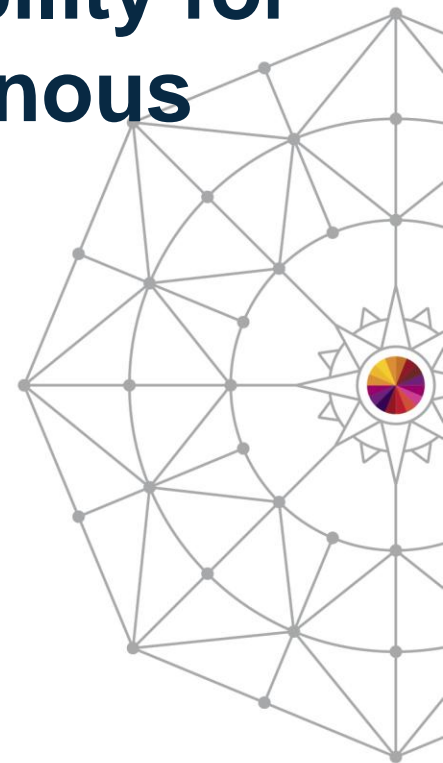


Achieving Continuous Availability for Mainframe Tape with Synchronous Tape Matrix

David Tolsma
Luminex Software, Inc.

Wednesday, August 6, 2014
Session Number 15973



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Discussion Topics

- Innovations in mainframe tape
- What have these innovations affected?
- The next evolutionary steps
- Example configurations
- Customer experience
- What's the next innovation?

Innovations in Mainframe Tape

- Physical tape
 - Better recording technologies (3480, 3490, 3590)
- Robotics (automated tape loading)
 - Dual robotic arms
 - Higher slot counts
- Virtual tape (disk cache with physical tape back store)
 - Replication of disk cache
- Encryption
- Tapeless (no physical tape)
 - Deduplication
 - GRID
 - Synchronous replication
 - Cloud storage

What Have These Innovations Affected?

Innovations

- Physical tape
- Robotics
- Virtual tape
- Encryption
- Tapeless

Effects

- Performance
- Capacity
- Media utilization
- Data Security
- Host devices
- RPO/RTO capabilities
- Copy creation
 - Number of copies
 - Number of locations
 - Copy consistency
- Operational accessibility
- Impact of equipment failure
- Impact of media failure

What Have These Innovations Affected?

Innovations

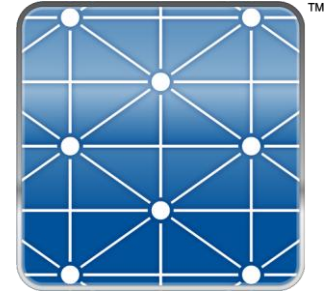
- Physical tape
- Robotics
- Virtual tape
- Encryption
- Tapeless
- **Synchronous Tape Matrix**

Effects

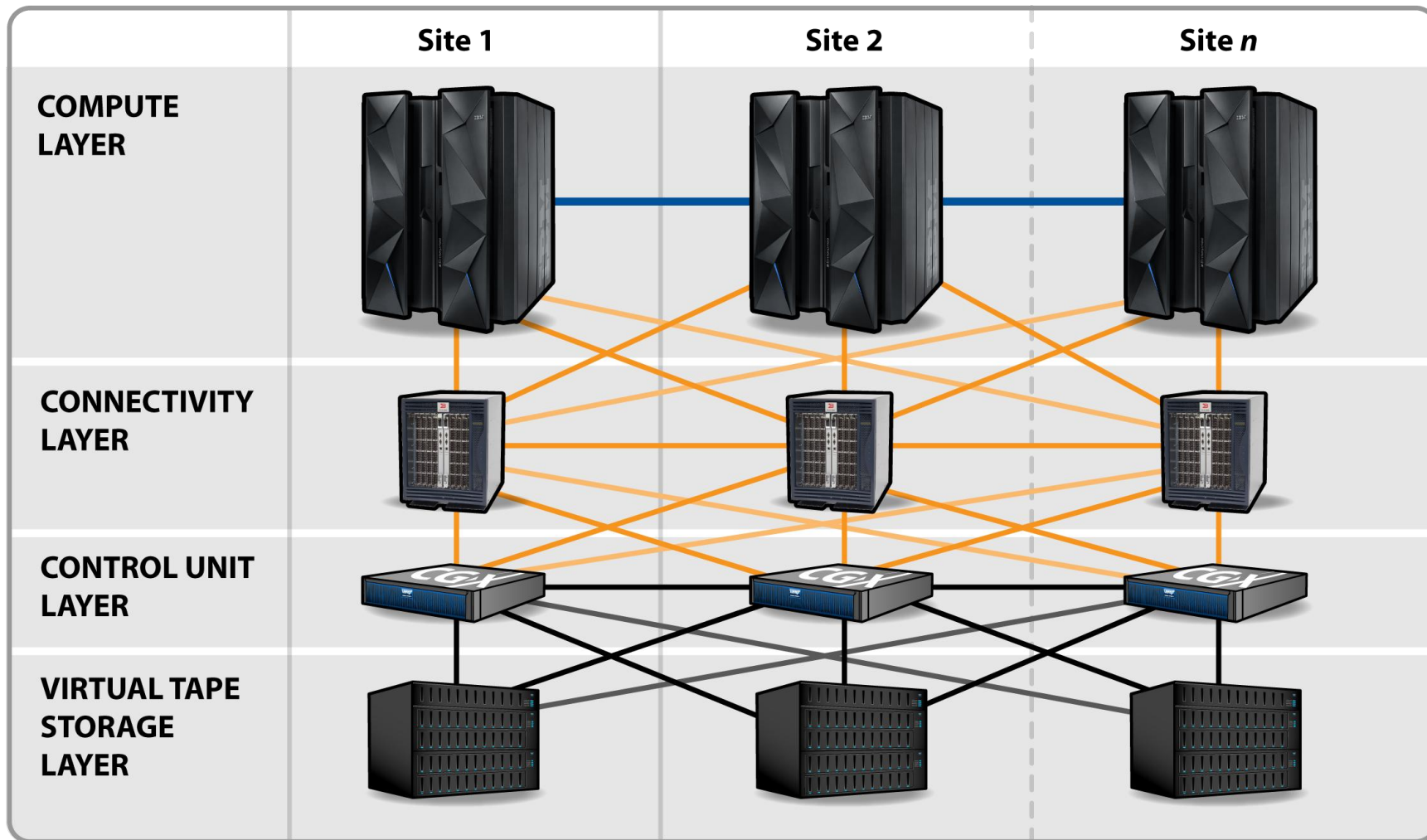
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Synchronous Tape Matrix (STM)

