GSE GUIDE SHARE EUROPE UK REGION

GSE UK Conference 2018
Better, stronger, faster; The Mainframe….. the Machine!

Do More with Virtual Tape

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Luminex Software, Inc.
November 2018
Session DC

Discussion Topics

- The Evolution of Mainframe Tape
- Virtual Tape: Simple & Mature
- From Virtual Tape… to Virtually Anywhere
- Real-World “Do More”
- Why is Virtual Tape a Better Approach?

The Evolution of Mainframe Tape

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Physical Tape

9 Track Tape Reel

3590 Tape Cartridge

Virtual Tape

Virtual Tape Cache w/ Physical Backend

IBM VTS

STK VSM

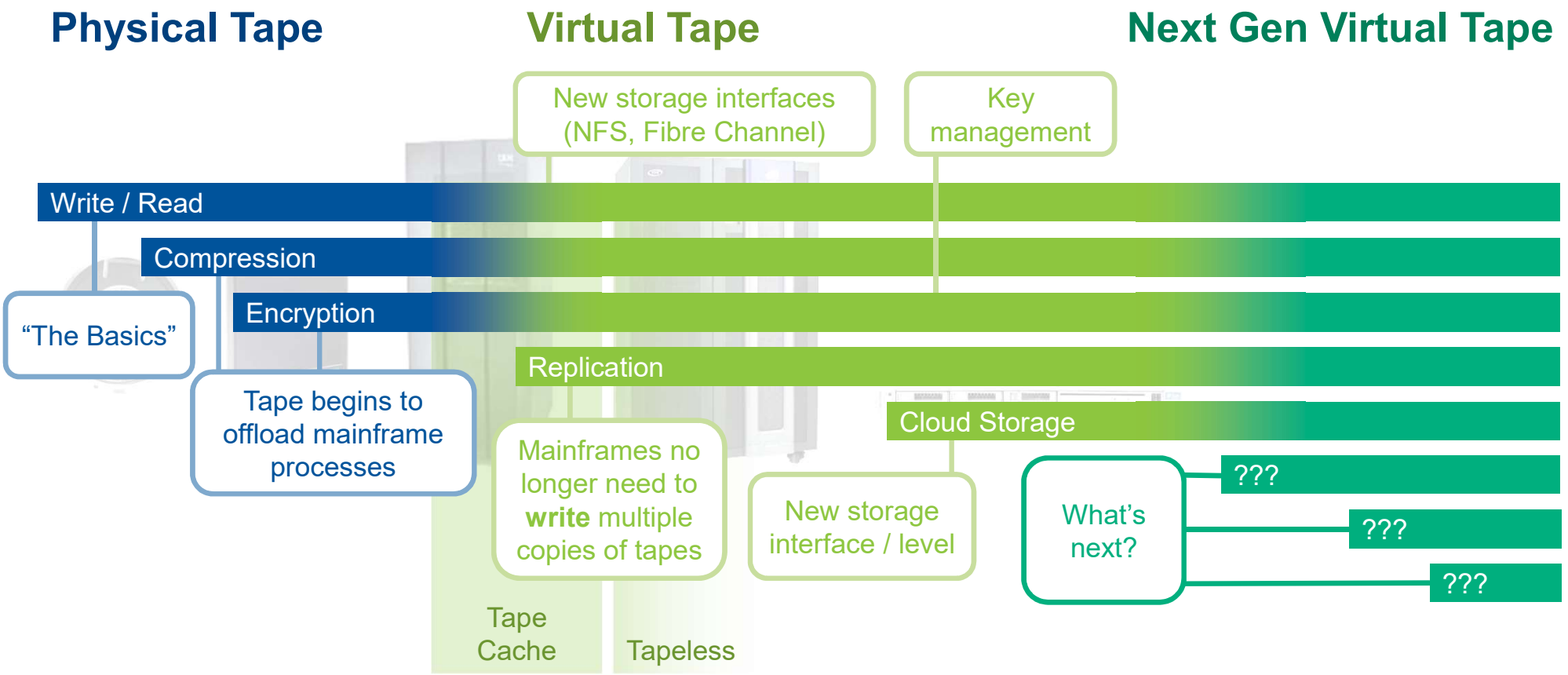
Next Gen Virtual Tape

Tapeless

Luminex Channel Gateway
Bus-Tech MDL/EMC DLm
IBM TS7720
Oracle VLE

?

