Delivering Real Business Value While Driving Down IT Cost with Virtual Tape

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Oracle Corporation
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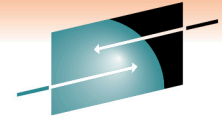
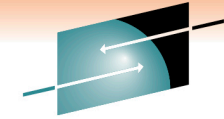# Agenda

- Data trends and drivers
- Data classification and categories
- Storage architectures
- Economics
- VSM/Tape architecture and data protection

IT Storage Challenges Have Not Slowed

Increasing Demand for Storage Capacity

SHARE

2009
Digital Data

0.8
Zettabytes

2010
Digital Data

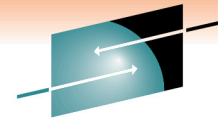1.2
Zettabytes

2020
Digital Data

35
Zettabytes
(44x growth)

Enterprises liable for
80 percent of this data
(security, privacy, reliability, compliance)

SHARE
in Anaheim
2011

Challenge: The Nature of Data is Changing
Align value of data with storage capabilities and cost

- The re-use of data is shrinking
  - 80% of data is never used after 90 days
- But the need to archive is growing
  - 68% of companies need 100-year archives
- Storage management costs more
  - Left unchecked, it could reach 30% of total IT spend
- Storage consumes ~40% of data center power
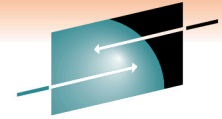 - Growing at 20% CAGR
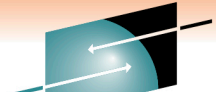
Mainframe Industry Trends

- *Data retention*
- *Data security*
- *Consolidation*
- *Virtualization*
- *Disaster recovery and offsite storage*
- *Reduction in tape handling/management*
- *Tape is archive layer*

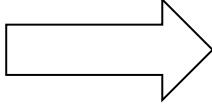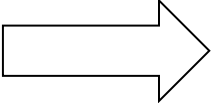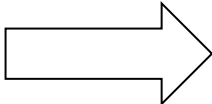# Mainframe: The Data Retention Requirements are changing

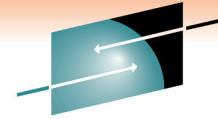- Data growth is partially driven by new media
  - Pictures, video, twitter are NOT stored on mainframe
  - Health records ARE (including imaging)
- The regulatory compliance has changed during last decade
  - Sarbanes-Oxley, HIPAA, Graham-Leach-Blily
- The need to archive is growing
  - Longer retention periods
  - More extensive data retention requirements
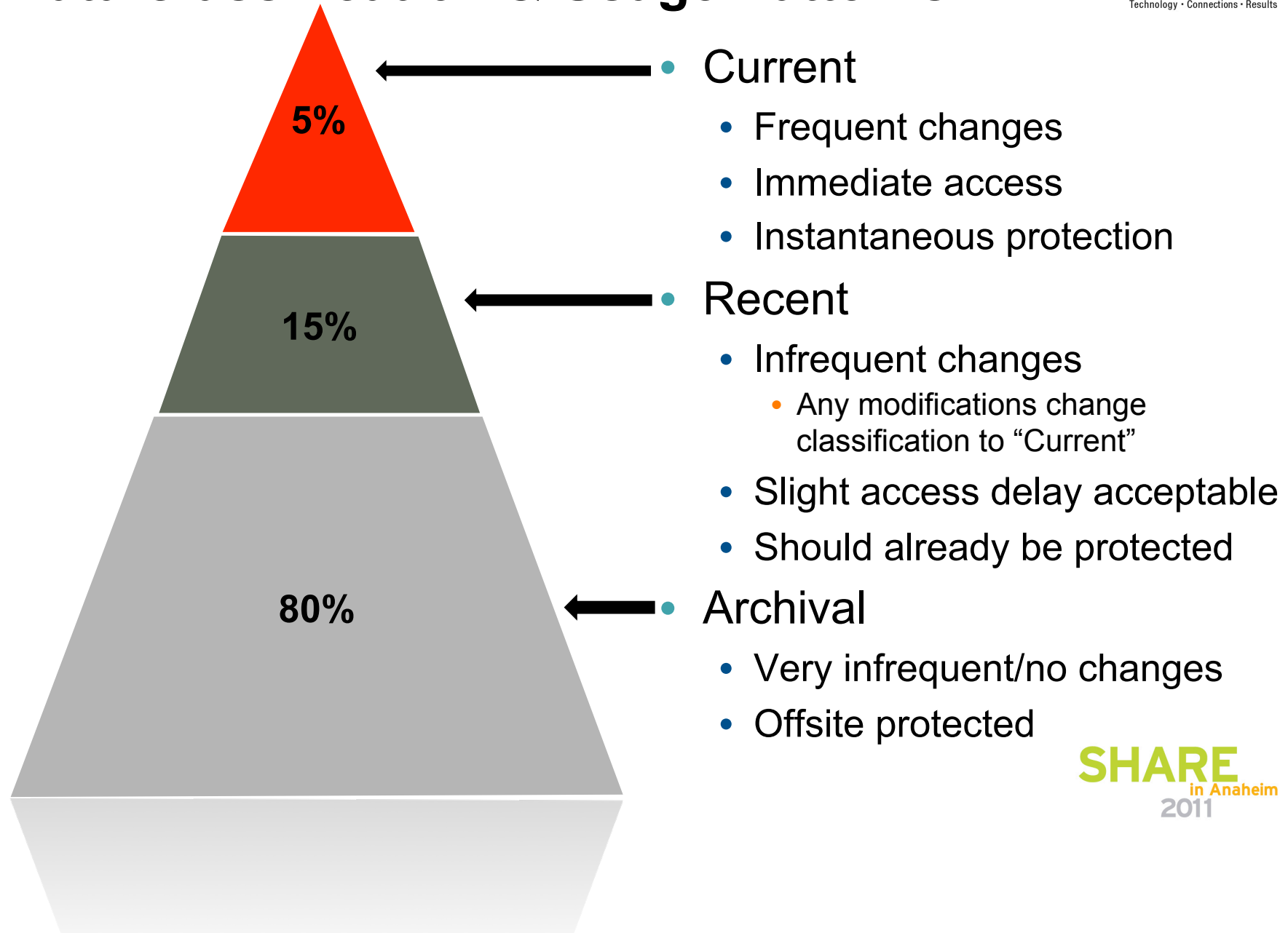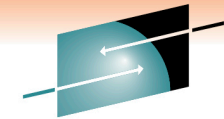 - More read-only, unalterable storage
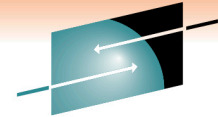
Data Categories

