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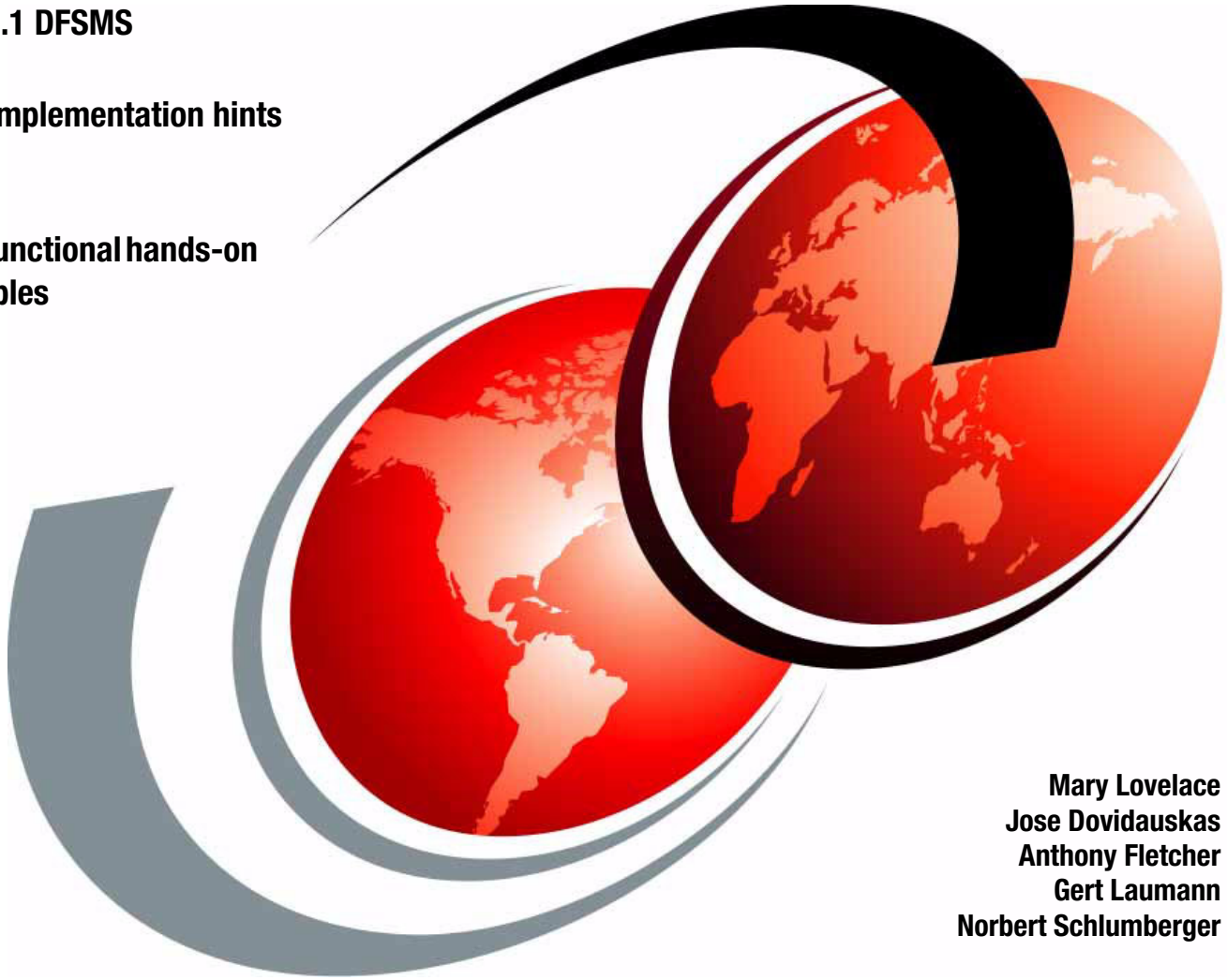
IBM z/OS V2.1 DFSMS Technical Update

- Understand the features and functions of z/OS V2.1 DFSMS
- Contains implementation hints and tips
- Provides functional hands-on code samples



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Note: Before using this information and the product it supports, read the information in “Notices” on page xi.

First Edition (September 2014)

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Contents

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Preface

Each release of IBM® z/OS® DFSMS builds upon the previous version to provide enhanced storage management, data access, device support, program management, and distributed data access for the z/OS platform in a system-managed storage environment.

This IBM Redbooks® publication provides a summary of the functions and enhancements integrated into z/OS V2.1 DFSMS. It provides you with the information that you need to understand and evaluate the content of this DFSMS release, along with practical implementation hints and tips.

This book is written for storage professionals and system programmers who have experience with the components of DFSMS. It provides sufficient information so that you can start prioritizing the implementation of new functions and evaluating their applicability in your DFSMS environment.

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Gert Laumann is an IT Specialist in Integrated Technology Delivery, Server Systems Operations/Storage Management in IBM Denmark. He has 28 years of experience in z/OS, working with storage management since 1989. He is the team leader for the Danish mainframe storage team. His experience is mostly with IBM products (DFSMSdfp, DFSMSdss, DFSMShsm, and DFSMSrmm), but he has also worked with OEM software and hardware products. His focus has mainly been automation and standardization across mainframe customer platforms. He currently helps customers share IBM DASD and tape hardware.

Norbert Schlumberger is an IT Architect with IBM Germany. He has 35 years of experience in storage software and storage management for IBM and customer systems, including 24 years of experience with DFSMSrmm. He has developed, delivered, and taught DFSMSrmm education to customers around the world. He has many tools available, such as a Tape Copy Tool to support the DFSMSrmm business. His areas of expertise include performing conversions from vendor tape management products to DFSMSrmm and new DFSMSrmm implementations. Norbert provides marketing support for DFSMSrmm, including IBM 3494 and IBM 3495 ATLs, VTSs, and TS7700 Virtual Engines. He has worked at IBM for 39 years.

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1

DFSMS V2.1 release summary

This chapter provides a summary of the features and functions in z/OS V2.1 DFSMS. The enhancements are listed based on the component of DFSMS. The implementation and use of the enhancements are described in the remaining chapters of this publication.

This chapter covers the following topics:

- DFSMS catalog enhancements
- VSAM and VSAM RLS enhancements
- PDSE enhancements
- SMS enhancements
- DFSMSdfp enhancements
- DFSMSdss enhancements
- DFSMShsm enhancements
- DFSMSrmm enhancements
- Advanced Copy Services enhancements
- DADSM/CVAF enhancements
- Object Access Method enhancements

1.1 DFSMS catalog enhancements

The catalog component of DFSMS V2.1 provides the following enhancements:

- VSAM record-level sharing (RLS) directory-only caching

  This enhancement adds the new **DIRONLY** parameter to DATACLAS RLSCFCACHE, which specifies that RLS not cache the data or index part of the VSAM data set in the coupling facility cache structure.

- Generation data set (GDS) support for PDSE data sets

  This enhancement removes the restriction against defining an SMS-managed partitioned data set extended (PDSE) as a generation data set (GDS). Both allocating a PDSE and defining a generation data group with generation data sets, including PDSEs, is unchanged. Details are provided in Chapter 2, “Catalog enhancements” on page 9.

  The LISTCAT ENTRY output is enhanced to indicate when a generation data set is a PDSE by adding the DSNTYPE field with a value of LIBRARY.

- New Catalog Search Interface (CSI) field names

  You can now access the following fields using the Catalog Search Interface:

  – ASSOC
  – ASSOCSYB
  – BUFND
  – BUFN
  – HILVLRBA
  – NDXLVLS
  – SEQSTRBA
  – STRNO
  – TRACKS

- JES3 allocation assist tape TS7700

  For scratch and specific allocations, this enhancement allows you to use JES3 to direct the allocations to candidate clusters for scratch mounts or to particular distributed library clusters for specific mounts in the TS7700 Virtualization Engine.

- Validate and remove an incorrect DEB address from the DEB table

  This function introduces the new PURGE,PURGE=FORCE option for the DEBCHK macro that tells the catalog to validate and remove an incorrect DEB address from the DEB table. This is used when a DEB is FREEMAINed, but for some reason the DEB table was not updated to remove that DEB address from the table.

- IDCAMS support for large block interface (LBI)

  This enhancement allows **IDCAMS REPRO** and **PRINT** commands to perform on data sets with a blocksize larger than 32 K, up to the maximum that the LBI interface supports, if the LBI feature is enabled. The blocksize is still limited to 32 K when the LBI feature is not enabled.

- Catalog contention detection enhancements

  The new **MODIFY CATALOG,CONTENTION** command can be used to specify a new wait time or action (or both) for one of the reason classes or catalog resources for which contention detection is available (ALLOCLCK, SYSIGGV2, SYSZTIOT, and SYSZVVDS).

- Generation data group enhancements

  You can now specify the order in which the generation data set list is to be returned for data set allocation when the generation data group (GDG) name is supplied on the DD

statement. GDG entries can now be returned in either FIFO (oldest GDS defined to the newest GDS) or LIFO (newest GDS defined to the oldest GDS) order for concatenation.

- Catalog alias enhancements
  - IDCAMS now resolves the symbolic related name for an alias to make sure that requests are oriented to the correct catalog. Previously, orientation was to the master catalog, which could cause unexpected results. The restriction on the **IDCAMS DEFINE ALIAS** command that the resolved value for entryname must be a catalog entry that is located in the same catalog that contains the value for aliasname has been removed.
  - **IDCAMS DEFINE ALIAS** command will record the alias creation date. This date can be helpful when cleaning up obsolete high-level qualifiers. If an alias has no associated data sets, the alias creation date can be used to determine whether this is a new alias for which no data sets have been created yet, or this is an obsolete alias that should be deleted.
  - IDCAMS will now check when deleting a catalog entry that has an associated alias to verify that the alias is related to the entry being deleted, before deleting the alias record. For example, non-VSAM record A has alias association C, but alias C has association D in its X record. In this case, the alias C should not be deleted when data set A is deleted. This check is done for all non-VSAM, GDS, and UCON records.

1.2 VSAM and VSAM RLS enhancements

z/OS V2.1 introduces the following enhancements for VSAM and VSAM RLS:

- The restriction is removed that data sets accessed by VSAM RLS could not use dynamic volume count. Dynamic volume count enables the dynamic addition of volumes to a DASD data set without increasing the number of candidate volumes stored in the catalog.
- The **SHOWCB** macro has added two new subparameters, **BUFNOL** and **BUFUSE**. These enhancements are used to display fields of an access method control block (ACB).
- A new data set attribute identifies whether a data set is eligible for VSAM replication.
- Expanded and new keywords for specifying record access bias and ACB RMODE31 values for a data class.

1.3 PDSE enhancements

z/OS V2R1 adds the following PDSE enhancements:

- Increased PDSE member size limits

  The maximum PDSE member size increases from 15,728,639 records to 2,146,435,071 records. The larger size limit applies to PDSEs being accessed with various sets of characteristics, including DSORG and MACRF values, whether they are open for input or output, and whether BLOCKTOKENSIZE=LARGE is specified.

- New PDSE version

  z/OS V2.1 introduces a new version of PDSE data sets that can provide for improved performance, reduced path lengths, and improved index searches. New data sets can be allocated as belonging to the new version (version 2) by specifying a new positional parameter in the **DSNTYPE** keyword of the DD statement or **TSO/E ALLOCATE** command, or by specifying a new parmlib option (PDSE_VERSION) in IGDSMSnn members. Unless version 2 is specified, new allocations continue to create the current version 1 PDSE data

sets. Externally, version 1 and version 2 PDSEs look the same, and both versions can be open for input/output with no changes for the users.

1.4 SMS enhancements

In z/OS V2R1SMS introduces these enhancements:

- Using clusters and extent pools in SMS volume selection

  SMS improves volume selection to use clusters and extent pools. SMS now prefers volumes that are in the same cluster when:

  - Allocating or extending a multi-volume data set if the accessibility attribute is CONTINUOUS or CONTINUOUS PREFERRED.
  - Allocating the target data set for the data set fast replication function. When allocating a striped data set, SMS now attempts to allocate the stripes across separate extent pools.

- Providing accurate space statistics

  You can now use a **VARY SMS** command to update space statistics in the ACDS for a pool storage group or a DASD volume.

- Providing an option to suppress SMS messages

  SMS provides a new keyword in the IGDSMSxx parmlib member that allows an installation to suppress specific SMS messages.

- Providing an option to guarantee that a PDS is created

  SMS provides a new keyword in the IGDSMSxx parmlib member and **SETSMS** command that allows you to direct SMS to honor any value for DSNTYPE that specifies that a PDSE is to be allocated, regardless of whether directory blocks have been requested.

1.5 DFSMSdfp enhancements

z/OS V2.1 adds the following DFSMSdfp enhancements:

- The **IEBCOPY** utility is enhanced with user exit capabilities for specifying control statements and for specific member selection.
- The IEBCOPY group copy function is expanded to include PDS to PDS member group copies. A new statement, COPYGROUP, provides the same functions as the existing COPYGRP statement, and expands it to support group copies when both the input and the output data set are PDS format.
- The IEBCOPY SELECT statement has been enhanced to allow wildcard characters in the specification of member names, when used with the COPYGROUP statement. Member name filter pattern masking, using the asterisk (*) and percent (%) characters, allows you to specify a wide range of similar member names. If you use member name filter pattern matching on a SELECT statement with COPYGROUP, you can also code a corresponding EXCLUDE statement with member name filter pattern matching.
- The **IEBCOPY** utility is enhanced to provide an ABEND code and the associated reason code in a structure returned in register 0, for certain ABENDs. Starting in z/OS V2.1, IEBCOPY returns this information if an ABEND occurs in the FAMS subcomponent.
- IEBCOPY introduces a new COPYGROUP statement that provides the same function as the COPYGRP statement but also performs that same function for a PDS to PDS copy.

With COPYGRP, when the input and output data sets are both PDSEs, the operation is treated as a simple COPY operation, not a group copy.

1.6 DFSMSdss enhancements

z/OS V2.1 introduces the following enhancements for DFSMSdss:

- A **RESET** keyword has been added to the **RESTORE FULL** and **RESTORE TRACKS** commands. It specifies whether the data-set-changed indicator is reset for the data sets on the volume being restored. You can protect the use of RESET with the **RESTORE** command. In addition, you can now protect the use of RESET with the **DUMP** command.
- A DEBUG(SMSMSG) option has been added to the **CONVERTV** command, the **COPY** command for logical and physical data sets, and the **RESTORE** command for logical and physical data sets. It instructs DFSMSdss to include ACS WRITE statements in the job output.
- The **FCCGVERIFY** keyword on the **CGCREATED** command now accepts multiple volume serials.
- The **REPLACEUNCONDITIONAL** keyword on the **RESTORE** command now works for physical data sets.
- The **RENAMEUNCONDITIONAL** keyword on the **RESTORE** command, which previously worked only on non-VSAM physical data sets, will now work on VSAM physical data sets, as well.

1.7 DFSMShsm enhancements

In z/OS V2R1, DFSMShsm is enhanced with the following new functions:

- Storage tiers

  In previous releases, DFSMShsm treated all data in Level 0 (L0) as being in one single tier in the overall storage hierarchy, with no policies to enable automated data movement within that L0 tier. In this release, DFSMShsm is enhanced to move data from one class of devices to another within the L0 hierarchy.

- Increased tape limit

  To allow DFSMShsm to migrate and back up larger data sets, the DFSMShsm limit of the number of tapes that a DFSMShsm migration or backup data set can span has been increased from 40 to 254. RECYCLE will now also process connected sets of up to 254 volumes.

- Migration subtasking

  A MIGRATIONSUBTASKS(YES | NO) parameter has been added to the **SETSYS** command. It allows DFSMShsm to run multiple subtasks concurrently under each migration task for primary space management, on-demand migration, and interval migration on level 0 volumes that migrate data sets to ML1 or ML2 volumes.

  The ADDITIONALSUBTASKS(nn) subparameter allows you to dynamically change the number of additional subtasks that the system can use, running under each migration task. These additional subtasks add to the number of subtasks that the system already uses when the **MIGRATIONSUBTASKS** parameter is specified.

  By processing data sets in migration subtasks for a level 0 volume migration task, the aggregate throughput of all the migration tasks is improved.

- Fast replication enhancements
  - Recovering a data set to a new name during fast replication data set recovery. A **NEWNAME(newdsname)** parameter has been added to the **FRRECOV** command. It allows DFSMShsm to use a new, fully qualified data set name for the recovered backup version or dump copy.
  - Recovering a data set to any volume during fast replication data set recovery DFSMShsm fast replication data set recovery will no longer be restricted to recovering data sets back to the original volumes. If DFSMShsm is not able to recover a data set to the original volumes, it will instead select the most eligible volumes with the most free space within the storage group. There are no changes to the DFSMShsm commands.
  - IBM FlashCopy® consistency groups

    DFSMShsm fast replication backup now supports FlashCopy consistency groups. A new FlashCopy consistency group option is added to the SMS copy pool definition. If set to "Yes" for the copy pool, it indicates that the copy pool backup version must be data-consistent. If the FlashCopy consistency group function fails, the **FRBACKUP** command is terminated and the new or in-process copy pool backup version is invalidated. The FlashCopy consistency group option can be used in combination with other FlashCopy options.
- Serviceability and usability enhancements:
  - Automatically generate a new recycle command when tape take-away occurs during recycle

    A **RECYCLETAKEAWAYRETRY(YES | NO)** parameter has been added to the **SETSYS** command. It allows DFSMShsm to automatically generate a new **RECYCLE** command for a tape when the original recycle must terminate due to the takeaway process, or when the tape is in use by another DFSMShsm task. Two additional subparameters, MAXRETRYATTEMPTS(nn) and DELAY(ssss), allow you to set the maximum number of recycle retry attempts and to set the delay interval in seconds between recycle attempts, respectively.

    In addition, a **SELECT(RECYCLETAKEAWAY)** subparameter has been added to the **LIST TAPETABLEOFCONTENTS** command. It displays the volumes that were not completely recycled because they were taken away by recall or another DFSMShsm task
  - Using recycle instead of tapecopy for failed alternate tape

    A **(TAPECOPY | RECYCLE)** subparameter has been added to both the **BACKUP** and the **MIGRATION** parameters of the **SETSYS DUPLEX** command. It specifies whether a tapecopy or a recycle will be immediately attempted, after an error occurs on the duplex alternate tape and the alternate tape is demounted and discarded so that DFSMShsm can continue to write to the original tape.
  - Resetting the data-set-changed indicator for data sets restored during full volume recover processing

    A **RECOVERRESET** keyword has been added to the **DEFINE DUMPCLASS** command. It specifies whether the data-set-changed indicator in the VTOC entry is reset for all data sets that are restored during full volume recover processing.
  - Additional output from QUERY ACTIVE(TCBADDRESS)

    The output returned from the **QUERY ACTIVE(TCBADDRESS)** command will now include the tape Volser, device address, and task name.
  - SMSVSAM server errors

    When an SMSVSAM server error occurs, DFSMShsm will now detect the error and quiesce all CDS I/O activity. When the SMSVSAM server initializes, DFSMShsm will

automatically close and reopen the CDSs, and resume all requests waiting for CDS I/O operations.

1.8 DFSMSrmm enhancements

The functional enhancements available with z/OS V2.1 DFSMSrmm provide you with these benefits:

- DFSMSrmm operational enhancements
  - Retain data sets based on the number of days since they were last referenced.

    Data sets managed by the EXPDT retention method can be retained or expired based on the number of days since the data set was last referenced. A new LastReferenceDays attribute is added to the data set record as a binary number.

    The value is taken from the new LASTREF suboperand of the DFSMSrmm parmlib OPTION RM(EXPDT) operand.

    If the volume set is retained by SET or VOLUME, the LastReferenceDays data set attribute will be kept equal for all files of a multi-volume data set. The latest LastReferenceDays update to a single file in a multivolume data set is propagated to all files that belong to the same multi-volume data set.

    However, for volume set retained by FIRSTFILE the LastReferenceDays data set attribute will be set but not equalized across the multi-volume data set because the expiration date depends only of the first file of the first volume, and its LastReferenceDays.
  - EXPDT retention method now allows retention to be based on a single volume or volume set, or on a controlling first file.

    You now have the option of retaining volumes with the EXPDT retention method based on a single volume or volume set, or on a controlling first file.
  - DFSMS management class attributes.

    You can now set the expiration date in DFSMSrmm for a tape data set with a DFSMS management class. When you enable use of management class attributes by DFSMSrmm, the management class expiration attributes (except the management class Expiration attribute Retention limit) are retrieved by DFSMSrmm during OPEN for output and used to set the expiration date for the tape data set, and also to set the LASTREF extra days in the tape data set record on retention method EXPDT managed volumes.
- Web page for DFSMSrmm conversion support.

  Information on migrating to DFSMSrmm from other products, former found in the EDGCMM01 documentation member of SYS1.SAMPLIB, has been updated and moved to the z/OS website designated for “as-is” downloads as a compressed sequential XMIT file of a PDS. The z/OS downloads website can be found at:

  `http://www.ibm.com/systems/z/os/zos/downloads/#asis`

1.9 Advanced Copy Services enhancements

z/OS V2.1 adds the Advanced Copy Services enhancement where XADDPAIRed primary volumes can remain offline when you issue the **XSTART** command for restart or the **XADDPAIR** command for suspended pairs. Utility volumes and secondary volumes must be online when

you issue the **XADDPAIR** command. Refer to Chapter 9, “System Data Mover enhancements” on page 171 for additional information.

1.10 DADSM/CVAF enhancements

The **LSPACE** macro now allows the caller to have obtained the SYSVTOC ENQ resource on the volume before calling LSPACE for that volume. A new **ENQHELD** keyword on the **LSPACE** macro specifies whether the LSPACE caller’s address space has already obtained the SYSVTOC resource.

1.11 Object Access Method enhancements

z/OS DFSMS V2.1 provides the following enhancements to the object access method (OAM):

- OAM now supports tape block sizes larger than 32760. A new **TAPESDB** keyword on the SETOAM statement in the CBROAMxx parmlib member can be set to enable larger block sizes. When the first object is written to an OAM tape volume, the maximum block size for the volume is established. If support for larger tape block sizes is enabled, that maximum block size is set to the optimal system-determined block size for the device. Otherwise, a maximum block size of 32760 is used. The maximum block size for all objects written to a tape volume is the maximum block size for the volume established when the first object was written regardless of the current SETOAM TAPESDB setting.
- OAM now provides a new **ALLOCRETRYMINUTES** keyword on the SETOAM statement in the CBROAMxx parmlib member. This can be set to control how long OAM makes retry attempts or to bypass retry processing entirely and issue message CBR6400D immediately. This can be used with Automated Tape Allocation Manager processing.
- The minimum object size required to use Store Sequence processing (STOREBEG, STOREPRT, STOREEND) has been reduced from the previous limit of 256MB+1 to 50MB+1 for all objects except those being written to an optical volume.
- Previously, when OSMC moved an object to a different management class, existing backup copies of the object were kept. If the object moves to a management class that requires fewer (or no) OAM backup copies, the extra backup copies remained, but were no longer needed and wasted storage space. OAM now provides a new **BACKUPDELETE** keyword on the SETOSMC statement in the CBROAMxx parmlib member, which can be set to indicate that OSMC should delete all unneeded OAM backup copies when processing an object.
- OAM now provides a new SETTLIB statement for tape library settings. The optional SETTLIB statement and its associated keywords in the CBROAMxx parmlib member can be used to override the default behavior for some of the main cartridge entry messages in a system managed tape library environment.

  The SETTLIB statement and keywords are processed when the OAM address space is started and cannot be updated by operator command. The SETTLIB statement can be used to specify:

  - How OAM displays volume entry ignore messages during cartridge entry processing (DETAIL, SUMMARY, or SUPPRESS).
  - Where OAM displays volume entry ignore messages during cartridge entry processing (on both the console and system log or only on the system log).
  - Where OAM displays successful volume entry messages (CBR3610I) during cartridge entry processing (on both the console and system log or only on the system log).

2

Catalog enhancements

This chapter provides an overview of the new features and functions in catalog included in z/OS V2.1. The updates mainly address availability and performance limitations.

The following topics are covered in this chapter:

- Record Level Sharing support for catalog
- Preparing to migrate to an RLS enabled ICF Catalog
- Catalog maintenance considerations in RLS environment
- Catalog contention detection enhancements
- Catalog alias enhancements
- Catalog parmlib member enhancements
- Catalog DFSMS GDG enhancements
- Catalog RNLs Health Check
- MODIFY CATALOG,LIST enhancement
- Improved catalog recovery features

2.1 Record Level Sharing support for catalog

Record Level Sharing (RLS) access for VSAM is widely used today for transactional (DFSMStvs) and non-transactional applications. RLS provides multisystem sharing at a record level across a sysplex using the coupling facility (CF). VSAM RLS will use a CF-based Lock Manager and CF Cache Manager in the implementation of Record Level Sharing. The function requires data sets using RLS control to be DFSMS managed.

RLS is one of multiple access modes to VSAM and will be set at OPEN time. This can be done by using the JCL parameter RLS or by specifying MACRF=RLS in the ACB. Other types of access are nonshared resources (NSRs), local shared resources (LSRs), and global shared resources (GSRs). These access types can be referred to as non-RLS access to distinguish RLS from other modes of access.

2.1.1 RLS for catalog overview

DFSMS V2.1 introduces RLS usage for ICF catalogs and for volume catalogs (VOLCATS). The purpose of the enhancement is to meet requirements for better performance and availability on catalogs. Using RLS will provide locking at a record level improving performance by not having to serialize on the SYSIGGV2 *bcsname*. SMSVSAM will hold SYSIGGV2 *bcsname* SHARE while a catalog is opened for RLS access. This ensures catalog data integrity from programs relying on SYSIGGV2 to serialize the catalog.

Moving to 64-bit buffering using RLS reduces the I/O activity. In addition, availability is improved, if you do not have to do disruptive maintenance on your ICF catalogs due to split or catalog reorganization regularly.

The improvements discussed here are expected to reduce the need for customers having to split ICF catalogs to meet availability requirements and to solve performance bottlenecks.

2.1.2 Requirements for RLS

RLS exploitation for ICF catalogs requires the base RLS setup. This is an IBM Parallel Sysplex® and also the SMSVSAM address space to be active. As always required with VSAM RLS data sets, you need a storage class assigned with a *Cacheset* and *Lockset* identifying cache and lock structures in the coupling facility.

The SMSVSAM started task must be up and running. The SMSVSAM address space automatically starts at IPL if the RLSINIT (YES) keyword is specified in the IGDSMSxx member of SYS1.PARMLIB. If SMSVSAM is not started, you can start the address space after IPL by issuing the **`V SMS,SMSVSAM,ACTIVE`** command from the IBM MVS™ console.

You will need to define the SHCDS data sets, which are key for RLS recovery as they hold vital information for this. For example, an SMSVSAM restart depends on the SHCDSs being available. Following are the contents of the SHCDS:

- The name of the coupling facility lock structure in use.
- A list of subsystems and their status.
- A list of open data sets using the coupling facility.
- A list of data sets with unbound locks.
- A list of data sets in permit non-RLS state.

SHCDSs are basically VSAM linear data sets. Define and activate two of these for normal use and also one for spare purpose.

The data sets in scope for RLS exploitation must have their attributes changed as related to recoverable and unrecoverable options. Alter to LOG(NONE) if unrecoverable or to LOG(UNDO) or LOG(ALL) if the data set is recoverable. Also, add the storage class created for this RLS application to have the appropriate cache set and coupling facility Cache assigned.

Refer to *z/OS DFSMSdfp Storage Administration,* SC23-6860 for information about how to set up the initial RLS environment.

2.1.3 Support for ICF catalogs using RLS

New and existing parameters are needed to define new or alter existing ICF catalogs to support RLS access mode. The **LOG** parameter must be defined, however in this implementation, only unrecoverable catalogs will be supported (LOG(NONE)). You also need parameters to set the type of initial access (non-RLS or RLS) at the first access of the catalog.

Catalogs may be defined or altered in one of four states; Eligible, RLS quiesced, RLS enabled or in RLS mode. These states are discussed in detail in 2.1.4, “ICF catalog possible RLS states” on page 11.

New operator commands and define parameters have also been provided to support transition of ICF Catalogs between RLS and non-RLS access. These commands will work sysplex wide even when submitted from one LPAR only and have the catalogs do a serialized close across the sysplex. The status will end up being RLS enabled or RLS quiesced, ready for being accessed in RLS mode. Catalog requests issued during transition will not be failed. However, they will be suspended while the QUIESCE or ENABLE process happens. Regard these commands as migration or fallback tools. These commands are not intended for daily usage.

When an ICF catalog has been migrated to RLS mode, it should remain in RLS mode. The only exception is if you encounter an issue that forces you to revert to non-RLS mode.

Important: Moving to RLS accessed ICF catalogs from non-RLS accessed will only be supported for USERCATALOGS. It is not supported for MASTERCATALOGS.

2.1.4 ICF catalog possible RLS states

In an environment using RLS for the ICF catalogs, these can be in one of four states:

1. Eligible

   The catalog has been defined or altered to have the LOG attribute. This is mandatory to be able to access the catalog in RLS mode (as for all other VSAM data sets). OPEN in this state will still happen as non-RLS.

2. RLS quiesced

   RLS quiesced indicator is set to YES in the catalogs VVR entry. OPEN is only possible for non-RLS access.

3. RLS enabled

   RLS enable indicator is set to YES in the catalogs VVR entry. As RLS enabled the catalog can only be opened in RLS mode.

4. RLS mode

   A catalog in RLS mode can be defined as a catalog currently open in RLS mode or was last closed in RLS mode. The RLS-IN-USE indicator will also be set in the catalogs VVR. The catalog can be taken out of RLS mode by command. For pre-DFSMS V2.1 systems, this will either require SMSVSAM up and running or by using the IDCAMS **SHCDS CFRESETDS(user_cat_name)** command to reset the RLS-IN-USE indicator. In this case, it requires all instances of SMSVSAM to be shut down.

2.1.5 Comparison with other enhanced catalog features

RLS for catalog can coexist with other advanced catalog features. In this section, we compare enhanced catalog features with the RLS for catalog feature.

Enhanced Catalog Sharing

Enhanced Catalog Sharing places the catalogs self describing VVR in the CF (SYSIGGCAC_ECS) to reduce I/O. Catalog Data Space Cache (CDSC) uses Virtual Lookaside Facility (VLF) and is intended for shared catalogs. Virtual storage is possible within a range 256 - 2 GB. Cached records are stored in a data space.

In Storage Cache

In Storage Cache has a maximum of 3041 BCS records. Storage is obtained within the catalog address space. It is intended for non-shared catalogs.

The enhanced catalog features can be replaced by RLS. For the master catalog, it still makes sense to use enhanced catalog sharing since RLS mode is not supported for master catalogs at this point.

Catalogs using RLS will not need to access the VVR in cache. For catalogs in RLS mode the catalog records are placed in RLS local buffer pools or CF cache structures. The STORAGECLASS cacheset defines which cache structure to use. The DATACLAS controls buffer pool (64 bit) and caching options through the RLSOVETHEBAR and RLSCFCACHE settings.

Locking happens at a record level to serialize access to individual catalog records instead of enqueuing on the SYSIGGV2 bcsname resource (entire catalog).

For other tuning parameters like STRNO, BUFND, BUFNI on DEFINE USERCATALOG command, these settings will be ignored in an RLS environment. RLS will obtain buffers dynamically as they may be needed (using System Managed Buffering).

2.1.6 New parameters on DEFINE USERCATALOG command

To support transition to RLS new parameters were added to the **DEFINE USERCATALOG** command. The parameters define the availability level for readiness to use RLS mode on the ICF catalogs.

Table 2-1 on page 13 is an overview of the parameters added in DFSMS V2.1. For SUSPEND and RESUME, the catalog will either be in SUSPEND state or RESUME state.

This is also the case for RLSQUIESCE and RLSENABLE, the two parameters directly related to RLS catalogs. The catalog status is either QUIESCED or ENABLED.

Table 2-1 Summary of new DEFINE USERCATALOG parameters in DFSMS V2.1

New DEFINE user catalog parameters	Description	Default
SUSPEND	Requests will be suspended until a RESUME has been issued. Mutually exclusive with LOCK parameter	RESUME
RESUME	Request for the catalog will be executed immediately. Command will release a SUSPEND state.	RESUME
RLSQUIESCE	The catalog will be accessed in non-RLS mode following the define.	RLSQUIESCE
RLSENABLE	The catalog will be accessed in RLS mode after the allocation.	RLSQUIESCE
RECONNECT	Request the new catalog to use existing ALIAS information.	N/A
LOG(NONE)	Catalog is eligible for access in RLS mode.	Value will appear as NULL

If the catalog is in LOCKED or SUSPENDED mode, an authorized user with READ access to the RACF STGADMIN profile can still access and repair a locked catalog. At the same time, other operations against the catalog will be failed or queued.

If the IGG.CATLOCK profile is not defined, or the RACF FACILITY class is not active, you cannot LOCK, UNLOCK, SUSPEND, or RESUME a catalog. An example of defining a USERCATALOG using the new define parameters is shown in Example 2-1.

Example 2-1 DEINE USERCATALOG using new DEFINE parameter

```
DEFINE USERCATALOG -
       (NAME(UCAT.RLSTST.BNC) ICFCATALOG -
       VOLUME(MHL1A0) TRK(50 50) -
       STORCLAS(SCRLS) -
       DATACLAS(WELCHRLS) -
       LOG(NONE) RECONNECT RLSENABLE -
       FREESPACE(20 20) -
       NOIMBED NOREPLICATE) -
       DATA (CISZ(32768))
```

Note, that LOG(NONE) is used to prepare for RLS, and RLSENABLE will enable OPEN in RLS mode.

2.2 Preparing to migrate to an RLS enabled ICF Catalog

When you have the base RLS environment in place, you can start migrating your first ICF catalog to use RLS mode. To summarize the basic requirements for RLS:

- SMSVSAM must be active.
- An RLS cache structure must have been defined in the Coupling Facility.
- An RLS Cache Set must have been defined.
- An RLS Lock Set Name must have been defined.
- The catalogs in scope must be DFSMS managed.

It is suggested that all systems in the sysplex have migrated to DFSMS V2.1 before starting the migration. This is because shared catalogs cannot be accessed in RLS mode if they are opened on a pre-DFSMS V2.1 system.

