



Ensuring Catalog and Control Data Set Integrity

Part II: Control Data Set Integrity

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ICF catalogs and DFSMSHsm Control Data Sets (CDSs) manage and provide access to your data. By protecting the integrity of these crucial structures, you can decrease the risk of outages and achieve better business resiliency.

In Part II, discover the steps you can take to ensure DFSMSHsm CDS integrity.

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With the right strategy, you can avoid costly outages.

For a resilient business, you need a healthy system infrastructure, including healthy ICF catalogs and DFSMSHsm Control Data Sets (CDSs). Because these crucial structures manage and provide the access to your data, even a small problem can have catastrophic results for your organization. The good news is, you can decrease the risk of an outage and improve your business's overall resiliency simply by implementing proven techniques for managing ICF catalogs and CDSs.

In the first part of this two-part series, we discussed ICF catalogs and how you can ensure their integrity. In this article, we'll turn our attention to CDSs: why they matter and how you can keep them healthy.

DFSMSHsm CDSs

CDS are particularly powerful structures, and they pose a major risk if they aren't in good shape.

Consider the role that CDSs play in your installation. They track all of your DFSMSHsm data and provide the only paths for accessing this data. Three data sets are required for any DFSMSHsm environment:

- The Migration Control Data Set (MCDS) keeps track of every DFSMSHsm-owned migrated data set (no matter where it resides).
- The Backup Control Data Set (BCDS) keeps track of every DFSMSHsm data set backed up, including migration copies, as well as incremental, changed, and dump backups.
- The Offline Control Data Set (OCDS) keeps track of every tape owned and managed by DFSMSHsm.

In each CDS, several records may be used to describe a data set:

- True name
- Alias
- Volume
- VSAM Association & Component
- Backup Version
- Tape Table of Contents

These records are chained together with physical address pointers. Broken or corrupted pointers can cause recall, recover, and recycle processing to fail. When any of these failures occur, your data access is in jeopardy.

More Crucial than Ever

Fifteen years ago, if a shop had 200,000 or 300,000 data sets migrated in the MCDS, it was considered a large shop. Today, CDSs may contain millions of records across four splits, with the DFSMShsm workload split between shared environments.

Based on a Mainstar customer survey:

- Between 60% and 80% of data is managed by DFSMShsm migration.
- A large number of installations migrate data required to execute weekly, monthly, quarterly, and annual batch applications.
- More than 80% migrate data they will need at the disaster recovery site in the event of a disaster.

Because DFSMShsm manages millions of data sets, it's more crucial than ever to ensure that DFSMShsm-managed data are available, even in the event of a disaster. With growing industry and governmental regulations requiring certain data to be retained, properly stored, and readily available – no matter what – you simply can't afford CDS errors.

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Achieving CDS Integrity

How do you keep these critical records healthy?

The key is auditing your DFSMShsm CDSs as often as possible. Running audits is similar to checking the fluid levels on your car. If you don't check regularly that your car has enough fluids, you don't know whether you're running the risk of engine failure. Auditing your CDSs on a regular basis gives you insight to the state of your environment and helps you correct potential issues before they become major problems.

An audit should include checking the contents of the MCDS, BCDS, and OCDS, verifying the connections between and within these structures, and verifying connections in ICF catalogs and tape management databases

Once you've audited your CDSs, you need to fix any issues that you find. As the amount of DFSMShsm-managed data grows, performing these fixes manually becomes increasingly problematic, so many installations take advantage of automated fixes.

Auditing the MCDS, BCDS, and OCDS

These are several different ways to audit these records to ensure they are in good health and accurate.

If you're already using Mainstar's Catalog RecoveryPlus (CR+) for ICF catalog management, you can take advantage of its auditing capabilities. CR+ checks all your pointers from your catalogs to your DASD.

IBM AUDIT and Enhanced AUDIT commands can be used for auditing, but have some drawbacks:

- These audits can run for long periods of time.
- Multiple different audits need to be executed to check all these records.
- Some records do not have audits available.
- Errors that are not automatically fixed will require research and single line correction commands.
- The same audits must be rerun several times to insure completeness and accuracy.
- The catalog is used as the rule for correcting errors.

