

# Storage Virtualization for Mainframe DASD, Virtual Tape & Open Systems Disk

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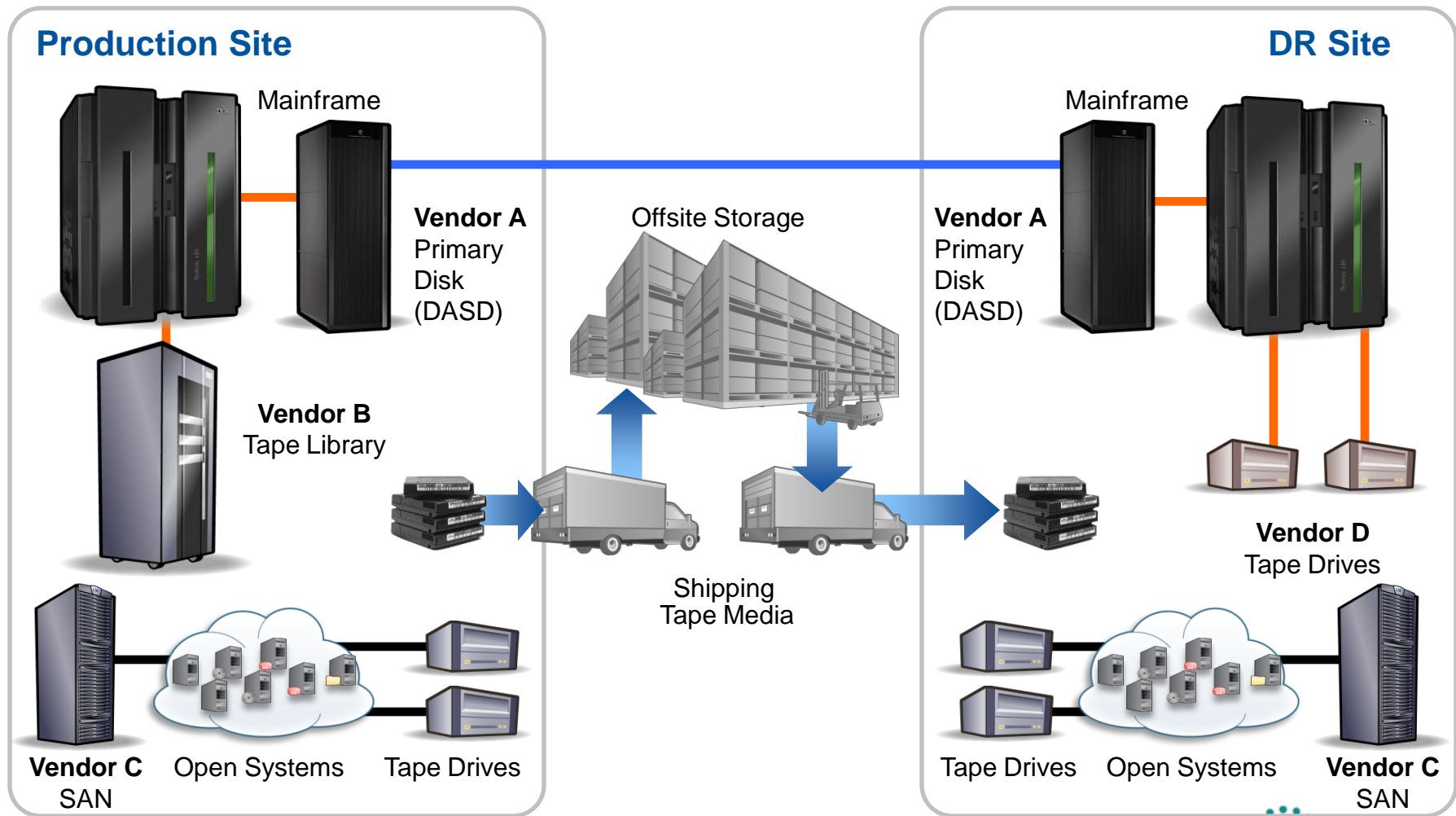
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# Discussion Topics

