



*Software is the Key to the All-Flash Data Center*

Scott Dietzen, Ph.D.  
CEO, Pure Storage

# Journey to the All-Flash Data Center

- Flash memory now dominates the consumer technology experience:

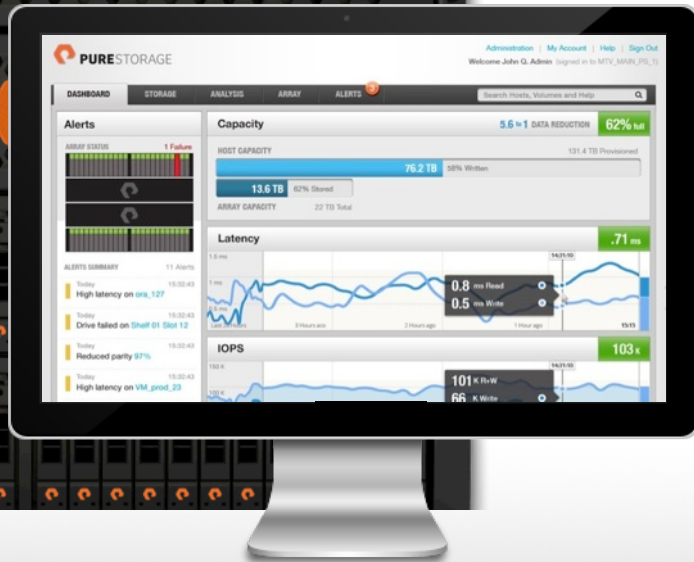


- Why flash over disk?

- ✔ >10x faster
- ✔ 10x smaller
- ✔ 10x lower power
- ✔ 10x more reliable

- But relatively little impact yet on enterprises and XaaS. Why?

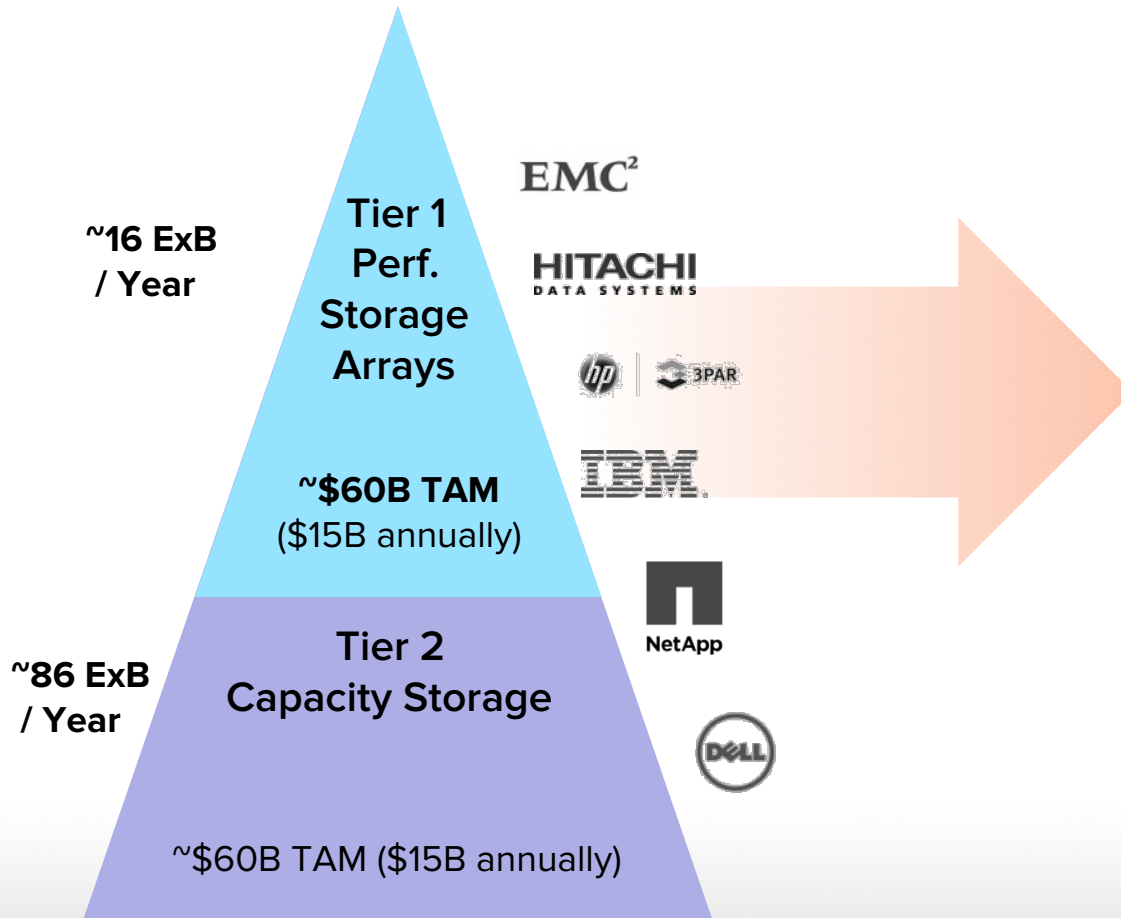
- ✘ Too expensive
- ✘ Doesn't work with existing architectures
- ✘ Reliability concerns



