Advanced Technology Group

Accelerate with ATG:

Toy Phouybanhdyt
Storage Technical Specialist – Tape Solutions SME
Sandra Browning
Storage Technical Specialist – Tape Solutions SME

Panelists:
Ben Smith, Tape Solutions SME
Bob Sommer, Tape Solutions SME
Eric Singsaas, Tape Solutions SME

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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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ATG Accelerate Support Site: https://www.ibm.com/support/pages/node/1125513

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ATG-Storage Offerings

CLIENT WORKSHOPS

- **IBM DS8900F Advanced Functions: December 6-7, 2023 (Virtual)**
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Meet the Speakers

Toy Phouybanhdyt is a Principal Storage Technical Specialist, Tape Solutions SME, at IBM with over 30 years of experience in the field of tape hardware, both physical and virtual, and System-Managed Storage. He held various IT positions, including 8 years as MVS system programmer who was responsible for maintaining the MVS system, capacity and performance management, storage management and disaster recovery. After joining IBM, he eventually chose a storage career path supporting both disk and tape. After the surge in IBM Virtual Tape Server interest, he dropped disk to concentrate on tape. He is responsible for architecting the TS7700 Grid solution and providing the technical recommendations on various TS7700 projects such as capacity planning, performance management, technology refresh, data center move, cyber resiliency protection, etc.

Sandra Browning has been with IBM 10+ years, she previously worked in sales as a Client Technical Specialist, mainly supporting large IBM storage customers. Recently, she joined the Advanced Technical Group specializing in Tape. Sandy has a strong background in tape as she worked for a tape vendor for many years before joining IBM.

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Session objectives

To share with the audience to the TS7700 R5.4 features and functions.

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Agenda

- Logical WORM and Logical WORM retention
- Full base frame SSD cache (R5.3 PGA1)
- New p9 server TSSC (R5.3 PGA1)
- Larger capacity logical volume size
- 3rd party encryption key manage support
- Hardware and code matrixes
  - Code upgrade rule
  - Cluster Join rule
  - Frame roll rule

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Logical WORM Retention – R5.4 Enhancements

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Benefits of implementing Logical WORM

- Immutability
- Compliance
- Cyber security
- Mishap

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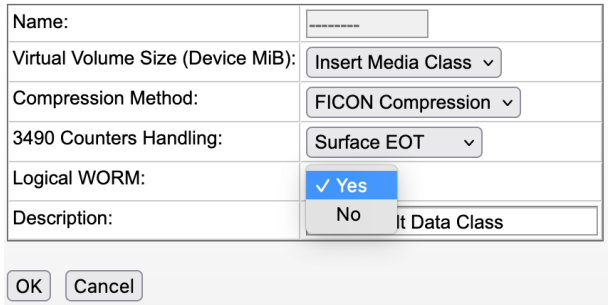
TS7700 Logical WORM (Write Once Read Many)

- **LWORM Introduced in R1.6 (2009)**

Certified WORM compliant by the SEC
Logical Volume (LVOL) is only appendable after last data record
Emulates physical WORM and is WORM compliant
Logical Volume (LVOL) – cannot modify until it is scratched

TS7700 DATACLAS construct



- **LWORM Retention – Introduced R5.1 PGA1 (via RPQ only)**

Ability to set ”retention” date to a logical volume
Logical Volume (LVOL) is held until it exceeds retention date value
Logical Volume (LVOL) can be reused after retention date exceeded and is returned to Scratch

- **LWORM Retention – R5.4 Data Class enhancements**

Enhanced configuration settings within Data Class
New DataClass Wizards for LWORM Retention

