DFSMS – What's New with DFSMS ICF Catalog and IDCAMS

Stephen Branch

IBM

March 4, 2015

17104

Legal Disclaimer

NOTICES AND DISCLAIMERS

Product data has been reviewed for accuracy as of the date of initial publication. Product data is subject to change without notice. This information could include technical inaccuracies or typographical errors. IBM may make improvements and/or changes in the product(s) and/or programs(s) at any time without notice.

Any statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

References in this document to IBM products, programs, or services does not imply that IBM intends to make such products, programs or services available in all countries in which IBM operates or does business. Any reference to an IBM Program Product in this document is not intended to state or imply that only that program product may be used. Any functionally equivalent program, that does not infringe IBM's intellectual property rights, may be used instead. It is the user's responsibility to evaluate and verify the operation of any non-IBM product, program or service.

Agenda

- GDG Enhancements:
  - GDG > 255 GDSs
  - GDG SCRATCH/NOSCRATCH support
  - GDG PURGE option
- Catalog RAS
  - New CSI fields (in support of the private CAXWA chain)
  - Connect Multi-Line WTOs
  - Catalog Attributes Healthcheck
  - DSS Restore a Catalog to Any Volume
- Modify Command Security Enhancements
- IDCAMS
  - REPRO MERGECAT output is too long
  - TSO LISTCAT adds userid as PREFIX for LEVEL and ENTRY
  - PRINT and REPRO CI Mode Processing

GDG > 255 GDSs aka GDG Extended (GDGE)

- New keyword for DEFINE GDG
  - EXTENDED keyword allows up to 999 GDS to be active within 1 GDG
  - Example:

```
DEFINE SMS.GDG GDG EXTENDED LIMIT(999)
```

  - Default is NOEXTENDED - LIMIT is 255

GDG Extended (GDGE)

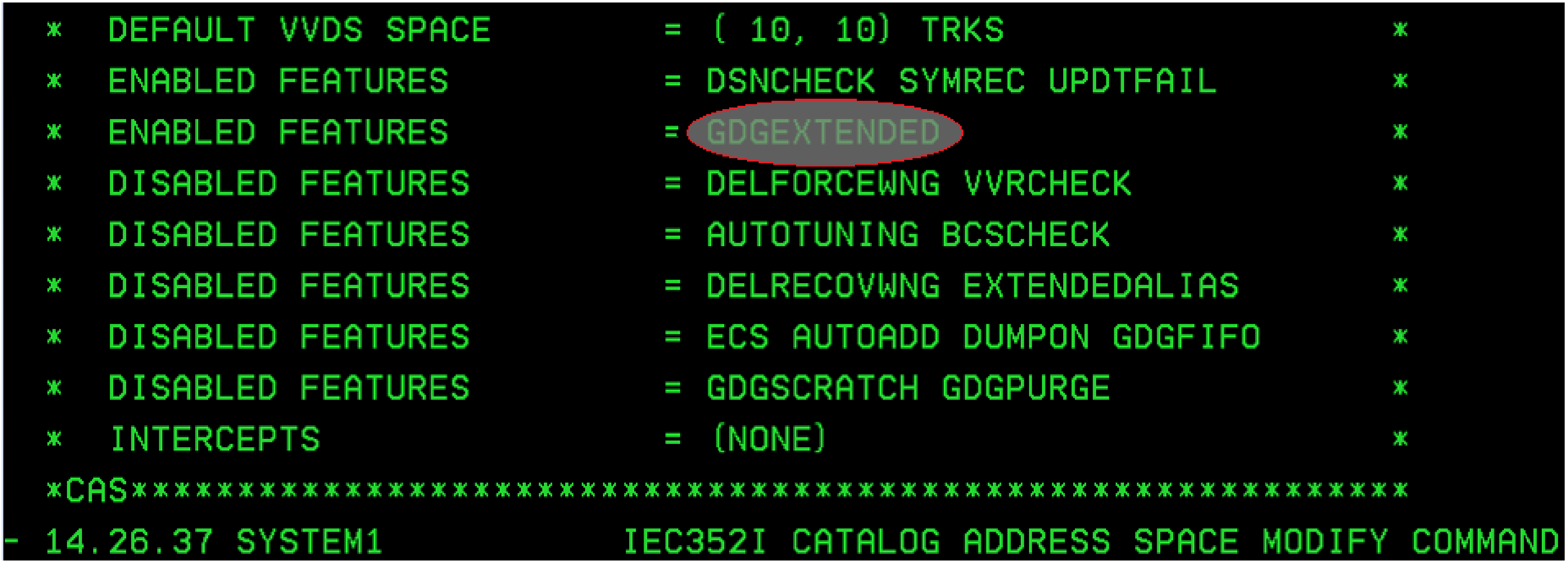
- GDGE support must be enabled for a system
  - SYS1.PARMLIB member IGGCATxx must have new GDGEXTENDED variable set to “YES” (default is “NO”)
  - Example:

