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Technology · Connections · Results

Replicating Mainframe Tape Data for DR – Best Practices
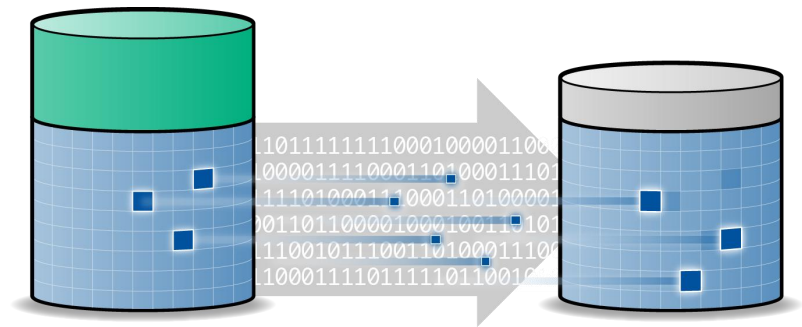
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Luminex Software, Inc.

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Financial Services Company

Tuesday, August 13

Session #14131

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Discussion Topics

- Perspective
- Why Replicate Mainframe Tape Data?
- Replication Options
- Recommendations for Best Practices
- Customer Replication Configuration Examples
- Continuous Availability of Virtual Tape

Perspective
Who We Are – Focused on Mainframe Virtual Tape

- Luminex Software, Inc.
- Providing mainframe tape solutions for 25+ years
- Each of our Subject Matter Experts (SMEs) have an average 25+ years of experience with mainframe tape
- All of our SMEs are former STK Systems Engineers
- We're recognized for enabling the latest innovations in mainframe virtual tape

Why Replicate Mainframe Tape Data?

- It is the best way to move tape data between the production and disaster recovery site
    - Much faster than shipping physical tape
    - Eliminates security risk associated with shipping physical tape
    - Eliminates the cost of physical tape media, shipping & storage
- Dramatically improves the remote disaster recovery plan
    - Improve RPO through continuous replication
    - RTO is significantly reduced
- Control over your data

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Replication Options

- Technology

- Which data should I replicate?

- Monitoring

- Disaster recovery testing

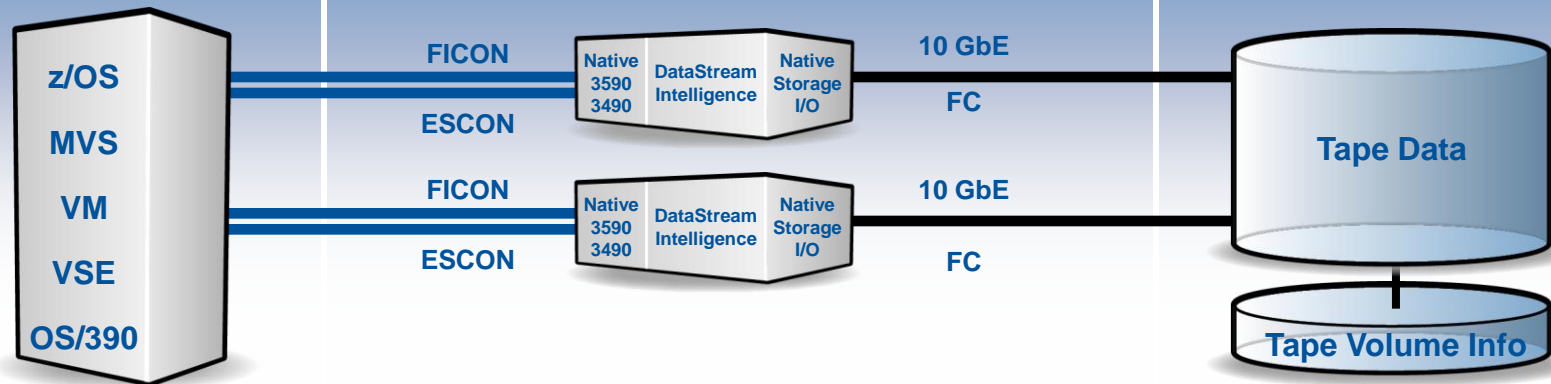- Continuous Availability for Virtual Tape
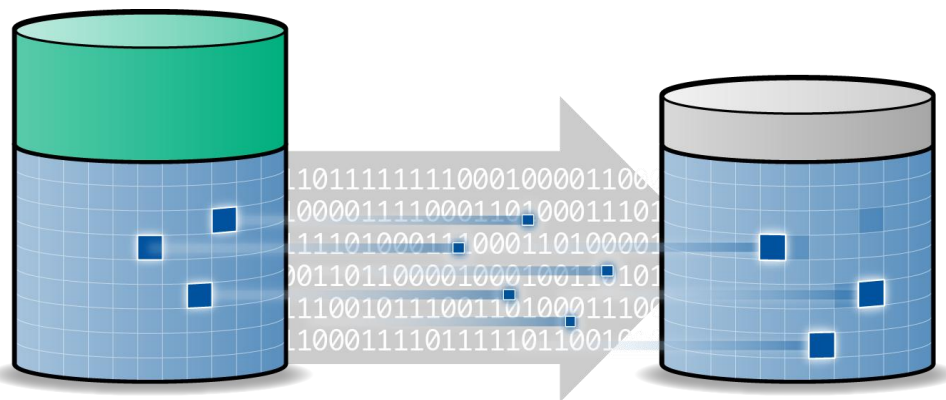
Replication Options
Technology

- Control Unit-based Replication
  - Asynchronous or Synchronous Replication
- Storage-based Replication
  - Hitachi Universal Replicator (asynchronous)
  - IBM, HP, Quantum, Data Domain, NetApp or Oracle Replication (asynchronous)
  - HDS TrueCopy (synchronous)

