

A decorative graphic consisting of a series of blue dots of varying sizes, arranged in a curved, upward-sloping line that starts from the left edge of the page and points towards the title.

Microsoft and Citrix: Joint Virtual Desktop Infrastructure (VDI) Offering

Architectural Guidance
July 2009

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Objective

This document highlights three deployment scenarios for the joint Virtual Desktop Infrastructure (VDI) offering from Microsoft and Citrix. Citrix XenDesktop™ extends Microsoft's Virtual Desktop Infrastructure (VDI) to deliver an end-to-end enterprise desktop delivery solution that addresses the scalability and management requirements for enterprise customers while maintaining the lowest Total Cost of Ownership (TCO) of any VDI solution on the market.

Microsoft-Citrix VDI Offering Benefits

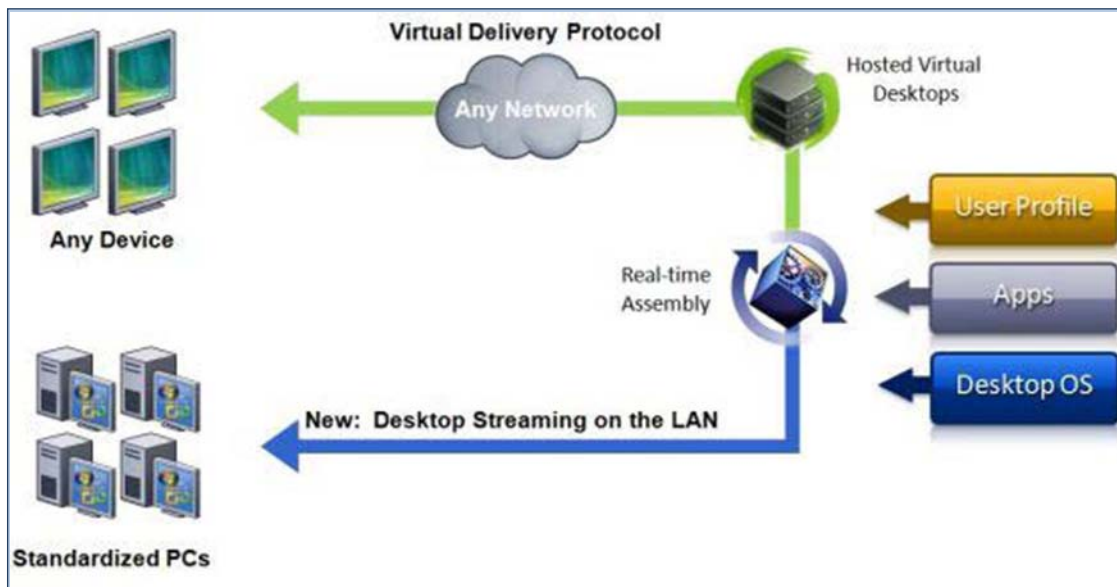
The joint Microsoft-Citrix VDI offering is a desktop virtualization solution that centralizes and delivers desktops as a service to users on any authorized device to provide users with an optimal remote user experience and enable IT departments can take advantage of an integrated management capability with Microsoft-Citrix's comprehensive and cost effective VDI solution. How does the Microsoft-Citrix VDI solution differ from other VDI alternatives?

High Definition User experience

Citrix XenDesktop™ technology provides a rich user experience over the LAN and WAN, even over low bandwidth high latency connections. Most VDI offerings do not perform consistently over WAN connections, thereby lowering worker efficiency and hence defeating the very purpose of using the desktop as a productivity tool.

A very cost effective and feature rich solution

Amongst the VDI offerings available today, the Microsoft VDI platform extended by Citrix XenDesktop™ is considered the most cost effective, offering a wide variety of features and performance benefits over the competition. Operating System provisioning technology allows organizations to use a single master desktop image in the datacenter to provide users a pristine desktop at each logon, thereby drastically reducing maintenance and cutting storage costs. Application virtualization technology eliminates system conflicts and reduces application regression testing, further reducing storage requirements and improving flexibility. (Figure 1)



(Figure 1) – The real-time assembly of the Desktop OS, Applications, and User Profiles delivers the lowest TCO for Virtual Desktop Infrastructure

Integrated Management

Most VDI offerings in the marketplace require you to buy additional management technology, which usually does not leverage your existing investments in infrastructure management. The joint Microsoft-Citrix VDI offering delivers an integrated management suite to allow IT organization to manage both physical and virtual desktops from a single, familiar management console, which reduces the complexity of managing multiple environments, and allows your IT to work with the familiar environment that they are trained on today.

