

Virtual Desktop Infrastructure (VDI) Implementation: VMware View 3 Premier Versus Microsoft Virtual Desktop Infrastructure

EXECUTIVE SUMMARY

The VMware View 3 VDI solution is simpler and quicker to deploy than Microsoft's VDI solution. VMware provides more comprehensive and efficient storage and memory management to reduce the hardware investment. The Microsoft VDI solution combines multiple utilities which were not specifically developed for VDI and which considerably increase the complexity of the VDI environment. Microsoft VDI supports Windows 7 for virtual desktops, but requires the use of Windows 7 and Windows Server 2008 R2 end-to-end to realize the full benefits of its VDI implementation, while VMware View 3 does not impose such requirements.

Deploying a Virtual Desktop Infrastructure (VDI) can provide significant benefits to IT organizations. By moving desktop computing environments from physical PCs sitting on user desktops to virtual machines hosted on servers in the data center, companies can realize significant savings in cost-of-ownership associated with the ongoing support and maintenance of their end-user computing resources.

Additional benefits can accrue to an IT organization by implementing a VDI solution that is easy to install, features a consistent management interface and provides for flexible and efficient management of virtual desktop images while reducing associated storage requirements.

This Tolly test, conducted in September, 2009, evaluated the installation of the VDI products, as well as the process for deployment of virtual desktop environments.

THE BOTTOM LINE

VMware View 3:

- 1** Installed more rapidly and with considerably fewer steps and less need for manual configuration compared to the Microsoft VDI solution
- 2** Provided simple image management using 'linked clone' technology that makes efficient use of disk space and allows rapid virtual desktop provisioning
- 3** Supported memory overcommit technology transparently, allowing to host more virtual desktops than Microsoft VDI solution could with the same hardware configuration
- 4** Allowed management of all VDI functions from a single, Web-based GUI, whereas the Microsoft VDI solution required multiple utilities and interfaces to manage the virtual desktop infrastructure
- 5** Provided an end-user experience on LAN similar to that of a local desktop for Microsoft Office applications



Background

The goal of the test was to help prospective users of the VMware and Microsoft virtual desktop infrastructure solutions better understand the process of setting up and managing the respective VDI environments while only using the tools provided by each vendor.

The latest release offerings were used for each of the solutions. Figure 1 provides details of components and release levels for each solution tested. At the time of testing, VMware View 3 Premier was available at retail, whereas the Microsoft VDI solution was comprised of the RTM versions of the constituent components listed.

Readers should note that while the Microsoft VDI suite license includes Application Virtualization capability using Microsoft App-V or Terminal Services RemoteApp, engineers did not

implement this capability under the current scope of the test, which focused on delivering virtualized desktops, and not on the application virtualization.

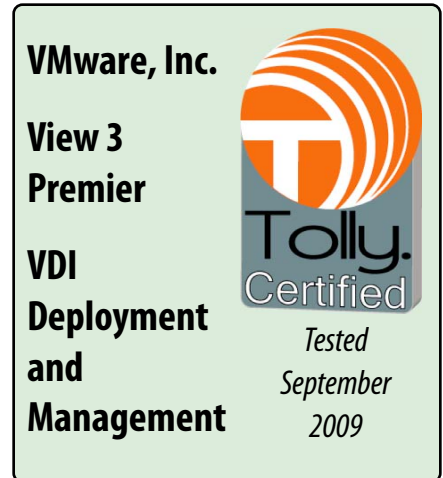
The areas of focus for this test are outlined in the following sections.

Initial Deployment

Tolly engineers set out to build and deploy a virtual desktop environment consisting of persistent and non-persistent desktops. Engineers layered the virtual desktop capabilities onto a pre-existing virtualization environment to serve as a starting point.

Engineers noted the number of steps that were required, rather than the time required to deploy virtual desktops since different users may work at different paces.

Furthermore, Tolly engineers noted whether the steps were automated or



manual and whether a single management interface or multiple, different management interfaces were required to accomplish a given task.

