



IBM Virtualization Engine TS7700 Series Architecture and R1.5 Overview Session 31

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Topics

- **TS7700 Overview**
- **3953 Library Manager Convergence**
- **Drive Switches in TS3500 Frame**
- **New Cache Controller for TS7740**
- **TS7720 Disk Centric Virtualization Engine**
- **3592-E06/EU6 Support**
- **Workflow Management Controls**
- **zOS Host Support**
- **Withdrawals**
- **Implementation and Migration Services**

IBM's Tape Virtualization Engine for System z

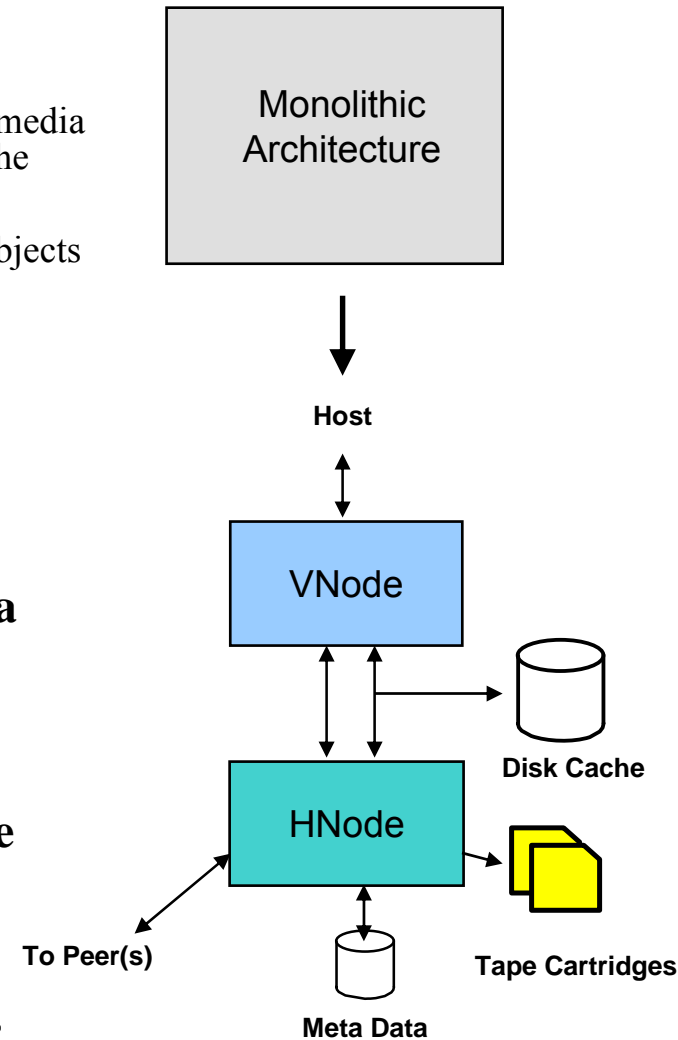
- **The TS7700 Virtualization Engine is the tape virtualization solutions for the IBM System z environment**
 - ▶ Builds on over 10 years of enterprise tape virtualization experience
 - ▶ Designed to provide improved performance and capacity to help lower the total cost of ownership for tape processing
 - ▶ Introduces a modular, scalable high-performance architecture
- **Supports attachment to multiple operating systems**
 - ▶ z/OS, z/VM, z/VSE & z/TPF
 - ▶ Same level of host software support as 3494 - B20
- **Expanded cache and performance**
- **Standalone and business continuation configurations**



Began Customer Shipment 9/26/06

TS7700 Modular/Scalable Architecture

- **Architecture separates the functionality of a virtualization solution into two pieces**
 - ▶ Virtualization Node (Vnode) - handles all virtual tape device and media handling functions, encapsulates host data in an object stored on the disk cache arrays
 - ▶ Hierarchical Storage Management Node (Hnode) - manages the objects stored on disk cache and physical tape media, manages the data movement between disk cache, physical tape media & peers
- **A Vnode and an Hnode make up the function of a TS7700 Virtualization Engine**
 - ▶ Combined single Vnode/Hnode solution is a Gnode
- **Uses standards-based interfaces for control and data movement between nodes**
 - ▶ Ethernet & WebSphere for control
 - ▶ FCP for site local data
- **Peering is an integral part of the Hnode architecture**
 - ▶ Uses standard TCP/IP for interconnection
 - ▶ Architecture for multiple peers
- **Single site solution with physical back end tape is referred to as the TS7740**



TS7700 Virtualization Engine Components

■ TS7740 Virtualization Engine (3957 Model V06)

- ▶ Power5 architecture server based
- ▶ Two dual-core, 64-bit, 1.9-GHz processors (Now 2.1-GHz)
- ▶ Runs the V and H nodes (Gnode)

■ TS7740 Cache Drawer (3956 Model CX6)

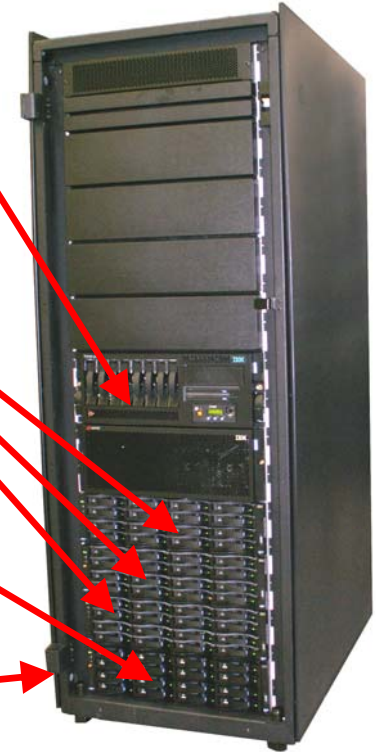
- ▶ RAID array expansion
- ▶ 16 15K 146GB FC HDDs
- ▶ 1.5 TB usable capacity (after RAID and spares)
- ▶ Three maximum drawers

■ TS7740 Cache Controller (3956 Model CC6)

- ▶ Disk RAID array controller
- ▶ 16 15K 146GB FC HDDs
- ▶ 1.5 TB usable capacity (after RAID and spares)
- ▶ Adding up to three CX6 drawers provides up to 6 TB total capacity

■ 3952 Model F05 Frame

- ▶ Houses major components & support components
- ▶ Dual Power



The combination of the Virtualization Engine components is called a TS7700 Cluster

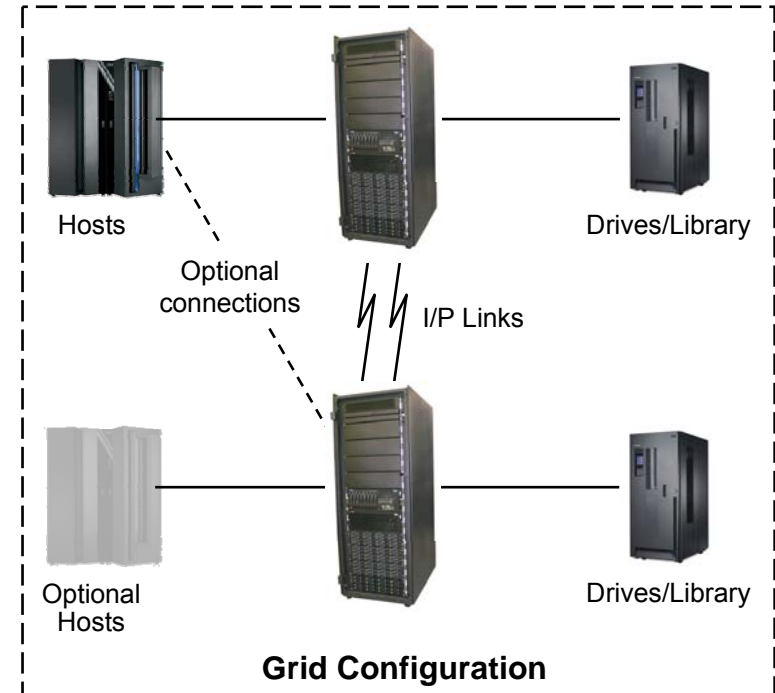
TS7700 Virtualization Engine Solutions

Supports RTO/RPO
measured in seconds

■ TS7700 Grid Configuration

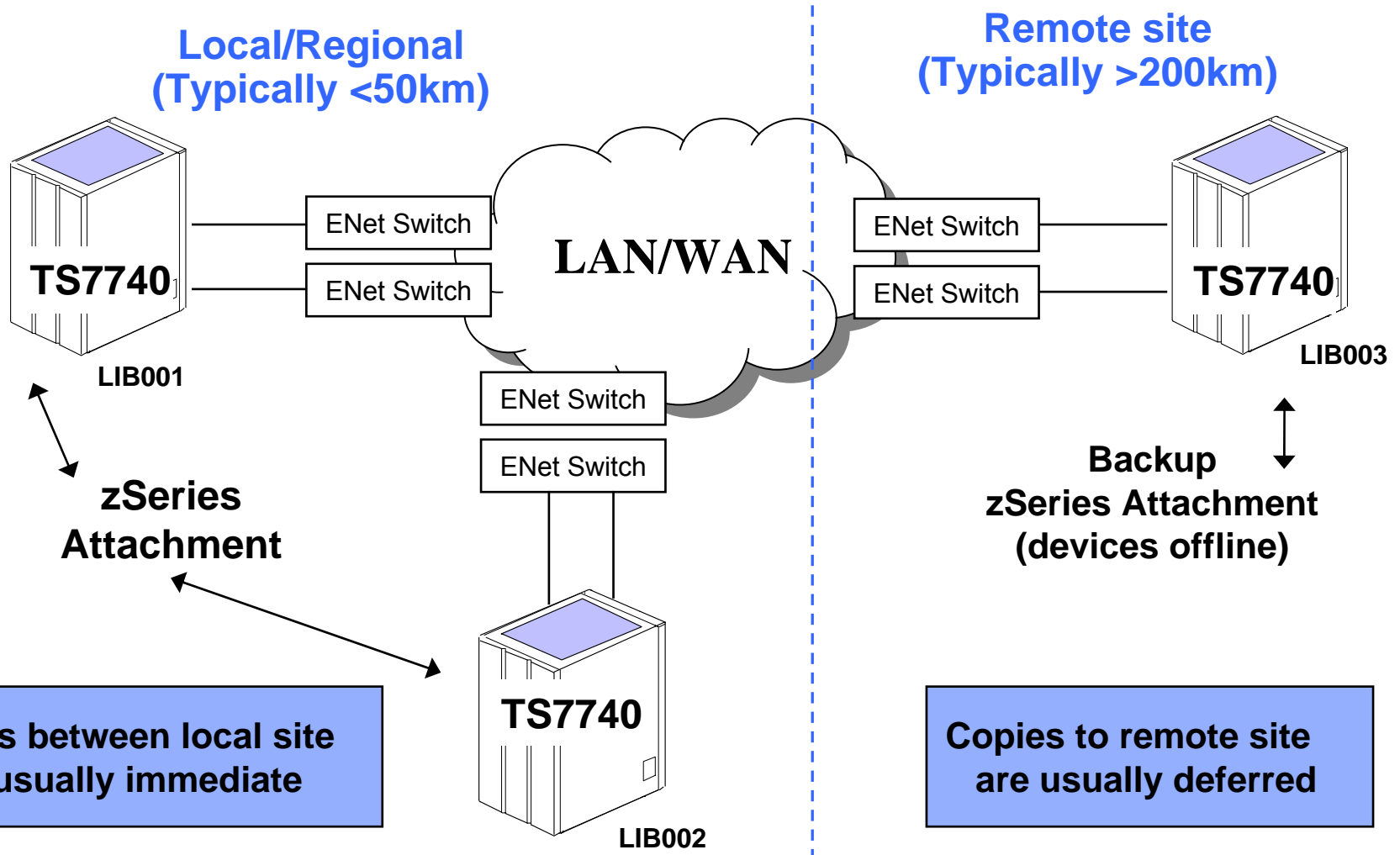
- ▶ Couples two or three TS7700 Clusters together to form a Grid configuration
- ▶ Hosts can attach directly to all TS7700s
- ▶ All volumes are accessible through any TS7700 cluster in the Grid configuration independent of data consistency
- ▶ Each TS7700 represents 256 virtual 3490E drives
- ▶ I/P based replication
 - Two 1 Gbps Ethernet links
 - RJ45 Copper (Cat 6) or SW Fiber Optic
 - Standard TCP/IP
- ▶ Policy-based replication management

■ Can be configured for disaster recovery or higher availability environments



I/P replication may greatly simplify the infrastructure and management needed for a disaster recovery solution as compared to FICON extender based solutions

TS7700 – Three Cluster Grid



TS7700 - Multi-Site Policy Based Copy Management

Management Class Storage Construct

- ▶ Where copies are to reside
 - By distributed library
- ▶ When copies are to be consistent with host that created the data
 - At volume close time (Rewind/Unload: RUN)
 - After volume close time (Deferred)
 - No copy

Management Class: PROD01

LIB001	LIB002	LIB003
RUN	RUN	Deferred

Management Class: TEST01

LIB001	LIB002	LIB003
No Copy	No Copy	RUN

Examples

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Library Manager Convergence

■ Integration of the Library Manager

- ▶ Move the logical volume management into the TS7700
- ▶ Moves some physical volume/device management to the TS7700

■ TS7700 takes over Logical/Physical Volume Management

- ▶ Sends SMC commands directly to 3584/TS3500
 - Eliminates the use of the 3953 Library Manager controller for attaching the TS7740 to the 3584/TS3500
- ▶ Sends PLF commands to the 3494 Library Manager
 - 3494 LM partition sees the TS7740 as limited VE partition
 - During capability exchange, the VE indicates it is managing the logical volumes
 - 3494 LM is still required to drive physical commands to the robot/library.
 - Fewer 3494 code changes to keep pace with new TS7700 functionality

■ Library Manager GUI Incorporated into TS7700 Management Interface

- ▶ Configuration and management panels previously provided by the Library Manager have been added to the TS7700 Management Interface
- ▶ TS7740 Menu items on the 3494 Library Manager are “grayed” out

