CA 1® Tape Management Best Practices

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Thursday, March 3rd, 3:00
Session Number 9097

Agenda

- Health Checks
- TMSXTEND
  - use it instead of TMSFORMT unless you have non-standard volser naming conventions
- CTS Address Space
  - Enqueue the TMC
  - Tapemap
  - TMSAPEC
- Miscellaneous

- Real-time Robotic Interface
  - CBRUX*nnn* Exits
  - Identify Virtual-Tape ranges
  - READONLY subpool
- External Security
  - Protect tapes
  - Erase residual data
  - Data erase
- Stay Current on Maintenance
  - Call support when upgrading z/OS OR adding new devices
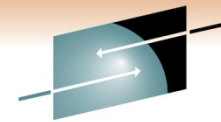
Health Checks

- Added with CA 1 maintenance RO04520
  - Included with CA 1 SP5
- Originally 15 Health Checks were added
  - Simple analysis of DSNB free chain
    - Short run of 1000 – run every 60 minutes
    - Long run of complete chain – run daily
  - Recommended Option Settings
  - DSNB and Audit Utilization Thresholds
    - Medium if within 10% of Threshold
    - Low if within 20% of Threshold
  - TMC and Audit on the same volume

Health Checks (cont.)

- Two ways to activate
- With CA Health Check Common Services r12.1 – new CA Health Check address space PLUS CA 1 r12.0
  - See instructions in RI18684 for CCS r11
  - See instructions in RI18890 for CCS r12
  - Simply running TMSINIT will define the CA 1 Health Checks
- Without the CA Common Services Health Check Address Space OR CA 1 r11.5
  - Requires the CTS address space

Health Checks (cont.)

- Here is a display from the SDSF CK panel that lists all the CA 1 Health Checks

```
SYSVIEW 11.6 XE76 --------- HCHECKER, Health Checker ---------- 10/07/27 09:55:38
Command ====> _                                                 Scroll *===> PAGE
------------------------------------------------------- Lvl 2 Row 6-21/129 Col 1-79/567
Options CONFIRM XSYS

---------------------------------------------------------------------------------------
Cmd Name                              UState     SState     Status              Global
___  CATALOG_IMBED_REPLICATE          ACTIVE     ENABLED    EXCEPTION-LOW
___  CA1_AUDIT_VRFY_WITHIN_LOW_THRSH   ACTIVE     ENABLED    SUCCESSFUL
___  CA1_AUDIT_VRFY_WITHIN_MED_THRSH   ACTIVE     ENABLED    SUCCESSFUL
___  CA1_FREE_DSNB_LOW_THRSH           ACTIVE     ENABLED    SUCCESSFUL
___  CA1_FREE_DSNB_MEDIUM_THRSH        ACTIVE     ENABLED    SUCCESSFUL
___  CA1_FREE_DSNB_QUICK_SCAN          ACTIVE     ENABLED    SUCCESSFUL          GLOBAL
___  CA1_TMC_AUDIT_PLACEMENT           ACTIVE     ENABLED    EXCEPTION-MEDIUM
___  CA1_USED_DSNB_FREE_CHAIN          ACTIVE     ENABLED    SUCCESSFUL          GLOBAL
___  CA1_VRFY_MIXED_EXPDT_OPTION       ACTIVE     ENABLED    SUCCESSFUL
___  CA1_VRFY_OPTION_DCHG              ACTIVE     ENABLED    SUCCESSFUL
___  CA1_VRFY_OPTION_LCHG              ACTIVE     ENABLED    SUCCESSFUL
___  CA1_VRFY_OPTION_TCHG              ACTIVE     ENABLED    SUCCESSFUL
___  CA1_VRFY_SECURITY_EXIT_FUNC       ACTIVE     ENABLED    SUCCESSFUL
___  CA1_VRFY_SECURITY_EXIT_PSWD       ACTIVE     ENABLED    EXCEPTION-MEDIUM
___  CA1_VRFY_SECURITY_EXIT_YSVC       ACTIVE     ENABLED    SUCCESSFUL
```

