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Replicating Mainframe Tape Data for DR – Best Practices

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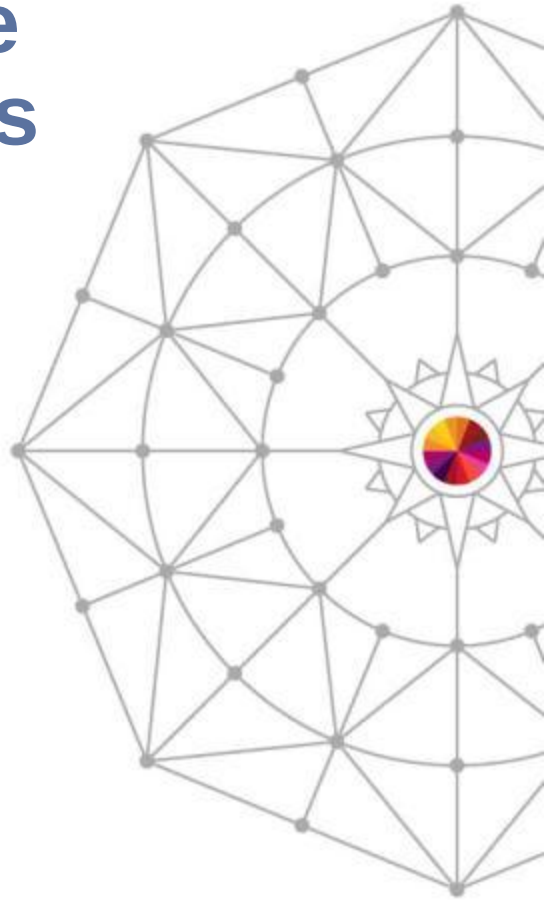
Thursday, March 13
Session #14846



SHARE in Anaheim

Discussion Topics

- Perspective
- Why Replicate Mainframe Tape Data?
- Replication Considerations
- Configuration Examples
- Recommendations for Best Practices

Perspective

Who We Are – Focused on Mainframe Virtual Tape

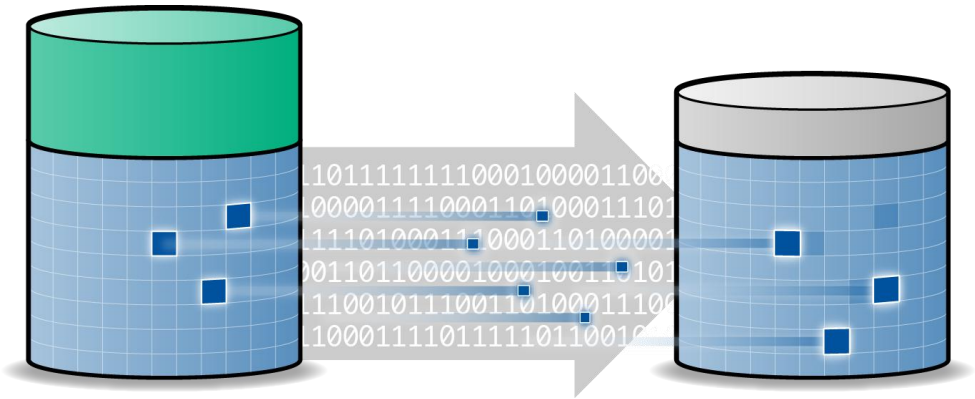
- Luminex Software, Inc.
- Providing mainframe tape solutions for 25+ years
- Each of our Subject Matter Experts (SMEs) have an average 25+ years of experience with mainframe tape
- Our SMEs are former STK Systems Engineers
- We’re recognized for enabling the latest innovations in mainframe virtual tape

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

Replication Considerations

- Which Data Should I Replicate?
- Consistency Points
- Which Replication Engine Should I Use?
- Monitoring and Auditing
- Disaster Recovery Testing
- Beyond DR: Continuous Availability



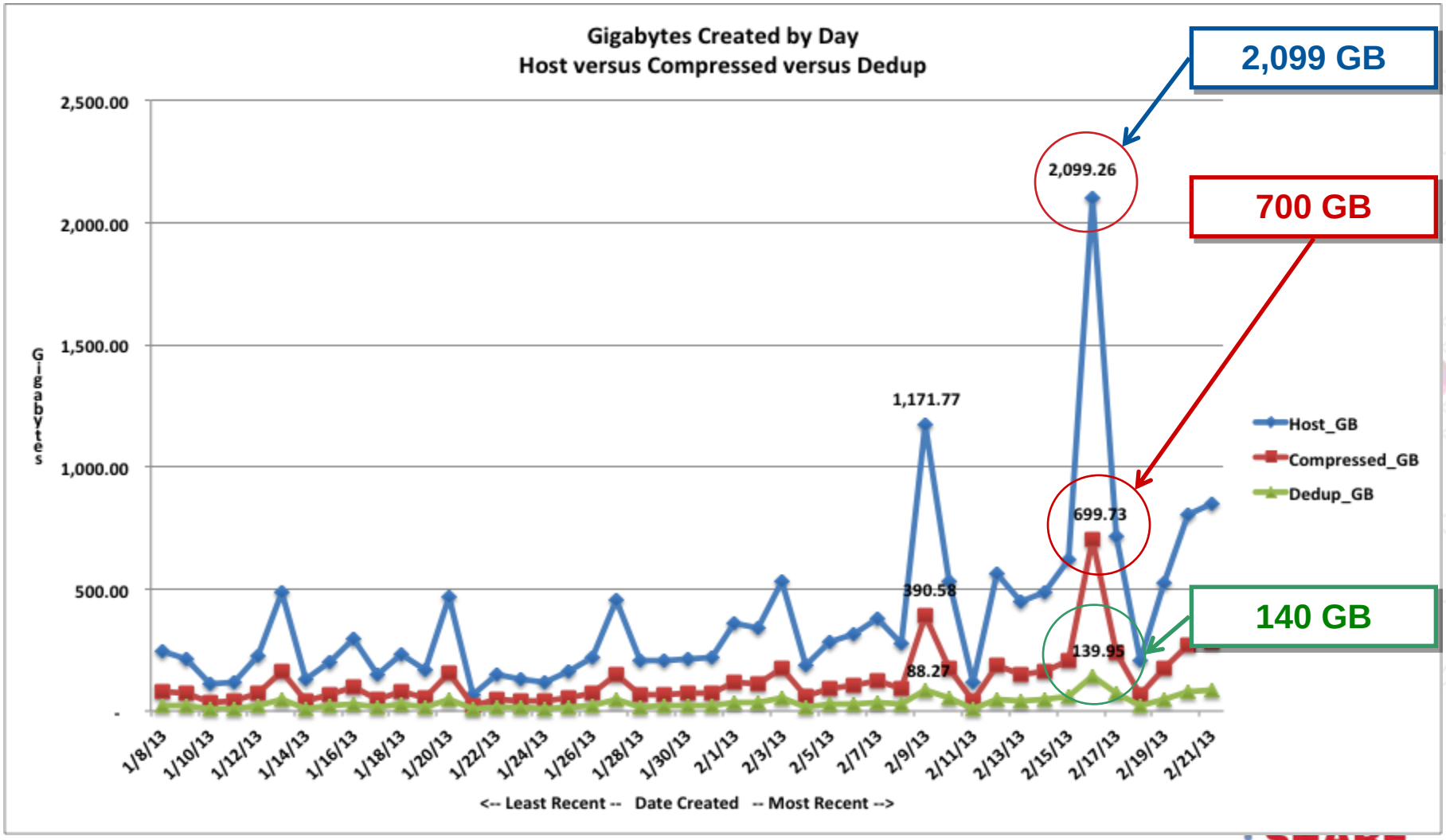
Replication Considerations

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?

Replication Considerations

Sizing - Network Bandwidth Requirements (TMC & SMF Analysis)



Replication Considerations

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 Considerations

Consistency Points

- What does your business require?
  - Application
  - Cross Platform
  - DR
- Do you have what you [redacted] you have?
  - How do you verify wh[redacted]u have?

