Dell Wyse Datacenter for VMware Horizon View Reference Architecture Brief

A summary of features in the Dell Wyse Datacenter for VMware Horizon View

Dell Wyse Solutions Engineering
May 2014
## Revisions

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<tr>
<td>May 2014</td>
<td>Initial release v.6.5.0</td>
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1 Introduction

1.1 Purpose of this document
The purpose of this document is to explain, at a high level, the new features, architecture design and test results of the latest iteration of the Dell Wyse datacenter for VMware Horizon View solution. It serves as a companion to the Reference Architecture which is a comprehensive document that details every aspect of the solution hardware and software components, design considerations and testing results.

1.2 New in this release
- RDS based desktop and Remote App support - http://dell.to/QRqAud
- View 6 Cloud POD Architecture - http://dell.to/1gOGv5

See the attached hyperlinks for focused white papers on each of the above topics.
2 Solution architecture overview

2.1 Introduction

The Dell Wyse Datacenter Solution leverages a core set of hardware and software components consisting of 4 primary layers:

- Networking Layer
- Compute Server Layer
- Management Server Layer
- Storage Layer

These components have been integrated and tested to provide the optimal balance of high performance and lowest cost per user. Additionally, the Dell Wyse Datacenter Solution includes an approved extended list of optional components in the same categories. These components give IT departments the flexibility to custom tailor the solution for environments with unique virtual desktop infrastructure (VDI) feature, scale or performance needs. The Dell Wyse Datacenter stack is designed to be a cost effective starting point for IT departments looking to migrate to a fully virtualized desktop environment slowly. This approach allows you to grow the investment and commitment as needed or as your IT staff becomes more comfortable with VDI technologies.
2.1.1 Physical architecture overview

The core Dell Wyse Datacenter architecture consists of two models: Local Tier 1 and Shared Tier 1. Tier 1 in the Dell Wyse Datacenter context defines from which disk source the VDI sessions execute. Local Tier 1 includes rack servers only while Shared Tier 1 can include rack or blade servers due to the usage of shared Tier 1 storage. Tier 2 storage is present in both solution architectures and, while having a reduced performance requirement, is utilized for user profile/data and Management virtual machine (VM) execution. Management VM execution occurs using Tier 2 storage for all solution models. Dell Wyse Datacenter is a 100% virtualized solution architecture.

In the Shared Tier 1 solution model, an additional high-performance shared storage array is added to handle the execution of the VDI sessions. All compute and management layer hosts in this model are diskless.
3  Hardware components

3.1  Networking
The core network components for the solutions include various models from the Force10, Brocade and PowerConnect product lines. For detailed information on specific model numbers and configuration guidance, please refer to the Reference Architecture document. The following models were validated in the labs and are core components of the solution: Force10 S55, S60 and S4810; Brocade 6510 and 5424; and PowerConnect I/O Aggregator and M6348. General uplink cabling guidance to consider in all cases is that Twinax is very cost effective for short 10Gb runs and for longer runs it is best to use fiber with SFPs.

3.2  Servers

3.2.1  PowerEdge R720
The rack server platform for this solution is the best-in-class Dell PowerEdge R720. This dual socket CPU platform runs the fastest Intel Xeon E5-2600 family of processors, can host up to 768GB RAM and supports up to 16 2.5” SAS disks. The PowerEdge R720 offers uncompromising performance and scalability in a 2U form factor. For more information, please visit: http://www.dell.com/us/business/p/poweredger-r720/pd.

3.2.2  PowerEdge M620
The blade server platform for this solution is the PowerEdge M620. This half-height blade server is a feature-rich, dual-processor platform that offers a blend of density, performance, efficiency and scalability. The M620 offers remarkable computational density, scaling up to 24 cores, 2 socket Intel Xeon processors and 24 DIMMs (768GB RAM) of DDR3 memory in an extremely compact half-height blade form factor. This server platform is currently offered in both the PowerEdge M1000e blade enclosure and VRTX shared infrastructure platform. For more information, please visit: http://www.dell.com/us/business/p/poweredger-m620/pd

3.3  Storage

3.3.1  EqualLogic Tier 1 storage (iSCSI)
High-speed, low-latency solid-state disk (SSD) technology and high-capacity HDDs in a single chassis. The PS6210XS 10GbE iSCSI array is a Dell Fluid Data solution with a virtualized scale-out architecture that delivers enhanced storage performance and reliability that is easy to manage and scale for future needs. For more information on the PS6210XS please visit: http://www.dell.com/us/business/p/equallogic-ps6210-series/pd
3.3.2 EqualLogic Tier 2 storage (iSCSI)

The following arrays can be used for management VM storage and user data, depending on the scale of the deployment. Please refer to the hardware tables in section 2 of the Reference Architecture document. For more information on Dell EqualLogic offerings, please visit: http://www.dellstorage.com/equallogic/.

