

**DELL** Technologies

PowerFlex

argos

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**Romain L'Hotellier**  
Sales Lead & BDM | PowerFlex France  
Mobile + 33 6 73 95 53 65  
Romain.l.hotellier@dell.com



**David Regourd**  
Senior Modern Infrastructure Architect  
Mobile + 33 7 60 63 51 76  
David.regourd@dell.com

# Agenda



45 minutes

Pourquoi PowerFlex

Architecture de la plateforme

Cas d'usage

Q&A

# Pourquoi PowerFlex ?



# Business needs Apps & Data Not IT

“You go to bed an industrial company and you wake up a software and analytics company.”

*Jeff Immelt,  
(When he was CEO General Electric)*

**What's Next ?**



Legacy Workloads



Moderns Workloads





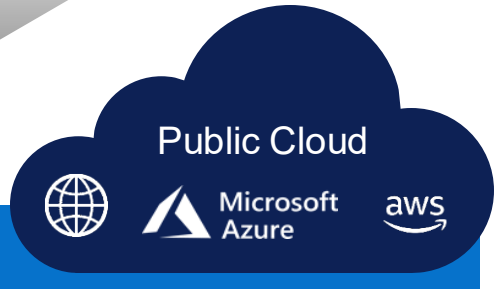
Databases      Analytics      Consolidation      Cloud native      Next-Gen databases      AI / ML



Bare metal      Virtual machines      Containers

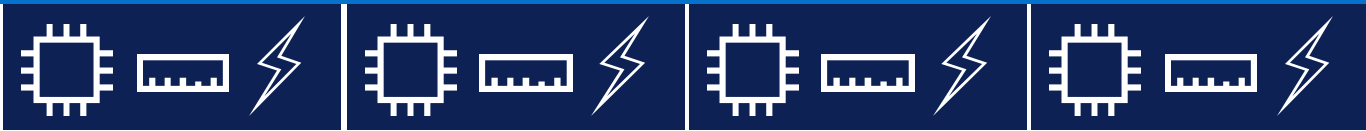


# Next Gen Data Platforms



## PowerFlex can do that !

Available on GitHub



Shared resource pool



- Massive Performance
- Unmatched linear scalability
- Extreme resilience
- LCM automation
- Block, File Services
- Heterogenous environments
- Rich APIs & Tools
- AiOps with CloudIQ

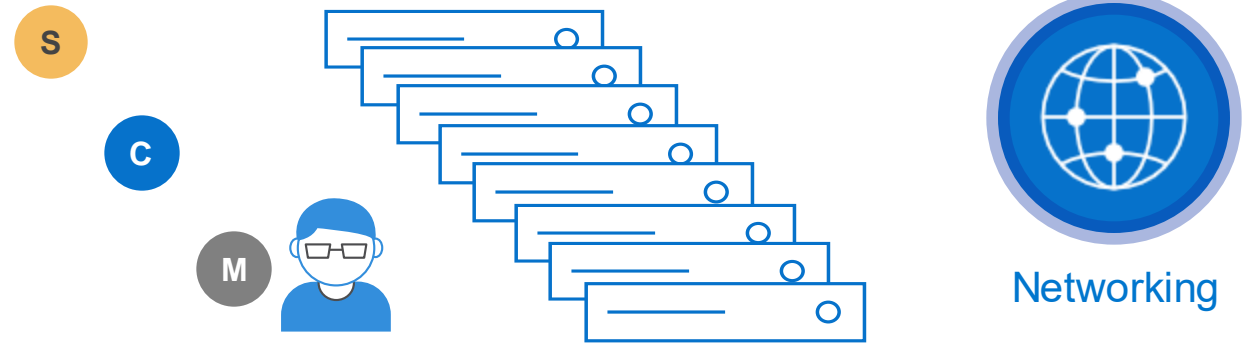
# Architecture de la plateforme



# PowerFlex software-defined infrastructure

## Software-first architecture

- Start with a bunch of x86 nodes (and networking)
- A few bits of software to make it work
  - A storage supplier
  - A storage consumer
  - And a manager to supervise



## SDS

### Storage Data Server

Installed on servers contributing local disks to the storage cluster

## SDC

### Storage Data Client

Installed on servers consuming storage

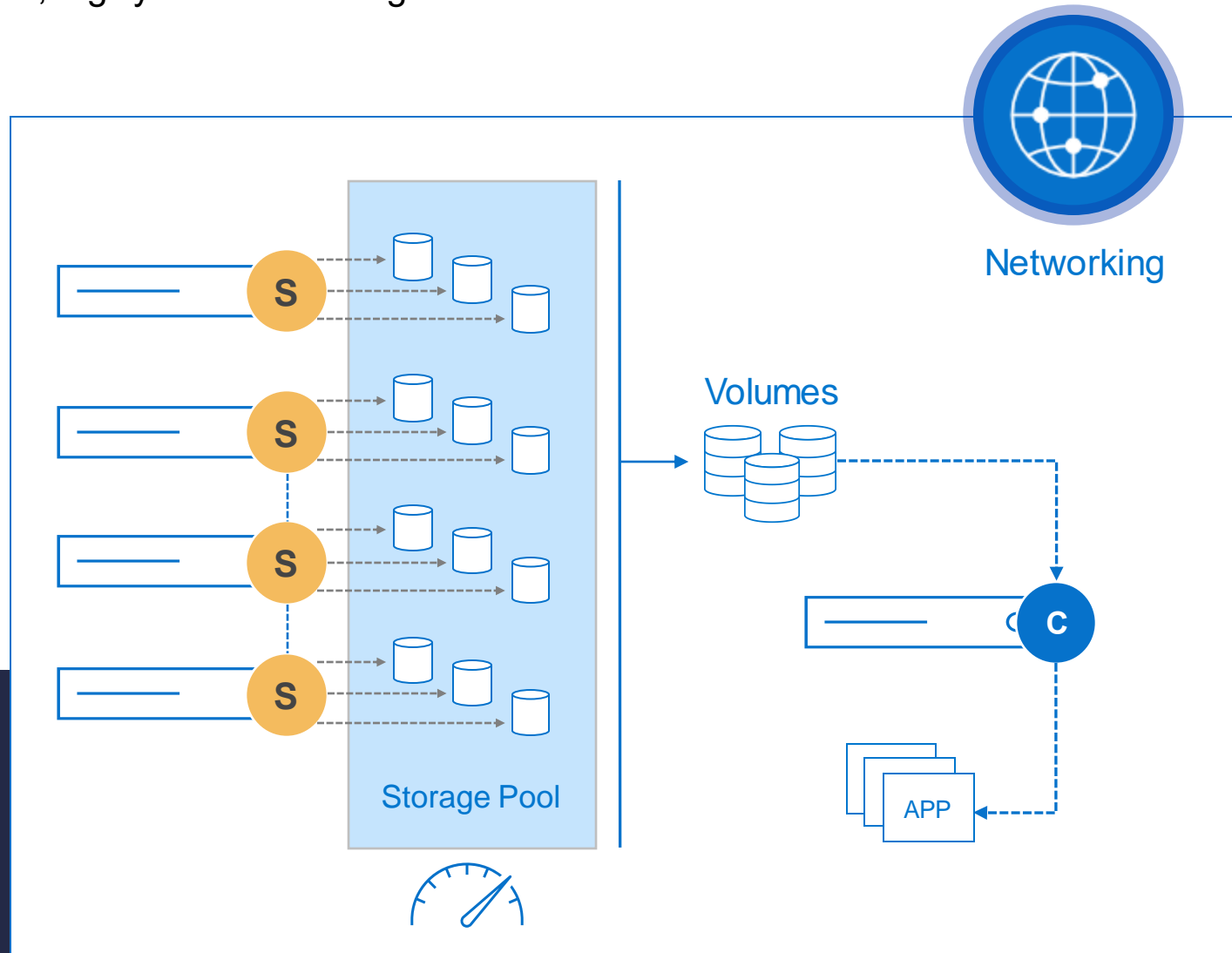
## MDM

### Metadata Manager

Oversees cluster configurations, monitoring, rebalances, and rebuilds

# PowerFlex software-defined infrastructure

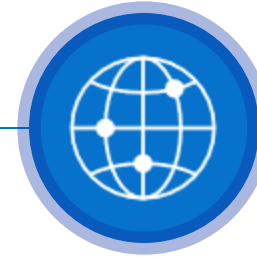
High-performance, scalable, highly resilient storage