Replication Considerations

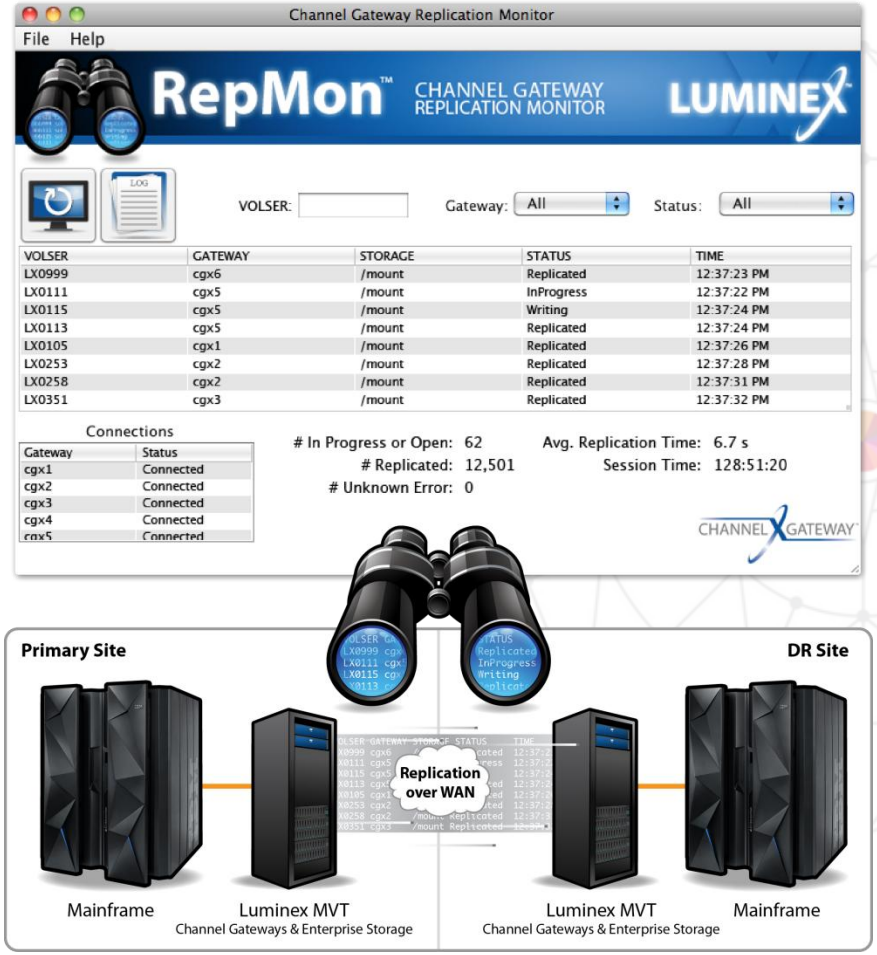
Monitoring and Auditing

Why monitor?

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

What does it provide?

- Replication logs
- Detailed reporting
- VOLSER-level monitoring



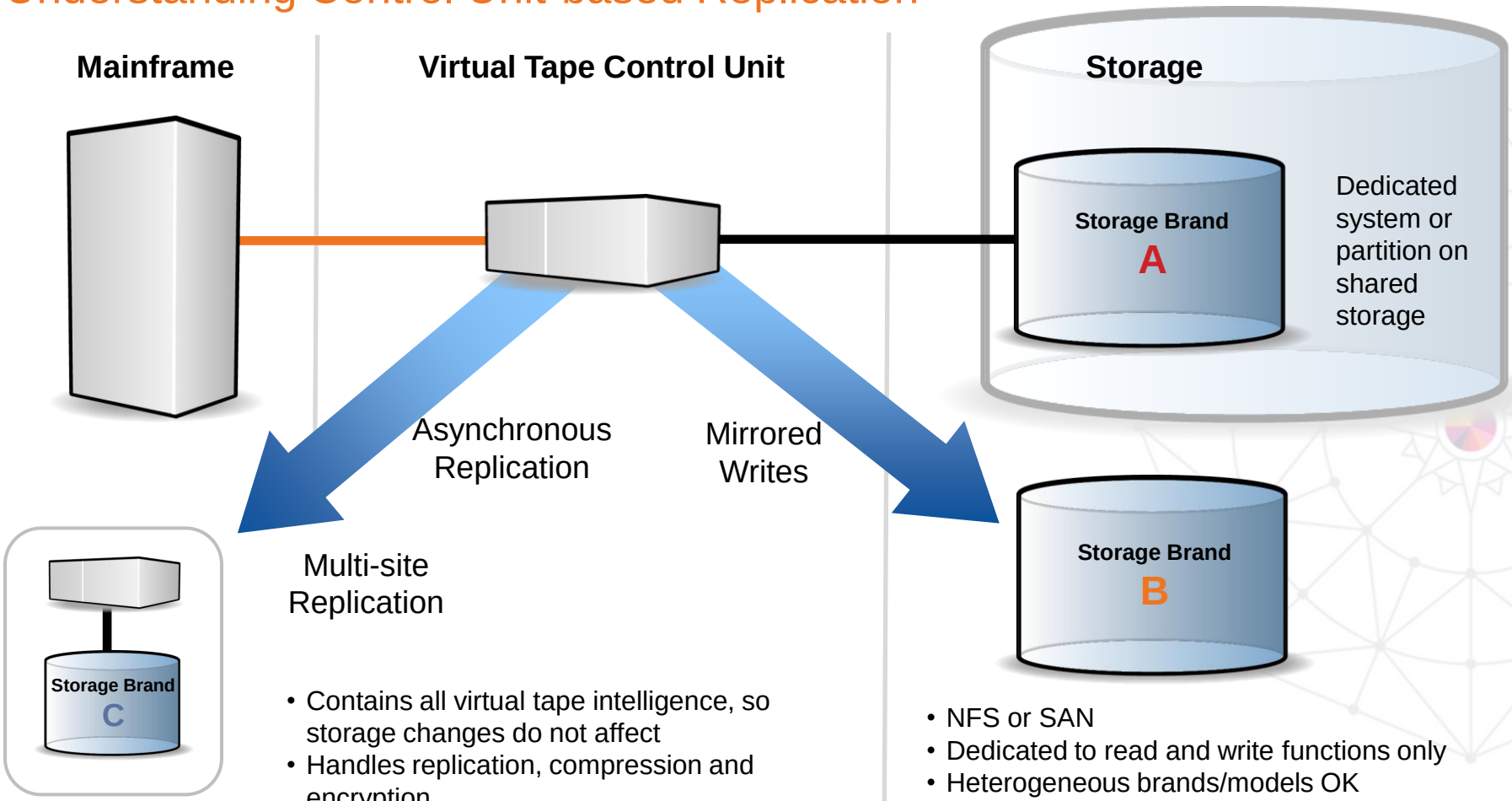
Replication Considerations

Which Replication Engine Should I Use?

- Control Unit-based
  - Cost effective
  - Flexibility
    - Storage independence (vendors, capabilities, cost)
    - Upgrade throughput, capacity and functionality independently
  - Reduced compute and read/write burden on storage system increases investment options
- Storage-based
  - Uniquely implemented technology (deduplication)
  - Shared replication software for DASD, virtual tape and open systems
  - Capacity-based licensing

Replication Considerations

Understanding Control Unit-based Replication

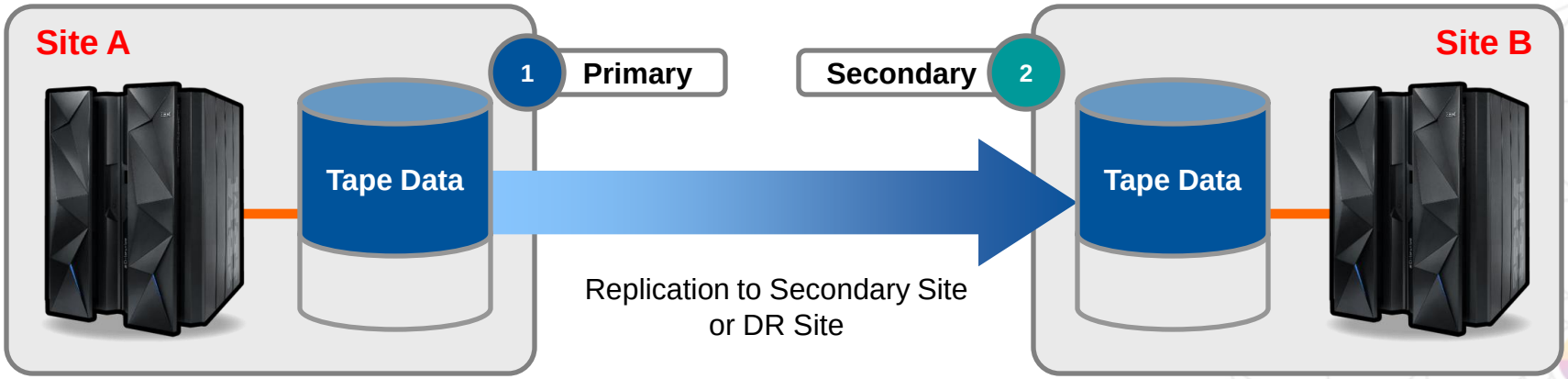


- Contains all virtual tape intelligence, so storage changes do not affect
- Handles replication, compression and encryption
- Typically less expensive replication licenses
- Scalable, just add more control units