- PS4100E – 1 GbE, up to 36 TB, up to 1000 users
- PS4110E – 10 GbE, up to 36 TB, up to 1000 users
- PS6100E – 1 GbE, up to 96 TB, up to 1500 users
- PS6210E – 10 GbE, up to 96 TB, up to 1500 users
- PS6500E – 1 GbE, up to 144 TB, over 1500 users
- PS6510E – 10 GbE, up to 144 TB, over 1500 users

3.3.2.1 Compellent Tier 1 storage (FC)

Compellent Tier 1 storage consists of a standard dual controller configuration and scales upward by adding disks/shelves and additional discrete arrays. A single pair of SC8000 controllers will support Tier 1 and Tier 2 for 2000 knowledge worker users, as depicted below, utilizing all 15K SAS disks. If Tier 2 is to be separated then an additional 30% of users can be added per Tier 1 array. Scaling above this number, additional arrays will need to be implemented. Additional capacity and performance capability is achieved by adding larger disks or shelves, as appropriate, up to the controller’s performance limits. Each disk shelf requires 1 hot spare per disk type. RAID is virtualized across all disks in an array (RAID10 or RAID6). Please refer to the test methodology and results for specific workload characteristics. SSDs can be added for use in scenarios where boot storms or provisioning speeds are an issue.

3.3.2.2 Compellent Tier 2

Compellent Tier 2 storage is completely optional if a customer wishes to deploy discrete arrays for each tier. The guidance below is provided for informational purposes and arrays built for this purpose will need to be custom. The optional Compellent Tier 2 array consists of a standard dual controller configuration and scales upward by adding disks and shelves. A single pair of SC8000 controllers should be able to support Tier 2 for 10,000 basic users. Additional capacity and performance capability is achieved by adding disks and shelves, as appropriate. Each disk shelf requires 1 hot spare per disk type. When designing for Tier 2, capacity requirements will drive higher overall array performance capabilities due to the amount of disk that will be on hand. Our base Tier 2 sizing guidance is based on 1 IOPS and 5GB per user.

3.4 Dell Wyse Cloud Clients

3.4.1 Dell Wyse P25

Uncompromising computing with the benefits of secure, centralized management. The Dell Wyse P25 PCoIP zero client for VMware View is a secure, easily managed zero client that provides outstanding graphics performance for advanced applications such as CAD, 3D solids modeling, video editing and advanced worker-level office productivity applications. Smaller than a typical notebook, this dedicated zero client is designed specifically for connecting to View environments. It features the latest processor technology from Teradici to process the PCoIP protocol in silicon and includes client-side content...
caching to deliver the highest level of performance available over 2 HD displays in an extremely compact, energy-efficient form factor. The Dell Wyse P25 delivers a rich user experience while resolving the challenges of provisioning, managing, maintaining and securing enterprise desktops.

3.4.2 Dell Wyse D10DP
The Dell Wyse D10DP is a high-performance and secure ThinOS 8 thin client that is absolutely virus and malware immune. Combining the performance of a dual-core AMD G-Series APU with an integrated graphics engine and ThinOS, the D10DP offers exceptional thin client PCoIP processing performance for VMware Horizon View environments that handles demanding multimedia apps with ease and delivers brilliant graphics. Powerful, compact and extremely energy efficient, the D10DP is a great VDI endpoint for organizations that need high-end performance but face potential budget limitations.

3.4.3 Dell Wyse P45
Uncompromising computing with the benefits of secure, centralized management. The Dell Wyse P45 PCoIP zero client for VMware View is a secure, easily managed zero client that provides outstanding graphics performance for advanced applications such as CAD, 3D solids modeling, video editing and advanced worker-level office productivity applications. About the size of a notebook, this dedicated zero client designed specifically for VMware View. It features the latest processor technology from Teradici to process the PCoIP protocol in silicon and includes client-side content caching to deliver the highest level of display performance available over 4 HD displays in a compact, energy-efficient form factor. The Dell Wyse P45 delivers a rich user experience while resolving the challenges of provisioning, managing, maintaining and securing enterprise desktops.

