ADVANCED TECHNOLOGY GROUP (ATG)

Accelerate with ATG Webinar:
IBM TS7700 Tape Solution Overview 101

Presenter: Bob Sommer, IBM Certified Tape Specialist

Panelists: Ben Smith, Toni Alexander, Sandy Browning, Toy Phoubanhdyt

Accelerate with ATG Technical Webinar Series

Advanced Technology Group experts cover a variety of technical topics.

Audience: Clients who have or are considering acquiring IBM Storage solutions. Business Partners and IBMers are also welcome.

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- IBM FlashSystem and Storage Virtualize
- IBM Cloud Object Storage

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- IBM Storage Scale and Storage Scale System GUI
- IBM Storage Virtualize Test Drive
- IBM DS8900F Storage Management Test Drive
- Managing Copy Services on the DS8000 Using IBM Copy Services Manager Test Drive
- IBM DS8900F Safeguarded Copy (SGC) Test Drive
- IBM Cloud Object Storage Test Drive - (Appliance based)
- IBM Cloud Object Storage Test Drive - (VMware based)
- IBM Storage Protect Live Test Drive
- IBM Storage Ceph Test Drive - (VMware based)

Please reach out to your IBM Representative or Business Partner for more information.

IMPORTANT The ATG team serves clients and Business Partners in the Americas, concentrating on North America.

Save the date

Storage @ IBM TechXchange Conference 2024

October 21-24, 2024
Mandalay Bay | Las Vegas
#IBMTechXchange

Key Learnings

– Practical how-to advice
– Patterns and best practices
– Success stories, IBM PoV, proven techniques

Featured Products

IBM Storage Defender   IBM Storage Fusion

IBM Storage Scale + IBM Storage Ceph   IBM Tape + IBM SAN

IBM Storage FlashSystem + IBM Storage DS8000

Collaborate. Learn. Play.

Community

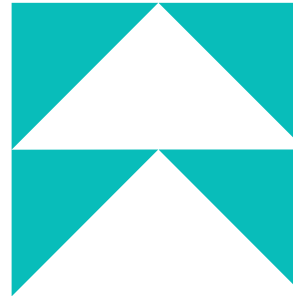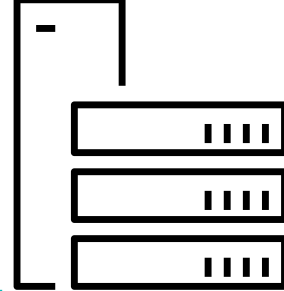IBM Champions

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ADVANCED TECHNOLOGY GROUP (ATG)

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Please take a moment to share your feedback with our team!

You can access this 6-question survey via Menti.com with code 1708 6924 or

Direct link https://www.menti.com/alwhyze7z1gz

Or

QR Code

Join at menti.com | use code 1708 6924   Mentimeter

If you had to scrap all social media except one, which would you keep?
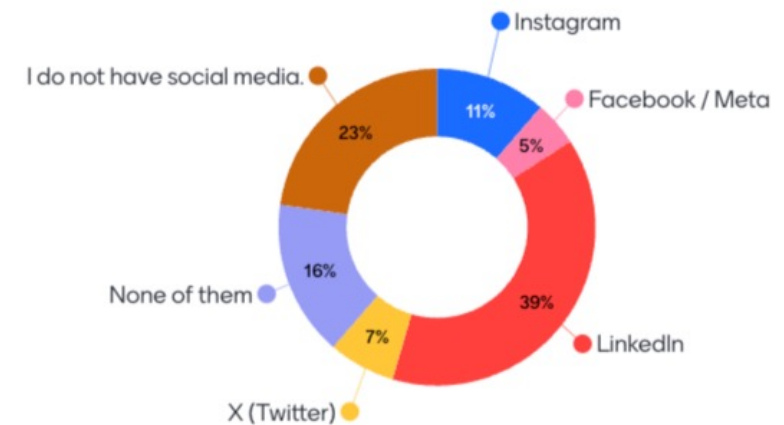
- Instagram 11%
- Facebook / Meta 5%
- LinkedIn 39%
- X (Twitter) 7%
- None of them 16%
- I do not have social media. 23%

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IBM TS7700 Tape Solution Overview 101

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Agenda

- **IBM TS7700 Grid Technology Overview**
- **IBM TS7700 Virtualization Engine Overview**
- **IBM TS7700 Advanced Functions**
- IBM TS4500 Tape Library Overview
- IBM TS1100 Tape Drive Overview
- DFSMS/MVS Environment
- Pre-installation Planning
- Implementation
- Miscellaneous
- Commands, Publications and Documents
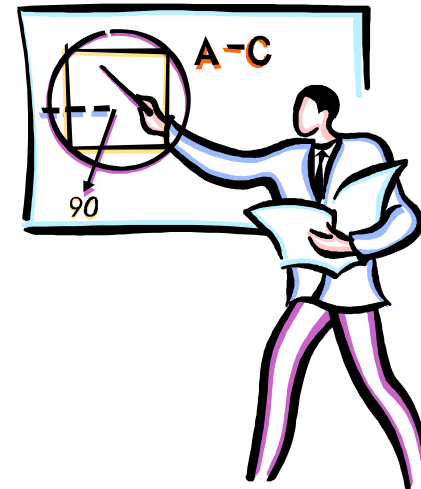
TS7700 Terminology

- **TS7700: TS7760 or TS7770 Virtualization Engine**
  - **Older out of service – TS7720, TS7740**
- **TS7770D: TS7770 disk cache only**
- **TS7770T: TS7770 tape attached**
- **Cache: disk cache or Tape Volume Cache (TVC)**
- **Cluster/Node/Distributed library: a TS7700 Virtualization Engine**
- **Library/Grid/Composite library: a collection of one or more clusters**
- **Hybrid: a collection of TS7770, TS7760, TS7720, TS7740 in a grid configuration**
- **LVOL: logical volume, logical tape volume, or virtual volume**
- **PVOL: physical stacked volume or back-end tape volume**
- **Copy Consistency Point (CCP): replication policy**

IBM TS7700 IBM Z Virtual Tape
Leveraging Grid as Cloud Tape Storage for IBM Z

Grid Cloud

8-way consisting of any generation of TS7700 – throughput 100MBS to 4000 MBS
• Synchronous and asynchronous replication
• AES256 Encryption at rest and in flight
• Tight integration with IBM Z and DFSMS policy managed
• Optional Cloud Storage Tier to object storage
• Optional DS8000 Offload target for DS8000 TCT
• Optional integration with physical tape

IBM Z   DS8K   DS8K   IBM Z
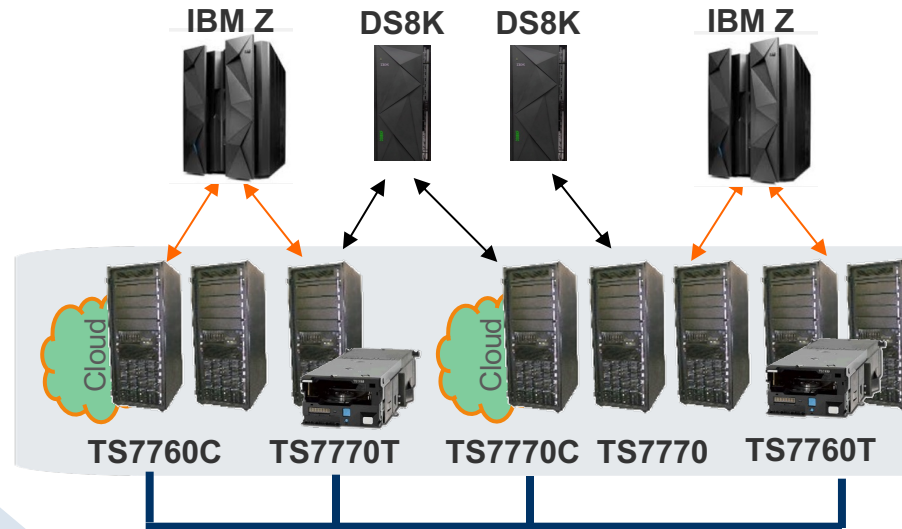
Cumulative 16Gb FICON throughput up to 4.8GB/s * 8

TS7760C   TS7770T   TS7770C   TS7770   TS7760T

IBM Z hosts view up to 496 * 8 equivalent devices

Grid Cloud

Grid access to all data independent of where it exists

Replication

IBM Cloud Object Storage   **RStor**   **amazon** web services™ **S3**

IBM TS7700

- ## z/OS Synergy
  - No additional z/OS software required to support TS7700
  - Full access to all IBM propriety tape library command sets
    - Host sees entire TS7700 Grid versus a series of independent MTLs
    - DFSMS OAM Management of TS7700 clusters
    - TMS Integration, including house keeping
    - Device/Scratch Allocation Assist
    - 3,968 shared devices per composite library
    - Numerous exclusive functions
  - Full DFSMS volume granular policy management
  - Replication, LWORM, Cloud, Physical Tape Usage and many other features.
  - IBM Z intelligent, allowing efficiencies such as impressive zero RPO synchronous copy speeds.
  - User commands (i.e. LI REQ) and tools support.
  - Can partition with zVM, zVSE, zTPF
  - End to end FICON CRC protection
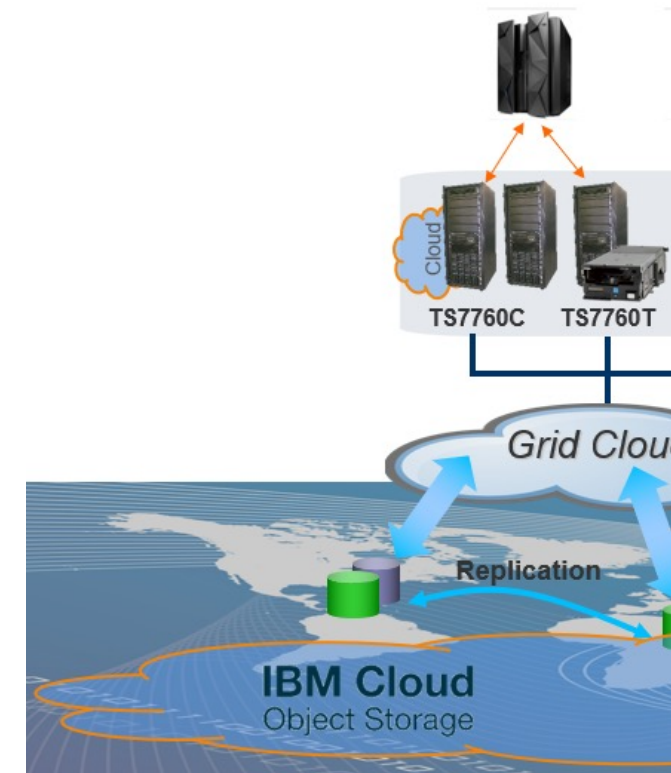
Virtual Tape Concept