- NFS or SAN
- Dedicated to read and write functions only
- Heterogeneous brands/models OK
- Storage can be repurposed for open systems

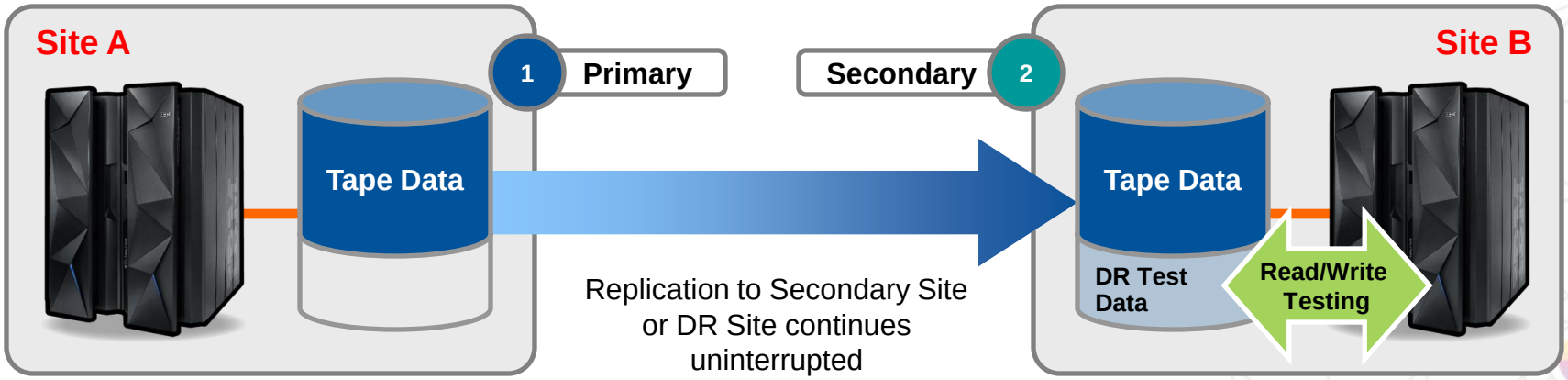
Disaster Recovery Testing

Replication During Normal Operations



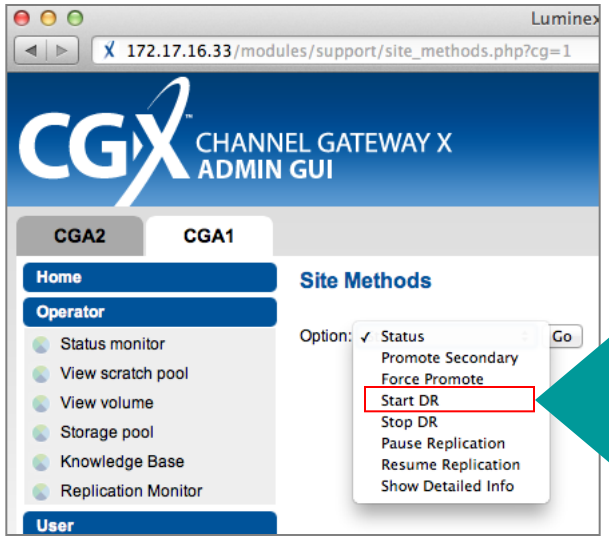
Disaster Recovery Testing

Replication During DR Testing



Replication to Secondary Site or DR Site continues uninterrupted

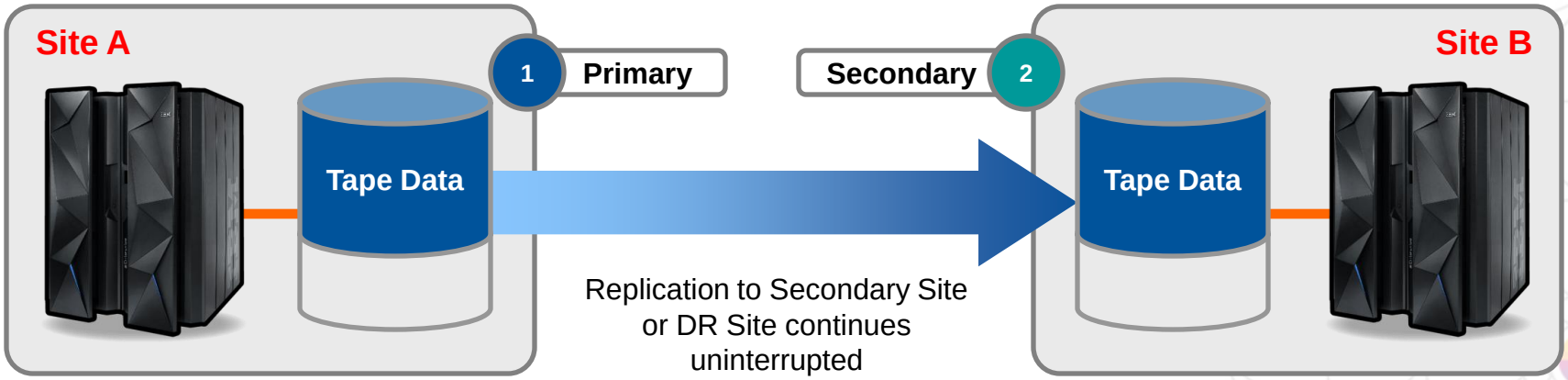
Space efficient clone of Tape Data is created for read/write testing; original Tape Data remains untouched