TS7700 Cluster Summary

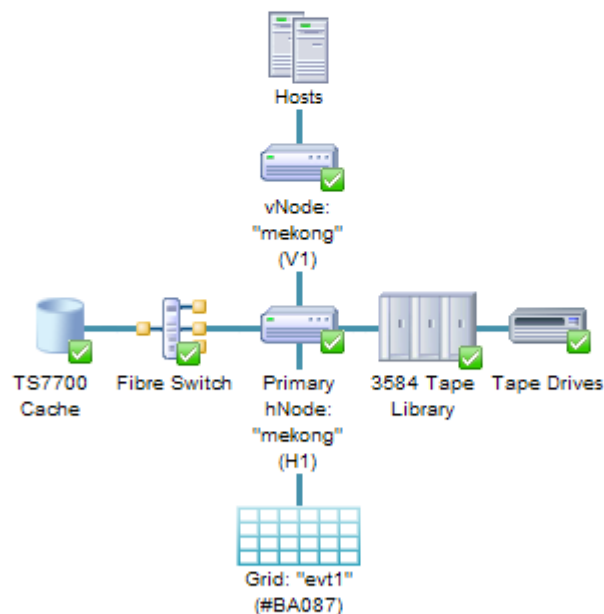
Last Refresh: Friday, October 31, 2008 7:51:11 AM

Current component selected:

- [-] Clusters
 - "Nada[0]" (#BA87A)
 - "Mekong[1]" (#BA87B)**
 - "Bandito[2]" (#BA87C)

[View tutorial](#)

Library Sequence Number: BA87B
 Management Interface IP Address: 9.11.200.112

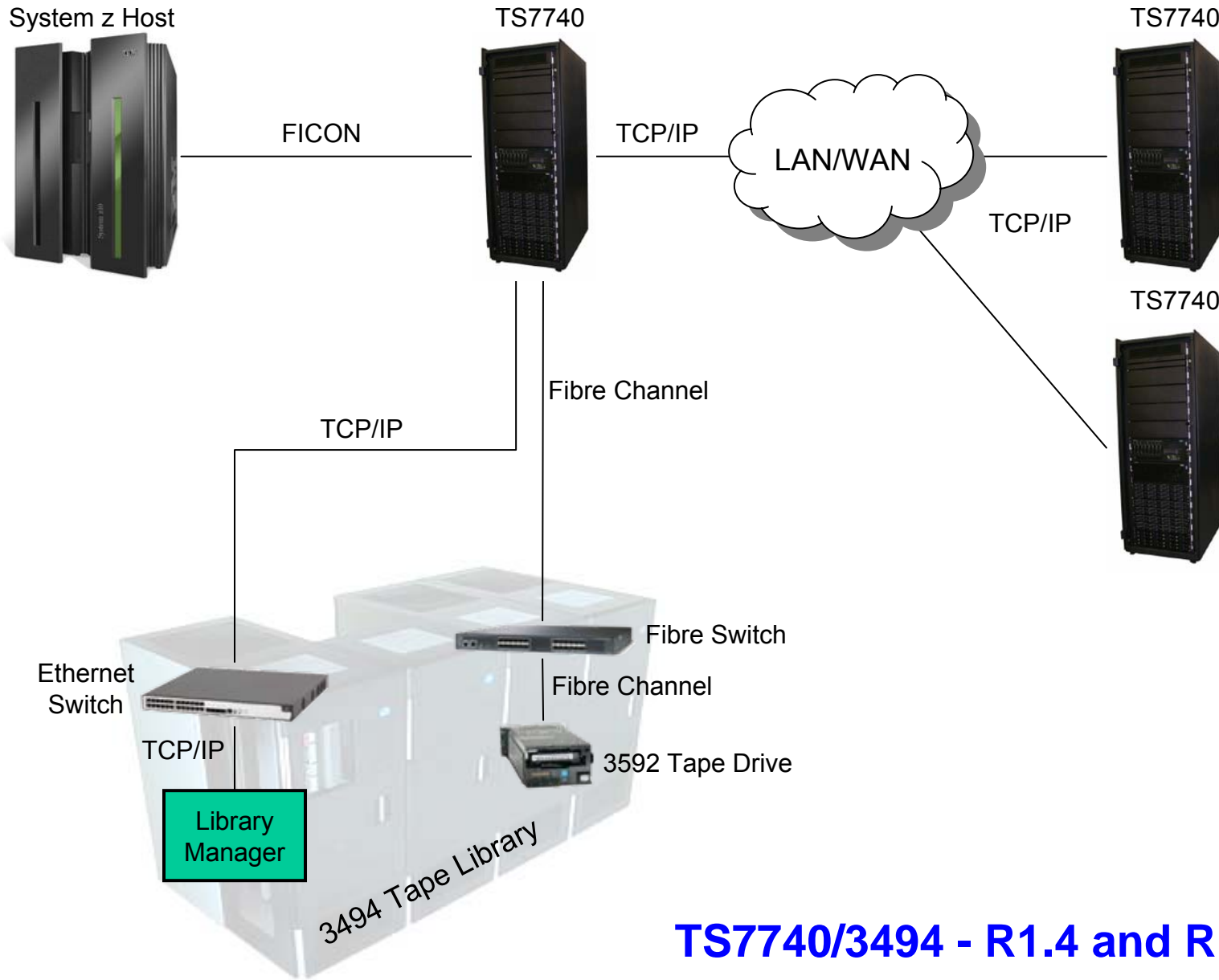


LEGEND

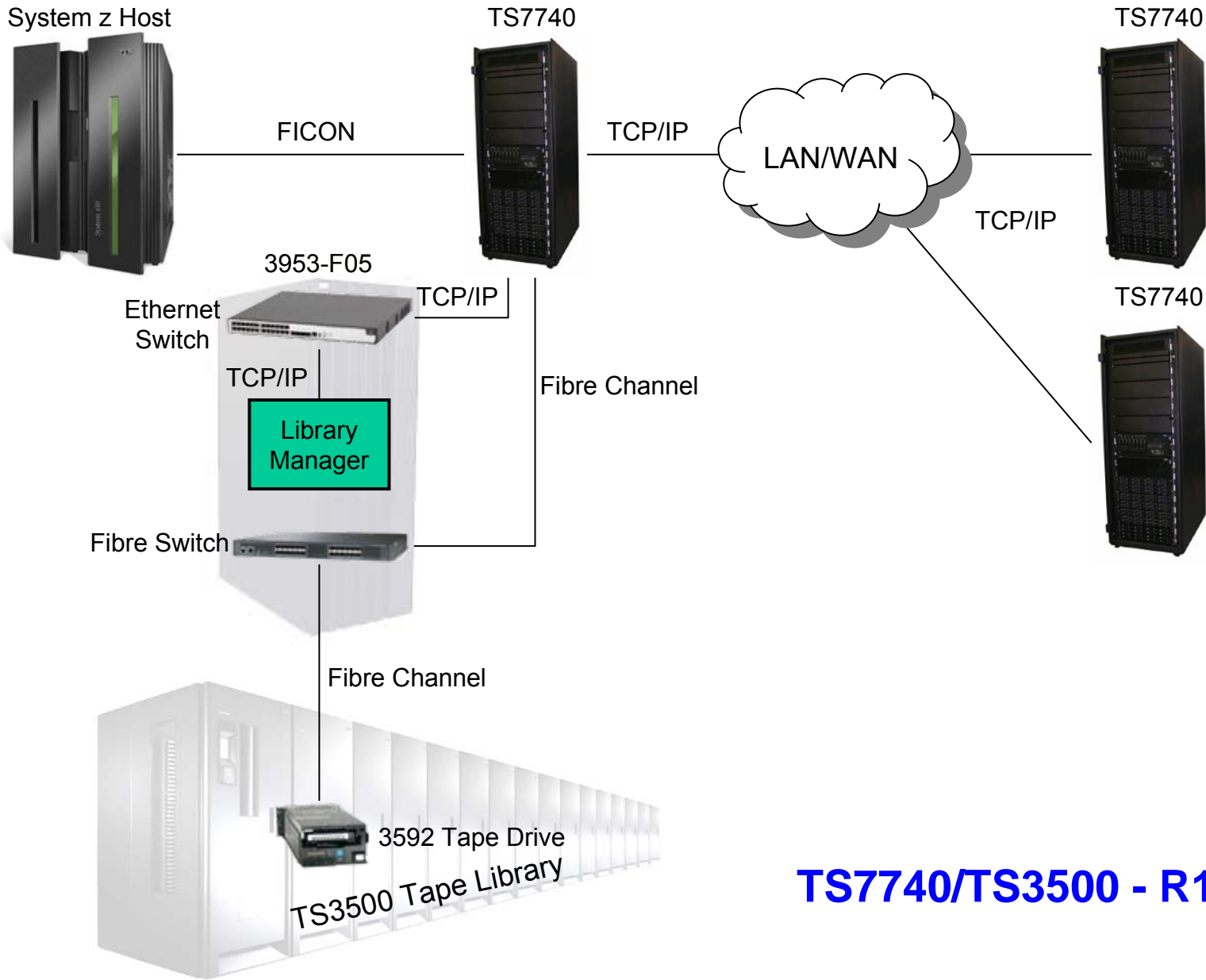
- Normal
- Degraded
- Failed
- Offline
- Service / Service Prep

**Link to
Operator Intervention**

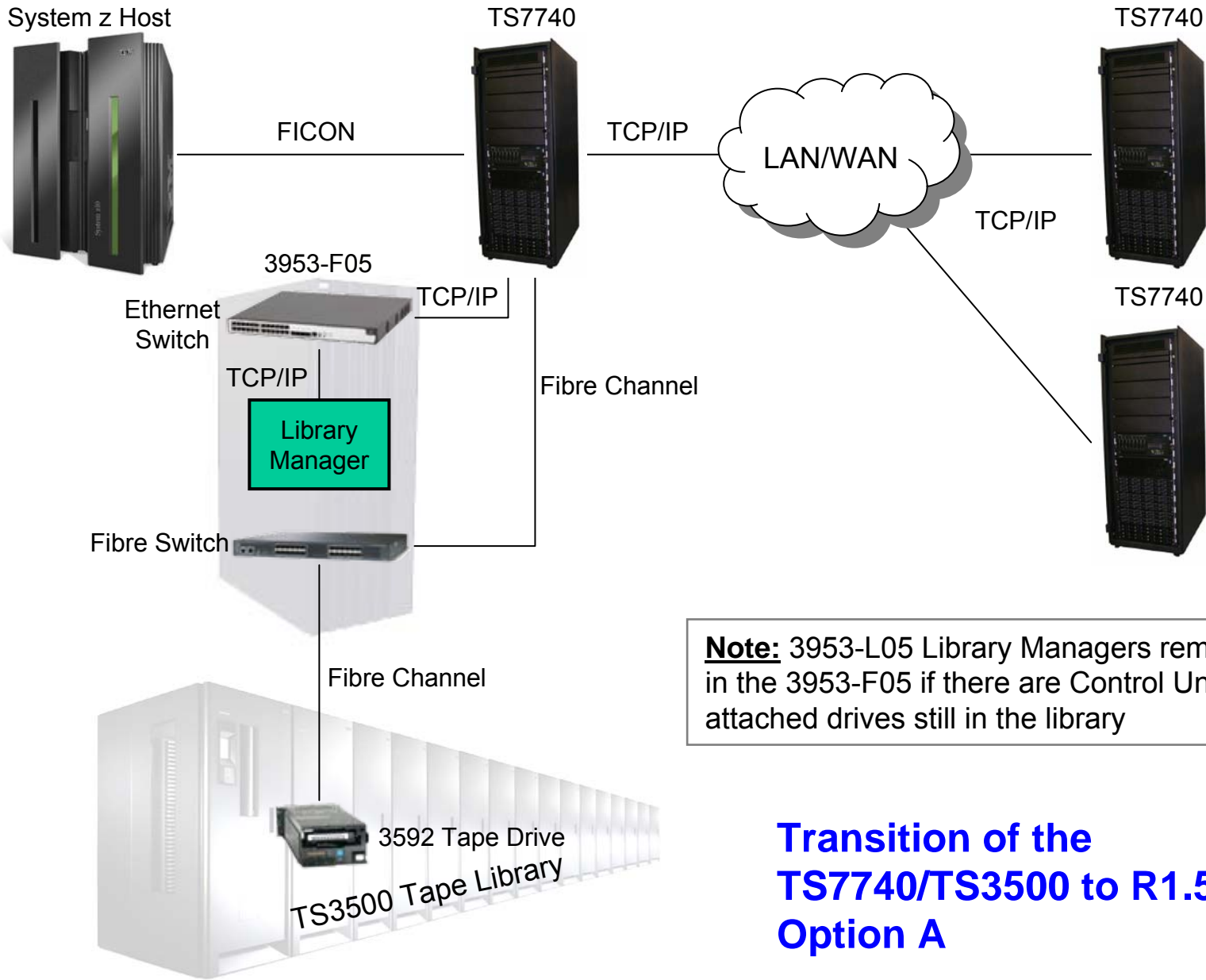
Current Cluster State	Degraded
Virtual Drives (Available/Total)	256/256
Physical Drives (Available/Total)	6/6
Operator Intervention	<u>Priority 0</u>



