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Wir unterstützen Sie kompetent und persönlich!



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Unlocking Your Data Potential

PowerScale Technical Overview and News

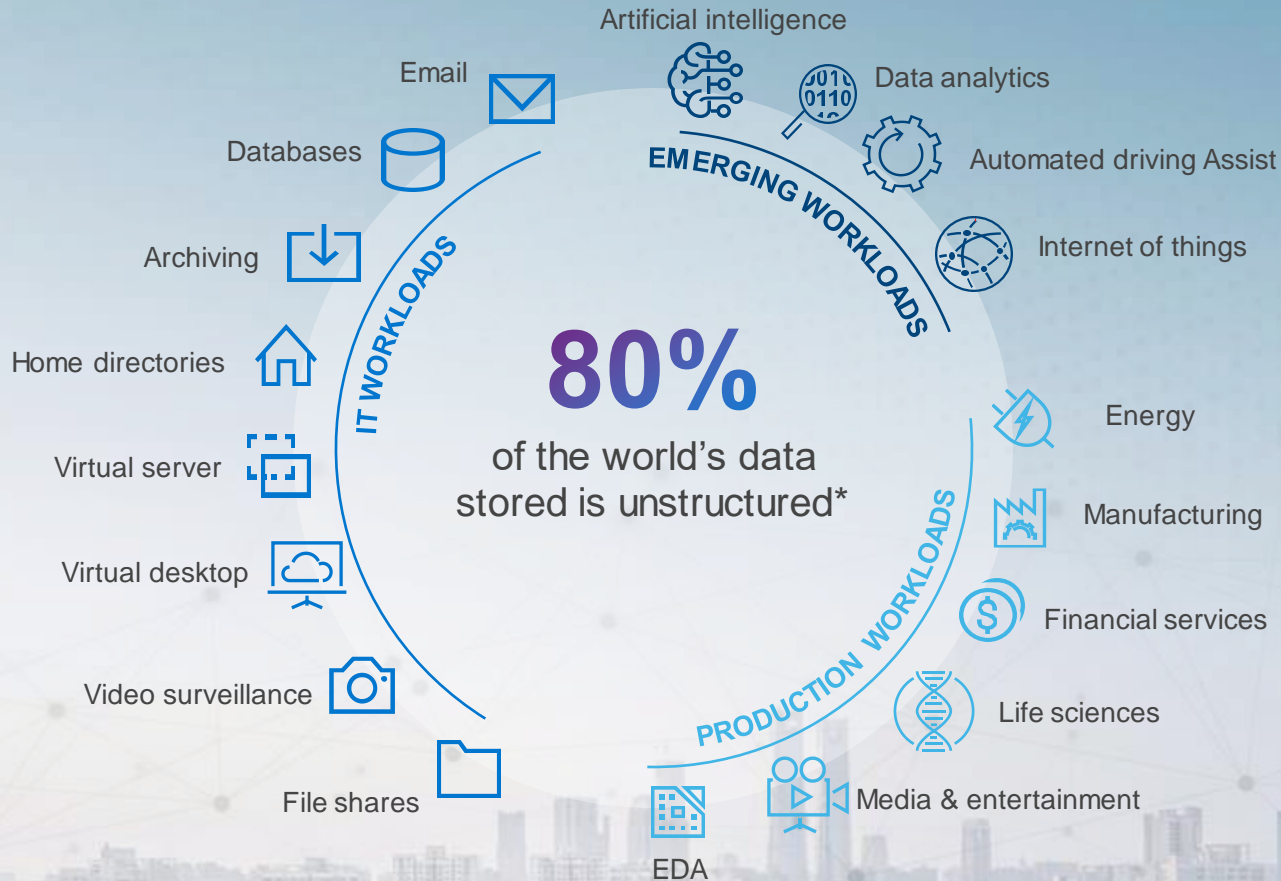
Christian Stein

Adv. Systems Engineer

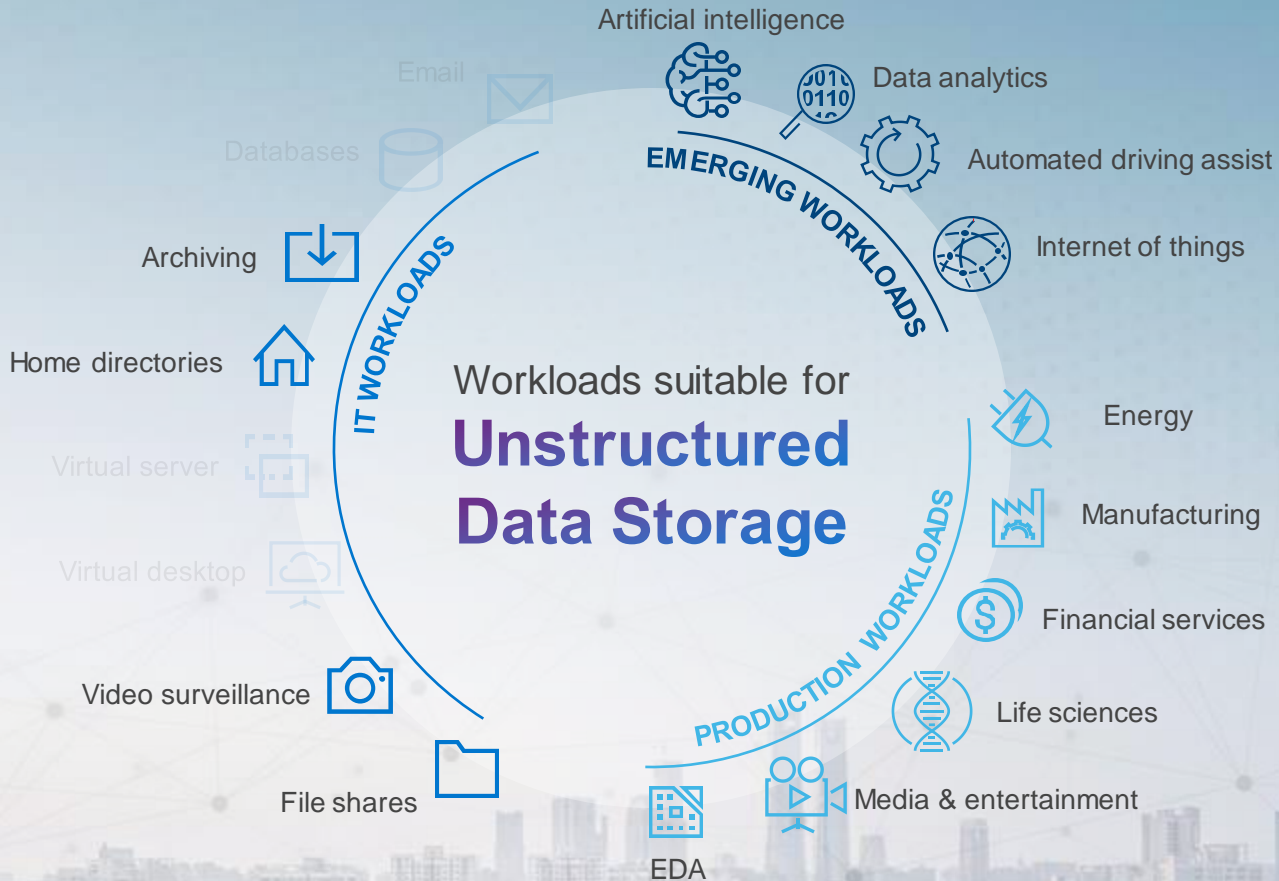
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DELLTechnologies

What is unstructured data?



What is unstructured data?