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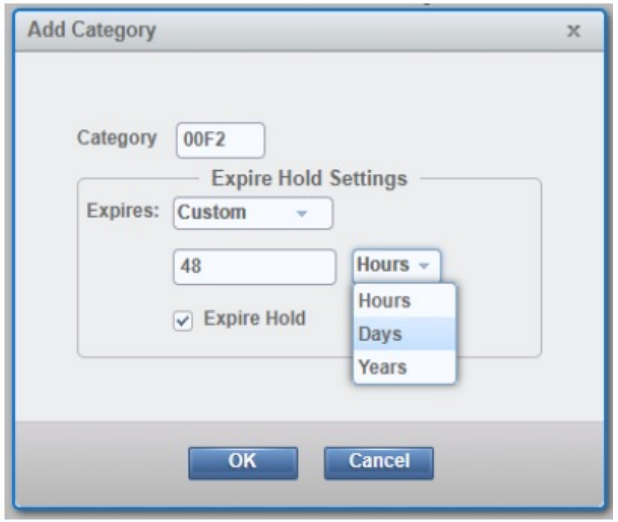
TS7700 – Category Retention with “Expire Hold”

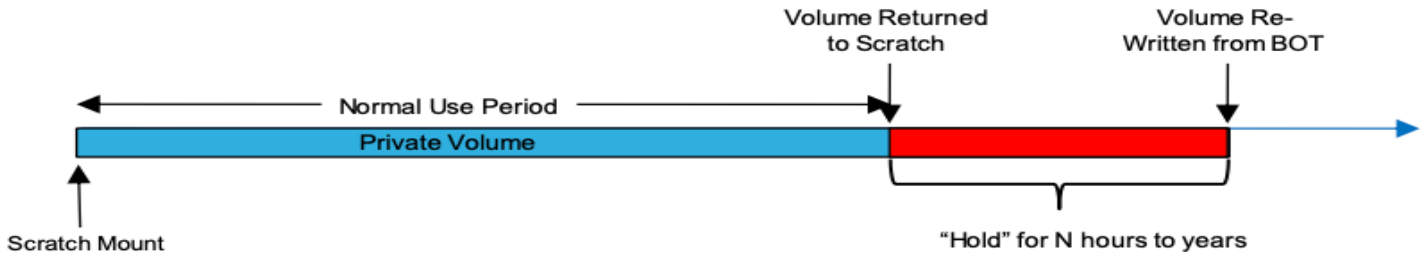
Optionally “hold” Logical volumes when they are returned to scratch

- Counter starts from when a volume is scratched
- Once expire time passes, the volume is a candidate for re-use
- Retention Time can be reduced and changes are retroactive



HOST ACCESS DENIED

- Volumes in an “expire hold” state are excluded from IBM Z scratch pool and can’t be used
- Volumes in an “expire hold” state cannot be accessed or modified by any host



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TS7700 Logical WORM Retention R5.4

DataClass Lworm Settings under 5.4

First Step is to Select Lworm ”**without Retention**” or Lworm “**with Retention**”:

Without Retention – The Logical Volume is LWORM protected – until it is SCRATCHED by Tape Management System

With Retention – You have TWO options – choose either **FIXED** or **HDR1**

FIXED – Retention Date is set in Data Class – for example: 30 days – DCLWRM30

Granular Expire Hold

Each MOD results in an automatic extension

Option to set to “forever”

HDR1 - Application Provided Retention Date – contents of the header record will be Analyzed to calculate the retention date

HDR1 with most future Date always wins (disp=MOD)

Many Options for Exception Handling:

For example, a Non-Labeled Tape or a second file with bad HDR1(disp=Mod)

