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Paradigm Shifts in How Tape is Viewed and Being Used on the Mainframe

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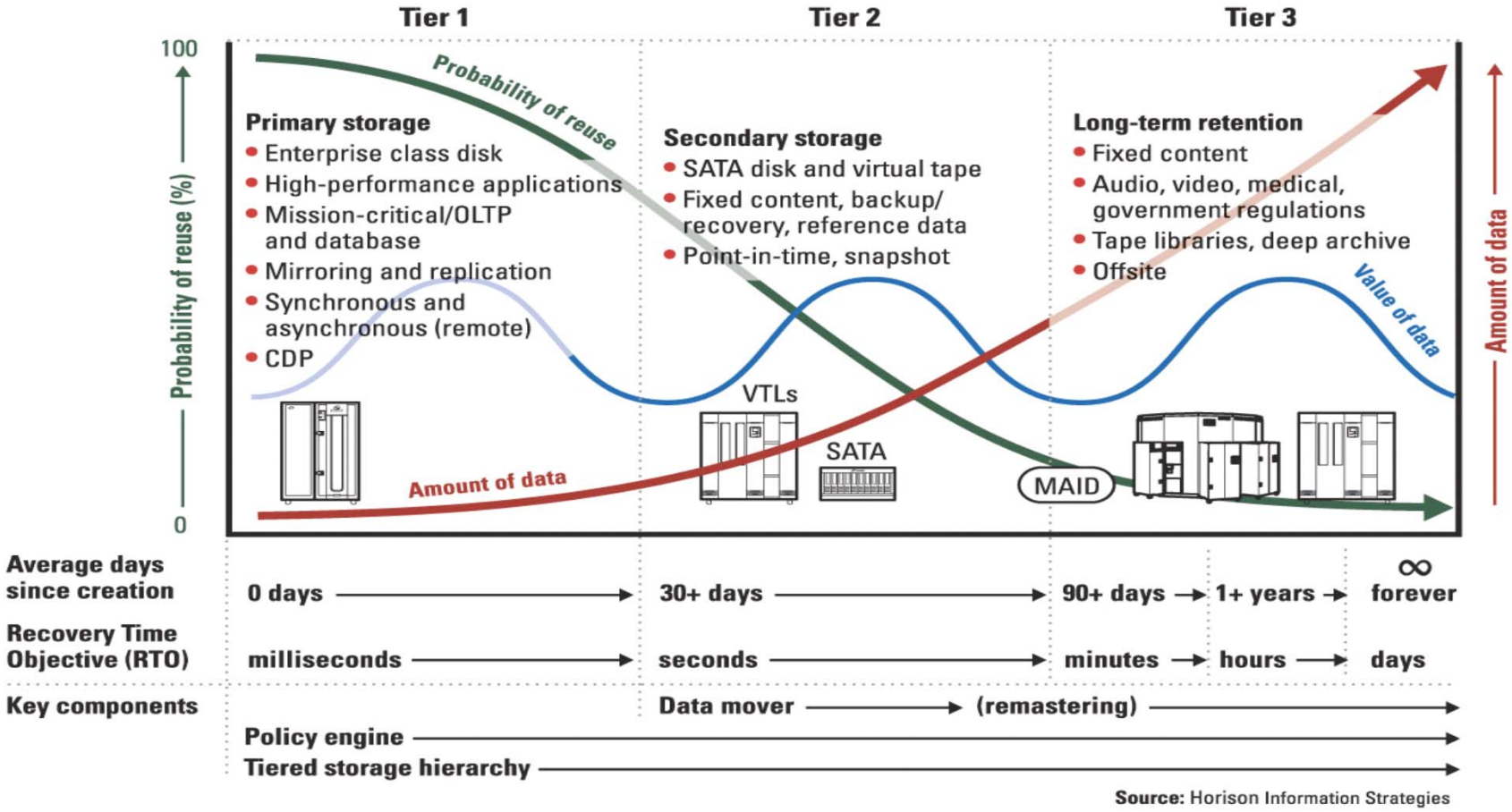
Conventional Outlook



Source: Horison Information Strategies

Mainframe Tape Use Cases

BACKUP

- 3390 DASD volume dumps
  - Fixed size volumes
  - 3, 9, 27, and 54 GB
- z/OS leading backup applications
  - FDR—Innovation Data Processing
  - DSS—IBM

SPACE MGMT

- IBM HSM
- CA-Disk (DMS/OS)
- FDR/ABR
- Migrates data between different storage classes
- Meant to conserve DASD usage