Unstructured data trends

RAPID GROWTH OF DATA

3X

growth of file and object data capacity from 2019 to 2023¹



SHIFT TO HYBRID MULTI-CLOUD

85%

of enterprises will adopt a hybrid multi-cloud environment by 2022²



MAKING SENSE OF THE DATA

643EB

of file and object data will have to be managed by 2023¹



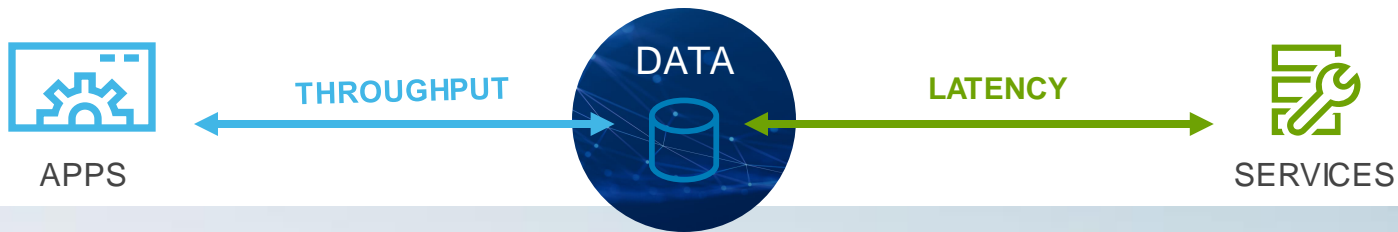
Organizations need **simple scalable** solutions to **flexibly store**, **manage**, and **get insights** into their growing unstructured data

¹IDC Market Forecast: Worldwide File and Object-Based Storage Forecast, 2019-2023, Dec 2019

²IDC Perspective: The Evolving Market for Enterprise Storage: Hybrid Cloud, NVMe and Software Defined are the Next Wave, Nov 2019

Data gravity

As data grows, it gains “gravity”



Data gravity

As data grows, it gains “gravity”

Harder to move | Requires more services and apps | Architecture elements matter more



World's #1 enterprise scale-out file solution*

#1 Scale Out file system

17K+

customers

23EBs

raw capacity shipped

1EB+

(raw) deployed by a single customer

252

nodes deployed in a single cluster

60%

Fortune 500 customers

1,500

new customers in 2019

#1

WW IDC Markshare



Figure 1: Magic Quadrant for Distributed File Systems and Object Storage

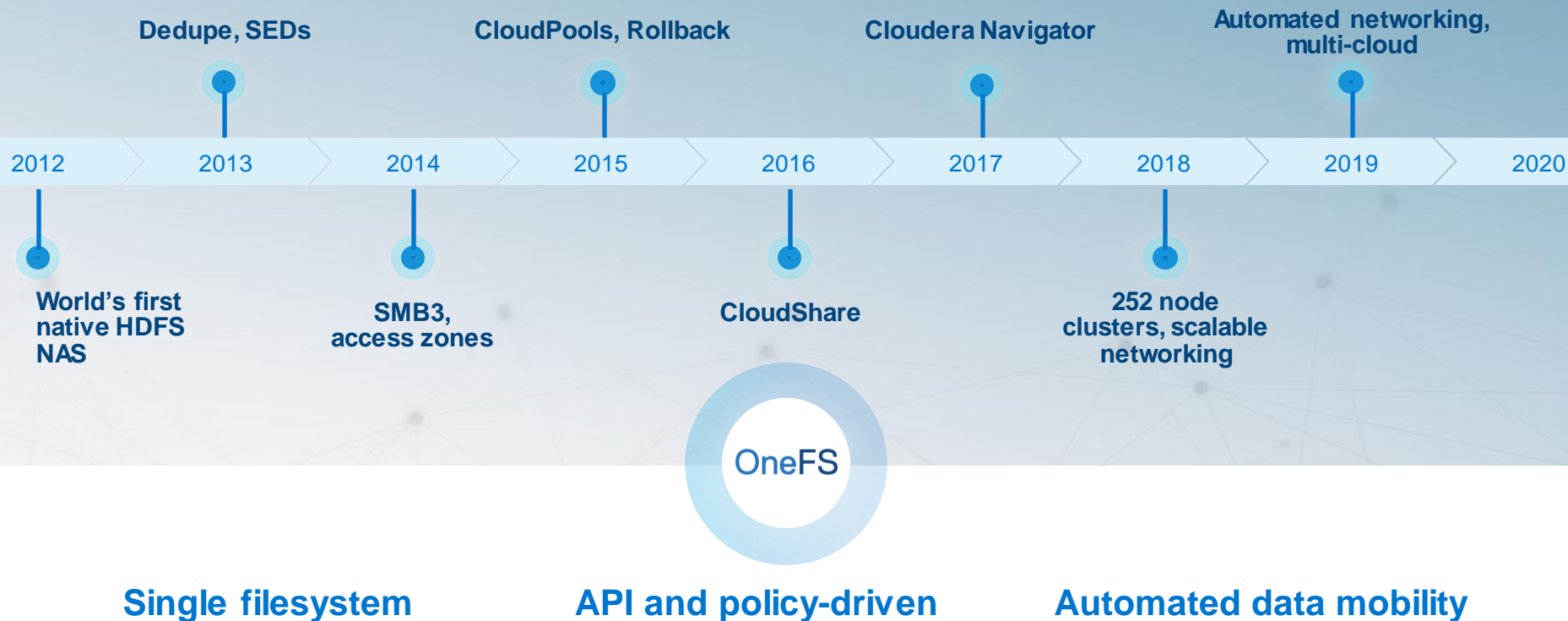


Dell Technologies recognized by **Gartner** as a **leader** in distributed file and object storage for **4th consecutive year**

* Shipped Q1 FY18 – FY21

The evolution of OneFS software

Building on a proven history of innovation



Introducing PowerScale

Unlocking the power of OneFS
to unlock the potential of your data



Simplicity at ANY scale

From 7TB to petabyte scale.
Increased automation and
efficiency enhancements.



Any data anywhere

PowerEdge based NVMe
and All flash nodes.
S3 access.
Native Google Cloud option.



Intelligent insights

CloudIQ for datacenter intelligence.
DataIQ for data insights.
No additional cost.

The strength of the #1 scale-out NAS filesystem with the world's #1 server vendor

Many ways to deploy ...

One powerful experience



1

PowerScale



2

Isilon



3

Cloud



The new PowerScale family

ALL-FLASH



Isilon F800 | F810



PowerScale F600
PowerEdge based All-NVMe



PowerScale F200
PowerEdge based All-Flash

HYBRID



H400 | H500 | H5600 | H600

ARCHIVE



Isilon
A200 | A2000

CLOUD



MULTI-CLOUD

Azure, AWS, Google

NATIVE CLOUD

PowerScale OneFS for Google Cloud

PowerScale OneFS

PowerScale can join existing Isilon nodes in the same OneFS 9.0 cluster

Introducing...

PowerScale F900

Power demanding data workloads with our latest, most powerful All-NVMe scale-out file storage



More Power & Scale

- Blazing fast All-NVMe
- Accelerate GPU applications
- Scales up to 93 PB



More Flexibility & Choice

- Compatibility with existing Isilon clusters
- Supports on-premise and public cloud
- Consume as appliance or as a service



World-class Ecosystem

- Supports modern, high performance data lakes
- Over 250 ISV partner integrations & certifications across AI, HPC, analytics, data management

Always simple, flexible and reliable – at any scale

New high-end All-NVMe node



Power & speed

- 30% faster sequential reads¹
- Supports NVIDIA GPUDirect
- Multi-CPU server platform optimized with high density

All NVMe performance

- Ideal for high performance data access
- Next-gen workloads requiring high single stream throughput can leverage NVMe flash

Seamless connectivity

- Interoperability with existing Isilon clusters
- Optional Infiniband HBA for connecting to legacy Isilon clusters with Infiniband back-end network



F900



All-NVMe | 100Gb connect | 24 drives per node
Starts at 46 TB | 369 TB | Up to 6 GB/s per node

1) Based on internal streaming performance testing performed by Dell EMC for F900 and F800 nodes. Performance varies by cluster and is dependent on workloads. Feb 2021. Actual results will vary.