- Current - operational →
  - Current month's statement
  - Current year W2
  - Next appointment health info
- Recent - active →
  - Last 3 months statements
  - Last 6 months' visit data
- Archival - inactive →
  - Last 7 years' statements
  - Lifetime X-rays
  - Former employees data

- Business critical
  - Any loss can result in significant business impact
  - High legal liability
- Business continuity
  - Protected with backup
  - Loss can be recovered
- Historical info
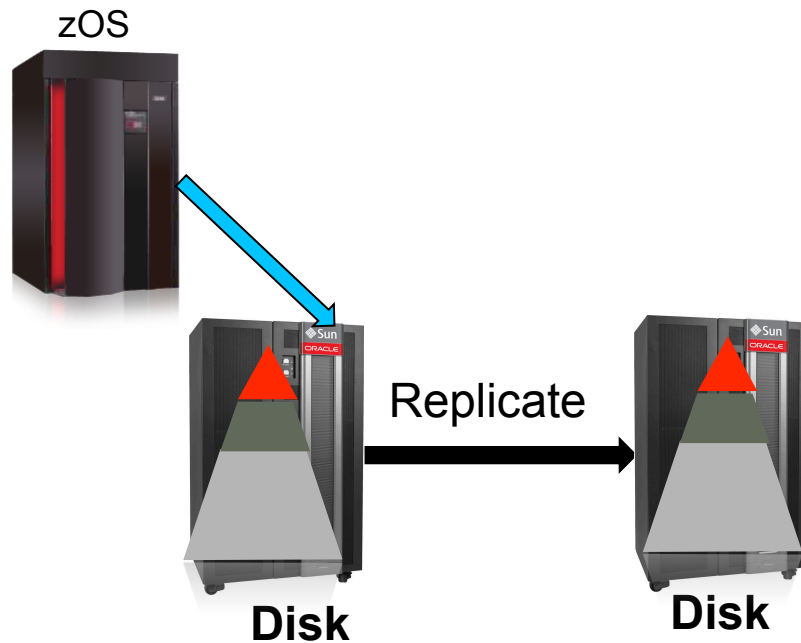 - Required for auditing
  - Governed by data retention regulations

Data Classification & Usage Patterns

5%

15%

80%

- Current
  - Frequent changes
  - Immediate access
  - Instantaneous protection
- Recent
  - Infrequent changes
    - Any modifications change classification to "Current"
  - Slight access delay acceptable
  - Should already be protected
- Archival
  - Very infrequent/no changes
  - Offsite protected