How Virtual Tape Solutions Work…

z/OS

MVS

VM

VSE

OS/390

FICON

ESCON

FICON

ESCON

Native 3590 3490 | DataStream Intelligence | Native Storage I/O

Native 3590 3490 | DataStream Intelligence | Native Storage I/O

10 GbE

FC

10 GbE

FC

Tape Data

Tape Volume Info

Mainframe	Virtual Tape Control Units	System Storage
■ Application transparent – non-intrusive	■ Emulates 3490 or 3590 mainframe tape drives	■ FC or Network Attached Storage (Using NFS over 10 GbE)
■ No MIPS required	■ "Wire Speed" up to 8 Gb FICON	■ Mainframe tape volumes stored as standard files
■ z/OS, MVS, VM, VSE and OS/390 supported	■ DataStream Intelligence™ optimizes compression and deduplication	■ Replication for backup/DR
■ Works well with all major tape management systems	■ No dependencies on separate code to modify a backup VOLSER	■ RAID Data Protection
■ SMS via MTL or Esoterics can be used	■ Active – Active with NSPOF	■ Enterprise and modular storage systems are supported
■ Optional host-based software for management	■ Encryption and Key Management Option	
	■ Modular design makes scaling throughput and/or capacity easy and cost effective	

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Replication Options
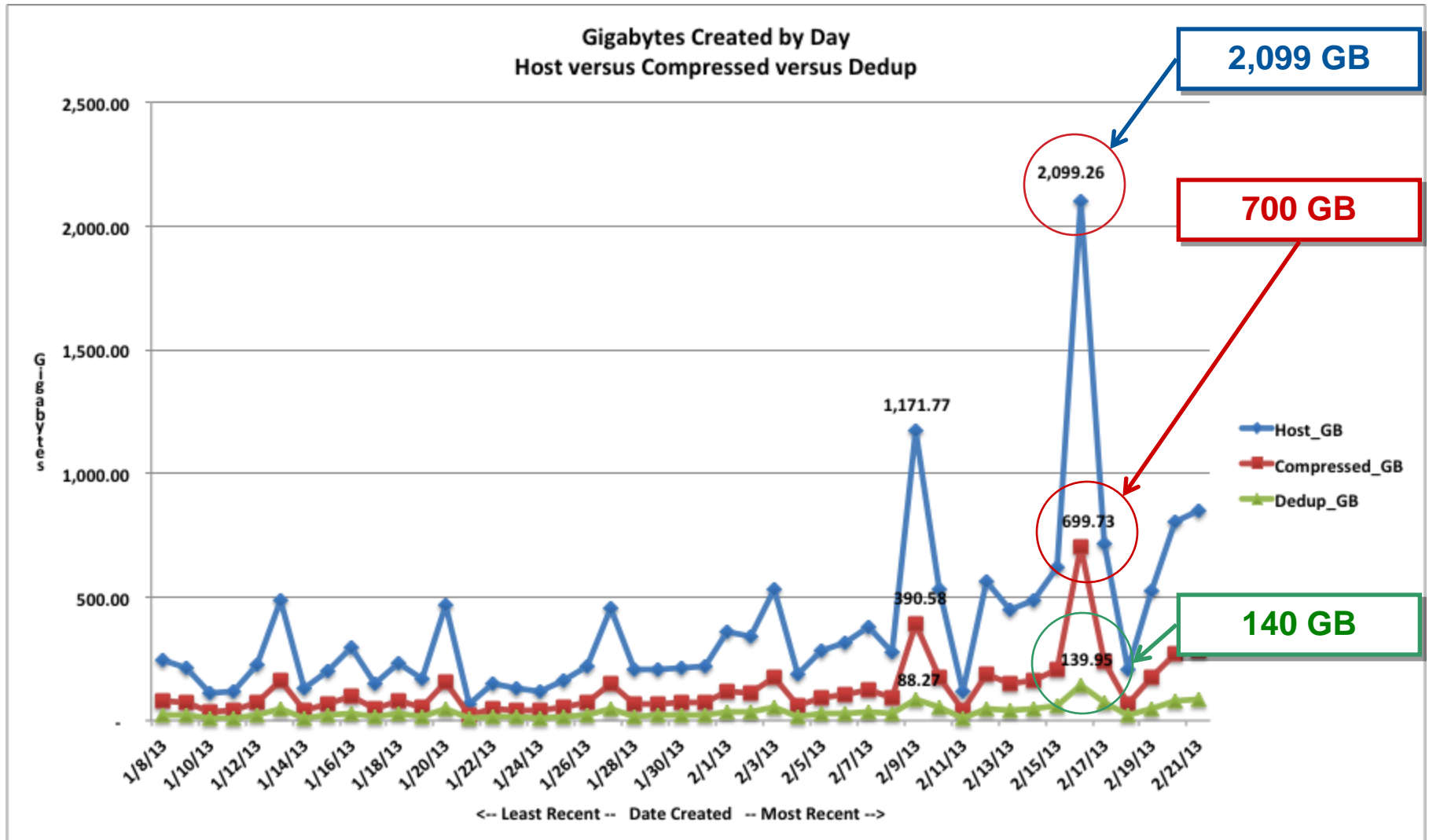What data should I replicate?

- Everything
  - How much bandwidth is required?
  - Is there enough capacity at DR?
    - Including DR test space?
- Selectively
  - What is essential?
  - SLA requirements?
  - Legal requirements?

Test
Development
Primary Operational
Backup

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Sizing - Network Bandwidth Requirements
TMC & SMF Analysis

Gigabytes Created by Day
Host versus Compressed versus Dedup

2,099 GB

700 GB

140 GB

2,099.26

1,171.77

699.73

390.58

88.27

139.95

Host_GB
Compressed_GB
Dedup_GB

Gigabytes

2,500.00
2,000.00
1,500.00
1,000.00
500.00

1/8/13 1/10/13 1/12/13 1/14/13 1/16/13 1/18/13 1/20/13 1/22/13 1/24/13 1/26/13 1/28/13 1/30/13 2/1/13 2/3/13 2/5/13 2/7/13 2/9/13 2/11/13 2/13/13 2/15/13 2/17/13 2/19/13 2/21/13

<-- Least Recent --   Date Created   -- Most Recent -->

How Much Bandwidth is Required?

