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# Improve Disaster Recovery and Lower Costs with Virtual Tape Replication

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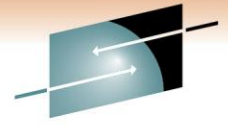
**Damon Brown**

*CTO*

Govplace

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in Anaheim  
2011





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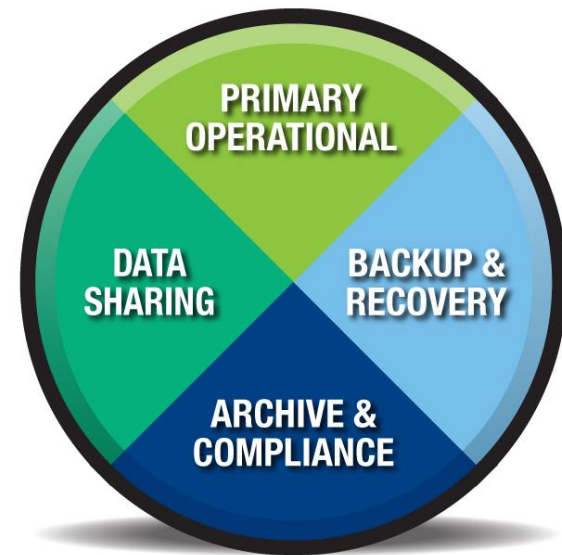
# Discussion Outline

- Mainframe Tape Use
- Disaster Recovery Configurations & Challenges
- Targets for Lowering the Cost of DR Plans
- LUMINEX Channel Gateways - Virtual Tape Control Units
- Customer Examples & Case Studies
  - Wells Fargo Dealer Services
  - Ingram Entertainment
  - Govplace/County of Orange

# Disaster Recovery for All Mainframe Tape

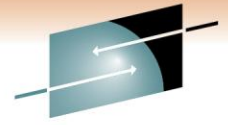
## Mainframe Storage World:

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

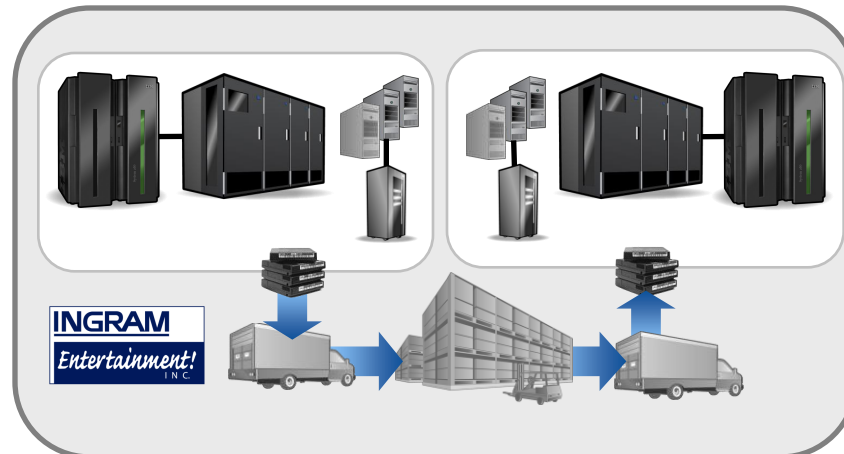
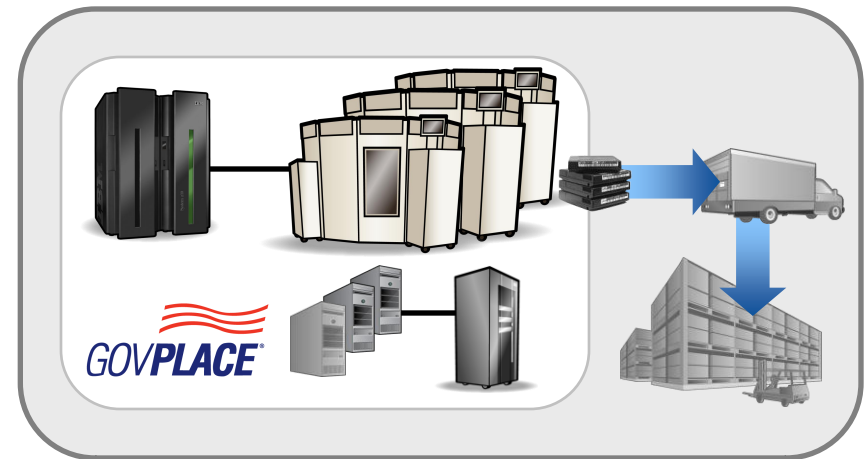
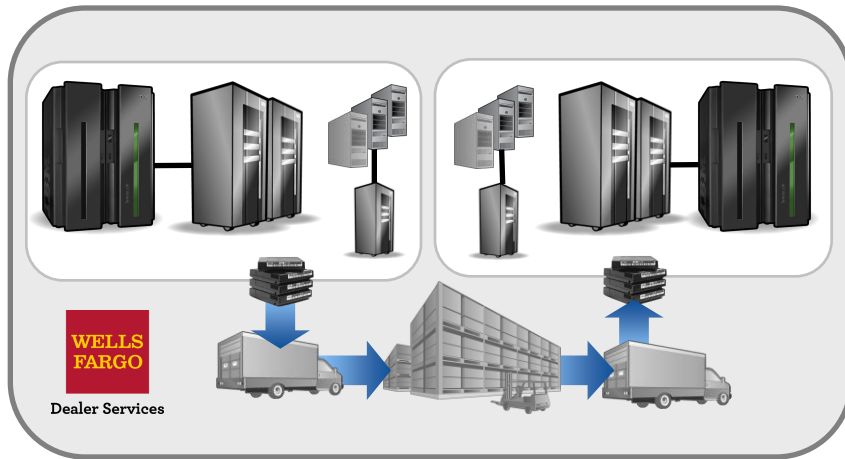