TS7740/3494 - R1.4 and R1.5

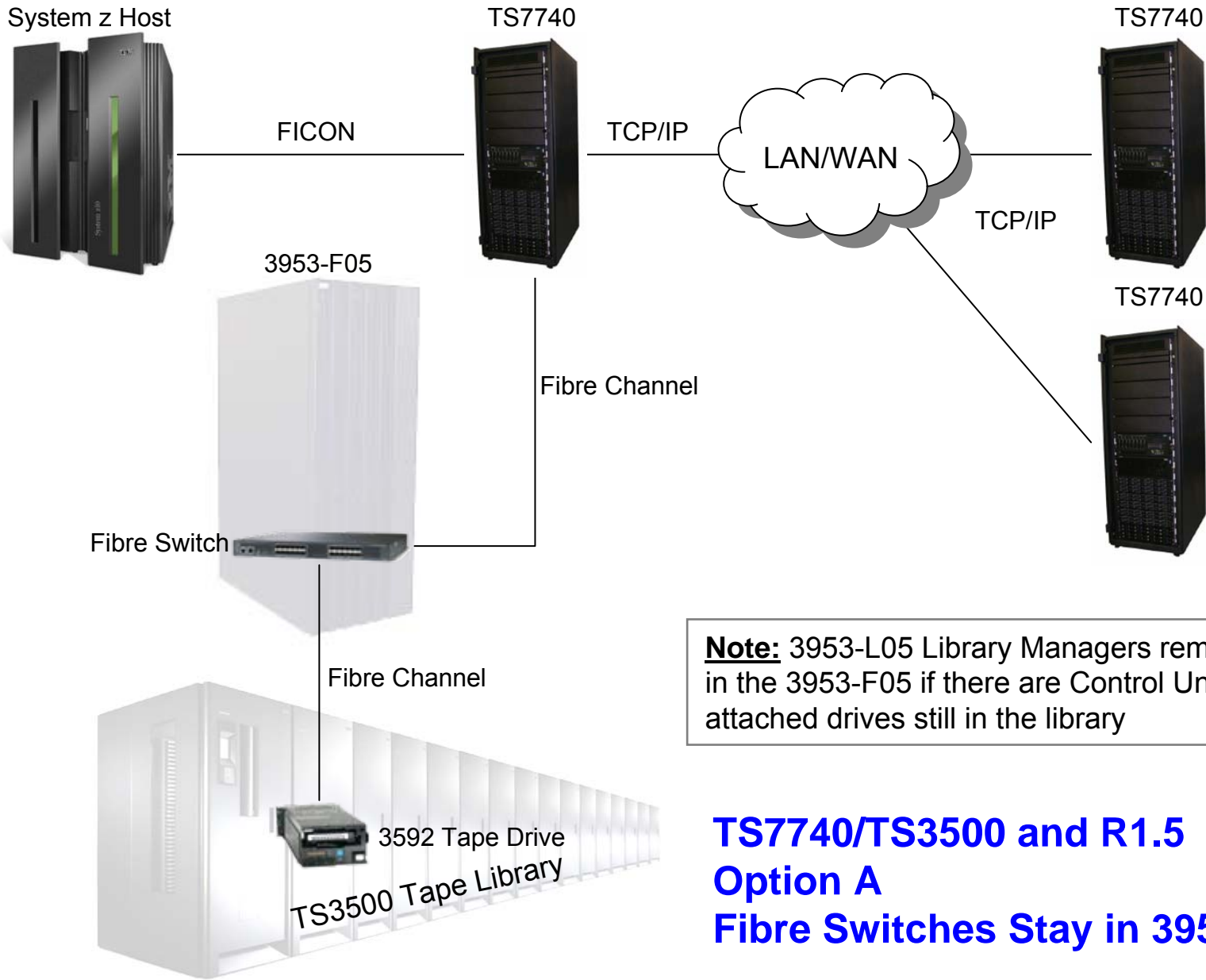


TS7740/TS3500 - R1.4



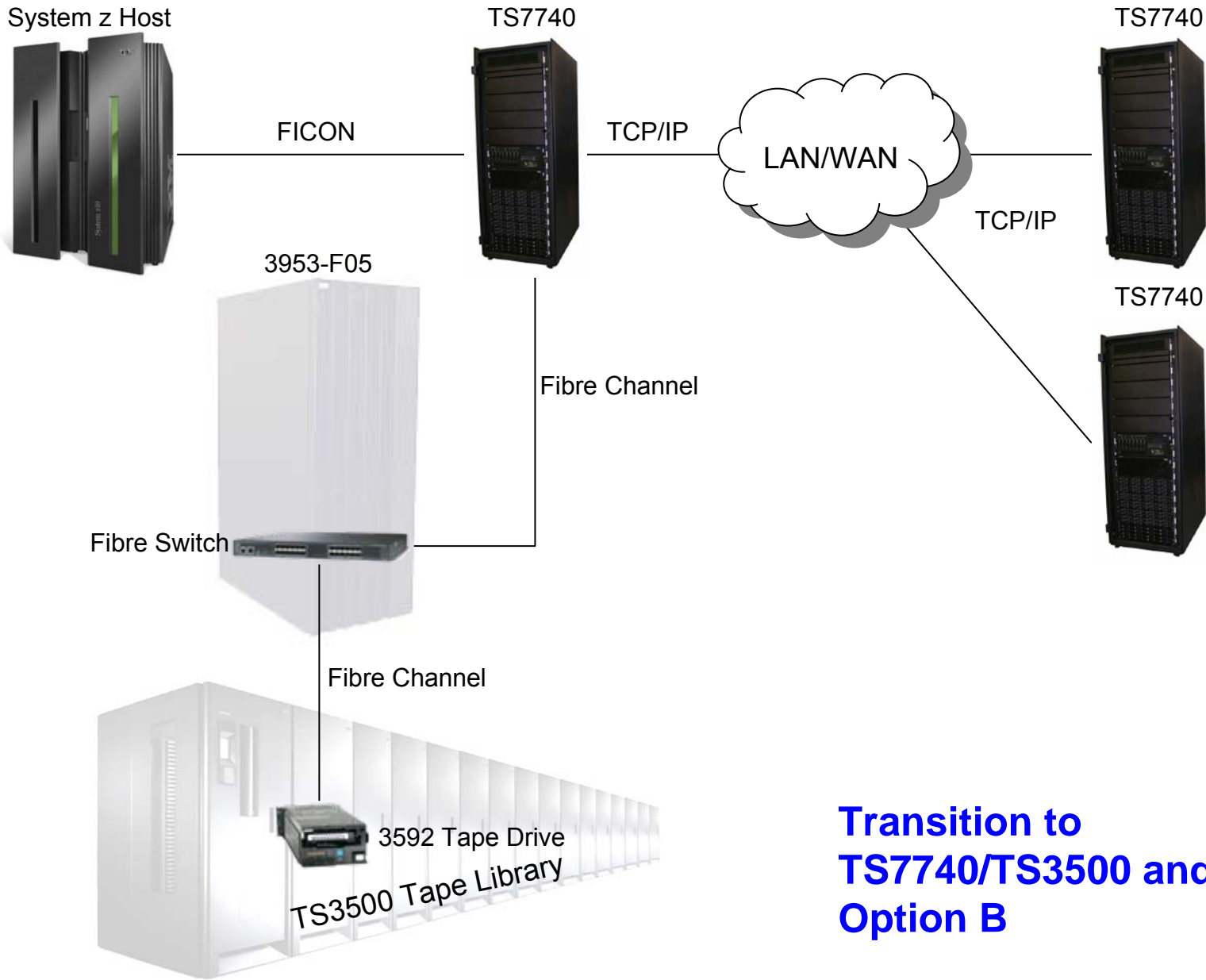
Note: 3953-L05 Library Managers remain in the 3953-F05 if there are Control Unit attached drives still in the library

Transition of the TS7740/TS3500 to R1.5 Option A

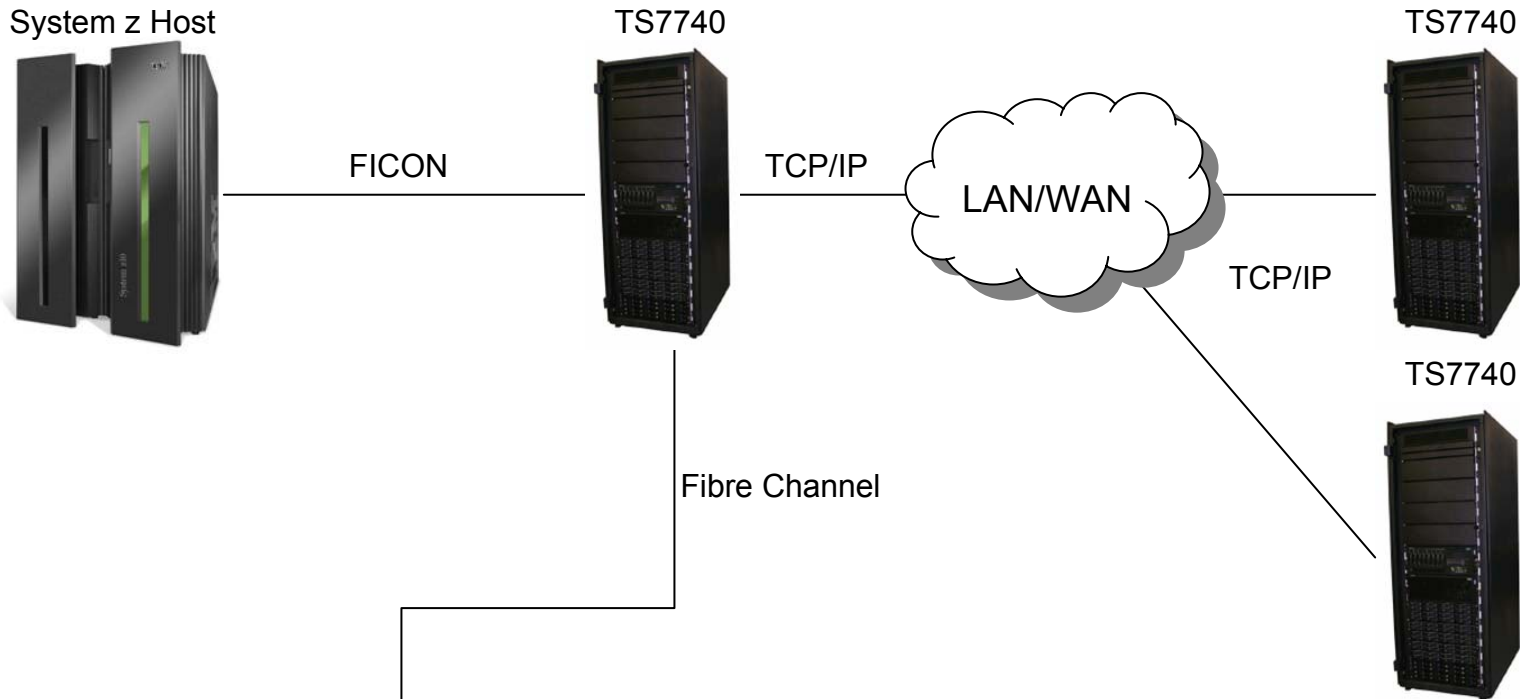


Note: 3953-L05 Library Managers remain in the 3953-F05 if there are Control Unit attached drives still in the library

**TS7740/TS3500 and R1.5
Option A
Fibre Switches Stay in 3953-F05**



**Transition to
TS7740/TS3500 and R1.5
Option B**



TS7740/TS3500 and R1.5 - Option B Fibre Switches Move to TS3500 D23 Frames

- **FC4748 Remove 4GB Switch** to remove switches from 3953-F05 (if applicable)
- **FC4871 TS7700 BE SW Mounting Hardware** to provide mounting hardware for Back End drive fibre switches. Includes a pair of cable trunks with 8 fibre cables each.
- **FC4872 TS7700 BE 4Gb Switches** if new switches are required
- **FC4873 Reinstall TS7700 BE switches** if moving switches from 3953-F05

R1.5 Performance Considerations

- Library Manager Functionality merged into TS7700 Code
- Faster return to scratch
- Faster logical mount times
- Higher logical mount rates
- Considerations if upgrading from R1.4 to R1.5
 - ▶ Perform another Tape Study (BatchMagic) if TS7700 is a very busy machine
 - ▶ Some workloads are faster with R1.5, others are slower

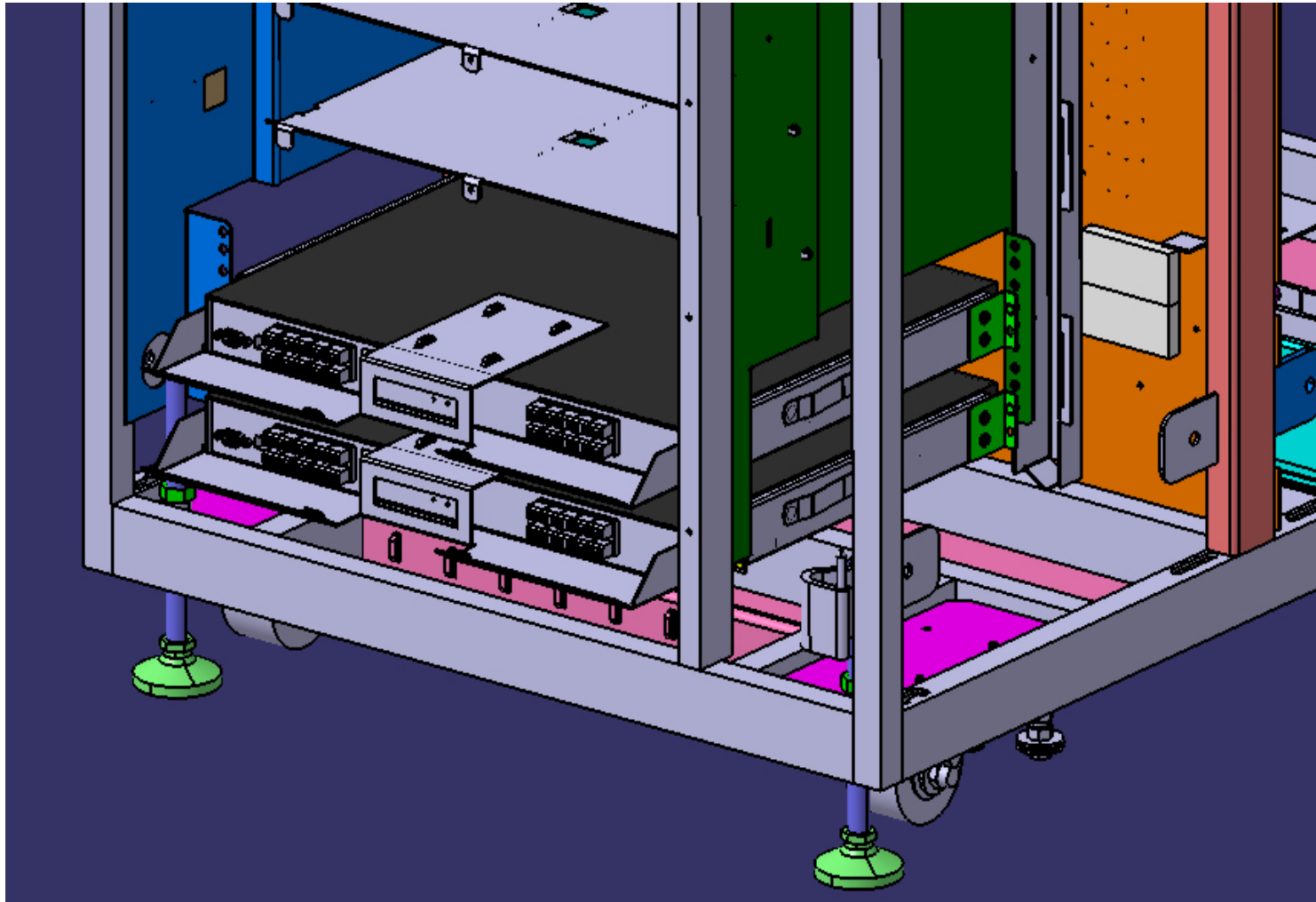
Fast-Ready and Read Hit Mounts		
	Pre R1.5	R1.5
Single Cluster	2-5 seconds	1-2 seconds
Grid	3-7 seconds	2-4 seconds

