3590 Tape Drive End of Support: Transitioning from 3590 Physical Tape to Virtual Tape

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Discussion Topics

• 3590 Transition Considerations
  – EOS Timeline
  – Media Types
  – Short-term and long-term implications
  – Benefits of virtual tape
• Examples of Recent Customer Experiences
  – Environment
  – POC
  – Implementation
  – Conclusions

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3590 Physical Tape Timelines

May 1999
3590-E1A, & E11 General Availability

July 2002
3590 H1A & H11 General Availability

September 2006
Marketing (Sales Availability) Withdrawal

January 2015
U.S. Services Withdrawal (End of Support)

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Key Considerations

Replacing 3590 Tape with Current Generation Physical Tape Requires:

- 3592 (Gen 1-5) tape drives
- New 3592 tape media
  - 3590 media is not compatible with 3592 drives
- Tape migration tools and services to transition from old, to new tape cartridges
- Stacking software to fill the space on the higher capacity cartridges
- A 3592 Compatible Mainframe Control Unit/Controller

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Physical-to-Physical Tape Transition

- Still requires resources for
  - Media
  - Handling
  - Shipping
  - Off site storage
- Risk of lost, missing or damaged tapes remains
- Limits DR preparedness, RPO and RTO
- Limits access to the latest storage innovations (i.e. cloud)
## Trends Toward More Efficient Media...

Faster Access, Faster Site-to-Site Data Transmission & One-to-Many Capability:

<table>
<thead>
<tr>
<th>Daily Activities</th>
<th>Then</th>
<th>…and Now</th>
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<tr>
<td>Correspondence and Documents</td>
<td>Letters, stamps &amp; faxes</td>
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<tr>
<td>Banking</td>
<td>In-person, standing in line, ATMs</td>
<td>Online, dedicated smartphone apps</td>
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<tr>
<td>Presentations</td>
<td>In-person, poster boards, slide projectors</td>
<td>Web-based services (e.g. WebEx, GoToMeeting)</td>
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<td>Keeping in Touch</td>
<td>Handwritten notes sent via US Mail</td>
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<td>Maps &amp; Navigation</td>
<td>Printed atlases and gas station maps</td>
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<td>Archiving</td>
<td>Boxes, file cabinets</td>
<td>Cloud storage</td>
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<tr>
<td>Music</td>
<td>Vinyl, cassette or CD</td>
<td>MP3s, Streaming, Personalized Programming</td>
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<td>Movies</td>
<td>BetaMax, VHS, LaserDisc, DVD, tube televisions</td>
<td>On-demand streaming to smartphones, computers &amp; 3D TVs</td>
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<tr>
<td>Shopping</td>
<td>Retail stores, mail order catalogs, malls</td>
<td>Online, dedicated smartphone apps</td>
</tr>
<tr>
<td>Mainframe Tape</td>
<td>Physical 3490 and 3590 tapes</td>
<td>Virtual tape</td>
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</table>
What Are The Benefits Of Going Tapeless?

Future-Proof 3590 Virtual Tape Solutions

- Reduce or eliminate physical tape
  - Save $ on maintenance, media, handling, shipping and off site storage
- Reduce security concerns and cost related to lost or missing physical tapes
- For HSM, reclaim CPU Cycles
  - Skip ML1 (DASD) and migrate from ML0, to ML2 (virtual tape)
- Improve disaster recovery preparedness by replicating tape data over the WAN
  - Tape data immediately available for use at the remote DR site
- Improve performance for all tape operations

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Tapeless Technologies Enable More Capability & Possibilities

- Emulate 3590 tape drives
- Remote Replication and Monitoring
- Simplified DR Testing and Execution
- Data Deduplication
- Continuous Availability
- CU Based Encryption & Key Management
- Cloud Storage for Tape
- Unique Tape Migration Tools and Services

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Tapeless Solutions – More Options... a Better Solution

Optional Features

- **Luminex Replication**
  Improve your disaster recovery plan with remote replication to one or more DR sites

- **RepMon**
  Replication monitoring and auditing at the VOLSER level

- **Push Button DR**
  Disaster recovery and testing with “push button” ease

- **Multi-site Disposition Change**
  Easily redirect source-and-target replication flow between multiple data centers

- **Synchronous Tape Matrix**
  Continuous availability with 1+n mirrored writes and non-disruptive auto failover/restore

- **CGSafe**
  Encryption and key management

- **LTMon**
  Integrated, centralized management from the mainframe console

Storage Options

- **Enterprise**
  Highly available & flexible

- **Modular**
  Cost-effective performance

- **Internal**
  Compact (2U) & power efficient

- **MVT Vault**
  Cost-effective virtual tape vaults for remote, off site storage

- **CloudTAPE**
  Cloud-based tape vaulting solution for mainframes

- **Deduplication/Compression**
  DataStream Intelligence further reduces bandwidth & storage requirements

- **Tape Migration Software and Services**
  Seamlessly transition physical and virtual tapes with exact copies of original VOLSER numbers and labels

- **TMACS**
  Tape Monitoring and Allocation Control System intercepts tape device allocations and steers them to tape devices according to a customizable set of rules

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Customer Example (Automotive Industry): From Evaluation To Production

- Previous Configuration
- Vendor Selection Goals
- Sizing & Modeling
- Proof of Concept (POC)
- IOCP Statements
- Implementation & Testing
- Production Environment
- Tape Migration & Cutover
- DR Testing Using Push Button DR
- Summary