    GDGEXTENDED(YES)

  - All systems in an installation should be at z/OS V2.2 or higher before enabling GDGEs
    - Coexistence APAR OA46009 prevents access to GDGEs on lower level systems
    - No coexistence can give unpredictable results

GDGE Enablement

F CATALOG,REPORT shows enablement status



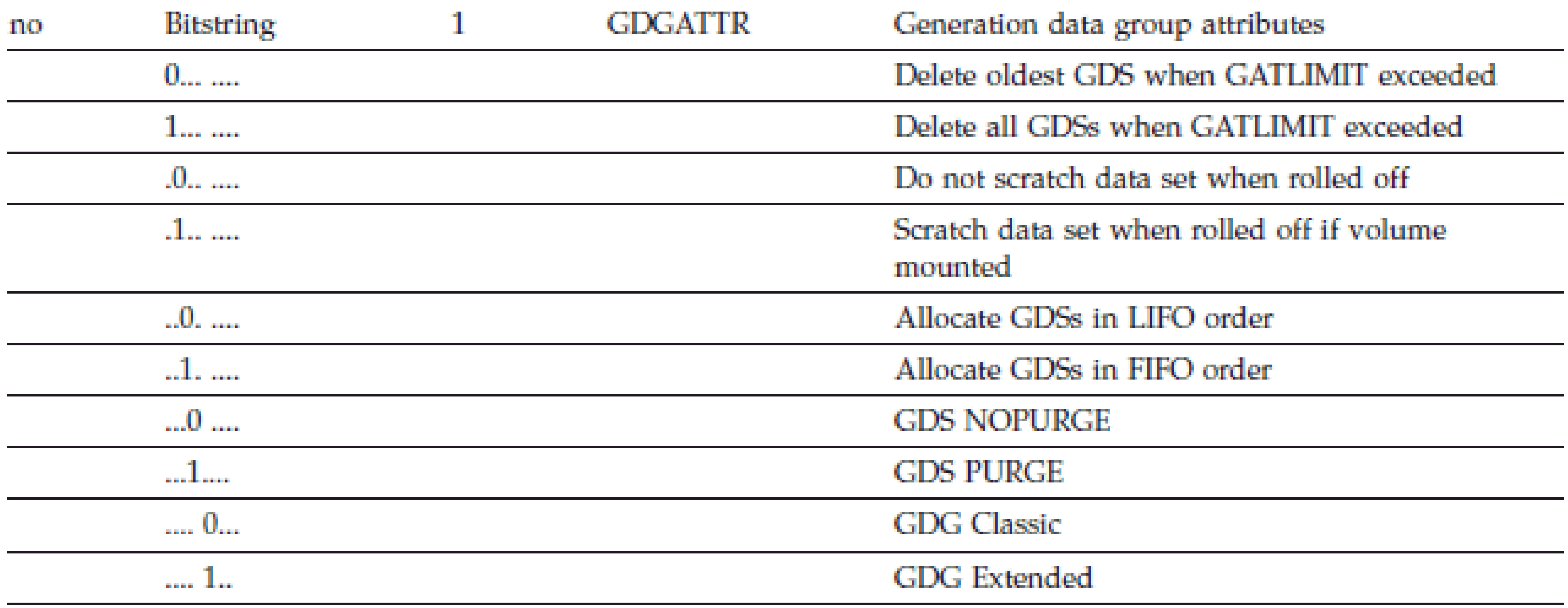
```
  *  DEFAULT VVDS SPACE        = ( 10, 10) TRKS                  *
  *  ENABLED FEATURES          = DSNCHECK SYMREC UPDTFAIL        *
  *  ENABLED FEATURES          = GDGEXTENDED                     *
  *  DISABLED FEATURES         = DELFORCEWNG VVRCHECK            *
  *  DISABLED FEATURES         = AUTOTUNING BCSCHECK             *
  *  DISABLED FEATURES         = DELRECOVWNG EXTENDEDALIAS       *
  *  DISABLED FEATURES         = ECS AUTOADD DUMPON GDGFIFO      *
  *  DISABLED FEATURES         = GDGSCRATCH GDGPURGE             *
  *  INTERCEPTS                = (NONE)                          *
  *CAS************************************************************
- 14.26.37 SYSTEM1           IEC352I CATALOG ADDRESS SPACE MODIFY COMMAND
```