Return To Scratch		
	Pre R1.5	R1.5
Single Cluster	3.5-4.5 / sec	6-7 / sec
Grid	2.2.5 / sec	3.5-4.5 / sec

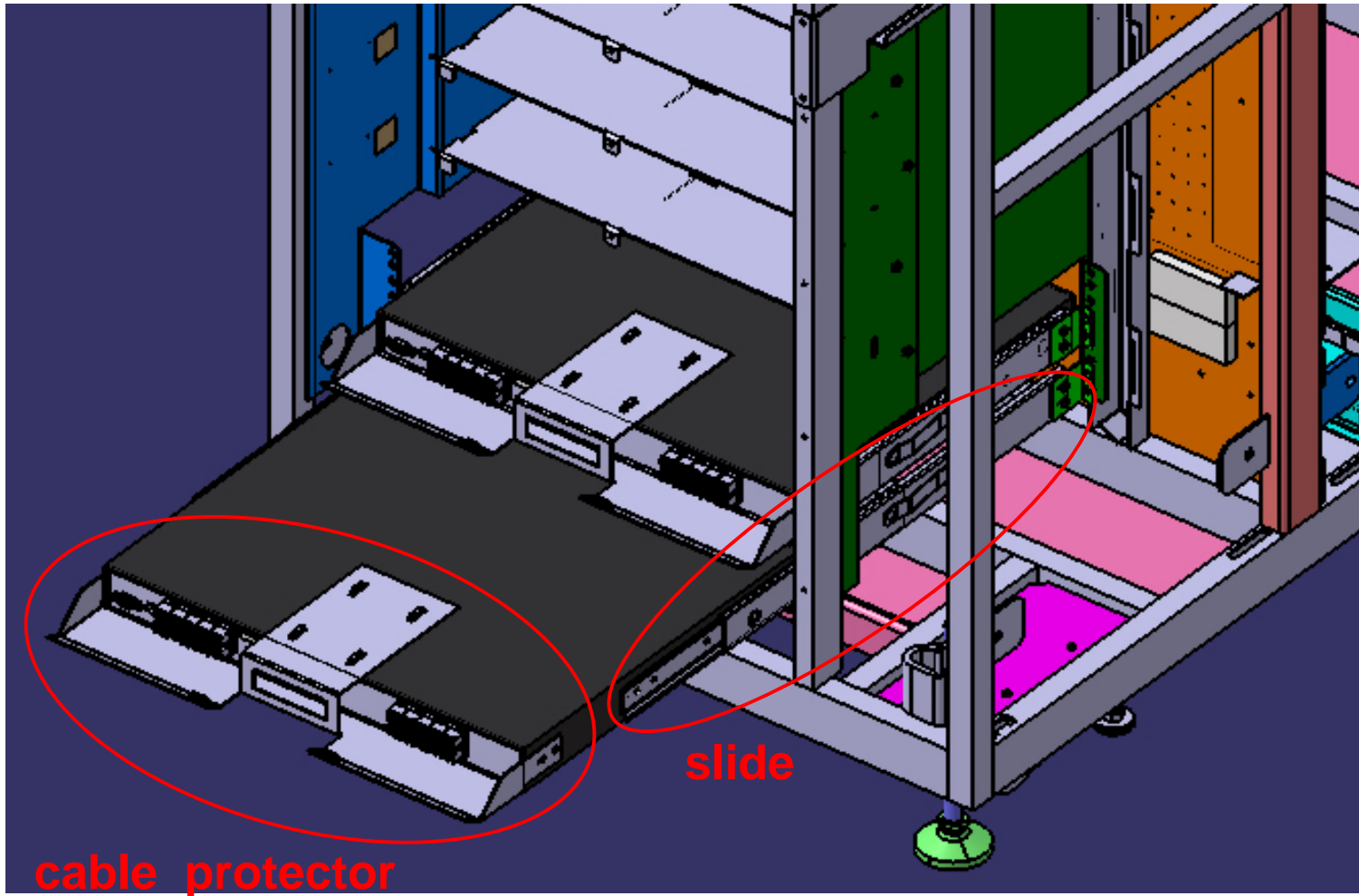
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Backend Drive Switch Placement