Single Tier Architecture
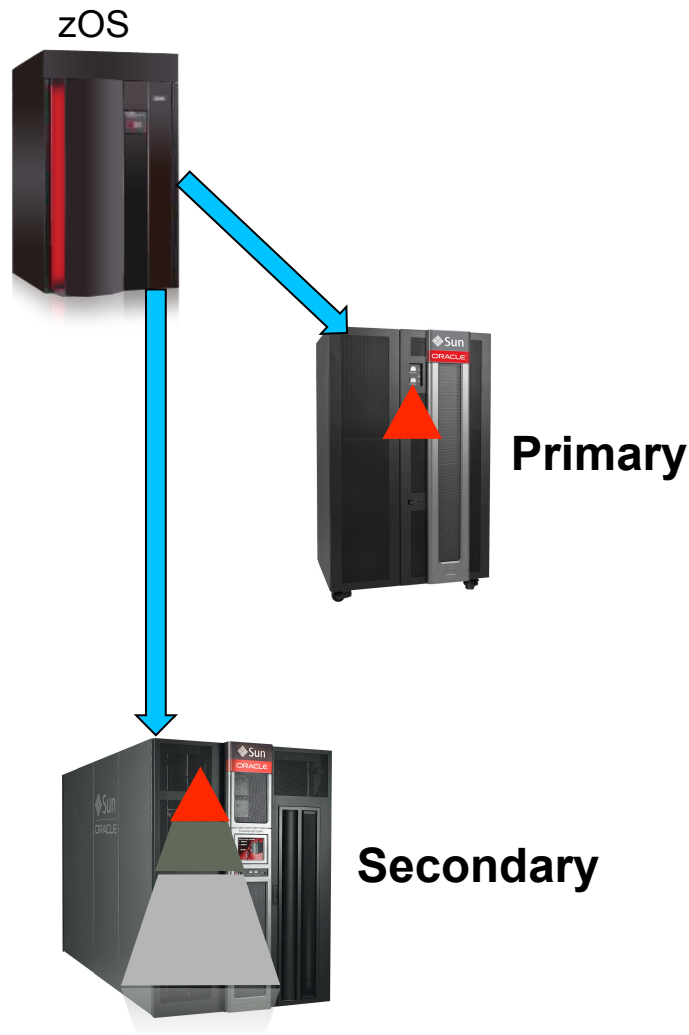
zOS

Disk   Replicate   **Disk**

- Primary storage – 100% of data
  - High performance disk
  - Instantaneous data access
- Spare capacity
  - Provision extra capacity to maintain system stability
- Data protection
  - Secondary disk system
  - Double capacity requirement
  - Can be lower performance
- Technology migration
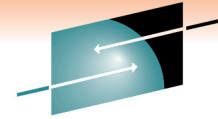 - Every 4-5 years
- Backup/archive
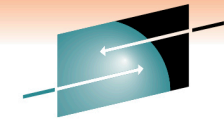
Two Tier Architecture

zOS

Primary

Secondary
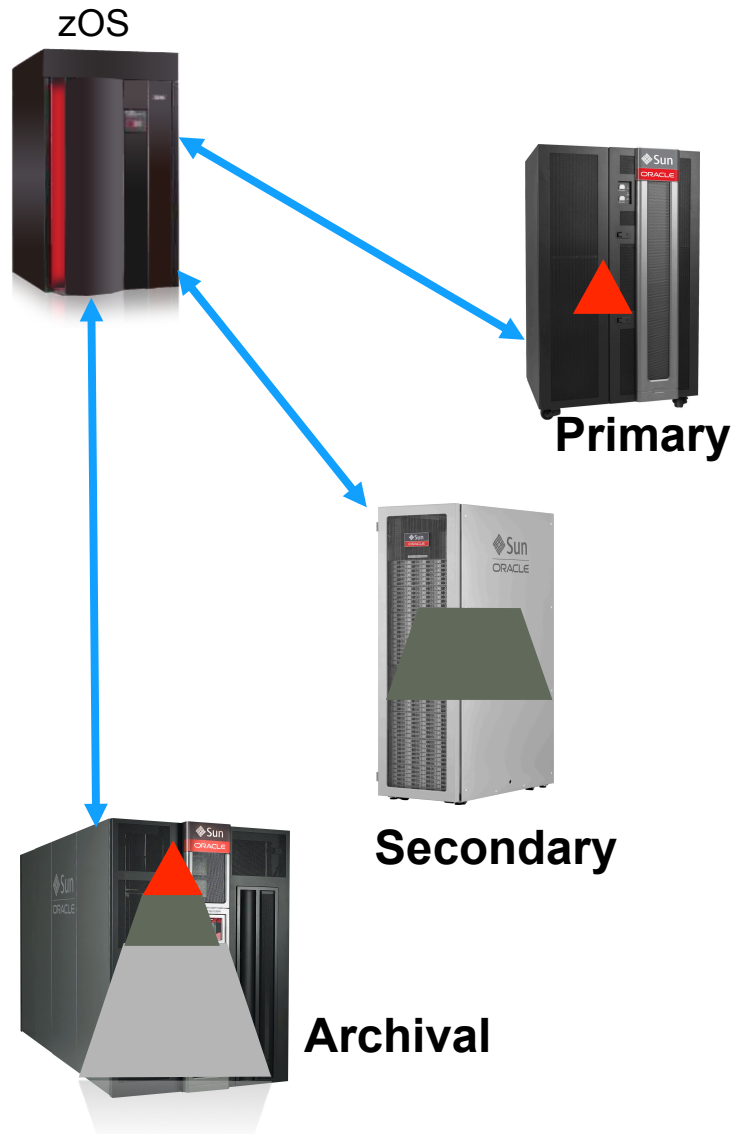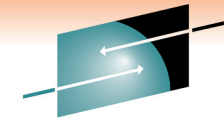
- Primary - Current
  - High performance disk
  - Instantaneous data access
- Secondary – Recent/Archival
  - Capacity disk or tape
- Spare capacity
  - Overflow to secondary storage
- Data protection
  - Secondary disk or tape
- Technology migration
  - Primary - every 4-5 years
  - Secondary – every 10 years

Multi-Tier Architecture

zOS

Primary

Secondary

Archival

- Primary – Current data
  - High performance disk
  - Instantaneous data access
- Secondary – Recent
  - Capacity disk
- Archival
  - Tape
- Spare capacity
  - Overflow to secondary or archive
- Data protection
  - Disk and/or tape
- Technology migration
  - Current data - every 4-5 years
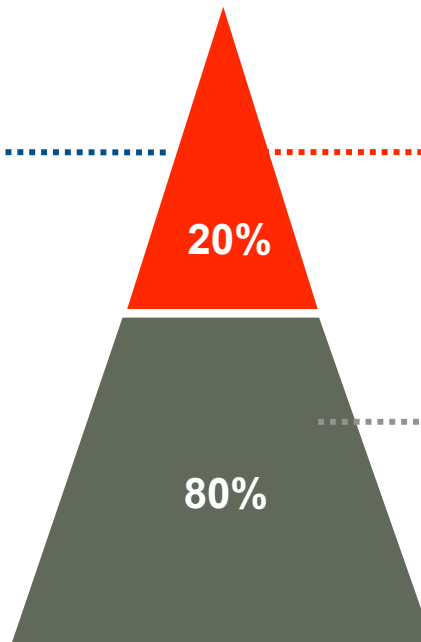 - Archival – every 10 years