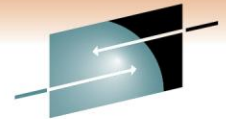
# Previous Environments for Backup & DR

*Physical tape limits capability & increases cost...*



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# Targets for Cost Reduction

- Tape Media
- Tape Shipping
- Off-site Tape Storage
- Tape Maintenance for Aging Tape Products
- 3<sup>rd</sup> Party Disaster Recovery Site & Services
- Electrical & Cooling
- Computer Room Real Estate

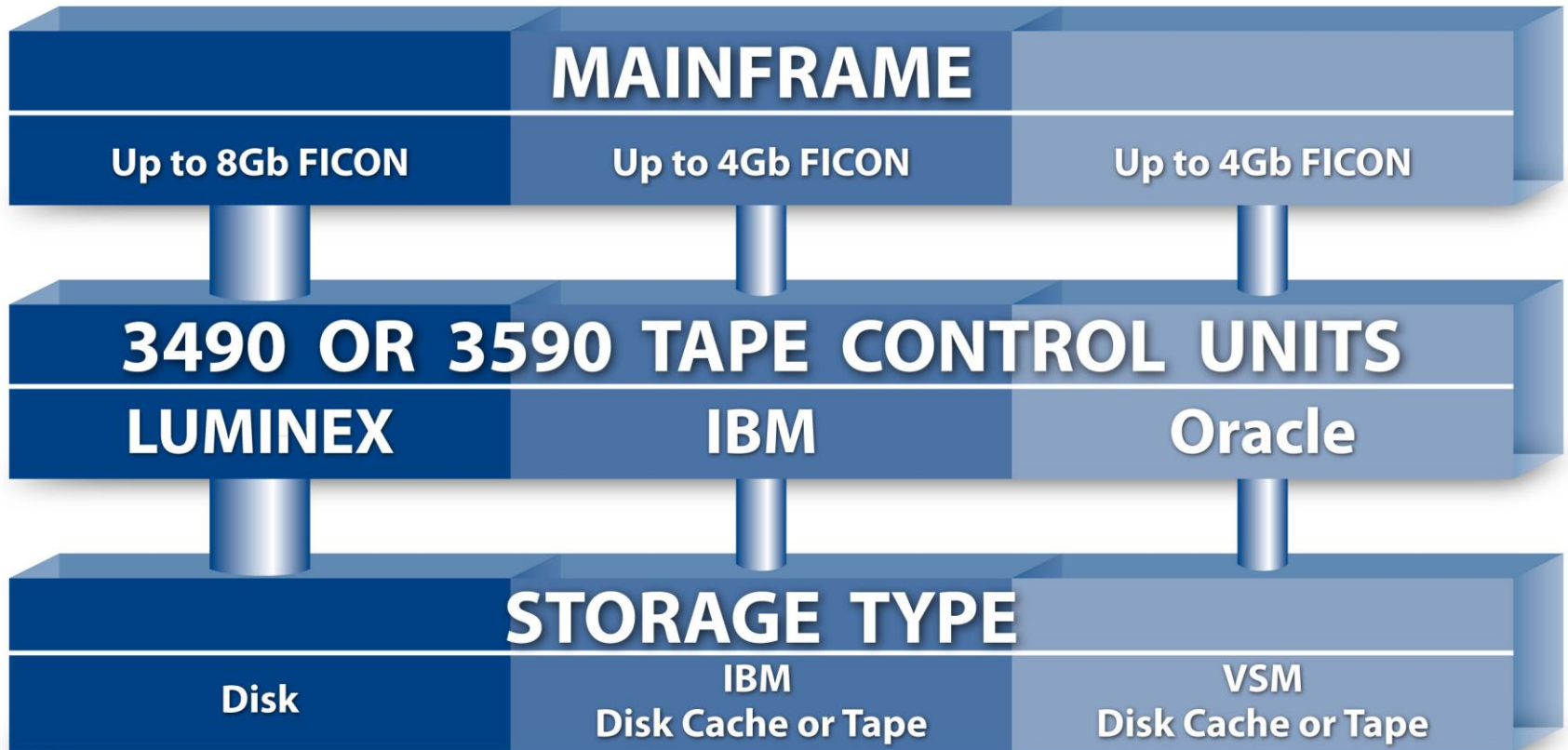
# Targets for Cost Reduction

## Example/Est. – IBM 3494 & (4)3590's

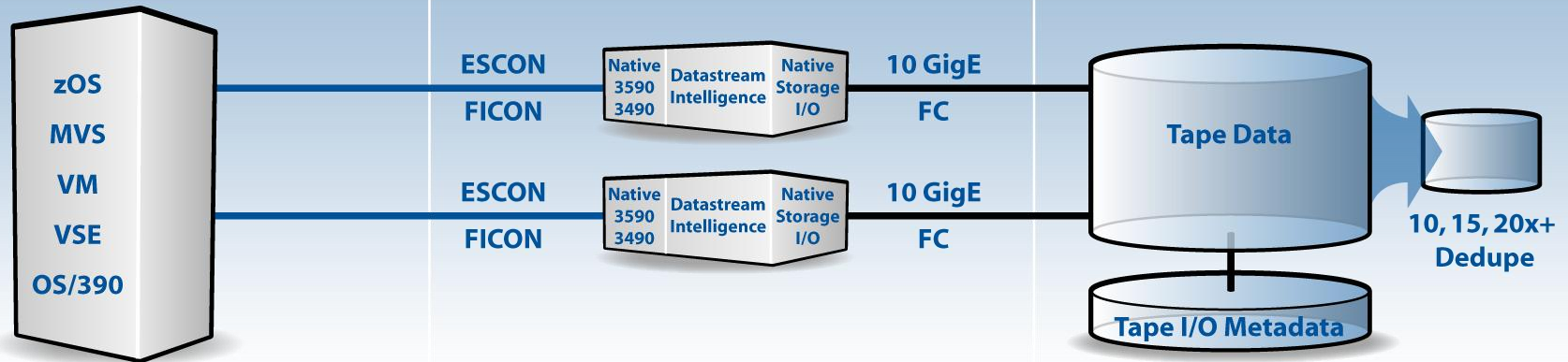


- Tape Media - **\$84,000** (\$70/cartridge & 1200 cartridges)
- Tape Shipping & Off-site Tape Storage - **\$36,000/yr**
- Tape Maintenance for Aging Tape Products - **\$30,680/yr**
- 3<sup>rd</sup> Party Disaster Recovery Site & Services - **\$72,000/yr**
