Leveraging Cloud Storage for Mainframes

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Session #17711

What, Why, and How of Cloud Storage

- Cloud Storage and Cloud Computing are changing how IT operates – outside of the mainframe data center

- Trends and Tides

- Use Cases

- CloudTAPE - How it Works

- Questions

Why Cloud Storage?

- Agility and scalability drives cloud deployment value more than cost

- 2014 is the year that Enterprise IT embraced Cloud

- **Cloud IT infrastructure spending climbed to nearly 30% of overall IT infrastructure spending in 1Q15, up from 26.4% a year ago (IDC)**

- AWS 81% YoY Growth and profitable

- Cost is compelling
  - IT infrastructure is now driven by low margin and capital intensive cloud business models

- Security is now a driving reason TO USE Cloud (Security now up to 10% of Enterprise IT budgets)

Trends and Tides

- AWS Cloud Storage Pricing

	Standard Storage	Reduced Redundancy Storage	Glacier Storage
First 1 TB/mo	$0.0300 per GB	$0.0240 per GB	$0.0100 per GB
Next 49 TB/mo	$0.0295 per GB	$0.0236 per GB	$0.0100 per GB
Next 450 TB/mo	$0.0290 per GB	$0.0232 per GB	$0.0100 per GB

- *IBM SoftLayer Object Storage Pricing at $0.04/GB/month*
- *Oracle Storage Cloud Archive $0.001/GB/month*
- *Google Announced 100PBs FREE of cloud storage (restrictions apply)*
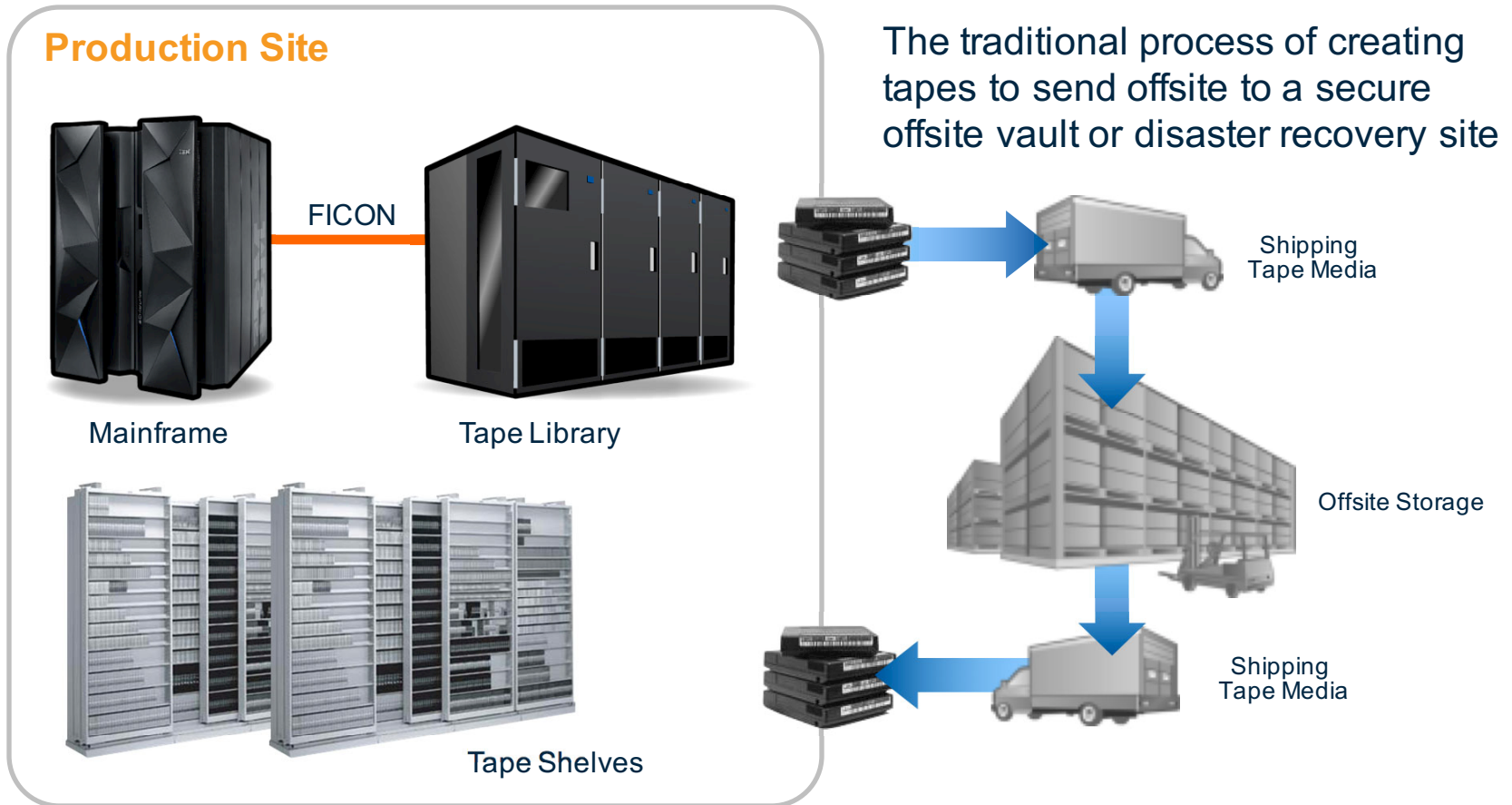- *Cloud Storage leading the Race to Zero*