Provisioning

Engineers examined the options to provision custom desktops and both persistent and non-persistent desktop

Virtual Desktop Infrastructure Components by Function
Comparison of Microsoft and VMware Software Used in Testing

Function	Microsoft	VMware
Virtualization platform	Hyper-V Server 2008 R2 and System Center Virtual Machine Manager 2008 R2	VMware ESX Server 3.5 update 4 and VMware vCenter 3.1
Virtual desktop management server	Remote Desktop Virtualization Host	VMware View Connection Server 3.1
Virtual desktop brokering, provisioning and remote access	<ul style="list-style-type: none"> ● Remote Desktop Connection Broker ● Remote Desktop Session Host ● Remote Desktop Web Access 	VMware View Manager 3.1
Storage optimization	N/A	VMware View Composer 3.1
End-node client	N/A	VMware View Client 3.1

Note:

* All Microsoft components except the System Center Virtual Machine Manager (SCVMM) were built into the RTM version of Windows Server 2008 R2 Data Center (Version 6.1 Release 7600). SCVMM 2008 R2 was also tested as the RTM version at the time of testing.

Source: Tolly, September 2009

Figure 1

pools. Tests also examined options to allocate more virtual desktops such that their combined memory exceeds the total memory on the physical host server. Furthermore, storage optimization and speed of provisioning of virtual desktops were also examined.

Persistence

In many VDI usage cases administrators want users to be able to access a desktop environment that stores the user's data and personalization settings. Both VMware and Microsoft offer this option but take differing approaches that can have implications on both disk storage consumption and software licensing costs.

System Maintenance

Virtualizing desktops helps reduce maintenance costs associated with physical machines. But maintenance needs to occur in the virtual world as well.

After deploying the virtual desktops, the engineers examined various aspects of

system maintenance like deploying updates to virtual desktops.

LAN End-user Experience

Engineers examined the responsiveness of the virtual desktops in terms of the experience of using typical business applications like Microsoft Office over the LAN.

Findings on VMware View 3

Initial Deployment

Engineers found the VMware deployment process to be significantly simpler than the process required by Microsoft, which will be described later. Figure 2 provides a visual depiction of the VMware deployment process that consisted of manually creating an empty SQL database, installing View Composer, installing View Connection Server, defining an administrator, and finally installing the licenses.

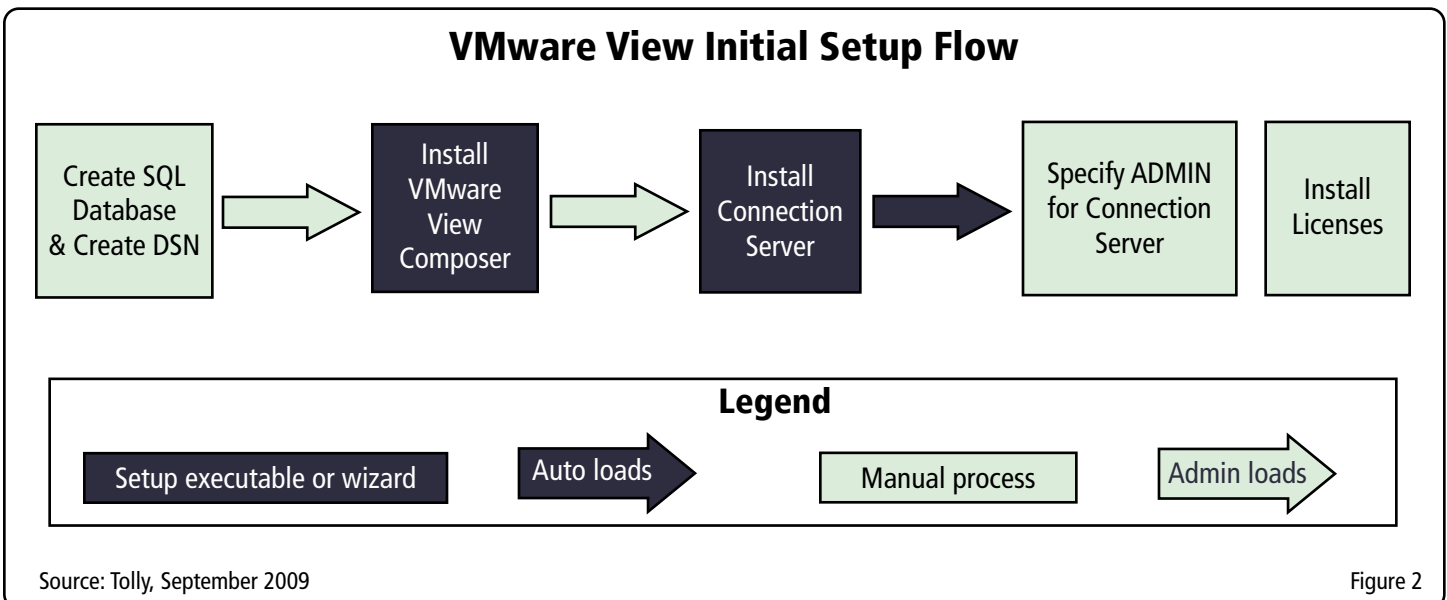
Three virtual servers were required for VMware View deployment.