How desktop delivery works

1. **Authentication** – With virtualization, users can access their virtual desktops from any authorized device. Typically, the connection will be from either a desktop appliance in the office or a PC from home. When connecting from a desktop appliance at work, the user simply switches the device on and they are presented with an authentication request. If they are connecting from a home PC, they will navigate to a Web page that looks identical to the desktop appliance authentication page. At this point, the users enter their credentials, and the next thing they will see is their virtualized corporate desktop.
2. **Brokering and desktop assembly** – After authentication, the Desktop Delivery Controller (DDC) identifies the user and dynamically assembles her virtual desktop. The appropriate desktop operating system is streamed into the hosting environment using the built-in Provisioning Services. The user's profile is added to the desktop operating system, and the user's applications are made available via integrated application delivery technology via Microsoft Application Virtualization (App-V). This assembly can be scheduled to occur before the user tries to connect ensuring instant access to the user's desktop while allowing effective power and hosting infrastructure utilization.
3. **Server Virtualization architecture** – Citrix XenDesktop™ allows IT administrators the ability to host desktop workloads on Microsoft® Hyper-V™ or blade PCs, a broad range of client platforms (Windows®, Windows XPe, Windows CE, Linux, Mac OS, Windows Virtual Server) and any application virtualization solution (Microsoft Application Virtualization).
4. **Desktop delivery** – Once the user's identity has been verified, his desktop environment is then delivered via the ICA protocol. As part of the user verification stage, policies controlling the user's environment can be applied such as limiting the user's ability to upload files if they are connecting from a home PC. Additionally, Citrix XenDesktop™ can also stream a desktop over the LAN to a standardized PC or desktop appliance from a single desktop image that is managed in the datacenter. This offers centralized management and control of the desktop while leveraging the processing power of the endpoint.

Microsoft-Citrix VDI Offering

The joint offering is based on a suite of Microsoft and Citrix technology designed to enable everything from enterprise-wide desktop delivery to low complexity VDI deployments.

The main components of this offering are:



Windows Server 2008 R2 with Hyper-V:

- WS2008 R2 with Hyper-V provides a stable, high performance hypervisor platform
- Hyper-V includes features such as support for clustering of VMs, backup for VMs, and new management tools and performance monitors that keep virtual environments operating at peak efficiency

System Center Virtual Machine Manager 2008 R2 (SCVMM):

- SCVMM offers Enterprise IT integrated management capability across physical and virtual environments
- SCVMM has the capability to manage physical, virtual and session based desktops from a single console
- SCVMM can integrate across non-Microsoft environments such as Citrix XenDesktop and VMware VirtualCenter

Microsoft Application Virtualization (App-V) OR Remote App:

- These technologies enable separation and virtualization of applications
- App-V enables applications to be centrally stored on a server, while allowing for local execution of the application by streaming it onto the user's desktop
- Remote App enables applications to be stored, managed and executed on the server without local client computing
- Both methods of application virtualization remove application-to-application incompatibility, thereby reducing conflicts and improving application management efficiency

Citrix XenDesktop: Citrix XenDesktop adds valuable functionality to the Microsoft VDI suites, such as delivering an HDX user experience across multiple device types and network configurations, single image provisioning and management and storage optimization technologies, to give our Customers a truly enterprise

grade VDI solution. Through close collaboration, XenDesktop seamlessly integrates with the Microsoft stack to deliver best-in-class functionality and value.

- This is the component of the VDI offering that provides virtual and physical desktop delivery, brokering services, virtual desktop management and end user performance needed to deliver virtual desktops to user devices over any network
- It allows IT to manage their virtual desktops at lowest possible cost – enabling IT to manage a single instance of standardized desktop OS image while still providing complete personalization of virtual desktop to end users. It includes the capability of dynamic desktop assembly, VM scheduling, desktop pooling, access permissions, and app delivery
- Depending on organizational requirements, Citrix has the following editions of XenDesktop:
 - Standard
 - Advanced
 - Enterprise
 - Platinum

Windows Virtual Enterprise Centralized Desktop (VECD):

