

# Portfolio NetApp



## FAS / All Flash FAS

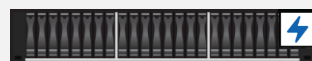
Wydajność plus zarządzanie danymi



- Zunifikowane
- Konsolidacja NAS i SAN
- Scale-out
- Najszerza integracja

## E-Series / EF

Największe pasmo i/lub najniższa latencja



- 0.2 ms latencji
- Gęstość i Efektywność
- Przyspieszenie aplikacji
- 100% blok

## SolidFire

Flash nowej generacji

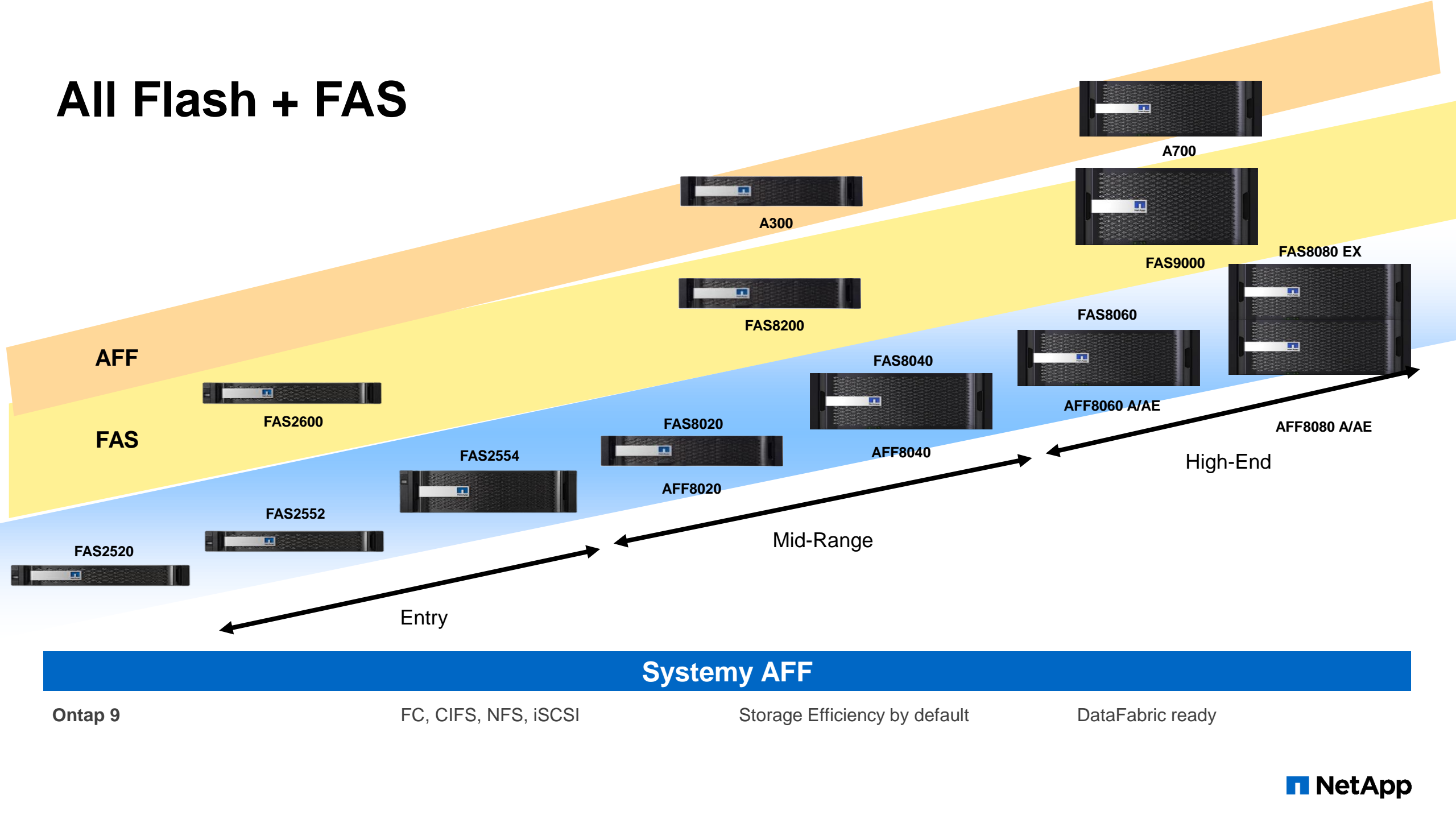


- Liniowy Scale Out
- Automatyzacja
- Modułowa budowa
- Podstawa chmur



AFF, the

# All Flash + FAS



Ontap 9

FC, CIFS, NFS, iSCSI

Storage Efficiency by default

DataFabric ready

## Systemy AFF



# FAS2600 na początek

- FAS2620: 12 internal LFF drives for capacity
- FAS2650: 24 internal SFF drives for performance
- High performance
  - Up to 3x greater
  - Onboard NVMe Flash Cache™
- Expanded connectivity
  - 4 UTA-2 ports per controller
- Scale up to over 1PB, scale out to 5PB
- Small 2U footprint



## FAS2620



12 Internal 3.5" LFF Drives  
**1.4PB**  
144 Drives

## FAS2650



24 Internal 2.5" SFF Drives  
**1.2PB**  
144 Drives

# Oto nowy FAS8200



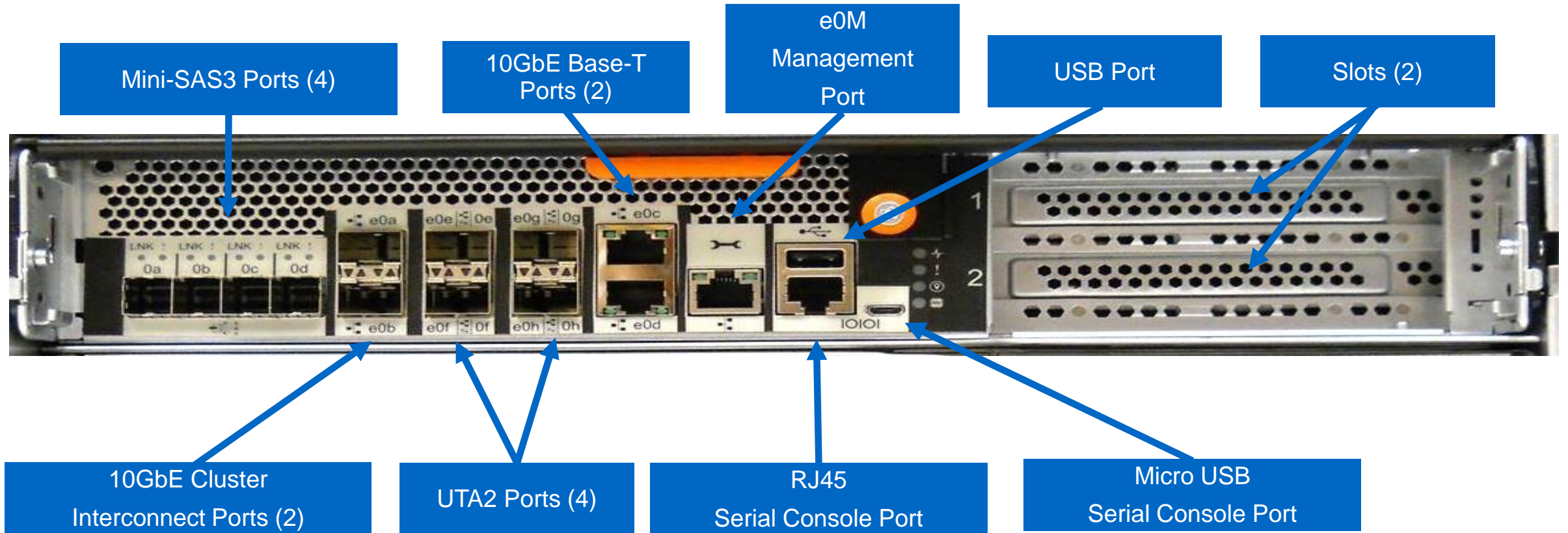
FAS8200

## Zastępując FAS8040...

- ~50% performance improvement
  - 32 CPU cores: 2 times more cores
  - 256GB memory: 4 times more memory
- Onboard NVMe M.2 flash, enhanced NVMEM
- Persistent write cache
- Enhanced I/O layout
  - 4 mini-SAS3 ports for external storage
  - 2 10GbE cluster interconnect ports
  - 4 UTA2 16Gb FC or 10GbE ports; also supports GbE
  - 2 10GbE Base-T ports
  - PCIe Gen3 architecture
  - USB port that works!
  - New USB-based console port, 115K baud

# FAS8200 kontroler

Po staremu?