2.2.1 Sizing the RLS catalog environment for RLS buffers and CF cache

To assure sufficient RLS local buffering and coupling facility cache size for your RLS managed ICF catalogs, look at the buffer sizes in your current environment. Add up the buffer sizes based on the number of catalogs and the type of caching. Look into the following values:

- Current Catalog Data Space Cache - using VLF.

  Capture current MAXVIRT value (in 4 K blocks). Sum up the total for the entire sysplex.

- In Storage Cache (ISC) - default.

  Calculate 3041 records per catalog. BCS records vary in size. An average size chosen could be 2000 bytes (total is then 608,200 bytes per catalog). Regard this as a minimum and add additional as needed to meet performance requirements. Again, calculate the total for the sysplex.

Buffer calculation scenario

Let us calculate a sample scenario. You have a sysplex with four LPARs sharing 50 ICF catalogs (10 ISC managed and 40 in CDSC).

Your COFVLFxx member specifies 16384 for the MAXVIRT value (times 4 K). This is a total of 67,108,864 bytes for the VLF managed catalogs. For four systems, this is 268,435,456 bytes.

The 10 ICF catalogs using ISC cache currently uses (10*3041*2000) bytes = 60,820,000. For four LPARs, this adds up to 24,3280,000 bytes.

The total requirement in buffering all existing catalogs will then total as shown in Table 2-2.

Table 2-2 Buffering requirement calculation

Component	Current usage in bytes	Current usage in MB
COFVLFxx	268,435,456	262,144
ISC	243,280,000	2,375,781
Total in Bytes/MB	511,715,456	4.997,221

The current buffer need totals over 500 MB. A coupling facility cache size of 500 MB could then be allocated as a start and monitored as conversion of the ICF Catalogs to RLS access mode progresses.

RlsFixedPoolsize and RlsAboveTheBarMaxPoolSize parameters

To meet the requirement in the scenario above as to RLS local buffers, set RlsFixedPoolsize in IGDSMSxx to 500 MB. This value specifies the maximum number of buffers under and above the bar. To limit use of storage above the bar use the *RlsAboveTheBarMaxPoolSize* parameter. Set this parameter to limit use for the RLS buffer (default is 0).

Coupling Facility Structure Sizer tool

The Coupling Facility Structure Sizer Tool (CFSizer) is a web-based application that will return structure sizes based on the latest CFLEVEL for the IBM products that use the coupling facility, CFSIZER can be used to generate the exact settings and the JCL for creating the Cache Structure. The CFSIZER can be found at the following site:

`http://www-947.ibm.com/systems/support/z/cfsizer`

1. To size a structure, open the CFSizer web page. Click the **VSAM RLS** the product links in the left side navigation bar as shown in Figure 2-1.

Figure 2-1 CFSizer tool main page

2. In the VSAM RLS page, select one or more structures to size by clicking the check box for the cache structure you want to size. At least one structure must be checked to submit a request for a structure size. Enter the required information and click **Submit** to continue. We selected the **VSAM RLS CACHE structure** as shown in Figure 2-2 on page 16.

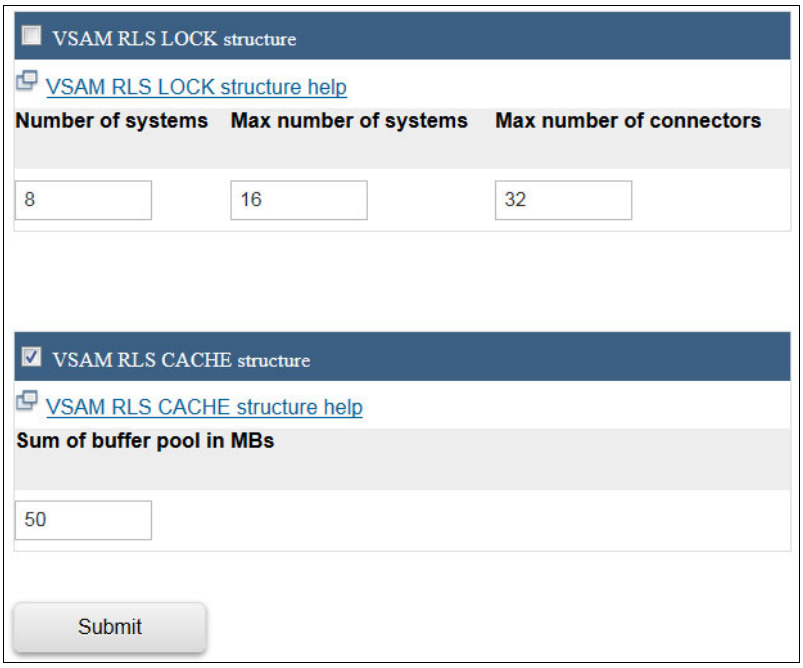

Figure 2-2 Using CFSizer for building RLS cache structure

3. The CFSizer presents you with sample CFRM statements based on the input you provided. You can cut and paste these statements into your CFRM policy and modify them as necessary. Figure 2-3 shows the results of our input.

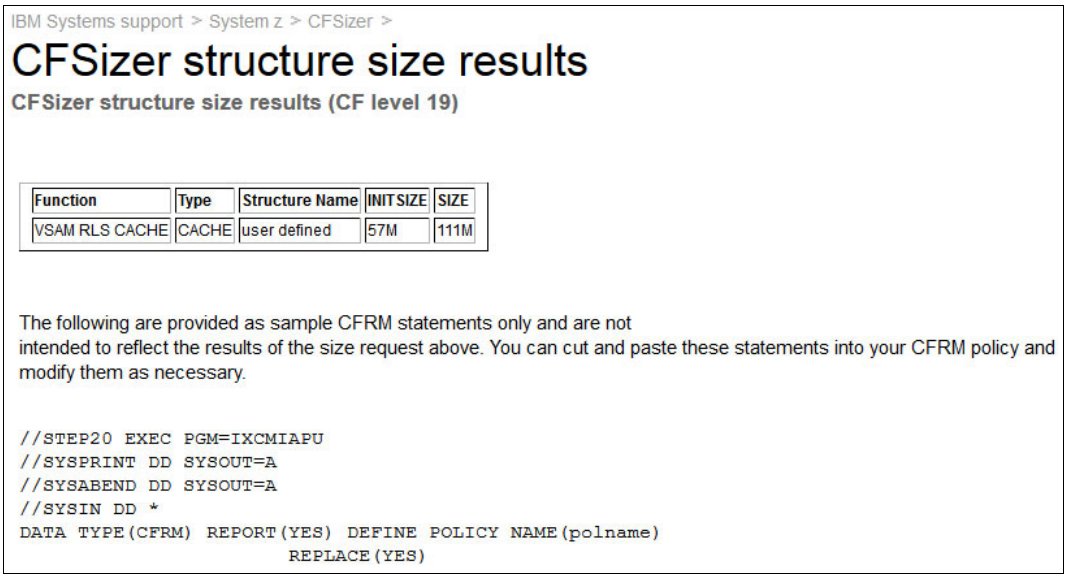

Figure 2-3 CFSizer results on VSAM RLS Cache structure for catalog

It is suggested that you create a dedicated structure for ICF catalogs. This is to assure that if catalog buffers are flushed from cache, it is based on the catalog activity, and not based on other activity in the coupling facility.

2.2.2 Migrating to RLS enabled ICF Catalog

After having upgraded all systems in the sysplex to DFSMS V2.1, you may start using RLS mode on ICF catalogs. This is done by either defining a completely new ICF catalog for test purpose or by altering an existing ICF Catalog to have the LOG(NONE) attribute. The LOG(NONE) attribute will put the catalog in RLS quiesced mode. By default, non-RLS catalogs will the value NULL in the **LOG** parameter.

An example of a DEFINE is shown in Example 2-2. Note the LOG(NONE) option. Keywords like STRNO and BUFND and BUFNI have been removed because they will not be used in an RLS environment.

Example 2-2 DEFINE USERCATALOG example of ICF catalog for RLS support

```
DEFINE USERCATALOG -
       (NAME(UCAT.RLSTST) ICFCATALOG -
       VOLUME(MHL1A0) TRK(5 1)  -
       STORCLAS(SCRLS) -
       DATACLAS(WELCHRLS) -
       LOG(NONE) -
       FREESPACE(20 20) -
       NOIMBED NOREPLICATE) -
       DATA (CISZ(4096))
```

A **LISTCAT** following immediately after the **DEFINE** shows that the user catalog has the required LOG(NONE) attribute and also is VSAM QUIESCED already. No RLS QUIESCE command is needed at this point. Example 2-3 is sample output from the **LISTCAT** command.

Example 2-3 LISTCAT output from newly defined ICF user catalog defined with LOG(NONE)

```
RLSDATA
  LOG ------------------NONE   RECOVERY REQUIRED --(NO)
  VSAM QUIESCED ------(YES)    RLS IN USE ---------(NO)
```

To make the ICF catalog we defined fully RLS enabled, issue the **F CATALOG,RLSENABLE** command. Example 2-4 shows the SYSLOG after issuing this command.

Example 2-4 How to enable an ICF Catalog for RLS access mode

```
F CATALOG,RLSENABLE(UCAT.RLSTST)
IEC351I CATALOG ADDRESS SPACE MODIFY COMMAND ACTIVE
IEC352I MODIFY CATALOG UCAT.RLSTST TO STATE RLSENABLE SUCCESSFUL
IEC352I CATALOG ADDRESS SPACE MODIFY COMMAND COMPLETED
```

The **MODIFY CATALOG** command in Example 2-4 is directed towards a specific ICF catalog. If you want a system-wide scope to change all RLS enabled catalogs in one command across the sysplex, issue the **F CATALOG,RLSENABLE,SYSTEM** command. The same command syntax is valid for RLSQUIESCE.

A **LISTCAT** of the user catalog will now show the VSAM QUIESCED field changed from YES to NO. This means that the catalog is no longer quiesced, but enabled for RLS. RLS enablement is also indicated by RLS IN USE field, which has changed to YES as shown in Example 2-5 on page 18.

Example 2-5 Extract from LISTCAT of user catalog in RLS enabled state

```
RLSDATA
  LOG ------------------NONE   RECOVERY REQUIRED --(NO)
  VSAM QUIESCED -------(NO)    RLS IN USE --------(YES)
```

Another way of displaying the RLS readiness of an ICF catalog is to use the **F CATALOG,OPEN** command. This command lists all open catalogs and displays settings for the open catalogs in this environment. Example 2-6 shows sample output.

Example 2-6 Display of RLS enabled ICF Catalog using MODIFY CATALOG command

```
-F CATALOG,OPEN
 IEC351I CATALOG ADDRESS SPACE MODIFY COMMAND ACTIVE
 IEC348I ALLOCATED CATALOGS
 *CAS*************************************************************
 * FLAGS -VOLSER-USER-CATALOG NAME
 * YSU-R- SBXHS8 0001 UCAT.RLSTST
*******************************************************************
* 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*************************************************************
IEC352I CATALOG ADDRESS SPACE MODIFY COMMAND COMPLETED
```

Note the U indicator for an RLS-enabled catalog. If you have a lower-level system in your sysplex, and a shared RLS candidate catalog is open in this system, you get an error message when trying to enable this catalog. The error message is shown in Example 2-7.

Example 2-7 Error message, trying to RLS enable a catalog shared with a lower-level system

```
F CATALOG,RLSENABLE(UCAT.RLSTST)
IEC351I CATALOG ADDRESS SPACE MODIFY COMMAND ACTIVE
IEC353I SERVICE 'CLRC' RETURNED  RC-236-030, QUIESOFF, UCAT.RLSTST
IEC353I MODIFY CATALOG UCAT.RLSTST TO STATE RLSENABLE UNSUCCESSFUL
IEC353I CATALOG ADDRESS SPACE MODIFY UNSUCCESSFUL
```

You get a similar error message when trying to do the RLS enable using IDCAMS **ALTER** command. The error message is shown in Example 2-8.

Example 2-8 Error message in IDCAMS ALTER RLSENABLE on shared catalog

```
IDCAMS  SYSTEM SERVICES                                      TIME: 17:37:27

   ALTER           -
          UCAT.RLSTST             -
          RLSENABLE
IDC3014I CATALOG ERROR
IDC3009I ** VSAM CATALOG RETURN CODE IS 236 - REASON CODE IS IGGOCLRC-30
IDC0532I **ENTRY UCAT.RLSTST NOT ALTERED
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 8

IDC0002I IDCAMS PROCESSING COMPLETE. MAXIMUM CONDITION CODE WAS 8
```

2.2.3 Fallback from using RLS mode on ICF Catalogs

SMSVSAM recovery is essential for ICF catalogs using RLS and of course for other exploiters. SMSVSAM is the server for all RLS processing, and RLS processing fails if SMSVSAM for some reason is not available.

z/OS V2R1.0 DFSMSdfp Storage Administration, SC23-6860 has a detailed description on recovery of SMSVSAM and the RLS environment.

For ICF catalogs using RLS, the process to disable the use of RLS should SMSVSAM and the RLS environment encounter problems is straightforward. Use the **`F CATALOG,RLSQUIESCE(ucat name)`** command or the **`F CATALOG,RLSQUIESCE,SYSTEM`** command and catalog management will revert to normal catalog and VSAM I/O.

Before enabling RLS use on ICF catalogs, it is also suggested that you have a fallback plan in place. New catalog commands support fallback, but earlier level systems need SMSVSAM active to switch catalogs out of RLS mode.

2.3 Catalog maintenance considerations in RLS environment

New keywords have been introduced in support of RLS enablement for catalogs. In this section, we look at catalog maintenance in an RLS environment.

2.3.1 Backing up RLS managed catalogs

Backing up your RLS managed user catalogs with IDCAMS can be done as in prior releases. There are new IDCAMS keywords to manage RLS source or target catalogs; RLSSOURCE(NO|YES|QUIESCE) and RLSTARGET(NO|YES|QUIESCE). Using these parameters will influence processing as follows:

- NO

  Indicates the source and target data sets will be opened using non-shared resources. (NSR).

- YES

  Indicates that the source and target data sets will be opened using Record Level Sharing (RLS) and the data set will have consistent read integrity.

- QUIESCE

  Indicates that the source and target data sets will be opened using Record Level Sharing (RLS) and the data set will be quiesced before processing any entries.

IDCAMS backup

Using IDCAMS for backing up a catalog, you can choose to access the catalog using RLS or not. When QUIESCE is specified, RLS access will be QUIESCED during backup and will be resumed when IDCAMS finishes backup. Using this parameter assures integrity, but also suspends availability during backup. Example 2-9 on page 20 shows a sample IDCAMS job with RLSSOURCE(QUIESCE).

Example 2-9 Sample IDCAMS export (backup) of a user catalog using RLSSOURCE parameter

```
//CATOO4 EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//DD1      DD DISP=(,CATLG),
//            DSN=MHLRES1.BACKUP1.RLSTST1,
//            SPACE=(TRK,(2,1),RLSE)
//SYSOUT   DD SYSOUT=*
//SYSIN    DD *
   EXPORT UCAT.RLSTST OUTFILE(DD1) TEMPORARY -
   RLSSOURCE(QUIESCE)
```

DFSMSdss backup

When using DFSMSdss for backing up RLS managed catalogs there is no specific keyword for QUIESCE. DFSMSdss will do the QUIESCE implicitly during backup and enable RLS when the backup is finished. Example 2-10 is an example of DFSMSdss backing up a catalog.

Example 2-10 Example of catalog backup using DSS as the backup tool

```
//MHLRES1D JOB ................................
//STEPTOO6 EXEC PGM=ADRDSSU,REGION=4096K
//SYSPRINT DD SYSOUT=*
//TAPE DD DISP=(NEW,CATLG),
//     DSN=MHLRES1.DSS.BACK2.MHLRES1A,SPACE=(TRK,(2,1)),
//     UNIT=3390,DCB=(BLKSIZE=27920)
//SYSIN DD *
 DUMP DS(INC(UCAT.RLSTST      )) -
 OUTDDNAME (TAPE)
/*
```

DFSMShsm backup

DFSMShsm is also able to back up catalogs. You need to ensure that DFSMShsm has access to IGG.CATLOCK in order to be able to work with a locked catalog. Otherwise, DFSMShsm is a privileged user and is able to back up catalogs. DFSMShsm will back up aliases and restore those also when restoring the catalog.

Remember to LOCK or SUSPEND the catalog before doing the restore to control the integrity of that catalog.

2.3.2 Using REPRO MERGECAT on an RLS managed catalog

Running the REPRO MERGECAT function in a shared environment from a non-RLS enabled ICF catalog to an RLS enabled ICF catalog requires the QUIESCE done on the target catalog, before you are allowed to do a REPRO MERGECAT. Attempting to do the REPRO MERGECAT without having the target catalog quiesced for RLS access ends up giving the error in Example 2-11.

Example 2-11 REPRO MERGECAT message when running from non-RLS to RLS managed catalog

```
REPRO -
 INDATASET(UCAT.VSBOXO1         ) -
 OUTDATASET(UCAT.RLSTST.MHLRES1A ) -
 LEVEL(MHLRES1A) -
 MERGECAT
```

```
IDC3300I  ERROR OPENING UCAT.RLSTST.MHLRES1A
IDC3351I ** VSAM OPEN RETURN CODE IS 168
IDC3003I FUNCTION TERMINATED. CONDITION CODE IS 12
```

2.3.3 Reporting on catalogs

To track your catalog efficiency there are several reporting options. This is the case for both non-RLS managed and RLS managed catalogs. In the following section, we look into the reporting options.

I/O statistics of catalog address space report

Reporting on both non-RLS and RLS managed catalogs is done through **MODIFY CATALOG** commands or through standard z/OS tools.

Using the **F CATALOG,REPORT,PERFORMANCE** command gets you the I/O statistics of the catalog address space since the last IPL or since the last reset of these statistics through the **MODIFY CATALOG,REPORT,PERFORMANCE(RESET)** command. An example of the output from this report is shown in Example 2-12. Note the “Statistics since” time stamp that shows the starting time for this summary report.

Example 2-12 Example of MODIFY CATALOG,REPORT,PERFORMANCE output

```
F CATALOG,REPORT,PERFORMANCE
IEC351I CATALOG ADDRESS SPACE MODIFY COMMAND ACTIVE
IEC359I CATALOG PERFORMANCE REPORT
*CAS************************************************
*  Statistics since  9:51:36.31 on  09/26/2013       *
*  -----CATALOG EVENT----   --COUNT--  ---AVERAGE---  *
*  Entries to Catalog          2,134K     5.491 MSEC  *
*  BCS ENQ Shr Sys             3,624K     0.837 MSEC  *
*  BCS ENQ Excl Sys            1,317K     1.933 MSEC  *
*  BCS DEQ                     4,559K     0.037 MSEC  *
*  VVDS RESERVE CI             1,190K     0.052 MSEC  *
*  VVDS DEQ CI                 1,190K     0.056 MSEC  *
*  VVDS RESERVE Shr            5,522K     0.097 MSEC  *
*  VVDS RESERVE Excl          24,667      0.380 MSEC  *
*  VVDS DEQ                    5,543K     0.058 MSEC  *
*  SPHERE ENQ Excl Sys       452,247      0.084 MSEC  *
*  SPHERE DEQ                452,251      0.074 MSEC  *
*  CAXWA ENQ Shr              71,017      0.011 MSEC  *
*  CAXWA ENQ Excl                 71      0.002 MSEC  *
*  CAXWA DEQ                  71,093      0.002 MSEC  *
*  VDSPM ENQ                   4,803K     0.027 MSEC  *
*  VDSPM DEQ                   4,803K     0.001 MSEC  *
*  RPL ENQ                    92,968      0.136 MSEC  *
*  RPL DEQ                    92,968      0.004 MSEC  *
*  BCS Get                     1,807K     0.312 MSEC  *
*  BCS Put                   430,989      1.040 MSEC  *
*  BCS Erase                     719      0.314 MSEC  *
*  VVDS I/O                    6,789K     0.257 MSEC  *
*  VLF Delete Minor               23      0.006 MSEC  *
*  VLF Define Major               98      0.001 MSEC  *
*  VLF Identify                  618      0.001 MSEC  *
*  RMM Tape Exit                 823      0.000 MSEC  *
```

```
*  OEM Tape Exit                823      0.000 MSEC  *
*  BCS Allocate               8,617      5.499 MSEC  *
*  BCS Deallocate             2,432      1.019 MSEC  *
*  SMF Write                580,422      0.019 MSEC  *
*  CAS Cache Lock               248      0.081 MSEC  *
*  CAS Alloc Lock                14     41.258 MSEC  *
*  CAS MLA Lock                  38      8.472 MSEC  *
*  VVDS Format                    8      6.910 MSEC  *
*  IXLCONN                        3     97.797 MSEC  *
*  IXLCACHE Read                  5     16.676 MSEC  *
*  Resolve Symbolic              10      0.029 MSEC  *
*  MVS Allocate               2,576     12.752 MSEC  *
*  MVS Deallocate             2,478      0.943 MSEC  *
*  Capture UCB                7,985      0.003 MSEC  *
*  Uncapture UCB                 16      0.007 MSEC  *
*  SMS Active Config             88      0.171 MSEC  *
*  SMS Mgmt Class ACS             4      0.733 MSEC  *
*  RACROUTE Auth            977,727      0.046 MSEC  *
*  RACROUTE Define           17,062      0.039 MSEC  *
*  DADSM Scratch                645      6.006 MSEC  *
*  DADSM Rename                   4      6.305 MSEC  *
*  DADSM Allocate            17,044      1.538 MSEC  *
*  DADSM Allocate SMS            36      4.201 MSEC  *
*  Get LatchShr Æ             7,667K     0.010 MSEC  *
*  IXLREBLD                       1      4.866 MSEC  *
*  IXLEERSP                       1      0.011 MSEC  *
*  ENQ SYSZPCCB               2,329K     0.001 MSEC  *
*  DEQ SYSZPCCB               2,329K     0.000 MSEC  *
*  Release Latch Æ            7,681K     0.000 MSEC  *
*  Capture to Actual         63,555      0.002 MSEC  *
*  Get LatchExc Æ            14,663      5.100 MSEC  *
*  ENQ SYSIGGV1                   3      0.004 MSEC  *
*  DEQ SYSIGGV1                   3      0.001 MSEC  *
*  ENDREQ                     1,519      0.001 MSEC  *
*  Purge Latch                   77      0.071 MSEC  *
*  BCS Close                  4,132      0.732 MSEC  *
*  SYSVSAM S ENQ Excl         8,625     13.932 MSEC  *
*  SYSVSAM S DEQ              8,623      0.049 MSEC  *
*  SYSVSAM D ENQ Shr          8,615      0.196 MSEC  *
*  SYSVSAM D DEQ              8,615      0.059 MSEC  *
*CAS*************************************************
IEC352I CATALOG ADDRESS SPACE MODIFY COMMAND COMPLETED
```

The REPORT PERFORMANCE command should be issued regularly to identify potential performance bottlenecks, as your catalogs are a key component in I/O activity.

Cache data space efficiency

The **F CATALOG,REPORT,CACHE** command reports on the cache data space efficiency. The hit rate is reported and should be at least 20% to reach a reasonable value. Statistics must be measured over time to be valid. Measuring for an hour might not represent your normal catalog access.

You can reset the statistics by issuing **F CATALOG,CLOSE** command. When the catalog is reopened after this, a new cache structure is built. Through this all counters have been reset except for the purge values. An example of the cache report is shown in Example 2-13 on

page 23. This will only have ISC statistics, but you also see statistics from VLF-managed catalogs if there are any in your environment.

Example 2-13 Example of output from F CATALOG,REPORT,CACHE command

```
F CATALOG,REPORT,CACHE
IEC351I CATALOG ADDRESS SPACE MODIFY COMMAND ACTIVE
IEC359I CATALOG CACHE REPORT 545
*CAS*****************************************************************
*   HIT% -RECORDS- -SEARCHES --FOUND-- -DELETES- -SHR UPD- --PURGE-- *
*                                                                     *
* UCAT.RLSTST.BNC                                  (ISC)              *
*     0     4,757   800,025        11         0        0     1,648  *
* UCAT.ZOSR1A                                      (ISC)              *
*     0         1         1         0         0        0         0  *
* UCAT.VTFMTAPE                                    (ISC)              *
*     0         1         1         0         0        0         0  *
* UCAT.VSTEST1                                     (ISC)              *
*    50%        1         2         1         0        0         0  *
* MCAT.SANDBOX.Z1C.SBOX00                          (ISC)              *
*    59%       84    10,026     5,990         0        0        17  *
*CAS*****************************************************************
IEC352I CATALOG ADDRESS SPACE MODIFY COMMAND COMPLETED
```

I/O statistics of specific user catalog

The **MODIFY CATALOG,REPORT,CATSTATS(catname)** gives you I/O statistics including BUFND, BUFNI, and STRNO information about a specific user catalog as specified in the **catname** parameter.

Example 2-14 Sample report using MODIFY CATALOG,REPORT,CATSTATS parameter

```
CATALOG,REPORT,CATSTATS(UCAT.RLSTST)
EC351I CATALOG ADDRESS SPACE MODIFY COMMAND ACTIVE
EC359I CATALOG I/O STATS REPORT
CAS*****************************************************************
     ADDS  UPDATES     GETS   GETUPD  DELETES  BUFNI  BUFND STRNO *
                                                                  *
 UCAT.RLSTST                                                      *
       0        0       88        4        0      1      2   180 *
CAS*****************************************************************
EC352I CATALOG ADDRESS SPACE MODIFY COMMAND COMPLETED
```

The new **CATSTATX** parameter on the **MODIFY CATALOG,REPORT,CATSTATX(catname)** command reports the same information as MODIFY CATALOG,CATSTATS, but it includes CA-reclaim and CA-reuse information as well. This command can report on one or more catalogs with the use of “*” or wildcards in the catname specification.

Example 2-15 is an example of catalog reporting using the **CATSTATX** parameter.

Example 2-15 Report on user catalog using the new CATSTATX parameter

```
CATALOG,REPORT,CATSTATX(UCAT.RLSTST)
EC351I CATALOG ADDRESS SPACE MODIFY COMMAND ACTIVE
EC359I EXTENDED CATALOG STATS
CAS*****************************************************************
  CATALOG NAME     = UCAT.RLSTST                                  *
```

```
  INSERTS (ADDS)   =        0                                        *
  UPDATES          =        0                                        *
  RETRIEVES        =       88                                        *
  RETRIEVES FOR UP =        4                                        *
  ERASES (DELETES) =        0                                        *
  CA-RECLAIMS      =      N/A                                        *
  CA-REUSES        =      N/A                                        *
  BUFNI SETTING    =        1                                        *
  BUFND SETTING    =        2                                        *
  STRNO SETTING    =      180                                        *
  AVG ELAPSED TIME =    2.139 MSEC                                  *
  AVG CPU TIME     =  144.232 USEC                                  *
CAS*****************************************************************
EC352I CATALOG ADDRESS SPACE MODIFY COMMAND COMPLETED
```

The information about CA-reclaim, AVG ELAPSED TIME, and AVG CPU TIME has been added in z/OS V2.1.

Reporting on RLS managed catalogs

RMFMON III has RLS activity reports. Choose SYSPLEX option, there are several reports on RLS. See RMFMON III Sysplex panel with these reports displayed in Figure 2-4.

```
 RMF Sysplex Report Selection Menu
Selection ===>

Enter selection number or command for desired report.


 Sysplex Reports
         1 SYSSUM   Sysplex performance summary                (SUM)
         2 SYSRTD   Response time distribution                 (RTD)
         3 SYSWKM   Work Manager delays                        (WKM)
         4 SYSENQ   Sysplex-wide Enqueue delays                 (ES)
         5 CFOVER   Coupling Facility overview                 (CO)
         6 CFSYS    Coupling Facility systems                  (CS)
         7 CFACT    Coupling Facility activity                 (CA)
         8 CACHSUM  Cache summary                             (CAS)
         9 CACHDET  Cache detail                              (CAD)
        10 RLSSC    VSAM RLS activity by storage class        (RLS)
        11 RLSDS    VSAM RLS activity by data set             (RLD)
        12 RLSLRU   VSAM LRU overview                         (RLL)

 Data Index
         D DSINDEX  Data index                                 (DI)
```

Figure 2-4 RMF3 reports on RLF activity

Following are possible selections related to RLF:

- VSAM RLS activity by storage class
- VSAM RLS activity by data set
- VSAM LRU overview

Coupling facility lock structure report

The **D SMS,CFLS** command displays information about the coupling facility lock structure. This information includes the lock rate, lock contention rate, false contention rate, average number of requests waiting for locks, the lock structure size, and primary structure information. If the lock structure is in duplex mode, secondary structure information will also be displayed. Output from this command will look similar to Example 2-16.

Example 2-16 Output from D SMS,CFLS command

```
D SMS,CFLS
IEE932I 853
IGW320I 07:42:24 Display SMS,CFLS(IGWLOCK00 )
PRIMARY STRUCTURE:IGWLOCK00 VERSION:CBE13E285CE22FD3 SIZE:14336K
RECORD TABLE ENTRIES:27365 USED:6
LOCK STRUCTURE MODE: SIMPLEX  STATUS: ENABLE
System   Interval   LockRate   ContRate  FContRate   WaitQLen
SC64     1 Minute        0.0      0.000      0.000       0.00
SC64      1 Hour         0.0      0.000      0.000       0.00
SC64      8 Hour         0.0      0.000      0.000       0.00
SC64       1 Day         0.0      0.000      0.000       0.00
  (04)   1 Minute        0.0      0.000      0.000       0.00
  (04)    1 Hour         0.0      1.923      0.000       0.00
  (04)    8 Hour         0.0      5.048      0.000       0.00
  (04)     1 Day         0.0      4.968      0.000       0.00

***************** LEGEND ******************
  LockRate = number of lock requests per second
  CONTRATE = % of lock requests globally managed
  FCONTRATE = % of lock requests falsely globally managed
   WaitQLen = Average number of requests waiting for locks
```

SMF reports

SMF is another source of information. You need a reporting tool that can process the SMF data. Choose the option that you have in your shop.

SMF type 42 subtypes 15 through 19 can be used for summary reporting on RLS use. These subtypes are available:

- Subtype 15. VSAM RLS Storage Class Response Time Summary
- Subtype 16. VSAM RLS Data Set Response Time Summary
- Subtype 17. VSAM RLS Coupling Facility Lock Structure Usage
- Subtype 18. VSAM RLS CF cache partition usage
- Subtype 19. VSAM RLS local buffer manager LRU statistics summary

Use command **V SMS,MONDS(spherename),ON** to collect subtype 16 statistics. Additionally data set collection for SMF type 42 must be turned on, when using IBM RMF™ III.

For catalogs and VSAM in general, all the catalog-specific SMF records can be used. These are:

- Type 60. VVR Updated
- Type 61. ICF Define
- Type 62. VSAM OPEN
- Type 64. VSAM CLOSE (new for catalogs in z/OS 1.13)
- Type 65. ICF Delete
- Type 66. ICF Alter

2.3.4 Migration considerations

It is required that SMSVSAM is enabled on all systems in the sysplex using RLS mode for catalogs. This is valid for DFSMS V2.1 systems as for lower-level systems participating in the sysplex.

It is also required that all systems in the sysplex have migrated to DFSMS V2.1 before implementing RLS mode for shared ICF catalogs. Even if you put on toleration support on the earlier systems, a candidate catalog to move to RLS will only be usable in an earlier system in RLS Quiesced mode. It will not be usable when the catalog enters RLS Enabled mode.

2.3.5 Benchmarks for ICF catalogs using RLS mode

Benchmarks comparing VLF managed and RLS managed catalogs shows significant improvements in performance. One particular benchmark on massive DELETES showed that elapse time was reduced 90%, while CPU usage was reduced over 75%. On CREATES, numbers were 56% and 81% in reduction. For GENERIC READS however the saving was 32% in elapse time, but CPU usage was higher; over 15%.

For DIRECT READS the corresponding figures are a 24% reduction in elapse time and a CPU consumption that is 14% higher.

We did a small study creating and deleting 300,000 data sets in a non-RLS managed environment compared to an RLS managed environment.

An RLS quiesced ICF catalog was created, and the 300,000 data set creates and deletes were done in eight batch jobs sequentially. Elapse time and CPU time was captured on those. Next, the ICF catalog was RLS enabled and the same 300,000 data sets were created and deleted in the same way, again capturing elapse time and CPU time.

In the graphical presentation in Figure 2-5, the improvement on elapse time using RLS managed catalogs is obvious in our case. In average, elapse time on data set creates were reduced by 57.2%.

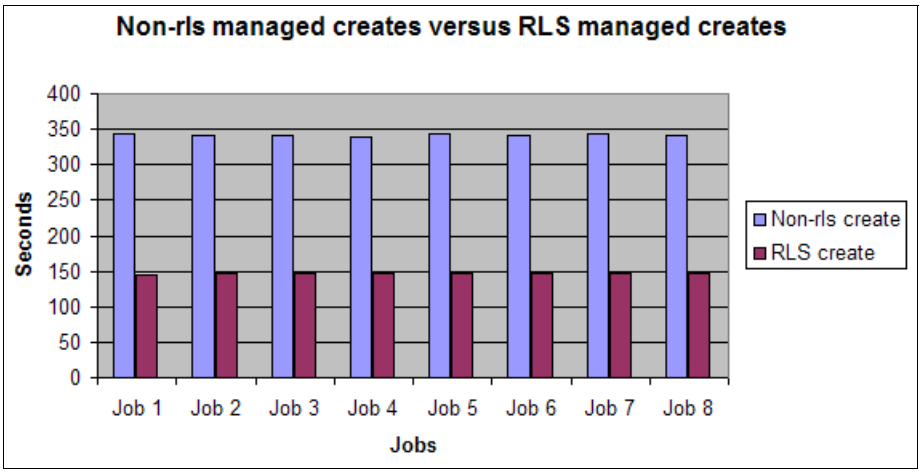

Figure 2-5 Graphical view of elapse time creating 300 K data sets (Non-RLS and RLS managed)

Deleting the same 300,000 data sets, the comparison between non-RLS managed and RLS managed deletes showed a 31.8% reduction in elapse time moving from a non-RLS managed ICF catalog to an RLS managed ICF catalog. This is shown in Figure 2-6 on page 27.