The Evolution of Mainframe Tape
and How It Continues to Take On New Workloads



Virtual Tape: Simple & Mature

- Reading and writing a tape is simple, efficient and secure
- Virtualizing tape introduced more useful and powerful capabilities
  - … without adding burden to the mainframe
- Controllers are, basically, **“tape co-processors”**
  - Offloading compression, encryption, creating additional copies, etc.
- ***Why stop there?***

From Virtual Tape…

VIRTUAL TAPE

Source

Controller

- Compression
- Encryption
- Replication
- Push Button Disaster Recovery
- Cloud Connectivity

FICON

Internal SAS, Fibre Channel,
1 or 10 GbE

Target

- ✓ Create / Process
- ✓ Protect
- ✗ Transfer / Share
- ✗ Analyze / Report

From Virtual Tape… to Virtually Anywhere

VIRTUAL TAPE

DATA INTEGRATION

Source

- Data Integration Control Software
- Listener

Controller

- Compression
- Encryption
- Replication
- Push Button Disaster Recovery
- Cloud Connectivity

FICON

FICON

- Data Movement
- Communications
- Translation / Conversion

Target

Internal SAS, Fibre Channel,
1 or 10 GbE

1 or 10 GbE

- Create / Process
- Protect
- Transfer / Share
- Analyze / Report

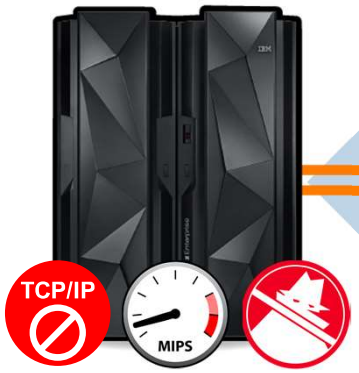
Source / Target

Controller

Source / Target

MDI is a Data Transfer & Co-Processing Platform

Mainframe FICON

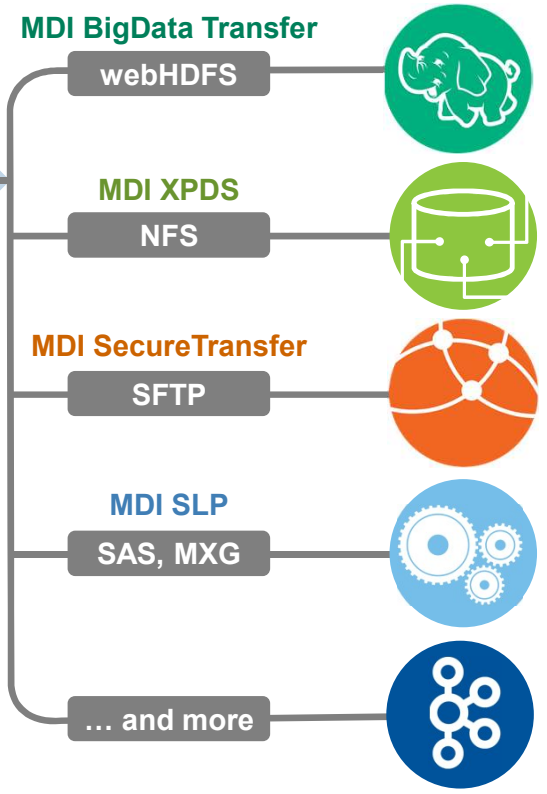


- Secure
- High speed
- Efficient, redundant I/O channels

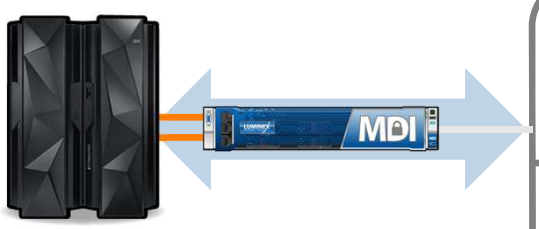
MDI Platform

- Profile-based architecture for extending processing & interface capabilities
- High speed, scalable transfer rates
- SAF integration & protocol-based encryption
- Bi-directional movement and communication for multi-platform workflows and co-processing
  - Including data translation from EBCDIC to ASCII and between character sets