# Premiera FAS9000

1sza edycja



FAS9000

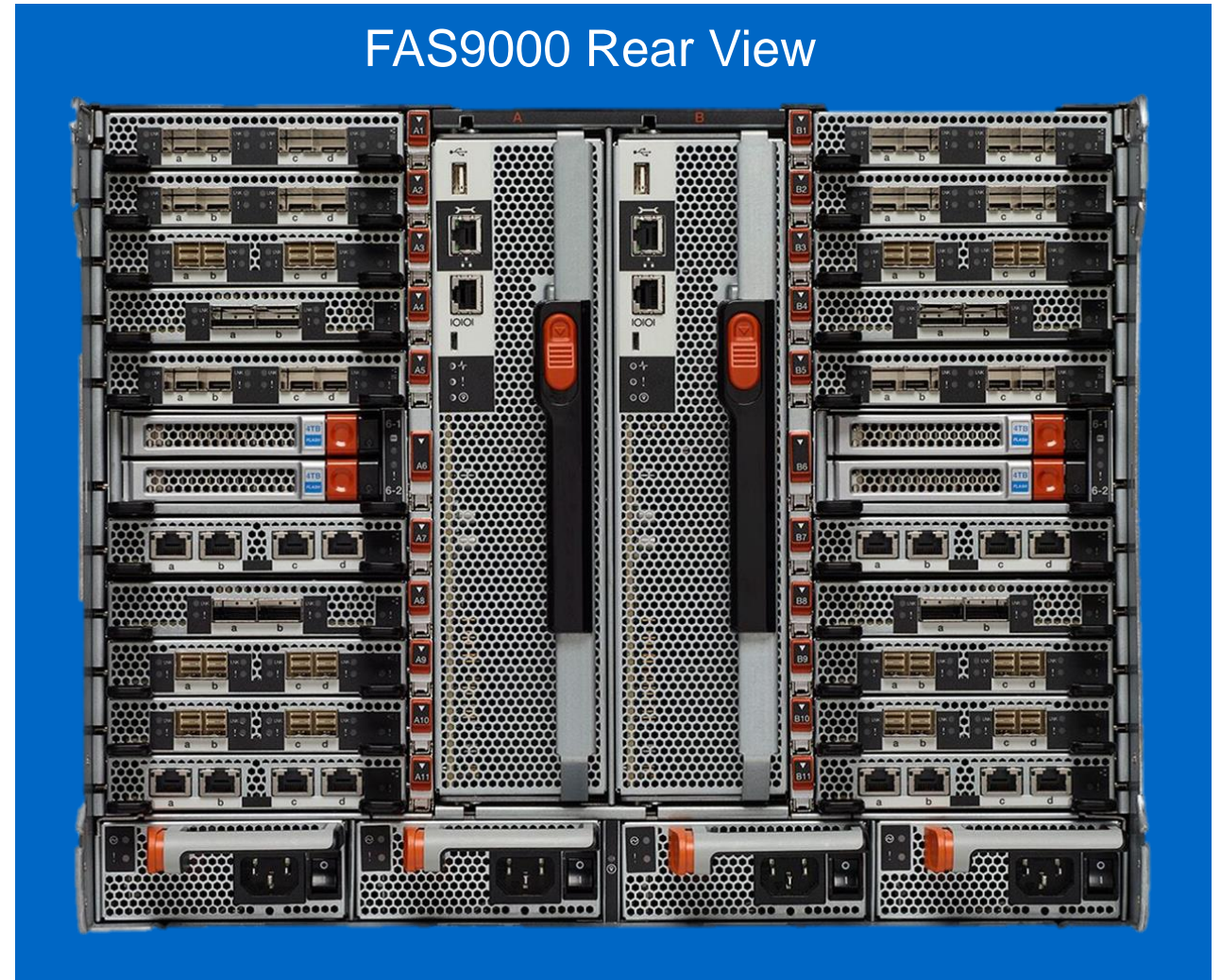
## Porównując do FAS8080 EX...

- ~50% performance improvement
  - 72 CPU cores: 80% more cores
  - 1024GB memory: 4x increase
    - DDR4 memory
  - 64GB NVRAM: 2x more NVRAM
  - High-speed HA interconnect, 80Gb bandwidth
- Onboard NVMe-attached SSD flash
- Enhanced I/O layout
  - I/O slots outside processor module
  - PCIe Gen3 slots, X16 wide lanes for each I/O slot
  - 10 I/O slots per controller (plus 2 NVMe slots)
  - USB port that works
  - New USB-based console port, 115K baud



# FAS9000: modularna budowa

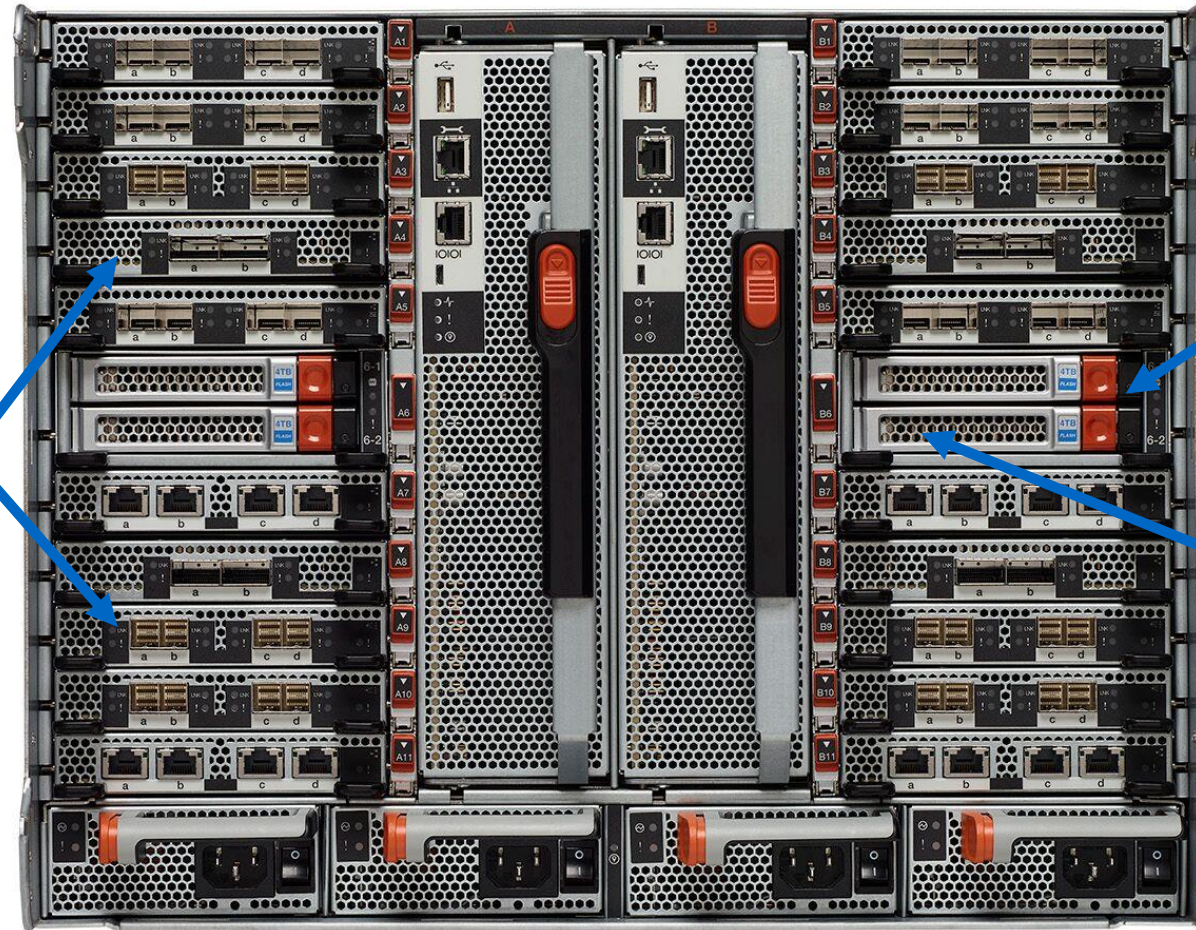
- Two independent controllers with:
  - 10 PCIe I/O slots per controller
  - 2 NVMe slots per controller
  - Service independent of I/O cards
- Flexible, high-performance I/O
  - Add and upgrade as needs evolve
  - 40GbE, 10GbE
  - 32Gb FC, 16Gb FC
  - 12Gb SAS-3





# FAS9000 kontroler

A dysków brak...