Provisioning

Engineers created a master desktop virtual machine with 1GB RAM in the VMware Virtual Center, and created a snapshot of that virtual machine. Then, engineers tested manual provisioning, automatic provisioning and dynamic provisioning of virtual desktops.

Using manual provisioning, engineers created three virtual desktop images from the master virtual desktop image. One of the virtual desktops was assigned to a specific user, and the other two virtual desktops were configured into a virtual desktop pool.

VMware leverages 'linked clone' technology for automatic provisioning of virtual desktops. The number of available desktops, number of maximum and minimum desktops to be provisioned can be specified to automate the dynamic provisioning of desktops. Engineers noted in the VMware vCenter that the dynamic provisioning is



Interaction with Microsoft Corporation

In accordance with The Tolly Group's Fair Testing Charter, Tolly representatives contacted Microsoft Corporation to notify them of the evaluation and invite their participation. A management representative of Microsoft respectfully declined to participate in the test.



For more information on the Tolly Fair Testing Charter, visit:
<http://www.tolly.com/FTC.aspx>

automatic, fast and efficient with disk storage space.

Finally, to illustrate the 'memory overcommit' feature of VMware View, engineers increased the total number of virtual desktops to 43. (This number was chosen so that the 32GB of physical memory on the VDI host server would be oversubscribed as at the end of the provisioning.)

All virtual desktops were auto provisioned and powered up successfully at the same time.

Persistence

VMware allows administrators to create a persistent pool of virtual desktops. When a user entitled to a persistent virtual desktop logs in, VMware dynamically picks an available virtual desktop from the pool and loads the user's profile to it. This method saves the disk storage and the number of licenses required for the virtual desktop instances.

If, for some reason, administrators would like to provision full desktop clones for persistent users, that usage scenario can be accommodated as well.

System Maintenance

All VMware VDI management functions are integrated into one Web-based interface - the View Manager.

Also, using the View Composer, administrators can upgrade the master virtual desktop image, and then create a snapshot of that image with a one-click operation using the VMware vCenter. This snapshot with the desired updates can then be applied to a group of virtual desktops in a desktop pool. VMware View allows administrators to selectively roll out updates to sets of users, such that different users in the same desktop pool can have different versions of the master desktop image, while still being managed by a common set of policies applied to the entire pool.

VMware View lets administrators migrate multiple virtual desktops at a time, without interrupting the user sessions.

LAN End-user Experience

When using the virtual desktops, normal business productivity applications like Microsoft Office 2007 delivered an acceptable user experience. While creating a Word or PowerPoint

document involving both text and images, the responsiveness was almost as good as using the applications on a local machine. Moving and resizing pictures could be accomplished without clipping, and system menus opened and closed rapidly and smoothly.