Q2/FY22

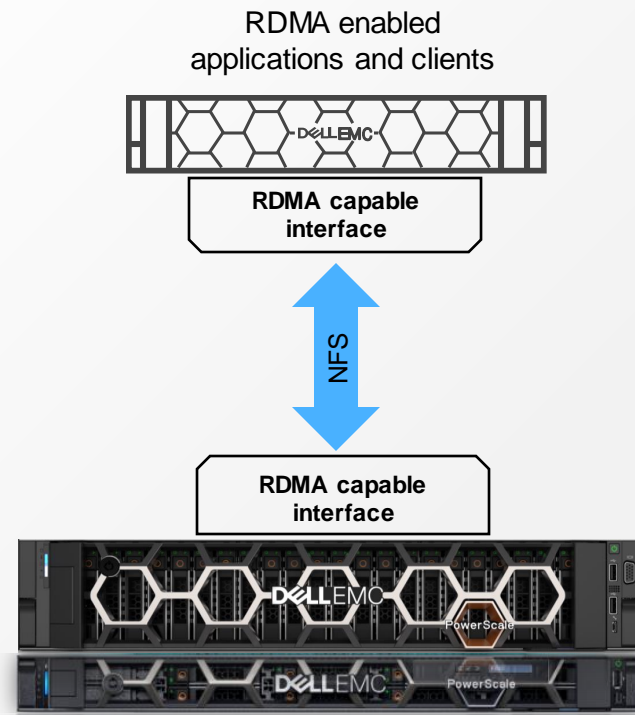
Accelerate GPU applications

Key Features

- Remote direct memory access (RDMA) support for applications and clients with NFS over RDMA
- Supported on all PowerScale nodes and Isilon nodes with 40GbE interfaces
- Cluster-wide on/off capability

Benefits

- Significantly higher throughput performance, especially single connection and read intensive workloads
- Achieve high bandwidth, low latency communication for GPU accelerated applications
- Improved cluster and client CPU utilization

Q2
CY21

Powered up F200 & F600

Higher performance

- OneFS 9.2 speeds up F600 by up to 70% for sequential reads²
- OneFS 9.2 speeds up F200 by up to 25% for sequential reads²

Greater Flexibility

- New drive options: 7.7TB on F200, 15.4TB on F600
- Infiniband (IB) back-end option for PowerEdge based platforms
- Ability to add to legacy Isilon clusters

More security

- Get data-at-rest encryption through self-encrypting drives (SED) on F200³

Q2
CY21



F600



All-NVMe | 100Gb connect | 8 drives per node
Starts at 46 TB | 92 TB | 184 TB raw
New 368TB raw option for 3 node cluster



F200



All-flash | 25Gb connect | 4 drives per node
Starts at 11 TB | 23 TB | 46 TB raw
New 92TB raw option for 3 node cluster

2) Based on internal performance testing performed by Dell EMC for All-flash nodes with OneFS9.2 and OneFS9.1 on Spec '14 and NFS IOzone benchmarks.

3) All drive sizes on F200 will have SED options by June 2021

Q2/FY22

OneFS 9.2 powers up the entire PowerScale portfolio

PowerScale F900



Up to **6 GB/s** per node | **46TB** to **369TB** per node

PowerScale F600



Up to **5 GB/s** per node | **15TB** to **123TB** per node

PowerScale F200



Up to **3 GB / sec** per node | **4TB** to **31TB** per node



Performance

- New **F900** all-NVMe with **30% faster** sequential reads than F800
- OneFS 9.2 speeds up **F600** by up to **70%** for sequential reads
- OneFS 9.2 speeds up **F200** by up to **25%** for sequential reads

PowerScale F200 Starter Kit

PowerScale F200



ALL-FLASH | 25GbE |
 PER NODE: | 3.84 TB | 7.68 TB | 15.36 TB
 Entry all-flash solution

F200 BENEFITS

Lowest entry price

Lowest \$ / throughput

Perfect for edge, remote or entry

	F200 (0.9TB drives)	F200 (1.9TB drives)
Node Capacity	3.84 TB raw	7.68 TB raw
Cluster Capacity (3 nodes)	15.2 TBe (11 TBr)	30.4 TBe (23 TBr)

PowerScale F200 Starter Kits are now available !

To help customers struggling with unstructured data, two aggressively priced PowerScale F200 Starter Kit offers – a 15TBe cluster and a 30TBe cluster – are now available for a limited time

- **15.2 TBe (11 TBr) cluster config:** three F200 nodes using 0.9 TB drives, two Dell S4112 Ethernet switches, OneFS, Enterprise Advanced Bundle (SmartConnect, SnapshotIQ, SyncIQ, SmartQuotas, and SmartPools software), three years ProSupport MC
- **30.4 TBe (23 TBr) cluster config:** three F200 nodes using 1.9 TB drives, two Dell S4112 Ethernet switches, OneFS, Enterprise Advanced Bundle (SmartConnect, SnapshotIQ, SyncIQ, SmartQuotas, and SmartPools software), three years ProSupport MC

How to sell: PowerScale F200 Starter Kit

1 Offer



- ↑ **8X Performance**
- ↓ **2X Operational Costs**
- > **3X Data Reduction**

2 Listen for

Current file storage solution not meeting needs	Silos of storage over many locations	All flash entry
No file storage strategy	Remote file need	Store, stream, imaging, video, thermal
No Isilon today	Edge-Core strategy	Files, unstructured data analytics
	Start small need	

↓ ↓ ↓

4 Incentives

- Gen 4 tech refresh incentives
- Migration services incentives
- Trade in or competitive swap incentives

Simplicity at Any Scale

Any Data, Anywhere

Intelligent Insights

3 What to say

#1 OneFS in #1 PowerEdge	Enterprise scale out solution for entry or remote need	#1 IDC worldwide market share
Enterprise-class storage and data services	Edge/Core/Cloud without compromise	Manage PBs with 1 FTE
Massive efficiency and scalability	TB to PB scale	No more data migrations!
		Single file system

S3 support



MULTI-PROTOCOL ACCESS

File and object apps share same dataset



RICH DATA SERVICES¹

Inline efficiency, async replication, and more



ALL FLASH PERFORMANCE

Ideal for high performance object access

READ PERFORMANCE²

F600: Up to 7K TPS per node

F810: Up to 13K TPS per node

CREATE PERFORMANCE²

F600: Up to 12K TPS per node

F800: Up to 18K TPS per node

SHARE DATA BETWEEN TRADITIONAL AND CLOUD NATIVE APPLICATIONS

¹ Accessing data that is tiered to secondary cloud / object with CloudPools is not possible ² Performance numbers are for 10KB object size