3.4.4 Dell Wyse Z50D
Designed for power users, the Dell Wyse X50D is the highest performing thin client on the market. Highly secure and ultra-powerful, the X50D combines Dell Wyse-enhanced SUSE Linux Enterprise with dual-core AMD 1.65 GHz processor and a revolutionary unified engine for an unprecedented user experience. The Z50D eliminates performance constraints for high-end, processing-intensive applications like computer-aided design, multimedia, HD video and 3D modelling.

3.4.5 Dell Wyse Z90D
This is super high performance Windows Embedded Standard 7 thin client for virtual desktop environments. Featuring a dual core AMD processor and a revolutionary unified engine that eliminates performance constraints, the Z90D7 achieves incredible speed and power for the most demanding embedded windows applications, rich graphics and HD video. With touch screen capable displays, the Z90D7 adds the ease of an intuitive multi touch user experience and is an ideal thin client for the most demanding virtual desktop workload applications.
3.4.6 **Dell Wyse Z90Q8**

Users who demand more from their virtual desktop environments, yet still need the security and management benefits of cloud clients will find the Z90Q8 to be a great fit. Featuring a quad core AMD G-Series APUs, the Z90Q8 offers uncompromising performance with fast, flexible user connectivity and outstanding energy-efficiency. The most demanding users in virtually any VDI environment will appreciate the power for challenging Windows virtual desktop and cloud applications, rich content creation and consumption, HD video, unified communications and 3D graphics. The Z90Q8 is available as a thin client with the Windows 8 Embedded Standard operating system.

3.4.7 **Dell Chromebook 11**

With its slim design and high performance, the Dell Chromebook 11 features a 4th Generation Intel Celeron 2955U processor, 11.6-inch screen, up to 10-hours of battery life and 16GB embedded Solid State Drive which allow it to book in seconds. The Dell Chromebook 11 is available in two models with either 2GB or 4GB of internal DDR3 RAM. This provides options for the education ecosystem, allowing students, teachers and administrators to access, create and collaborate throughout the day at a price point that makes widespread student computing initiatives affordable. The 11.6 inch, edge-to-edge glass screen produces exceptional viewing clarity at a maximum resolution of 1366x768 and is powered by Intel HD Graphics. The high-performing display coupled with a front-facing 720p webcam creates exciting opportunities for collaborative learning. The Dell Chromebook 11 is less than one inch in height and starts at 2.9lbs, making it highly portable. With two USB 3.0 ports, Bluetooth 4.0 and an HDMI port, end users have endless possibilities for collaborating, creating, consuming and displaying content. With battery life of up to 10-hours, the Chromebook is capable of powering end users throughout the day. Lastly, a fully compliant HTML5 browser makes the Dell Chromebook11 an excellent choice as an endpoint when connecting to an HTML5/BLAST Horizon View VDI desktop.
4 Software components

4.1 What’s new in this release of Horizon View 6.0?
This new release of VMware Horizon View delivers following important new features and enhancements:

RemoteApp – RemoteApp enables administrators to make programs that are accessed remotely through a Remote Desktop Session (RDS) server appear as if they are running on the client computer versus a remote desktop.

Virtual SAN – Horizon 6 with VMware Virtual SAN™ is a new storage technology that automates storage provisioning and pools together with server-attached flash drives and hard disks and virtualizes them into reliable storage. Built into the vSphere platform, the technology offers greater performance while simplifying storage management. Virtual SAN eliminates the need to overprovision storage to ensure that end users have enough IOPS per desktop.

Cloud pod architecture – The cloud pod architecture allows organizations to dynamically move and locate View pods across multiple data centers for efficient management of end users across distributed locations.

vDGA and vSGA 3D graphics enhancements – 3D graphics capabilities are enhanced to augment a graphically rich user experience. Using Virtual Dedicated Graphics Acceleration (vDGA), a single virtual machine is mapped to one physical graphics processing unit (GPU) in the ESXi host, providing high-end, hardware-accelerated workstation graphics. Using Virtual Shared Graphics Acceleration (vSGA), multiple virtual machines leverage physical GPUs that are installed locally in ESXi hosts, providing hardware accelerated 3D graphics to multiple virtual desktops.

Unity Touch enhancements – Enhancements to VMware Unity Touch technology make it easier to connect to View Connection Server or a View security server, log in to remote desktops in the data center, and edit the list of connected servers. Unity Touch for VMware Horizon Client makes it easier to run Windows apps on iPhone, iPad, and Android devices.

Additional OS support – View Connection Server, security server, and View Composer are supported on Windows Server 2012 R2 operating systems.