# Eye on the Prize:

# Flash Disrupting the Enterprise Storage Market


## Disk Storage Market



## Tier 1 Priorities

1. Resiliency
2. Performance
3. Usability
4. Supportability
5. Cost

# The Recipe for Flash Disrupting Enterprise Storage

- 
- Disruptive Performance
  - Cost Parity to Disk or Better
  - Resiliency
  - Usability
  - Supportability

# The Recipe for Flash Disrupting Enterprise Storage

Hardware

- Disruptive Performance
- Cost Parity to Disk or Better
- Resiliency
- Usability
- Supportability

Software



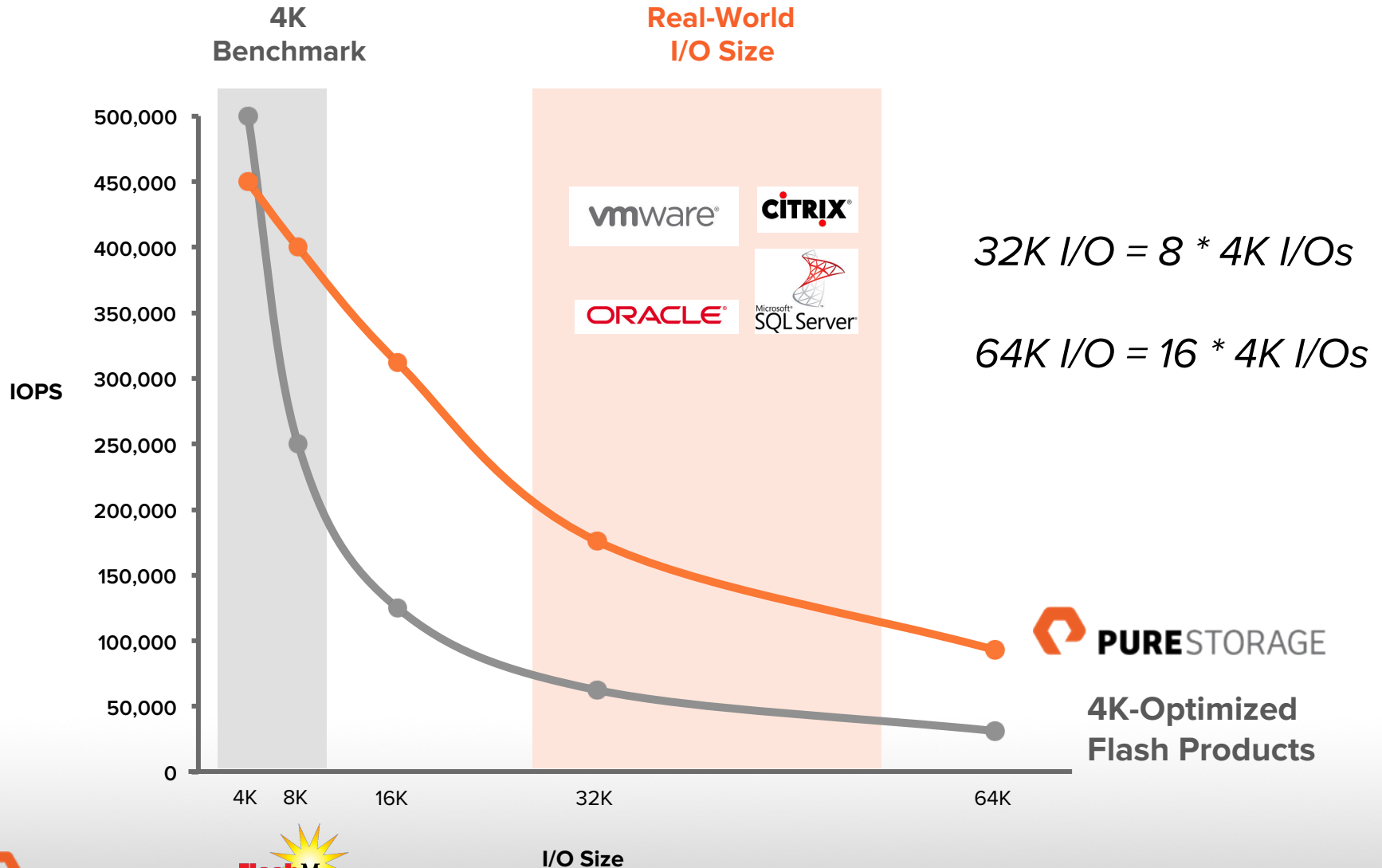
# Need for All-Flash: Hybrids Don't Disrupt Performance

- *At 95% cache hit rate, hybrids run at about ½ the speed of all-flash on I/O bound workloads*
- When you expect disk and hit flash, all is well
- But once you expect flash performance ...
- For random I/O latency
  - Flash is air travel, while
  - Hard drive is sea travel

