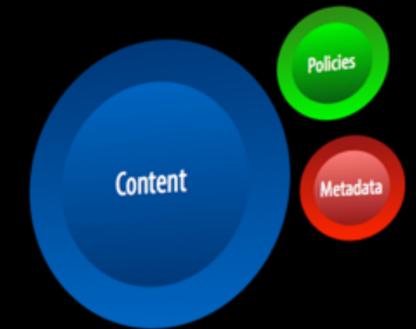


ObjectMatrix

Company

- UK based IT software company started, 2003
 - Employees with clustered object storage background
 - Recognised the move to disk-based archiving and the need to address that space with new products
- Flagship product: MatrixStore
- Object Based Storage Technology



Object Storage



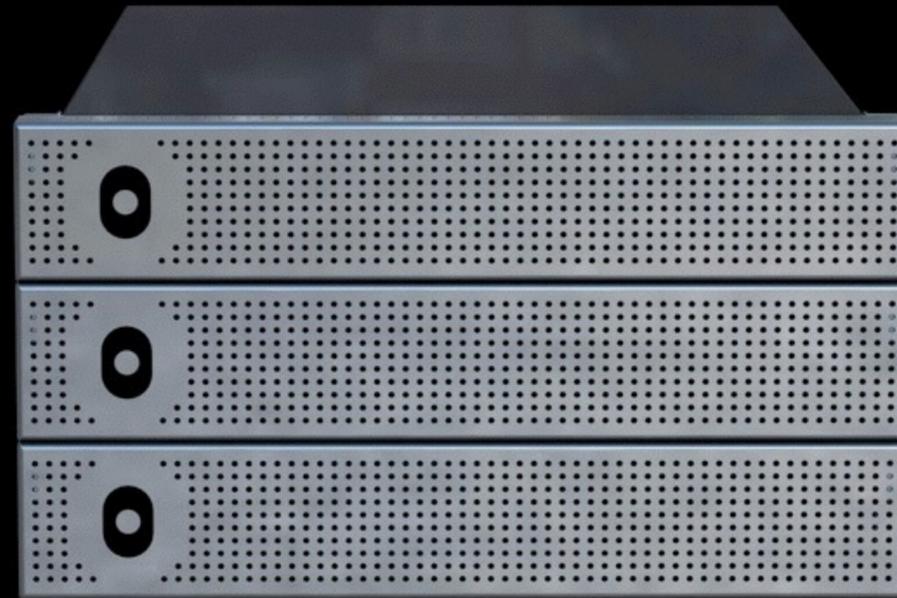
Customers including:



speakeasy



MatrixStore



A scalable **nearline** digital preservation platform

MatrixStore

A Nearline Archive for File Based Workflows

- Proven Object Storage that Protects Data & Metadata
- Self-Managing Archive
- Enforces Storage Policies & Data Security
- Non-Proprietary Platforms and Formats
- Easy to Manage and Cost Effective
- Built in Disaster Recovery and Business Continuity
- Scale as you grow
- Complements existing technologies and infrastructure
- Integrated into customer workflows through APIs
- Process & enrich content in place (e.g AS11 metadata extraction)
- A central hub in your ecosystem

Nearline & Archive Storage

Online

Cost per TB: \$\$\$\$\$\$\$
Guaranteed Bandwidth

Promo Teams
Admin Teams
Client Access
Remote Access

Nearline

Cost per TB: \$\$\$\$
Guarantees data will be there

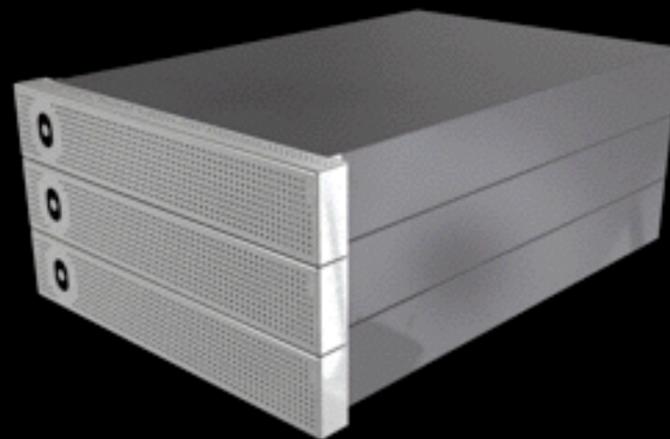
Deep Archive

Cost per TB: \$\$\$
Deep Offsite Protection for data
with low or no access requirements

- DAMs
- MAMs
- PAMs
- VOD
- Playout
- Transcoders
- Avid
- Final Cut
- Adobe
- EVS
- AutoDesk
- Quantel



Products



MatrixStore Enterprise

Capacity

12TB to Petabytes

Node Capacity (Raw TB)

12, 24, 36, 48, 96, 144

Minimum Configuration

3 MatrixStore Nodes

Protection Policies

Single, Dual (local and remote)

RAID Protection

RAID6

Node Dimensions

2u, 4u (rack mounted)

Node Power

Dual (Redundant)

Node Connectivity

GigE or 10GigE



MatrixStore Quattro

24TB to 128TB

24, 32

1 MatrixStore Quattro Unit

Single, Dual (local and remote)

None

2u

Dual (Redundant)