- **Virtual Tape Drives**
  - **Appear as multiple 3490E tape drive**
  - **Can be shared / partitioned like real tape drives**
  - **Require fewer and can eliminate real tape drives**
- **Tape Volume Caching**
  - **Designed to eliminate all or many physical tape delays**
  - **Supports read hits from cache / recalls from cartridge**
  - **Supports 100 % cache write hits**
  - **Can be configured to support 100% cache read hits**
- **Optional Volume Stacking to Physical Tape**
  - **Designed to fully utilize cartridge and library capacity**
  - **Stacks multiple logical volumes onto stacked cartridges**
  - **Supports TS1160, TS1150 – 20TB, 10TB uncompressed**
    - **Out of service TS1140, TS1130, TS1120**

180   181   19F

Virtual Drive 1   Virtual Drive 2   Virtual Drive n

Tape Volume Cache

Virtual Volume 1
Virtual Volume 2
Virtual Volume n

Optional Tape Stacking

Logical Volume 1

Logical Volume n

TS1160 up to 60TB capacity[1]
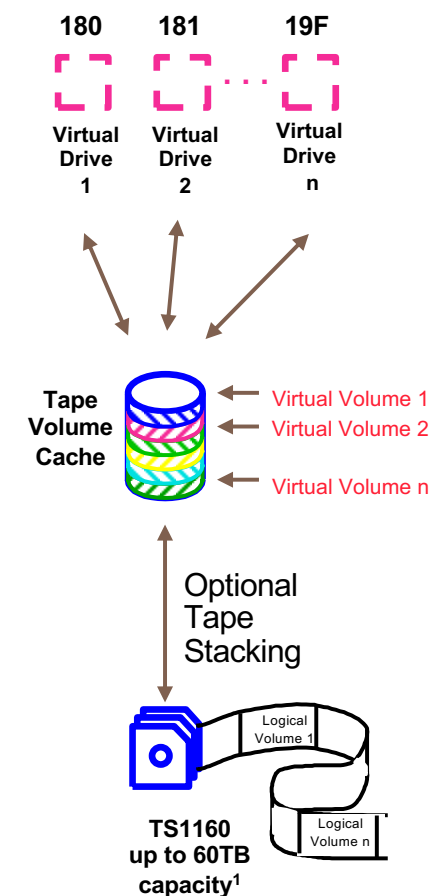
[1]assuming 3:1 compression

TS7770 Overview

- Built on the **Power9** platform (TS7770 VED)
  - Two 10 core, 3.8GHz processors
  - 64GB and 128GB DDR4 Memory
  - **16Gb FICON** (up to 4 adapters, 2 ports per adapter, 512 paths per port)
  - 1Gb Copper and 10Gb LW Grid Network (up to 4 ports total)
  - 16Gb FC attachment to disk cache and tape drives (up to 16 ports)
  - 3.8TB SSD or SAS for pSeries storage
  - **Common DS8000 pSeries hardware, I/O bays and adapters**
  - Single phase power (30AMP), Three Phase 400V support via iRPQ
  - Primary ethernet and FC adapters integrated into pSeries slots

POWER9

TS7770

POWER9

TS7700 Grid Solutions

WAN interconnected TS7700s form a Grid configuration
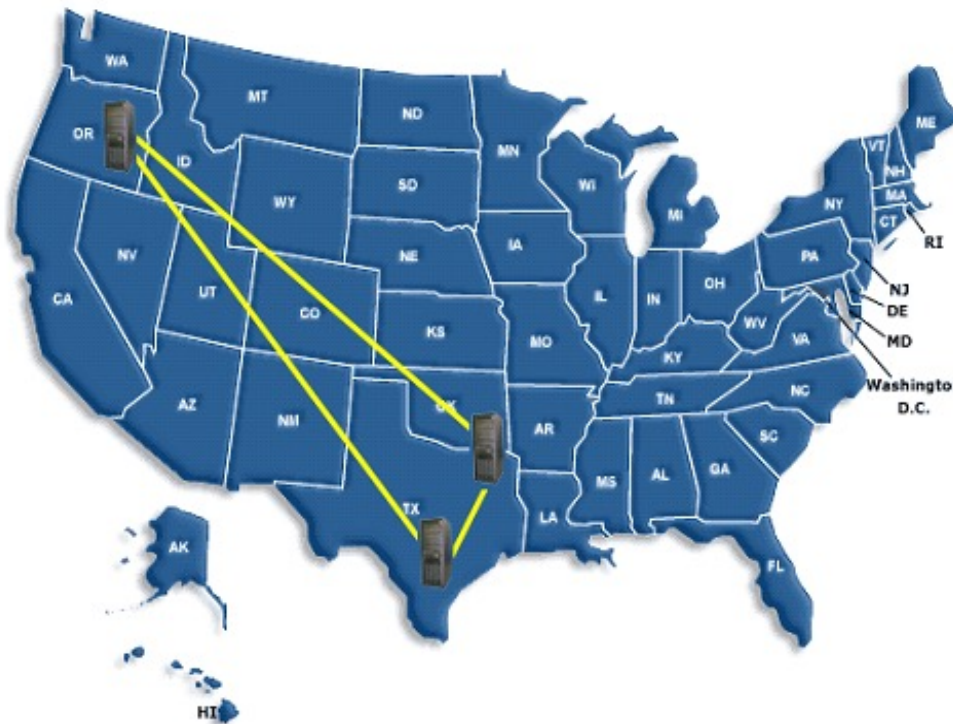
Optimized for Recoverability and Automatic Failback

- **Couples two or more TS7700 Clusters together to form a Grid configuration**
  - Up to 8 TS7700 Clusters **(6 max for production)**
- **I/P based replication**
  - Standard TCP/IP
- **Hosts attach directly to some or all clusters**
- **Policy-based replication management**
  - Asynchronous
  - Synchronous at rewind and unload
  - Synchronous (duplexing)
- **Data written to one is transparently replicated to the other**
  - Policy control for location of copies and how copies are made
- **A logical tape volume can be accessed through any cluster**
- **Can be configured for disaster recovery and/or higher availability environments**
- **Resilient recovery**
  - Requires very minimal human intervention
  - No concepts of primary or secondary clusters

TS7700 Grid – more than just replication

▪ **All clusters are equal players – Cloud Storage, before it was a buzz word!**
- **No concept of primary, secondary, or standby nodes**
- **Each cluster's devices within an entire grid always have access to all volumes**
- **System z hosts views the entire grid as one large composite library with up 3,968 common devices**
- **Volume data is accessible from any cluster's devices independent of where copies exist**
  - **User intervention or host knowledge of where data exists is not required**
  - **If a local copy isn't present, IP is used as a channel extender to cluster containing a valid copy**

▪ **Post outage**
- **All updates are automatically reconciled when cluster(s) return**
- **Failback can occur immediately**

TS7700 Cluster

TS7700 Clusters

TS7700 Cluster

Host(s)

TS7700 Cluster

LAN/WAN

Host(s)

TS7700 Cluster

Composite Library
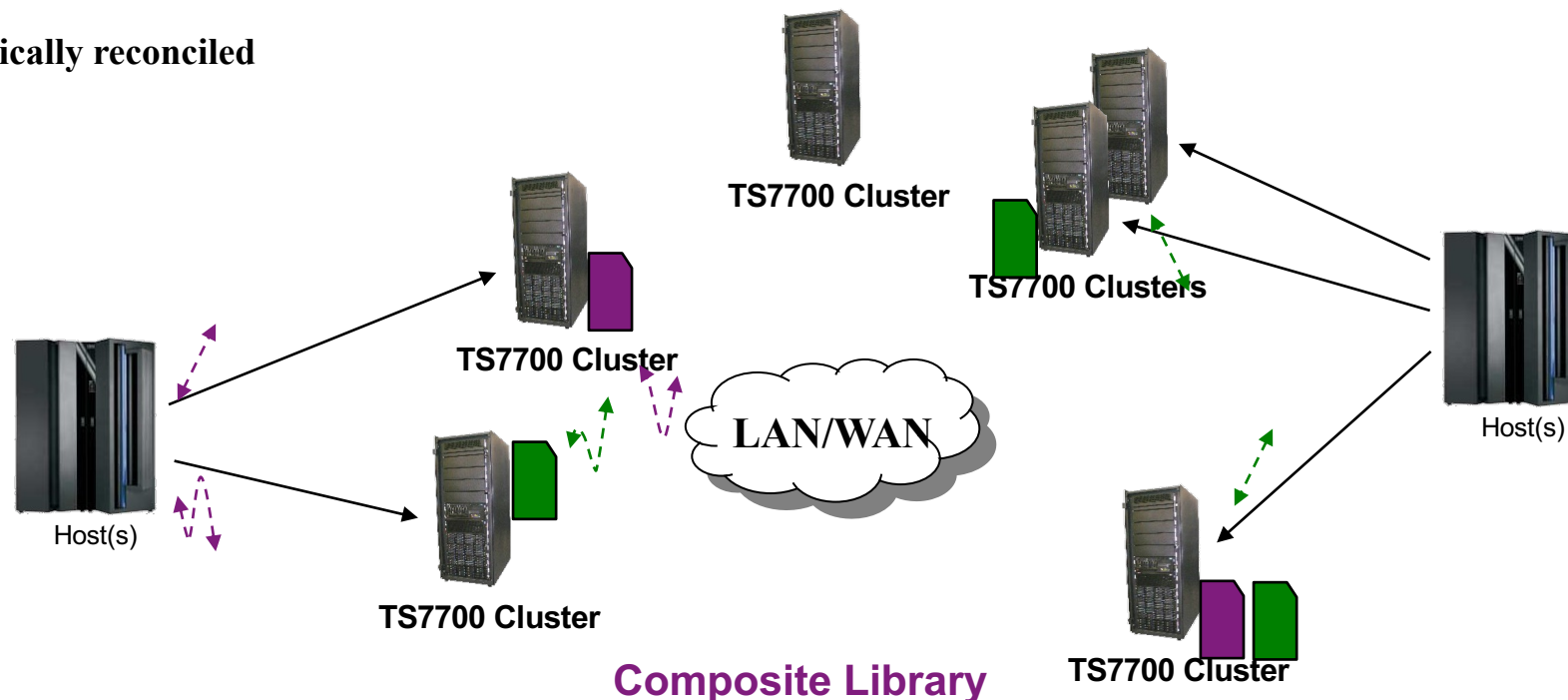
How available is your entire solution?

