

Understanding Cloud Storage for Mainframe Virtual Tape

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Why Cloud Storage?

- Cloud Storage and Cloud Computing are changing how IT operates – outside of the mainframe Data Center
 - According to 2013 Symantec report 94% of enterprises are now discussing cloud storage
 - “A majority of respondents (80%) already have some sort of cloud storage in place” *Study by Avere released this week*
 - “the total cloud storage market is expected to reach \$46.8B by 2108 with a CAGR of 40.2%” *Markets and Markets report*
- Concerns and Questions
- Use Cases
- CloudTAPE - How it Works
- CloudTAPE Advantages

Why Cloud?

- Concerns and Questions (from Symantec study)
 - Unintentional storage of confidential data in the Cloud
 - Multiple storage strategies are complicated to manage
 - Slow to recover data from the cloud
 - Fear of losing data out of enterprise control
 - No easy way to implement a cloud tier
 - Privacy concerns – who is allowed to access my data?

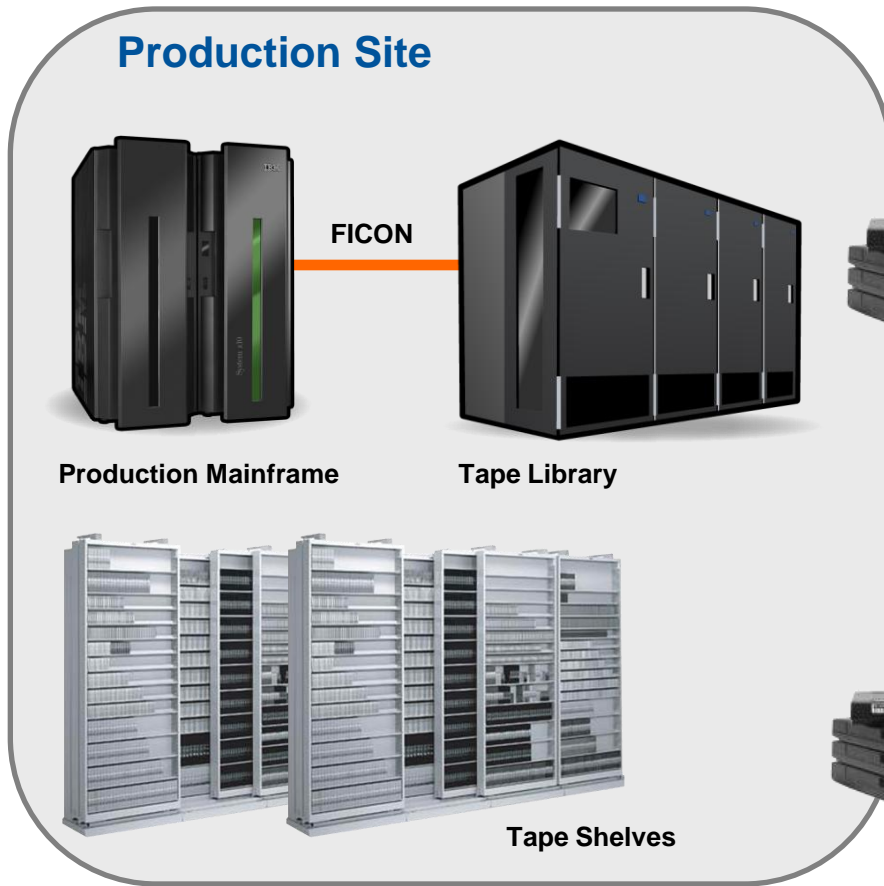
Cloud Storage: Customer Feedback as reported by Nirvanix

Cloud Storage: Aggregation of multiple storage resources into a single universally accessible pool

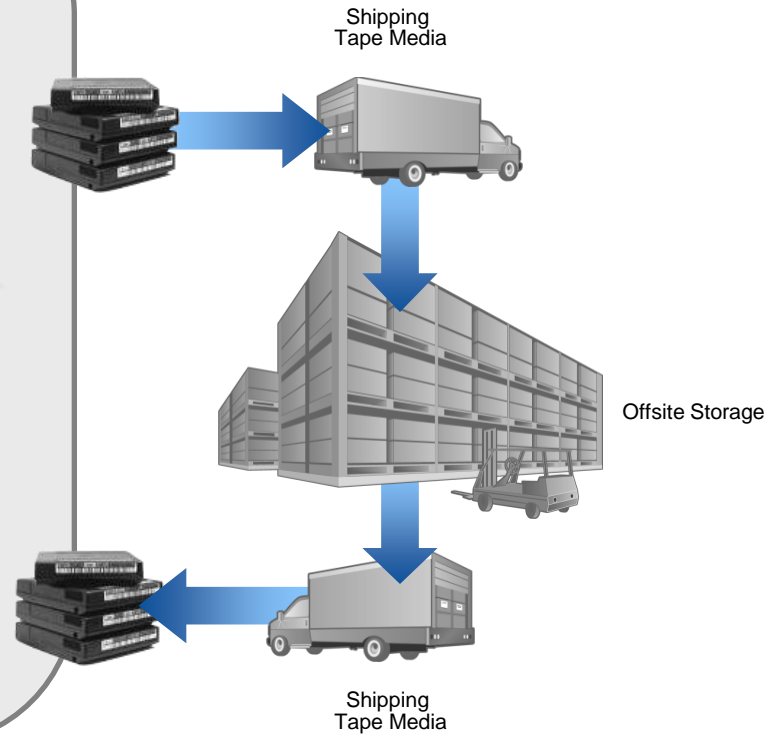
- Deployed as a Service
- Usage-based Pricing
- No Maintenance/Tech Refresh Fees
- Help in Eliminating CapEx
- Elastic Flexibility
- Web-based Access
- Guaranteed SLAs
- Accessed via the Internet or dedicated network link