- VDI introduces new use cases that did not previously exist in traditional desktop environments, such as the ability to create multiple desktops dynamically, enable user access to multiple virtual machines (VMs) simultaneously, and the flexibility to move desktop VMs across multiple platforms, especially in load balancing and disaster recovery situations
- Microsoft designed Windows Virtual Enterprise Centralized Desktop (VECD) to enable organizations to license virtual copies of Microsoft Windows client operating systems in virtual environments
 - Ability to run a copy of Windows in a datacenter
 - Rights to move virtual machines between servers for increased reliability
 - Unlimited backup of virtual machines
 - Ability to access up to 4 running VM instances per device
 - Rights to access corporate desktops from home for a user that has already been licensed at work
 - Availability of volume licensing keys, such as KMS (Key Management Service) / MAK (Multiple Activation Keys)
 - VECD is a device-based subscription license model – for more information, see the [VDI Licensing brochure](#)

Microsoft VDI Suite: As part of our strategy to provide the best value and technology for customers, we have made it simpler and more affordable to buy the comprehensive VDI technology from Microsoft.

Customers can now buy the Microsoft server and management infrastructure required to run VDI through a single licensing vehicle. This licensing vehicle has two SKUs: The VDI Standard Suite and VDI Premium Suite. Both suites complement the VECD license, by following the same device-based annual subscription pricing model.

Microsoft VDI Suite

Windows Virtual Enterprise Centralized Desktop (Windows VECD)

Microsoft*

Virtual Desktop Infrastructure Standard Suite

Hyper-V, MDOP, SCVMM, and VDI specific
rights to SCOM, SCCM and RDS

OR

Microsoft*

Virtual Desktop Infrastructure Premium Suite

All components of VDI Standard Suite,
plus unrestricted RDS and App-V for RDS

Citrix XenDesktop adds value to the Microsoft VDI Suite

Simple Licensing

- Two simple SKUs for Microsoft VDI
- Simple device based annual subscription model

Excellent Value

- Both SKUs are significantly cheaper than the competition
- Enterprise grade features at a low price point in conjunction with Citrix

Comprehensive Technology

- Application virtualization, integrated management included in base SKU
- Choice of VDI and session based desktops in premium SKU

The **VDI Standard Suite** is a set of technologies to help organizations deploy the basic infrastructure for VDI. Hyper-V Server 2008 R2 is the virtualization platform for hosting your servers and desktops. Management of your virtual infrastructure is taken care of through the various System Center components, including System Center Virtual Machine Manager, System Center Operations Manager 2007 R2 and System Center Configuration Manager 2007 R2. Applications can be delivered dynamically via App-V, since MDOP is also included in the VDI standard suite. The standard Suite also enables restricted use rights for Remote Desktop Services, to deliver VDI desktops to users. (Session based desktop delivery is not permitted via the VDI Standard Suite). The VDI Standard Suite offers tremendous value by including key VDI technologies such as application virtualization and integrated management.