16 GigE Ports

Client Applications



DropSpot

Mini DAM/MAM application

Windows/Mac/Linux

Free



MXFS & SMB

MatrixStore File System

Windows/Mac/Linux

Free/POA



Move2

Deep Archive Service

Windows

POA



FTPConnect

FTP Application

Windows/Mac

POA



InterConnect

Avid Interplay Plugin

Windows

POA



MatrixStore Access & Client Connectivity

Application Programming Interface

Object Matrix Applications



3rd party Ingest, MAM, DAM,
PAM, Transcode, HSM, VOD &
home grown Applications

MatrixStore API

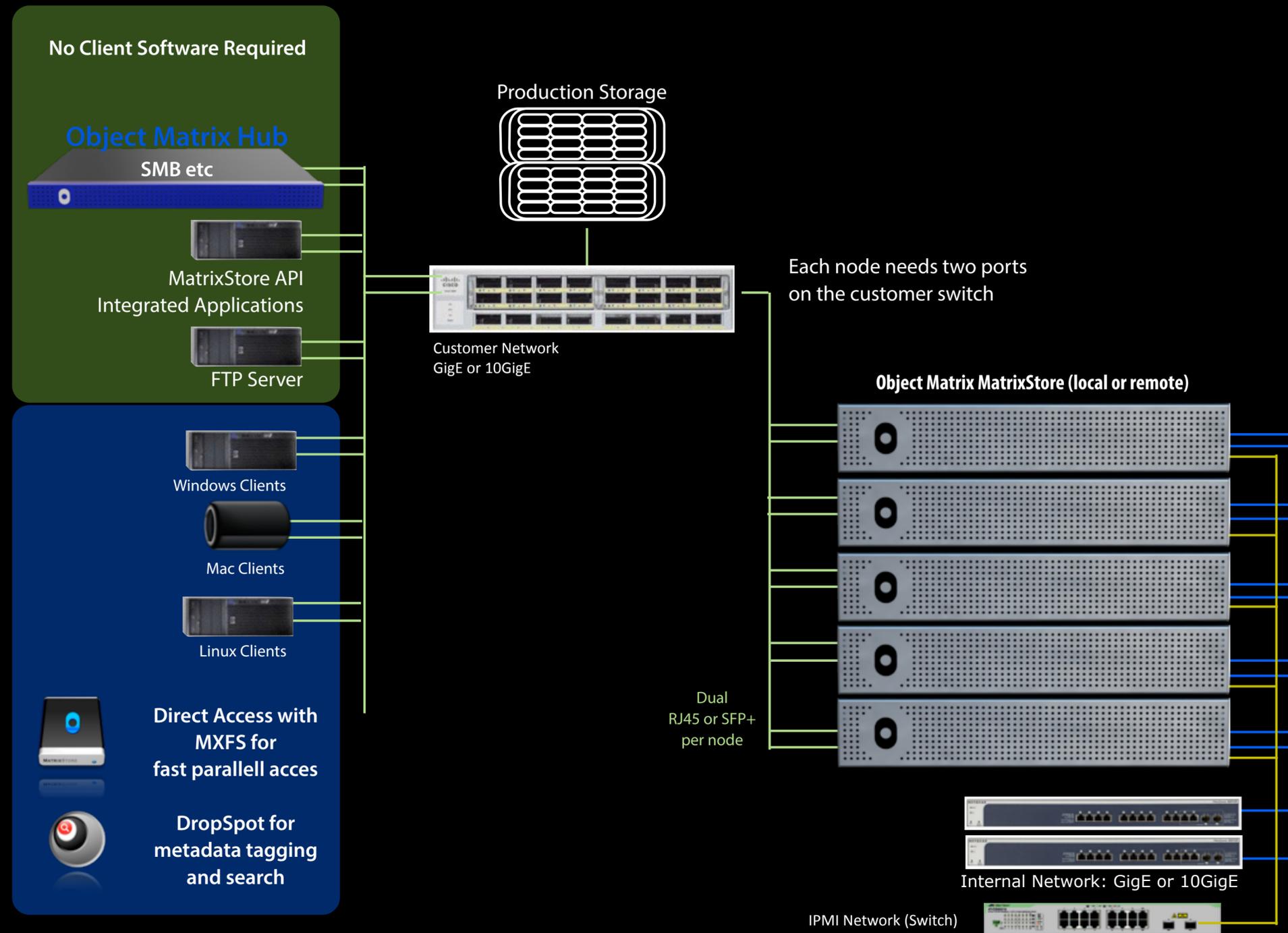


MatrixStore

MatrixStore API

- C or Java
- Data & Metadata operations
- Provides Seamless Integrations

Client Connectivity

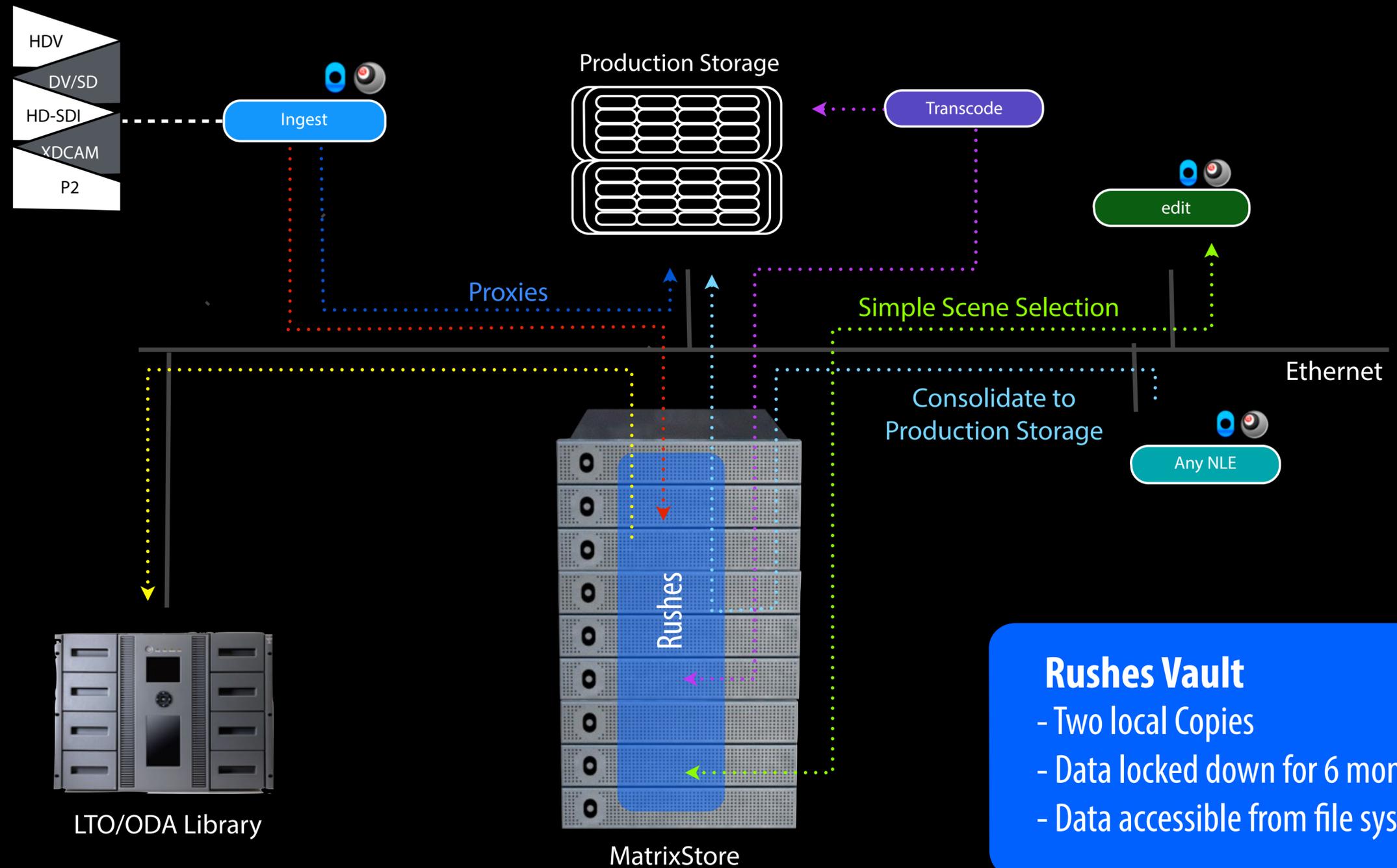




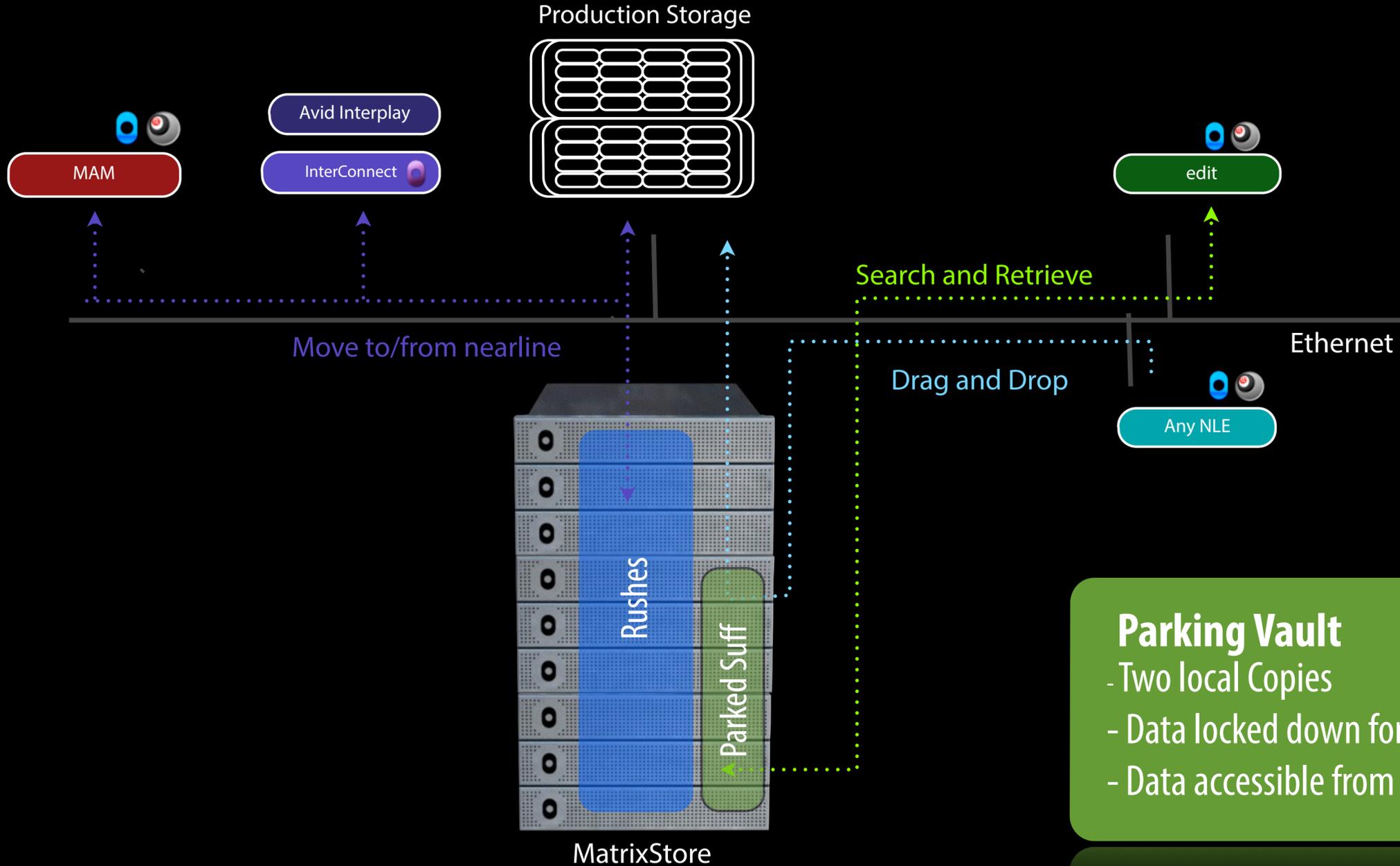
Positioning

(on premises or hosted)

Ingest, Parking, Archive



Ingest, Parking, Archive



Parking Vault

- Two local Copies
- Data locked down for 6 months
- Data accessible from file system

Ingest, Parking, Archive

Rushes Vault

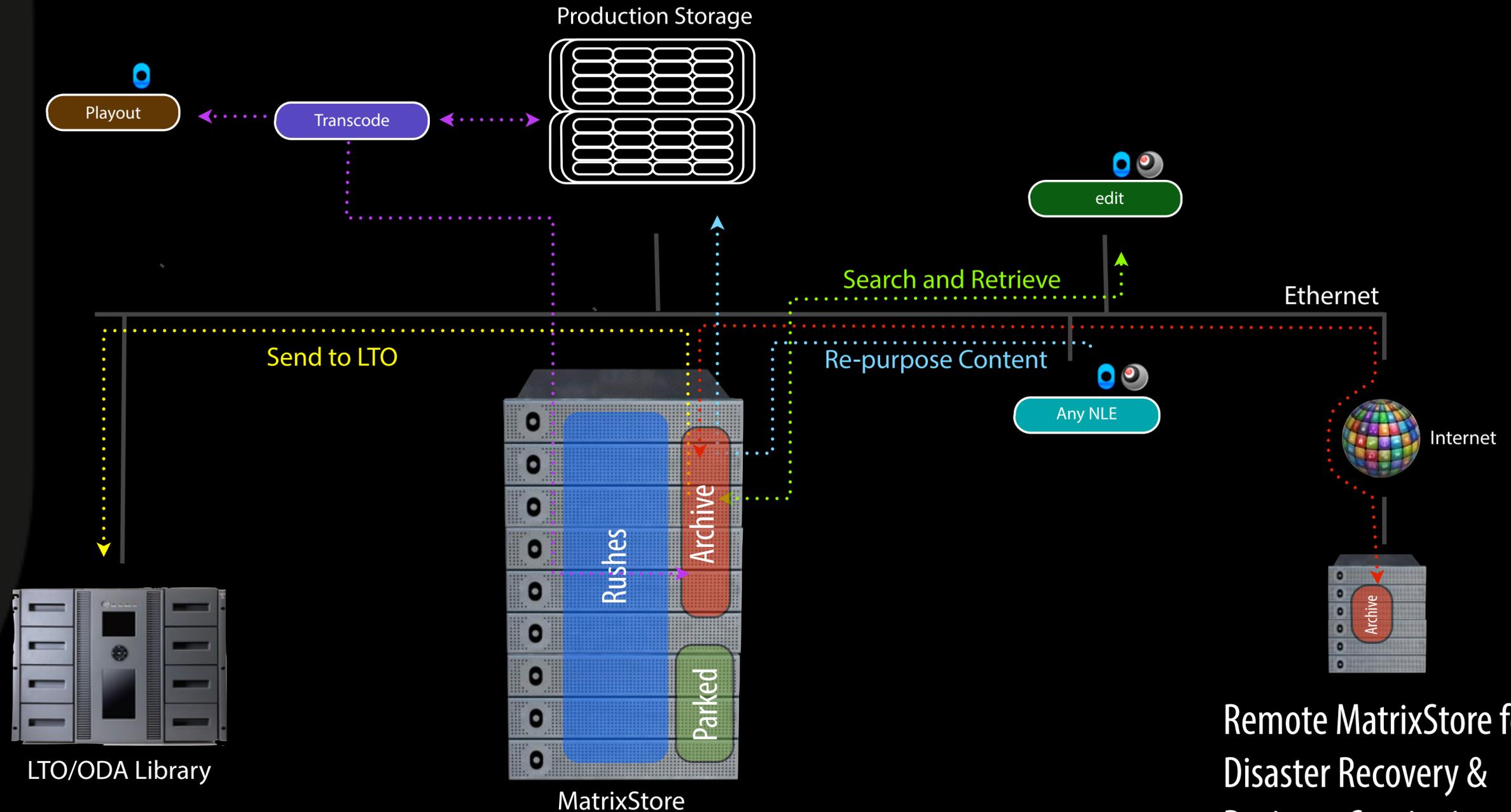
- Two local Copies
- Data locked down for 6 months
- Data accessible from file system

Parking Vault

- Two local Copies
- Data locked down for 6 months
- Data accessible from file system

Archive Vault

- One local Copy, One remote copy
- Data locked down for 12 months
- Data accessible from file system



Remote MatrixStore for Disaster Recovery & Business Continuity
(more details later in presentation)



Who uses it and how?



theguardian

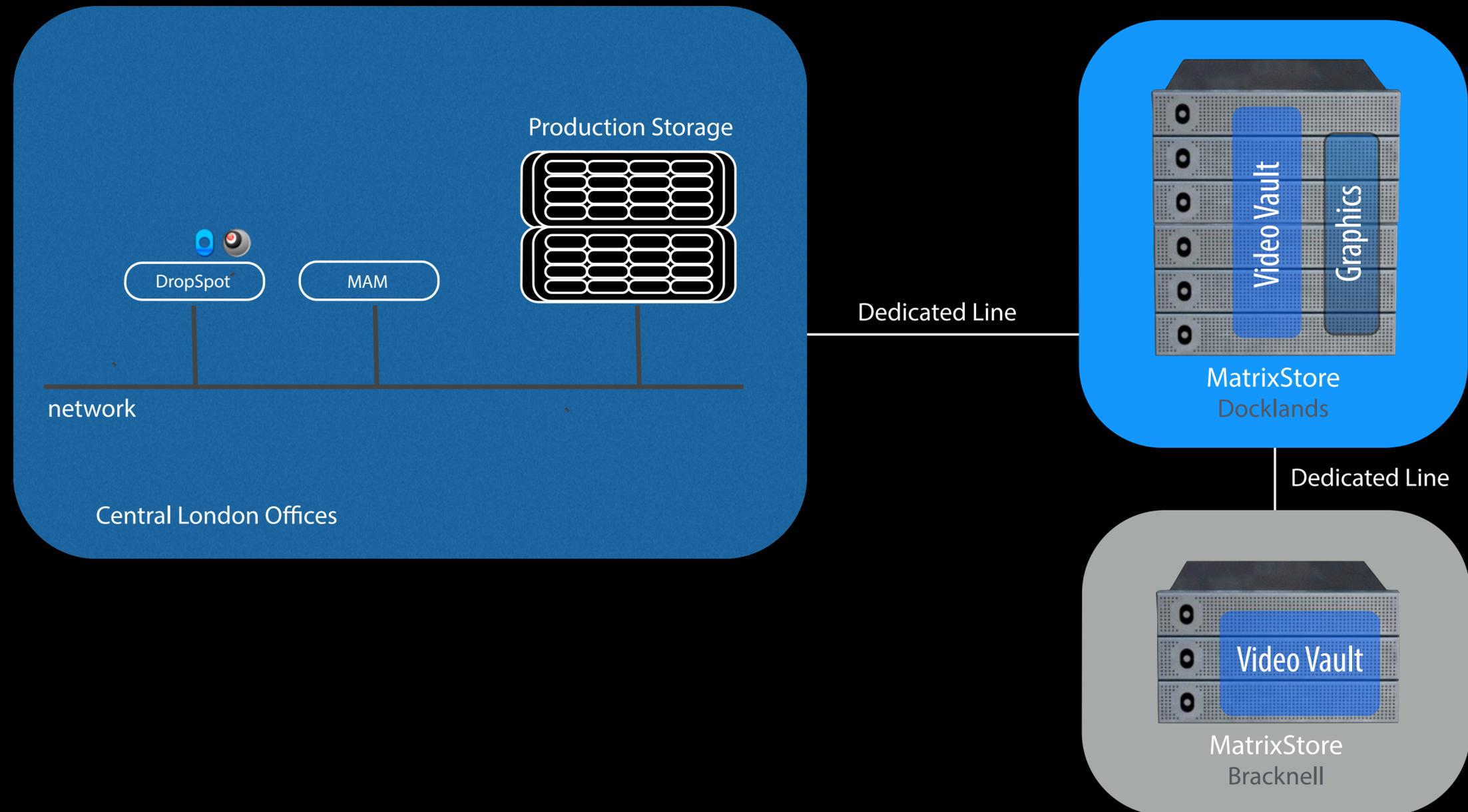
Nearline and Offsite Archive

Using DropSpot (with Forms) or a MAM like Cantemo Portal. Content is sent to MatrixStore which can be hosted locally or in a remote data centre.

Optionally (Guardian) you can replicate vaults to a 3rd location

Re-Purpose Location

Use DropSpot to ingest and add metadata. Use MXFS to browse content in the nearline.



The image features the BBC logo, which consists of the letters 'B', 'B', and 'C' in a bold, white, sans-serif font. Each letter is contained within a white square, and these three squares are arranged horizontally and separated by thin white vertical lines. The entire logo is set against a solid red rectangular background. On the left side of the image, there are two overlapping circular shapes: a smaller, solid black circle in front of a larger, semi-transparent grey circle. The background of the entire image is black.

B B C



Nearline for Interplay

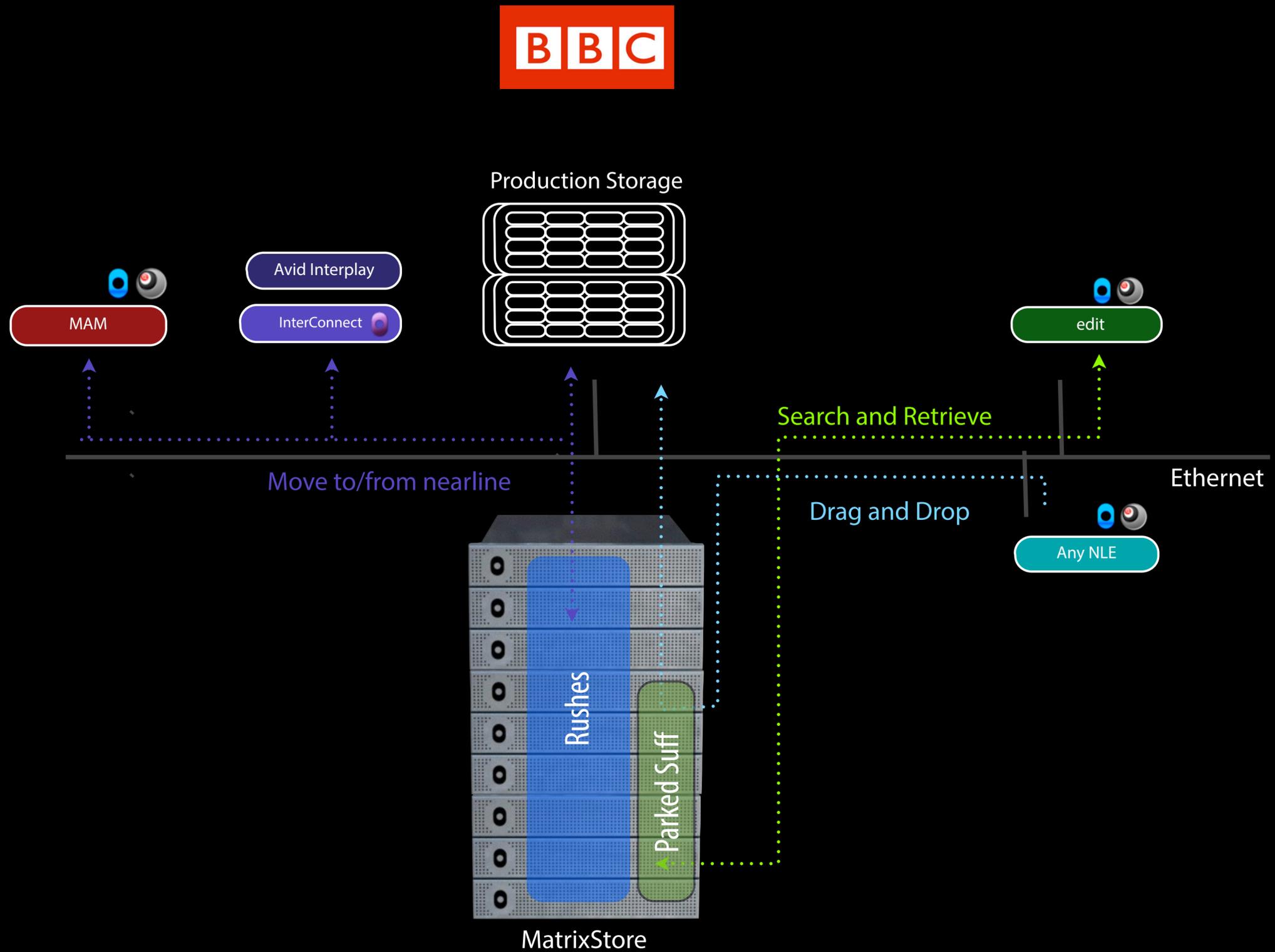
Drag and Drop Clips/Projects into 'To Be Archived' or 'To Be Restored' Folder.