- Electrical & Cooling - TBD
- Computer Room Real Estate – TBD
- Total for 5 years (Excluding Electrical, Cooling and Floor Space) - **\$776,000**

# Channel Gateway: Mainframe Virtual Tape Control Units



# How Channel Gateway Leads the Industry...



## Mainframe

- 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

## LUMINEX Channel Gateways

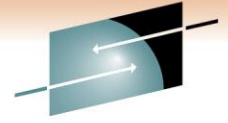
- Emulates 3480, 3490 or 3590 mainframe tape drives
- DataStream Intelligence optimizes deduplication
- Active – Active with NSPOF
- Dual PS, Fans & Mirrored OS
- No tape data on gateways

## Storage System

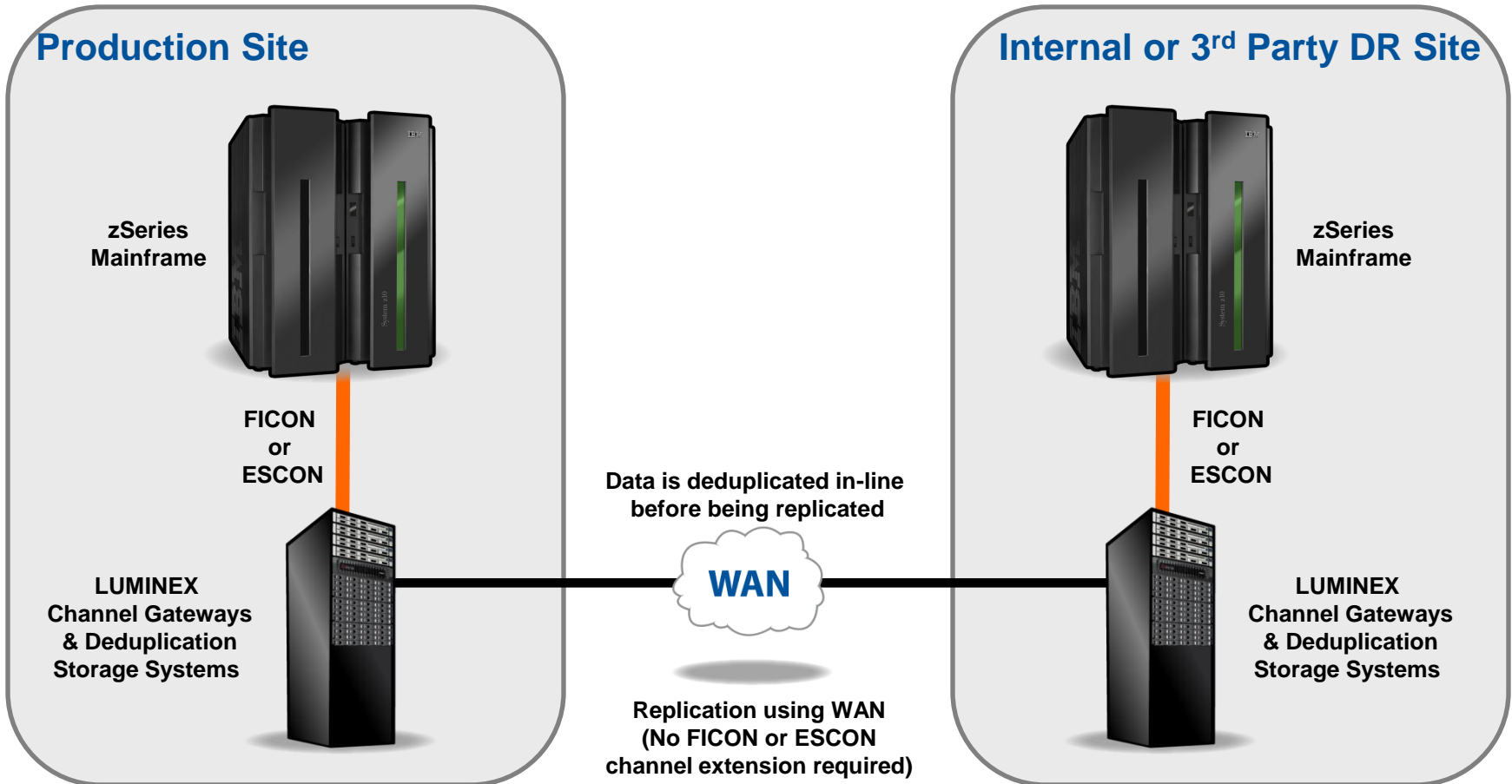
- NFS or FC attached
- Mainframe Tape Volumes stored as standard files
- Data Deduplication optimized
- Replication for backup and Disaster Recovery