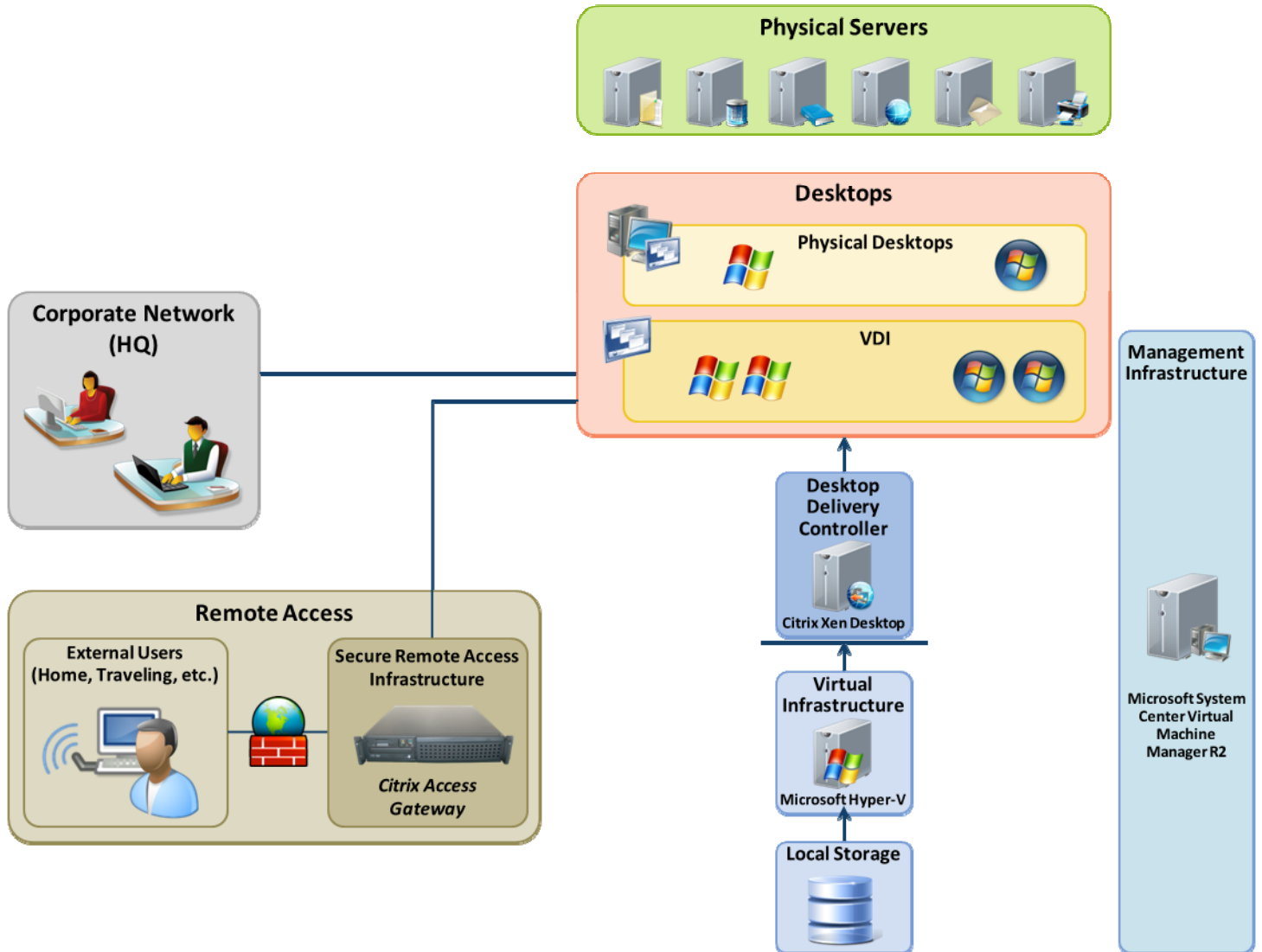
The **VDI Premium Suite** is for customers seeking additional flexibility from their VDI environment. The Premium Suite includes unrestricted Remote Desktop Services, thereby enabling Customers to deliver both session based desktops as well as VDI desktops. The VDI Premium Suite also includes App-V for RDS, allowing organizations to deliver applications dynamically to the Remote Desktop Server, effectively reducing silos for RDS applications.

In addition to simplifying the purchase process, both Suites deliver excellent value. The Microsoft VDI Suite together with Citrix XenDesktop are priced at a substantial discount over competitor's retail pricing (and a tremendous savings compared to buying each product individually).

It is important to note that neither suite replaces VECD. Customers looking to use Windows XP/Vista/7 in a VDI environment still need to purchase VECD separately to be fully compliant with licensing.

Scenario 1: Entry Level Virtual Desktop Environment

The Microsoft VDI Suite with Citrix XenDesktop Standard Edition provides an entry-level desktop virtualization that runs on Microsoft virtualization platform and managed from Microsoft System Center Virtual Machine Manager. While this scenario minimizes architectural complexity and initial licensing costs, it is a sub-optimal solution as a lack of application virtualization will create large image sizes, increasing storage and other costs.



Strengths:

- Simple Configuration for small deployments or for building a Proof of Concept/Pilot
- Low cost solution to provide access to Windows XP or Windows Vista® Virtual and Physical Desktops for use by internal or external users
- Manage the Virtual Infrastructure from a “single pane” administrative view of virtual machines (desktops and servers) and resources (libraries and CD/DVD repositories)
- High performance, standards-based encrypted transmissions are used to deliver desktops using SSL technology to both internal and remote users
- Centralized control policies ensure that the correct users connect to their desktops and that only screen updates, mouse clicks and keystrokes—not data—transit the network
- Users can pause desktops sessions and resume working from different locations at exactly where they left off

Considerations:

- Microsoft Hyper-V Server 2008 is the entry level edition from Microsoft
- Each Operating System must be deployed manually from a template
- Applications must be installed within the image
- Storage requirements (local or SAN/NAS based) will be at least equal to “number of virtual desktops times the disk size of the virtual

Requirements:

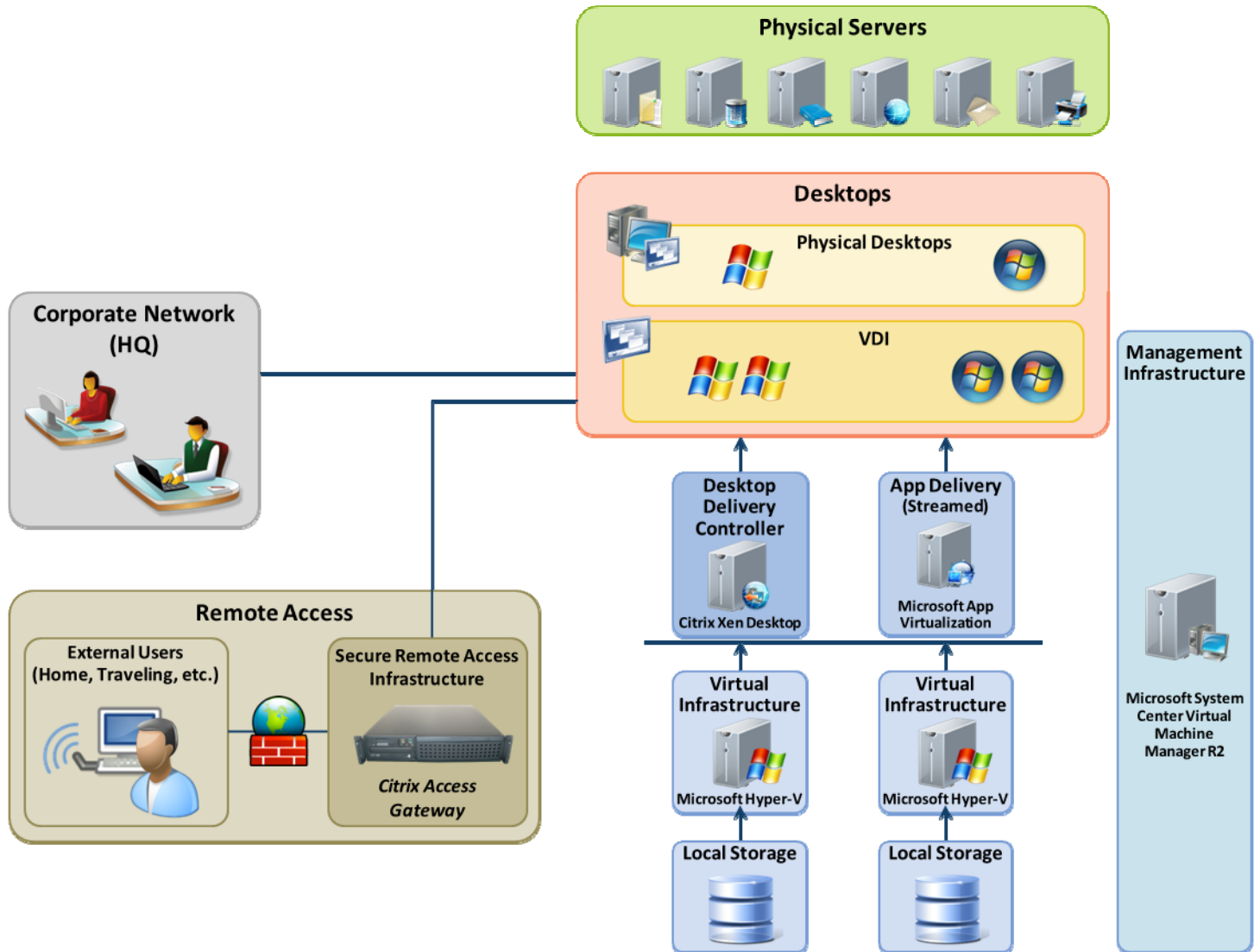
- Citrix XenDesktop, Standard Edition
- Windows XP or Windows Vista *
- Microsoft System Center Virtual Machine Manager
- Microsoft Hyper-V Server 2008
- Windows Server 2003 for Desktop Delivery Controller component of Citrix XenDesktop **
- Windows Server 2008 R2 for Microsoft System Center Virtual Machine Manager **
- XenDesktop includes the licenses for Citrix Access Gateway

Recommendations:

- Integrate with App-v to stream applications to the virtual desktop
- Upgrade to XenDesktop Advanced to decouple the desktop operating from the application
- Migrate to Windows Server 2008 R2, Enterprise Edition with Hyper-V for enhanced virtualization capabilities and to reduce risks if you need Quick Migrations or High Availability Clustering (which are available in Windows Server 2008 R2, Enterprise Edition)
- Upgrade to **Server Management Suite Enterprise** (SMSE) to leverage the full capabilities of System Center

Scenario 2: Entry Level Virtual Desktops with Application Virtualization

The previous use case was built on the basic requirements to host virtual desktops at the datacenter. Adding Application Virtualization through Microsoft App-V delivers applications rather than install them in the desktop image.