Data Sharing Targets/Sources



How MDI is Used



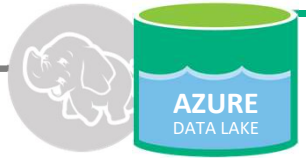
MDI BigData Transfer
webHDFS

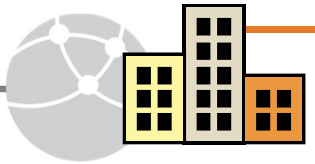
MDI XPDS
NFS

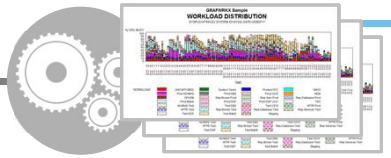
MDI SecureTransfer
SFTP

MDI SLP
SAS, MXG

… and more







SAMPLE USE CASES

Insurance Provider
Data aggregated into an Azure Data Lake with data from distributed systems, then used for risk analysis by actuaries

Financial Services
DB2 dumped into Apache Ignite, transformed/ sorted off-host, then imported back into DB2 on the mainframe

Bank
Files securely, efficiently and simply shared with business partners via off-host encryption, compression and data movement over SFTP

Logistics Company
SMF data sent to MDI co-processor, reports generated with MXG off-host, then copies are sent back to mainframe ISPF and to Capacity Planning team via email

Real-World “Do More”

It’s already happening…

U.S. Financial Company

Goal: Reduce Costs for Mainframe

Challenge/Obstacles:

- Client is outsourced and wanted to reduce mainframe costs
- **Company challenged to find ways to save $1B in 1 year**
- To contribute to that goal, client looked at where mainframe $ were being spent
  - Mainframe batch processing
  - Data sharing needs
  - Data archive

U.S. Financial Company

Goal: Reduce Costs for Mainframe

Solution: Mainframe Data Integration (MDI)

- Data that needs to be archived for 7 – 50+ years
  - MDI Archive to Open Systems commodity storage
- Off-hosting sort to Open Systems Platform
  - MDI Cross Platform Data Sharing (XPDS)
- Share mainframe data with distributed compute platforms
  - MDI Cross Platform Data Sharing (XPDS)
- Replace 3rd party secure file transfer software
  - MDI SecureTransfer (ST)

U.S. Insurance Company

Goal: Competitive Edge & Better Claim Experiences

Challenge/Obstacles:

- Data was generated, collected and processed separately on multiple platforms
- **Created data silos between mainframe and open systems**
- Made risk analysis even more challenging:
  - Actuary team had to perform analytics on mainframe and open systems data separately
  - Their mainframe data processing tool, limited their ability to ask new questions of the data
  - As analytic tools for distributed systems advanced, the ability to extract new information from the mainframe couldn't keep up with the demands

U.S. Insurance Company

Goal: Competitive Edge & Better Claim Experiences

Solution: Mainframe Data Integration (MDI) with an Azure Data Lake

- Integration of data into Azure from multiple platforms to better understand customer behavior & meet expectations
- Eliminates security and speed concerns and makes mainframe data readily available to the Azure Data Lake for joint processing
- Provides more accurate and complete analytics to make better business decisions.
- Data Lake enables discovery of hidden correlations and the ability to ask questions that were previously not possible
  - Leading to the critical answers that insurance premiums are dependent upon

U.S. Logistics Company's Evaluation

Goal: Off-host Non-Revenue Generating Applications

Challenge/Obstacles:

- Client wanted to off-host all non-revenue generating workloads
- **Save MSUs, storage costs and allow for modernization**
- Client looked at SAS Language MXG processing for off-hosting
  - Client generated more than 1TB of SMF data daily
  - Dumped SMF every 4 hours
  - Data Analyst processed output from MXG processing for business analysis
  - MXG code in existence for decades; modified by many

U.S. Logistics Company's Evaluation

Goal: Off-host Non-Revenue Generating Applications

Solution: Mainframe Data Integration SAS Language Processor

- Provided dedicated platform for MXG processing
  - Resulting in reduce execution time from 4 hours to under 90 minutes
- Mainframe remains in control of JCL, Scheduling, SMF Logging, etc.
- Allowed for simplifying/streamlining the code using MXG macros
- Modernization could be achieved with Python and R
- Saved from 400 - 800 MSUs daily
- Reduced storage requirements for SMF and MXG PDBs on mainframe storage

Why Is Virtual Tape A Better Approach?