Start DR

Disaster Recovery Testing

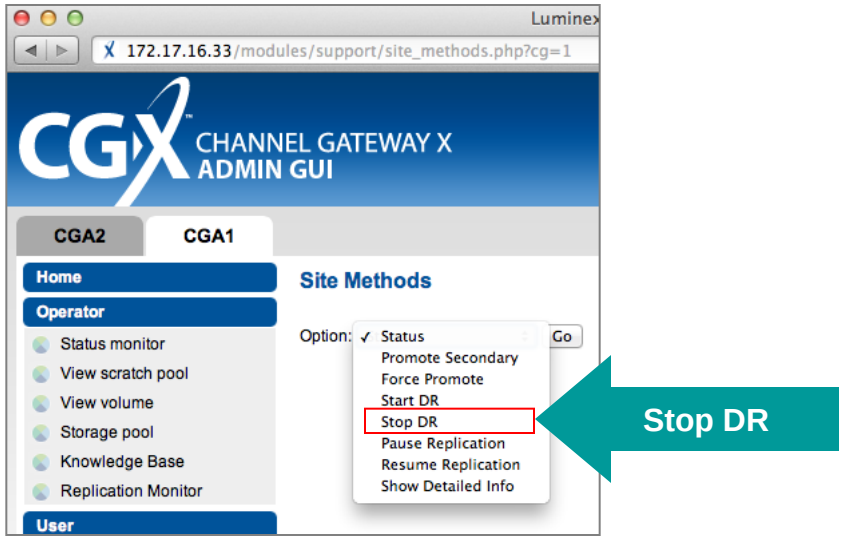
After DR Testing is Completed



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



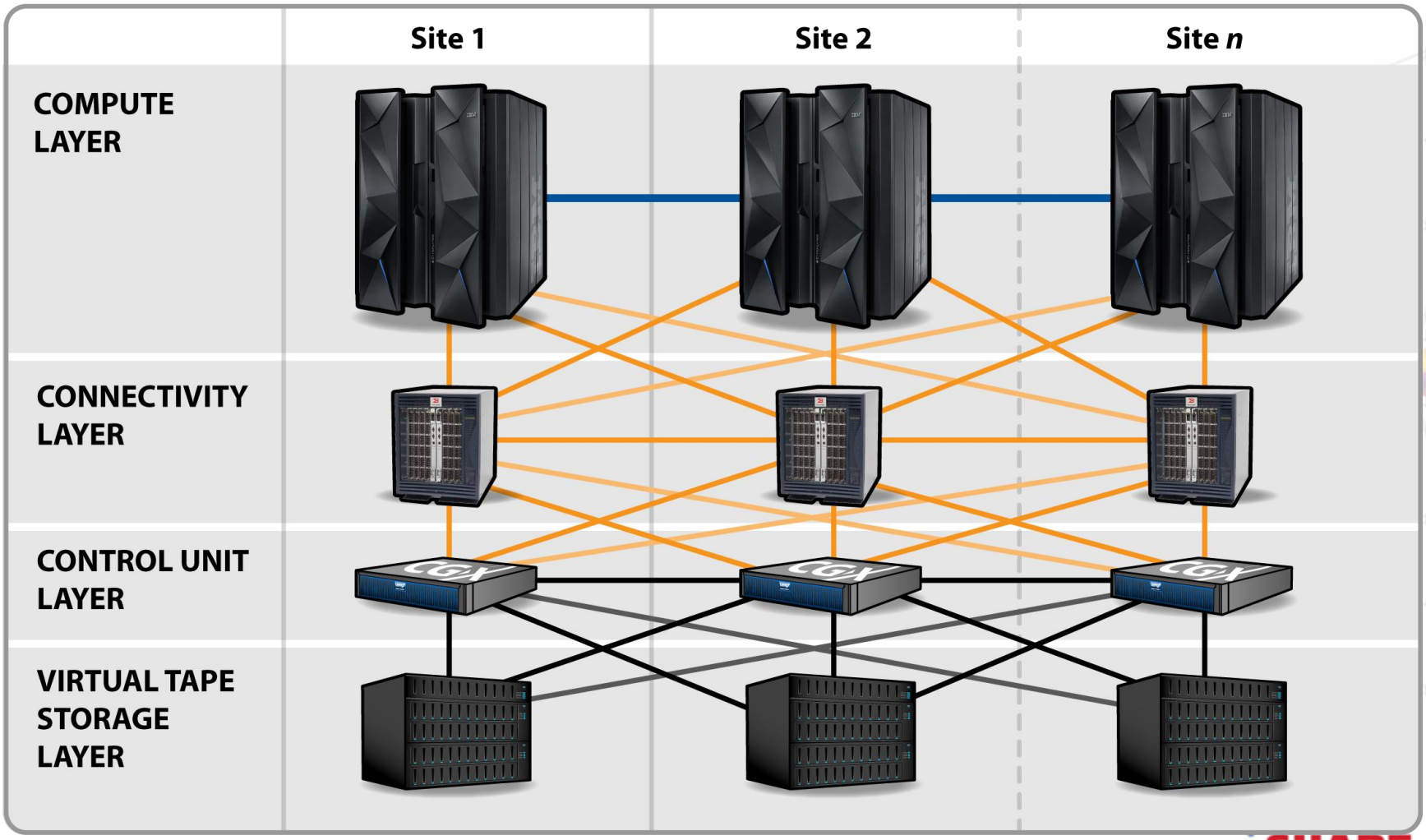
Beyond DR: Continuous Availability

When Downtime Isn't An Option

- Replace or augment disaster recovery processes and infrastructure
- Synchronous replication / mirrored writes
  - Local storage redundancy
  - Across data centers (campus to metro distance)
    - Storage and compute redundancy
- Active-Active Host
  - Data always available for I/O from every host
- Active-Passive Host
  - Data remains accessible, but host intervention may be required to resume operations

