ACCELERATE
Virtual Desktop Infrastructure

Presented by Tom Tittermary
BEFORE SEPTEMBER 30th, ALL DISTRICT US COURTS HAVE THE OPTION TO ADOPT AO COURTS VDI CLOUD SERVICE FOR FREE
“My Virtual Desktop is Now Faster Than My Laptop”
– City of Davenport, IA

Existing Disk-Based Storage
- VMware View recompose time taking >45 mins
- Running out of space
- General performance challenges including mixed workloads

Pure Storage FA-420
- 30TB moved to array
- 6-to-1 data reduction
- View recompose time reduced to under 2 minutes!
- Runs “everything” on it
Gartner: Decision Point for Selecting VDI Storage Architecture
“For the vast majority of VDI deployments, the largest contributor to the cost of a virtual desktop is storage.”

ESG: 2015 Storage Trends Survey
VDI is 4th on a list of IT Initiatives to significantly impact storage spending in the next 12-18 months.

451 Research: The Storage Cornucopia
The primary use cases for All-Flash Storage are:
#1 – Databases
#2 -- VDI
VDI CHALLENGES:

- **End User Dissatisfaction**
- **Cost of Storage and TCO Are Too High**
- **Managing VDI Is Too Complex**
- **Fail To Scale From Pilot To Enterprise**

**All-Flash Performance and Non-Disruptive Operations**

**Industry Leading Data Reduction**

**Raising The Bar On Simplicity**

**Seamless Scalability and Resilience**

>10x
IT’S ALL ABOUT END USER EXPERIENCE

Predictable User Experience

Consistent < 1ms Performance

IOPS →

Boot Storm
Login Storm
Virus Scanning
Patching, Recomposing & Updating

Latency ↑

1 ms
0.5 ms

Morning
Noon
Evening
Overnight
VDI DATA REDUCTION DROPS $/DESKTOP

> 10:1

$49/DESKTOP
The Promise of a Better Workspace

Manageable
Secure
Lower cost

Reliable
Compliant
Mobile
Powerful
Legacy Storage is the Problem:

- The biggest performance bottleneck for virtualization
- Painful to manage and a frequent source of issues or outages
- Expensive to buy and operate at scale
- Most “fixes” result in more complexity and higher cost

VMware vSphere

VMware Horizon View

Storage-side Cache

Tier 1 “Performance” Disk Storage

Tier 2 “Capacity” Disk Storage

Isolated Disk Storage
Flash is the Answer:
Enable Virtualization to the Fullest

- Virtualize 100% of Applications
- Run a Fully-Shared Infrastructure
- Make Virtual Perform Better Than Physical
- Have Storage Contribute to the Space & Power Savings of Virtualization
- Dramatically Simplify Operations
Flash is the New Standard for the Desktop Virtualization

But Challenges Remain

- Performance needs
- Latency requirements
- Complexity
- Disaster recovery
- Manageability
- Reliability
- High costs
- Architectural confusion
Pure Storage is Flash for Horizon View

Consistent performance
100% MLC Flash

Less cost than disk
Inline deduplication & compression

Mission-critical reliability
99.999%, non-disruptive operations

Scalable & compatible
10 → 100s of TBs, Purity software, VMware Ready
The Ultimate Storage for VMware Horizon View

The Best User Experience
- High performance desktops, consistent excellence
- 100Ks of IOPS at the ready
- Handles peak boot/login workloads

Affordable:
100% flash for the price of disk
- Inline dedupe/compression 5-10x data reduction
- Persistent desktop = linked clones

Scale & Reliability
- Scale from 100s to 5,000+ users in one array
- High availability, resiliency, and non-disruptive upgrades

Simplest Administration
- Completely managed inside vSphere
- Designed for VMware admins
- High availability, resiliency, and non-disruptive upgrades
FlashArray Meets the Requirements of Horizon View

**Boot Storm**
- Boot 1,000s of desktops in mins
- 100Ks of IOPS at the ready
- Booting users don’t impact running users

**Login Storm**
- Read-intensive mornings
- 20x improvement in login times

**Predictable User Experience**
- Consistent <1ms response times
- No caching variability

**Virus Scanning**
- Heavy read period
- Speed scan times
- Lower impact on running users

**Patching & Recomposing**
- Heavy write period
- Recompose time reduced from hours to minutes

**Timeline**
- Morning:
  - Boot Storm
  - Login Storm
- Noon:
  - Predictable User Experience
  - Virus Scanning
- Evening:
  - A / V Scans
  - Maintenance & Patches
- Overnight:
  - Patching & Recomposing
Flash Makes Virtual Administration Faster

