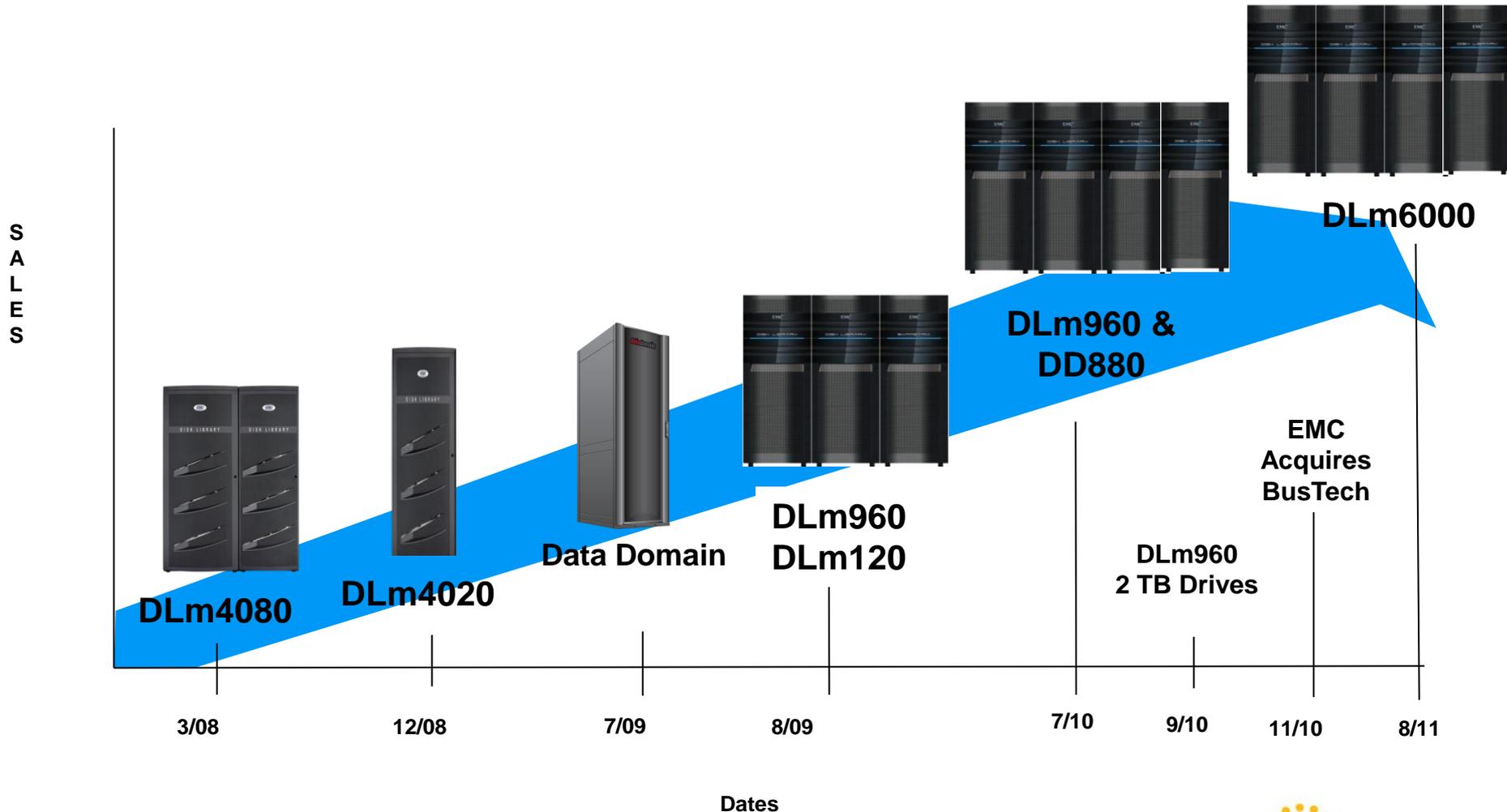# Virtual Tape Replication Multi-Vendor Panel Discussion