Simplicity at scale



Balance at scale

No hot spots with auto balance, auto connect and auto provision



Elasticity at scale

From 11.5TB to PBs of capacity under one filesystem



Efficiency at scale

Inline data reduction and up to 89% storage utilization



Availability at scale

Sustain failures of up to 4 nodes or 4 drives in a single node pool



Unified at scale

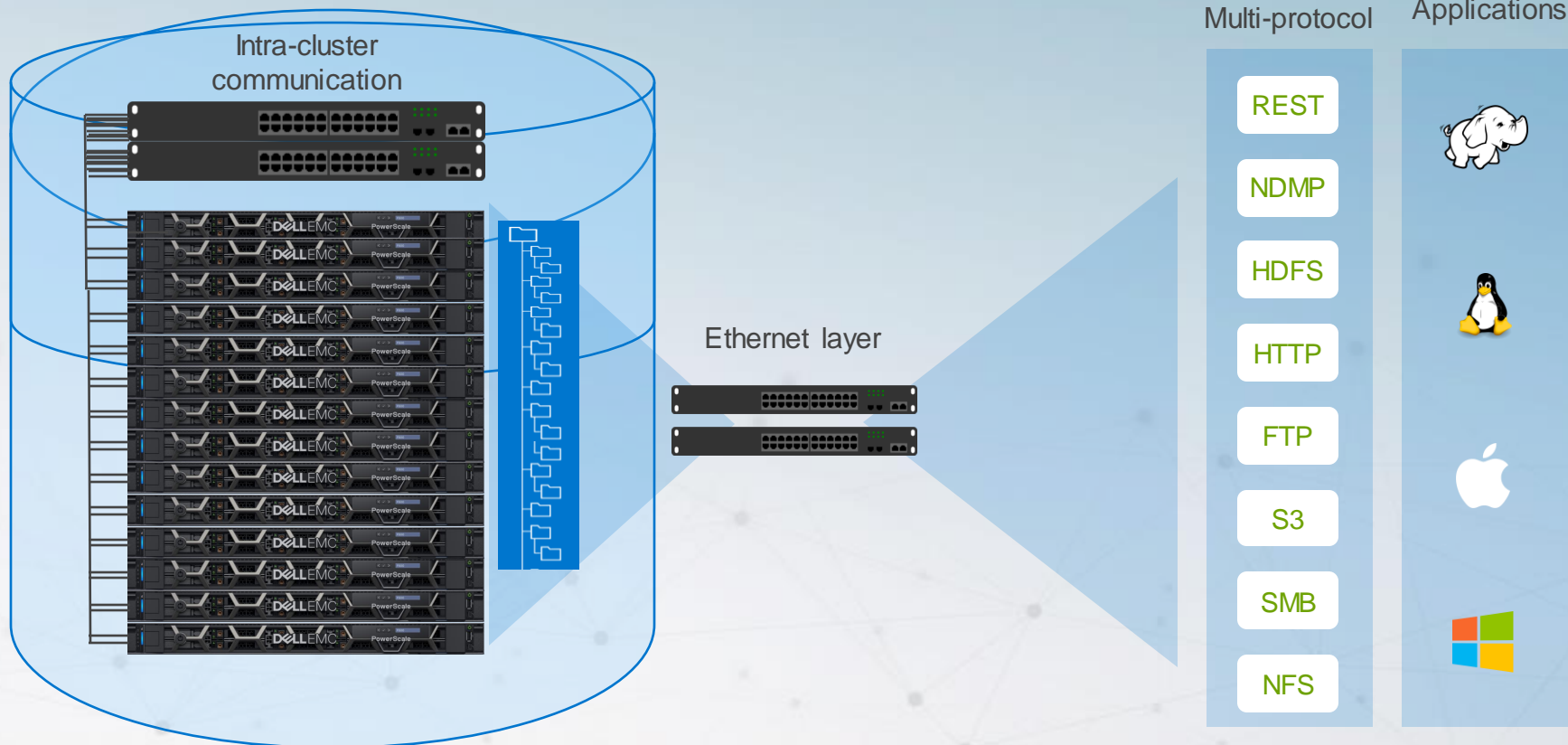
File, object and big data protocol access to the same data set



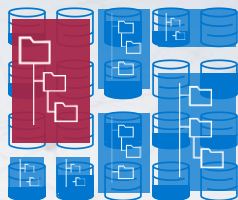
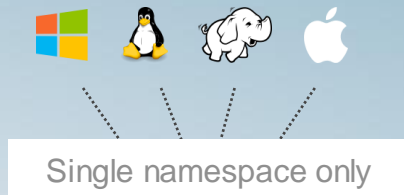
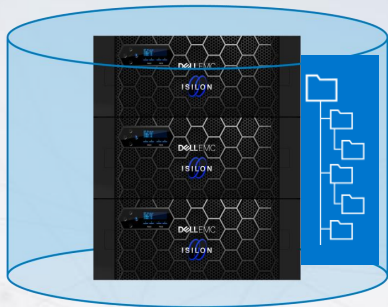
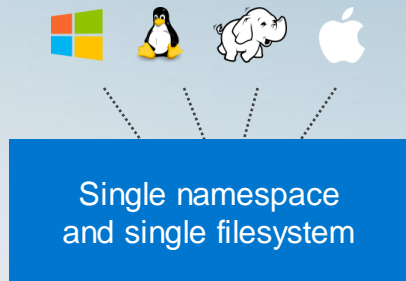
Refresh at scale