- **If a single component is lost, can you afford a host plex failover?**
  - **With dual clusters per site, a host plex failover is only required if both clusters are unavailable.**
  - **Operations automatically continue to remaining cluster(s).**
- **If a host plex failover is required, that's easy too!**
  - **Additional clusters in standby site are fully operational at all times.**
  - **Simply vary on devices and go.**
    - **No manual intervention is required.**
    - **Yes, it's that easy.**
  - **If channels interconnect the two sites, workload can be run concurrently, or optionally in the event if a double cluster outage.**
    - **Again, vary on devices and go.**
- **Replicating everywhere isn't required**
  - **Unlike disk based replication models, the TS7700 can access any volume from within any cluster's disk cache. Data looks like a tape at all times. This level of access minimizes the number of replication points in a configuration reducing capacity requirements while not reducing enterprise availability.**

Standby Host

TS7700 Clusters

WAN

Optional Channel

TS7700 Clusters

Production Host(s)

Metro Region
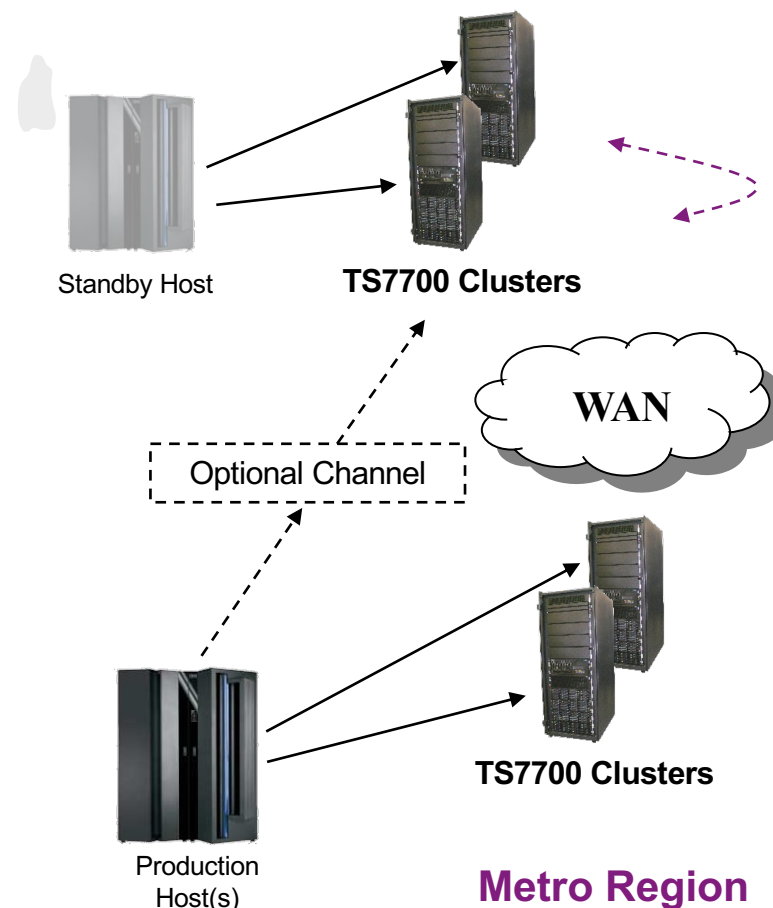
Does each site play a role in production and DR?

▪Introduce 3rd distant site for DR.
  In the event both production environments are lost, recovery can
  occur at a remote DR location.
  Once the System z environment is recovered, continuing operation
  is as easy as varying on devices.
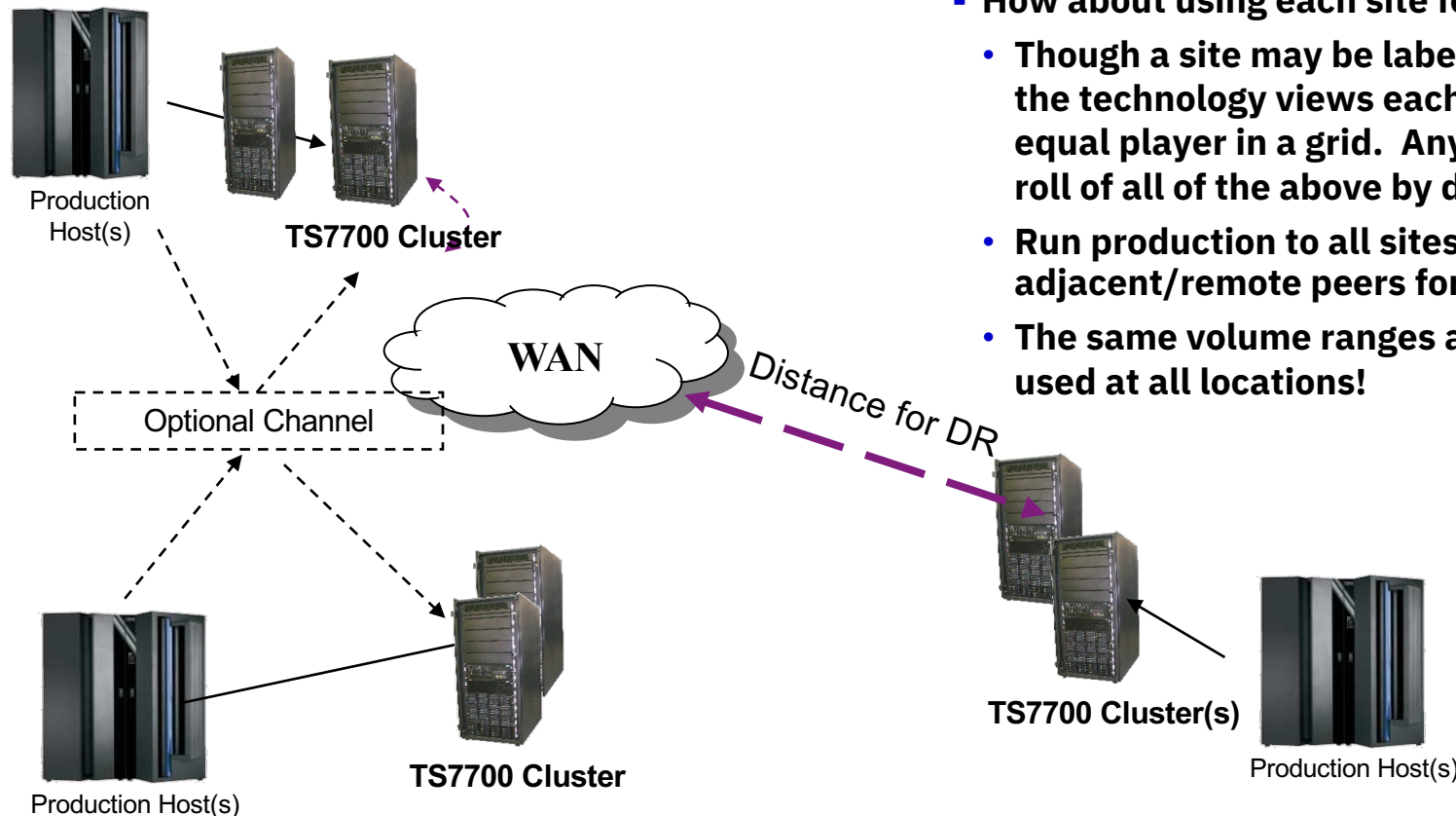
▪ **How about using each site for dual purpose? No problem!**
  • **Though a site may be labeled as an HA pair or DR site, the technology views each site as an equal player in a grid. Any site can concurrently play the roll of all of the above by design.**
  • **Run production to all sites at the same time and use adjacent/remote peers for HA and/or DR.**
  • **The same volume ranges and scratch pools can even be used at all locations!**

Production Host(s)

TS7700 Cluster

WAN

Distance for DR

Optional Channel

TS7700 Cluster

Production Host(s)

TS7700 Cluster(s)

Production Host(s)

TS7700 Grid – Volume Granular Replication

▪**DFSMS policy managed replication**
- **Each volume, independent of where it is created, can have one to eight copies within a grid.**
- **Replication can occur immediately or asynchronously or any mixture of the two.**
- **Simply use your SMS ACS routines to determine which method is used at volume granularity.**
- **No dependency on Tape Management System pools.**

▪**Volume granular data integrity**
- **Prior to any host write first write, all clusters are made aware of the coming change.**
- **No ambiguity of whether you can trust additional copies after any failover event.**
- **Full audit lists of any inconsistent volumes.**

TS7700 Cluster

TS7700 Clusters

TS7700 Cluster

Host(s)

Host(s)

LAN/WAN

TS7700 Cluster

Grid

TS7700 Cluster
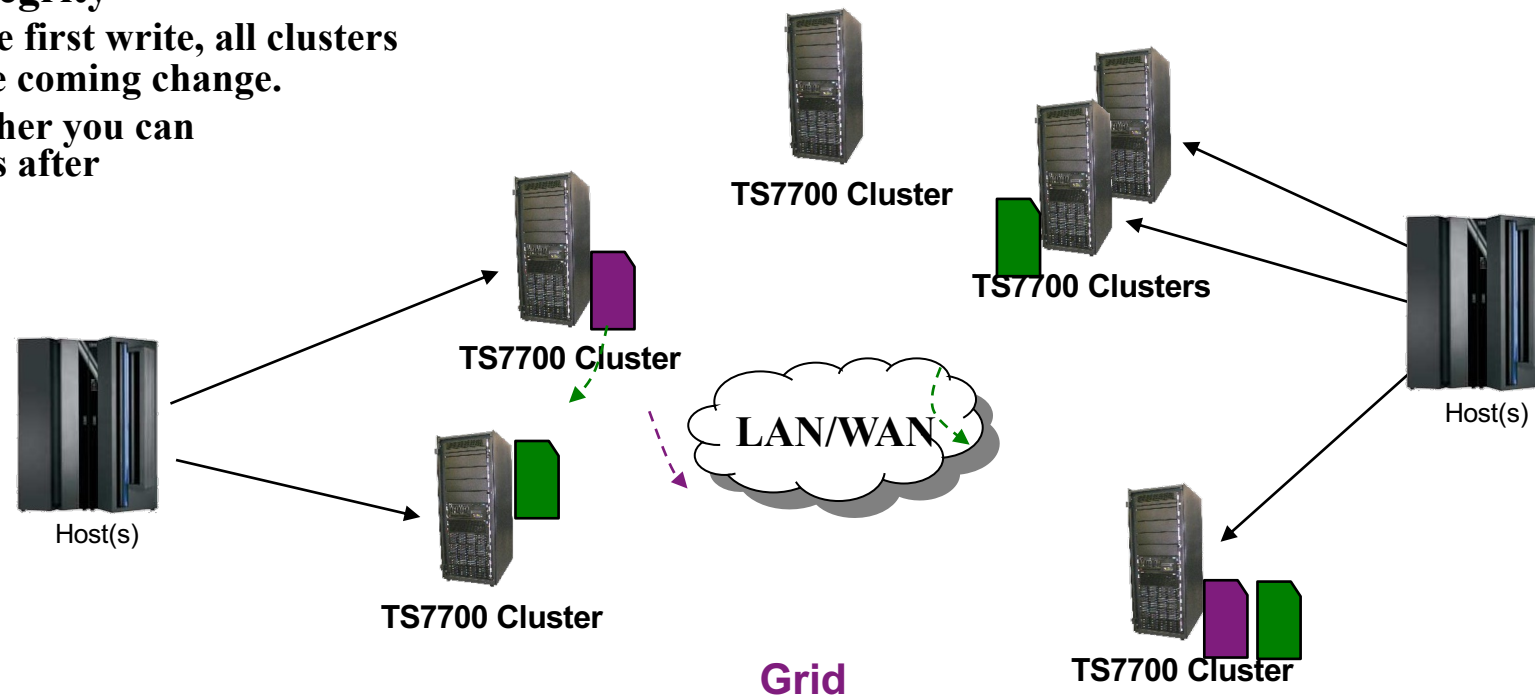
TS7700 Grid – 4-Way HA/DR Partitioned Configuration