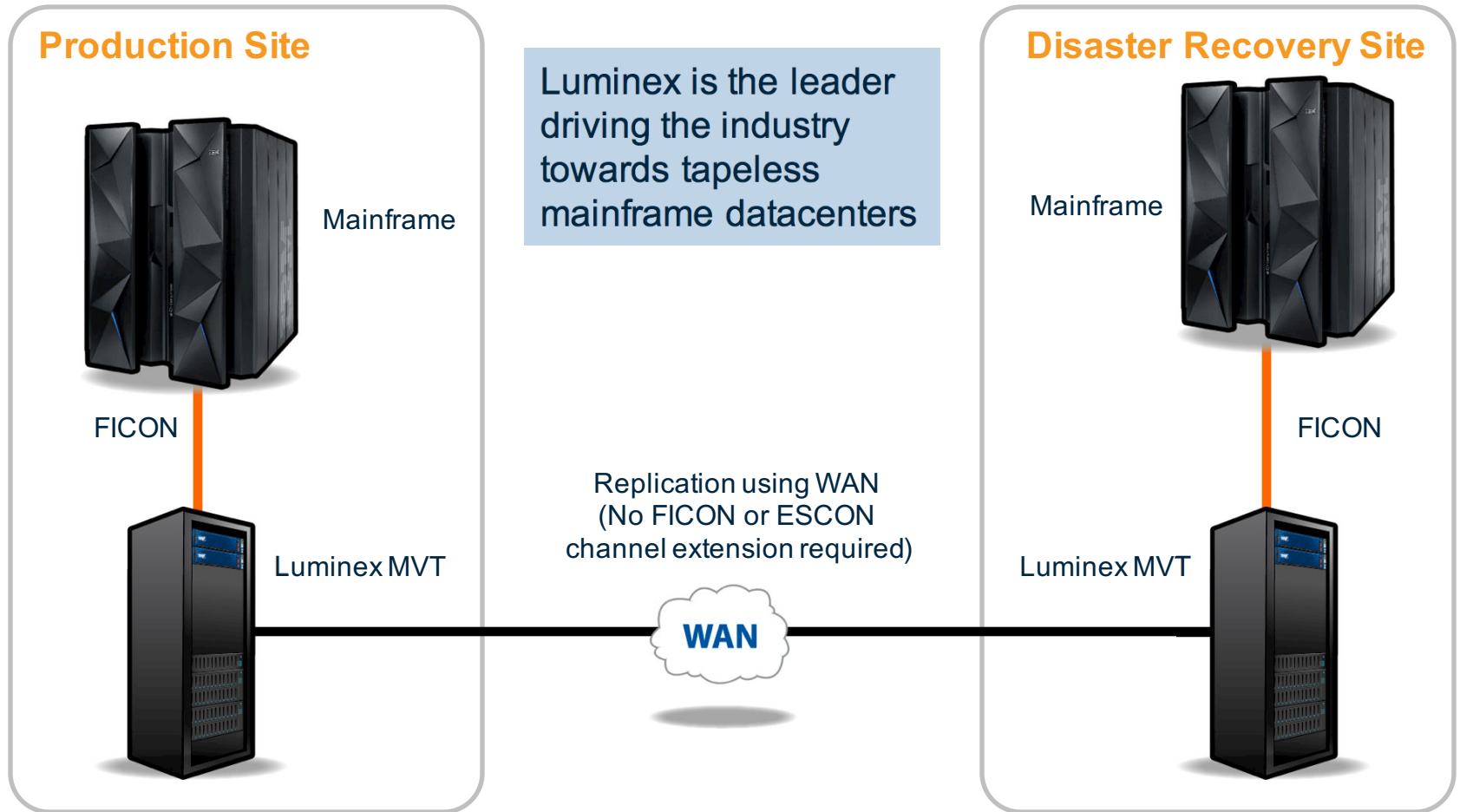# Trends and Tides for Mainframe Virtual Tape

- Infrastructure Changes and Operational Trends

  - Better Disaster Recovery

  - Security and Encryption

  - Multi-site Data Center Operations

  - Shared Storage Infrastructure

  - Virtual for the Masses

  - Big Data Meets Big Value Data

Traditional Physical Tape
Vaulting and Recall

Production Site

Mainframe

FICON

Tape Library

Tape Shelves

The traditional process of creating tapes to send offsite to a secure offsite vault or disaster recovery site