DATA ARCHIVE

- Fixed content data
  - Check images, etc.
  - Variable data
- z/OS leading archive applications
  - ASG-ViewDirect
  - IBM ImagePlus
  - IBM OnDemand
  - $AVRS

WORK TAPES

- Short retention—temporary tapes
- High read/write requirements
- Transaction log files
- SMF data files
- Large sequential files

Realities Affecting How Tape is Used

- Older data is not less valuable
- Access to older data can be critical to business operations
- 75~90 second access of older data is unacceptable
- Recoverability is just as important
- DR compliance is paramount
- Some data requires same recoverability as DASD
- Data Loss is not an option

Customer Workload Trends

BACKUP

- True synchronous replication
- Remote vaulting
- Faster backup (smaller windows)
- Tight SLAs
- Avoid data movement through mainframe
- Non-proprietary
- Data deduplication
- No data loss

SPACE MGMT

- Eliminate ML1 costs
- No data loss
- Eliminate host CPU cycles for compression
- ML2 with ML1 performance
- Consistent high performance on recalls

DATA ARCHIVE

- Unpredictable access patterns
- Performance oriented recalls
- Must be accessible (online) always
- Active archive versus inactive
- Need better integration with applications
- No data loss

WORK TAPES

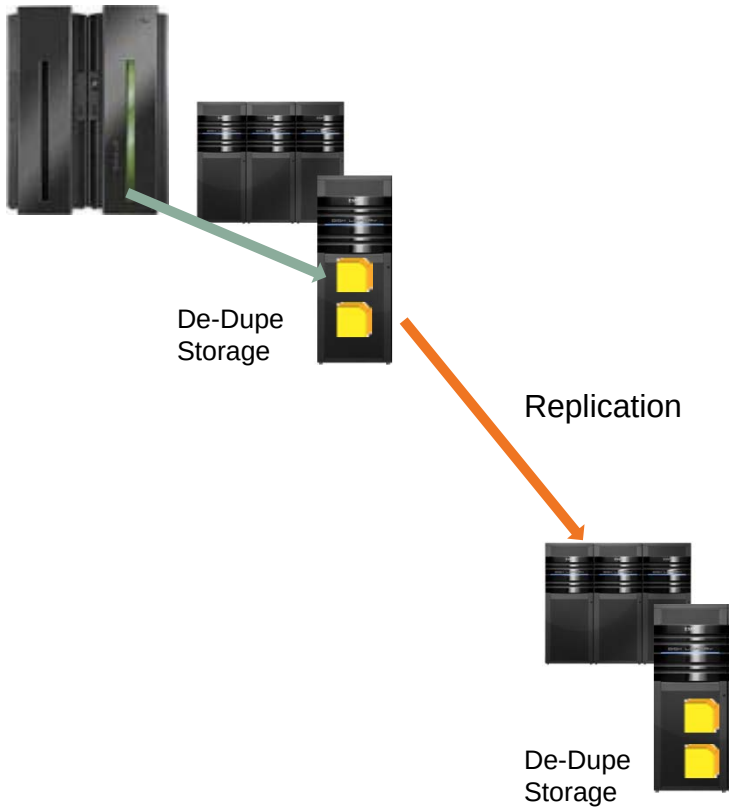
- Reduce CPU overhead
- Reduce elapsed time (e.g., sorts)
- Reduce batch windows
- Tight SLAs
- Log files key to recovery