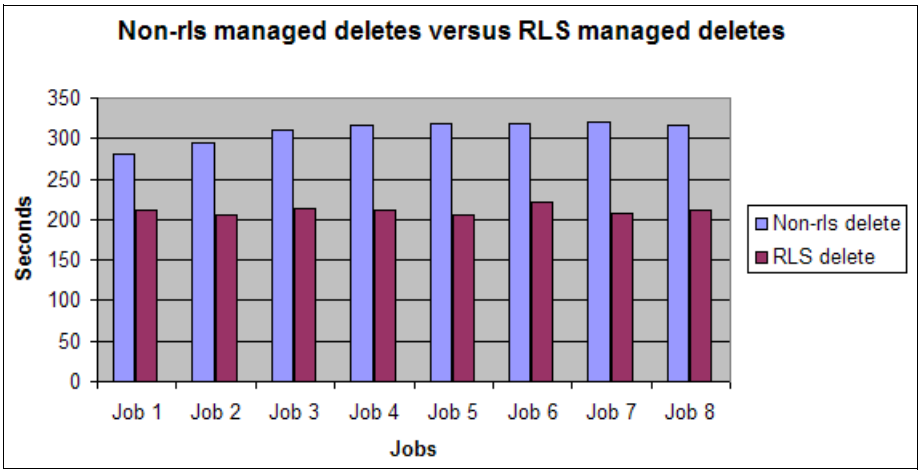

Figure 2-6 Graphical view of elapse time deleting 300 K data sets (Non-RLS and RLS managed)

Comparing the CPU consumption on the 300.000 data set creates and data set deletes in a non-RLS managed environment with creates and deletes in an RLS managed environment only showed a little improvement moving from a non-RLS managed ICF catalog to an RLS managed ICF catalog in our scenario.

2.3.6 Tolerations APARs related to ICF catalogs and RLS

The following APARs are required on earlier systems when accessing catalogs that might have been opened for RLS on z/OS V2.1:

- OA36403
- OA36409
- OA36916
- OA36492
- OA36422
- OA36414

2.3.7 Documentation

When planning for implementation of RLS for catalogs, consult the following documentation:

- *z/OS DFSMS Managing Catalogs*, SC23-6853
- *z/OS DFSMS Access Method Services Commands*, SC23-6846
- *z/OS DFSMSdfp Storage Administration*, SC23-6860

2.4 Catalog contention detection enhancements

The initial version of catalog contention detection (introduced in DFSMS V1.12) provided the framework for checking contention of resources between ICF catalogs (initially only on the task input/output table SYSZTIOT). The function only gave a means to notify the operator which tasks waited outside the specified wait-time (default 10 minutes) and provided the information required to address the potential catalog contention.

A SYMREC record would be written to LOGREC and message IEC393I displaying information about the waiting task or tasks would appear. This procedure would next happen repeatedly at preset intervals.

Also a new CATALOG MODIFY command was introduced: **F CATALOG,CONTENTION.** This command can both display current settings and change these dynamically.

The enhancement to Contention Detection gives better diagnostics whenever a contention problem occurs. Immediate action improves the probability of a successful recovery.

2.4.1 Enhancement overview

DFSMS V2.1 introduces monitoring of additional resources and also the possibility of triggering an action per resource monitored. Wait-time and actions by resource must be set in the IGGCATxx member of SYS1.PARMLIB catalog member.

In addition to notification, the system can also redrive. When redrive is active the first time a service task with an active resource passes the contention threshold, the service task is abended and the request is resubmitted to catalog for processing.

The new resources now being monitored are SYSZVVDS, SYSIGGV2, SYSZTIOT, and ALLOCLCK.

2.4.2 Contention detection problems

The resources monitored are essential resources used in catalog management. The function of each individual resource is explained in more detail in this section.

- SYSZVVDS. Used to serialize access to associated VVDS records.
- SYSIGGV2. Used to serialize access to associated catalog resources.
- SYSZTIOT. Used to control access to task input/output table resources.
- ALLOCLCK. A catalog Address Space internal lock that assures serialization of access to most catalog allocation events

If the catalog parmlib is not activated, the default for all resources is a wait-time of 10 minutes and notification only, no action. The default wait-time of 10 minutes can be overwritten by IGGCATxx member of SYS1.PARMLIB settings in the format *resource(minutes,action)*.

An example of the settings is shown in Example 2-17.

Example 2-17 Catalog parmlib settings for monitored resources

```
SYSZTIOT(11,N)
SYSZVVDS(12,R)
SYSIGGV2(13,R)
ALLOCLCK(0,N)
```

Valid actions are:

- N for notify. This is the default action and cannot be disabled.
- R for redrive.

In this example, ALLOCKLCK notification is disabled (set to 0). For the remaining resources, monitoring and an action is enabled. The remaining parameters in IGGCATxx can be changed through command (only some resources), through IPL or through a catalog restart.

Validation will happen through a catalog restart and if one parameter is in error, it will be skipped and maintain the previous value.

Resource monitor

The catalog detection function monitors resources looking into wait-time, and alerts those exceeding wait-time. Below is the action sequence that starts based on the extended wait-time.

1. A symptom record is written to LOGREC, and message IEC393I is issued providing information about the task.
2. If the same task is still pending after another 5 minutes, message IEC393I is issued again.
3. Issuing message IEC393I next continues at 15-minute intervals until the wait has ended. At end the status will be updated in the next system check (within 30 seconds).

Redrive action

In addition to the notification above, a redrive action can be triggered. If this action is set, the task having exceeded wait-time is canceled and also resubmitted for execution. Remember redrive does not fail the job, just resubmits the catalog requests. The abend issued is 91A-13 and is accompanied by a dump with reason code 246. A LOGREC record with the same reason code is generated.

At abend time, the redrive action frees all previously allocated resources and through this, removes the contention without operator intervention. The proactive and automatic handling of this catalog problem reduces the risk of having multiple resources queue up, some of which could have a critical impact on the entire system.

The resubmitted request may successfully complete. If it should hang again, the redrive action will not happen. Only the notification part (LOGREC write and message IEC393I) occurs.

Redriving a catalog request is not always possible as the initial request might have completed part of the request. Redriving the request again might fail due to this. A manual clean-up would in this case be required.

2.4.3 Example of catalog contention

Seeing the message IEC393I might not necessarily mean that you have a critical problem. A way to assure you that have captured the documentation is to take a dump using the **F CATALOG, TAKEDUMP** command. Example 2-18 shows a sample command and the resulting output.

Example 2-18 Example of catalog,takedump command

```
F CATALOG,TAKEDUMP
IEC351I CATALOG ADDRESS SPACE MODIFY COMMAND ACTIVE
IEA045I AN SVC DUMP HAS STARTED AT TIME=13.32.04 DATE=09/30/2013 681
FOR ASIDS(003B,0001)
QUIESCE = YES
IEA794I SVC DUMP HAS CAPTURED: 682
DUMPID=005 REQUESTED BY JOB (CATALOG )
DUMP TITLE=CAS DYNAMIC DUMP-IGGOCLGA RC246 RSN100
IEC352I CATALOG ADDRESS SPACE MODIFY COMMAND COMPLETED
IEF196I IGD101I SMS ALLOCATED TO DDNAME (SYS00014)
IEF196I         DSN (DUMP.D130930.H17.SC64.CATALOG.S00005        )
IEF196I         STORCLAS (SCDUMP) MGMTCLAS (MCDB22) DATACLAS (
```

```
)
IEF196I         VOL SER NOS= SBOXZ1
IEF196I IGD104I DUMP.D130930.H17.SC64.CATALOG.S00005         RETAINED,
IEF196I DDNAME=SYS00014
```

The new IECT393I message provides more information about the problem that occurred. The format of the message is shown in Example 2-19.

Example 2-19 Example of contents in message IEC393I

```
IEC393I CATALOG CONTENTION 778
WARNING: CATALOG TASK CONTENTION WAIT-TIME WAS EXCEEDED.
RESOURCE(SYSZTIOT)JOBNAME(HZSPROC )ASID(0014)TCB(007CA968)
```

Using the IEC393I message, you can extract the job name and use the command **F CATALOG,LISTJ(jobname)** to get more information from this display. Also, issue the command **F CATALOG,LIST** to have information about all current catalog tasks. It is always a good idea to have output from these commands in the SYSLOG for diagnostics and problem solving or later error reporting, for example in a PMR.

Intervention at this point could be to issue the command **F CATALOG,END(taskid),REDRIVE** to try to redrive the active catalog task, if this was not already automated. If this is not possible, the command **F CATALOG,ABEND(taskid)** can abend the task and remove the critical contention.

Additionally, to identify tasks outside of catalog address space (CAS) causing contention, the command **D GRS,RES=(SYSZTIOT,*)** is useful for the diagnostics.

2.4.4 Changing catalog contention detection settings

The contention detection settings in the IGGCATxx catalog parmlib member can be dynamically changed if you want to make changes to defaults or values already set. This can be done with a catalog modify command as shown in Example 2-20.

Example 2-20 Example of changing contention detection setting

```
MODIFY CATALOG,CONTENTION(SYSZTIOT,,R)
```

The setting above enables a redrive action on the SYSZTIOT resource if a wait-time violation should occur. Wait-time setting will in this case remain unchanged. Remember that this setting will not be permanent, but will be reset to the IGGCATxx value during IPL or catalog restart, if a value is set in IGGCATxx. To have a dynamic setting become permanent, you must change the setting in the IGGCATxx parmlib member.

Tip: Valid wait-time settings are zero for disabled and otherwise 5 - 999 minutes.

Current settings can always be displayed with the **F CATALOG,CONTENTION** command. Example 2-21 is an example of output display from this command.

Example 2-21 Display of catalog contention settings

```
F CATALOG,CONTENTION
IEC351I CATALOG ADDRESS SPACE MODIFY COMMAND ACTIVE
IEC359I CATALOG CONTENTION REPORT
*CAS*************************************************
```

```
* RESOURCE        THRESHOLD(MIN)    ACTION(S)          *
*CAS*************************************************
* SYSZTIOT           11             N                  *
* SYSZVVDS           12             NR                 *
* SYSIGGV2           13             NR                 *
* ALLOCLCK        INACTIVE          N                  *
*CAS*************************************************
* ACTION KEY                                          *
* N = NOTIFY OPERATOR  R = REDRIVE REQUEST            *
*CAS*************************************************
IEC352I CATALOG ADDRESS SPACE MODIFY COMMAND COMPLETED
```

Migration considerations

There are no special considerations for migration. Changes can be implemented dynamically and in the IGGCATxx parmlib member.

Documentation

IGGCATxx parmlib member setup is documented in *MVS Initialization and Tuning Reference z/OS V2.1,* SA23-1380. Also, consult *z/OS Managing Catalog*, SC23-6853 for more information.

2.5 Catalog alias enhancements

Catalog clean-up is sensitive as access to data depends on the full integrity in catalogs. Need for specific data varies over the years and data set entries may decline and even disappear. This can leave aliases behind without data sets connected at them. You can identify unnecessary aliases, but you also need to verify that they are obsolete. Doing this verification can be difficult though, as data set aliases do not have the creation date stored historically.

With DFSMS V2.1, a new alias creation stores the alias record with a creation date in the master catalog record (type X). This eases later identification as to when the alias was created and if it is potentially a completely new one that was never used.

Example 2-22 is a LISTCAT of an alias created in a pre-DFSMS V2.1 release.

Example 2-22 LISTCAT of a data set alias created before DFSMS V2.1

```
ALIAS --------- MHLRES1
     IN-CAT --- MCAT.SANDBOX.Z1C.SBOX00
     HISTORY
       RELEASE----------------2     CREATION--------0000.000
     ASSOCIATIONS
       USERCAT--UCAT.VSBOX01
```

The CREATION date fields show zeros only and in theory this alias might have been created recently or many years back.

For comparison, a LISTCAT was issued on an alias created on a DFSMS V2.1 system where the alias creation date now is being stored. See Example 2-23.

Example 2-23 LISTCAT of data set alias created under DFSMS V2.1

```
ALIAS --------- MHLRESD
     IN-CAT --- MCAT.SANDBOX.Z1C.SBOX00
```

```
HISTORY
  RELEASE----------------2     CREATION--------2013.259
ASSOCIATIONS
  USERCAT--UCAT.VSBOX01
```

Only data sets created with DFSMS V2.1 and after have the creation date available.

2.5.1 Additional verification on delete ALIAS

Before DFSMS V2.1, a delete of an alias was honored if the alias name could be found. In DFSMS V2.1, additional verification will be done on the association cell of the base record, assuring that the backwards pointer is correct.

If the resolved name is not found in the master catalog, if the resolved name is a symbolic name, the symbolic is resolved and the code re-orients to the correct user-catalog depending on the high-level qualifier (HLQ).

2.5.2 Catalog Search Interface enhancements

Catalog Search Interface (CSI) was created to offer a faster interface to ICF catalogs compared to CAMLST and IDCAMS search. CSI can offer generic search through filtering and multiple entries in the program in one search. CSI can be invoked from high-level programs through a callable interface (GUPI) and can return search results for one or more entries at a time.

Updates in DFSMS V2.1

In DFSMS V2.1, new fields are externalized to improve the usability of CSI. The new fields are listed here:

- STRNO. Number of concurrent requests.
- BUFND. Number of buffers requested for Data component.
- BUFNI. Number of buffers requested for Index component.
- INDXLVLS. Number of index levels seq-set-rba.
- HILVLRBA. RBA of High Level Index Record.
- ASSOC. A repeating list of catalog records associated with this entry.
- ASSOCSYB. Indicates if the entry is symbolic-relate.
- TRACKS. Total tracks per volume.

Basically, the CSI feature is one load module IGGCSI00 that can be called, linked to, or linked into a user module. IGGCSI00 cannot be used in these environments:

- In a dynamic allocation exit
- During an OPEN/CLOSE/EOV exit
- In cross-memory mode
- In SRB mode
- In disabled mode

2.5.3 Sample programs and REXX for CSI reporting

Doing a CSI search requires fields describing options that control CSI processing, filtering criteria, types of catalog entries to be returned, generic (or specific) filter key for entry names to be processed, or catalog field names to be returned.

To get started with CSI, you will find three assembler programs and a REXX in SYS1.SAMPLIB. The assembler programs only have to be assembled and linked to be ready for use.

You might have specific reporting needs and may consequently need to change the source code accordingly. The programs and description of each are described here:

- IGGCSILC. Input is the catalog name. Output is a listing of all entry names in the catalog printed along with a summary of the number of each entry type found and the total of all entries found.
- IGGCSIVG. Input is the catalog name. Output is a summary for each catalog name showing the total unused space by VSAM type. A total for all catalog names supplied is printed after the last catalog name is processed.
- IGGCSIVS. Input is a six character volser number, followed by the catalog name. The output is a listing of all data sets that reside in the given catalog and are on the given volume.
- IGGCSIRX. IGGCSIRX is a REXX exec that prompts you for a search key and returns you the data set name, its type, and volume serial numbers.

2.5.4 Running reports with CSI programs

Following are examples of how to run the provided CSI programs in batch jobs. The corresponding output reports are displayed.

IGGCSILC sample program

The first example in Example 2-24 shows how a report using the IGGCSILC program is created.

Example 2-24 Sample job running CSI program IGGSILC

```
//CSI0001 EXEC PGM=IGGCSILC
//*
//*THE INPUT TO IGGCSILC IS AN 80-BYTE SYSIN DD RECORD. THE CATALOG NAME
//*OF THE CATALOG TO BE LISTED SHOULD BE LEFT JUSTIFIED IN COLUMN 1 OF
//*THE RECORD.
//*
//*A LISTING OF ALL ENTRY NAMES IN THE CATALOG IS PRINTED ALONG WITH A
//*SUMMARY OF THE NUMBER EACH ENTRY TYPE FOUND AND THE TOTAL OF ALL
//*ENTRIES FOUND.
//SYSOUT DD SYSOUT=*
//SYSIN DD *
UCAT.DBOBTARG
```

As shown in Example 2-25, one or more catalog names are input for the report. The output shows a list of all data set names in the catalogs that are listed plus a summary at the end of the report.

Example 2-25 Sample output from IGGCSILC program

```
LISTING FROM CATALOG -- UCAT.DBOBTARG
CLUSTER ------ 000000000000000000000000000000000000000000000000
   DATA ------ UCAT.DBOBTARG
  INDEX ------ UCAT.DBOBTARG.CATINDEX
NONVSAM ------ DBOBT.ADSNLOAD
NONVSAM ------ DBOBT.ADSNMACS
```

```
NONVSAM ------ DBOBT.DBOBWLMJ.JAVAENV
......... more data set entries .......... and next the summary >>>
THE NUMBER OF ENTRIES PROCESSED WAS:
          AIX -------------------0
          ALIAS -----------------0
          CLUSTER ---------------2
          DATA ------------------2
          GDG -------------------0
          INDEX -----------------1
          NONVSAM ---------------121
          PAGESPACE -------------0
          PATH ------------------0
          USERCATALOG -----------0
          TOTAL ----------------126
```

IGGCSIVG sample program

The IGGCSIVG program creates a summary of unused space per VSAM data set type by ICF catalog. The catalog names are entered as input. Example 2-26 is a sample batch job for this program.

Example 2-26 Sample job for running catalog report using CSI program IGGCSIVG

```
//CSIOOO1 EXEC PGM=IGGCSIVG
//*INPUT
//*THE INPUT TO IGGCSIVG IS AN 80-BYTE SYSIN DD RECORD. THE CATALOG NAME
//*OF THE CATALOG TO BE PROCESSED MUST BE LEFT JUSTIFIED AND START IN
//*COLUMN 1 OF THE INPUT RECORD. MULTIPLE INPUT RECORDS CAN BE SUPPLIED.
//*OUTPUT
//*UNUSED SPACE BY VSAM TYPE. A TOTAL FOR ALL CATALOG NAMES
//*SUPPLIED IS PRINTED AFTER THE LAST CATALOG NAME IS PROCESSED.
//SYSOUT DD SYSOUT=*
//*YSOUT DD DISP=SHR,DSN=MHLRES1.CSI.PRINT.VBA133
//SYSIN DD *
UCAT.DBOADATA
```

The output from the IGGCSIVG program has a summary per catalog on unused VSAM space as shown in Example 2-27. At the end of the report, there is a summary of all the catalog's input to the program.

Example 2-27 Sample output from the IGGCSIVG program

```
CATALOG NAME: UCAT.DBOADATA

            BYTES UNUSED    BYTES ALLOCATED      Æ OF DS            MIN
LDS       36,187,750,400     48,436,510,720        3,186              0
KSDS             376,832            425,984            5              0
ESDS                   0                  0            0              0
RRDS          40,796,160         40,992,768            1     40,796,160
TOTAL     36,228,923,392     48,395,091,968        3,192              0


CATALOG NAME: UCAT.DBOAIMAG

0100 0004      FS
            BYTES UNUSED    BYTES ALLOCATED      Æ OF DS            MIN
```

```
LDS      143,515,062,272     89,557,762,048          257              0
KSDS                   0                  0            0              0
ESDS                   0                  0            0              0
RRDS                   0                  0            0              0
TOTAL    143,515,062,272     89,557,762,048          257              0

ALL CATALOGS:

            BYTES UNUSED    BYTES ALLOCATED      Æ OF DS            MIN
TOTAL    179,743,985,664     41,162,670,080        3,449              0
```

IGGCSIVS sample program

The third provided CSI report program is IGGCSIVS. The function of this program is to list all data sets in a given user catalog that has entries on a specific volume.

Input will be the volser and the catalog name in scope, as shown in Example 2-28.

Example 2-28 Sample job for running catalog report using CSI program IGGCSIVS

```
//CSIOOO1 EXEC PGM=IGGCSIVS
//*INPUT
//*THE INPUT TO IGGCSIVS IS AN 8O-BYTE SYSIN DD RECORD. THE SIX-
//*CHARACTER VOLUME SERIAL NUMBER SHOULD BE LEFT JUSTIFIED AND STARTS IN
//*IN COLUMN 1 OF THE INPUT RECORD. THE CATALOG NAME OF THE CATALOG TO
//*BE SEARCHED STARTS IN COLUMN 7. MULTIPLE INPUT RECORDS CAN BE
//*SUPPLIED.
//*OUTPUT
//*THE OUTPUT IS A LISTING OF ALL DATA SETS THAT RESIDE IN THE GIVEN
//*CATALOG AND ARE ON THE GIVEN VOLUME.
//*
//SYSOUT DD SYSOUT=*
//SYSIN DD *
SBOXA8UCAT.VSBOXO1
```

Example 2-29 contains sample output from the *IGGCSIVS* program listing all data sets on volser SBOXA8 belonging to ICF catalog UCAT.VSBOX01 as requested in the SYSIN DD statement in Example 2-28.

Example 2-29 Sample output from IGGCSIVS program

```
DATA SETS FOUND IN CATALOG UCAT.VSBOXO1 HAVING VOLSER SBOXA8

ADHUSER.DB9A.ATEXT.DO90306.IO124O.DATA       CLUSTER ADHUSER.DB9A.ATEXT.DO90306
ADHUSER.DB9A.D.DO90305.H19.M42.Z2
ADHUSER.DB9A.SD.DO90224.H19.MO3.Z5
ADHUSER.DB9A.SP.DO90210.H14.M54.Z1
ADHUSER.DB9A.T.DO90220.H17.M11.Z15
ADIS.SC63.ISPF42.ISPPROF
```

IGGCSIRX CSI REXX

The IGGCSIRX REXX is found in SYS1.SAMPLIB. It is used to display fully qualified data set names, an alias, a GDG entry, or any catalog entry type. For the data set name, the catalog name, and the entry type the volser is returned. Example 2-30 on page 36 is an example. The

REXX is called. You are requested to enter a key (data set name and alias). The response is returned to your display.

Example 2-30 Running IGGCSIRX CSI REXX in foreground

```
ENTER FILTER KEY
MHLRES1.CSI.PRINT.VBA133
 CATALOG  UCAT.VSBOX01
NONVSAM  MHLRES1.CSI.PRINT.VBA133                      MLD52B
```

If you type in an alias, a GDG name, or other types of catalog entries other than a data set name, the catalog name and type is returned for this key.

CATSRCHI: improved search facility

An improved version of IGGSRCIX REXX CATSRCHI is now offered “as is”. This REXX has full data set names or data set filters as input and generates a list based on the selection criteria.

The CATSRCHI REXX is available for download from the IBM FTP site:
`ftp://ftp.software.ibm.com/ - userid: anonymous and password: your email address`

The full path in our environment is:
`ftp://ftp.software.ibm.com/servers/storage/support/software/dfsms/II14316`

There are two members at this website:

- II14316.clist.clist. File holding the CATSRCHI rexx code.
- II14316.tso.cntl. File holding the JCL running the REXX.

An example of the search input could be as shown in Example 2-31. The example shows a generic search on a high-level qualifier level. The **fieldname** parameter specifies the fields on which information is requested.

Example 2-31 Running a generic search using CATSRCHI in a batchjob

```
//MHLRES1A JOB (999,POK),MSGLEVEL=1,NOTIFY=MHLRES1
/*JOBPARM SYSAFF=SC64
//*
//STEP1     EXEC PGM=IKJEFT1B
//SYSPROC   DD DISP=SHR,DSN=MHLRES1.TSO.CLIST
//*POINT TO YOUR CLIST DATA SET.
//SYSPRINT  DD SYSOUT=*
//SYSTSPRT  DD SYSOUT=*
//SYSTSIN   DD *
 %CATSRCHI MHLRES4.** -
  FIELDNAMES(XHARBADS XHURBA XACIFLAG VOLSER  -
             COMPIND NOEXTNT AMDKEY PHYBLKSZ EXTENT)
/*
```

The output from the CATSRCHI REXX displays the externalized field names. For non-VSAM files, only the data set name and the VOLSER is displayed. A VSAM file appears with cluster, data component, and index component, as shown in Example 2-32.

Example 2-32 Sample output from CATSRCHI rexx displaying externalized fields

```
CLUSTER  MHLRES4.NSMS.CARENO.TEST01
 XHARBADS = no data
```

```
 XHURBA = no data
 XACIFLAG = no data
 COMPIND = no data
 NOEXTNT = no data
 AMDKEY = no data
 PHYBLKSZ  = no data
 EXTENT = no data

DATA     MHLRES4.NSMS.CARENO.TEST01.DATA
 XHARBADS = 55296
 Volume MHLS1A XHURBA = 55296
 XACIFLAG - Data set is not EA (extended addressing)
 On volser(s)  SBOXEF
 COMPIND - No flags set
 Data set has 1 extents on 1 volumes
 Volume SBOXEF NOEXTNT = 1
 Relative key position = 41
 Key length = 10
 PHYBLKSZ = x'00004800'

 Data set has 1 extents on SBOXEF
 Extent Seq number  = 1          Extent tracks      = 1
 Extent low cchhr   = 000D000B   Extent Start RBA   = 0
 Extent high cchhr  = 000D000B   Extent End RBA     = 55295
  Number of extents from all VVR entries is 1

INDEX    MHLRES4.NSMS.CARENO.TEST01.INDEX
 XHARBADS = 25088
 Volume SBOXEF XHURBA = 512
 XACIFLAG - Data set is not EA (extended addressing)
 On volser(s)  SBOXEF
 COMPIND - No flags set
 Data set has 1 extents on 1 volumes
 Volume SBOXEF NOEXTNT = 1
 Relative key position = 41
 Key length = 10
 PHYBLKSZ = x'00000200'

 Data set has 1 extents on SBOXEF
 Extent Seq number  = 1          Extent tracks      = 1
 Extent low cchhr   = 000D000E   Extent Start RBA   = 0
 Extent high cchhr  = 000D000E   Extent End RBA     = 25087
  Number of extents from all VVR entries is 1
```

Documentation on CSI

Additional information about CSI can be found in *z/OS V2R1.0 DFSMS Managing Catalogs*, SC23-6853.

2.6 Catalog parmlib member enhancements

The catalog parmlib member IGGCATxx was introduced in z/OS V1.13. The main purpose of this new feature was to remove the bottlenecks in the current 80 character line specification in

SYS1.NUCLEUS or SYS1.IPLPARM. It is also to make catalog changes more dynamic and independent of having to do an IPL.

The parameters that are listed here were part of the initial implementation:

- VVDSSPACE
- TASKMAX
- NOTIFYEXTENT
- DELFORCEWNG
- DSNCHECK
- SYMREC
- UPDTFAIL
- VVRCHECK
- DELFORCEWNG
- EXTENDEDALIAS

In DFSMS V2.1 additional parameters were added to the IGGCATxx catalog parmlib.

2.6.1 How to prepare for catalog parmlib

If not already done, you must populate the IGGCATxx member in SYS1.PARMLIB with the options that you want to move to the parmlib function. It is suggested to define all possible parameters once you decide to implement the catalog parmlib function to visualize all options available. But initially perhaps only use default values. You have the possibility to quickly change these values easily having the defaults available and visible in the IGGCATxx catalog parmlib.

Example 2-33 is a sample where all options in the catalog parmlib are displayed with the corresponding default value.

Example 2-33 Example of IGGCATxx member showing options with default value

```
ALIASLEVEL(1)
AUTOADD(OFF)
CATMAX(1024)
DELFORCEWNG(OFF)
DELRECOVWNG(YES)
DSNCHECK(YES)
DUMP(OFF)
EXTENDEDALIAS(NO)
GDGFIFOENABLE(NO)
NOTIFYEXTENT(80)
SYMREC(YES)
SYS%(OFF)
TAPEHLQ(SYS1)
TASKMAX(180)
TASKMIN(60)
TASKTABLESIZE(200)
UPDTFAIL(YES)
VVDSSPACE(40,40)
```

Most of these options can be changed dynamically by **MODIFY CATALOG** commands. The system applies all IGGCATxx values at IPL time as well as at a restart of the Catalog Address Space.

Activating a new IGGCATxx catalog parmlib configuration change also validates the individual settings. Example 2-34 is a sample Modify Catalog Restart command, where the IGGCAT00 member contains an error.

Example 2-34 Example of error message after restart of Catalog Address Space

```
IEC355I IDACAT14, CATALOG ADDRESS SPACE IS RESTARTING
IEE252I MEMBER IGGCAT00 FOUND IN SYS1.PARMLIB
 IEC386W INVALID KEYWORD DETECTED IN IGGCAT00 AT LINE:DELFORCEWNG(OFF)
```

All valid settings are updated in IGGCATxx after a catalog restart. The settings in error remain unchanged.

2.6.2 Activating IGGCATxx catalog parmlib

To have the system start using the IGGCATxx member in SYS1.PARMLIB, you must specify the IGGCATxx member suffix in IEASYSxx member by specifying CATALOG=xx. If CATALOG=01 is specified, the system looks for an IGGCAT01 member in SYS1.PARMLIB.

If there is no CATALOG specification in the IEASYSxx member, the system will, by default, look for an IGGCAT00 member. If this is not found, the old setup using SYS1.NUCLEUS or SYS1.IPLPARM will be used.

Activation happens either by a catalog restart command or through IPL.

2.6.3 IGGCATxx new options in DFSMS V2.1

In this section, we look at the new options and their function made available in DFSMSV2.1:

- TASKMIN(n). Catalog service task lower limit (number of tasks that can run concurrently). Default is 60. Minimum is 24 and maximum is 180.
- TAPEHLQ(name). High-level qualifier of a Tape Volume catalog. Default is SYS1. Valid character set includes alphabetic, numerics, and the national characters @,#,$.
- SYS%(ON|OFF). Specifies whether SYS% to SYS1 conversion is enabled. Default is OFF.
- AUTOADD(ON|OFF). Specifies whether Enhanced Catalog Sharing (ECS) Autoadd is to be turned on or off. Default is OFF. When ON, catalogs will be added to ECS on their next reference if they are eligible for ECS.
- DUMP(ON|OFF). Specifies whether dynamic dumping is to be turned on or off. Default is OFF.
- ALIASLEVEL(n). Specifies the MLA search level. ALIASLEVEL has a default value of 1, with a minimum of 1 and a maximum of 4.
- DUMPON(rc,rsn,mod,cnt). Specifies the return (*rc*) and reason codes (*rsn*) to take a dump on if a match is found in a valid catalog module (*mod*). The optional *cnt* value specifies how many times to skip before taking the dump. The default for *cnt* is 1.
- TASKTABLESIZE(n). Specifies the maximum possible tasks running at a particular time. This includes both catalog and non-catalog tasks. TASKTABLESIZE is an IPL only parameter. TASKTABLESIZE is ignored on a CAS restart (no error message is issued). TASKTABLESIZE has a default value of 200, with a minimum of 200 and a maximum of 400.

- CATMAX(n). The maximum number of catalogs that can be open at any given time on the system. The default is 1024. Valid values are 1 - 9999. When the maximum number of open catalogs is reached, close of least recently used catalogs will start.
- VVRCHECK(YES|NO). Specifies if you want to enable enhanced VVR checking on VVDS I/O. The default is NO.

2.6.4 How to display settings on Catalog parmlib

Display of current settings in CAS can be done through the **F CATALOG,REPORT** command. The display output shows the IGGCATxx settings except for resource values, as shown in Example 2-35.

Example 2-35 IGGCATxx settings displayed by F CATALOG,REPORT command

```
F CATALOG,REPORT
IEC351I CATALOG ADDRESS SPACE MODIFY COMMAND ACTIVE
IEC359I CATALOG REPORT OUTPUT
*CAS*************************************************************
*  CATALOG COMPONENT LEVEL   = HDZ2210                           *
*  CATALOG ADDRESS SPACE ASN = 0098                              *
*  SERVICE TASK UPPER LIMIT  =  180                              *
*  SERVICE TASK LOWER LIMIT  =   60                              *
*  HIGHEST Æ SERVICE TASKS   =    3                              *
*  Æ ATTACHED SERVICE TASKS  =    3                              *
*  MAXIMUM Æ OPEN CATALOGS   = 1,024                             *
*  ALIAS TABLE AVAILABLE     = YES                               *
*  ALIAS LEVELS SPECIFIED    = 1                                 *
*  SYS% TO SYS1 CONVERSION   = OFF                               *
*  CAS MOTHER TASK           = 00790680                          *
*  CAS MODIFY TASK           = 007FC558                          *
*  CAS ANALYSIS TASK         = 007FC0F8                          *
*  CAS ALLOCATION TASK       = 007FC328                          *
*  CAS ASYNC TASK            = 0077AE88                          *
*  CAS SYSPLEX COMMAND TASK  = 0077AA28                          *
*  CAS SYSPLEX QUIESCE TASK  = 0077AC58                          *
*  VOLCAT HI-LEVEL QUALIFIER = SYS1                              *
*  NOTIFY EXTENT             =   80%                             *
*  DEFAULT VVDS SPACE        = ( 10, 10) TRKS                    *
*  ENABLED FEATURES          = DSNCHECK DELFORCEWNG SYMREC       *
*  ENABLED FEATURES          = UPDTFAIL                          *
*  DISABLED FEATURES         = VVRCHECK AUTOTUNING BCSCHECK      *
*  DISABLED FEATURES         = DELRECOVWNG EXTENDEDALIAS         *
*  DISABLED FEATURES         = ECS AUTOADD DUMPON GDGFIFO        *
*  INTERCEPTS                = (NONE)                            *
*CAS*************************************************************
IEC352I CATALOG ADDRESS SPACE MODIFY COMMAND COMPLETED
```

To see which catalog parmlib you are using on this system, use the **D IPLINFO,CATALOG display** command. This shows which IGGCATxx parmlib member is active. The output from the command is shown in Example 2-36 on page 41.

Example 2-36 D IPLINFO,CATALOG display output

```
D IPLINFO,CATALOG
IEE255I SYSTEM PARAMETER 'CATALOG': 00
```

The IGGCATxx catalog parmlib suffix on this system is “00”. In this case, the catalog parmlib member name is IGGCAT00.

Documentation

See *MVS Initialization and Tuning Reference z/OS V2.1*, SA23-1380; and *z/OS Managing Catalogs*, SC23-6853, for details about the catalog parmlib feature.

2.7 Catalog DFSMS GDG enhancements

Current GDG processing is from newest to oldest (LIFO). Given the processing order, GDG data sets are presented from oldest (lowest generation data set number) to newest in sequence. Based on requirements, DFSMS V2.1 added a new attribute so that GDG data sets can be processed in reverse order. The new attribute is GDGFIFOENABLE.

Processing GDG data sets in first-in first-out (FIFO) order often reduces the need for doing SORT, as data often is time stamped and needs to be processed accordingly.