InterConnect moves the data to and from MatrixStore in the background updating Interplay via the Web Services API.

Re-Purpose Location

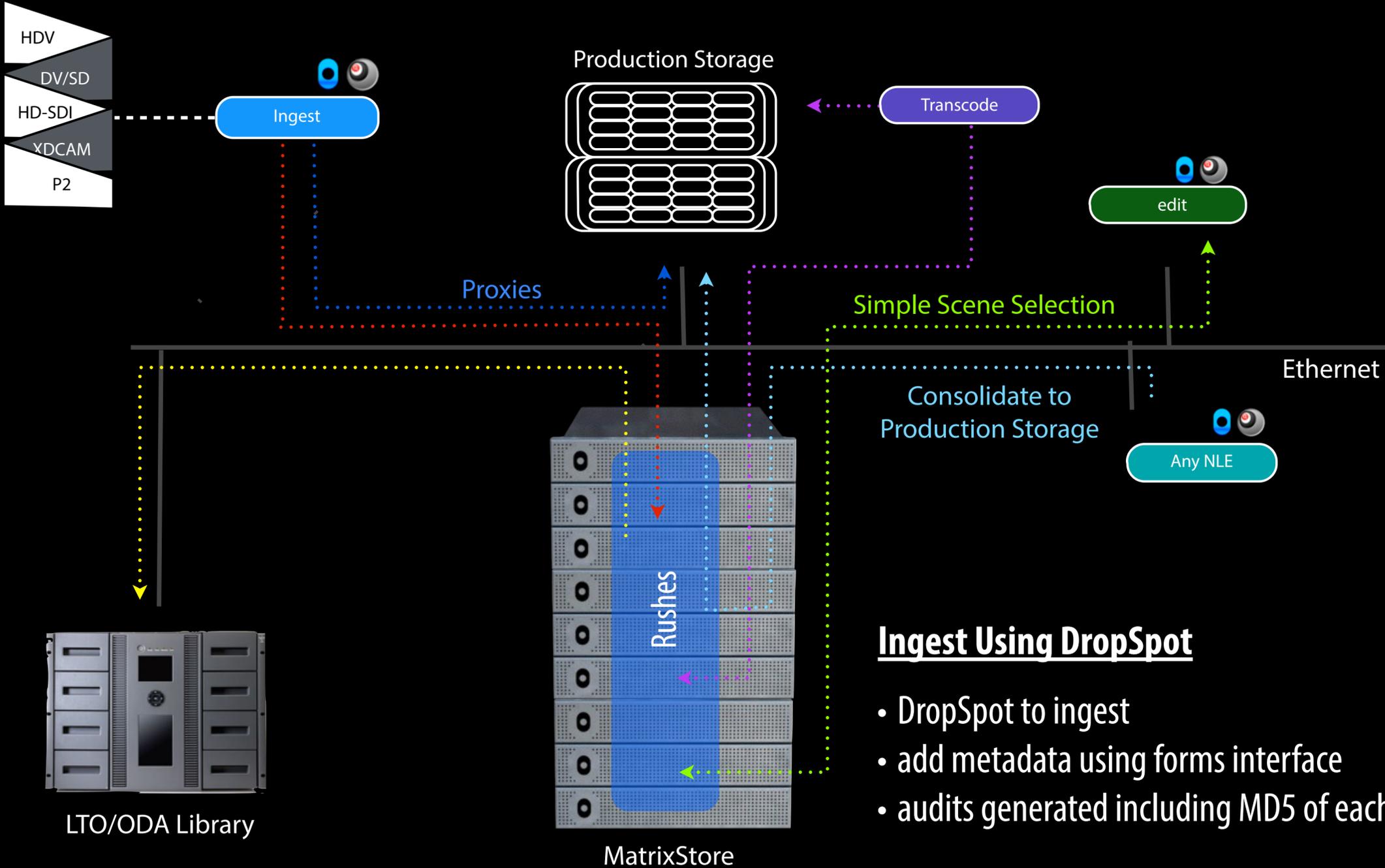
Use DropSpot to ingest and add metadata. Use MXFS to browse content in the nearline.

1.5 Petabytes across two sites



GORILLA

GORILLA



Ingest Using DropSpot

- DropSpot to ingest
- add metadata using forms interface
- audits generated including MD5 of each object stored

The image features the Universal logo, which consists of the word "UNIVERSAL" in a bold, 3D, metallic font. The letters are silver with a gold-colored outline and are positioned in front of a glowing blue globe of the Earth. The globe shows the continents of North and South America. The background is a dark blue space filled with numerous stars and a faint nebula. The overall aesthetic is futuristic and cinematic.

UNIVERSAL

A COMCAST COMPANY

Ingest location

Content landed in dual copy
MatrixStore vault

Transcode

Rhozet Farm reads from vault
and writes to new single copy
proxy vault

Interplay Archive

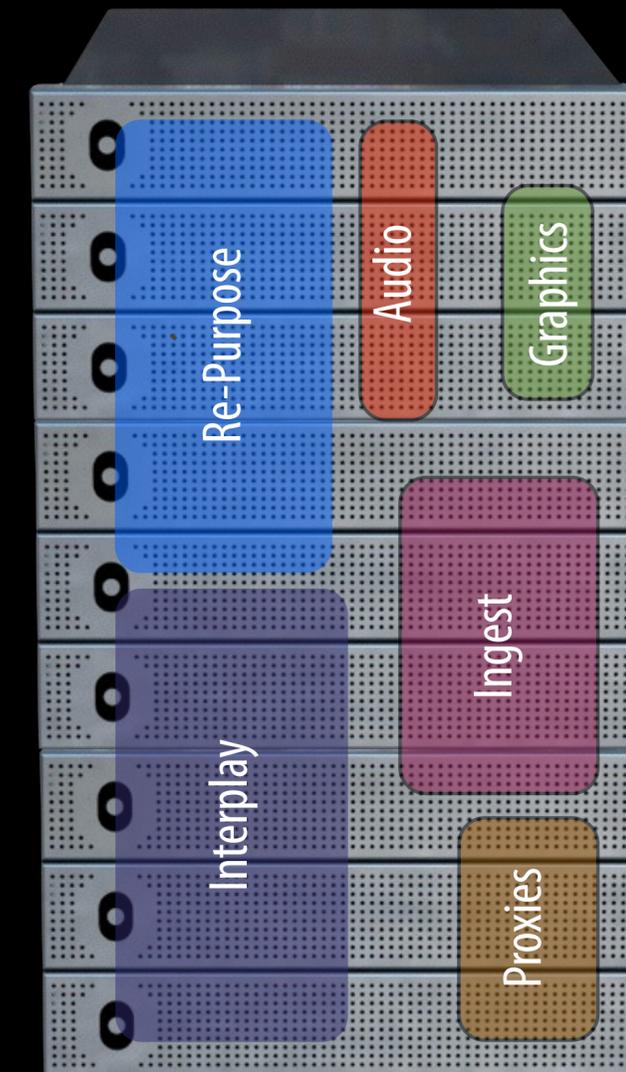
Rhozet Farm reads from vault
and writes to new single copy
proxy vault

Graphics & Audio

DropSpot & MXFS used to provide
secure shared area.

move2LTO

Older content moved to LTO



MatrixStore

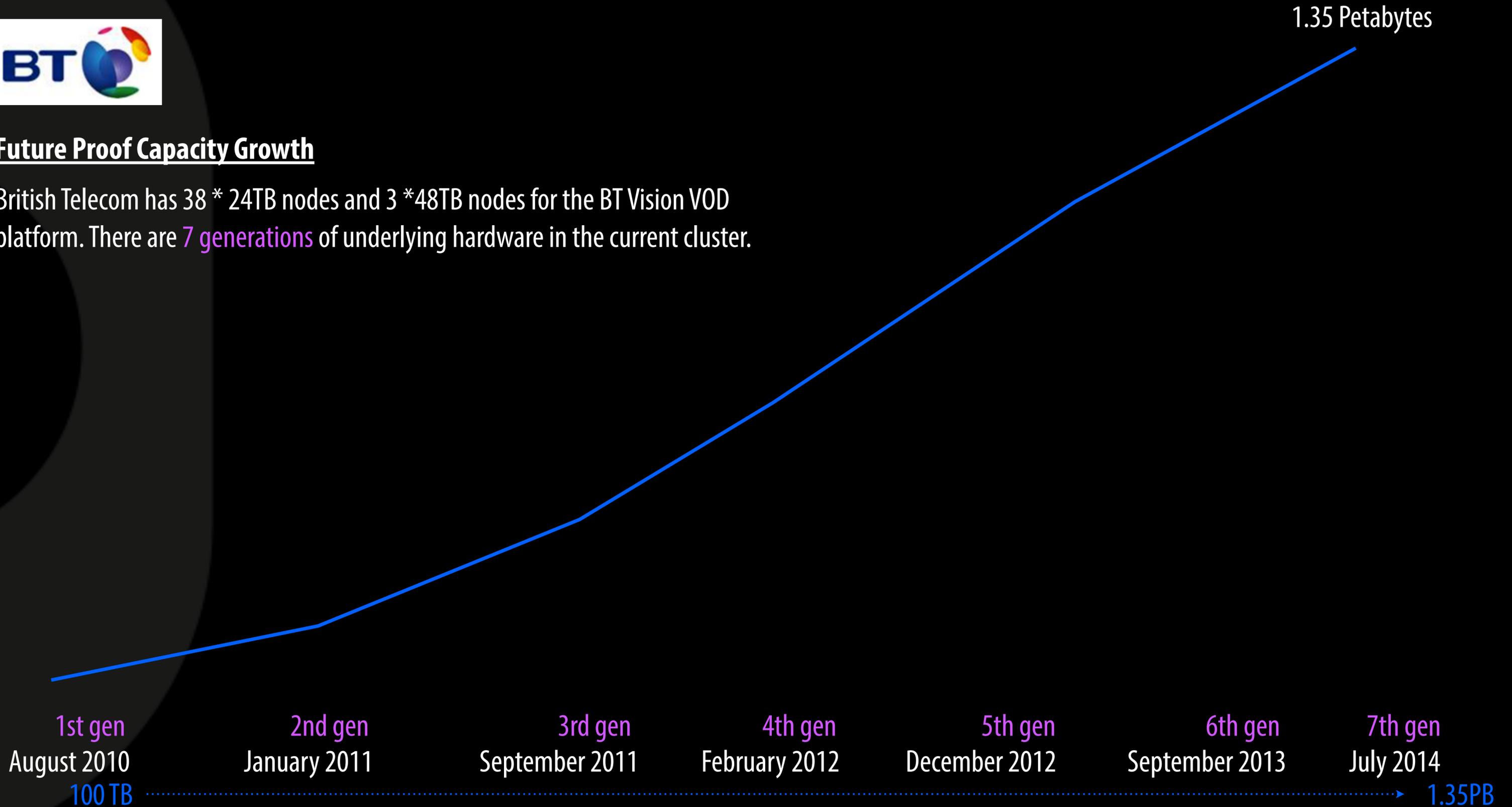




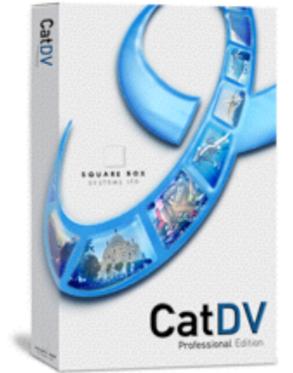
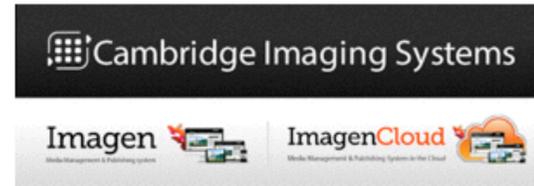


Future Proof Capacity Growth

British Telecom has 38 * 24TB nodes and 3 * 48TB nodes for the BT Vision VOD platform. There are 7 generations of underlying hardware in the current cluster.