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TMSXTEND

- If you aren't using it yet, why not?
- Eliminates the need for most clients to use TMSXITU & TMSXITE to convert Alpha-numeric volsers to numeric
  - Exception – Numbers to the left of Alpha characters
    - 0001NT – 9999NT
  - Exception – non decimal counting techniques
    - 000000-00000F, 000010-00001F, 000020-00002F
  - Eliminates the need to use TMSFORMT to add volume ranges or additional DSNB records
  - Eliminates the need to use TMSREMOV to remove volume ranges

TMSXTEND (cont.)

- Can be run without stopping OPEN/CLOSE/EOV tape processing
  - CA 1 Batch Utilities and Report Utilities should not be run
  - Attempting to start such a utility after TMSXTEND has started will most likely fail (JCL error or dynamic-allocation failure)
- A new TMC must be pre-allocated (IEFBR14) – strongly recommend a blocked TMC of 340 x 8880
- TMSRINIT should be added as a Started Task on all systems sharing the TMC – not as a batch job
- Supports DSNTYPE=LARGE format; supporting 12,960,000 volsers (aannnn format) and 16,750,000 DSNB's

TMSXTEND (cont.)

- Can be run in test-mode first (PARM=TEST)
- TMSXTEND executes TMSBLDVR as a subtask
  - You can execute TMSBLDVR as a standalone utility to build a new TMC if you are doing a new install of CA 1
  - Can be executed standalone with PARM=TEST to validate the control statements
- EXCLUDE LPAR's/machines that are NOT active when TMSXTEND is running
- INCLUDE LPAR's/machines that do not perform any normal tape processing each day

CTS Address Space

- Enqueue the TMC
  - The DBS subtask allocates the TMC and Audit files
  - Insures they are not deleted or archived by accident
  - F CTS,START DBS
  - F CTS,STOP DBS or F CTS,MSG DBS,STOP

- Tapemap
  - F CTS,SET TASK(TMAP) PGM(CTSTMAP)
  - F CTS,START TMAP
  - F CTS,MSG TMAP,'MAP volser1,volser2,..,UNIT=uuuu'

CTS Address Space (cont.)

- TMSAPEC
    - Similar to TMSPTRS, will automatically correct more errors
    - No copy of the TMC is made, the actual TMC is analyzed in place
    - Can be scheduled to run on a periodic basis and only between certain hours
    - Can automatically correct errors or create control statements for TMSUPDTE, TMSUDSNB or TMSAGGR to post-process

Real-time Robotic Interface

- CBRUX*nnn* Exits
- CBRUXENT – Called for ENTRY into an SMS managed robot
  - Includes the definition of Virtual Volumes or the definition of tapes to a Manual Tape Library
  - Modification to the ATLTABLE in the distributed source allows CA 1 to identify which IBM robot the tape is in
- CBRUXEJC – Called for EJECT MOVE (not called for EJECT COPY) and for a DELETE of a Virtual Volume
  - Modification to the pseudo Data Set Name associated with the physical volume used during an EJECT MOVE

Real-time Robotic Interface (cont.)

- CBRUX*nnn* Exits (cont.)
- CBRUXVNL – Called for every attempt to allocate an offline DASD device or any tape volume not currently inside an IBM robot or defined to a MTL
  - Modification to the CA 1 supplied sample to ignore based on defined or not, by device type if defined, or by location (off-site or in-house)
- All three CA 1 supplied exits should be installed to prevent the execution of the DFSMSrmm supplied versions (which are normally distributed in SYS1.LINKLIB)

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Real-time Robotic Interface (cont.)

- **The CA-1 supplied sample ++USERMOD to be applied to the z/OS SMP zone needs to be restored and re-applied whenever there is maintenance to the IBM versions of these exits**

- New option (r11.5 SP5 or r12.0) to notify the robotic system when a tape is scratched

  - ROBSCR in TMOOPT*nn*

  - Based on the setting of the Robot-Type field within the TMC (TMROBTY) – *this MUST be correctly set*

  - If set to IBM or VIBM, then LCS services are invoked to notify OAM the volume has been scratched

Real-time Robotic Interface (cont.)