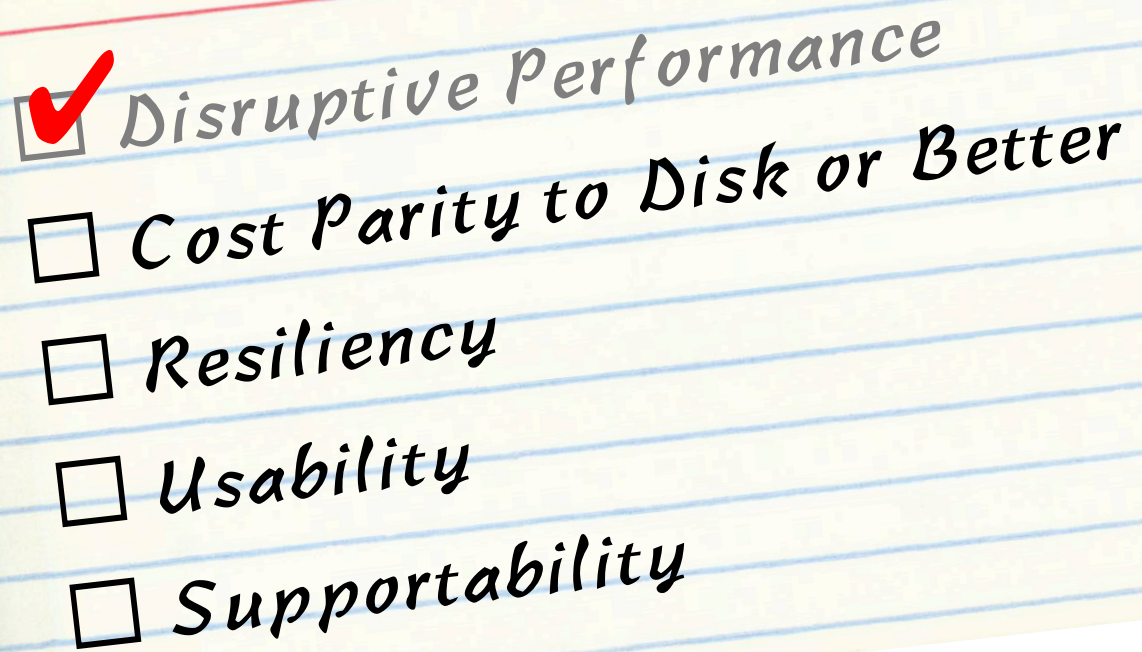


# Variable Block Size Wins For Real World Workloads

## Don't Believe the 4K Benchmark Hype!

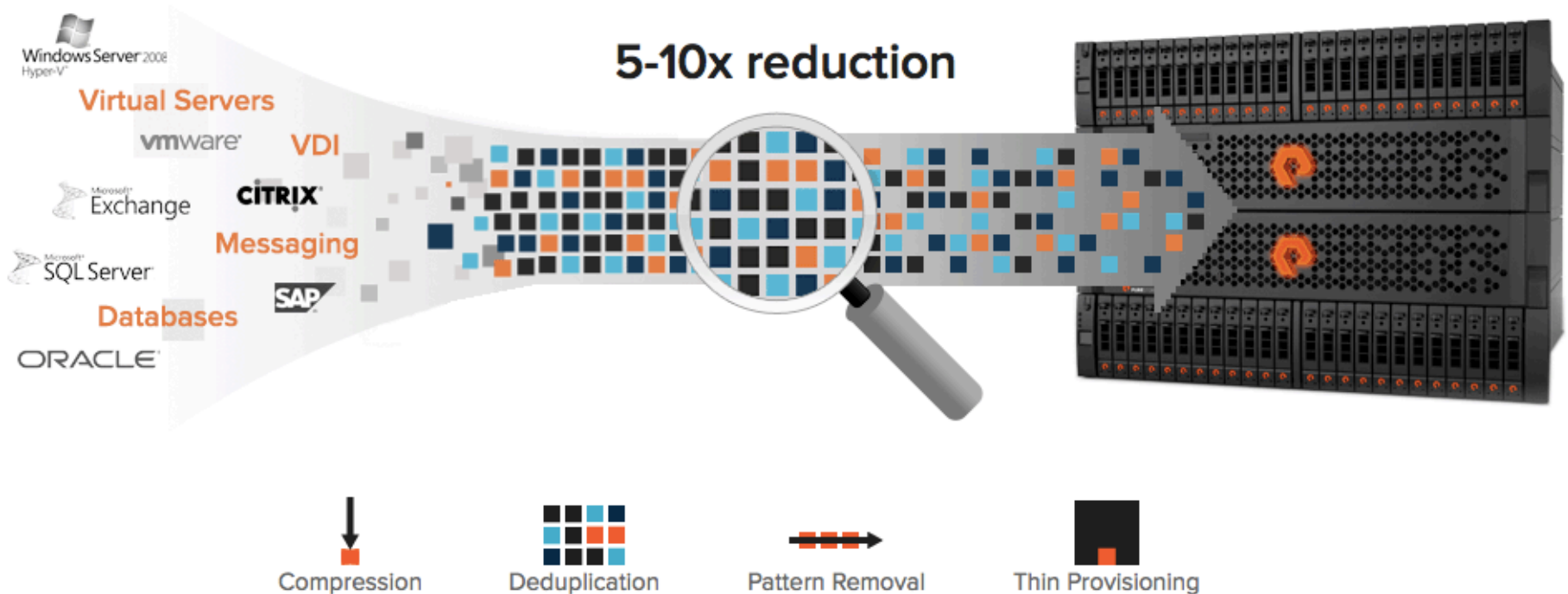


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# Data Reduction: Essential for Affordable Flash...



