Virtual Tape Replication Multi-Vendor Panel Discussion

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August 10, 2011
Session Number: 09969
EMC ‘Tape On Disk’ Timeline

- **3/08**: DLm4080
- **12/08**: DLm4020
- **7/09**: Data Domain
- **8/09**: DLm960 & DLm120
- **7/10**: DLm960 & DD880
- **9/10**: EMC Acquires BusTech
- **11/10**: DLm960 2 TB Drives
- **8/11**: DLm6000
DLm6000 Components

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
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
## Disk Library for Mainframe Family

<table>
<thead>
<tr>
<th></th>
<th>DLm120</th>
<th>DLm6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of VTEs</td>
<td>1 or 2</td>
<td>2–6</td>
</tr>
<tr>
<td>Connectivity</td>
<td>ESCON/FICON</td>
<td>FICON</td>
</tr>
<tr>
<td>Number of channels to host</td>
<td>2 or 4</td>
<td>4–12</td>
</tr>
<tr>
<td>Number of virtual tape drives</td>
<td>Up to 512</td>
<td>Up to 1,536</td>
</tr>
<tr>
<td>Maximum capacity (usable)</td>
<td>19.5 TB–96.5 TB</td>
<td>40 TB–5.7 PB</td>
</tr>
<tr>
<td>Performance</td>
<td>Over 400 MB/s</td>
<td>Over 2 GB/s</td>
</tr>
<tr>
<td>Number of cabinets</td>
<td>1</td>
<td>2–10</td>
</tr>
<tr>
<td>Deduplication storage option</td>
<td>X</td>
<td>✓</td>
</tr>
<tr>
<td>Replication</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Hardware compression</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
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
Testing the Disaster Recovery Environment

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

Campus Fiber Connected

Bi-Directional IP Replication

Site 2

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

2 NS80s each with
3 Data Movers
(2 Active/1 Passive)
2 Control Stations

1 NS80
2 Data Movers
1 active /1 passive
2 Control Stations

FICON Directors
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