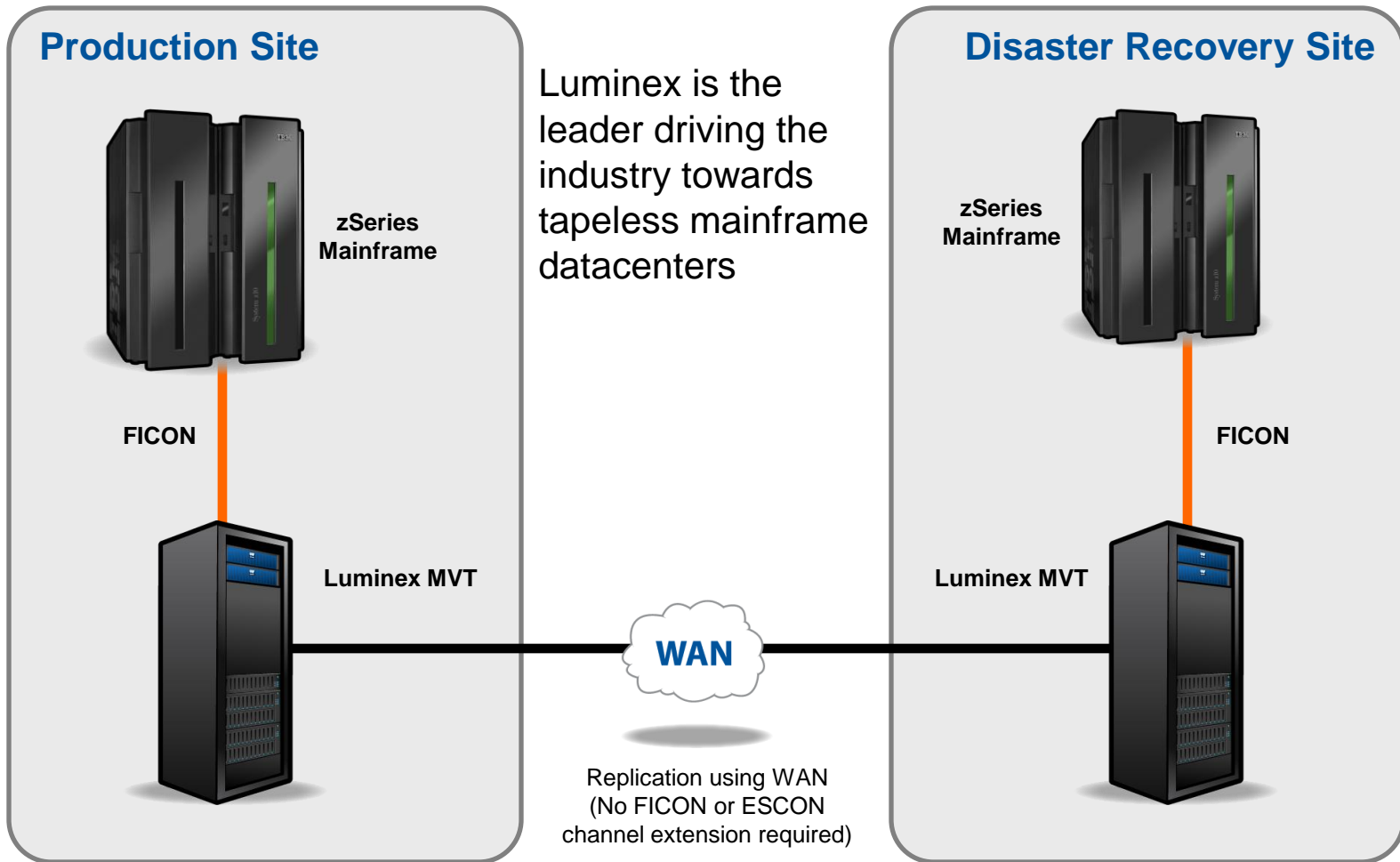
Traditional Physical Tape Vaulting and Recall



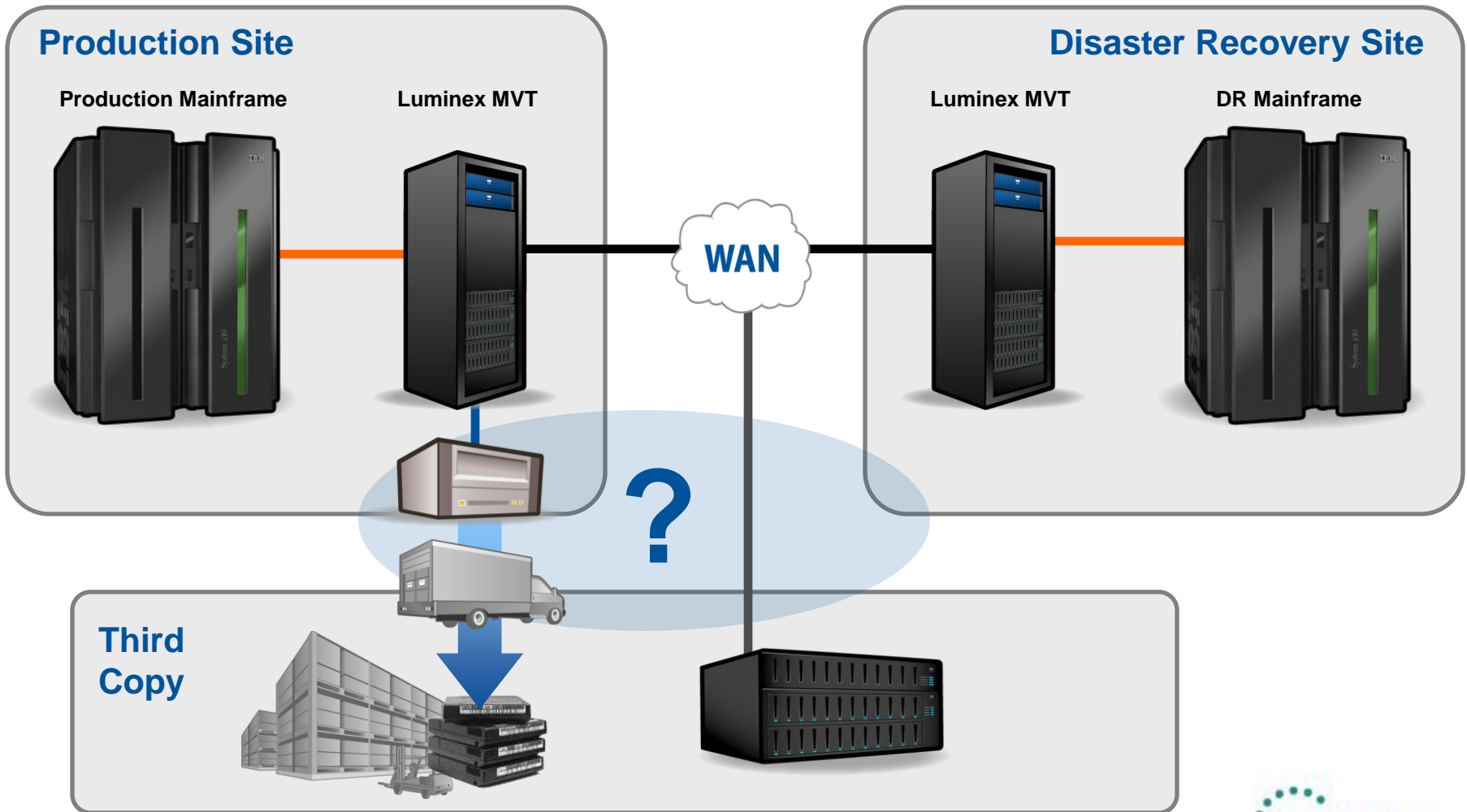
The traditional process of creating tapes to send offsite to a secure offsite vault or disaster recovery site