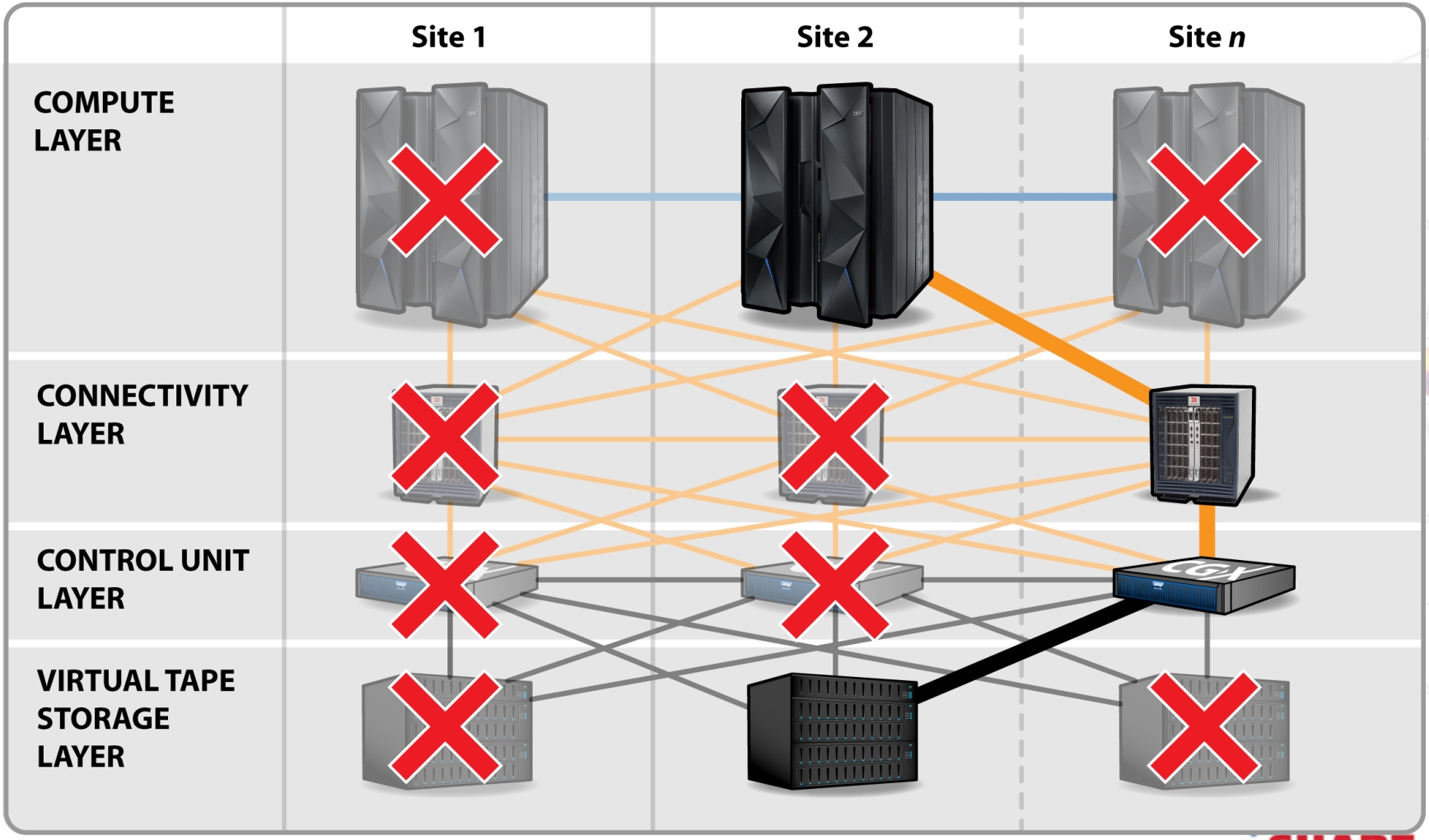
Beyond DR: Continuous Availability

Simplified Configuration with *n*-Sites

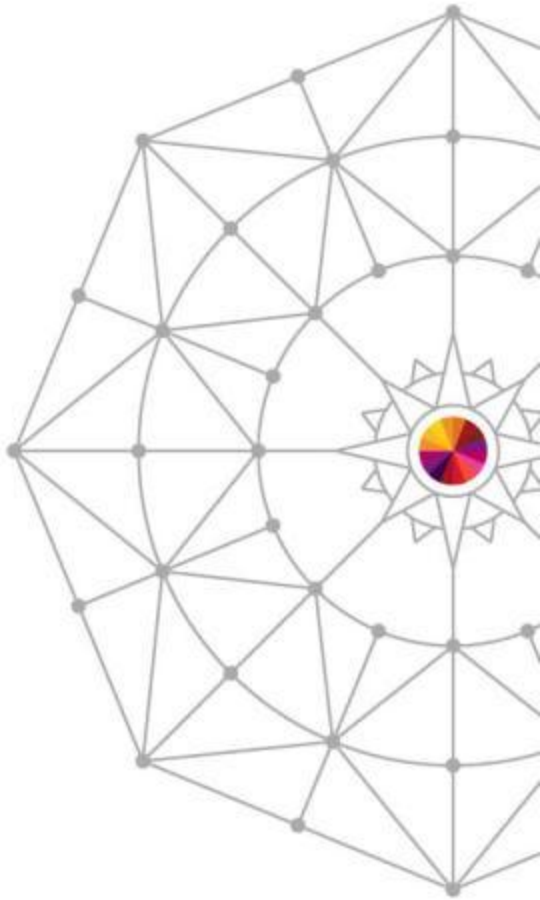


Beyond DR: Continuous Availability

Operational Configuration with Multiple Failures Across Layers and Sites

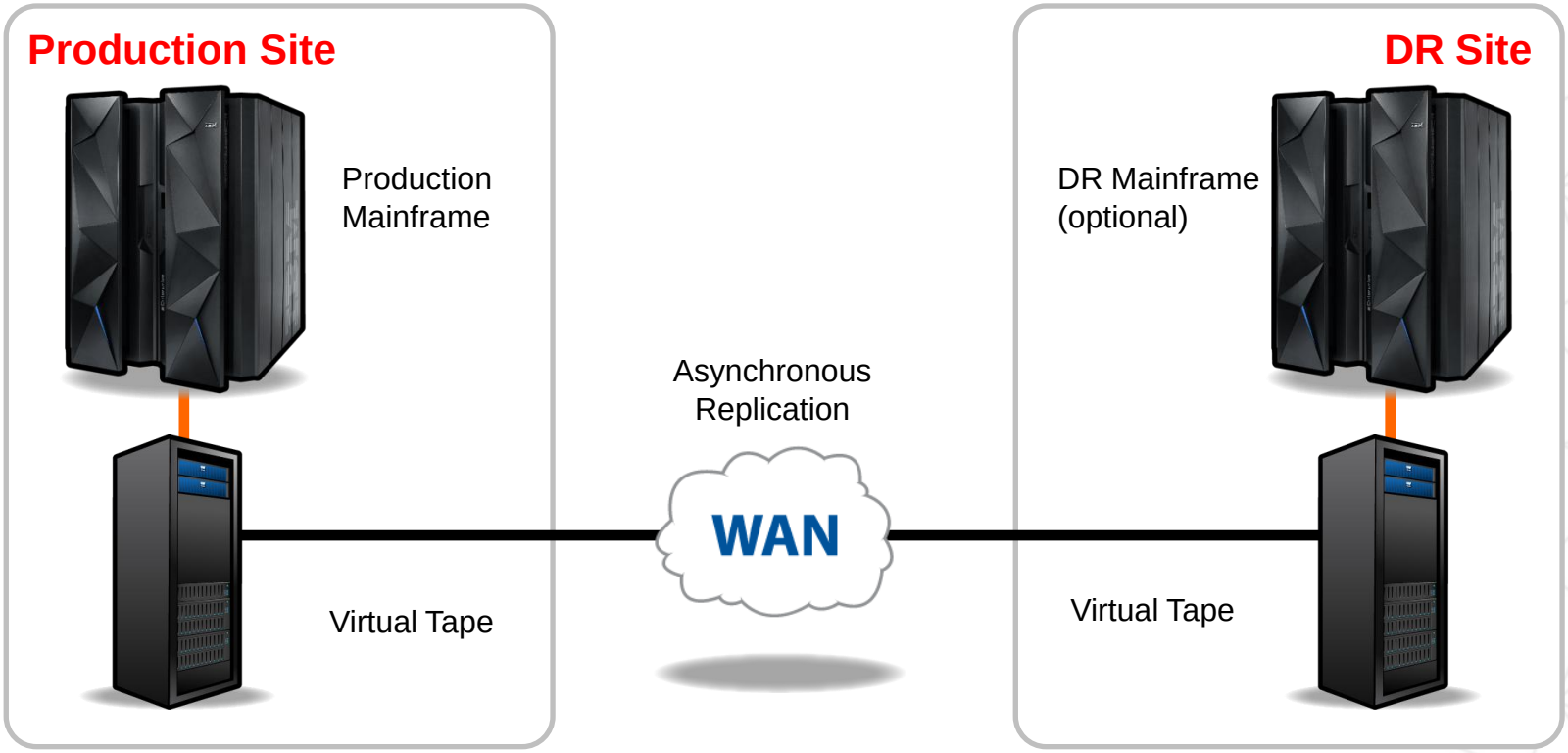


Replication Configuration Examples



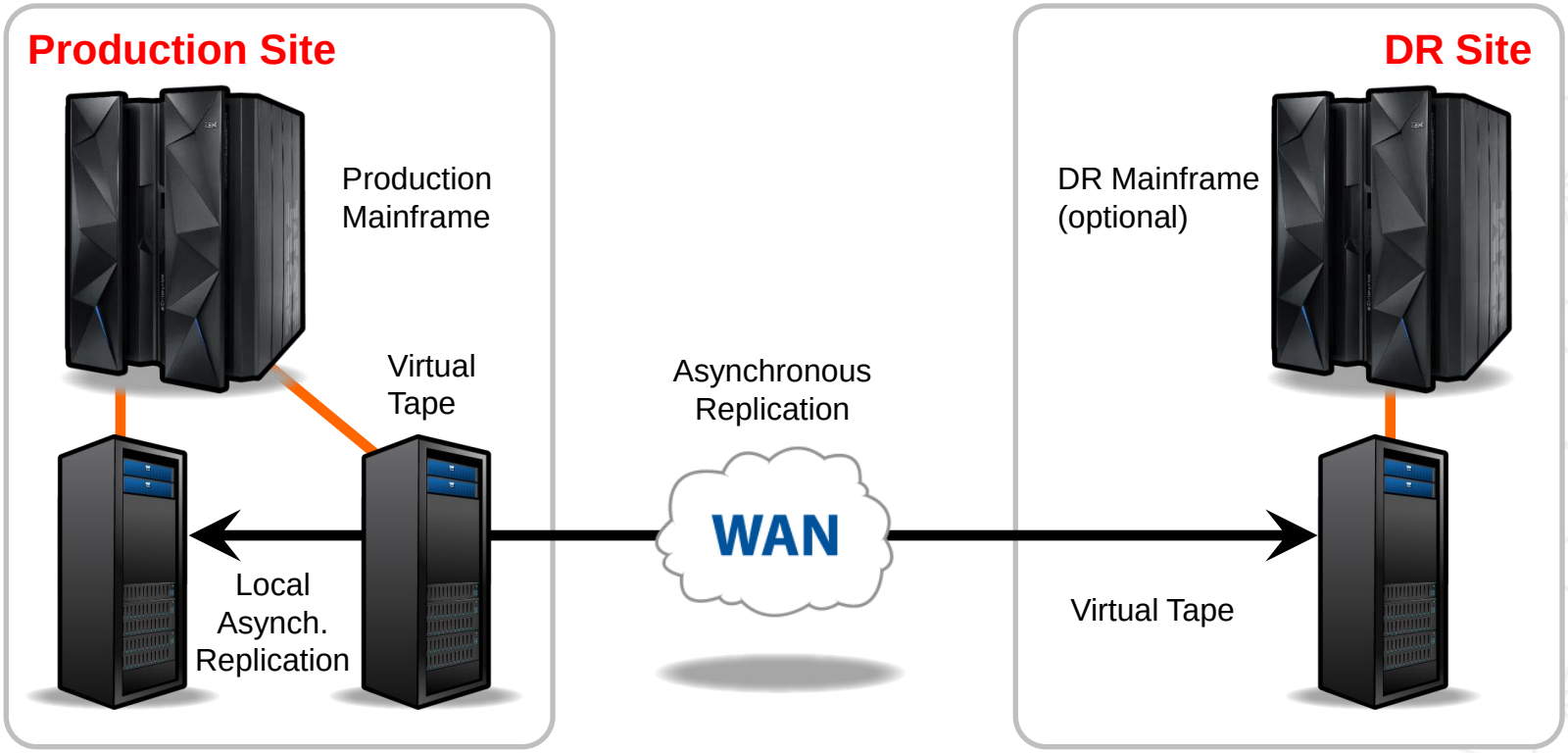
Replication Configuration Examples

Active-DR Host/Storage (Typical 2 Site Replication)