Findings for Microsoft VDI

Initial Deployment

Compared to the initial setup process for VMware, the setup process required by Microsoft VDI was considered to be significantly more complex by the Tolly engineers.

To realize the full benefits of Microsoft VDI, users need to run Microsoft Windows 7 on the end-node client, in the virtual desktop, and also run Windows Server 2008 R2 on the VDI infrastructure servers. While Windows XP can be used on the end-node client, the user loses the single sign-on (SSO) capability, and can only access VDI via a Web browser.

These requirements impose additional expenditures on the enterprise, at least in the short term, if any of the client or server OS components need to be updated.

Note: VMware did not support Windows 7 for virtual desktops at the time of testing.

Microsoft VDI required at least five virtual servers spread across at least two physical servers, while VMware required three virtual servers on one physical server.

To get full-fledged configuration, management and monitoring capabilities for the VDI environment, Microsoft recommends using its System Center 2008 suite of applications consisting of System Center Virtual Machine Manager 2008 R2, System Center Operations Manager and System Center Configuration Manager.

While many enterprises might already have these components (or their previous versions) deployed to manage their physical PC/server environment, using these multiple individual components to manage the VDI infrastructure is more complicated than VMware's use of just Virtual Center and View Manager for VDI management tasks.

Also, while VMware View does not require users to configure existing infrastructure components manually,

Microsoft requires administrators to modify the RDP protocol manually as well as edit the registry on the end-node clients.

Provisioning

Microsoft VDI only supports manual provisioning for virtual desktops. Engineers used Microsoft Hyper-V Manager to create virtual desktop images. Engineers tested this option by creating a virtual desktop and assigned it to a specific user, and created two other virtual desktops, configured into a virtual desktop pool.

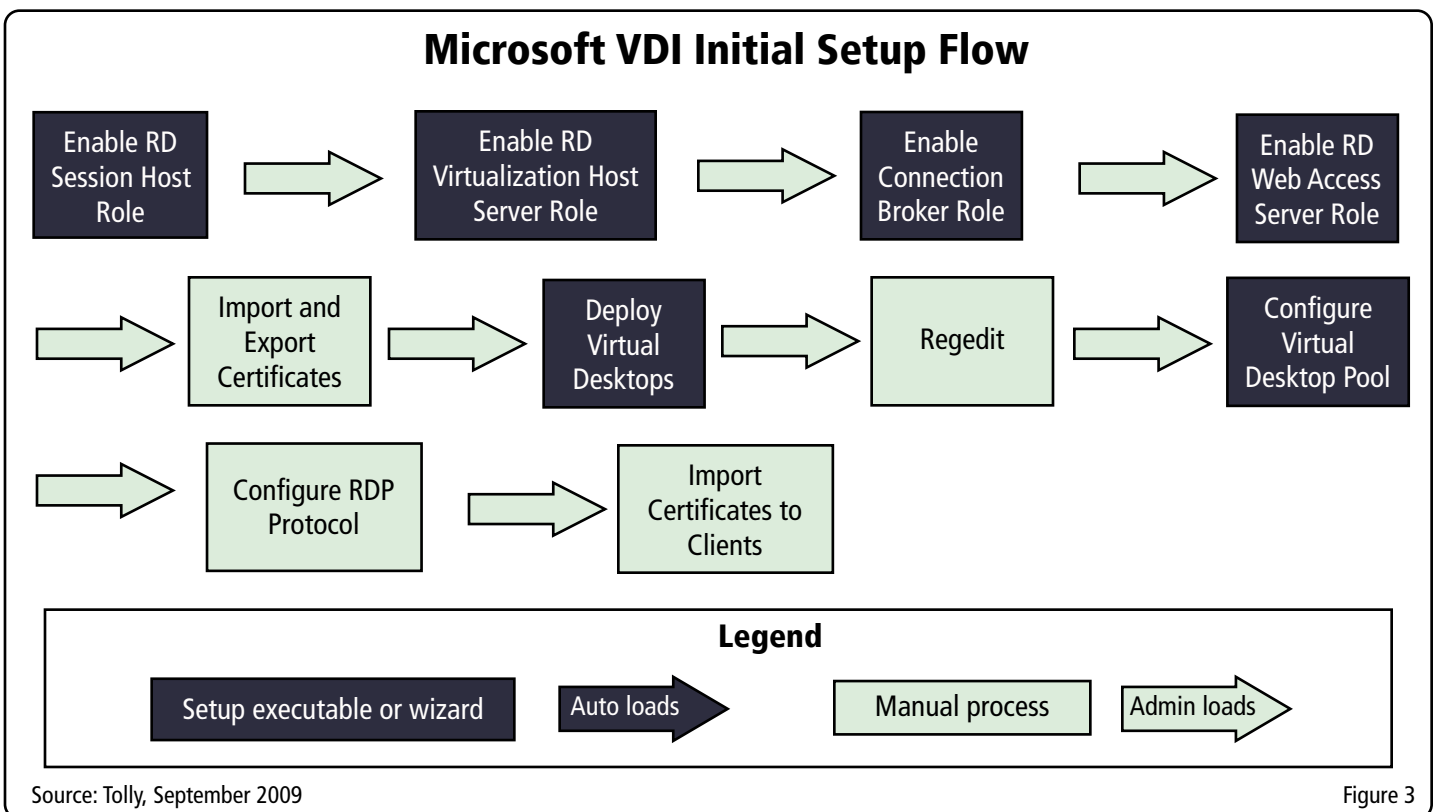
To configure the personal virtual desktops and virtual desktop pools, engineers needed to work on both the Remote Desktop Connection Broker server and the Remote Desktop Web Access server.

