

# Breakthrough Cloud Performance NeoSapphire All-Flash Arrays

AcceleStor, Inc.



# Company Profile



- About AccelStor, Inc.
  - Established in November 2014
  - Management team
    - President: Charles Tsai, Ph.D.
    - Vice president: Weafon Tsao, Ph.D.
  - Office locations
    - Headquarters: Taipei City, Taiwan
    - Technology center: Hsinchu City, Taiwan
  - Website: [www.accelstor.com](http://www.accelstor.com)
- One of the 10 Coolest Storage Startups of Year 2015
- One of the 20 Most Promising HPC Solution Providers of Year 2016



Source: <http://www.crn.com/slide-shows/storage/300077438/the-10-coolest-storage-startups-of-2015-so-far.htm>  
<http://high-performance-computing.cioreview.com/vendors/most-promising-hpc-solution-providers-2016.html>

# Award and Partner List



Top 10 Coolest Startup Storage



Top 20 Most Promising HPC Solution



Flash Memory Summit Best of Show



VMware Ready Storage



OpenStack Compatible



Tiger Technology Global Partner



DataCore Software Global Partner (End of Oct.)



Mellanox Technologies Global Partner

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# Strategy SSD Partner

The Toshiba logo is displayed in red, bold, uppercase letters within a dotted rectangular border.

Toshiba enterprise MLC SSD  
Specifically engineered for value-endurance workloads, the eSSD delivers high reliability, high performance and low power usage.

The Innodisk logo is displayed in white, lowercase letters on a red rectangular background, which is itself within a dotted rectangular border.

Innodisk SSD  
Delivers excellent performance, especially in random data transfer rate, and which offers reliability making it the ideal solution for a variety of applications

The Intel logo is displayed in blue, lowercase letters within a dotted rectangular border.

Intel SSD Data Center SSD  
Data Center drivers for a seamless system that helps handle 2.3X more transactions and reduces data center power consumption.

# In terms of cost, why All-Flash Arrays,?

75%

Power Savings  
Reduce 76% in power and cooling costs

63%

Space savings  
Reduce 63% in terms of rack space

48%

Simplicity of administration  
Reduce 48% in terms of time and money

16%

Maintenance savings  
Reduce 16% in maintenance costs



Return of Investment  
Results in **5.4** months

\*Source: Gartner, Solid-State Array TCO Reality Check, January 2016, Joseph Unsworth and Arun Chandrasekaran



AcceleStor - Breakthrough Cloud Performance - NeoSapphire All-Flash Array



# Why AcceleStor ?

## FlexiRemap<sup>®</sup> Technology

Adopts an efficient strategy to speed up data processing.

Rearranges all new data to sequential block addresses before passing it to SSDs, which then receive and process the sequential data



### High Performance

- \* 600K Sustained 4K random write in one Storage Node

- \* Scalability, the performance scales when the number of solid-state drives is increased



### Data Protection

- \* proprietary algorithm for data protection.

- \* Divides SSD drives into two groups of with fault tolerance of single-drive failure.



### Long SSD Lifespan

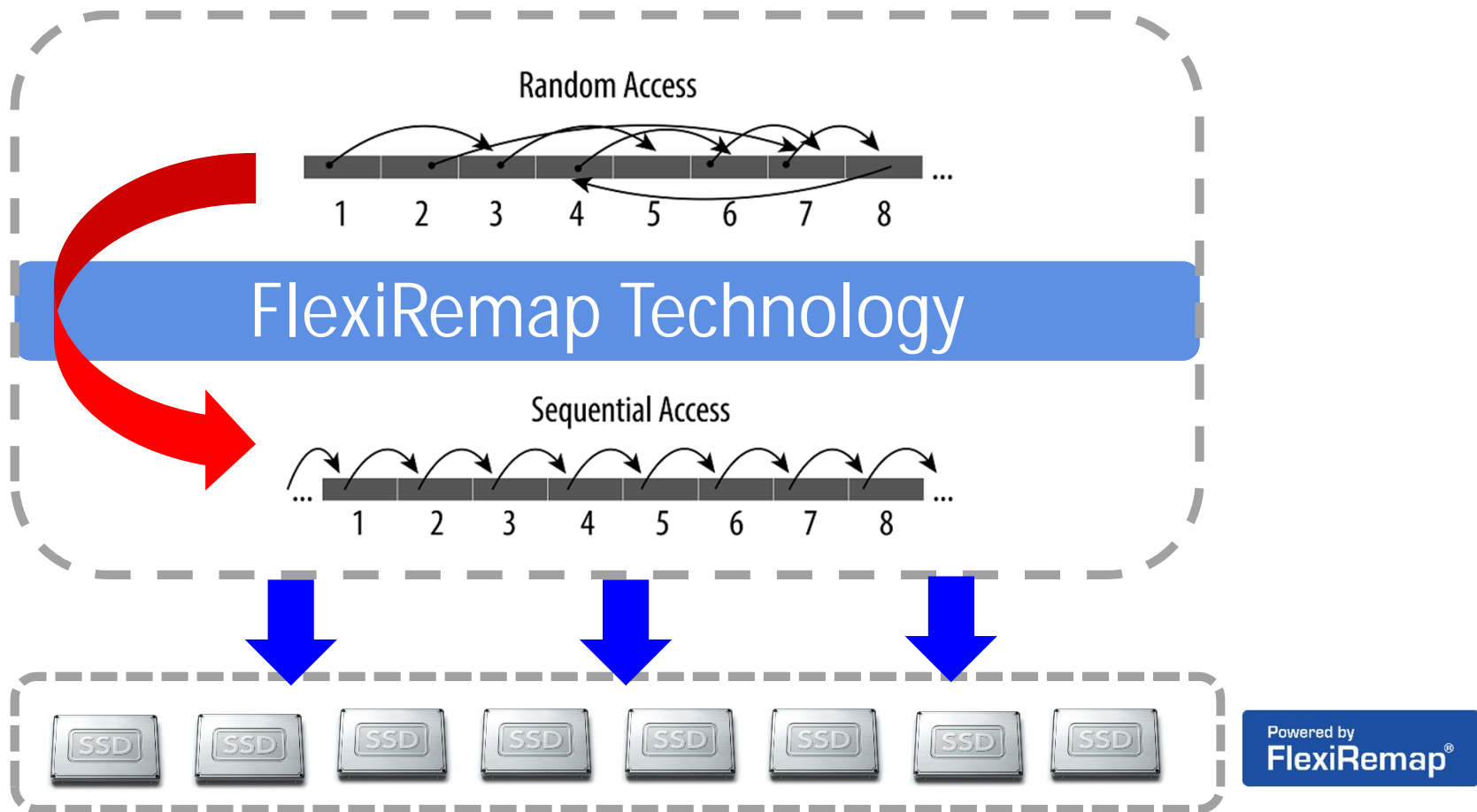
- \* Global wear leveling algorithm Extended SSD endurance, due to the limited P/E cycles of flash memory.