Let me count the ways…

Why is Virtual Tape a Better Approach?

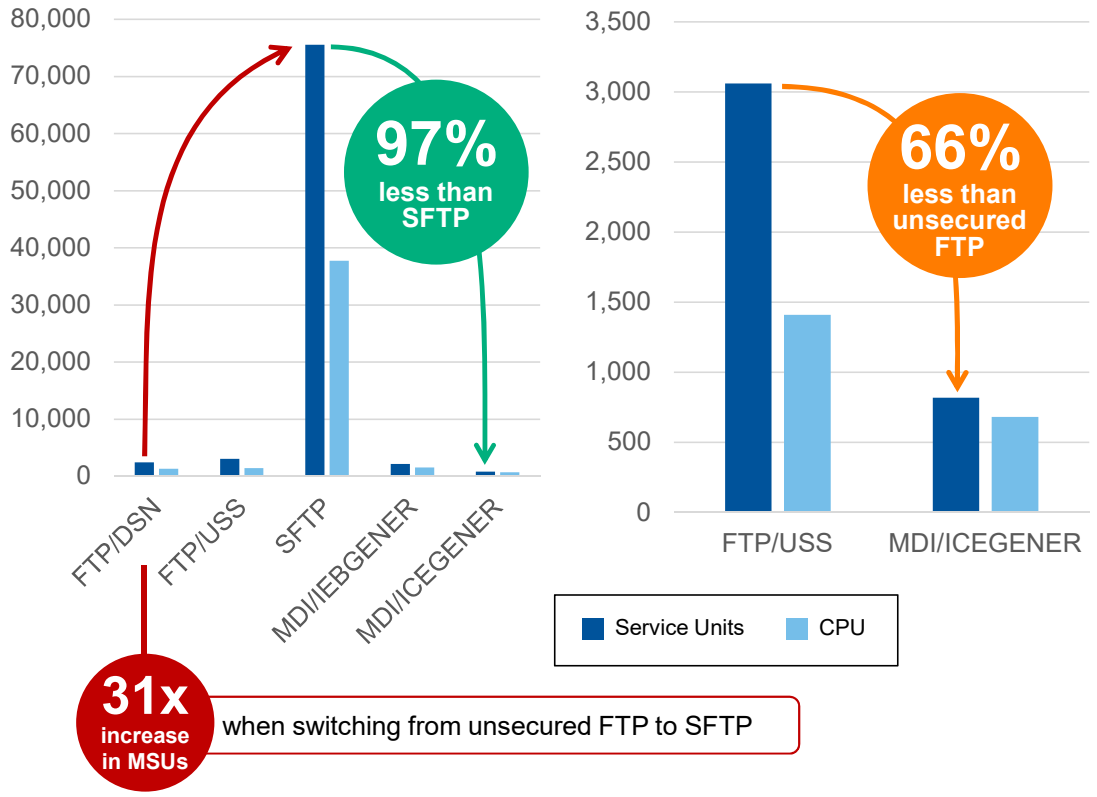
- **FICON is the Network**
  - FICON channels are specifically designed and optimized for the purpose of moving data off the mainframe
  - Faster, More Secure, Cheaper (less CPU) and Easy (native) are compelling advantages vs. TCP/IP
- **Mainframe-Centric Design**
  - Design and operations from mainframe centered discipline
  - Bi-directional communication and data transfer
  - Tape is the native API for both Control Path and Data Path
- **Common Platform with Enterprise Virtual Tape (MVT/CGX)**
  - Leverages enterprise-proven quality and reliability
  - Better together