Engineers also installed Microsoft Virtual Center Virtual Machine Manager (SCVMM) 2008 R2, in order to provision virtual desktop images by using templates. However, SCVMM did not support dynamic provisioning, disk storage optimization and memory overcommitment features.

Since Microsoft VDI only supported manual provisioning of virtual desktops, there is no on-demand provisioning of virtual desktops according to demand. Virtual desktops have to be manually created by the administrator, which quickly becomes cumbersome.

Persistence

Microsoft required administrators to assign a specific virtual desktop for a specific user to provide a persistent virtual desktop. Microsoft refers to persistent desktops as "personal virtual



desktop". Non-persistent virtual desktops can be assigned to users for the duration of the user session from "Virtual Desktop Pools."

System Maintenance

For system maintenance, Microsoft requires the use of System Center Virtual Machine Manager, System Center Operations Manager and System Center Configuration Manager for various maintenance functions. Apart from these, the administrator may also need to configure the Group Policy and other components like the Remote Desktop Connection Broker server, Remote Desktop Web Access server, etc.

The need to use multiple interfaces to perform the maintenance functions makes for a highly complex environment, which could be hard to troubleshoot.

LAN End-user Experience

The end-user experience of the Microsoft VDI virtual desktops was very similar to that delivered by VMware View.

Creating and manipulating text and images in Microsoft Word and PowerPoint was smooth and almost as good as using the applications on a local PC.

Fonts were clear, pictures resized smoothly and could be moved around the screen without clipping and the application menus opened and closed rapidly and smoothly.

Test Environment

Physical Environments

Identical physical environments were built for the tests consisting of two physical servers each. All servers were

identical 2U rack mount HP ProLiant DL380 G5 servers.

Each was outfitted with dual quad-core Intel® Xeon® E5430 2.66-GHz, 64-bit processors, 32 GB RAM, 1 TB of usable disk space and a DVD optical drive.