Example: Replicate 1 TB daily

WAN Class	MB/s	GB/hr	Replication Time w/ 3:1 compression	Replication Time w/ 15:1 deduplication
DS3	5.59	19.66	16.95 hours	3.39 hours
OC-1	6.48	22.78	14.63 hours	2.93 hours
OC-3	19.44	68.34	4.88 hours	0.98 hours

If replication begins at midnight, a DS3 line will complete replication long before a courier would show up to begin transporting a physical tape.
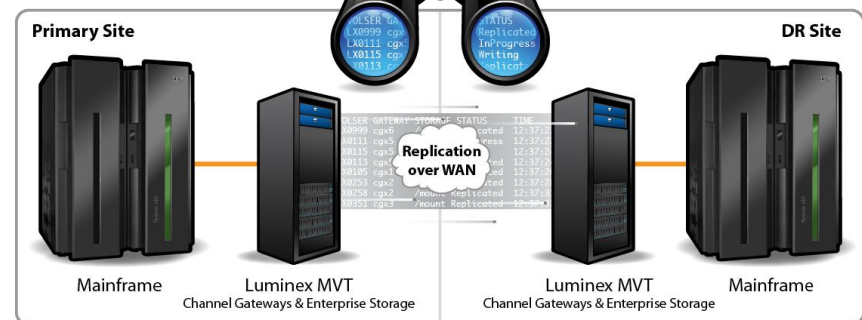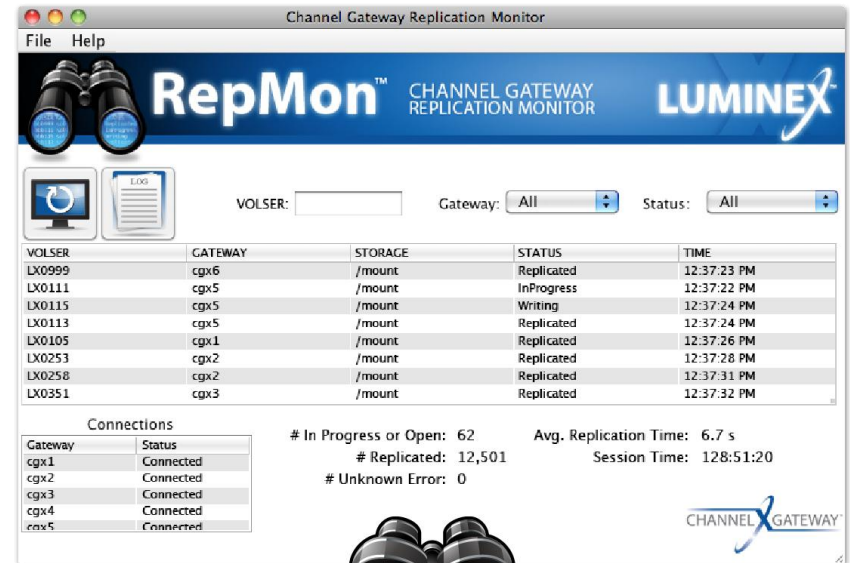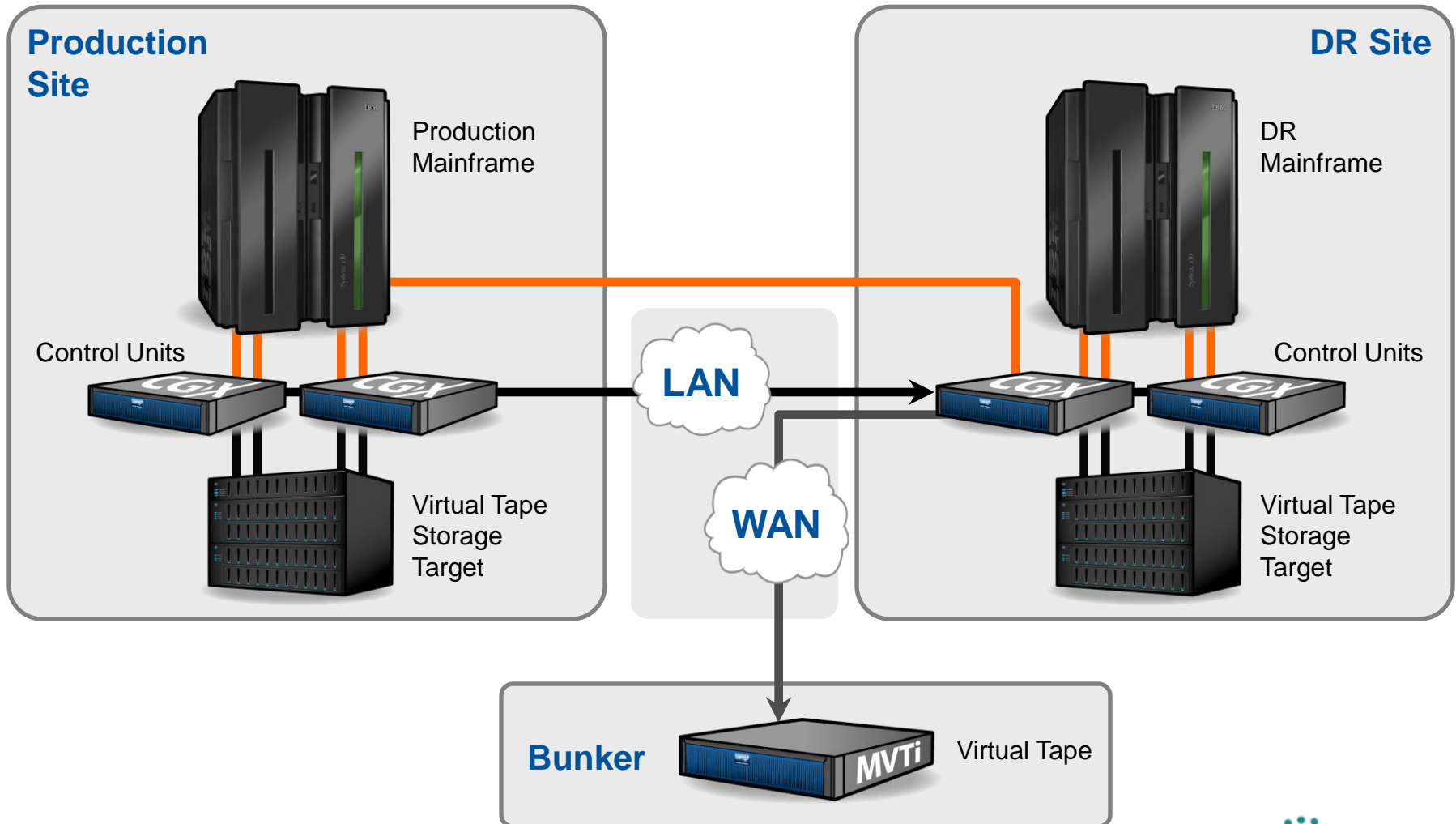
Replication Options
Monitoring

