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So You Have a Catalog Failure... What Happens Next?

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The warning messages are there. The typical IDC3009I and IEC333I messages have been issued and the only option is to recover the catalog. You have Mainstar's Catalog RecoveryPlus (CR+) installed and have just switched the SYS1.MAN* files in preparation for recovery. So, what else do you need to do?

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Be ready for a recovery.

Because the ICF catalog facility is the key control structure that provides access to your z/OS® data, the integrity and availability of your ICF catalogs is of paramount importance. ICF catalogs break, and they have planned and unplanned outages – so you need to be ready to perform a quick, effective recovery. This article outlines considerations and recommended processes for accomplishing the task of catalog recovery with Catalog RecoveryPlus™ (CR+).

SMF Collection

To perform a forward recovery of a catalog, you must be collecting and retaining SMF record types 61, 65, and 66.

- Type 61 represents an ICF catalog entry define.
- Type 65 represents an ICF catalog entry delete.
- Type 66 represents an ICF catalog entry alter.

If you're not collecting these SMF types, recovery will only be possible up to the time of the latest catalog backup. This may result in catalog entries being out of sync with the actual data sets themselves. CR+ will issue a warning message if these records are not being collected, but you must still ensure they are being retained.

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Alternate Logon to TSO

What if the catalog that needs to be recovered contains the files you need to access TSO?

Just in case, a system programmer should maintain an alternate logon into another catalog with appropriate security.

Always keep a copy of all the JCL you may need to run in an alternate control library that can be used as a template, if access to ISPF is restricted. Typically, this library should contain the JCL for CR+ and also include the JCL for products, such as ICKDSF, DFSMSdss™, SMF, and IDCAMS, that are necessary to recover your data. Placement of this type of data set is best suited to a volume and catalog that are shared, in order to enable access to all systems.

Tape Management

When a catalog is in the process of being recovered, all tape

volumes that are under catalog control in that catalog will appear uncataloged to the tape management software. Any tape housekeeping that runs during the recovery would identify that these tapes are uncataloged and mark them for expiration. This means that these tapes could be overwritten by subsequent jobs that define files with a disposition of (NEW, CATLG) under catalog management from other applications. Therefore, you should ensure that no one is able to initiate any tape management housekeeping jobs during the recovery. This situation can also occur when performing a MERGECAT function from one catalog to another.

Automated Scheduling Packages

Planning for a recovery should include stopping or restricting execution of Job Schedulers or current tasks that that could impede recovery.

Shared Catalogs

For manual recovery of an ICF catalog, always lock a faulty catalog to all other systems to which the catalog is connected. Once the recovery is complete, the catalogs can be unlocked to these systems. Locking or unlocking a troublesome catalog is accomplished by the use of IDCAMS ALTER. For this command to work you must have defined a FACILITY class profile to IGG.CATLOCK. If the catalog is to be moved to a new volume, then please refer to the IBM® Manual, *Managing Catalogs* (Chapter 6, “Recovering Shared Catalogs”).

Avoid Complications

Before performing a manual catalog recovery, shut down any jobs or tasks that are using the catalog. This will stop any new files being defined into the master catalog while the recovery is performed.

Catalog Resizing & Dynamic Reorg

More often than not, catalogs are left untouched for years, until something goes horribly wrong. In many cases, these catalogs were allocated years ago using incorrect or obsolete parameters. A recovery is probably not the best time to determine whether the catalog needs to have its extents consolidated, to resize its primary allocation to allow for growth, to take advantage of a new CISIZE, or to remove parameters such as IMBED/REPLICATE. A reorganization of the catalog should be scheduled to correct these issues before

a problem occurs.

With CR+ these changes can now also be accomplished with the use of a feature called Reorg While Open. This feature enables a dynamic reorg of an ICF catalog to occur while online tasks are up and running, thereby negating the need to cease processing. Reorg While Open incorporates numerous parameters to override old define statements or insert new parameters and also features the ability to dynamically move an ICF catalog from one volume to another non-disruptively.

CR+ provides recovery options to fit different situations: manual recovery using SMF data to forward recover and non-SMF recovery using Reorg While Open to dynamically reorganize an ICF catalog on the fly. In companies where 24x7 processing occurs and outages must be kept to a minimum, Reorg While Open provides real, quantifiable benefits.

Non-SMF recovery is not normally an emergency recovery; instead it's a crucial aspect of day-to-day catalog maintenance. On the other hand, if you run out of extents on a catalog unexpectedly, performing Reorg While Open will make the catalog usable again.

Always Test Before Giving the All Clear

Regardless of the technique used, it is good practice to run the DIAGNOSE functions to ensure that no anomalies exist. The CR+ DIAGNOSE function is made up of three parts:

1. DIAGNOSE ALIAS interrogates the alias structure within the master catalog environment and synchronizes it with other master catalogs. With three selectable modes of operation, DIAGNOSE PEER, NON-PEER, and NON-PEER UNCONDITIONAL, installations can interpret and correct aliases in a manner suitable to their needs.
2. DIAGNOSE BCS-VVDS identifies data set entries that exist in the catalog, but do not physically exist on disk.
3. DIAGNOSE VOLUME-BCS identifies orphan data sets that exist on volumes, but do not exist within the catalog.

In addition, the three DIAGNOSE functions can generate the required fixes to insert into a file that is edited for analysis. If the user is satisfied with its contents, an IDCAMS JCL step is inserted prior to job submission to clean up the errors. This will ensure that the catalog is free from error and synchronized.

A final health check using IDCAMS EXAMINE should be run. The EXAMINE command will scan for structural errors in the INDEX and DATA component of the catalog.

Conclusion

By preparing for a catalog recovery in advance, and running regular diagnostics you can minimize downtime and ensure success.

Take these steps for a successful SMF recovery:

- Make sure you are collecting SMF types 61, 65, and 66.
- Maintain an alternate logon into another catalog with appropriate security.
- Ensure that no one is able to initiate any tape management housekeeping jobs during the recovery.
- Stop or restrict executing Job Schedulers or current tasks that that could impede recovery.
- Lock a faulty catalog to all other systems to which the catalog is connected.
- Shut down any jobs or tasks that are using the catalog before recovering the catalog.
- Perform catalog maintenance such as reorganization on a regular basis – not during a catalog failure.
- Test before making the catalog available for use.

If the catalog has not been damaged so severely that total access to the catalog has been disrupted, you can instead perform a non-SMF recovery using Reorg While Open.

For more information on recovering catalogs with CR+, visit our web site, www.mainstar.com, or contact us at experts@mainstar.com to arrange a personal briefing.

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Working with mainframes since 1976, in fields ranging from operations and technical support to disaster recovery and storage management, Amerigo Baldassarri has developed an exceptional breadth of MVS knowledge. With 31 years of experience in the Australian banking system, he also possesses a keen understanding of the challenges encountered by companies today.

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