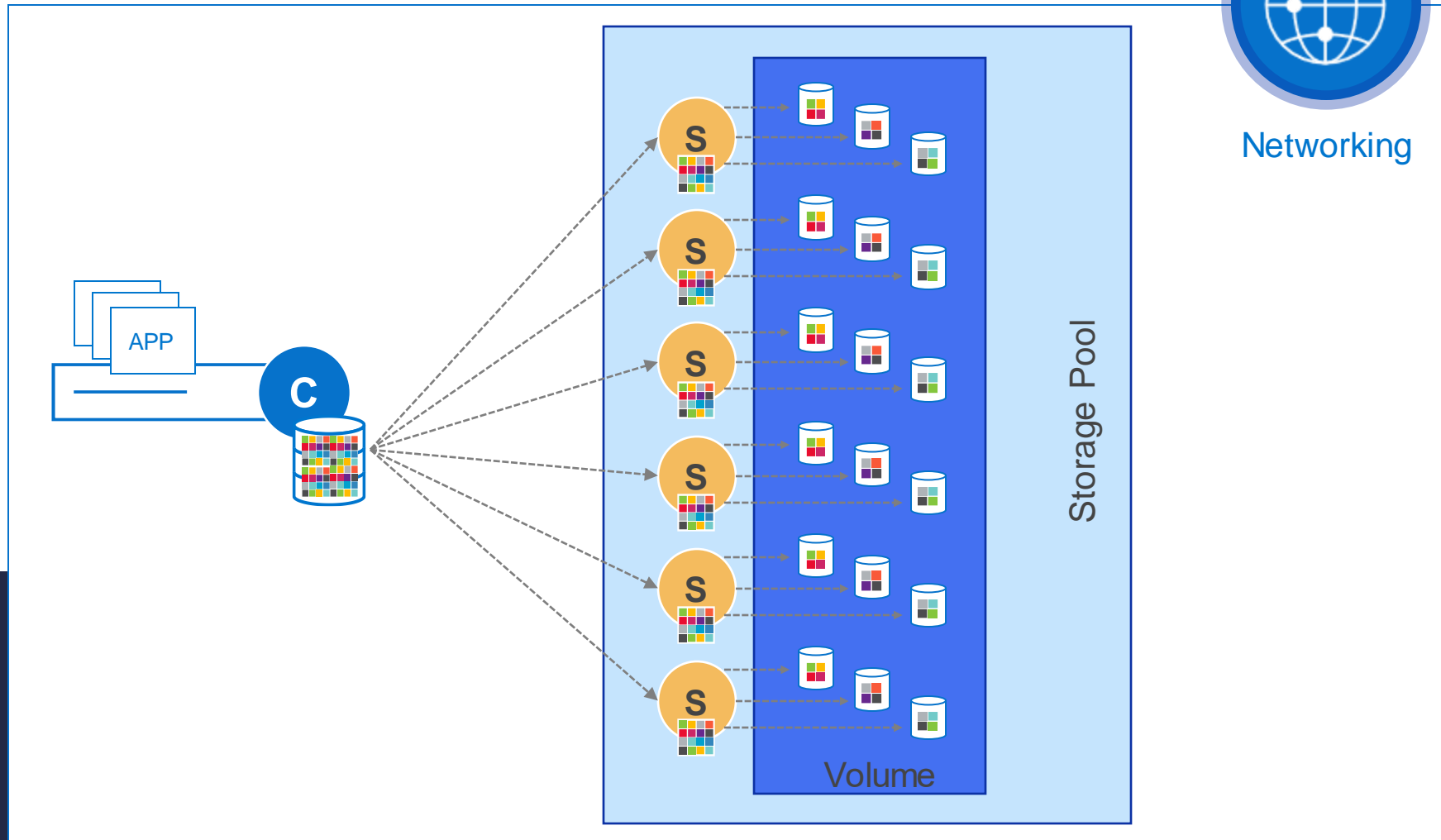


# PowerFlex software-defined infrastructure

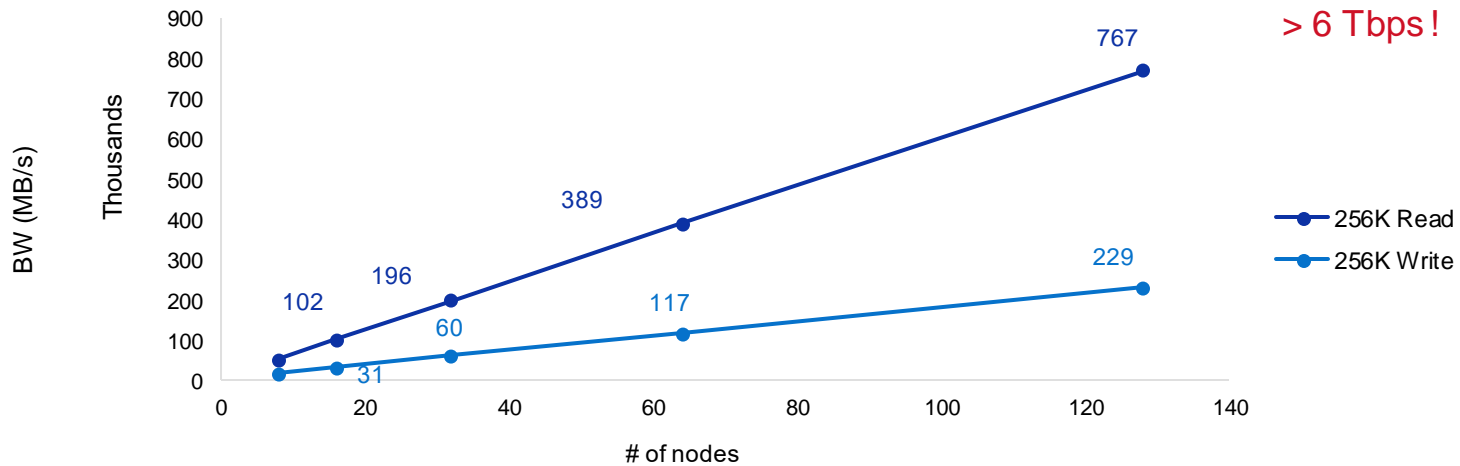
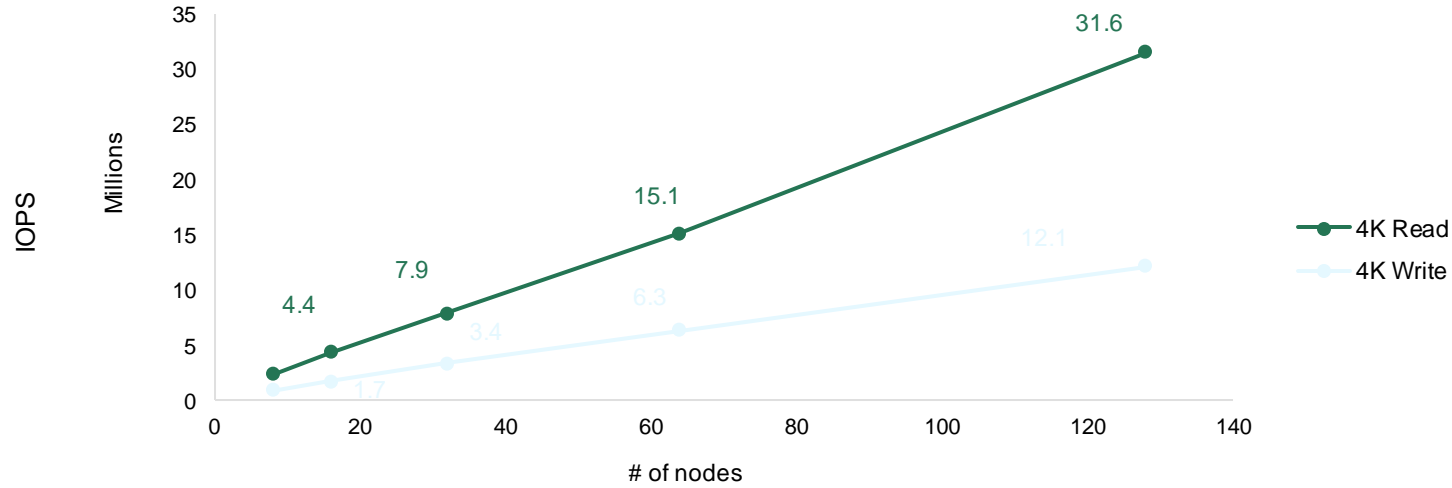
Distributed data layout – native multipathing and massively parallel performance



