The Benefits of Tapeless Mainframe Virtual Tape – A Customer Panel Discussion

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Discussion Topics

- Overview of Tapeless Virtual Tape Control Units
- Common Customer Challenges & Goals for Tape
- Introduction of the Customer Panel
- Frequently Asked Questions
  - Additional questions from the audience
- Other features and options
Mainframe Virtual Tape Control Units

<table>
<thead>
<tr>
<th>MAINFRAME</th>
<th>3490 OR 3590 TAPE CONTROL UNITS</th>
<th>STORAGE TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 8Gb FICON</td>
<td>Up to 4Gb FICON</td>
<td>Up to 4Gb FICON</td>
</tr>
<tr>
<td>LUMINEX</td>
<td>IBM</td>
<td>Oracle</td>
</tr>
<tr>
<td>Best-of-Breed</td>
<td>IBM</td>
<td>VSM</td>
</tr>
<tr>
<td>Disk Cache or Tape</td>
<td>Disk Cache or Tape</td>
<td>Disk</td>
</tr>
</tbody>
</table>

SHARE in Orlando 2011
Luminex Channel Gateways
(Virtual Tape Solutions)

- Application Transparent
- Up to 8Gb FICON support at wire speed
- Tape Migration Tools & Services to ensure a smooth transition
- Scalable in throughput & capacity
- Backed by the industry’s Subject Matter Experts in disk-based virtual tape
How Luminex Tapeless Virtual Tape solutions work...

- Application transparent – non-intrusive
- No MIPS required
- zOS, MVS, VM, VSE and OS390 supported
- Works well with all major tape management systems
- SMS, MTL or Esoterics can be used

### Mainframe
- Emulates 3480, 3490 or 3590 mainframe tape drives
- DataStream Intelligence optimizes deduplication
- Compression options
- Active – Active with NSPOF
- Dual PS, Fans & Mirrored OS
- No tape data on gateways

### Luminex Channel Gateways
- NFS or FC attached
- Mainframe Tape Volumes stored as standard files
- Data Deduplication optimized
- Replication for backup and Disaster Recovery

### Any Enterprise Storage System
- Tape Data
- Tape I/O Metadata
- 10, 15, 20x+ Dedupe

- zOS
- MVS
- VM
- VSE
- OS/390
- ESCON
- FICON
Solutions For All Mainframe Tape Use

Mainframe Storage World:

- Primary copies of data on tape
  - Including batch processing
- Backup and Disaster Recovery
- Archiving and Compliance
  - Including HSM/ML2
- Sharing data internally & externally
Typical Production & DR Configuration

Production Site

- zSeries Mainframe
- FICON or ESCON
- Luminex Channel Gateways & Enterprise Storage Systems

Internal or 3rd Party DR Site

- zSeries Mainframe
- FICON or ESCON
- Luminex Channel Gateways & Enterprise Storage Systems

Replication using WAN (No FICON or ESCON channel extension required)
In Case You Missed SHARE Anaheim – *Most Mainframes Data Centers Have Similar Challenges and Goals*…

<table>
<thead>
<tr>
<th>Specific Challenges and/or Goals:</th>
<th>Wells Fargo DS</th>
<th>Kawasaki</th>
<th>Ingram</th>
<th>Govplace</th>
</tr>
</thead>
<tbody>
<tr>
<td>Must replace aging mainframe tape products or products facing End of Support</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Improve tape reliability</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Reduce tape maintenance, media, shipping &amp; storage cost</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Reduce or eliminate physical tape</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Upgrade tape data protection and security</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Improve &amp; simplify all tape operations (Batch, HSM/ML2, Archiving, Backup &amp; Rec.)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Physical tape limited the ability to improve the disaster recovery plan RPO &amp; RTO</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Improve remote disaster recovery plan (RPO &amp; RTO)</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Reduce network bandwidth requirements to replicate virtual tape data to the DR site</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Prefer a common virtual tape storage solution for mainframe &amp; open systems DR</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tbody>
</table>
Q&A Topics

- Physical Tape
- Mainframe Applications
- Data Deduplication
- Remote Replication
- Remote Disaster Recovery
Q&A: Physical Tape

- Which tape drives, library or virtual tape products did you replace and why?
- Have you reduced or eliminated physical tapes (If so, please quantify the reduction in tape use)?
- How do you share tape cartridges between partners, vendors and internal remote sites?
- How do you meet security requirements for tape?
- How did you migrate the old physical tapes to the new solution? …
Q&A: Mainframe Applications

• Which tape backup applications and tape management systems are you using?
• Did you have to make any changes to your tape applications?
• How does the solution integrate or sync up with your tape management system for scratch management?
• Which of the following is the solution used for:
  • Production tape and batch processing
  • HSM/ML2/Archiving
  • Backup & Disaster Recovery …
Q&A: Data Deduplication

• Are you using data deduplication for all tape data, (Including batch, HSM/ML2, archiving, backup & recovery?

• What deduplication rates are you experiencing?

• How do you measure & monitor your deduplication rates?

…
Q&A: Remote Replication

- What type of WAN connection are you using to replicate your tape data to the DR site?
- Do you replicate all of your mainframe tape data, including development, HSM/ML2, batch & backups?
- How long does it take to complete the replication to DR?...
Q&A: Remote Disaster Recovery

- Do you use an internal DR site, Sungard, IBM BCRS or other provider for DR?
- Do you own the solution at the DR site or does the third party provider own/provide it?
- Please describe your DR process or DR test process? …
End User Experience

Linda Fisher
*Systems Programmer*
Trustmark Corporation
The Company

- Established in 1889
- Diversified financial services company providing banking, wealth management and insurance solutions
- $9.8 billion in assets
- Over 2,600 employees
- Locations in Florida, Mississippi, Tennessee and Texas
What were our Goals and Objectives?