Benchmark Testing: 30 MB File

Method	Job	Program	Elapsed	Service Units	CPU
FTP from DSN	BNCHMRK1	FTP	0:00:15.32	2403	1280
(Clear Text)			**0:00:15.32**	**2403**	**1280**
FTP from USS	BNCHMRK2	FTP	0:00:13.96	3060	1409
(Clear Text)			**0:00:13.96**	**3060**	**1409**
SFTP	BNCHMRK3	login	0:00:00.10	150	135
(Encrypted)	BNCHMRK3	tty	0:00:00.02	140	119
	BNCHMRK3	sftp	0:00:00.14	340	317
	BNCHMRK3	ssh	0:00:06.27	68463	34493
	BNCHMRK3	sftp	0:00:08.41	6106	2363
	BNCHMRK3	SH	0:00:08.47	213	163
	BNCHMRK3	BPXBATCH	0:00:08.77	129	107
			0:00:32.18	**75541**	**37697**
MDI/IEBGENER	BNCHMRK4	IEBGENER	0:00:03.24	2010	1407
	BNCHMRK4	LUMXPROC	0:00:09.34	156	134
			0:00:12.58	**2166**	**1541**
MDI/ICEGENER	BNCHMRK5	ICEGENER	0:00:00.79	667	550
	BNCHMRK5	LUMXPROC	0:00:09.19	151	131
			0:00:09.98	**818**	**681**

Benchmarks performed on z13 Model 2965-N10 using SMF Type 30 records

MDI/ICEGENER System Resources Savings



FICON Advantages: A Secure Data Path

"If you replace mainframe FTP with a channel/**FICON** based solution, you can mitigate FTP security issues a great deal, if not remove them completely. This is the real benefit of a solution such as MDI SecureTransfer."

Mark Wilson
Technical Director
RSM Partners

www.rsmpartners.com

Simple JCL Deployment

```
JOBCARD...
//GENER    EXEC PGM=ICEGENER
//SYSPRINT DD   SYSOUT=*
//SYSIN    DD   DUMMY
//SYSUT1   DD   DSN=PROD.FTP.TXDATA,
//              DISP=SHR
//SYSUT2   DD   DSN=PROD.FTP.TXDATA.MDI,
//              DISP=(NEW,CATLG),
//              UNIT=MDITAPE,RETPD=0,
//              DCB=*.SYSUT1
```

Step 1: Write the file you want to transfer to an MDI SecureTransfer owned tape. This is a simple ICEGENER to tape.

MDI JCL – Step 2

```
//STEP2    EXEC LUMXPROC,PROFILE=MDIST
//XPROCLOG DD   SYSOUT=*
//COPYFILE  DD   DISP=OLD,
//               DSN=PROD.FTP.TXDATA.MDI,
//               UNIT=MDITAPE
//SYSIN     DD *
-PARM destination=206.154.7.19
  cipher=aes192-ctr
  login=<loginid>
  password=<password>
  conversion=ascii_CRLF
-DD_COPYFILE=prod.ftp.txdata
```

Step 2: Execute LUMXPROC. Communicates to MDI what you want to do with the data.

Destination IP, DNS/server name

Multiple ciphers supported

Credentials externalized in JCL

Convert EBCDIC to ASCII

Do More with Mainframe Data, More Often & for Less

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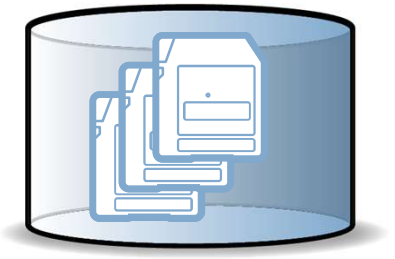
Do More	**Strategic Mainframe Initiatives**	**Share Data w/ Distributed Systems for Analytics, Cloud, Archiving etc.**	**Aggregate Data for Enterprise-wide Decision Making** (Eliminate Data Silos)
Improve Security	**Ensure all Data Movement to/from Mainframe is Secure**	**Comply with Mainframe Security, User Access & Control** (RACF)	**Reduce Security Risks Associated with Open IP Ports**
Reduce Costs	**Reduce MIPS Usage/Workload, Licensing Cost & Manage R4HA**	**Avoid an Expensive Mainframe Upgrade**	**Off-Host SAS Language Workloads like MXG**