### Affordable

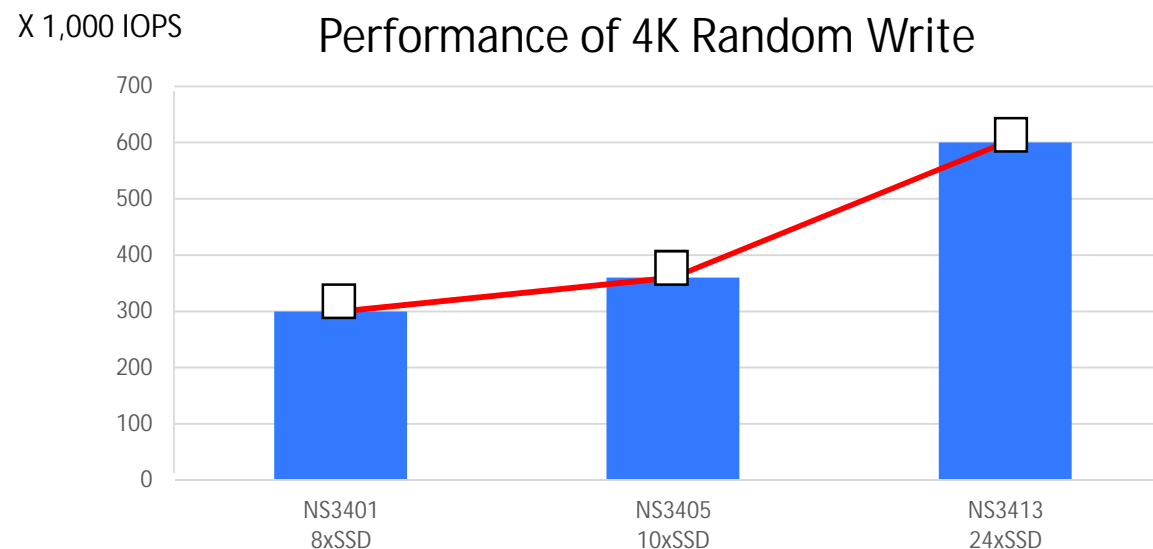
- \* Leverage the industrial standard 2.5" SSD and storage rack mount design