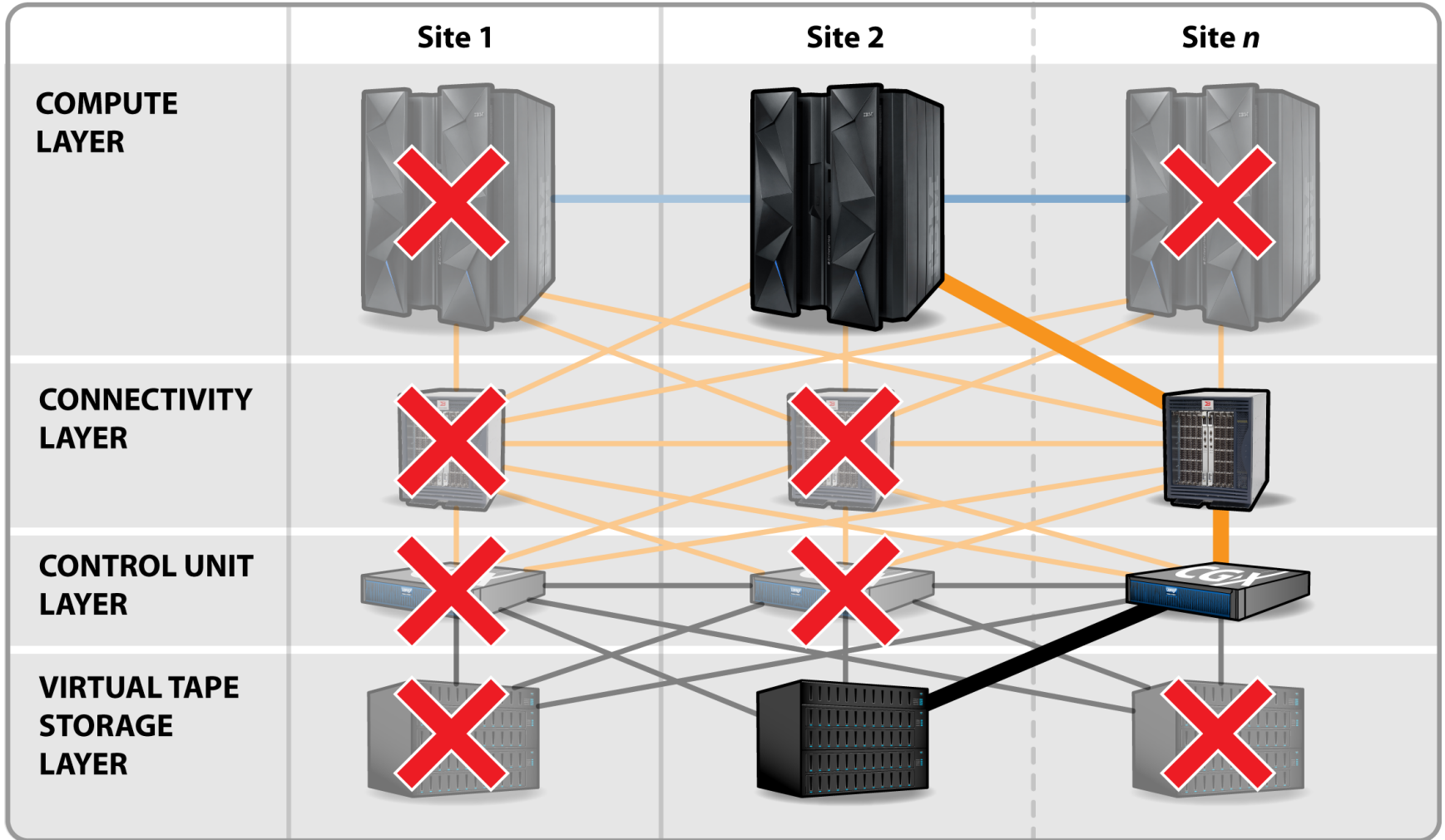
- Continuous Availability
 - Resilient architecture instantly and automatically adjusts to multiple failures without interruption
 - Data is always available for I/O
 - No downtime from failover or restore processes
- No idle components to buy
 - All components contribute to day-to-day operations, not 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 STM Configuration with n -Sites



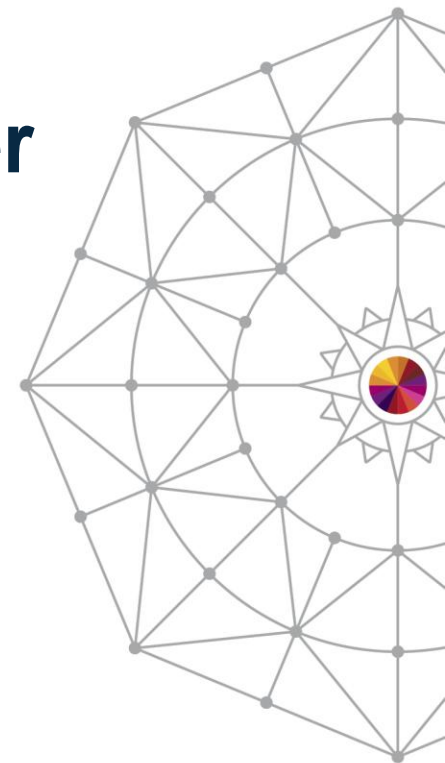
Operational STM Configuration with Multiple Failures Across Layers and Sites