Data Centers and Disaster Recovery without Physical Tape



3 Site Backup and Archive



Tape Analysis by Age

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%

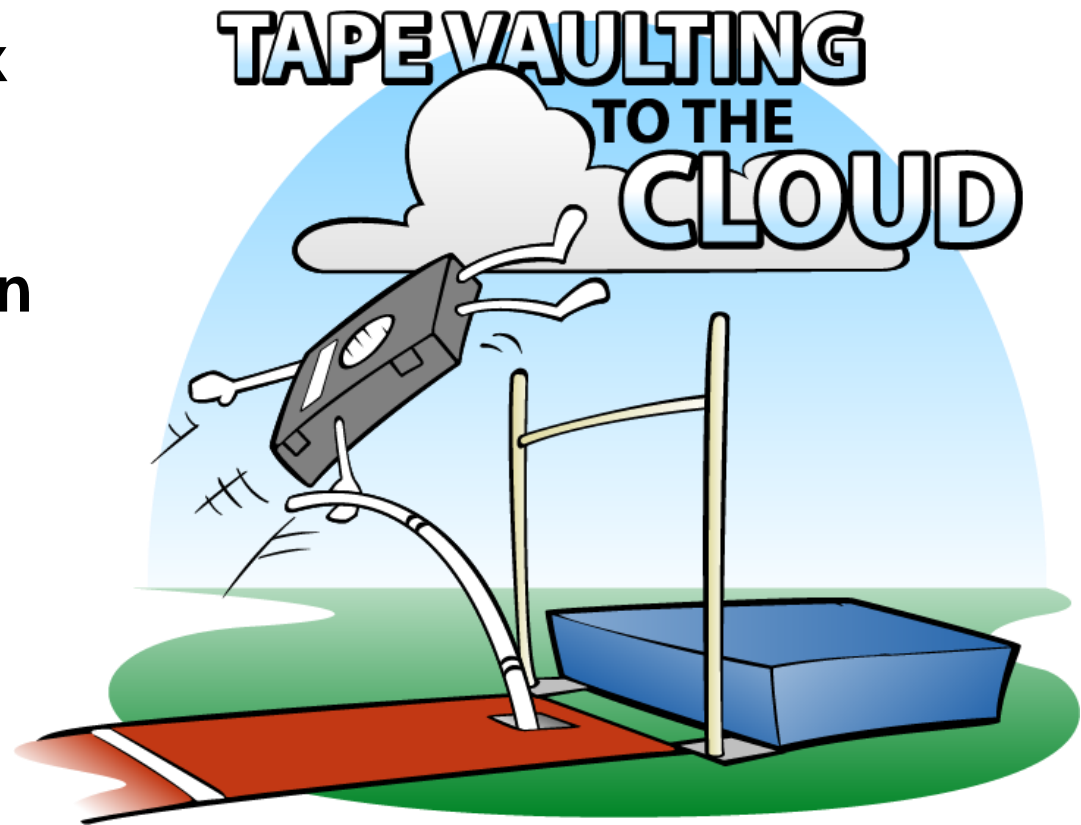
- ~68% of Tape data is more than 90 days old

Tape Analysis by Age

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%

“Luminex and Nirvanix Introduce World’s First Cloud-based Tape Vaulting Solution For Mainframe Environments”

