

Archives and Data Management Systems *in the Big Data Era*

Quantum[®]
Your difference is in your data.[™]

Chiappella Stefano
Presale Italy & Iberia



About Quantum (NASDAQ: QMCO)

We deliver end-to-end data management solutions for AI and unstructured data across the entire lifecycle

**Accelerate and
Enrich AI**

~10,000

Customers

**Store and
Manage**

52%

Fortune 100

**Protect and
Preserve**

84+ Exabytes

Stored and Protected

Our Customers Include...



5 of 5

Largest US Broadcasters

The Largest

Media Companies

The Most Recognized

Brands

13 of 30 MLB Teams

15 of 32 NFL Teams

4 of 5

Largest US Public Transit Systems

6 of Top 10

Hotel, Casino, Resort Companies

10 of the World's

Highest-Volume Airports

100+

Universities

5 of 5

Largest Hyperscalers

6 of Top 10

Largest Financial Institutions

17 of 18

US Intelligence Agencies

14 of 17

National Labs

Building an End-to-End Architecture

Added
Object Storage



2020



#1 in hyperscale
tape archives

Added data catalog,
workflow orchestration



2021

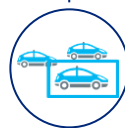


Added solutions for
video surveillance

First private cloud
with S3 Glacier tier



2022



AI enrichment for
video, audio, images

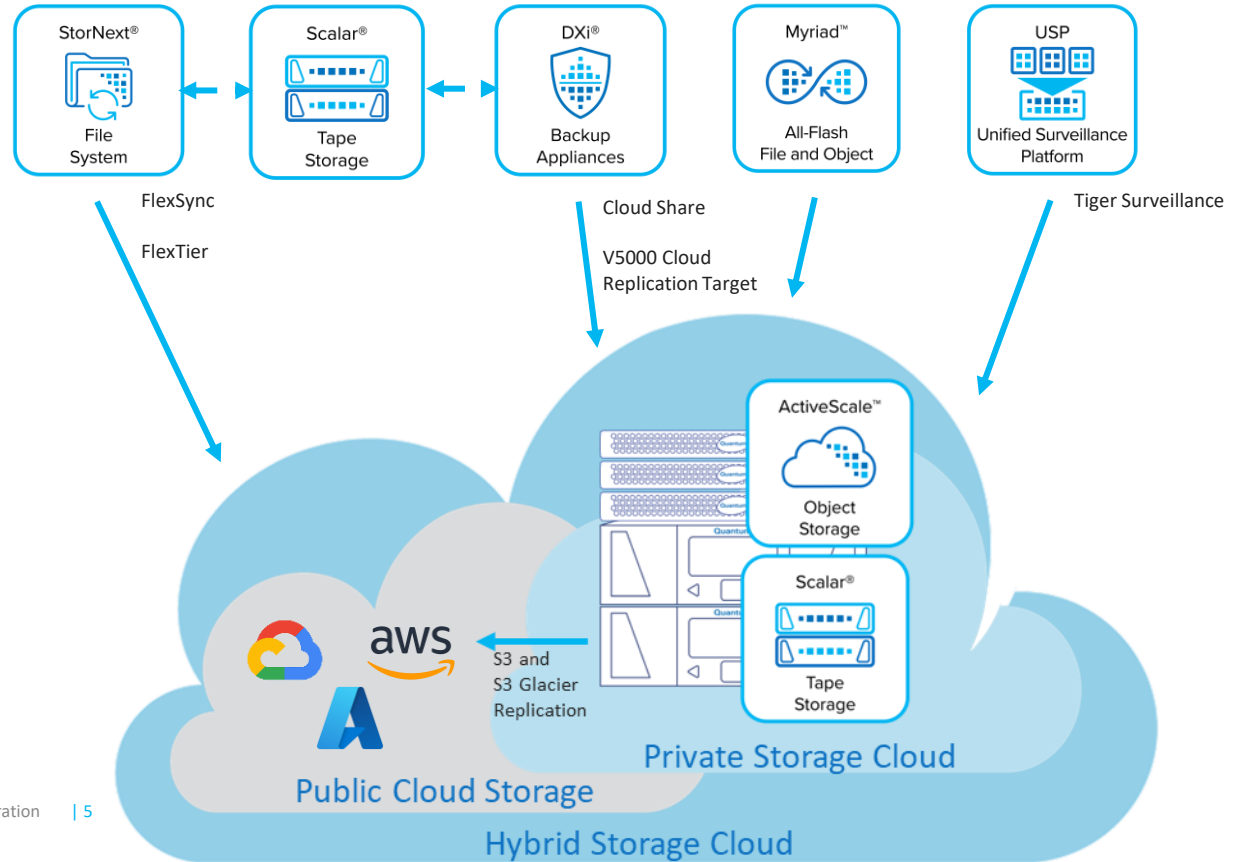
All-Flash File and
Object Storage



2024

Quantum Portfolio Integration with ActiveScale

ActiveScale forms the basis for private and hybrid enterprise storage clouds



Long Term Archive Solutions

- *Active Scale Cold Storage*
- *StorNext Iceberg*

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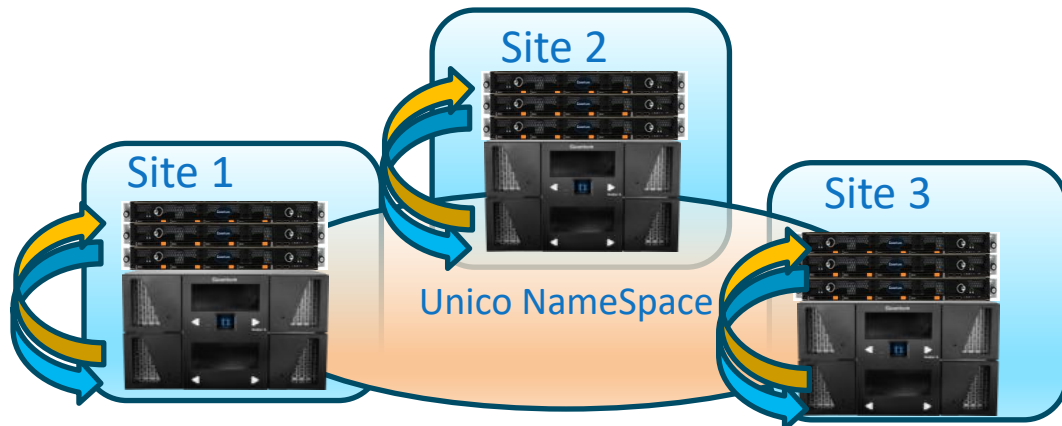
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Long Term Data Archiving – ActiveScale Cold Storage

Vantaggi:

1. **Efficienza** (solo 1 nodo su 9 per parity)
2. **Affidabilità** (Erasure Coding su dischi e nastri: si può perdere un intero sito senza impatto sul servizio)
3. **Sicurezza** (ogni oggetto è unico by design, con ObjectLock il dato è protetto contro ransomware)
4. **Espandibilità e flessibilità** (si può crescere sia sul layer nodi che su quello tapes)
5. **Costo:** €50/TB (minimo 4PB)



Quantum Iceberg

StorNext + Scalar i3 Tape Library

Un Appliance semplice ma molto efficiente per realizzare un archivio a basso costo

Configurazione in offerta (940TB):

- NAS ibrida HD + Tape:
 - Disk Tier: 40TB (net space)
 - Tape Tier: 900TB (net space)
- Tiering automatico da Disk Tier a Tape Tier
- StorNext 7
- 2x drives LTO-9
- 3Y subscription, Bronze (5x9xNBD)

Prezzo promo: €75,000

Caratteristiche principali

- Single Namespace
- Accesso via SMB/NFS
- Motore di tiering interno basato su StorNext 7
- Funzionalità anti-ransomware
- Scalabilità sia per Tier Disk che Tape (fino a 400 slots)
- Gestione accessi, replica a/da sistemi NAS esterni, QoS, File system Audit
- Predisposizione per tiering S3 su Cloud privato/pubblico



ActiveScale

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Quantum ActiveScale®

Simplicity, performance, and efficiency at any scale, so you can focus on value creation



Scalable, multi-class object storage for affordable, durable access across the data lifecycle

Simplicity

Address massive data growth from terabytes to exabytes with effortless expansion, management, and protection.

Performance

Achieve best-in-class performance at any scale across storage classes for AI pipelines and data-intensive workflows.

Durability

Maintain secure, available, and durable access throughout data's life from years to decades.

Lowest TCO

Deploy analytics, data lakes and storage clouds optimized across flash, disk and tape with easy-to-predict costs.

ActiveScale – Built for Data Protection

Data Security and Data Recoverability



Authentication & Role-based Access

Users have exclusive access to their data



Inflight & At Rest Encryption

System-wide and object-based encryption



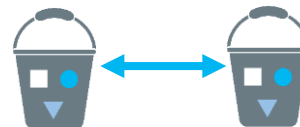
Immutability

Object locking protects an object from being deleted or changed



Object Versioning

Preserve multiple versions of an object for easy recovery



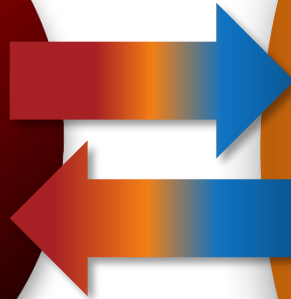
Bucket Replication

Copy a bucket of objects to S3-compatible storage over distance

Prepare for the 'Barbell Workflow' To Drive Storage Requirements

HOT

- active data
- multiple workloads
- multi-protocol
- low latency
- intelligent
- easy to manage



HOLD

- massive, long-term
- online and accessible
- S3 addressable
- resilient
- economical
- built-in cold tier

ActiveScale Object Storage

Optimized architecture for seamless scalability and efficiency

Scale-out architecture

- Seamless expansion of network, compute, and storage
- Data-in-place upgrades and decommissioning

Single namespace across flash, disk and tape

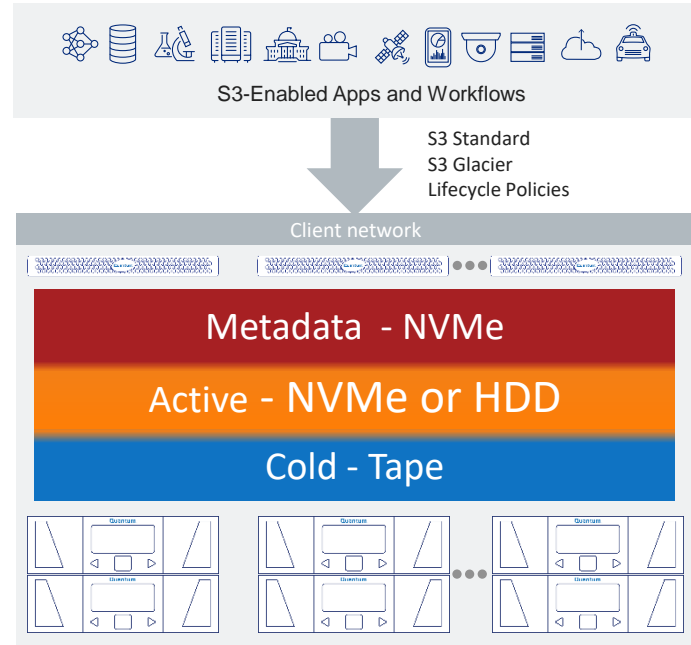
- Metadata: NVMe
- Active data: NVMe or HDD
- Cold data: Tape

Unlimited, independent scaling

- Active and Cold storage classes
- Dynamic allocation of NVMe in all-flash configs