Economies of Multitier Storage

Single Tier
of Disk Storage
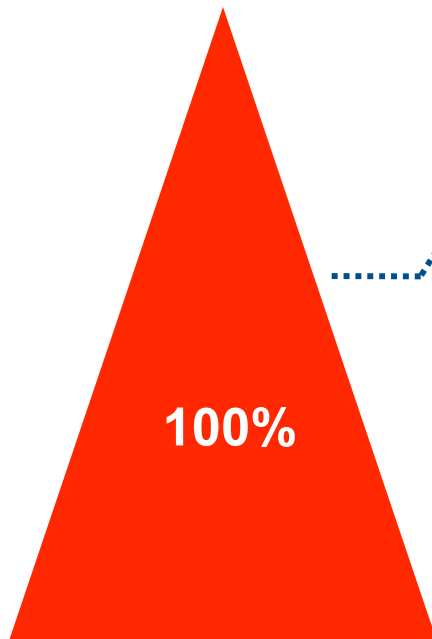
Two Tier
System

Multitier Tier
System

100%

20%

80%

5%

15%

80%
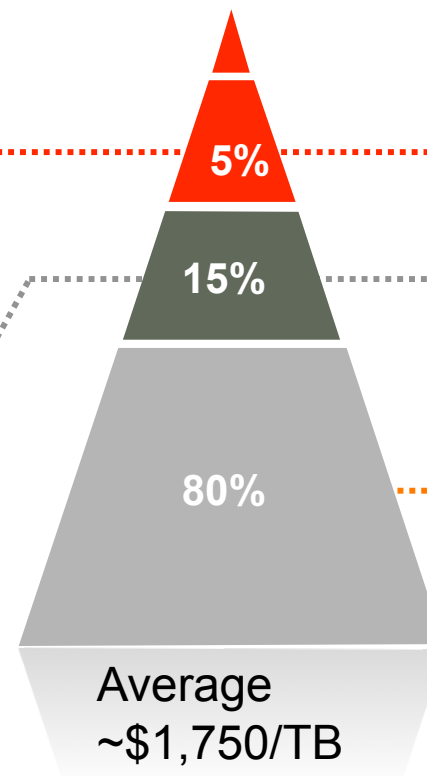
Performance Disk
$7 - $22/GB

Capacity Disk
$1 - $6/GB

Tape
$0.25 - $1/GB

Average
~$14,500/TB

Average
~$5,700/TB

Average
~$1,750/TB

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2011

Oracle Virtual Storage Manager & VLE - Enhanced Virtual Tape

zOS

FICON/ESCON

VSM5
(1-256)

TCP/IP

VLE
(1-4)

SL8500 or SL3000
Library (1-256)

T10000C drives
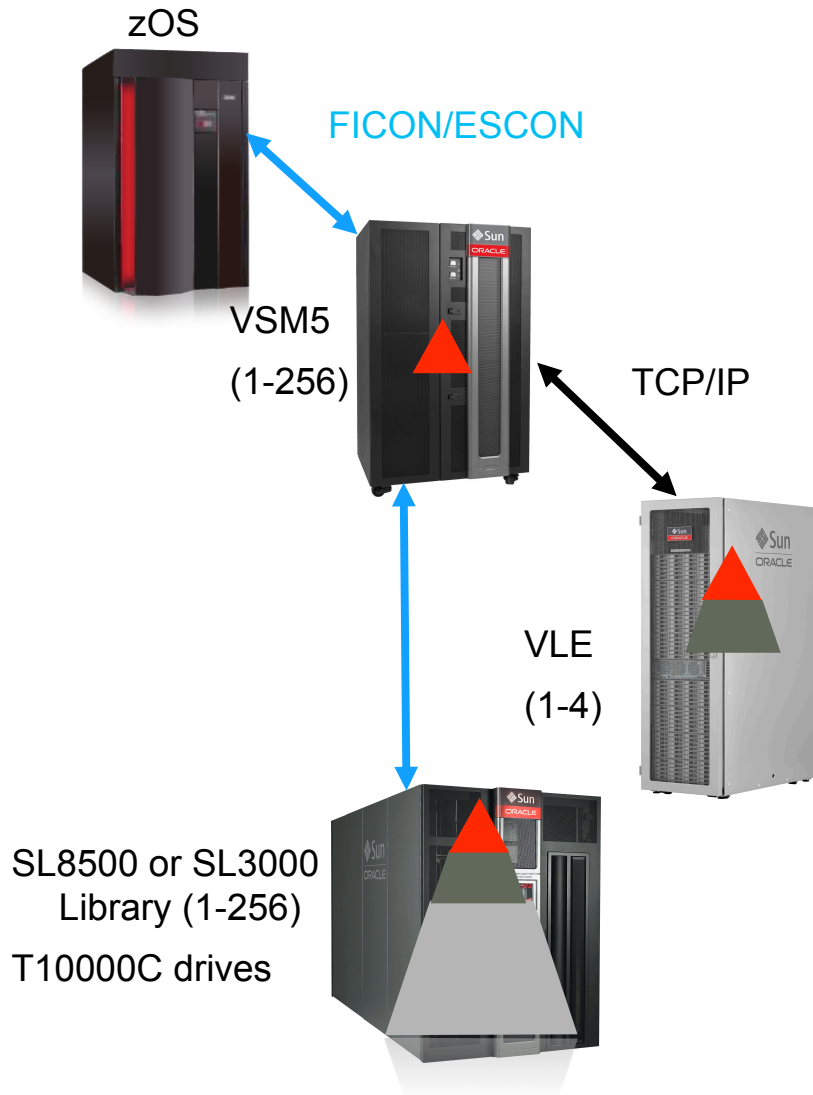
- Centralized management for all parts of storage system
  - Seamless integration
- Performance and cost of storage closely matched to type of data
  - High performance disk buffer – up to 25.6PB (90TB each)
  - High capacity disk virtual tape – up to 3.5PB
  - Ultra high capacity tape system – up to 512 EB with T10000C drive

