Solution Track 4
Design a Scalable Virtual Desktop Infrastructure

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Basics of Virtual Desktop Infrastructure (VDI)

- Ease of provisioning
- Migration of platforms (XP -> Vista)
- Mobility access (from anytime and anywhere)
- Security (lock-down of devices)
- Confidentiality of data
- Compliance (central patching & monitoring)
- Access and provisioning of applications
- Facilitate remote troubleshooting
- Disaster Recovery (DR) plans
- Backup recovery
VDI Architecture Design Model
Client Access Devices

- Thin clients
- Repurposed PCs
- Mobile users
End User Device Considerations

Desktop Requirements:
- Single/multiple monitors support
- Multimedia support, 3D/Graphic intensive applications
- Peripheral port access requirements (USB, card reader, PCMCIA support etc)
- Mobility Access (Local & remote)

Solution:
- Leverage on RDC 6 to support monitor spanning
- Third-party window managers to expand functionality (SplitView or iShadow)
- Built-in graphics card to support virtual channels/RGS
- VDM client supports USB redirection (on ThinClient/PC)
Who’s On Board

Compatibility Guide:

> [http://www.vmware.com/resources/techresources/1053](http://www.vmware.com/resources/techresources/1053)

VDM Supported Thin Client devices:


> ThinClient Vendors (Wyse, HP, Sun Microsystems, NEC etc)
Access Infrastructure and Services

- Internet
- VPN Access
- Corporate Network
- Leased Lines
- Connection Broker Services
Access Infrastructure Considerations

Bandwidth and latency
Load balancing
Total / concurrent sessions anticipated
  > Virtual machine density
  > Connection broker infrastructure
  > Access infrastructure scalability

Other key considerations
  > VDI availability requirements
  > Security and encryption requirements
Access Infrastructure Design Guidance

Bandwidth

➢ Averagely 30k to 50k bps per user, plus include estimates for peaks up to 100k bps

➢ WAN optimization can be leveraged to optimize other, non-encrypted traffic (e.g. Internet access)

Latency

➢ Up to 150ms yields “acceptable” usage for most applications, over 200ms for few apps, 250ms+ approach with caution

➢ End-user experience across remote sites can be enhanced by integrating with vendor solutions (e.g. F5, Riverbed, Juniper via compression of the RDP traffic)
Access Infrastructure Design Guidance

Virtual machine density

- VM density drives network infrastructure demands
  - Estimate 5-8 users per core, depending upon user characteristics and application workloads
  - VDI sizing guide (depending on light & heavy user workload)

Connection Broker Infrastructure

- Use VMs for connection broker infrastructure, and create resource pools to prioritize workloads
  - Dual processors with 3GB for 50 desktops or more
- Keep connection brokers on separate ESX hosts
- For remote access, include at least two VDM Security Servers in the DMZ
Access Infrastructure Design Guidance

Rule of Thumb

Maximum connection without SSL to a VDM server is 1000
Maximum with SSL enabled is about 700 concurrent connections
Up to 5 VDM Connection Servers to support up to 5000 desktops
Access Infrastructure Design Guidance

Network Load Balancing

> Key points

- Load balancing is NOT provided by VDM
- Connection server sessions are stateful

> Leverage load balancing in the DMZ and internal networks

> Be able to detect Connection Server failure (deep probe)

> Use dedicated purpose load balancers

  - A load balancing VM appliance (e.g. Hercules)
  - Hardware-based load balancers (e.g. F5 Big IP, Cisco CSS, MNLB)
Access Infrastructure Design Guidance

Figure 2. Load Balancing VDM Security Servers in a DMZ
VMware Infrastructure Considerations

ESX/ESXi hosts
Storage network
FC Storage
iSCSI / NFS storage
vSwitch network
Virtual Infrastructure Considerations

Sizing of VI depends on

- Workload/User Profile (light, heavy worker)
- Processor Cores (No of VD’s per core)
- Footprint of VD (Keep it lean)
- Operating System (Transparent Page Sharing)
- Projected total / concurrent sessions
- Growth requirements, failover resources available
- Dynamic Resource Scheduling (DRS) available
- Storage & disk requirements (data de-dup..)
Image Server - Storage Cost Savings

- Image Server enables the creation of “linked clones” based off a “Gold Master Image” (also called redo logs)
- Leveraging VMware “snapshot” technology that has been in production for over ten years.
- Can dramatically (90%+) reduce the amount of storage consumed.
- Increase overall performance due to better storage controller / cache utilization.

<table>
<thead>
<tr>
<th>Ratio</th>
<th>% Savings</th>
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<tbody>
<tr>
<td>1:50</td>
<td>85%+</td>
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<tr>
<td>1:100</td>
<td>90%+</td>
</tr>
<tr>
<td>1:1000</td>
<td>95%+</td>
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</table>

25 MB Clone

25 MB Clone

25 MB Clone

10 GB OS

VIRTUALIZATION FORUM 2008
Virtual Desktop Layer

OS Build / Template

Applications Deployment

Virtual Desktop
A typical desktop has everything bundled into a single device with a complex intertwined collection of software and data.
Using Application Virtualization such as ThinApp, applications can be moved to a file share and launched without being installed locally.
ThinApp

➢ Package be launched from a network share for VDI
➢ Deploy as a msi using existing delivery tools e.g. BMC, HP, SMS etc

Virtual Desktop

➢ Leverage memory over-commitment feature in ESX
➢ Create pools for CPU and Memory based on user profile
➢ Remove Visual Effects (Windows XP visual wrappers)
➢ Change Screen Saver to Blank and password protect
➢ Don NOT use VSMP as this may delay CPU scheduling. Do NOT CPU affinity
Virtualization Forum 2008


Desktop and Session Management Considerations

Folder Redirection / Policies

Pool Management

Printer / USB Device Management
Desktop Pool Management

Individual Desktop - Static 1-to-1 relationship between user and desktop

Non-Persistent Pool - Assignment of desktop based on per session basics

Persistent Pool - Once assign from pool, static to user

Desktop pool able to auto-provision VMs

<table>
<thead>
<tr>
<th>Virtual Machine Name</th>
<th>DNS Name</th>
<th>User</th>
<th>Status</th>
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<tr>
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</tr>
<tr>
<td>np-2</td>
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<tr>
<td>p-3</td>
<td></td>
<td></td>
<td>Provisioning</td>
</tr>
</tbody>
</table>
USB Device Redirection – Requirements

- **VMware VDM Agent**
  - Installs USB redirection driver in the VM

- **VMware VDM Client**
  - Used to establish connection with virtual desktop
  - Installs the USB redirection driver on the client

- Requires user to have admin privileges

- Supports standard USB devices
  - Mass Storage
  - Printers
  - Scanners
  - Smart Card Readers
  - Most PDA devices e.g. Blackberry, Palm, Windows Embedded
Putting everything together..
Why VMware VDI?

- Unified Platform for server and desktops
- Dynamic workload management for desktops
- Session broker (VDM) for desktop management
- On-demand auto-provisioning capabilities
- Scaleable and resilient design architecture
- Delivers complete desktop management (Patching, Provisioning, App delivery, Secure remote access)
- Delivers full desktop experience to users (online and offline support)
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**Enterprise Acceleration Kit**
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**SRM Acceleration Kit**
- VI-Ent and SRM for 6 processors + VCMS with 1-year Platinum SNS
- USD34,792

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