Deploying VDI with Software-Defined Storage and Hyper-convergence

Michael Letschin
Nexenta
Why is VDI storage so hard?
Evolution of Storage
Evolution of Storage

1979

This is a 250 MB hard drive.
It weighed about 550 lbs, and costs tens of thousands of dollars.
Evolution of Storage

2013

This is a 16 GB microSD card.

It holds about 64x the data as the HD above.

It weighs about 4/10 of 1 gram, and costs about $11.
Speed Matters too…

- 7200 HDD: 80
- 10 K HDD: 120
- 15 K HDD: 180
- Consumer SSD: 55,000
- Enterprise SSD: 100,000
- Memory: ∞
Impact of Business

x86 Server Shipments and Virtual Machine Shipments

83% of Images Deployed as Virtual Machines

Gartner
Why Density Matters

5-50 Virtual Servers
Or
25-200 Virtual Desktops
How have we always done it?

Replica, Persistent, and User data disk reside on the shared storage!
SO HOW DO WE FIX IT?
Storage Separation

10 Server LUNs

3 App Vols LUN

20 Desktop LUNs
But how do I know?

- **Always Assess** – Rule of Thumb are average guesses
- **What impacts them?**
  - Read / Write Mix
  - Bursts – Boots, Provisioning, Logins, Lunar Cycles, Antivirus
  - Average Numbers = Likely failure

<table>
<thead>
<tr>
<th>User Classification</th>
<th>Simultaneous Applications in Use</th>
<th>Virtual Machine Configuration</th>
<th>IOPS Requirements Per User</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task User (Light)</td>
<td>Limited 1-5 apps light use</td>
<td>1vCPU 1GB RAM</td>
<td>3-7</td>
</tr>
<tr>
<td>Knowledge Worker (Medium)</td>
<td>Standard productivity 1-5 apps regular use</td>
<td>1vCPU 1GB RAM</td>
<td>8-16</td>
</tr>
<tr>
<td>Power User (Standard)</td>
<td>Compute intensive &gt;5 apps regular use</td>
<td>1vCPU 2GB RAM</td>
<td>17-25</td>
</tr>
<tr>
<td>Power User (Heavy)</td>
<td>Compute intensive &gt;5 apps intense use</td>
<td>2vCPU ≥3GB RAM</td>
<td>25+</td>
</tr>
</tbody>
</table>
# Desktop Load for 100 Users

<table>
<thead>
<tr>
<th>User Classification</th>
<th>Simultaneous Applications in Use</th>
<th>Virtual Machine Configuration</th>
<th>IOPS Requirements per User</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task User (Light)</td>
<td>Limited 1-5 apps light use</td>
<td>1vCPU 1GB RAM</td>
<td>3-7</td>
</tr>
<tr>
<td>Knowledge Worker (Medium)</td>
<td>Standard productivity 1-5 apps regular use</td>
<td>1vCPU 1GB RAM</td>
<td>8-16</td>
</tr>
<tr>
<td>Power User (Standard)</td>
<td>Compute intensive &gt;5 apps regular use</td>
<td>1vCPU 2GB RAM</td>
<td>17-25</td>
</tr>
<tr>
<td>Power User (Heavy)</td>
<td>Compute intensive &gt;5 apps intense use</td>
<td>2vCPU ≥3GB RAM</td>
<td>25+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Light</td>
<td>700</td>
</tr>
<tr>
<td>Medium</td>
<td>1500</td>
</tr>
<tr>
<td>Power</td>
<td>3000</td>
</tr>
<tr>
<td>Heavy</td>
<td>4000</td>
</tr>
</tbody>
</table>
How do we know if it is good?

- Low Latency
- Reasonable CAPEX
- Green
- Simple Architecture
- Existing Vendor
- Resilient
- Easy to Manage
- Support
- Scalable
- Reasonable OPEX
- Burst Capable
- Existing Platform
Are there many options?
Scale Up Storage

- All Flash Arrays
- Hybrid Arrays
- All HDD
Traditionally HDD Based
Can be All Flash
Grow Storage and Compute separate
Hyper-Converged Storage

- Could still require other storage for user data
- Compute and Storage grow linear
Comparing the Approaches

<table>
<thead>
<tr>
<th></th>
<th>All Flash Arrays</th>
<th>Hybrid Arrays</th>
<th>Converged Appliances &amp; “Blocks”</th>
<th>Virtual Storage Appliances</th>
<th>DASD</th>
<th>Virtual SANs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scalability</strong></td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
<td>Limited</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Performance</strong></td>
<td>Better</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
<td>Best</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Availability</strong></td>
<td>Best</td>
<td>Best</td>
<td>Variable</td>
<td>Good</td>
<td>LOL</td>
<td>Better</td>
</tr>
<tr>
<td><strong>Manageability</strong></td>
<td>Mixed Bag</td>
<td>Good</td>
<td>Mixed Bag</td>
<td>Mixed Bag</td>
<td>Complex</td>
<td>Better</td>
</tr>
<tr>
<td><strong>Simplicity</strong></td>
<td>Best</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
<td>Mixed Bag</td>
<td>Good</td>
</tr>
</tbody>
</table>
Is one model better than the other?

IT DEPENDS...
Michael Letschin
mike@nexenta.com
@mletschin
Thesolutionsarchitect.net
Types of Storage

10Ks to 100Ks of IOPS
(5 → 20 IOPS/desktop)

Highly Random

80% Write, 20% Read

Bursty & Unpredictable