VDI infrastructure considerations: Choices that dramatically influence user experience and cost outcomes

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Promise of Virtual Desktops

- **Simplify desktop management**
  - Reduce the intensive technical support
  - Reduce the number of PC images

- **Lower costs**
  - Address staffing costs and data recovery costs

- **Reduce data loss**
  - Backup is a challenge if it gets done at all

- **Improve security and compliance**
  - Control data portability
  - Centralize the continuous security upgrades and patches
Typical VDI Architecture

Clients
- Laptops, desktops, thin clients

Connection Broker
- VMware Virtual Desktop Manager

Virtual Desktops
- VMware ESX

Hypervisor

Persistent Non-Persistent

Datacenter

Clients

Connection Broker

Virtual Desktops

Hypervisor

Physical Servers

Persistent

Non-Persistent
The Storage Challenges

- **Storage costs affect ROI**
  - Traditional shared storage is expensive

- **Lengthy mass deployment timeframes**
  - Need to smoothly mix physical and virtual
  - Provisioning for hundreds/thousands at a time

- **Storage is central to security and control of user data**
  - Reliable backups, data retention and immutable storage

- **High service levels are critical**
  - Any failure can bring 1000’s of users down
  - Performance bottlenecks -1000’s of systems boot at same time
Typical VDI storage outcome
VDI with NetApp Data Deduplication
Virtual Desktops by design are identical
- Dedupe eliminates the data redundancy in a Datastore
- Also eliminates the redundancy in user profiles and network directories

Making it practical
- Dedupe requires no special configuration
- Implemented with existing deployed images
- Continue to use Converter to migrate desktops

Dedupe Reduces the storage in a Datastore down to that of an individual Virtual Desktop
Cost Effective Desktop Storage

- Deduplicate virtual desktops
- Dedupe end-user storage by 20%-40%
- Thin provisioning increases utilization to over 70%
- RAID10 protection at ½ the cost
Use 50% Less Storage. Guaranteed*.

Use NetApp for your virtual environments, and we guarantee* you will use 50% less storage

- Implement our standard best practices
- Use our industry-leading features
  - Thin provisioning
  - Deduplication
  - RAID-DP®
  - NetApp Snapshot™ copies
- Have us help you install
- If you don’t use 50% less storage, get the required capacity at no additional charge

“We now see an average of 83% reductions in redundant data on our VMware® system.”

- Jonathan Davis, Duke Institute for Genome Sciences and Policy

*For terms and conditions, go to netapp.com/guarantee
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The Evolution of the Desktop

A common storage pool for virtual desktop and end-user storage
The Deployment Challenge

- Lengthy Mass Deployment Timeframes
  - Cloning 100s – 1,000s of Virtual Machines Takes Time
  - Traditional infrastructure:
    - 6-12 Minutes Per VM (5-10 VMs deployed per Hour)

- What if you could do **thousands** of VMs in **minutes**?
NetApp FlexClone Storage Provisioning

Begin by Building Template of the VM to Deploy

V-Disk 0

Datastore A

Virtual Machine Template (VMX)

NetApp FAS System

NetApp FlexVol

Datastore A

VI3 Server
NetApp FlexClone Storage Provisioning

Use VMware’s Cloning to Fill the Datastore with VMs
NetApp FlexClone Storage Provisioning

FlexClone the Volume and Mount the Cloned Datastore

NetApp FAS System

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NetApp FlexClone Storage Provisioning

...Continue to Build out Datastores with FlexClone...
NetApp FlexClone Storage Provisioning

- Instantly Provision VMs and Datastores
  - Supports FCP, iSCSI, VMFS, RDM, & NAS
  - Clones are Immediately Available
  - Clones Require Zero Additional Storage

- FlexClone Reduces the storage of Multiple Datastores down to that of a Single Datastore

FlexClone provides the ability to provision 1000s of Virtual Machines in minutes
Success Is When All Management Functions Are More Productive
SnapManager for Virtual Infrastructure

- Policy based management of
  - Snapshots
  - Restores
  - Replication
- Storage Admin sets and controls policy
- Virtual Server Admin delegated to run data management for virtual infrastructure
- SMVI coordinated with Virtual Center
  - VM-aware snapshot
  - VM locality
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Business Continuance for Desktops

- 99.999% system availability
- Transparent recovery from component failure
- Automatic failover for system and site failure
- Recover in minutes from larger regional disasters

Get storage for HA and DR for less than the cost of a single traditional storage system
Ensure Compliance of Desktop Data

- Centralized desktop backups
  - Hourly, with no load on servers
  - Always full backups – space efficient
- Retain daily user history on disk
  - Store cost-effectively for months or years
  - Secure history in tamper-proof storage
- Protect access to desktop and end-user storage
  - Real-time encryption of data
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Virtualization and larger disk drives require higher resiliency
– Does this mean RAID 6?

Storage performance is paramount too
– Does this mean RAID 10?

But cost is also a major factor…

This is critical as you move Virtualization into large scale workloads like serious VDI.
# Choices in RAID

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<th>Storage Efficiency</th>
<th>Resiliency</th>
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<td>RAID 6</td>
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<tr>
<td></td>
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</tr>
<tr>
<td>Poor</td>
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<td>RAID 0</td>
</tr>
</tbody>
</table>

Note: RAID DP is a high performance variant of RAID 6
Dedupe Aware Cache

- Keep up with performance requirements without increasing drive counts
- Resilience to boot and login storms
- Extend capability of an existing system
- Implemented in Hardware & Software
  - Performance Accelerator Module (PAM)
  - FlexScale
NetApp VDI Performance Benefits

PAM provides the equivalent VDI performance of a higher-end system

- Improve boot time by up to ~40%
  - Increase Performance!

- Decrease disk workload by >60%
  - Increase Scalability!
  - Lower Cost!

- Increase disk throughput by ~70%

Source: Upcoming TR 3705
1024 virtual desktops tested on a FAS3070 with PAM and Dedupe
Effect of Dedup Aware Cache (PAM) on VDI

- Significantly increase system throughput
- Dramatically decrease boot time
  - Boot 1000 desktops in 10 minutes
  - Similar effects on login storms
- Improve Scalability
  - Reduce disk workload by up to 50%
  - Deploy more virtual desktops per storage system
- Lower VDI cost
  - Meet your VDI performance requirements at a lower cost
  - Higher and more predictable service levels with fewer disks on a less expensive storage model
Through Attention to VDI Infrastructure

Choices You Can:

- Buy less infrastructure
- Accomplish more
- Make end users enthusiastic about the results
- Protect your business
Thank You