Partners including:



Contact Details

Object Matrix

sales@object-matrix.com

+44 (0) 2920 382308

Twitter: [@Object_Matrix](https://twitter.com/Object_Matrix)

home: www.object-matrix.com

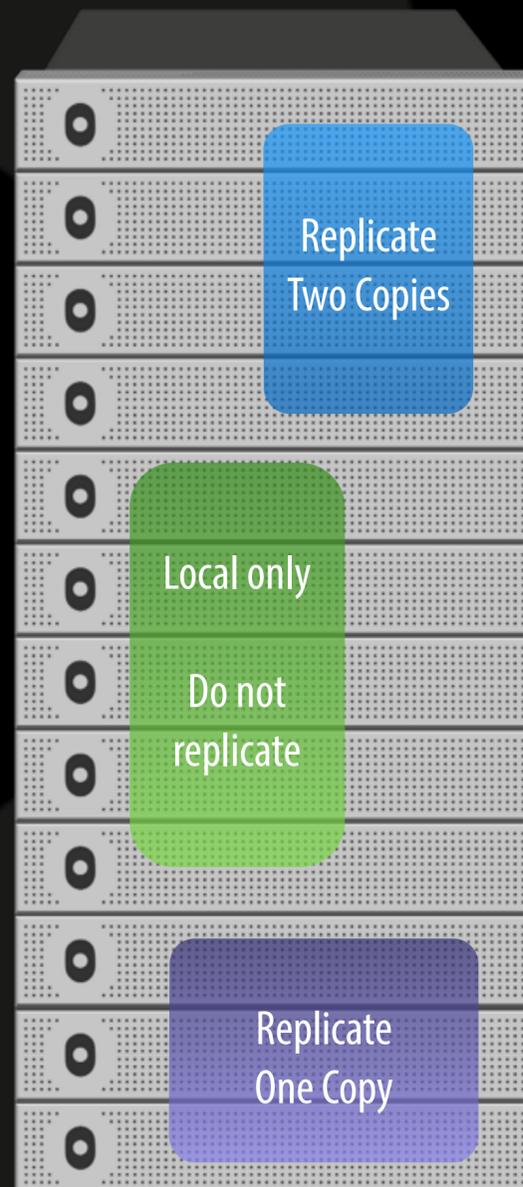
blog: www.matrixstore.net



Some Tech Stuff



Disaster Recovery



- **Vault based**

- Flexible approach ensures only mission critical data is replicated
- Choice of data redundancy levels on both sites

- **Asynchronous**

- Data is protected in two (local) locations instantly
- Copies then made to disaster recovery site asynchronously

- **Self Healing**

- Data is copied between sites during localised loss of availability thus ensuring data protection policies always adhered to

- **Semi-automated**

- Protection of content to DR site is completely automated
- Simple administration required on disaster recovery site when primary site is offline

Disaster Recovery Location Options

1. On Premises Disaster Recovery

(Platforms owned by you in your premises. The most popular option)

2. Hosted Private Cloud

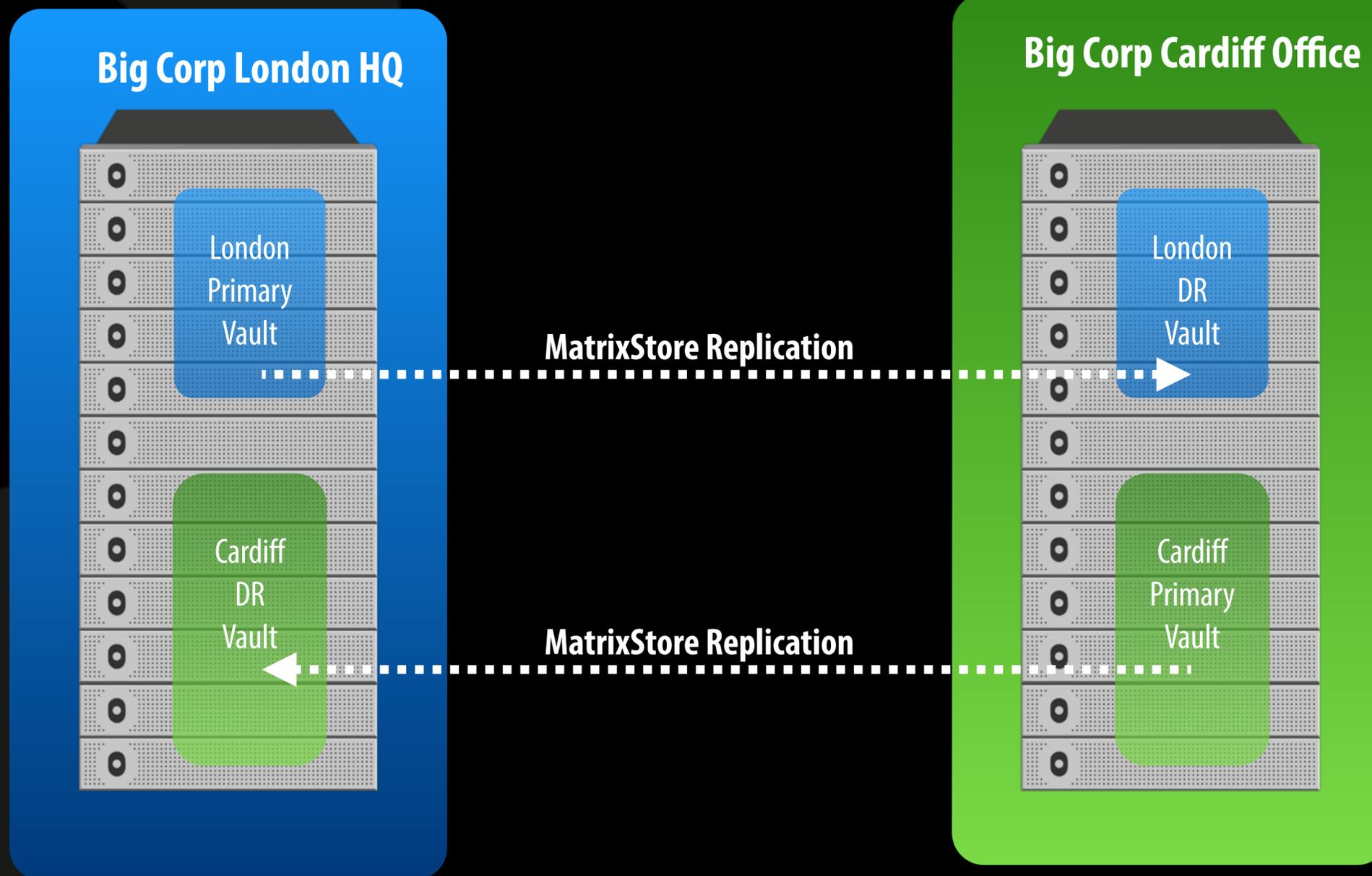
(Platforms owned by you in a mixture of your premises and 3rd party data centres)

3. Hosted Cloud

(Source platform owned by you. Replication platform owned and storage offered as a service by a third party)

1. On Premises Disaster Recovery

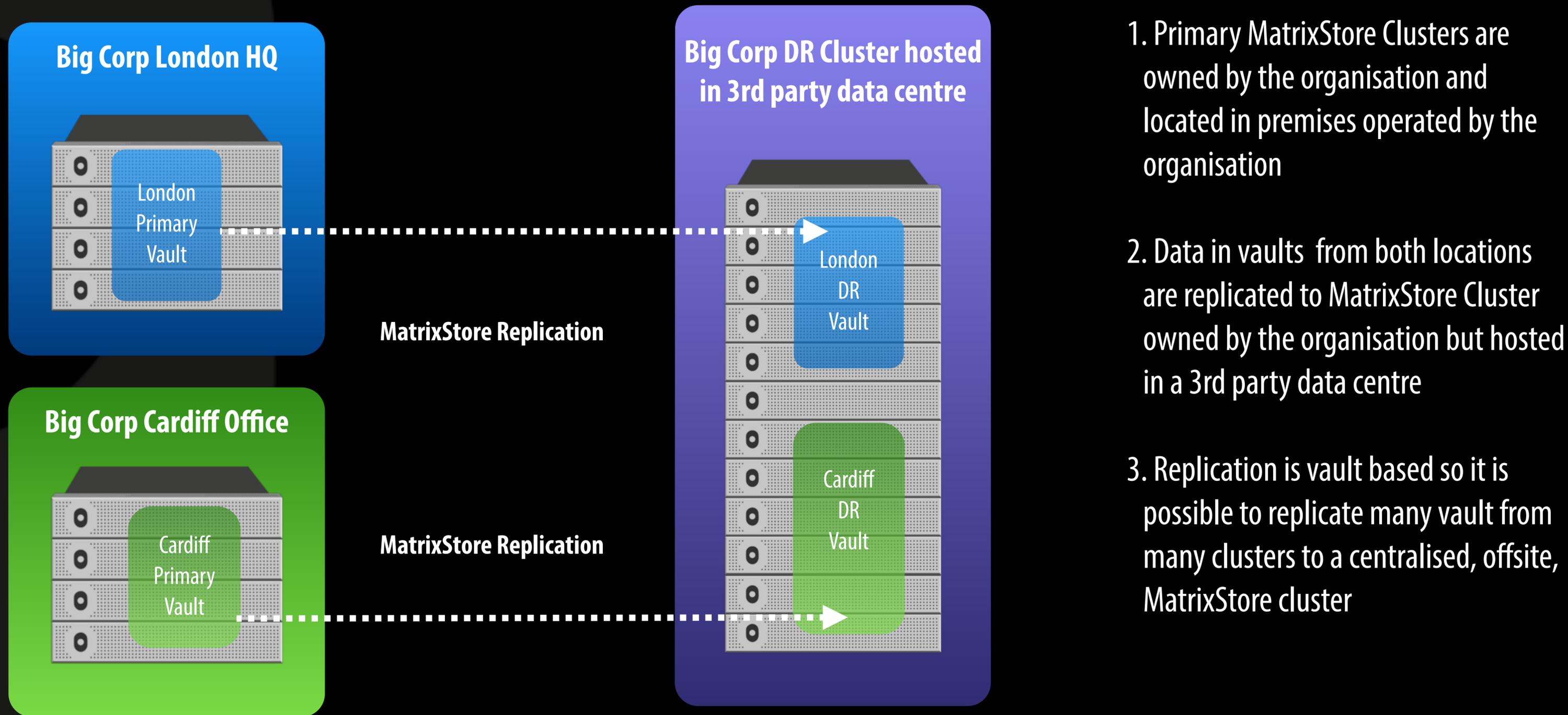
(Where both premises are locations owned and operated by the organisation)



1. MatrixStore clusters are owned by the organisation and located in premises operated by the organisation
2. Vaults in both locations can be replicated to the remote location

2. Hosted Private Cloud for Disaster Recovery

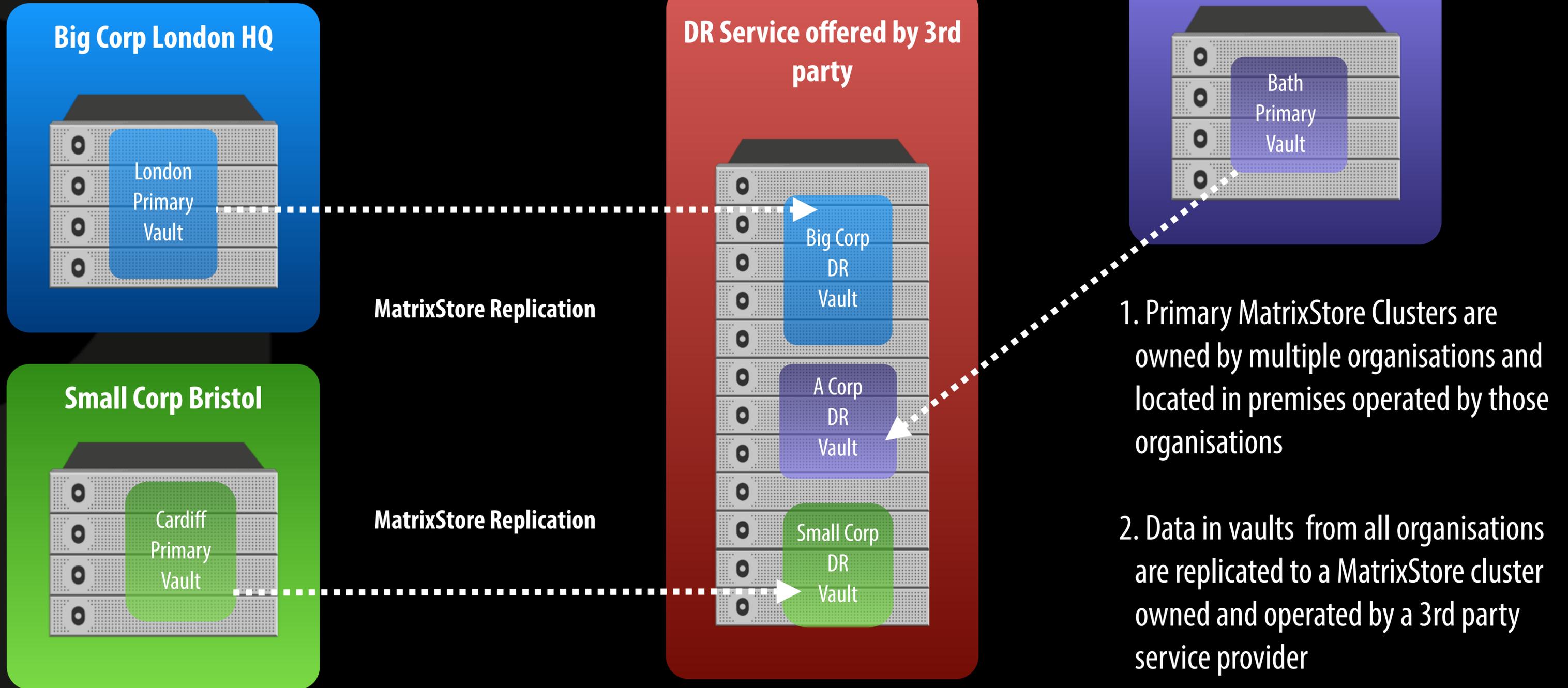
(Where disaster recovery location is hosted in a 3rd party data centre)



1. Primary MatrixStore Clusters are owned by the organisation and located in premises operated by the organisation
2. Data in vaults from both locations are replicated to MatrixStore Cluster owned by the organisation but hosted in a 3rd party data centre
3. Replication is vault based so it is possible to replicate many vault from many clusters to a centralised, offsite, MatrixStore cluster

3. Hosted Cloud for Disaster Recovery

(Where disaster recovery vaults are hosted by a 3rd party service provider)



1. Primary MatrixStore Clusters are owned by multiple organisations and located in premises operated by those organisations
2. Data in vaults from all organisations are replicated to a MatrixStore cluster owned and operated by a 3rd party service provider

