Implementing DFSMShsm Best Practices with Tivoli Advanced Products

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March 11, 2014

Session Number 15109

SHARE
in Anaheim

Implementing DFSMShsm Best Practices

- DFSMShsm Best Practices is not a one time process.
  - Usually requires constant monitoring and updating.
  - What was acceptable before may not be acceptable today.
  - Is an extension to current DFSMShsm best practices.
    - Data allocation, retention and management.

- Question:
  - How many of you have the time and resources to look at DFSMShsm work everyday?
    - Not just failed work, but also successful work.

Implementing DFSMShsm Best Practices

- What makes DFSMShsm Best Practices successful?
  - Remember, DFSMShsm Best Practices is not only allocation of data; it includes Management Movement and the Availability of data.
  - DFSMShsm Best Practices can also help reduce the amount of system and task resources needed and used.

Implementing DFSMShsm Best Practices

- Where could current Best Practices fall through or be missed?
  - Purchase of a new company/business
    - In most cases, the purchased company/business standards and procedures are copied over.
  - Business growth
    - In many situations, current practices were defined years ago and may no longer apply or be correct.

Hints and Tips Reminders

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Prior SHARE Hints and Tips

Recycle

- Recycle purpose is to free-up HSM tape by merging no longer needed migrated and backup data to new tape releasing the cycled tape back to the tape management system for reuse.
  - Also used to move HSM data to new tape devices

- Truth or Myth –
  - Virtual Tape Library's
    - Some sites are under the impression because they have HSM tapes in a VTL they have unlimited tapes available.
      - Myth – as the saying goes, you are only as strong as the weakest link. Though there could thousands of tapes defined, the weak link is the back end storage.

Recycle

- Truth or Myth (continued)–
  - We aggressively migrate HSM data to the VTL because it uses less resources than physical tape.
    - Truth and Myth –
      - VTL's do process data faster than physical tape, aside from the regular DFSMShsm resources for recycle a VTL also uses these additional cycles–
      - Cache for loading data
      - Loading of complete tape into memory
      - Hardware decompression
  - Recommended recycle percentage
    - Physical Tape – 30-40 percent valid data
    - Virtual Tape – 10-20 percent valid data

Prior SHARE Hints and Tips

Thrashing

- Thrashing can be described in 2 ways
  - A data set which is migrated and recalled within a few days
  - Data sets which are migrated and recalled multiple times
- Often generation data sets involved
  - Management Class says to allows GDS early migration
    - MC Class field # GDG Elements on Primary
  - Some jobs recall entire GDG rather than relative generation
    - Data is recalled even when not needed
- Consider not migrating small datasets
  - Migration may not be worth the processing overhead
  - Use ARCMDEXT exit to exclude from migration
    - Can also allow migration to ML1 but exclude from ML2

Common Causes of Migration & Backup Failures

- Everyday in most shops DFSMShsm primary, secondary and backup are run at specific times daily. In most cases business's have grown, storage farms have grown and managed data has grown, but when was the last time your scheduled tasks were reviewed or verified?
- Here are some common failures documented while doing the Health Assessments.
  - Data Set in Use (migration/backup) –
    - A common encountered error, everyday DFSMShsm will try to migrate and backup these data sets and fail.
      - *Waste of DFSMShsm resources*

Prior SHARE Hints and Tips

Migration and SMS Storage Group Thresholds

- Found sites using unrealistic storage group thresholds
  - E.g. High threshold 80%, low threshold 1%
- Primary Space Management will attempt to process down to low threshold
- Interval Migration starts after halfway between high- & low-threshold is exceeded
  - Ends at low-threshold
- Leads to excessive cycles and missed space management windows
- Set values that are realistic for the storage group

Stopping a DFSMShsm Started Task

- Normal Shutdown
  - Operator issues shutdown of the DFSMShsm started task
    - HSM clears and updates ghost records.
    - HSM finishes and marks open tapes as completed.
    - HSM completes all remaining requests and scheduled work.
    - HSM finalizes all chained records.