Built for enterprise scale

- Built-in availability, data durability, strong consistency and performance

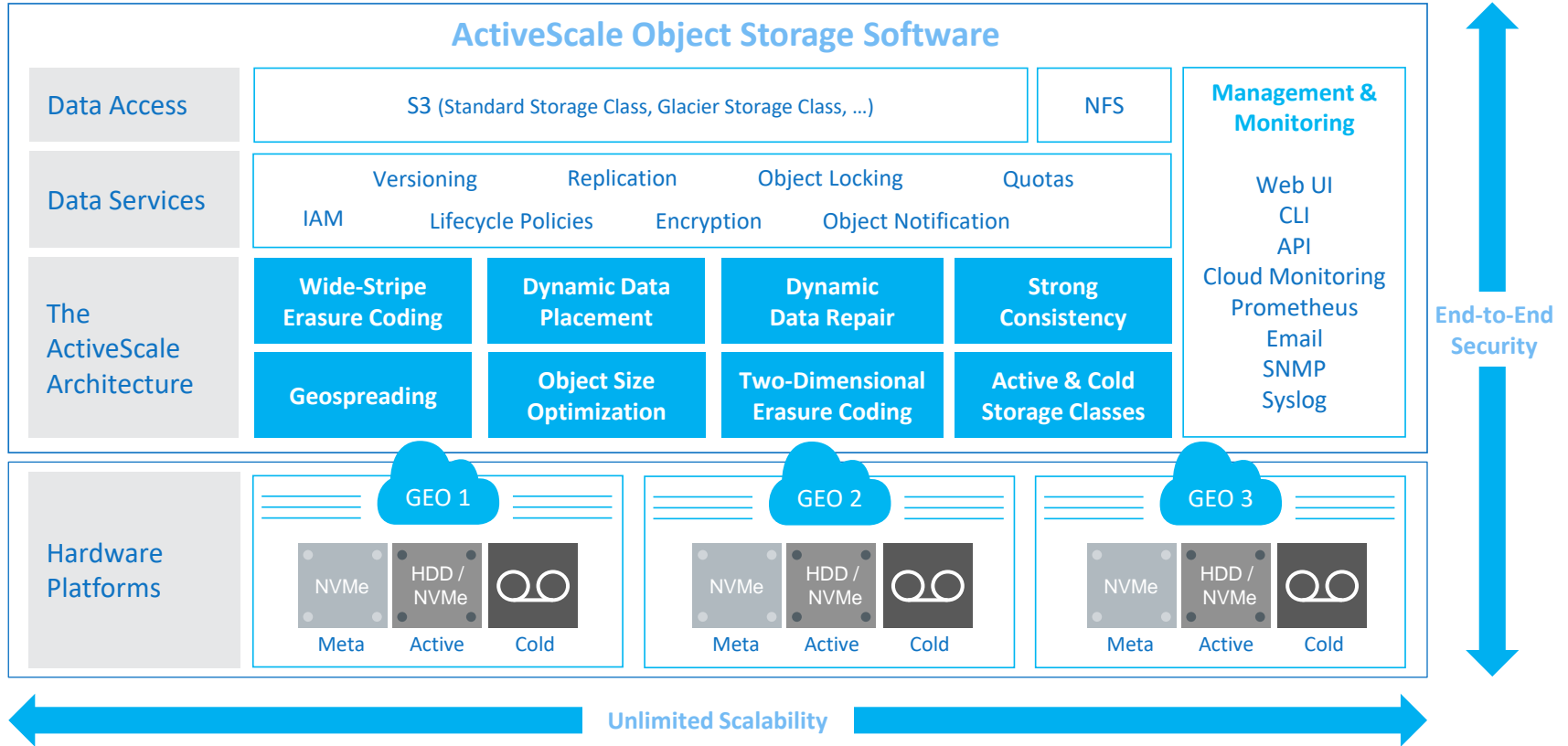


Quantum ActiveScale®

The industry's 1st and only object store architected for active and cold data

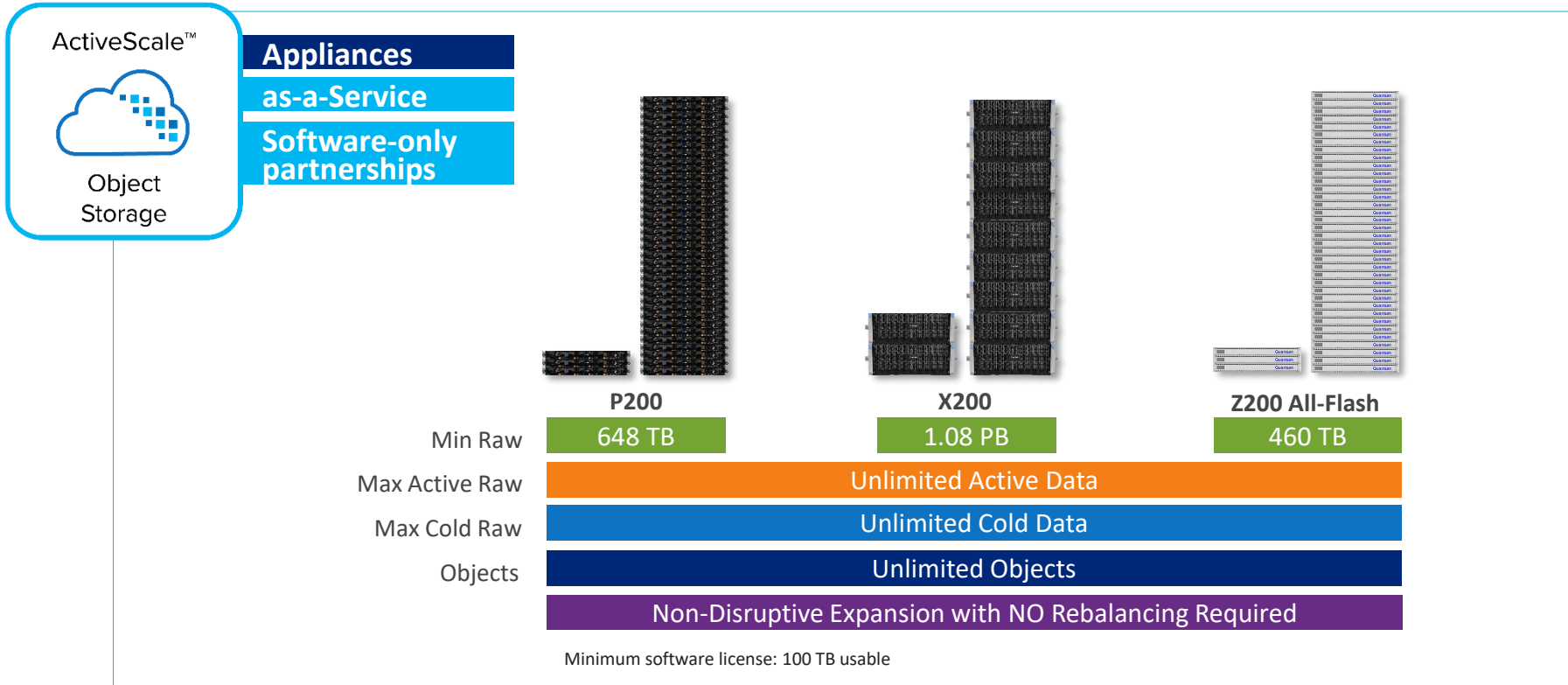
ActiveScale Feature-Rich Software

Built-in data durability, security, availability, performance and cost-efficiency



ActiveScale Object Storage Platform Portfolio

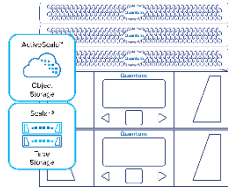
Flexible deployment and purchase vehicles from terabytes to exabytes and beyond



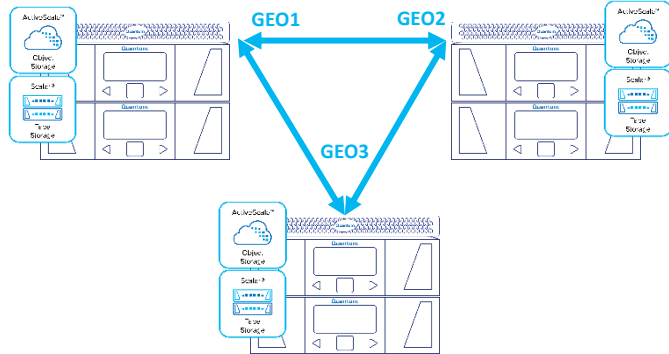
ActiveScale Cold Storage Deployment Examples