Today's Disk Based Virtual Tape Can Help

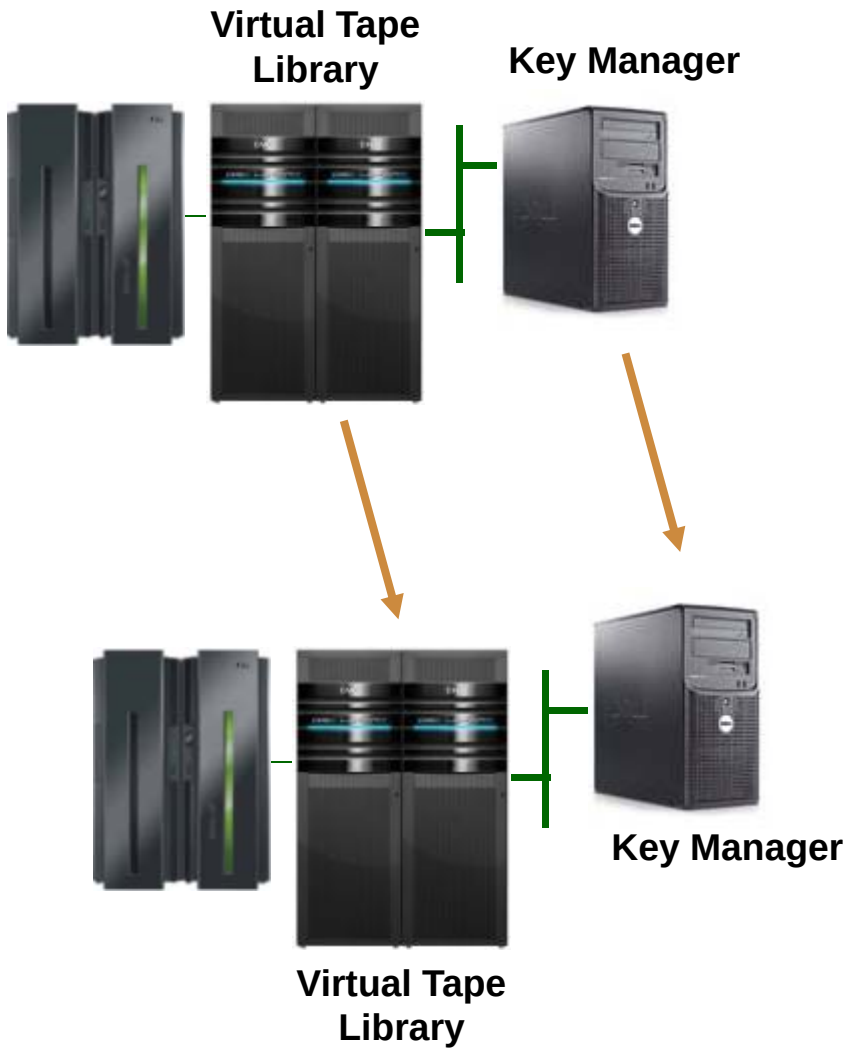
- Sub-Second Mount Times
- High-Performance I/O
- Deduplicating Storage
- Data Encryption at Rest
- Guaranteed Replication
- Synchronous Replication

Data Deduplication

- Virtual tape On disk is the mechanism for bringing data deduplication to the mainframe
- As the mainframe writes data to the virtual tape the storage performs deduplication on the data
- Reducing local and DR storage footprints
- Reduces the data sent across DR Links
- Repetitive backup data will achieve the highest benefit from this technology
  - Daily FDR / DSS Dumps of static DASD volumes



Data Encryption with Key Management



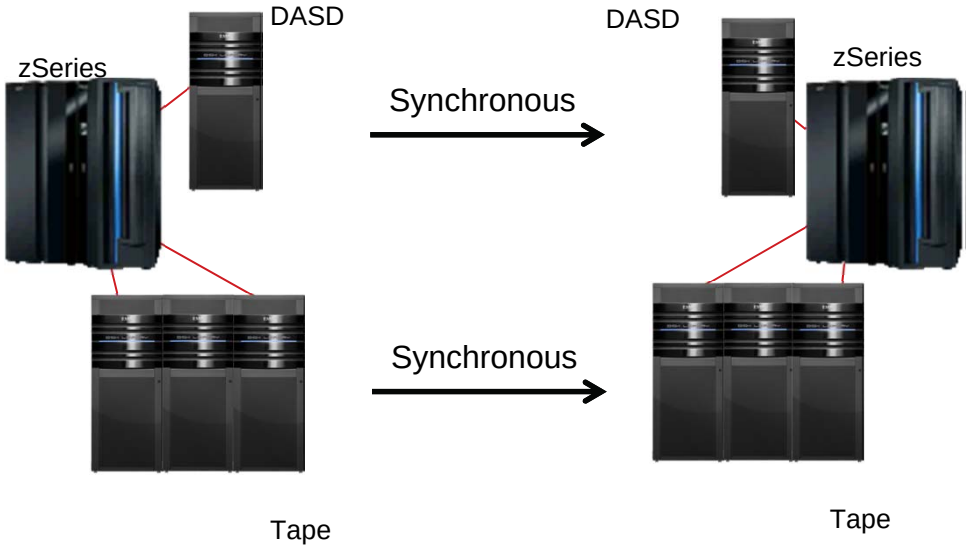
- Primary site drives encrypt data before writing to the library
- Data is encrypted at rest
- Data remains encrypted while in flight during replication
- Key manager can also be replicated
- Remote DR site has full access to VOLSERs in the library as long as the key manager can be accessed
- Allow for corporate wide key management (mainframe and open-systems)