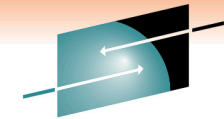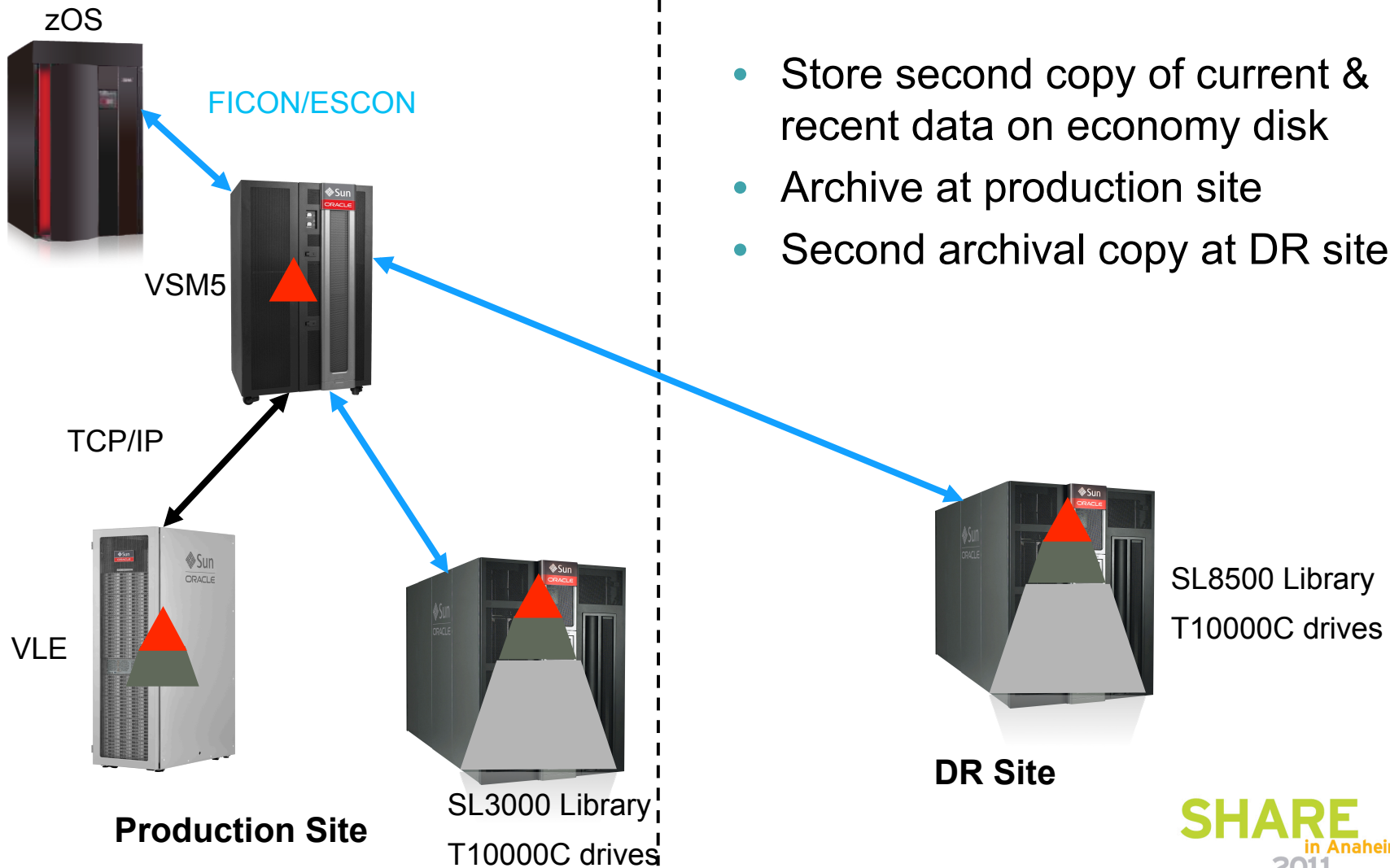# Oracle VSM/VLE – Data Protection Offsite Archival
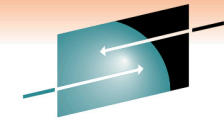
zOS