Stopping a DFSMShsm Started Task

- Cancel HSM task
  - Ghost records are lost.
  - Tapes are left in FAILED status.
  - Chained records are left orphaned and disconnected.
  - Data at HIGH risk for unavailability.

Prior SHARE Hints and Tips

Reorganizing Control Data Sets

- Should you reorganize a Control Data Set (cont)?

- Think of DFSMShsm as a crucial part of the OS
  - Every minute it is down –
    - Migrated data cannot be recalled
      - *Production delays*
    - Backed up data cannot be recovered
      - *Simple HSM lost revenue calculation*
        - *Total seconds HSM is working times cpu second divided by time HSM is down equals lost HSM revenue.*

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Reorganizing Control Data Sets

- Should you reorganize a Control Data Set (cont)?

  - Look for alternative solutions
    - Correct sizing of CDSs
    - Reorg While Active products
    - Review why and if needed use tested procedure

  - Is there a performance increase after a reorg?
    - Yes, the reorg removes all splits, but when HSM is restarted the first thing it will do inside a CDS is a split.
    - Performance impact for a number of weeks

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Helping Customers Understand Current Practices

Some actual customer discussions.

Best Practices – HSM Tasks

- **Know the status of HSM tasks.**
  - Someone may have held a task without communicating to team.
  - Unknown held tasks can cause –
    - Unexplained events
      - *Space issues*
      - *Backup issues*
    - Unnecessary task load when restarted
      - *Back workload*

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Best Practices – DFSMShsm Daily Work

- Just because HSM is working does not mean it's correct.
  - That's the way we have always done it.
- Ask yourself –
  - Are we migrating too much data?
  - Are we backing up too much data?

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DFSMShsm Best Practices

HSM Administration

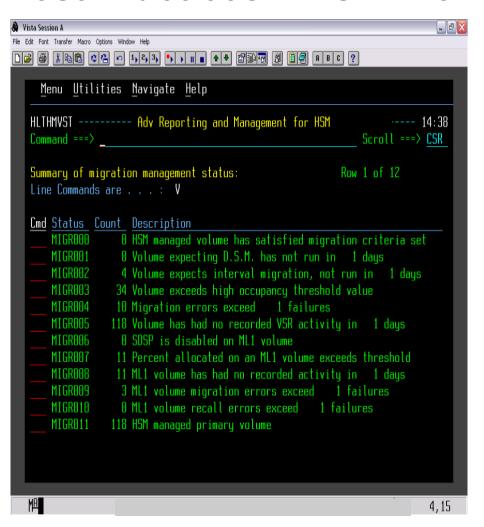# Best Practices – HSM CDS Administration

- To Reorg or Not to Reorg – That is the Question…
  - Some say yes – Some say no ..
    - If you need to reorg or you still reorg on a scheduled basis –
      - *It's always better to schedule when technical staff are still available.*
        - *Reduces chance of CDS corruption due to human error.*

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Best Practices – HSM Work Administration

Vista Session A

Menu Utilities Navigate Help

HLTHMVST ---------- Adv Reporting and Management for HSM ---- 14:38
Command ===> _   Scroll ===> CSR

Summary of migration management status: Row 1 of 12
Line Commands are . . . : V

Cmd Status Count Description
___ MIGR000   0 HSM managed volume has satisfied migration criteria set
___ MIGR001   0 Volume expecting D.S.M. has not run in   1 days
___ MIGR002   4 Volume expects interval migration, not run in   1 days
___ MIGR003   34 Volume exceeds high occupancy threshold value
___ MIGR004   10 Migration errors exceed   1 failures
___ MIGR005   118 Volume has had no recorded VSR activity in   1 days
___ MIGR006   0 SDSP is disabled on ML1 volume
___ MIGR007   11 Percent allocated on an ML1 volume exceeds threshold
___ MIGR008   11 ML1 volume has had no recorded activity in   1 days
___ MIGR009   3 ML1 volume migration errors exceed   1 failures
___ MIGR010   0 ML1 volume recall errors exceed   1 failures
___ MIGR011   118 HSM managed primary volume