*August 8, 2012, at SHARE IBM
Mainframe User Group*



Mainframe Tape Performance Characteristics

LOCAL SITE

- Fast Read/Write Critical
- Frequent Activity



LOCAL SITE

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

REMOTE SITE

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

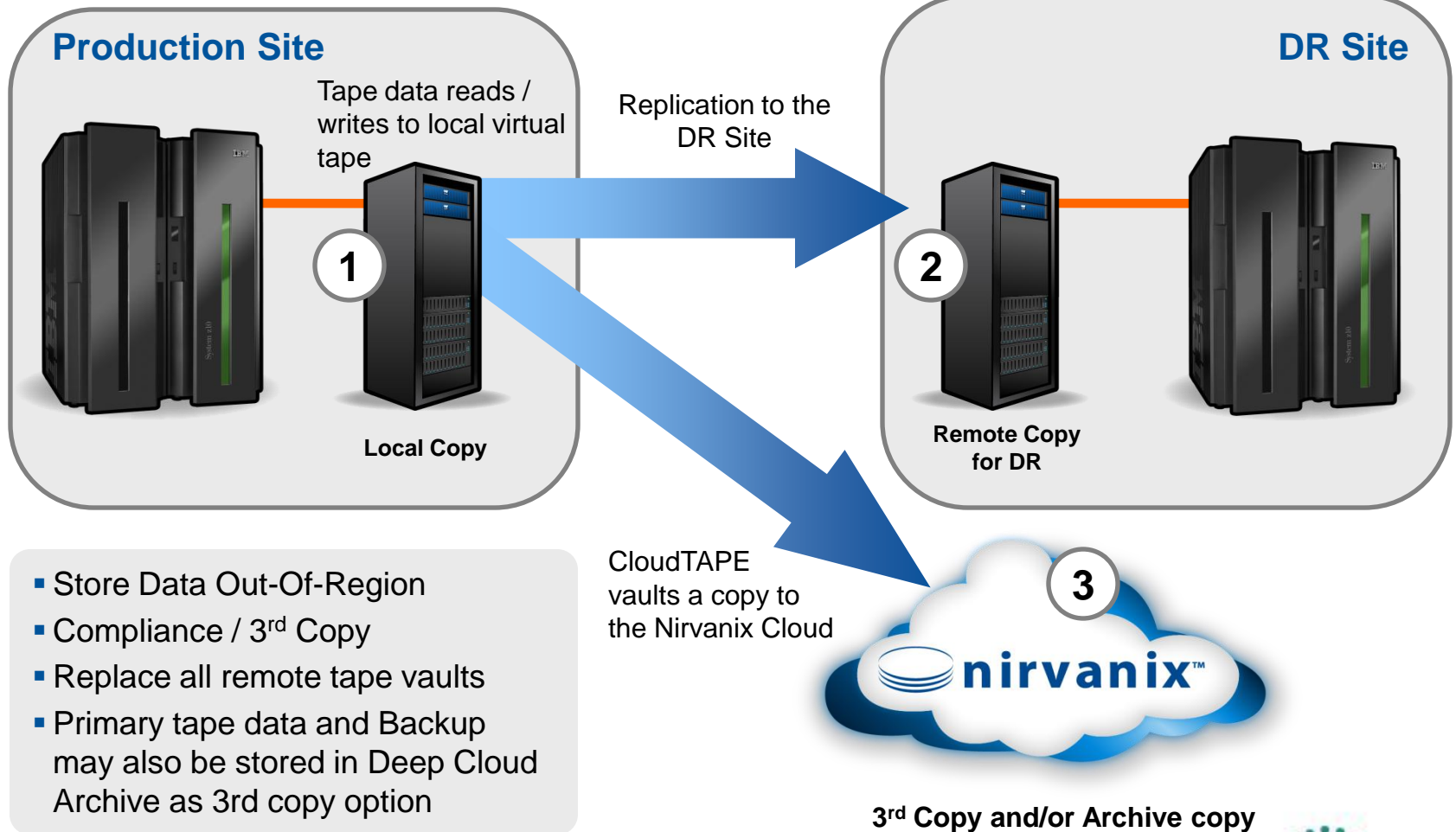
LOCAL SITE

- Write & Read Speed Not Critical
- Infrequent Activity

REMOTE SITE

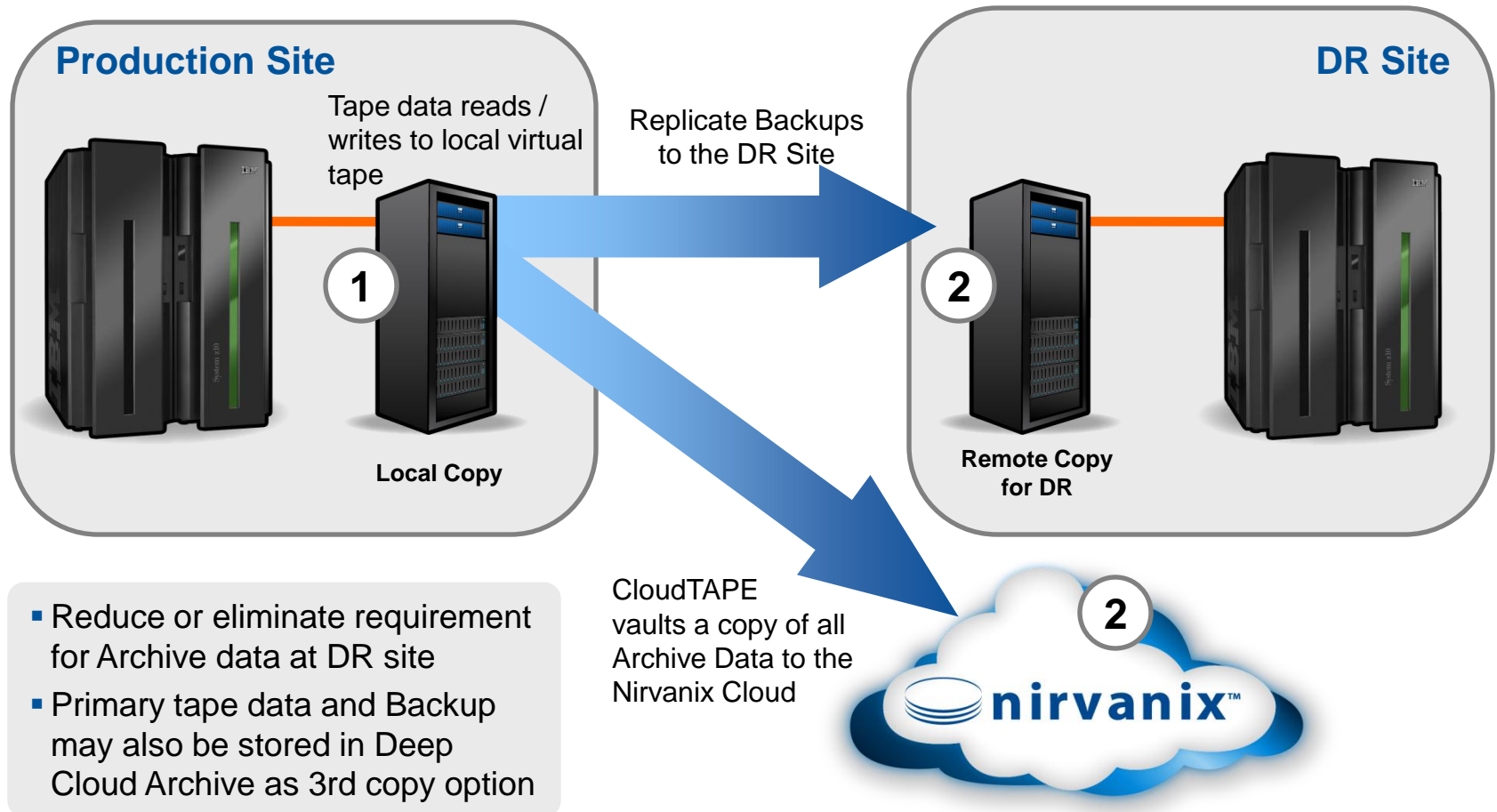
- Write & Read Speed Not Critical
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3rd Copy and/or Archive