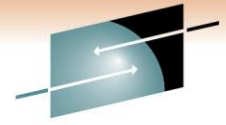


# Deduplication Makes Remote Replication Practical & Affordable



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Dealer Services

# End User Experience

**Greg Saccomanno**

*Systems Programmer*

Wells Fargo Dealer Services





Dealer Services

# About Wells Fargo Dealer Services

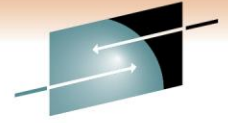


- One of the nation's largest auto dealer finance companies:
  - Headquartered in Irvine, CA
  - Regional offices serving 47 states
  - Servicing over 11,000 auto dealers



Dealer Services

# Our Previous Environment



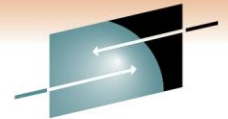
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- zSeries mainframe and 3590 tape drives
- Mainframe software – zOS, Batch, HSM/ML2 & DFdss
- Open systems software – ArcSight



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# Our Challenges & Goals

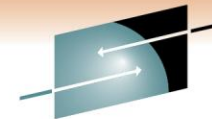


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- Protecting sensitive tape data was our #1 priority (Upgrade tape data security)
- Physical tape limited our options for improving the RPO & RTO
- We needed to upgrade our aging tape products
- We wanted to reduce/eliminate physical tape
- Sharing virtual tape storage between mainframes & open systems was preferred

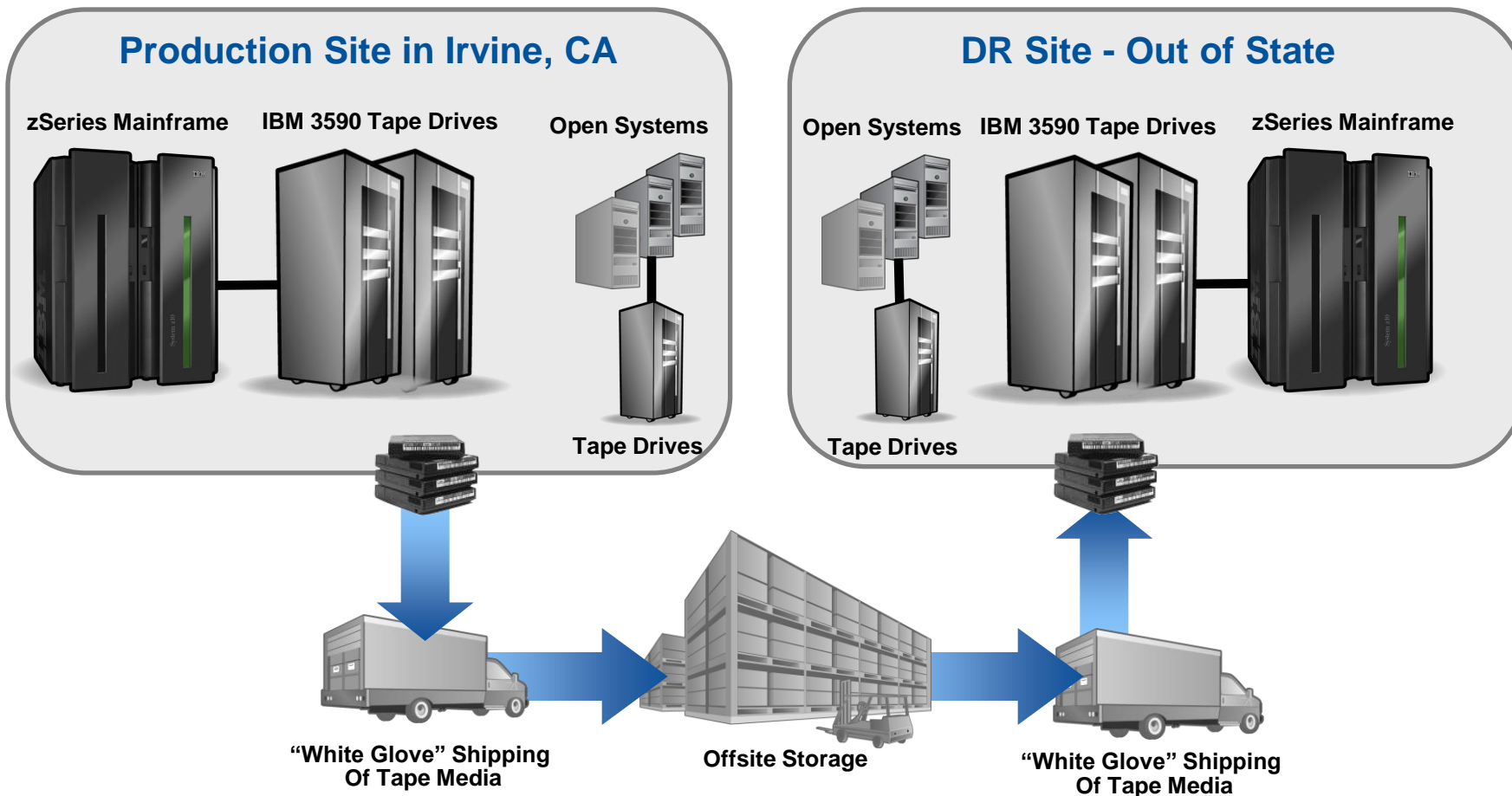


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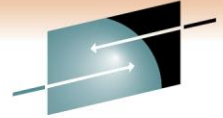
# Our Previous Configuration