# FlexiRemap Remapping Random to Sequence



# Scalable Performance

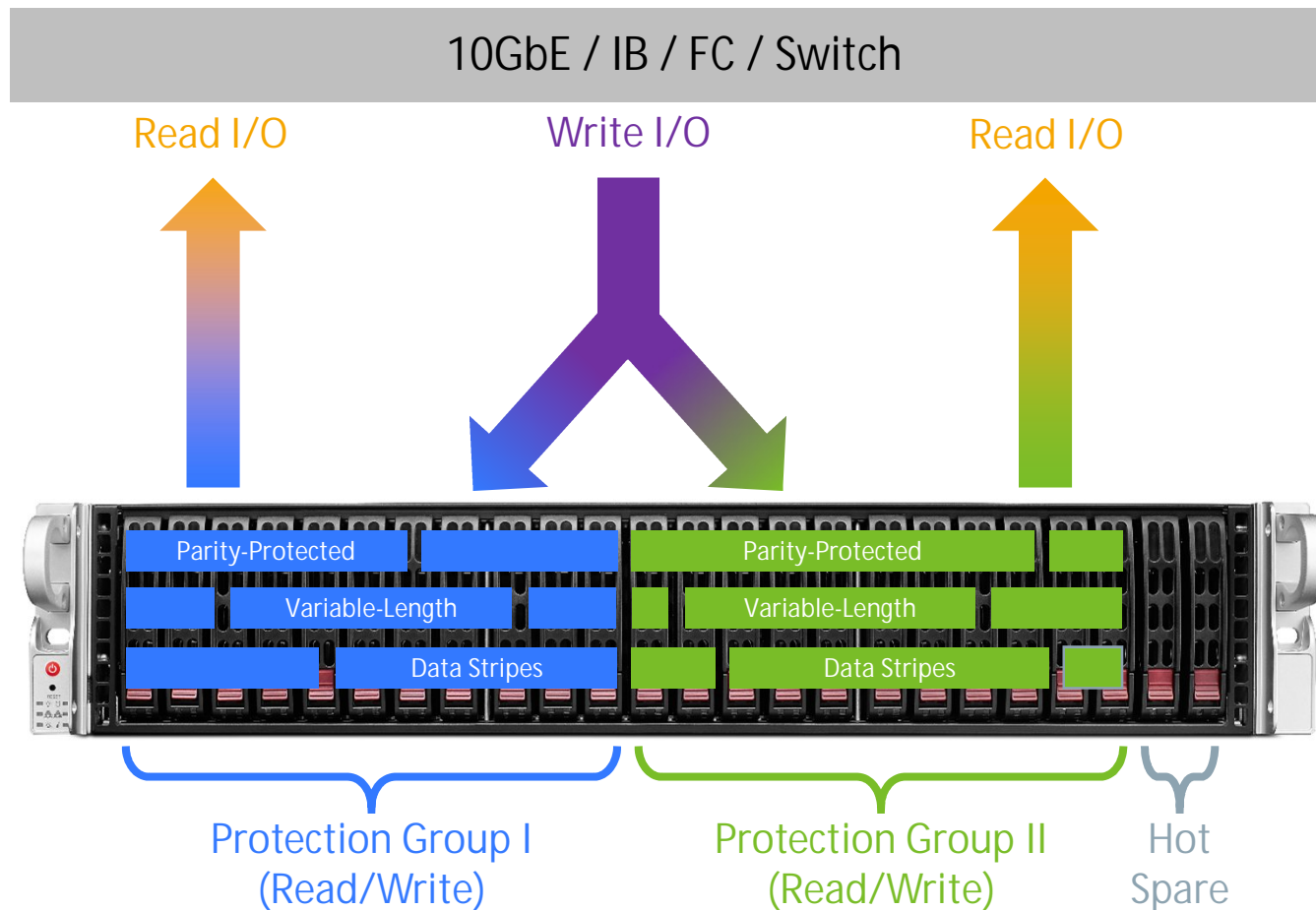
- 10GbE models for 4K IOPS random write performance in single storage appliance
  - NS3401 8 x SSDs with data protection: 300K+ IOPS for 4K random write
  - NS3405 10 x SSDs with data protection : 360K+ IOPS for 4K random write
  - NS3413 24 x SSDs with data protection : **600K+ IOPS** for 4K random write