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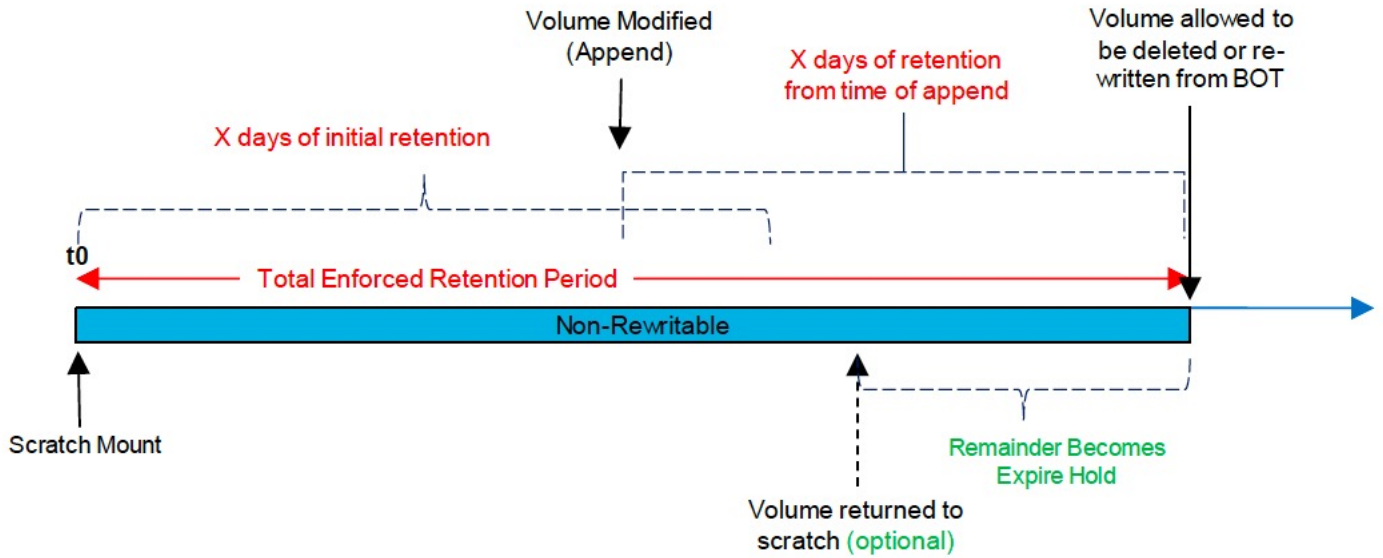
TS7700 LWORM retention – Fixed Duration

Fixed Duration

- Fixed at Logical Volume (LVOL) Creation
- Each Append (DISP=MOD) results in an automatic extension
- Return to Scratch – is Optional – works exactly like Expire Hold does today