Non-disruptively scale and refresh across product generations

PowerScale scale-out architecture



Single namespace across a single filesystem



No volumes to manage

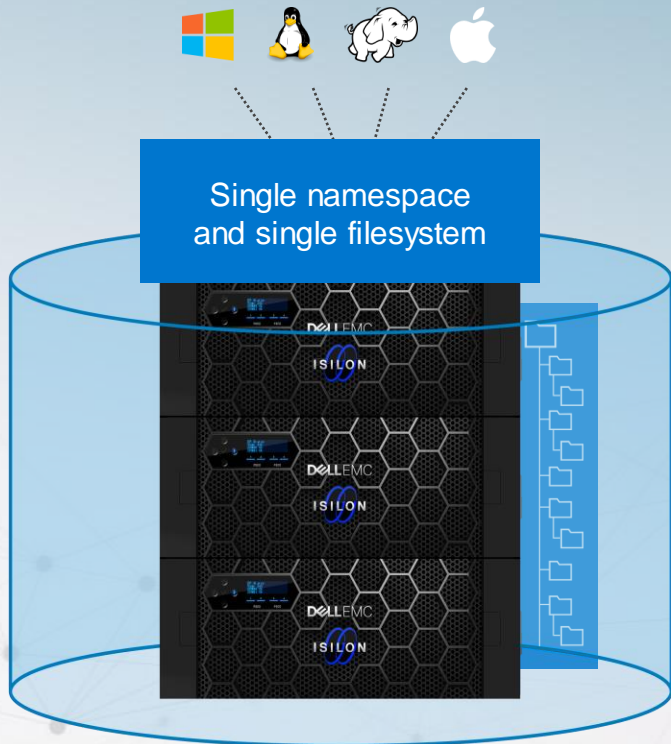
All nodes managed as one

Files automatically spread evenly

Single namespace across all nodes

100PB+ on a single share or export

Single namespace across a single filesystem



No volumes to manage

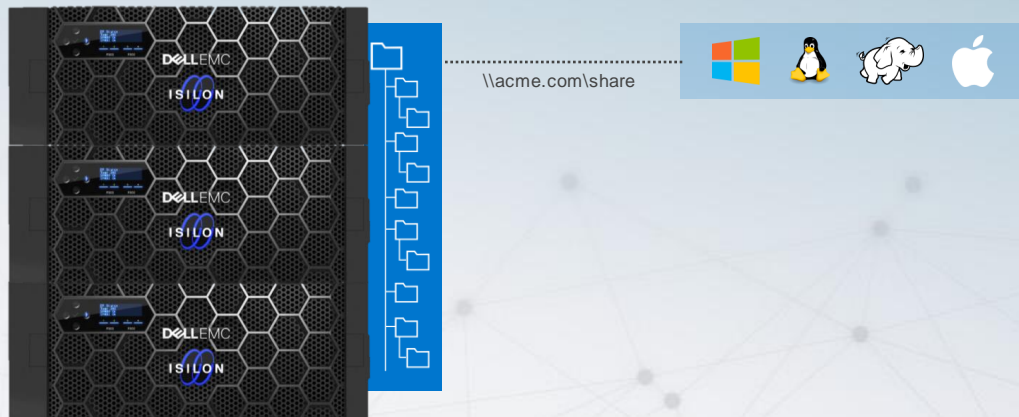
All nodes managed as one

Files automatically spread evenly

Single namespace across all nodes

100PB+ on a single share or export

Single namespace across a single filesystem



No volumes to manage

All nodes managed as one

Files are spread evenly across all nodes in cluster

Single hostname/namespace up to 256 nodes

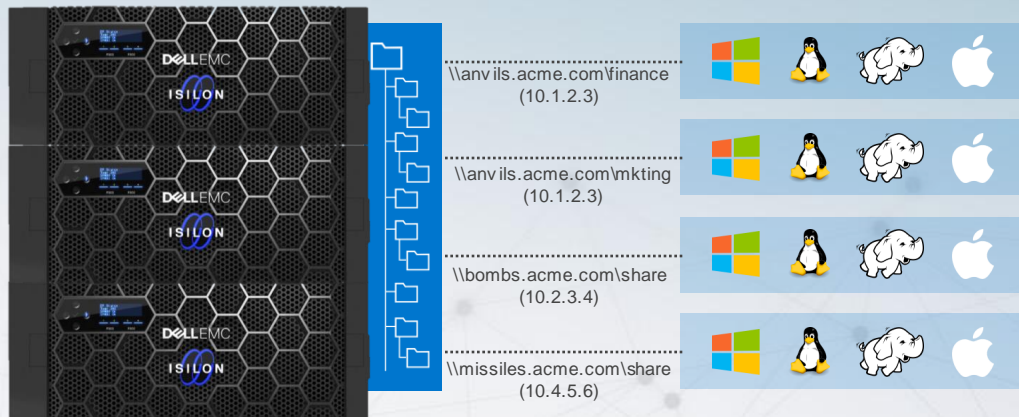
Start simple

50PB+ on a single share/export

Grow complexity only as organization requires

Support multiple departments, networks, authentication providers, security policies, from one system

Single namespace across a single filesystem



No volumes to manage

All nodes managed as one

Files are spread evenly across all nodes in cluster

Single hostname/namespace up to 256 nodes

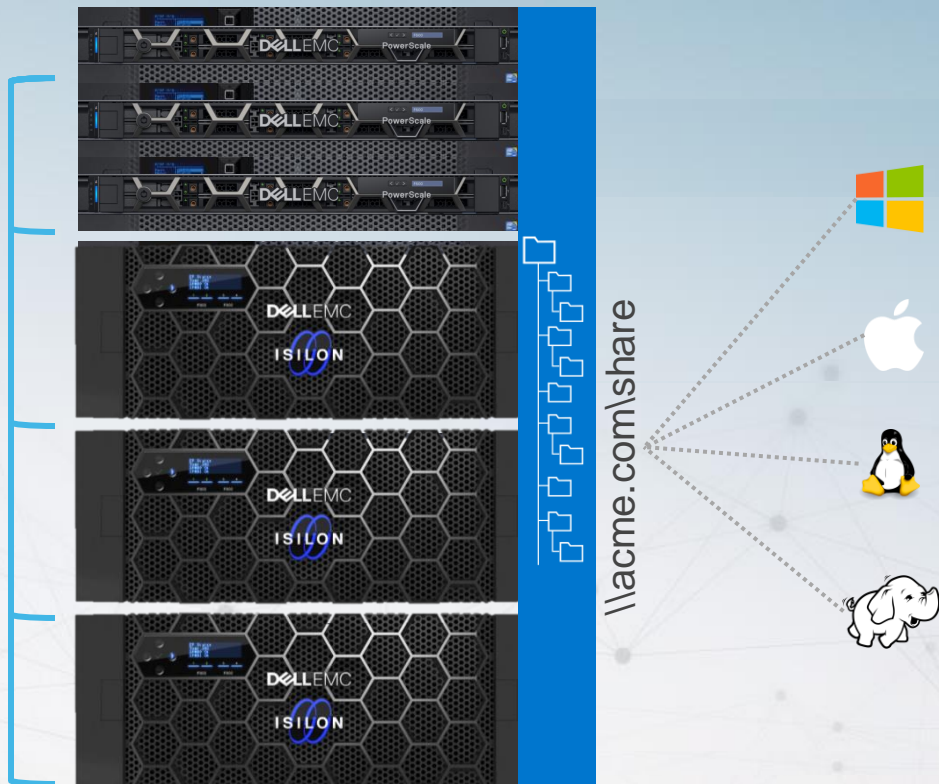
Start simple

50PB+ on a single share/export

Grow complexity only as organization requires

Support multiple departments, networks, authentication providers, security policies, from one system

Configuration persistence across generations



Cluster configuration lives independent of hardware configuration

Capacity expands automatically

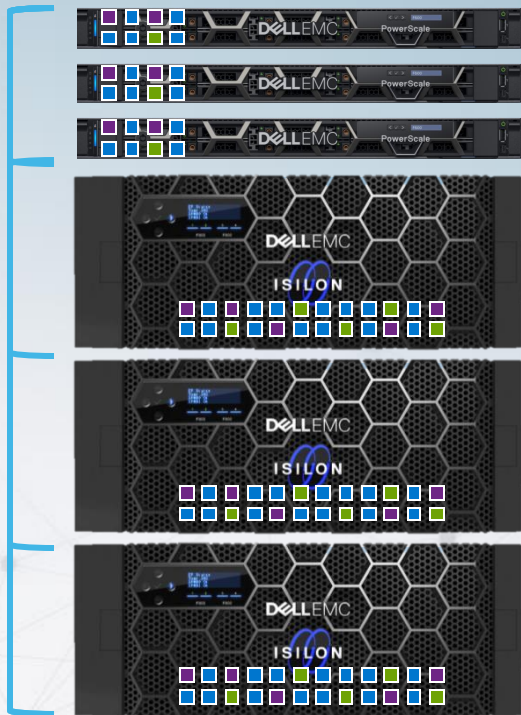
Shares and exports are unchanged when hardware is added or removed

No application changes required as hardware changes

Data can be spread across old and new nodes

Eliminate data migrations

Compatibility with existing clusters



Add new generation node to existing cluster



Non-disruptive access continues



Policy-driven job moves data to new nodes



Seamless and transparent to clients



No impact to users

Capacity expansion and balancing



Automated data balancing across nodes eliminates “hot spots”

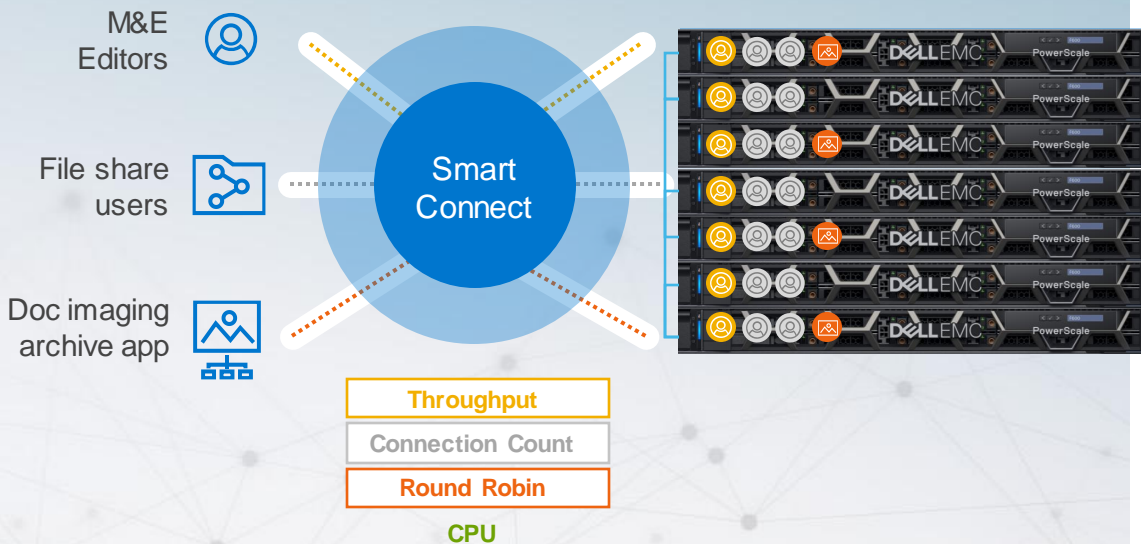
AutoBalance automatically moves content to new storage nodes