- WORKFILES should not be allowed when the real-time scratch interface is used – WRKFLS=NO
- CTSSYNC is an interface module to pass commands to the IBM robot
  - Can be used to synchronize the robot to the CA 1 status
  - If the two OAM data bases (TCDB and LM) become out-of-sync with each other;
    - Notify IBM, since this may indicate a more serious problem
    - Use CTSSYNC to force the tape into SCRATCH status, then into PRIVAT status, and finally perform a SYNC to synchronize with CA 1

Real-time Robotic Interface (cont.)

- TMSUPDTE should be used to set the Robot-Type (TMROBTY) for virtual volume ranges
  - VIBM – Virtual IBM
  - VSTORTEK – Virtual Oracle/STK
  - VCAVTAPE – CA Vtape
- TMSKEYAB may be modified to add new names to the Robot-Type translation table

Real-time Robotic Interface (cont.)

- READONLY subpool support
  - New enhancement
    - R11.5 – RO20262 & RO19148
    - R12.0 – RO20261 & RO19149
  - Allows for a CA 1 subpool to be defined as READONLY
  - When defined as READONLY, no MOD processing or creation of additional secondary files are allowed
  - If open'ed for INOUT but will only be read for input, specify LABEL=(,,,IN) in the JCL
  - Simply define a subpool with READONLY as the first 8 characters of the 13-character pool name

External Security

- Protect Tapes – During Standard OPEN processing
  - External Security System (TAPE DATA SET PROTECTION)
  - With z/OS 1.8 and above, new DEVSUPxx member of SYS1.PARMLIB

TAPEAUTHDSN	*TAPEAUTHF1*
TAPEAUTHRC4	*TAPEAUTHRC8*

  - With CA 1 TMOOPTxx options

    OCEOV

    DSNB

    FORNDSN

External Security (cont.)

- Protect Tapes – During Special OPEN processing
  - EXPDT=98000 either specified or implied
  - If the Tape Management System is bypassed, then 44-character DSN checking is bypassed – **ANY HLQ** can be added to trick the previous security check
  - TMOOPTxx option FUNC
    - CLASS – CATAPE (CA@APE, CAT) entity FORNORES or FORRES with access of READ or UPDATE
    - Strictly limit FORRES – both READ and UPDATE
    - Using 98000 for in-house tapes is a security exposure
    - Limited to TAPEMAP utilities only

External Security (cont.)

- Protect Tapes – During Special OPEN processing (cont.)
  - BLP can be controlled via JES jobclass definition
  - BLP can be controlled via external security options
  - CA 1 TMOOPTxx option FUNC
    - CLASS = CATAPE (CA@APE or CAT), ENTITY BLPRES or BLPNORES, ACCESS either READ or UPDATE
    - Allows for tight control of BLP for in-house tapes, optionally more relaxed rules for BLP for foreign tapes
  - NL usage is also controlled when FUNC is active
  - FUNC=EXT (extended) allows for control via volser or unit address – ENTITY = *xxx*RES.V*vvvvvv*.UCB*nnnn* or *xxx*NORES.V*vvvvvv*.UCB*nnnn*

External Security (cont.)

- Protect Updates to the TMC itself
  - TMOOPTxx option YSVC should be YES
  - Check for CLASS = CATAPE (CA@APE, CAT), ENTITY = YSVCUNCD or YSVCCOND
  - If Un-Conditional access is allowed, no further checking
  - If Conditional access is allowed, then a second check of the DSN of the record itself is performed
- CREATE processing
  - TMOOPTxx option CREATE should be ALTER/CREATE
- Control who runs TMSINIT as a started task
  - TMOOPTxx option SECWTO should be YES

External Security (cont.)