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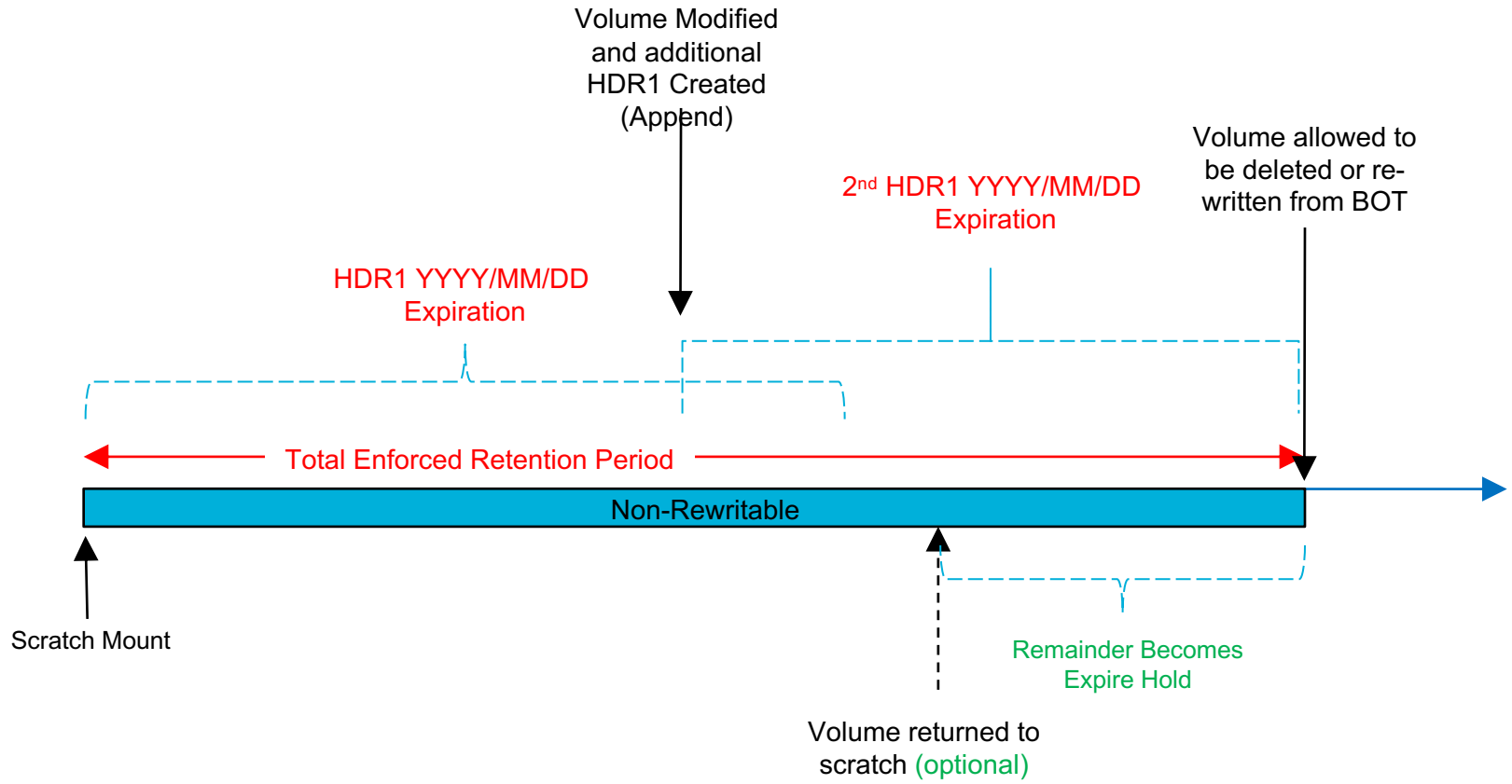
TS7700 LWORM retention – HDR1 base duration

- HDR1 based retention
  - Each HDR1 is analyzed
  - HDR1 with most future date always win
  - Many additional Options