Networking



# PowerFlex performance



- Scale out by adding more nodes
- Scaling adds both capacity and performance
- Near-linear predictable improvement with scale



# Technology: Storage Schemes

# System Architecture: PowerFlex appliance

OOB-mgmt. uplink to core network

Uplinks to core network

Management switch(es)\*

Access - Aggregation switches\*

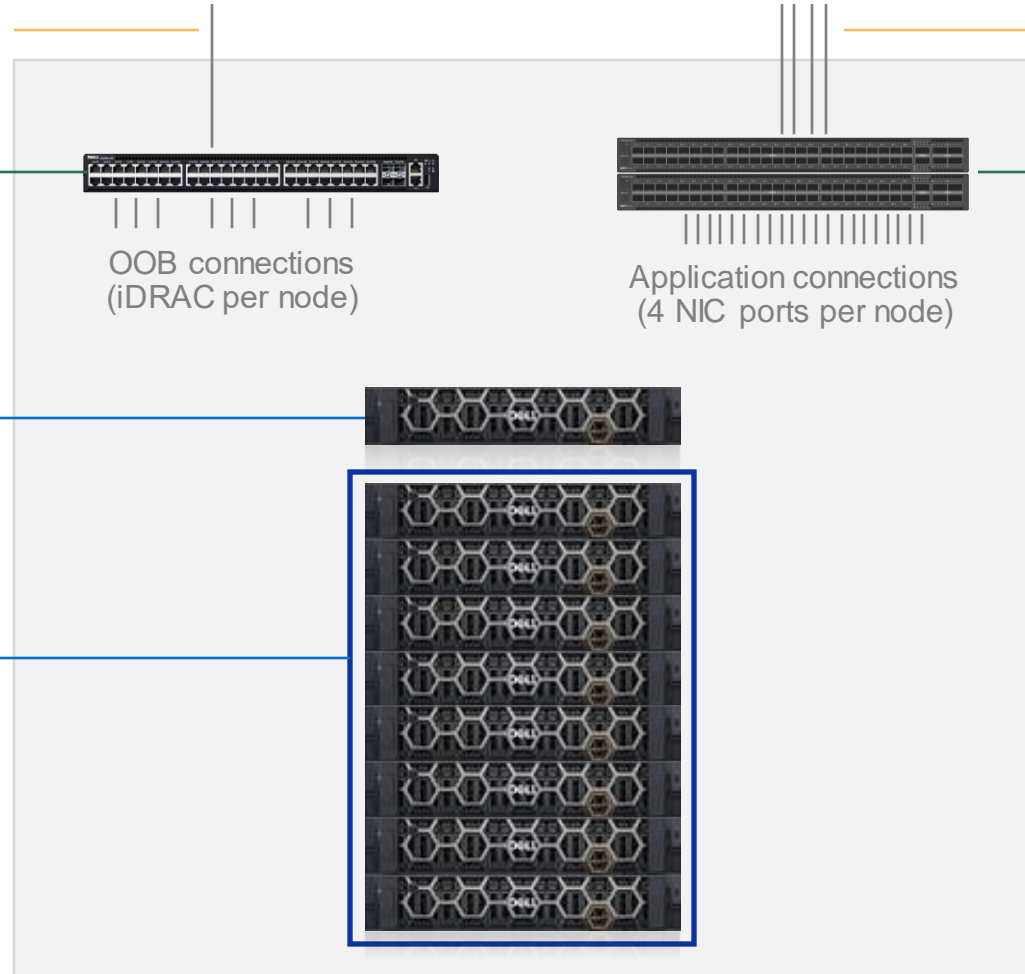
PowerFlex management node

- HA management cluster available
- Or use existing customer management infrastructure