- When is Virtualization and Storage Consolidation the Right Choice?
- The Benefits of Shared Storage Infrastructure
- Adding Mainframe Virtual Tape to Your Strategy
- A Single Replication Tool for:
  - For DASD, Virtual Tape and Open Systems
- A Customer's Perspective:
  - Financial Services Company

# When is Storage Virtualization & Consolidation the Right Choice?



# When is Storage Virtualization & Consolidation the Right Choice?



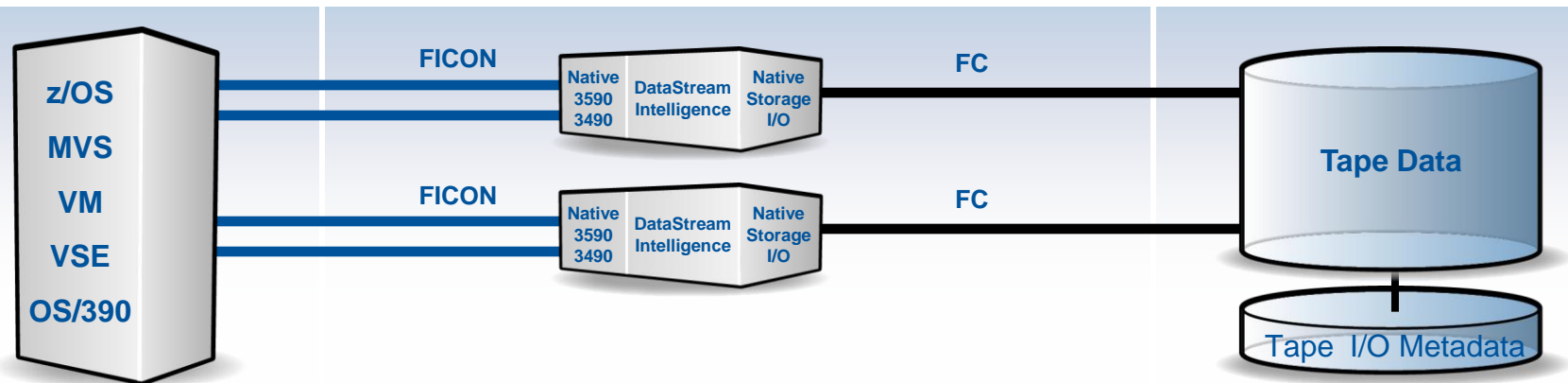
- When best of breed virtualization, storage and replication solutions are available from a single vendor
  - Mainframe Primary Disk (DASD)
  - Mainframe Virtual Tape
  - Distributed (Open) Systems

# Shared Storage Infrastructure

- Leverage enterprise DASD and tiered storage virtualization capabilities for tape data storage
  - Focus on DASD / tape data consistency and common enterprise replication features
  - Enterprise customers have used these solutions since 2008
    - Using HUR with USP/USP-V/VSP enterprise storage with and without modular storage
  - Replication Monitoring can provide VOLSER replication status when using synchronous or asynchronous replication
  - Customers can leverage simplified disaster recovery procedures
  - Storage consolidation facilitates:
    - Fewer vendors to manage
    - Increased internal expertise
    - More customer leverage for purchasing storage products

# Adding Mainframe Virtual Tape To Your Strategy

## How the Solution Works



### Mainframe

- Application transparent – non-intrusive
- No MIPS required
- z/OS, MVS, VM, VSE and OS/390 supported
- Works well with all major tape management systems
- SMS via MTL or Esoterics can be used

### Virtual Tape Control Units

- Emulates 3490 or 3590 mainframe tape drives
- “Wire Speed” up to 8 Gb FICON
- Hardware Compression Option
- DataStream Intelligence™ optimizes compression
- Active – Active with NSPOF
- Encryption and Key Management
- Modular design makes adding throughput and capacity easy and cost effective

### Storage Systems

- Fibre Channel attached storage
- Mainframe tape volumes stored as standard files
- Replication for backup/DR
- RAID Data Protection
- Enterprise and modular storage systems are supported