Why monitor?

- RPO determination
- Error reporting
- Satisfy legal and audit concerns

What does it provide?

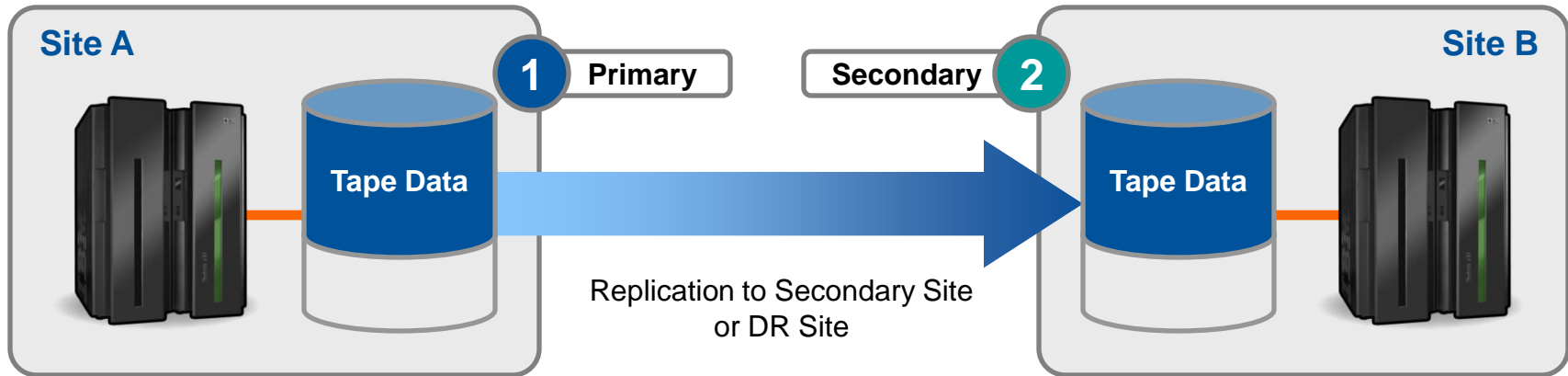- Replication logs
- Detailed reporting
- VOLSER-level monitoring

3 Site Replication

Complete your sessions evaluation online at SHARE.org/BostonEval

Disaster Recovery Testing
Replication During Normal Operations

Luminex Push Button DR

Site A

1 Primary   Secondary **2**

Tape Data → Tape Data

Replication to Secondary Site
or DR Site

Site B

Disaster Recovery Testing
Replication During DR Testing

Luminex Push Button DR

Site A

1 Primary

Secondary **2**

Site B

Tape Data

Tape Data

DR Test Data

Read/Write Testing

Replication to Secondary Site or DR Site continues uninterrupted
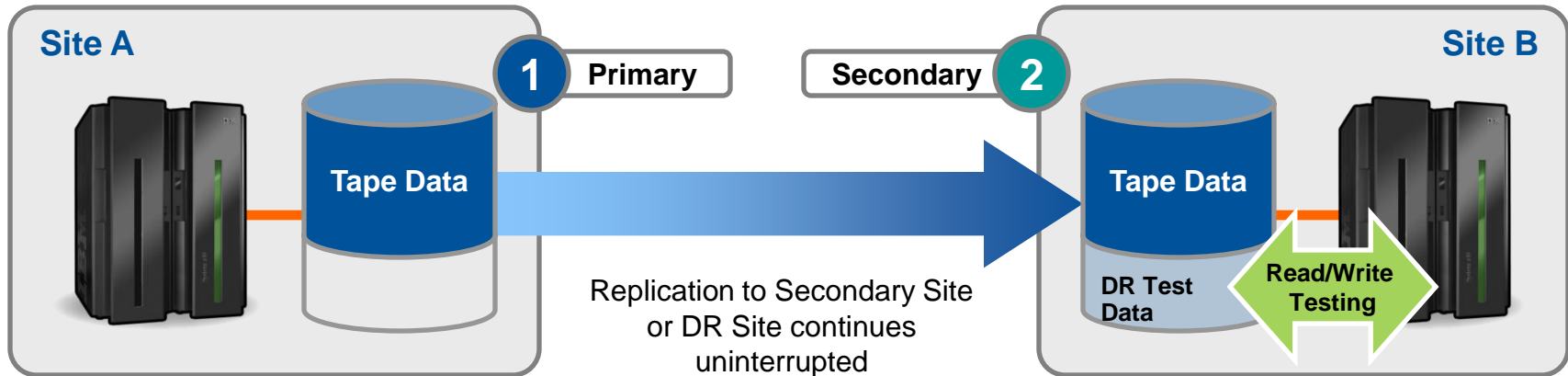
Space efficient clone of Tape Data is created for read/write testing; original Tape Data remains untouched