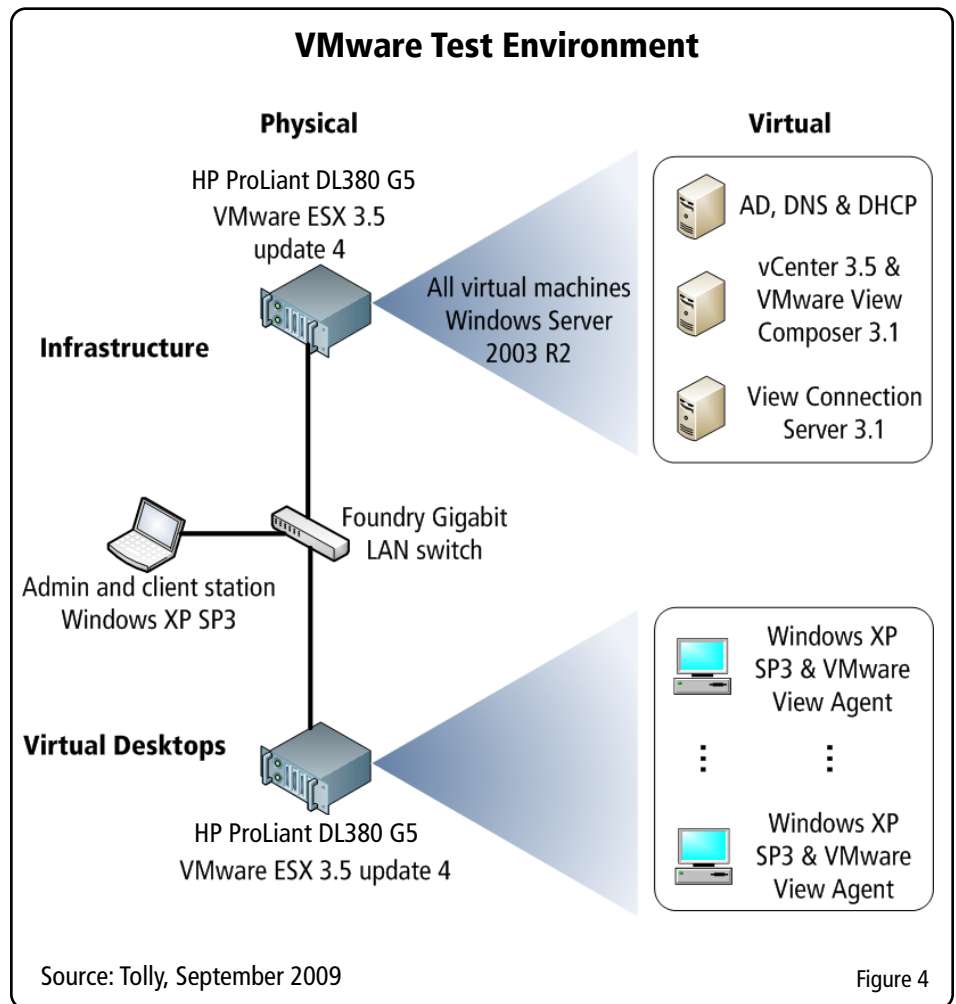
Devices in each physical test bed were connected via a dedicated Foundry FastIron Edge X424-POE-PREM switch.

All hardware and software was acquired through normal evaluation distribution channels. A notebook outfitted with an Intel® Core™ 2 Duo 2-GHz processor and 2 GB of RAM

(DDR2 667 MHz) was used for the administration console/user station.

All virtual desktop machines' resources were configured identically for both vendors and consisted of the following software and virtual hardware components:

- 1 virtual CPU, 1,024 MB RAM
- 8 GB Hard disk drive storage
- Microsoft Windows Media Player 11 on Windows XP SP3 in the VMware environment, and Windows Media Player 12 on Windows 7 Professional for Microsoft environment
- Microsoft Office 2007 (Full install)