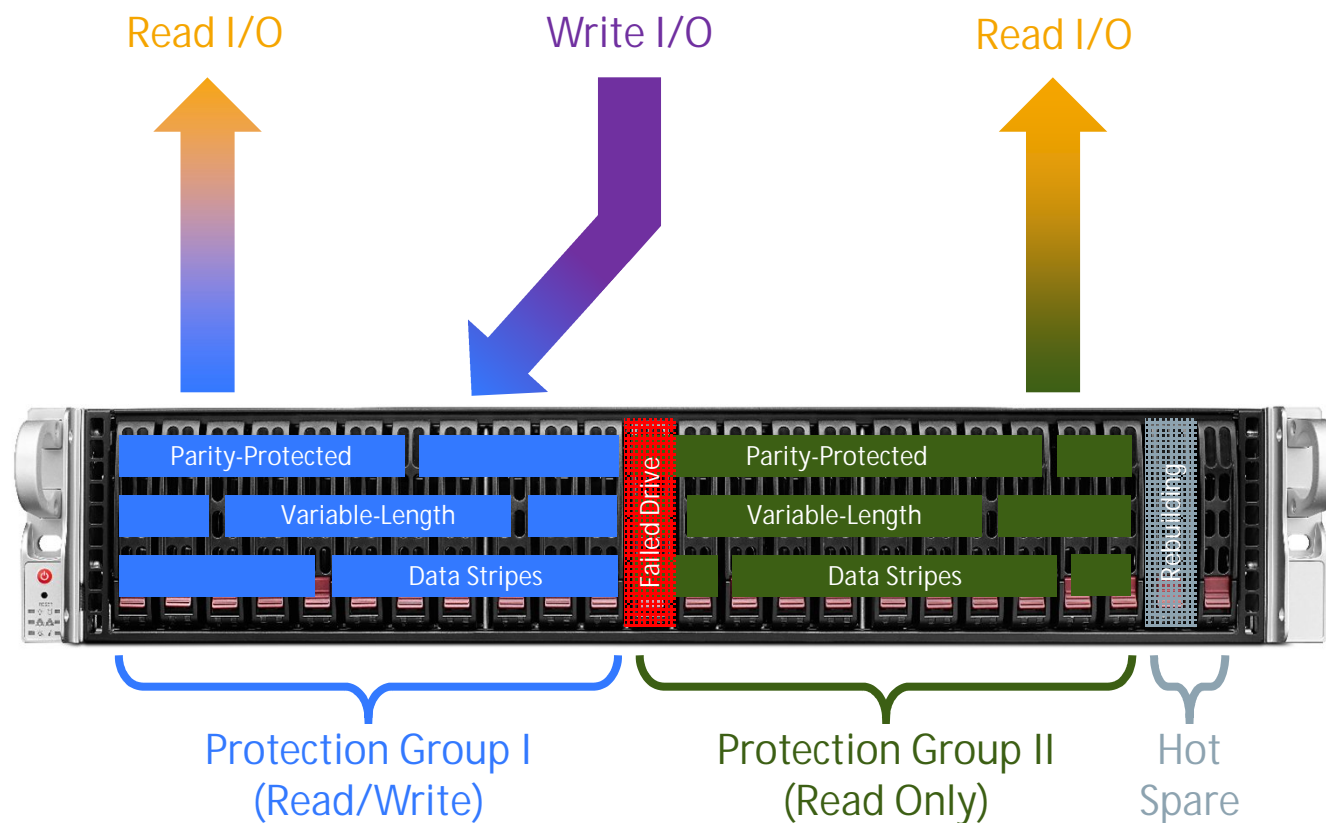
# Data Protection through Redundancy

Normal State: Workload Distributed across Both Groups (Not Mirroring)



## Data Protection through Redundancy (Cont.)

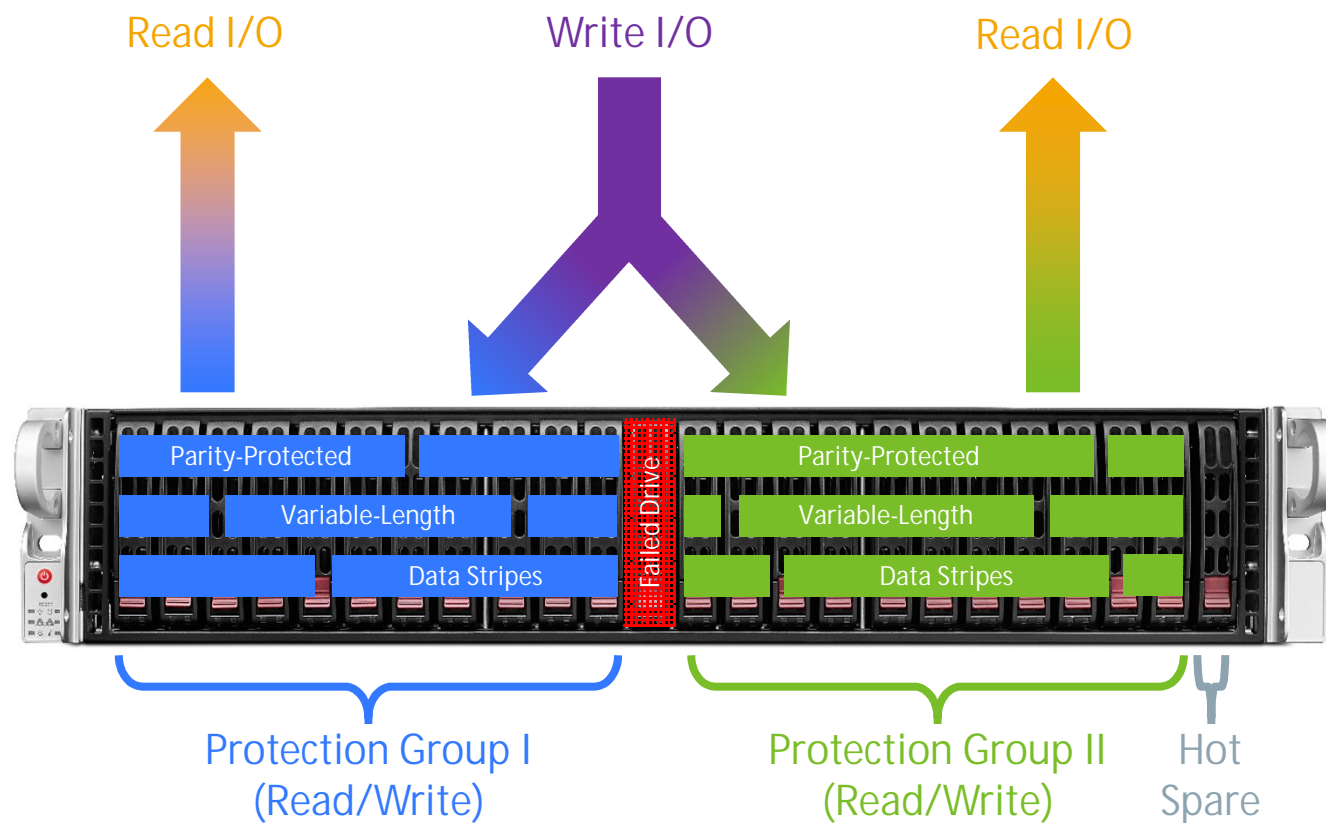
- Degraded State: Write Requests Redirected to One Group