Single site, 3-Geo geospreading, and replication across storage classes

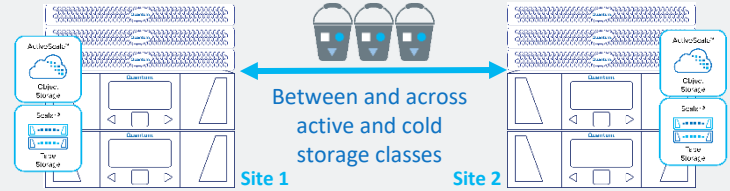
Single site



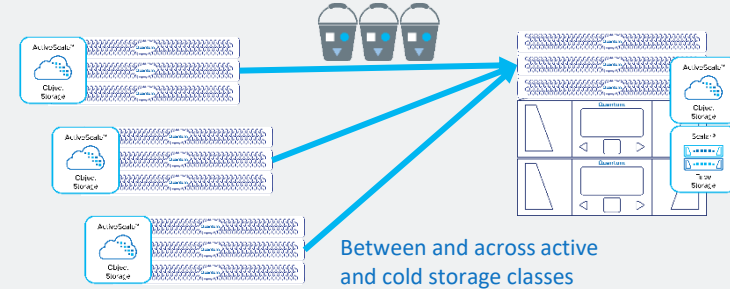
3-Geo geospreading



Uni & bidirectional replication



Replicate to hub



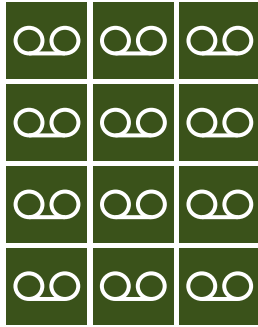
Hybrid replication



ActiveScale Cold Storage Innovations

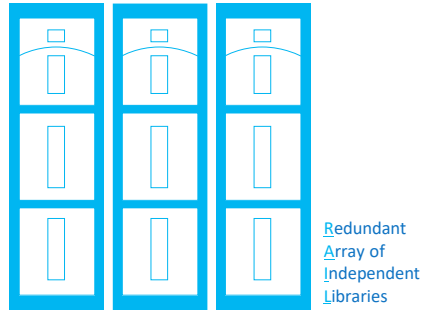
Simultaneously maximizes access performance, data durability, and storage efficiency

Object on Tape Management



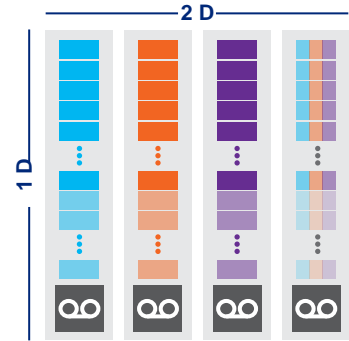
- Integrated staging to disk
- No handling of tape media
- Intelligent, programmatic use
- Architected for long reads/writes

Quantum RAIL



- Scale-out architecture
- Designed for RAS
- Modular, flexible footprint
- Multi-site protection

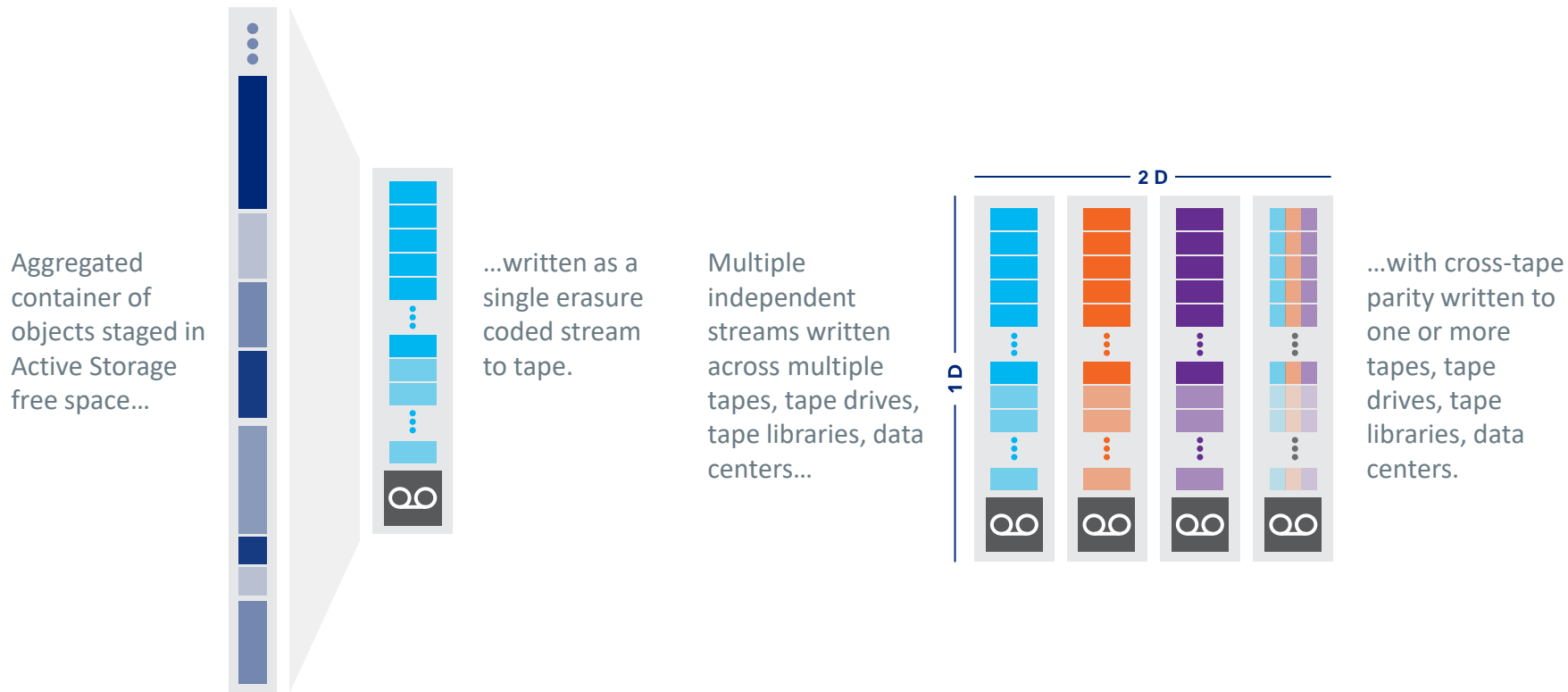
Patented* 2D Erasure Coding



- Single tape read data access
- Fully protects against tape and library failures
- Overhead as low as 15%
- Durability up to 19 9's

Patented* Two-Dimensional Erasure Coding (2D EC)

Industry-Leading Durability, Performance, Availability, and Storage Efficiency



Two-Dimensional Erasure Coding (2D EC)