...and essential for write avoidance

# The Six “Musts” of Data Reduction

**1** **Inline & always on** (to avoid writes)

**2** **Global** (across entire array)

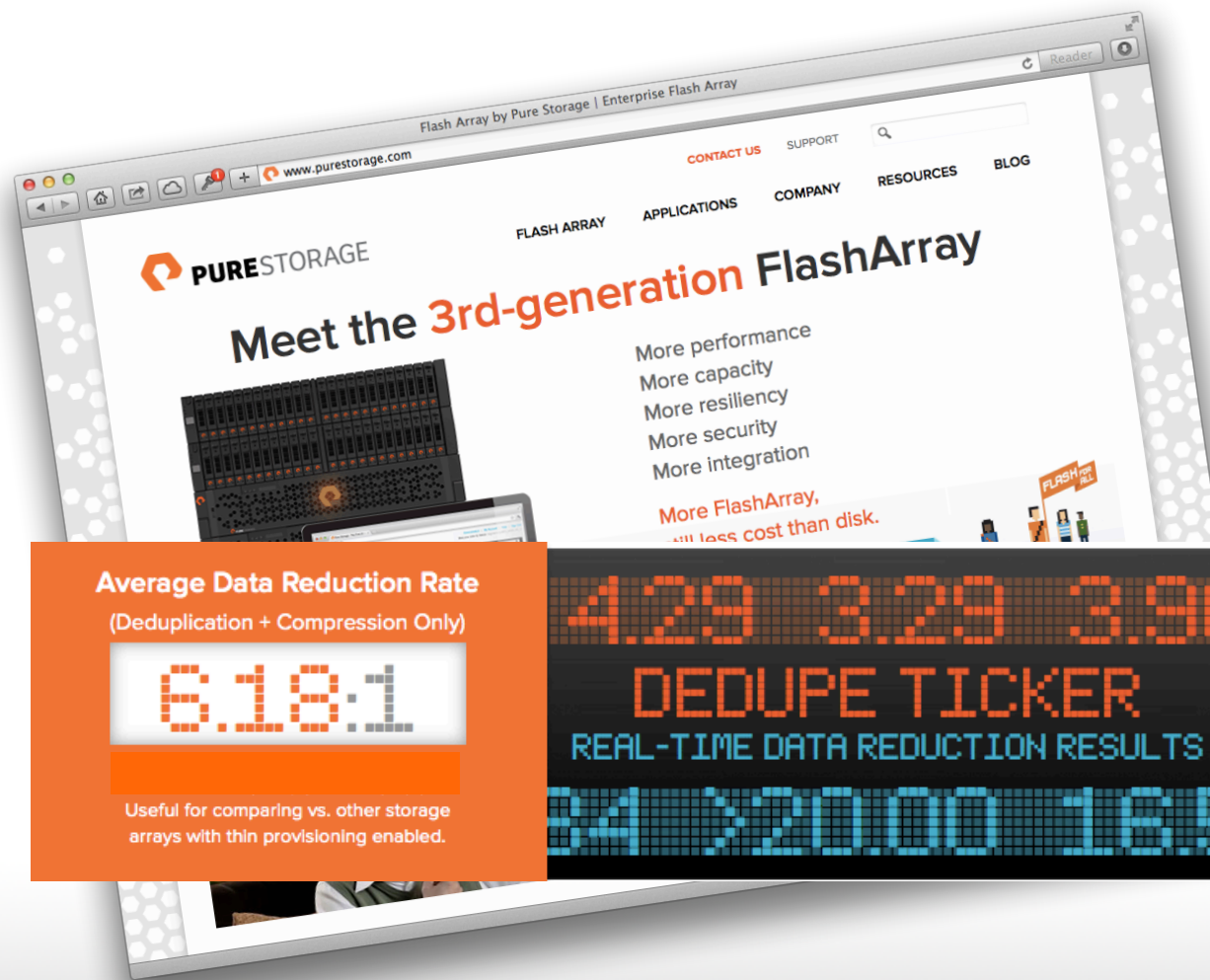
**3** **No performance penalty**

**4** **Deduplication AND compression** (DB & VM/VDI)

**5** **Small chunk size** (effectiveness + alignment)

**6** **No trusting hashes** (collision = corruption)

# Proven Across 100s of Production Deployments

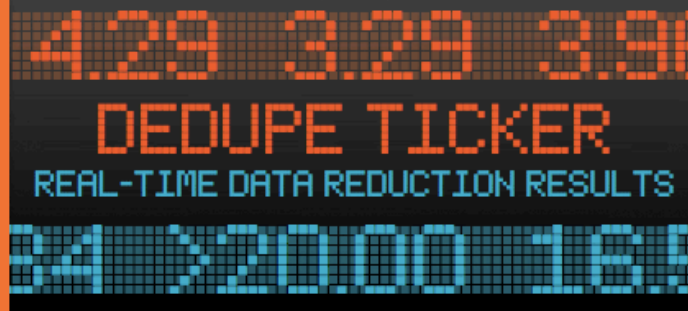


- All customers
- Mixed workloads
- Some >20X!

**Average Data Reduction Rate**  
(Deduplication + Compression Only)

**6.18:1**

Useful for comparing vs. other storage arrays with thin provisioning enabled.