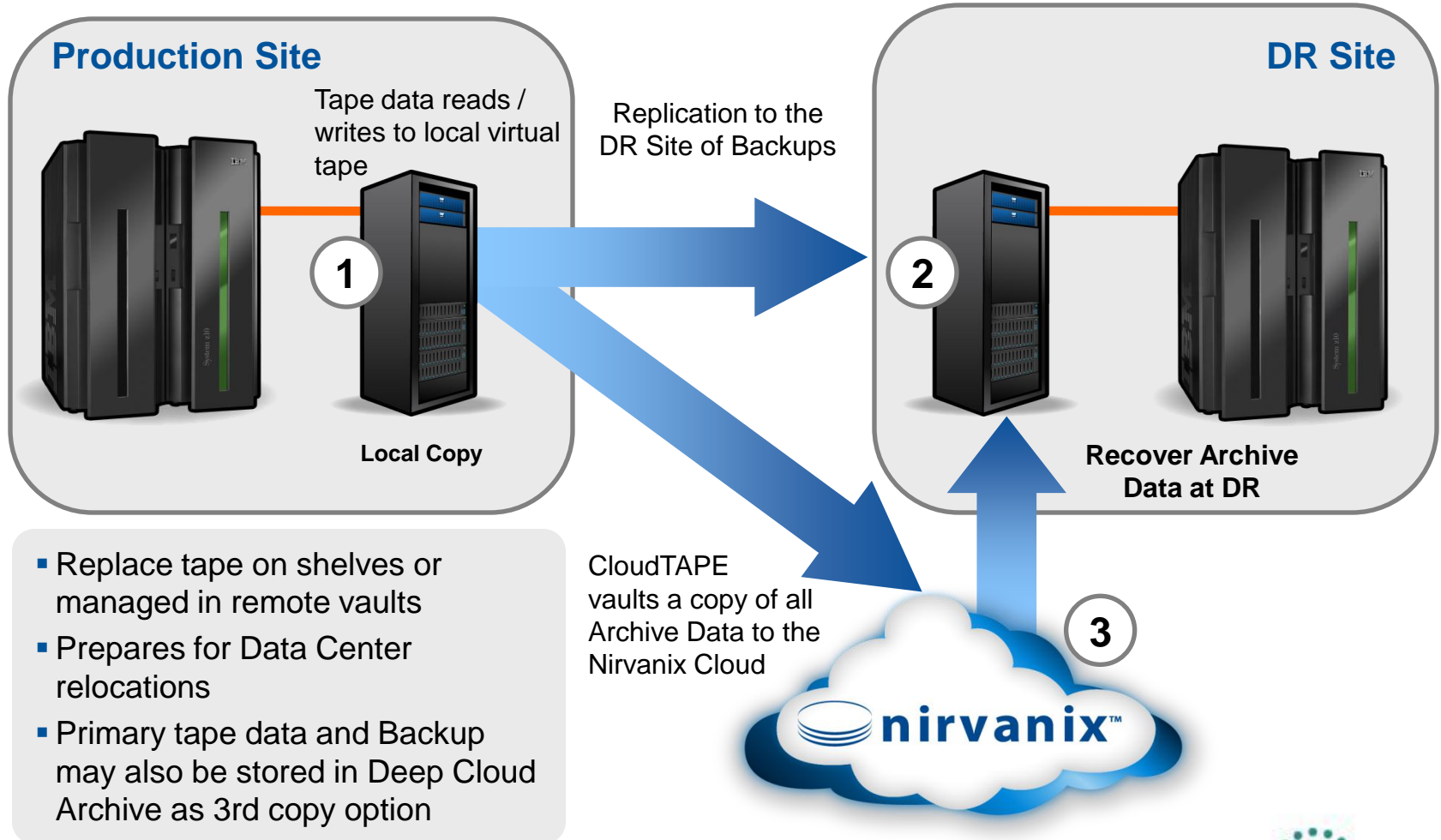
- Store Data Out-Of-Region
- Compliance / 3rd Copy
- Replace all remote tape vaults
- Primary tape data and Backup may also be stored in Deep Cloud Archive as 3rd copy option

2nd Copy Archive Data not stored at DR

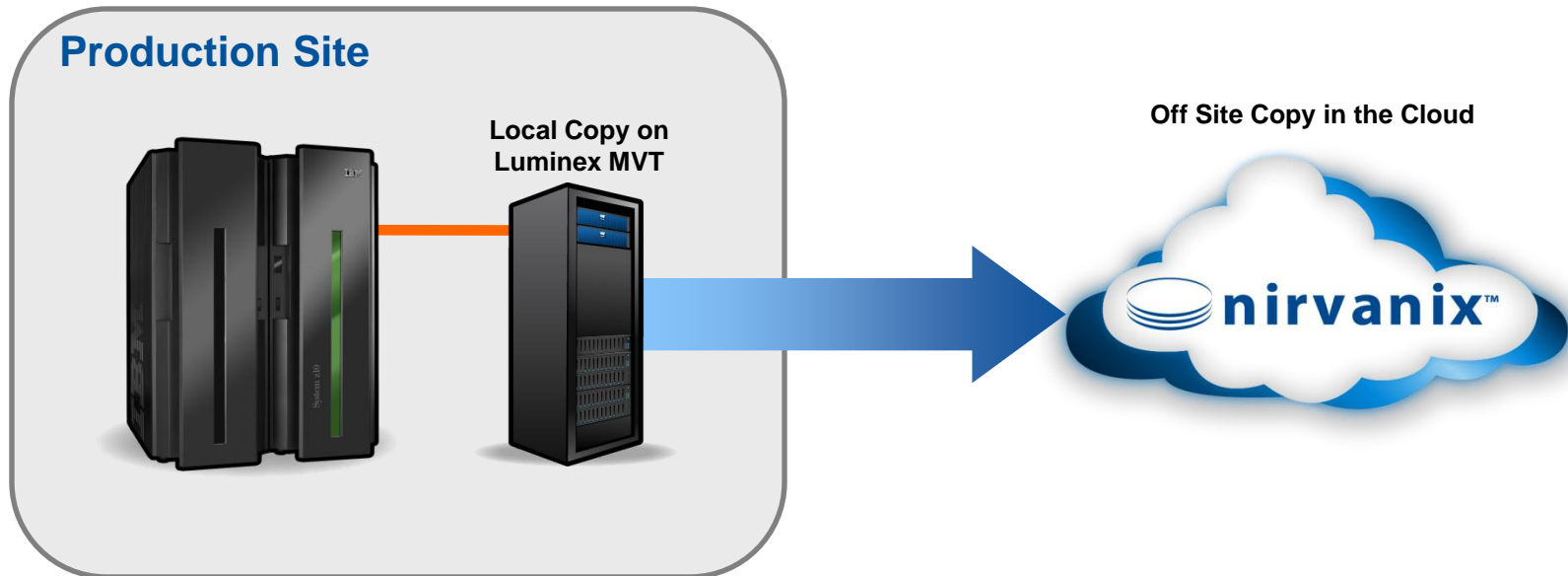


- Reduce or eliminate requirement for Archive data at DR site
- Primary tape data and Backup may also be stored in Deep Cloud Archive as 3rd copy option