2.7.1 Enable FIFO processing of GDG processing

To activate the FIFO processing of GDG data sets, you first must enable this in catalog parmlib with the **GDGFIFOENABLE(YES)** parameter. The default for this parameter is NO. Therefore, if you try to create a new GDG using a new keyword FIFO without changing the default, you will see the error message that is shown in Example 2-37.

Example 2-37 Error message returned if you try to define GDG without activating GDGFIFOEANABLE

```
DEFINE GENERATIONDATAGROUP -
           (NAME(MHLRES1.TEST.FIFO.GDG) -
           EMPTY FIFO -
           SCRATCH -
           LIMIT(10) )
IDC0010I GDG FIFO ALLOCATION ORDER FEATURE NOT ENABLED.
IDC3003I FUNCTION TERMINATED. CONDITION CODE IS 12
```

GDGFIFOENABLE(YES) must be set in catalog parmlib to be able to create a GDG with the FIFO option. You can activate this setting by restarting CAS or doing an IPL after updating the IGGCATxx member. There is no dynamic **MODIFY** command available for this setting.

The FIFO option is available on a DEFINE GDG statement or on the IDCAMS alter statement.

FIFO processing scenario

To illustrate the change in processing order, we create a scenario:

1. Two GDG entries were created, one with the default option (last-in first-out (LIFO)), the other one with the FIFO option provided. Two data sets were allocated in each GDG.
2. Next, we did an IDCAMS print to process the data sets and the allocation of the DD statements shows the two different processing orders. The data sets were processed from newest to oldest with the LIFO option, as seen in Example 2-38 on page 42.

Example 2-38 LIFO processing order of GDG data set with default option

```
IGD104I MHLRES1.TEST.LIFO.GDG.G0002V00              RETAINED,  DDNAME=DD1
IGD104I MHLRES1.TEST.LIFO.GDG.G0001V00              RETAINED,  DDNAME=
```

3. For the FIFO option, the GDG data sets are processed in reverse order, as seen in Example 2-39.

Example 2-39 Processing order of GDG data set with FIFO option enabled

```
IGD104I MHLRES1.TEST.FIFO.GDG.G0001V00              RETAINED,  DDNAME=DD1
IGD104I MHLRES1.TEST.FIFO.GDG.G0002V00              RETAINED,  DDNAME=
```

2.7.2 Setting processing through JCL

The JCL parameter **GDGORDER** can be used to influence the concatenation order. This keyword overwrites any LIFO or FIFO setting on the GDG. Example 2-40 shows an example of the GDGORDER=FIFO JCL parameter.

Example 2-40 Overwriting LIFO/FIFO setting on GDG using the JCL parameter

```
//SMFDATA DD DSN=MHLRES1.TEST.LIFO.GDG,DISP=SHR,GDGORDER=FIFO
```

Valid settings for the **GDGORDER** parameter are USECATLG, FIFO, and LIFO.

Documentation

See more details in *z/OS V2R1.0 MVS JCL Reference,* SA23-1385.

2.8 Catalog RNLs Health Check

We suggest converting the resources SYSIGGV2/SYSZVVDS/SYSVTOC in the GRS RNL to avoid serious deadlocks involving these. The exception can be for resources placed on disk outside the sysplex.

With DFSMS V2.1, a new health check (Catalog_Rnls) will now be monitoring these resources and creates an alert, if suggested conversions are not met. The customer benefits from this if incorrect settings are detected and can be changed before facing a hang-up situation.

2.8.1 SDSF Health Checker panel

The new health check can be found in the Health Checker panel in SDSF.

1. To reach this, go to the SDSF main menu and type **CK** to enter the Health Checker menu. The Catalog_RNLS is to be found as shown in Figure 2-7 on page 43.

```
SDSF HEALTH CHECKER DISPLAY  SC64                    LINE 1-19 (199)
COMMAND INPUT ===>                                        SCROLL ===> CSR
NP   NAME                              CheckOwner      State              Statu
     ALLOC_ALLC_OFFLN_POLICY           IBMALLOC        ACTIVE(ENABLED)    SUCCE
     ALLOC_SPEC_WAIT_POLICY            IBMALLOC        ACTIVE(ENABLED)    SUCCE
     ALLOC_TIOT_SIZE                   IBMALLOC        ACTIVE(ENABLED)    SUCCE
     ASM_LOCAL_SLOT_USAGE              IBMASM          ACTIVE(ENABLED)    SUCCE
     ASM_NUMBER_LOCAL_DATASETS         IBMASM          ACTIVE(ENABLED)    SUCCE
     ASM_PAGE_ADD                      IBMASM          ACTIVE(ENABLED)    SUCCE
     ASM_PLPA_COMMON_SIZE              IBMASM          ACTIVE(ENABLED)    EXCEP
     ASM_PLPA_COMMON_USAGE             IBMASM          ACTIVE(ENABLED)    SUCCE
     CATALOG_IMBED_REPLICATE           IBMCATALOG      ACTIVE(ENABLED)    EXCEP
     CATALOG_RNLS                      IBMCATALOG      ACTIVE(ENABLED)    SUCCE
     CNZ_AMRF_EVENTUAL_ACTION_MSGS     IBMCNZ          ACTIVE(ENABLED)    SUCCE
```

Figure 2-7 SDSF Health Checker panel with the new Catalog_RNLS health check

2. Run the Health Checker real time by selecting the health check-in scope. In this scenario, select **Catalogs_RNLS**. The output from the health check is shown in Example 2-41. If successful, the status is updated accordingly.

Example 2-41 Result of running Catalog_RNLS heath check

```
CHECK(IBMCATALOG,CATALOG_RNLS)
SYSPLEX:    SANDBOX   SYSTEM: SC64
START TIME: 09/13/2013 23:35:08.042348
CHECK DATE: 20120827  CHECK SEVERITY: LOW

IGGHC110I CHECK(IBMCATALOG,CATALOG_RNLS) ran successfully and found no
exceptions.

END TIME: 09/13/2013 23:35:08.044066  STATUS: SUCCESSFUL
```

3. During the health check, if any of the resources are not converted a notification is created that a potential deadlock situation can occur and on which of the resources. The user is suggested to follow instructions in the health check as to how to resolve and prevent the potential deadlock situation.

Documentation

The book *z/OS V2R1.0 MVS Planning: Global Resource Serialization, S*A23-1389 explains how to convert resources in more detail. Regarding Catalog RNL reserves, refer to chapter 2, page 44.

2.9 MODIFY CATALOG,LIST enhancement

The latch number has been added to **F CATALOG,LIST** output. Message IEC347I has been changed to display latches, when any contention occurred.

Example 2-42 on page 44 is the pre-DFSMS V2.1 display.

Example 2-42 MODIFY CATALOG LIST display in previous releases

```
IEC347I LIST CATALOG TASK(S)
*CAS*************************************************************
* FLAGS - TASK ADDRESS - JOBNAME / STEPNAME - ELAPSED TIME - ID *
* ------ NOACTIVE / NONE 00.00.00 *
*******************************************************************
* O-OLDEST, W-WAIT, A-ABEND, E-ENQ, R-RECALL, L-RLS *
*CAS*************************************************************
```

Latch information has been added in DFSMS V2.1, as shown in Example 2-43.

Example 2-43 MODIFY CATALOG LIST display having latch information added

```
IEC347I LIST CATALOG TASK(S)
*CAS*************************************************************
* FLAGS - TASK ADDR - JOBNAME / STEPNAME - ELAPSED TIME - ID *
* ------ 00891D78 DUMPSRV / DUMPSRV 00.01.55 02 *
* WAITING FOR Get LatchShr # 00001 FROM 09F06730 FOR 00.01.23 *
*******************************************************************
* O-OLDEST, W-WAIT, A-ABEND, E-ENQ, R-RECALL, L-RLS *
*CAS*************************************************************
```

2.10 Improved catalog recovery features

New parameters have been provided for in DFSMS V2.1 on the DELETE and DEFINE USERCATALOG statement to keep and maintain alias information about deletion and later creation of an ICF catalog. Using the new **DELETE USERCATALOG NODISCONNECT** and **DEFINE USERCATALOG RECONNECT** parameters, you will no longer have to maintain the ALIAS pointers yourself.

Reconnect will also support rebuilding alias information even if the ICF catalog is defined on another volume or device type.

Another significant enhancement for ICF Catalogs is the new **MODIFY RECOVER** command that has been added in DFSMS V2.1 to support catalog forward recovery procedures. This new command will work for both RLS managed and non-RLS managed catalogs:

2.10.1 F CATALOG,RECOVER,LOCK(ucat name)

This command locks and closes the catalog sysplex wide. The catalog appears as LOCKED in a catalog display. Trying to access the catalog, you get the return code 186, with the message “UNABLE TO ACCESS LOCKED CATALOG”. A LOCK is generally used when the catalog is being reorganized or recovered. LOCK fails any user request while the LOCK is active.

2.10.2 F CATALOG,RECOVER,UNLOCK(ucat name)

This command releases a LOCK set by a previous **RECOVER LOCK** command or by an **IDCAMS ALTER LOCK** command.

2.10.3 F CATALOG,RECOVER,SUSPEND(ucat name)

This command does a serialized close of the catalog across the sysplex. The suspend prevents unauthorized request to the catalog. In a catalog display, the catalog appears as in a suspended state.

Compared to the **LOCK** parameter, **SUSPEND** queues up incoming requests in the users address space and does not fail the job.

2.10.4 F CATALOG,RECOVER,RESUME(ucat name)

The **RESUME** command resumes a suspended catalog that was earlier brought in this state by a **RECOVER SUSPEND** command.

The user catalog name can be specified generically or as a fully qualified catalog name.

Example 2-44 shows the messages when using the **RECOVER** command to prevent access and again opening for access. The first example shows a lock of the catalog.

Example 2-44 LOCK an ICF Catalog using a RECOVER LOCK command

```
F CATALOG,RECOVER,LOCK(UCAT.RLSTST)
IEC351I CATALOG ADDRESS SPACE MODIFY COMMAND ACTIVE
IEC352I MODIFY CATALOG UCAT.RLSTST TO STATE LOCK SUCCESSFUL
IEC352I CATALOG ADDRESS SPACE MODIFY COMMAND COMPLETED
```

To bring the ICF Catalog out of a locked status, use the **RECOVER UNLOCK** command as shown in Example 2-45.

Example 2-45 UNLOCK an ICF Catalog from a LOCKED state by command

```
F CATALOG,RECOVER,UNLOCK(UCAT.RLSTST)
IEC351I CATALOG ADDRESS SPACE MODIFY COMMAND ACTIVE
IEC352I MODIFY CATALOG UCAT.RLSTST TO STATE UNLOCK SUCCESSFUL
IEC352I CATALOG ADDRESS SPACE MODIFY COMMAND COMPLETED
```

To set the ICF Catalog in a suspended state before doing maintenance or recovery, use the **RECOVER SUSPEND** command as shown in Example 2-46.

Example 2-46 Example of suspending an ICF Catalog using the RECOVER SUSPEND command

```
F CATALOG,RECOVER,SUSPEND(UCAT.RLSTST)
IEC351I CATALOG ADDRESS SPACE MODIFY COMMAND ACTIVE
IEC352I MODIFY CATALOG UCAT.RLSTST TO STATE SUSPEND SUCCESSFUL
IEC352I CATALOG ADDRESS SPACE MODIFY COMMAND COMPLETED
```

When the maintenance or recovery has been done to the suspended ICF catalog, resume the ICF catalog from the suspended state, issuing the **RECOVER RESUME** command. All catalog requests outside of the maintenance work will be queued up while this is ongoing. Example 2-47 on page 46 is the output from the **RESUME** command.

Example 2-47 Resume of ICF Catalog being in suspended state

```
F CATALOG,RECOVER,RESUME(UCAT.RLSTST)
IEC351I CATALOG ADDRESS SPACE MODIFY COMMAND ACTIVE
IEC352I MODIFY CATALOG UCAT.RLSTST TO STATE RESUME SUCCESSFUL
IEC352I CATALOG ADDRESS SPACE MODIFY COMMAND COMPLETED
```

Remember to have the appropriate access to the IGG.CATLOCK resource to be able to issue the commands in this section.

The **IDCAMS ALTER LOCK|SUSPEND** command now works sysplex-wide assuring full integrity.

2.10.5 Catalog define and delete parameters

New parameters **NODISCONNECT|RECONNECT** to be used along with the **DELETE USERCATALOG** command are available with DFSMS V2.1. NODISCONNECT retains alias information at the deletion of a user catalog. If you use this parameter, the new parameter **RECONNECT** can be used on the **DEFINE USERCATALOG** command to have the newly defined catalog connected to the existing alias information so that you do not have to rebuild this information manually.

NODISCONNECT | RECONNECT subparameter scenario

For visualization of how the new **NODISCONNECT | RECONNECT** subparameters work, a DELETE of a user catalog is done using the keyword **NODISCONNECT**. The user catalog is defined again with the **RECONNECT** parameter. Example 2-48 is an example of deleting a user catalog using the **NODISCONNECT** parameter.

Example 2-48 Delete of user catalog using the NODISCONNECT parameter

```
//IDCAMS  EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
     DELETE UCAT.RLSTST USERCATALOG RECOVERY NODISCONNECT
/*
```

Next, the user catalog was defined again with the **RECONNECT** keyword to connect to the existing alias pointers as shown in Example 2-49.

Example 2-49 Example of defining a user catalog using RECONNECT parameter

```
//IDCAMS  EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
     DEFINE USERCATALOG -
            (NAME(UCAT.RLSTST ) ICFCATALOG -
            VOLUME(MHL1A0) TRK(5 1)  -
            STORCLAS(SCRLS) -
            DATACLAS(WELCHRLS) -
            LOG(NONE) RECONNECT -
            FREESPACE(20 20) -
            NOIMBED NOREPLICATE) -
            DATA (CISZ(4096))
/*
```

The only ALIAS in this user catalog was RLSTST with one data set created. When we looked up the alias using ISPF 3.4 after the define of the usercatalog, the alias was visible. At this

point, there are none with no data sets. A restore from a backup had to be done. In our scenario, it is a DFSMSdss backup.

The backup job was started but failed immediately with the error in Example 2-50.

Example 2-50 DSS restore of a user catalog fails due to missing access to IGG.CATLOCK

```
ICH408I USER(MHLRES1 ) GROUP(SYS1    ) NAME(MHLRES1/MARY LOVELAC)
  IGG.CATLOCK CL(FACILITY)
  INSUFFICIENT ACCESS AUTHORITY
  ACCESS INTENT(READ   )  ACCESS ALLOWED(NONE   )
```

The preceding example shows that DFSMSdss does an implicit LOCK|SUSPEND of a user catalog before importing data from backup.

To correct the error, READ access to the IGG.CATLOCK facility class is provided. The restore was restarted and ended successfully this time, as shown in Example 2-51.

Example 2-51 Sysout from DSS restore of user catalog pre-allocated with keyword RECONNECT

```
ADR442I (001)-FRLBO(01), DATA SET UCAT.RLSTST PREALLOCATED, IN CATALOG MCAT.....
ADR360I (001)-TDVSM(02), PROCESSING SUSPENDED USER CATALOG UCAT.RLSTST
ADR963I (001)-TDLOG(02), CLUSTER UCAT.RLSTST WAS DUMPED USING RECORD LEVEL SHARI
                         GMT TIMESTAMP IS: 2013.275 00:04:50.8
ADR489I (001)-TDLOG(02), CLUSTER UCAT.RLSTST WAS RESTORED
                          CATALOG        MCAT.SANDBOX.Z1C.SBOX00
                          COMPONENT      UCAT.RLSTST
                          COMPONENT      UCAT.RLSTST.CATINDEX
ADR372W (001)-TDNVS(03), ALIAS RLSTST NOT RESTORED FOR USER CATALOG UCAT.RLSTST,
ADR480W (001)-TDLOG(01), THE FOLLOWING DATA SETS WERE NOT PROCESSED FROM THE LOG
                          RLSTST
ADR454I (001)-TDLOG(01), THE FOLLOWING DATA SETS WERE SUCCESSFULLY PROCESSED
```

Before processing the restore DFSMSdss does a suspend of the catalog. The catalog is protected against concurrent updates. DFSMSdss also has the awareness that the dump was taken using RLS access (implicit QUIESCE before doing the dump, and RESUME after the DUMP had finished).

DFSMSdss finds the user catalog preallocated and consequently does not restore the alias, as this information is already in place.

The SUSPEND issued by DFSMSdss is resumed again after successful restore.

2.10.6 Catalog forward recovery using new features

Forward recovery of a catalog is done differently using the newest DFSMS V2.1 enhancements. You will still need backups as your recovery checkpoint and SMF data to perform forward recovery from this checkpoint to a current point in time. In this section, we describe the steps for a catalog forward recovery at the DFSMS V2.1 level:

1. Using DFSMSdss as the backup tool, the RLS-managed catalogs will be quiesced. DFSMSdss will enqueue on SYSIGGV2 for the non-RLS managed catalogs as done in DFSMS before V2.1.
2. Forward recovery to a new volume should be preceded by issuing the **F CATALOG,RECOVER,SUSPEND(ucat name)** command. This will queue up catalog requests

against this catalog without failing them. Most importantly, the SUSPEND will close the catalog across the sysplex ensuring integrity.

3. You are now ready to delete the catalog from its current location (knowing you have a valid backup). Delete should happen with the new **NODISCONNECT** parameter to maintain alias pointers. Only DSCBs and VVRs are deleted.
4. Next, redefine the catalog using the new **RECONNECT** parameter (counterpart to NODISCONNECT). Use parameters VOLSER(vvvvvv), LOG(NONE), SUSPEND and RLSQUIESCE or RLSENABLE along with this.

   Using the VOLSER, this will be updated across the sysplex and RECONNECT will connect existing alias information, while the **SUSPEND** parameter assures integrity.
5. Next, restore can happen using DFSMSdss. DFSMSdss will sense the suspended status and will restore the empty catalog without using additional serialization except from the SUSPEND.
6. When the restore has been successfully completed, you will need to do forward recovery from the time the catalog backup was taken up until the current point. This can happen by using the ICFRU tool that uses selected SMF records for the forward recovery.
7. The only outstanding action is now to release the SUSPEND of the catalog. Do this with the **MODIFY CATALOG,RECOVER,RESUME(ucat name)** command.

2.10.7 Catalog recovery using BCSRECOVER

This section explains how to use DFSMSdss as the backup and restore tool for the ICF catalog using the new **BCSRECOVER** parameter for DFSMSdss. BCSRECOVER should be used along with the **SUSPEND** parameter to assure the best possible integrity and availability.

As mentioned earlier, DFSMSdss will QUIESCE a catalog in use by RLS when backing up the catalog. For non-RLS managed catalogs, DFSMSdss will enqueue on the SYSIGGV2 resource.

Restoring an ICF catalog using DFSMSdss can be done using the **BCSRECOVER** parameter with the subparameter **SUSPEND**. The **BCSRECOVER(SUSPEND)** parameters will do a sysplex wide suspend that will suspend incoming requests while restore is ongoing. Once this has finished, the requests can be resumed.

Using the **BCSRECOVER(LOCK)** parameter instead, DFSMSdss invokes a sysplex-wide lock of the catalog. Compared to SUSPEND, LOCK fails all incoming unauthorized requests while restore is ongoing. A sample job is shown in Example 2-52.

Example 2-52 DSS restore job using BCSRECOVER SUSPEND parameters

```
//STEPT006 EXEC PGM=ADRDSSU,REGION=4096K
//SYSPRINT DD SYSOUT=*
//DASD    DD DISP=SHR,UNIT=3390,VOL=SER=SBOX1A
//TAPE DD DISP=SHR,
//     DSN=MHLRES1.DSS.BACK1.MHLRES1A,SPACE=(TRK,(2,1)),
//     UNIT=3390,DCB=(BLKSIZE=27920)
//SYSIN DD *
 RESTORE DATASET(                      -
          INCLUDE(                     -
                 UCAT.RLSTST  ))       -
          INDDNAME(TAPE)               -
          OUTDDNAME(DASD)              -
          BCSRECOVER(SUSPEND)
```

Example 2-53 shows the sysout from a BCSRECOVER. Alias and user catalog data is recovered.

Example 2-53 Sysout from DSS restore of user catalog and BCSRECOVER SUSPEND parameters

```
ADR360I (001)-TDVSM(01), PROCESSING LOCKED USER CATALOG UCAT.RLSTST
.....
ADR489I (001)-TDLOG(02), CLUSTER UCAT.RLSTST WAS RESTORED
                          CATALOG        MCAT.SANDBOX.Z1C.SBOX00
                          COMPONENT      UCAT.RLSTST
                          COMPONENT      UCAT.RLSTST.CATINDEX
ADR393I (001)-TDNVS(01), ALIAS RLSTST RESTORED FOR USER CATALOG UCAT.RLSTST
ADR454I (001)-TDLOG(01), THE FOLLOWING DATA SETS WERE SUCCESSFULLY PROCESSED
                          UCAT.RLSTST
ADR006I (001)-STEND(02), 2013.274 23:59:37 EXECUTION ENDS
ADR013I (001)-CLTSK(01), 2013.274 23:59:37 TASK COMPLETED WITH RETURN CODE 0000
```

After restoring the ICF catalog, a check with the command **F CATALOG,OPEN** shows that the catalog is no longer suspended. See Example 2-54.

Example 2-54 Check of catalog after DSS restore using SUSPEND parameter

```
F CATALOG,OPEN
IEC351I CATALOG ADDRESS SPACE MODIFY COMMAND ACTIVE
IEC348I ALLOCATED CATALOGS 655
*CAS*******************************************************
*
* FLAGS -VOLSER-USER-CATALOG NAME
*
* YSU-R- SBXHS8 0001 UCAT.RLSTST
..... more catalogs listed .....
*************************************************************
*
* Y/N-ALLOCATED TO CAS, S-SMS, V-VLF, I-ISC, C-CLOSED, D-DELET
*
* R-SHARED, A-ATL, E-ECS SHARED, K-LOCKED, U-RLS, W-SUSPENDED
*
*CAS*******************************************************
```

Using **SUSPEND** | **LOCK** subparameters only applies to existing (pre-allocated) catalogs. If the catalog does not exist, DFSMSdss defines the catalog as locked to ensure that the catalog is not accessible before DFSMSdss completes restore processing.

Programs using BCSRECOVER require READ access to RACF FACILTY CLASS resource IGG.CATLOCK.

3

IDCAMS enhancements

This chapter provides an overview of the features and function in IDCAMS included in DFSMS V2.1.

IDCAMS is the program name for access method services (AMS). It is used to create and maintain catalogs and data sets.

These are the enhancements that we discuss in this chapter:

- Large block size for LBI support
- IDCAMS support for RLS
- DELETE PDS or PDSE member with mask
- ALTER NULLIFY management class
- DIAGNOSE of GDGs

3.1 Large block size for LBI support

The large block interface (LBI) was introduced around 10 years ago. It allows programs and utilities to use block sizes larger than 32760 bytes when recording data to tape. It uses less tape storage and provides fast data transfer.

Before DFSMS V2.1, IDCAMS did not support LBI. Any attempt to run IDCAMS PRINT or REPRO to print or copy a data set that was created with block size larger than 32760 bytes gets an error message IDC3300I, followed by IDC3321I with a return code 12. Also, an abend 013 with return code E1 is externalized in the job SYSOUT.

In DFSMS V2.1, IDCAMS PRINT and REPRO support data sets with a block size up to the access method limit, which currently is 256 K.

The block size is still limited to 32760 bytes for data sets that do not support LBI. SYSIN and SYSPRINT do not support LBI.

3.1.1 Use of function

Example 3-1 shows a sample REPRO job that we used in a z/OS V2.1 system to REPRO the sequential data set MHLRES3.VSAM.UPDT1 on disk to the new data set MLHRES3.LBI.SC64.TEST on tape. Notice that we used a BLKSIZE of 240000.

We ran the same job in a z/OS V1.13 system. The job also ran successfully, but the block size was adjusted to 32700 bytes because IDCAMS on z/OS V1.13 does not support an LBI. The number of transferred blocks was much bigger than when we ran this job in the z/OSV 2.1 system.

Example 3-1 REPRO using LBI

```
//MHLRES3A JOB (999,POK),'MHLRES3',CLASS=A,MSGCLASS=T,
// NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM SYSAFF=*
//REPRO EXEC PGM=IDCAMS,REGION=0M
//SYSPRINT  DD SYSOUT=*
//DD1      DD DSN=MHLRES3.VSAM.UPDT1,DISP=SHR
//DD2      DD DSN=MHLRES3.LBI.SC64.TEST,DISP=(,CATLG),
//         DCB=(RECFM=FB,LRECL=300,BLKSIZE=240000),
//         UNIT=VT3590,LABEL=(,SL)
//SYSIN     DD *
     REPRO INFILE(DD1)  -
           OUTFILE(DD2)
/*
```

3.1.2 Coexistence

If you create data sets on the z/OS V2.1 system, and intend to read them on z/OS V1.13 or older systems, we suggest you not specify a block size larger than 32760 bytes for output data sets.

We tried to print the data set MHLRES3.LBI.SC64.TEST that we created in Example 3-1 in a z/OS V1.13 system, using the job shown in Example 3-2 on page 53.

Example 3-2 PRINT on z/OS 1.13 of a LBI data set

```
//MHLRES3P JOB (999,POK),'MHLRES3',CLASS=A,MSGCLASS=T,
// NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM SYSAFF=*
//PRINT    EXEC PGM=IDCAMS,REGION=0M
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
     PRINT INDATASET(MHLRES3.LBI.SC64.TEST) -
           COUNT(1)
/*
```

The job failed with message IEC141I abend 013 rc E1. Return code E1 means that a magnetic tape data set with a block size greater than 32,760 is being opened for input or output extend processing, but the large block interface is not being used. Messages IDC3300I and IDC3321I are also shown in the job log as shown in Example 3-3.

Example 3-3 Error messages associated with LBI not being used

```
IDC3300I  ERROR OPENING MHLRES3.LBI.SC64.TEST
IDC3321I ** OPEN/CLOSE/EOV ABEND EXIT TAKEN
```

3.2 IDCAMS support for RLS

In DFSMS V2.1 IDCAMS is enhanced to support commands PRINT, REPRO, EXPORT, and IMPORT to open VSAM data sets that are already open in RLS mode by other applications, for example IBM CICS®. In this section, we describe the function in DFSMS V2.1 and provide samples.

3.2.1 Overview

Before DFSMS V2.1, IDCAMS can only open VSAM data sets using nonshared resources (NSRs). Because of this, it had a limited support to access data sets already opened by other applications in RLS mode. You could use only **PRINT**, **REPRO**, and **EXPORT** commands to data sets that were defined with cross region SHAREOPTION 2. For example, you could make a copy of a VSAM data set opened in RLS mode to CICS, if the data set was created with SHAREOPTION(2 3). However, there is not any guarantee that the copy has integrity.

Now in DFSMS V2.1, IDCAMS can use the keywords **RLSSOURCE** and **RLSTARGET** to be able to open VSAM data sets using RLS. Here is a brief description of the syntax and the associated keywords:

- RLSSOURCE

  For PRINT, REPRO, and EXPORT commands, it specifies how the input data set is to be opened. The following are RLSSOURCE options:

  NO Tells IDCAMS to open the data set using NSR. This is the default.

  YES IDCAMS opens the data set in RLS mode, with consistent read integrity.

  QUIESCE IDCAMS quiesces a VSAM data set. It switches from RLS mode to non-RLS mode before processing any entry in the data set.

- RLSTARGET

For **REPRO** and **EXPORT** commands, it specifies how the target data set is to be opened, either NO, YES, or QUIESCE. The description for these options is the same as for RLSSOURCE.

3.2.2 Use

In this section, we provide some examples on how to use the RLS enhancements that are provided in IDCAMS in DFSMS V2.1.

In Example 3-4, we show you a sample PRINT job. Here we print a VSAM KSDS data set that is already open in RLS mode for another application. We request IDCAMS to open the VSAM data set in RLS mode by using the **RLSSOURCE(YES)** parameter on the **PRINT** command.

Example 3-4 Printing a VSAM data set in RLS mode

```
//MHLRES3P JOB (999,POK),'MHLRES3',CLASS=A,MSGCLASS=T,
// NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM SYSAFF=*
//PRINT    EXEC PGM=IDCAMS,REGION=0M
//DD1      DD   DSN=MHLRES3.VSAM.KSDS,DISP=SHR
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
     PRINT INFILE(DD1) -
           RLSSOURCE(YES) -
           COUNT(1)
/*
```

Example 3-5 shows the JCL to copy the MHLRES3.VSAM.KSDS data set contents to MHLRES3.VSAM.NEW.KSDS. We requested that IDCAMS opens MHLRES3.VSAM.KSDS in RLS mode by specifying RLSSOURCE(YES). We also requested our target data set, MHLRES3.VSAM.NEW.KSDS, to be open in RLS mode by specifying RLSTARGET(YES).

Example 3-5 REPRO of two VSAM KSDS data sets in RLS mode

```
//MHLRES3R JOB (999,POK),'MHLRES3',CLASS=A,MSGCLASS=T,
// NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM SYSAFF=*
//REPRO    EXEC PGM=IDCAMS,REGION=0M
//DD1      DD   DSN=MHLRES3.VSAM.KSDS,DISP=SHR
//DD2      DD   DSN=MHLRES3.VSAM.NEW.KSDS,DISP=SHR
//SYSPRINT DD   SYSOUT=*
//SYSIN    DD   *
     REPRO INFILE(DD1) -
           OUTFILE(DD2) -
           RLSSOURCE(YES) -
           RLSTARGET(YES)
/*
```

3.2.3 Coexistence

We do not find any coexistence issues for using these IDCAMS RLS enhancements in DFSMS V2.1 while having VSAM data sets opened in RLS mode by z/OS V1.13 or V1.12 systems.

However, trying to use the new keywords **RLSSOURCE** and **RLSTARGET** in a z/OS V1.12 or z/OS V1.13 results in a *IDC3211I KEYWORD IS IMPROPER* message, and the command is not executed.

3.3 DELETE PDS or PDSE member with mask

IDCAMS in z/OS 1.12 provided the support to delete all members of a partitioned data set (PDS or PDSE) in a single operation.

IDCAMS in DFSMS V2.1 enhances the **DELETE** command to be more flexible in performing the delete of members of a partitioned data set. It now allows a mask to be specified in a **DELETE** command for PDS and PDSE members.

3.3.1 Use

There are some rules for specifying a mask in deleting PDS or PDSE members in an IDCAMS **DELETE** command:

- A mask for a member name can contain an asterisk (*) or a percent sign (%):
  - An asterisk means match 0 or more characters in the member name.
  - A % means match one character.
- A single asterisk (*) tells IDCAMS to delete all members in a PDS/PDSE data set.

  Double asterisks (**) also tell IDCAMS to delete all members in a PDS/PDSE data set. In addition, IDCAMS lists all deleted member names.

Here we provide some examples on how to use a mask for deleting selected members of a partitioned data set. In these examples, we assume that we must have a partitioned data set with the following members before each **DELETE** command:

- ABC
- ABCDEFGC
- AC
- A1C
- DEF

DELETE example 1

In Example 3-6, we are using an IDCAMS **DELETE** command to delete only MEMBERS ABC and A1C from partitioned data set MHLRES3.PDSE.TEST.

Example 3-6 Using IDCAMS to delete members of a PDSE

```
//MHLRES33 JOB (999,POK),'MHLRES3',CLASS=A,MSGCLASS=T,
// NOTIFY=&SYSUID,TIME=1440,REGION=6M
//REPRO    EXEC PGM=IDCAMS,REGION=0M
//SYSPRINT DD   SYSOUT=*
//SYSIN    DD   *
     DELETE MHLRES3.PDSE.TEST(A%C)
/*
```

The resulting job log output in Example 3-7 on page 56 shows that ABC and A1C are deleted after running this job.

Example 3-7 Job log results of DELETE

```
DELETE MHLRES3.PDSE.TEST(A%C)
IDC0549I MEMBER ABC DELETED
IDC0549I MEMBER A1C DELETED
```

Members ABCDEFGC, AC, and DEF are not deleted after running the job in Example 3-6 on page 55.

DELETE example 2

You can use the following IDCAMS **DELETE** command to select all members with a name starting with A and ending with C to be deleted:

```
DELETE MHLRES3.PDSE.TEST(A*C)
```

The resulting job log output would show the messages in Example 3-8 showing the deleted member names.

Example 3-8 Job log of DELETE command with mask

```
DELETE MHLRES3.PDSE.TEST(A*C)
IDC0549I MEMBER ABC DELETED
IDC0549I MEMBER ABCDEFGC DELETED
IDC0549I MEMBER AC DELETED
IDC0549I MEMBER A1C DELETED
```

3.3.2 Coexistence

You are able to delete members of partitioned data sets using IDCAMS DELETE with a mask provided in DFSMS V2.1, even if they are shared between z/OS systems.

However, you are not able to run these DELETE with a mask commands in a z/OS system before V2.1. For example, if you try to run the same job as Example 3-6 on page 55 in a z/OS V1.13 system, you get the message in Example 3-9 and the job fails.

Example 3-9 Error message attempting to run DELETE with mask on a system before DFSMS V2.1

```
IDC3203I ITEM 'MHLRES3.PDSE.TEST(A%' DOES NOT ADHERE TO RESTRICTIONS
```

3.4 ALTER NULLIFY management class

IDCAMS in DFSMS V2.1 allows you to use the **ALTER** command to remove the management class information of an SMS-managed data set from the catalog in which it is cataloged.

3.4.1 Overview

For SMS-managed data sets, the management class information resides in an NVR (for non-VSAM data sets) or VVR (for VSAM data sets) in each VVDS on the volumes where the extents for the data set are allocated. You can specify NULLIFY(MANAGEMENTCLASS) in the **ALTER** command in order to nullify the management class of an SMS-managed data set. Its abbreviation is NULLIFY(MGMTCLAS).

3.4.2 Use

In Example 3-10, we show you the SMSDATA information that we take from a LISCAT ALL of data set MHLRES3.CLIST. It shows that this data set has SMS management class MCDB22 assigned to it.

Example 3-10 LISTCAT before ALTER

```
SMSDATA
  STORAGECLASS ---STANDARD     MANAGEMENTCLASS---MCDB22
  DATACLASS --------(NULL)     LBACKUP ---0000.000.0000
```

We decided to remove this management class information by running an IDCAMS ALTER NULLIFT(MGMTCLAS) batch job, as shown in Example 3-11.