**Average Total Reduction**  
(Including Thin Provisioning)

**1279:1**

Useful for comparing vs. other disk arrays without thin provisioning, including most other flash products.

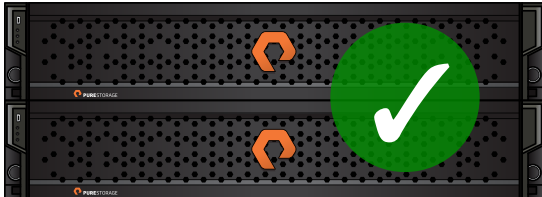
# The Recipe for Flash Disrupting Enterprise Storage

- Disruptive Performance
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# Resiliency is Essential For Tier 1

Active / Active  
High Availability



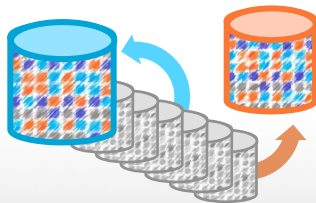
RAID-3D™  
Dual-Parity+ Protection



Non-Disruptive  
Everything



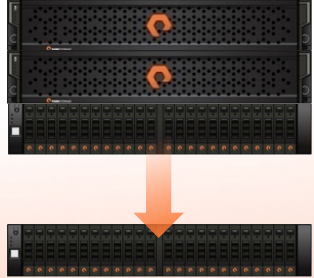
Snapshots &  
Replication



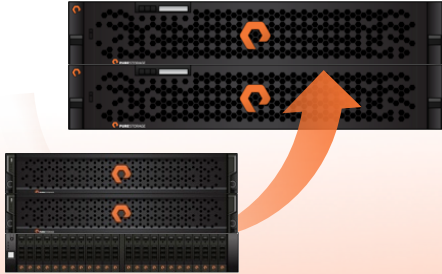
End-to-End  
Data Integrity Fabric




# Non-Disruptive Everything




Non-Disruptive  
Capacity Expansion



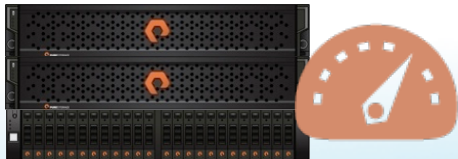
Non-Disruptive  
Performance Expansion



Non-Disruptive  
Hardware Replacement

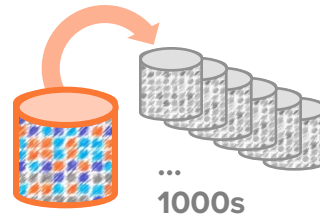
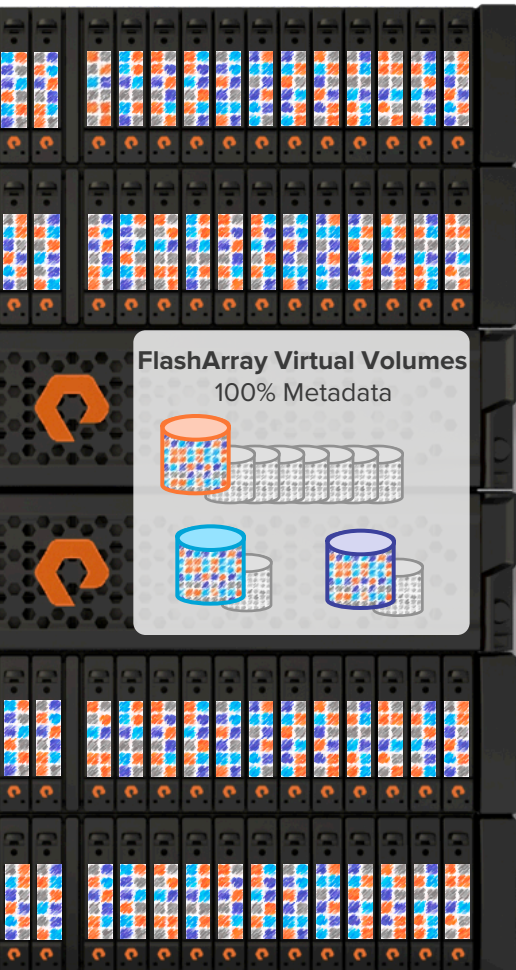


Non-Disruptive  
Software Updates

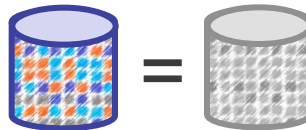


...All With  
Zero Performance Loss

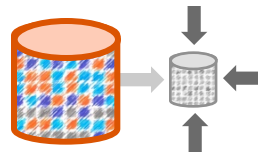
# ZeroSnap™ Snapshots



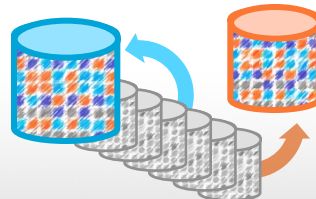
**Instantly snapshot any volume with no performance overhead**