Offsite / Compliance / Deep Archive Stored Only in Cloud



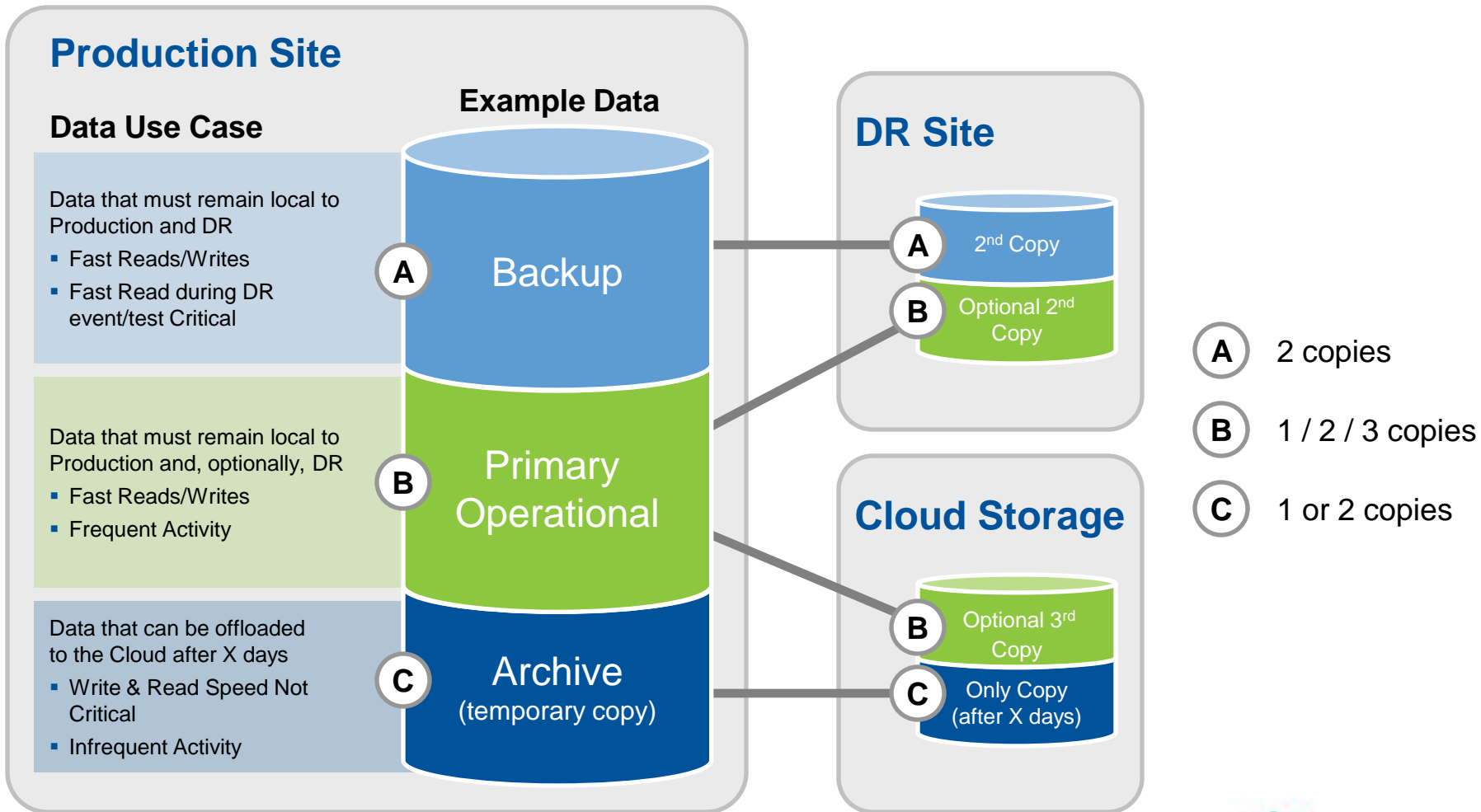
Off Site Copy



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

How it Works

CloudTAPE Intelligent Storage Management

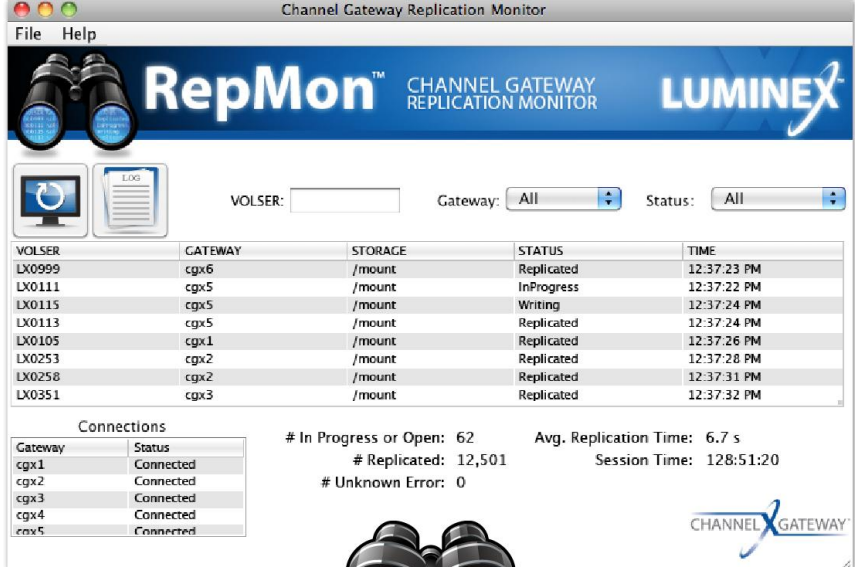


CloudTAPE Replication & Vaulting

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 Nirvanix 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



Channel Gateway Replication Monitor

File Help

RepMon™ CHANNEL GATEWAY REPLICATION MONITOR **LUMINEX**

VOLSER: Gateway: All Status: All

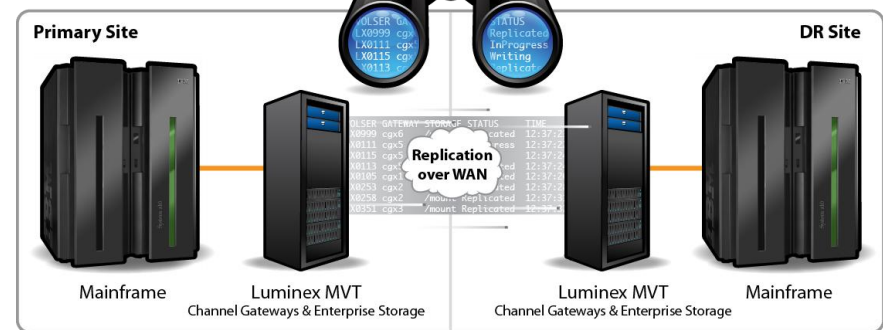
VOLSER	GATEWAY	STORAGE	STATUS	TIME
LX0999	cgx6	/mount	Replicated	12:37:23 PM
LX0111	cgx5	/mount	InProgress	12:37:22 PM
LX0115	cgx5	/mount	Writing	12:37:24 PM
LX0113	cgx5	/mount	Replicated	12:37:24 PM
LX0105	cgx1	/mount	Replicated	12:37:26 PM
LX0253	cgx2	/mount	Replicated	12:37:28 PM
LX0258	cgx2	/mount	Replicated	12:37:31 PM
LX0351	cgx3	/mount	Replicated	12:37:32 PM

Connections

Gateway	Status
cgx1	Connected
cgx2	Connected
cgx3	Connected
cgx4	Connected
cgx5	Connected

In Progress or Open: 62 Avg. Replication Time: 6.7 s
 # Replicated: 12,501 Session Time: 128:51:20
 # Unknown Error: 0