No administrator intervention required

Utilization increases as cluster grows

Performance scales linearly with capacity

Connection and CPU balancing



Client connects evenly distributed across cluster

In flight reads and writes handed off

Multiple connection balancing policies

User and application access are uninterrupted

Ensures CPU is evenly utilized across cluster

Policy based data protection

Protection with no downtime

N+1 → **N+4**



Flexible disk and node protection with lower impact

Faster rebuild

On the fly at directory and file

Multiple levels of protection

No impact to users

Policy based data protection

Protection with no downtime

N+2



Flexible disk and node protection with lower impact

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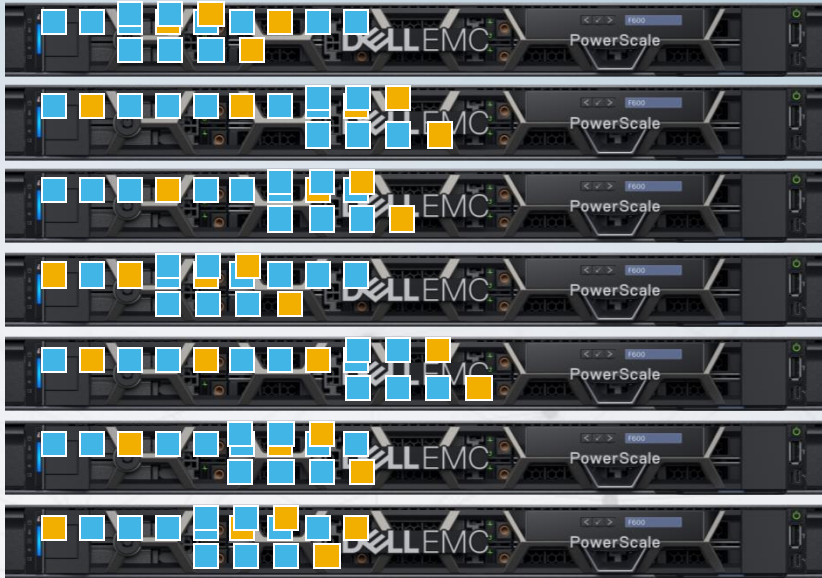
Multiple levels of protection

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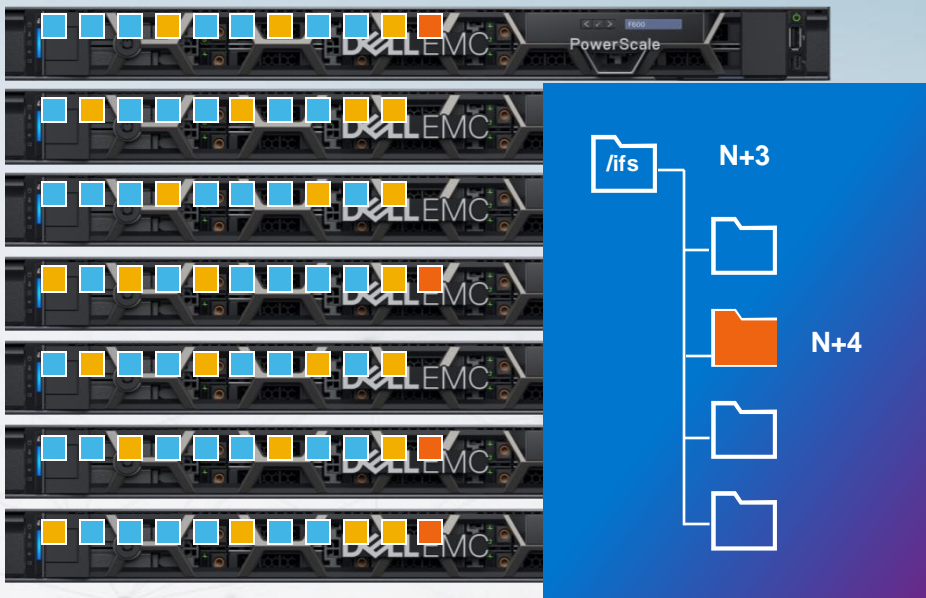
Multiple levels of protection

No impact to users

Policy based data protection

Protection with no downtime

N+2



ADVANTAGES

Change data protection on the fly

Directory and file level granularity
change just a single directory to a higher level

Policy based data protection

Protection with no downtime

N+3

Protected @ N+3



ADVANTAGES

Change data protection on the fly

Directory and file level granularity
change just a single directory to a higher level

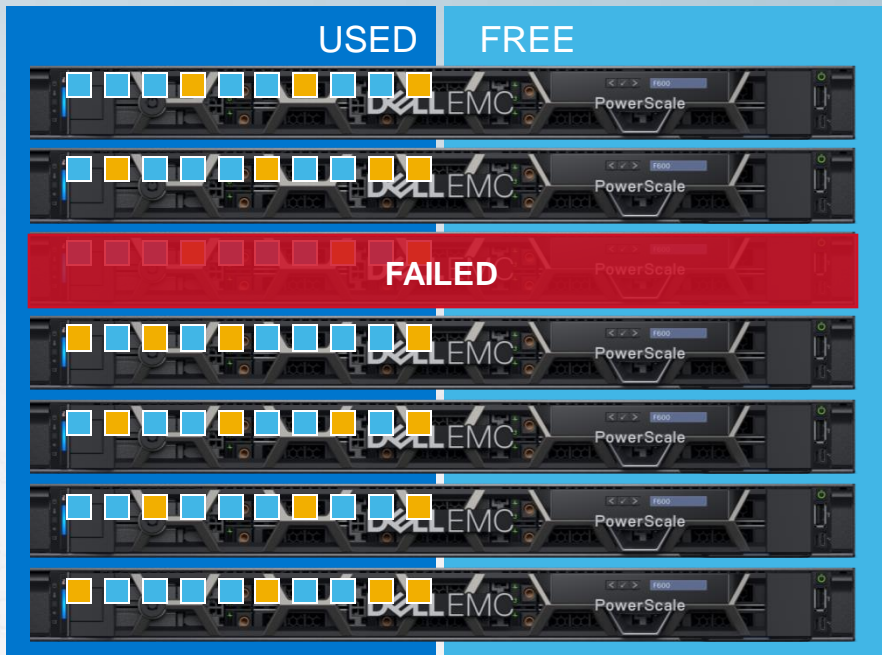
How rebuilds work

Policy based data protection

Protection with no downtime

N+3

Protected @ N+2



Node Fails, Below Protection

ADVANTAGES

Change data protection on the fly

Directory and file level granularity
change just a single directory to a higher level

How rebuilds work

Policy based data protection

Protection with no downtime

N+3

Protected @ N+3



All of the nodes rebuild the failed units into free space

ADVANTAGES

Change data protection on the fly

Directory and file level granularity
change just a single directory to a higher level

How rebuilds work

Policy based data protection

Protection with no downtime

N+3

Protected @ N+3



Failed node is replaced

ADVANTAGES

Change data protection on the fly

Directory and file level granularity
change just a single directory to a higher level