Strengths: (in addition to Scenario 1)

- Applications are separated from the OS
- Application Delivery Infrastructure through App-V simplifies application rollout
- Application isolation eliminates application conflicts and simplifies application compatibility testing

Considerations:

- Microsoft Hyper-V Server 2008 is the entry level edition from Microsoft
- Each Operating System must be deployed manually from a template
- Storage requirements (local or SAN/NAS based) will be at least equal to “number of virtual desktops times the disk size of the virtual desktops”
- Application virtualization should be tested before deploying in a production environment

Requirements:

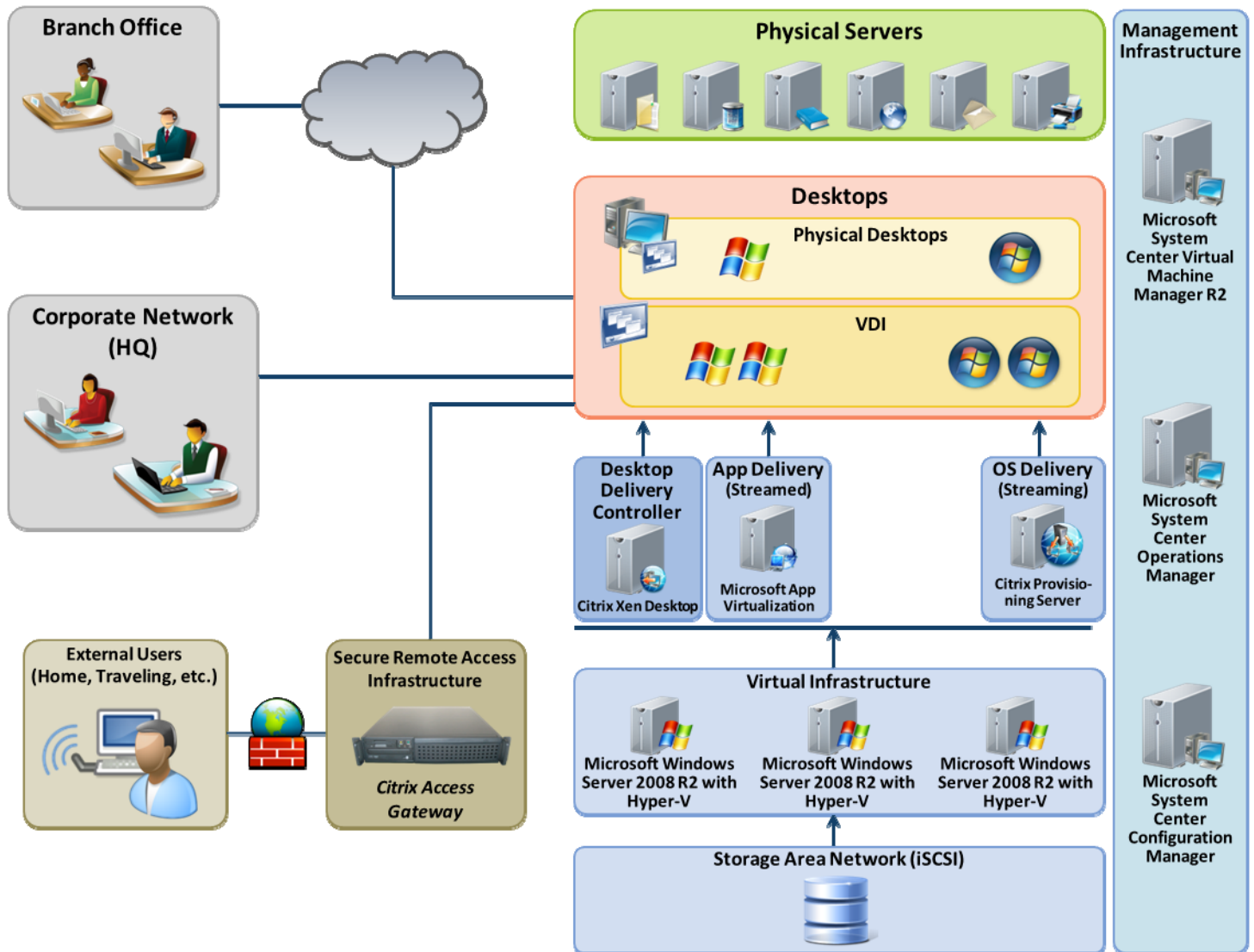
- Citrix XenDesktop, Standard Edition
- Windows XP or Windows Vista *
- Microsoft System Center Virtual Machine Manager
- Microsoft Hyper-V Server 2008
- Windows Server 2003 for Desktop Delivery Controller component of Citrix XenDesktop **
- Windows Server 2008 R2 for Microsoft System Center Virtual Machine Manager **
- Microsoft Desktop Optimization Pack with App-V “Need feedback from MS”
- XenDesktop includes the licenses for Citrix Access Gateway