Patent Pending

## Data Protection through Redundancy (Cont.)

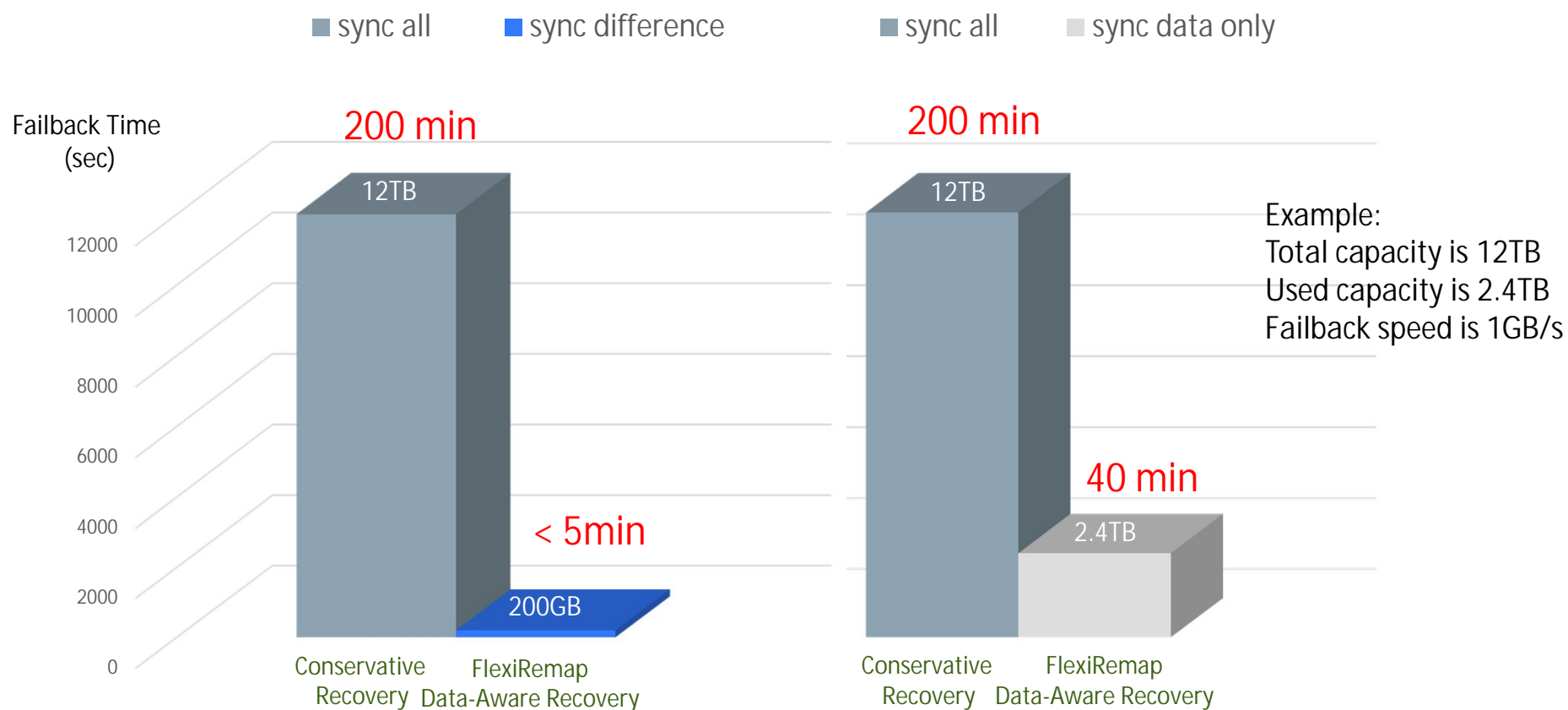
- Recovered State: Seamless Recovery with Automatic Data Rebuilding



Patent Pending

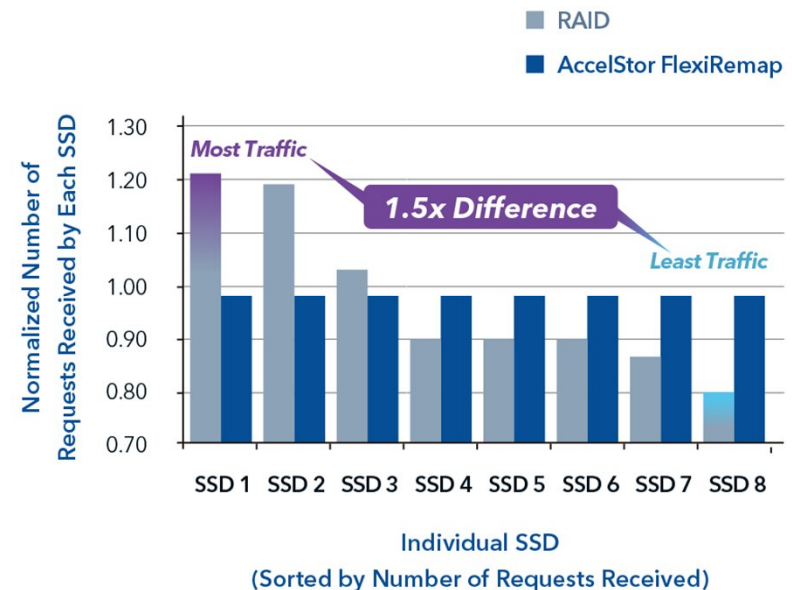
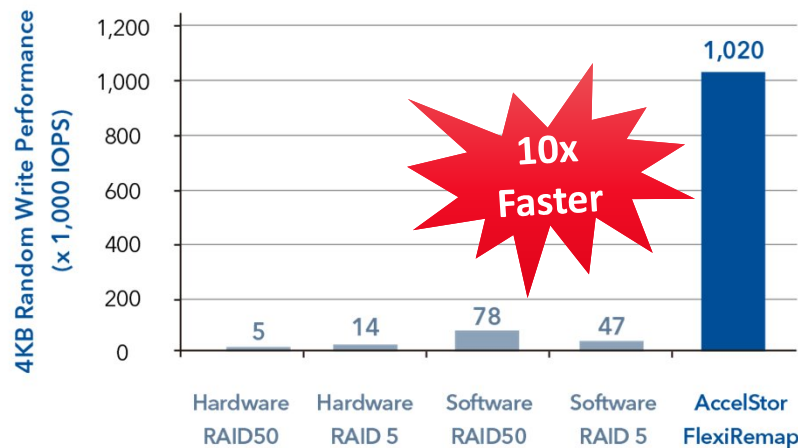
# FlexiRemap Data-Aware Recovery