Brian Kithcart
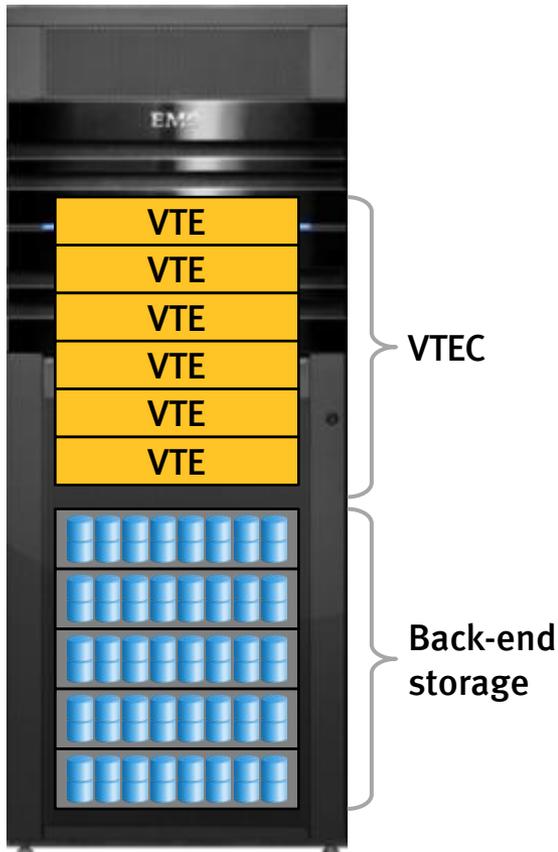
EMC² Corporation

August 10, 2011
Session Number: 09969

EMC 'Tape On Disk' Timeline

S
A
L
E
S

DLm6000

**DLm960 &
DD880**

**DLm960
DLm120**

Data Domain

DLm4080

DLm4020

**EMC
Acquires
BusTech**

**DLm960
2 TB Drives**

3/08   12/08   7/09   8/09   7/10   9/10   11/10   8/11

Dates

DLm6000 Components

**EMC Disk Library
for mainframe**

Virtual tape emulation controller (VTEC)

- Emulates IBM 3480/3490/3590 tape drives
  - 256 tape drives per VTE
- FICON connectivity – Over 2GB/sec
- Virtual cartridge size up to 16 TB
- Disk consumption is based on data written
- Supports deduplication and/or hardware compression
- Optional started task for DLm Console

Back-end storage

- Leverages 2TB SAS & SATA II drives
- Supports deduplication storage
  - Or both storage types concurrently
    - *Only solution available today that supports both Dedup & Non-Dedup backend storage*
- Stores VOLSER as file – no metadata
- Shares all tape volumes among all VTEs

No Single Point of Failure

- All VTEs can see all tape volumes
- If a VTE fails…
    - Job will fail with tape error (same as regular tapes)
    - Tape volumes are still available
        - Tape volumes can be accessed through a different drive
    - VTE does not contain metadata
        - No tape information is lost
- Disk drives are RAID 6 protected
    - 8 + 2 protection - best available RAID protection
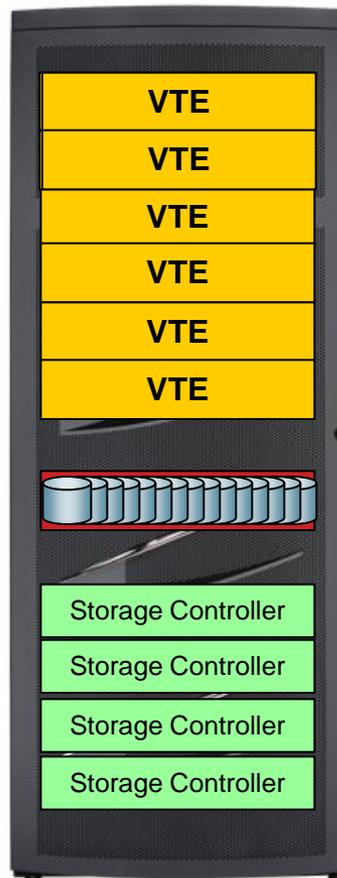   - Hot spares