How rebuilds work

Policy based data protection

Protection with no downtime

N+3

Protected @ N+3



Data is redistributed and balanced automatically

ADVANTAGES

Change data protection on the fly

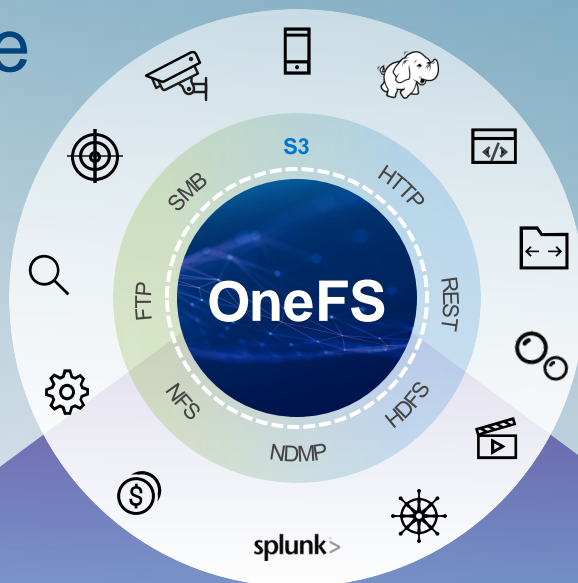
Directory and file level granularity
change just a single directory to a higher level

How rebuilds work

OneFS features: manage what matters



Any data anywhere



PowerScale F200
EDGE



PowerScale Family
CORE



Multi-Cloud and Native Cloud Services
CLOUD

Big data
and analytics



Backup
and archive



Disaster
recovery



What are you trying to do
with your **data** in the **cloud**?



Lift and
shift



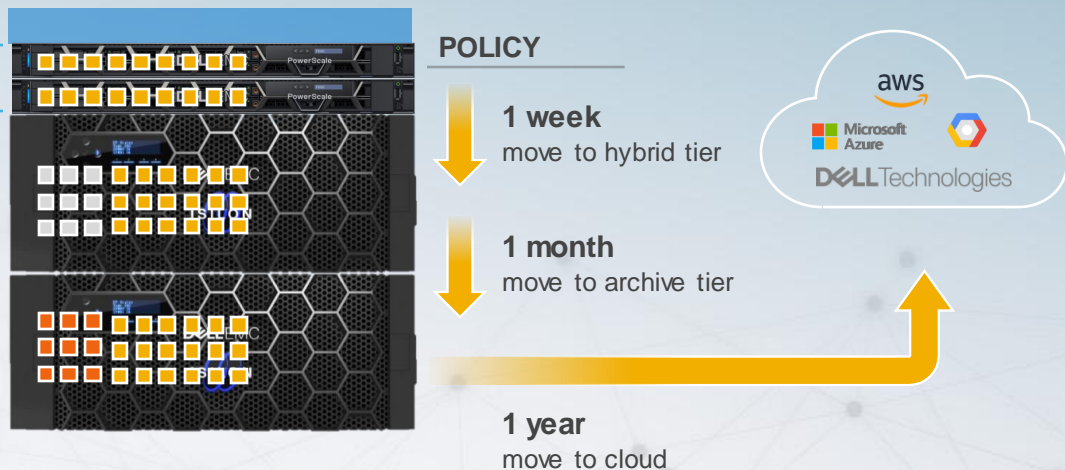
Content editing
and distribution



Dev / test
and operations

Multiple pools, one filesystem

Cloud tiering to choice of providers



SMARTPOOLS

Main point appears here

Main point appears here.
Could be two lines

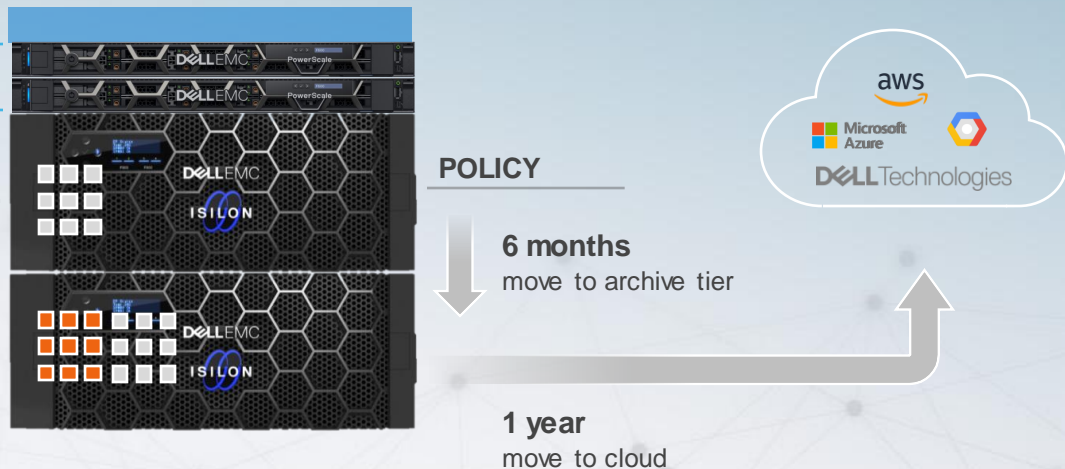
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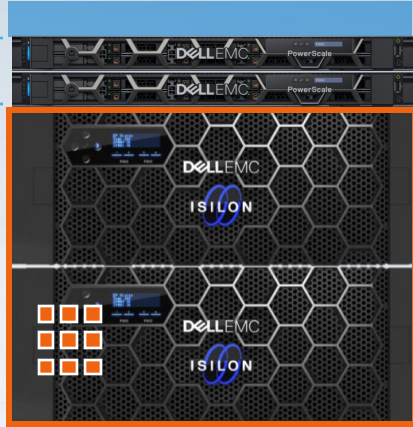
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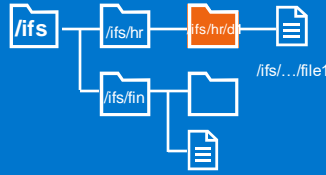
Multiple pools, one filesystem

Cloud tiering to choice of providers



Archive Pool

Automate down to the directory, sub-directory and file level



SMARTPOOLS

Main point appears here

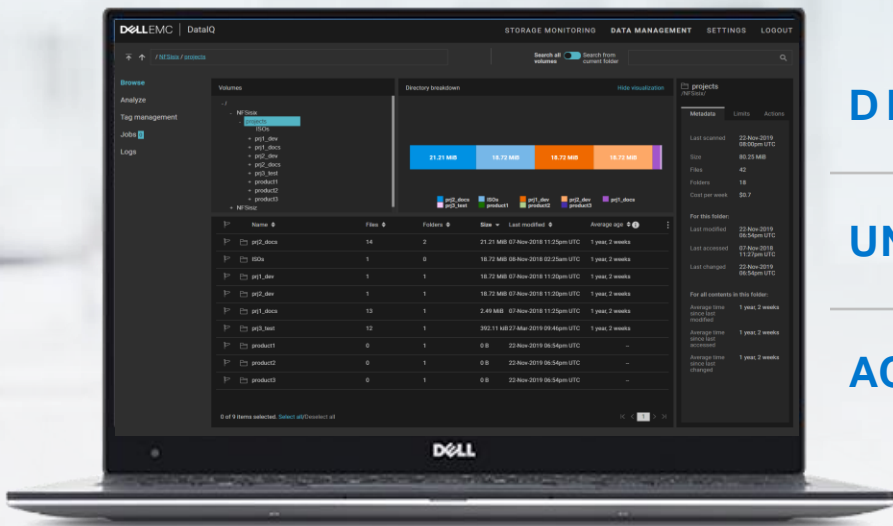
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Could be two lines

CLOUDPOOLS

Main point appears here

Main point appears here.
Could be two lines

DataIQ Insights



DISCOVER

File and object data across multiple data sources

UNDERSTAND

The data type, the cost of storage and its business value

ACT

Move data to another location, identify duplicates and more

Capacity/performance trending and analysis

Gain valuable insights into your unstructured data.
Now included with PowerScale and all Dell storage!