Production Site/DR

Production Site/DR

LAN/ WAN

System z

System z
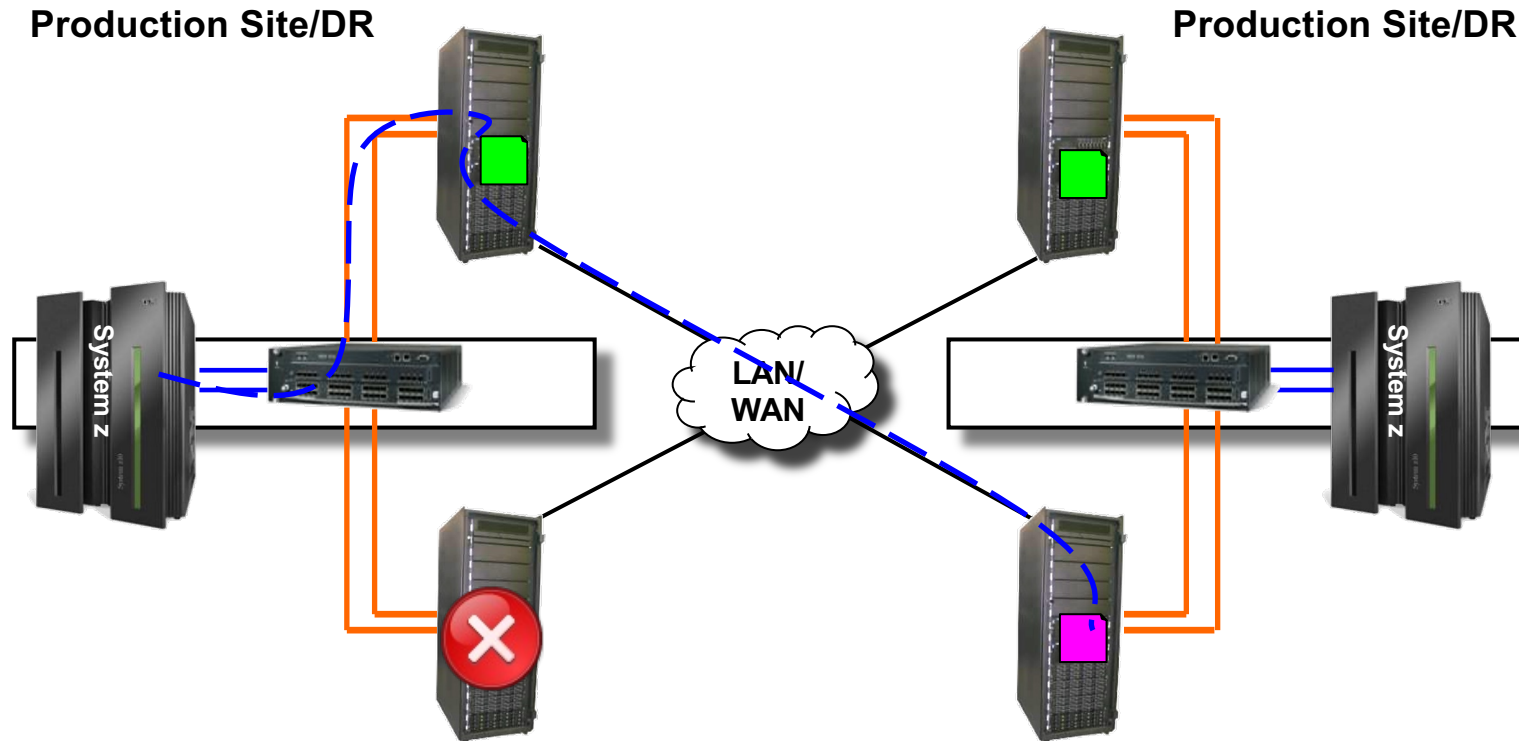
- Synchronous or asynchronous replication policy
  - One local copy and one remote copy
- Continuous access to data, planned or unplanned outage

Agenda

- IBM TS7700 Grid Technology Overview
- **IBM TS7700 Virtualization Engine Overview**
- IBM TS7700 Advanced Functions
- IBM TS3500 Tape Library Overview
- IBM TS1100 Tape Drive Overview
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- Pre-installation Planning
- Implementation
- Miscellaneous
- Commands, Publications and Documents

TS7770 Virtualization Engine

- **TS7770 Virtualization Engine (if new, can have 1,3 5 year expert care)**
  - **Up to 4000 MB/sec of host throughput**
    - **Performance on Demand – 100 MB/sec increment**
  - **Up to 3.9 PB of disk cache / capacity (11.7 PB with 3:1 compression)**
    - **Capacity on demand - 20 TB and 100TB increments**
    - **Magic size – 157TB for each 2 drawers – 10 drawers in first frame – 780TB**
  - **FICON connections**
    - **2, 4, or 8 8 or 16Gbps**
  - **Grid network connections**
    - **2x or 4x 10Gbps longwave fibre**
    - **2x or 4x 1Gbps, Copper or Shortwave fibre**
  - **Up to 496 virtual drives**
    - **Standard offering – 256 virtual drives**
    - **Capacity on Demand – 16 virtual drives increment**
  - **Up to 4,000,000 logical volumes**
    - **Standard offering – 1,000,000 logical volumes**
    - **Capacity on Demand – 200,000 logical volumes increment**
  - **Advanced Policy Management**
    - **Logical volume size: 400MB, 800MB, 1GB, 2GB, 4GB, 6GB ,25GB and 65GB**
    - **Logical WORM**
    - **Copy Consistent Point in Grid Configuration**

Hosts

TS7770 Cluster

TS7770 Disk Cache

- **Performance from 100 M/sec to 4000 MB/sec**

- **Large Capacity (Option 1)**

  - **10TB 7.2K SAS Drives, RAID6 Distributed RAID Pools**

  - **157 TB usable capacity per pair of drawers**

  - **789 TB usable capacity base Frame**

  - **2.37 PB 1x Expansion Frame,**

  - **3.90 PB 2x Expansion Frames**

  - **Concurrent disk cache drawer expansion**

- **High IOPS Enabled SSD Capacity (Option 2) – NEW with 5.2**

  - **Performance equal to and exceeding 10 drawer SAS configurations**

  - **3.84 TB SAS SSD Drives, RAID6 Distributed RAID Pools**

  - **60 TB usable capacity for single drawer**

  - **Maximum of 4 drawers for a total of 260 TB usable capacity**

  - **Concurrent disk cache drawer expansion**

IBM Synergy: Leveraging Flash Systems 5030

Capacity On Demand

Enabled in 20TB and/or 100TB increments

Full AES256 Encryption

Both Local and External Key Management supported

Encryption must be enabled at time of purchase

TS7770 Virtualization Engine Tape Attached

- **4 to 16 backend tape drives**
  - **Up to 20 TB cartridge capacity (60 TB with 3:1 compression)**
  - **Data at rest encryption support**

- **Cache Partitioning required – on partition automatically sends data to physical tape**
- **TS1130, TS1140 though withdrawn used for migration**
- **JA, JB, media**
- **TS1150, TS1160 JC, JD, JE media**
- TS3500/TS4500 tape library
  - **Up to 100 PB of physical tape storage (300 PB with 3:1 compression)**

Hosts

Drives/Library

TS7770 Cluster

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Logical Volume Size

- **Objective: reduce the number of volumes needed for large datasets**
- **Provides for multiple logical volume sizes**
  - **Defined at insert (400 MB or 800 MB)**
  - **1000 MB**
  - **2000 MB**
  - **4000 MB**
  - **6000 MB**
  - **25000 MB**
  - **65000 MB**
- **Only actual space used is consumed in cache and on physical stacked volume**
- **Defined by Data Class construct**
- **Can be used to reduce the number of volumes in a multi-volume data set**

Logical WORM Support

- Expands TS7700 support into compliance storage space
  - Logical volume now can support Non-Rewritable storage solutions
  - Emulates Write Once, Read Many (WORM) physical tape functionality
    - Logical volume can only be appended to beginning after last customer data record
    - Supported for IBM Standard and ANSI Labeled volumes
    - Every write from BOT generates a unique ID for tracking and detection volume replacement
- Uses Data Class construct to specify that a logical WORM volume is to be allocated
- Retention period controlled by application through a Tape Management System
- When data is expired, volume can become a candidate for re-use as a new instance of a logical WORM volume or as a full read/write volume
- Volumes can be "held" once scratched to accommodate later recoveries or invalid expirations

Volume Returned to Scratch

Volume Re-Written from BOT

Retention Period

Non-Rewritable

Subject to Being Scratched or Deleted unless "held"

Scratch Mount
- DC = LWORM
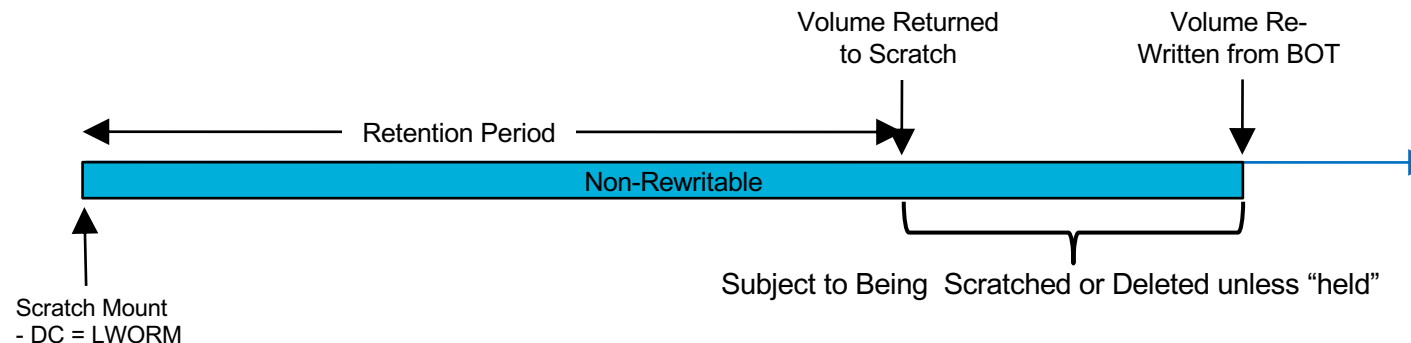
TS7700 Data Class Construct