Shipping Tape Media

Offsite Storage

Shipping Tape Media

Data Centers and Disaster Recovery without Physical Tape

3rd Site Tape Archive

Production Site

Production Mainframe   Luminex MVT

WAN

Disaster Recovery Site

Luminex MVT   DR Mainframe

Third Copy

?
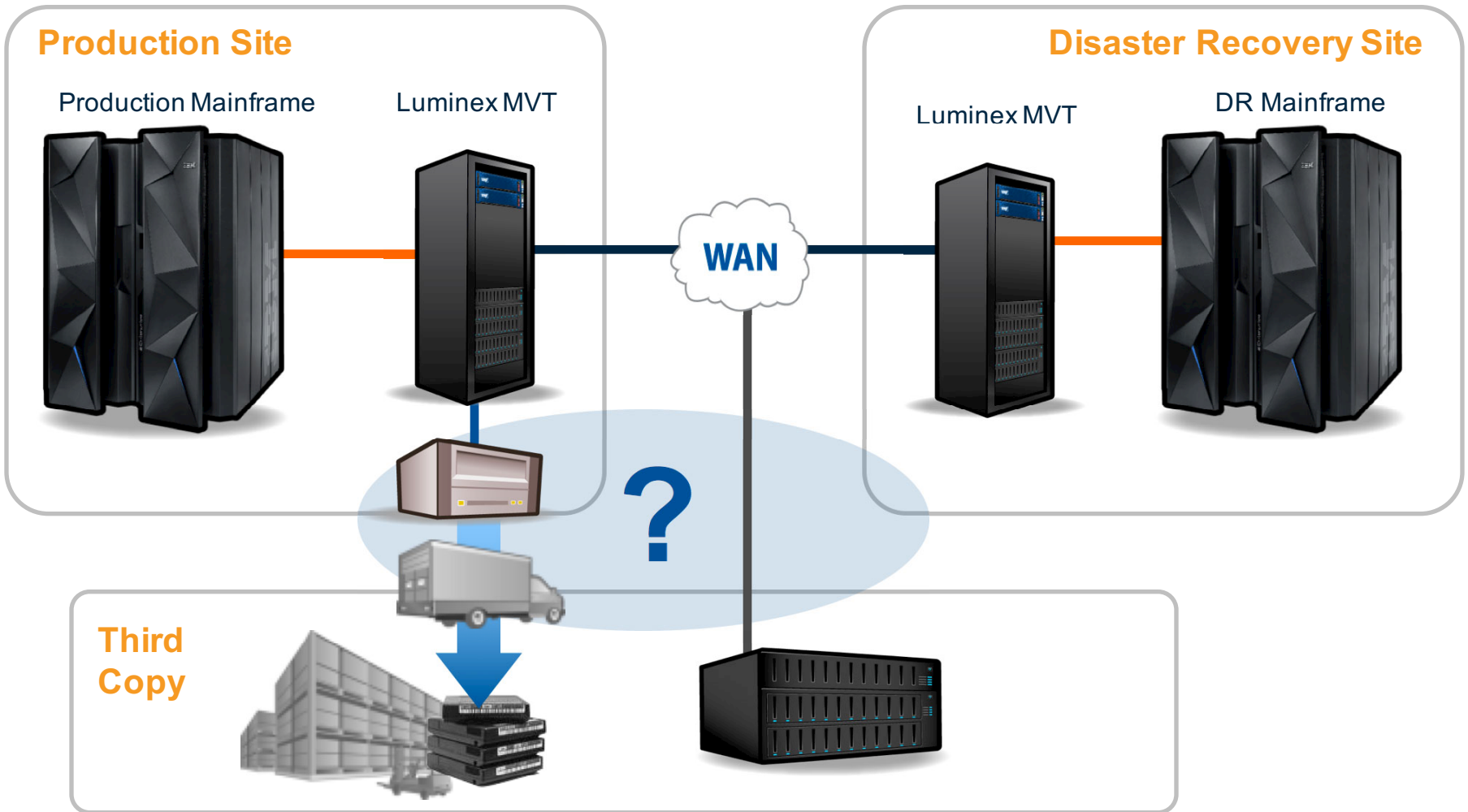
Encryption and Security

- It is essential to encrypt data PRIOR to it being sent to the cloud storage
  - Processes and key management in your total control
  - Ensure that any breach of the cloud storage data center does not risk your data
  - Ensure that data cannot be mis-used or subject to government request without your involvement
- Integrates with and leverages CGSafe Luminex encryption and key management

Trends and Directions
Security and Encryption

- Increased Customer Focus on Mainframe Data Security
  - Data-At-Rest and Data-in-Flight

- Inline data encryption options with key management
  - Luminex – CGX-based or KMIP appliance
  - EMC – RSA
  - IBM and Oracle for physical tape media only

- Drive-based encryption does not protect against logical access or in-flight during replication

- Security requires encrypting data at its earliest point of creation and decrypting closest to when/where it is used

Mainframe Tape Performance Characteristics

LOCAL SITE
- Fast Read/Write Critical
- Frequent Activity

PRIMARY OPERATIONAL

DATA SHARING

BACKUP & RECOVERY

ARCHIVE & COMPLIANCE

LOCAL SITE
- Fast Write Critical
- Read Speed Not Critical
- Frequent Activity

REMOTE SITE
- Fast Read during DR event/test Critical
- Infrequent Activity

LOCAL SITE
- Write & Read Speed Not Critical
- Infrequent Activity

REMOTE SITE
- Write & Read Speed Not Critical
- Infrequent Activity

SHARE in Orlando 2015

Understand Your Data
Tape Analysis by Age Report

Category	Capacity (GB)	Current Volumes	% of Total	Cumulative % of Total
5+ Years	117,655.34	69,929.00	8.47%	8.47%
3+ Years - 5 Years	179,092.39	64,788.00	12.89%	21.35%
1+Years - 3 Years	260,912.72	94,375.00	18.77%	40.13%
181 Days - 1 Year	227,960.98	84,509.00	16.40%	56.53%
91-180 Days	153,766.02	57,078.00	11.06%	67.60%
61-90 Days	65,719.32	24,592.00	4.73%	72.32%
31-60 Days	61,356.24	20,044.00	4.41%	76.74%
0-30 Days	323,259.88	140,785.00	23.26%	100.00%
Summary:	1,389,722.89	556,100.00	100.00%	100.00%