Guaranteed Replication

- Guaranteed Replication (GR) Insures Individual VOLSERs Have Been Replicated to the DR Site
- Rewind Unload Requests are not acknowledged until the VOLSER has been replicated
- Providing superior recovery of data

Synchronous Replication

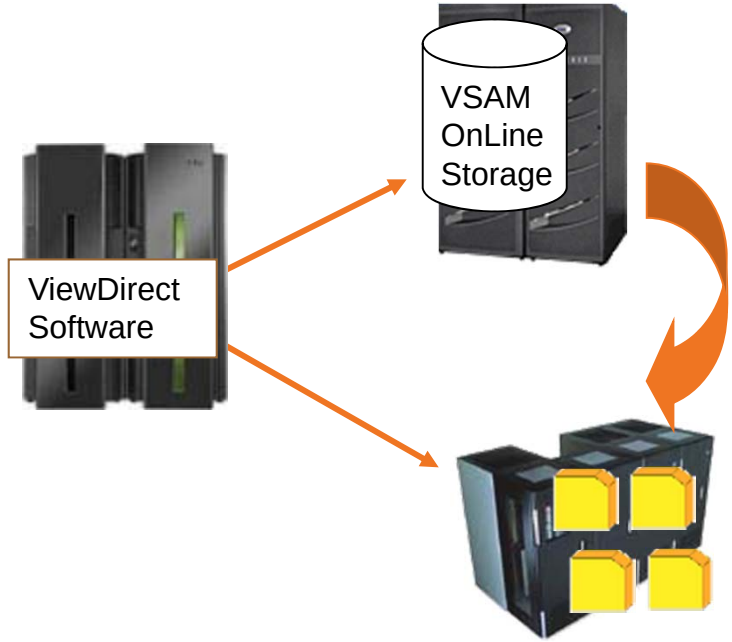
- In region DR sites rely on synchronous replication of DASD
- Historically tape has been asynchronously replicated
- Leading to inconsistency between tape and DASD at the DR Site
- Synchronous replication of tape can now insure tape and DASD are consistent
- Eliminating potential data loss for space management and data archive applications



Improved Application Processing - ViewDirect

Traditional ASG ViewDirect Operational Environment

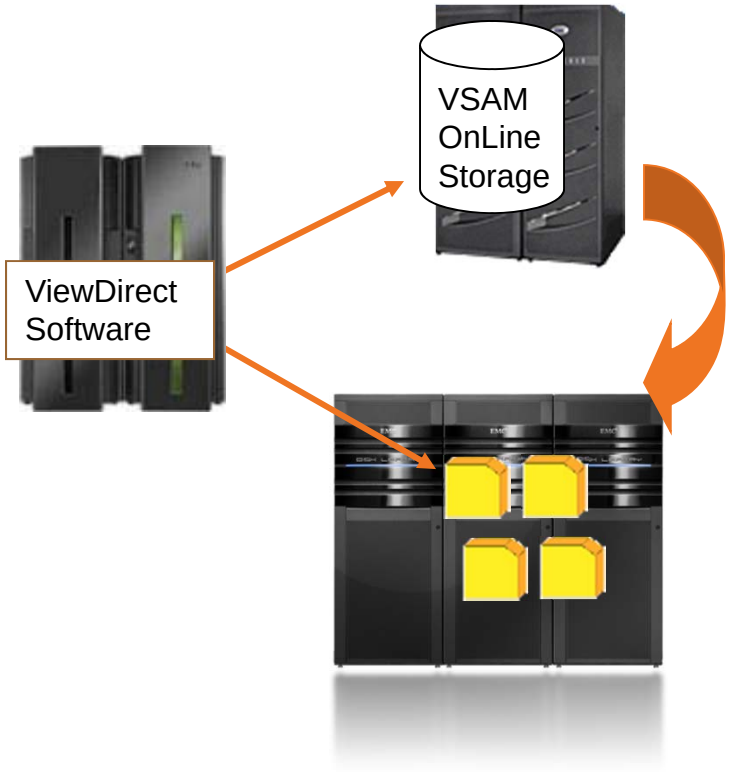
- Reports captured from systems output queues are stored online in VSAM datasets
- Daily migration copies newly captured reports to tape
- Data is initially left on disk to support online query from ViewDirect
- Disk resident data provides sub-second response to ViewDirect
- Data is eventually deleted from disk to reduce on-line storage requirements
- Once it is deleted queries of “offline” tape data can take 45 seconds or more from an automated tape silo