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- **Daily Scheduled Work**
  - **Is HSM doing everything you think it is?**
    - RC-0 as long as the task starts and stops as defined.
      - *Are all volumes being touched as expected?*
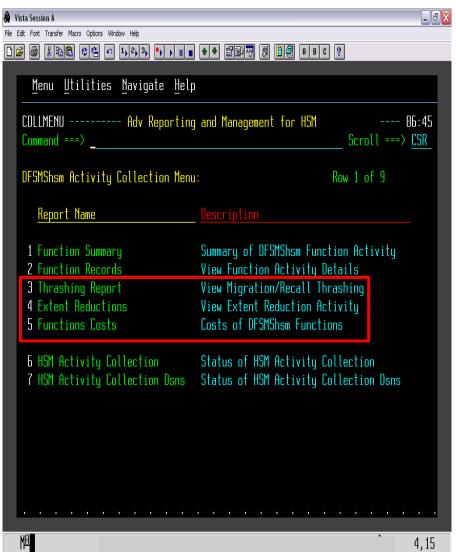   - *What volumes are having issues?*

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DFSMShsm Best Practices

HSM Management and Tuning

What is it using and where can I make changes?
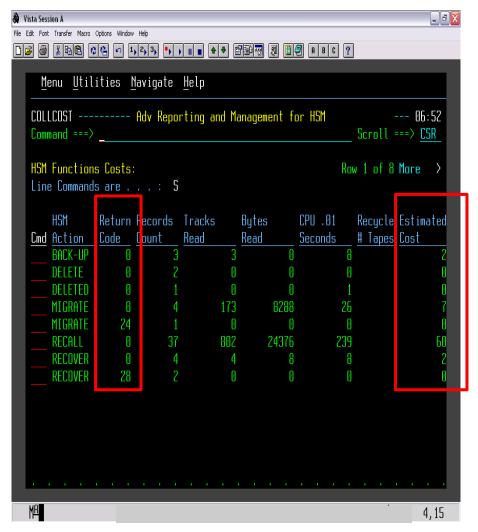
2/13/2014

Best Practices for – HSM Tuning

- Standards defined years ago do not automatically change with the business and can lead to higher resource consumption by DFSMShsm.

- Simple tasks like monitoring thrashing data can help point to loopholes in procedures.

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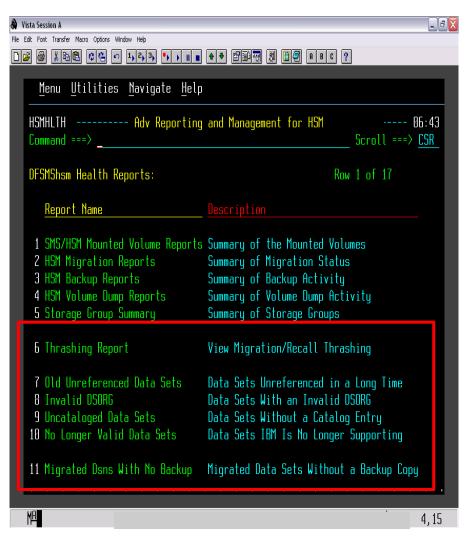
Best Practices for – HSM Tuning