Mainstar's *FastAudit/390* Suite is a comprehensive solution for keeping these pointers, chains, and records healthy and accurate:

- Auditing your environment requires 1/10th the time or less.
- One audit job executes the all the equivalent Command audits for a specific CDS.
- Every error reported has pre-defined appropriate fixes shipped in the product.
- You decide which errors to fix, the levels of priority for fixing errors, and how you want them fixed.

When auditing with *FastAudit/390* Suite, you can choose between two methods of error correction.

Method One

- Apply fixes after the audit.
- You can see what you are doing.
- You can fix things your way.

Method Two

- Automatically generate and submit fixes.
- Generate the desired fix per corresponding error code each time the audit job is executed.

Automatic Error Correction

Keep your CDSs healthy faster and with greater accuracy by automatically correcting errors during the audit process.

FastAudit/390 Suite applies different corrective actions to errors reported depending on the type of data, such as test,

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production, end-user, and so forth. Automatic corrective actions can be enabled and disabled individually.

In addition, the *FastAudit/390 Suite: HSM FastAudit* automated corrective actions replace the IBM Audit command with FIX specified, at many times the speed.

Correcting DFSMSHsm Tape Errors

DFSMSHsm tape errors include:

- Audit command AUDITMEDIACONTROLS TTOC errors (not corrected by directory controls)
- Missing or invalid records (MCC, MCD)
- Tapes in failed create or failed recycle status
- Block count discrepancies

In the past, the only way to correct these errors was to execute the DFSMSHsm Enhanced Audit command AUDITMEDIACONTROLS. It requires hours – or even days – just to audit one tape, and tape drives are held and unusable during audit. CDS backup is also held until tape audit is complete, so any changes that occur during the audit will not be protected.

With *FastAudit/390 Suite: HSM FastAudit-MediaControls*, you can tailor your audits to your situation by choosing the level of auditing needed. Even the "thorough" option executes in a fraction of the time of IBM's AUDITMEDIACONTROLS, so you can audit tapes quickly, without tying up resources. You can also pick, choose, and prioritize actions to meet the unique needs of your data center.

Correcting High-Level Qualifiers

By auto-correcting specific high-level qualifiers or groups of high-level qualifiers, you gain control over audits and priorities. Zero in on business-critical data; select one, two, or various high-level qualifiers to audit; and select the right fix. This ensures that business-critical information is at the top of the audit priority list.

Recovering and Rebuilding Lost Data

FastAudit/390 Suite is also the only product available on the market today that can rebuild and reconnect lost or expired DFSMSHsm migrated and backup data. This feature has already saved installations countless man-hours of trying to recreate HSM data accidentally deleted or corrupted.

Conclusion

The health of your CDSs is crucial for providing access to data managed by DFSMSHsm. When your CDSs are in good shape:

- Data can be recalled.
- Data can be restored from DFSMSHsm backup.
- Tape can be recycled.
- Damaged tapes can be rebuilt.
- DFSMSHsm and the tape management system are in synchronization.
- Control data sets are healthy and free of errors.
- Data can be recovered at the disaster recovery site.

With the tremendous growth in data – and often less personnel to manage it – automation is the answer for managing your CDSs effectively. *FastAudit/390 Suite* audits your environment quickly and provides customizable automatic fixes, so you can protect the integrity of your CDSs – and still manage to go home at night.

For more information visit our web site, www.mainstar.com, or contact us at experts@mainstar.com to arrange a personal briefing.

Steven Clar, Product Manager

During his 25 years in mainframe storage management, disaster recovery, and MVS systems, Steven Clar has supported and managed shops ranging from one terabyte of storage to over one hundred terabytes of storage, in industries ranging from banking and insurance to pharmaceutical and outsourcing companies. As a Mainstar Product Manager, he travels extensively, sharing his knowledge and discussing emerging challenges in storage management.

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Janet Sun has over 20 years of mainframe systems programming experience in the areas of operating system management, performance management, storage management, data security, web server management, and disaster recovery planning. She frequently presents at user conferences such as SHARE and the IBM Storage Symposium.

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