Setting Up and Using an SMS-Managed Manual Tape Library (MTL)

Session 09887
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Agenda

• How are tapes managed in SMS?
  – Automated vs. Manual Libraries
  – The OAM Address Space
  – The Tape Control Database

• Setting up an MTL
  – HCD definitions
  – SMS Constructs
  – ACS Routines

• Allocating SMS-Managed tape datasets

• Issues with SMS MTL

• Managing Tapes without SMS
Tape Libraries

• Automated Libraries
  – Tape robotic systems
  – Managed by vendor software, or SMS and OAM
  – May include outboard policy management

• Manual Libraries
  – Defined in HCD as 'MTL'
  – Standalone (non-robotic) tape drives
    • Tapes manually mounted by operator
  – Virtual tape systems
  – Managed by SMS and OAM; usually no outboard management
Define Libraries in HCD

- Define tape drives as MTL libraries (MTL=YES)
- Define tape library serial number (LIBRARY-ID)
  - Any 5 digit number
  - Must be unique within sysplex
  - *Must match SMS Tape Library Definition*
- Identify control unit for library (LIBPORT-ID)
  - All devices on control unit must have same LIBPORT-ID
  - Devices on control unit can
    - Reside in different libraries (have different LIBRARY-IDs)
    - be non-MTL
Define Libraries in HCD

Required because MTL's are not self-defining at IPL time
The OAM Address Space

• Library Control System (LCS) provides
  – Cartridge handling (entry/eject, mount/demount, et.al.)
  – Operator commands (DISPLAY, VARY, etc.)
  – TCDB (VOLCAT) updates

• Cartridge Entry / Eject
  – Manually via LIBRARY command or ISMF line command
  – Programatically via CBRXLCS interface
Parmlib / JCL Changes Required for OAM

- PARMLIB Changes
  - IGDSMSxx – OAMPROC procname, task id
  - IEFSSNxx – start OAM subsystem

- OAM Catalogued Procedure
  - SYS1.SAMPLIB(CBRAPROC)
Tape Control Database (VOLCAT)

TCDB (all VOLCATs, specific & general)

hlq.VOLCAT.VGENERAL
General VOLCAT
- all LIBRARY recs
- all VOLUME recs not in a specific VOLCAT

hlq.VOLCAT.VA
Specific VOLCAT
- VOLUME recs for volser=Axxxxxx

hlq.VOLCAT.VB
Specific VOLCAT
- VOLUME recs for volser=Bxxxxxx

one per system

Specific VOLCATs ‘hlq.VOLCAT.Vx’ where x = A-Z, 0-9
Library Entry

<table>
<thead>
<tr>
<th>Library Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library ID</td>
</tr>
</tbody>
</table>

- Console Name (to receive msgs)
- Description (1-120 char)
- Hardware Device Type (1-8 char)
- Logical Type (automated/manual)
- Total no. of slots (automated library)
- No. of empty slots (automated library)
- No. of scratch vols (for each MEDIATYPE)
- Scratch threshold (for each MEDIATYPE)
Volume Entry

Volume Serial Number
--Storage Group Name or *SCRTCH*
--Library Name (library name or ‘SHELF’)  
--Location (LIBRARY or SHELF)  
--Use attribute (SCRATCH or PRIVATE)  
--Shelf name (usually for non-library volumes)  
--Owner Info (1-64 char)  
--Mediatype (MEDIA1-nn)  
--Recording Technique  
--Compaction (yes/no/none/IDRC)  
--expiration date (highest on vol, blank for scratch tape)  
--date last entered / ejected  
--date last mounted and opened  
--date last written  
--readcompatible attribute (yes/no)  
--writeprotect attribute (yes/no)  
--secure checkpoint volume attribute (yes or no)
Defining the TCDB

• Define Catalog
  
  ```
  DEFINE UCAT -
    NAME(SYS1.VOLCAT.VGENERAL) -
  VOLCATALOG
  VOLUME(vvvvvv)
  CYLINDERS(pri sec) 
  ```

• Define LIBRARY Entries
  - Automatically when entered in SMS via ISMF
  - Manually via IDCAMS CREATE LIBRARYENTRY

• Alter LIBRARY Entries
  - IDCAMS ALTER LIBRARYENTRY
  - ISMF Library Management (option 10.3)
Defining the TCDB

- Define VOLUME Entries
  - Automatically, as cartridges are entered into library
    - via LIBRARY ENTER command
    - via CBRXLCS
  - Manually, via IDCAMS CREATE VOLUMEENTRY

- Alter VOLUME Entries
  - Automatically by OPEN/CLOSE/EOV, TMS (CBRXLCS)
  - Manually via
    - IDCAMS ALTER VOLUMEENTRY
    - ISMF Mountable Tape Volume (ISMF option 2.3)
Altering TCDB Records