Customer Experience: Major U.S. Healthcare Provider

Andrew Graham

Production Control Manager



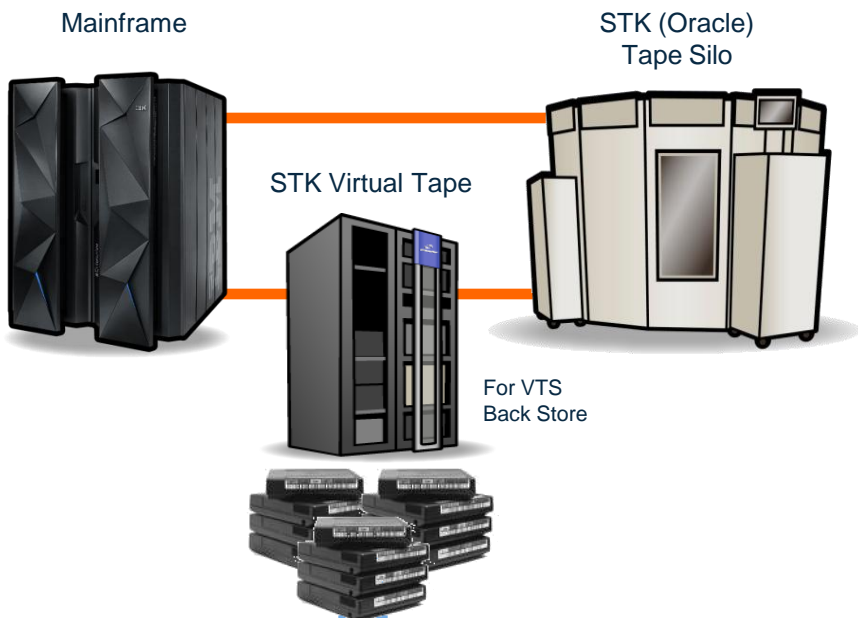
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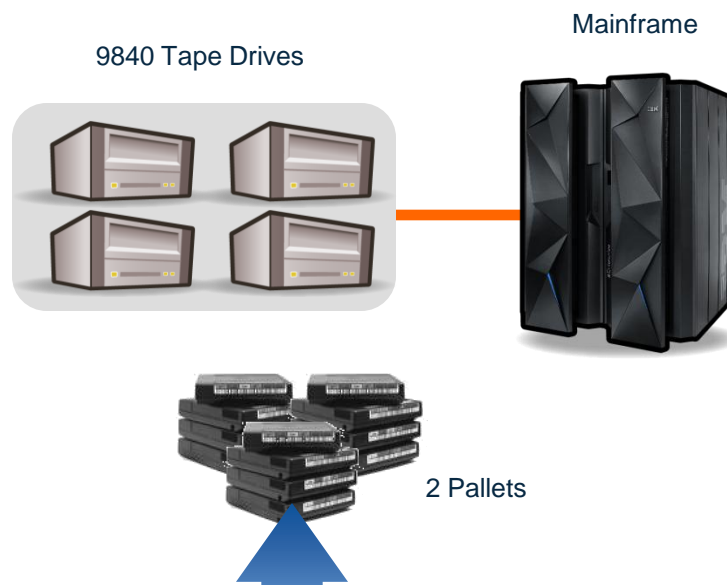
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Initial Mainframe Environment