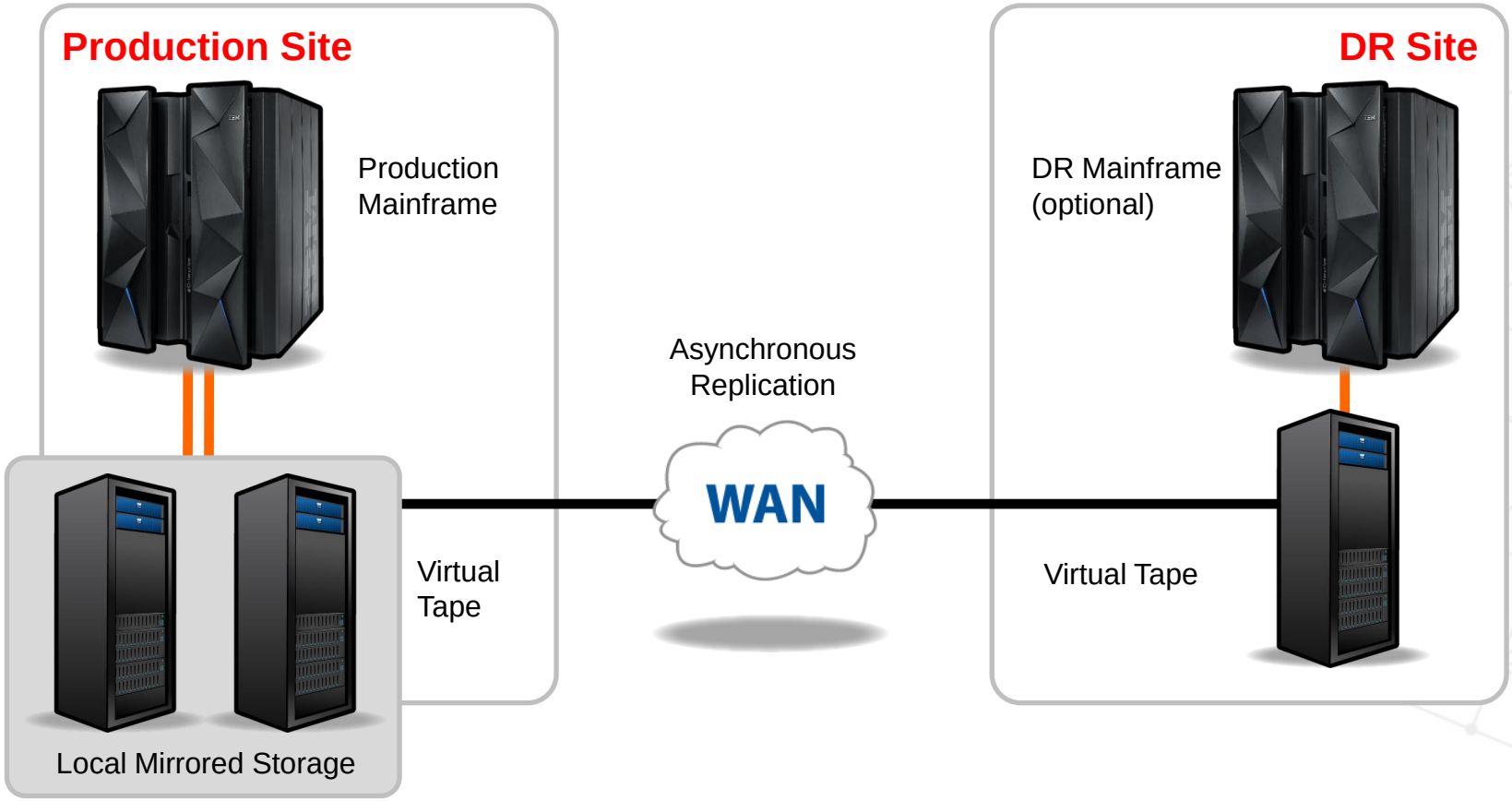
Replication Configuration Examples

Active-DR Host, Local Active-“Near Active” Storage with DR



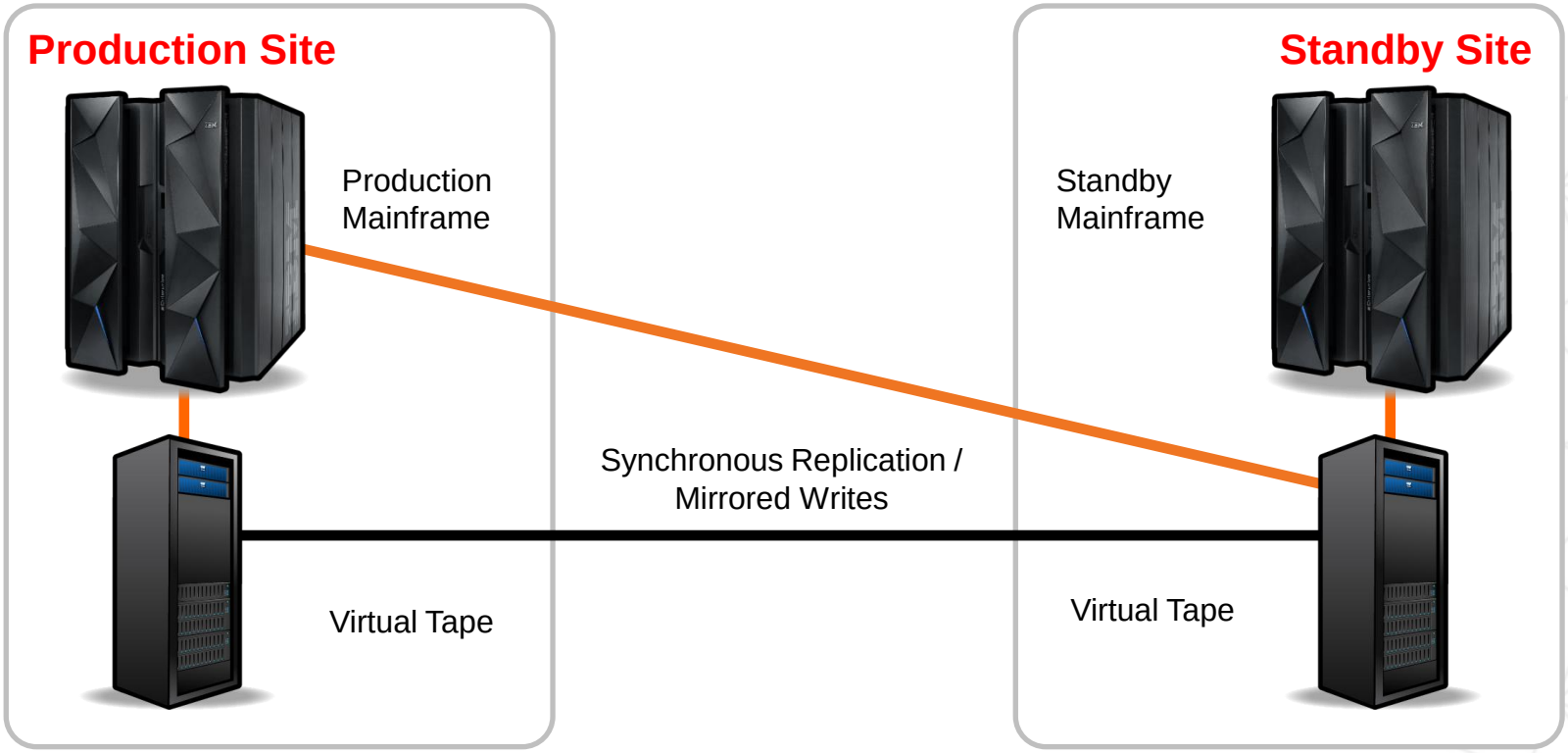
Replication Configuration Examples

Active-DR Host, Active-Active Local Storage with DR



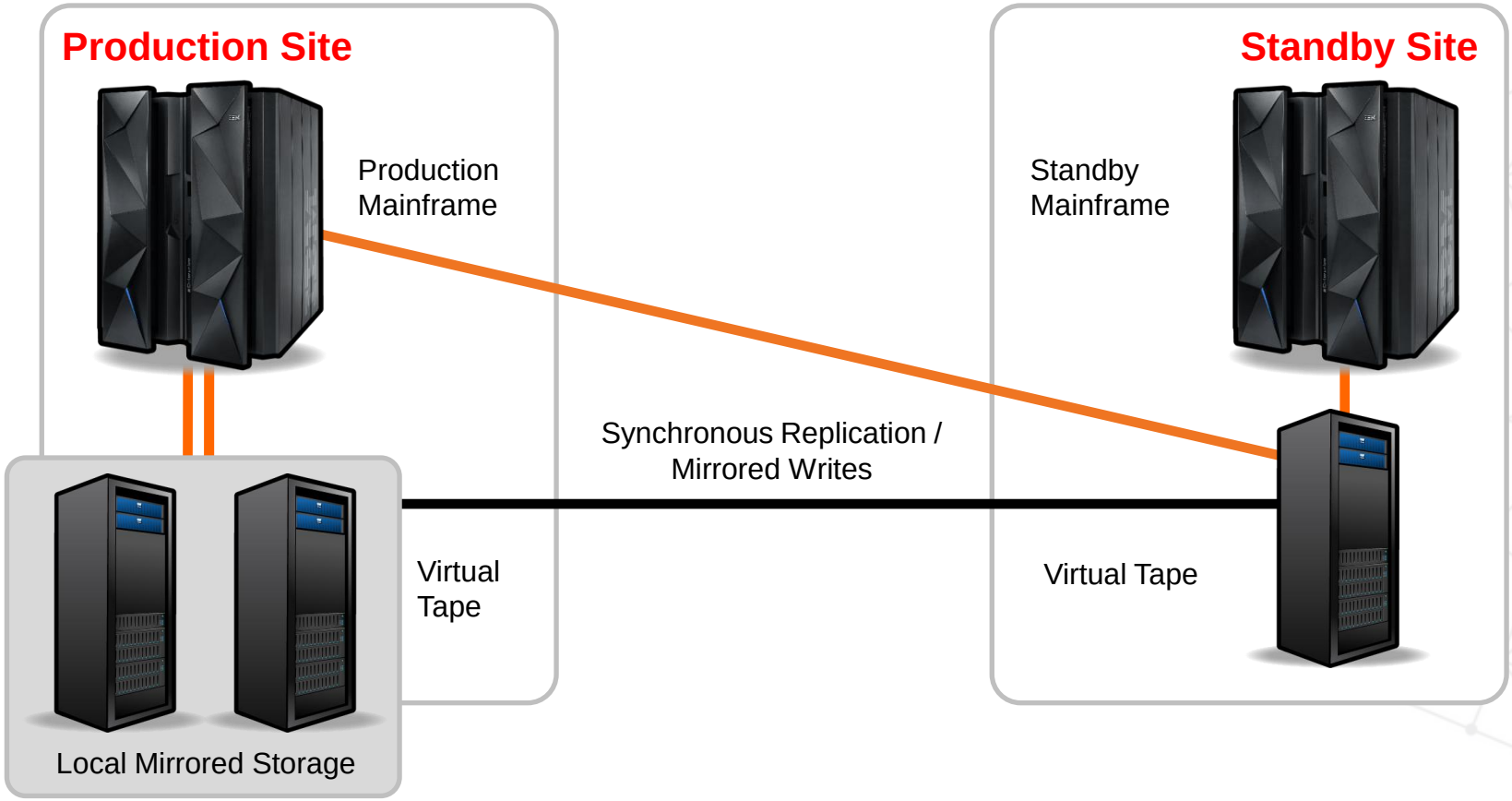
Replication Configuration Examples

Active-Standby Host, Active-Active Storage



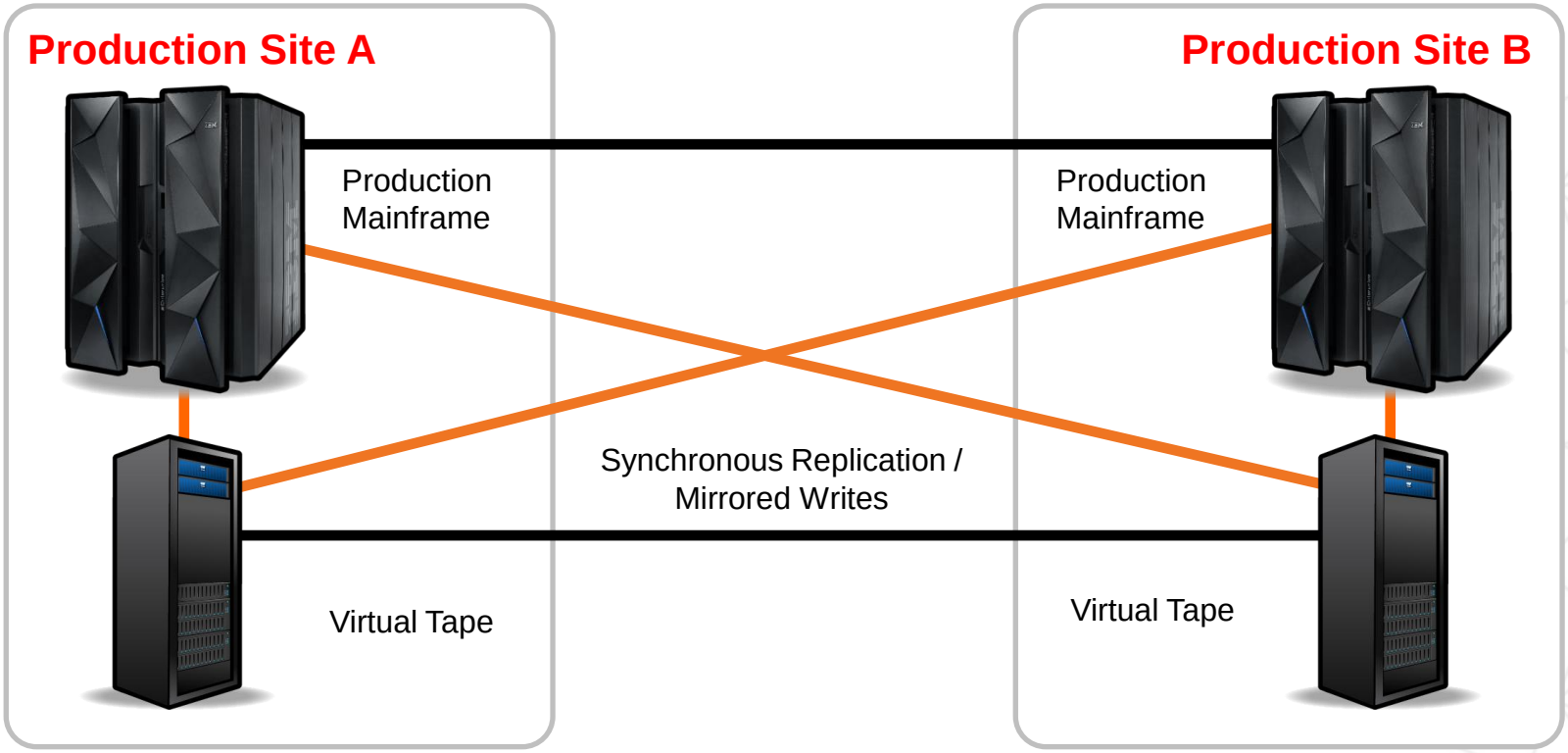