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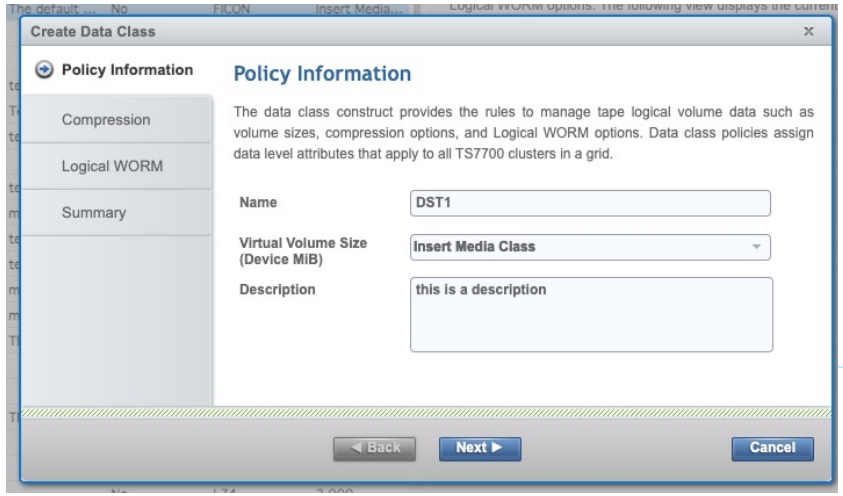
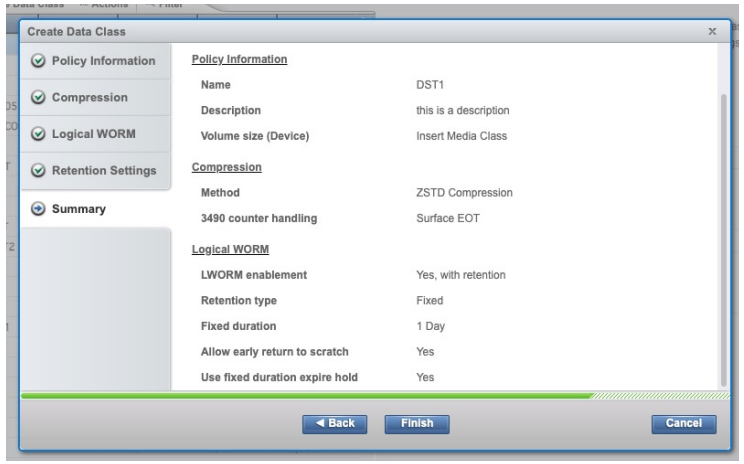
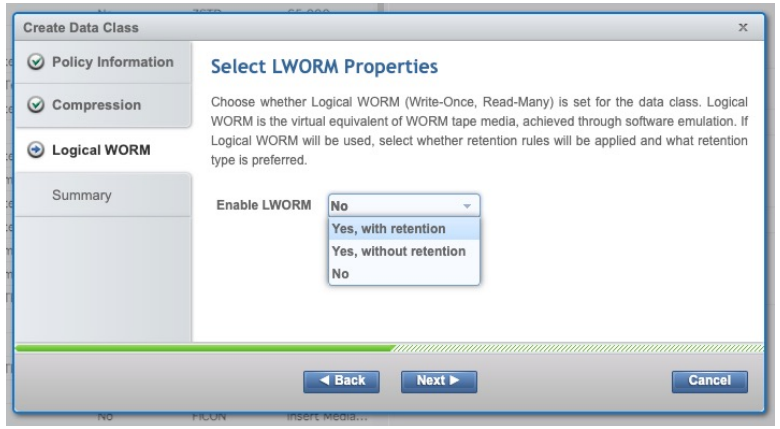
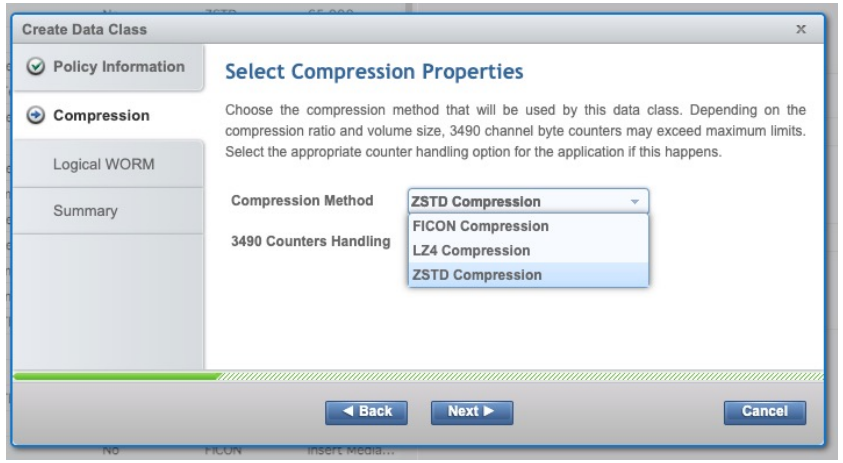
R5.4 Data Class – Wizard Steps

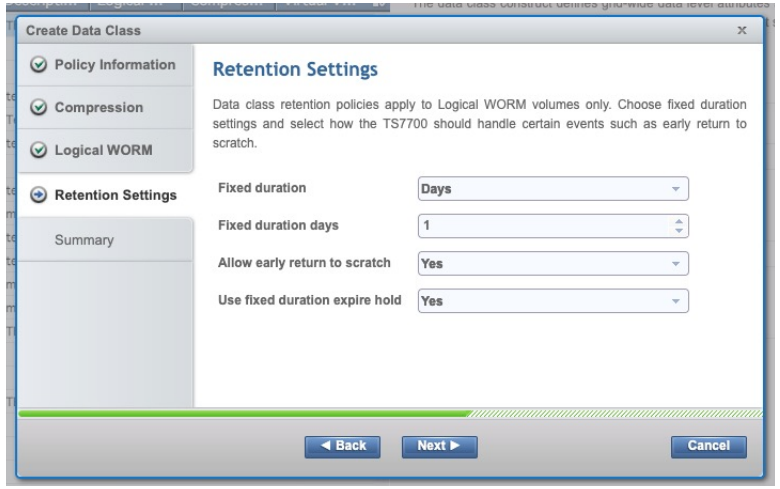
(All Clusters in the Grid must be R5.4 before the new Data Class screens will appear)