# A Single Replication Tool

## Hitachi Universal Replicator Highlights

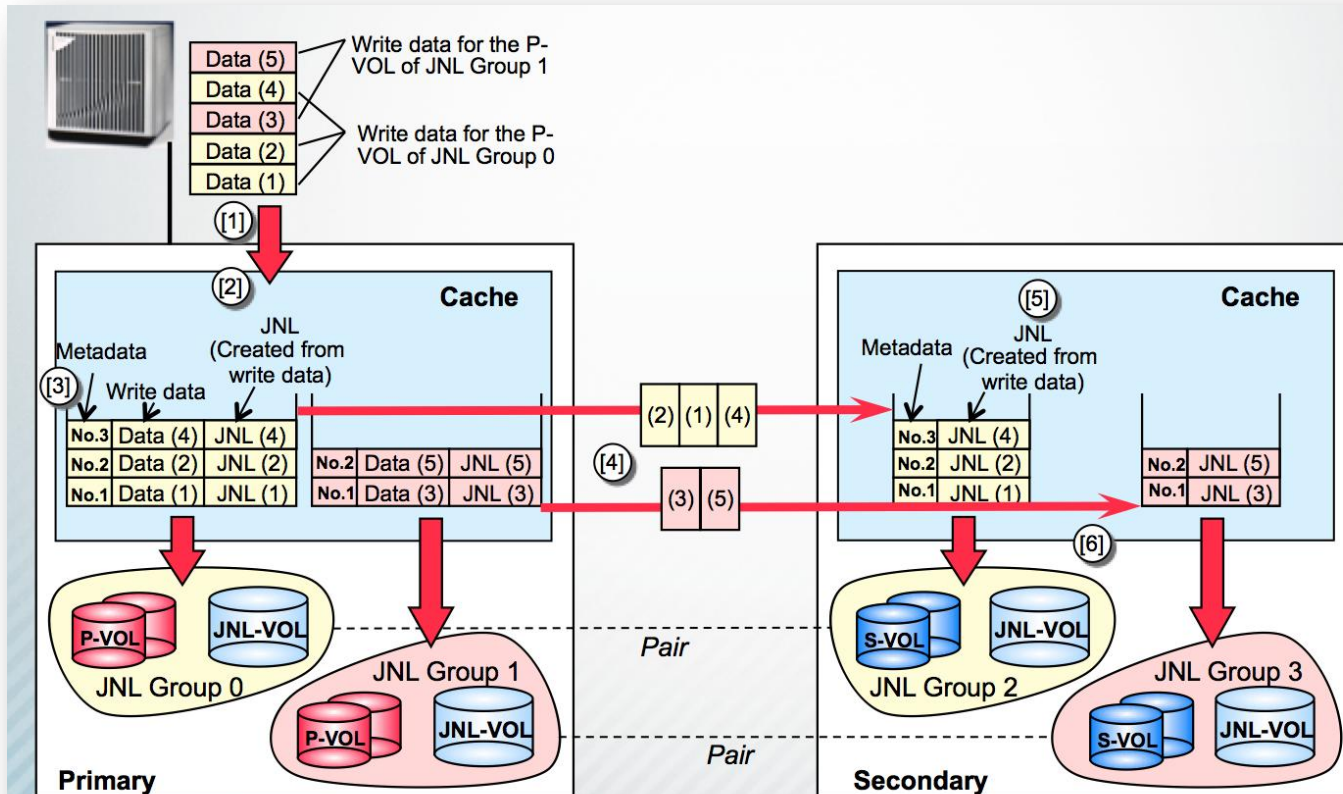


- Hitachi Universal Replicator and Data Resilience
  - Protects production performance during replication **anomalies**
  - Protects RPO with replication resilience during replication **anomalies**
  - Leverages HDS virtualization for **lower-cost** BC/DR solutions
  - Can enable reductions in **bandwidth** requirements
- Key Features
  - **Asynchronous** replication of data using
  - Unique **cache and disk** based journaling
  - **Same** technology for Mainframe and Open Systems (key difference is timestamp vs. sequence number)
  - Unique **pull** technology to move data to target storage system which settles consistency per IO.
  - Multi-volume and multi-storage-system **consistency** groups
  - **Thin** (dynamic) provisioning awareness
  - Quick Failover and Failback (**site switching**) without full copy of data.
  - **Advanced** configuration support (e.g., Extended CTG, 3DC, 4DC, delta-resync)