Horizon View logs – Ability to send Horizon View logs to a Syslog server such as VMware vCenter Log Insight.

Horizon View Agent – The Remote Experience Agent is now integrated with View Agent. Previously, you had to install View Agent and the Remote Experience Agent to use features such as HTML Access, Unity Touch, Real-Time Audio-Video, and Windows 7 Multimedia Redirection. In this release these features are available by installing just the View Agent.
4.2 VMware Horizon View

The solution is based on VMware Horizon View which provides a complete end-to-end solution delivering Microsoft Windows virtual desktops to users on a wide variety of endpoint devices. Virtual desktops are dynamically assembled on demand, providing users with pristine, yet personalized, desktops each time they log on.

VMware Horizon View provides a complete virtual desktop delivery system by integrating several distributed components with advanced configuration tools that simplify the creation and real-time management of the virtual desktop infrastructure. For the complete set of details, please see the Horizon View resources page at http://www.vmware.com/products/horizon-view/resources.html

The core Horizon View components include:

**View Connection Server (VCS)** – Installed on servers in the data center and brokers client connections. The VCS authenticates users, entitles users by mapping them to desktops and/or pools, establishes secure connections from clients to desktops, support single sign-on, sets and applies policies, acts as a DMZ security server for outside corporate firewall connections and more.

**View Client** – Installed on endpoints. Is software for creating connections to View desktops that can be run from tablets, Windows, Linux, or Mac PCs or laptops, thin clients and other devices.

**View Portal** – A web portal to access links for downloading full View clients. With HTML Access Feature enabled enablement for running a View desktop inside a supported browser is enabled.

**View Agent** – Installed on all VMs, physical machines and Terminal Service servers that are used as a source for View desktops. On VMs the agent is used to communicate with the View client to provide services such as USB redirection, printer support and more.

**View Administrator** – A web portal that provides admin functions such as deploy and management of View desktops and pools, set and control user authentication and more.

**View Composer** – This software service can be installed standalone or on the vCenter server and provides enablement to deploy and create linked clone desktop pools (also called non-persistent desktops).

**vCenter Server** – This is a server that provides centralized management and configuration to entire virtual desktop and host infrastructure. It facilitates configuration, provision, management services. It is installed on a Windows Server 2008 host (can be a VM).

**View Transfer Server** – Manages data transfers between the data center and the View desktops that are checked out on the end users’ desktops in offline mode. This Server is required to support desktops that run the View client with Local Mode options. Replications and syncing are the functions it will perform with offline images.
4.3 VMware vSphere 5 hypervisor platform

VMware vSphere 5 (currently vSphere 5.5 U1) is a virtualization platform used for building VDI and cloud infrastructures. vSphere 5 represents a migration from the ESX architecture to the ESXi architecture.

VMware vSphere 5 includes three major layers: Virtualization, Management and Interface. The Virtualization layer includes infrastructure and application services. The Management layer is central for configuring, provisioning and managing virtualized environments. The Interface layer includes the vSphere client and the vSphere web client.

Throughout the Dell Wyse Datacenter solution, all VMware best practices and prerequisites are adhered to (NTP, DNS, Active Directory, etc.). The vCenter 5 VM used in the solution will be a single Windows Server 2012 R2 VM (Check for current Windows Server OS compatibility at: http://www.vmware.com/resources/compatibility), residing on a host in the management tier. SQL server is a core component of vCenter and will be hosted on another VM also residing in the management tier. All additional Horizon View components need to be installed in a distributed architecture, 1 role per VM.

For more information on VMware vSphere, visit http://www.vmware.com/products/vsphere

4.4 Test results summary

This validation was performed on single server compute host solutions, running on a PowerEdge R720 host. The compute hosts had 256GB of RAM and dual E5-2690V2 v2 3.0GHz 10 core processors. Using Ivy Bridge processors the M620 can support the same processors as the R720. Results presented below were performed on Local Tier1 storage (10 HDDs installed in RAID-10 group located in the server chassis). For each user workload, the CPU, memory and achieved density are provided.

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<th>User Workload</th>
<th>vCPUs</th>
<th>vRAM Total</th>
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<td>1</td>
<td>2 GB</td>
<td>185</td>
</tr>
<tr>
<td>Enhanced User</td>
<td>2</td>
<td>3 GB</td>
<td>130</td>
</tr>
<tr>
<td>Professional User</td>
<td>2</td>
<td>4 GB</td>
<td>115</td>
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</table>

For complete test results, please see the Reference Architecture document located here:

Acknowledgements

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