Luminex

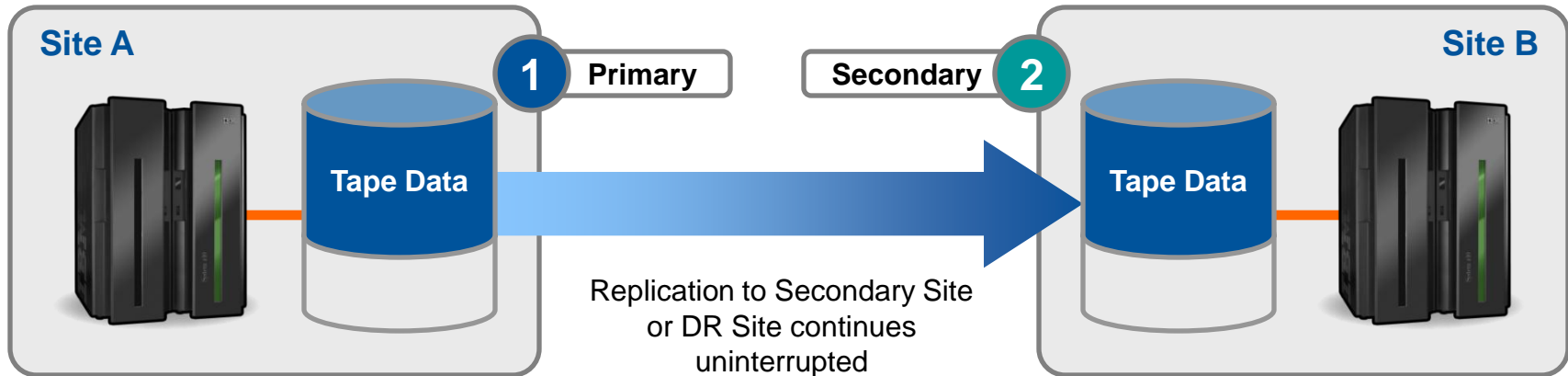172.17.16.33/modules/support/site_methods.php?cg=1

CGX CHANNEL GATEWAY X ADMIN GUI

CGA2   CGA1

Home
Operator
Status monitor
View scratch pool
View volume
Storage pool
Knowledge Base
Replication Monitor
User

Site Methods

Option: ✓ Status   Go
Promote Secondary
Force Promote
Start DR
Stop DR
Pause Replication
Resume Replication
Show Detailed Info
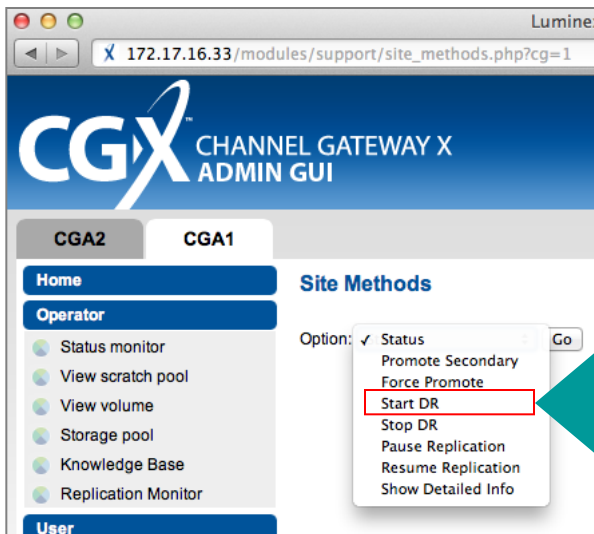
Start DR

Disaster Recovery Testing
After DR Testing is Completed

Luminex Push Button DR

Site A

1 Primary   Secondary **2**

Site B

Tape Data → Tape Data

Replication to Secondary Site or DR Site continues uninterrupted

DR Test Data is purged

Optionally, DR Test Data can be automatically replicated back to Site A for auditing purposes

172.17.16.33/modules/support/site_methods.php?cg=1

CG⟨X⟩ CHANNEL GATEWAY X ADMIN GUI

CGA2   CGA1

Home
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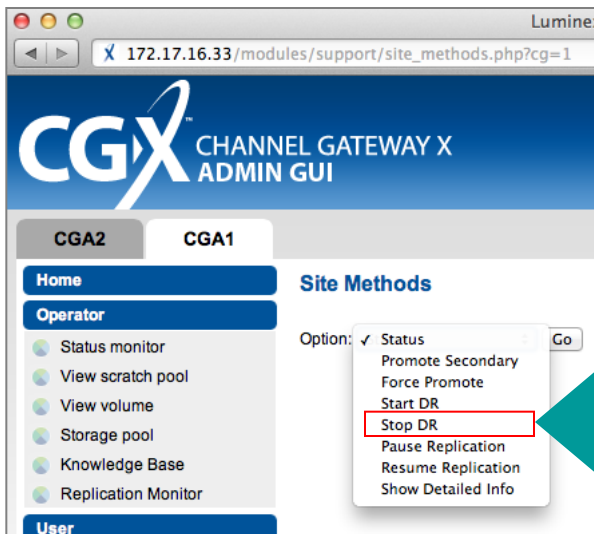
Stop DR

About Us

- One of America's largest providers of insurance, retirement plans and investments for individuals and businesses

- Tens of billions of dollars in assets under management and insurance in force and several million clients