Production Site



Disaster Recovery Site

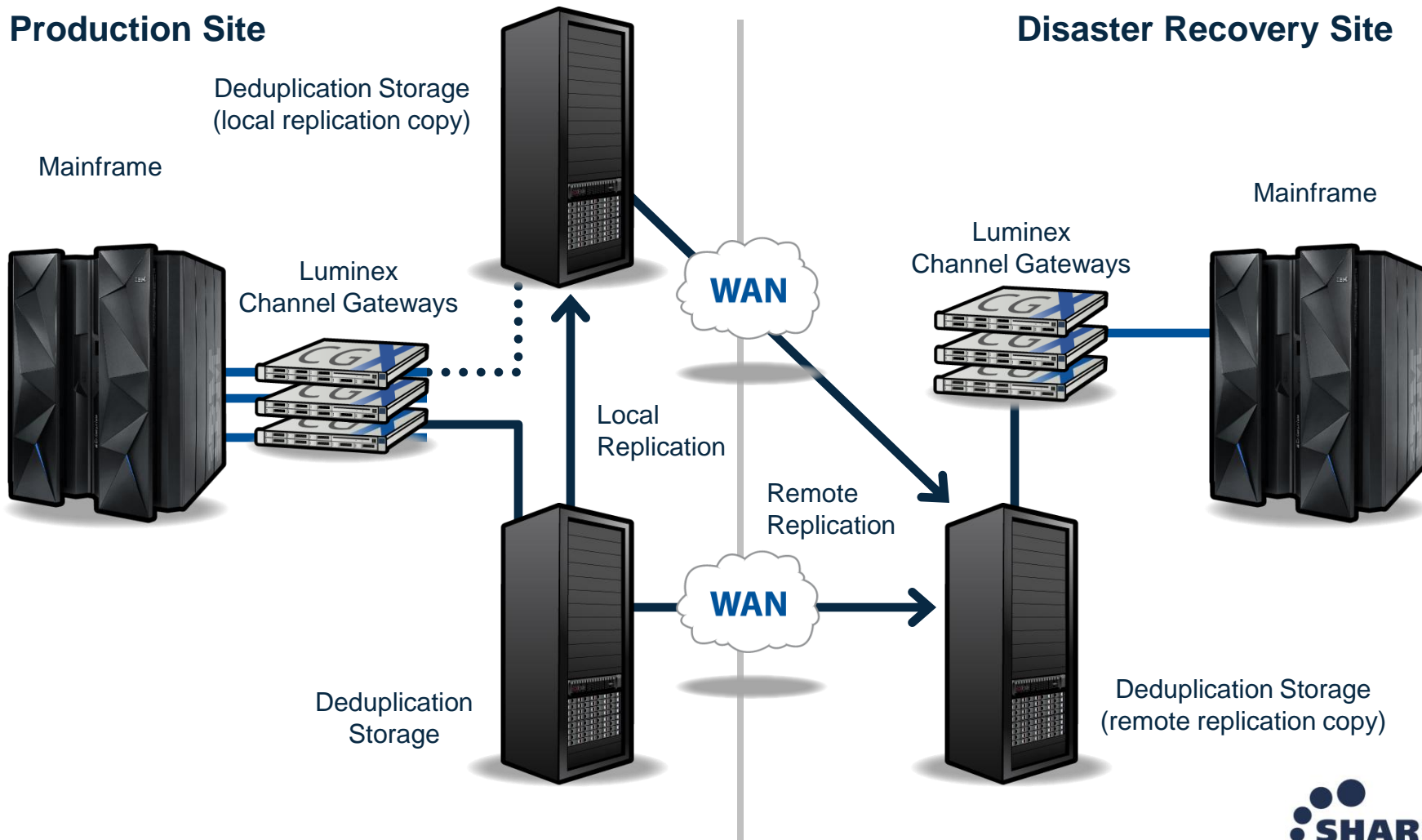


Goals And Objectives for Initial Mainframe Environment



- Address physical tape capacity limitations
- Improve performance
- Achieve uninterrupted service
- Completely tapeless environment
- Maintain “Belt and Suspenders” approach (3 copies of data)

Intermediate Mainframe Environment



Intermediate Benefits and Achievements

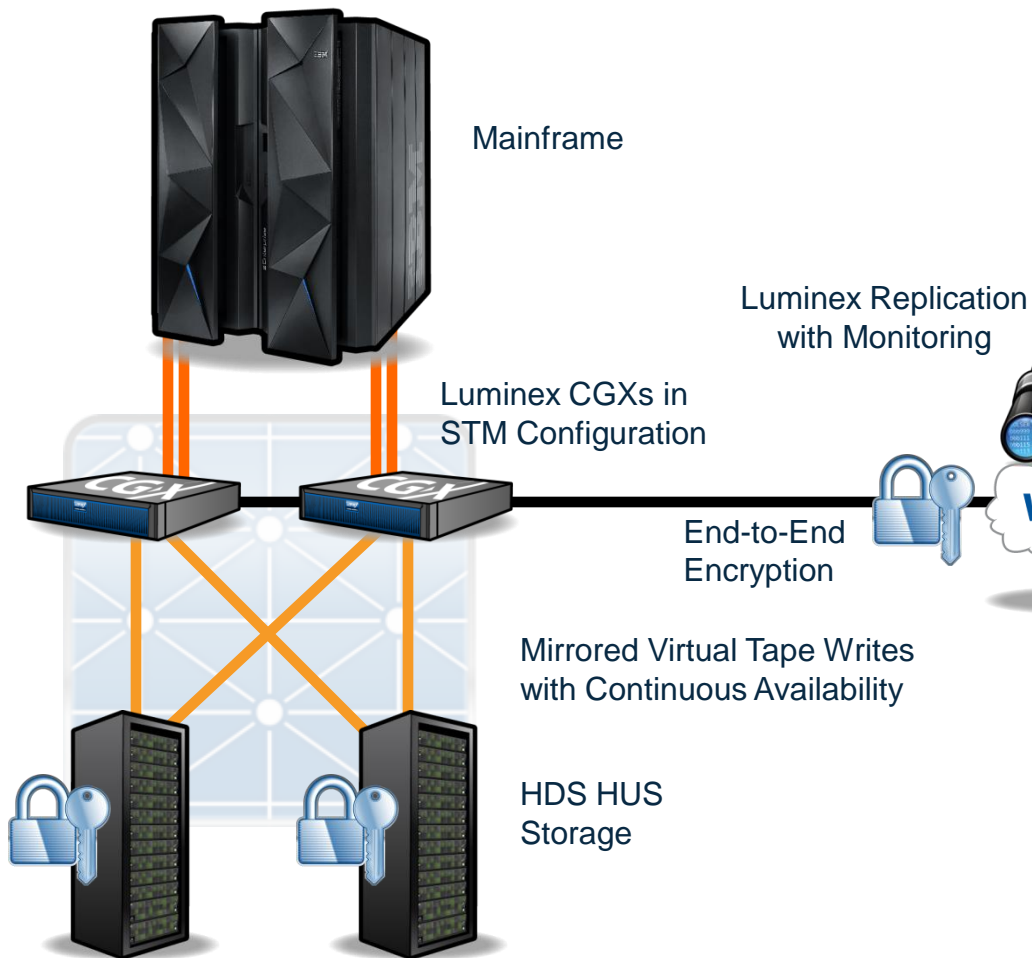
- ☑ Eliminated physical tape
 - ☑ No longer shipping 2 pallets of tapes
 - ☑ Eliminated offsite storage of tapes
- ☑ All tape data available at DR site, not just a subset of critical data
- ☑ Expanded capacity
- ☑ Improved performance (initially)
 - ☑ 5x reduction in time to restore DASD farm at DR site
 - ☑ 20 hours down to 4 hours (1000 volumes)
 - ☑ Significant improvement in production run times