Example 3-11 ALTER NULLIFY(MGMTCLAS) example

```
//MHLRES3A JOB (999,POK),'MHLRES3',CLASS=A,MSGCLASS=T,
// NOTIFY=&SYSUID,TIME=1440,REGION=6M
//ALTER   EXEC PGM=IDCAMS,REGION=512K
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  *
  ALTER MHLRES3.CLIST NULLIFY(MGMTCLAS)
/*
```

We took another LISTCAT ALL of this data set in order to confirm that the management class information was removed from the catalog, as seen in Example 3-12.

Example 3-12 LISTCAT after the ALTER NULLIFY(MGMTCLAS)

```
SMSDATA
  STORAGECLASS ---STANDARD     MANAGEMENTCLASS---(NULL)
  DATACLASS --------(NULL)     LBACKUP ---0000.000.0000
```

3.4.3 Coexistence

You are to use the **ALTER NULLIFY(MANAGEMENT CLASS)** command on any system with DFSMS V2.1, even if they are shared with z/OS V1.13 or previous releases of z/OS.

However, if you try to use this command in a system with z/OS V1.13 or previous releases of z/OS, you get the message `IDC3211I KEYWORD 'MGMTCLAS' IS IMPROPER` and the ALTER is not completed.

3.5 DIAGNOSE of GDGs

The IDCAMS **DIAGNOSE** command scans a basic catalog structure (BCS) or a VSAM volume data set (VVDS) component of an ICF catalog to validate data structures and detect structure errors. You can use DIAGNOSE to check the structure and the content of a BCS or a VVDS, to cross-check BCS and VVDS information, to detect missing records and several types of mismatches and structural problems in a catalog.

3.5.1 Overview

DIAGNOSE has been enhanced in DFSMS V2.1 to detect a mismatch between the actual number of GDG extension cells and a count it keeps inside the record that describes a base GDG.

Extension records are created when the maximum record size of the BCS cannot contain a new component entry. This can occur as a result of the creation of a new generation data set. The first piece of information in an extension record is the extension cell. Catalog must keep a counter inside the record that describes the base GDG; this counter holds the number of extension cells that exist for a GDG.

There may be error situations where the counter and the real number of extension cells do not match. This can lead to some processing errors that are undetectable until batch processing fails.

DIAGNOSE in DFSMS V2.1 helps users to quickly identify the cause of GDG processing errors.

3.5.2 Use

Example 3-13 shows a sample job for a **DIAGNOSE** command. In this example, we check the BCS component of catalog MHLRES.TEST.UCAT for structural errors, like the mismatch between the number of extension cells, and the counter of extension cells.

Example 3-13 DIAGNOSE BCS

```
//MHLRES3D  JOB   'JOE',NOTIFY=MHLRES3,
//          MSGCLASS=T
//*-------------------------------------------------------------------*
//DIAG      EXEC PGM=IDCAMS
//DD1       DD   DSN=MHLRES3.TEST.UCAT,DISP=SHR
//SYSPRINT  DD   SYSOUT=*
//SYSIN     DD   *
  DIAGNOSE ICFCATALOG -
      INFILE(DD1)
```

If DIAGNOSE detects a mismatch in the number of GDG extension cells, it issues the following message in the job log:

```
IDC31379I GDG BASE EXT CELL COUNT DOES NOT MATCH THE EXT CELLS COUNT
```

If the count of number of extension cells is 0, but there are extension cells, DIAGNOSE presents the following message in the job log:

```
IDC31379I  GDG BASE EXT CELL COUNT DOES NOT MATCH THE EXT CELLS COUNTV
```

Refer to the manual *z/OS DFSMS Managing Catalogs Version 2 Release 1*, SC23-6853 for more information about using the **DIAGNOSE** command.

3.5.3 Coexistence

There are no coexistence issues between the IDCAMS **DIAGNOSE** command on DFSMS V2.1 and z/OS 1.13 or earlier releases.

If you try to run the same **DIAGNOSE** command as shown in Example 3-13 on page 58 in a system with z/OS 1.13 or older releases of z/OS, it does not detect this type of mismatch between the number of GDG extension cells and the counter of GDG extension cells.

4

Virtual Storage Access Method enhancements

This chapter provides an overview of the features and functions that apply to Virtual Storage Access Method (VSAM), introduced in DFSMS V2.1.

We also provide an overview of the IBM System z® High-Performance FICON® (zHPF) support for EXCP, and the support for sequential extended format (SAM EF) Version 2 data sets.

In this chapter, we describe the enhancements that are available with DFSMS V2.1:

- VSAM RLS enhancements
- VSAM non-RLS enhancements
- DFSMS support for zHPF
- Sequential Extended Format Version 2

Several of the enhancements apply to VSAM RLS:

- VSAM RLS directory-only caching
- VSAM RLS Buffer Management Facility 64-bit enhancement
- VSAM RLS Dynamic Volume Count

These enhancements apply to VSAM access not in RLS mode:

- SHOWCB enhancements
- System-managed buffering enhancements

4.1 VSAM RLS enhancements

In this section, we look at the enhancements in DFSMS V2.1 that apply to VSAM RLS.

4.1.1 VSAM RLS directory-only caching

VSAM RLS uses one or more cache structures allocated in Coupling Facility images in the sysplex as a buffer shared between all systems in a sysplex. This buffer has VSAM data that has been accessed by one or more partitions in the sysplex.

RLS CF Cache Value before DFSMS V2.1

You can control the amount of data to be cached by each VSAM RLS data set by assigning them different SMS data classes with different values for the RLS CF Cache Value. These are the valid values for DFSMS releases before V2.1:

ALL	VSAM data and index components will be cached in the CF. This is the default value.
NONE	Only the index will be cached in the CF.
UPDATESONLY	Only write requests will be cached in the CF.

Some VSAM RLS customers need a way to continue to use the CF cache structures as a sysplex data sharing mechanism but without writing any actual data to the cache structure.

RLS CF Cache Value in DFSMS V2.1

In DFSMS V2.1, there is a new DIRONLY value for the RLS CF Cache specification in SMS data class that tells RLS to not cache any data or index CI in RLS cache structures.

DIRONLY indicates that RLS will not cache the data or index parts of the VSAM data set in the coupling facility cache structures. In this case, RLS uses the cache structures to keep track of data that resides in DASD and in the local buffer, but data or index CIs are not stored in the cache structure itself.

Installations that benefit from directory-only caching:

- Installations with limited coupling facility storage but still need to share VSAM data sets across a parallel sysplex. They are able to define small cache structures and use them only to maintain data consistency.
- Installations with single system sysplex configurations also benefit from this feature. These installations do not need to have their data sets stored in the cache structure because their local cache buffers contain valid data always since there are no other systems that update the VSAM data sets in RLS mode.
- Depending on their application's design and workload, some RLS users, including single system sysplex users, can also experience performance improvements when using directory-only cache. This is because RLS skips writing the data to XCF cache structure every time the data is updated.
- Installations that want to prevent applications that use VSAM RLS to fill the cache structures with data that does not need to be shared among z/OS images in the sysplex.

Use and invocation

You need to define a new SMS data class, or alter an existing one, to specify RLS CF Cache Value of D, as shown in Figure 4-1 on page 63. You must also modify your ACS routines to assign new VSAM data sets to this data class accordingly.

```
Panel  Utilities  Scroll  Help
------------------------------------------------------------------------------
                              DATA CLASS DEFINE                 Page 6 of 6
Command ===>

SCDS Name . . . : SYS1.SMS.V2R1.SCDS
Data Class Name : DCRLSNC

To DEFINE Data Class, Specify:
  Shareoptions Xregion  . . .      (1 to 4 or blank)
               Xsystem  . . .      (3, 4 or blank)
  Reuse . . . . . . . . . . . N    (Y or N)
  Initial Load  . . . . . . . R    (S, R or blank)
  BWO . . . . . . . . . . . .      (TC, TI, NO or blank)
  Log . . . . . . . . . . . .      (N, U, A or blank)
  Logstream Id  . . . . . . .
  FRlog . . . . . . . . . . .      (A, N, R, U or blank)
  RLS CF Cache Value  . . . . D    (A, N, U or D)
  RLS Above the 2-GB Bar  . . N    (Y or N)
  Extent Constraint Removal   N    (Y or N)
  CA Reclaim  . . . . . . . . Y    (Y or N)
  Log Replicate . . . . . . . N    (Y or N)
Use ENTER to perform Verification; Use UP Command to View previous Panel;
Use HELP Command for Help; Use END Command to Save and Exit; CANCEL to Exit
```

Figure 4-1 DIRONLY Define and Alter data class

Migration and coexistence consideration

Systems before z/OS V2.1 are not able to open VSAM RLS data sets that are created in z/OS V2.1 with an RLS CF Cache Value of DIRONLY.

We tried to run job MHRES3U in a z/OS V1.13 partition in our sysplex. This job runs a program that does updates to a VSAM RLS data set named MHLRES3.DIRONLY.KSDS. This data set was defined in a z/OS V2.1 partition, with a Data Class that has DIRONLY defined as RLS CF Cache Value. We received the error message in Example 4-1 when our program tried to open the data set.

Example 4-1 Error message on a pre-DFSMS V2.1 system

```
IEC161I 132-0814,MHLRES3U,UPDDIR,VSAM,,,MHLRES3.DIRONLY.KSDS
   where ccc = 814 - RLS Directory Only Cache
```

4.1.2 VSAM RLS Buffer Management Facility 64-bit enhancements

VSAM RLS customers have been able to take advantage of 64-bit storage for RLS buffering in a system in the sysplex. You can specify the amount of storage above the 2 GB bar that a system is going to use as a local buffer by specifying RlsAboveTheBarMaxPoolSize in the IGDSMSxx parmlib member, as shown in Example 4-2.

Example 4-2 Sample IGDSMSxx parmlib RlsAboveTheBarMaxPoolSize

```
[RlsAboveTheBarMaxPoolSize{( sysname, maxrls; ...)|(ALL,maxrls}]
```

You can specify a different above the bar amount for each system in the sysplex, or specify the same value for all the systems in the sysplex.

You also must tell VSAM RLS that a data set is eligible for buffers that are allocated in the 64-bit storage by assigning them an SMS data class construct with RLS above the 2 GB bar specified as shown in Example 4-3.

Example 4-3 RLS above the 2 GB bar parameter

```
RLS Above the 2-GB Bar . . . : YES
```

As many users have increased the use of 64-bit buffers, the number of control blocks needed to support these additional buffers has increased also. The problem is that these control blocks resided in the limited storage space of SMSVSAM data space, competing for space with VSAM data allocated in the 31-bit buffers.

In DFSMS V2.1, some RLS-related control blocks were moved from the VSAM data space into 64-bit storage. This brings RLS users two benefits:

- Relieve some space for the local 31-bit buffers.
- May improve performance when processing a large amount of VSAM RLS data because SMSVSAM can reduce the premature flushing of the 31-bit buffers due to aging algorithms.

4.1.3 VSAM RLS Dynamic Volume Count

Dynamic Volume Count (DVC) provides the capability to dynamically add volumes to an SMS-managed data set, for both VSAM and non-VSAM formats, when a data set extends.

During define processing, Dynamic Volume Count allows for a larger number of volumes to be considered without increasing the number of candidate volumes stored in the catalog. During existing data set allocation, it provides a way to increase the number of TIOT/JFCB entries that are created, so that more volumes can be dynamically allocated as required. This occurs as part of EOV processing to extend to a new volume, during the lifetime of the allocation.

During extend to a new volume, SMS checks whether the data set has a candidate volume entry in the catalog. If there is no candidate volume entry for the data set, and the number of volumes for the data set is less than the Dynamic Volume Count value, SMS adds a candidate volume entry using the ALTER ADDVOLUME interface to the catalog for the selected volume. Thus, the user application does not need to close the data set and perform ALTER ADDVOLUME to increase the volume count.

DFSMS V2.1 allows you now to specify and effectively use DVC for VSAM data sets in RLS mode. This prevents space-related abends when VSAM data sets need to grow while they are in RLS mode.

Usage

In order for your VSAM RLS data sets to take advantage of DVC, you must assign them an SMS data class with the following attributes:

- Space Constraint Relief = Y
- Dynamic Volume Count = x, where x represents a value 1 - 59.

Figure 4-2 on page 65 shows the new attributes in the ISMF Data Class Alter panel.

```
                            DATA CLASS ALTER                Page 2 of 6
Command ===>

SCDS Name . . . : SYS1.SMS.V2R1.SCDS
Data Class Name : DCRLSNC

To ALTER Data Class, Specify:

  Data Set Name Type  . . . . .        (EXT, HFS, LIB, PDS, Large or blank)
    If Ext  . . . . . . . . . .        (P, R or blank)
    Extended Addressability . . N      (Y or N)
    Record Access Bias  . . . .        (S, U, DO, DW, SO, SW or blank)
    RMODE31 . . . . . . . . . .        (ALL, BUFF, CB, NONE or blank)
  Space Constraint Relief . . . Y      (Y or N)
    Reduce Space Up To (%)  . . 0      (0 to 99 or blank)
    Dynamic Volume Count  . . . 20     (1 to 59 or blank)
  System Managed Buffering  . .            (1K to 2048M or blank)
```

Figure 4-2 Dynamic Volume Count specification

Migration and coexistence

Earlier systems in the sysplex are not able to extend the data set without this enhancement. However, when the data set is extended by Dynamic Volume Count on systems with DFSMS V2.1 or higher, the earlier system is able to recognize and use the new volume.

4.2 VSAM non-RLS enhancements

In this section, we look at the enhancements in DFSMS V2.1 that apply to VSAM non-RLS access.

4.2.1 VSAM SHOWCB buffer option

You can use the **SHOWCB** macro to cause VSAM to move the contents of various fields in an access method control block (ACB), an exit list, or a request parameter list to a work area inside your program. For example, you can use this area to identify an error and print a message, or to keep statistic information about the VSAM data set, like the number of buffers being used for the data and index I/Os.

The **SHOWCB** macro is enhanced in DFSMS V2.1 to include two new fields that you can use to verify buffer utilization for a VSAM data set:

BUFNOL Number of I/O buffers allocated for the data component or index component during BLDVRP or system-managed buffering (SMB) for LSR processing.

BUFUSE Allows you to query the number of buffers in the LSR or NSR buffer pool that are currently being used.

This information can be helpful for deciding about changing the size of an LSR buffer pool.

Both fields return a value of 0, if you open your VSAM data set in RLS mode.

Use

Example 4-4 is an example of how you can code a **SHOWCB** macro on your application program to get the values of BUFNOL and BUFUSE.

Example 4-4 SHOWCB example

```
SHOW     SHOWCB   ACB=CONTROL,                    x
                     AREA=DISPLAY,                x
                     FIELDS=(BUFNOL,              x
                     BUFUSE),                     x
                     LENGTH=8

DISPLAY  DS       OF
BUFNOL   DS       F
BUFUSE   DS       F
RKP      DS       F
```

The following SHOWCB parameters were used in this example:

ACB Specifies the address of the ACB (CONTROL in our example) for the data set that we need to see the buffer values.

AREA Specifies the area where SHOWCB should store the FIELDS that we are asking for. We can externalize the information in AREA by using it in a WTO instruction, or recording it in a separate data set, for further analysis.

FIELDS Specifies what type of information we want to extract. In our case, the BUFNOL and BUFUSE values.

LENGTH Specifies 8 bytes, as both BUFNOL and BUFUSE are 4 bytes in size.

For more information about the **SHOWCB** macro, refer to the manual *z/OS DFSMS Macro Instructions for Data Sets Version 2 Release 1*, SC23-6852.

4.2.2 VSAM SMB specification in SMS data class

VSAM supports the use of SMB for VSAM data sets for batch processing. Before DFSMS V2.1, you can provide SMB access bias (ACCBIAS) and RMODE31 specifications in JCL, but not at a system level. If you need to change any of these options for a group of VSAM data sets, potentially you need to scan hundreds of JCL DD AMP to change them.

Now in DFSMS V2.1, you can specify ACCBIAS and RMODE31 values in SMS data classes that you can assign to your VSAM data sets as you need.

Use

You can let VSAM manage buffering by using the following specifications in an SMS data class (refer to Figure 4-3 on page 68):

- Data Set Name Type EXT

  The VSAM data set must be defined with the extend format attribute in order to be eligible for SMB.

- Record Access Bias

  Specifies whether to let VSAM determine how many and which type of buffers to use when accessing VSAM extended format data sets by batch processing. This is known as

system-managed buffering, and is available to VSAM data sets in any record organization that are allocated in the extended format. The values that you can use for Record Access Bias are the same that you can specify in JCL AMP statements:

- S (System)

  Specifies VSAM to use SMB, determining the buffer algorithms based on the ACB MACRF macro and storage class specification.

- U (User)

  Tells VSAM to obtain buffers the same way as if without SMB. This is the default value.

- DO

  Uses SMB with direct access optimization.

- DW

  SMB weighted for direct processing.

- SO

  SMB with sequential optimization.

- SW

  SMB weighted for sequential processing.

- RMODE31

  Specifies whether for VSAM to allocate the buffers and control blocks in 31-bit addressable storage. You can use this field independently of SMB. With SMB, the default location is in 31-bit addressable storage (above the 16-megabyte line). Without SMB, the default is in 24-bit addressable storage (below the line).

  The following values can be specified for RMODE31 in data class:

  - ALL

    All buffers and control blocks reside above the line.

  - BUFFER

    Only buffers reside above the line.

  - CB

    Only control blocks reside above the line.

  - NONE

    Buffers and control blocks reside below the line.

Using a data class definition, you can modify these Record Access Bias and RMODE 31 values without having to edit individual JCL statements, and the modification is no longer limited to one single job step. See Figure 4-3 on page 68.

```
                              DATA CLASS ALTER                Page 2 of 6
Command ===>

SCDS Name . . . : SYS1.SMS.V2R1.SCDS
Data Class Name : DCRLSNC

To ALTER Data Class, Specify:

  Data Set Name Type  . . . . . EXT    (EXT, HFS, LIB, PDS, Large or blank)
    If Ext  . . . . . . . . . . R      (P, R or blank)
    Extended Addressability . . N      (Y or N)
    Record Access Bias  . . . . S      (S, U, DO, DW, SO, SW or blank)
    RMODE31 . . . . . . . . . . ALL    (ALL, BUFF, CB, NONE or blank)
  Space Constraint Relief . . . Y      (Y or N)
    Reduce Space Up To (%)  . . 0      (0 to 99 or blank)
    Dynamic Volume Count  . . . 20     (1 to 59 or blank)
  System Managed Buffering  . .            (1K to 2048M or blank)
```

Figure 4-3 Record Access Bias and RMODE31 specifications in data class

Migration and coexistence

The **AMP** parameter specifications in JCL override Record Access Bias and RMODE31 specifications in SMS data class. You can code data classes and ACS routines according to your needs, and modify or leave the JCL specifications as they are now if you are happy with them.

4.2.3 Specifying eligibility for VSAM replication

DFSMS V2.1 provides a method to identify VSAM data sets that are eligible for replication. You can use a new data set attribute, LOGREPLICATE, to identify each VSAM data set that is eligible for replication. You can specify it in IDCAMS **DEFINE** or **ALTER** command, or in an SMS data class construct that you assign to the data set.

The VSAM replication in itself is performed by IBM InfoSphere® Classic Replication Server for VSAM that is the VSAM feature for the IBM InfoSphere Classic Replication Server for z/OS product suite. Refer to Figure 4-4 on page 69. In that figure, we have a site where the production workload is running and a standby site. The standby does not run any production workload normally, but it has standby z/OS instances and subsystems already up and waiting for work. These sites can be thousands of miles apart from each other.

CICS on the production site performs reads, writes, deletes, and updates records in VSAM data sets residing on the same site. Those operations that modify the contents of the VSAM data sets are recorded in one or more logstreams in the production site.

The capture engine of IBM InfoSphere Classic Replication Server for VSAM captures those updates made to the logstreams, and sends them, through a TCP/IP connection, to the standby site.

At the standby site, the apply engine receives the updates that are sent from the production site and applies them to VSAM data sets residing at the standby site.

In case we have a disaster on our production site, the production workload can be routed to the standby site.

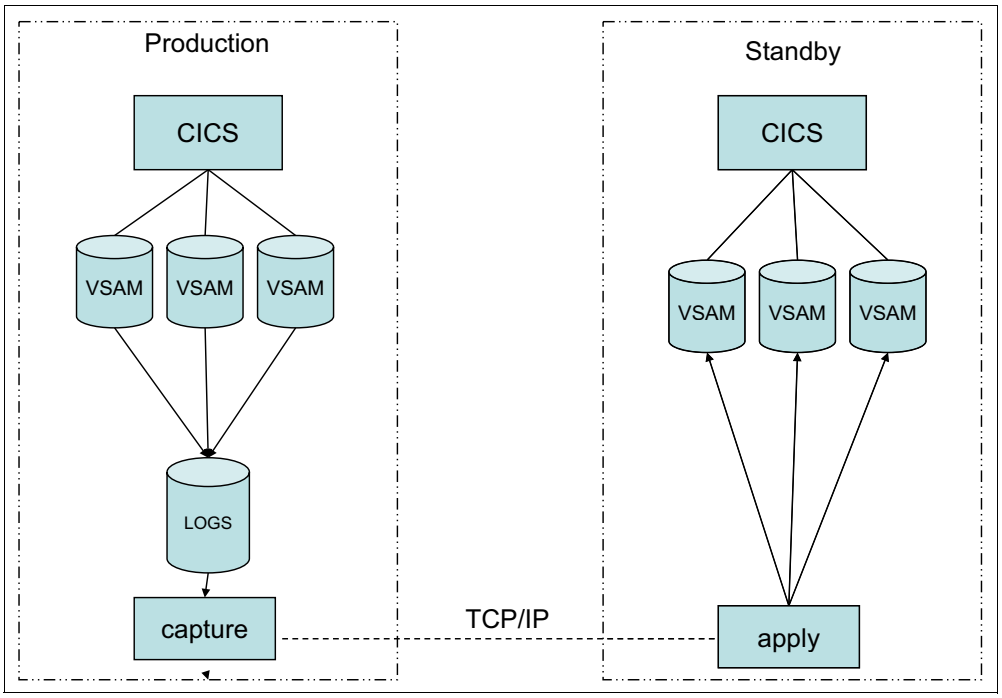

Figure 4-4 VSAM replication as performed by IBM InfoSphere Classic Replication Server for VSAM

This model environment is called Active-Standby. The implementation of this Active-Standby model allows production workload to run in only one site.

Use

You can specify the LOGREPLICATE attribute by specifying LOGREPLICATE in an IDCAMS **DEFINE** or **ALTER** command. The default of IDCAMS **DEFINE** command is NOLOGREPLICATE. Example 4-5 shows a sample job for a DEFINE of a VSAM KSDS data set with LOGREPLICATE attribute. This attribute tells VSAM that this data set is eligible for VSAM replication, and that updates made to this data set will be reflected in the replication logs pointed out by the **LOGSTREAMID** parameter.

Example 4-5 DEFINE of a VSAM KSDS data set with LOGREPLICATE attribute

```
//MHLRES3D  JOB   'JOE',NOTIFY=MHLRES3,
//          MSGCLASS=T
//DEF       EXEC PGM=IDCAMS
//SYSPRINT  DD SYSOUT=*
//SYSIN     DD  *
  DEFINE CLUSTER(NAME(MHLRES3.VSAMREP.KSDS) -
      KEYS(8,0) RECORDSIZE(300 300) SPEED    -
      FREESPACE(15 15) -
      SHAREOPTIONS(3 3) -
      DATACLASS(DCEXTSEQ) -
      STORAGECLASS(SCRLS)   -
      RECORDS(1000000 100000) -
      LOGREPLICATE  -
      LOGSTREAMID(LOGA) -
      VOLUMES(VOL1 VOL2))        -
      DATA(CONTROLINTERVALSIZE(4096))
/*
```

As an alternative, you can also assign an SMS data class with Log Replicate Y. Figure 4-5 shows an example of a data class construct that we called DCVSAMRE, with both Log Replicate Y and Logstream Id specified.

```
DATA CLASS DEFINE                 Page 6 of 6
Command ===>

SCDS Name . . . : SYS1.SMS.MHLRES3.SCDS
Data Class Name : DCVSAMRE

To DEFINE Data Class, Specify:
  Shareoptions Xregion  . . . 3    (1 to 4 or blank)
               Xsystem  . . . 3    (3, 4 or blank)
  Reuse . . . . . . . . . . . N    (Y or N)
  Initial Load  . . . . . . . R    (S, R or blank)
  BWO . . . . . . . . . . . .      (TC, TI, NO or blank)
  Log . . . . . . . . . . . .      (N, U, A or blank)
  Logstream Id  . . . . . . . LOGA
  FRlog . . . . . . . . . . .      (A, N, R, U or blank)
  RLS CF Cache Value  . . . . A    (A, N, U or D)
  RLS Above the 2-GB Bar  . . N    (Y or N)
  Extent Constraint Removal   N    (Y or N)
  CA Reclaim  . . . . . . . . Y    (Y or N)
  Log Replicate . . . . . . . Y    (Y or N)
Use ENTER to perform Verification; Use UP Command to View previous Panel;
Use HELP Command for Help; Use END Command to Save and Exit; CANCEL to Exit
```

Figure 4-5 Log Replicate Y

You can modify the LOGREPLICATE of an existing VSAM data set by using IDCAMS ALTER. Example 4-6 shows a sample job to assign the attribute LOGREPLICATE to the existing MHLRES3.VSAMR1.KSDS data set.

Example 4-6 ALTER LOGREPLICATE attribute

```
//MHLRES3A JOB (999,POK),'MHLRES3',CLASS=A,MSGCLASS=T,
// NOTIFY=&SYSUID,TIME=1440,REGION=6M
//ALTER   EXEC PGM=IDCAMS,REGION=512K
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  *
  ALTER MHLRES3.VSAMR1.KSDS -
  LOGREPLICATE -
  LOGSTREAMID(LOGA) /*
```

If you assign a LOGREPLICATE attribute to a VSAM data set, you must also assign the LOGSTREAMID to it, where updates to the VSAM data set are going to be logged.

Figure 4-6 on page 71 shows the RLSDATA portion of a **LISTCAT ENTRIES ALL IDCAMS** command where you see the LOGREPLICATE attribute, and the LOGSTREAMID also.

```
RLSDATA
 LOG ----------------(NULL)   RECOVERY REQUIRED --(NO)     FRLOG ------------(NULL)
 VSAM QUIESCED -------(NO)    RLS IN USE ---------(NO)     LOGREPLICATE------------(YES)
 LOGSTREAMID--------------------------------LOGA
 RECOVERY TIMESTAMP LOCAL-----X'0000000000000000'
 RECOVERY TIMESTAMP GMT-------X'0000000000000000
```

Figure 4-6 LISTCAT ENTRIES showing LOGREPLICATE

Coexistence

Support for the VSAM replication is also routed to z/OS V1.13, through a list of APARs. You must apply the program temporary fixes (PTFs) for the following APARs in order to be ready for VSAM replication support:

- OA38198 (Catalog)
- OA38200 (DFSMShsm)
- OA38201 (IDCAMS)
- OA38202 (RLS)
- OA38203 (SMS)
- OA38204 (ISMF)
- OA38205 (NaviQuest)
- OA38209 (VSAM)
- OA38210 (DFSMSdss)
- OA38211 (RLS)
- OA38550 (FAMS)

4.3 DFSMS support for zHPF

IBM System z High Performance FICON (zHPF) is an enhancement to the Fibre Channel connection (FICON) protocol. It reduces the number of information units exchanged between a channel and the controller during an I/O operation. Sending small blocks of data over FICON involves additional handshaking between the channel engine and the FICON adapter in the control unit. zHPF has reduced the processor usage of this process. zHPF allows the collapsing of command chains and data-chained channel command word (CCW) strings into a single command called the transport control word (TCW). This configuration provides a substantial performance improvement in data transfer, especially in online environments.

The initial support for zHPF, provided in z/OS v1.11, was for data sets accessed through the DFSMS data manager compoment, including VSAM data sets.

z/OS V1.13 added support for QSAM, BSAM, and BPAM and allowed EXCPVR callers to use zHPF channel programs.

DFSMS V2.1 extends zHPF support to EXCP callers. We expect to achieve significant I/O performance improvements for programs using EXCP. This support is also provided for z/OS V1.12 and z/OS V1.13 through the APAR OA38185.

4.3.1 zHPF requirements

These are the prerequisites for implementing zHPF in a z/OS system:

- Systems zEC12, z114, z196, IBM z10™, or newer processors.

- FICON Express8S cards on the host provide the most benefit, but older cards are also supported. The old FICON Express adapters are not supported.
- In order to have the EXCP support for zHPF, your system must at least be at z/OS V1.12 with PTF for APAR OA38185 applied. In DFSMS V2.1 support is on the base code.
- DS8700, DS8800, DS8870, or newer disk subsystems. These disk subsystems must have the zHPF Licensed Feature Key activated.

zHPF is transparent to applications. However, z/OS configuration changes are required. Hardware configuration definition (HCD) must have channel-path identifier (CHPID) type FC defined for all the CHPIDs that are defined to the disk control units, which also support zHPF.

For z/OS, you must set ZHPF=YES in IECIOSxx in SYS1.PARMLIB or issue the SETIOS ZHPF=YES command. ZHPF=NO is the default setting. We suggest you use the ZHPF=YES setting after the required configuration changes and prerequisites are implemented.

4.4 Sequential Extended Format Version 2

In previous z/OS releases, before z/OS V2.1, DFSMSdss is not able to use ESS or IBM DS8000® FlashCopy function in order to copy or move a single striped extend format sequential data set. This happens because each block has as a suffix, a block number that delimits the boundaries of the data set in a disk volume. FlashCopy cannot adjust those boundaries.

If you try to copy a sequential extended format (SAM EF) data set using DFSMSdss COPY function with the CONCURRENT(REQUIRED), the COPY succeeds, but without invoking the FlashCopy function. You will see a message like Example 4-7 in the COPY job log.

Example 4-7 Error message FlashCopy is not invoked

```
ADR918I (001)-AMOVE(08), FAST REPLICATION COULD NOT BE USED FOR DATA SET
MHLRES3.SAM.TEST, RETURN CODE 12
```

Similarly, DFSMSdss is not able to call FlashCopy if the source data set is a single volume single striped SAM EF data set, but the target requires a multivolume allocation.

DFSMS V2.1 introduces a new format for extended format data sets: Format 2, also referred as Version 2 format in some publications. This new format does not have the volume boundary awareness on sequential extended format data sets.

4.4.1 Use

In this section, we describe the steps you need to take in order to take advantage of the new Format 2 enhancement.

There is a new parameter PS_EXT_FORMAT(1|2)in IGDSMSxx PARMLIB member that tells the format in which the system should create extended format data sets:

- PS_EXT_FORMAT(1) is the default value that tells the system to create the extended format in the old format.
- PS_EXT_FORMAT(2) tells the system to create any new extended format data set in the new format. The associated catalog entry indicates whether the data set is version 1 or version 2. The data set version will be displayed via IDCAMS LISTCAT and DCOLLECT.

Figure 4-7 is a sample portion of a **LISTCAT IDCAMS** command issued against a version 2 extended format single stripe data set.

```
 ---------0
        VOLSER-----------------*     DEVTYPE------X'00000000'
FSEQN---------
---------0
        VOLSER-----------------*     DEVTYPE------X'00000000'
FSEQN---------
---------0
        VOLSER-----------------*     DEVTYPE------X'00000000'
FSEQN---------
---------0
      ASSOCIATIONS--------(NULL)
      ATTRIBUTES
        VERSION-NUMBER---------2
        STRIPE-COUNT-----------1
        EXTENDED
 ***
```

Figure 4-7 LISCAT sample

You can also issue the **SETSMS PS_EXT_VERSION(2)** command to active Version 2 extended data sets creation from the z/OS console.

The **D SMS,OPTIONS** command shows you what version your system is creating new extended format data sets.

Even if your system is set up to only create old version 1 extended format data sets by default, you can create Format 2 extended format data sets by explicitly coding DSNTYPE=(EXTREQ,2). An example is shown in Example 4-8. In this example, we create a new sequential data set, requesting it to be in Version 2 extend format, by specifying DSNTYPE=(EXTREQ,2) in the DD card.

For dynamic allocations, you can request the data set to be created in Version 2 format by specifying DALDSNV in the DYNALLOC macro. For more information about the DYNALLOC macro, refer to the publication *z/OS MVS Programming: Authorized Assembler Services Guide Version 2 Release 1*, SA23-1371.

Example 4-8 Requesting Version 2 format

```
//MHLRES3I  JOB   'JOE',NOTIFY=MHLRES3,
//          COND=((8,EQ),(12,EQ),(16,EQ),(888,EQ)),
//          MSGCLASS=T,REGION=32M
//*-------------------------------------------------------
//IEF       EXEC PGM=IEFBR14
//I         DD   DSN=MHLRES3.SAM.TEST,DISP=(,CATLG),
//          SPACE=(TRK,(30,3),RLSE),UNIT=3390,
//          DCB=(RECFM=FB,LRECL=300,BLKSIZE=27900),
//          DATACLAS=DCEXTSEQ,STORCLAS=SCSDR0,
//          DSNTYPE=(EXTREQ,2)
```

We only specified DCEXTSEQ data class in order to get its volume count, instead of specifying several candidate volumes in JCL.

When Sustained Data Rate (MBps) in a Storage Class construct is 0 or blank, the system creates new extended format data sets with only a single stripe. Refer to Figure 4-8.