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Migration of LWORM Retention from 5.x to new 5.4

As you plan to migrate from previous LWORM RETENTION R5.1 R5.2 and R5.3 – to the new R5.4

Before you deploy R5.4 code on an existing TS7770 cluster:

Please contact IBM to assist with your migration to R5.4

You are more than welcome to reach out to ATG Tape Team for assistance

As a reminder:

TS7760 – cannot go higher than R5.2

You needed an RPQ to invoke LWORM RETENTION on previous releases which is no longer necessary with R5.4

Whitepaper Link:

TS7700 LWORM Retention Function User's Guide V1.02

https://www.ibm.com/support/pages/node/6438317

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Full base frame SSD cache (R5.3 PGA1)

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TS7770: 3956-CFC/XFC SSD Cache

- SSD cache capacity
  - 16Gb FC connectivity
  - 3.84 SSD SAS drives
  - Approx. 60TB usable capacity per drawer
  - Single drawer increment
  - 640TB with 10-draw configuration
- Dynamic disk pools
  - No dedicated spares required
- Full AES256 Encryption
  - No impact to performance
  - Internal or external key management
    - External key management utilizes ISKLM KMIP protocol with TLS 1.2
  - Retroactive encryption is not supported
    - Encryption must be enabled at time of purchased/installed
- Concurrent drawer addition

IBM Synergy: Leveraging Flash Systems 5030

draw	1	2	3	4	5	6	7	8	9	10
GB	60	120	180	260	320	380	440	520	580	640

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SSD cache timeline

- R5.2 GA initial support was 1 CFC and optional 1 XFC
  - 60 TB usable
- R5.3 GA support was 1 CFC and up to 3 XFCs
  - 260 TB usable
- R5.3 PGA1 support is 1 CFC and up to 9 XFCs
  - 640 TB usable

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p9 server TSSC (R5.3 PGA1)

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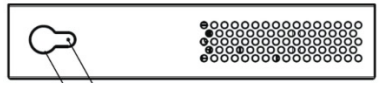
TSSC hardware difference

- p9 server TSSC (new)
  - No feature code
  - 1U rack mount
  - 5 fans removable
  - 2 power supplies removable
  - Replacement parts – fans and power supplies



- x86 server TSSC (old)
  - FC2725 TS3000 system console
  - Mounted on 1U rack mount tray
  - No fan
  - 1 external power brick
  - No replacement parts – entire TSSC is replaced