**Snapshots are just new volumes, with full capabilities**



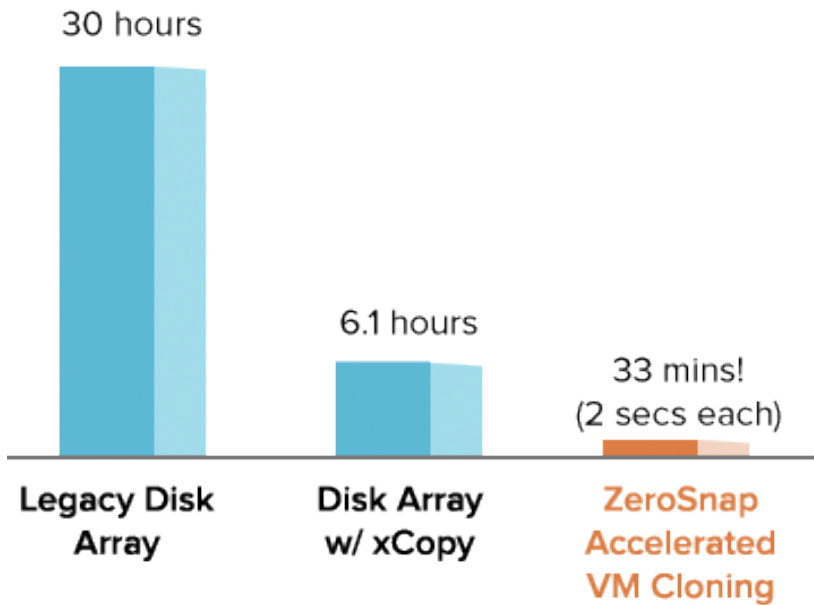
**Always full yet space saving**



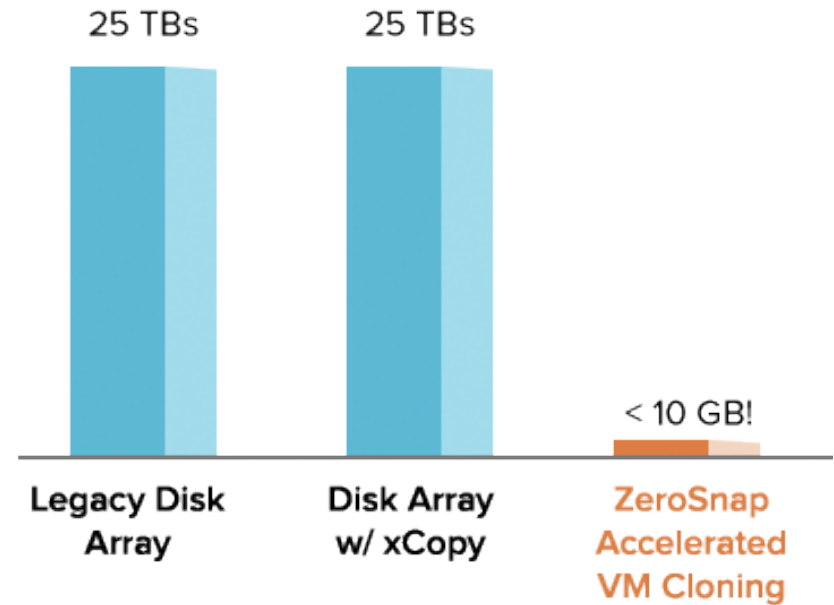
**Recover anything to anywhere instantly**

# “Free” VM Cloning with Flash-Optimized Snaps

## Cloning Time Comparison\*



## Data Stored Comparison



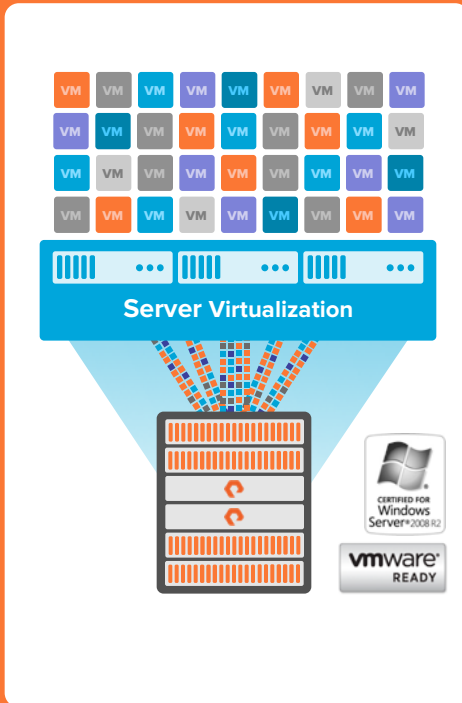


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# Suitable for Variety of Workloads