GDGE Migration & Coexistence Considerations

- APAR OA46009 provides limited coexistence by failing access to a GDG EXTENDED (GDGE) or GDSs in a GDGE on pre-z/OS 2.2 systems
- Failure to have OA46009 will produce unpredictable results if access to a GDGE or GDS in a GDGE is attempted from a pre-z/OS 2.2 system
- PTFs for OA46009:
  - UA75975 HDZ1D10
  - UA75976 HDZ2210
- It is strongly advised that all systems be at z/OS 2.2 or higher before enabling GDGE support
- GDG PURGE support is not available on pre-z/OS 2.2 systems although it may have been set using a z/OS 2.2 system to DEFINE the GDG
  - PURGE setting simply ignored on pre-V2R2 systems

GDGE Programming Considerations

- New mapping for GDGATTR



no	Bitstring	1	GDGATTR	Generation data group attributes
	0...			Delete oldest GDS when GATLIMIT exceeded
	1...			Delete all GDSs when GATLIMIT exceeded
	.0..			Do not scratch data set when rolled off
	.1..			Scratch data set when rolled off if volume mounted
	..0.			Allocate GDSs in LIFO order
	..1.			Allocate GDSs in FIFO order
	...0			GDS NOPURGE
	...1....			GDS PURGE
	.... 0...			GDG Classic
	.... 1..			GDG Extended

- Can be used to determine if a GDG Extended and PURGE setting

GDGE Programming Considerations

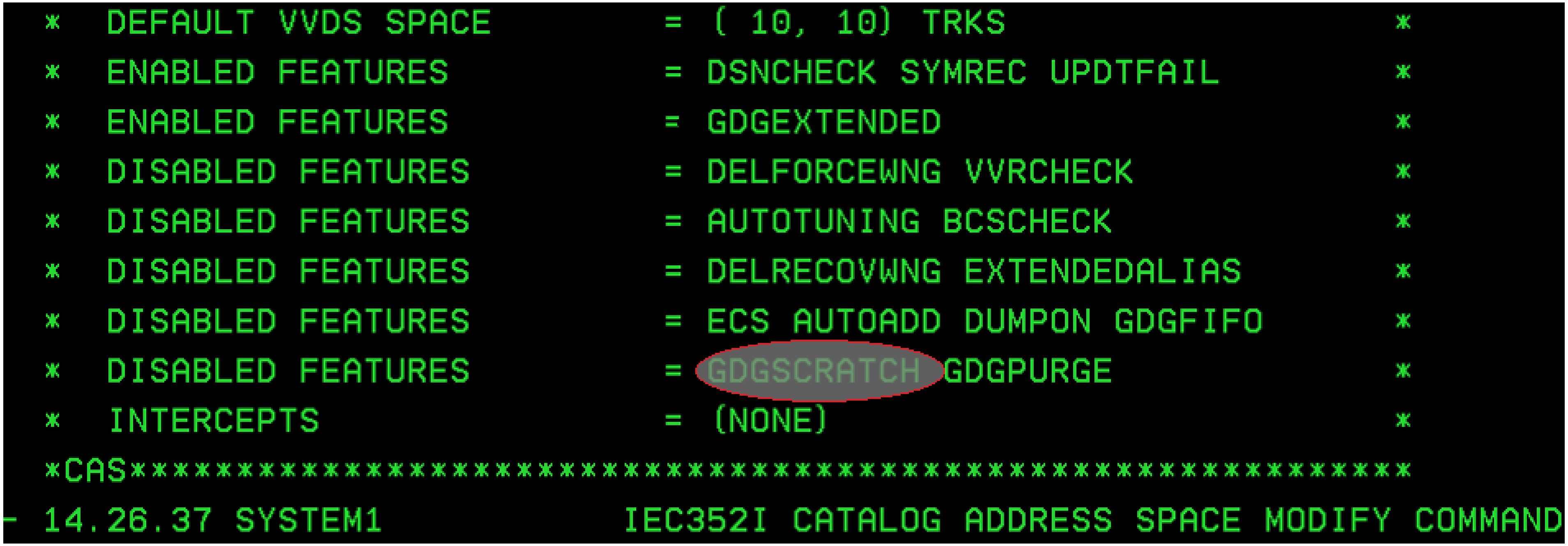
- New field for GDGE GDGLIMTE
  - GDG Limit needs 2 bytes to represent >255 limits - GDGLIMTE
    - New fieldname for Catalog Search Interface GDGLIMTE returns all GDG Classic and Extended limits
    - GDGLIMIT only returns GDG Classic values
    - GDGLIMIT returns “no data” for GDGE
- Can use GDGATTR to determine GDGE and use the appropriate field name
  - IBM recommends only using GDGLIMTE and converting GDGLIMIT references
- To find applications using GDGLIMIT, the GDGLIMIT field name is tracked by z/OS Generic Tracker when GDGLIMITE is not also present
  - Usage can be displayed with DISPLAY GTZ,TRACKDATA when using GDZTRACK is active