Replication Configuration Examples

Active-Standby Host, Local Active-Active Storage w/ Active Remote



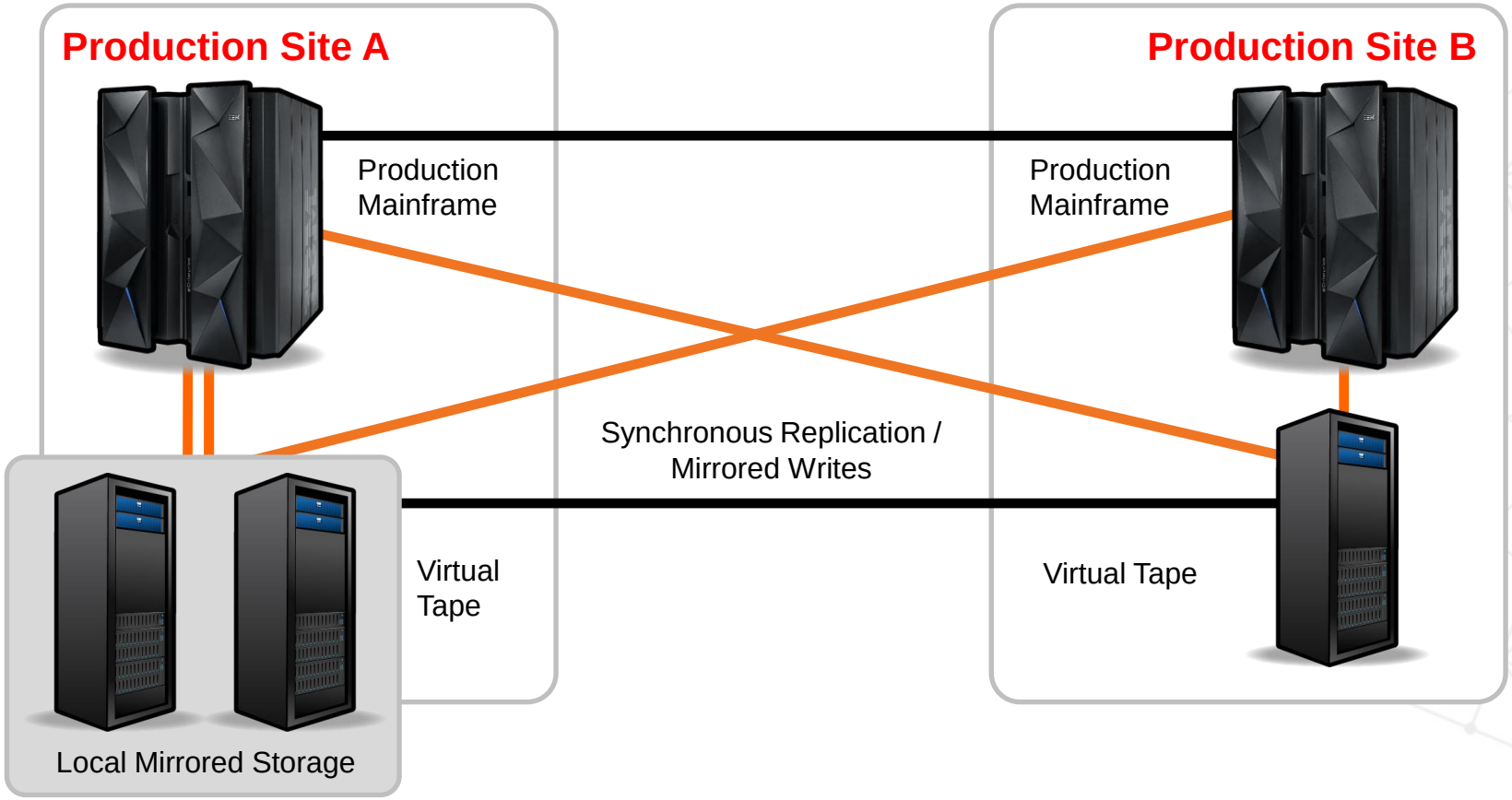
Replication Configuration Examples

Active-Active Host/Storage



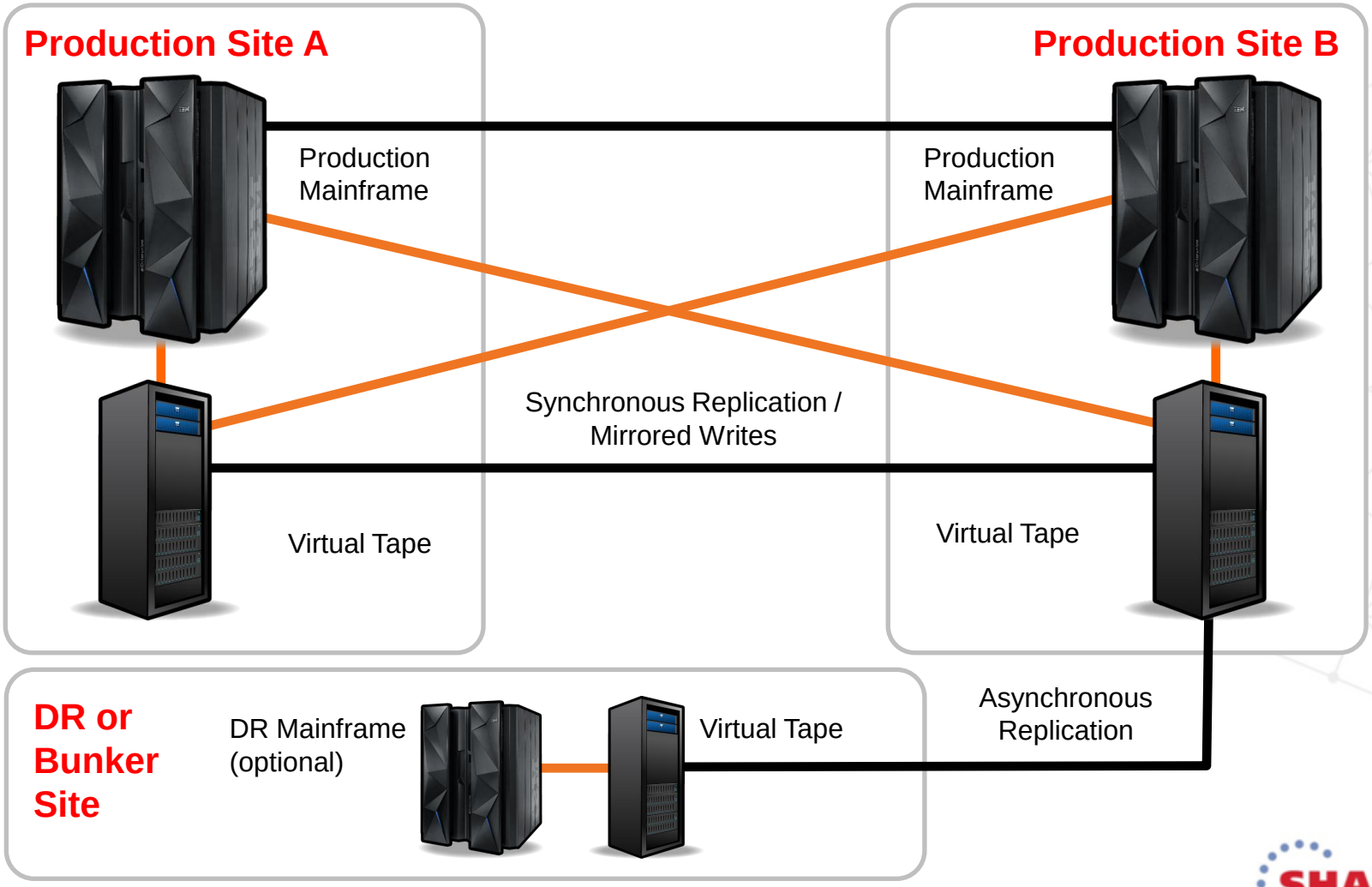
Replication Configuration Examples

Active-Active Host/Storage with Local Active-Active Storage



Replication Configuration Examples

Active-Active-DR Host/Storage