- Knowing an estimated DFSMShsm cost associated with the data movement can help identify where current procedures need to be reviewed and assist with tuning DFSMShsm.
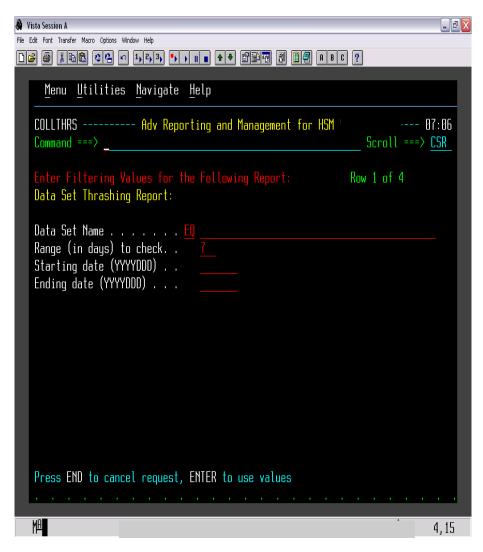
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Best Practices for – HSM Tuning

- **Best practices does not only include data movement.**
  - It can also include –
    - HSM Backup
    - Unreferenced data in HSM
    - Data HSM constantly fails on that you may not be aware of, such as:
      - *DSORG*
      - *Uncataloged*
      - *In use*

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Best Practices for – HSM Tuning

- To fully understand where DFSMShsm Best Practices weaknesses are, you may need to analyze multiple days worth of data.

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DFSMShsm Best Practices

DFSMS Management Class Auditing

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Best Practices for – Management Class Auditing

- **Successful DFSMShsm Best Practices is not a one-time deal.**
  - You should monitor different areas.
    - CDS Health
    - Management Class Activity
  - Note where you are seeing unexplained actions.
  - Note where there may be a high amount of activity.

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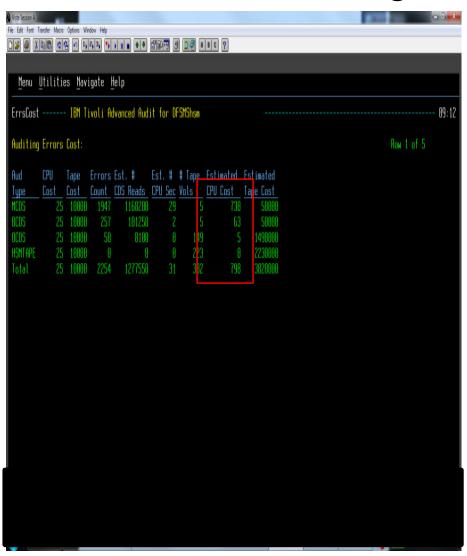
Best Practices for – Management Class Auditing

- Understanding where there may be weaknesses in your Management Class definitions can help –
  - Reduce DFSMShsm system and resource consumption.
  - Alert you of possible problem areas.
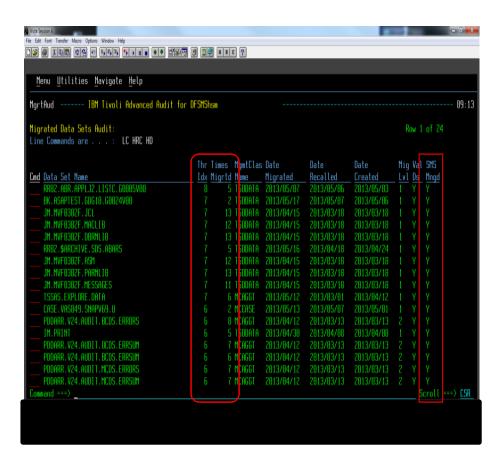 - Alert you of the possibility of data loss.