Challenges/Goals:

- New OCC laws required a new disaster recovery plan
- Faster, more reliable disaster recovery
- Remote replication
- Reduce or eliminate mislabeled/missing tapes
- Improve DB2 operations and backup
Previous Tape Environment

Production Site, MS

- zSeries Mainframe
- Tape Library with Virtual Tape Cache
- Onsite Physical Tape Copies
- Shipping Tape Media
- Offsite Storage
New Tape Environment

Production Site, MS
- zSeries Mainframe
- Virtual Tape

Disaster Recovery Site, AZ
- Virtual Tape
- zSeries Mainframe

WAN
How Did We Do?

We Achieved Our Goals:

- New multi-site DR plan has been implemented using remote replication for DASD and tape data
- 3 successful DR tests: 2 full, 1 limited – all painless and fast
- No physical tape is required for DR
- Recovery time improved – from 13+ hours to about an hour!
- Reduced cost for tape transportation, media and vaulting
- Nightly processing time reduced by 2-3 hours
- The solution performs better for all applications, including DB2
- 99% Tapeless, physical tapes only used for input and sharing
End User Experience

Benjamin Fernbach
Systems Programmer
Health Management Systems
The Company

- **Background**
  - HMS is a wholly owned subsidiary of HMS Holdings
  - We’re the nation's leader in coordination of benefits and program integrity services for payors of healthcare services.
  - Our clients include health and human services programs in more than 40 states.
    - Including commercial programs and plans, employers, and over 100 Medicaid managed care plans; the Centers for Medicare & Medicaid Services (CMS); and Veterans Administration facilities
  - We recover in excess of $1 billion for our clients every year.
What were our Goals and Objectives?

Challenges/Goals:

- Resolve performance limitations related to archiving with content addressed storage
- Implement a better disaster recovery plan
- Replace aging tape or virtual tape products
Previous Mainframe Archiving Environment

zSeries Mainframe

Content Addressed Storage For Archiving
New Environment

Sungard Facility
Philadelphia

Informatica Server

New York City

Mainframe
3 LPARS
EDISRV Fileserver

DD880
35TB Usable
VSM 07/18/10
LUMINEX Channel Gateways
Deduplicated Replication
Deduplicated Replication

DD580
EDISRV FS & MF FTP
>23TB Logical Used
~2.5TB Physical Used

DD880
Mainframe Archive
>200TB Logical Used
~19TB Physical Used

Dallas

DD580
EDISRV FS & MF FTP
>23TB Logical Used
~2.5TB Physical Used

LUMINEX Channel Gateways

LUMINEX Channel Gateways

Deduplicated Replication
Deduplicated Replication

07/18/10

VSM
Luminex – EMC Data Domain Environment

Sungard Facility, Philadelphia
- Single DD880
- EA, VSM, & SMF
- Up to 143TB Usable
- Up to 14.2PB Logical

Mainframe - 3 LPARS
- EDISRV Fileserver
- LUMINEX Channel Gateways
- LUMINEX Channel Gateways

New York City

Watertown Facility
- DD880
- TSM/NBU Backup Environment
- Informatica Server
- NFS/OST
  - Up to 5.4TB/hr
- CIFS
  - Up to 2.5TB/hr

Irving Facility
- DD880
- EDI, TSM, NBU, MF FTP
- Up to 143TB Usable
- Up to 14.2PB Logical

New York City
- EDISRV Fileserver
- LUMINEX Channel Gateways
- LUMINEX Channel Gateways

Mainframe - 3 LPARS
- DD880
- VSM, SMF, FTP & EDI
- DD880 Mainframe EA archive

NFS/OST
- Up to 5.4TB/hr

CIFS
- Up to 2.5TB/hr

TSM/NBU Backup Environment
**Data Deduplication Rates**

Currently Used (GB):

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Post</th>
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</thead>
<tbody>
<tr>
<td>Data</td>
<td>234,608.4</td>
<td>19,266.5</td>
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</table>

**DEDUPLICATION RATE** 12.2x
**STORAGE REDUCTION** 91.8%

Last 7 Days:

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<tr>
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<th>Pre</th>
<th>Post</th>
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<tbody>
<tr>
<td>Data</td>
<td>879.8</td>
<td>60.7</td>
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</table>

**DEDUPLICATION RATE** 14.5x
**STORAGE REDUCTION** 93.1%

Last 24 Hours:

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<th></th>
<th>Pre</th>
<th>Post</th>
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</thead>
<tbody>
<tr>
<td>Data</td>
<td>145.5</td>
<td>7.0</td>
</tr>
</tbody>
</table>

**DEDUPLICATION RATE** 20.8x
**STORAGE REDUCTION** 95.2%
We Achieved Our Goals:

- Replaced previous archiving solution with a higher performance virtual tape solution
- New multi-site DR plan has been implemented for mainframes and open systems
- Recovery time has been improved
- Reduced cost for tape transportation, media and vaulting
- No physical tape is used for archiving
- Reduced storage requirements via 12x+ deduplication
- The solution performs better and does not need DB2 for archiving applications
Customer-Driven Product Enhancements

**LTMON™**
- **Luminex Tape Monitoring:** Brings *mainframe console integration* to Channel Gateway virtual tape solutions

**RepMon™**
- **Replication Monitoring:** Provides *real-time monitoring* of virtual tape data writes and replication to a remote disaster recovery site

**SyncCopy™**
- **Synchronous Replication:** Enforces *tape data consistency* across replicated storage systems with remote status monitoring of tape availability and integrity