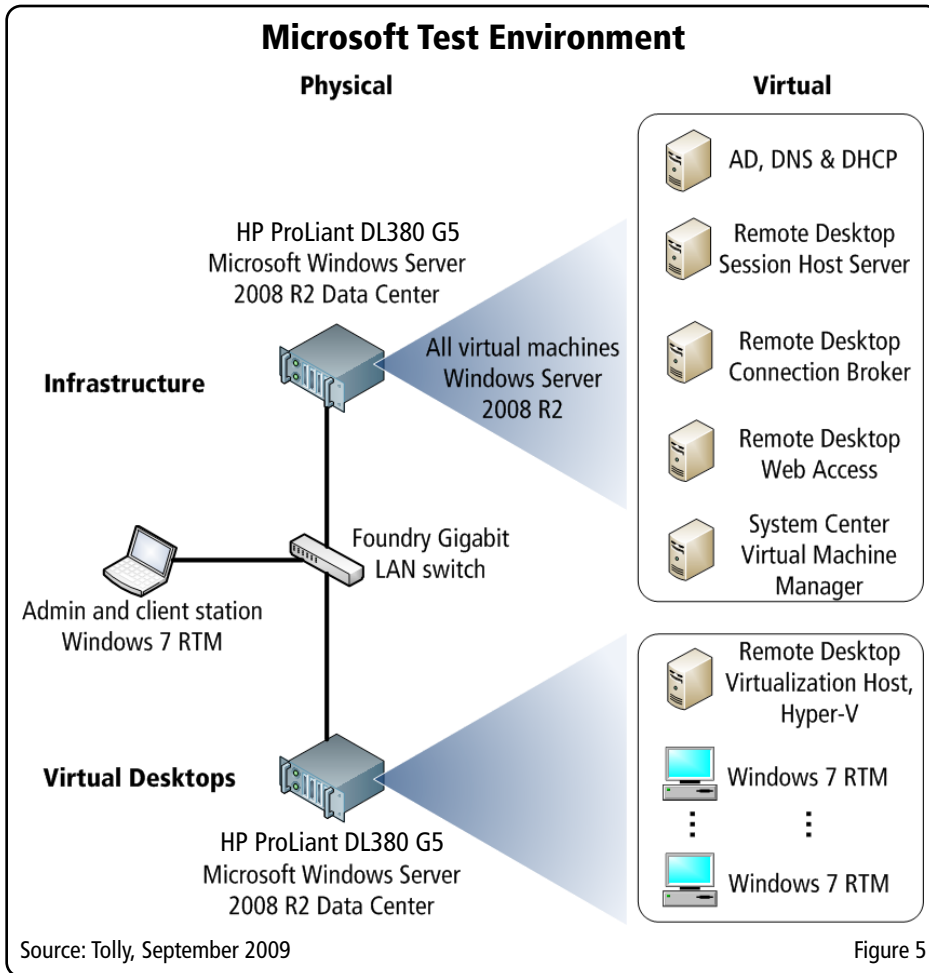


Figure 5

VMware Virtual Environment

Both physical servers were loaded with VMware ESX 3.5 update 4. One server was used to house the virtual desktop infrastructure components and the other to host the virtual desktop images. (See Figure 4.)

Three virtual machines were configured for the infrastructure machine. All ran Microsoft Windows Server 2003 R2. One machine ran Active Directory, Domain Name System (DNS) and Dynamic Host Configuration Protocol services.

The remaining two virtual machines ran VMware components with one running vCenter and VMware View Composer

and the other running the View Connection Server. Microsoft Windows XP SP3 was used for the VMware administration console.

For VMware, Windows XP Professional SP3 was used as the operating system of the virtual desktops.

Microsoft Virtual Environment

Both physical servers were loaded with Windows Server 2008 R2 Datacenter 64-bit (6.1, Build 7600). One server was used to house the virtual desktop infrastructure components and the other to host the virtual desktop images. (See Figure 5.)

Five virtual machines were configured for the infrastructure machine. All ran Microsoft Windows Server 2008 R2. One machine ran Active Directory, DNS and DHCP (Dynamic Host Configuration Protocol) services. Another machine ran System Center Virtual Machine Manager.

The remaining virtual machines ran Microsoft VDI components with one running Remote Desktop Session Host server, one running Remote Desktop Connection Broker, and the other one running Remote Desktop Web Access server.

For Microsoft, Windows 7 Professional 64-bit (6.1, Build 7600) was used as the operating system for the virtual desktops.