History of (Tapeless) Virtual Tape

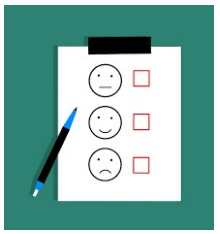


- First Tapeless Virtual Tape
  - **Luminex Software**, February **2005**
  - https://www.luminex.com/about/press/pr050208.php
- Bus-Tech Mainframe Data Library **2006** (acquired by EMC in 2010)
  - Hundreds of TB of raw storage
  - SAN connectivity (500 MB per hour throughput)
  - https://searchdatabackup.techtarget.com/tutorial/Virtual-tape-library-specifications
- IBM announces TS7720 (Tapeless) in **2008**
  - https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=an&subtype=ca&appname=gpateam&supplier=897&letternum=ENUS108-801
- Oracle (formerly StorageTek) announces Virtual Library Extension (VLE) in **2010**
  - http://www.oracle.com/us/corporate/press/182826

Q&A

We want your feedback!

- Please submit your feedback online at ….
  - http://conferences.gse.org.uk/2018/feedback/DC
- Paper feedback forms are also available from the Chair person
- This session is DC



Thank You

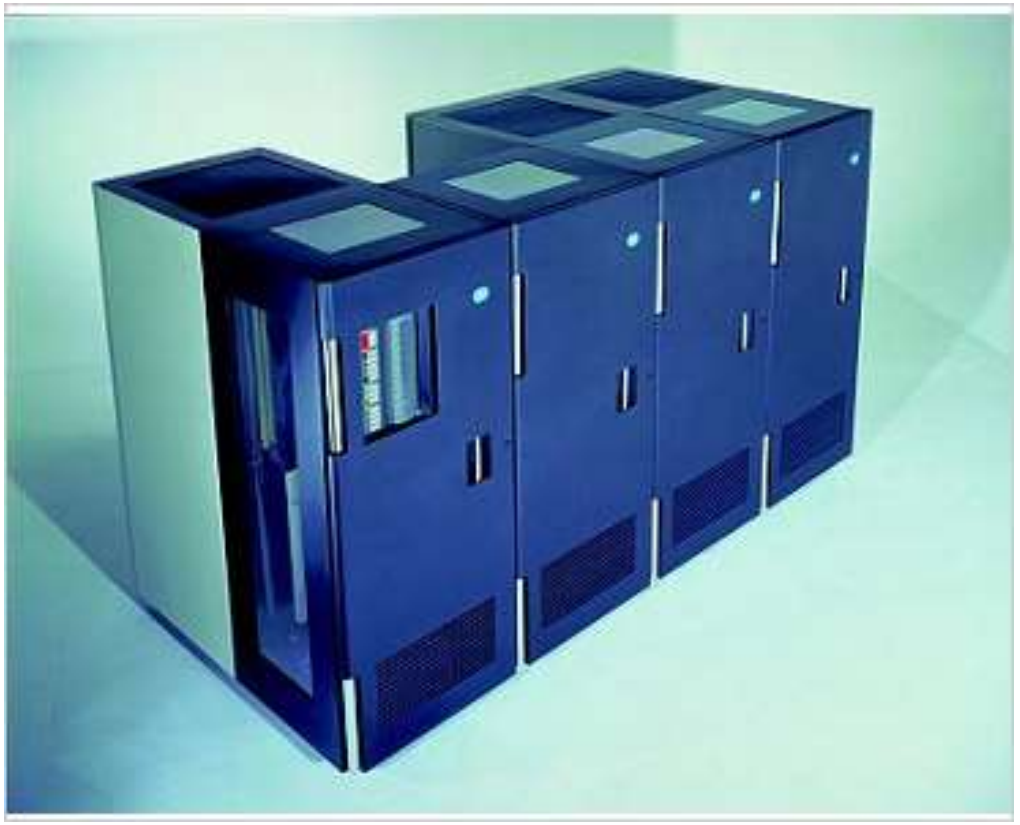
IBM 726 Tape Controller 1952 - 1955

IBM 3420 Tape Drive Early 70's

3850 Mass Storage Device 1974

IBM 3480 Tape Drive 1984

IBM 3494 Tape Library 1997



Luminex's Heritage of Innovation