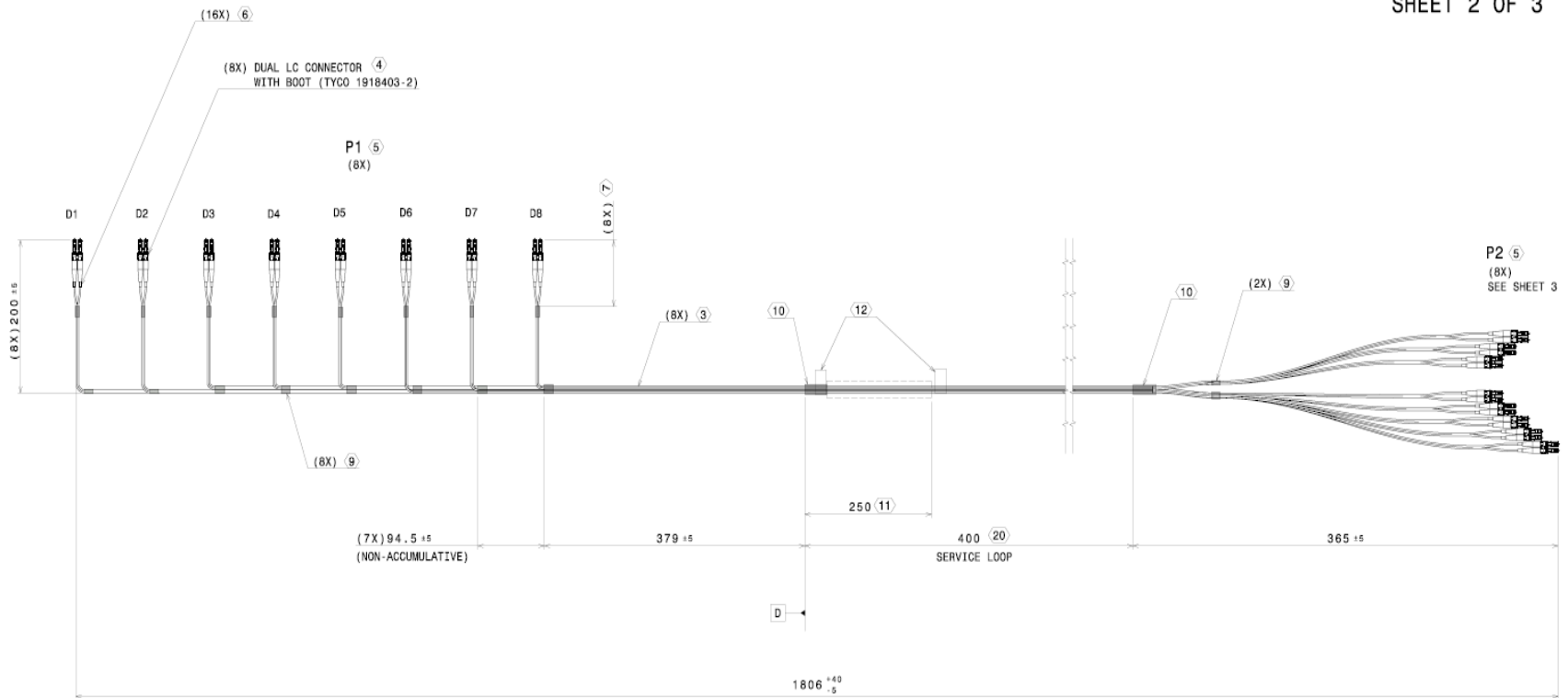
Backend Drive Switch Placement



Backend Switch Assembly

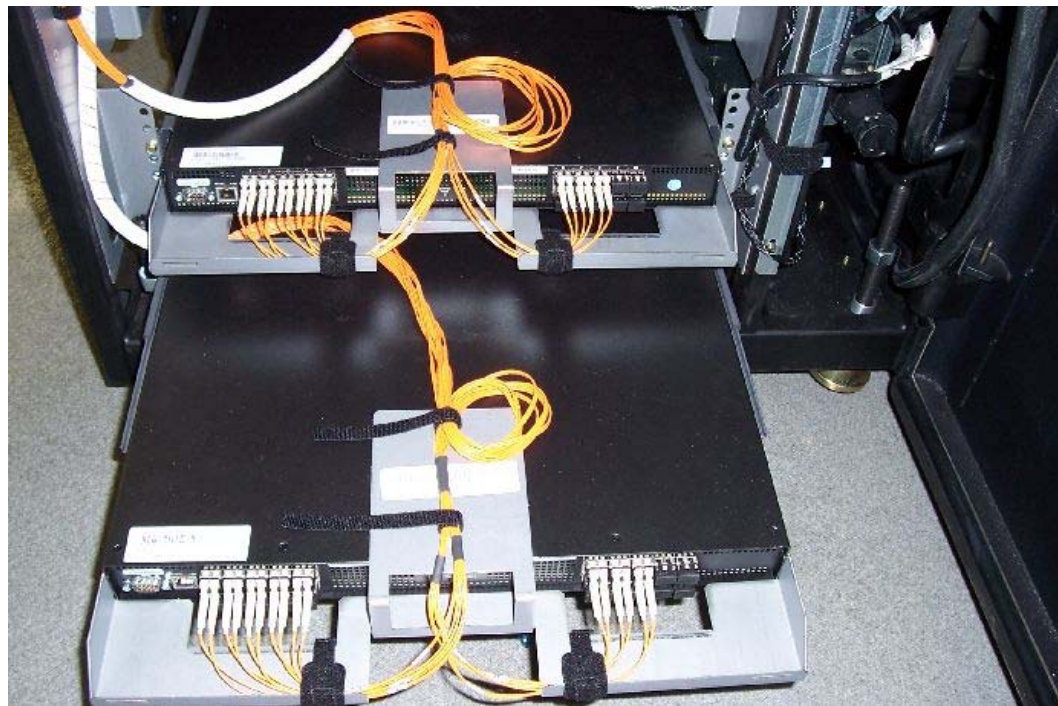
FC4871 - FC Trunk Cable

SHEET 2 OF 3

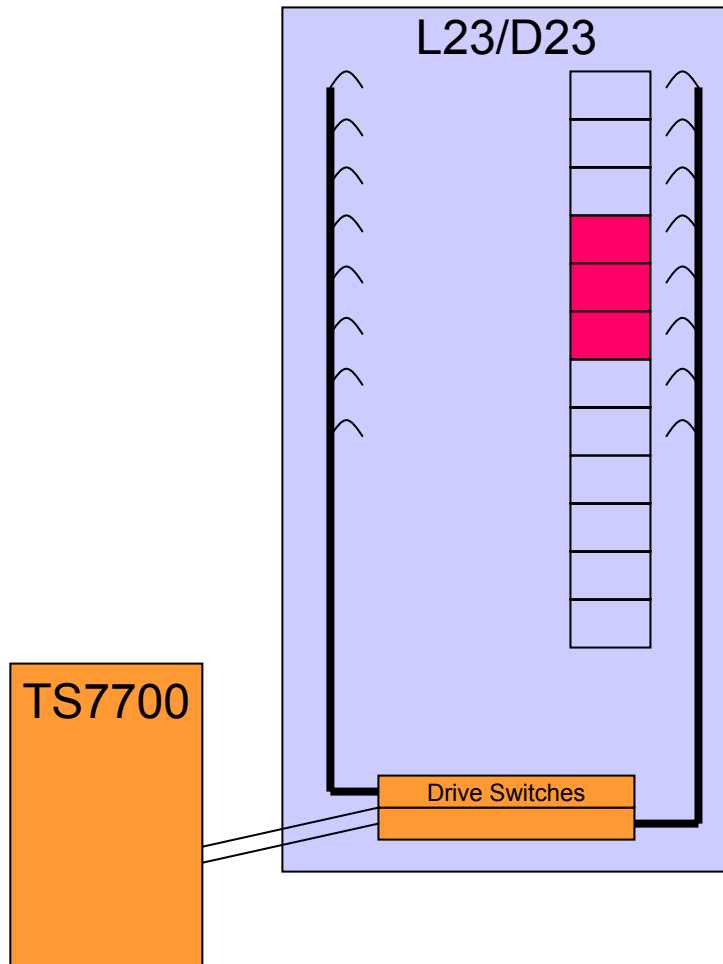


FC trunk cable

Trunk Cable Routing

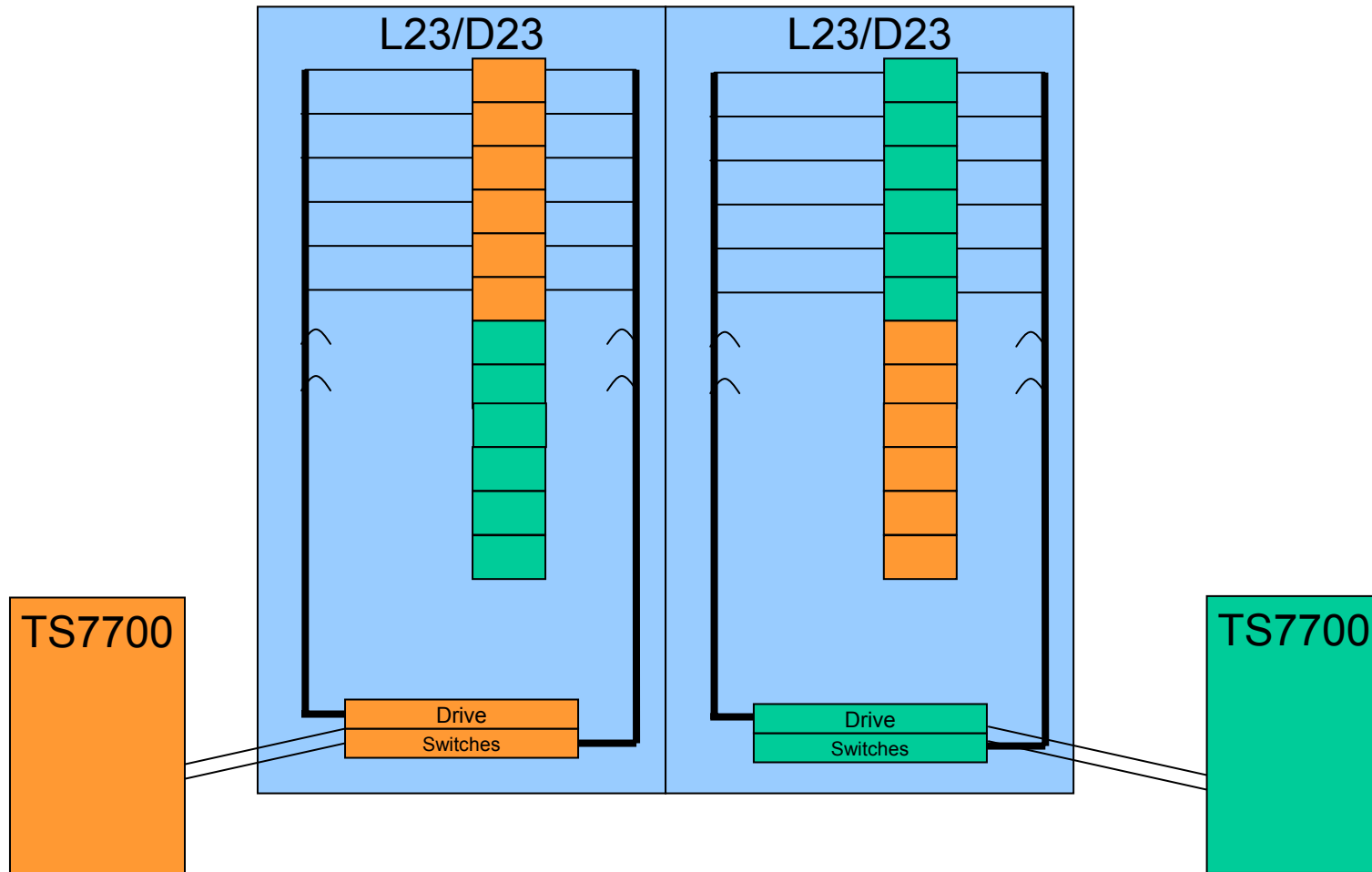


TS3500 L23/D23 Frame with TS7700 Drive Switches



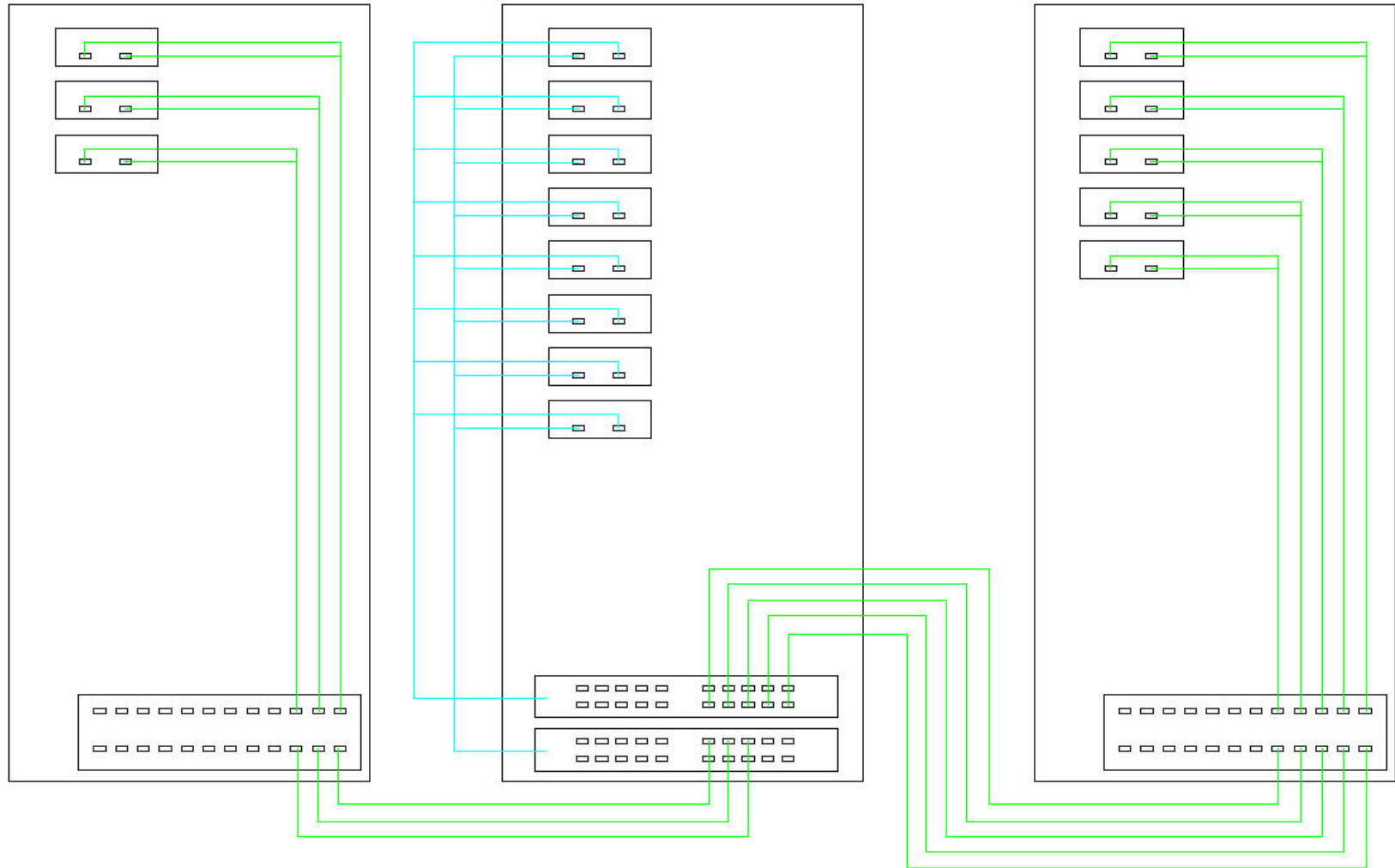
- **FC4871 – TS7700 BE SW Mounting Hardware**
 - Mounting hardware for drive switches
 - Two 8-cable trunk cables
- **TS7700 BE SW (Back-End Switch)**
 - FC4872 for new switches
 - FC4748 (remove) and FC4873 (reinstall) for existing switches in 3953-F05
- **FC1950 – Power Distribution Units**
 - Provides power to Frame Control Assembly (FC1451)
 - Requires dual line cord feature - #9954, #9955, #9956, #9957, #9958, #9959, or #9966.
 - Different power cord than frame with FC1451 only.
- Fibre patch panel is removed from frame.
- Drive slots may be used for non-TS7700 drives
 - Must be directly cabled to drive since patch panel is removed
 - Plan ahead for expansion of TS7700 drives in the frame.

Two TS7700s and Two Drive Frames



- FC4874, Adjacent Frame Support for BE Switches, cables not shown

Adjacent Frame Cabling



Examples and Exceptions

L23 with D23

“best practices”

L23	D23 8 Dr FC Sw	D23 8 Dr	D23
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max adjacent frame gap

L23	D23 8 Dr FC Sw	D23	D23	D23 8 Dr
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max distributed drives

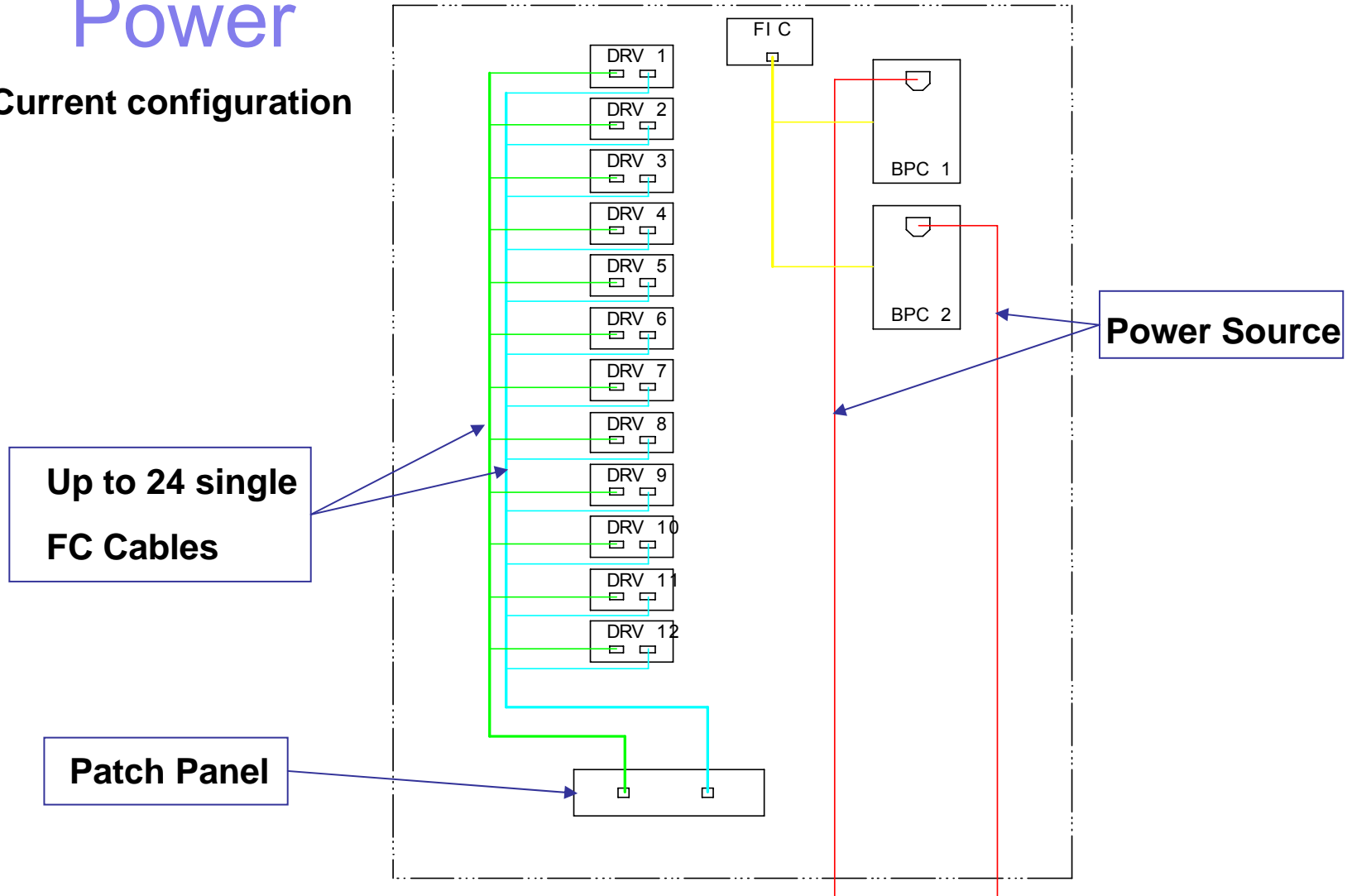
L23	D23 4 Dr FC Sw	D23 4 Dr	D23 4 Dr	D23 4 Dr
-----	----------------------	-------------	-------------	-------------

max distributed drives

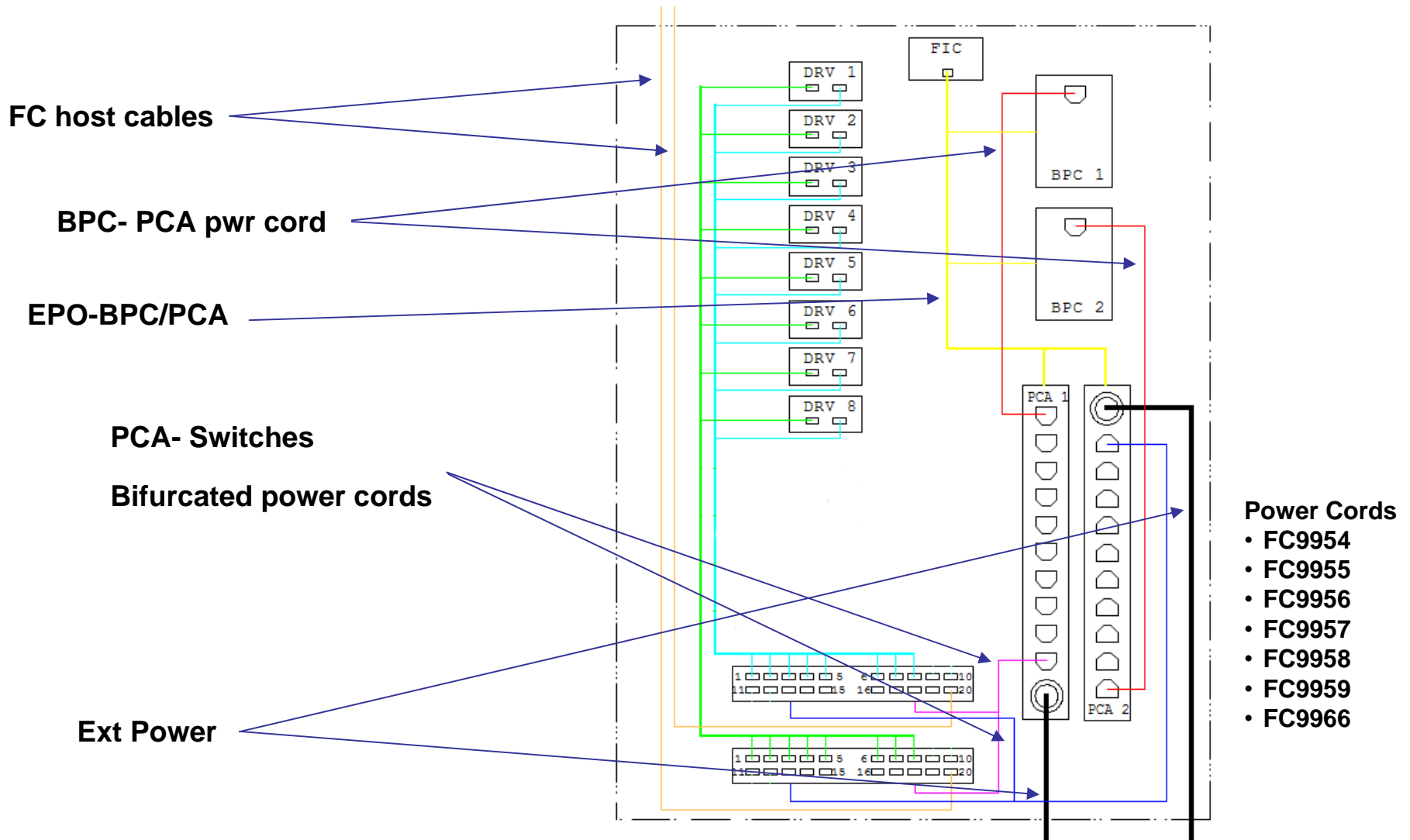
L23	D23 2 Dr	D23 3 Dr	D23 1 Dr	D23 4 Dr FC Sw	D23 3 Dr	D23 2 Dr	D23 1 Dr	D23
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Existing Frame Cabling Including Power