Provision 50GB Desktop From Template
- Disk: 3 min
- Flash: 5 sec

Boot 100 View Desktops
- Disk: 15 min
- Flash: <1 min

SvMotion 50GB VM
- Disk: 4 min
- Flash: 5 sec

Recompose 100 Desktop VMs
- Disk: 45 min
- Flash: 4 min

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Simplicity is the Key to the Software Defined Data Center

Say Goodbye to...

- Setting and managing RAID
- Host / array block alignment
- Troubleshooting performance
  - head contention
  - port contention
  - spindle contention
  - cache partitioning
- Day-long RAID re-builds
- Sizing / managing multiple tiers
- Over-provisioning
- Space reclamation
Complete Management within VMware vCenter

vCenter Web Client Plugin
Complete management of FlashArray from within vCenter.

Automated Datastore Creation
Just specify size and done.

Complete Capacity Visibility
See through deduplication, compression, and thin provisioning to understand real capacity.

Complete Performance Visibility
Correlate IOPS, latency, and bandwidth on a per-datastore basis.

VMware Ready and VAAI Certified
Highest performance possible, jointly supported by Pure Storage and VMware.
Configuration Ease & Flexibility

**Linked Clones and / or Persistent Desktops**
- Use either or both
- Both consume the same disk space after deduplication
- Both perform equally well

**Co-Mingle VDI and other workloads**
- Store multiple workloads on the same Pure Storage FlashArray
- Gains from deduplication span workloads
- No fears of performance contention

**Zero-Administration Storage**
- Install in 15 minutes
- Make one large datastore
- No LUNS, RAID, WWNs to worry about
- Never troubleshoot performance
Secure Vital Data with Encrypted Storage-at-Rest

Improve View security and compliance

- Zero-management, no configuration necessary
- No performance impact, even at load
- AES-256 encryption of data at rest with advanced, distributed key management
- Protects against compromise of drive or group of drives
- Always-on, always secure
Start Small, Grow Non-Disruptively, Scale Without Pain

FA-405 from 10-40+ TB

FA-420 from 40-125+ TB

FA-450 from 125-250+ TB

FA-next

Next Generation and beyond...

Further Expansion 2H 2014...

Non-disruptive upgrades
- Capacity expansion
- Controller upgrades
- No loss in performance

Forever Flash
- Free Every Three
- Fresh Every Upgrade
Achieve 100% Virtualization

Isolated Silos of Virtualization

- Virtual Desktops
- Server Workloads
- Database Workloads

Consolidation on Pure Storage
- Consistent Performance

- Virtual Desktops
- Server Workloads
- Database Workloads

10x smaller
Delivering Immediate ROI

Typical 3-year cost per usable-HA GB:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw</td>
<td>$2</td>
</tr>
<tr>
<td>Usable</td>
<td>$4</td>
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<tr>
<td>CAPEX</td>
<td>$8-12</td>
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<tr>
<td>$3 Usable</td>
<td></td>
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<tr>
<td>Maintenance</td>
<td>$1</td>
</tr>
<tr>
<td>Power</td>
<td>$1</td>
</tr>
<tr>
<td>Space</td>
<td>$0.5</td>
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<tr>
<td>Management</td>
<td>$2</td>
</tr>
<tr>
<td>OPEX</td>
<td>$1</td>
</tr>
<tr>
<td>Dedupe + Compress</td>
<td>$4.50</td>
</tr>
</tbody>
</table>
Data Reduction Drives Lower Cost-Per-Desktop

Enabling VDI and lowering total cost of ownership
FlashReduce: 2X The Savings of Dedupe Alone

- Total Data Reduction (xT) = Compression (xC) x Deduplication (xD)
- Compression delivers reliably 2-4x data reduction
- Compression + Dedupe = 2x the savings of Dedupe
- If your AFA doesn’t do dedupe AND compression, it isn’t designed for mixed workloads
Thank You!