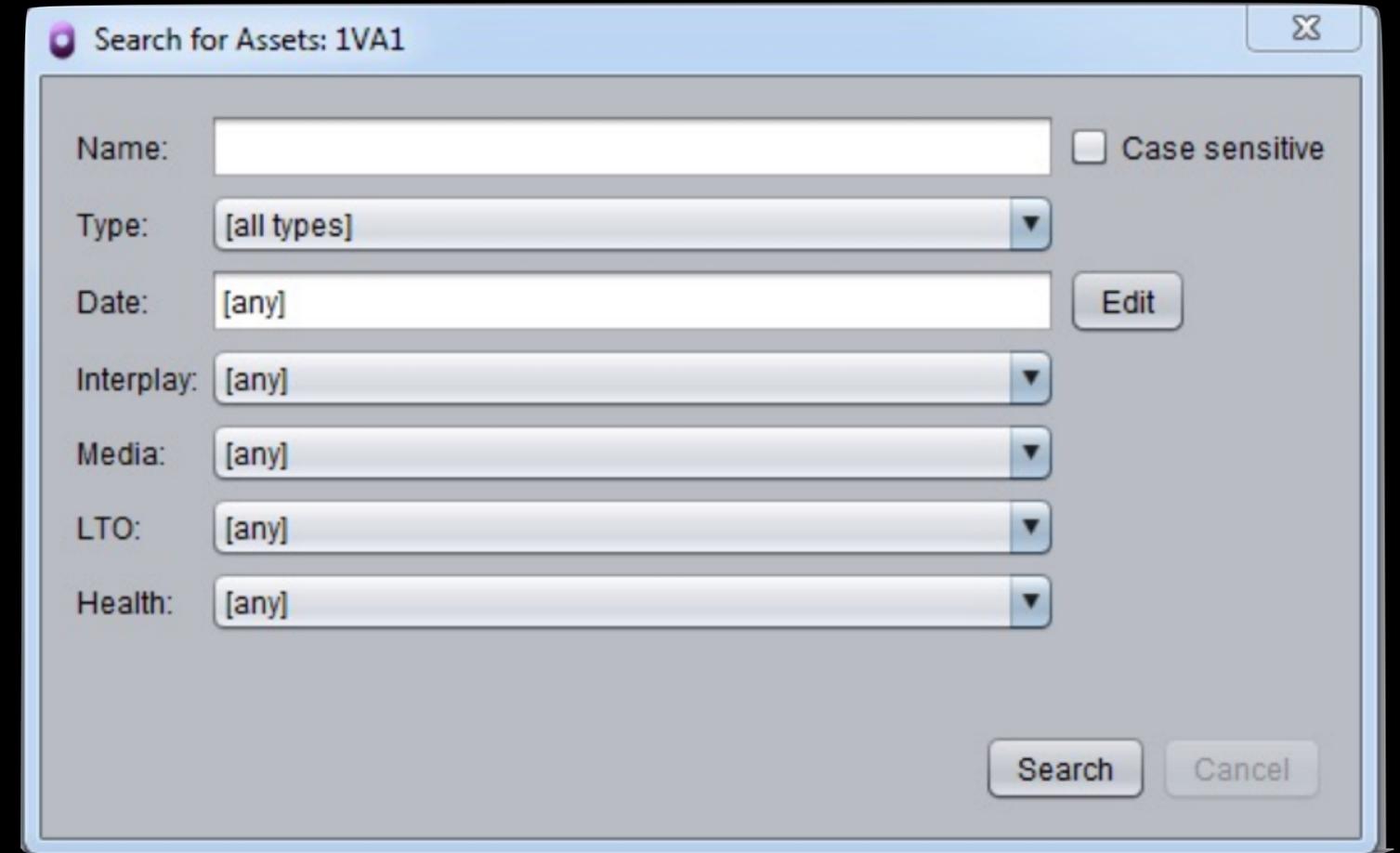


Disaster Recovery & Business Continuity for Avid Interplay Workflows

- The MatrixStore Disaster Recovery solution for Avid Interplay ensures all your assets can be available 24/7 at local or remote locations
- InterConnect provides the ability to select assets from the MatrixStore disaster recovery cluster when you need them most
- Get only the content you need, when you need it
- Know that all the media and metadata from all your projects are safe in two locations
- Use DropSpot and MatrixStore to tag, archive and replicate Avid project files from multiple workstations and locations
- The Object Matrix solution is flexible, scalable and proven

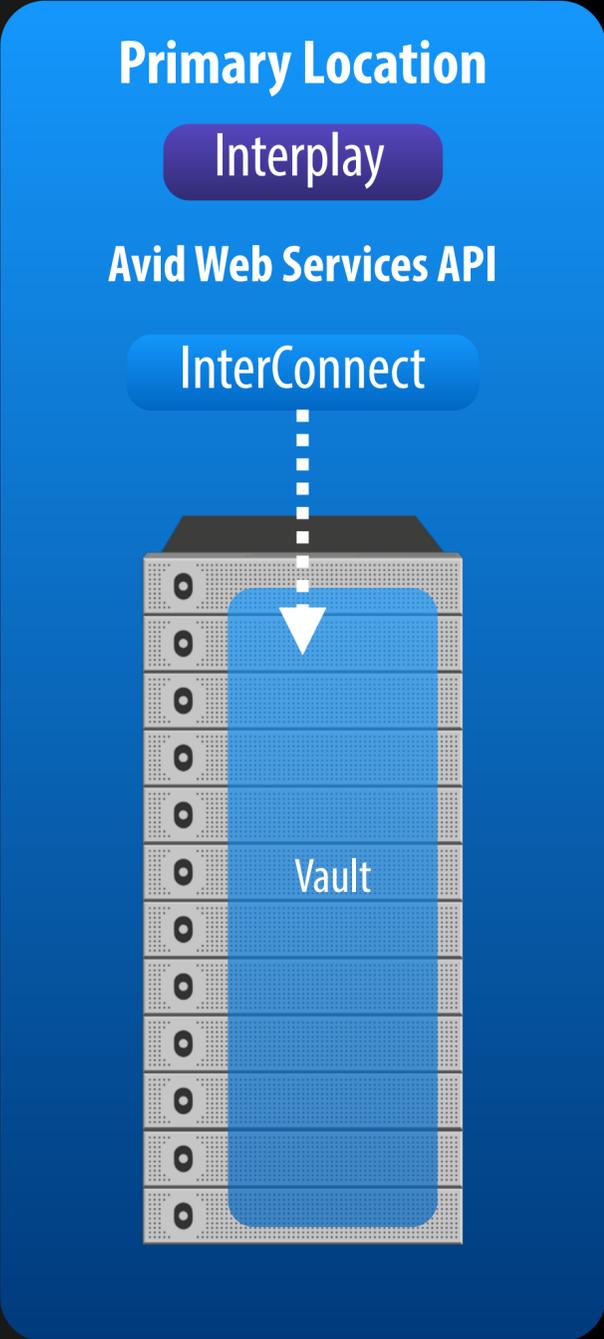
The Workflow

1. Manually Archive assets using Interplay Access with InterConnect configured
2. MatrixStore Asynchronously replicates the media and selected metadata to the disaster recovery site
3. At the Disaster Recovery site use the InterConnect Explorer to search for and restore selected assets to the clean Interplay
4. Simply open the project in Media Composer and your editors are working again
5. That simple



InterConnect Explorer - search for archive assets to restore

Business Continuity Elements



Interplay

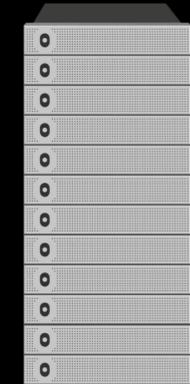
...▶ Avid PAM

InterConnect

...▶ Archive & Parking Application (from Object Matrix) for Avid Interplay



...▶ MatrixStore Vault. Analogous to Avid Workspace. Create and enforce storage, protection and business rules. Very flexible approach to managing your content



...▶ Enterprise MatrixStore Cluster. The proven and trusted object storage platform. MatrixStore scales in capacity, performance and workflows. Business Continuity built in via MatrixStore Replication

Avid Web Services API

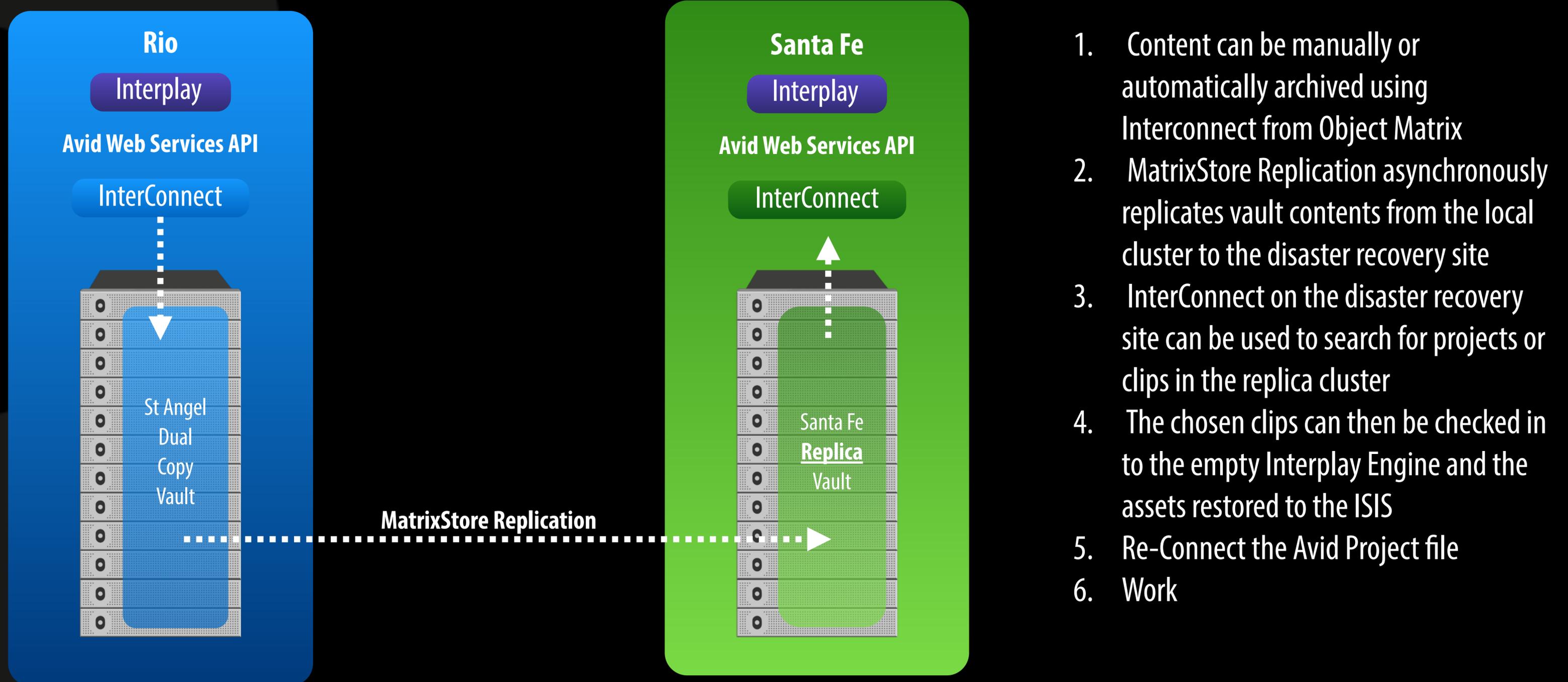
...▶ Avid API for interrogating and manipulating the AVID Interplay PAM



...▶ DropSpot MAM. Simple asset management for tagging, archiving and finding content in a MatrixStore cluster. Can also be used to retrieve content if the Interplay database is not available

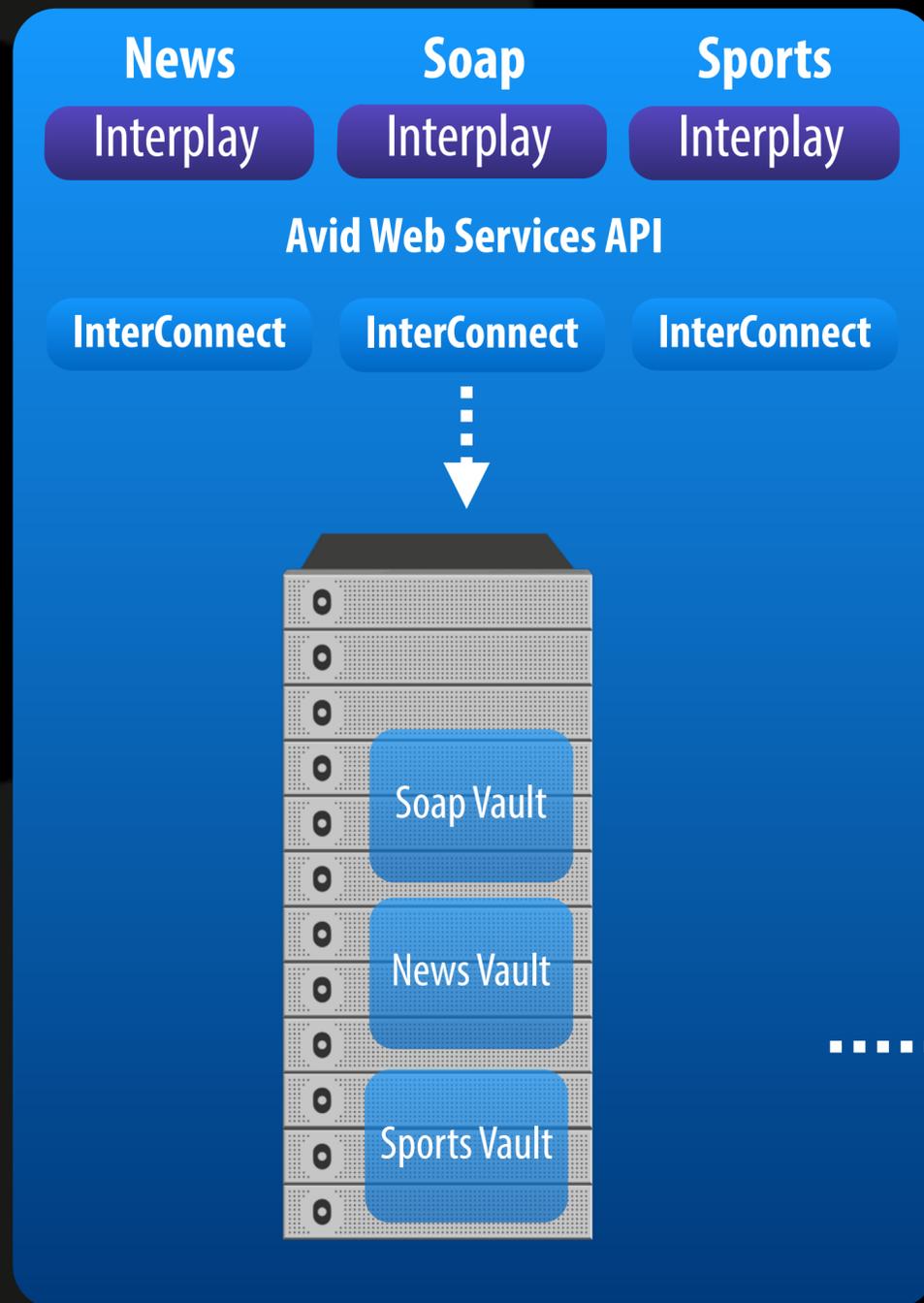
1. Offsite With MatrixStore Replication

(Where Rio is a production centre with the DR site in Santa Fe)