PowerFlex nodes

- HCI, Compute, or Storage nodes
- Minimum configuration with 4 nodes per system

Add nodes and switches in a system to provide for growth to over 1,000 nodes



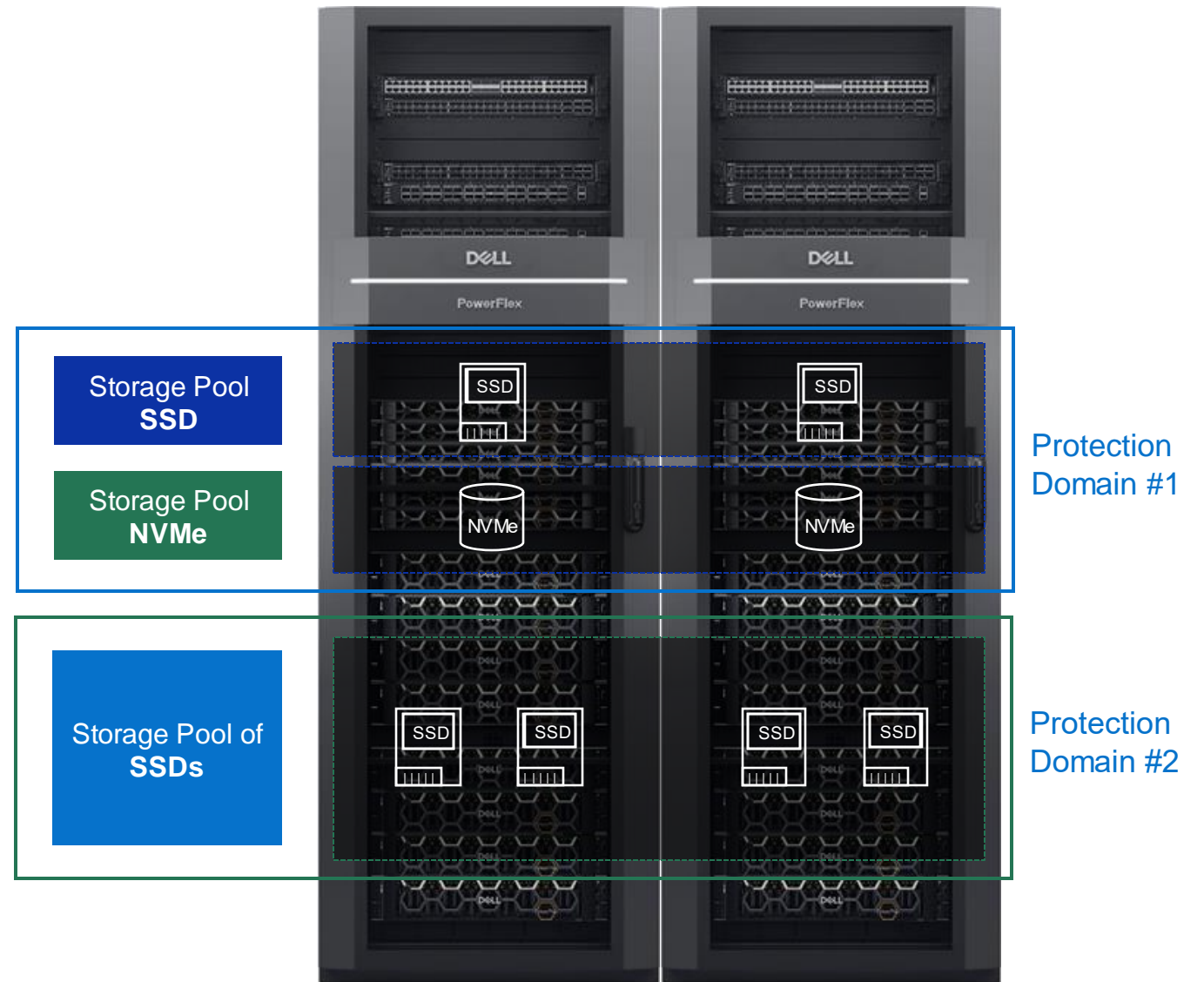
\* Select Dell and Cisco switches support automated deployment with PowerFlex Manager  
Select Dell switches support automated lifecycle management with PowerFlex Manager  
All other switch environments require customer self-management

# PowerFlex storage schemes

Three considerations when designing the PowerFlex storage layout:

- Protection Domains
- Storage Pools
- Fault Sets

These constructs provide the ability to group nodes in a variety of configurations that fit the demands of the infrastructure