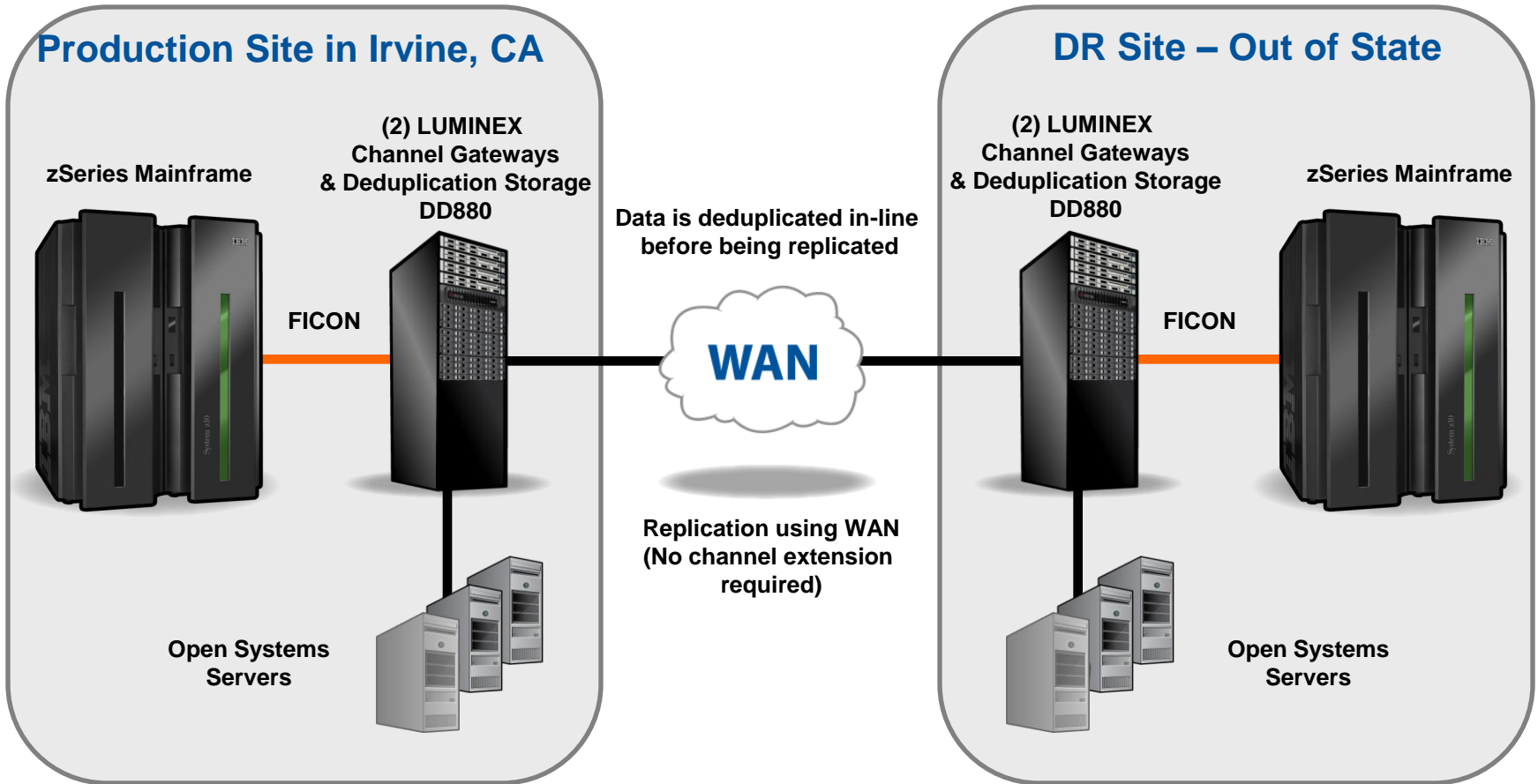


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# Our New Environment



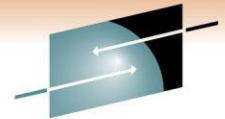
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# Our New Environment



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## Replication Monitor

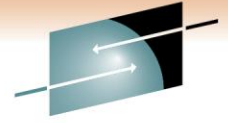
Management interface for local and remote status of mainframe tapes being written and replicated


Volser	Channel	Storage	Status	Time
fds222	cg100	/ddmnt	Close	2:19:45 PM 2010.07.09
iou888	cg100	/backup/here	Close	2:19:42 PM 2010.07.09
abc123	cg100	/ddmnt2	Query	2:20:33 PM 2010.07.09
lol555	cg100	/ddmnt	Close	2:19:42 PM 2010.07.09
oih879	cg100	/ddmnt	Close	2:19:42 PM 2010.07.09
dsi840	cg100	/ddmnt	Close	2:19:42 PM 2010.07.09
lsi395	cg100	/ddmnt	Write	2:19:42 PM 2010.07.09
tru989	cg100	/backup/here	Close	2:19:42 PM 2010.07.09
lil333	cg100	/ddmntsd/sfdsael/fesdd	Close	2:19:42 PM 2010.07.09
afk543	cg100	/backup/here	Query	2:19:42 PM 2010.07.09
lki000	cg100	/dfa/go/here	Close	2:19:42 PM 2010.07.09
pop111	cg100	/ddmnt2	Close	2:19:43 PM 2010.07.09

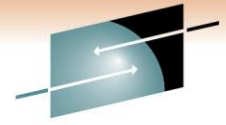
Avg. Replication Time: 5.67 s      Number currently open: 12  
 # Replicated: 9      Session Time: 1:31



# How Did We Do?



- 
- ✓ We achieved our goals!
  - ✓ Replication of tape data to the DR site is completed 5 hours before tapes would be picked up for shipment from the production site
  - ✓ Tape data protection and security has been upgraded
  - ✓ We've reduced/eliminated internal tape use!
    - ✓ Physical tape drives only kept for reading tapes provided by partners or vendors
  - ✓ We're using existing, spare network bandwidth for remote replication
  - ✓ Tape recalls are nearly as fast as ML1 disk
  - ✓ Batch job times have been reduced by up to 50%
  - ✓ REPMON enables us to monitor & verify that each tape volser has been successfully replicated to the DR site