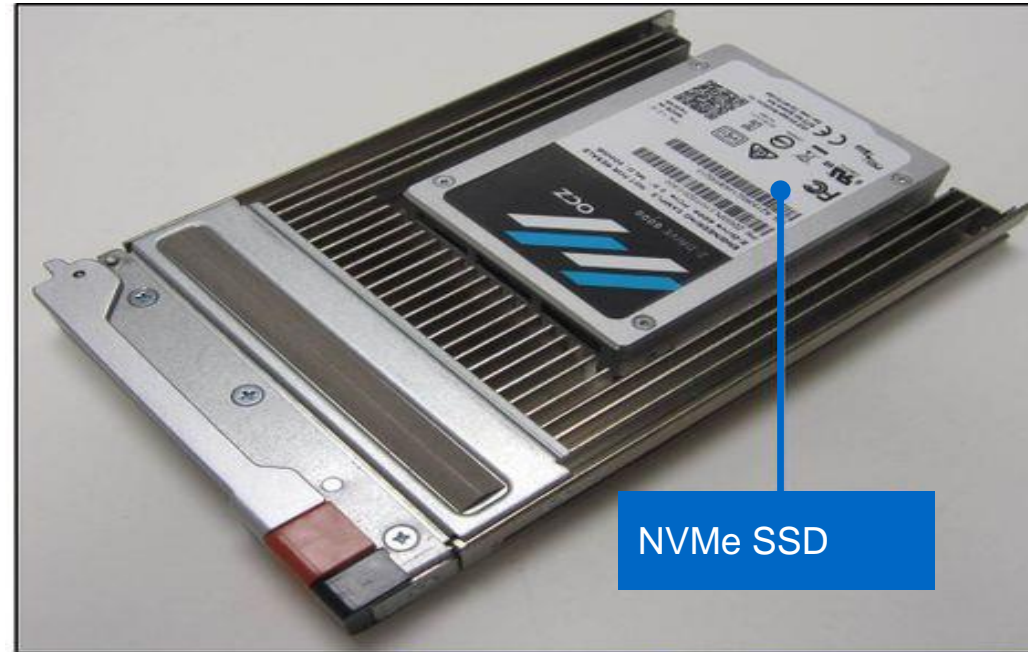


20 I/O modules

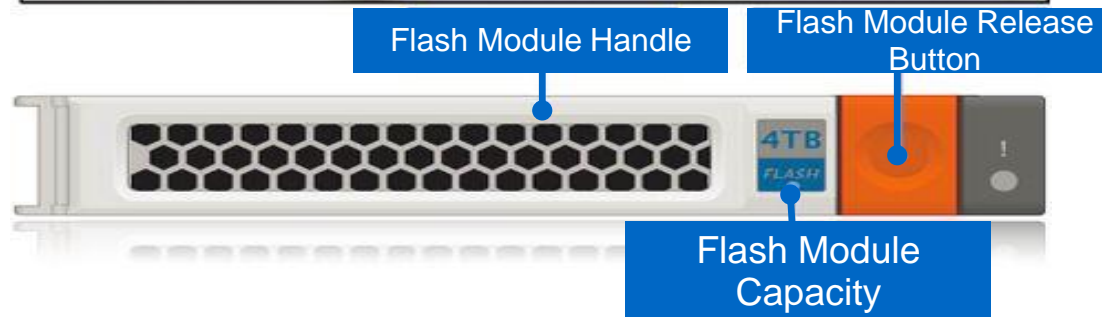
NVRAM modules  
(behind NVMe)

4 NVMe modules

# FAS9000 NVMe



NVMe SSD



Flash Module Handle

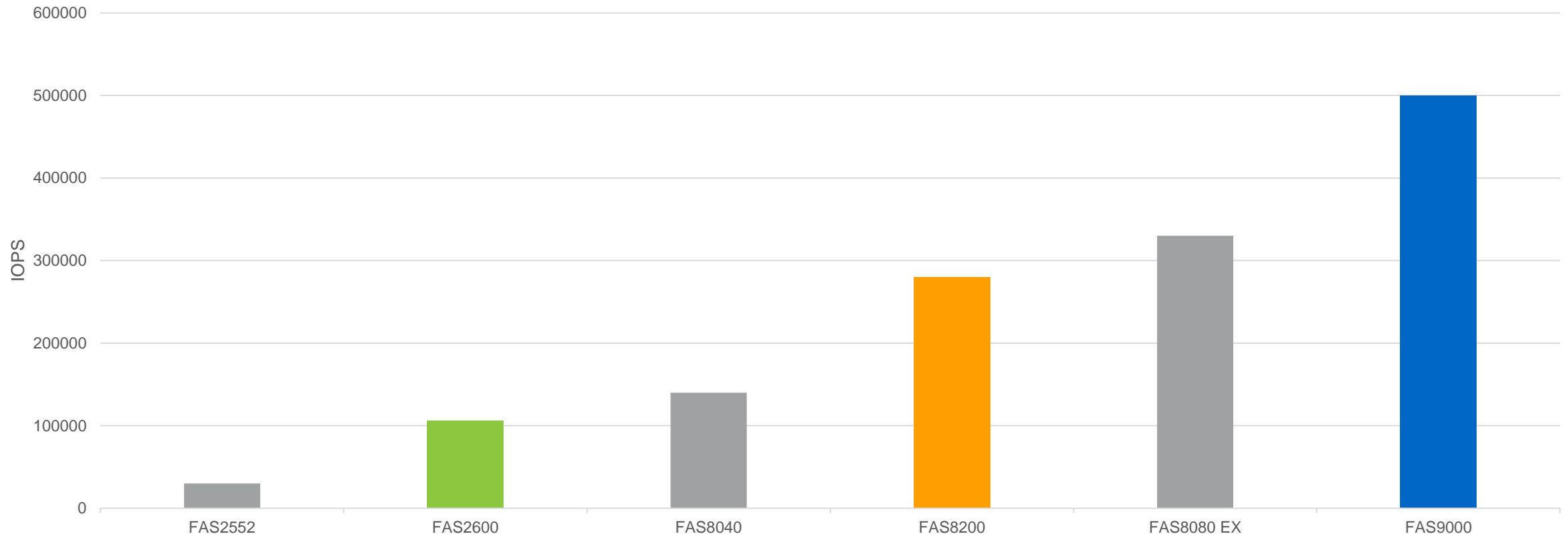
Flash Module Release Button

Flash Module Capacity

# Wydajność z grubsza

Pary HA

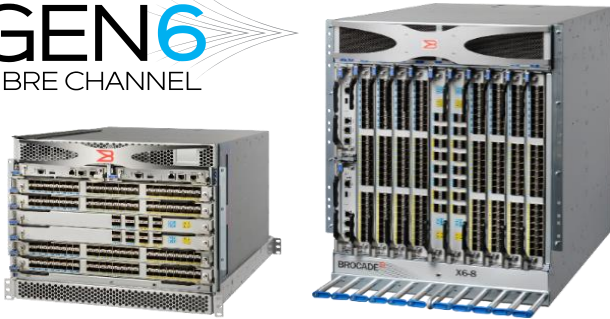
Next-Generation FAS Performance  
File System Workload (NFS)





# A co za tym (obok) idzie

Brocade  
**GEN6**  
FIBRE CHANNEL



Brocade X6 Directors  
X6-4 and X6-8



  
CISCO



Cisco 3132Q-V  
(Cluster Interconnect)