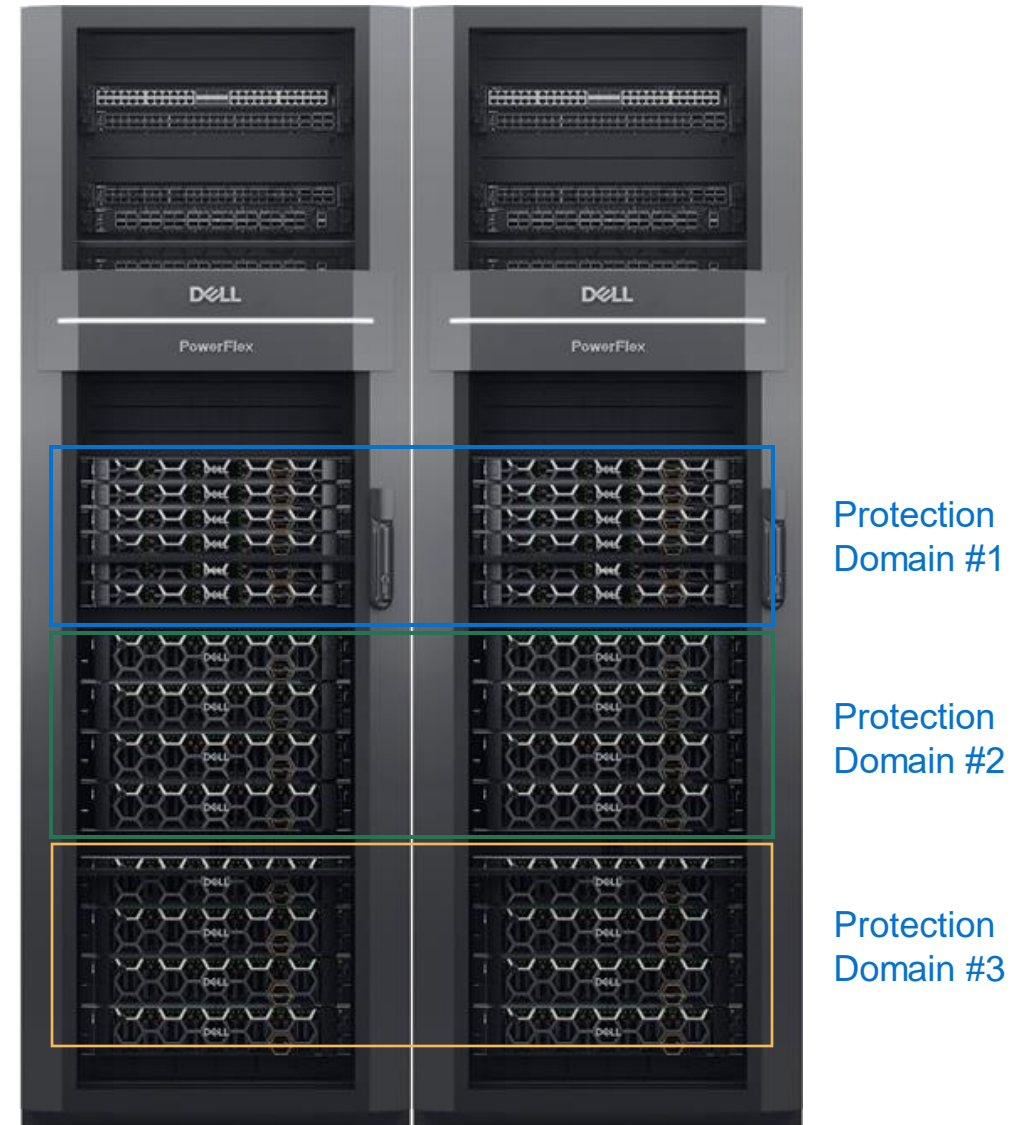


# Protection domains

A Protection Domain is a group of nodes or SDSs

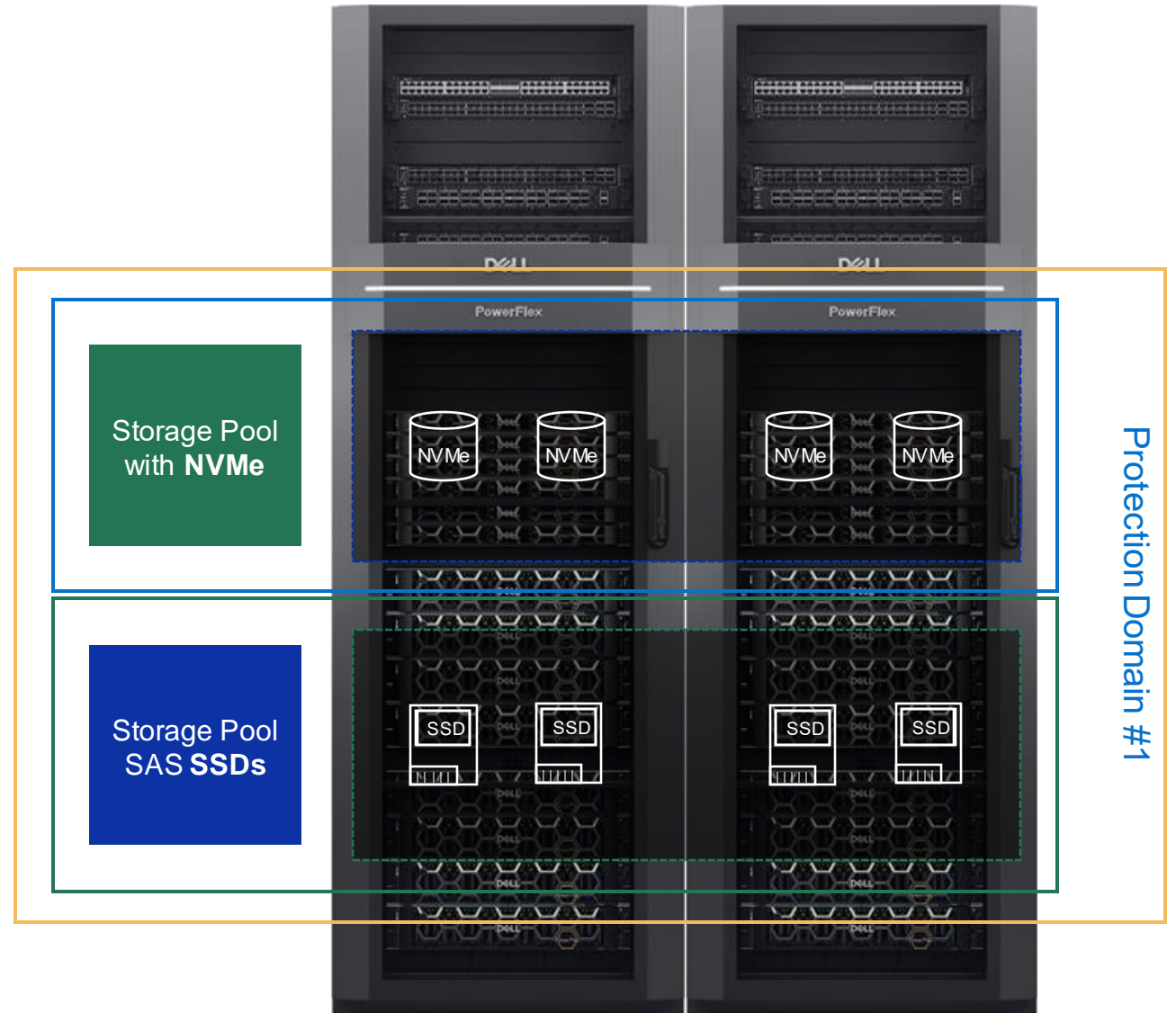
A node can only participate in one Protection Domain at a time. Benefits are:

- Data Isolation
  - Clear definition of which nodes are a part of the Protection Domain
  - No other node can impact the data within the Protection Domain
- Security
  - Protection Domains enforce data location to only exist on the defined node
- Performance
  - Nodes can be grouped by their respective performance profiles (different Protection Domains for different node types)



# Storage pools

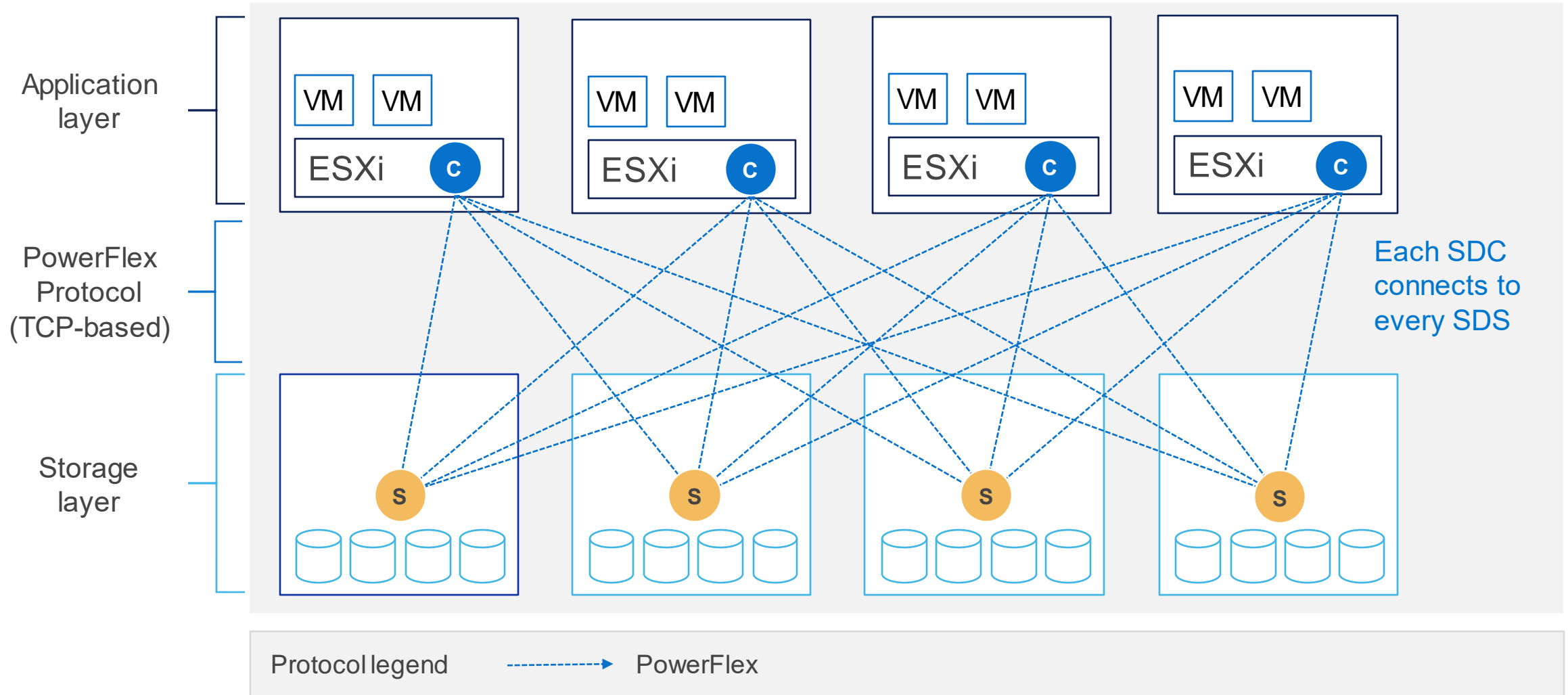
- Storage Pools are a subset of physical storage devices in a Protection Domain
- Each storage device belongs to one (and only one) Storage Pool
- The best practice is to have storage devices of similar character within a Storage Pool



