

# Driving Innovation Through the Information Infrastructure

# **SPRING 2011**



# Achieving storage efficiency and scalability in virtual desktop environments

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# Agenda

- Why VDI?
- Storage sizing guidelines & deployment best practices for VMware View
  - Strategies for virus protection
  - Image patch management to help reduce IO contention
- Introduction to advanced storage technologies
  - Help improve VDI performance
  - Reduce operational overhead
  - Expedite desktop delivery



## Let's get started, but first some data.....

From last year's Gartner's Data Center Conference

Figure 2. Rank in Order of Priority the Reasons for Considering or Deploying HVDs



n=142. Users were allowed to vote for more than one, hence, the cumulative total on the y-axis. Source: Gartner (April 2010)

\*Publication Date: 6 April 2010 ID Number: G00175612 Source: 2009 Gartner Data Center Conference Polling Results for Hosted Virtual Desktops and Application Virtualization Desktop virtualization reality today = costly

Figure 4. How Much Storage Will IT Allocate on a Per-User Basis for HVDs?



#### Source: Gartner (April 2010)

COMPUTERWORLD

\*Publication Date: 6 April 2010 ID Number: G00175612 Source: 2009 Gartner Data Center Conference Polling Results for Hosted Virtual Desktops and Application Virtualization



# How we're going to achieve a **cost breakthrough** for desktop virtualization...

- 1. Architect infrastructure for efficiency
  - Migration from FC->iSCSI
  - Deployment of 1GbE and 10GbE to unify fabric's
- 2. Tackle shared storage costs
  - Use storage virtualization technologies
  - Introduce SSDs where it makes sense
- 3. Size desktop images properly
  - Abstract applications from image
  - Consider virus/patch management into overall design of image
  - Linked clones! Need to be a common image to simplify patch management for scalability
- 4. Automate virtual desktop deployments to reduce OPEX



Storage sizing guidelines &

deployment best

practices for VDI



#### **Applications**

Flexible Desktop Solutions dynamically delivers the right resources instantly, on-demand, regardless of location or device.



Access Layer			Client Device	Access Layer	Digital Logic	VRD Capacity	
Network	•	<ul> <li>VDI can be network intensive – large numbers of VM's per server, especially with heavy printing.</li> <li>Plan for ~ 25Kbps per RDP User. Network Latency &lt; 75ms</li> <li>Plan for ~ 150-200Kbps per PCoIP User.</li> <li>Network Latency &lt;150ms</li> <li>Implement Traffic Shaping and VLAN's for optimum service levels</li> </ul>					
SSL+ Auth	•	Use Tunnel Mode for SSL Encryption Scale-out with Network Load Balancing to support > users					
Broker	•	Choose Persistent and/or Non-Persistent VM assigned per Group or User Assign Dynamic Pools for the Virtual Desktops VM's are drawn from a Template – Patch/Maintain Templates					
ICA/RDP/PCoIP	•	Disable COM services Enable traffic	/I Ports/USI	B if not requ nd VLAN's	uired & unnec to optimize Sl	essary LA's	



# Digital Logic





- VM is a composite view of OS, Profile and Application Stack
- VM Boots from SAN and is hosted on PowerEdge
- Application stack patched / optimized / configured
- Use Streaming and Presentation Virtualization for App Virtualization
- Roaming Profiles for Personalization with Non-Persistent Pool
- Profiles hosted on SAN
- Folder Redirection for My Documents using GPO's + Home Drives
- Centralize User storage on Public + Home Network drives
- Set CPU and Memory based upon Workload Profile
- Streamline Virus scanning & mgmnt.
- Single vCPU per VM

- Disable Visual Effects (Windows XP visual wrappers)
- Disable "Screen Saver"
- Install VMware tools



# **VRD** Capacity



www.are<sup>\*</sup>





- Choice of ESXi or ESX as HyperVisor
- DRS + VMware HA included with VDI Licensing
- VCB and VUM included
- Implement SRM for BC + DR Workflow
- Blade for Density, 2S for best price vs. performance
  - # of ESX Nodes required depends on # Cores, Memory, OS, User Workload Profile
- Average: 6 to 16 virtual desktops/core. Max of 320 per server, 160 in 8 host HA cluster (ESX4 U1)
- Estimate 75-150 users/2 socket current Dell-Intel platforms.
- Design iSCSI SAN with Redundancy and Segmentation.
- Knowledge worker = 5-10 Power User = 10-20 IOPS in XP - Win 7
- Account for VirtualHD size, snapshots, templates and ISO's
- Leverage Six Core > CPU's for VM performance



## Image Design Considerations

Anti-Virus Software:

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- · Install core Anti-Virus package not all add-on features.
- · Include Management Agent in Master Virtual Machine and update.
  - Use random and/or staggered scanning to limit per host impact.
    - Exclude certain files. I.E. Database, encrytped, pagefile, .pst, spool etc.