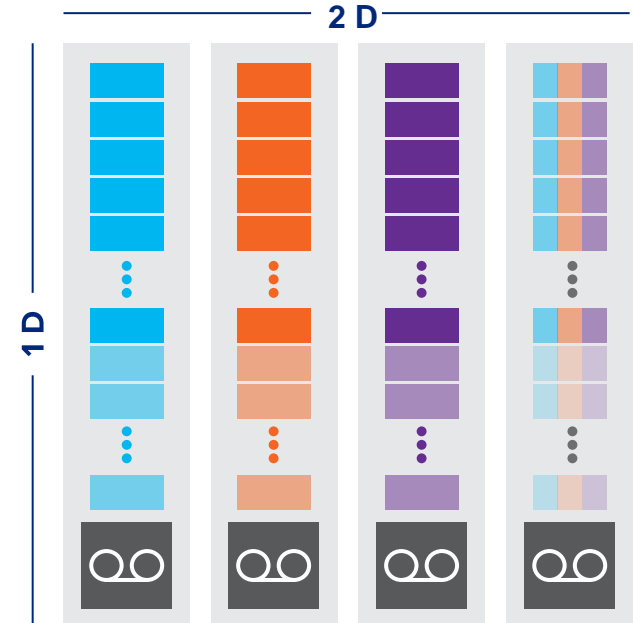
Conceptually, its simple

1D: Aggregate multiple objects into a larger container
Write shards of data and shards of parity to a tape

2D: As multiple streams (data+parity) are written to multiple tapes, write cross-tape parity shards to additional tapes

Why?

- Single tape read to access and restore objects
- Within-tape parity protects against most data read errors
- Cross-tape parity protects against tape and library failures
- Overhead as low as 15%
- Durability as high as 19 nines



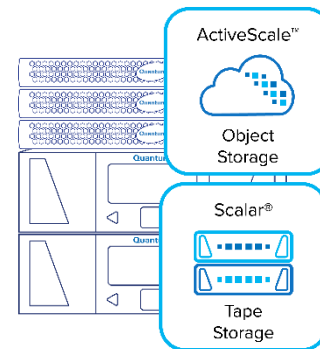
ActiveScale Object Storage: Cold Storage Class

Less storage overhead & better durability

Quantum RAIL with 7x Scalar i6 Tape Libraries

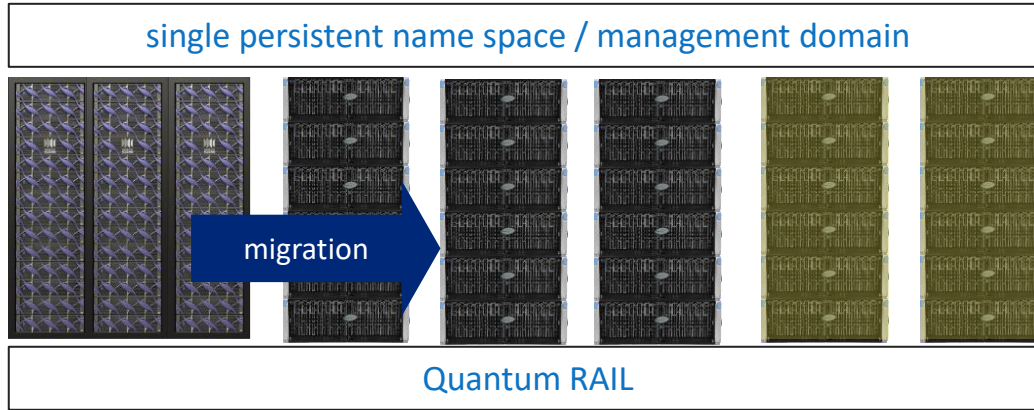
Patented 2-dimensional Erasure Coding (18+3)

- Protect across 21 tapes but **read from SINGLE TAPE**
- Protect from **up to 3 simultaneous tape failures** or 1 tape library going down (e.g. robot failure)
- **Overhead = 1.25x** (75PB usable capacity system only requires 91PB raw capacity)



75PB usable capacity systems	Legacy Tape 1-Copy	Legacy Tape 2-Copy	ASCS 2D EC	Legacy Tape 3-Copy	ASCS 3-Geo 2D EC (6+3)
LTO-9 Tapes	4,167	8,334	5,243	12,501	6,741
Durability	3 Nines	6 Nines	15 Nines	9 Nines	17 Nines
Objects Lost Per Year with 1B Objects	603,000	363	0.0000003 (one every 3M yrs)	0.22 (one every 4.6 yrs)	0.00000001 (one every 100M yrs)

ActiveScale vision: 100-year multi-generational archive

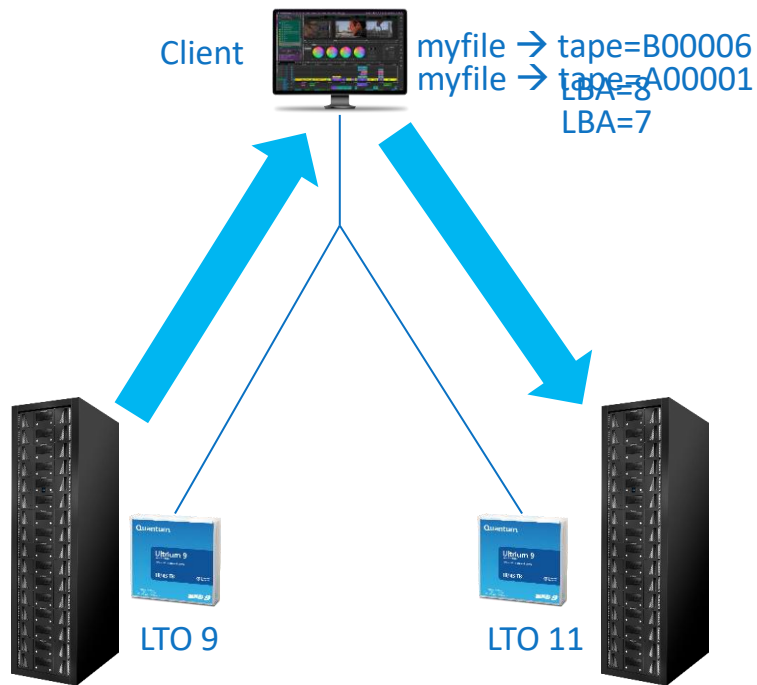


- Single namespace
- Single management domain
- Single pane of glass
- One-click migration
- One-click hardware decommission