The Accessibility C (CONTINUOUS) field in the Storage Class Alter panel tells the system to allocate and extend a data set in only one disk subsystem that is capable of doing point-in-time copies. FlashCopy is the function that allows point-in-time copies in a DS8000 disk subsystem.

```
                              STORAGE CLASS ALTER            Page 1 of 2
Command ===>

SCDS Name . . . . . : SYS1.SMS.MHLRES3.SCDS
Storage Class Name  : SCSDRO
To ALTER Storage Class, Specify:
  Description ==> STORCLASS FOR ALLOCATING A SAM DATA SET SINGLE STRIPE FOR
              ==> FC TESTING
  Performance Objectives
   Direct Millisecond Response . . . .            (1 to 999 or blank)
   Direct Bias . . . . . .            (R, W or blank)
   Sequential Millisecond Response . .            (1 to 999 or blank)
   Sequential Bias . . . . . .            (R, W or blank)
   Initial Access Response Seconds . .            (0 to 9999 or blank)
   Sustained Data Rate (MB/sec)  . . . 0          (0 to 999 or blank)
   OAM Sublevel  . . . . . .            (1, 2 or blank)
  Availability . . . . . . . . . . . . N          (C, P ,S or N)
  Accessibility  . . . . . . . . . . . C          (C, P ,S or N)
   Backup  . . . . . .            (Y, N or Blank)
   Versioning  . . . . . .            (Y, N or Blank)
Use ENTER to Perform Verification; Use DOWN Command to View next Page;
Use HELP Command for Help; Use END Command to Save and Exit; CANCEL to Exit.
```

Figure 4-8 Storage Class with Accessibility Continuous

After loading MHLRES.SAM.TEST data set with test data, we submitted the job shown in Example 4-9 to test FlashCopy usage.

Example 4-9 DFSMSdss COPY EXAMPLE

```
//MHLRES3C  JOB   'JOE',NOTIFY=MHLRES3,
//          MSGCLASS=T,REGION=32M,CLASS=A
//*-------------------------------------------------------------------*
//STEP1    EXEC  PGM=ADRDSSU
//SYSPRINT DD    SYSOUT=*
//SYSIN    DD    *
 COPY -
 DATASET( INCLUDE( MHLRES3.SAM.TEST)) -
 RENAMEUNCONDITIONAL((MHLRES3.SAM.TEST,MHLRES3.SAM.FLASH)) -
 CONCURRENT(REQUIRED) -
 DEBUG(FRMSG(DETAILED),SMSMSG)
/*
```

CONCURRENT(REQUIRED) tells DFSMSdss to use virtual concurrent copy, by invoking hardware functions like FlashCopy to perform the copy of the data set.

The DEBUG(FRMSG(DETAILED),SMSMSG) is just a way to verify if your copy is working as you planned. You can remove them if you are not trying to identify errors during COPY processing:

- FRMSG(DETAILED) gives us details about the utilization of FlashCopy or SnapShot. You can use it to determine why some data sets are not being copied through fast replication techniques (FlashCopy or SnapShot).
- SMSMSG instructs DFSMSdss to display ACS WRITE statements to the job output.

Figure 4-9 shows a sample of messages that you see with DEBUG(FRMSG(DETAILED),SMSMSG) specified. Message ADR806I tells us that our data set MHLRES3.SAM.TEST was copied using a Fast Replication function (FlashCopy in our case).

```
ADR803I (001)-ACS  (01), SMS DIAGNOSTIC MESSAGES:
  IGD01008I STORCLAS NOT NULL. SET TO SCSDR0
ADR803I (001)-VDSS (01), SMS DIAGNOSTIC MESSAGES:
  IGD01010I SG ACS GETS CONTROL &ACSENVIR=ALLOC
  IGD01010I &STORCLAS = SCSDR0
  IGD17332I DATA SET MHLRES3.SAM.FLASH WAS
  ALLOCATED ON VOLUME(S) WHICH ARE ELIGIBLE FOR FAST REPLICATION.
  PREFERRED FAST REPLICATION WAS SPECIFIED BY THE CALLER.
ADR809I (001)-VDSS (01), ADDITIONAL DIAGNOSTIC DATA FOR PRECEDING MESSAGE:
                         SC=SCSDR0 MC=MCDB22 DC=DCEXTSEQ
                         REQPRI=0000087950KB  REQSEC=0000000003TRK REQVOLS=10
ADR711I (001)-NEWDS(01), DATA SET MHLRES3.SAM.TEST HAS BEEN ALLOCATED WITH NEWNAME
MHLRES3.SAM.FLASH USING STORCLAS SCSDR0,
                         DATACLAS DCEXTSEQ, AND MGMTCLAS MCDB22
ADR806I (001)-TOMI (01), DATA SET MHLRES3.SAM.TEST COPIED USING A FAST REPLICATION
FUNCTION
```

Figure 4-9 Fast Replication function (FlashCopy) was used to copy

4.4.2 Migration and coexistence

We suggest you not set Version 2 extended format data sets in your IGDSMSxx parmlib member, or by using a **SETSMS** command, until all your sharing and backup systems are at z/OS V2.1 level, or compatibility APARS have been applied to older systems. The following are the compatibility APARs that you should apply on z/OS V1.12 and V1.13:

- OA39551
- OA39869
- OA39871

After applying these APARs to z/OS V1.12 and z/OS V1.13 systems, you are able to read and do any other operation other than create a Version 2 extended format data set.

Issue reported on APAR OA43701

At the time of writing, there is an issue with multi-volume single striped SAM Extended Format Version 2 data sets that are allocated using the Guaranteed Space storage class attribute. If such a data set is opened for EXTEND or opened for OUTPUT or OUTIN when allocated DISP=MOD, the volume label on the second to last volume may be overwritten by application data.

If you have storage classes with the Guaranteed Space attribute, avoid implementing SAM Extended Format Version 2 before this APAR has PTFs ready for z/OS V2.1, V1.13, and also V1.12. You can do this by:

- Specify DSNTYPE=(EXT,1) or DSNTYPE=(EXT) on the JCL
- Specify EXT_VERSION(1) in IGDSMSxx parmlib member and do not specify DSNTYPE=(EXT,2) on the JCL.

If you have a volume with its label damaged by an occurrence of this issue, you can recover the volume by using the following procedure:

1. Vary the volume offline to all systems.
2. Run the ICKDSF job step in Example 4-10 to rebuild the volume label.

Example 4-10 ICKDSF job step to rebuild the volume label

```
//*********************************************************** */
//*  This step rebuilds CYL 0 HEAD 0 to point to VTOC       */
//*  Change the VOLID to the required volser, UNIT to device */
//*  number, and VTOCCPTR to the CYLINDER and HEAD where the */
//*  VTOC is                                                */
//*********************************************************** */
//RFMT     EXEC  PGM=ICKDSF
//SYSPRINT DD SYSOUT=*
//SYSIN    DD  *
   REFORMAT UNIT(dddd) NVFY VTOCPTR(Cyl,Head) PURGE VOLID(vvvvvv)
/*
```

A successful vary online is a good indication that the volume label has been fixed.

5

PDSE enhancements

This chapter provides an overview of the features and function in PDSE included in z/OS V2.1. The following enhancements are described in this chapter:

- PDSE Version 2 scalability and usability
- PDSE member generation support
- Guaranteed PDSE data set format allocation
- PDSE larger member size
- Generation Data Group support

In addition, the **IEBCOPY** utility has been enhanced to provide improved support for PDS and PDSE data sets. This is documented in 7.1, “IEBCOPY COPYGROUP” on page 104.

5.1 PDSE Version 2 scalability and usability

z/OS V2.1 through DFSMS V2.1 provides Version 2 of PDSE data sets that can provide for improved performance, reduced path lengths, and improved index searches.

New data sets can be allocated in Version 2 format by specifying the new version on the **DSNTYPE** keyword on the JCL DD statement or on the TSO/E ALLOCATE statement, or through an option in the ISPF 3.2 panel.

There is also a new option PDSE_VERSION on the SYS1.PARMLIB member IGDSMSxx that makes all PDSE data sets created according to the PDSE_VERSION setting by default. If PDSE_VERSION is set, specific data sets can be created in the other format if necessary.

PDSE Version 1 and Version 2 formats are usable without changing access routines but a Version 2 PDSE can only be created using DFSMS V2.1 or later.

5.1.1 Compatibility

PDSE Version 2 data sets can be used on DFSMS V1.12 and DFSMS V1.13 provided the compatibility fixes are installed.

PDSE Version 2 data sets cannot be created on systems before DFSMS V2.1.

5.2 PDSE member generation support

PDSE members that are deleted or replaced cannot be retrieved. The function to retain and allow retrieval of old members is known as the PDSE member generation support.

The member generations support requires APAR OA42358. The text of APAR OA42358 as of the time of writing of this IBM Redbooks publication can be found in “APAR OA42846 Single striped, multi-volume sam tailored compressed data set” on page 272.

5.3 Guaranteed PDSE data set format allocation

Before DFSMS V2.1, specifying DSNTYPE=LIBRARY, or DSNTYPE=(LIBRARY,x) does not guarantee that a PDSE is going to be created. You would have to specify DSORG=PO, or specify directory blocks in the space in allocation in order for a PDSE to be created. Otherwise, a sequential data set is created instead.

If a data set is allocated using a referback to an existing data set that is not in PDSE format, attributes could be picked up that cause a PDS (or PS) data set to be allocated even though DSNTYPE=LIBRARY was specified.

Now in DFSMS V2.1, SMS provides a new parameter in IGDSMSxx parmlib member that directs SMS to create a PDSE when you specify DSNTYPE=LIBRARY or (LIBRARY,x) in JCL that is HONOR_DSNTYPE_PDSE. The syntax of the parameter is:

HONOR_DSNTYPE_PDSE(NO) NO is the default, and processing remains as in releases before DFSMSV2.1.

HONOR_DSNTYPE_PDSE(YES) Applies only when DSNTYPE=LIBRARY or DSNTYPE=(LIBRARY,x) is specified in the creation of

a new data set. z/OS creates a PDSE regardless of DSORG and directory blocks specification.

Alternatively, you can issue the **SETSMS HONOR_DSNTYPE_PDSE(YES)** z/OS console command to activate this enhancement.

You can confirm that HONOR_DSNTYPE_PDSE(YES) has been activated by looking at the output of the **D SMS,OPTIONS** command. Figure 5-1 shows a portion of the output of this command in a message IGD002I, where you can find the HONOR_DNSTYPE_PDSE information.

```
IGD002I 12:57:17 DISPLAY SMS
Rls_MaxCfFeatureLevel = Z
RlsAboveThebarMaxPoolSize = 0  RlsFixedPoolSize = 0
PDSE_MONITOR = (YES,0,0) PDSE1_MONITOR = (YES,0,0)
PDSE_DIRECTORY_STORAGE = 2000M PDSE1_DIRECTORY_STORAGE = 2000M
PDSE_BUFFER_BEYOND_CLOSE = NO   PDSE1_BUFFER_BEYOND_CLOSE = NO
GDS_RECLAIM = YES       DSSTIMEOUT = 0
BLOCKTOKENSIZE = NOREQUIRE       FAST_VOLSEL = ON
USEEAV = YES            BREAKPOINTVALUE = 21
OAMPROC =               SUPPRESS_DRMSGS = NO
OAMTASK =           PDSE_SYSEVENT_DONTSWAP = NO
DB2SSID =                SAM_USE_HPF = YES
CA_RECLAIM = DATACLAS
PS_EXT_VERSION = 1
SUPPRESS_SMSMSG = IGD17054I(NO ) IGD17227I(NO ) IGD17395I(NO )
HONOR_DSNTYPE_PDSE = YES  PDSE_VERSION = 1
```

Figure 5-1 D SMS,OPTIONS showing HONOR_DSNTYPE_PDSE = YES

5.3.1 Use

With this enhancement, you are able to allocate a PDSE when you specify DSNTYPE=LIBRARY or DSNTYPE=(LIBRARY,x) in JCL, whether DSORG or directory blocks is specified in space allocation. This simplifies the way you code your JCL.

Example 5-1 shows sample JCL with DSNTYPE=LIBRARY without DSORG specified. We did not specify directory blocks in our **SPACE** parameter.

Example 5-1 Sample allocation of a PDSE through IEFBR14

```
//MHLRES3I  JOB   'JOE',NOTIFY=MHLRES3,
//          MSGCLASS=T,REGION=32M
//IEF       EXEC PGM=IEFBR14
//I         DD   DSN=MHLRES3.PDSE.TEST2,DISP=(,CATLG),
//          SPACE=(TRK,(30,3),RLSE),UNIT=3390,VOL=SER=MLD201,
//          DCB=(RECFM=FB,LRECL=300,BLKSIZE=27900),
//          DATACLAS=DCEXTSEQ,STORCLAS=SCSDR0,
//          DSNTYPE=LIBRARY
```

The PDSE created is shown in Figure 5-2 on page 80.

```
 Data Set Information
Command ===>
                                                                More:     +
Data Set Name . . . . : MHLRES3.PDSE.TEST2

General Data                              Current Allocation
 Management class . . : MCDB22             Allocated tracks  . : 30
 Storage class  . . . : SCSDR0             Allocated extents . : 1
  Volume serial . . . : MLD231
  Device type . . . . : 3390
 Data class . . . . . : DCEXTSEQ          Current Utilization
  Organization  . . . : PO                  Used pages  . . . . : 5
  Record format . . . : FB                  % Utilized  . . . . : 1
  Record length . . . : 300
  Block size  . . . . : 27900
  1st extent tracks . : 30
  Secondary tracks  . : 3                 Dates
  Data set name type  : LIBRARY             Creation date . . . : 2013/10/01
  Data set version  . : 1                   Referenced date . . : 2013/10/01
                                            Expiration date . . : ***None***
```

Figure 5-2 HONOR_DSNTYPE_PDSE data set creation

5.3.2 Coexistence

Verify that you have APAR OA42239 (see Example A-4 on page 242) applied to your z/OS V2.1 systems before taking advantage of this enhancement. OA42239 fixes several DFSMS V2.1 problems, but in particular avoids allocating a PDSE if HONOR_DSNTYPE_PDSE is specified but the allocation request did not include DSNTYPE.

Systems with z/OS 1.13 or older releases of z/OS do not recognize the **HONOR_DSNTYPE_PDSE** parameter, and do not show it in the output of a **D SMS,OPTIONS** command.

Running the job in Example 5-1 on page 79 in a system with z/OS V1.13 or older creates a sequential data set, instead of a PDSE.

If you try to issue the **SETSMS HONOR_DSNTYPE_PDSE(YES)** command on a z/OS V1.13 system, you get the message in Figure 5-2 and the command does not take effect.

Example 5-2 Error message on a pre-DFSMS V2.1 system

```
IGD029I ERROR FOR SETSMS COMMAND
ERROR IS INVALID KEYWORD: HONOR_DSNTYPE_PDSE
```

If you specify the **HONOR_DSNTYPE_PDSE** parameter in a IGDSMSxx parmlib member, and try to activate it through the **SET SMS=xx** command from a z/OS V1.13 or earlier system, you get messages IGD030I and IGD074D, as shown in Figure 5-3 on page 81.

```
T SMS=T6
IEE252I MEMBER IGDSMST6 FOUND IN SYS1.PARMLIB
IGD030I SMS PARAMETER RECORD IN MEMBER IGDSMST6 HAS A SYNTAX ERROR 047
ERROR IS INVALID KEYWORD: HONOR_DSNTYPE_PDSE
052 IGD074D REPLY WITH SMS VALUE, 'KEYWORD(VALUE)', OR REPLY 'D' TO
DEFAULT, 'C' TO CANCEL, OR 'S' TO SAVE ALL SMS VALUES
```

Figure 5-3 Trying to activate HONOR_DSNTYPE_PDSE in a z/OS V1.13 system

5.4 PDSE larger member size

DFSMS V2.1 increases the PDSE member size to approximately 2,146,435,071 records. This is an increase from the previous limit of 15,728,639 records. This is lower than the limit for PDS data set member size.

The DFSMS V2.1 member size limit is higher than the limit for PDS members.

5.4.1 Compatibility

The larger PDSE member size limit is available on releases before DFSMS V2.1 provided that the appropriate compatibility fixes are installed.

5.5 Generation Data Group support

The system catalog support has been enhanced to allow creation of a PDSE format data set within a Generation Data Group (GDG). The PDSE can be Version 1 or Version 2.

In this section, we show several scenarios for creating a PDSE within a GDG.

5.5.1 Scenario 1: Define a Generation Data Group

In this scenario, we define a GDG. This is applicable for DFSMS V2.1 as well as prior releases. The GDG may be used for any type of data set that supports allocation in a GDG.

Example 5-3 shows an example of a job to create a GDG. Even though this scenario is to show examples of the allocation of PDSE data sets in a GDG, the presence of the qualifier PDSE in the name is not significant. This GDG could be used to allocate any data set format if the data set name starts with MHLRES2.GDG.PDSE.

Example 5-3 JCL to allocate a GDG for tests

```
//MHLRES2G JOB     99990000,MHLRES2,CLASS=T,NOTIFY=&SYSUID.
// EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
 DEFINE GDG(NAME(MHLRES2.GDG.PDSE) LIMIT(5)    )
```

5.5.2 Scenario 2: Define a PDSE version 1 in a GDG

In this scenario, we allocate a PDSE version 1 in a GDG set in a DFSMS V2.1 system.

In Example 5-4, we show the job to allocate a PDSE as a member of GDG MHLRES2.GDG.PDSE. The data set is allocated as a PDSE because of the DSNTYPE statement specifying LIBRARY. Specifically, a PDSE version 1 data set is wanted. The default setting on the running system is to allocate version 1 PDSE data set.

Example 5-4 JCL to allocate a PDSE data set as a member of a GDG

```
//MHLRES2G JOB (999,POK),'MHLRES2',CLASS=A,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=*
//S1      EXEC PGM=IEFBR14
//BIG1     DD  DSN=MHLRES2.GDG.PDSE(+1),DISP=(NEW,CATLG),
//             SPACE=(TRK,(02,200)),UNIT=3390,
//             DSORG=PO,LRECL=80,BLKSIZE=27920,DSNTYPE=(LIBRARY,1),
//             RECFM=FB
```

In Example 5-5, we show the messages resulting from the allocation of the PDSE as a member of GDG MHLRES2.GDG.PDS. There is no indication in the output that the data set is in version 1 format. The messages do show that the data set was allocated with the data set name MHLRES2.GDG.PDSE.G0002V00. The G0002V00 suffix confirms that a member of the GDG was allocated.

Example 5-5 Log output showing allocation messages

```
1 //MHLRES2G JOB (999,POK),'MHLRES2',CLASS=A,                          JOB13837
       //          NOTIFY=&SYSUID,TIME=1440,REGION=6M                  00002000
          IEFC653I SUBSTITUTION JCL -
(999,POK),'MHLRES2',CLASS=A,NOTIFY=MHLRES2,TIME=1440,REGION=6M
      2 /*JOBPARM L=999,SYSAFF=*                                        00003000
      3 //S1     EXEC PGM=IEFBR14                                       00004000
     4 //BIG1    DD  DSN=MHLRES2.GDG.PDSE(+1),DISP=(NEW,CATLG),          00005100
       //          SPACE=(TRK,(02,200)),UNIT=3390,                     00005213
      //         DSORG=PO,LRECL=80,BLKSIZE=27920,DSNTYPE=(LIBRARY,1),   000005313
        //           RECFM=FB                                          00005400
 STMT NO. MESSAGE
-
      4 IGD01010I SG ACS GETS CONTROL &ACSENVIR=ALLOC
      4 IGD01010I &STORCLAS = STANDARD
ICH70001I MHLRES2  LAST ACCESS AT 13:43:05 ON FRIDAY, SEPTEMBER 20, 2013
IEF236I ALLOC. FOR MHLRES2G S1
IGD101I SMS ALLOCATED TO DDNAME (BIG1    )
      DSN (MHLRES2.GDG.PDSE.G0002V00               )
      STORCLAS (STANDARD) MGMTCLAS (MCDB22) DATACLAS (      )
       VOL SER NOS= MLD42B
IEF142I MHLRES2G S1 - STEP WAS EXECUTED - COND CODE 0000
IGD107I MHLRES2.GDG.PDSE.G0002V00                    ROLLED IN, DDNAME=BIG1
```

The format of the data set can be checked using ISPF option 3.2.

In Example 5-6 on page 83, we show the output from ISPF 3.2. The data set version is shown in field Data set version. The fact that the data set is a PDSE is shown by the Data set name type being LIBRARY.

Example 5-6 ISPF listing of data set MHLRES2.GDG.PDSE.G0002V00

```
Data Set Information
Command ===>

Data Set Name  . . . : MHLRES2.GDG.PDSE.G0002V00

General Data                          Current Allocation
 Management class . . : MCDB22         Allocated tracks  . : 2
 Storage class  . . . : STANDARD       Allocated extents . : 1
  Volume serial . . . : MLD32E         Maximum dir. blocks : NOLIMIT
  Device type . . . . : 3390
 Data class . . . . . : **None**
  Organization  . . . : PO            Current Utilization
  Record format . . . : FB             Used pages  . . . . : 5
  Record length . . . : 80             % Utilized  . . . . : 20
  Block size  . . . . : 27920          Number of members . : 0
  1st extent tracks . : 2
  Secondary tracks  . : 200
  Data set name type  : LIBRARY       Dates
  Data set version  . : 1              Creation date . . . : 2013/09/20
                                       Referenced date . . : ***None***
                                       Expiration date . . : ***None***
```

5.5.3 Scenario 3: Define a PDSE Version 2 in a GDG

In this scenario, we allocate a PDSE Version 2 in a GDG set in DFSMS V2.1.

In Example 5-7, we show the JCL to allocate a PDSE using Version 2 format. The system default for PDSE allocation is Version 1. The DSNTYPE=(LIBRARY,2) is required to specify Version 2 format.

Example 5-7 JCL to allocate PDSE in Version 2 format

```
//MHLRES2G JOB (999,POK),'MHLRES2',CLASS=A,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=*
//S1      EXEC PGM=IEFBR14
//BIG1     DD  DSN=MHLRES2.GDG.PDSE(+1),DISP=(NEW,CATLG),
//             SPACE=(TRK,(02,200)),UNIT=3390,
//             DSORG=PO,LRECL=80,BLKSIZE=27920,DSNTYPE=(LIBRARY,2),
//             RECFM=FB
```

The job messages are essentially the same as in Example 5-5 on page 82.

In Example 5-8, we show that as a result of specifying DSNTYPE=(LIBRARY,2) the Data set version is set to 2.

Example 5-8 ISPF 3.2 listing of information about data set MHLRES2.GDG.PDSE.G0003V00

```
Data Set Information
Command ===>

Data Set Name  . . . : MHLRES2.GDG.PDSE.G0003V00
```

```
General Data                            Current Allocation
 Management class . . : MCDB22           Allocated tracks  . : 2
 Storage class  . . . : STANDARD         Allocated extents . : 1
  Volume serial . . . : MLD20C           Maximum dir. blocks : NOLIMIT
  Device type . . . . : 3390
 Data class . . . . . : **None**
  Organization  . . . : PO              Current Utilization
  Record format . . . : FB               Used pages  . . . . : 5
  Record length . . . : 80               % Utilized  . . . . : 20
  Block size  . . . . : 27920            Number of members . : 0
  1st extent tracks . : 2
  Secondary tracks  . : 200
  Data set name type  : LIBRARY         Dates
  Data set version  . : 2                Creation date . . . : 2013/09/20
                                         Referenced date . . : ***None***
                                         Expiration date . . : ***None***
```

5.5.4 Scenario 4: Access the PDSEs using DFSMS V1.13

In this scenario, we verify that PDSE data sets allocated in DFSMS V2.1, in Version 2 format and as a member of a GDG, can be accessed in DFSMS V1.13. This scenario requires that the necessary compatibility fixes are installed.

We accessed the following data sets using ISPF 3.2:

- MHLRES2.GDG.PDSE.G0002V00
- MHLRES2.GDG.PDSE.G0003V00

G0002V00 is Version 1 as shown in Example 5-6 on page 83, and G0003V00 is Version 2 as shown in Example 5-8 on page 83.

ISPF on releases before DFSMS V2.1, even with compatibility fixes installed, do not show the Data set version.

In Example 5-9, we show that the Data set version information is not present. If it had been shown, it would be after the Data set name type display.

Example 5-9 ISPF 3.2 listing of data set MHLRES2.GDG.PDSE.G000v00 using DFSMS V1.13

```
Data Set Information
Command ===>

Data Set Name  . . . : MHLRES2.GDG.PDSE.G0003V00

General Data                            Current Allocation
 Management class . . : MCDB22           Allocated tracks  . : 2
 Storage class  . . . : STANDARD         Allocated extents . : 1
  Volume serial . . . : MLD20C           Maximum dir. blocks : NOLIMIT
  Device type . . . . : 3390
 Data class . . . . . : **None**
  Organization  . . . : PO              Current Utilization
  Record format . . . : FB               Used pages  . . . . : 5
  Record length . . . : 80               % Utilized  . . . . : 20
  Block size  . . . . : 27920            Number of members . : 0
  1st extent tracks . : 2
```

```
  Secondary tracks  . : 200
  Data set name type  : LIBRARY       Dates
                                       Creation date . . . : 2013/09/20
                                       Referenced date . . : 2013/09/20
                                       Expiration date . . : ***None***
```

5.5.5 Scenario 5: Allocate a PDSE Version 1 in a GDG on DFSMS V1.13

In this scenario, we attempt to allocate a PDSE Version 1 in a GDG set on a DFSMS V1.13 system. In this scenario, the allocation should fail.

We ran the same JCL as shown in Example 5-7 on page 83 on DFSMS V1.13, and as expected the job failed. In Example 5-10, we show the messages resulting from running a job to allocate a PDSE to a GDG using DFSMS V1.13.

Example 5-10 Job messages showing catalog error when allocating PDSE to GDG on DFSMS V1.13

```
J E S 2  J O B  L O G  --  S Y S T E M  S C 6 3  --  N O D E

14.37.33 JOB13844 ---- FRIDAY,    20 SEP 2013 ----
14.37.33 JOB13844  IRR010I  USERID MHLRES2  IS ASSIGNED TO THIS JOB.
14.37.33 JOB13844  ICH70001I MHLRES2  LAST ACCESS AT 14:19:40 ON FRIDAY, SEPTEMB
14.37.33 JOB13844  $HASP373 MHLRES2G STARTED - INIT 1    - CLASS A - SYS SC63
14.37.33 JOB13844  IEF403I MHLRES2G - STARTED - TIME=14.37.33 - ASID=001E - SC63
14.37.33 JOB13844  -                                          --TIMINGS (MINS.)--
14.37.33 JOB13844  -JOBNAME  STEPNAME PROCSTEP    RC   EXCP    CPU    SRB  CLOCK
14.37.33 JOB13844  -MHLRES2G          S1       FLUSH      0    .00    .00    .00
14.37.33 JOB13844  IEF453I MHLRES2G - JOB FAILED - JCL ERROR - TIME=14.37.33
14.37.33 JOB13844  -MHLRES2G ENDED.  NAME-MHLRES2              TOTAL CPU TIME=
14.37.33 JOB13844  -NOT_EXECUTED_STEP_TABLE BEGIN
14.37.33 JOB13844  -JOBNAME  STEPNAME PROCSTEP STEPNO
14.37.33 JOB13844  -MHLRES2G          S1         1
14.37.33 JOB13844  -NOT_EXECUTED_STEP_TABLE END
14.37.33 JOB13844  $HASP395 MHLRES2G ENDED
------ JES2 JOB STATISTICS ------
  20 SEP 2013 JOB EXECUTION DATE
            8 CARDS READ
           55 SYSOUT PRINT RECORDS
            0 SYSOUT PUNCH RECORDS
            3 SYSOUT SPOOL KBYTES
         0.00 MINUTES EXECUTION TIME
        1 //MHLRES2G JOB (999,POK),'MHLRES2',CLASS=A,
          //             NOTIFY=&SYSUID,TIME=1440,REGION=6M
          /*JOBPARM L=999,SYSAFF=SC63
          IEFC653I SUBSTITUTION JCL - (999,POK),'MHLRES2',CLASS=A,NOTIFY=MHLRES2
        2 //S1      EXEC PGM=IEFBR14
        3 //BIG1     DD  DSN=MHLRES2.GDG.PDSE(+1),DISP=(NEW,CATLG),
          //             SPACE=(TRK,(02,200)),UNIT=3390,
          //             DSORG=PO,LRECL=80,BLKSIZE=27920,DSNTYPE=(LIBRARY,2),
          //             RECFM=FB
 STMT NO. MESSAGE
-
        3 IGD01010I SG ACS GETS CONTROL &ACSENVIR=ALLOC
        3 IGD01010I &STORCLAS = STANDARD
ICH70001I MHLRES2  LAST ACCESS AT 14:19:40 ON FRIDAY, SEPTEMBER 20, 2013
```

```
IEF344I MHLRES2G S1 BIG1 - ALLOCATION FAILED DUE TO DATA FACILITY SYSTEM ERROR
IGD17102I CATALOG ERROR IN DEFINING NONVSAM DATA SET
MHLRES2.GDG.PDSE.G0004V00
RETURN CODE IS 48 REASON CODE IS 152 IGGOCLEJ
IGD306I UNEXPECTED ERROR DURING IGGOCLEJ PROCESSING
RETURN CODE 48 REASON CODE 152
THE MODULE THAT DETECTED THE ERROR IS IGDVTSCU
SMS MODULE TRACE BACK - VTSCU VTSCT VTSCR SSIRT
SYMPTOM RECORD CREATED, PROBLEM ID IS IGD00013
IEF272I MHLRES2G S1 - STEP WAS NOT EXECUTED.
IEF373I STEP/S1      /START 2013263.1437
IEF032I STEP/S1      /STOP  2013263.1437
        CPU:     0 HR  00 MIN  00.00 SEC    SRB:     0 HR  00 MIN  00.00 SEC
        VIRT:     0K  SYS:     0K  EXT:        0K  SYS:        0K
IEF375I  JOB/MHLRES2G/START 2013263.1437
IEF033I  JOB/MHLRES2G/STOP  2013263.1437
        CPU:     0 HR  00 MIN  00.00 SEC    SRB:     0 HR  00 MIN  00.00 SEC
```

In Example 5-11, we show the JCL used to allocate a PDSE using DFSMS V1.13 and specifying DSNTYPE=(LIBRARY,2). PDSE Version 2 data sets cannot be *created* on releases before DFSMS V2.1, but they can be used on prior releases.

Example 5-11 JCL to create a PDSE Version 2 on DFSMS V2.1

```
//MHLRES2G JOB (999,POK),'MHLRES2',CLASS=A,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=SC63
//S1      EXEC PGM=IEFBR14
//BIG1     DD  DSN=MHLRES2.V2.PDSE,DISP=(NEW,CATLG),
//             SPACE=(TRK,(02,200)),UNIT=3390,
//             DSORG=PO,LRECL=80,BLKSIZE=27920,DSNTYPE=(LIBRARY,2),
//             RECFM=FB
```

In Example 5-12, we show the messages from the job allocating a PDSE using DSNTYPE=(LIBRARY,2).

Releases before DFSMS V2.1 do not allocate PDSE Version 2 format data sets, but the DSNTYPE=(LIBRARY,2) has been accepted, although the format will be Version 1.

Example 5-12 JOB messages resulting from allocating a PDSE on DFSMS V1.3 with LIBRARY,2

```
1 //MHLRES2G JOB (999,POK),'MHLRES2',CLASS=A,
          //             NOTIFY=&SYSUID,TIME=1440,REGION=6M
          /*JOBPARM L=999,SYSAFF=SC63
          IEFC653I SUBSTITUTION JCL - (999,POK),'MHLRES2',CLASS=A,NOTIFY=MHLRES2
        2 //S1      EXEC PGM=IEFBR14
        3 //BIG1     DD  DSN=MHLRES2.V2.PDSE,DISP=(NEW,CATLG),
          //             SPACE=(TRK,(02,200)),UNIT=3390,
          //             DSORG=PO,LRECL=80,BLKSIZE=27920,DSNTYPE=(LIBRARY,2),
          //             RECFM=FB
STMT NO. MESSAGE

        3 IGD01010I SG ACS GETS CONTROL &ACSENVIR=ALLOC
        3 IGD01010I &STORCLAS = STANDARD
CH70001I MHLRES2  LAST ACCESS AT 14:37:33 ON FRIDAY, SEPTEMBER 20, 2013
EF236I ALLOC. FOR MHLRES2G S1
```

```
GD101I SMS ALLOCATED TO DDNAME (BIG1    )
       DSN (MHLRES2.V2.PDSE                              )
       STORCLAS (STANDARD) MGMTCLAS (MCDB22) DATACLAS (        )
       VOL SER NOS= MLDB35
          //             RECFM=FB
 STMT NO. MESSAGE
-
        3 IGD01010I SG ACS GETS CONTROL &ACSENVIR=ALLOC
        3 IGD01010I &STORCLAS = STANDARD
ICH70001I MHLRES2  LAST ACCESS AT 14:37:33 ON FRIDAY, SEPTEMBER 20, 2013
IEF236I ALLOC. FOR MHLRES2G S1
IGD101I SMS ALLOCATED TO DDNAME (BIG1    )
        DSN (MHLRES2.V2.PDSE                              )
        STORCLAS (STANDARD) MGMTCLAS (MCDB22) DATACLAS (        )
        VOL SER NOS= MLDB35
IEF142I MHLRES2G S1 - STEP WAS EXECUTED - COND CODE 0000
IGD104I MHLRES2.V2.PDSE                                RETAINED,  DDNAME=BIG1
IEF373I STEP/S1      /START 2013263.1440
IEF032I STEP/S1      /STOP  2013263.1440
        CPU:     0 HR  00 MIN  00.00 SEC    SRB:     0 HR  00 MIN  00.00 SEC
        VIRT:     4K  SYS:   288K  EXT:        0K  SYS:    10636K
IEF375I  JOB/MHLRES2G/START 2013263.1440
IEF033I  JOB/MHLRES2G/STOP  2013263.1440
```

In Example 5-13, we show that even though DSNTYPE=(LIBRARY,2) was specified when allocating the data set on DFSMS V1.13, the data set was allocated as Version 1 because only Version 1 data sets can be allocated before DFSMS V2.1.

Example 5-13 ISPF 3.2 listing showing Version 2 data set allocated on DFSMS V1.13 is Version 1

```
Data Set Information
 Command ===>

 Data Set Name  . . . : MHLRES2.V2.PDSE

 General Data                          Current Allocation
  Management class . . : MCDB22         Allocated tracks  . : 2
  Storage class  . . . : STANDARD       Allocated extents . : 1
   Volume serial . . . : MLDB35         Maximum dir. blocks : NOLIMIT
   Device type . . . . : 3390
  Data class . . . . . : **None**
   Organization  . . . : PO            Current Utilization
   Record format . . . : FB             Used pages  . . . . : 5
   Record length . . . : 80             % Utilized  . . . . : 20
   Block size  . . . . : 27920          Number of members . : 0
   1st extent tracks . : 2
   Secondary tracks  . : 200
   Data set name type  : LIBRARY       Dates
   Data set version  . : 1              Creation date . . . : 2013/09/20
                                        Referenced date . . : ***None***
                                        Expiration date . . : ***None***
```

To demonstrate that PDSE Version 2 data sets created on DFSMS V2.1 can be accessed and updated on DFSMS V1.13, we put data in the data set using DFSMS V2.1, then read that data and added more data using DFSMS V1.13.