VTE

0000-00FF
0100-01FF
0200-02FF
0300-03FF
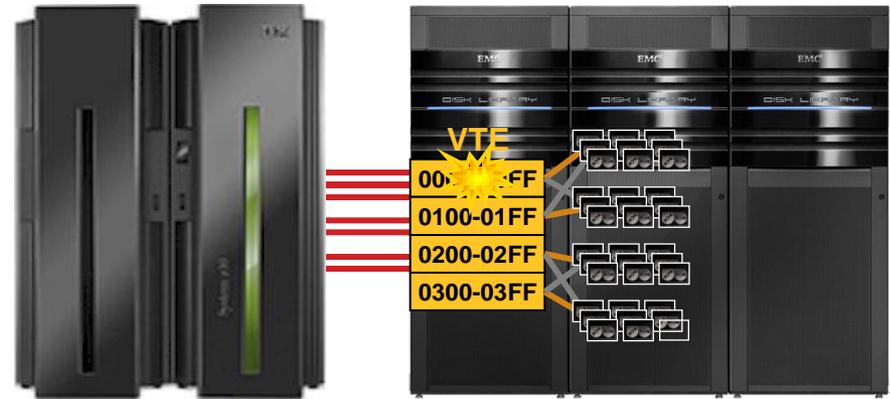
All tape volumes are available

EMC Disk Library for mainframe
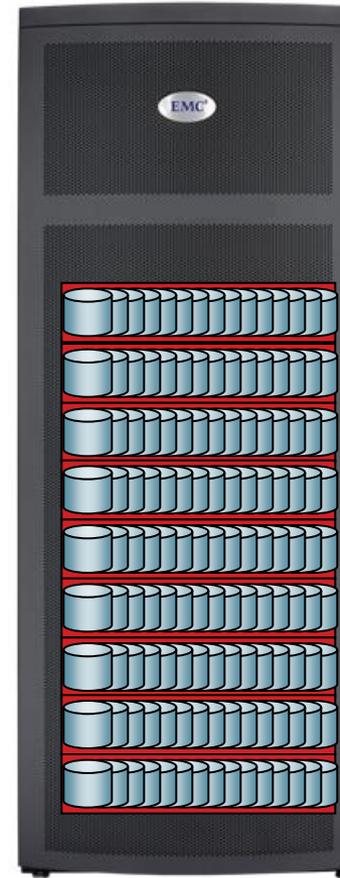
Parity   **Hot Spare**
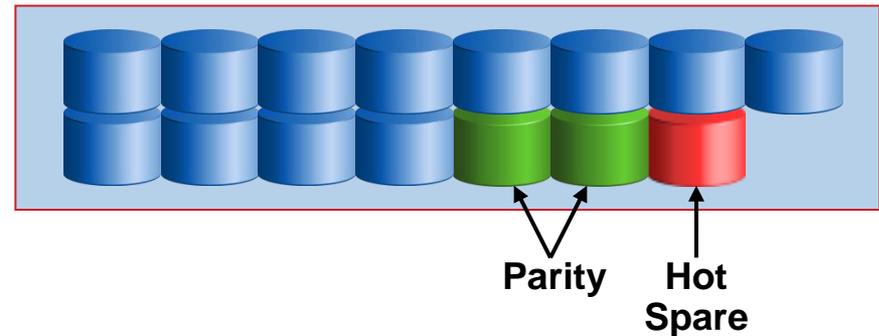
Disk Library for mainframe Scalability