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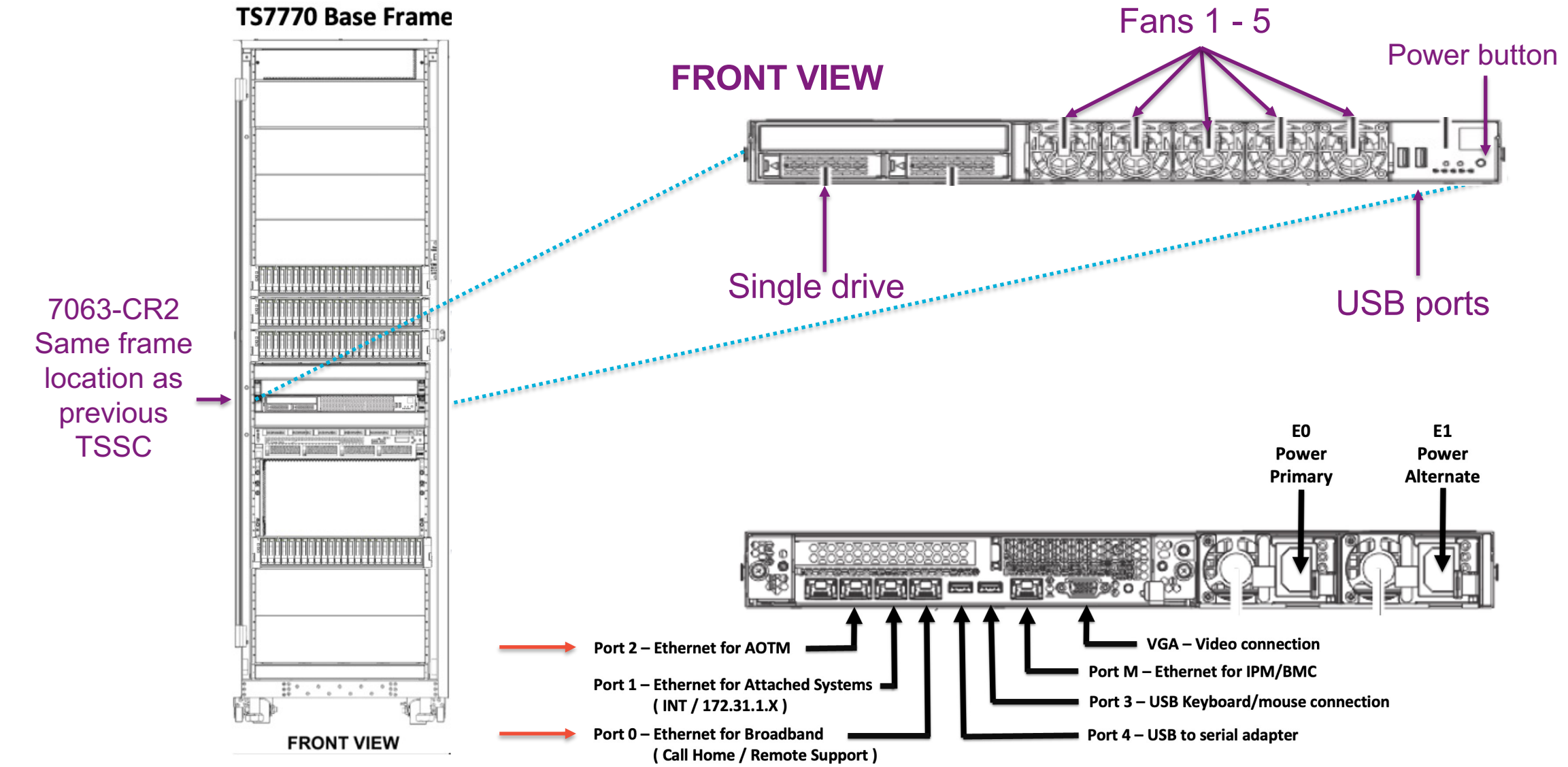
Frame layout