- Current configuration

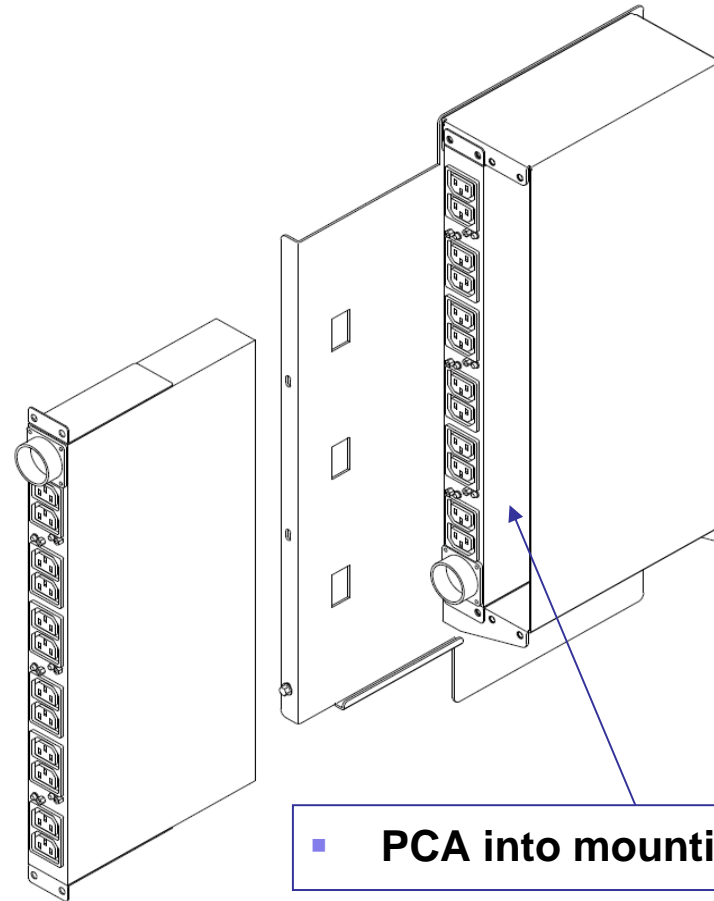
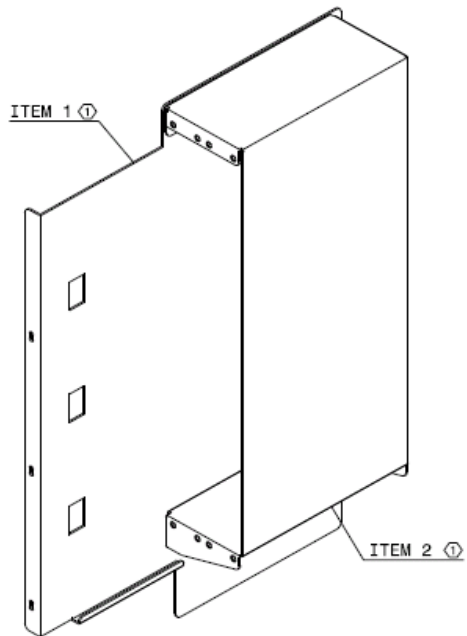


Cabling/Power with TS7700 BE Switches in Frame



TS3500 PDU Assembly FC1950

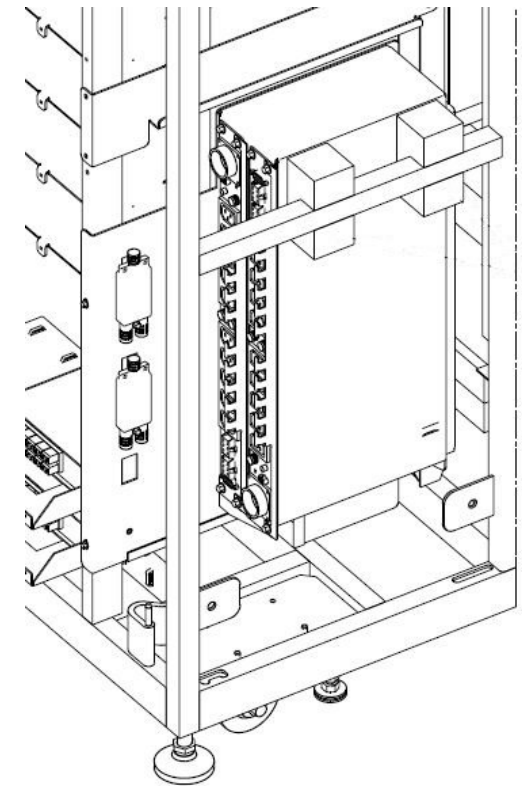
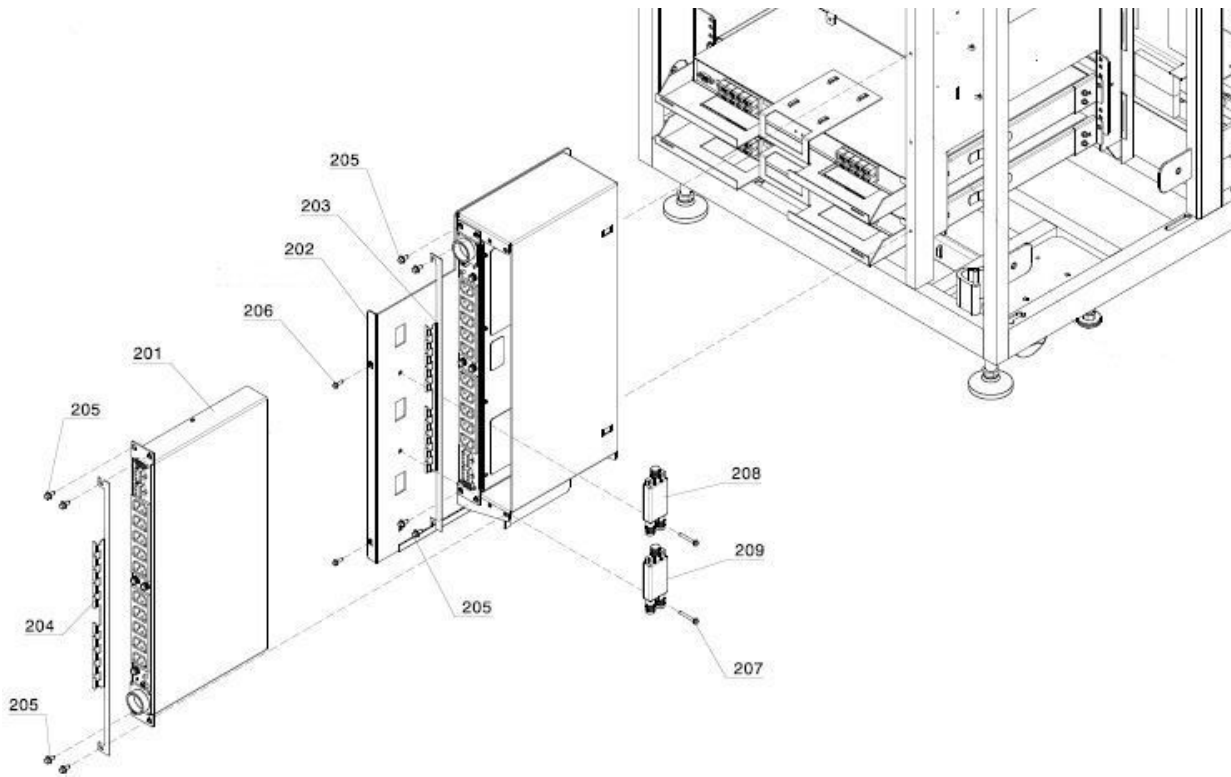
- PCA Mounting Bracket
- P/N 45E6244
- EC M10191
- Sheet Metal Part



- **PCA into mounting bracket**

PDU Assembly FC1950

TS3500 PDU Assembly FC1950



PDU Assembly FC1950

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CC6 - Upgrade

- Allows for capacity upgrades to existing CC6/CX6 chains by adding two additional CX6 drawers
- *9 TB option targeted for 1Q09 as an MES

Cache controllers	Cache expansion drawers	Drive capacity	Usable capacity
1	0	146 GB FC	1.5 TB
1	1	146 GB FC	3 TB
1	3	146 GB FC	6 TB
1*	5	146 GB FC	9 TB

New Disk Cache

- **Provides new CC7 and CX7 disk options for cache**
 - ▶ Keeps 0, 1 or 3 cache drawer options
 - ▶ Uses 300 GB FC drives instead of 146 GB FC drives
 - ▶ RAID 5 (same as CC6/CX6)
 - Two arrays of 6 Data and 1 Parity
 - 2 Hot spares per drawer
- **Initially only plant installed**

Cache controllers	Cache expansion drawers	Drive capacity	Usable capacity
1	0	300 GB FC	3.4 TB
1	1	300 GB FC	6.8 TB
1	3	300 GB FC	13.7 TB

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TS7700 Disk Only VTE for System z

- **Provides the benefits of the TS7740 Virtualization Engine without the need for physical tape**
 - ▶ All logical volumes are kept in the DASD cache
 - ▶ Number of logical volumes depends on their size
 - Maximum of 1M
- **Same functionality of the TS7740 System**
 - ▶ Transparent support on z/OS, z/VM, z/VSE & z/TPF
 - ▶ Standalone and business continuation configurations
- **What to call it?**
 - ▶ Disk Only
 - ▶ Disk Centric



TS7720 Disk Only VTE Components

■ TS7720 Disk Only VTE (3957-VEA)

- ▶ Power5++ architecture server based
- ▶ Two dual-core, 64-bit, 2.1-GHz processors
- ▶ Integrated Enterprise Library Controller

■ TS7720 Cache Drawer (3956-SX7)

- ▶ RAID array expansion (RAID 6)
- ▶ 16 – 7.5K RPM 1 TB SATA HDDs
- ▶ 10 TB Usable (after RAID and spares)
 - Two arrays of 5 Data and 2 Parity each
 - Two hot spares per drawer

■ TS7720 Cache Controller (3956-CS7)

- ▶ Disk RAID array controller
- ▶ 16 – 7.5K RPM 1 TB SATA HDDs
- ▶ 10 TB Usable (after RAID and spares)
 - Two arrays of 5 Data and 2 Parity each
 - Two hot spares per drawer

■ 3952 Model F05 Frame(s)

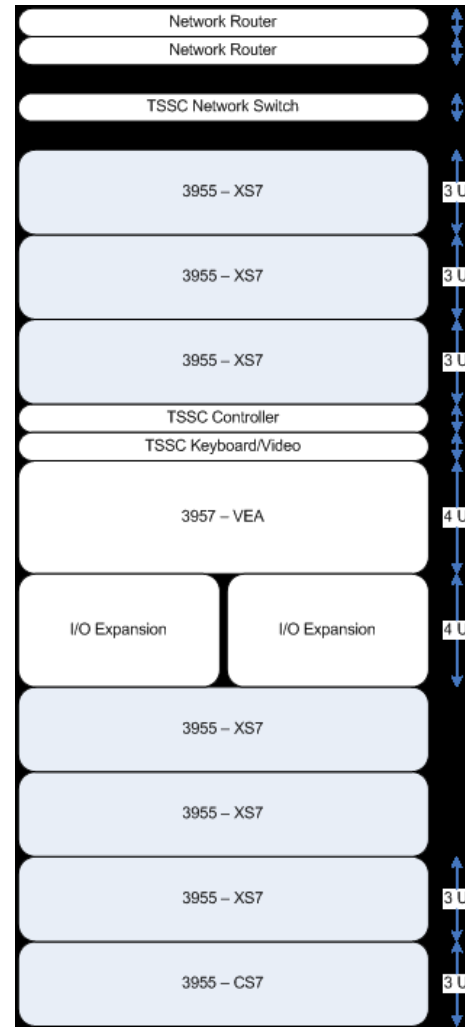
- ▶ Ethernet routers for service and management interface functions
- ▶ Houses major components & support components
- ▶ Dual Power

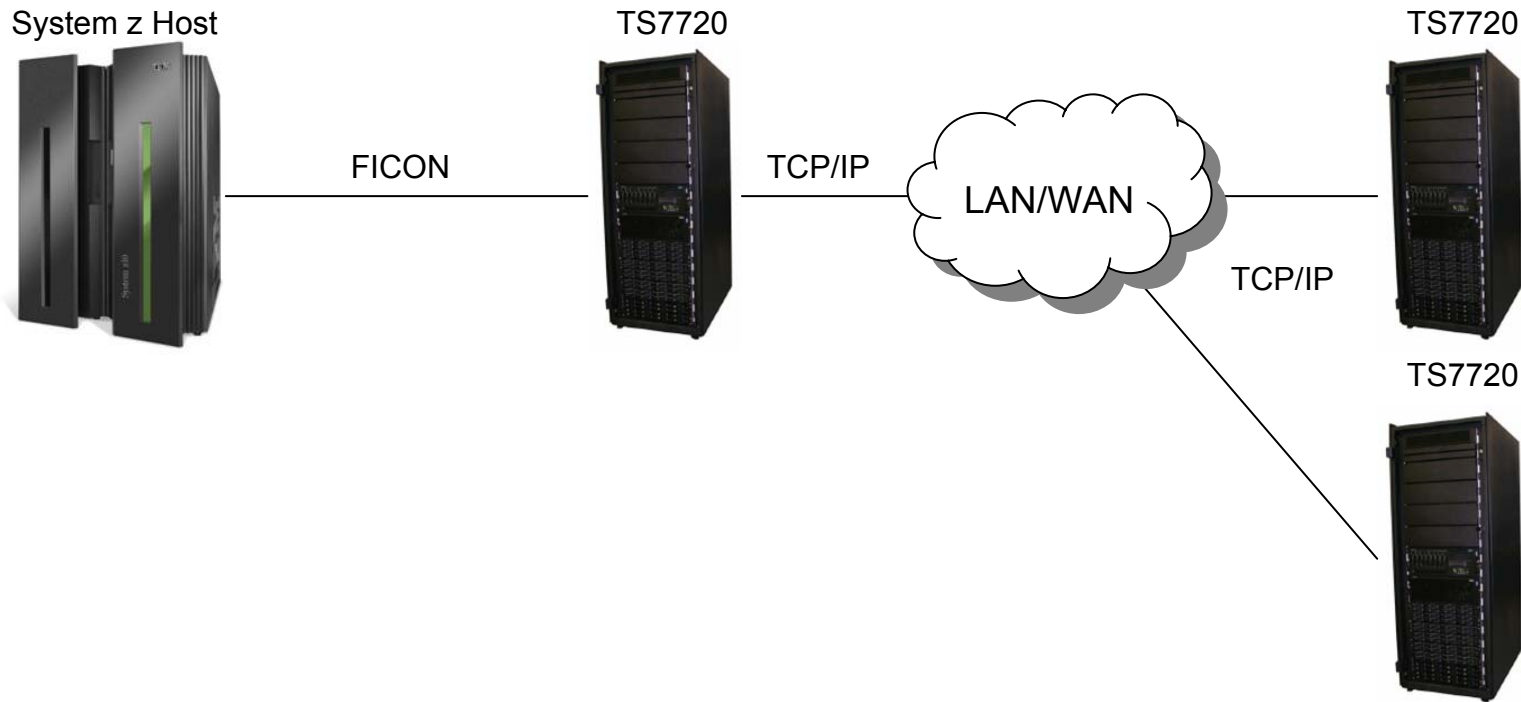


Cache Configuration (all prior to compression)