Cisco Nexus 9300 and 5600  
switches

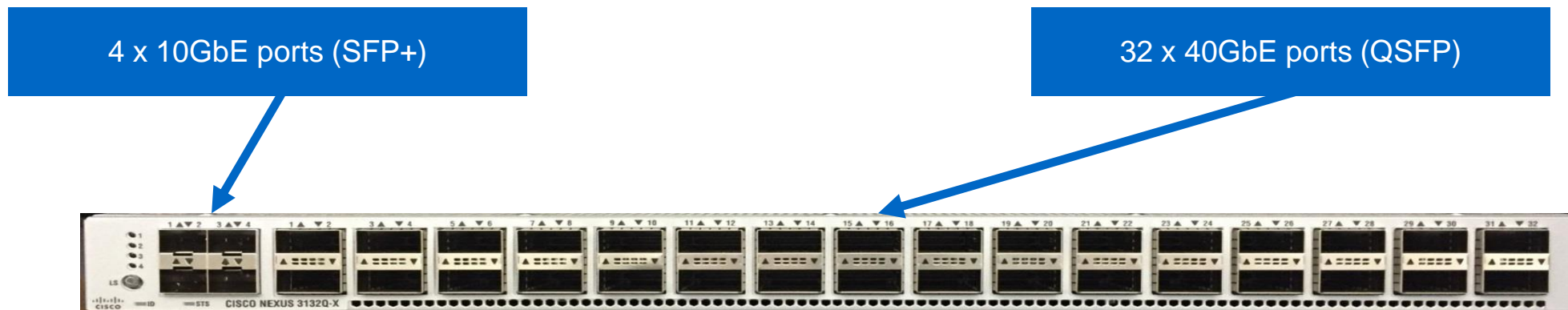
- 32Gb SAN Infrastructure

- First enterprise platforms to enable next generation 32Gb FC SAN

- 40GbE cluster interconnect
  - 32-port Cisco 3132Q-V switch
- Achieve end-to-end 40GbE host side access
  - Nexus 5600 and Nexus 9300 series

# 40GbE Cluster Interconnect

- X190001 (Cisco Nexus 3132Q-V)
  - 1U
  - Supports 10GbE and 40GbE connections
  - 32 x 40GbE ports
  - 4 x 10GbE ports
- Supported on FAS8200 and FAS9000 in ONTAP® 9.1



# Affero AFF



## Increased performance

- 7M IOPS—fastest unified AFA

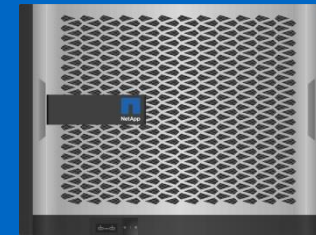
## Better economics

- First to support multi-stream-write (MSW) SSDs—42% increase in usable capacity combined with ADP
- Inline data compaction
- 15TB SSD supported on all models

## Simplified management

- Software encryption—NetApp® Volume Encryption
- Massively scalable NAS container—NetApp ONTAP® FlexGroups

AFF A700



High-End  
Expandable

AFF A300



Midrange

New applications on flash



# AFF A300

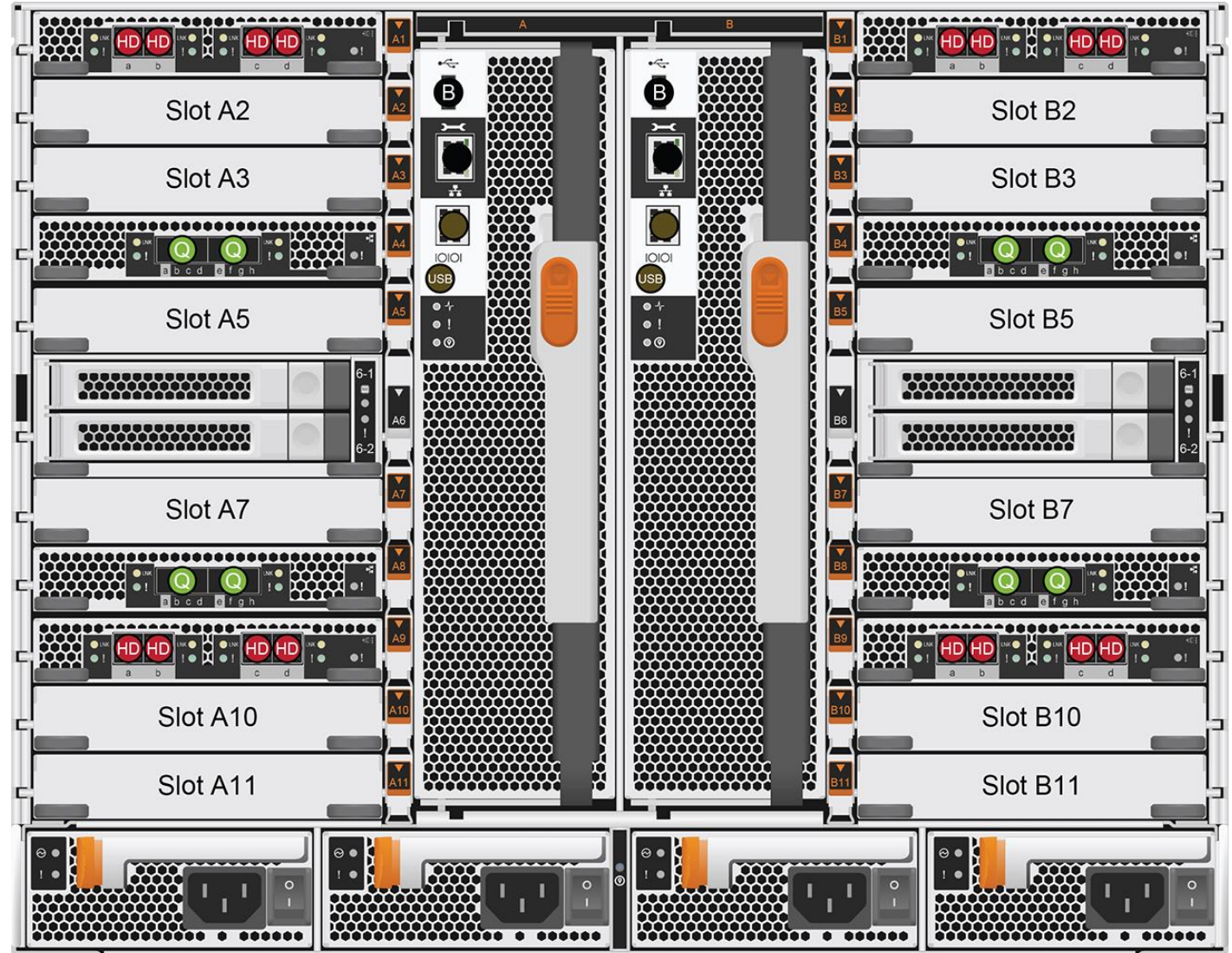
- 3U chassis
- AFF8060 performance, 8020 size
  - 32 CPU cores
  - 256GB RAM



- Onboard IO (per node)
  - 4x 10GbE (2x SFP+, 2x 10G base-T)
  - 4x UTA2 (SFP+, 10GbE or 16GbFC)
  - 4x 12Gb SAS mini-HD expansion ports
- PCIe Expansion
  - 2 slots per node
  - Enables MetroCluster support

# AFF A700

- 4U (Rack Optimized) Chassis w/Embedded SAS (24 internal SSDs)
- Configuration details
  - 36 cores, 512GB RAM per controller
- Significantly faster
  - ~30% faster than AFF8080
  - With compression and Dedupe inline



# Linia E-Series

## E2800

- 1.5PB
- 10GBps (odczyty)
- 3GBps (zapisy)
- 300,000 IOPS 64GB

## E5600

- 3PB
- 12GBps (odczyt)
- 6GBps (zapis)
- 825,000 IOPS 96GB

300%  
Faster

## EF560

- 384TB
- 300u sec latency
- 12GBps
- 825,000 IOPS 96GB

Entry

Midrange

AllFlash

- FC, SAS, IB, iSCSI
- Heterogeniczny SAN

- Najwyższa wydajność
- Elastyczność konfiguracji
- Lokalna / zdalna replikacja



# EF560 All-Flash

Dla najwyższej wydajności

## Wykorzystanie

- Bazy danych, OLTP oraz analityka

## Kluczowe korzyści

- Szybsze raporty i podejmowanie decyzji
- Lepsze odczucia użytkowników
- Skonsolidowane serwery i licencje



