Design a Scalable Virtual Desktop Infrastructure

Ranganath GK,
Technology Consultant, VCP
VMware India.
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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
VMware Virtual Desktop Infrastructure architecture
VMware VDI Architecture Design Model
VDI Architecture Design Model
Specific Usage Scenarios

The architecture design model is applicable to these use cases:

- Off shore development
- Remote Office / Telecommuting User
- Call Centers
- Office “Hotel” suites
- Long-term telecommuting scenarios
- Desktop replacement
- Brokerage firms
- Business Continuity / Disaster Recovery
- And any scenario where cost saving, centralized management, security, user flexibility, and green computing are key drivers
Client Access Devices

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

Key Considerations:

- Existing or new devices
- Version of OS
- Single or multiple monitors
- Multimedia requirements, and format of data streams
- Permanent local storage of data files
- Peripheral port access requirements
- VPN tunnel
- Location of device (support and access constraints)
Client Access Device Design Guidance

OS version
- Select device OS or browser that supports VDM client or web access to enable ability to apply policies to device
- Consider patching requirements and PXE boot options

Single or multiple monitors
- Decide on software versus hardware based strategy
  - RDC 6 supports monitor spanning, and third party window managers can expand functionality
  - Certain thin client devices provide additional support for multiple monitors
Client Access Device Design Guidance

Multimedia requirements

➤ Identify the type of multimedia stream and verify support
➤ Certain thin client devices include local codecs with dedicated drivers that support more multimedia streams

Peripheral Port Access

➤ RDP and VDM agent can redirect many locally attached devices

VPN Tunnel requirements

➤ Determine need and business driver; not all devices support a VPN tunnel; local VPN client installation may be necessary

Permanent local storage of data

➤ Identify requirement to allow or deny local storage
Who’s On Board

Vendor Statements:


Compatibility Guide:

➢ http://www.vmware.com/resources/techresources/1053

VDM Supported Thin Client devices:

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
  ➢ Load balancing
Other key considerations
  ➢ VDI availability requirements
  ➢ Security and encryption requirements
Access Infrastructure Design Guidance

Bandwidth

➤ Forecast 30k to 50k bps per user on average, 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

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., Cisco CSS, F5 Big IP, Microsoft NLB)
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..)
VI Design Guidance

Total / concurrent sessions anticipated
- Limit initial sizing of ESX capacity to 5-8 VDI VMs per core until pilot phase
- Provision ample VM memory to discourage guest OS swapping

Storage demands
- Relocate user data, applications, and profile out of base VM OS
  - Use folder redirection of My Documents to NAS / SMB / CIFS
- Keep VDI VM footprint small for faster deployment of new VMs
- Keep a pool of VMs at the ready for instant power on
- Individual and persistent VMs consume more disk space, so leverage non-persistent VMs as often as possible
- Use storage appropriate for use cases (data de-dup., high availability)

Network demands
- When coping with MMR designs, consider multiple NICs to separate the KVM traffic from data traffic
- Consider DHCP and DNS requirements for VDI VMs
View Composer - Storage Cost Savings

- View Composer 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>
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<tr>
<td>1:1000</td>
<td>95%+</td>
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</table>
Virtual Desktop Layer

OS Build / Template

Applications Deployment

Virtual Desktop
Virtual Desktop OS Considerations

Key Considerations:

- OS Build
- User Personalization
- VDI Specific Requirements
  - VDM agent and client interaction
  - Drivers required for certain client access devices
- Application Management and Deployment
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
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

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</table>
Desktop and Session Management Design Guidance

Use the ADM template that ships with VDM

- There are numerous performance and management related features
- Leverage a user logon script to register ThinApp packaged apps with the OS

Printing

- Leverage redirection to local device outside RDP session
  - Redirect to site printer when users do not roam
- Bandwidth optimization using ThinPrint’s .print*
Scoping for Success

Include a pilot phase in all VDI deployments

- Bandwidth and latency issues may not be obvious at first
- Application interaction may not be well understood
- Include time for developing clear and unambiguous POC/Pilot success criteria
- Obtain an understanding of how users operate and depend upon applications, and document test cases for structured re-testing at each design interval
Recap

> Keep and maintain a vision of the solution throughout the discovery process
> Gather, refine, and document requirements
> Take advantage of a modular design model for optimal flexibility when pitching a solution
> Include prototyping, pilots, and rollout plans in the overall pitch
> Contact VMware SE for VDI deployment questionnaire/designs
Putting everything together..
Thank You

Ranganath G K
Technical Consultant, VCP
rgk@vmware.com