



# Panasas Update

Mark Thomson, Director - Worldwide Systems Engineering

September 2015

**PANASAS, INC.**

- Performance that **improves with scale**
- Data protection that **increases with scale**
- Scalable storage that is **easy to access, deploy and manage**



**STORAGE THAT SCALES  
AS BIG AS YOUR IDEAS**



**33% increase in density**

**4TB and 8TB hard drive configurations**

**20PB and 200GB/s linear scalability**

**19% faster CPU and 2x cache**

## High Performance Hybrid Scale-Out NAS

- **Parallel Performance**
  - True scale-out architecture
  - Capacity and performance scale linearly to 20PB and 200GB/s
  - Flash-accelerated hybrid architecture
- **Easy Management**
  - Minimal management effort at scale
  - Set up or grow capacity in <10 minutes
  - Single, global namespace
- **Enterprise-Grade Reliability**
  - Triple parity protection with RAID 6+
  - Reliability increases with scale
  - Extended file system availability



**ActiveStor 18**

## ■ **33% Increase in Density**

- Western Digital HGST He<sup>8</sup> Helium-filled 8TB drives
- 480GB SSD optimized for RAID 6+
- Up to 181.28TB per 4U shelf (0+11 config)

## ■ **4TB and 8TB Hard Drive Configurations**

- 4KB native sector size support
- 16GB cache per storage blade (2x compared to AS16)
  - Benefits aggregate throughput, random I/O, and NFS/SMB IOPS performance by increasing active data set in cache

## ■ **Linear Scalability**

- Field proven to 20PB and 200GB/s in a single, global namespace
  - 130 shelves, 2600 HDDs, 1300 SSDs

## ■ **Improved Director Blade Performance**

- 19% faster CPU (2.53GHz quad-core)
- Improves metadata, small file and RAID rebuild performance

## ActiveStor Appliance



- Powered by PanFS storage operating system
- **New: 181.28TB per shelf → scales to 20PB**
- 1.5GB/s per shelf → scales to 200GB/s

## Director Blade



- Metadata access
- System management

## Storage Blade

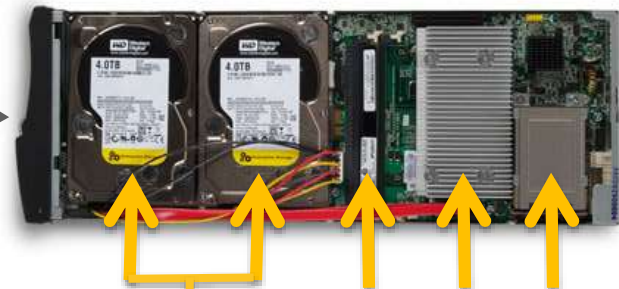


- Parallel data access
- Advanced caching

## ActiveStor 18 (Per-Shelf)

Capacity	82.4TB	164.8TB
Hard Drive Size	4TB	8TB
SSD Size	240GB	480GB
DRAM Cache	208GB	
Throughput, Read/Write (MB/sec)	1,700 / 1,500	
Ideal Workload	Small File or Metadata Oriented	Large File Oriented
Value	Best Price/Performance	Best Price/Capacity

Note: Assumes 1 director and 10 storage blades per shelf.



8TB  
HDD  
x2

16GB  
DRAM  
Cache

C  
P  
U

480GB  
SSD

## Per-file distributed RAID 6+ with Triple Parity Protection

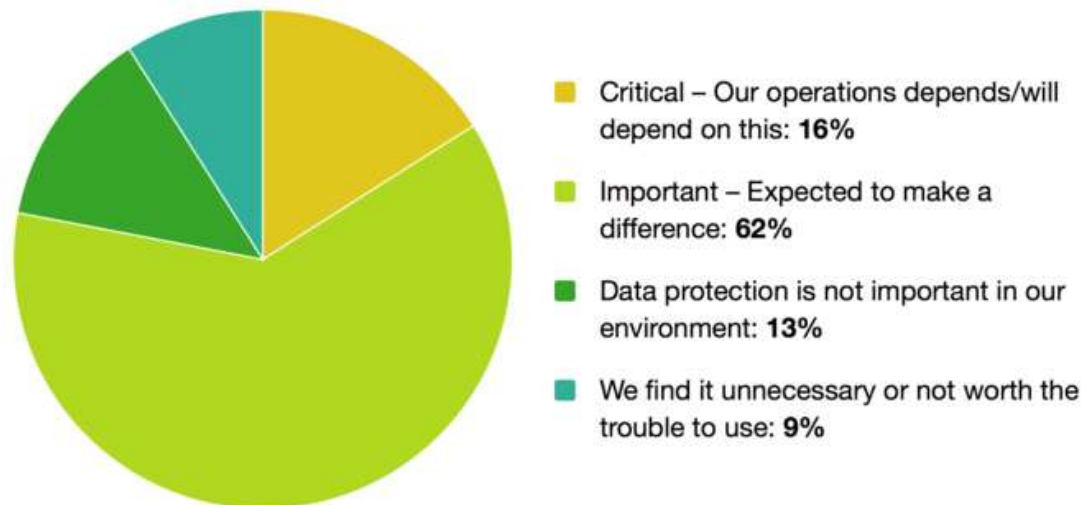
- **Erasur codes protect every file individually**
  - No hardware RAID, no block-level rebuilds
  - Limits rebuilds to affected files, not entire drives
- **150x increase in reliability over dual-parity approaches**
  - Triple parity protection guards against two simultaneous drive failures and single sector errors on multiple drives
  - Performance sensitive
  - Only ~25% capacity overhead
- **RAID rebuild performance scales linearly**
  - Mitigates risk from additional components at scale
- **Randomized distribution of data = increased reliability at scale**
  - Odds of “one-too-many” drive failures affecting data decrease with scale




Research by  TechValidate

## RAID 6+ is highly valued

How important is the 150x increased data protection delivered by Panasas RAID6+ to your future production operations?



**Source:**  TechValidate survey of 90 users of Panasas ActiveStor




# THANK YOU

 <http://www.panasas.com>

 <http://www.linkedin.com/company/panasas>

 <http://twitter.com/#!/panasas>

 <http://www.youtube.com/PanasasHPC>