## Wydajność

>825,000 IOPS

800 mikrosekund latencji

## Gęstość

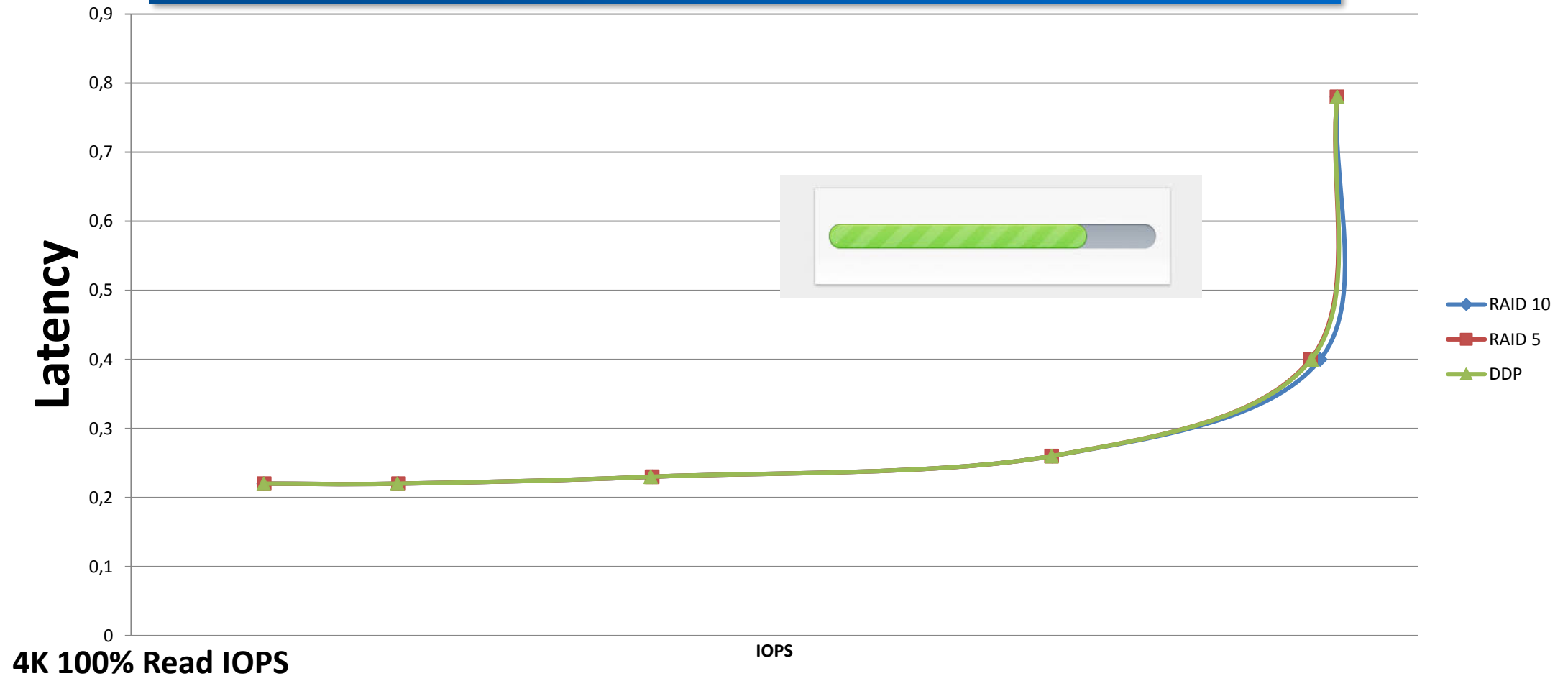
38TB w 2U

## Niezawodność

>99.999% dostępności

# EF560 – stała wydajność

825K IOPS przy opóźnieniu <800 Mikrosekund



# SOLIDFIRE

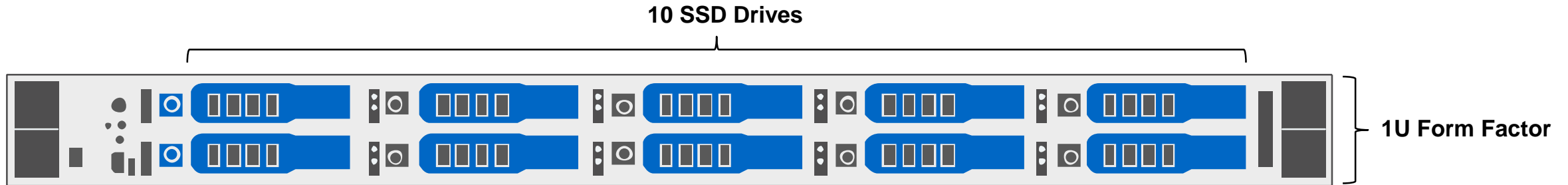
Macierz All-Flash dla Obciążeń  
Nowej Generacji





# Building Blocks of SolidFire Platform

## Nodes



### 2405

- ✓ (10) 240GB SSD
- ✓ 5 – 10TB (effective)
- ✓ 50,000 IOPS
- ✓ 64GB shared memory
- ✓ 2x6-core 2.1GHz

### 4805

- ✓ (10) 480GB SSD
- ✓ 10 – 20TB (effective)
- ✓ 50,000 IOPS
- ✓ 128GB shared memory
- ✓ 2x6-core 2.1GHz

### 9605

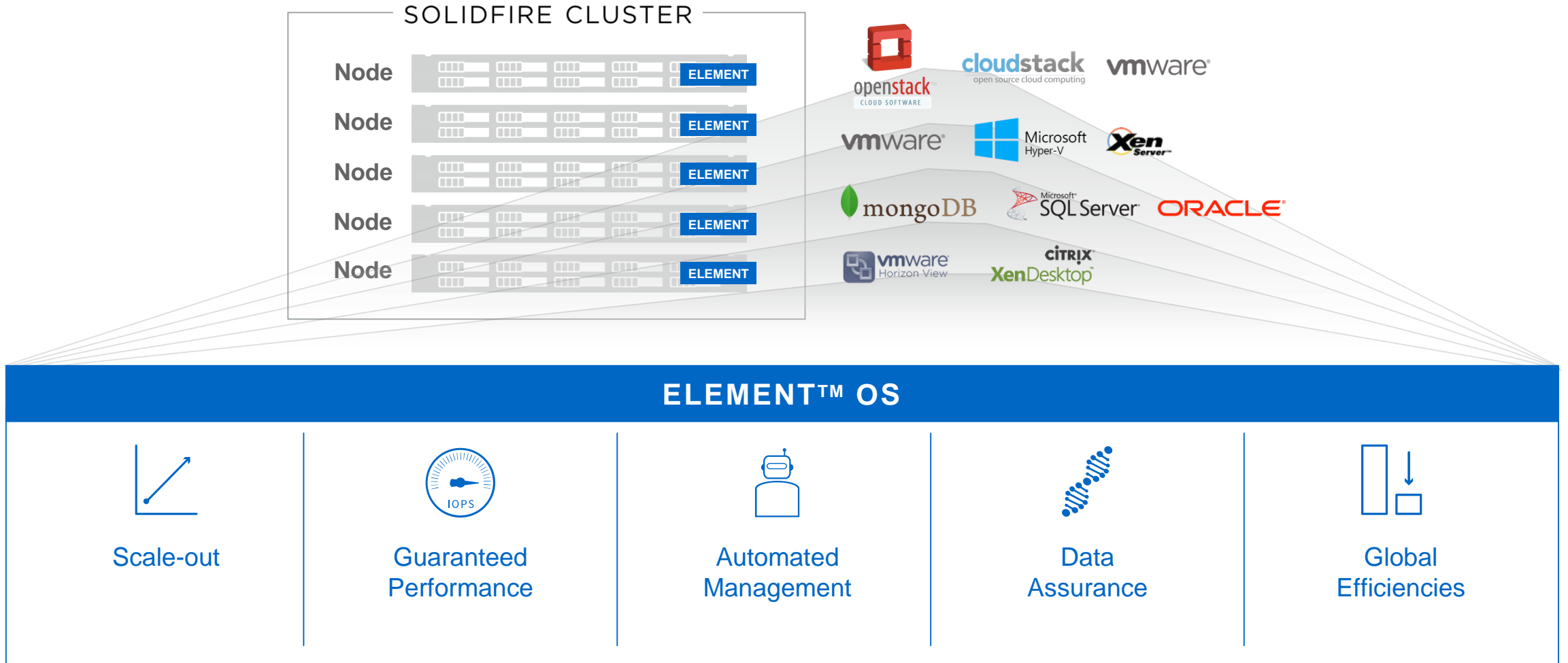
- ✓ (10) 960GB SSD
- ✓ 20 – 40TB (effective)
- ✓ 50,000 IOPS
- ✓ 256GB shared memory
- ✓ 2x6-core 2.1GHz