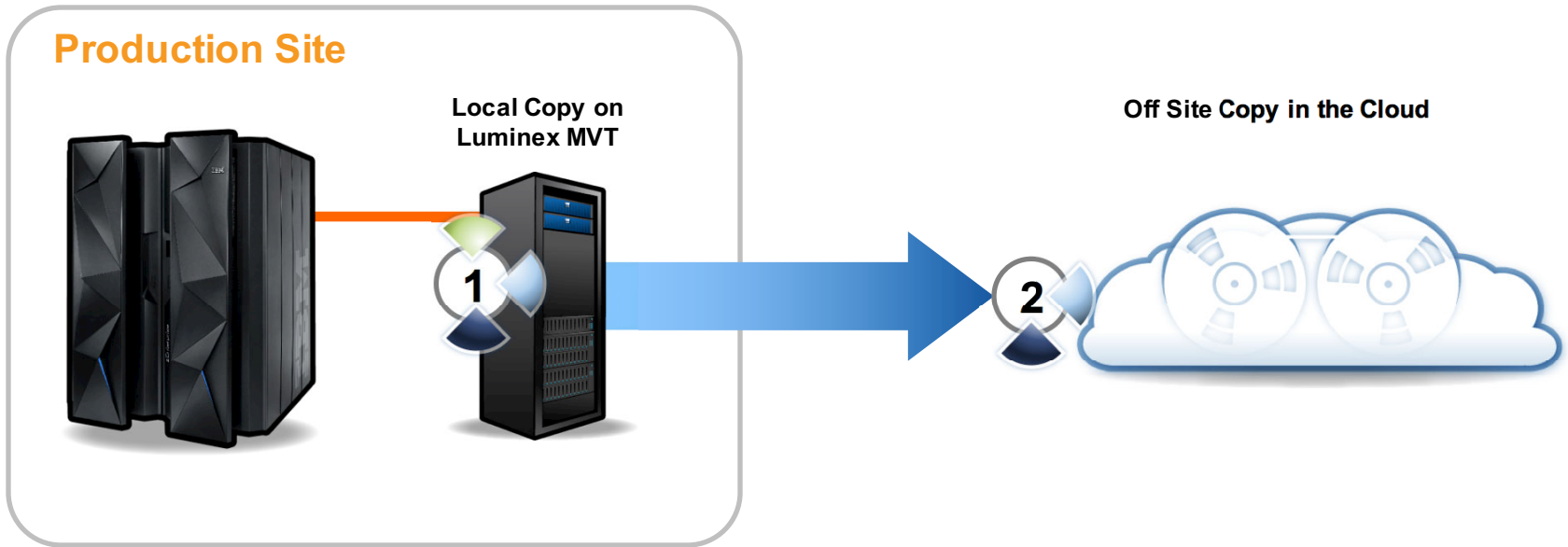- ~68% of Tape data is more than 90 days old

Understand Your Data
Tape Analysis by Age Report

Category	Capacity (GB)	Current Volumes	% of Total	Cumulative % of Total
5+ Years	611,116.17	39,465.00	41.09%	41.09%
3+ Years - 5 Years	304,034.82	10,697.00	20.44%	61.53%
1+Years - 3 Years	437,680.34	41,195.00	29.43%	90.95%
181 Days - 1 Year	40,843.12	6,671.00	2.75%	93.70%
91-180 Days	38,887.56	10,059.00	2.61%	96.31%
61-90 Days	9,564.28	3,242.00	0.64%	96.96%
31-60 Days	11,030.01	3,815.00	0.74%	97.70%
0-30 Days	34,238.84	13,431.00	2.30%	100.00%
Summary:	1,487,395.13	128,575.00	100.00%	100.00%