FICON/ESCON

VSM5

TCP/IP

VLE

Production Site
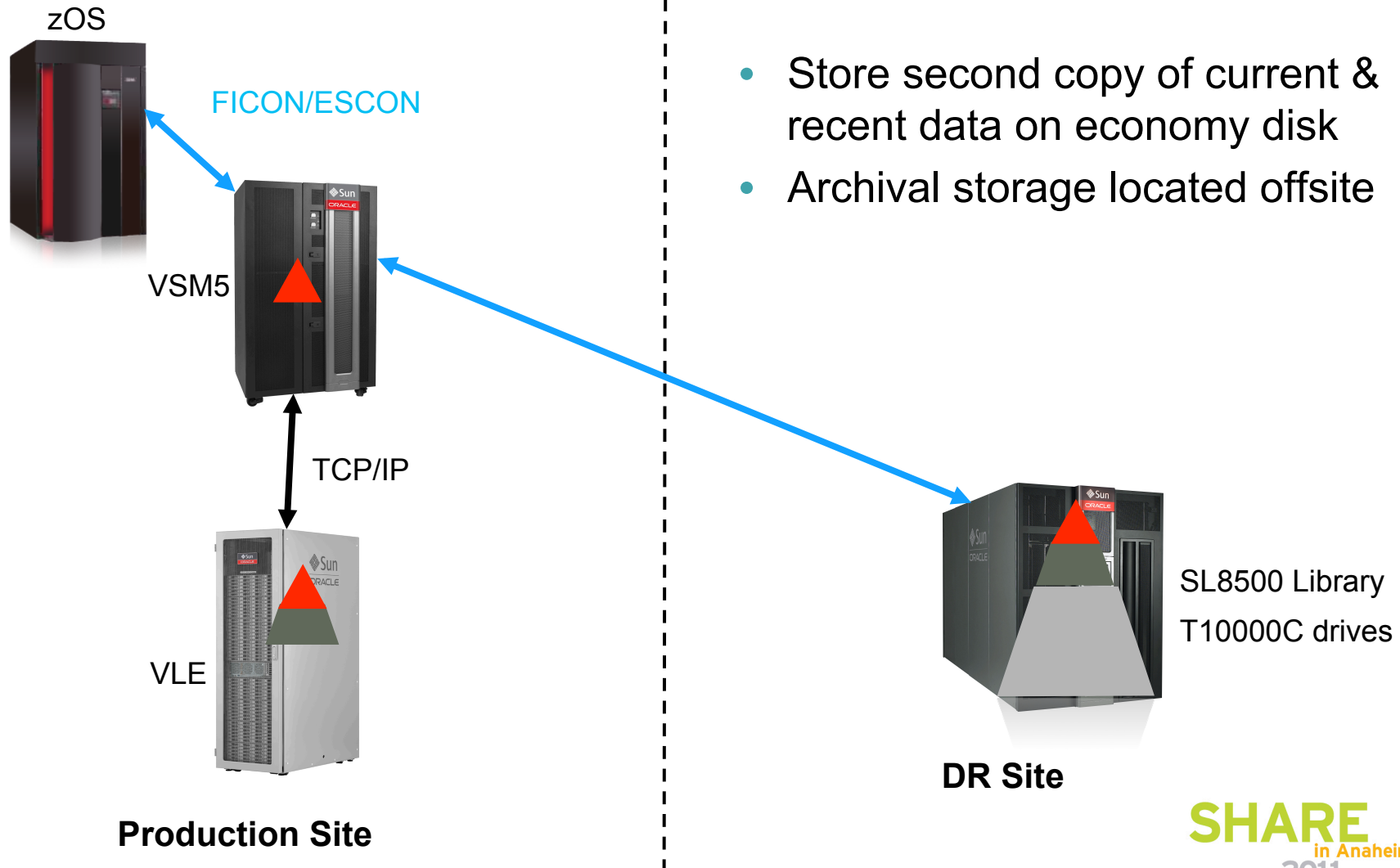
- Store second copy of current & recent data on economy disk
- Archival storage located offsite

SL8500 Library

T10000C drives

DR Site

Oracle VSM/VLE – Data Protection Local & Offsite Archival

zOS

FICON/ESCON

VSM5

TCP/IP

VLE

Production Site

SL3000 Library
T10000C drives

- Store second copy of current & recent data on economy disk
- Archive at production site
- Second archival copy at DR site

SL8500 Library
T10000C drives

DR Site

Oracle VSM/VLE – Data Protection Clustering

zOS

FICON/ESCON

VSM5

TCP/IP

- Full DR Testing & Recovery Support
- Cross-linked libraries – HA/Load balancing