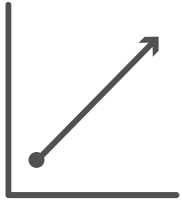
### 19210

- ✓ (10) 1.92TB SSD
- ✓ 40 to 80TB (effective)
- ✓ 100,000 IOPS
- ✓ 384GB shared memory
- ✓ 2x14-core 2.6GHz

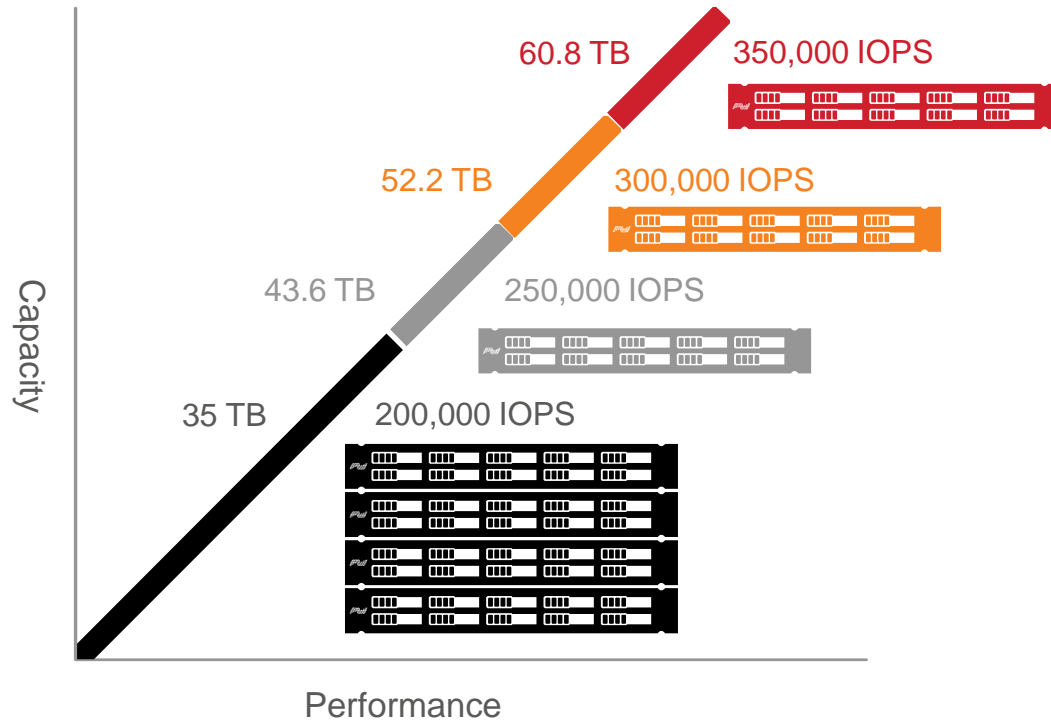


# Element™ OS





# Scale-Out Agility



Linear Scale  
of Performance and Capacity

Expand / Contract  
without disruption or reconfiguration

Guaranteed Compatibility  
between all SolidFire storage nodes

- Future-Proof your storage investment
- Eliminate storage migrations and forklift upgrades
- Never wait 3 years for an upgrade



# Guaranteed Quality of Service (QoS)

**Create New Volume**

Volume Name:

Account:

Total Size:  GB

Enable 512 Byte Emulation


**Quality of Service Settings**

IO Size	Min	Max	Burst
4KB	1001 IOPS	3501 IOPS	8000 IOPS
8KB	626 IOPS	2188 IOPS	5000 IOPS
16KB	371 IOPS	1297 IOPS	2963 IOPS
256KB	26 IOPS	90 IOPS	205 IOPS

Effective Max Bandwidth: 24.47 MB/ SEC (Min), 55.92 MB/ SEC (Burst)

Dynamically **Allocate**, **Manage** and **Guarantee** storage performance independent of capacity

Define / enforce **Min**, **Max** and **Burst** settings for each application / volume

SolidFire QoS Eliminates  of traditional performance related storage problems - *ESG 2015*

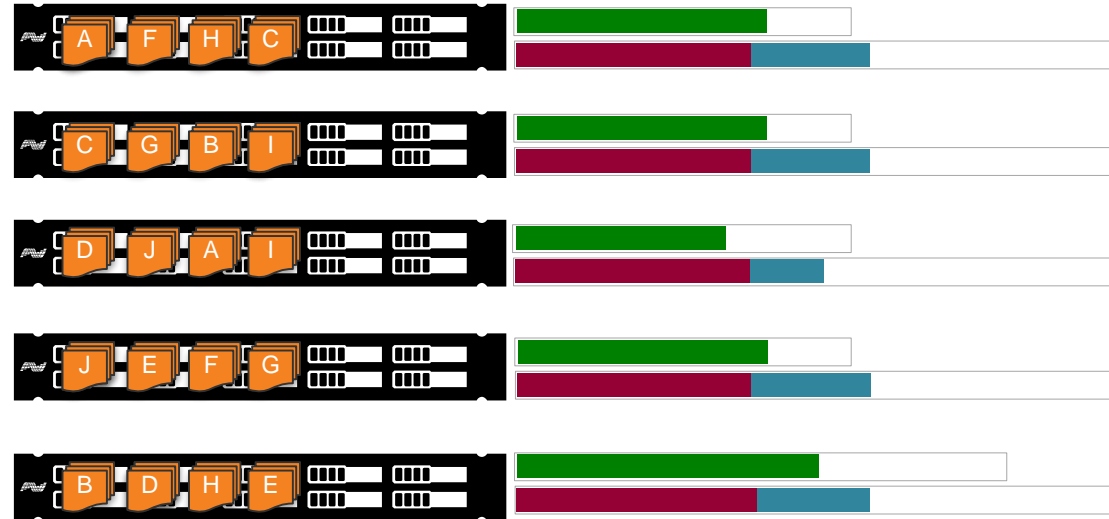


# Self Healing High Availability

## SolidFire Helix™

### Cluster wide RAID-less data protection

- No single points of failure
- Automatic self-healing – restores redundancy after failure
- Maintains all QoS settings regardless of failure condition
- Non-disruptive hardware and software upgrades