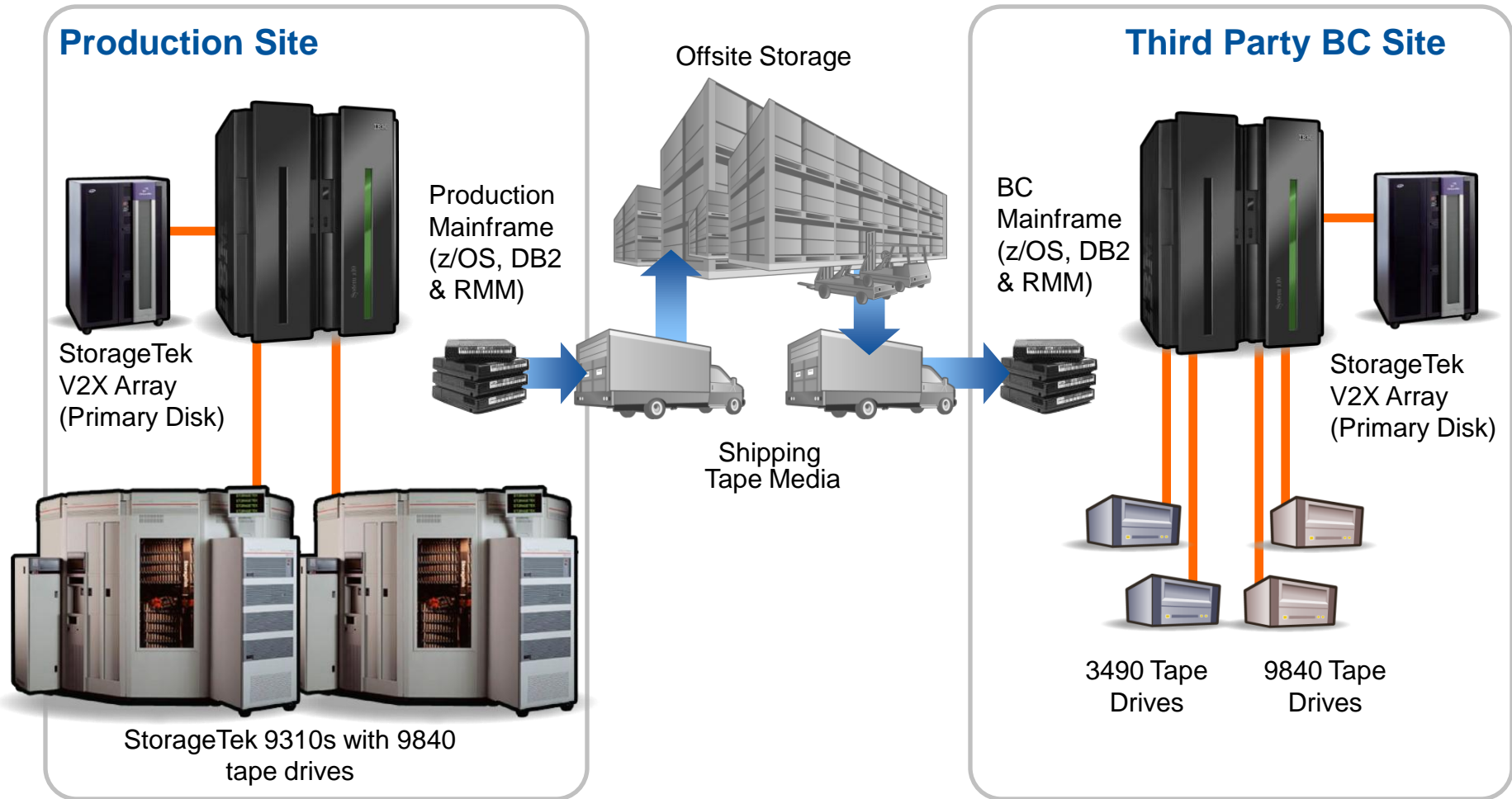- Several thousand associates and representatives nationwide
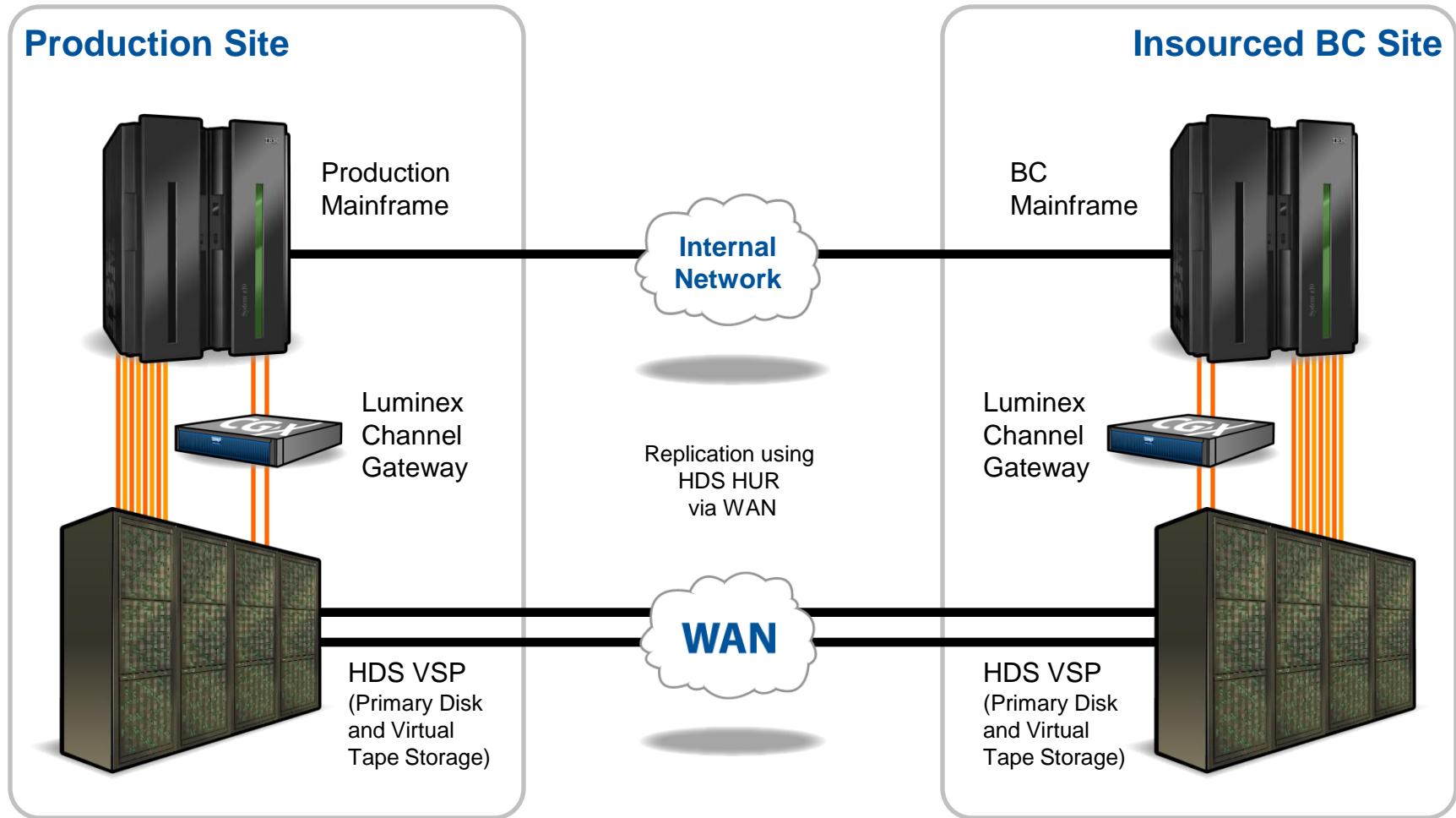
What were our Goals and Objectives?