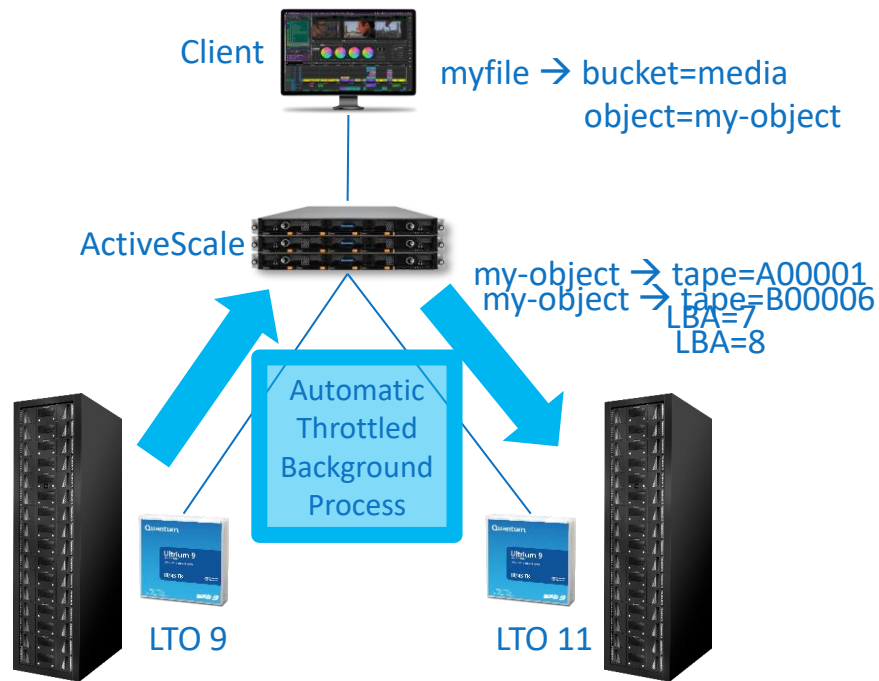


LTO generational migration

State-of-the-art



ActiveScale Cold Storage



StorNext

Iceberg

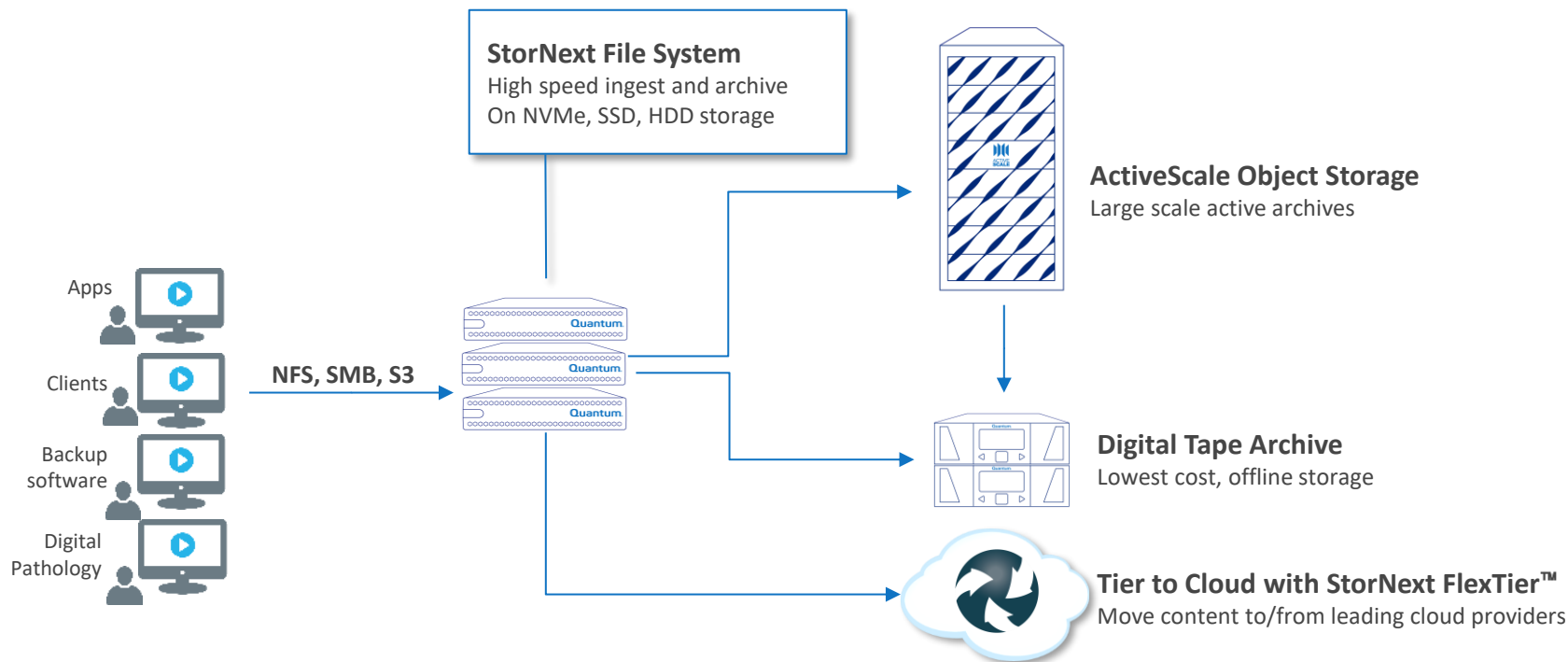
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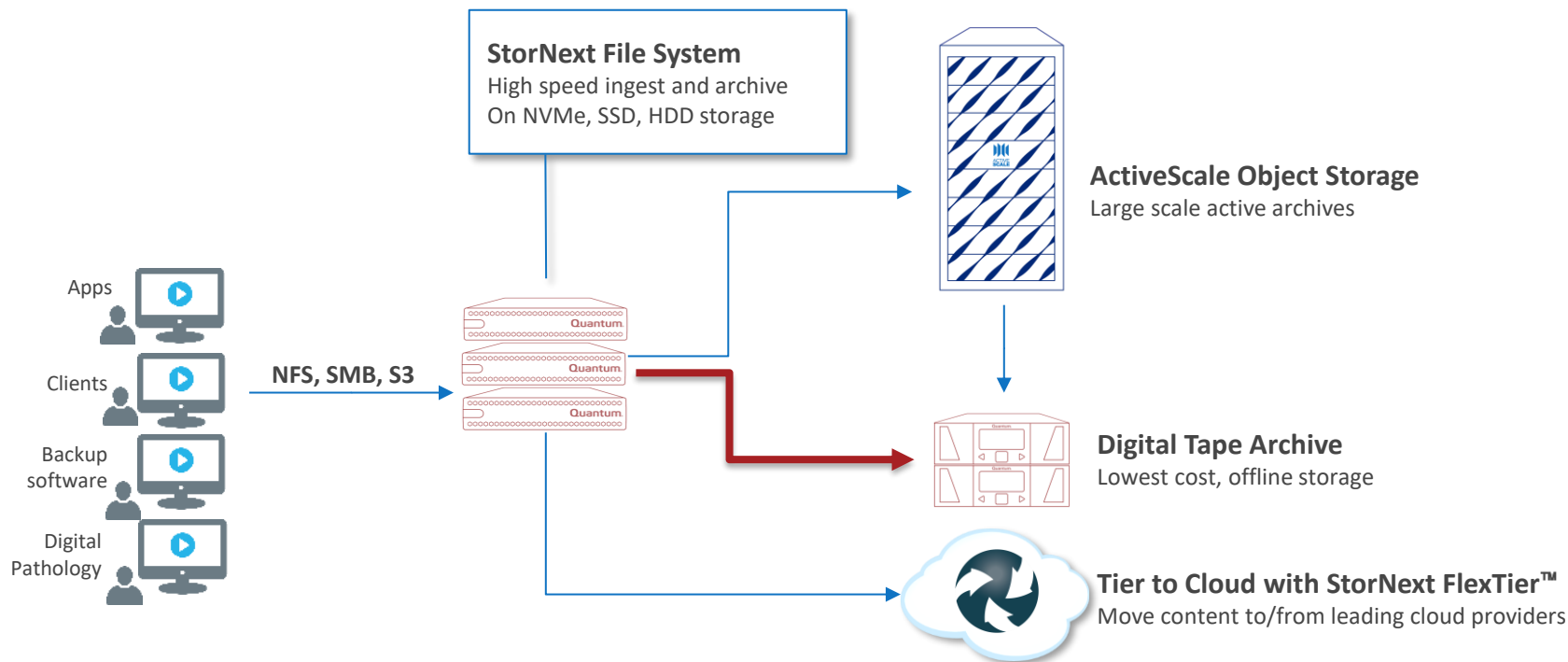
End-to-End Data Management Workflows on Quantum