Microsoft  
Hyper-V



vmware®



mongoDB



ORACLE®

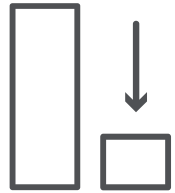


cloudstack  
open source cloud computing



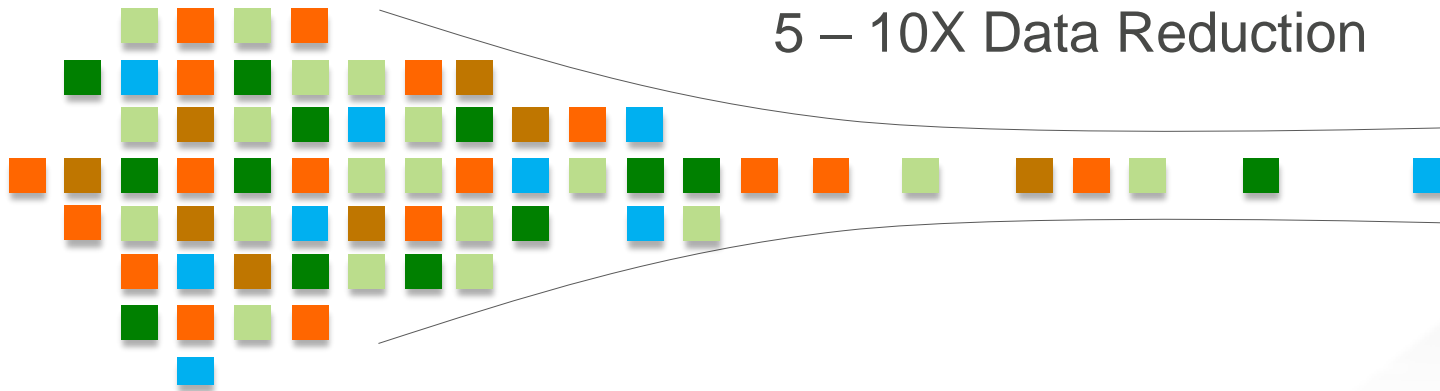
CITRIX®  
XenDesktop™





# In-line Data Reduction

Always-on Deduplication, Compression and Thin Provisioning  
5 – 10X Data Reduction



**63.5x**  
increase  
in performance  
per rack unit



**90%**  
fewer  
cables



**77%**  
less  
power &  
cooling cost



**89%**  
less  
rack space

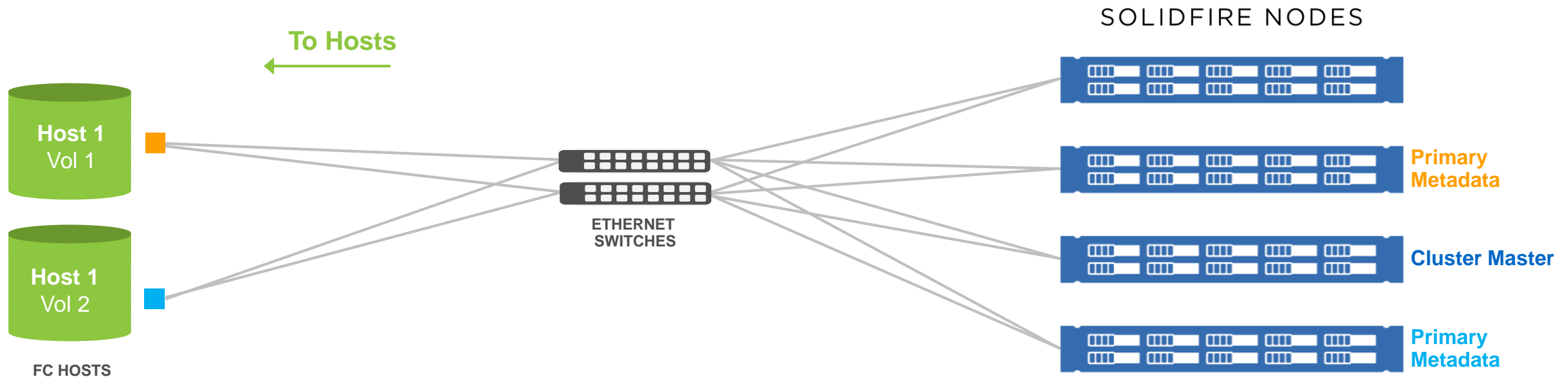
## Solution Benefits

- Cloud – De-Duplication typically scales with capacity
  - VDI – Enables full-clones saving on compute
  - Databases – Enables Test/Dev spinoffs and replica sets
- Drives cost below the price of disk



# iSCSI Physical Connectivity to NetApp

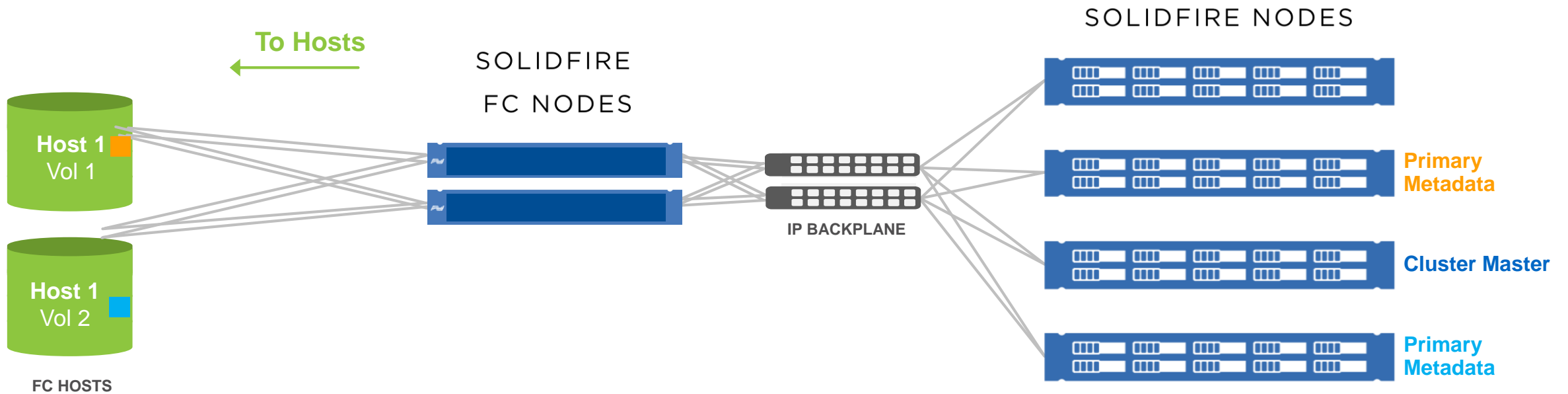
iSCSI (RFC-3720) | REDIRECTOR SERVICE





# FC Virtual Connectivity to NetApp

iSCSI (RFC-3720) | REDIRECTOR SERVICE





## All Inclusive Feature Set

- Replication (synchronous / asynchronous)
- Integrated cloud backup
- Snapshots & clones
- Global efficiencies
- 256-bit encryption-at-Rest
- Comprehensive logging
- Cloud based monitoring
- Secure multi-tenancy (VLAN support, volume access groups)
- Simultaneous multiprotocol support (FC / iSCSI)
- Deep integrations: VMware, OpenStack, CloudStack

