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Migrating Tape Data to the EMC DLm with DTS Software's DLMCLONE

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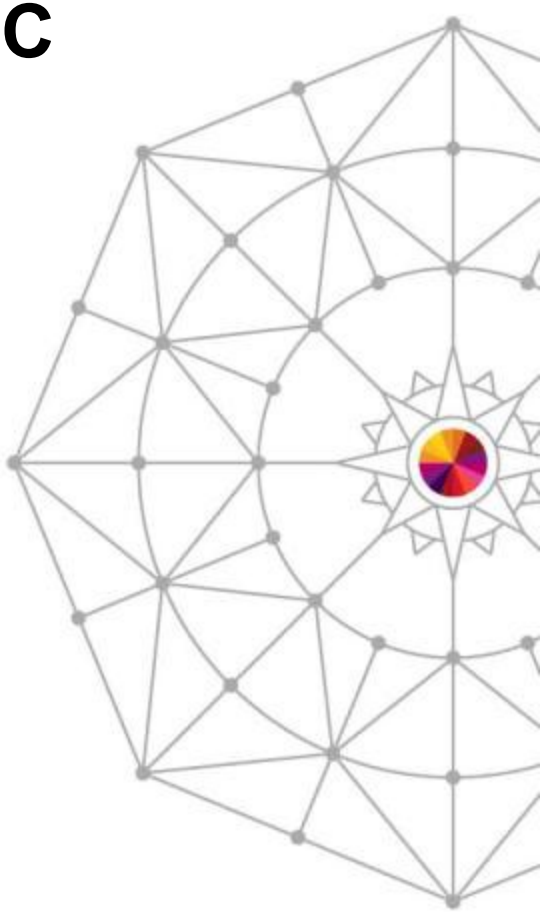

SHARE in Anaheim

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What is DLMCLONE?

- Volume-level batch-driven copy utility
  - Part of DLm Control Center product suite
  - “clones” tapes
    - Same VOLSER, same LABEL, same UNIT, same data
    - Updates TCDB if source or target is SMS-managed
    - Updates TMS if needed
    - Catalog or other metadata updates *not* required / performed
  - Restartable, auditable

Tape Migration via DLMCLONE

- Planning and Preparation Steps
- The Migration Process
- Completing the Migration
- Pitfalls and Best Practices

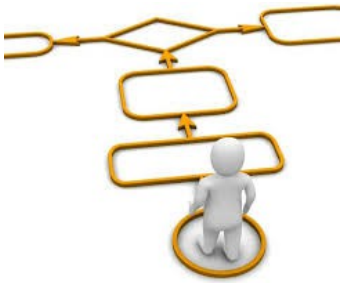
DLMCLONE Design Points

- Simplicity
  - Minimal updates to metadata
  - Simple backout
- Ease of Use
  - Restartable batch processes
  - Audit file progress reports
- Copy all types of data
  - OAM, Mobius, DB2, DFSMShsm, et. al.

Planning and Preparation

- Resources
  - The DCC User Guide
  - The DCC Migration Cookbook
  - EMC DLm User Guide
- Decisions
  - SMS or non-SMS target?
  - Which device types?
  - Retain existing scratch range?

Planning and Preparation



- Estimate size / duration of Migration
  - How many tape volumes must be moved?
    - Which ones are expiring?
  - How many bytes must be moved?
  - Will old technology continue to be used?
    - When will it disappear?
  - In which order should applications move?

Planning and Preparation

- Decide on Migration Resources
  - How many tape drives available (input and output)?
  - How many hours / day?
  - How many migration jobs / tasks?

Planning and Preparation

- DCC Installation
  - Install DCC Scripts
  - Build DCC DLMPOOLS and DLMRULES
    - Required if non-SMS target and no device-type change
  - Create DCC Audit Dataset
  - Install and test DCC ISPF interface
    - Access to DLM VTE Activity Logs and DCC Audit Dataset
- Start DCC Components
  - DLM, DLMALLOC, DLMCRSCR, DLMCLONE
- Create DCC tape volume list jobs

Planning and Preparation

- Obtain Volume Lists from TMS
  - Volumes to be ignored
  - Volumes to be cloned
  - Scratch Volumes
- Via DCC MONitor jobs or TMS reports