Sync with data difference only.



# Global wear leveling with inter-drive knowledge

- Compared to conventional RAID configurations:
  - Data protection through redundancy, without penalty of reduced performance and lifespan – particularly important for solid-state drives
  - Automatic workload redirection upon drive failure
  - Improvement of system lifespan with global wear-leveling



# All-Flash Arrays for Enterprises/Datacenters

## NeoSapphire All-Flash Array

### High performance

Up to 600K IOPS for 4KB random write

### Low total cost of ownership

Enable cost-effective investment

### Complete product portfolio

From economic model to total package



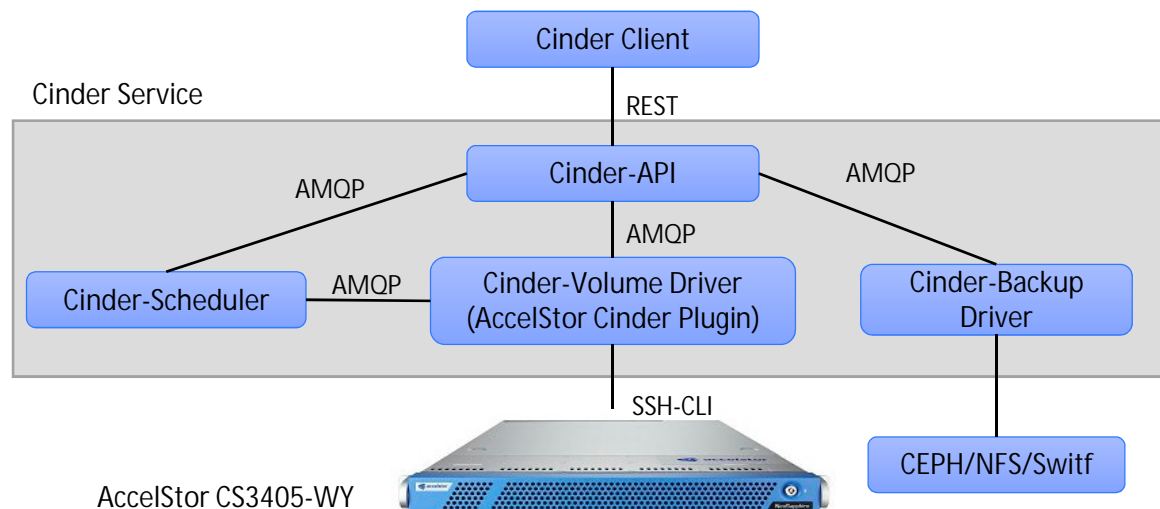


# All-Flash Array Comparison



2	1	3
<b>Some competitors</b>	<b>AccelStor</b>	<b>Some Conventional competitors</b>
Proprietary flash modules with customized software	Commodity SSDs with flash management software	SSDs replace HDDs in conventional disk array with RAID management
<b>Expensive!</b>	<b>Unbeatable!</b>	<b>Impractical!</b>
High performance High price	Great performance Long SSD lifespan Low TCA and TCO	Poor performance Short SSD lifespan Low cost, high TCO