Add Data Class

Name: * DC0305

Logical Volume Size (MiB): Insert Media Class ▾

Logical WORM: Yes ▾

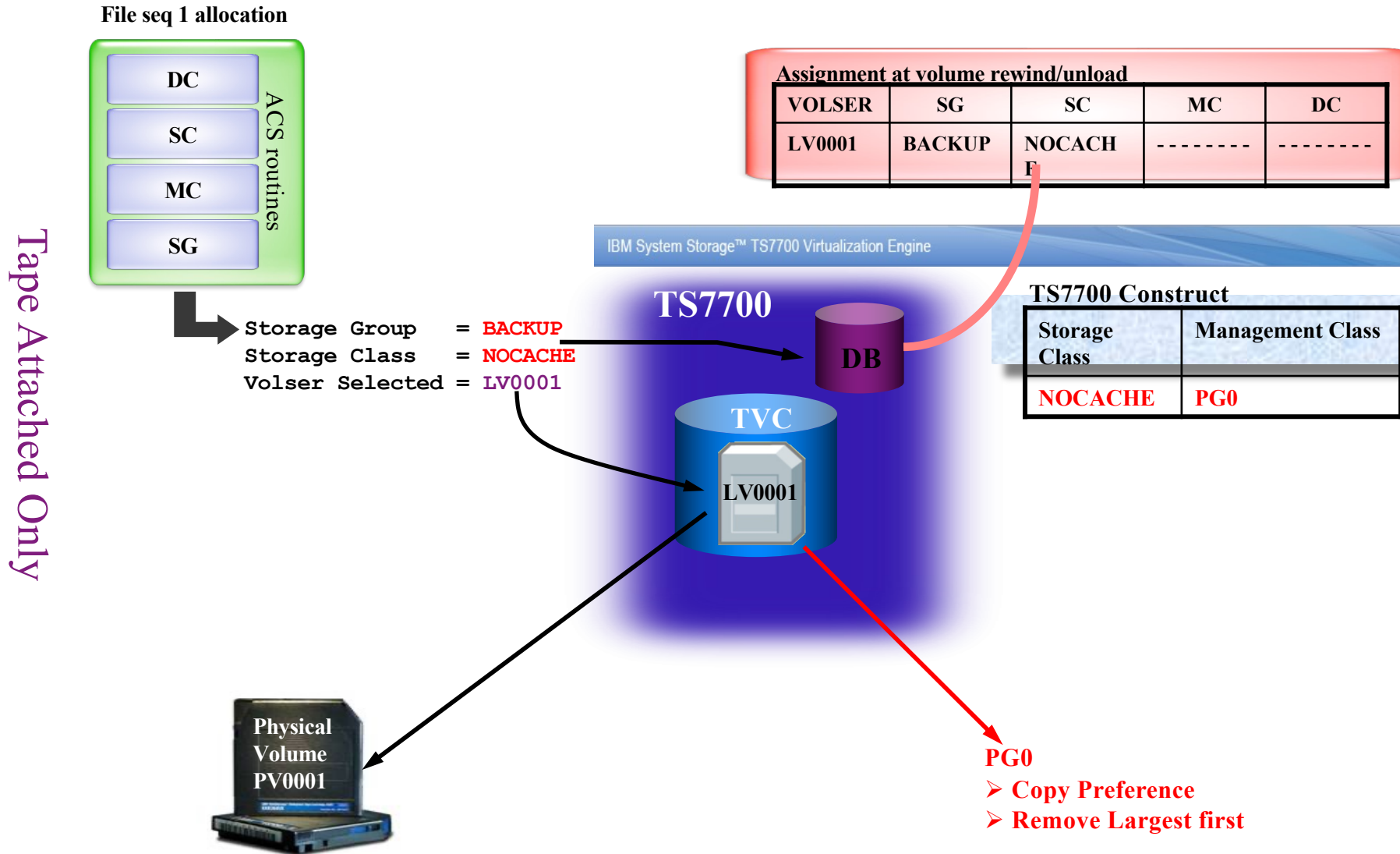Description: WORM

OK   Cancel

- Insert Media Class
  - 400 MB
  - 800 MB
- 1000 MB
- 2000 MB
- 4000 MB
- 6000 MB
- 25000 MB

▪ Setting Logical WORM option for a Data Class causes all clusters in the grid to create the same Data Class name with the Logical WORM option set and the same Logical Volume Size.

Tape Volume Cache Management

Tape Attached Only

- Designed to minimize job processing delays
  - Maximize cache hits
- TS7700 attempts to always keep the cache full of data
  - When a logical volume is created or modified, it is copied to physical tape, but remains in the cache
  - When space is needed in the cache for new volumes, existing logical volumes that have already been copied to tape are examined to determine which ones to remove
  - Optional premigration delay is available to delay the copy to physical tape
- Two options - Preference Group 1 or 0
  - Selectable by logical volume
  - Storage Class construct control
  - Preference Group 0 - prefer expedited removal from cache
    - Soon after logical volume is pre-migrated to tape, volumes from PG0 are selected for removal before volumes from PG1 are selected
    - PG0 volumes removed from cache smallest first during periods of low activity
    - PG0 volumes removed from cache, largest file first, when space is needed immediately
  - Preference Group 1 - prefer to retain in cache
    - When cache space is needed and there are no available PG0 volumes, PG1 volumes are selected
    - Selected PG1 volumes are removed based on least recently used (LRU) basis
- Defined by Storage Class construct
  - Management Interface Web Interface (MI)
- Assignment options
  - Dynamic assignment by SMS
  - Static assignment through Management Interface Web Interface (MI)
  - System default

Tape Volume Cache Management Example

File seq 1 allocation

DC

SC

MC

SG

ACS routines

Tape Attached Only

Storage Group = **BACKUP**
Storage Class = **NOCACHE**
Volser Selected = **LV0001**

Assignment at volume rewind/unload

VOLSER	SG	SC	MC	DC
LV0001	BACKUP	NOCACHE	--------	--------

IBM System Storage™ TS7700 Virtualization Engine

TS7700

DB

TVC

LV0001

TS7700 Construct

Storage Class	Management Class
NOCACHE	PG0

Physical Volume PV0001

PG0
➢ **Copy Preference**
➢ **Remove Largest first**

Selective Dual Copy

Tape Attached Only
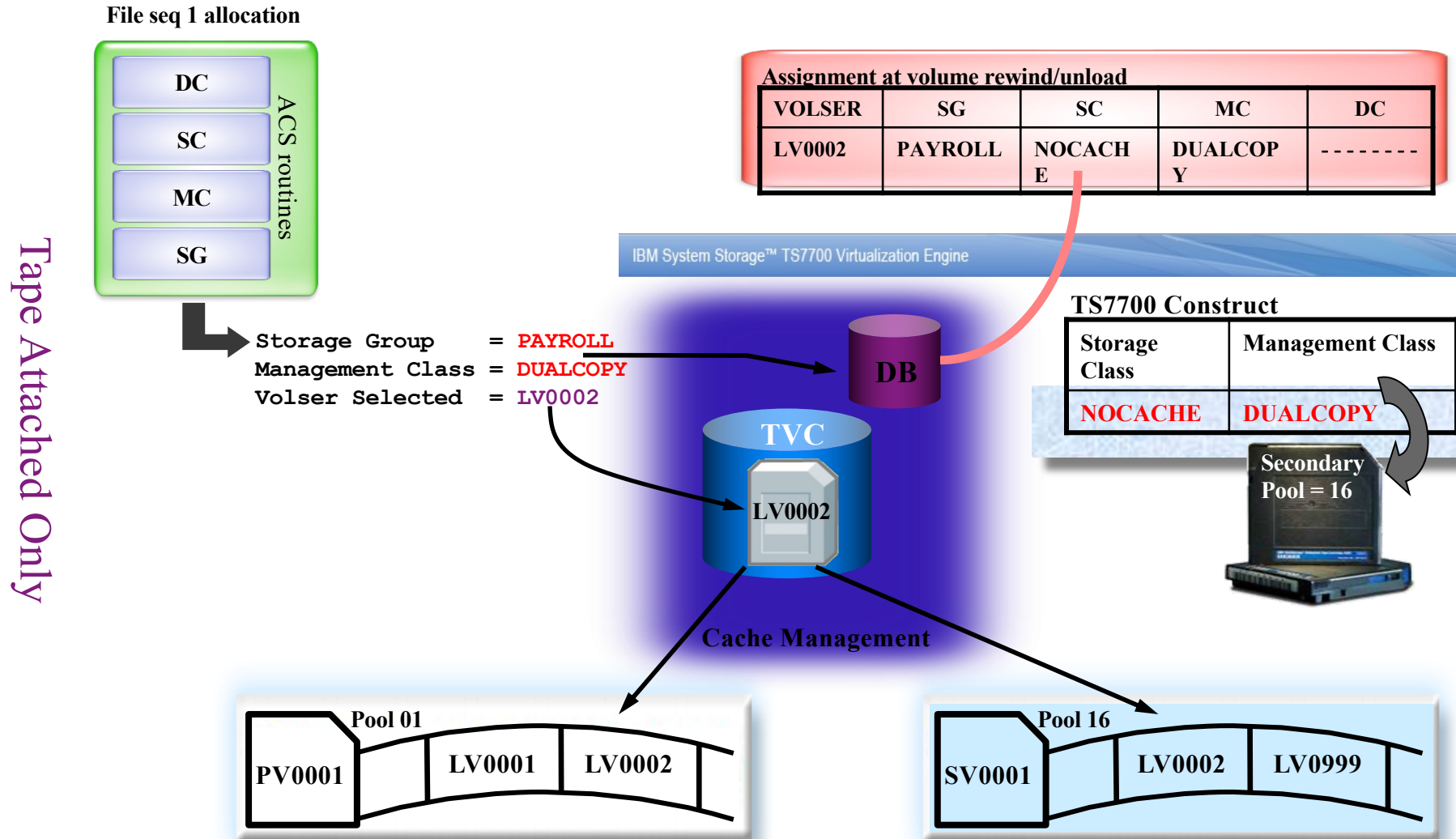
- Objective: Eliminate Physical Media as single point of failure
  - Control creation of separate second copy
  - Automatic recovery for damaged logical volumes
  - Can create up to 4 copies in a two cluster grid
- Primary/secondary copy in separate pools
- Secondary Pool can be defined as a Copy Export pool
- Defined by Management Class

Selective Dual Copy Control Flow

File seq 1 allocation

ACS routines:
- DC
- SC
- MC
- SG

Tape Attached Only

```
Storage Group    = PAYROLL
Management Class = DUALCOPY
Volser Selected  = LV0002
```