CHANNEL GATEWAY



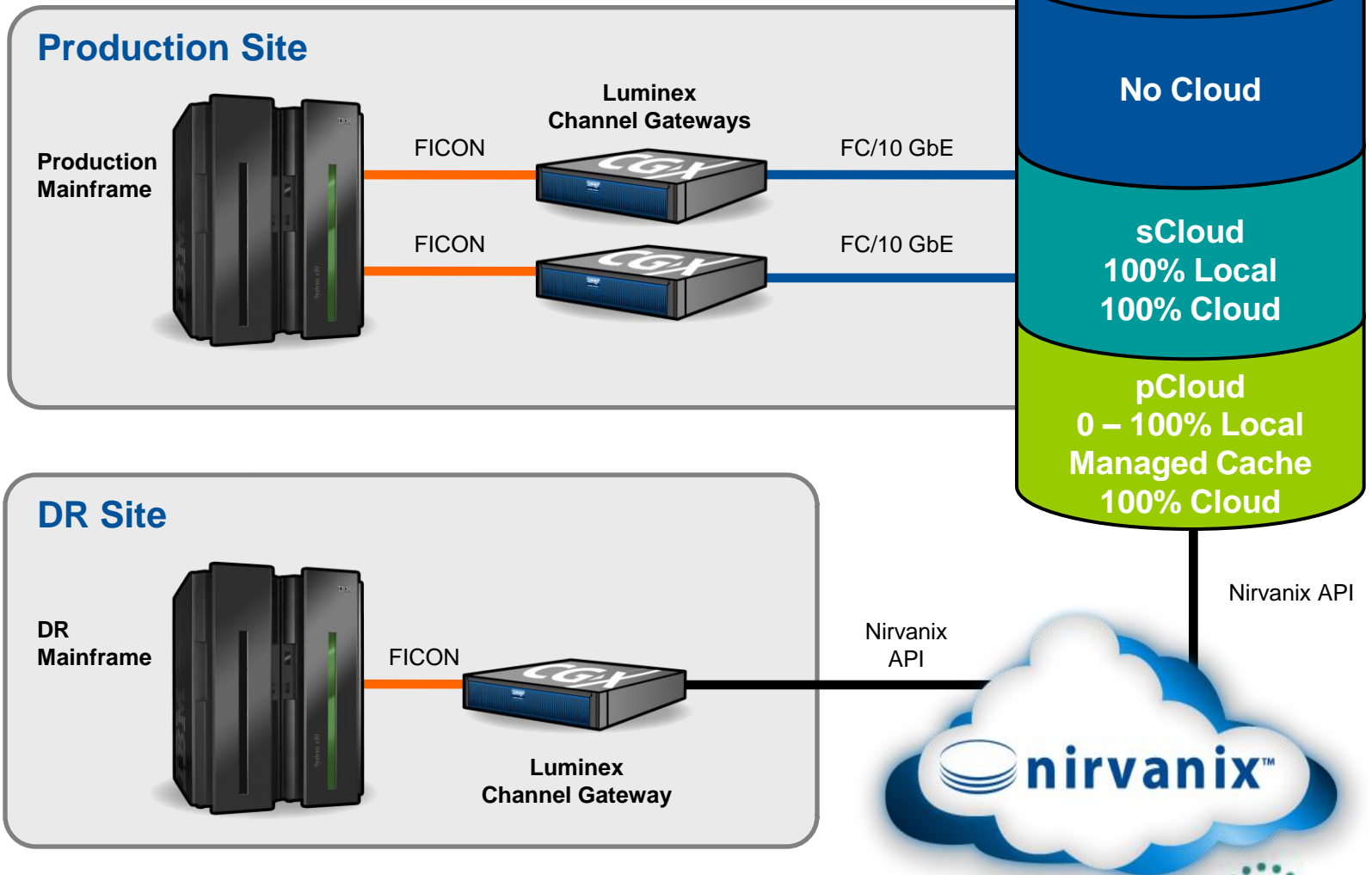
Mainframe Host-based storage allocation

- Uses Luminex TMACS – Tape Monitoring and Allocation Control Steering
 - Sort / Filter options, including by volser range, dataset names, etc.
- Esoterics
- Additional capabilities for host-based data tiering planned in future releases