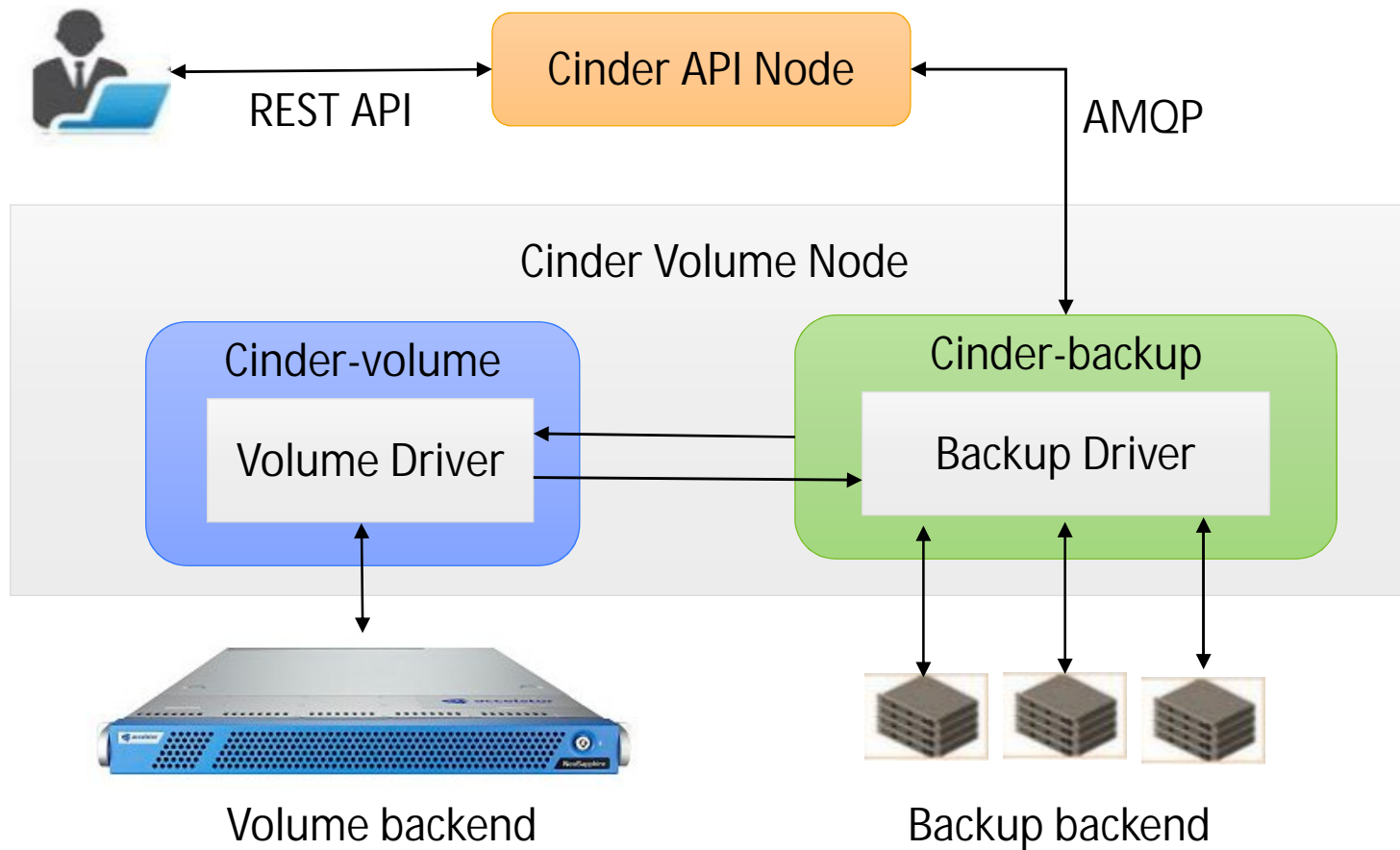
# Integration with OpenStack



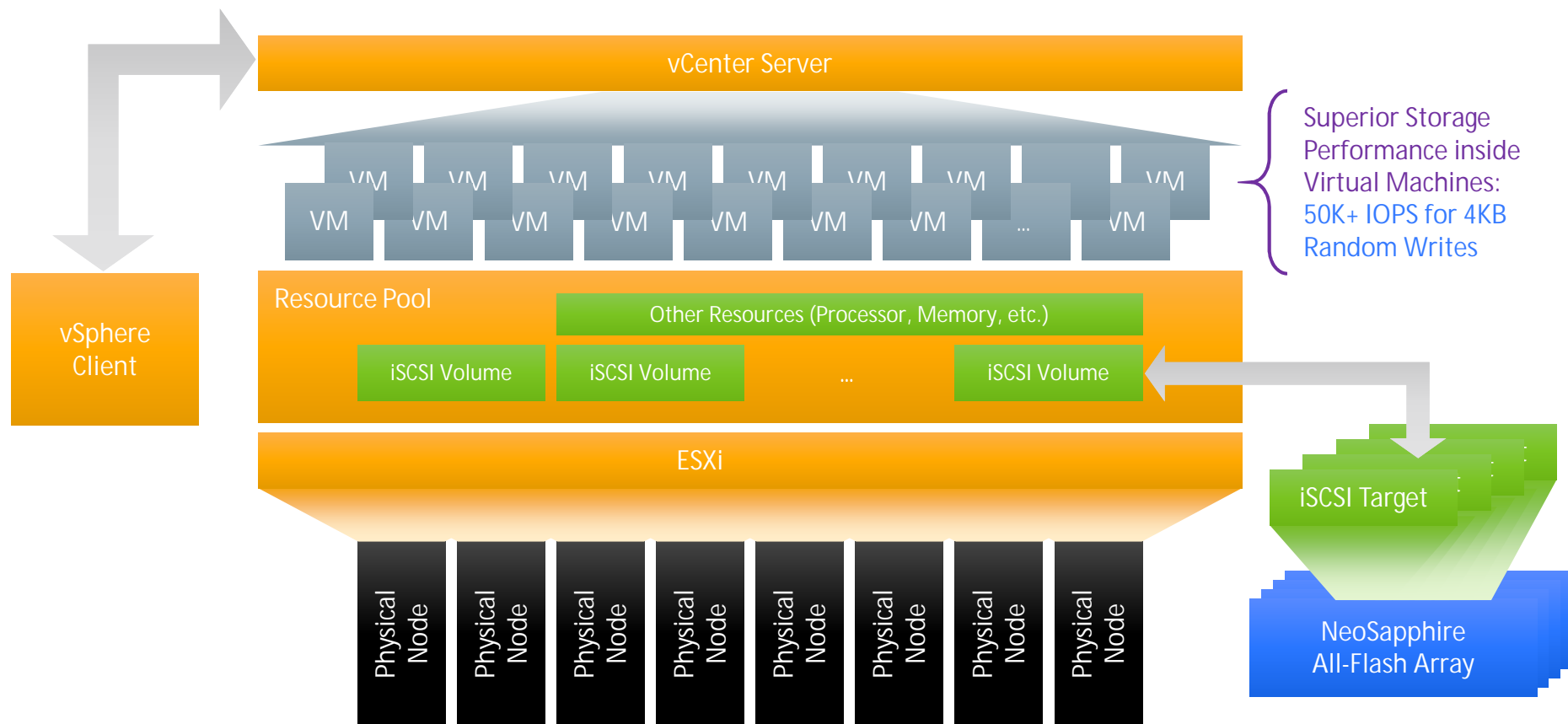
- Volume Create/Delete
- Volume Attach/Detach
- Snapshot Create/Delete
- Create Volume from Snapshot
- Get Volume Stats
- Copy Image to Volume
- Copy Volume to Image
- Clone Volume
- Extend Volume