# HUR Journal Processing with Timestamps

- [1] P-VOL receives write command from the host.
- [2] Primary array stores received data in the cache.
- [3] Primary array gives a sequence number per JNL group to each write IO, and creates metadata with the sequence number and DFSMSdfp timestamp for mainframe.
- [4] Remote array issues a Read JNL command, and Primary returns metadata and JNL as a response to the command. Such data can be transferred in the different order from the write order.
- [5] Secondary stores metadata and JNL in the cache.
- [6] Secondary uses metadata and puts data of each JNL group in the write order, and reflects (writes) the JNLs in the correct order.

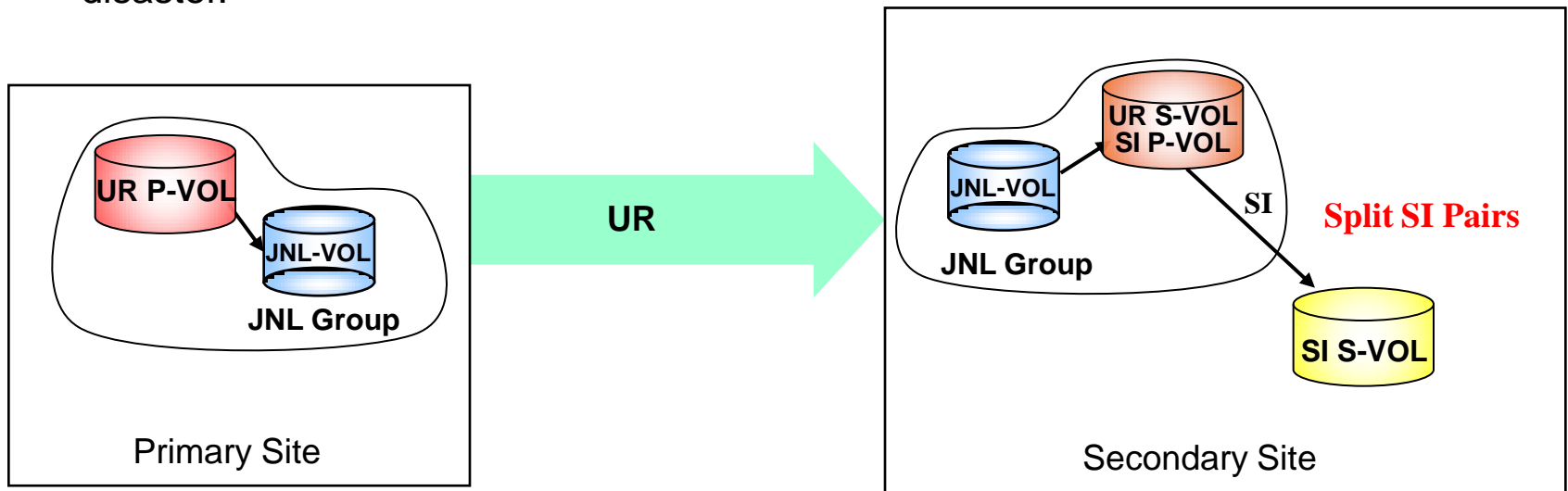




# HUR AT-Time Split – Reducing RPO/RTO Risk

## LINKAGE BETWEEN HUR AND SHADOWIMAGE

- Enables consistent split of cascaded ShadowImage clone pairs **without** suspending HUR replication (no RPO elongation due to testing).
- HUR receives at target site data but holds data in journal to allow SI to split consistently.
- Facilitates DR testing or data repurposing by providing a crash consistent copy.
- Scales across multiple arrays.
- Maintains constant and consistent DR readiness on HUR secondary copy.
- Allows for testing of data on SI pairs to be in a similar logical state as in a real disaster.