GDG SCRATCH Default Parmlib Variable

- New variable for SYS1.PARMLIB member IGGCATxx - GDGSCRATCH
  - Specified as GDGSCRATCH(YES):
    - Causes Catalog to set attribute to SCRATCH in GDG catalog record regardless of the setting in the DEFINE GDG statement
    - Default is “NO”
    - SCRATCH specifies a generation data set (GDS) is to be deleted from disk when rolled off of the GDG for EMPTY|NOEMPTY processing
    - Does not change original setting once attribute is set in DEFINE GDG
  - Allows system administrator to override IDCAMS DEFINE GDG setting to SCRATCH
  - If not set or parmlib variable is GDGSCRATCH(NO), the keyword specified on the DEFINE GDG takes precedence
- Also applies to GDGEs

GDGSCRATCH Parmlib Variable Enablement

F CATALOG,REPORT shows enablement status



```
 *  DEFAULT VVDS SPACE         = ( 10, 10) TRKS                 *
 *  ENABLED FEATURES           = DSNCHECK SYMREC UPDTFAIL        *
 *  ENABLED FEATURES           = GDGEXTENDED                     *
 *  DISABLED FEATURES          = DELFORCEWNG VVRCHECK            *
 *  DISABLED FEATURES          = AUTOTUNING BCSCHECK             *
 *  DISABLED FEATURES          = DELRECOVWNG EXTENDEDALIAS       *
 *  DISABLED FEATURES          = ECS AUTOADD DUMPON GDGFIFO      *
 *  DISABLED FEATURES          = GDGSCRATCH GDGPURGE             *
 *  INTERCEPTS                 = (NONE)                          *
 *CAS************************************************************
- 14.26.37 SYSTEM1           IEC352I CATALOG ADDRESS SPACE MODIFY COMMAND
```

GDG PURGE Keyword

- New keyword PURGE for DEFINE and ALTER GDG that specifies that when the SCRATCH is set, unexpired generation data sets (GDSs) are to be deleted during roll off processing
  - Examples:

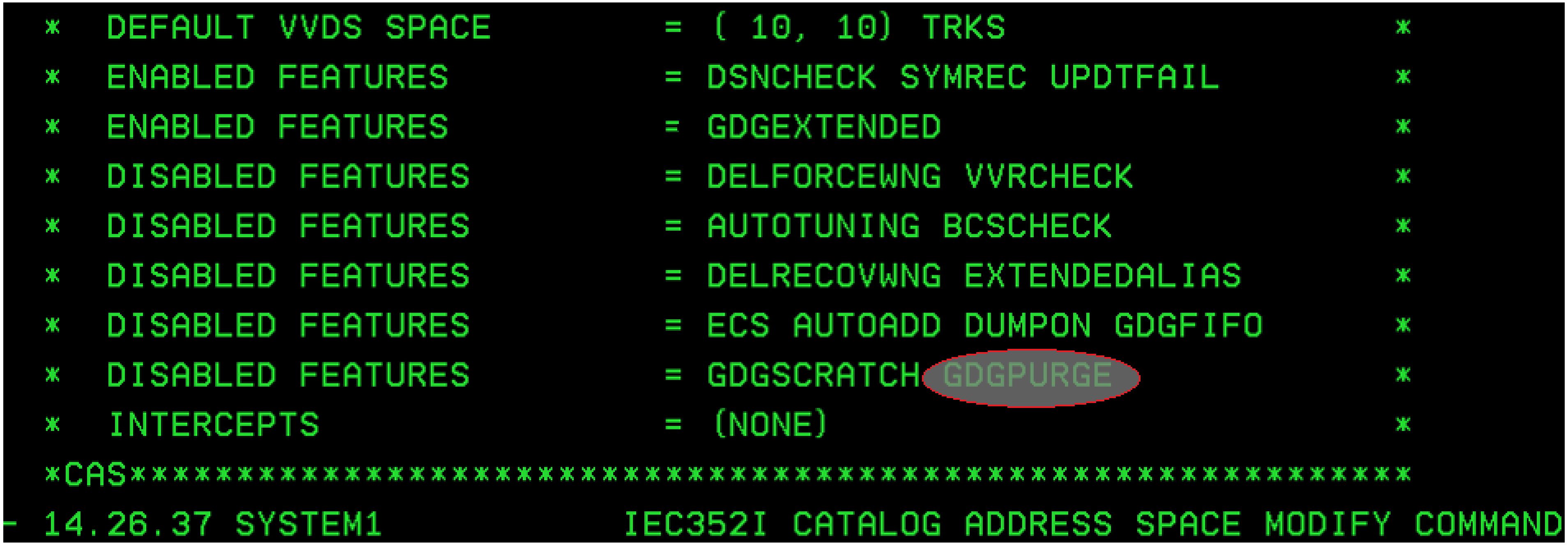
```
DEFINE SMS.GDG GDG EXTENDED LIMIT(999) PURGE SCRATCH

ALTER SMS.GDG1 PURGE (for existing GDGs)
```

  - NOPURGE is the default
- New variable for SYS1.PARMLIB member IGGCATxx – GDGPURGE overrides DEFINE GDG setting when the PURGE parameter is not explicitly specified
  - Specified as GDGPURGE(YES)
  - Only used when SCRATCH is also set
  - Default is GDGPURGE(NO)
- Also applies to GDGEs

GDGPURGE Parmlib Variable Enablement

F CATALOG,REPORT shows enablement status



```
  *  DEFAULT VVDS SPACE        = ( 10, 10) TRKS                   *
  *  ENABLED FEATURES          = DSNCHECK SYMREC UPDTFAIL         *
  *  ENABLED FEATURES          = GDGEXTENDED                      *
  *  DISABLED FEATURES         = DELFORCEWNG VVRCHECK             *
  *  DISABLED FEATURES         = AUTOTUNING BCSCHECK              *
  *  DISABLED FEATURES         = DELRECOVWNG EXTENDEDALIAS        *
  *  DISABLED FEATURES         = ECS AUTOADD DUMPON GDGFIFO       *
  *  DISABLED FEATURES         = GDGSCRATCH GDGPURGE              *
  *  INTERCEPTS                = (NONE)                           *
  *CAS*************************************************************
- 14.26.37 SYSTEM1           IEC352I CATALOG ADDRESS SPACE MODIFY COMMAND
```

LISTCAT Example of GDGE with Scratch and PURGE

```
LISTCAT ENTRY(SMS.GDGE) ALL
GDG BASE ------ SMS.GDGE
     IN-CAT --- SMSCAT
     HISTORY
       DATASET-OWNER-----(NULL)     CREATION--------2015.055
       RELEASE----------------2     LAST ALTER------2015.055
     ATTRIBUTES
       LIMIT-----------------999     SCRATCH    NOEMPTY    LIFO        PURGE       EXTENDED
     ASSOCIATIONS
       NONVSAM--SMS.GDGE.G0001V00
       NONVSAM--SMS.GDGE.G0002V00
```