Recommendations:

- Upgrade to XenDesktop Advanced to decouple the desktop operating from the application
- Migrate to Windows Server 2008 R2, Enterprise Edition with Hyper-V for enhanced virtualization capabilities and to reduce risks if you need Quick Migrations or High Availability Clustering (which are available in Windows Server 2008 R2, Enterprise Edition)
- Upgrade to **Server Management Suite Enterprise (SMSE)** to leverage the full capabilities of System Center

Scenario 3: Enterprise Desktops Delivery with Application Virtualization

Citrix XenDesktop, Advanced Edition integrates with App-V so users are instantly provisioned with a pristine desktop that incorporates the user's personal settings and applications, regardless of the access device.



Strengths: (in addition to Scenarios 1 & 2)

- Simplify upgrades and management for operating systems and applications
- Storing only one desktop image for thousands of users reduces storage requirements
- Patches and updates need to be applied only once to the single master image and all users get the latest desktops at next login
- App-V enables applications to be centrally stored on a server, while allowing for local execution of the application by streaming it onto the user's desktop
- Remove application-to-application incompatibility, thereby reducing conflicts and improving application management efficiency
- Application isolation eliminates application conflicts and simplifies application compatibility testing

Considerations:

- Requires SAN or shared storage
- Application virtualization should be tested before deploying in a production environment
- Consider how your storage infrastructure can support the increased load and demand on resources

Requirements:

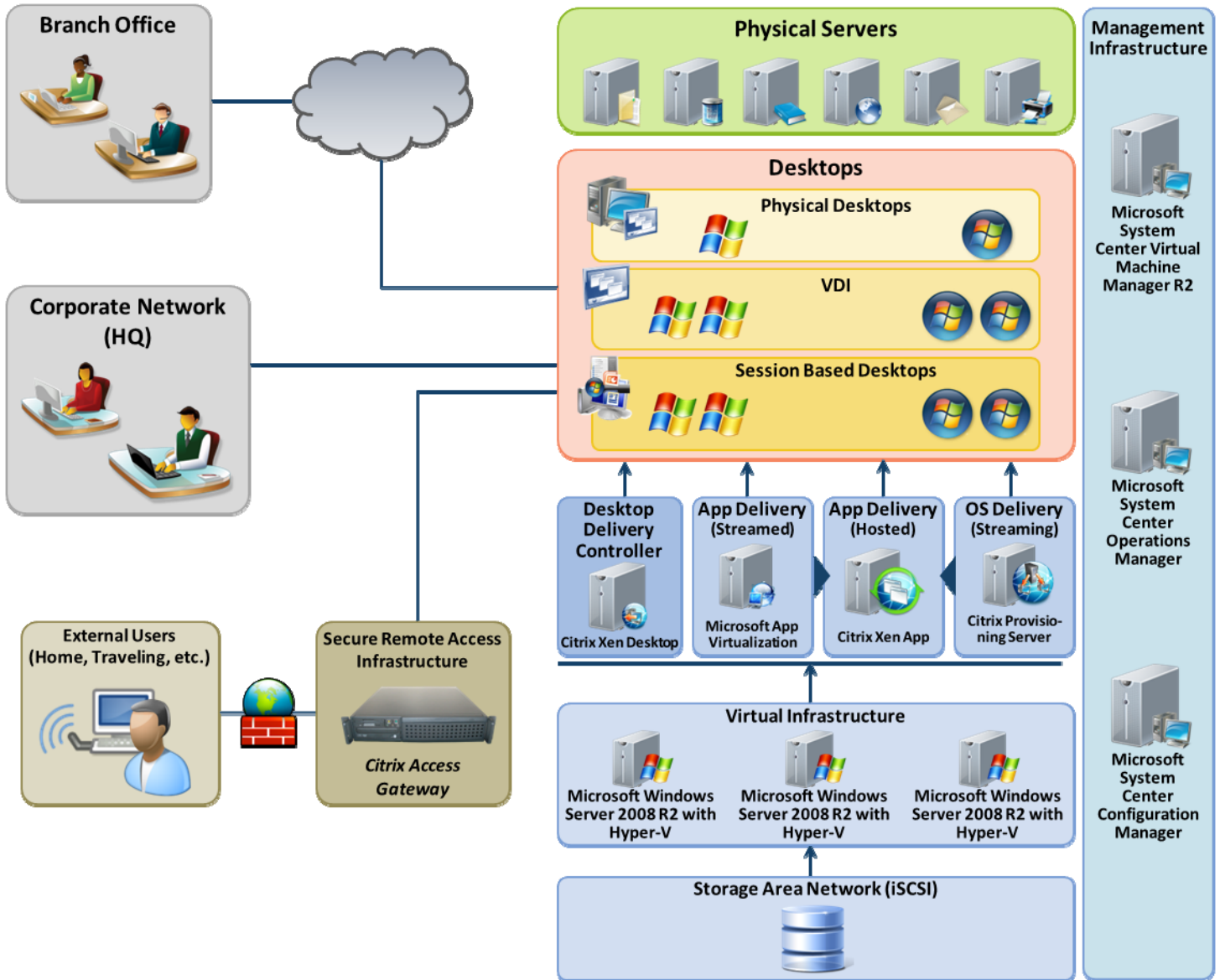
- Citrix XenDesktop, Advanced Edition
- Windows XP or Windows Vista *
- Microsoft System Center Server Management Suite Enterprise
- Windows Server 2008 R2, Enterprise Edition with Hyper-V
- Windows Server 2003 for Desktop Delivery Controller component of Citrix XenDesktop **
- Windows Server 2008 R2 for Microsoft System Center Virtual Machine Manager **
- Microsoft Desktop Optimization Pack with App-V
- XenDesktop includes the licenses for Citrix Access Gateway