- **Variable cache configurations**
 - ▶ One 3956-CS7 Cache Controller
 - ▶ Plus up to six 3956-SX7 Cache Drawers
- **Capacities up to 70 TB (RAID 6)**
 - ▶ Two sizes available - 40 TB and 70 TB
 - ▶ Uncompressed capacity
- **Stores hundreds of thousands of logical volumes**
 - ▶ Almost 300,000 assuming 600MB host volumes with a compression ratio of 3:1
 - ▶ Maximum of 1,000,000 logical volumes

TS7720 Physical Layout





TS7720 Multi-Cluster Grid

- All clusters in the same grid must have the same size cache

TS7700 Disk Only VTE - Initial Release Functions

■ Integrated Library Manager

- ▶ Logical library functions of 3953 Library Manager are integrated into the TS7720
- ▶ Handles the library interface to the zSeries attached hosts

■ Cache space management

- ▶ Monitor available and used space through host console command or TS7700 Management Interface
- ▶ Cache space messages to attached hosts (CBR3750I console messages on z/OS)
 - Limited space warning
 - Free space is below (5% of cache size plus 2TB)
 - Operations continue
 - Out of space warning
 - Free space is below 5% of cache size
 - Only specific mounts for read are allowed

■ Participation in a Grid configuration

- ▶ All clusters must be TS7720s
- ▶ Peers must be configured with the same cache size
- ▶ All Grid functions are supported (2 & 3 site configurations)

■ Management interface

- ▶ 'gray' out functions that are not available (anything to do with physical tape)

DFSMS Software Support - Transparent

- **Transparent to current levels of z/OS**
 - ▶ Configures the same as the current TS7740
 - ▶ Composite and Distributed libraries
- **Cache space warning messages**
 - ▶ Uses the CBR3750I Message to Operator functions
- **Out of Space mount return code**
 - ▶ Uses the CBR4196D Mount Retry function
 - ▶ Allows for retry after customer takes actions to free up space
- **Transparent to third-party software**
 - ▶ CA, TLMS, etc.
- **Accepts system managed storage constructs**
 - ▶ Only logical volumes size and Grid copy policies are used
 - ▶ All others are accepted but cause no actions to be taken



Customer Space Management

- **In response to warning messages**
 - ▶ Must free space in cache
 - ▶ Must remove logical volume data from the cache
- **Copy still needed logical volume to external tape**
- **Return unneeded logical volumes to scratch status and then eject them**
 - ▶ Uses existing z/OS host functions (or similar on other OSs)
- **Adjust expire time for scratch categories**
- **If mounts were failed with a return code - retry after making space available**
 - ▶ Mounts are held for retry with message CBR4196
 - ▶ Can also be cancelled if space cannot be made available.

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TS1130 Support (3592-E06/EU6)

- All drives in the system must be of the same type
 - ▶ 3592-J1A or 3592-E05 in J1A emulation mode
 - ▶ 3592-E05 in native mode
 - ▶ 3592-E06/EU6
- Media type/Capacities



Drive Type	Media	Capacity
3592-J1A	JJ	60 GB
3592-E05 in J1A emulation mode	JA	300 GB
3592-E05/TS1120	JJ	100 GB
	JA	500 GB
	JB	700 GB
3592-E06/TS1130	JJ	128 GB
	JA	640 GB
	JB	1000 GB

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Workflow Management Enhancements

- Provides the user the ability to adjust the internal management and alert levels managed by the TS7700
- New controls set and retrieved by via the TS7700 z/OS Host Command Line Request function
- Settings are persistent, are maintained across code upgrades, system restarts, etc.
- Keyword “SETTING” added
- Three categories (keywords) of setting added
 - ▶ Alert
 - ▶ Cache
 - ▶ Throttle
- Refer to IBM® Virtualization Engine TS7700 Series z/OS Host Command Line Request User's Guide Version 1.2 on Techdocs for details.

Workflow Management Enhancements – Alert Messages

■ Alert level controls

- ▶ Provides a mechanism to present messages to the host console when various metrics have crossed a customer set boundary
- ▶ Alerts are defined in two levels, warning and critical. Each is configured by the customer
- ▶ Messages are sent when the configured metric has crossed the warning or critical levels, as well as when the system drops below the threshold level

■ Alert conditions which can be managed are

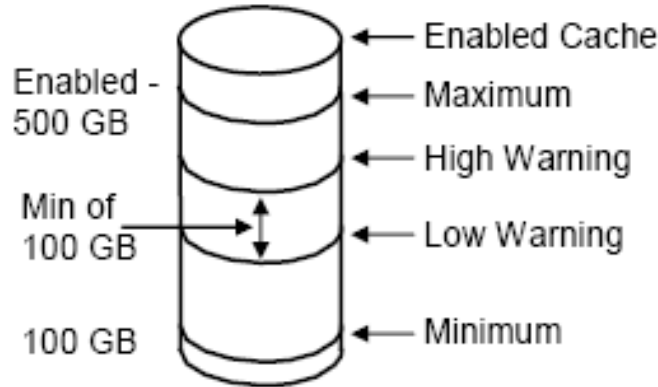
- ▶ Copy crit – Critical level of the amount of data needing to be replicated to other TS7700s
- ▶ Copy low – Warning level of the amount of data needing to be replicated to other TS7700s
- ▶ Physical drive crit – Critical level of available physical backend drives
- ▶ Physical drive low – Warning level of available physical backend drives
- ▶ Physical scratch crit – Critical level of physical scratch
- ▶ Physical scratch low – Warning level of physical scratch
- ▶ Residual data crit – Critical level of unpremigrated data in TS7700 cache
- ▶ Residual data warn – Warning level of unpremigrated data in TS7700 cache

■ Generates a z/OS message as thresholds are crossed

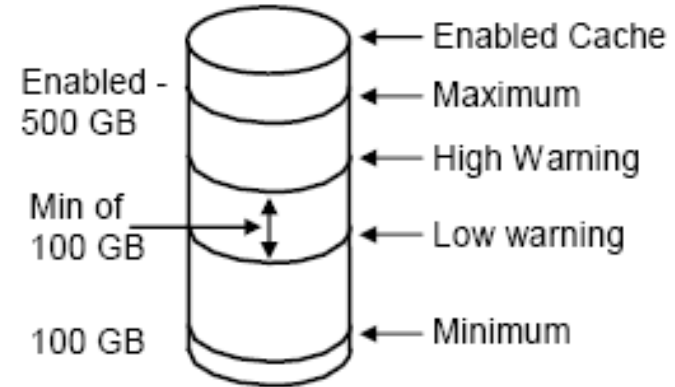
- ▶ CBR3750I Message from library Prodlib: AL5006 Available physical scratch volumes of 98 below critical limit of 100 for pool 12.

Workflow Management Enhancements – Alert Messages

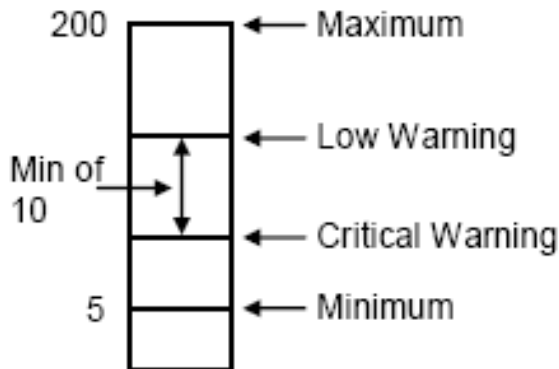
Uncopied Data



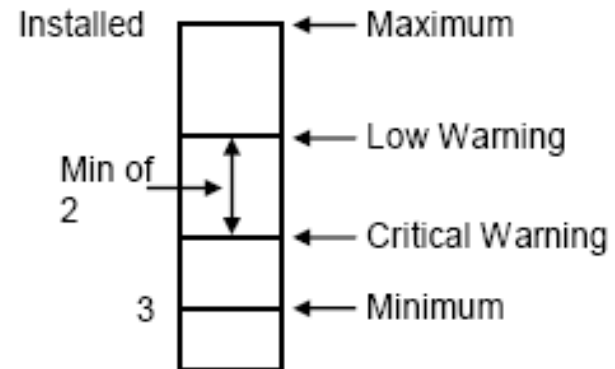
Resident Data



Physical Scratch Volumes



Available Physical Drives

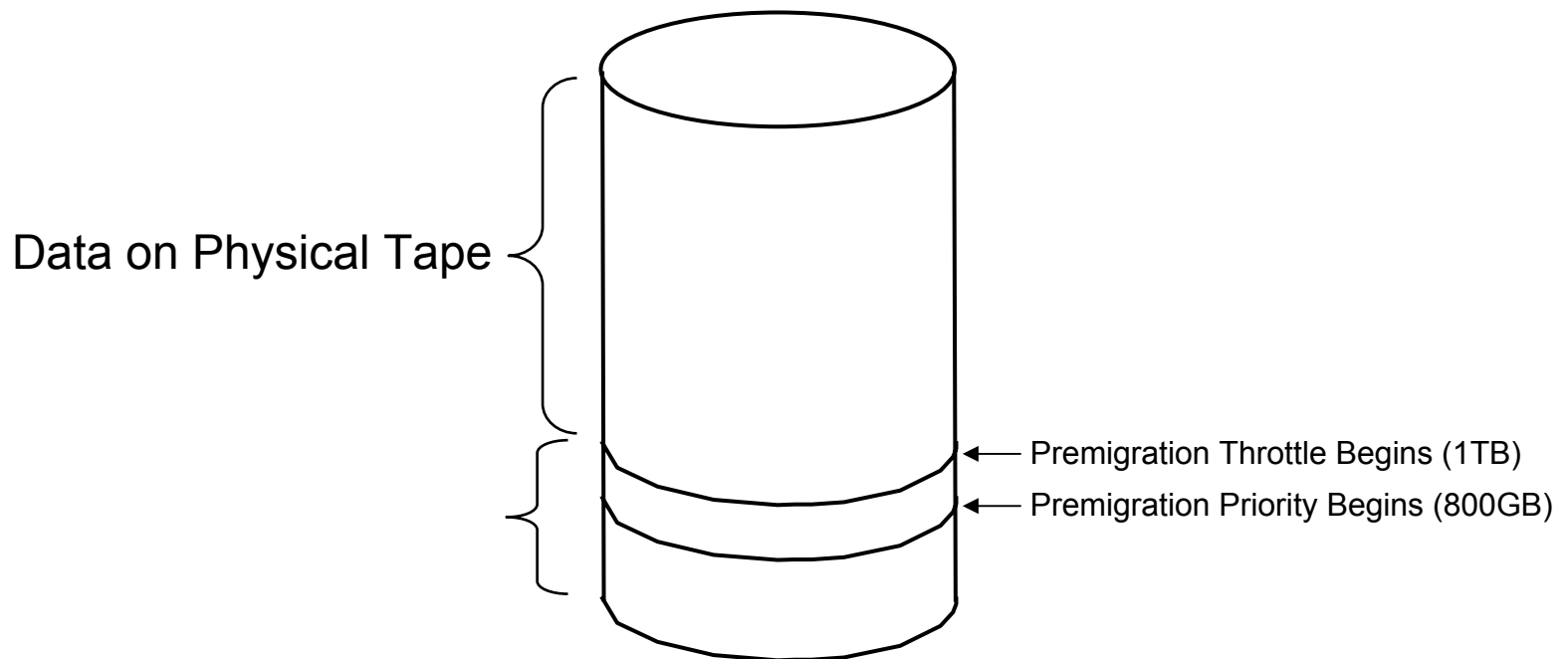


Workflow Management Enhancements – Cache Controls

- **This allows the customer to tailor how the TS7700 manages the data flow through the disk cache within the system to better fit their needs**
- **Cache Controls**
 - ▶ **Copies to follow Storage Class preference** – Determines if incoming copies should be treated as PG0 or as defined by Storage Class
 - **Disable/Enable**
 - ▶ **Premigration Priority Threshold** – Threshold to begin ramping up number of physical drives to perform premigration
 - Default is 800GB of resident data
 - ▶ **Premigration Throttling Threshold** – Threshold to begin throttling host I/O in order to keep unpremigrated data below this level
 - Default is 1000GB of resident data
 - ▶ **Recalls Preferred to be removed from cache** – treats recalls as PG0 rather than defined from Storage Class
 - **Disable/Enable**

Premigration Threshold

- **Manages amount of cache resident only (unpremigrated) data**
- **Manages write data rate between peak and sustained levels**



Workflow Management Enhancements – Throttle Controls

- **This allows the customer to tailor when, and to what levels, the TS7700 paces host I/O or replication via the throttling mechanism**
- **Throttle Controls**
 - ▶ **Full Cache Copy Throttle** – Determines if the TS7700 begins to pace the host I/O when logical volume replication begins to fall behind, such that the amount of uncopied data within the cache grows
 - **Enable/Disable**
 - ▶ **Deferred Copy Throttle** – Sets the amount of delay the TS7700 will introduce per 256KB copied, when system resources are constrained
 - Default is 125 msec
 - ▶ **Immediate Copy Throttling** – Determines if the TS7700 should restrict the host I/O when immediate copies begin to approach the MIH timeout value
 - **Enable/Disable**