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Previous Environment

Production Site
IBM VTS w/ 3494 Tape Library

Production Mainframe

TMC Total: 470 TB of tape & 250,000 volumes

3490 Tape Drives (x24)

DR Site
DR Mainframe

Tape Warehouse
40,000 tapes

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Vendor Selection Goals

1. Obtain the Best Value for Enterprise-Class Virtual Tape
2. Reduce or Eliminate Physical Tape Use
3. Reduce Disaster Recovery Time Requirements
Sizing & Modeling: Tape Assessment

- Sizing # of Channel Gateways (CGX), Storage & Network Capacity
- Throughput Analysis (MBytes/sec)
  - RMF Channel Stats
  - SMF21 Records
- Storage Capacity Assessment
  - From Tape Management Catalog
  - By Category
  - By Application
  - By Last 45 Days of Activity
  - By Age

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Sizing & Configuration Recommendations

- 702 TB w/ 3:1 compression (234 TB physical)
  - Based on 470 TBs in the TMC
  - RAID disk protection
  - Anticipated growth of up to 50% (next 5 years)
- FICON throughput requirements
  - (4) 8 Gb FICON channel interfaces at Production
  - (2) 8 Gb FICON channel interfaces at DR
- 100 Mb/s replication link for mainframe data
**Configuration Statement Examples**

**IOCP (for FICON-attached 3590 drives)**
RESOURCE PART=((CSS(0),(PROD1,1),(PROD2,4),(TEST,2),(DEV,3)))

CHPID PATH=(CSS(0),35),PCHID=1C3,TYP=FC,SWITCH=2F,
PARTITION=(CSS(0),(PROD1,PROD2,TEST),=)

CHPID PATH=(CSS(0),44),PCHID=161,TYP=FC,SWITCH=2F,
PARTITION=(CSS(0),(PROD1,PROD2,TEST),=)

CNTLUNIT CUNUMBR=2380,UNIT=3590,CUADD=0,UNITADD=((00,16)),
PATH=(35,44),LINK=(28,28),X UNITADD=((00,16))

IODEVICE ADDRESS=(2380,16),UNITADD=00,UNIT=3590,CUNUMBR=2380,
STADET=Y

**HCD**

100,16 3590 OFFLINE=YES,DYNAMIC=YES,LOCANY=YES,
LIBRARY=NO,AUTOSWITCH=YES,LIBRARY-ID=00001,
LIBPORT-ID=01,MTL=YES
Implementation & Testing

Test LPAR Set Up:
• New solution known by test LPAR only
• Verified MTL activated & up
• Verified TMC set up and operation
• TCDB readiness confirmed

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Proof of Concept

Extensive Testing:

- Monitored replication speed by VOLSER
  - Small volumes and full volume dumps (MOD-27)
- DR testing, while continuously replicating from Prod.
  - High priority
- Observed mount times were considerably less
- Performed data writing comparisons (current vs. proposed)
- CGX performance test results were significantly better
  - Tapeless CGX vs. virtual tape w/3590 tape drives/library
New Mainframe Virtual Tape Configuration

**Production Site**
- Production Mainframe
- Luminex Channel Gateways
- Storage: 702 TB @ 3:1 Compression
  234 TB w/o Compression

**DR Site**
- DR Mainframe
- Luminex Channel Gateway
- Storage: 702 TB @ 3:1 Compression
  234 TB w/o Compression

**CGX Options in Use:**
- Luminex Replication
- RepMon
- Push Button DR with Copy on Replicate
- Admin+
- LTMon

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Production Environment

Options Used in Production:

- **Luminex Replication**
  Replication between Production and DR sites

- **RepMon**
  Replication monitoring and auditing at the VOLSER level

- **Push Button DR with Copy On Replicate**
  To facilitate disaster recovery testing, while site-to-site replication continues

- **Admin+**
  Management & reporting with customized scripts for Inventory Auditing

- **LTMon**
  Integrated, centralized management from the mainframe console also sends email alerts

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Tape Migration & Cutover - 167,000 Volumes Migrated (Remainder by Attrition)

**Migration Process:**
- Luminex provided an Assessment, SOW, Software and Services

**Previous VTS**

**Mainframe**
- We applied a MIPS-friendly started task
- Compatible with our tape management system & catalog
- Migrated one catalog at a time
- 3490 to 3490, 3590 to 3590
- Ramped up or down as needed
- Audited to verify all tapes before and after

**Luminex Virtual Tape Solution**
- Exact copies of original VOLSERS, including labels, unusual tape mark combinations and data beyond last tape mark
- Automatically tracked VOLSERS that had been copied and needed to be copied or re-copied
- Cutover accomplished over a weekend

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Disaster Recovery Testing

- They declared the day & time in advance
- Used RepMon & Admin+ to facilitate the process
- DR Start was activated remotely & the status was checked via status display to confirm DR mode
  - This verified access to all tapes & provided a snapshot, point in time of data
- LPARS were brought up at the DR site and we used the point in time data
- They wrote the new tapes, validated data & turned it over to the application team
- DR tests finished 12 hours earlier than before
Customer Example Summary and Q&A

- The customer went 100% tapeless!
  - Note - Regulations are for data protection, physical tape is not required
- All physical tape and libraries are powered off
- Performance has substantially improved
- They realized substantial cost reductions
- DR tests finished 12 hours earlier than before
  - This means they turned it over to the application team 12 hours earlier

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Session Summary: Long Live 3590 Virtual Tape

Future-Proof 3590 Virtual Tape

- Access to the latest technologies
- Reduce or eliminate cost & limitations related to physical tape
- Improve all aspects of your tape operations

Thanks for attending!
Visit us at Booth #223 in the Tech Expo

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