Goals And Objectives for Intermediate Mainframe Environment

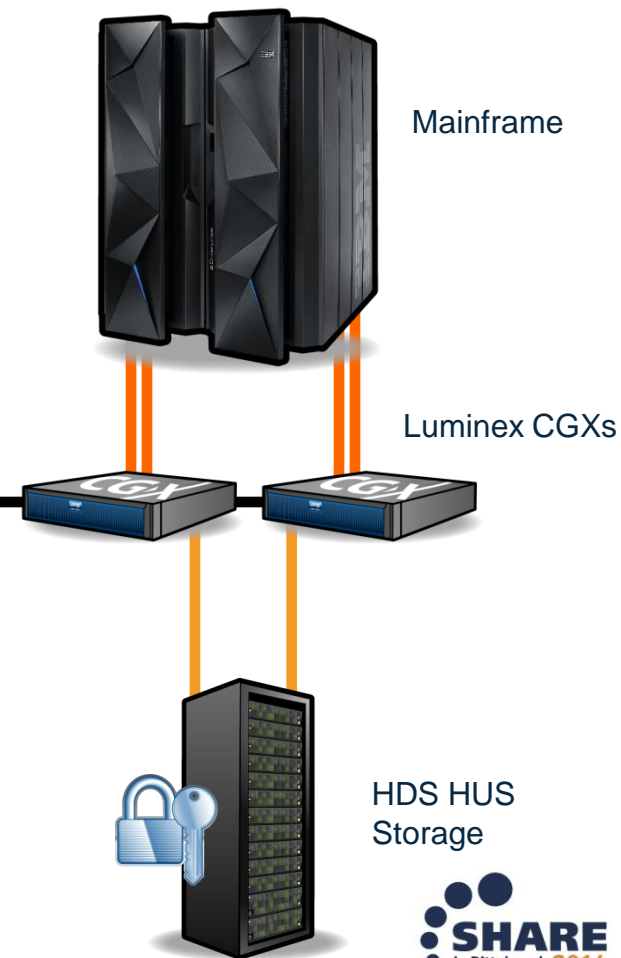
- Address virtual tape capacity limitations
 - Tape data continued to grow
- Improve performance
 - Deduplication system “read” performance degraded over time
- Local replication still required an outage in the event of a disaster
 - Manually taking storage offline and putting copy online
- Manually managing 3 copies of data
- Managing multiple replication streams was a challenge with existing deduplication storage systems

Current Mainframe Environment

Production Site



Disaster Recovery Site

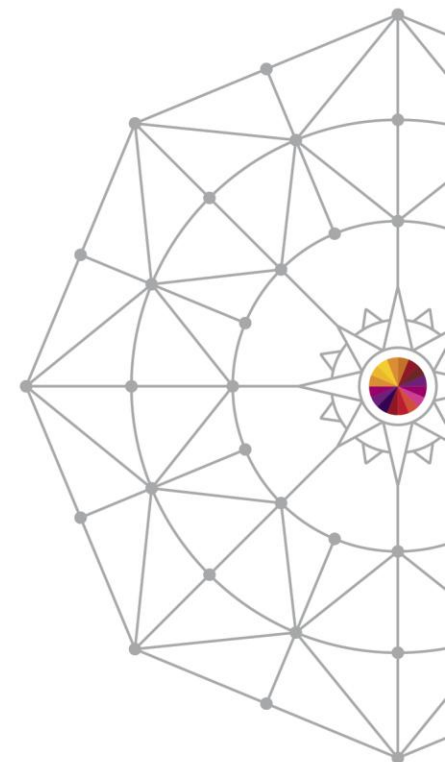


Current Benefits and Achievements

- ✓ Automatic management of multiple replication paths and copies
- ✓ Increased overall capacity
- ✓ Improved security by implementing CGSafe encryption
- ✓ Simplified DR testing with Push Button DR
- ✓ GUI-based monitoring of replication queues (RepMon)
- ✓ Improved performance (again)
 - ✓ 8-9x reduction in time for DASD restore over physical tape
 - ✓ Nearly 2x reduction over deduplicated virtual tape
 - ✓ Improved mainframe I/O performance and workload management
- ✓ Continuous availability for local data (STM)
 - ✓ Potential storage outages can be automatically managed