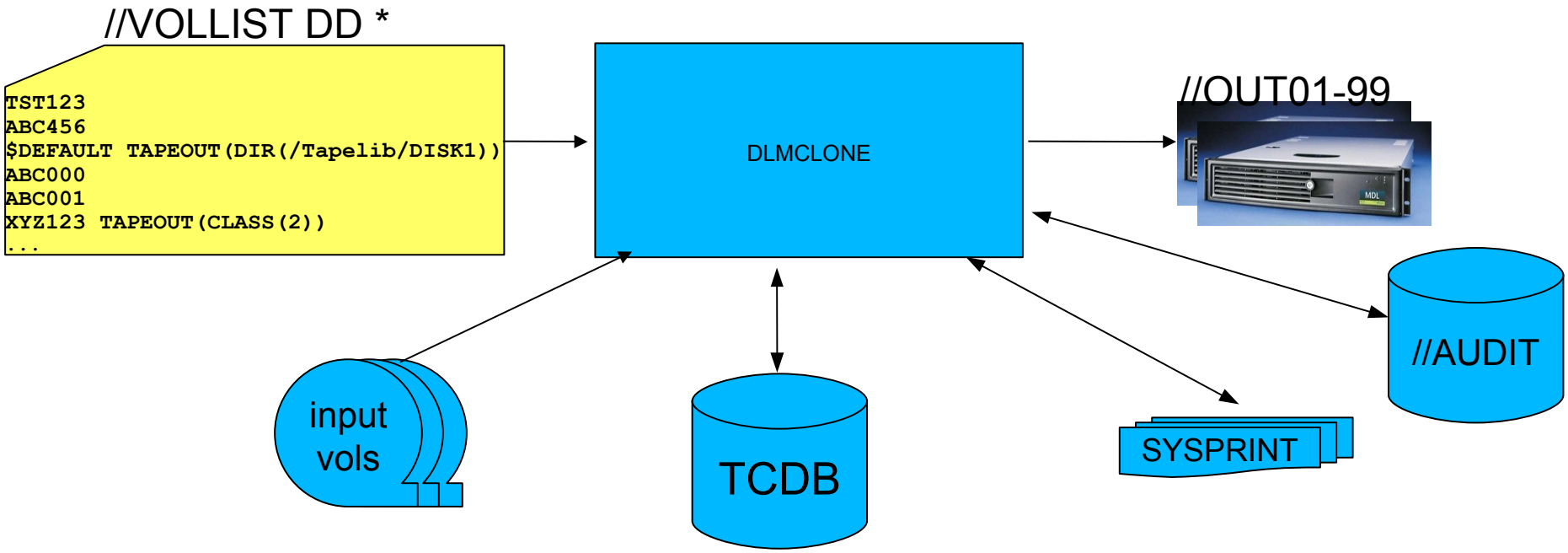
Planning and Preparation

- Direct Scratch Mounts to the DLm
  - Via DLMALLOC or SMS
- Scratch Volume Preparation
  - Obtain list of scratch volumes via MONitor
  - Init new-range scratch volumes into DLm, or
  - Copy scratch volumes to DLm with DLMCRSCR

Planning and Preparation Gotcha's

- DLm installation delays
  - Hardware issues, network issues, scheduling issues
- DCC Scripts not installed
- No tape devices for DCC communication
  - Or tape devices unavailable due to MIM

DLMCLONE Batch Process




```
//COPYSTEP EXEC PGM=DLMCLONE,PARM='TAPEIN(UNIT(3490))'
//STEPLIB DD DSN=DTS.R51.LOADLIB,DISP=SHR
//SYSPRINT DD SYSOUT=*
//AUDIT    DD DSN=DLM.CLONE.AUDIT.LOG,DISP=SHR
//OUT1 DD DISP=OLD,UNIT=(3490,,DEFER),DLMLIB=TAPELIB1,LABEL=(,BLP),VOL=SER=DUMMY1
//OUT2 DD DISP=OLD,UNIT=(3490,,DEFER),DLMLIB=TAPELIB1,LABEL=(,BLP),VOL=SER=DUMMY2
//OUT3 DD DISP=OLD,UNIT=(3490,,DEFER),DLMLIB=TAPELIB1,LABEL=(,BLP),VOL=SER=DUMMY3
//VOLLIST DD *
ABC101
ABC102
ABC103
```

Input unit

input volsers

Preparing to Clone

- Create 'dummy' volume entries in TCDB
  - for SMS target
  - one per DLMCLONE tape subtask
- Validation
  - BLP and EXPDT=98000 ok?
  - LCS cartridge entry exit ok?
    - Default entry data class defined
- Insure devices available for DCC commands
  - Beware CA-MIM, ATAM, etc.

The Migration Process

- Create DLMCLONE batch jobs
  - Multitask up to 100 concurrent clones per job
    - Practical limit is number/capacity of input drives
  - Separate jobs by
    - Device type or target class/directory
    - Tape Label type (ANSI, NL, SUL, etc.)
    - Optionally, single vs. multivolume
- Run DLMCLONE
- Validate output and correct errors
- Iterate

DLMCLONE Restart Procedures

- Restart Process
  - Reads AUDIT file and skips tapes in DONE status
  - Queries DLm and skips tapes already in target library

- Identifying Incomplete Tapes
  - Cancellation report – identify tapes in COPY status
  - DLMCLONE sysprint – identify tapes in error

- Use DLMUTIL to remove partially copied tapes from DLm
- Use FORCE operand to recopy partially copied tapes

Gotcha's

- Undesired tape management exit processing
- EJECT timeouts with real tape volumes
- Incorrectly coded 'dummy' volumes
  - Invalid MEDIATYPE or no default data class
- Unusual tape formats
  - ANSI, user labels, unlabeled, LTM, encrypted, I/O errors

Migration Processing

- Stopping and Starting DLMCLONE
  - Via parm or STOP command
- Correct failed volumes and re-clone
- An iterative process
  - Run volume selection jobs
  - Clone selected volumes
  - Correct any errors
  - Until all volumes cloned
    - Volume selection jobs return null list