O/C/E → TMS → CBRXLCS → SYS1.VOLCAT.V* → IDCAMS → TMC

TMS records not updated by IDCAMS ALTER
TCDB – Other Tasks

- Connect the VOLCAT to other systems

```ln
IMPORT CONNECT -
  VOLCATALOG -
  OBJECTS((SYS1.VOLCAT.VGENERAL) operands)
```

- Define and authorize RACF resources *(do this first)*

```ln
RDEFINE FACILITY STGADMIN.IGG.LIBRARY
PERMIT  STGADMIN.IGG.LIBRARY CLASS(FACILITY) -
  ACCESS(READ) ID(logonID)
```
Define Tape Libraries to SMS

- TCDB Library entry is created when library is defined to ISMF
  - Even if configuration is not activated
Define Tape Libraries to SMS

• Define Library Name
  – LIBRARY-ID identifies libraries and must match HCD

• Define Library Characteristics
  – ENTRY DEFAULT USE ATTRIBUTE
    • (default volume type – scratch or private)
  – EJECT DEFAULT
    • What to do with TCDB volume record on eject – Purge or Keep
  – ENTRY DEFAULT DATA CLASS
  – MEDIA TYPE Scratch Thresholds
  – INITIAL ONLINE STATUS (Y/N)
Define Data Classes

• Data Class
  – If assigned, supplies MEDIA TYPE, RECORDING TECHNOLOGY, COMPACTION
  – If not assigned, taken from
    • Tape library definition
    • LIBRARY SETCL command
    • LIBRARY ENTER command
  – all other data class attributes ignored
Define Storage Classes

• Storage Class
  • Must be assigned so that SG routine runs
  • Used in SG routine to select appropriate SG/Library

• Duplicate VOLSER label
  • Storage class DUPT@SMS and DISP=OLD
  • Allows mount outside of library
    • even though volser is in TCDB
Define Tape Storage Groups

• Specifies Library Name
  - Linked to tape drive via Tape Library LIBRARY-ID

• Tape SG may specify multiple libraries (1-8)
  - Scratch allocation will consider all devices in assigned libraries
  - Limited to first 253 tape subsystems (OA21462)
Update ACS Routines

• Data Class name assigned by DC routine
• Storage Class name assigned by SC routine
  – May need to check for UNIT=AFF
• Storage Group name assigned by SG routine
  – to the tape volume, not the dataset
  – TCDB record is updated
    • SG name changed from *SCRTCH* to SG
    • Use attribute changed from S to P
    • Set RECORDING-TECHNOLOGY, EXP DATE, et. al.

  – IGDACSXT may set ACS R/O variables
Activate

- Activate the IODF
  - IPL or ACTIVATE IODF=xx
- SMS Configuration
  - SETSMS SCDS(scdsname)
- Start OAM
Enter Volumes into Libraries

- Volumes must be 'entered' into the MTL

- LIBRARY ENTER,volser,library,MEDIAn
  - CBRXLCS programming interface
  - DFSMSrmm ADDVOLUME or equivalent

- MEDIATYPE
  - Set from LIBRARY ENTER or
  - Default data class or
  - LIBRARY SETCL command
Using ISMF Library Lists

• ISMF Mountable Tape Volume List commands
  • ALTER
  • EJECT

• ISMF Tape Library List commands (option 10.3.1)
  • ALTER
  • DELETE
  • LISTVOL – show tape volsers in library

• Console DISPLAY command for Libraries and Volumes
Tape Device Selection

JCL

DSN=
UNIT=

ACS

LCS

SRM

SCDS

TCDB

HCD
Cautions

• Changing ACS routines / SG Definitions
  – Affects only NEW tape allocations
  – TCDB records must be changed to change SG for existing tapes
    • ISMF ALTER, CBRXLCS (programmatically), IDCAMS

• Alter Tape Library in SMS
  – TCDB is updated immediately
    • Even before SMS configuration is activated

• Hardware type must be supported for MTL
• Operator must mount appropriate tape (mediatype)
Cautions

• Who maintains SMS configuration?
• Is TCDB in sync with TMC?
• Which tape drive is selected?
  – Multiple libraries
  – 'tape-on-disk' systems provide hundreds of drives
Useful Commands / Documentation

- DISPLAY UNIT (MTL devices shown as '349M', etc.)
- DEVSERV QT, QLIB
- DISPLAY SMS,
  - LIBRARY,ALL(DETAIL)
  - VOL(volser) (or ISMF option 2)
- LIBRARY
  - DISPDRV,deviceno
- DFSMS Implementing System-Managed Storage SC26-7407
Other Tape Allocation Possibilities

- **SMSSHONOR**
  - Allows device selection within UNITs selected by SMS

- **Non-SMS Managed Tape**
  - By UNIT esoteric or UIM
  - DTS Software ACC/DCC or similar
  - IGGPRE00
Questions?

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