- ~96% of Tape data is more than 90 days old

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Use Case: Off Site Copy

Production Site

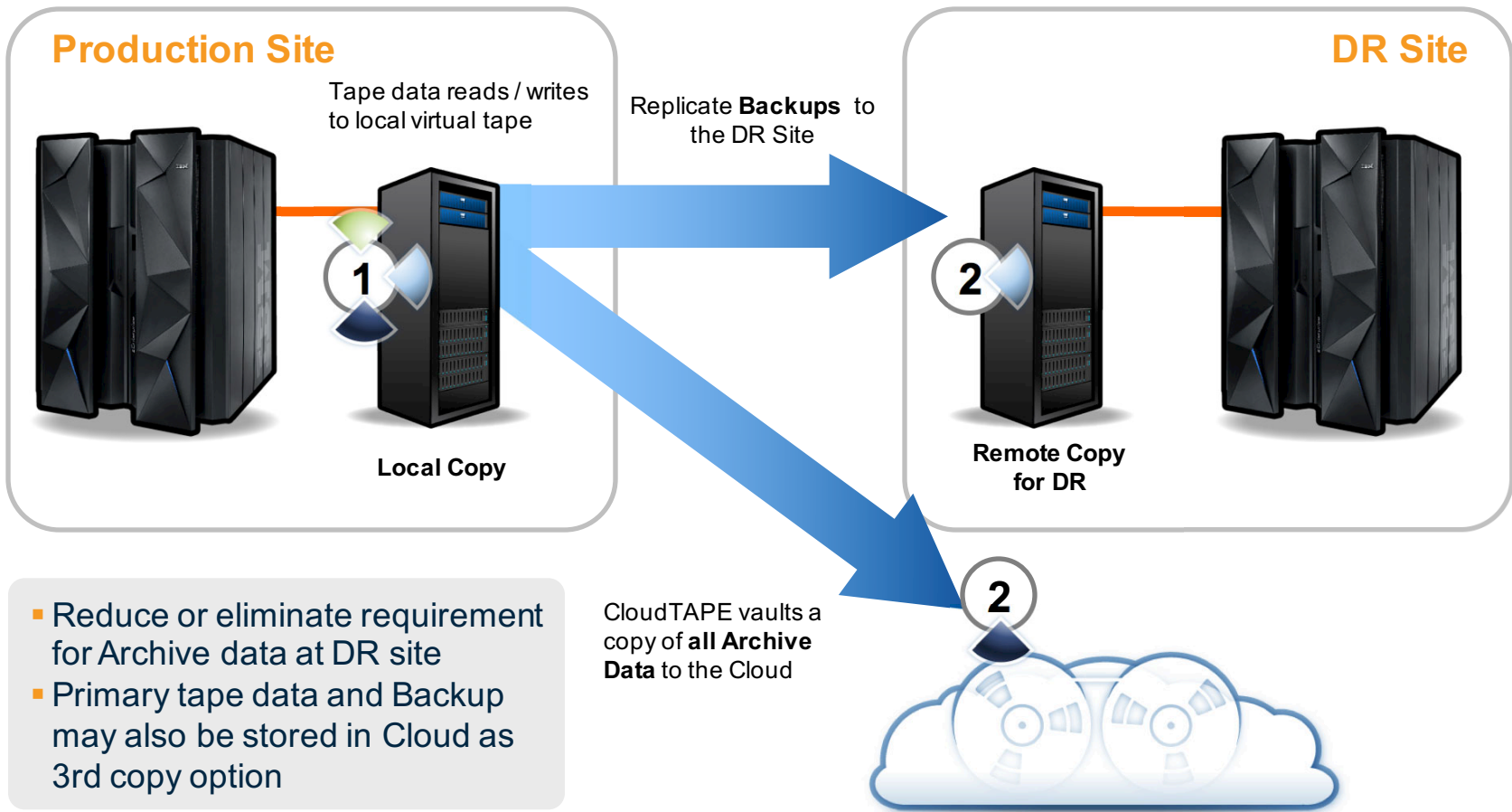Local Copy on
Luminex MVT

Off Site Copy in the Cloud

1

2

- Provide remote storage and redundancy without the cost and overhead of a dedicated DR or bunker site