- Start small
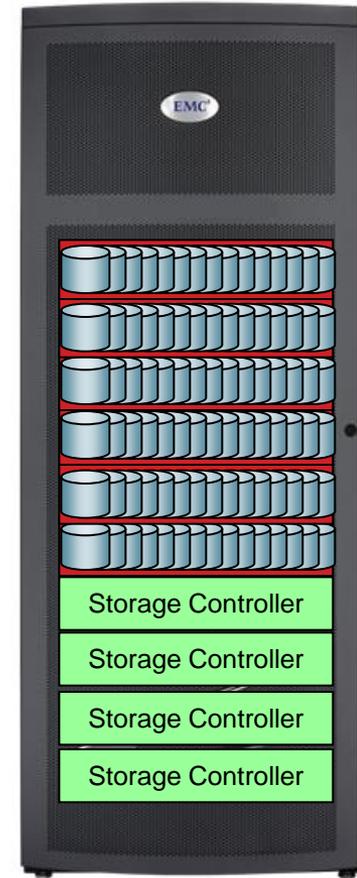 - 2 VTE
  - 2 DAE
- Scale as needed
  - Add VTEs to support more workloads
  - Add storage
- Non-disruptive upgrades
  - Add capacity
  - Upgrade microcode

VTE

VTE

VTE

VTE

VTE

VTE

Storage Controller

Storage Controller

Storage Controller

Storage Controller

EMC

EMC

Storage Controller

Storage Controller

Storage Controller

Storage Controller

Base cab

Storage cab

Expansion cab

Disk Library for Mainframe Family

	DLm120	DLm6000
Number of VTEs	1 or 2	2–6
Connectivity	ESCON/FICON	FICON
Number of channels to host	2 or 4	4–12
Number of virtual tape drives	Up to 512	Up to 1,536
Maximum capacity (usable)	19.5 TB–96.5 TB	40 TB–5.7 PB
Performance	Over 400 MB/s	Over 2 GB/s
Number of cabinets	1	2–10
Deduplication storage option	✘	✔
Replication	✔	✔
Hardware compression	✔	✔

Healthcare Customer TCO/ROI Impacts

- Challenges:
  - Writing archive data with OAM to Virtual Tape Libraries with high capacity drives - managing two separate tape environments
  - Mount times with OAM retrievals were erratic and sometimes timed out
  - Creating 2 and 3 copies of data on tape to minimize data loss exposure
  - Regulatory agencies were mandating encryption for 'ALL' offsite tapes
  - Directive from upper management to reduce or get off tape
  - Concerned with potential loss of tapes with personal & confidential customer information.
  - Floor space, KVA's, & BTU's consumed with tape based solutions
  - The normal problems every customer faces with tape media problems/issues/exposures

- Solution:
  - 190TB DLm replicated to 190TB DLm – Target located in SunGard
  - Before and after measurement:
    - Before = 28826 millisecond response time (28.826 seconds)
    - After = 561 millisecond response time (1/2 a second)
  - RPO lowered from 24-36 hours to less than ½ hour

SunGard

Source   Target
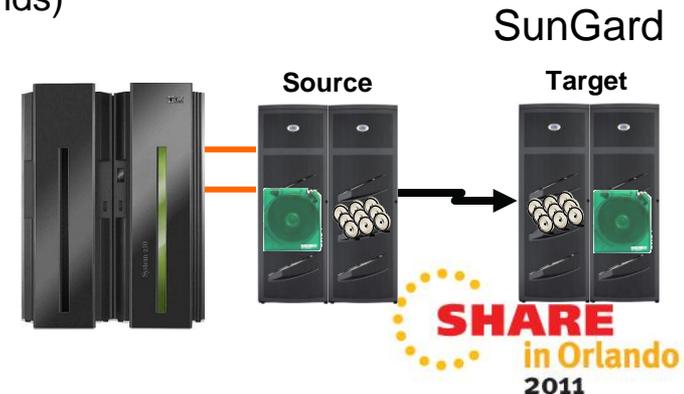
Testing the Disaster Recovery Environment