- Erase Residual Data
  - Older 3480/3490 cartridges can be physically degaussed with a large electro-magnet
  - Newer 3590/3592 type cartridges can be physically degaussed only if you want to permanently destroy them
    - Destroys the servo-tracks which are required
  - SCRATCH tapes can be programmatically degaussed with either TMSTPPRO or CTSDEU
  - Tapes with active data can have residual data erased prior to off-site shipment with CTSDEU

Miscellaneous

- Keep 3 months of Audit backup
  - Audit data is not just for recovery
  - Allows for easier trouble shooting, especially when a client asks "why was this tape scratched last month?"
- Set AUDB4 to BATCH
  - Writes a "before" image to the AUDIT file for every batch update (not O/C/EOV processing) performed
  - Uses more AUDIT records, so make sure your AUDIT file is sufficiently large before making this change

Miscellaneous (cont.)

- Use alternate method for backup of the TMC and restore at your DR location to eliminate pointer errors at DR
  - Use IEBGENER to copy the AUDIT file as LABEL=(2,SL) behind the TMSCOPY backup of the TMC for off-site storage
  - Not used for in-house restore (when the TMC is deleted or over-written).
  - At DR however, restore the AUDIT from file-2 first, then do a normal restore of the TMC (PARM=RESTORE)
  - Creates a "snap-shot" restore of the TMC at exactly the time the first record of the AUDIT file was copied
  - **No pointer errors at DR**

Miscellaneous (cont.)

- Install the FAILSAFE ++USERMOD on the z/OS SMP zone
  - Prevents tapes from being created when the CA 1 intercepts are inactive (prior to the activation of CA 1 or if CA 1 had been shutdown or in-activated for some reason)
- Use the real-time catalog interface instead of TMSCTLG
  - OCTLG changed to NO
  - First run TMSOSCAT with PARM=SYNC on all systems without shared catalogs
  - Eliminates the need to run TMSCTLG on a daily basis

Stay Current on Maintenance

- Always call CA 1 support prior to upgrading to a new release of z/OS
  - 214-473-1431
- Always call CA 1 support prior to adding new types of tape hardware or new Virtual Tape solutions
- PLEASE call CA 1 support when planning on data center migrations that involve moving tape libraries
  - Both L1 and L2 are willing to help review project plans to ensure that no steps are forgotten
- Are you using CA Mainframe Software Manager (CA MSM) yet to automate CA 1 installation, maintenance and deployment?

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simplify management
CA Mainframe Software Manager (CA MSM)

- InstallShield® and Windows Update for the Mainframe
- Dramatically simplifies software management activities
- Significantly reduces installation, deployment, and maintenance times
- Enormous productivity increases for both mainframe experts and novices
- More than 120 deployable products across all major product families
- Included at no additional charge for any active CA Technologies mainframe customers

CA MSM time savings - installation
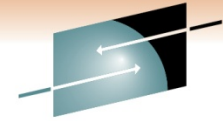
Product	Mainframe Expert Install			Mainframe Novice Install		
Time to Install 10 Mainframe Applications*						
	Traditional	With CA MSM	Improve-ment	Traditional	With CA MSM	Improve-ment
CA 1	36 min	**9 min**	**4X**	3 hrs 12 min	**14 min**	**14X**
CA Auditor for z/OS	26 min	**7 min**	**4X**	2 hrs 22 min	**8 min**	**18X**
CA Datacom®	1hr 14 min	**6 min**	**12X**	3 hrs 8 min	**10 min**	**19X**
CA JARS Resource Accounting	37 min	**5 min**	**7X**	1 hr 11 min	**6 min**	**12X**
CA Librarian®	28 min	**2 min**	**14X**	1 hr 13 min	**6 min**	**12X**
CA MIM™ Resource Sharing	30 min	**5 min**	**6X**	1 hr 31 min	**5 min**	**18X**
CA OPS/MVS®	36 min	**6 min**	**6X**	1 hr 50 min	**7 min**	**16X**
CA Panvalet®	54 min	**3 min**	**18X**	1 hr 11 min	**5 min**	**14X**
CA SMF Director	40 min	**5 min**	**8X**	1 hr 10 min	**6 min**	**12X**
CA SymDump® for CICS	38 min	**3 min**	**12X**	4 hrs 3 min	**6 min**	**40X**
Totals	**6 hrs 39 min**	**51 min**	**8X**	**20 hrs 51 min**	**1 hr 13 min**	**17X**