Improved Application Processing - ViewDirect

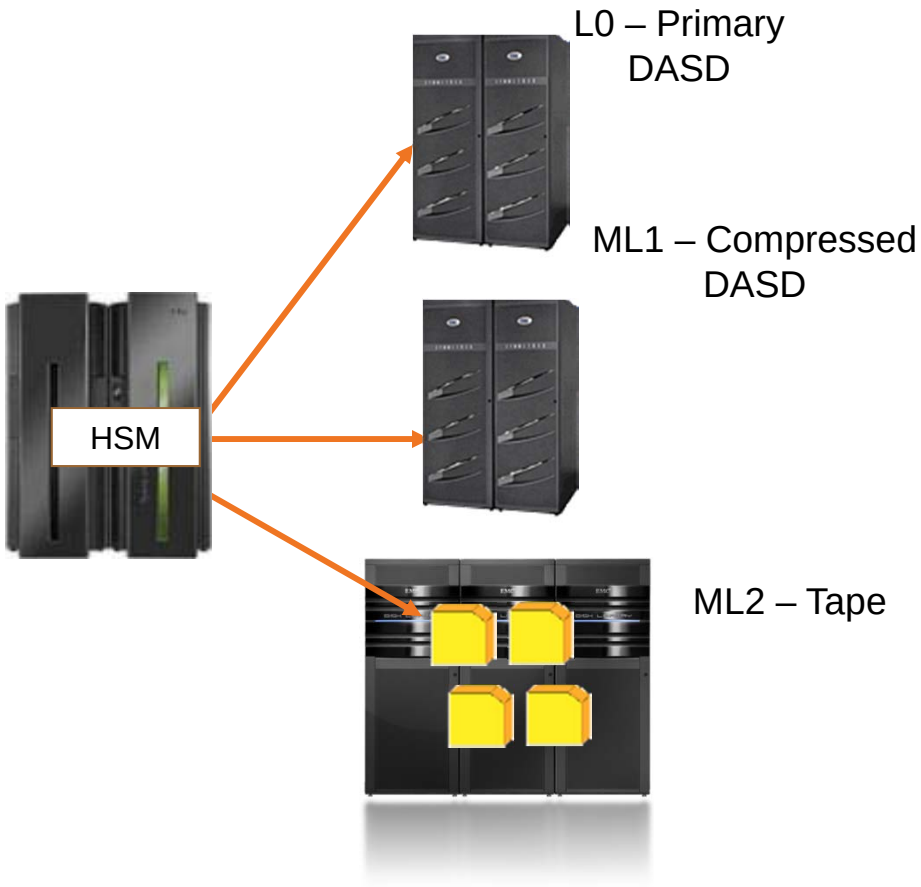
ASG ViewDirect Operational Environment with Virtual Tape on Disk

- Using a virtual tape on disk solution provides significant cost savings and benefit
  - Access to reports can be accomplished as quickly as from DASD
  - Customer service levels remain constant
  - Online data can be deleted as soon as migration is complete
  - Allowing DASD to be repurposed to other applications



Improved Application Processing - HSM

- ML1
  - Fast access times on virtual tape on disk can reduce or eliminate the need for ML1 storage
- ML2
  - Virtual tape improves HSM ML2 recalls by eliminating drive contention and arm movement
  - But placing ML2 on traditional virtual tape systems results in the need to perform both logical (HSM) and physical (VTS) volume recycles
  - Virtual tape on disk can provide sub-second recall capability and eliminate the need for physical recycles



Software Leverages Capabilities of the Hardware

- Recognizing the capabilities of newer disk-based VTLs
- Providing
  - ✓ Improved Performance
  - ✓ Migration Services
  - ✓ High-Availability
  - ✓ Management Reporting

Summary

- Mainframe tape is NOT JUST Backup!
- Tape systems must satisfy a variety of requirements
  - Performance
  - Increasing Capacities
  - High-Availability
  - Quick Recovery
  - Data Consistency with DASD
- Today's disk-based Virtual Tape Libraries (VTLs) can help
  - Quick mounts and random data access
  - Guaranteed Replication
  - Data Encryption at Rest
  - Data Deduplication
  - Multi-Site and/or Synchronous Replication
  - Software that Leverages the hardware

Thank You!