Use Case: 3rd Copy and/or Archive

Production Site

Tape data reads / writes to local virtual tape

1

Local Copy

Replication to the DR Site

DR Site

2

Remote Copy for DR

CloudTAPE vaults a copy to the Cloud

3

3rd Copy and/or Archive copy
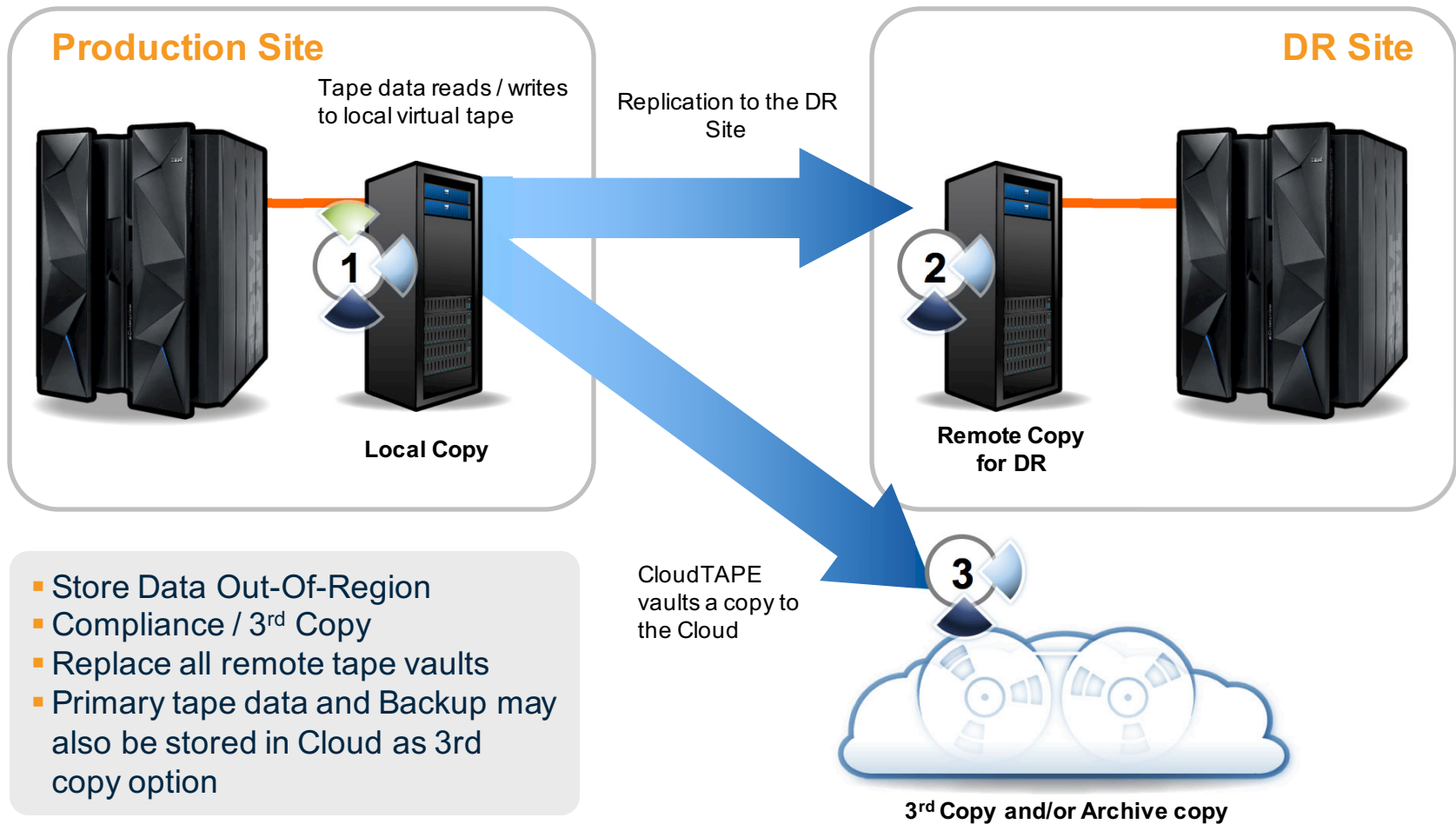