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Larger capacity volume size

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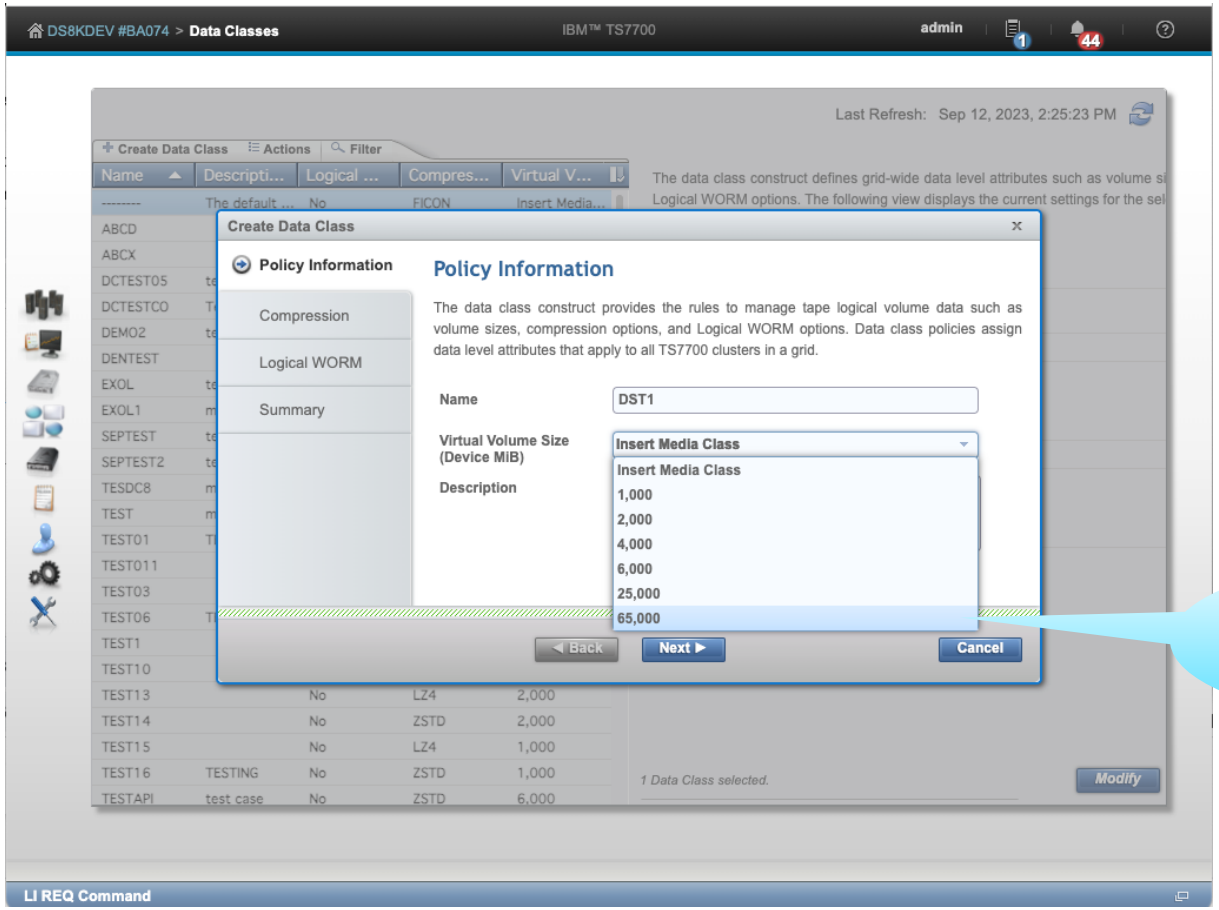
65GB logical volume size

- All clusters in the grid must be at R5.4



65GB SIZE OPTION

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3rd party encryption key manager

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3rd party encryption key manager

- R5.4 supports other encryption key manager: Thales
  - Only VED disk cache only system
  - Only new system, no conversion allowed
  - Only Thales CipherTrust Manager 2.0 and up
  - Only configurable via SMIT (TSSC console)

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Hardware and code matrixes

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Hardware and code matrixes

- Supported hardware
  - 3957/3948-VED
- R5.4 code requirement
  - 128GB of memory
- Code upgrade rule
  - R5.2 code or above can be upgraded to R5.4
- Cluster join rule
  - R5.4 can be joined with R5.1 or latter with a total of 3 code levels in the GRID
- Frame roll rule
  - R3.3 (8.33.xx.x) code or later
  - Source cluster does not have active data in cache partition 0
  - Target cluster is completely cleaned
- References:
  - TS7700 Code Update Recommendation: https://www.ibm.com/support/pages/node/6334607
  - TS7700 Code, Hardware and Grid Interoperability: https://www.ibm.com/support/pages/node/6354801

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Thank you!

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