Assignment at volume rewind/unload

VOLSER	SG	SC	MC	DC
LV0002	PAYROLL	NOCACHE	DUALCOPY	--------

IBM System Storage™ TS7700 Virtualization Engine

DB

TVC

LV0002

Cache Management

TS7700 Construct

Storage Class	Management Class
NOCACHE	DUALCOPY

Secondary Pool = 16

Pool 01
- PV0001
- LV0001
- LV0002

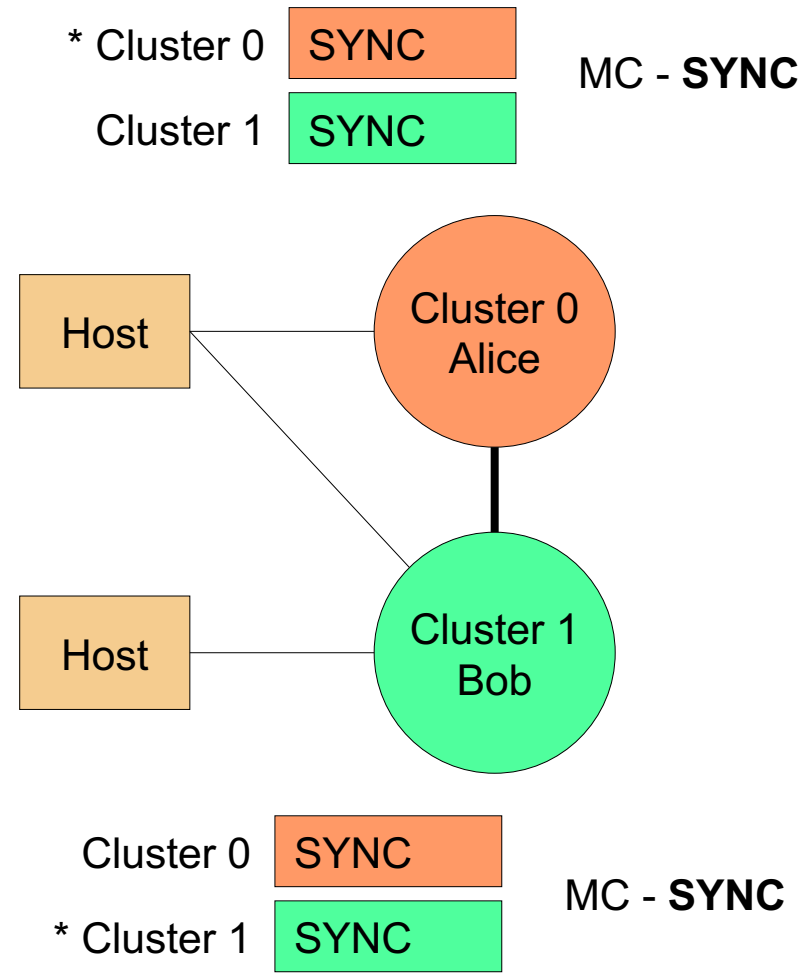**Pool 16**
- SV0001
- LV0002
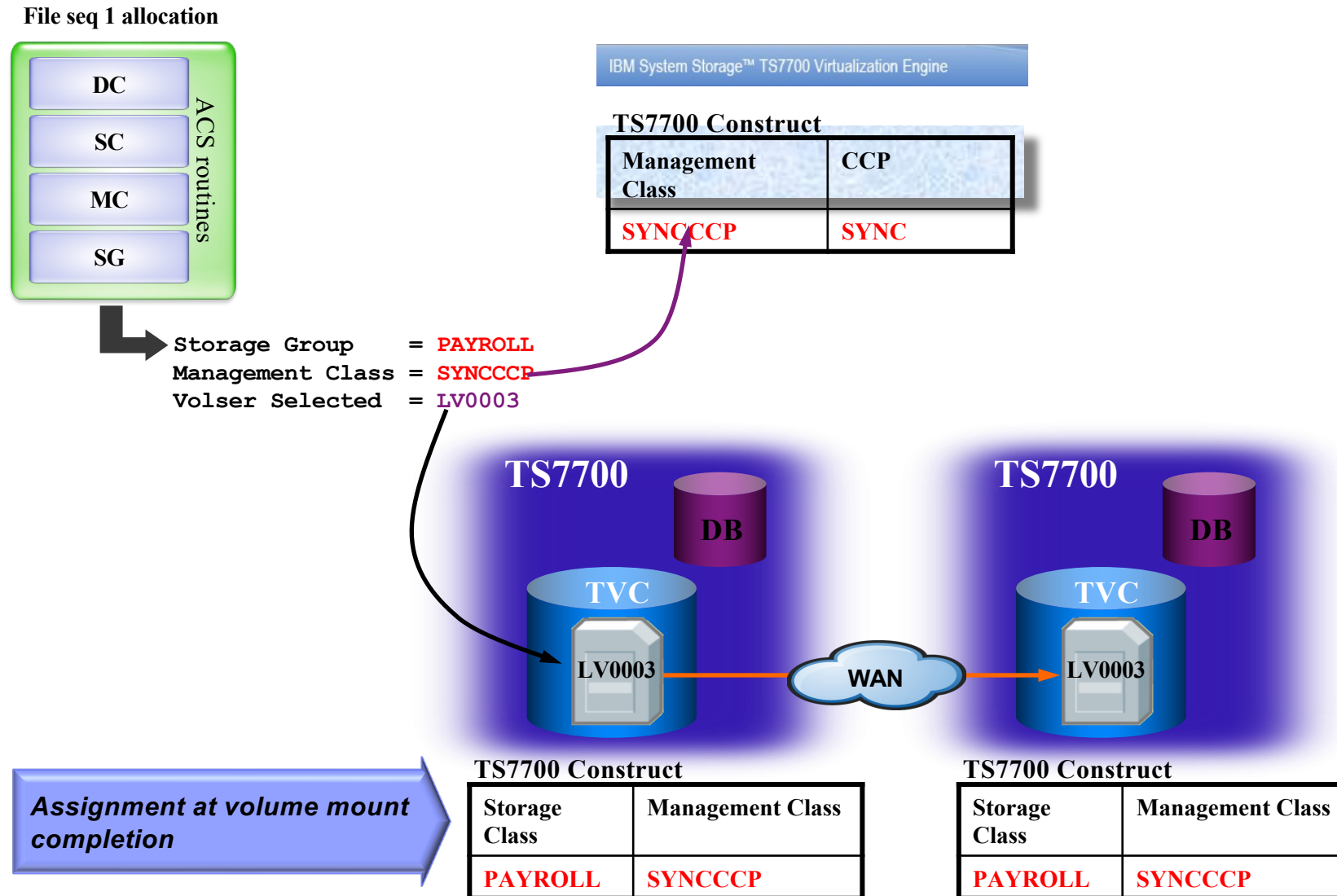- LV0999

Copy Consistency Point

- **Copy Consistency Point – This defines when the data for a virtual/logical volume is to be made valid or consistent at a cluster.**

  - **Deferred** – This Copy Consistency Point means that the data does not need to be valid on a cluster at rewind unload operation at the host, but will be copied to the cluster later, in a deferred manner.

  - **Time Delayed** – The Copy Consistency Point means that the data will be valid after a specified time (1 hour – 379 days).

  - **Rewind/Unload** – This Copy Consistency Point means that the data must be valid on a cluster before the TS7700 indicates the Rewind/Unload (RUN) command is complete.

  - **Synchronous Copy** – This Copy Consistency Point is a form of replication similar to host-initiated duplexing that provides a zero recovery point objective (RPO) for sets of records (datasets) or byte-stream data (objects) written to virtual tape.

  - **No Copy** – This Copy Consistency Point means that a copy of the data will not be made on a cluster.

Two Cluster Grid CCP Example

- In a multi-cluster grid each cluster is given a numeric designation

- Cluster 0 through Cluster 7

- Cluster Copy Policy provides the ability to define where and when copies are made

- Management Class used to define policy

- Data consistency points can be different for each cluster
  - Deferred
  - Time Delayed
  - Rewind/Unload (RUN)
  - Synchronous
  - No Copy

- Single cluster always uses Rewind/Unload

* Cluster 0 — SYNC
Cluster 1 — SYNC
MC - **SYNC**

Host — Cluster 0 Alice
Host — Cluster 1 Bob

Cluster 0 — SYNC
* Cluster 1 — SYNC
MC - **SYNC**

Management Class CCP Control Flow

File seq 1 allocation

ACS routines:
- DC
- SC
- MC
- SG

```
Storage Group    = PAYROLL
Management Class = SYNCCCP
Volser Selected  = LV0003
```

IBM System Storage™ TS7700 Virtualization Engine

TS7700 Construct

Management Class	CCP
SYNCCCP	SYNC

TS7700   DB   TVC   LV0003   WAN   **TS7700**   DB   TVC   LV0003

Assignment at volume mount completion

TS7700 Construct

Storage Class	Management Class
PAYROLL	SYNCCCP

TS7700 Construct

Storage Class	Management Class
PAYROLL	SYNCCCP

Three Cluster Grid CCP Example

Sample CCPs for Disaster Recovery Testing

- **During Disaster Recovery test you may only want to create copies on the cluster being used to perform the test**

- **Create Disaster Recovery Management Class with the appropriate CCPs at each cluster that will be used in the test**

- **Direct the Disaster Recovery test to virtual devices on the cluster being used for the test**

Two Cluster Grid

Name	Cluster 0	Cluster 1 (DR)
DRTEST	NR	NR

Three Cluster Grid

Name	Cluster 0	Cluster 1	Cluster 2 (DR)
DRTEST	NNR	NNR	NNR

Four Cluster Grid

Name	Cluster 0	Cluster 1	Cluster 2 (DR)	Cluster 3 (DR)
DRTEST	NNDD	NNDD	NNDD	NNDD