Production Site

WAN/IP

R/W

R/O

Bi-directional replication

Mainframe | Disk Library for mainframe

Remote Site

Disk Library for mainframe | Mainframe
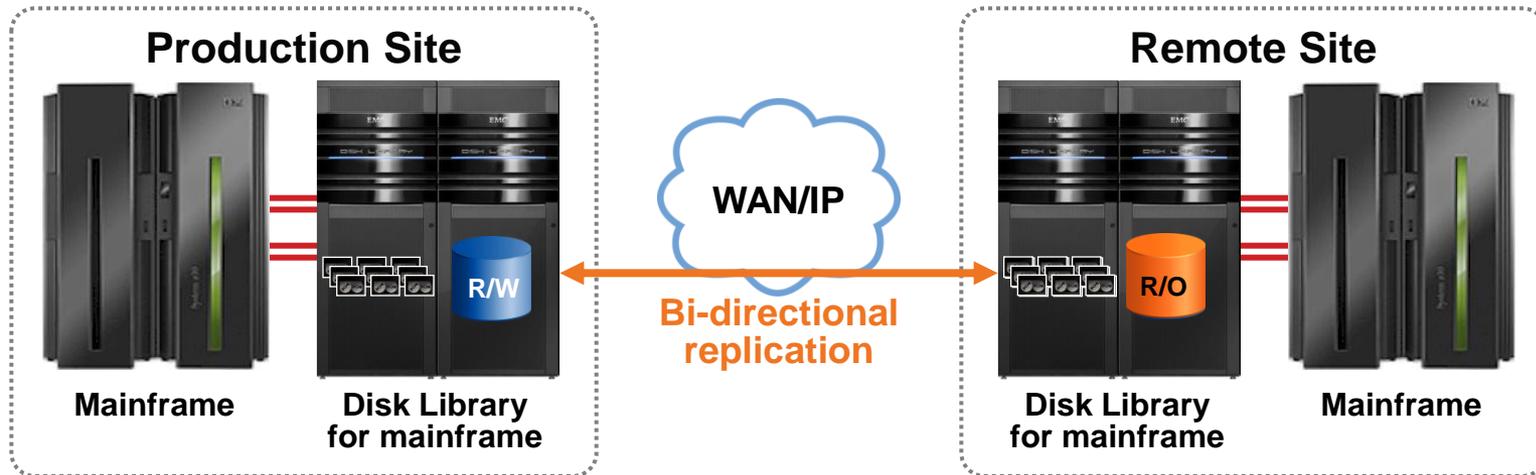
Two ways to conduct disaster recovery testing from copy of production data