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# End User Experience

**Tim Demonbreum**  
*Systems Programmer*  
Ingram Entertainment, Inc.





# About Ingram Entertainment



- A leading national distributor of home entertainment products:
  - Headquartered in La Vergne, TN
  - 15 locations across the U.S.
  - Servicing over 10,000 retail accounts

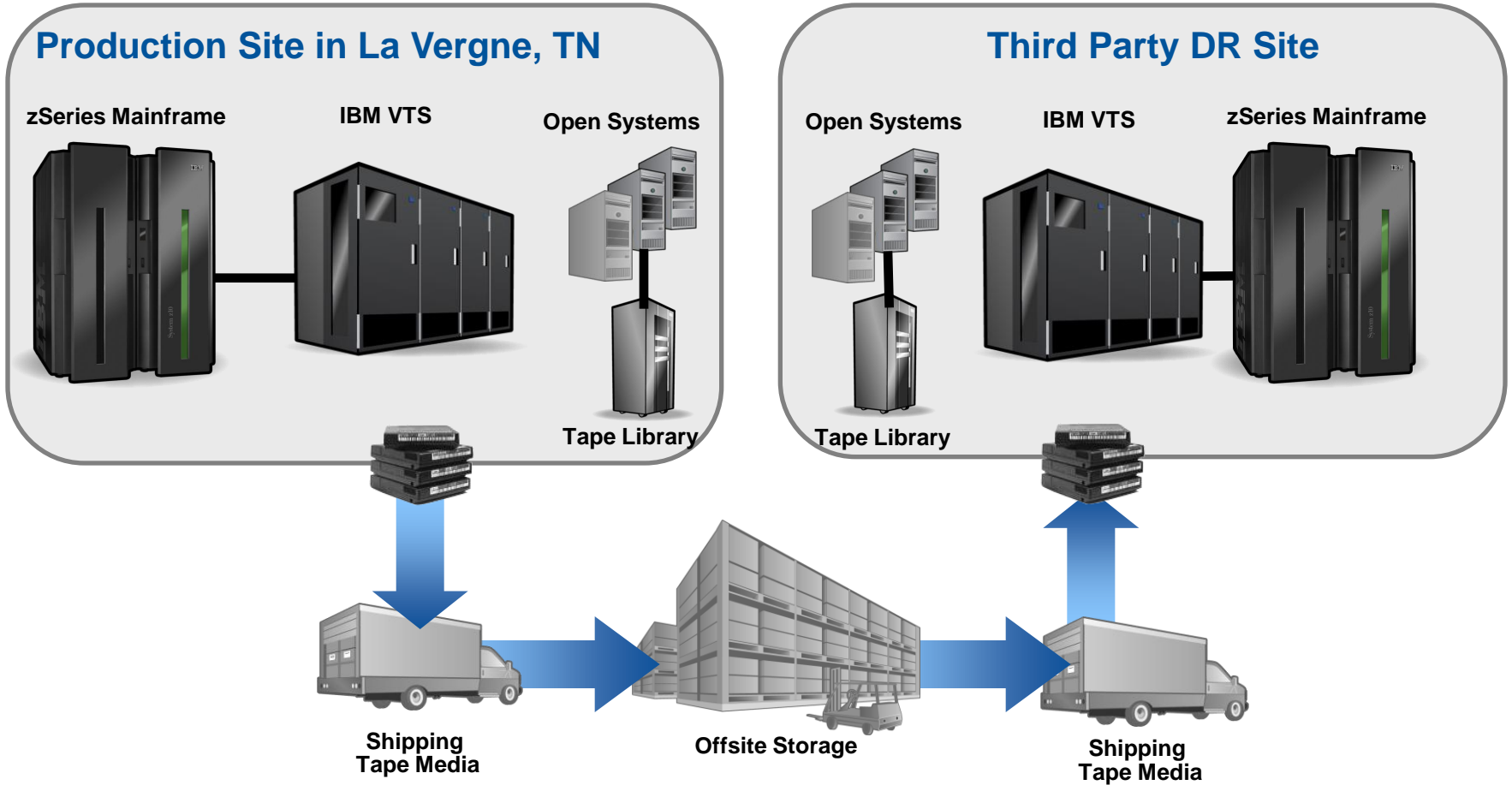
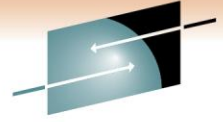


## Our Previous Environment




- zSeries mainframe, IBM VTS, 3494 tape library, 3490 & 3590 drives
- Mainframe software – zOS, batch & DFDSS
- Distributed Systems – MS Exchange & SQL servers
- Open systems backup software – CA ARCserve