2. Multiple Interplays

(Where any archived asset form multiple Interplay platforms can be restored to a single Interplay platform at the DR site)



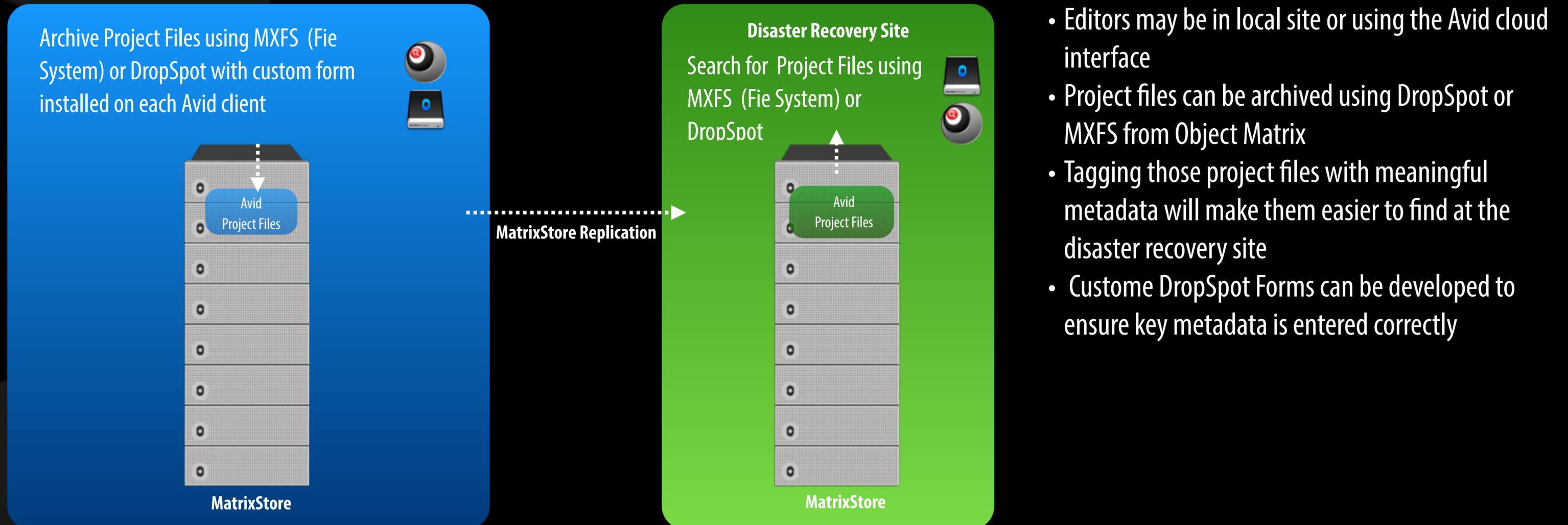
MatrixStore Replication



1. It is possible to have multiple Interplay instances archiving to multiple vaults in a single MatrixStore cluster
2. Each vault replicates its own data
3. Only restore the clips needed at the disaster recovery site
4. No need to replicate and re-install databases
5. Object Matrix approach is flexible and scalable

Archive and Replicate Project Files

(Tag, archive and find project files. Simple but essential)



- Editors may be in local site or using the Avid cloud interface
- Project files can be archived using DropSpot or MXFS from Object Matrix
- Tagging those project files with meaningful metadata will make them easier to find at the disaster recovery site
- Custom DropSpot Forms can be developed to ensure key metadata is entered correctly

Benefits

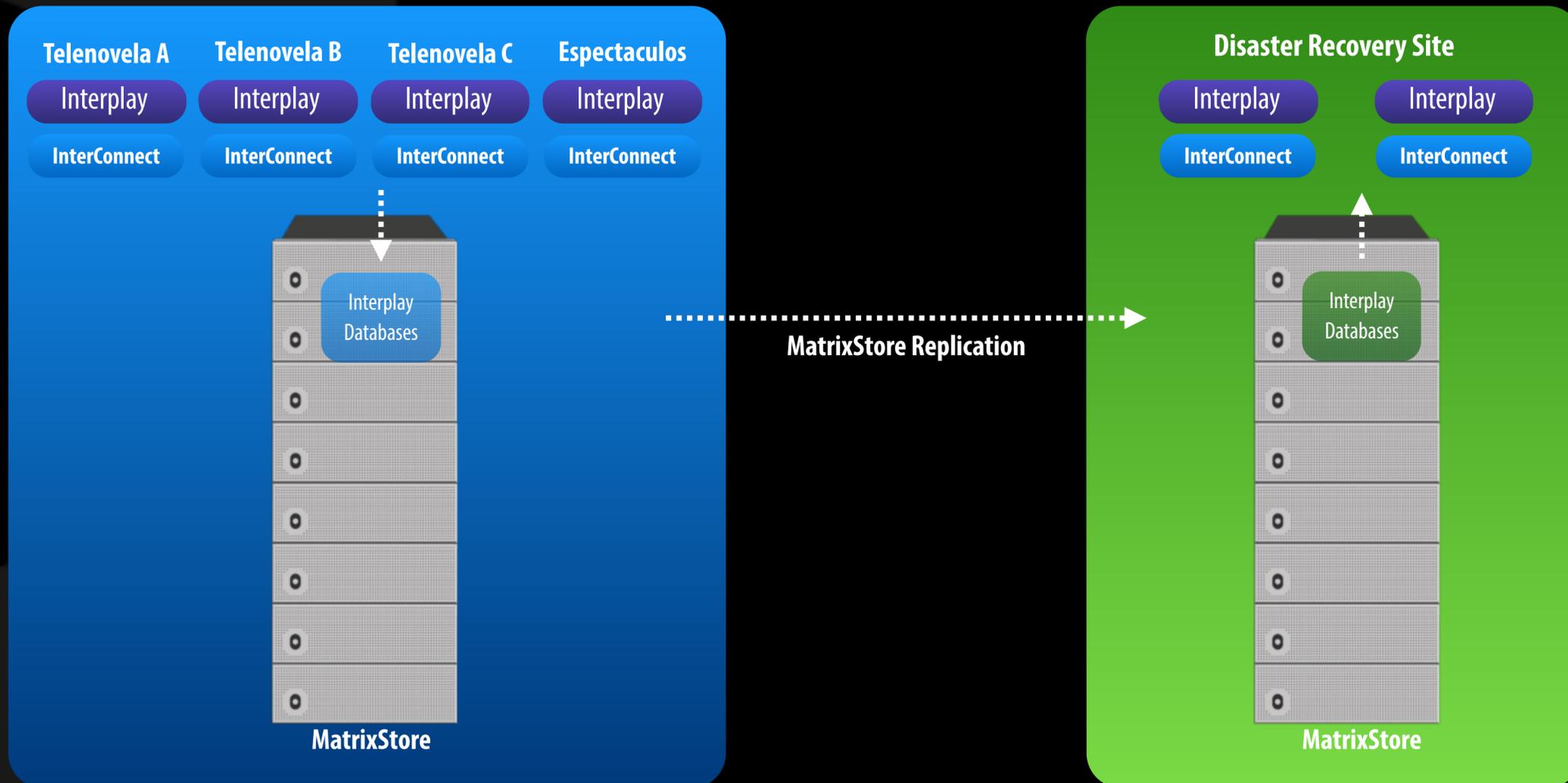
- Proven Replication Model (In production in Broadcast and VOD operations)
- All data is available 24/7 not just the data in the robots
- Does not rely on third party database utilities
- Does not require 1 to 1 Interplay installations at DR site
- Workflow is seamless and the storage self-managing
- High availability and disaster recovery roadmap exists for clients in Latin America and Europe
- Easy to bolt on more MatrixStore Storage or integrated with LTO via 3rd party middleware
- Easy to add other workflows (Adobe, Apple, DVS etc) to existing MatrixStore cluster
- Future Proof Scale. Migration to new technology happens in the box unlike LTO platforms

Avid Interplay Database Backup

- It is good practice to backup your Interplay databases
- Making those backups available on a secure, live and redundant storage platform also makes good business sense as databases have a habit of going wrong
- Replicating those backups ensures that any Interplay databases can be loaded up at the DR site at any time. Not the cleanest operation but a solution of last resort
- There is no reliance on a third part database utility

Archive and Replicate Avid Interplay The Database

(Tag, archive and find project files. Simple but essential)



- Editors may be in local site or using the Avid cloud interface
- Project files can be archived using DropSpot or MXFS from Object Matrix
- Tagging those project files with meaningful metadata will make them easier to find at the disaster recovery site
- Custom DropSpot Forms can be developed to ensure key metadata is entered correctly

Benefits Including:

- Self-Healing Functionality in the event of any hardware failure providing 99.999% uptime
- Future Proof. No “Lock in” to specific hardware or workflows
- Ability to process data in place (PiP)
- Data Integrity check with “checksum” (MD5 or Adler32)
- Proven Workflows – tight integration with various technology platforms and partners
- View the data as needed: Volume or Drive Letter, SMB, FTP or DropSpot, our ingest and search tool.
- Single Namespace. Very scalable file-system to petabytes and beyond
- Distinct vaults provide multiple tenancy and data protection options
- Very low TCO (Total Cost of Ownership: Easy to use and administer)
- Easy to add capacity and performance (In less than 1 minute)

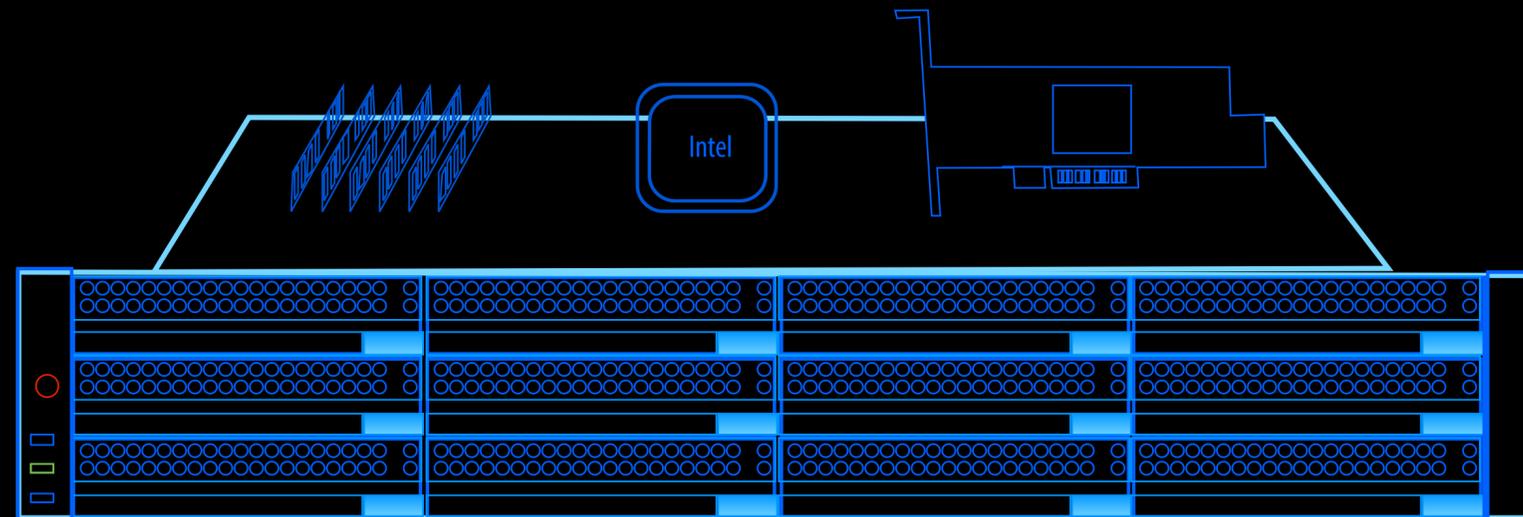


MatrixStore Enterprise Cluster

Contains a minimum of 3 MatrixStore nodes



What is in a MatrixStore Node?



- Off the shelf commodity components (CPU, Enterprise Drives, RAID6 Controller, GigE or 10GigE ports etc)
- Standard Linux Operating System and File System
- MatrixStore Software

Each MatrixStore Node is Responsible for:

- Maintaining the protection levels of its own data
- Participating in the health and load balancing of the overall cluster
- Providing a searchable, in memory, database of its own data
- MatrixStore PiP - Process in Place functionality enabling processing of data locally as and when required (Extraction of AS11 metadata etc.)

What is a MatrixStore Vault?

MatrixStore objects are stored in vaults. A vault is a secure virtual storage space within a MatrixStore cluster that allows data to be treated according to digital preservation policies set by the administrator. Policies that can be set include:

- Number of copies in local cluster
- Number of copies in remote cluster for disaster recovery purposes
- Retention Period. Lock content down from accidental or malicious deletion

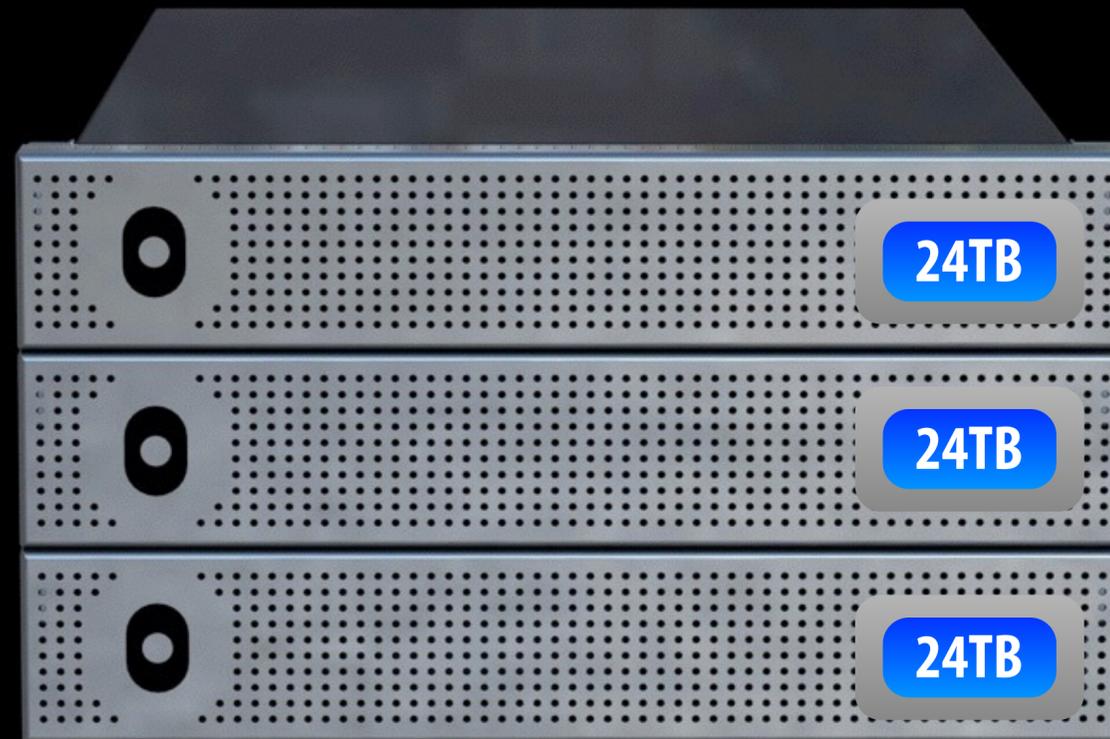
Vaults also provide a means by which to share storage infrastructure amongst departments, clients, projects or workflows.