- Store Data Out-Of-Region
- Compliance / 3rd Copy
- Replace all remote tape vaults
- Primary tape data and Backup may also be stored in Cloud as 3rd copy option
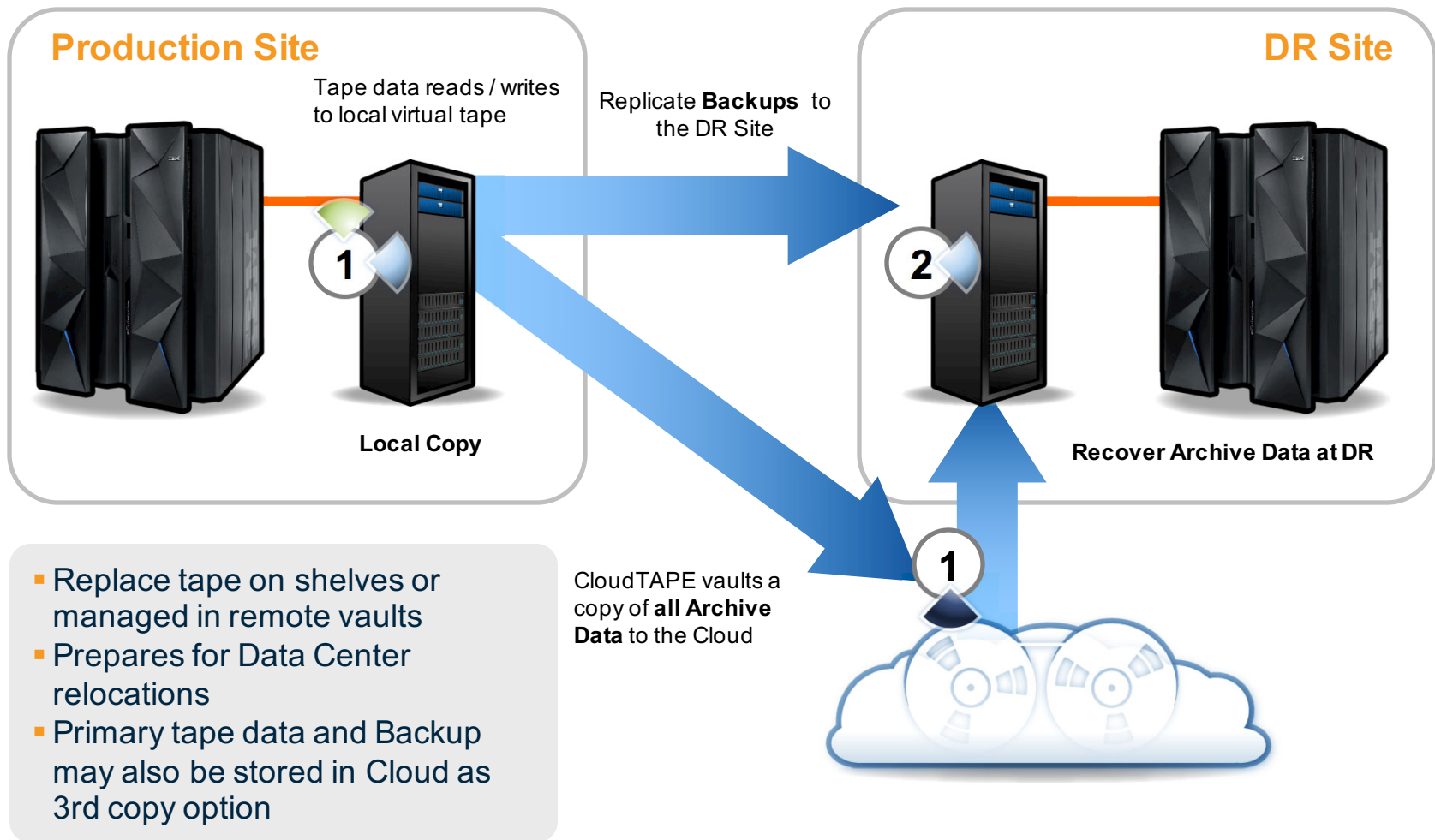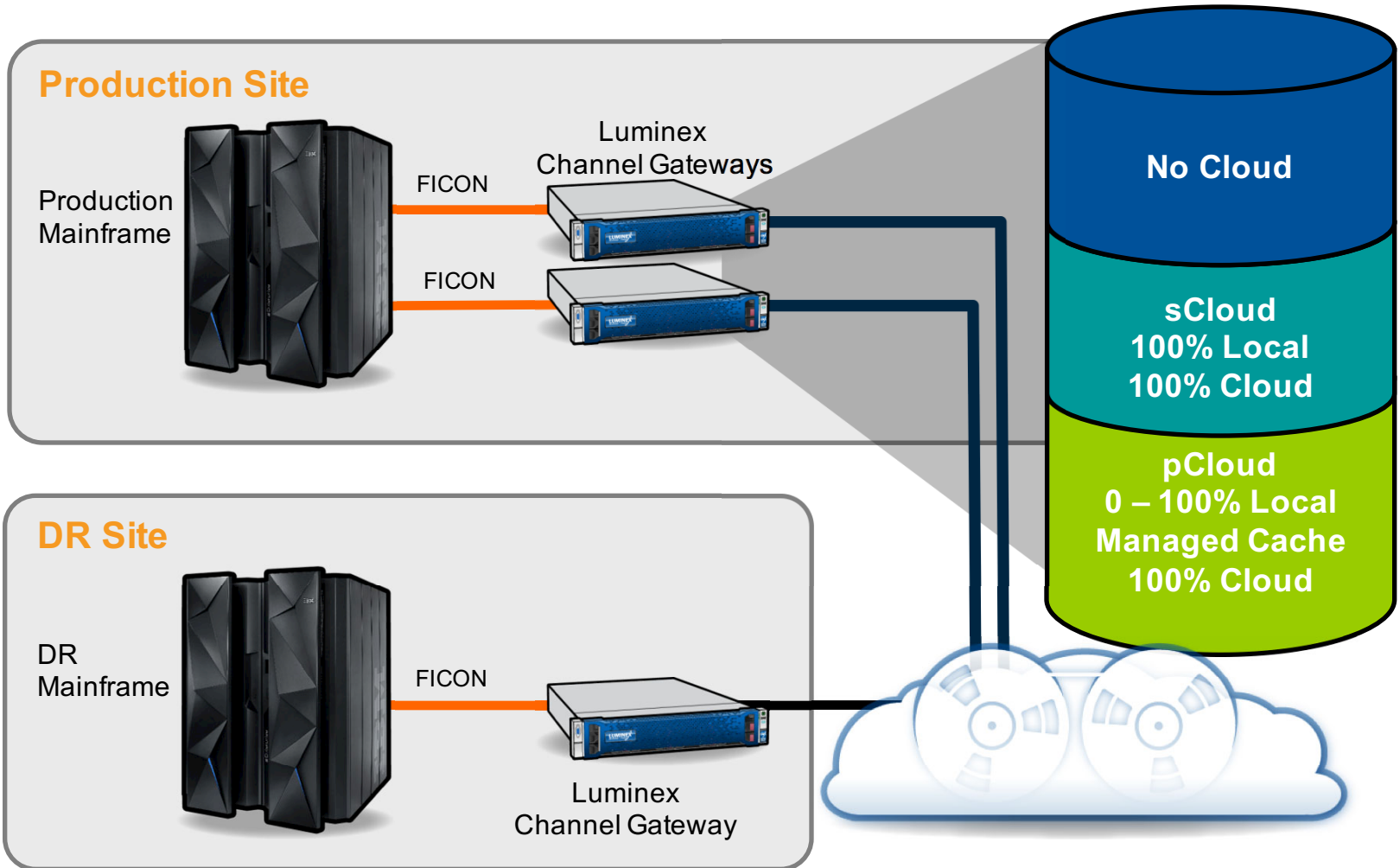
Use Case: 2nd Copy, Archive Data not stored at DR