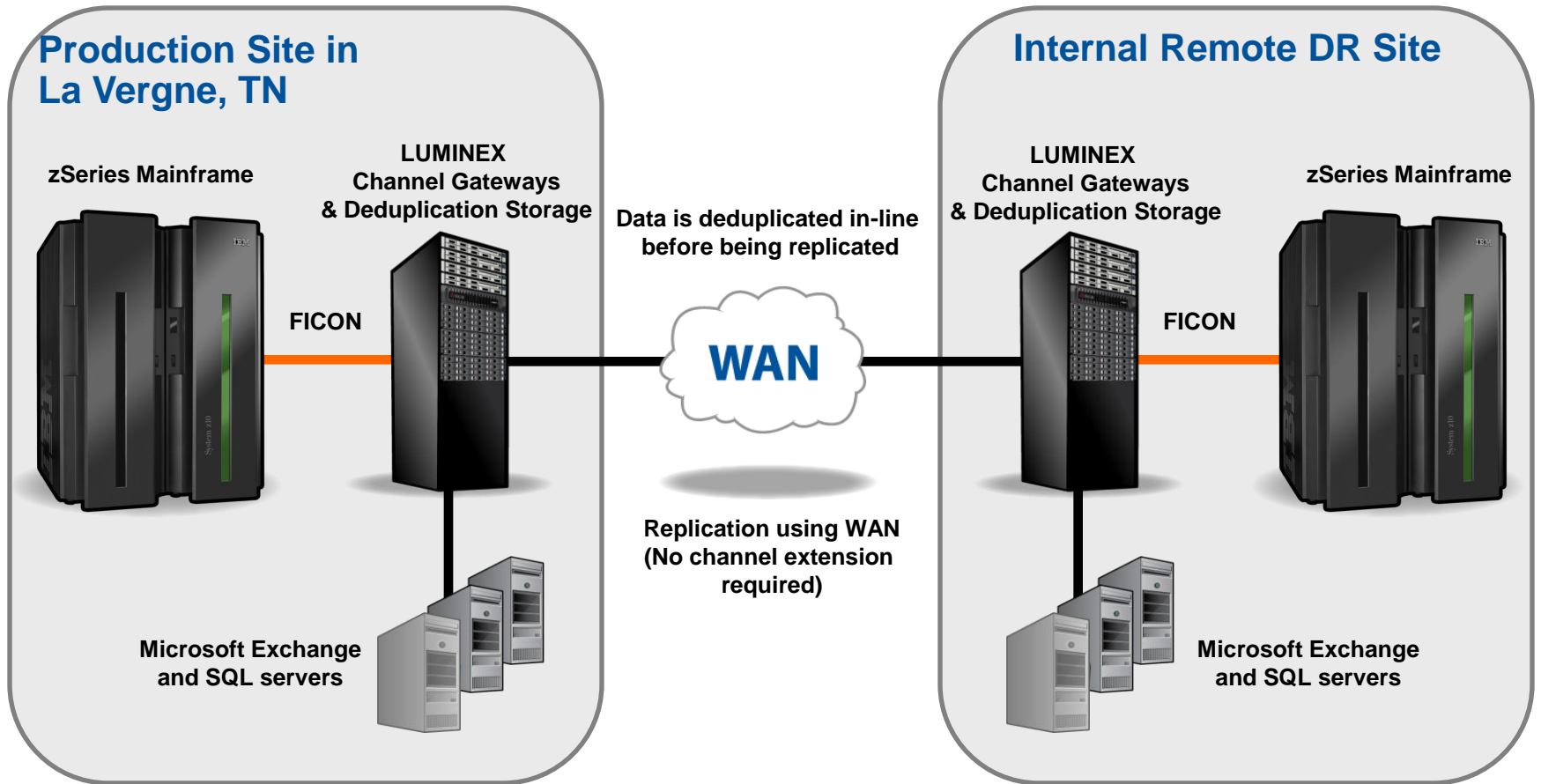
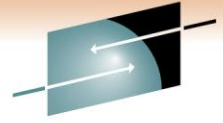
# Our Previous Environment



# Our Challenges & Goals

- 
- Replace the aging tape infrastructure
  - Eliminate frequent physical tape failures
  - Reduce the cost of maintenance, media, shipping and storage
  - The physical tape backup & recovery product was inadequate
  - Implement a self managed DR plan
    - Reduce/eliminate 3<sup>rd</sup> Party DR site cost \$\$\$
    - Eliminate tape media, shipping & tape storage requirements
    - Reduce network bandwidth requirements for remote replication of tape data
    - Improve, unify & simplify the DR Plan

# New Environment



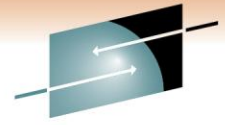
# Deduplication Performance

			DEDUPLICATION RATE	STORAGE REDUCTION
Currently Used (GB):	Pre	16,646.9	<b>10.1x</b>	<b>90.1%</b>
	Post	1,653.9		
Last 7 Days:	Pre	7,398.2	<b>21.5x</b>	<b>95.4%</b>
	Post	344.0		
Last 24 Hours:	Pre	764.4	<b>22.5x</b>	<b>95.6%</b>
	Post	33.9		



## How Did We Do?

- ✓ We achieved our goals!
- ✓ Business benefits and results:
  - ✓ 90%+ reduction in storage & network requirements
    - ✓ By achieving up to 20X deduplication rates
  - ✓ Eliminated tape use!
  - ✓ Reclaimed substantial IT floor space
  - ✓ Reduced cost
  - ✓ Implemented an internally managed DR site
  - ✓ Established a common, simplified DR plan
    - ✓ For mainframe & distributed systems



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# Managed Storage Provider/ User Experience

**Damon Brown**

*CTO*

Govplace





# GovPLACE<sup>®</sup> About Govplace



- Systems integration and IT solutions to:
  - Increased IT efficiency
  - Maximize investments
  - Achieve mission goals and objectives
- Our focus - Public Sector
- Managed Services Provider for the County of Orange
  - Infrastructure as a Service (IaaS)
- Based in Irvine, CA



# GOVPLACE<sup>®</sup> About the County of Orange



- Founded in 1838
- 3.1 Million residents
- 3rd largest county in California (by population)
- 798 square miles
- 24 Departments
- 47 Agencies
- Provides all governmental services
- Heterogeneous IT infrastructure
  - Mainframe
  - Unix and Windows