MatrixStore hub, hub+

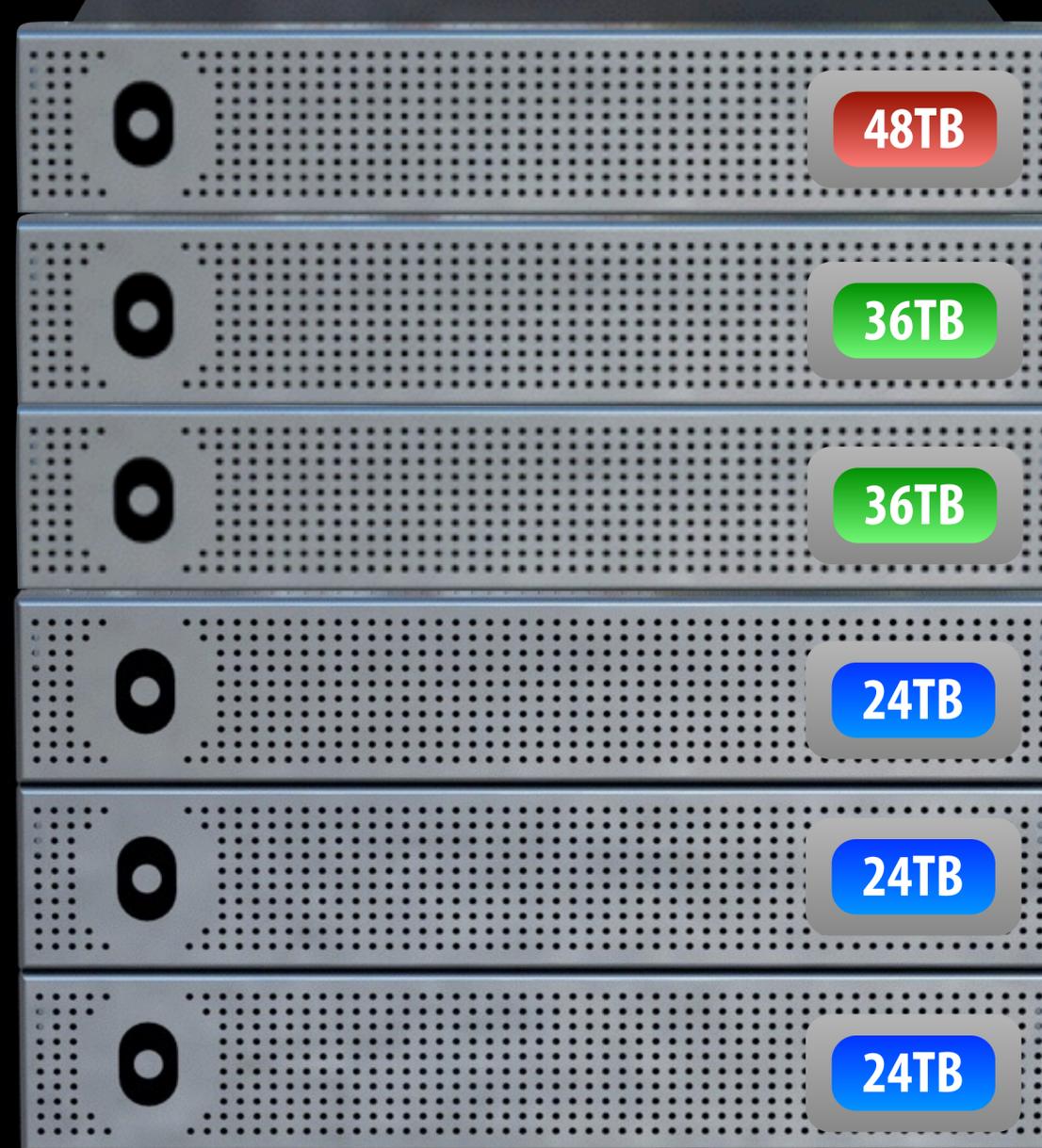


	hub	hub+
Operating System	Ubuntu Server	Ubuntu Server
Supported Interfaces	SMBv2.002	SMBv2.002
Connectivity	Dual GigE / 10GigE	Dual GigE / 10GigE
Number of Ports	2,4	8, 12, 24
Power Consumption	150-270W	150-270W
Dimensions	1u (Rack Mounted)	1u (Rack Mounted)
Power	Dual (Redundant)	Dual (Redundant)

How Does a MatrixStore Cluster Scale?

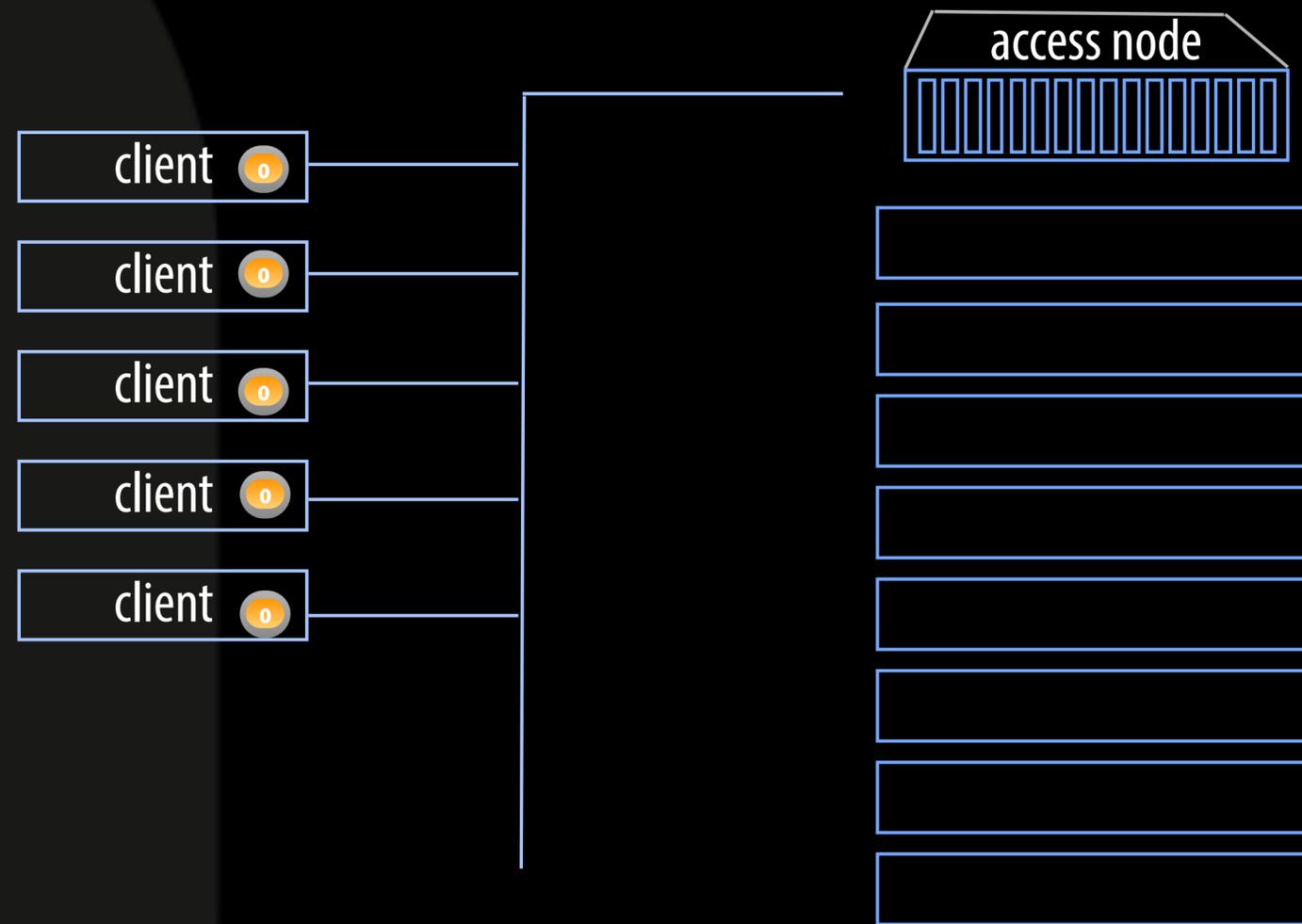


The minimum configuration for a MatrixStore cluster is 3 nodes of the same capacity footprint.



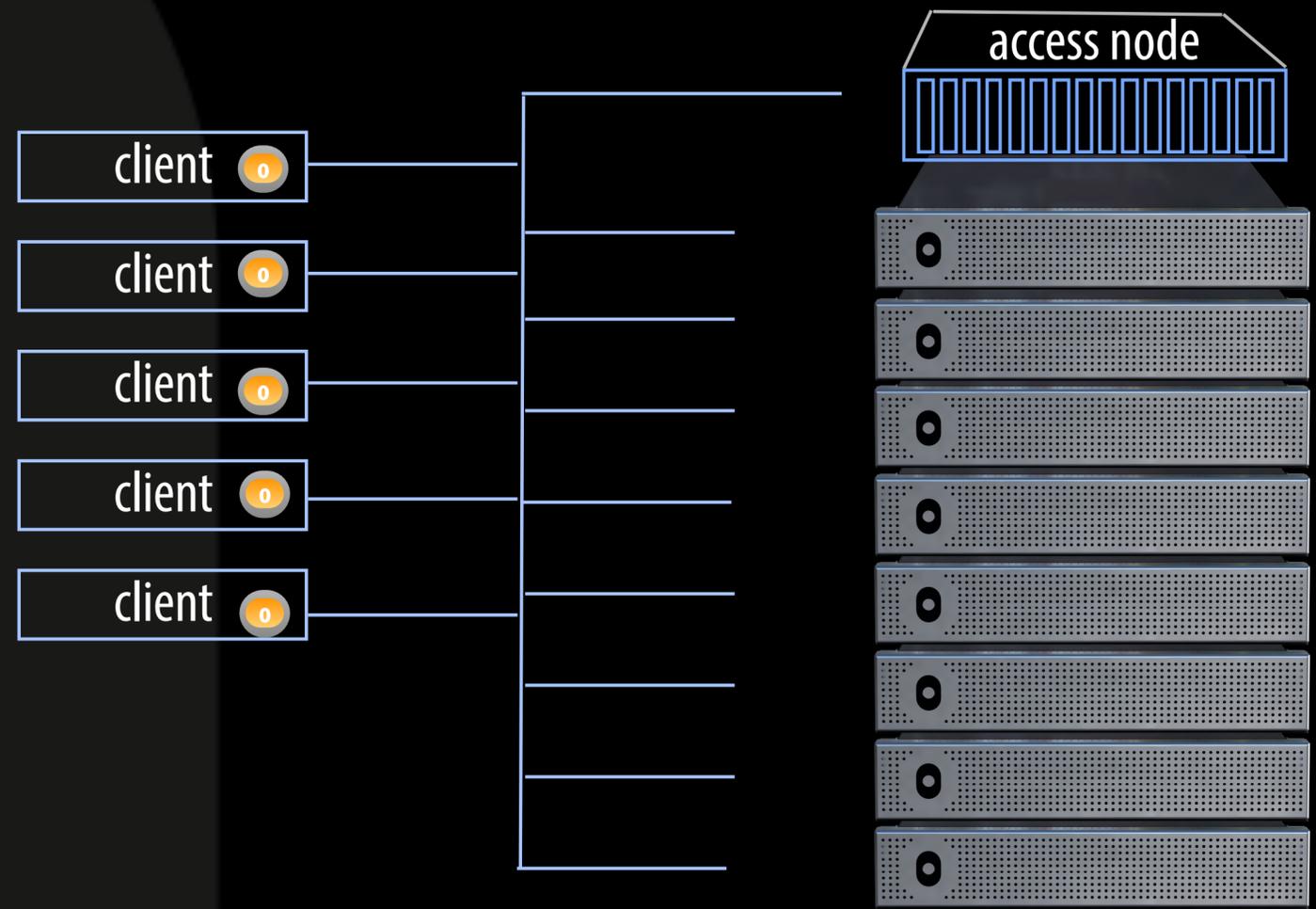
After which nodes of any size or certified technology can be added to the cluster

How Does a MatrixStore Cluster Scale in Performance?