# Cinder Backup Service



# High I/O Performance inside Virtual Machines







# Improve performance for Database in a easier way by simply changing storage system

- NeoSapphire successfully helped to shorten the reaction time of database from 10+ minutes to 10 seconds when querying specific conditions from millions of records.


	Record Numbers	Result Numbers of Search Result	Response Time on Disk Array (Seconds)	Response Time on NeoSapphire (Seconds)	Searching Conditions
Fuzzy Search	100,000,000	5,757	1,813	10	%LAE%
	100,000,000	5,180	1,809	10	%AQM%
	100,000,000	5,180	1,810	10	%AQM%
	100,000,000	5,763	1,815	10	%WKM%
	100,000,000	6,135	1,892	11	%NGW%
Complete Search	100,000,000	6	1,255	5	LAE1998
	100,000,000	17	1,324	7	AQM4448
	100,000,000	17	1,310	7	AQM4448
	100,000,000	45	1,402	7	WKM1300
	100,000,000	52	1,396	7	NGW6202
Index Search (SerialNo)	100,000,000	1	505	4	67379157
	100,000,000	1	511	7	67369157
	100,000,000	1	526	7	97469258
	100,000,000	1	513	8	42687
	100,000,000	1	509	8	642687

# NeoSapphire All-Flash Array Series

# NeoSapphire All-Flash Arrays(10GbE Models)

Model	NS3405	NS3411	NS3413	NS3706-ES1
Form Factor	1U Rack Mount	1U Rack Mount	2U Rack Mount	2U Rack Mount (built-in 2 nodes)
Product Picture				
IOPS for 4KB Random Write	360K Sustained	360K Sustained	600K Sustained	360K Sustained
Flash Management	FlexiRemap Technology	FlexiRemap Technology	FlexiRemap Technology	FlexiRemap Technology
Usable Capacity	5TB	11TB	13TB	6TB
Number of SSD	10 x Hot-Swappable SSD	20 x Hot-Swappable SSD	24 x Hot-Swappable SSD	12 x Hot-Swappable SSD x 2 nodes
Connectivity	4 x 10GbE	4 x 10GbE	4 x 10GbE	4 x 10GbE
Storage Protocol (SAN and/or NAS)	iSCSI/ NFS/CIFS	iSCSI/ NFS/CIFS	iSCSI/ NFS/CIFS	iSCSI
Endurance (TBW and Lifespan for 3 DWPD)	> 25PB > 4 Years	> 50PB > 4 Years	> 65PB > 4 Years	> 30PB > 4 Years

# NeoSapphire All-Flash Arrays(IB & FC Models)

Model	NS3505	NS3605	NS3611
Form Factor	1U Rack Mount	1U Rack Mount	1U Rack Mount
Product Picture			
IOPS for 4KB Random Write	500K Sustained	360K Sustained	360K Sustained
Flash Management	FlexiRemap Technology	FlexiRemap Technology	FlexiRemap Technology
Usable Capacity	5TB	5TB	11TB
Number of SSD	10 x Hot-Swappable SSD	10 x Hot-Swappable SSD	20 x Hot-Swappable SSD
Connectivity	1 x InfiniBand FDR	2 x 16GFC	2 x 16GFC
Storage Protocol (SAN and/or NAS)	iSER/SRP/ NFS/CIFS	Fibre Channel	Fibre Channel
Endurance (TBW and Lifespan for 3 DWPD)	> 25PB > 4 Years	> 25PB > 4 Years	> 50PB > 4 Years

# Thank You

Visit us at [www.accelstor.com](http://www.accelstor.com) or send your inquiries to [inquiry@accelstor.com](mailto:inquiry@accelstor.com).