About Tolly

The Tolly Group companies have been delivering world-class IT services for 20 years. Tolly is a leading global provider of third-party validation services for vendors of IT products, components and services. You can reach the company via E-mail at sales@tolly.com, or via telephone at +1 561.391.5610. Visit Tolly on the Internet at: <http://www.tolly.com>

About VMware, Inc. (NYSE:VMW)

VMware, Inc. provides virtualization solutions. Its virtualization platform products include Player that enables individuals to run virtual machines on their desktops; Fusion, a desktop virtualization product for users of Intel-based Apple Macintosh computers; Workstation for software developers and enterprise IT professionals; Server, which enables virtual partitioning of a server; ESX Server, an enterprise-class virtualization platform that runs directly on the hardware; Virtual SMP that enables a virtual machine to use four physical processors simultaneously; and VMFS, which allows multiple ESX Servers to share block-based storage. The company also offers VirtualCenter that provides a central point of control to manage a virtualized IT environment; VMotion, which allows users to move virtual machines; DRS that creates resource pools from physical servers; HA, which provides automated recovery from hardware failure; Consolidated Backup that enables LAN-free automated backup of virtual machines; Storage VMotion, which allows live migration of virtual machine disks; Update Manager that automates patch and update management; Capacity Planner, which enables VMware service providers to perform capacity assessments onsite; Converter to convert local and remote physical machines into virtual machines; Lab Manager to automate the setup, capture, storage, and sharing of multi-machine software configurations; ACE that allows desktop administrators to protect company resources against the risks presented by unmanaged desktops; Virtual Desktop Infrastructure to host individual desktops inside virtual machines running on centralized servers; Virtual Desktop Manager, a desktop management server that connects users to virtual desktops in the data center; and VMware Lifecycle Manager that provides control over the virtual environment. The company was founded in 1998 and is headquartered in Palo Alto, California. VMware, Inc. is a subsidiary of EMC Corporation.

Terms of Usage

This document is provided, free-of-charge, to help you understand whether a given product, technology or service merits additional investigation for your particular needs. Any decision to purchase a product must be based on your own assessment of suitability based on your needs. The document should never be used as a substitute for advice from a qualified IT or business professional. This evaluation was focused on illustrating specific features and/or performance of the product(s) and was conducted under controlled, laboratory conditions. Certain tests may have been tailored to reflect performance under ideal conditions; performance may vary under real-world conditions. Users should run tests based on their own real-world scenarios to validate performance for their own networks.

Reasonable efforts were made to ensure the accuracy of the data contained herein but errors and/or oversights can occur. The test/audit documented herein may also rely on various test tools the accuracy of which is beyond our control. Furthermore, the document relies on certain representations by the sponsor that are beyond our control to verify. Among these is that the software/hardware tested is production or production track and is, or will be, available in equivalent or better form to commercial customers. Accordingly, this document is provided "as is", and Tolly Enterprises, LLC (Tolly) gives no warranty, representation or undertaking, whether express or implied, and accepts no legal responsibility, whether direct or indirect, for the accuracy, completeness, usefulness or suitability of any information contained herein. By reviewing this document, you agree that your use of any information contained herein is at your own risk, and you accept all risks and responsibility for losses, damages, costs and other consequences resulting directly or indirectly from any information or material available on it. Tolly is not responsible for, and you agree to hold Tolly and its related affiliates harmless from any loss, harm, injury or damage resulting from or arising out of your use of or reliance on any of the information provided herein.

Tolly makes no claim as to whether any product or company described herein is suitable for investment. You should obtain your own independent professional advice, whether legal, accounting or otherwise, before proceeding with any investment or project related to any information, products or companies described herein. When foreign translations exist, the English document is considered authoritative. To assure accuracy, only use documents downloaded directly from Tolly.com. No part of any document may be reproduced, in whole or in part, without the specific written permission of Tolly. All trademarks used in the document are owned by their respective owners. You agree not to use any trademark in or as the whole or part of your own trademarks in connection with any activities, products or services which are not ours, or in a manner which may be confusing, misleading or deceptive or in a manner that disparages us or our information, projects or developments.