## Server Virtualization



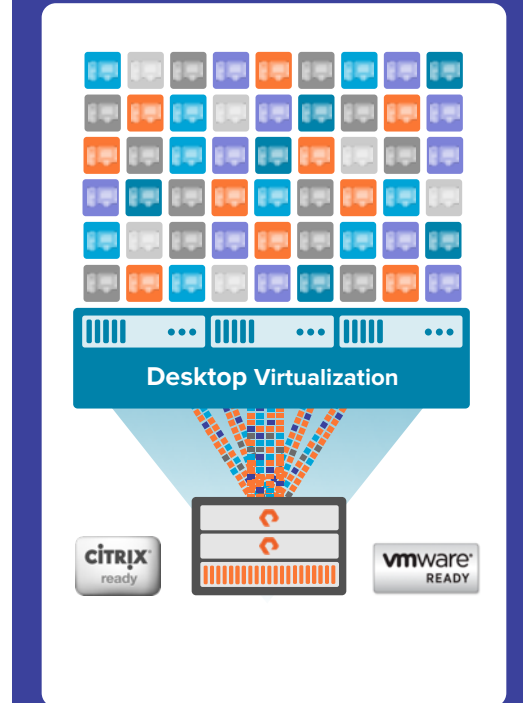
Typical Reduction: **4-8x**

## Database & Analytics



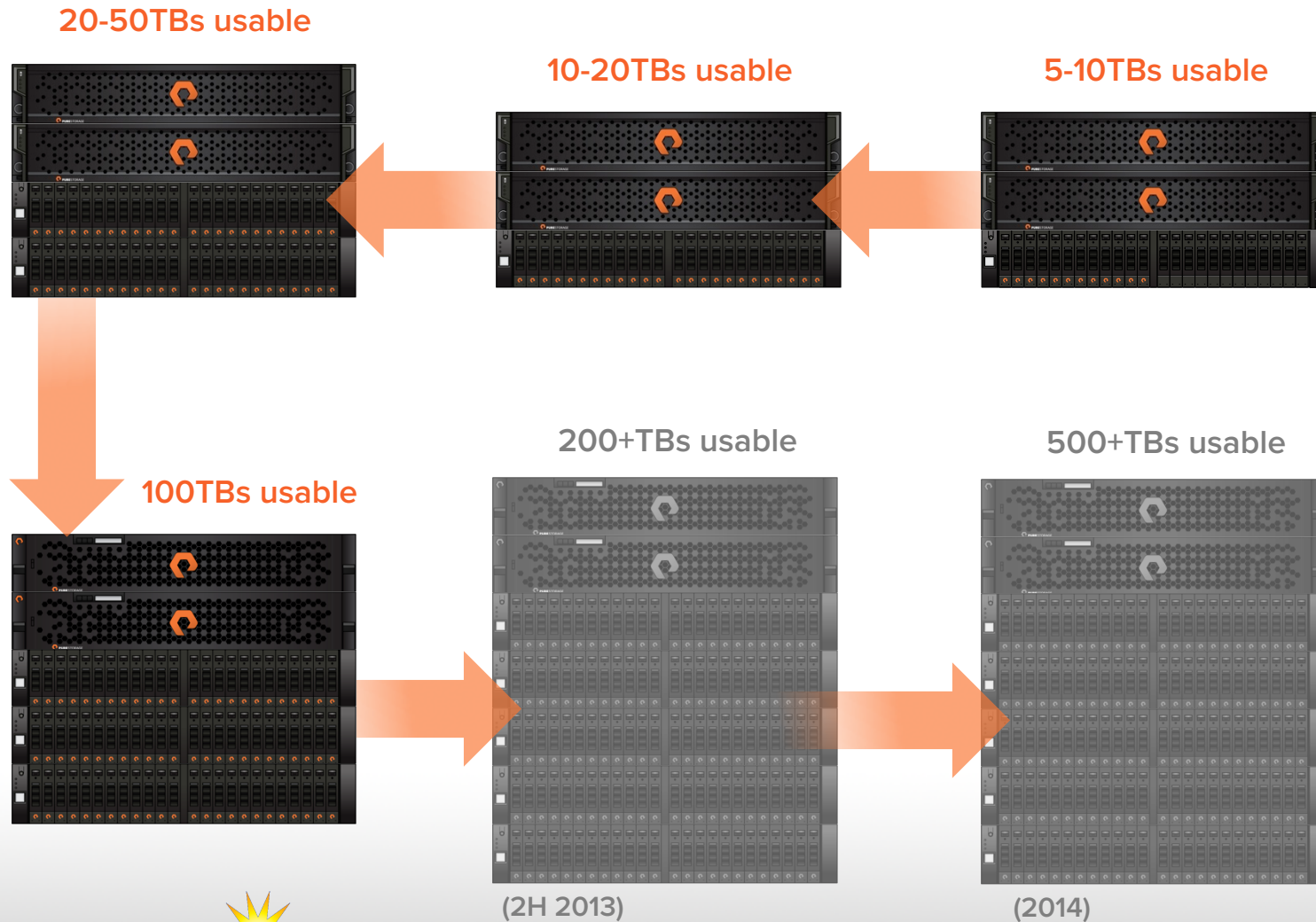
Typical Reduction: **2-4x**

## VDI



Typical Reduction: **5-10x**

# Start Small and Grow Online



# Ultimate Simplicity

Sub-Volume Tiering  
Concatenation  
RAID Configuration  
Hotspots  
Drive Rebuilds  
Sparing  
Deduplication  
Cache Management  
Rebalancing  
Thin Provisioning  
Performance Planning  
Block Alignment  
Software Licensing  
Encryption  
Pool Management  
Snap or Clone ?  
Volume Tiering  
Striping