Catalog RAS – CAXWA in Private

- The Catalog Address Space (CAS) uses internal control blocks called CAXWAs to process catalogs. The CAXWAs are in common storage and when they are damaged an IPL is the only way to fix it.
  - Some vendors use the CAXWAs to retrieve information about a catalog.
- CAXWAs are moved to CAS private storage in z/OS V2R2
  - Vendors can obtain information about a catalog from new fields supported by the Catalog Search Interface (CSI).
- A CAS restart can now be used to repair broken CAXWAs.
- Dynamic catalog data is available to all thru a supported user interface.

Catalog RAS – New CSI Fields

- The CSI interface is documented in Chapter 11 of the *DFSMS Managing Catalogs* manual.
- A new entry type of “Z” (used in the CSIDTYPS field) is used to tell the CSI that the information desired is dynamic data from CAS control blocks rather than information stored in the catalog.
- No other types are allowed to be specified with the Z entry type
- The master catalog name is returned for every Z entry request
- For Z entry requests, the catalog name is specified in the filter key field (CSIFILTK); the catalog name field (CSICATNM) should be blank

Catalog RAS – New CSI Fields (con't)

The new supported fields are described below:

- CATACT: A 2-byte field containing the catalog activity count (the number of address spaces that have the catalog allocated)
- CATFLAGS: A 2-byte field containing flags that indicate the following:
  - Catalog is open
  - Catalog is the master catalog on this system
  - Catalog is active in In-Storage Cache
  - Catalog is active in VLF
  - Catalog is active in ECS
  - Catalog is open in RLS mode
  - Catalog is deleted
  - Catalog is locked

- CATUCB: A 4-byte field containing the address of the UCB for the volume the catalog resides on

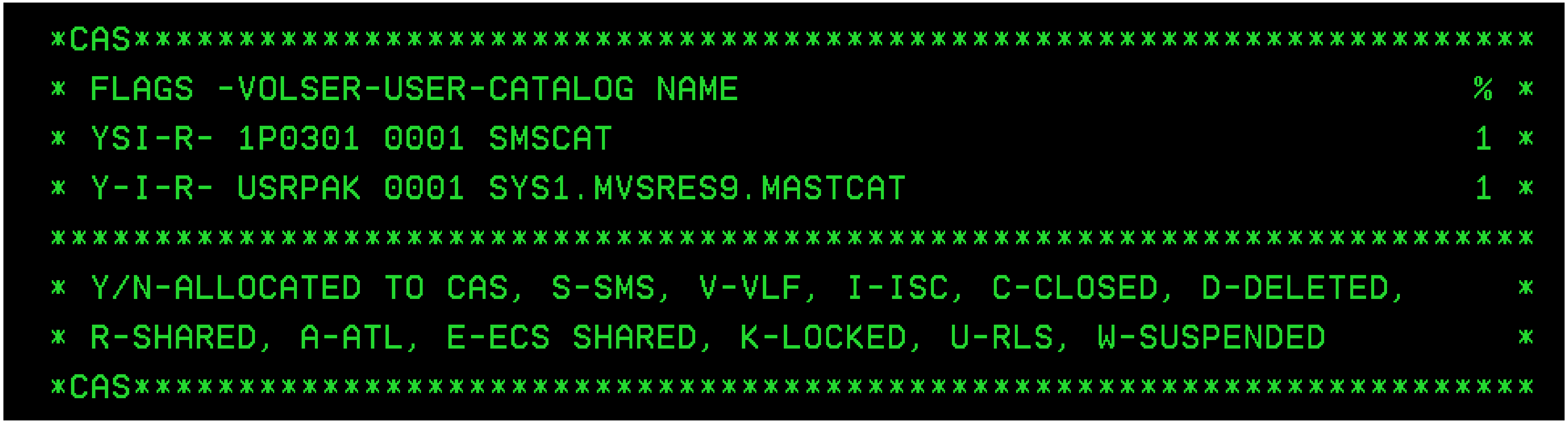
Catalog RAS – Connect Multi-Line WTOs

- Customers requested that large Catalog multi-line operator messages (>255 lines) that were being cut off, be allowed to display to completion.
- The behavior was actually a defect for only the MODIFY CATALOG,ALLOCATED command output. It has been fixed.
- All allocated/open catalogs now appear in the MODIFY CATALOG,ALLOCATED command output.