Topics

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- **3592-E06/EU6 Support**
- **Workflow Management Controls**
- **zOS Host Support**
 - ▶ Device Knowledge at the Distributed Level
 - ▶ TS7720 “Disk-Only” Support
 - ▶ Releases and Applicable APARs
- **Withdrawals**
- **Implementation and Migration Services**

Device Knowledge at the Distributed Level

- **TS7700 now reports to the host what devices are in which distributed library (reported through read device characteristics (RDC)):**

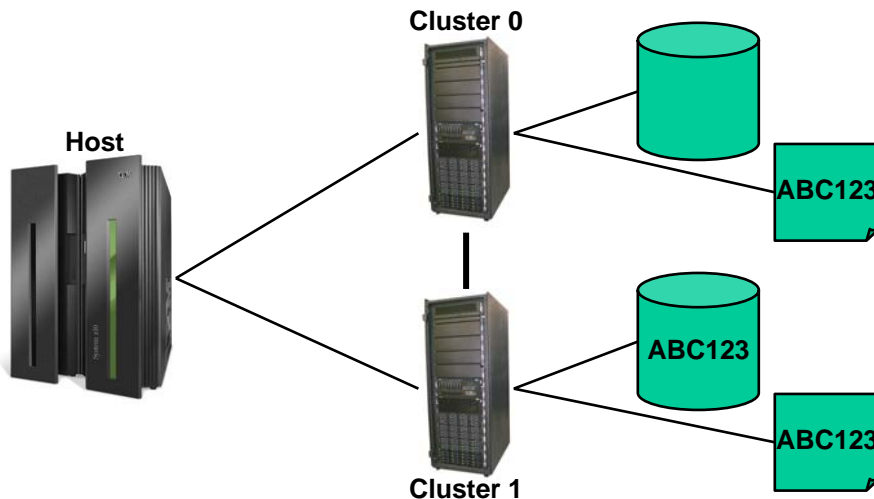
- ▶ This added information is maintained in host control blocks and displayed also through enhanced operator commands (DEVSERV QLIB)

```
10.53.28 devserv qtape,1c20,rdc
10.53.28 IEE459I 10.53.28 DEVSERV QTAPE 993
UNIT DTYPE DSTATUS CUTYPE DEVTYPE CU-SERIAL DEV-SERIAL ACL LIBID
1C20 3490L ON-RDY 3957C2A 3592 * 0178-3484G 0178-3484G I 3484F
READ DEVICE CHARACTERISTIC
34905434905400E0 1FD88080B61B4168 00005AC000000000 3957413592400002
03484F0301000000 4281000004000000 0400000000000000 0000000000000000
**** 1 DEVICE(S) MET THE SELECTION CRITERIA
**** 1 DEVICE(S) WITH DEVICE EMULATION ACTIVE
```

Note: Byte 36 in the display above indicates that device 1C20 is associated with the 1st distributed library

Device Knowledge at the Distributed Level

- **Even though the host has this knowledge**, all devices and volumes are still associated with the composite library
 - ▶ When defining devices through HCD, the composite library ID is still specified
- **With this added knowledge host “affinity” list processing reintroduced**
 - ▶ on a specific mount, the library will preference a specific distributed library(s):
 - directs the host to the best distributed library in a multi-cluster grid configuration
 - maximizes cache hits, minimizes remote cache access, and provides for better workload balancing
 - ▶ host will allocate a device from the ordered list of distributed library IDs provided



DEVSERV QLIB Command

■ Sample display for composite library “11111”

```
DEVSERV QLIB,11111
IEE459I 11.34.29 DEVSERV QLIB
The following are defined in the ACTIVE configuration:
LIBID  PORTID      DEVICES
11111  01             0200* 0201* 0202* 0203* 0204* 0205* 0206* 0207*
                0208* 0209* 020A* 020B* 020C* 020D* 020E* 020F*
                02             0218* 0216* 0217* 0219* 021A* 021B* 021C* 021D*
                021E* 021F* 0210* 0211* 0212* 0213* 0214* 0215*
                03             7737* 7736* 7738* 7739* 773A* 773B* 773C* 773D*
                773E* 773F* 7730* 7731* 7732* 7733* 7734* 7735*
                . . .
                41             0316* 0318* 0317* 0319* 031A* 031B* 031C* 031D*
                031E* 031F* 0310* 0311* 0312* 0313* 0314* 0315*
                42             A877* A876* A878* A879* A87A* A87B* A87C* A87D*
                A87E* A87F* A870* A871* A872* A873* A874* A875*
                . . .
DISTRIBUTED LIBID(S)
1111A* 1111B* 1111C
```

Note: no host connectivity to the devices in distributed library “1111C”

DEVSERV QLIB Command

■ Sample display for the 1st distributed library “1111A”

```
DEVSERV QLIB,1111A
IEE459I 11.34.29 DEVSERV QLIB
The following are defined in the ACTIVE configuration:
LIBID  PORTID      DEVICES
22222  01             0200* 0201* 0202* 0203* 0204* 0205* 0206* 0207*
                0208* 0209* 020A* 020B* 020C* 020D* 020E* 020F*
                02             0218* 0216* 0217* 0219* 021A* 021B* 021C* 021D*
                021E* 021F* 0210* 0211* 0212* 0213* 0214* 0215*
                03             7737* 7736* 7738* 7739* 773A* 773B* 773C* 773D*
                773E* 773F* 7730* 7731* 7732* 7733* 7734* 7735*
                04             7757* 7756* 7758* 7759* 775A* 775B* 775C* 775D*
                775E* 775F* 7750* 7751* 7752* 7753* 7754* 7755*
                . . .
COMPOSITE LIBID
11111
```

DEVSERV QLIB Command

■ Sample display for the 2nd distributed library “1111B”

```
DEVSERV QLIB,1111B
IEE459I 11.34.29 DEVSERV QLIB
The following are defined in the ACTIVE configuration:
LIBID  PORTID      DEVICES
33333  41             0316* 0318* 0317* 0319* 031A* 031B* 031C* 031D*
                               031E* 031F* 0310* 0311* 0312* 0313* 0314* 0315*
                               42             A877* A876* A878* A879* A87A* A87B* A87C* A87D*
                               A87E* A87F* A870* A871* A872* A873* A874* A875*
                               . . .
COMPOSITE LIBID
11111
```

DEVSERV QLIB Command

- **Sample display for the 3rd distributed library “1111C”**

```
DEVSERV QLIB,1111C
```

```
IEE459I 14.15.28 DEVSERV QLIB
```

```
No devices connected or configured to host
```

```
Composite LIBID
```

```
11111
```

TS7720 Support – “disk-only”

■ Cache capacity notification - new warning and critical cache free space messages:

- ▶ **CBR3792E Library *library-name* has entered the limited cache free space warning state.**
- ▶ **CBR3794A Library *library-name* has entered the out of cache resources critical state.**
- ▶ RMM will intercept the new messages and return volumes to scratch ... similar to their handling of CBR3660A “low on scratch volumes”
- ▶ When the states are cleared, the messages above are deleted (DOMed) and the following messages are issued:
 - **CBR3793I Library *library-name* has left the limited cache free space warning state.**
 - **CBR3795I Library *library-name* has left the out of cache resources critical state.**

TS7720 Support – “disk-only”

■ DISPLAY SMS,LIBRARY enhancements (distributed library)

Display SMS,LIBRARY(BARR86A),DETAIL

```
CBR1110I OAM LIBRARY STATUS:
```

TAPE	LIB	DEV	TOT	ONL	AVL	TOTAL	EMPTY	SCRATCH	ON	OP
LIBRARY	TYPE	TYPE	DRV	DRV	DRV	SLOTS	SLOTS	VOLS		
BARR86A	VDL	3957-VEA	0	0	0	0	0	0	Y	Y

```
-----  
Composite Library:          BARR86  
-----
```

```
LIBRARY ID:  BA86A
```

```
CACHE PERCENTAGE USED:  35
```

```
OPERATIONAL STATE:  AUTOMATED  
-----
```

```
status lines
```

■ The new status lines that may be displayed include:

- ▶ Limited Cache Free Space – Warning State
- ▶ Out of Cache Resources – Critical State

Note: “cache percentage used” only associated with a distributed library; the new status states may be associated with a distributed or a composite library

Releases and APARs

- **Host support is being provided at z/OS V1R8 and above**
- APAR is optional but needed to take advantage of new functionality
- **APARs**

Device Support	OA24964
AOM	OA24965
OAM	OA24966
SMS	OA24967
OCE	OA24968
HSM	OA24969
RMM	OA24970

Note: OAM APAR will bring in the needed support

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Feature Code Withdrawals

■ **FC0522 and FC0523**

- ▶ Provides migration from B10/B20 VTS to TS7700
- ▶ Withdrawn December 5th, 2008
- ▶ Replaced with GTS offering. Contact tapebda.

■ **FC1030 and FC1031**

- ▶ Single ported grid adapter cards (copper and fibre)
- ▶ Replaced with FC1032 and FC1033
 - Dual ported grid adapter cards
 - Only one port activated on each card
- ▶ Can be ordered for R1.4a TS7740 through February 27th, 2009
- ▶ R1.4a machines do not support FC1032 and FC1033
- ▶ New TS7740 R1.5 machines will ship with FC1032 or FC1033
- ▶ TS7720 will ship with FC1032 or FC1033

RPQ 8B3523 for 'N-1' Configurations Withdrawn

- RPQ 8B3523 was defined to accept orders for shipments of configurations with release 1.4a machine code after the Release 1.5 GA date (December 5, 2008).
- When the RPQ was ordered, the configuration had to include a TS7740 Server Model V06 with Grid adapter features #1030 or #1031, one Model CC6 Cache Controller, and 0, 1 or 3 Model CX6 Cache Modules.
- The RPQ is mutually exclusive with the dual port Grid adapters (#1032 and #1033), the TS3500 Attach (#9219), and the new disk cache models (CC7, CX7, CS7, XS7)
- The withdrawal date for the RPQ is February 27, 2009
- Follow standard process for ordering a withdrawn product

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IBM Implementation Services for tape systems

■ Value Proposition

- ▶ For organizations that need quick, reliable implementation of IBM tape system products, including the TS7700, IBM can provide highly skilled storage specialists to help facilitate a more predictable, less risky implementation, allowing for a quicker ROI for storage purchases.
- ▶ Designed to help clients get more timely or effective use out of IBM tape system products, this service can help clients more quickly realize the benefits of tape products, including increased IT efficiency, better cost control for storage management, shortened backup and recovery times, and maximized application availability.

■ IBM Benefits

- ▶ Quick, reliable and efficient implementation allows for quicker ROI for tape investment
- ▶ Project planning for a more predictable implementation process, cost and outcome
- ▶ In-house staff does not need to learn new skills and can stay focused on key business objectives.
- ▶ Basic skills instruction for client staff increases understanding of tape system implementation.
- ▶ Reduces business disruption and implementation risk with proven methodology and project management

■ Tasks Performed

- ▶ Conduct planning session with client
- ▶ Perform implementation plan as defined in the planning session
- ▶ Configure and test implemented solution
- ▶ Provide basic skills instructions on newly implemented tape technology

IBM Implementation Services for tape systems

- **Service Component name and description:**

(6948-C43) IBM Implementation Services for tape systems - IBM Virtualization Engine TS7700 - Assists with the planning, installing, configuring, and basic skills instruction for IBM Virtualization Engine TS7700

- **Additional Information**

- ▶ IBMers should access the Implementation Services for tape systems Engagement Portfolio on SalesOne Solution Finder:

<http://spimweb1.boulder.ibm.com/services/sosf/dyno.wss?oid=812#masthead>

- ▶ Business Partners should access this Partnerworld link:

<https://www-304.ibm.com/jct09002c/partnerworld/mem/services/us/reimp19.html>

- **Ordering information:**

- ▶ **IBMers:** Contact IBM Americas ibm.com Center at 1-888-426-4343 option 3
- ▶ **BPs:** contact the BPSS either by e-mail (Channels@us.ibm.com) or through PartnerWorld (www.ibm.com/partnerworld - shortcut SERVOPps)

IBM Migration Services for tape systems

■ Value Proposition

- ▶ For organizations that need efficient, reliable migration to new IBM tape technology, IBM Migration Services for tape systems provides highly skilled storage specialists who can simplify the migration process and improve ROI on new tape system purchases. IBM can help with project planning and management as well as provide technical assistance with migrating your tape data to new tape technology

■ IBM Benefits

- ▶ Faster, more efficient and reliable migration can provide quicker ROI
- ▶ Project management and planning helps ensure smooth migrations with less downtime and risks
- ▶ Reduced project risks due to predictable cost model, IBM expertise and proven tools and devices
- ▶ Allows client in-house IT resources to focus on other key business projects
- ▶ Accelerated migration can help clients realize the business benefits of IBM tape technology more quickly
- ▶ IBM has the resources and expertise to streamline migration while helping to reduce risks associated with data loss

■ Tasks Performed

- ▶ Conduct onsite planning session to create data migration plan
- ▶ Perform migration as defined in the planning session
- ▶ Verify migration and update migration control book
- ▶ Review results with client

IBM Migration Services for tape systems

▪ Service Component name and description:

IBM Migration Services – for tape systems – Bxx and TS77xx data migration (6948-D34) Assists clients with a cost-effective, efficient alternative to manual data migration. This service helps transfer virtual tape server (VTS) data from older automated tape library (ATL) VTS to a newer model or replacement model Bxx model or to a Virtualization Engine (VE) TS77xx system

Note: In 12/08 this service replaced migration feature codes 0522 & 0523 on the TS7740

▪ Additional Information - IBMers

- ▶ IBMers should access the Migration Services for tape systems Engagement Portfolio on SalesOne Solution Finder

<http://spimweb1.boulder.ibm.com/services/sosf/dyno.wss?oid=832#masthead>

- ▶ Business Partners should access this Partnerworld link:

<https://www-304.ibm.com/jct09002c/partnerworld/mem/services/us/ofmigtape.html>

▪ Ordering information:

- ▶ **IBMers:** Contact IBM Americas ibm.com Center at 1-888-426-4343 option 3
- ▶ **BPs:** contact the BPSS either by e-mail (Channels@us.ibm.com) or through PartnerWorld (www.ibm.com/partnerworld - shortcut SERVOPps)

Questions?



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