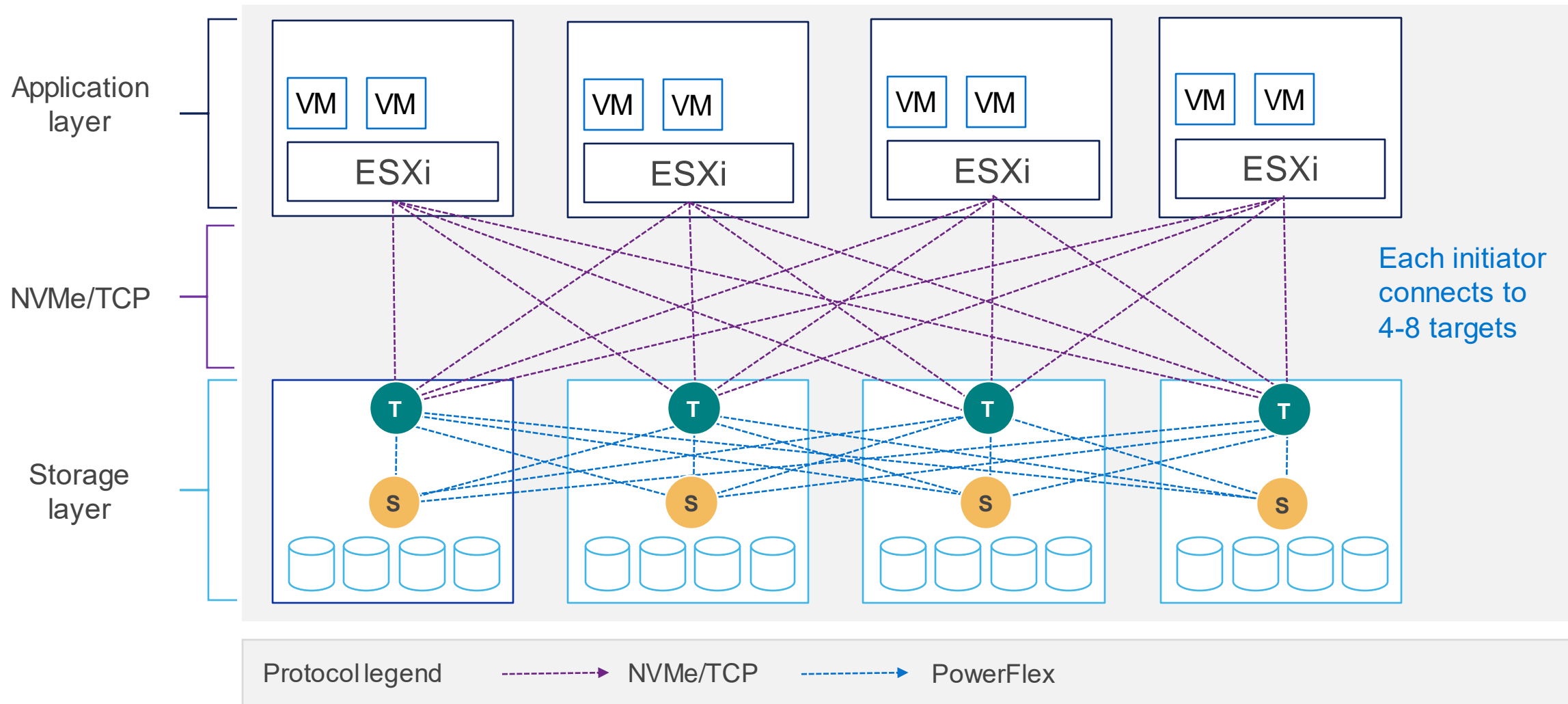
# — NVME over TCP/IP



# Current PowerFlex Host Connectivity



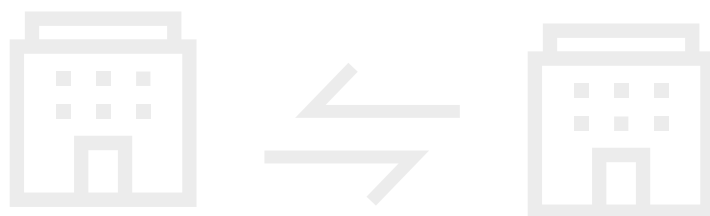
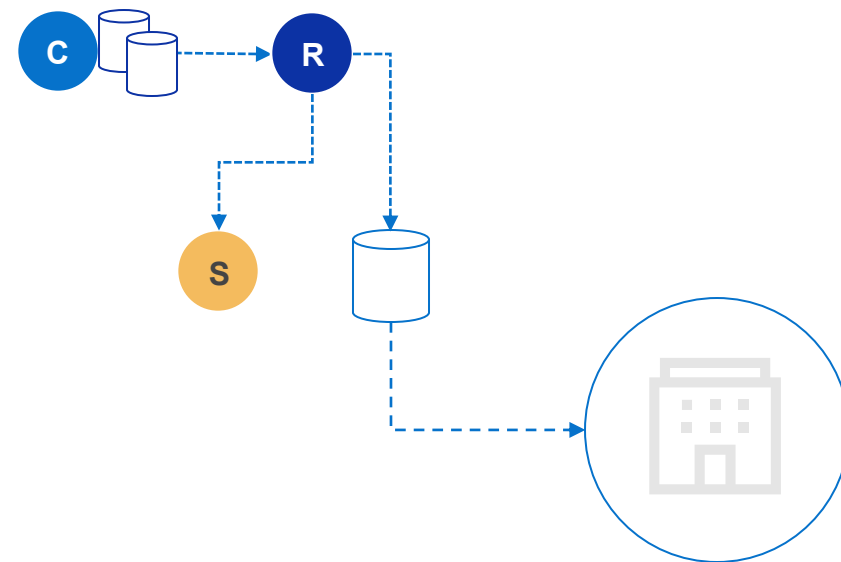
# Host Connectivity in 4.0 using NVMe/TCP