Best Practices for – Management Class Auditing

- Corruption Cost Reporting
  - Provides estimate DFSMShsm costs wasted in a 24hour period.
    - Waste due to reading corrupted DFSMShsm CDS records
      - *Resource waste*
      - *Tape waste*

  - Good report for –
    - Prioritizing corrective actions
    - Tuning DFSMShsm

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Best Practices for – Management Class Auditing

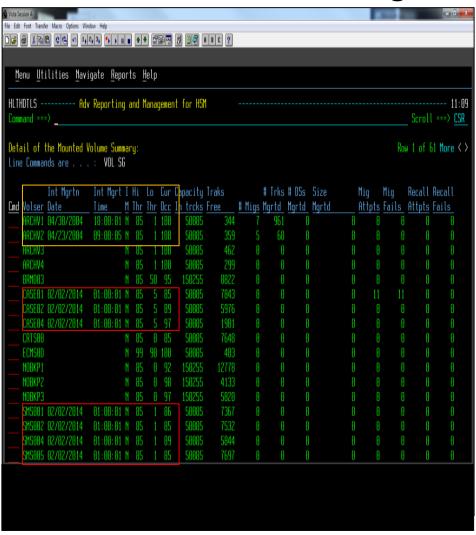
- Data Set Thrashing Report
  - Reports on data meeting predefined Thrashing criteria
    - Thrashing Index of 6+
  - Calculations are performed on the total data set life cycle.
    - Create date, number times migrated/recalled

  - Good report for DFSMShsm Tuning
  - Alerts you to data that may be in the incorrect Management Class
    - High Migration/Recall
    - Candidate to expire on primary rather than in HSM control
    - Alerts you to users trying to bypass set procedures.

  - DFSMShsm Tuning

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Best Practices for – Storage Group Auditing

- **Storage Group Audit Report**
  - Reviewing Storage Group definitions should be part of your DFSMShsm Best Practices.
    - Good standard for High/Low definition should be 15-20.
    - Low threshold defined at 50 or lower could add additional HSM workload if interval migration is turned on.

- **DFSMShsm Tuning**

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Best Practices for – Management Class Auditing

- • Migrated Data Without Backup Audit Report
  - • Audits and reports on sequential data migrated without a valid backup.
    - • Reduces risk of data loss due to not having a valid DFSMShsm backup.
    - • Backup policies may have changed, but data could have been missed.
      - • *You know your Data*

- • Data Availability Report

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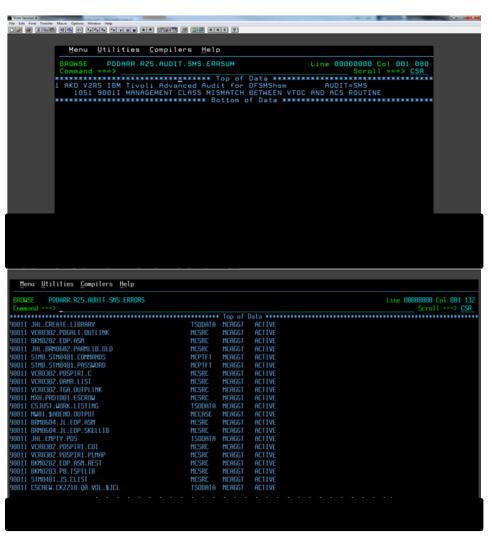# Best Practices for – Management Class Auditing

- VSAM Data Sets Needing Backup
  - Audits and reports on VSAM data changed/updated and not backed up in 2+ days.
    - Reduces risk of data loss due to no valid backup.
    - Reduce the risk of application downtime due to data inaccuracy.
      - *You Know Your Data*

- Data Availability Report

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Best Practices for – Management Class Auditing

- Audit your data to the active DFSMS ACDS.

  - Know if there is data being managed incorrectly due to wrong Management Class assignment.

  - Affects DFSMShsm

    - Migration
    - Backup
    - Expire
    - More ..

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Best Practices for – Management Class Auditing

- DFSMShsm Best Practices is not a one-time task.
  - To have good procedures in place will require that you audit and monitor your current procedures
  - You will want to understand what the data is doing and why it is doing it.
  - Be able to react to and correct quickly weaknesses you may find.
  - Question the unexplainable.
- DFSMShsm Best Practices is no longer just
  - data allocation, backup, archival, etc..
  - It now includes performance, tuning and costs.

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Questions?

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