Gotcha's

- Compressed input tape too large for DLm
- CA-1 Options
  - Set NLWTOR to avoid IECTMS1, ENTER VSN messages
- DLm supports only 128TRACK rec tech
  - `CBRXLCS 12-66 NO DEVICE POOLS TO FULFILL REQUEST FOR SPECIFIED REC TECH`
  - Specify rec tech on dummy volume or default data class
- DIF40417 Volume is Scratch

Completing the Migration

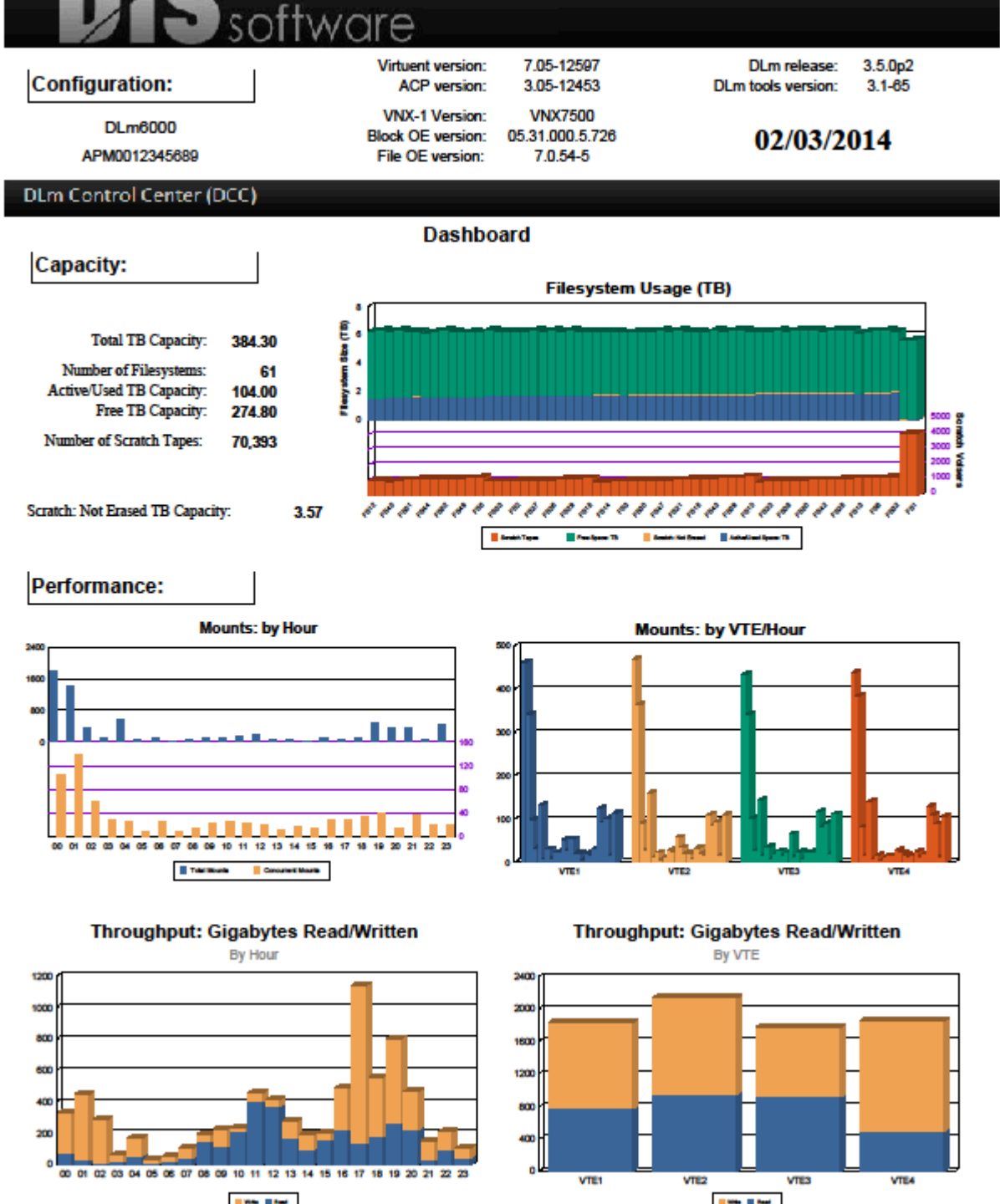
- Examine Audit File for uncopied volumes
  - Audit file indicates copy status:
    - DONE, FAILED, COPY, SCRATCH, BYPASS
  - Remove target volume in DLM if present
  - Remove dummy volume in DLM if present

- Run batch reports to generate volume selection list
  - When no more input volumes, migration is complete!

Other DCC Features

- Automatic return-to-scratch
- Back-end and activity log monitoring
- Tape allocation management with DLMALLOC
  - Device selection
  - Allocation load balancing across VTEs
- ISPF, graphical, batch interfaces
  - To DLM commands, reports, and logs

Other DCC Features - Dashboard



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Questions??

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