- ❑ Eliminate the security risk of transporting tape media

- ❑ Reduce cost and time required to ship, store & manage physical tape media

- ❑ Improve & simplify Business Continuity (BC) planning and testing

Previous Tape Environment

Production Site

StorageTek
V2X Array
(Primary Disk)

Production
Mainframe
(z/OS, DB2
& RMM)

StorageTek 9310s with 9840
tape drives

Offsite Storage

Shipping
Tape Media

Third Party BC Site

BC
Mainframe
(z/OS, DB2
& RMM)

StorageTek
V2X Array
(Primary Disk)

3490 Tape
Drives

9840 Tape
Drives

Complete your sessions evaluation online at SHARE.org/BostonEval

Current Tape Environment

How Did We Do?

Benefits/Achievements

- ☑ We're completely tapeless!
- ☑ Now all data remains "inside our walls"
- ☑ Eliminated 4 hours of tape packing for off site shipping <u>daily</u>
- ☑ Saved $50-60K in off site shipping and warehousing fees annually
- ☑ Insourced our Business Continuity site
    - ☑ IBM CBU licensing made it very affordable to have a 2nd mainframe for BC
- ☑ Improved Business Continuity efficiency
    - ☑ Just half a day for testing, down from several days
- ☑ Consolidated storage for Primary Disk, Virtual Tape and Distributed Systems

Continuous Availability of Virtual Tape

# Continuous Availability of Virtual Tape

Features and Benefits

- Continuous Availability
  - Resilient architecture instantly and automatically adjusts to multiple failures without interruption
  - Data is always available for I/O
  - No downtime from failover or restore processes

- No idle components to buy
  - All components contribute to day-to-day operations, not just during failure events