# GOVPLACE<sup>®</sup> Previous Mainframe Environment



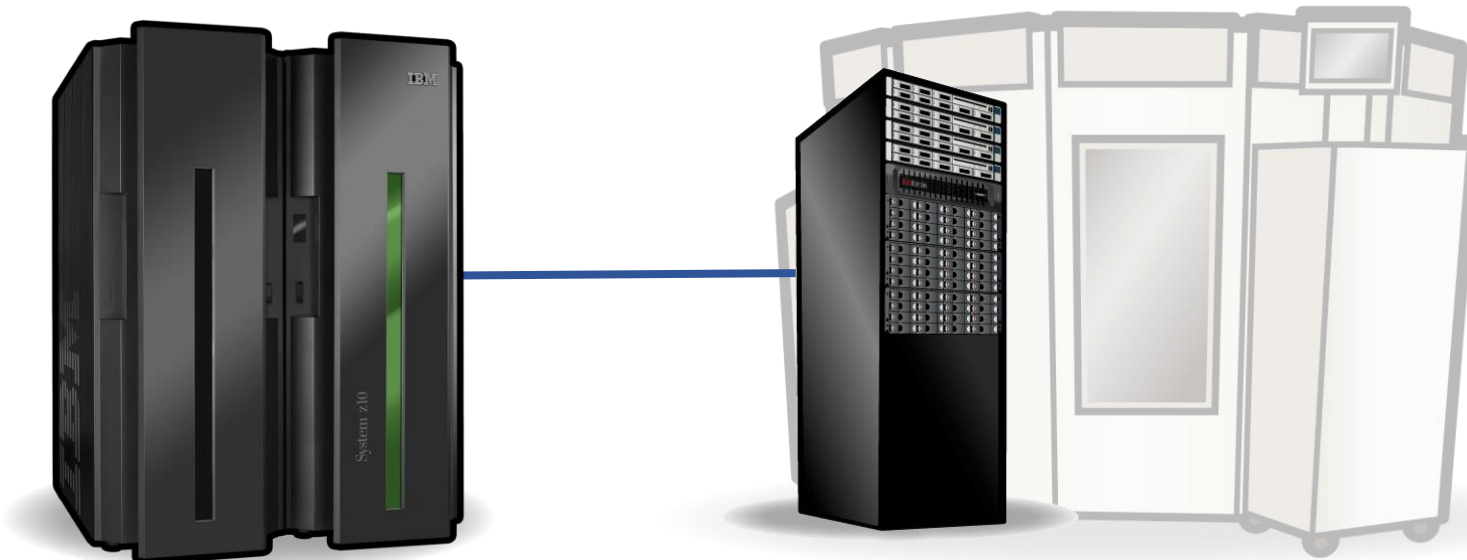
- (1) STK Silo 9310
- ESCON attached
- 65,000 9840 STK Cartridges
- DFSMS hsm:
  - Migrate and Backup
- DFSM dss:
  - Full Volume Backup
- CA CA-1:
  - Tape Management

# GOVPLACE® Challenges & Goals



- Replace STK silo which was approaching End of Support life
- A common DR strategy was required for mainframe & open systems
- Improve RPO and RTO
- Improve tape operations (Batch, HSM, Backup & Recovery):
  - Reduce tape storage and tape media cost
  - Reduce network bandwidth requirements for replicating tape data off-site for remote disaster recovery
  - Eliminate frequent tape failures (Improve overall reliability)
  - Meet current compliance & security requirements for off-site storage

**GOVPLACE** County of Orange, CA:  
**Heavy Batch Processing Environment**




**Luminex Channel Gateways  
for the mainframe.  
Deduplication storage shared  
between mainframe & open  
systems**

			DEDUPLICATION RATE	STORAGE REDUCTION
Currently Used (GB):	Pre	356,927.6	<b>11.5x</b>	<b>91.3%</b>
	Post	31,117.8		
Last 7 Days:	Pre	25,291.0	<b>15.2x</b>	<b>93.4%</b>
	Post	1,665.9		
Last 24 Hours:	Pre	1,614.1	<b>17.2x</b>	<b>94.2%</b>
	Post	94.0		



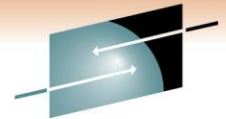


# GOVPLACE® How Did We Do?

- 
- ✓ Reduced Cost
  - ✓ 8 hour batch job, now only 5 – 6 hours
  - ✓ Reduced physical tape use
  - ✓ Reduced tape storage requirements via deduplication
  - ✓ Achieved compliancy requirements
  - ✓ STK silo replaced with disk-based virtual tape
  - ✓ Reclaimed substantial floor space
  - ✓ Disaster Recovery Plan vastly improved
  - ✓ Common DR solution for mainframe and open systems
  - ✓ Migrated more than 65,000 9840 STK mainframe tape cartridges

# 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
- **HA-Grid™**
  - **High Availability:** Provides fully redundant local storage of virtual tape data, with automated failover for **high-availability** operations, leveraging the capabilities of both SyncCopy and LTMON
- **SyncCopy™**
  - **Synchronous Replication:** Enforces **tape data consistency** across replicated storage systems with remote status monitoring of tape availability and integrity



# Differentiated Features & Capabilities

Features	LUMINEX	Other Vendors
Mainframe VT with deduplication - Customer proven since 2006	✓	✗
DataStream Intelligence to maximize deduplication	✓	✗
8Gb/s FICON	✓	✗
No limits on ESCON Availability	✓	✗
Support for up to 4096 devices per FICON channel	✓	✗
No limits on volsers or ranges	✓	✗
Storage capacity and bandwidth can be added non-disruptively	✓	✗
LUMINEX Tape Migration Tools and Services (Optional)	✓	✗
Tape Monitoring & Allocation Control System - TMACS (Optional)	✓	✗
INNOVATION's FDR Upstream application is optimized for deduplication	✓	✗