VSM5

VLE

SL8500 Library

T10000C drives

SL3000 Library

T10000C drives

DR Site
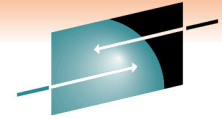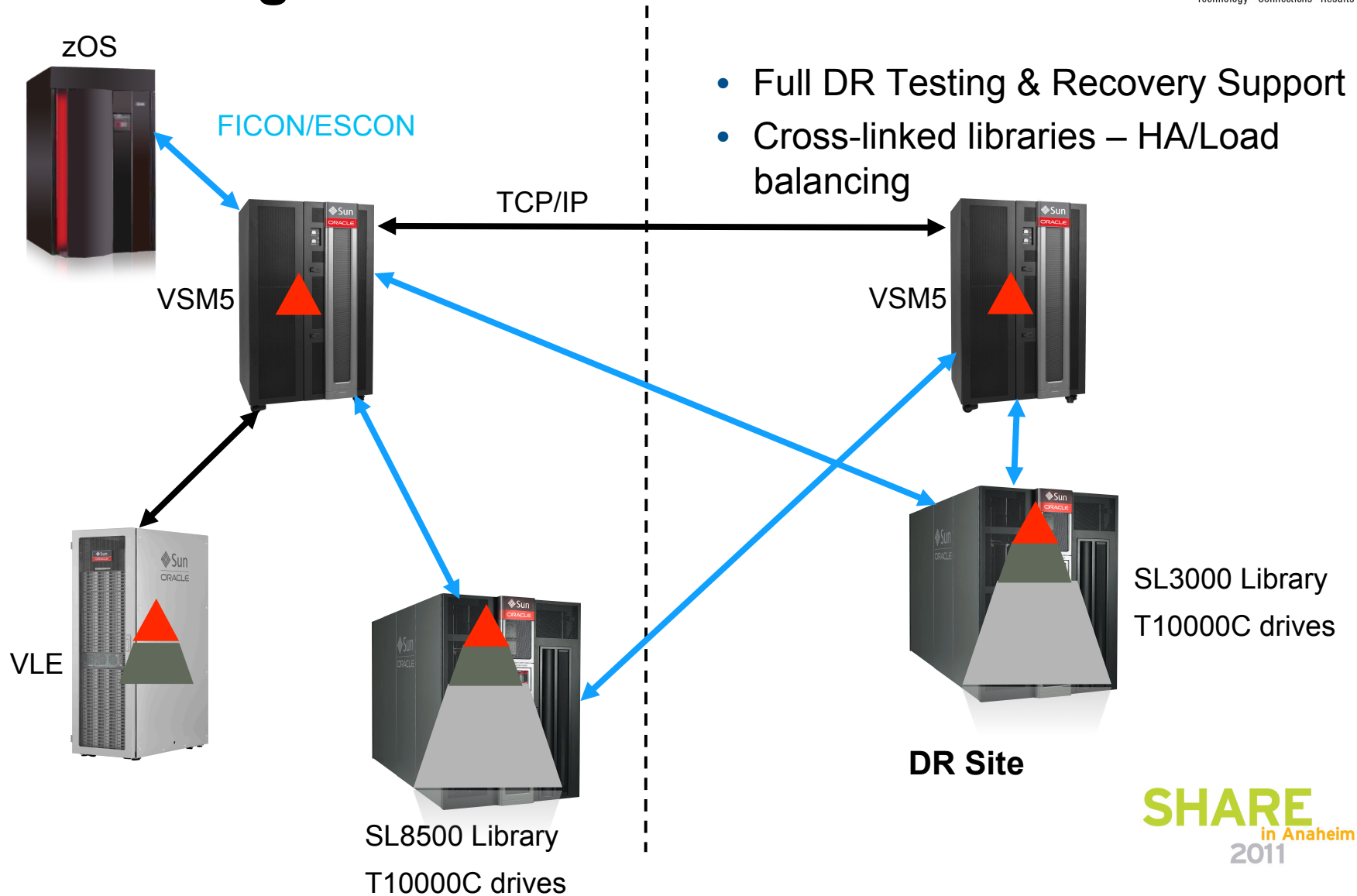
Oracle VSM/VLE – Data Protection
Cross Tapeplex Replication
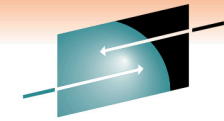
zOS