STM Configuration Examples

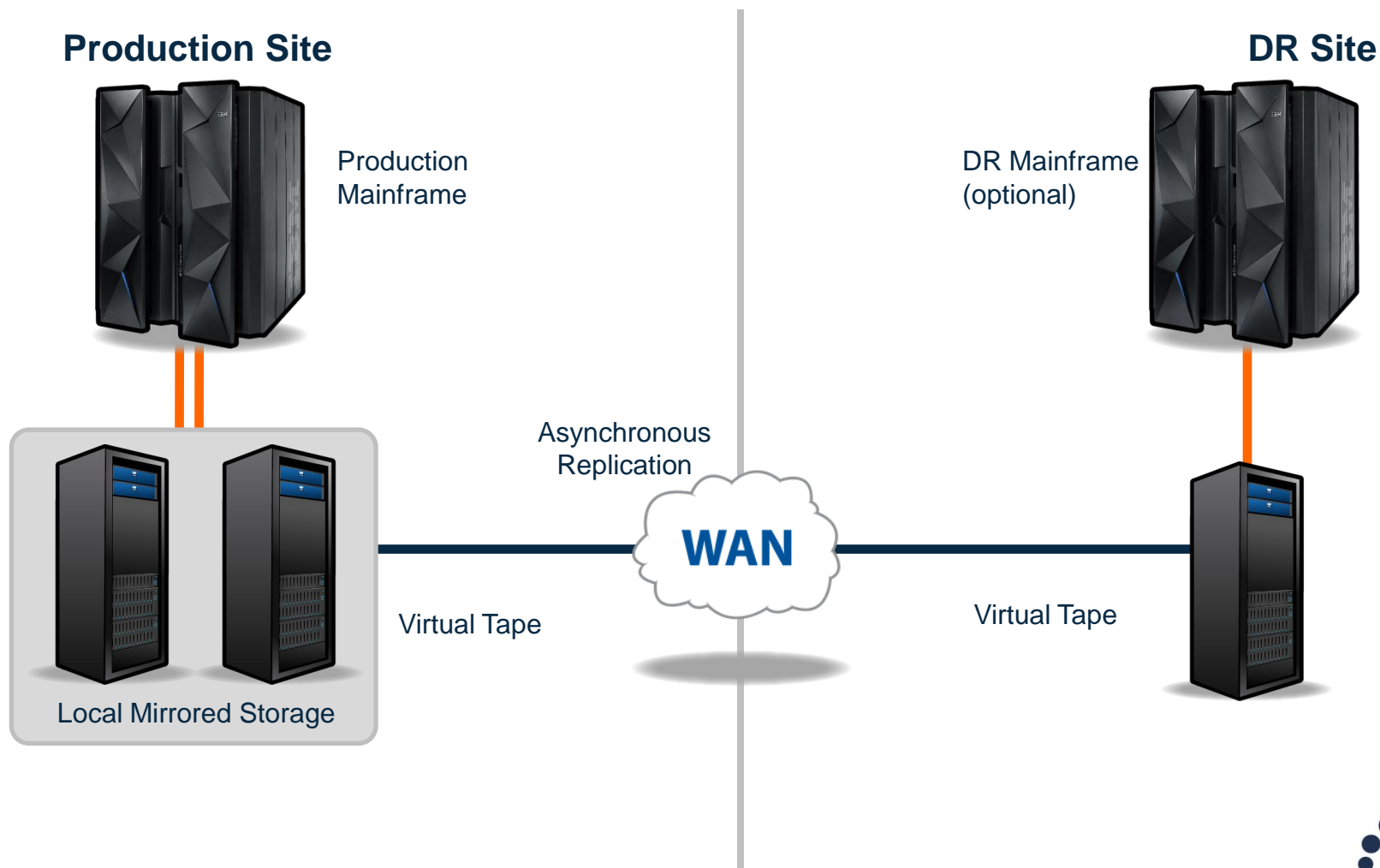


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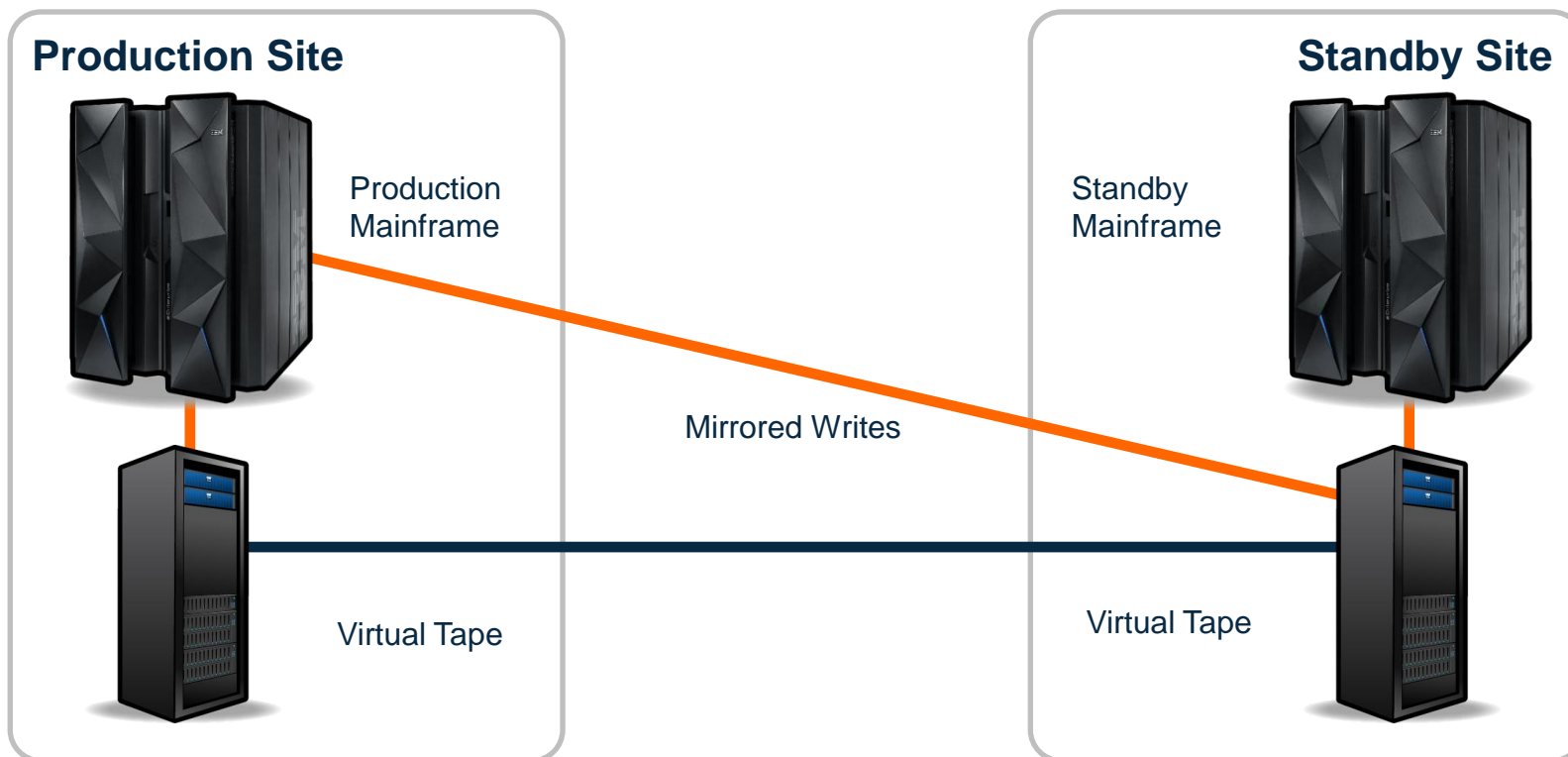
STM Configuration Examples