Traditional architectures and even some object based solutions need some sort of head node, metadata controller or access node.

which can be limiting to scaling performance and capacity



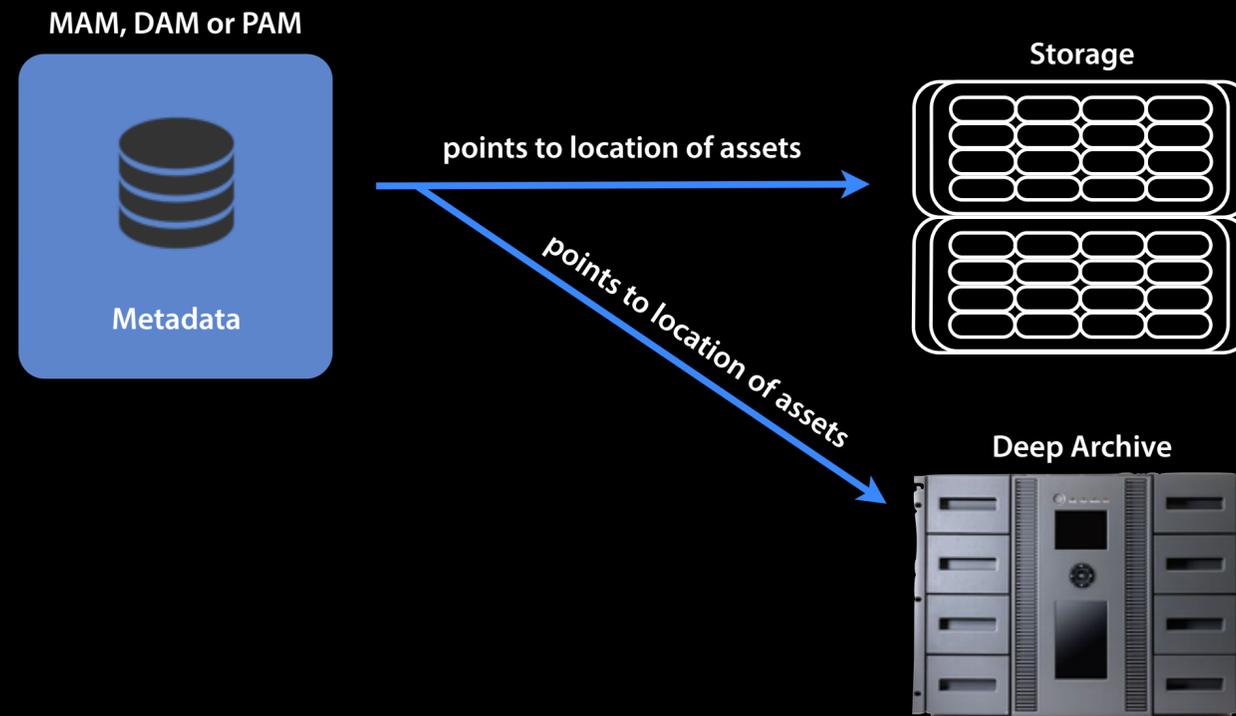
With MatrixStore there is no head node,
network node or access node with expansion
chassis to get in the way of true scaling

all MatrixStore nodes are connected to the
network for direct client connections

Metadata

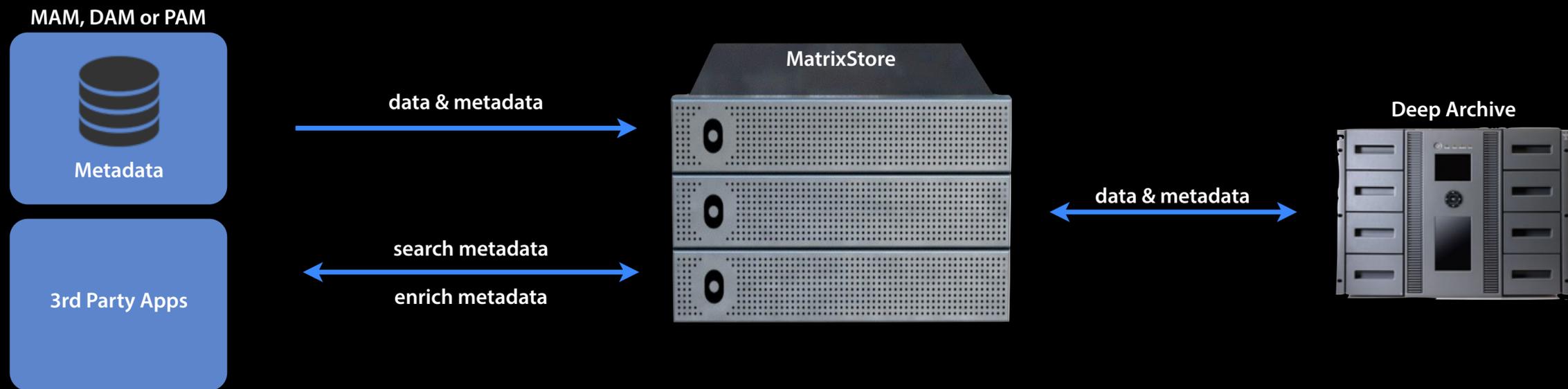


Metadata (Traditional Model)



- Metadata not protected beyond simple MAM database backup
- Metadata not easily accessed by third party applications
- Metadata store to Deep Archive can be in proprietary format
- Change to MAM system means data could be in danger of being disconnected or lost

Metadata (MatrixStore Model)



- MatrixStore protects the Essence and Metadata in non-proprietary format
- Future proof access to content dependent on the Metadata
- If the MAM changes the metadata can be automatically scanned and ingested
- Able to extract key metadata from supported standards such as AS11 (DDPP)

Metadata Forms

Custom metadata tagging and search forms offered by DropSpot application



BBC Studios and Post Production
bbcstudiosandpostproduction.com @BBCStudios

A/C Number	<input type="text"/>
Cam A/B	<input type="text"/>
Clip Range	<input type="text"/>
Couple	<input type="text"/>
Camera	<input type="text"/>
Content	<input type="text"/>
Programme	<input type="text" value="SCD Series 10"/>
Shoot Date	<input type="text"/>
TX	<input type="text"/>
Cleared for reuse	<input type="text" value="No"/>

Archive logo_line.png into root folder

Where: Vault

NBC UNIVERSAL

Project Title	<input type="text" value="Battleship"/>
Project Type	<input type="text" value="Trailer"/>
Element Name	<input type="text" value="Promo 1"/>
Version	<input type="text" value="N/A"/>
Tape/Creation Date On	<input type="text" value="01/04/2012"/>
Series	<input type="text" value="1"/>
Episode	<input type="text" value="5"/>
Invisible Watermark Info	<input type="text" value="WMD ###"/>
Visible Watermark Info	<input type="text" value="Person's Name"/>
Frame Rate	<input type="text" value="24p"/>
Aspect Ratio	<input type="text" value="4.3"/>
Audio	<input type="text" value="320k"/>
Duration (min)	<input type="text" value="5"/>
Colour Space	<input type="text" value="RGB"/>
File Type	<input type="text" value="MOV"/>
Additional Notes	<input type="text" value="Example"/>

Cancel OK

Data Security & Integrity

- Independently verified security protocols and practices
- All transmitted data packets are fully encrypted(256-bit) and authenticated.
- High resistance to 'denial of service' attacks
- Strictly enforced user authentication
- Safe from viruses
- Tamper proof messaging
- All content is has guaranteed integrity on ingest. Checksum generated is stored as metadata for ongoing integrity guarantee

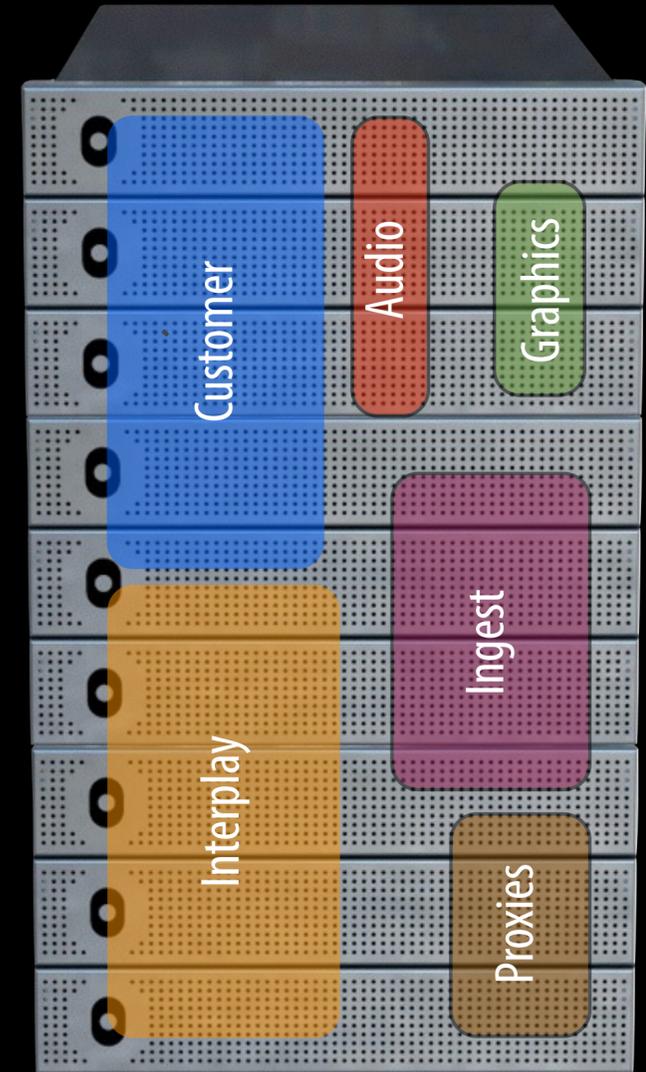
Business Rules



- Create policies on MatrixStore vaults to protect content in accordance with business needs
- Lock vaults down to ensure data is not lost through accidental or malicious action
- Retention periods can be set on vaults so data is locked down for a specific amount of time
- Vaults can replicate data to a remote location for disaster recovery or data sharing

Multiple Tenancy

Allows many workflows, departments, customers or projects to independently use the same physical platform



Future Proof

- Object Matrix uses non-proprietary platforms, operating systems, file systems & data formats
- Add any qualified MatrixStore node to a cluster. No limit on node size
- If Linux supports future hardware components, Object Matrix will qualify them
- API and multiple interfaces (SMB etc) provides access to content from any workflow
- Metadata stored in an open format providing access to content now and in the future

References

White paper

<http://www.object-matrix.com/MatrixStoreTechnologyArchitecture.pdf>

Small Videos

Object Storage: <http://www.matrixstore.net/2014/05/19/object-storage-benefits-in-media-workflows-2/>

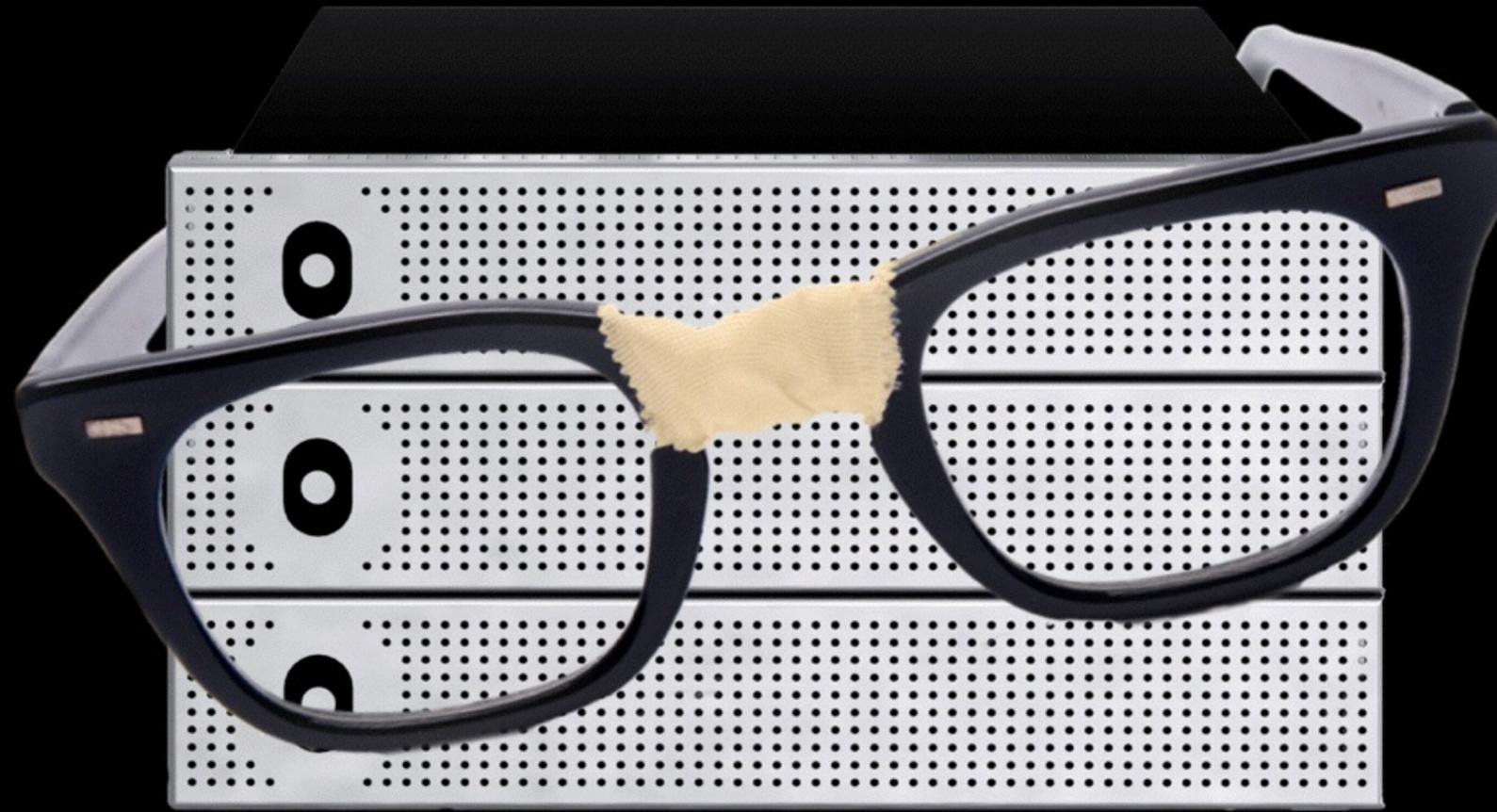
What's a MatrixStore node: <http://www.matrixstore.net/2010/02/26/matrixstore-concepts-what-is-a-matrixstore-node/>

How does MatrixStore scale: <http://www.youtube.com/watch?v=BUWpit2EUyE>

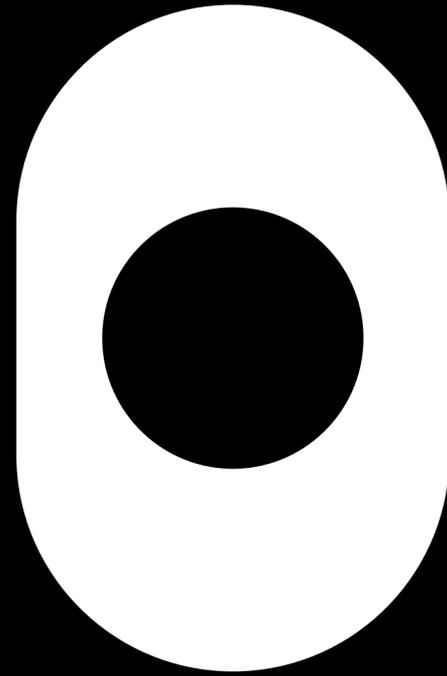
Digital Preservation: <http://www.matrixstore.net/2010/03/16/the-matrixstore-pre-production-archive-for-file-based-content/>

MatrixStore.

The trusted disk based nearline storage from Object Matrix



The storage geek so you don't have to be.



ObjectMatrix