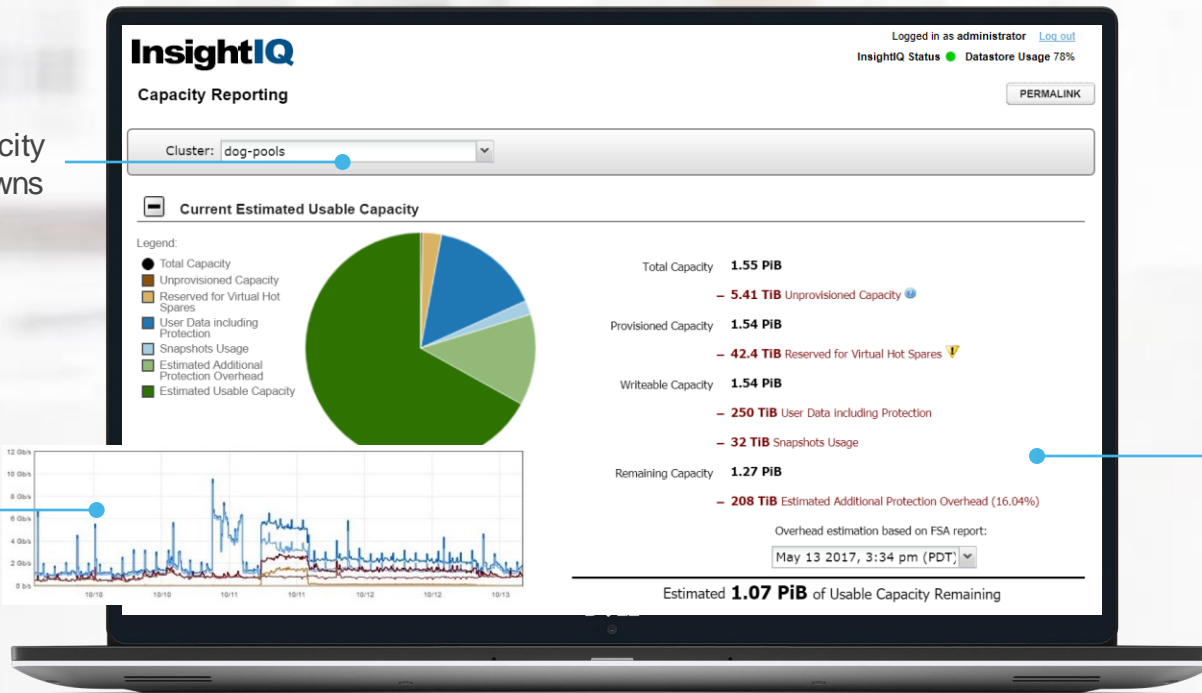
InsightIQ

Detailed capacity breakdowns

Historical capacity trending and reports

Detailed cache statistics

Elaborate drill downs and roll-ups

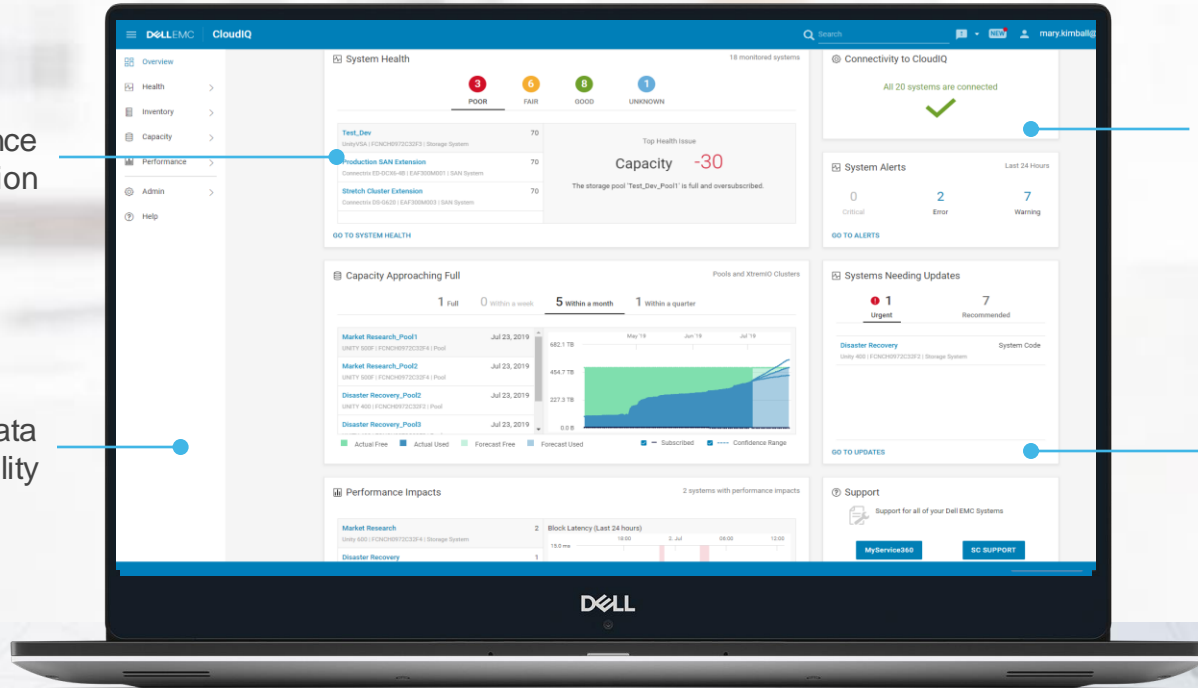


CloudIQ - Take control of your infrastructure

Proactive monitoring and predictive analytics

Performance anomaly detection

Broad data center visibility

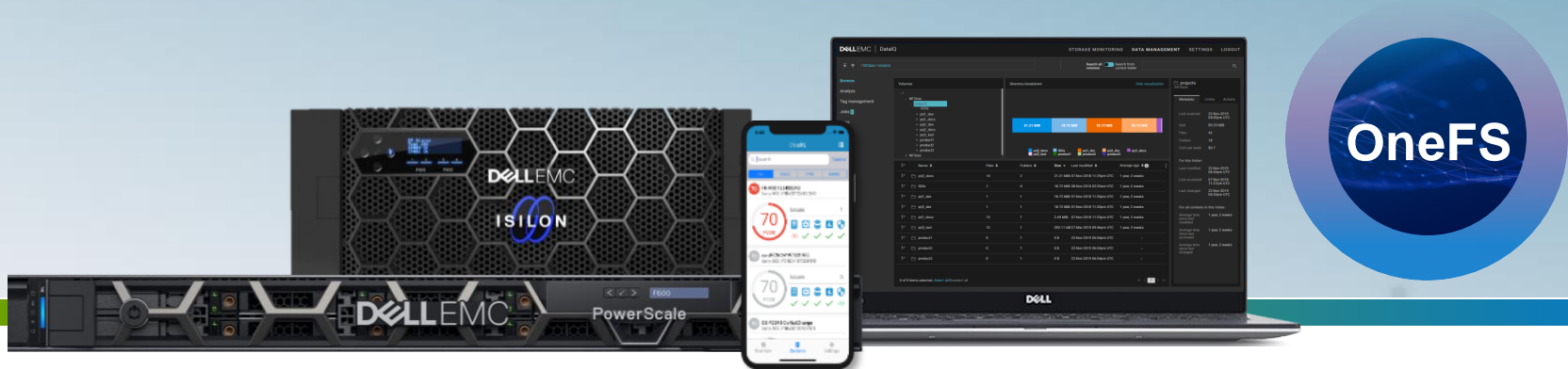


Capacity utilization forecasting

Proactive health scores

PowerScale unlocks your data potential

A new standard in unstructured data storage



Enabling OneFS to do more



Simplicity at any scale



Any data anywhere



Intelligent insights

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Wir unterstützen Sie kompetent und persönlich!



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