Then, returned to DFSMS V2.1 and verified that both the original data and the updates using DFSMS V1.13 were in the data set.

In Example 5-14, we show the data entered into a PDSE Version 2 data set, then updated on DFSMS V1.13.

Example 5-14 PDSE Version 2 data set as populated using DFSMS V2.1 then updated using DFSMS V1.13

```
EDIT       MHLRES2.GDG.PDSE.G0003V00(DEMODATA) - 01.01
Command ===>
****** ******************************** Top of Data **************
==MSG> -Warning- The UNDO command is not available until you change
==MSG>           your edit profile using the command RECOVERY ON.
000100 This data was entered using DFSMS V2.1
000110 and it is a version 2 data set
000200 This data was entered using DFSMS V2.1
000210 and it is a version 2 data set
000300 This data was entered using DFSMS V2.1
000310 and it is a version 2 data set
000400 This data was entered using DFSMS V2.1
000410 and it is a version 2 data set
000500 This data was entered using DFSMS V2.1
000510 and it is a version 2 data set
000600 This data was entered using DFSMS V2.1
000610 and it is a version 2 data set
000700 This data was entered using DFSMS V2.1
000710 and it is a version 2 data set
000800 This data was entered using DFSMS V2.1
000810 and it is a version 2 data set
000900 This data was entered using DFSMS V2.1
000910 and it is a version 2 data set
001000 This data was entered using DFSMS V2.1
001100 and it is a version 2 data set
001200 *********
001300 The above data was read successfully using DFSMS V1.13
001400 *********
001500 This data was entered using DFSMS V1.13
001600 and it is accepted even even thou it is a version 2 data set
001700 This data was entered using DFSMS V1.13
001800 and it is accepted even even thou it is a version 2 data set
001900 This data was entered using DFSMS V1.13
002000 and it is accepted even even thou it is a version 2 data set
002100 This data was entered using DFSMS V1.13
002200 and it is accepted even even thou it is a version 2 data set
002300 This data was entered using DFSMS V1.13
002400 and it is accepted even even thou it is a version 2 data set
002500 This data was entered using DFSMS V1.13
002600 and it is accepted even even thou it is a version 2 data set
002700 This data was entered using DFSMS V1.13
002800 and it is accepted even even thou it is a version 2 data set
002900 This data was entered using DFSMS V1.13
003000 and it is accepted even even thou it is a version 2 data set
003100 This data was entered using DFSMS V1.13
003200 and it is accepted even even thou it is a version 2 data set
```

Compatibility

The default setting for PDSE version can be set in DFSMS V2.1 systems to be Version 1 (default) or Version 2. This setting can then be overridden for a particular PDSE data set allocation to whatever is required for that PDSE.

The `PDSE_VERSION(1|2)` statement is in member IGDSMSxx of SYS1.PARMLIB.

Note: The PDSE_VERSION statement might not be specified in member IGSSMSxx of a system before DFSMS V2.1. There is no compatibility for this statement.

PDSE Version 2 data sets cannot be allocated using releases before DFSMS V2.1.

If a data set is allocated using DFSMS V2.1 as a member of a GDG, it can be accessed and used from DFSMS V1.13.

A PDSE data set may not be defined as a member of a GDG when using DFSMS releases before DFSMS V2.1.

Updates are required in DFSMS V1.12 and DFSMS V1.13 to use PDSE version 2 data sets. Examples of fixes that are required on pre-DFSMS V2.1 systems can be found in Appendix B, “APARs to be reviewed for DFSMS V1.13 or DFSMS V1.12” on page 303.

For IBM products, a current listing of compatibility fixes can be obtained by loading the IBM enhanced HOLDDATA files, then using SMP/E to search on the pre-DFSMS V2.1 system for the z/OS V2.1 compatibility fixes.

6

SMS enhancements

This chapter provides an overview of the features and function in SMS included in z/OS V2.1. They include:

- New IGDSMSxx parameters
- Provide accurate volume space statistics
- Alter ACDS and COMMDS to SHAREOPTIONS(3 3)
- SMS ACS read-only variable for EAVs
- DFSMS storage tiers
- Option to suppress specific SMS messages

6.1 New IGDSMSxx parameters

DFSMS V2.1 introduces several new parameters that you specify in the IGDSMSxx parmlib member:

HONOR_DSNTYPE_PDSE	Specifies that a partitioned data set is to be created regardless of the values for other data set attributes, such as data set organization or directory blocks.
PDSE_VERSION	Specifies a default version number (1 or 2) for data sets that are allocated with DSNTYPE value of LIBRARY.
SUPPRESS_SMSMSG	Specifies an option to suppress messages IGD17054I, IDG17227I, and IGD17395I.
PS_EXT_FORMAT	Indicates the format (1 or 2) in which the system creates extend format data sets.

6.1.1 IGD030I error message

If you try to activate any of the new parameters, through a **SET SMS=xx** z/OS console command, from a z/OS V1.13 or earlier system, you receive message IGD030I. You also receive message IGD030I when you IPL a z/OS V1.13 or earlier system pointing to an IGDSMSxx parmlib member that contains any of these new parameters in it.

For more information about the PDSE parameters, see Chapter 5, “PDSE enhancements” on page 77.

For information about the new sequential extended data set format 2, see 4.4, “Sequential Extended Format Version 2” on page 72.

6.2 Provide accurate volume space statistics

SMS in DFSMS V2.1 provides more accurate volume space statistics. Before DFSMS V2.1, SMS was enhanced to return accurate space statistics in the following situations:

- When Common Access VTOC Facility (CVAF) informs SMS that a volume space usage has changed.
- When a volume is varied online for the first time.
- When users issue IGDCNS calls to retrieve volume information that does not contain updated space statistics.
- When SMS issues LSPACE and updates volume information with the most current space statistics.

However, there were some special cases where the space statistics remained outdated. This can happen, for example, when a user issues **ICKDSF REFORMAT REFVTOC** in a system outside the SMSplex.

6.2.1 Use

When a volume is resized, the disk subsystem sends an Unsolicited Stated Change Interrupt to all the systems. This interrupt causes device support code to be invoked in each system. Each system sends a Read Device Characteristics CCW in order to get the new size for that

device. Each system updates the size information that resides in the Device Class Extension (DCE) that is an extension for the UCB for that device.

Now in DFSMS V2.1, when SMS receives a request for space information, it compares the information in the DCE with the information inside the SMS address space. It automatically refreshes the space information inside the active configuration data set (ACDS) of SMS, returning accurate space statistics to the caller that requested this information.

VARY SMS command to update space statistics

In z/OS 2.1, there is a new **VARY SMS** command to force SMS to update space statistics for a volume in a storage group. The syntax of the command is shown in Example 6-1.

Example 6-1 VARY SMS syntax

```
V SMS,{STORGRP(storgrp) | SG(storgrp) |
      VOLUME(volser) | VOL(volser)},
      {SPACE | S}
```

where:

storgrp	Refers to a pool storage group.
volser	A volser in a pool storage group.

For example, if you want your SMS active configuration to immediately get accurate space statistics for a storage group called BIGSTUFF, you issue the **V SMS,SG(BIGSTUFF),SPACE** command from a z/OS console.

6.2.2 Coexistence

If the caller that requested space information comes from a z/OS V1.13 or earlier system, it will not refresh the space statistics in the ACDS, if a volume has been resized from a system outside the SMSplex.

If the caller is a z/OS V2.1 system, all the systems in the SMSplex benefit from this enhancement, as the ACDS is shared among all systems in the SMSplex.

6.3 Alter ACDS and COMMDS to SHAREOPTIONS(3 3)

SMS in DFSMS V2.1 now checks whether the ACDS or COMMDS were defined with SHAREOPTIONS(3 3) and tries to alter it, if it was defined with different sharing options. This enhancement helps users avoid potential problems due to incorrect sharing options.

Using SHAREOPTIONS(3,3) when allocating an ACDS or COMMDS allows full authority to read from and write to the ACDS or COMMDS from any system. The ACDS and COMMDS must be accessed from all systems in the complex simultaneously.

If SMS detects a lower value for SHAREOPTIONS when the CDS is activated, SMS attempts to alter the value to SHAREOPTIONS(3,3), and issues a message to inform the user of the result of the change:

- If the change is successful, SMS issues new message IGD098I
- If the change is not successful, it issues message IGD099I

In both cases, the activation process continues as before.

6.3.1 Use

Example 6-2 shows a sample job for allocating a new ACDS. We specified SHAREOPTIONS(2 3). This is not the SHAREOPTIONS that are adequate for the ACDS. We defined it this way to test the automatic alter to SHAREOPTIONS(3 3) that is going to be done by SMS.

Example 6-2 Sample ACDS definition with wrong SHAREOPTIONS(2 3)

```
//MHLRES3A JOB (999,POK),'MHLRES3',CLASS=A,MSGCLASS=T,
// NOTIFY=&SYSUID,TIME=1440,REGION=6M
//DEF1    EXEC PGM=IDCAMS,REGION=512K
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  *
  DEFINE   CLUSTER(                    +
             NAME(SYS1.SMS.V2R1.ACDS) +
             LINEAR                    +
             VOLUME(SBOX12)            +
             CYL(10 1)                  +
             SHAREOPTIONS(2,3)  )      +
           DATA(                       +
             NAME(SYS1.SMS.V2R1.ACDS.DATA) REUSE)
/*
```

After defining the new ACDS, we replaced the current ACDS with the newly defined ACDS by issuing the following commands:

1. **SETSMS SAVEACDS(SYS1.SMS.V2R1.ACDS)**

   This command saves the current active SMS configuration into the newly defined ACDS.

2. **SETSMS ACDS(SYS1.SMS.V2R1.ACDS)**

   This command activates the new ACDS.

During the activation process, SMS detected that our new ACDS was defined with SHAREOPTIONS(2,3), and automatically altered it to SHAREOPTIONS(3,3), as shown in Figure 6-1.

```
SETSMS ACDS(SYS1.SMS.V2R1.ACDS)
IGD098I ACDS SYS1.SMS.V2R1.ACDS 698
PREVIOUSLY DEFINED WITH SHAREOPTIONS(2,3) HAS BEEN AUTOMATICALLY
CORRECTED TO SHAREOPTIONS(3,3)
IEF196I IEF237I D26C ALLOCATED TO SYS00024
IEF196I IGD104I SYS1.SMS.ACDS.NEW                          RETAINED,
IEF196I DDNAME=SYS00003
IEF196I IEF237I A529 ALLOCATED TO SYS00025
IEF196I IEF285I   WTSCPLX2.DFSMS.DATASET.SEP                 KEPT
IEF196I IEF285I   VOL SER NOS= SBOXBF.
IEF196I IEF237I A529 ALLOCATED TO SYS00026
IEF196I IEF285I   WTSCPLX2.DFSMS.DATASET.SEP                 KEPT
IEF196I IEF285I   VOL SER NOS= SBOXBF.
IGD009I ACDS SWITCHED TO SYS1.SMS.V2R1.ACDS
```

Figure 6-1 SMS alters to SHAREOPTIONS(3,3) during activation process

6.3.2 Coexistence

There is not any coexistence issue with this DFSMS V2.1 enhancement when you share ACDS and COMMDS between systems at z/OS V2.1 and z/OS V1.13 or earlier releases of z/OS.

6.4 SMS ACS read-only variable for EAVs

DFSMS V2.1 provides a new ACS read-only variable *&EATTR* for extended address volume (EAV) support. This variable contains the EATTR value as specified in JCL, IDCAMS DEFINE or ALLOCATE, dynamic allocations, and data class constructs. EATTR means the extend attributes for EAV.

ACS routines become more intelligent and easier to code. You can select the proper SMS constructs to your data sets, so the data sets can be allocated or not to an EAV storage group.

6.4.1 EAV overview

An EAV is a volume with more than 65,520 cylinders. An EAV increases the amount of addressable DASD storage per volume beyond 65,520 cylinders by changing how tracks on IBM ECKD™ volumes are addressed.

The benefit of this support is that the amount of z/OS addressable disk storage is significantly increased. This helps customers who are approaching the four-digit device number limit by providing constraint relief for applications using large amounts of data.

EAV support was first introduced in z/OS V1.10, and was limited to VSAM data sets. Also, the initial support for EAV allowed a maximum of 262,668 cylinders or 223 GB in volume size.

z/OS V1.11 extended this support to non-VSAM data sets, and also introduced a new attribute, EATTR, to be used at allocation time, for controlling the allocation of VSAM and non-VSAM data sets in regard to when EAS can be used. EAS is the area on EAV whose cylinder addresses are equal to or greater than 65,536, as shown in Figure 6-2 on page 96.

At the time the EATTR attribute was created, there was not an ACS read-only variable to be checked by the ACS routines.

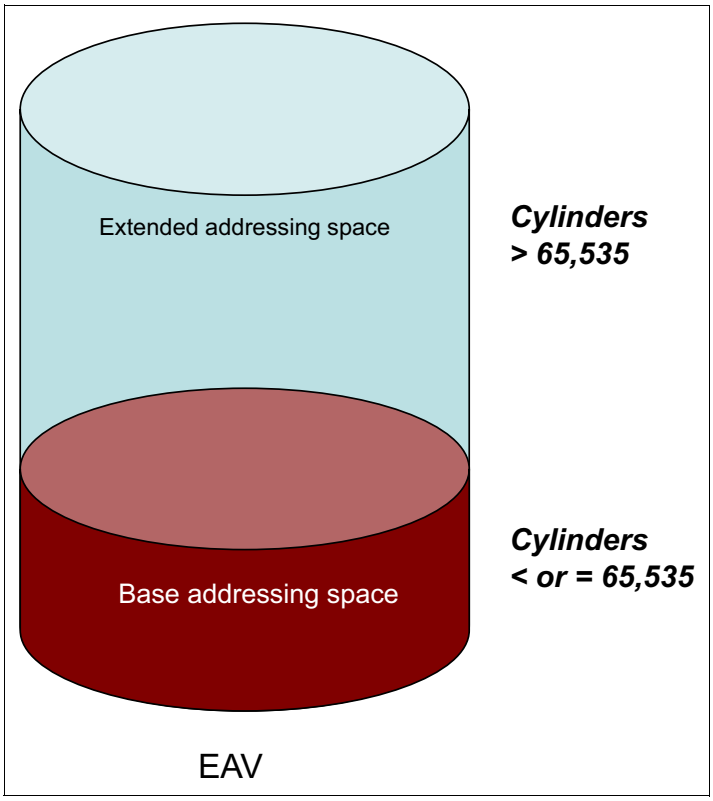

Figure 6-2 EAV layout

6.4.2 EATTR overview

You can specify this attribute EATTR in IDCAMS DEFINE and ALLOCATE, JCL, dynamic allocation, and data classes constructs. You can use IDCAMS ALTER to modify this attribute in existing data sets. There is no JCL override of the current EATTR value for existing data sets. To change the EATTR value after a new allocation requires you to run the IDCAMS **ALTER** command.

The &EATTR that is passed to the ACS routines contains the EATTR value that you can specify in IDCAMS, JCL, dynamic allocation, and data classes are:

NO No extended attributes. The data set cannot have extended attributes (format 8 and 9 DSCBs) and cannot reside in EAS. This is the default behavior for non-VSAM data sets.

OPT Extended attributes are optional. The data set can have extended attributes (format 8 and 9 DSCBs) and can optionally reside in EAS. This is the default behavior for VSAM data sets.

Blank No specification. It assumes the default behavior depending on the type of the data set; VSAM or non-VSAM.

6.4.3 Use

Example 6-3 on page 97 shows some lines of ACS code taken from a storage group ACS routine. We create a filtlist called ZOS21 that has the system names of the systems that are already at z/OS V2.1 in our SMSplex: SC63, SC64, and SC70. We assign a BIGSTUFF

storage group for data sets that were created with EATTR=OPT in JCL, dynamic allocation, IDCAMS, and TSO also. This storage group BIGSTUFF has only two 1 TB EAV volumes.

SC65 is still at z/OS 1.13 level, so we avoid executing the ACS code that tests the &EATTR read-only variable on that system.

Example 6-3 Example of storage group ACS routine

```
FILTLIST MHLRES INCLUDE(MHLRES%.**)
FILTLIST ZOS21   INCLUDE('SC63','SC64','SC70')
   .
   .
   .
   WHEN (&DSN = &MHLRES AND &STORCLAS NE SCLIB%) DO
      SELECT(&SYSNAME)
         WHEN('SC65') DO
            SET &STORGRP = 'SGMHLO1'
            EXIT
         END
         WHEN(&ZOS21) DO
            IF &EATTR = 'OPT' THEN
               SET &STORGRP = 'BIGSTUFF'
            ELSE
               SET&STORGRP = 'SGMHLO1'
               EXIT
         END
      END
    END
```

Example 6-4 shows a sample IEFBR14 job that we used to test this ACS routine.

Example 6-4 Sample IEFBR14 job with EATTR=OPT

```
//MHLRES3T  JOB   'JOE',NOTIFY=MHLRES3,
//          MSGCLASS=T,REGION=32M
//IEF       EXEC PGM=IEFBR14
//I         DD   DSN=MHLRES3.EATTR.TEST8,DISP=(,CATLG),
//          SPACE=(CYL,(300,300)),UNIT=3390,EATTR=OPT,
//          DCB=(RECFM=FB,LRECL=300,BLKSIZE=27900),
//          DATACLAS=DCEXTSEQ,STORCLAS=SCSDRO
```

The data set MHLRES3.EATTR.TEST8 was created successfully on one of our EAV volumes in storage group BIGSTUFF.

6.4.4 Coexistence

The read-only variable &EATTR is only available on z/OS V2.1 systems. SMS at z/OS V1.13 or lower releases does not recognize the &EATTR variable.

If you have systems at z/OS V1.13 or prior releases in your SMSplex, and plan to start using the &EATTR read-only variable, you must code your ACS routines to branch around any reference to &EATTR when they run in a system with z/OS V1.13 or earlier releases of z/OS.

Example 6-3 shows a sample piece of a storage group ACS code, where we first test if the new allocation is going to occur in system SC65. This system is at z/OS V1.13. We avoid it testing the &EATTR when the new allocation happens in our system SC65.

6.5 DFSMS storage tiers

A storage tier is a class of devices that has a defined set of performance, availability, accessibility, and capacity characteristics.

The three fundamental storage tiers consist of disk, optical, and tape devices. Disk being defined as the highest tier and tape the lowest. Until recently, there have only been minor variations in the characteristics of the devices available within each of these fundamental tiers. But, with recent advances in storage technology, these fundamental tiers can be further divided into more discrete tiers. New technologies introduced significant variations in the disk storage tier. For example, we can have the following technologies available for allocation of our data sets in disk:

- Solid-state drives (SSD)
- Hard disk drives (HDD)
- Serial Advanced Technology Attachment (SATA) drives

Each one of these technologies provides different performance levels to data access. Also, each one has a different cost to store your data. Before DFSMS V2.1, there was not a way to automatically move less active data between these technologies, from the fastest and more expensive, to the slowest and cheaper.

Figure 6-3 on page 99 shows the classic storage hierarchy that is around 30 years old. It is a three-tier hierarchy:

- Level 0 (L0) or Primary disks

  This is the primary level that contains data that is directly accessible by users and applications. Data at this level is owned by users and applications and optionally managed by DFSMShsm.

- Migration Level 1 (ML1)

  When DFSMShsm-managed L0 data remains inactive for a specified (policy-based) duration of time, DFSMShsm moves the data down in the hierarchy. Data at this level is in a proprietary format and cannot be directly accessed by users or applications. ML1 data is owned by DFSMShsm. Storage devices at this level may only be disk. DFSMShsm does not distinguish between any variations in disk technology used at this level.

- Migration Level 2 (ML2)

  As the unreferenced age of data increases, the data is moved to the lowest level in the hierarchy, ML2. ML2 is generally auxiliary storage and hence the least expensive. Similar to ML1, all ML2 devices are treated equally.

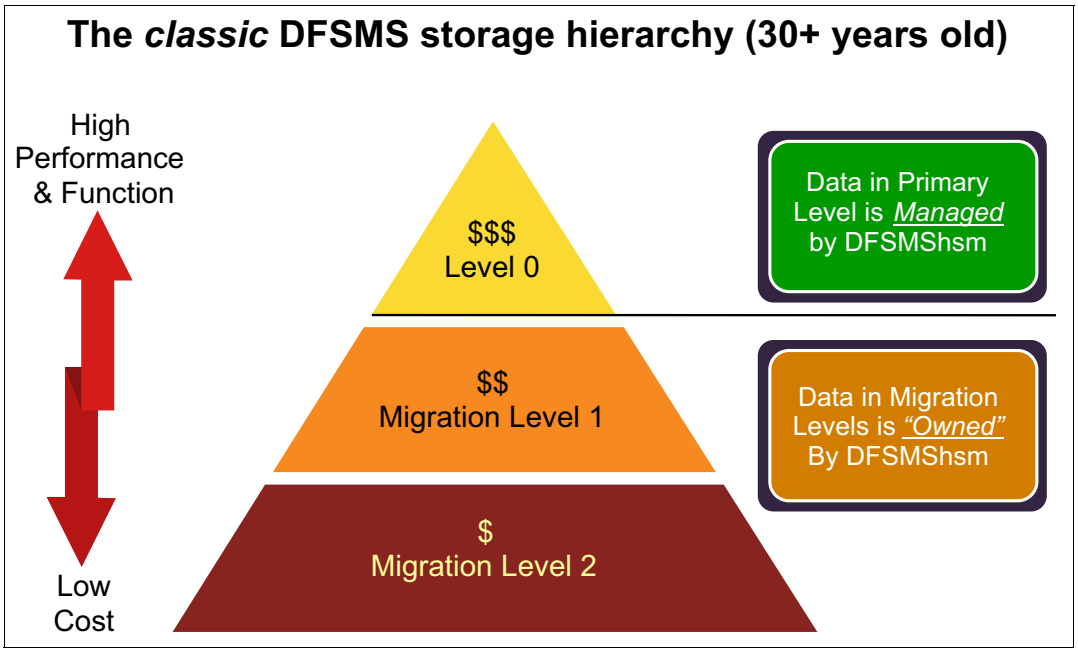

Figure 6-3 The classic DFSMS storage hierarchy

Today, with the possibility of several technologies present on the Level 0 tier, it comes the opportunity to break Level 0 into multiple tiers.

6.5.1 Storage tier hierarchies

The existing three-layer hierarchy is being separated into two distinct hierarchies; the primary hierarchy and the migration hierarchy, as seen in Figure 6-4 on page 100. The primary hierarchy consists of all the storage tiers that contain application and user data in its native format. The data in this hierarchy is directly accessible by applications and users and is composed of tiers. The data in these tiers is DFSMShsm-managed.

Figure 6-4 on page 100 shows an example of a primary storage hierarchy subdivided into three tiers:

- SSD
- HDD
- SATA disks

Data on primary storage hierarchy can be moved across the tiers by DFSMShsm, according to management class attributes assigned to SMS-managed data sets. These attributes, also called *class transition attributes*, are not new to DFSMS. They have been used for class transition for OAM non-structured data. DFSMS V2.1 allows these attributes to be used for class transitions of structured data, that is, your application data sets.

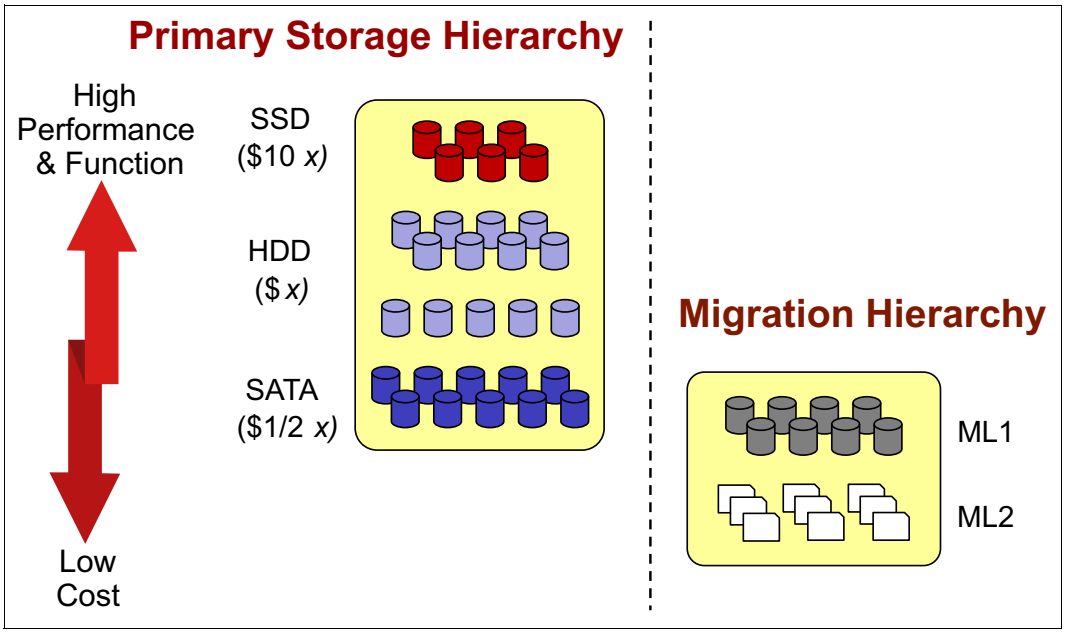

Figure 6-4 Two hierarchies of migration storage

For more information about how DFSMShsm uses these storage tiers, see 10.2, “DFSMShsm storage tiers” on page 177.

6.6 Option to suppress specific SMS messages

DFSMS V2.1 provides a new *SUPPRESS_SMSMSG* option in IGDSMSxx parmlib member to suppress some specific informational messages. There are messages that may occur often, and some installations do not want to view these messages when they appear at the job log. The messages that can be suppressed by using this option are:

- IGD17054I DATA SET NOT FOUND FOR DELETE/RENAME ON VOLUME volser DATA SET IS dsn
- IGD17227I JOBNAME jobname PROGRAM NAME progname STEPNAME stepname DDNAME ddname DATA SET dsn WAS ALLOCATED TO A SUBSEQUENT MULTI-TIERED STORAGE GROUP. ALLOCATED STORAGE GROUP WAS sg1. CANDIDATE STORAGE GROUPS ARE: sg2, sg3...
- IGD17395I DATA SET dsn WAS NOT ALLOCATED IN THE SAME STORAGE FACILITY IMAGE BECAUSE (text) MODID(modid) RC(rc) RSN(rsn)]

These messages cannot be suppressed by the message processing facility (MPF) of z/OS, nor can they be suppressed by installation exits.

6.6.1 Use

You can specify this new parameter **SUPPRESS_SMSMSG** in your IGDSMSxx parmlib member as shown in Example 6-5.

Example 6-5 Sample SUPRESS_SMSMSG parameter

```
SUPPRESS_SMSMSG(YES,IGD17054I,IGD17227I,IGD17395I)
```

To activate this modification, you can issue the **SET SMS=xx** command from the z/OS console.

The default behavior of SMS is not to suppress any of these messages.

You can also suppress those messages by using the **SETSMS** command. For example, you can tell SMS to suppress all occurrences of messages IGD17054I and IGD17227I by issuing the following command from the z/OS console:

```
SETSMS SUPPRESS_SMSMSG(YES,IGD17054I,IGD17227I)
```

You can use the **D SMS,OPTIONS** command to confirm that suppression for these SMS messages is active or not active. Figure 6-5 shows a piece of the output of the message IGD002I as a result of issuing this command. It shows that we are suppressing messages IGD17054I, and IGD17227I, and not suppressing IGD17395I in our SMSplex.

```
D SMS,OPTIONS
IGD002I 08:56:51 DISPLAY SMS 312
ACDS     = SYS1.SMS.ACDS.NEW
COMMDS   = SYS1.SMS.COMMDS
ACDS LEVEL = z/OS V2.1
      .
      .
      .
CA_RECLAIM = DATACLAS
PS_EXT_VERSION = 1
SUPPRESS_SMSMSG = IGD17054I(YES) IGD17227I(YES) IGD17395I(NO )
```

Figure 6-5 Displaying SUPPRESS_SMSMSG

6.6.2 Coexistence

Activating the suppression of these SMS messages in z/OS V2.1 system has no effect on systems at DFSMS V1.13 or prior versions sharing the same ACDS.

If you issue SETSMS SUPPRESS_SMSMSG from a system at DFSMS V1.13 or earlier, you receive message IGD029I, as it does not recognize the **SUPPRESS_SMSMSG** parameter.

If you try to activate an IGDSMSxx member with the **SUPPRESS_SMSMSG** parameter, you receive message IGD030I.

7

DFSMSdfp enhancements

In this chapter, we describe the DFSMSdfp features and functions introduced in z/OS V2.1 DFSMS. The following topics are included in this chapter:

- IEBCOPY COPYGROUP
- IEBCOPY user exit capabilities
- IEBCOPY return code feedback
- Open Close and End of volume (OCE) partial release
- OCE RAS enhancements
- IEAAPPxx comments
- DCBE invalidation message IEC190I
- XTIOT HealthCheck

7.1 IEBCOPY COPYGROUP

Before DFSMS V2.1, IEBCOPY had a COPYGRP statement, which is still available, that did not process groups when using a PDS. That has been complemented by the new **COPYGROUP** command, which has additional functions that makes it applicable to all types of PDS and PDSE formats and all operations between them.

The significant feature of COPYGROUP (and in the case of PDSE for COPYGRP) is that it can be used to ensure that a member and all its aliases are copied together, and that if an alias is selected the main member and any other aliases are copied together.

COPYGROUP can also be used with SELECT minor statements, which specify a member or alias using wildcards. If SELECT is used with wildcards, EXCLUDE can be used to refine the selection list. The EXCLUDE minor statement operates on the set of members generated by the SELECT minor statement.

When no member selection is done, all aliases are copied whether using COPY, COPYGRP, or COPYGROUP.

COPYGROUP may be used to perform the following:

- COPY PDS to PDS, PDS to PDSE, PDSE to PDS, and PDSE to PDSE
- UNLOAD PDS to PS, and PDSE to PS
- LOAD PS to PDSE, and PS to PDS

A group consists of a member and all its aliases. If a member is selected, the member and all its aliases are included. The member may be the main member or any of the aliases, but they will all be copied, or none will be copied, if there is some condition preventing all from being copied.

Note: This is different from the COPYGRP function where *only* the selected member will be copied when the output data set is a PDS. If the output is a PDSE, the member and all its aliases will be copied.

The SELECT minor statement can be used with the **COPYGROUP** command to specify wildcards to facilitate member selection. Wildcards are not permitted when using the COPYGRP statement. When SELECT has been used with wildcards, EXCLUDE can be used.

Note: To use the minor statements SELECT (and EXCLUDE where applicable), the INDD and OUTDD statements must be specified on the main statement, such as COPY, COPYGRP, or COPYGROUP. The default DDNAMEs of SYSUT1 and SYSUT2 are not usable for this function.

7.1.1 Scenarios

We generated and ran a number of jobs to illustrate the basic capabilities of the COPYGROUP statement.

In the examples that follow, the following data sets are used:

- SYS1.LINKLIB for INDD
- MHLRES2.SYS1.LINKLIB.IEBCOPY1 for OUTDD

Data set MHLRES2.SYS1.LINKLIB.IEBCOPY1 was allocated new before running the first job.

In Table 7-1, we list a number of scenarios relating to the IEBCOPY COPYGROUP statement. We describe these scenarios in this section.

Table 7-1 Scenarios provided to show COPYGROUP functions

Scenario number	Purpose
“Scenario 1” on page 106	Copy from PDS to empty PDS. Use COPYGROUP with INDD and OUTDD. SELECT a member that has an alias. Observe that the alias is copied as well as the main member.
“Scenario 2” on page 107	Copy from PDS to output PDS that is not empty. Use COPYGROUP with INDD and OUTDD. SELECT a member that has already been copied that has an alias. Observe that neither the member or the alias is copied.
“Scenario 3” on page 107	PDS to PDS output not empty. COPYGROUP INDD,R OUTDD. SELECT a member that has an alias. Observe that both the member and the alias are copied.
“Scenario 4” on page 108	PDS to PDS output not empty. COPY INDD OUTDD. SELECT a member that has an alias. Observe that only the member is copied.
“Scenario 5” on page 109	PDS to PDS output not empty. COPYGROUP INDD OUTDD. SELECT the alias of a member. Observe that the alias is not copied because the member is present.
“Scenario 6” on page 110	PDS to PDS output not empty. COPYGROUP INDD, OUTDD. SELECT the alias of a member. Observe that neither the alias or the main member is replaced because of a COPYGROUP conflict.
“Scenario 7” on page 111	PDS to PDS output not empty. COPY INDD,R OUTDD. SELECT the member and related alias of the member. Observe that neither the alias or the main member is replaced because of a COPYGROUP conflict.
“Scenario 8” on page 113	Using the COPYGROUP statement, demonstrate the use of SELECT minor statement with wildcard character to specify the primary members to be copied. Expect to see alias names included when their primary member is specified for inclusion.

Scenario number	Purpose
“Scenario 9” on page 116	Using the COPYGROUP statement, demonstrate the use of SELECT and EXCLUDE minor statements with wildcard character to specify the members to be copied. Expect to see alias names excluded when their primary member is specified for exclusion.
“Scenario 10” on page 119	COPYGRP limitation when working with PDS to PDS copying.

Scenario 1

In this scenario, copy from PDS to empty PDS. Use COPYGROUP with INDD and OUTDD. SELECT a member that has an alias. Observe that the alias is copied as well as the main member.

In Example 7-1, you find the JCL that was run to show the use of the COPYGROUP statement with the SELECT minor statement to select a member.

Example 7-1 JCL to copy a member of a PDS to empty PDS

```
//MHLRES2C JOB (999,POK),'MHLRES2',CLASS=A,MSGCLASS=T,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=*
/* example of use of COPYGROUP to contrast with COPYGRP
//S1      EXEC PGM=IEBCOPY
//SYSPRINT DD  SYSOUT=*
//INDD     DD  DISP=SHR,DSN=SYS1.LINKLIB
//OUTDD    DD  DISP=SHR,DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
//SYSIN    DD  *
 COPYGROUP INDD=INDD,OUTDD=OUTDD
 SELECT MEMBER=(ARCABA)
```

In Example 7-2, you find the IEBCOPY messages showing that the alias is copied together with the main member.