## Wait, More Image Design Considerations

Master Image:

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- Categorize applications required by user type and leverage Application Virtualization to deliver 2<sup>nd</sup> and 3<sup>rd</sup> tier.
- Include corporate applications in master image. Virus, Sys mgmnt, Office etc.
- Leverage GPO's to redirect user data.
- Investigate profile management techniques to lower administration overhead. (Roaming Profiles, Liquidware, RTO ETC.)

Turn off non-essential services. I.E. Indexing, com ports, themes, system restore points etc.



Introduction to advanced storage technologies



# Tiering is important

- Leverage software or hardware use of tiered storage
- Break up user data and operating system files
- Leverage advanced SAN capabilities for data protection



Goal

# Create a proof point for "PS6000XVS Performance" using a VDI workload



## Task Worker Workload Test Setup

Applications used in VDI workload generation tool

- Outlook
- IE

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- Word
- Adobe reader

#### Load generated

- 2-5 IOPS / Desktop
- 3GB linked clone disk space/Desktop (additional to base image)

#### Volume Layout used

- 1 volume for "Gold" image
- 4 volumes for desktop linked clones





## Dell EqualLogic PS6000XVS/PS6010XVS Storage Optimized for multi-tiered VDI Workload





#### Max. IOPS: 8,600 Max. Read Latency: 9.9 ms Max. Write Latency: 6.3 ms





90% IOPS coming from SSDs, 10% coming from SAS drives ~1700 IOPS / SSD, ~160 IOPS / SAS drive at login storm





Avg. IOPS: 2,100 Avg. Read Latency: 4.6 ms Avg. Write Latency: 1.7 ms





- For task worker workload, ~1,000 desktops on a single PS6000XVS array
- Performance at  $\sim$ 1,000 desktops:
  - 8,600 IOPS at peak load
  - ~5% performance headroom
  - latency well below the 20 ms criteria
  - Capacity at ~1,000 desktops:
    - Gold images and a minimum of 2GB per linked clone delta disk
    - ~15% capacity headroom
- With automatic workload tiering, PS6000XVS is optimally balanced for both capacity and performance in VDI environment



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## Smart Deploy Features

- Adds EqualLogic intelligence to VMware View
- Automates storage provisioning for Manual Desktop Pool
  - Dell EqualLogic VDI solution with ASM/VE provides:
    - Automated virtual desktop deployment by managing operations on storage arrays and inside vCenter
    - Import of VDI pool metadata directly into VMware View
    - Space/time savings using thin clone technology
    - Fast provisioning of additional desktops
    - Fast and automated re-deployment of desktop pools



#### Prepare template VM image

Create deployment template ("Golden image")

Provision deployment units:

- create thin clones
- provision datastores
- register VMs
- customize VMs
- Import into View



## Advantages

- Storage Savings:
  - Thin Cloning allows up to 80% less storage over full clones
- Time Savings:
  - Faster deployment
- Better Scalability
  - Quickly extend pool size by provisioning additional deployment units
  - Limited by only storage pool capacity VS individual data store size
- Full Automation:
  - Single wizard deployment VS multiple tools and independent steps

#### • Redeploy Savings:

 Recreate desktop pool from stored metadata VS delete and recreate every desktop





# Virtual Desktop Deployment Utility





# **Accelerating virtualization efficiency**

# **Business Ready Configurations**

- · Slash set-up and integration time
- Simplify ordering and configuring
- · Optimized for virtualization and energy efficiency
- Backed by Dell ProSupport services
- Stream virtualization processes with
   Virtualization Design Consulting





# Next Steps

Visit <u>www.Dell.com/PSseries</u> or <u>www.GetMoreVirtual.com</u> for more information Contact your Dell Account Executive



# Want to learn more?

- Stop by the Dell booth
- Stop by the hands on lab

• Thank you!