StorNext policy-based data management and APIs



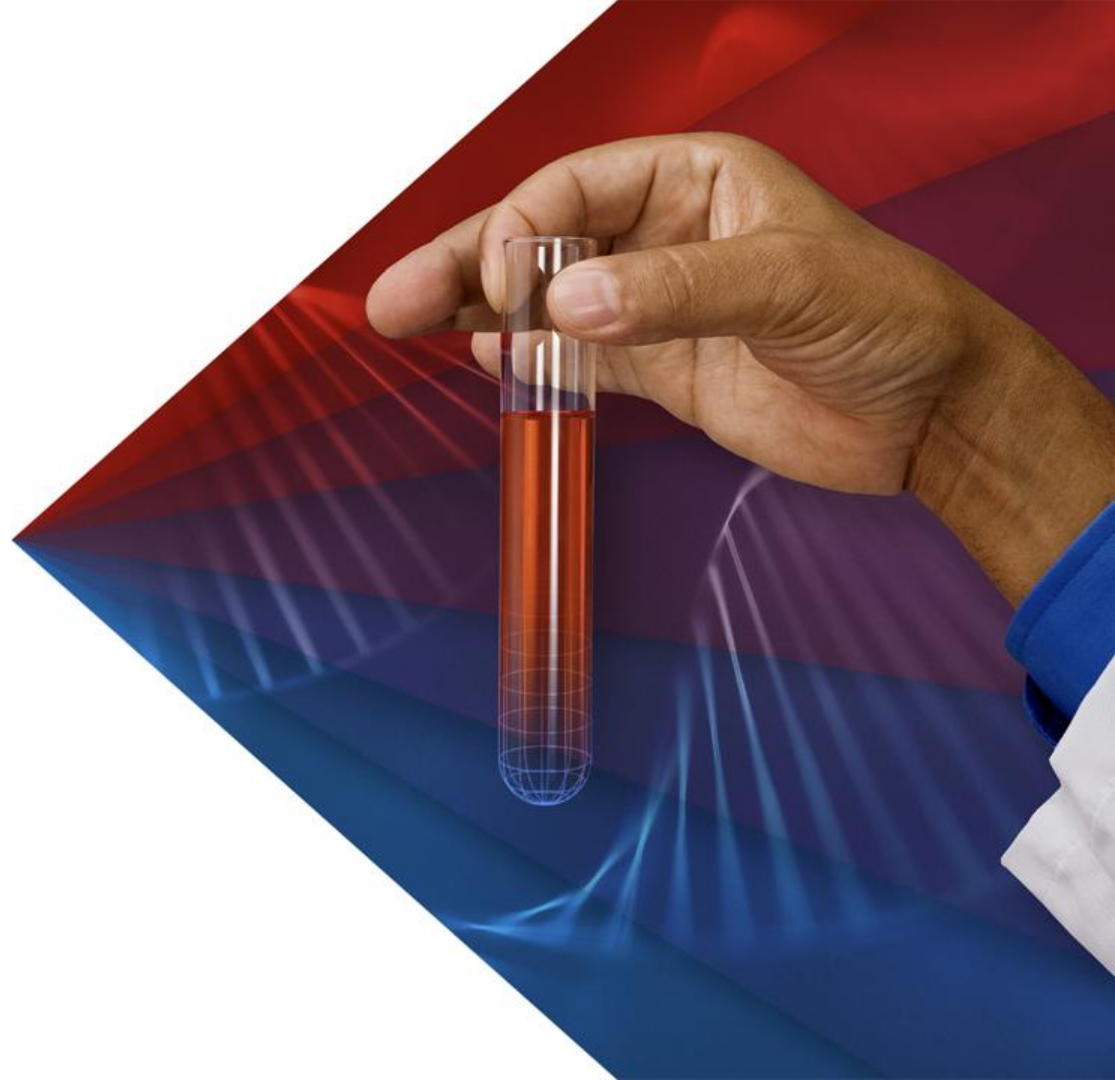
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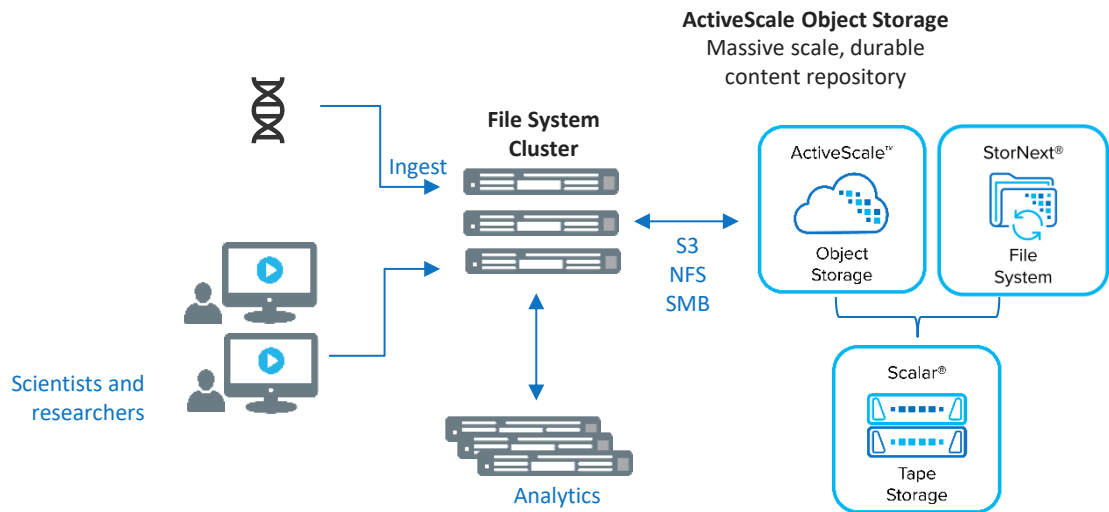