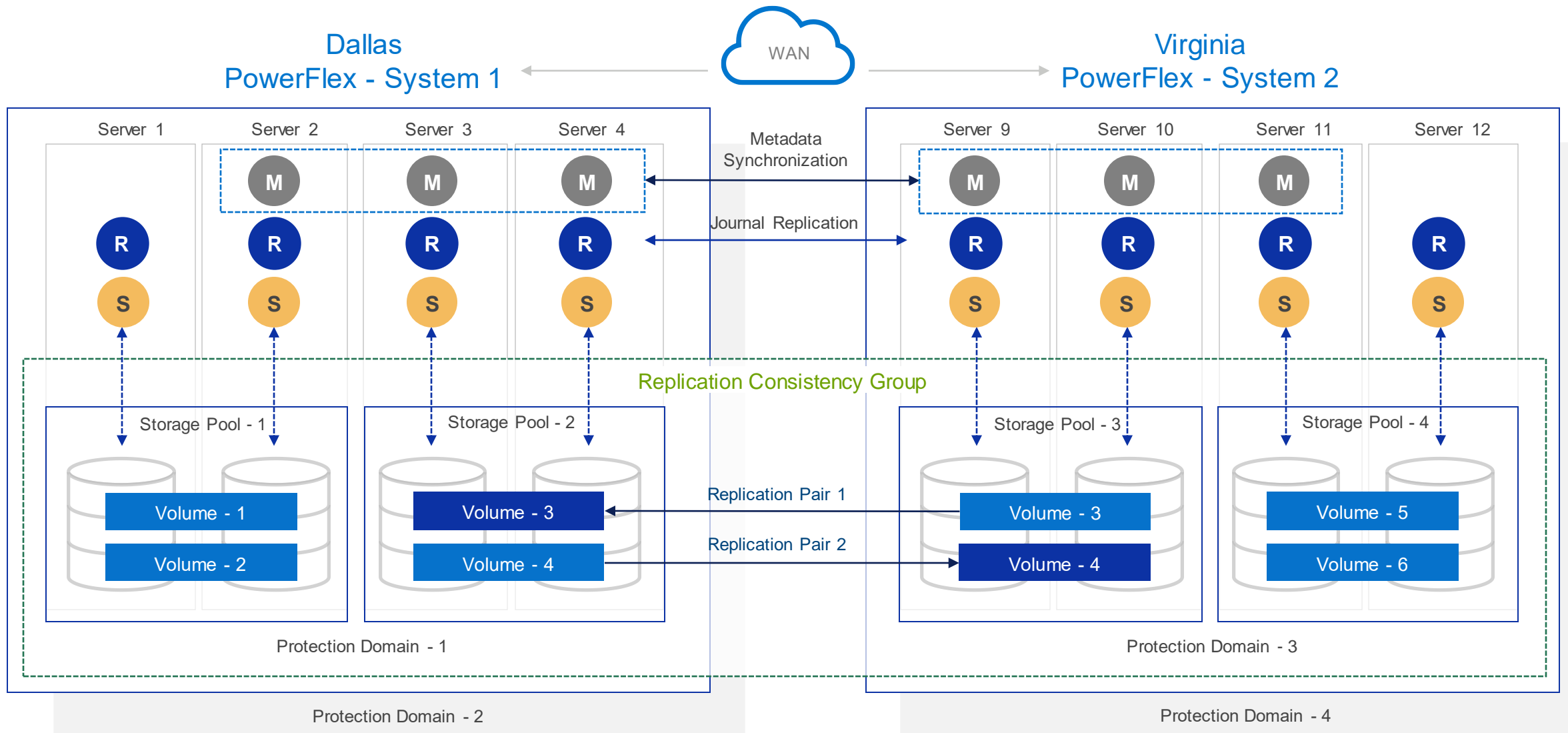
# — Native Replication

# Native Asynchronous Replication

- I/O for replicated volumes passes through SDR
  - Writes are split for local SDS commit & journal shipping to remote SDS
- Replication Consistency Group States
  - Active / Inactive states
  - Activate / Terminate operations
  - Allows the user to control the activation of an RCG
    - For example: New RCGs can be created inactive, use no additional resources, and be started/activated later
  - Improves the recovery process if journal capacity runs out