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



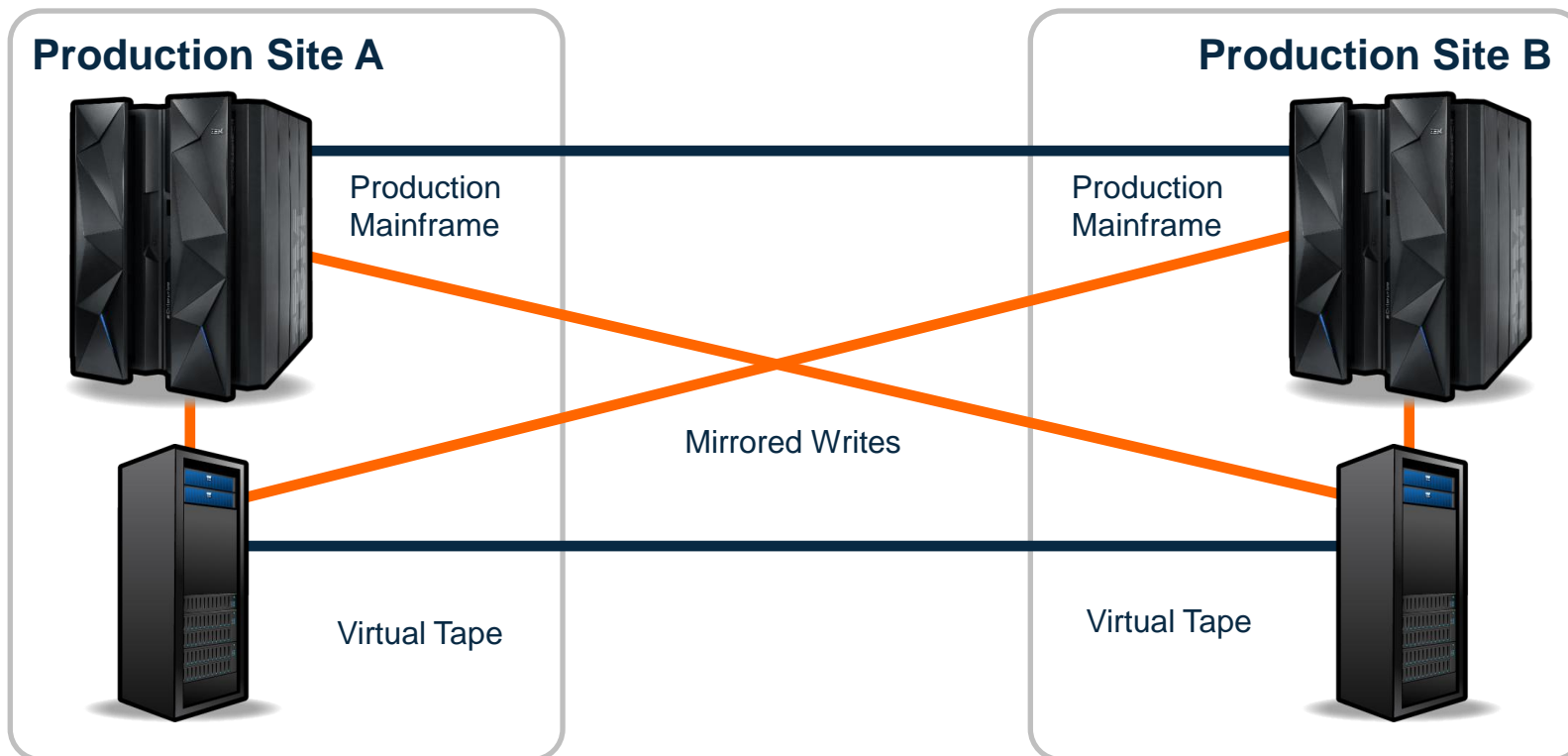
STM Configuration Examples

Active-Standby Host, Active-Active Storage



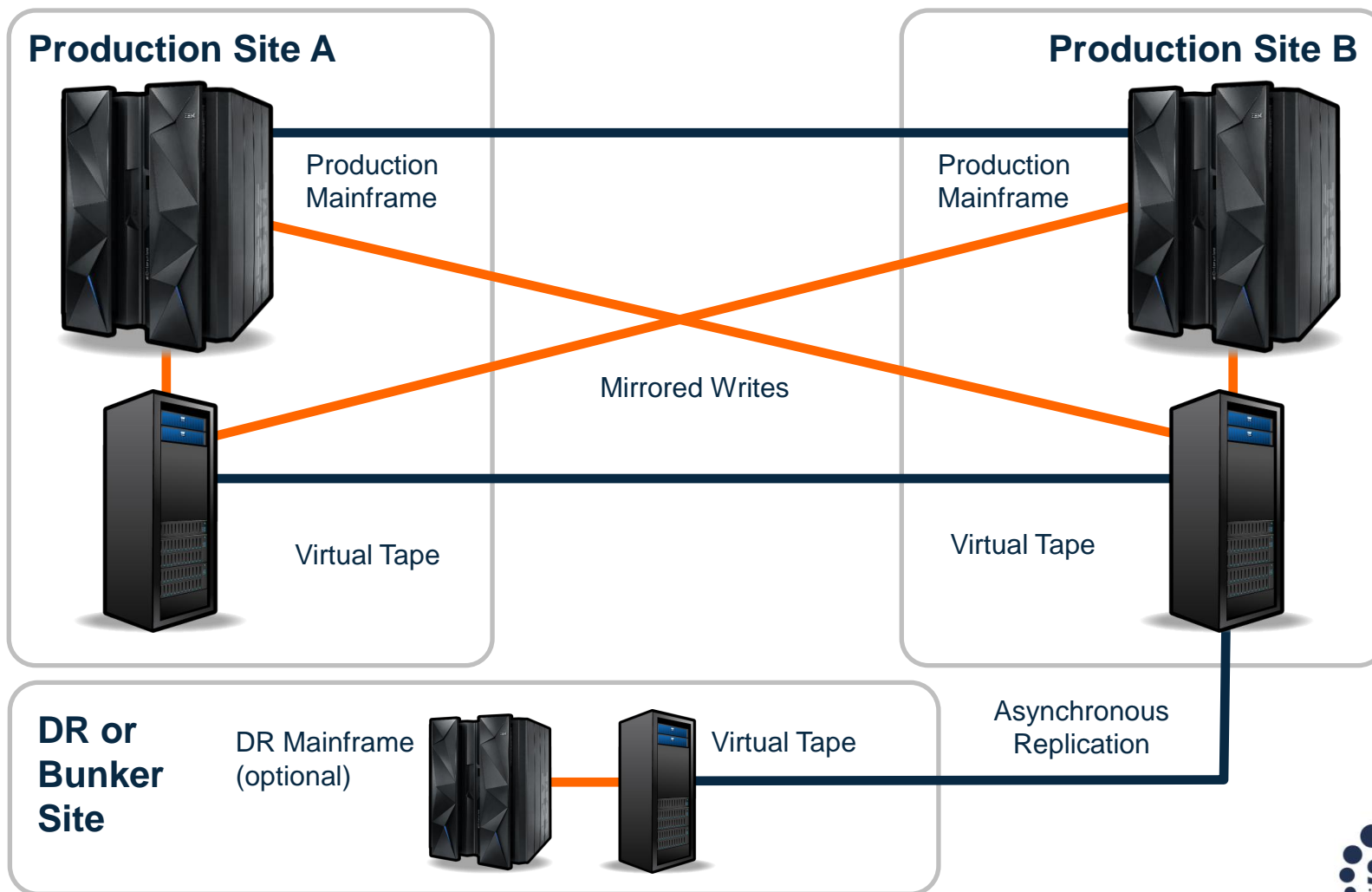
STM Configuration Examples

Active-Active Host/Storage



STM Configuration Examples

Active-Active-DR Host/Storage



**What does the mainframe
do today that you never
thought possible?**



**What do you want the
mainframe to do in
the future?**



What does ~~the~~ mainframe ^{tape} do today that you never thought possible?