Best Practices – Replicating Mainframe Tape Data for DR (and Beyond)

- Determine if you will selectively or completely replicate tape data based on:
  - Internal and external requirements
  - Bandwidth availability
- Determine your requirements for consistency points
- 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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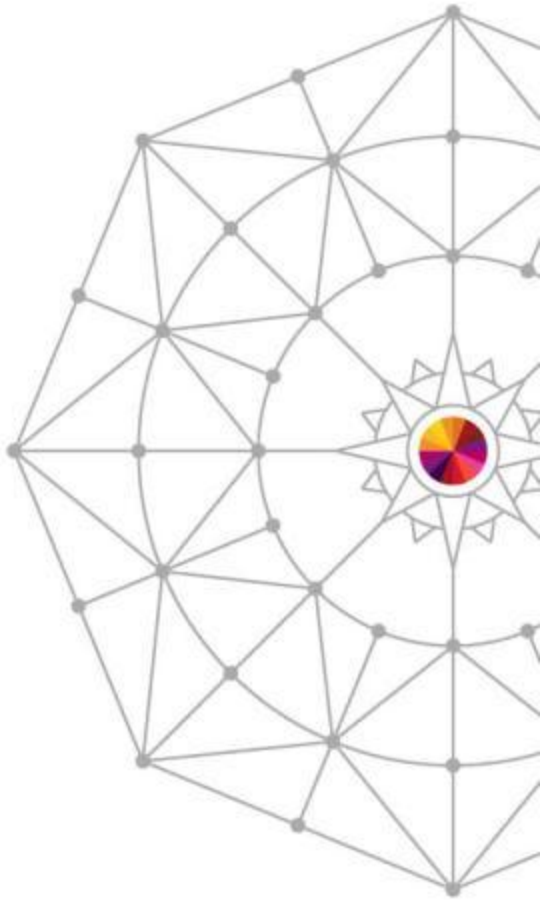

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