- Read-only mounts
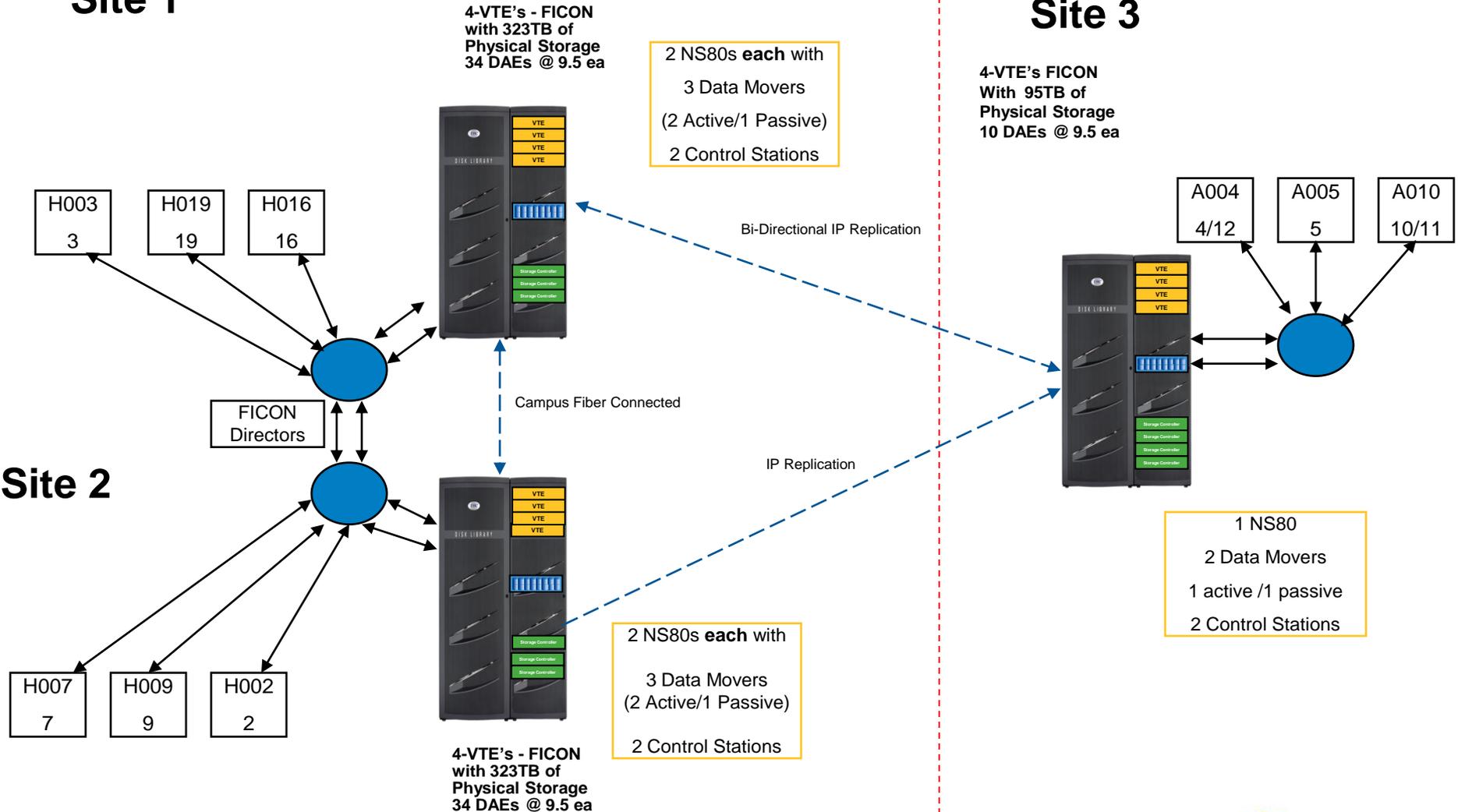 - Disk arrays allow instant "read-only" copies
  - Confirm that tapes can be mounted and all required data can be accessed
  - No incremental storage capacity required

- Snapshots
  - Disk arrays allow creation of "read only" or "read/write" snapshot
    - Some incremental storage capacity required if writing to snap
  - Confirm operation at the disaster recovery site

Remote replication is uninterrupted

High Availability

Site 1

4-VTE's - FICON with 323TB of Physical Storage 34 DAEs @ 9.5 ea

2 NS80s **each** with

3 Data Movers

(2 Active/1 Passive)

2 Control Stations

Site 3

4-VTE's FICON With 95TB of Physical Storage 10 DAEs @ 9.5 ea

Bi-Directional IP Replication

H003
3

H019
19

H016
16

A004
4/12

A005
5

A010
10/11

FICON Directors

Campus Fiber Connected

Site 2

IP Replication

1 NS80

2 Data Movers

1 active /1 passive

2 Control Stations

H007
7

H009
9

H002
2

2 NS80s **each** with

3 Data Movers
(2 Active/1 Passive)

2 Control Stations

4-VTE's - FICON with 323TB of Physical Storage 34 DAEs @ 9.5 ea

What "Tape on Disk" Data Gets Replicated?

- It Depends!
  - Is DASD replicated today?
    - ML2 is required (or like product)
  - Tape based restore?
    - Restore volser's
    - Database backups / Some GDG's?
  - FDR/SOS in use?
  - Other special considerations?

Questions?

EMC²®

Booth # 417

Session # 10135 : "Mainframe Virtual Tape: Improve Operational Efficiencies and Mitigate Risk in the Data Center"

Thursday 8/11, 9:30am Europe 3 Dolphin