Copy Export Overview

- **Export function to support transfer of data for offsite disaster recovery**
- **Exports a copy of selected data, leaving the primary copy in the TS7700 Tape Attached**
- **Copy exported physical volume continues to be managed by the source TS7700 Tape Attached**
  - **Utilizes off site reclamation to free up previously exported tapes**
- **Customer performed recovery process**
  - **All copy exported data from a source TS7700 is recovered on an empty TS7700**
  - **Recovery options for test vs an actual disaster recovery**
- **Operation in a Grid Configuration**
  - **Executed on a specific TS7700 Tape Attached**
  - **Logical volumes must have been copied to the TS7700 Tape Attached to be exported**
  - **Recovery is to a standalone TS7700 Tape Attached**
- **CopyExport merge is available via service offering only**
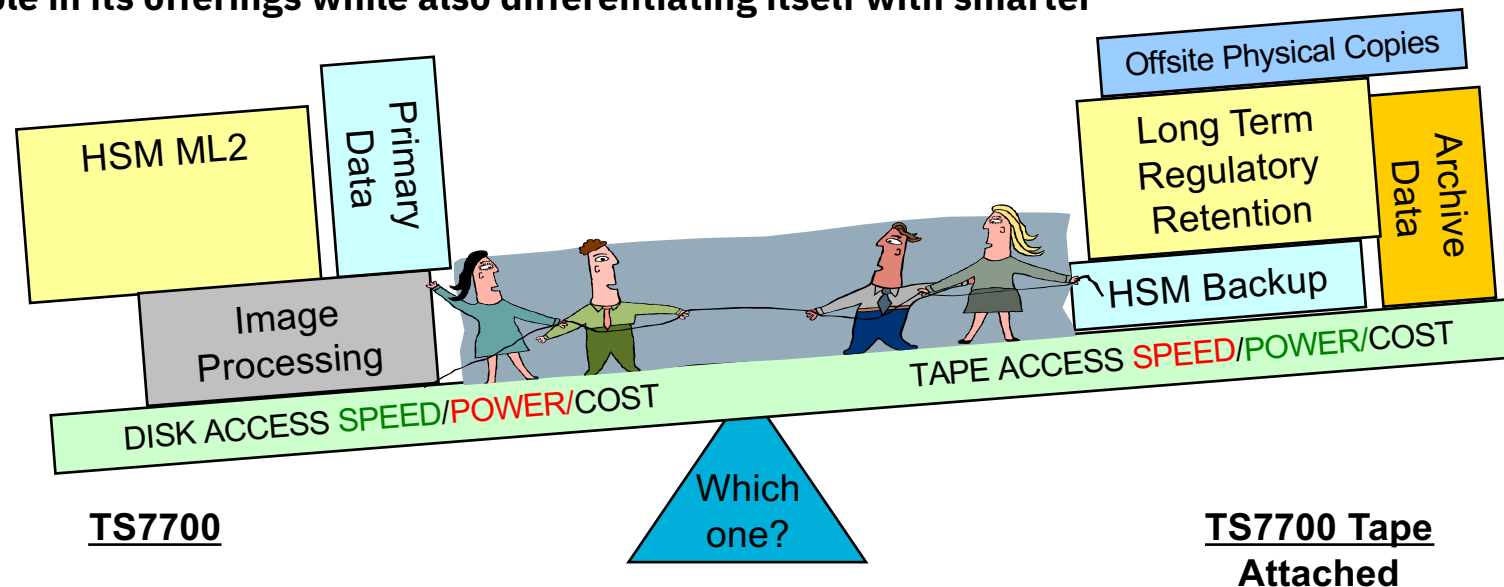 - **Provides the ability to merge copy export content from one grid into another**

Tape Attached Only

Copy Export

Production Host

Source TS7700

TVC

Database

Pool 01

Pool 09

Tape Attached Only

Dual copy of data
Export second copy w/DB

Recovery Host

Recovery TS7700

TVC

Database

Pool 09

Load all exported volumes in library
Restore DB from latest export volume

Production Site

Recovery Site
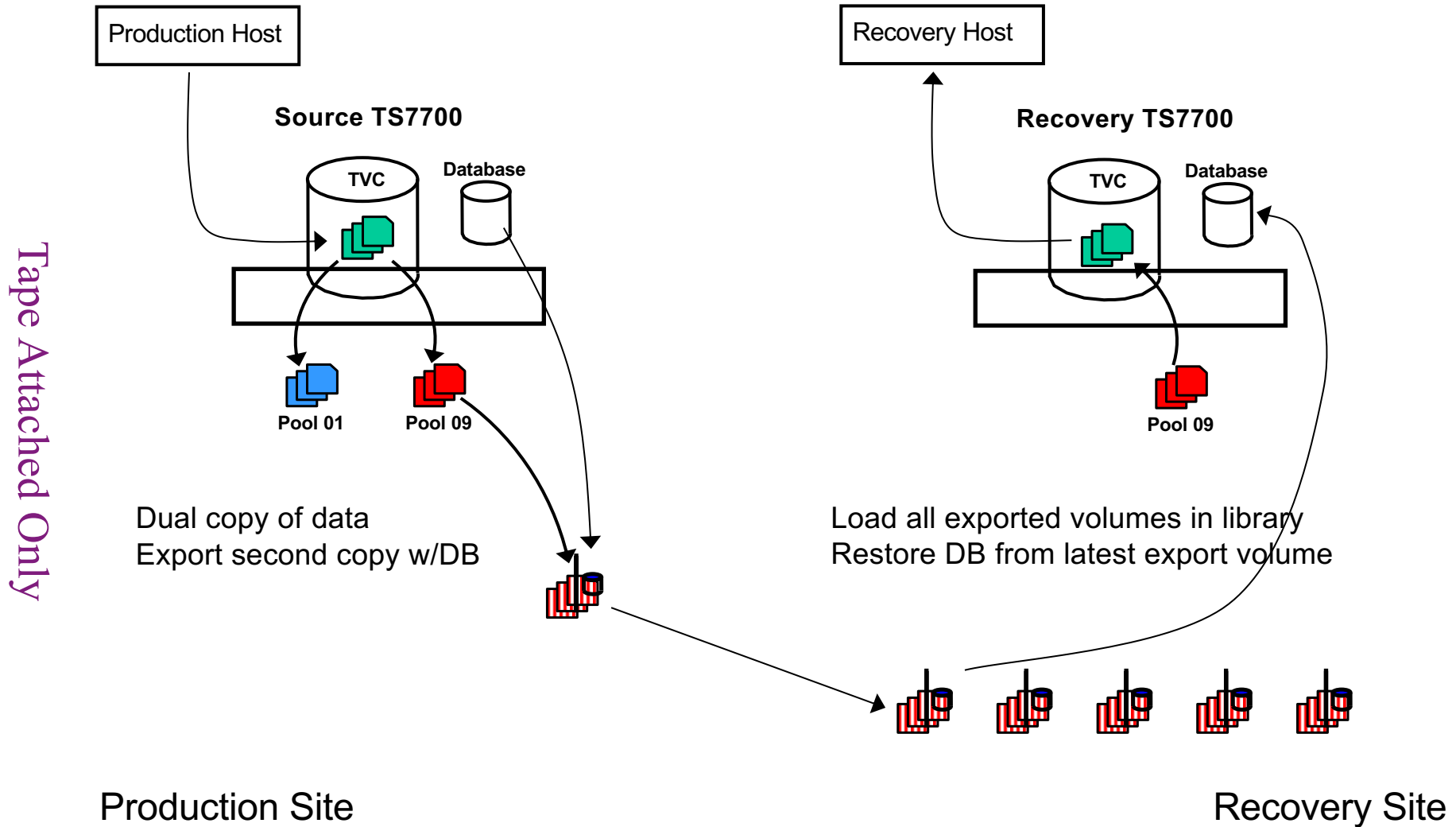
Hybrid Grid Configuration

- **One size does not fit all**
  - **Disk only solutions are optimal for primary data applications or applications which need fast access times**
  - **Solutions tightly integrated with physical tape are best for archive and backup data**
  - **Total cost of ownership also factors into a customer's choice which doesn't always agree with usage case**
- **Hybrid is the best of both worlds**
  - **Using Grid architecture, intermix disk only TS7700 solutions with disk/tape TS7700 solutions**
  - **Allows customer to configure how their data is managed in order to fully benefit from an intermixed configuration**
  - **Allows IBM to be flexible in its offerings while also differentiating itself with smarter options**

HSM ML2

Primary Data

Image Processing

Offsite Physical Copies

Long Term Regulatory Retention

Archive Data

HSM Backup

DISK ACCESS SPEED/POWER/COST

TAPE ACCESS SPEED/POWER/COST

Which one?
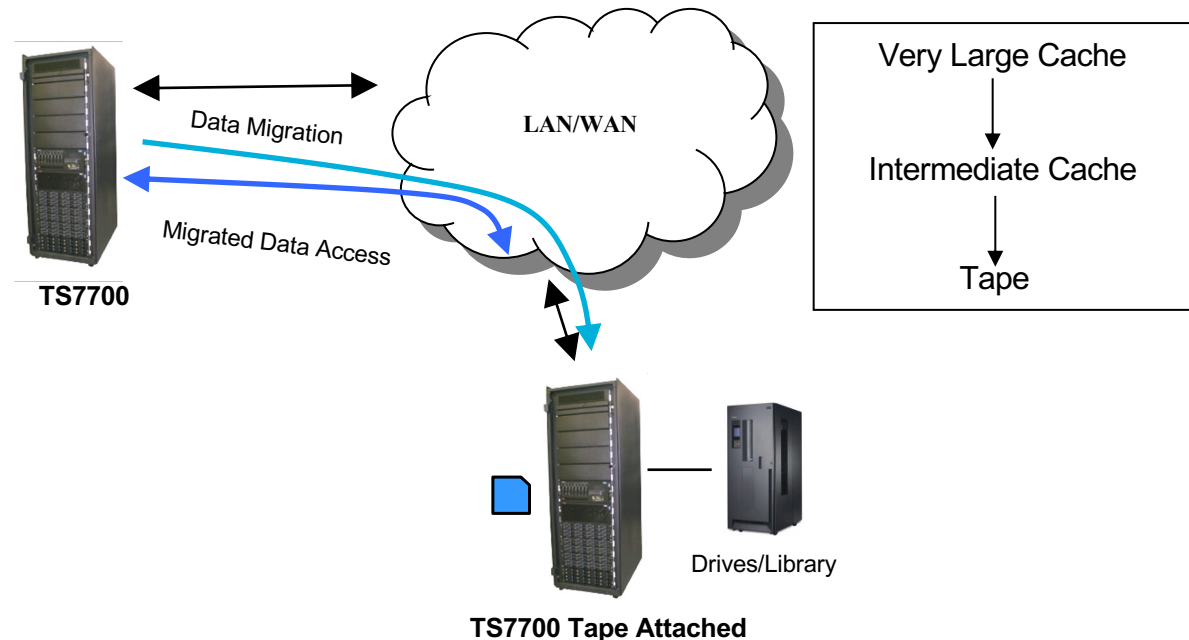
TS7700

TS7700 Tape Attached

One of many Hybrid Grid Configurations

- **Different combinations satisfy High Availability and Performance characteristics:**
  - **TS7700 Tape Attached provides high capacity physical tape backend, copy export capability**
  - **TS7700 Disk Cache only provides high performance through read-hits due to larger tape volume cache**
  - **Grid provides high availability at local and/or remote sites**
- **_Policies_ manage the removal of data from the TS7700 Disk Cache only sites**
- **No host changes required to support hybrid grids**