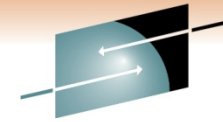## *87% productivity gains for mainframe experts and 94% for novices!*

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CA MSM time savings – maintenance

CA MSM time savings - maintenance

		Time to Install Maintenance for 7 Mainframe Applications*					
Product	**Number of Fixes**	**Mainframe Expert Install**			**Mainframe Novice Install**		
		Traditional	**With CA MSM**	**Improve-ment**	**Traditional**	**With CA MSM**	**Improve-ment**
CA Auditor for z/OS	14	23 min	1 min 22 sec	17X	41 min	1 min 30 sec	27X
CA Cleanup for CA ACF2™	1	6 min	38 sec	10X	33 min	1 min 13 sec	27X
CA Easytrieve®	9	24 min	1 min 24 sec	17X	60 min	1 min 59 sec	31X
CA Endevor® Software Change Manager	19	32 min	5 min 5 sec	7X	46 min	10 min 2 sec	5X
CA Librarian®	15	45 min	1 min 58 sec	23X	38 min	2 min 55 sec	13X
CA Panvalet®	12	27 min	1 min 39 sec	17X	62 min	2 min 25 sec	26X
CA View®	4	32 min	1 min 48 sec	18X	37 min	1 min 39 sec	22X
Totals		3 hrs 09 min	13 min 54 sec	14X	5 hrs 17 min	21 min 43 sec	15X

Source: CA Technologies Lab Results

93% productivity gains for mainframe experts and 94% for novices!

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Mainframe 2.0

CA MSM time savings - deployment

S H A R E

Product	Time to **Deploy** 10 Mainframe Applications*					
	To A Single Remote System			To Six Remote Systems		
	Traditional	With CA MSM	Improvement	Traditional	With CA MSM	Improve-ment
CA 1					0:05:45	26X
CA Workload Automation Restart Option (CA 11)					0:03:32	30X
CA Cleanup for CA ACF2™					0:03:22	24X
CA Copycat					0:03:15	25X
CA Deliver™					0:05:36	14X
CA Endevor® Software Change Manager					0:11:24	11X
CA NetMaster® Suite					0:21:58	9X
CA SYSVIEW® Performance Management					0:13:42	22X
CA TPX Session Management	0:43:00	0:06:11	12X		0:11:01	6X
CA View®	0:58:00	0:06:19	9X	2:40:00	0:13:55	12X
Totals	**9:03:00**	**0:33:55**	**16X**	**22:44:00**	**1:33:30**	**15X**

93% productivity increase using CA MSM for Deployment

Deploy all products to one system	0:24:02
Deploy all to six remote systems	1:28:25

There were 4 tasks performed in non-MSM deployments
1. JCL Preparation and documentation review
2. TSO XMIT process
3. Send using FTP Protocol
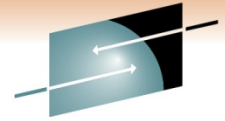4. Receive using FTP Protocol

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Source: CA Technologies Lab Results

Summary

- Being cautious is fine, don't be afraid. There are a LOT of new features that will help a great deal;
  - TMSXTEND
  - Real-time Catalog Interface
  - READONLY
  - HealthChecks
- If you want to be safe, take advantage of what's available
  - AUDB4 as BATCH
  - Keep 3 months of AUDIT data
  - Apply FAILSAFE
- External security doesn't have to be avoided to do your job
  - FUNC, YSVC, UNDEF should ALL be properly set

QUESTIONS

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