- Easy to implement
  - No host scripts or policies required

- Scalable
  - No limitations for throughput, capacity or degrees of redundancy

- Modular design ensures investment protection

- Supports dissimilar storage systems and compression/deduplication technologies
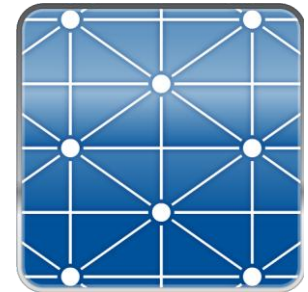
Simplified Configuration with *n*-Sites
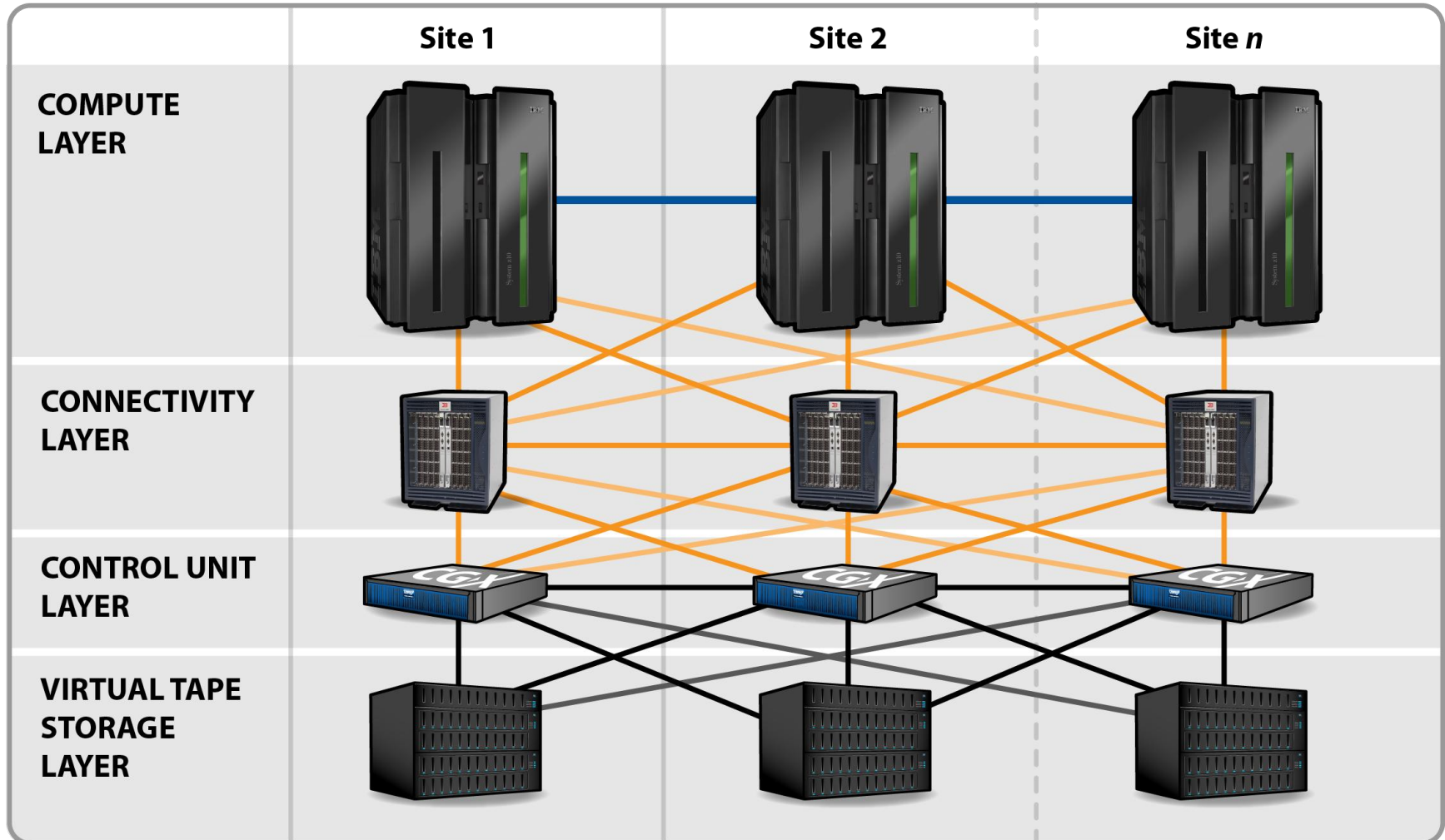
Operational Configuration with Multiple Failures Across Layers and Sites
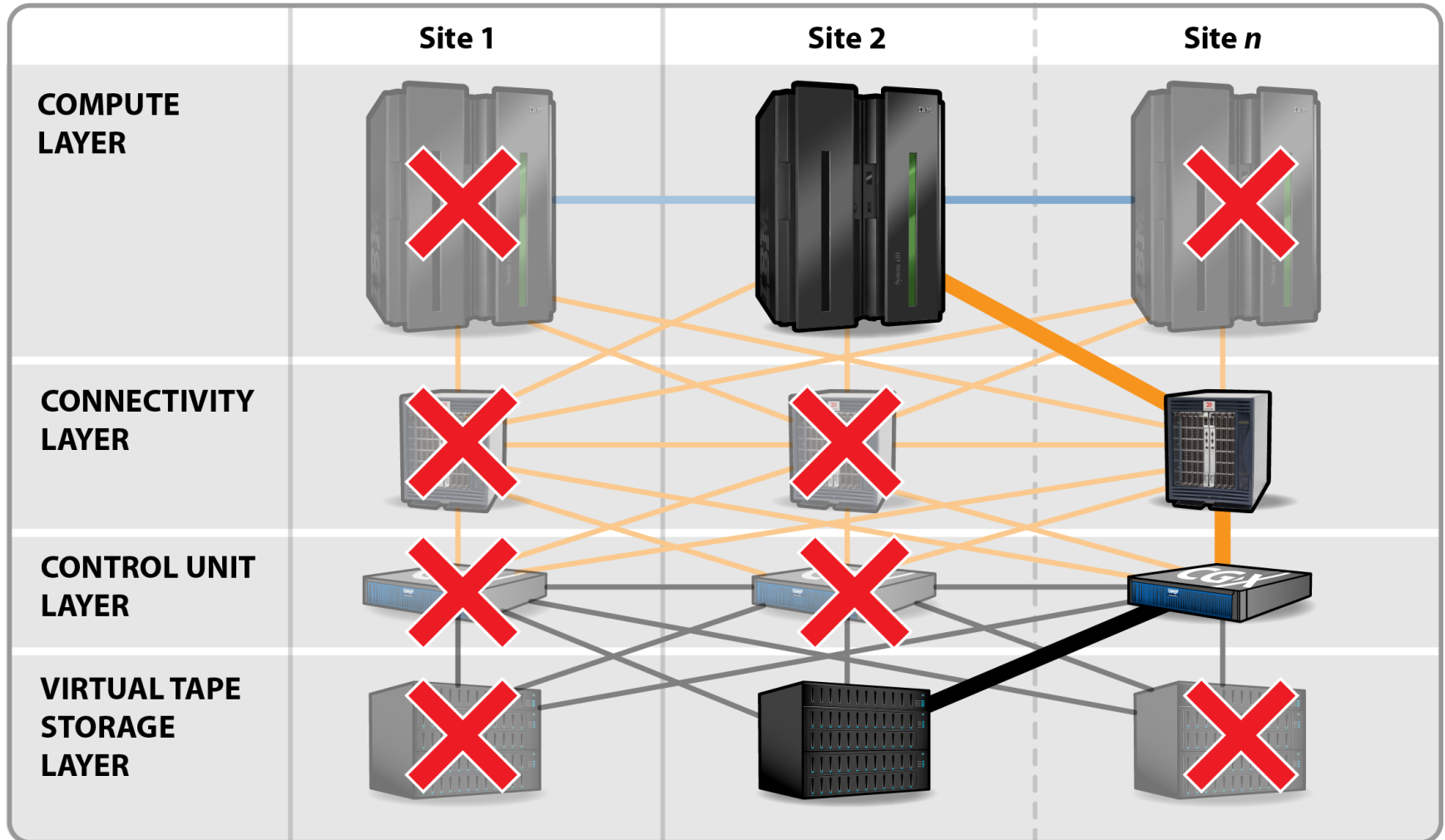
Best Practices – Replicating Mainframe Tape Data for DR

- Determine if you will **selectively** or **completely replicate** tape data based on:
  - Internal and external requirements
  - Bandwidth availability
- Determine if **control-unit** or **storage based replication** is best for you, based on budget and functionality
- **Monitor replication** – **VOLSER-level** monitoring is critical
- Use a **non-disruptive** and **efficient** process
  - Continuous protection of the production site's data
  - Non-disruptive remote DR testing
    - Automated DR testing (start and cleanup)
    - Space efficient DR testing
- For Active-Active tape operations and higher availability
  - Consider solutions that offer continuous availability

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Thank You

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