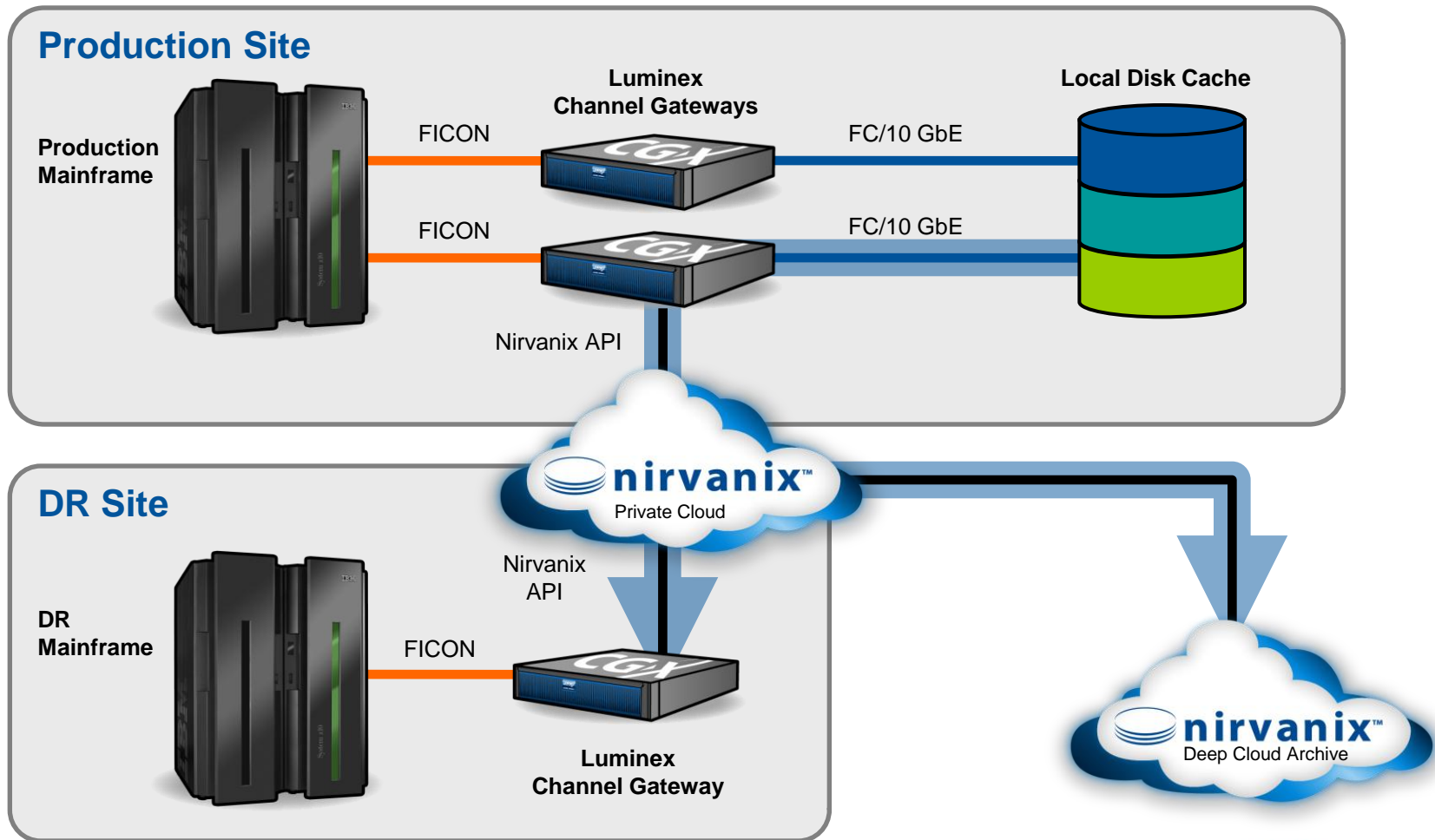
Encryption and Security

- 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

CloudTAPE – How it Works



CloudTAPE with private or hybrid cloud

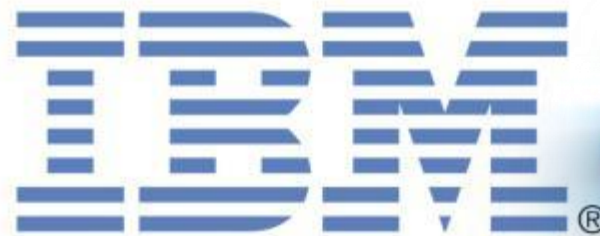


The Largest IT Services Company in the World Selects Nirvanix for Cloud Storage

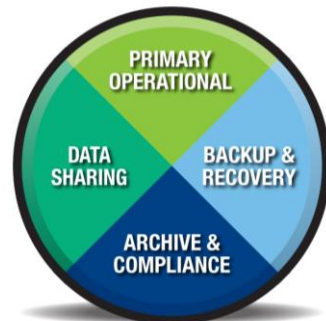
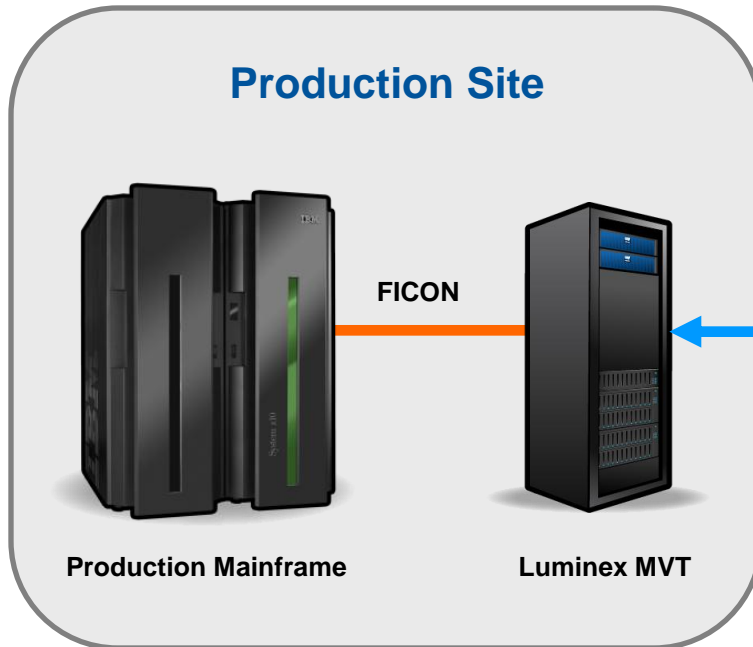


SERVICES TOP 100 The world's largest IT services companies

- **#1: IBM \$37B**
- **Nirvanix and IBM Signed a 5-Year OEM Pact**
- **IBM is integrating Nirvanix cloud storage technology into its SmartCloud Enterprise services portfolio**
- **IBM determined Nirvanix is the only cloud storage suitable for IBM's global enterprise customer base**



Virtual Tape Vaulting and Recall



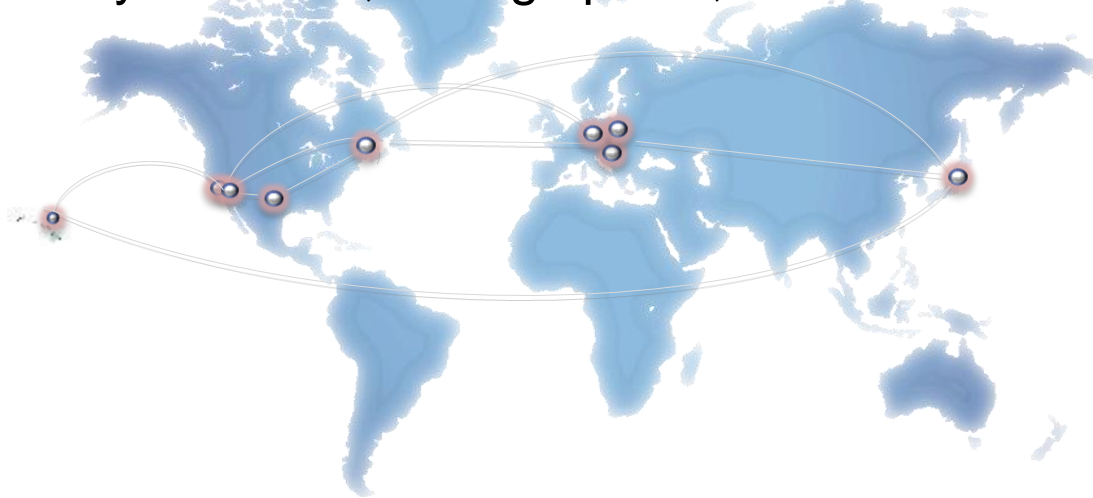
Expanded datacenter use of private, hybrid and public clouds will provide new opportunities and implementations that offer tremendous value

Mainframe tape data types can be managed uniquely to meet the business requirements

Battle-Hardened, Proven Second Generation Cloud Storage Technology

The Cloud Storage Network

- 9 globally distributed nodes under a single namespace
 - Honolulu, LA, Las Vegas, Dallas, New Jersey, Frankfurt, Geneva, Bern, Tokyo
- Fully redundant infrastructure with integrated load balancing
- SAS 70 Type II compliant operations, physical security
- Secure multi-tenant file system, encryption, SSL
- Full directory structure, storage pools, and child accounts



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

Why LUMINEX?

- Luminex is the leader in solving real-world customer issues moving to modern mainframe data centers
- Proven Innovation and Technology Leader
- Proven Customer Advocate