FICON/ESCON

VSM5

TCP/IP Replication

- Replication to multiple tapeplexes

Remote LPAR

VSM5

VLE

VLE

SL8500 or SL3000 Library

T10000C drives

SL3000 Library

T10000C drives

2nd, 3rd, 4th… Tapeplex
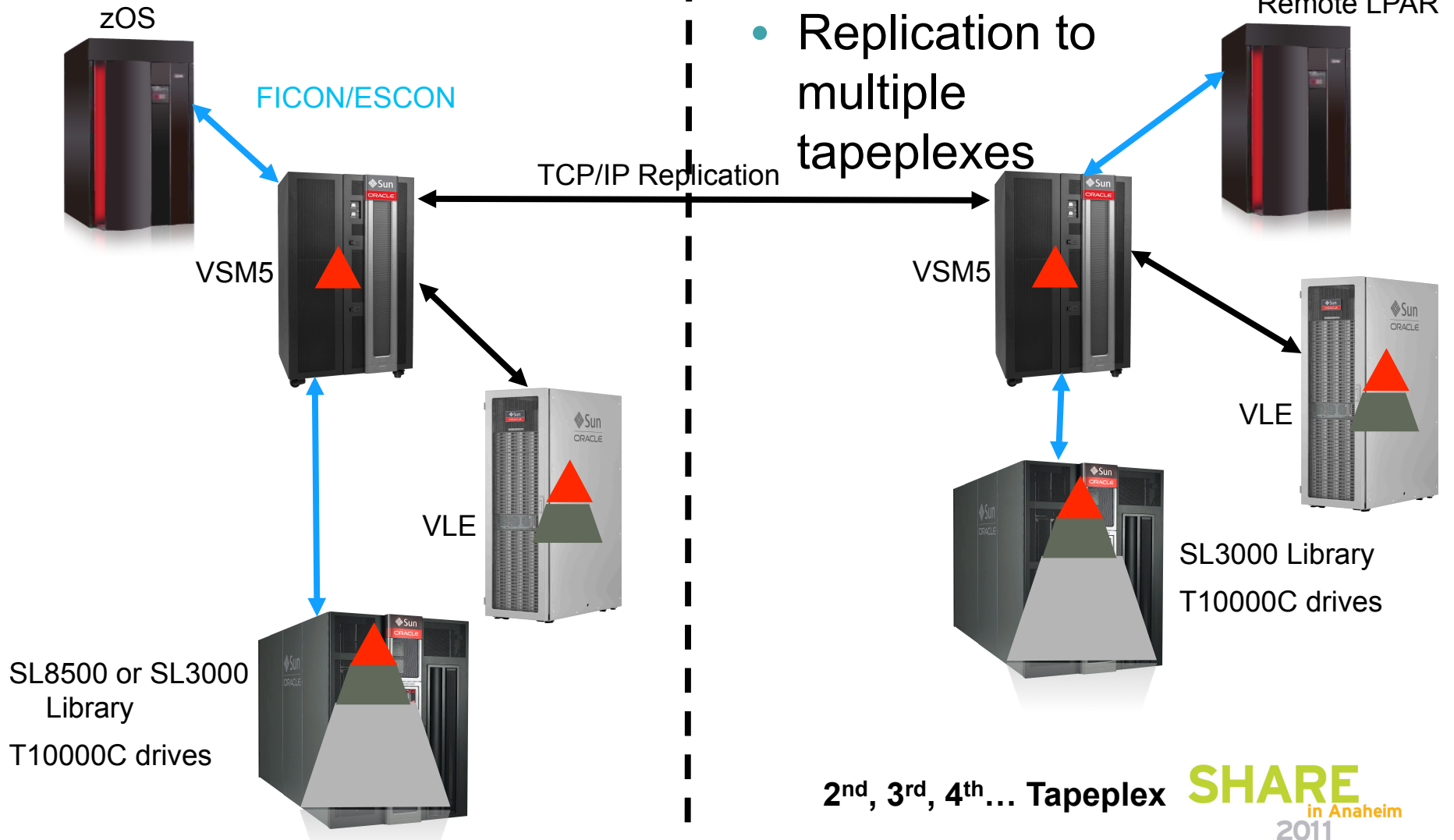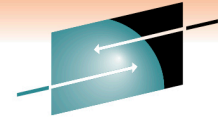
Enhanced Virtual Tape Benefits

- Leverage central, single point of management
- Significantly drive down the total cost of ownership
  - Acquisition – up to 10x
  - Power and cooling – up to 20x
  - Technology migration – up to 2x improvement
- Improve recent data access performance
- Optimization of physical tape
  - Leverage physical tape strengths for majority of data:
    - Long term data retention – 30+ years
    - Long technology migration cycle – 10+ years
    - Environmental – significant cooling/power reduction – up to 290x
  - More efficiently utilize physical tape
    - Reducing tape recall
    - Reduce tape space reclamation
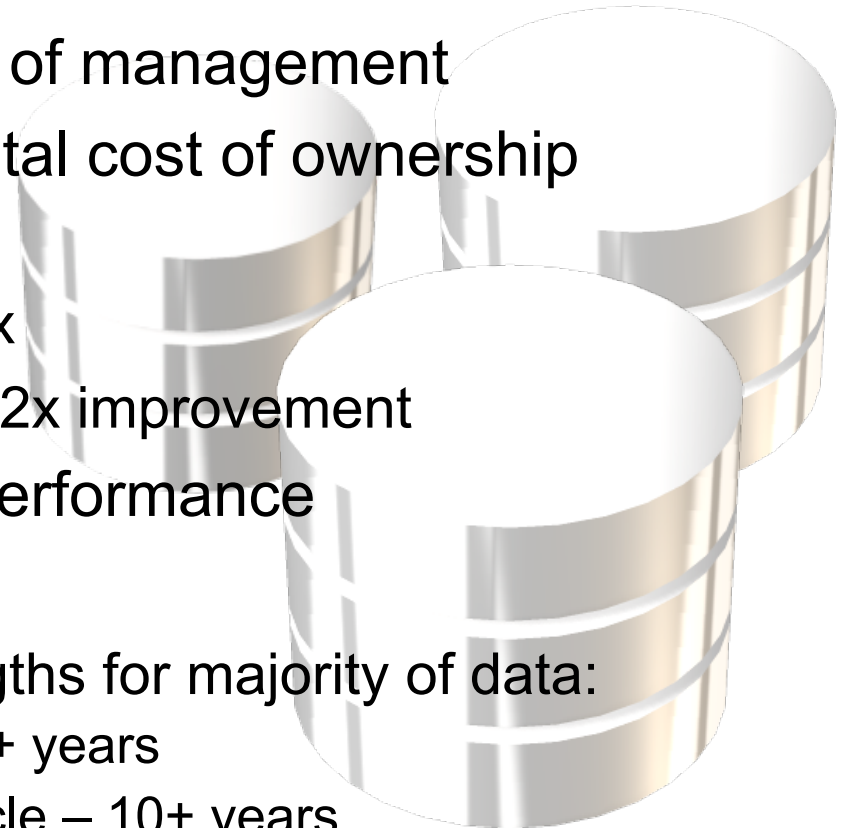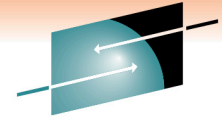
Summary

- Match data type and usage patterns closely to type of storage
- Consider "peripheral" factors
  - Expected "shelf life"
  - Technology migration
  - Cooling and power consumption
  - Footprint
- Questions?