Catalog RAS – Connect Multi-Line WTOs

- The Catalog Modify command is documented in Chapter 8 of the *DFSMS Managing Catalogs* manual.
- The following sample operator command shows how to display a list of all catalogs currently allocated on the system:

F CATALOG,ALLOCATED



```
*CAS*******************************************************************
* FLAGS -VOLSER-USER-CATALOG NAME                                   % *
* YSI-R- 1P0301 0001 SMSCAT                                         1 *
* Y-I-R- USRPAK 0001 SYS1.MVSRES9.MASTCAT                           1 *
***********************************************************************
* Y/N-ALLOCATED TO CAS, S-SMS, V-VLF, I-ISC, C-CLOSED, D-DELETED,     *
* R-SHARED, A-ATL, E-ECS SHARED, K-LOCKED, U-RLS, W-SUSPENDED         *
*CAS*******************************************************************
```

Catalog RAS - Catalog Attributes Healthcheck

- New Health Check for Catalogs
  - By default, catalogs are defined with SHAREOPTIONS(3 4). A shared catalog must be defined with SHAREOPTIONS(3 4) and must reside on a shared volume. Catalogs that reside on shared volumes will become damaged if referred to by another system and the shareoptions are inconsistently set i.e not (3 4).
  - A new Catalog Health Check is designed to inspect all the catalogs defined in the environment for shareoptions and volume status (shared or non-shared) and report any inconsistencies between the two. System programmers can decide to redefine or alter the inconsistent catalog(s) with the correct shareoptions during system downtime.
  - Damage to incorrectly shared catalogs can now be avoided. Further, for catalogs on non-shared devices, the shareoptions can be set to (3,3), which will provide for more efficient access and better overall performance.

Catalog RAS - Catalog Attributes Healthcheck

- Once the IBM Health Checker for z/OS is up and running, an exit routine (IGG0CLHX) adds the new check to the system. If the check is successfully added, it will start running at the interval specified in the exit routine unless it is disabled or the interval is modified. The default interval for the check to run is every 720 hours (30 days). This interval can be changed using the F HZSPROC command.
- For a detailed list of health check commands and how to run, start, stop, activate, deactivate, enable, disable, delete, refresh, modify and update a specific health check, refer to *Chapter 4 Managing Checks* 'IBM Health Checker for z/OS User's Guide Manual'.

DFSMSdss Restore of a User Catalog to Any Volume

- DFSMSdss previously only allowed a user catalog to be restored to the same volume from which it was dumped
  - Volsers of source volume where catalog was dumped had to match the restore target volume
- New function allows a user catalog to be restored to any volume
  - Device capacity must match (3380 vs 3390)
  - Applies to logical restore
    - Restriction for physical data set restore remains
- Makes recovering a user catalog easier
- When a user catalog is backed up there could be a point where the user catalog is moved to a different volume (volser)

Catalog Modify Command Security Enhancement

- Clients have indicated that they would like to be able to provide some people with access to the Catalog Address Space reporting commands without also allowing those same people to issue commands which might alter the catalog configuration.
- For example, a user via SDSF might be able to issue an “/F CATALOG,ALLOCATED" command, but not be able to issue an “/F CATALOG,CLOSE(usercat)" command.
- The RACF OPERCMDS class can be used to restrict or allow access to Modify Catalog commands.
- New resource MVS.MODIFY.STC.CATALOG.CATALOG.SECURE

Catalog Modify Command Security Enhancement

- Setup using RACF

RDEFINE OPERCMDS MVS.MODIFY.STC.CATALOG.CATALOG.SECURE UACC(NONE) OWNER(CATADMIN)

PERMIT MVS.MODIFY.STC.CATALOG.CATALOG.SECURE CLASS(OPERCMDS) ID(*user01*) ACCESS(READ)

PERMIT MVS.MODIFY.STC.CATALOG.CATALOG.SECURE CLASS(OPERCMDS) ID(*user02*) ACCESS(UPDATE)