# A Customer Perspective

## A Financial Services Company



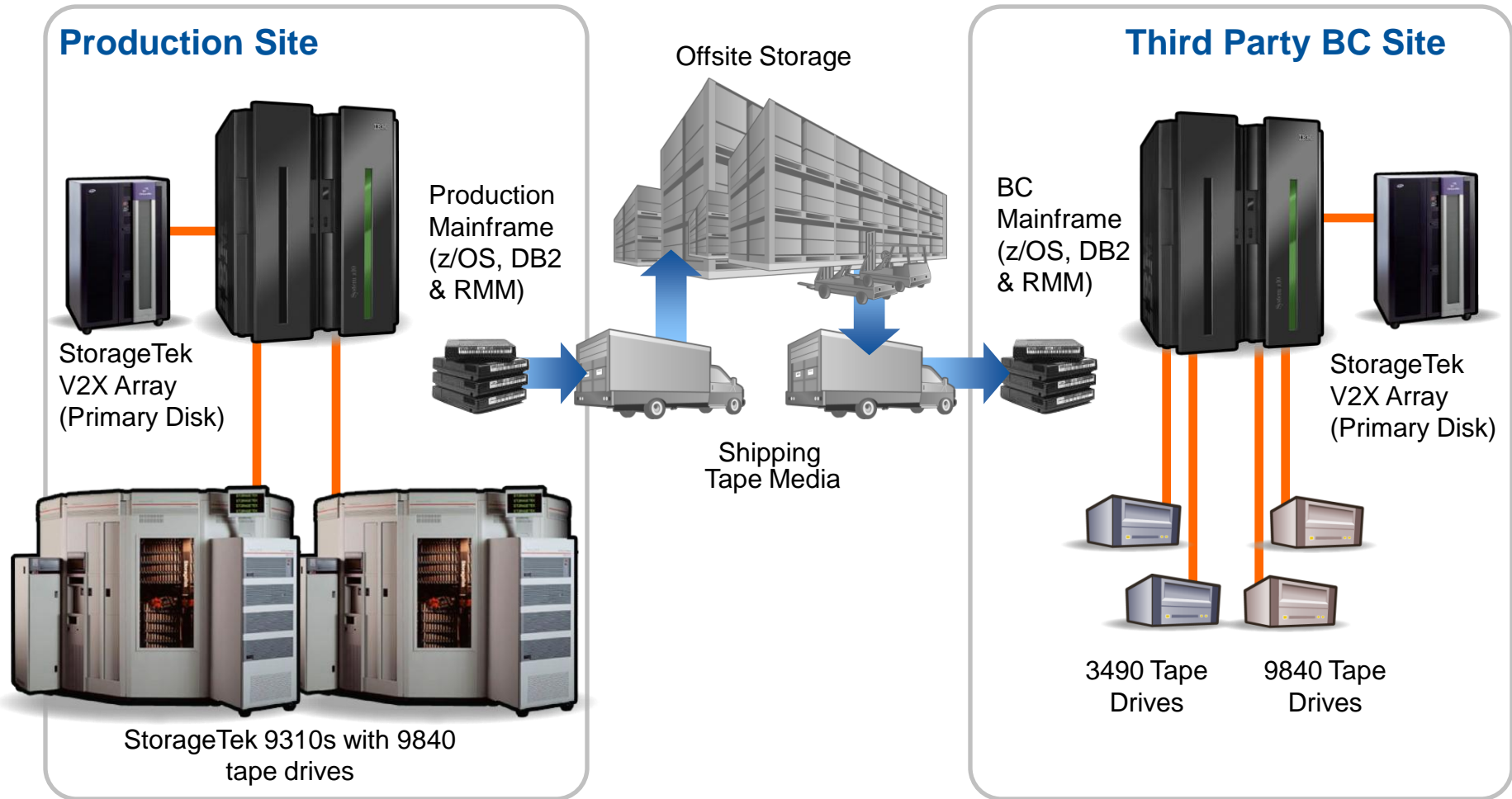
- One of America's largest providers of insurance, retirement plans and investments for individuals and businesses
- Tens of billions of dollars in assets under management and insurance in force and several million clients
- Several thousand associates and representatives nationwide