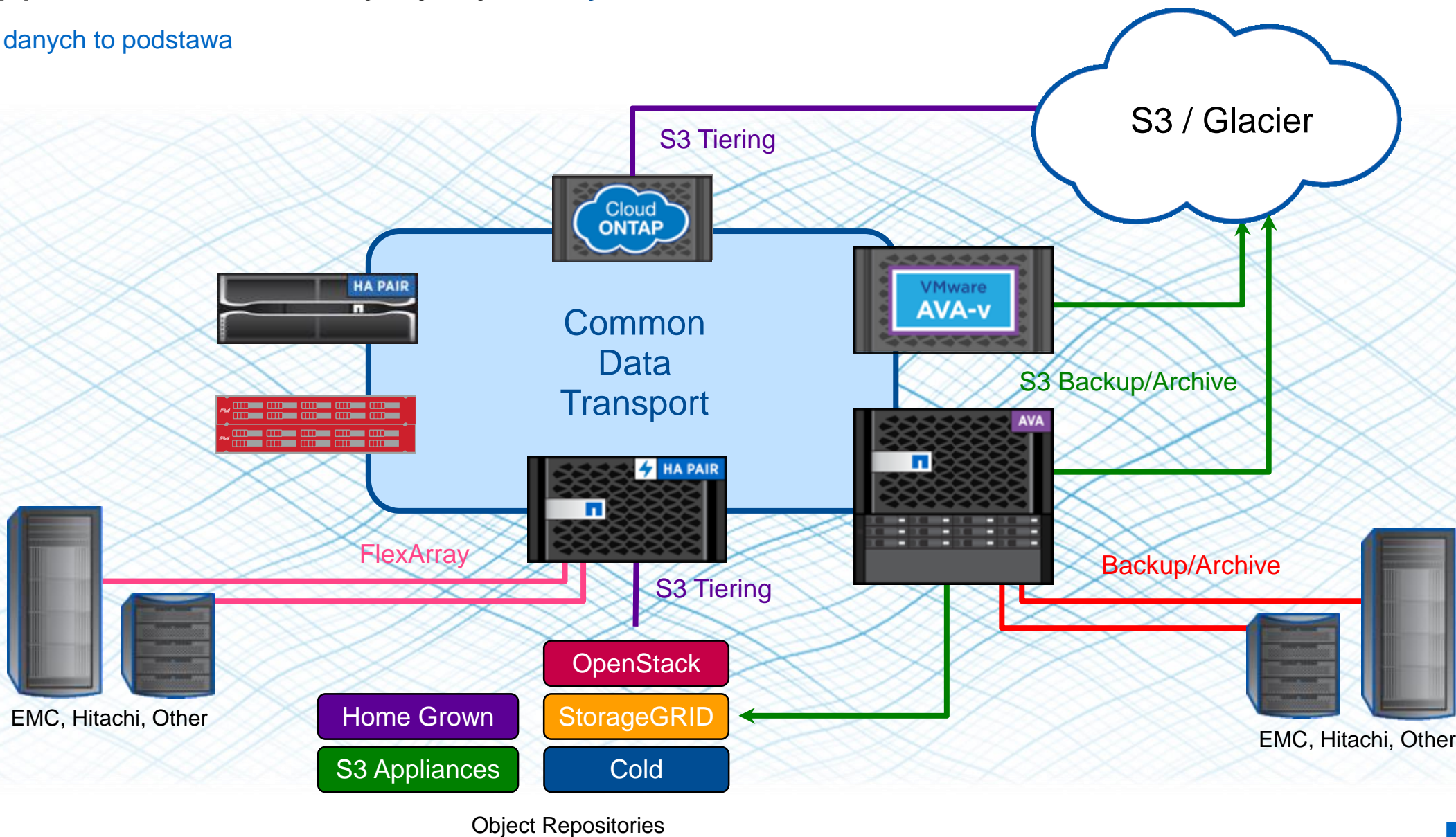


# NetApp Data Fabric

Wszystko dla...

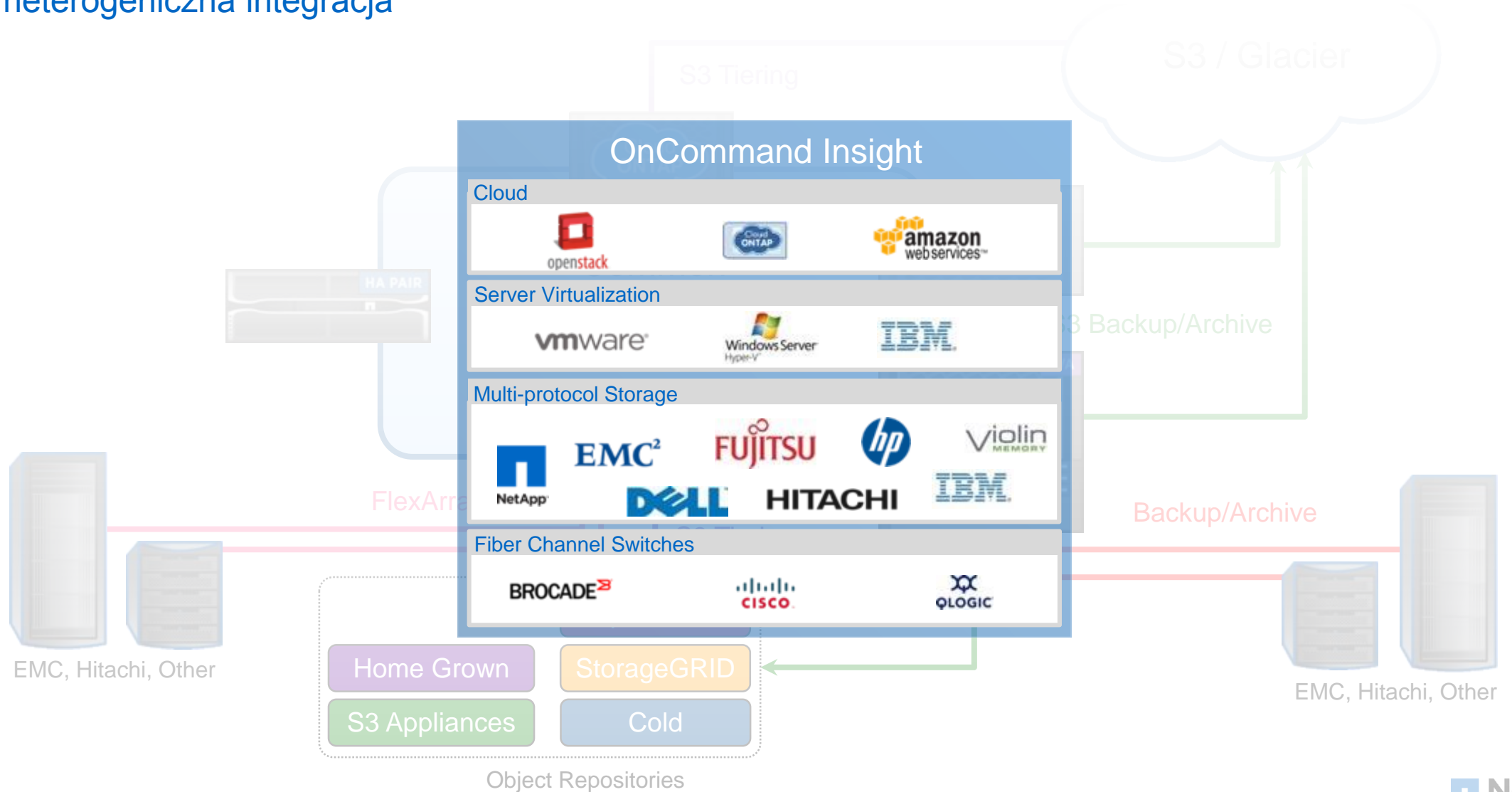
# NetApp Data Fabric – łączymy wszystko

Migracja danych to podstawa



# Data Fabric wymaga wglądu

Pełna, heterogeniczna integracja





# For Flash – it has to be **NetApp**



## All Flash FAS

Performance and data management



- Unified
- Consolidated NAS & SAN
- Scale-out
- Broadest integration

## EF-Series

Biggest bandwidth / lowest latency



- 0.2 ms latency
- Density & Efficiency
- App acceleration
- 100% block

## SolidFire

3rg gen Flash



- Linear Scale Out
- Automatization
- Modular architecture
- Cloud ready



# Wartość NetApp np HANA

[www.netapp.com/us/company/customer-stories](http://www.netapp.com/us/company/customer-stories)

## Zamknięcie projektu

# 70%

"We like to say we've taken the infrastructure out of the way so that the business doesn't even notice it anymore. We can deliver our application portfolio to any device, anywhere in the world. And we've accelerated new application delivery by 70% on average."

Revlon, Inc.(Cosmetics, Skin Care), USA

## Skalowalność

# 80PB

SAP provides over 30 SaaS applications to thousands of customers based on NetApp. Many HANA deployments in partnership with Fujitsu and Cisco deployed globally. Deployed in 8 SAP HANA Enterprise Cloud (HEC) locations and in 5 SAP SaaS Cloud Locations (formerly: SuccessFactor and ByD). Over 7,5PB managed by only three people.

SAP SE (Enterprise Software), Germany

## Efektywność Operacyjna

# 100x

If we had opted for conventional SAP backup technology, we would have had to reconfigure the SAP HANA system so we could offset service disruptions during backup. [...] Compared to traditional methods, the first step in the backup process, which is important for database operations, is completed 60 to 100 times faster. With the exception of about one minute, SAP HANA is available 24/7.

All for One Steeb (IT SP), Germany

## Przyszłość

# NPS

Support faster time to market by enabling the company's SI engineering teams to leverage public cloud benefits and proven enterprise storage to accelerate and optimize SAP consulting engagements' outcome. Differentiate SAP services from hyperscalers by offering dedicated storage systems and more data control with pay-as-you-go public cloud compute.

IT Service Provider, Japan