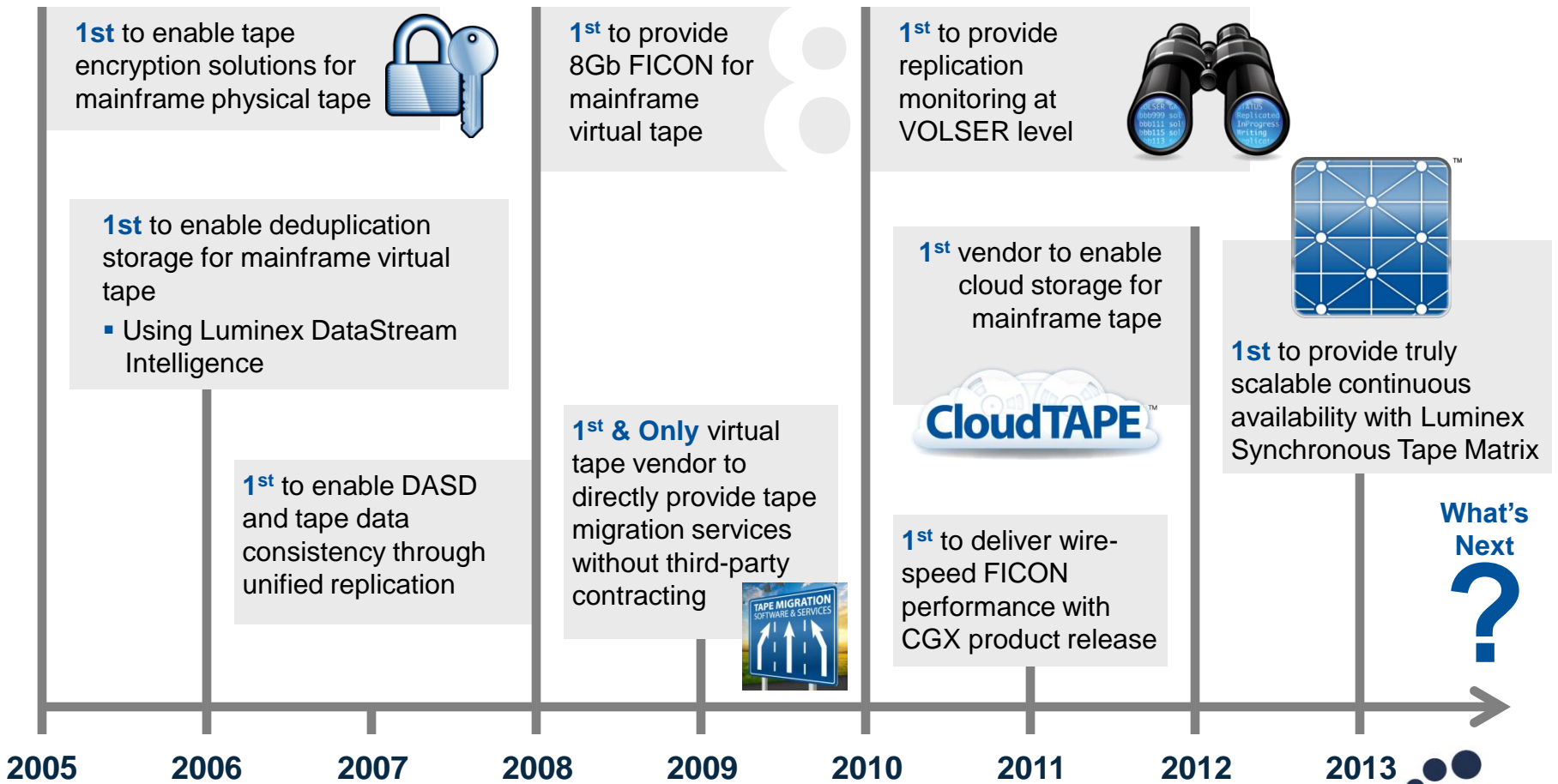


What do you want ~~the~~ mainframe ^{tape} to do in the future?



What's the Next Innovation?

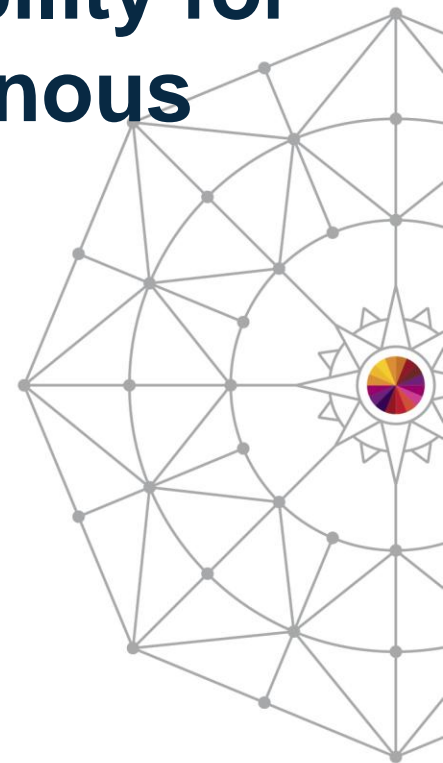
Luminex's Heritage of Innovation



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