Production Site

Tape data reads / writes to local virtual tape

1

Local Copy

Replicate **Backups** to the DR Site

DR Site

2

Remote Copy for DR

- Reduce or eliminate requirement for Archive data at DR site
- Primary tape data and Backup may also be stored in Cloud as 3rd copy option

CloudTAPE vaults a copy of **all Archive Data** to the Cloud

2

Use Case: Offsite / Compliance / Deep Archive
Stored Only in Cloud

Production Site

Tape data reads / writes to local virtual tape

1

Local Copy

Replicate **Backups** to the DR Site

DR Site

2

Recover Archive Data at DR

CloudTAPE vaults a copy of **all Archive Data** to the Cloud

1

- Replace tape on shelves or managed in remote vaults
- Prepares for Data Center relocations
- Primary tape data and Backup may also be stored in Cloud as 3rd copy option

CloudTAPE Storage Flexibility

Production Site

Production Mainframe

FICON

FICON

Luminex Channel Gateways

DR Site

DR Mainframe

FICON

Luminex Channel Gateway

No Cloud

sCloud
100% Local
100% Cloud

pCloud
0 – 100% Local
Managed Cache
100% Cloud

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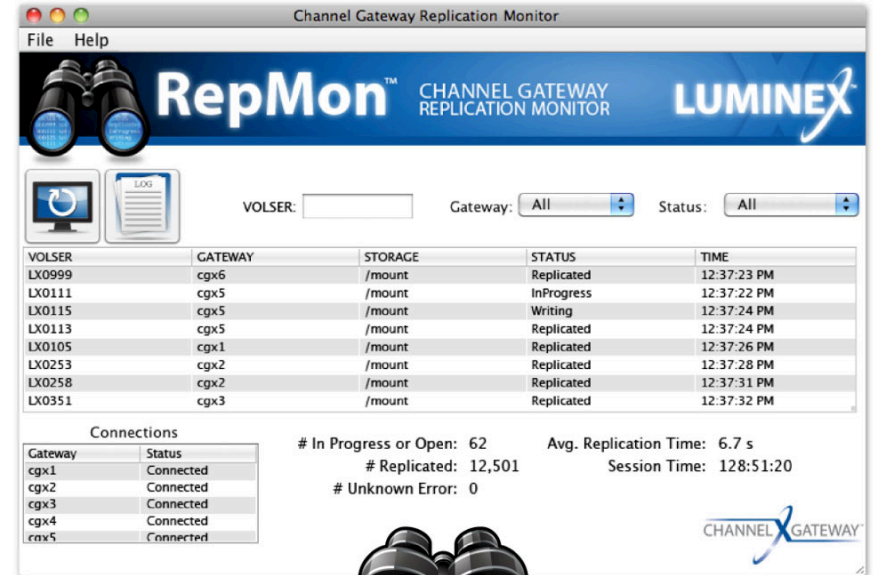
CloudTAPE Intelligent Storage Management

Production Site

Data Use Case

Example Data

Data that must remain local to Production and DR
- Fast Reads/Writes
- Fast Read during DR event/test Critical

(A) **Backup**

Data that must remain local to Production and, optionally, DR
- Fast Reads/Writes
- Frequent Activity

(B) **Primary Operational**

Data that can be offloaded to the Cloud after X days
- Write & Read Speed Not Critical
- Infrequent Activity

(C) **Archive (temporary copy)**

DR Site

(A) 2nd Copy

(B) Optional 2nd Copy

Cloud Storage

(B) Optional 3rd Copy

(C) Only Copy (after X days)

(A) 2 copies

(B) 1 / 2 / 3 copies

(C) 1 or 2 copies

CloudTAPE Replication & Vaulting

- Integrated with proven RepMon mainframe VOLSER-based replication software

- Provides **real-time status monitoring and logging** of virtual tape data writes and replication to the Cloud at the VOLSER level

  - Provides visual and audit capabilities to confirm when tapes are "in the cloud"

  - Satisfy legal and audit concerns
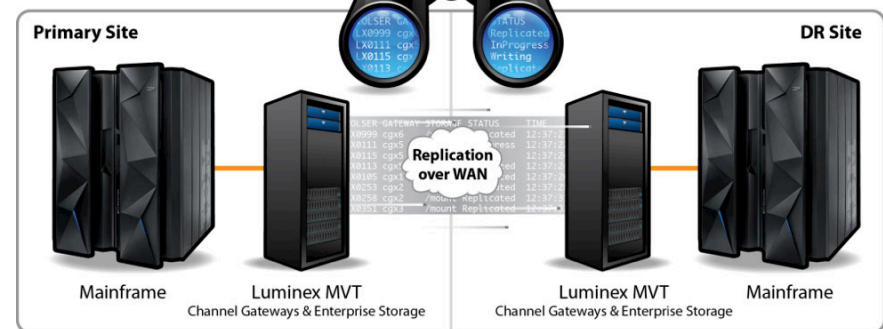
  - No chain of custody issues

CloudTAPE Advantages

- Better Access
  - Access to a 2nd or 3rd copy of mainframe tape anywhere in the world, at any time

- Save Money
  - Eliminate the cost associated with physical tape media, shipping and off-site storage for vaulting

- Simply Secure
  - Eliminate security issues with physical media

- Compliance
  - Geographic Dispersal of Archive Data

- No changes!
  - Non-disruptive to existing tape applications and datacenter operations

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