TS7700

TS7700

LAN/WAN

TS7700

Copy Export
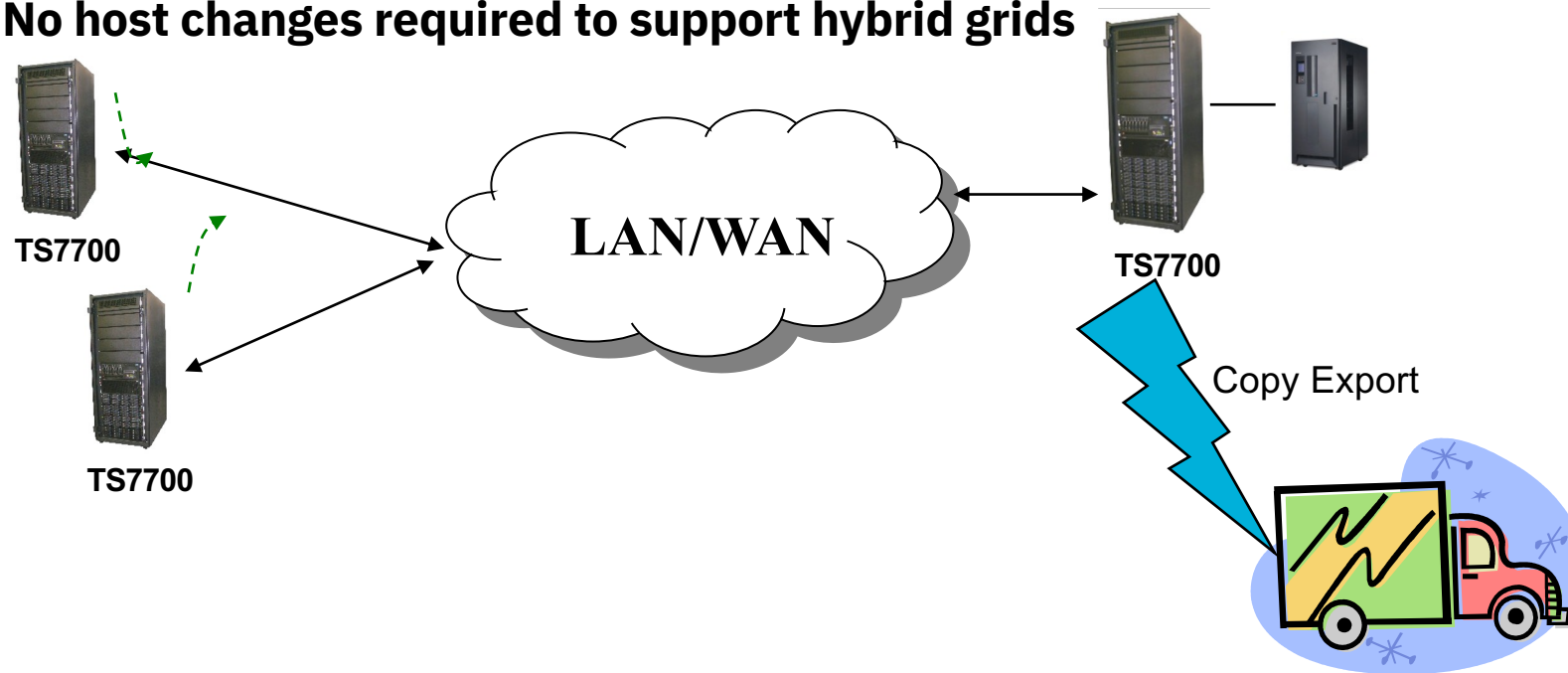
TS7700

Automatic Removal Policy

- **Disk-centric and cost effective Hybrid Grid Configurations**
- **Automatic volume migration and cache space management of the TS7700 cache**
  - **Volumes are copied from TS7700 cache to a Tape Attached through normal copy policies**
  - **When space is needed, the least recently accessed volumes in the TS7700 cache that have been copied to the Tape Attached are removed from the TS7700 cache**
- **Migrated volumes remain accessible through the TS7700 cache**
  - **TS7700 uses the grid links to remotely access the volume data in the TS7700 Tape Attached**

Extended Removal Policies

- **Configurable Volume Migration Settings**
  - "Pinned" – These volumes remain pinned in the TS7700 Tape Attached cache (except when scratched).
  - "Prefer Remove" LRU Group 0 and "Prefer Keep" Group 1 – As the TS7700 Tape Attached reaches full capacity, these volumes will be automatically removed in LRU order favoring those in Group 0 over those in Group 1. Only volumes that have completed peer copies are candidates for removal.
    - Minimum Retention Time – Associated pin duration or grace period where data must exist prior to removal. Only after the pin time has elapsed since last access will the LRU Group 0 and 1 volumes become candidates for removal.
  - Fast Ready/Scratch Volumes – When removal takes place, volumes that have been returned to scratch are always preferred first. This includes both "Pinned" and "LRU Group 0/1" volumes.
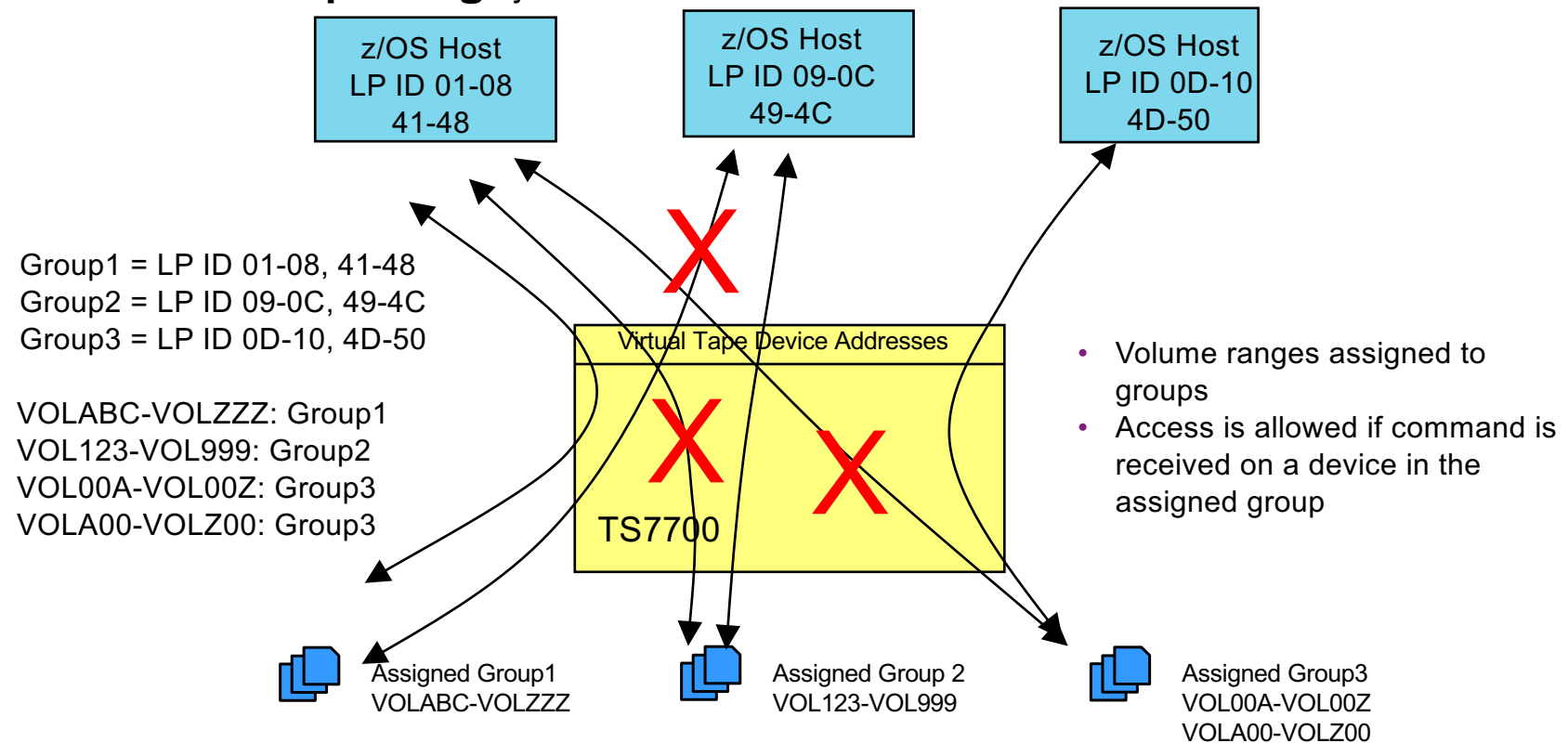- **Removed volumes remain accessible through all clusters**
  - Grid links are used to remotely access the volume data in other TS7700s if locally removed.

TS7700

Data Migration

Migrated Data Access

LAN/WAN

TS7700 Tape Attached

Drives/Library
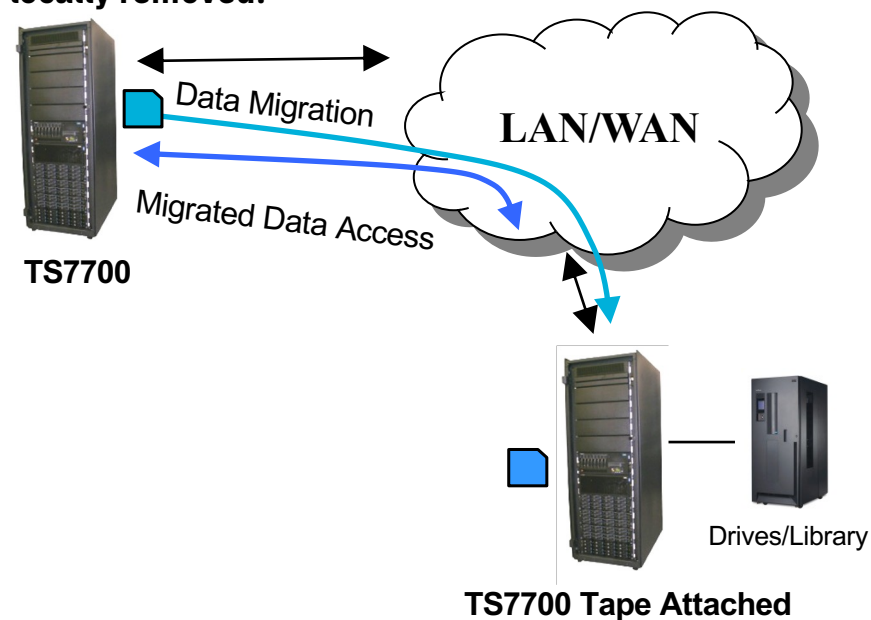
Selective Device Access Control (SDAC)

- **Enables hard partitioning of a TS7700 between several hosts**
  - **Blocks access and control of volumes created by one host from the other hosts**
  - **Separated by tape management systems, independent volume ranges and scratch pools**
  - **Access is allowed through specific Library Port IDs (virtual device addresses)**
  - **Each plex can have a different operating** system

z/OS Host
LP ID 01-08
41-48

z/OS Host
LP ID 09-0C
49-4C

z/OS Host
LP ID 0D-10
4D-50

Group1 = LP ID 01-08, 41-48
Group2 = LP ID 09-0C, 49-4C
Group3 = LP ID 0D-10, 4D-50

VOLABC-VOLZZZ: Group1
VOL123-VOL999: Group2
VOL00A-VOL00Z: Group3
VOLA00-VOLZ00: Group3

Virtual Tape Device Addresses

TS7700

- Volume ranges assigned to groups
- Access is allowed if command is received on a device in the assigned group

Assigned Group1
VOLABC-VOLZZZ

Assigned Group 2
VOL123-VOL999

Assigned Group3
VOL00A-VOL00Z
VOLA00-VOLZ00

Thank you!

Accelerate with ATG Survey

Please take a moment to share your feedback with our team!

You can access this 6-question survey via Menti.com with code 1708 6924 or

Direct link https://www.menti.com/alwhyze7z1gz

Or

QR Code