Recommendations:

- Upgrade to XenDesktop Platinum for service level assurance including user performance monitoring, high availability and WAN QOS.
- Migrate to Windows Server 2008 R2, Enterprise Edition with Hyper-V for enhanced virtualization capabilities and to reduce risks if you need Quick Migrations or High Availability Clustering (which are available in Windows Server 2008 R2, Enterprise Edition)
- Upgrade to **Server Management Suite Enterprise (SMSE)** to leverage the full capabilities of System Center Upgrade to XenDesktop Advanced for single image provisioning

Scenario 4: Complete Virtual Desktops with Application and Presentation Virtualization

This architecture provides an integrated enterprise-ready system for improved scalability and virtual application delivery using the Microsoft VDI Premium Suite and Citrix XenDesktop Enterprise Edition.



Strengths: (in addition to Scenarios 1, 2 and 3)

- Enable session-based desktops in addition to VDI desktops for increased scalability and flexibility
- Heavy line-of-business applications can be hosted to offload virtual desktop resource consumption
- Remove application-to-application incompatibility, thereby reducing conflicts and improving application management efficiency
- Increases user density for hosted desktops on virtualization platform
- Leveraging existing investments with Windows Server Terminal Services with XenApp
- Applications centralized in the datacenter need to be updated only once; the updates are then applied to user desktops at logon

Considerations:

- Requires external/shared storage to provide many of the Enterprise features

Requirements:

- Citrix XenDesktop Enterprise Edition
- Windows XP or Windows Vista *
- Microsoft System Center Server Management Suite Enterprise
- Windows Server 2008 R2, Enterprise Edition with Hyper-V and Remote Desktop Services (RDS)
- Windows Server 2003 for Desktop Delivery Controller component of Citrix XenDesktop **
- Windows Server 2008 R2 for Microsoft System Center Virtual Machine Manager **
- Microsoft Desktop Optimization Pack
- XenDesktop includes the licenses for Citrix Access Gateway

Recommendations:

- Upgrade to XenDesktop Platinum for service level assurance including user performance monitoring, high availability and WAN QOS.
- Migrate to Windows Server 2008 R2, Enterprise Edition with Hyper-V for enhanced virtualization capabilities and to reduce risks if you need Quick Migrations or High Availability Clustering
- Upgrade to **Server Management Suite Enterprise** (SMSE) to leverage the full capabilities of System Center Upgrade to XenDesktop Advanced for single image provisioning