoring tools.		
Provides built-in help desk support / Help Desk services.		
Integrates with and provides WAN optimization capabilities.		
Desktop Delivery Ecosystem	XenDesktop	Other
Supports Windows XP/Vista Clients		
Supports MAC Clients		
Supports Windows XPE Clients		

Supports Linux-Based Thin Clients		
VI3 Hypervisor supported.		
XenServer Hypervisor supported		
HyperV Hypervisor supported		