Catalog Modify Command Security Enhancement

- The following commands require at least READ
  - MODIFY CATALOG,ALLOCATED
  - MODIFY CATALOG,ALLOCATED(volser)
  - MODIFY CATALOG,ECSHR(STATUS)
  - MODIFY CATALOG,ECSHR(STATUS,catname)
  - MODIFY CATALOG,LIST
  - MODIFY CATALOG,LIST(task ID)
  - MODIFY CATALOG,LIST(task tcb)
  - MODIFY CATALOG,LISTJ(jobname)
  - MODIFY CATALOG,LISTJ(jobname),DETAIL
  - MODIFY CATALOG,OPEN
  - MODIFY CATALOG,OPEN(volser)
  - All versions of the MODIFY CATALOG,REPORT
- All other commands require UPDATE

IDCAMS

- New External parameters in support of
  - REPRO MERGECAT output being too long
  - TSO LISTCAT adding userid as PREFIX for LEVEL and ENTRY
  - PRINT and REPRO not being able to process damaged VSAM CIs or records

REPRO MERGECAT output is too long

- REPRO MERGECAT currently produces up to 6 lines for each entry that is processed; one blank line, one or two for the IDC0639I message(Sphere conversion started), a blank line, and one or two for the IDC01402I (Sphere conversion ended). The one or two lines depend on the length of the dataset name.
- New keyword MESSAGELEVEL(ALL|SHORT)
  - All is the default and is the same as the current output
  - SHORT reduces the number of lines for each entry
- Example:

```
REPRO INDATASET(SMSCAT) OUTDATASET(SMSCAT1) -
MERGECAT MESSAGELEVEL(SHORT) FILE(DD1)
```

TSO LISTCAT adds userid as PREFIX for LEVEL and ENTRY

- New keyword NOPREFIX causes userid to not be added to ENTRY name or LEVEL specification
- PREFIX is the default
- Example:

```
LISTCAT ENTRY(A.B.C) NOPREFIX
        searches the catalog for A.B.C

LISTCAT ENTRY(A.B.C) PREFIX
        searches the catalog for userid.A.B.C
```

PRINT and REPRO CI Mode Processing

- PRINT and REPRO functions cannot process damaged VSAM CIs or records
- New keyword CIMODE
- PRINTs or REPROs by CI rather than by record
- Opens VSAM data set in CIMODE
- Primarily for use with ESDS, but could be used to access a KSDS data component directly.
- CIMODE can only be specified with keyword INFILE, INDATASET, ERRORLIMIT, FROMADDRESS, SKIP, TOADDRESS, COUNT, NOMERGECAT, NOREPLACE and NOREUSE
- NOCIMODE is the default

Example:

```
    PRINT INDATASET(SMS.ESDS) CIMODE
```

Summary

- GDG Enhancements:
  - GDG > 255 GDSs
  - GDG SCRATCH/NOSCRATCH support
  - GDG PURGE option
- Catalog RAS
  - New CSI fields (in support of the private CAXWA chain)
  - Connect Multi-Line WTOs
  - Catalog Attributes Healthcheck
  - DSS Restore a Catalog to Any Volume
- Modify Command Security Enhancements
- IDCAMS
  - REPRO MERGECAT output is too long
  - TSO LISTCAT adds userid as PREFIX for LEVEL and ENTRY
  - PRINT and REPRO CI Mode Processing

Additional Information

- Publications:
  - *DFSMS Managing Catalogs* (SC23-6853-02)
  - *DFSMS Access Method Services Commands* (SC23-6846-02)
  - *IBM Health Checker for z/OS User's Guide* (SC23-6843-03)
  - *z/OS DFSMSdss Storage Administration* (SC23-6868)
- Terminology
  - GDG: Generation Data Group. Can have 1 to 255 GDSs, aka GDG Classic
  - GDGE: GDG Extended. Can have 1 to 999 GDSs
  - GDS: Generation Data Set. Data sets whose generations are managed by a GDG or GDGE.
  - Roll off processing: What happens to a GDS when it is uncataloged (removed) from a GDG or GDGE.
  - RBA – Relative byte address
  - CI – Control Interval
  - VVR – VSAM volume Record
  - NVR – NonVSAM Volume Record

The End

If you have questions in the future, please contact

Stephen Branch

branchs@us.ibm.com