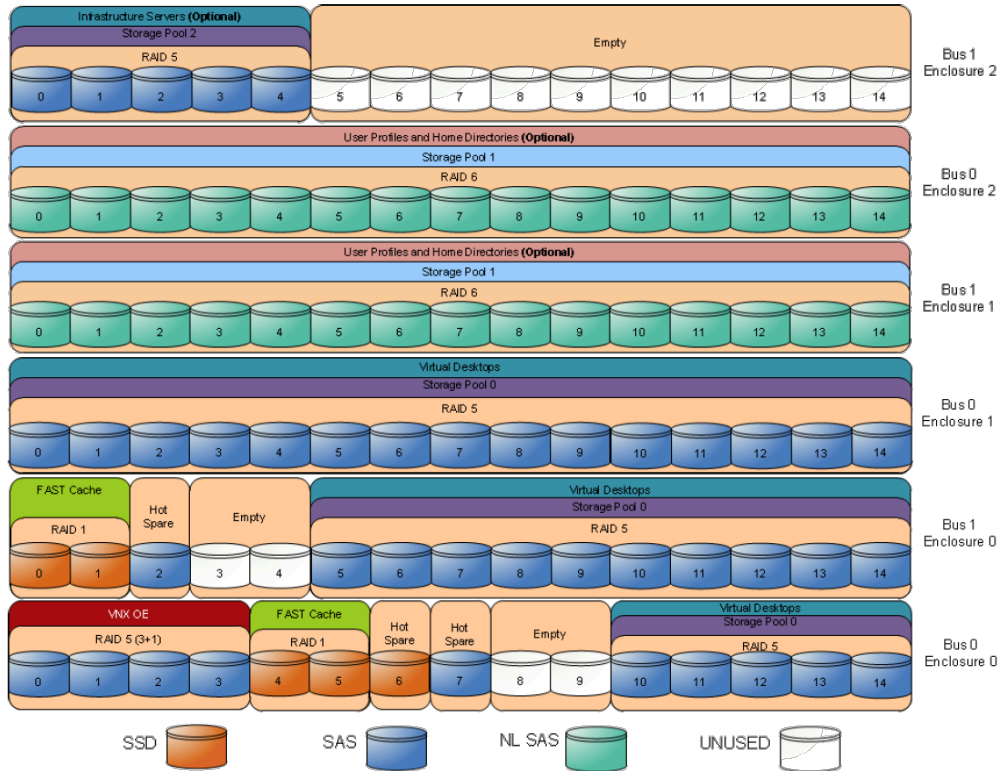


**Legacy Disk Arrays**

**Pure Storage**

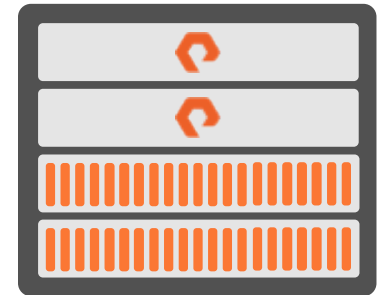
# Ultimate Simplicity

## Hybrid Disk Array VDI Reference Architecture\*



VS.

## Pure Storage



# Complete Management within VMware



## vCenter Web Client Plugin

Complete management of FlashArray from within vCenter.



## Automated Datastore Creation

Just specify size and done. No LUNs, no RAID, no WWNs, no rescanning.



## 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.



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# Global 24x7 Reach

- 24x7 Global Support
- Offices around the world
- 100s of Production Deployments
- >100 Resellers within global partner network



**Headquarters**  
Mountain View, CA

**24x7 WW Support**  
Salt Lake City, UT +  
Mountain View, CA











**EMEA HQ**  
Staines, UK

**APJ HQ**  
Singapore




# Maturity Matters


Industry leaders have selected Pure:

 Top 5 Investment Bank	 Top 5 Global Telco	 Top 5 Global Pharma	 Top 5 Social Network	 2 Top Hedge Funds	 Top 5 Software Vendor
 Top 5 Media Company	 Top US Military Branch	 US Intelligence Community	 Top EMEA Oil/Gas Producer	 Top 5 Online Gaming Co.	 Top 5 Networking Vendor

3+ years of continued growth and expansion:


  
**\$95M Raised From  
Top Investors**


  
**30+ Patents Filed to Date**


  
**24x7x365 Support Globally  
US, EMEA, APJ**

**Award-Winning Technology**

							
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# CloudAssist

Better Support through People + Technology

## Complete

### Multiple service levels:

-  Base 3-year HW warranty
-  CloudAssist NBD
-  CloudAssist 4Hr

### Global delivery:

- US, EMEA and APJ

### Key partnerships:

- Avnet Source Support
- Network of trained support partners offering T1/T2
- TSAnet for solution support

## Cloud-Driven

### Cloud-driven support technology:



Real-Time Monitoring



Global Analysis / Analytics



Proactive Resolution



Continuous Improvement

## Proactive + Focused


### Proactive approach:

- We'll call you
- Auto case creation
- Self-service portal

### 100% focused:

- Single-product company
- All US-based support employees
- Dedicated escalations team in Engineering
- Single-site 24x7
- No "on call" hours

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# If You Want to Disrupt, Put Your Money Where Your Mouth Is: Love Your Storage™ Guarantee

Dedupe? **Guaranteed.**  
Performance? **Guaranteed.**  
Resilience? **Guaranteed.**  
Simplicity? **Guaranteed.**  
Support? **Guaranteed.**

If you don't love it, we'll  
take it back.



# Some Parting Thoughts...

The \$15B/year performance disk market can and should go **all-flash within 5 years**

Performance is solved. Success hinges on **Cost, Resilience, Usability, & Supportability.**

That is, **in the Software!**

The ultimate winners will have the best software





Thank You!