# PowerFlex Replication Topology





# PowerFlex cloud storage

Raising the bar for cloud storage

**DELL**Technologies

# PowerFlex on AWS – Flexibility and choice

## Choose your storage option:

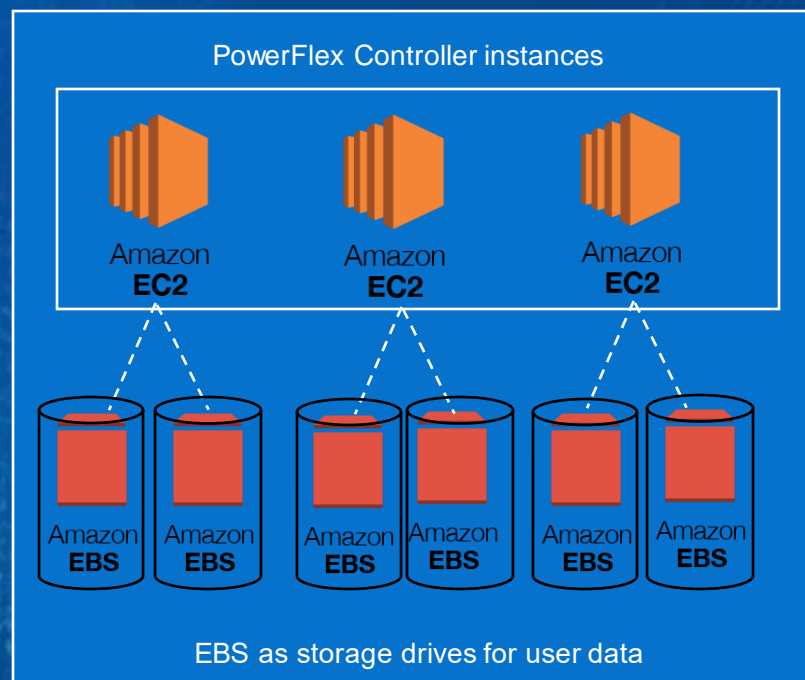
### 1) Elastic Block Storage

- Persistent storage
- Better for on/off users

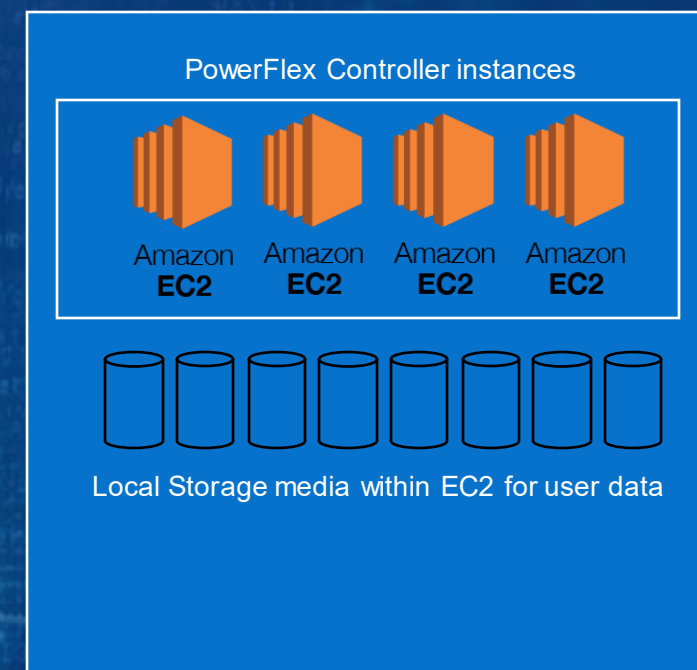
### 2) EC2 Instance store

- Ephemeral storage (non-persistent)
- Optimized for performance

### PowerFlex on AWS using EBS volumes to store user data

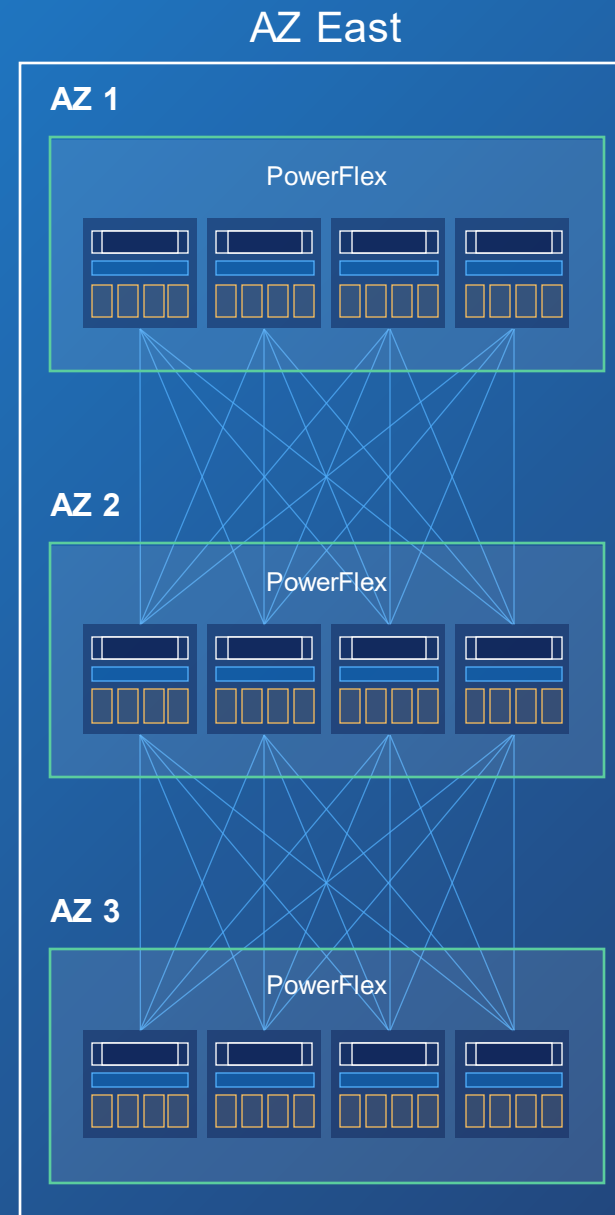


### PowerFlex on AWS EC2 instances store to store user data



# Unique multi-AZ durability

- Utilizes PowerFlex Fault Set architecture
- Aggregates capacity and performance across AZs
- Retains critical response time and IOPS performance properties
- Rapidly re-protects from instance or even an AZ failure with rapid rebuilds

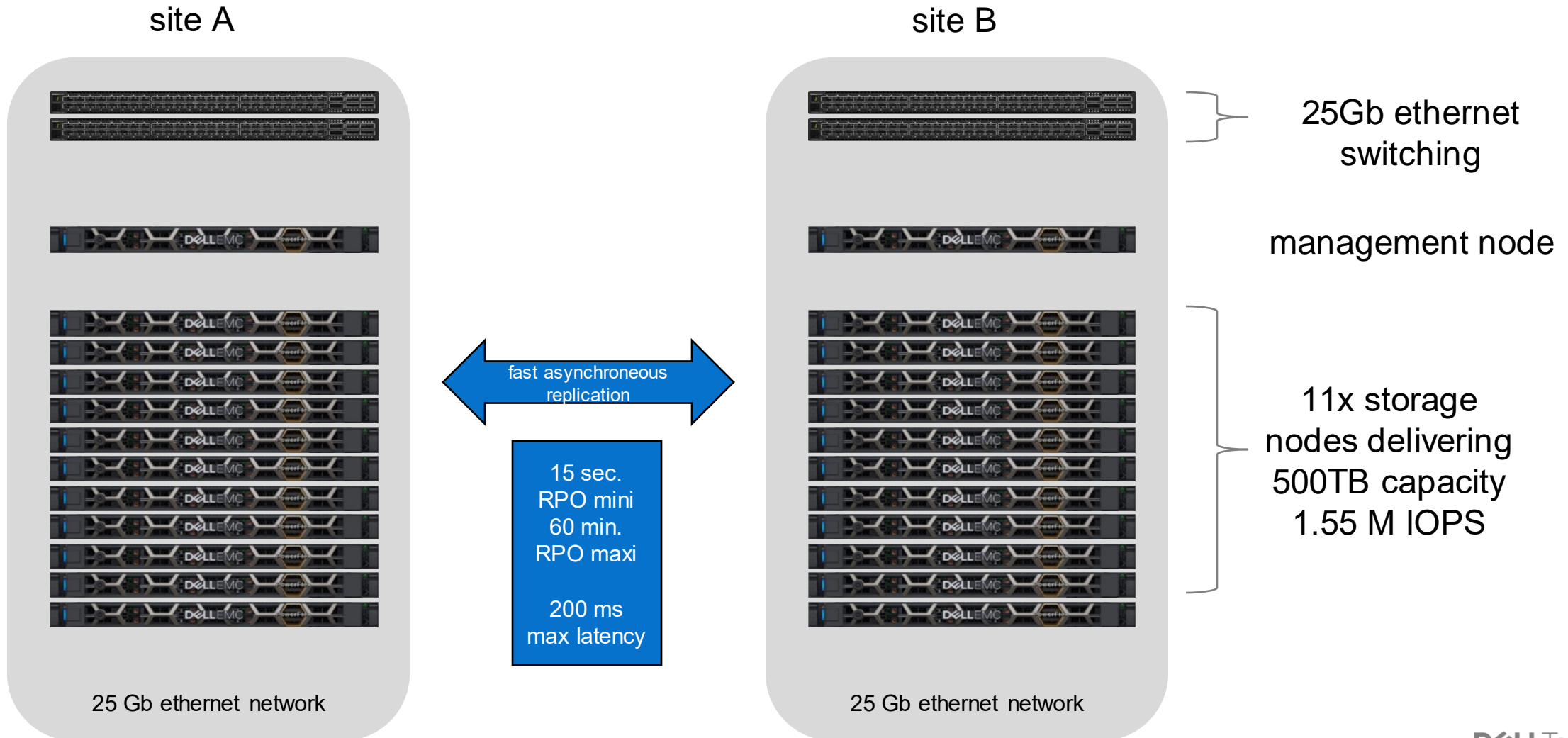




# Architecture Type



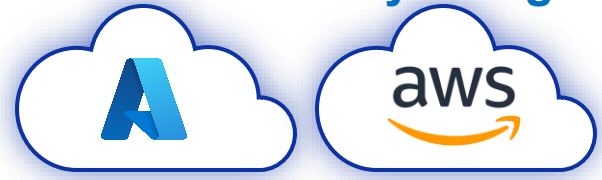
# Proposed Solution summary for 500 TB capacity



# — Synthèse

# PowerFlex | Universal Software Defined Infrastructure

## 5# Multicloud by Design



Apex Block Storage

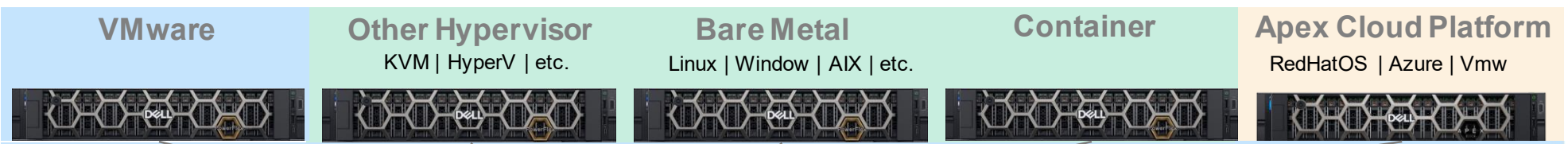
## 3 # Automation & LCM



- PowerFlex Manager LCM
- Customer Managed LCM
- Apex Cloud Platforms LCM

## 4# Horizontality

## 2 # Ecosystem Compute



Independent Scale !

## 1 # Storage



- ✓ High IO/Bandwidth
- ✓ Low Latency
- ✓ High Resilience (99.9999%)
- ✓ No data migration / forklifts

- Management**
- Customer Managed
  - Partner Managed
  - Dell Managed

## 6# Open Choices

- Capex or Opex**
- Apex FOD Subscription
  - DFS Leasing
  - TLA

Scale-Out





# Q&A

# PowerFlex

The Ultimate Software-defined Infrastructure