# What were our Goals and Objectives?

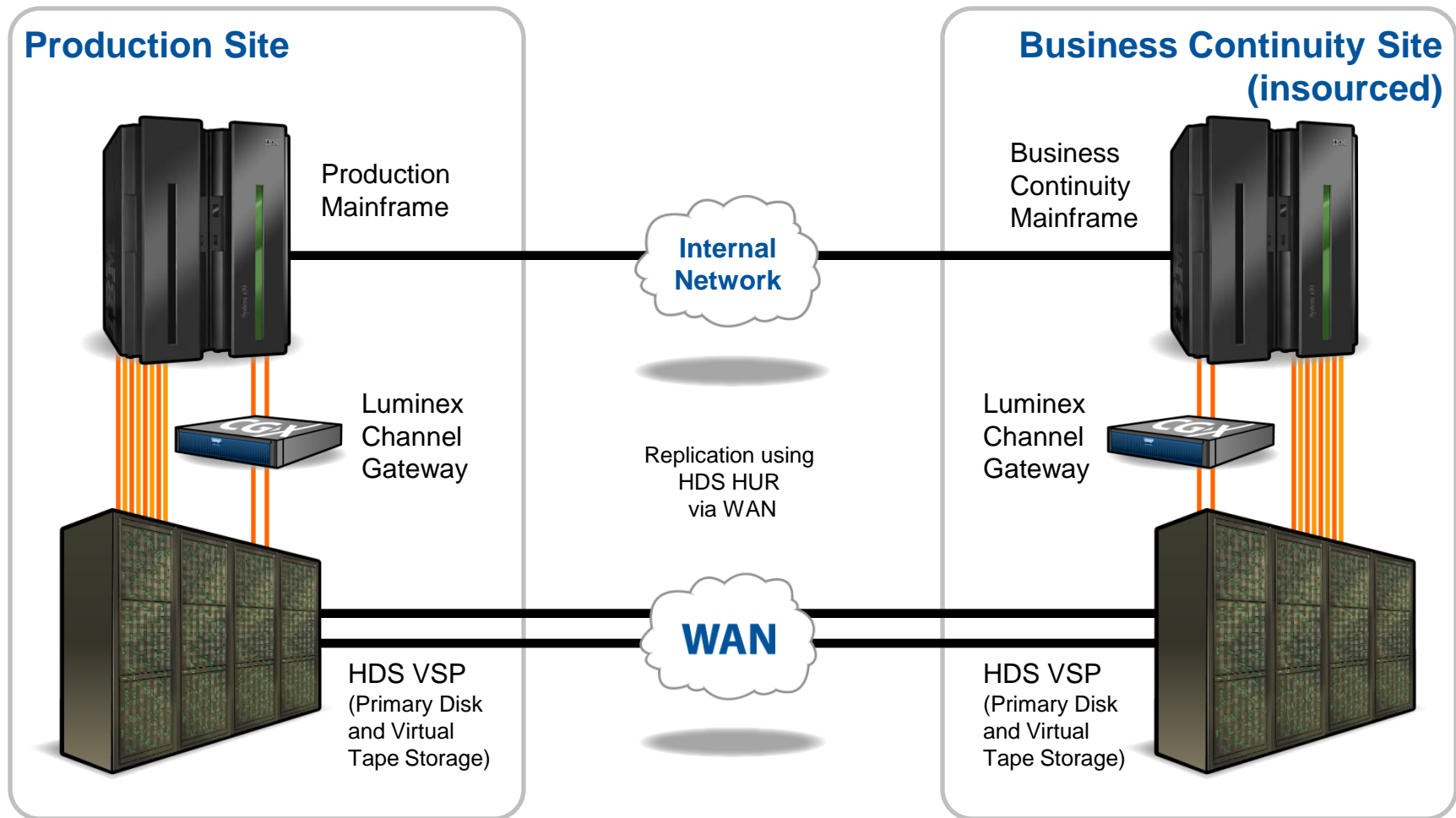


- ☐ Eliminate the security risk of transporting tape media
- ☐ Reduce cost and time required to ship, store & manage physical tape media
- ☐ Improve & simplify Business Continuity (BC) planning and testing

# Previous Tape Environment



# 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 daily
- ☑ 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 2<sup>nd</sup> 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



# Thank You!

## Enjoy the Conference!

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