Use Cases

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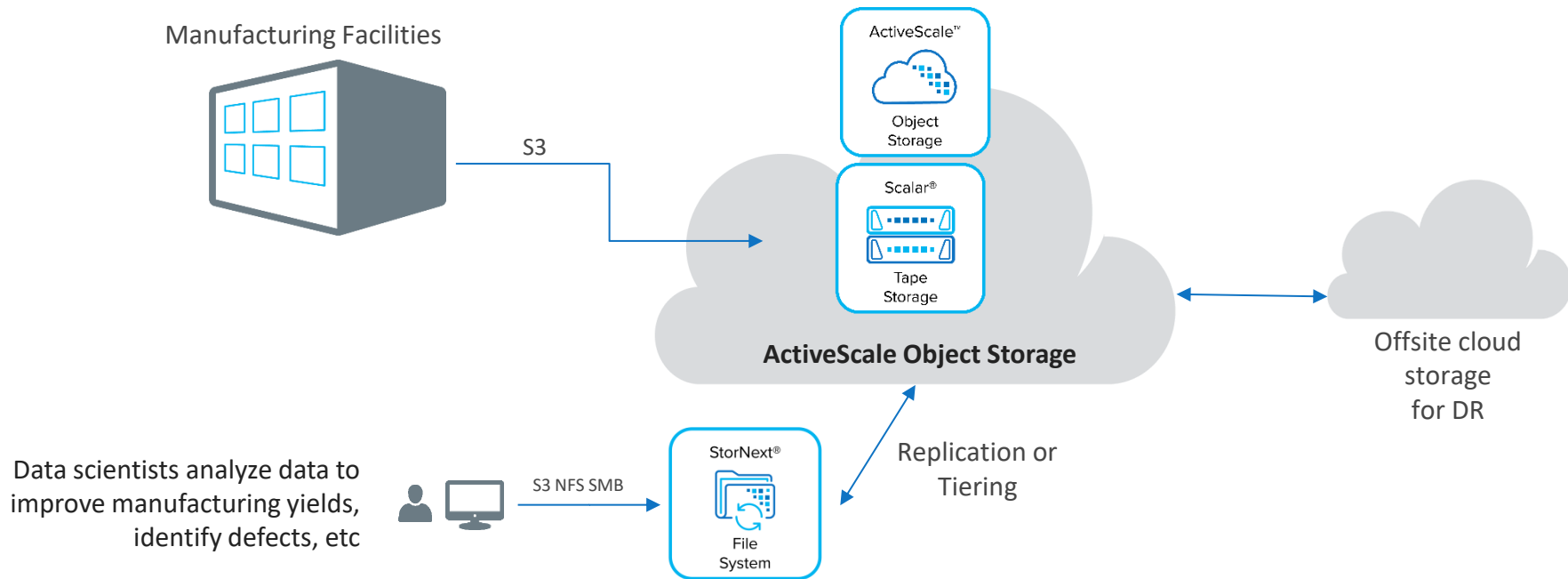


Storage Repository for Genomics Sequencing Data



- ✓ Protect and preserve research data
- ✓ Best-in-class performance
- ✓ Retrieve data from 'live' archive

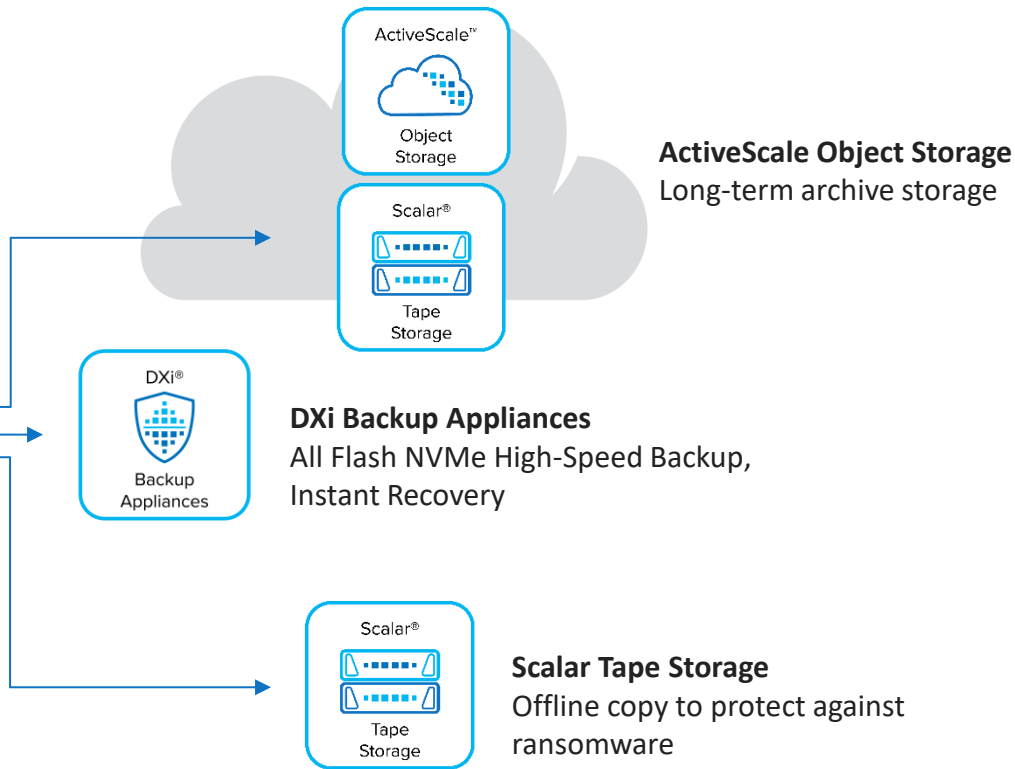
Data Lake for Manufacturing “Big Data” Analytics



Addressing Business Requirements for Data Protection, Compliance, Retention

As part of 3-2-1-1 Data Protection Infrastructure

- ✓ Ensure business continuance
- ✓ Meet any RPO and RTO
- ✓ Protect against system issues, disasters, and ransomware
- ✓ Avoid public cloud egress charges



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