Example 7-2 IEBCOPY messages showing member ARCABA copied as well as alias ABA

```
IEBCOPY MESSAGES AND CONTROL STATEMENTS                                PAGE     1
IEB1135I IEBCOPY  FMID HDZ2210  SERVICE LEVEL UA70502  DATED 20130821 DFSMS
02.01.00 z/OS    02.01.00 HBB7790  CPU 2827
IEB1035I MHLRES2C S1    19:50:39 MON 16 SEP 2013 PARM=''
GRPCOPY COPYGROUP  INDD=((INDD,R)),OUTDD=OUTDD          00010006
     SELECT MEMBER=(ARCABA)                            00020005
IEB1013I COPYING FROM PDS  INDD=INDD  VOL=Z21RB1 DSN=SYS1.LINKLIB
IEB1014I            TO PDS  OUTDD=OUTDD    VOL=MLD12F
DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
IGW01553I ALIAS ABA OF COPIED PRIMARY ARCABA HAS BEEN COPIED
IGW01552I MEMBER ARCABA HAS BEEN COPIED  AND REPLACED
IGW01550I 2 OF 2 SPECIFIED MEMBERS WERE COPIED
IEB147I END OF JOB - 0 WAS HIGHEST SEVERITY CODE
```

Scenario 2

In this scenario copy from PDS to an output PDS that is not empty. Use COPYGROUP with INDD and OUTDD. SELECT a member that has already been copied that has an alias. Observe that neither the member or the alias is copied.

In Example 7-3, you find the JCL that was run to show the use of the COPYGROUP statement with the SELECT minor statement to select a member that already exists in the output PDS.

Example 7-3 JCL to copy a member of a PDS to a PDS that already has the member

```
//MHLRES2C JOB (999,POK),'MHLRES2',CLASS=A,MSGCLASS=T,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=*
/* example of use of COPYGROUP to contrast with COPYGRP
//S1      EXEC PGM=IEBCOPY
//SYSPRINT DD  SYSOUT=*
//INDD     DD  DISP=SHR,DSN=SYS1.LINKLIB
//OUTDD    DD  DISP=SHR,DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
//SYSIN    DD  *
 COPYGROUP INDD=INDD,OUTDD=OUTDD
 SELECT MEMBER=(ARCABA)
```

In Example 7-4, you find the IEBCOPY messages showing that the alias is not copied because the main member already exists.

Example 7-4 IEBCOPY messages showing neither the member or the alias is copied

```
IEBCOPY MESSAGES AND CONTROL STATEMENTS                              PAGE     1
IEB1135I IEBCOPY  FMID HDZ2210  SERVICE LEVEL UA70502  DATED 20130821 DFSMS
02.01.00 z/OS    02.01.00 HBB7790  CPU 2827
IEB1035I MHLRES2C S1    13:34:14 TUE 17 SEP 2013 PARM=''
 COPYGROUP INDD=INDD,OUTDD=OUTDD                     00010000
 SELECT MEMBER=(ARCABA)                             00020000
IEB1013I COPYING FROM PDS  INDD=INDD  VOL=Z21RB1 DSN=SYS1.LINKLIB
IEB1014I            TO PDS  OUTDD=OUTDD    VOL=MLD83A
DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
IGW01557W MEMBER ARCABA NOT COPIED BECAUSE THE NAME ALREADY EXISTS IN
THE OUTPUT DATASET CAUSING A COPY GROUP NO-REPLACE CONFLICT
IGW01558W MEMBER ABA  NOT COPIED BECAUSE IT BELONGS TO A GROUP
IN WHICH A PREVIOUS NAME PROCESSED ENCOUNTERED COPY GROUP NO REPLACE CONFLICT
IGW01550I 0 OF 2 SPECIFIED  MEMBERS WERE COPIED
IEB1130I A WARNING MESSAGE FROM FAMS PROCESSING APPEARS ABOVE -- DIAGNOSTIC
INFORMATION IS X'2810022D'
IEB147I END OF JOB - 0 WAS HIGHEST SEVERITY CODE
```

Scenario 3

This scenario shows a PDS to PDS copy where the output data set is not empty using COPYGROUP INDD,R OUTDD. SELECT a member that has an alias. Observe that both the member and the alias are copied.

In Example 7-5, you find the JCL that was run to show the use of the COPYGROUP statement with the SELECT minor statement to select a member that already exists in the output PDS. In this example, `INDD=((INDD,R))`is specified so that the member is replaced, and the alias is copied.

Example 7-5 JCL to copy a member that already exists, but with replace specified

```
//MHLRES2C JOB (999,POK),'MHLRES2',CLASS=A,MSGCLASS=T,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=*
/* example of use of COPYGROUP to contrast with COPYGRP
//S1      EXEC PGM=IEBCOPY
//SYSPRINT DD  SYSOUT=*
//INDD     DD  DISP=SHR,DSN=SYS1.LINKLIB
//OUTDD    DD  DISP=SHR,DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
//SYSIN    DD  *
 COPYGROUP INDD=((INDD,R)),OUTDD=OUTDD
 SELECT MEMBER=(ARCABA)
```

In Example 7-6, you find the IEBCOPY messages showing that the alias was copied because the main member was replaced as a result of `INDD=((INDD,R))`.

Example 7-6 IEBCOPY messages showing that member ARCABA was replaced and ABA copied

```
IEBCOPY MESSAGES AND CONTROL STATEMENTS                              PAGE     1
IEB1135I IEBCOPY  FMID HDZ2210  SERVICE LEVEL UA70502  DATED 20130821 DFSMS
02.01.00 z/OS    02.01.00 HBB7790  CPU 2827
IEB1035I MHLRES2C S1    14:03:11 TUE 17 SEP 2013 PARM=''
 COPYGROUP INDD=((INDD,R)),OUTDD=OUTDD                 00010007
 SELECT MEMBER=(ARCABA)                               00020000
IEB1013I COPYING FROM PDS  INDD=INDD  VOL=Z21RB1 DSN=SYS1.LINKLIB
IEB1014I            TO PDS  OUTDD=OUTDD    VOL=MLD83A
DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
IGW01554I ALIAS ABA OF COPIED PRIMARY ARCABA  HAS BEEN COPIED
 AND REPLACED
IGW01552I MEMBER ARCABA HAS BEEN COPIED  AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01550I 2 OF 2 SPECIFIED MEMBERS WERE COPIED
IEB147I END OF JOB - 0 WAS HIGHEST SEVERITY CODE
```

Scenario 4

In this scenario, a copy of a PDS to PDS where the output data set is not empty. COPY INDD OUTDD. SELECT a member that has an alias is specified. Observe that only the member is copied.

In Example 7-7, we show the JCL that was run to show the use of the COPY statement with the SELECT minor statement to select a member that has an alias but we do not want the alias to be copied. In this example, `INDD=((INDD,R))` was specified so that the member will be replaced.

Example 7-7 JCL to use COPY to copy a member without any alias

```
//MHLRES2C JOB (999,POK),'MHLRES2',CLASS=A,MSGCLASS=T,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=*
/* example of use of COPYGROUP to contrast with COPYGRP
```

```
//S1      EXEC PGM=IEBCOPY
//SYSPRINT DD  SYSOUT=*
//INDD     DD  DISP=SHR,DSN=SYS1.LINKLIB
//OUTDD    DD  DISP=SHR,DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
//SYSIN    DD  *
 COPY      INDD=((INDD,R)),OUTDD=OUTDD
 SELECT MEMBER=(IKJEFA00)
```

In Example 7-8, you find the IEBCOPY messages showing that only the specified main member was copied.

Example 7-8 IEBCOPY messages showing that COPY copied just the specified member

```
IEBCOPY MESSAGES AND CONTROL STATEMENTS                                PAGE     1
IEB1135I IEBCOPY  FMID HDZ2210  SERVICE LEVEL UA70502  DATED 20130821 DFSMS
02.01.00 z/OS    02.01.00 HBB7790  CPU 2827
IEB1035I MHLRES2C S1    14:20:38 TUE 17 SEP 2013 PARM=''
 COPY    INDD=((INDD,R)),OUTDD=OUTDD                   00010008
 SELECT MEMBER=(IKJEFA00)                             00020008
IEB1013I COPYING FROM PDS  INDD=INDD  VOL=Z21RB1 DSN=SYS1.LINKLIB
IEB1014I            TO PDS  OUTDD=OUTDD    VOL=MLD83A
DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
IEB167I FOLLOWING MEMBER(S) COPIED FROM INPUT DATA SET REFERENCED BY INDD
IEB154I IKJEFA00 HAS BEEN SUCCESSFULLY COPIED
IEB1098I 1 OF 1 MEMBERS COPIED FROM INPUT DATA SET REFERENCED BY INDD
IEB144I THERE ARE 747 UNUSED TRACKS IN OUTPUT DATA SET REFERENCED BY OUTDD
IEB149I THERE ARE 9 UNUSED DIRECTORY BLOCKS IN OUTPUT DIRECTORY
IEB147I END OF JOB - 0 WAS HIGHEST SEVERITY CODE
```

Scenario 5

In this scenario, we show a copy of a PDS to a PDS where the output data set is not empty using COPYGROUP INDD OUTDD. SELECT the alias of a member is specified. Observe that the alias is not copied because the member is present.

In Example 7-9, we show the JCL that was run to show the use of the COPYGROUP statement with the SELECT minor statement to select an alias of a member that already exists in the output.

Example 7-9 JCL to copy alias ACCOUNT

```
//MHLRES2C JOB (999,POK),'MHLRES2',CLASS=A,MSGCLASS=T,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=*
/* example of use of COPYGROUP to contrast with COPYGRP
//S1      EXEC PGM=IEBCOPY
//SYSPRINT DD  SYSOUT=*
//INDD     DD  DISP=SHR,DSN=SYS1.LINKLIB
//OUTDD    DD  DISP=SHR,DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
//SYSIN    DD  *
 COPYGROUP INDD=INDD,OUTDD=OUTDD
 SELECT MEMBER=(ACCOUNT)
```

In Example 7-10 on page 110, we show the IEBCOPY messages showing that the specified alias member was not copied because of a NO-REPLACE CONFLICT, which is as expected.

Example 7-10 IEBCOPY messages showing selection of an alias for a member that already exists is not completed

```
IEBCOPY MESSAGES AND CONTROL STATEMENTS                                PAGE     1
IEB1135I IEBCOPY  FMID HDZ2210  SERVICE LEVEL UA70502  DATED 20130821 DFSMS
02.01.00 z/OS    02.01.00 HBB7790  CPU 2827
IEB1035I MHLRES2C S1    14:29:59 TUE 17 SEP 2013 PARM=''
 COPYGROUP INDD=INDD,OUTDD=OUTDD                      00010010
 SELECT MEMBER=(ACCOUNT)                             00020011
IEB1013I COPYING FROM PDS  INDD=INDD  VOL=Z21RB1 DSN=SYS1.LINKLIB
IEB1014I            TO PDS  OUTDD=OUTDD    VOL=MLD83A
DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
IGW01557W MEMBER IKJEFA00 NOT COPIED BECAUSE THE NAME ALREADY EXISTS IN
THE OUTPUT DATASET CAUSING A COPY GROUP NO-REPLACE CONFLICT
IGW01558W MEMBER ACCOUNT  NOT COPIED BECAUSE IT BELONGS TO A GROUP
IN WHICH A PREVIOUS NAME PROCESSED ENCOUNTERED COPY GROUP NO REPLACE CONFLICT
IGW01550I 0 OF 2 SPECIFIED  MEMBERS WERE COPIED
IEB1130I A WARNING MESSAGE FROM FAMS PROCESSING APPEARS ABOVE -- DIAGNOSTIC
INFORMATION IS X'2810022D'
IEB147I  END OF JOB - 0 WAS HIGHEST SEVERITY CODE
```

Scenario 6

In this scenario, we copy PDS to PDS where the output data set is not empty. COPYGROUP INDD,R OUTDD is specified. SELECT the alias of a member. Observe that neither the alias or the main member is replaced because of a COPYGROUP conflict.

In Example 7-11, you find the JCL that was run to show the use of the COPYGROUP statement with the SELECT minor statement to select an alias of a member that already exists in the output. In this case, replace the main member name using `INDD=((INDD,R))`.

Example 7-11 JCL to copy a member alias for a main member that exists, but replace it

```
//MHLRES2C JOB (999,POK),'MHLRES2',CLASS=A,MSGCLASS=T,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=*
/* example of use of COPYGROUP to contrast with COPYGRP
//S1      EXEC PGM=IEBCOPY
//SYSPRINT DD  SYSOUT=*
//INDD     DD  DISP=SHR,DSN=SYS1.LINKLIB
//OUTDD    DD  DISP=SHR,DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
//SYSIN    DD  *
 COPYGROUP INDD=((INDD,R)),OUTDD=OUTDD
 SELECT MEMBER=(ACCOUNT)
```

In Example 7-12, you find the IEBCOPY messages showing that this COPYGROUP did not complete successfully because of a CONDITIONAL-REPLACE conflict. COPYGROUP is designed to ensure that members of a group are consistent, and that they do not affect members of any other group.

Example 7-12 IEBCOPY messages illustrating CONDITIONAL-REPLACE conflict

```
IEBCOPY MESSAGES AND CONTROL STATEMENTS                                PAGE     1
IEB1135I IEBCOPY  FMID HDZ2210  SERVICE LEVEL UA70502  DATED 20130821 DFSMS
02.01.00 z/OS    02.01.00 HBB7790  CPU 2827
IEB1035I MHLRES2C S1    14:56:23 WED 18 SEP 2013 PARM=''
 COPYGROUP INDD=((INDD,R)),OUTDD=OUTDD                00010011
```

```
 SELECT MEMBER=(ACCOUNT)                                00020016
IEB1013I COPYING FROM PDS  INDD=INDD  VOL=Z21RB1 DSN=SYS1.LINKLIB
IEB1014I            TO PDS  OUTDD=OUTDD    VOL=MLD83A
DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
IGW01559E MEMBER IKJEFA00 NOT COPIED BECAUSE OF COPY GROUP
CONDITIONAL-REPLACE CONFLICT, SINCE AT LEAST ONE NAME IN THIS INPUT
GROUP BELONGS TO A DIFFERENT OUTPUT GROUP
IGW01559E MEMBER ACCOUNT  NOT COPIED BECAUSE OF COPY GROUP
CONDITIONAL-REPLACE CONFLICT, SINCE AT LEAST ONE NAME IN THIS INPUT
GROUP BELONGS TO A DIFFERENT OUTPUT GROUP
IGW01550I 0 OF 2 SPECIFIED  MEMBERS WERE COPIED
IEB1130W AN ERROR MESSAGE FROM FAMS PROCESSING APPEARS ABOVE -- DIAGNOSTIC
INFORMATION IS X'2810022F'
IEB151I JOB HAS TERMINATED WITH ERROR(S)
IEB147I  END OF JOB - 4 WAS HIGHEST SEVERITY CODE
```

The reason for the COPY GROUP CONDITIONAL-REPLACE CONFLICT is the COPY that was done in Scenario 4. We specified to copy member IKJEFA00 but did not also specify alias ACCOUNT, and because we were using COPY there was no automatic inclusion of ACCOUNT.

The listing of the members of the output data set MHLRES2.SYS1.LINKLIB.IEBCOPY1 is shown in Example 7-13.

The significant points to note are:

- Members ABA and the alias ARCABA have the same TTR reference 000121
- Member ACCOUNT shows that it is an alias of IKJEFA00 and has TTR reference 00031F
- Member IKJEFA00 shows that it is at TTR 00032C

This effectively means that ACCOUNT and IKJEFA00 are not the same member any longer although they might have the same content. COPYGROUP recognizes this and refuses to do the copy.

Example 7-13 Listing of members in output data set showing TTR inconsistency

```
EDIT              MHLRES2.SYS1.LINKLIB.IEBCOPY1         Row 0000001 of 0000004
Command ===>                                                 Scroll ===> CSR
           Name     Prompt        Alias-of     Size      TTR     AC   AM   RM
_________ ABA                     ARCABA     00004140   000121   00    31   24
_________ ACCOUNT                 IKJEFA00   00001430   00031F   00    24   24
_________ ARCABA                             00004140   000121   00    31   24
_________ IKJEFA00                           00001430   00032C   00    24   24
          **End**
```

This situation cannot be corrected by using COPYGROUP. It must be corrected by using COPY and specifying (in this case) both the main member name IKJEFA00 and its alias ACCOUNT.

Scenario 7

In this scenario, we copy PDS to PDS where the output data set is not empty using COPY INDD,R OUTDD. SELECT the member and related alias of the member. Observe that neither the alias or the main member is replaced because of a COPY GROUP conflict.

In Example 7-14, you find the JCL that was run to show the use of the COPY statement with the SELECT minor statement to select a member and its alias that already exist in the output data set. In this case, we need to replace the main member name and alias so we used INDD=((INDD,R)).

Example 7-14 JCL to COPY member and alias to correct inconsistency

```
//MHLRES2C JOB (999,POK),'MHLRES2',CLASS=A,MSGCLASS=T,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=*
/* example of use of COPYGROUP to contrast with COPYGRP
//S1      EXEC PGM=IEBCOPY
//SYSPRINT DD  SYSOUT=*
//INDD     DD  DISP=SHR,DSN=SYS1.LINKLIB
//OUTDD    DD  DISP=SHR,DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
//SYSIN    DD  *
 COPY      INDD=((INDD,R)),OUTDD=OUTDD
 SELECT MEMBER=(IKJEFA00)
 SELECT MEMBER=(ACCOUNT)
```

In Example 7-15, we show the IEBCOPY messages showing that this COPY did complete successfully because both the member name and its alias were specified on the SELECT minor statement.

Example 7-15 IEBCOPY messages showing that both member and alias were copied

```
IEBCOPY MESSAGES AND CONTROL STATEMENTS                              PAGE     1
IEB1135I IEBCOPY  FMID HDZ2210  SERVICE LEVEL UA70502  DATED 20130821 DFSMS
02.01.00 z/OS    02.01.00 HBB7790  CPU 2827
IEB1035I MHLRES2C S1    17:34:22 WED 18 SEP 2013 PARM=''
 COPY    INDD=((INDD,R)),OUTDD=OUTDD                 00010000
 SELECT MEMBER=(IKJEFA00)                           00020000
 SELECT MEMBER=(ACCOUNT)                            00030009
IEB1013I COPYING FROM PDS  INDD=INDD  VOL=Z21RB1 DSN=SYS1.LINKLIB
IEB1014I            TO PDS  OUTDD=OUTDD    VOL=MLD83A
DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
IEB167I FOLLOWING MEMBER(S) COPIED FROM INPUT DATA SET REFERENCED BY INDD
IEB154I ACCOUNT  HAS BEEN SUCCESSFULLY COPIED
IEB154I IKJEFA00 HAS BEEN SUCCESSFULLY COPIED
IEB1098I 2 OF 2 MEMBERS COPIED FROM INPUT DATA SET REFERENCED BY INDD
IEB144I THERE ARE 745 UNUSED TRACKS IN OUTPUT DATA SET REFERENCED BY OUTDD
IEB149I THERE ARE 9 UNUSED DIRECTORY BLOCKS IN OUTPUT DIRECTORY
IEB147I END OF JOB - 0 WAS HIGHEST SEVERITY CODE
```

The reason for the COPY GROUP CONDITIONAL-REPLACE CONFLICT is the COPY that was done in Scenario 4. We specified to copy member IKJEFA00 but did not also specify alias ACCOUNT, and because we were using COPY there was no automatic inclusion of ACCOUNT.

The listing of the members of the output data set MHLRES2.SYS1.LINKLIB.IEBCOPY1 is shown in Example 7-16 on page 113.

The following significant points are worth noting:

- Members ABA and the alias ARCABA have the same TTR reference 000121 as before.

- Member ACCOUNT shows that it is an alias of IKJEFA00 and has TTR reference 000406.
- Member IKJEFA00 shows that it is at TTR 000406.

This effectively means that ACCOUNT and IKJEFA00 are now the same member and are at a new location in the output data set.

Example 7-16 Listing of members in output data set showing TTR consistency within groups

```
BROWSE            MHLRES2.SYS1.LINKLIB.IEBCOPY1         Row 0000001 of 0000004
Command ===>                                                 Scroll ===> CSR
           Name     Prompt        Alias-of     Size      TTR     AC   AM   RM
_________ ABA                     ARCABA     00004140   000121   00    31   24
_________ ACCOUNT                 IKJEFA00   00001430   000406   00    24   24
_________ ARCABA                             00004140   000121   00    31   24
_________ IKJEFA00                           00001430   000406   00    24   24
```

We illustrated the value of using COPYGROUP to ensure that members and their aliases remain consistent.

Scenario 8

Using the COPYGROUP statement demonstrates the use of the SELECT minor statement with wildcard character to specify the primary members to be copied. Expect to see alias names included when their primary member is specified for inclusion.

SYS1.LINKLIB is the source data set.

There are a number of members that start with ANTX, and a number that start with IKJ. Select these with ANTX*, and I%J* respectively.

In Example 7-17, you find the JCL that was run to show the use of the COPYGROUP statement with the SELECT minor statement to select two sets of members:

- With prefix ANTX and their aliases.
- With prefix IxK (where x is any character in position two) and their aliases.

The members may already exist in the output data set so we used INDD=((INDD,R)) so that they will get replaced.

Example 7-17 JCL to run COPYGROUP with SELECT statements with wildcards

```
//MHLRES2C JOB (999,POK),'MHLRES2',CLASS=A,MSGCLASS=T,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=*
/* example of use of COPYGROUP to contrast with COPYGRP
//S1      EXEC PGM=IEBCOPY
//SYSPRINT DD  SYSOUT=*
//INDD     DD  DISP=SHR,DSN=SYS1.LINKLIB
//OUTDD    DD  DISP=SHR,DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
//SYSIN    DD  *
 COPYGROUP INDD=((INDD,R)),OUTDD=OUTDD
 SELECT MEMBER=(ANTX*)
 SELECT MEMBER=(I%J*)
```

In Example 7-18 on page 114, we show the IEBCOPY messages resulting from the member name SELECT specifications. In particular, we see that there are many alias names that are automatically selected even though their names do not match the specified name selection pattern. We noted that 75 members and aliases were copied.

Example 7-18 IEBCOPY messages showing main members selected using wildcards

```
IEBCOPY MESSAGES AND CONTROL STATEMENTS                                 PAGE     1
IEB1135I IEBCOPY  FMID HDZ2210  SERVICE LEVEL UA70502  DATED 20130821 DFSMS
02.01.00 z/OS    02.01.00 HBB7790  CPU 2827
IEB1035I MHLRES2C S1    20:25:25 WED 18 SEP 2013 PARM=''
 COPYGROUP INDD=((INDD,R)),OUTDD=OUTDD                  00010000
 SELECT MEMBER=(ANTX*)                                  00020017
 SELECT MEMBER=(I%J*)                                   00030017
IEB1013I COPYING FROM PDS  INDD=INDD  VOL=Z21RB1 DSN=SYS1.LINKLIB
IEB1014I             TO PDS  OUTDD=OUTDD    VOL=MLDA39
DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
IGW01264I TOTAL PRIMARY NAMES: 3047, FILTER PATTERN MATCHES: 37
IGW01554I ALIAS ACCOUNT OF COPIED PRIMARY IKJEFA00  HAS BEEN COPIED
 AND REPLACED
IGW01552I MEMBER ANTXCRSM HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER ANTXICAL HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER ANTXITSO HAS BEEN COPIED  AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01554I ALIAS CDELPAIR OF COPIED PRIMARY ANTXITSO  HAS BEEN COPIED
 AND REPLACED
IGW01553I ALIAS CDELPATH OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01554I ALIAS CESTPAIR OF COPIED PRIMARY ANTXITSO  HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS CESTPATH OF COPIED PRIMARY ANTXITSO  HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS CGROUP  OF COPIED PRIMARY ANTXITSO    HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS CQUERY  OF COPIED PRIMARY ANTXITSO    HAS BEEN COPIED
 AND REPLACED
IGW01553I ALIAS CRECOVER OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01553I ALIAS CSUSPEND OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01553I ALIAS FCESTABL OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01553I ALIAS FCQUERY  OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01553I ALIAS FCWITHDR OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01554I ALIAS GETMSG  OF COPIED PRIMARY IKJCNUGW    HAS BEEN COPIED
 AND REPLACED
IGW01552I MEMBER IKJCNANT HAS BEEN COPIED   AND REPLACED
IGW01552I MEMBER IKJCNASR HAS BEEN COPIED   AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01552I MEMBER IKJCNUGW HAS BEEN COPIED   AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01554I ALIAS IKJCNUMI OF COPIED PRIMARY IKJCNASR    HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS IKJCT467 OF COPIED PRIMARY IKJCT469    HAS BEEN COPIED
 AND REPLACED
IGW01552I MEMBER IKJCT469 HAS BEEN COPIED   AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01552I MEMBER IKJEES40 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFA00 HAS BEEN COPIED  AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01552I MEMBER IKJEFA10 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFA20 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFA30 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFA40 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFD38 HAS BEEN COPIED  AND REPLACED
```

```
IGW01552I MEMBER IKJEFD40 HAS BEEN COPIED  AND REPLACED
IGW01554I ALIAS IKJEFF03 OF COPIED PRIMARY IKJEFF04  HAS BEEN COPIED
 AND REPLACED
                              IEBCOPY MESSAGES AND CONTROL STATEMENTS
PAGE      2
IGW01552I MEMBER IKJEFF04 HAS BEEN COPIED  AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01552I MEMBER IKJEFF10 HAS BEEN COPIED  AND REPLACED
IGW01554I ALIAS IKJEFF15 OF COPIED PRIMARY IKJEFF04  HAS BEEN COPIED
 AND REPLACED
IGW01552I MEMBER IKJEFF18 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFF19 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFF50 HAS BEEN COPIED  AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01552I MEMBER IKJEFF51 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFF53 HAS BEEN COPIED  AND REPLACED
IGW01554I ALIAS IKJEFF55 OF COPIED PRIMARY IKJEFF50  HAS BEEN COPIED
 AND REPLACED
IGW01552I MEMBER IKJEFF57 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFT25 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFXSR HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJHCA00 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJHCM00 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJHCR00 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJLDI00 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJLDI99 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJLHENP HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJLHENU HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJPRMSG HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJPRM01 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJPRM03 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJRBBU0 HAS BEEN COPIED  AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01552I MEMBER IKJTSOEV HAS BEEN COPIED  AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01554I ALIAS RQUERY  OF COPIED PRIMARY ANTXITSO  HAS BEEN COPIED
 AND REPLACED
IGW01553I ALIAS RSESSION OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01553I ALIAS RVOLUME  OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01554I ALIAS TSOENV  OF COPIED PRIMARY IKJTSOEV   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS UADSREFM OF COPIED PRIMARY IKJRBBU0   HAS BEEN COPIED
 AND REPLACED
IGW01553I ALIAS XADD  OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01554I ALIAS XADDPAIR OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01553I ALIAS XADVANCE OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01553I ALIAS XCLIP  OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01553I ALIAS XCOUPLE  OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01553I ALIAS XDEL  OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01553I ALIAS XDELPAIR OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01553I ALIAS XEND  OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01553I ALIAS XQUERY  OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01553I ALIAS XRCV  OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01553I ALIAS XRECOVER OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
```

```
IGW01554I ALIAS XSET  OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS XSTART  OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01553I ALIAS XSTATUS OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01553I ALIAS XSUSPEND OF COPIED PRIMARY ANTXITSO HAS BEEN COPIED
IGW01550I 75 OF 75 SPECIFIED MEMBERS WERE COPIED
                          IEBCOPY MESSAGES AND CONTROL STATEMENTS
PAGE     3
IEB147I END OF JOB - 0 WAS HIGHEST SEVERITY CODE
```

Scenario 9

In this scenario, the COPYGROUP statement is used to demonstrate the use of SELECT and EXCLUDE minor statements with wildcard characters to specify the members to be copied. Expect to see alias names excluded when their primary member is specified for exclusion.

SYS1.LINKLIB is the source data set.

There are a number of members that start with ANTX, and a number that start with IKJ.

Select these with ANTX*, and I%J* respectively and check whether any other members with a character other than K in position two of the member name.

Exclude the subset of I%J members that have EFF in positions 4 - 6 of the name.

In Example 7-19, we show the JCL that was run to show the use of the COPYGROUP statement with the SELECT minor statements to specify two sets of members and use of the EXCLUDE minor statement to exclude members from the second SELECT set:

- Select members with prefix ANTX and let COPYGROUP pick up their aliases.
- Select members with prefix IxK (where x is any character in the second position) and let COPYGROUP pick up their aliases.
- Exclude members with prefix IxJEFF to specify a subset of those with prefix IxK. Let COPYGROUP pick up their aliases and exclude them as well.

Note: The EXCLUDE minor statement is only allowed after a SELECT minor statement.

The members may already exist in the output data set so we used INDD=((INDD,R)) so that they will get replaced.

Example 7-19 JCL showing COPYGROUP with SELECT and EXCLUDE using wildcards

```
000010 //MHLRES2C JOB (999,POK),'MHLRES2',CLASS=A,MSGCLASS=T,
000020 //             NOTIFY=&SYSUID,TIME=1440,REGION=6M
000030 /*JOBPARM L=999,SYSAFF=*
000031 /* example of use of COPYGROUP to contrast with COPYGRP
000040 //S1      EXEC PGM=IEBCOPY
000050 //SYSPRINT DD  SYSOUT=*
000051 //INDD     DD  DISP=SHR,DSN=SYS1.LINKLIB
000060 //OUTDD    DD  DISP=SHR,DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
000080 //SYSIN    DD  *
000100  COPYGROUP INDD=((INDD,R)),OUTDD=OUTDD
000200  SELECT MEMBER=(ANTX*)
000300  SELECT MEMBER=(I%J*)
```

```
000400  EXCLUDE MEMBER=(I%JEFF*)
```

In Example 7-20, you find the IEBCOPY messages resulting from the COPYGROUP major and SELECT and EXCLUDE minor statements. In particular, we see that there are many alias names that are automatically selected even though their names do not match the specified name selection pattern.

We noted that 64 member names were copied. This contrasts with the corresponding messages from Scenario 8 as in Example 7-18 on page 114 where 75 members were copied.

The difference is due to the EXCLUDE minor statement that has caused members and aliases to be omitted.

Example 7-20 IEBCOPY messages showing the number of members copied due to EXCLUDE

```
IEBCOPY MESSAGES AND CONTROL STATEMENTS                                PAGE     1
IEB1135I IEBCOPY  FMID HDZ2210  SERVICE LEVEL UA70502  DATED 20130821 DFSMS
02.01.00 z/OS    02.01.00 HBB7790  CPU 2827
IEB1035I MHLRES2C S1    20:29:11 WED 18 SEP 2013 PARM=''
 COPYGROUP INDD=((INDD,R)),OUTDD=OUTDD                 00010000
 SELECT MEMBER=(ANTX*)                                 00020000
 SELECT MEMBER=(I%J*)                                  00030000
 EXCLUDE MEMBER=(I%JEFF*)                               00040018
IEB1013I COPYING FROM PDS  INDD=INDD  VOL=Z21RB1 DSN=SYS1.LINKLIB
IEB1014I            TO PDS  OUTDD=OUTDD    VOL=MLDA39
DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
IGW01264I TOTAL PRIMARY NAMES: 3047, FILTER PATTERN MATCHES: 29
IGW01554I ALIAS ACCOUNT OF COPIED PRIMARY IKJEFA00  HAS BEEN COPIED
 AND REPLACED
IGW01552I MEMBER ANTXCRSM HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER ANTXICAL HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER ANTXITSO HAS BEEN COPIED  AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01554I ALIAS CDELPAIR OF COPIED PRIMARY ANTXITSO  HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS CDELPATH OF COPIED PRIMARY ANTXITSO  HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS CESTPAIR OF COPIED PRIMARY ANTXITSO  HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS CESTPATH OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS CGROUP  OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS CQUERY  OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS CRECOVER OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS CSUSPEND OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS FCESTABL OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS FCQUERY  OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS FCWITHDR OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS GETMSG  OF COPIED PRIMARY IKJCNUGW   HAS BEEN COPIED
```

```
 AND REPLACED
IGW01552I MEMBER IKJCNANT HAS BEEN COPIED   AND REPLACED
IGW01552I MEMBER IKJCNASR HAS BEEN COPIED   AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01552I MEMBER IKJCNUGW HAS BEEN COPIED   AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01554I ALIAS IKJCNUMI OF COPIED PRIMARY IKJCNASR  HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS IKJCT467 OF COPIED PRIMARY IKJCT469  HAS BEEN COPIED
 AND REPLACED
IGW01552I MEMBER IKJCT469 HAS BEEN COPIED  AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01552I MEMBER IKJEES40 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFA00 HAS BEEN COPIED  AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01552I MEMBER IKJEFA10 HAS BEEN COPIED  AND REPLACED
                           IEBCOPY MESSAGES AND CONTROL STATEMENTS
PAGE      2
IGW01552I MEMBER IKJEFA20 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFA30 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFA40 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFD38 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFD40 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFT25 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJEFXSR HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJHCA00 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJHCM00 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJHCR00 HAS BEEN COPIED  AND REPLACED
IGW01552I MEMBER IKJLDI00 HAS BEEN COPIED   AND REPLACED
IGW01552I MEMBER IKJLDI99 HAS BEEN COPIED   AND REPLACED
IGW01552I MEMBER IKJLHENP HAS BEEN COPIED   AND REPLACED
IGW01552I MEMBER IKJLHENU HAS BEEN COPIED   AND REPLACED
IGW01552I MEMBER IKJPRMSG HAS BEEN COPIED   AND REPLACED
IGW01552I MEMBER IKJPRM01 HAS BEEN COPIED   AND REPLACED
IGW01552I MEMBER IKJPRM03 HAS BEEN COPIED   AND REPLACED
IGW01552I MEMBER IKJRBBU0 HAS BEEN COPIED   AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01552I MEMBER IKJTSOEV HAS BEEN COPIED   AND REPLACED
 A PRIMARY WITH ALIAS(ES)
IGW01554I ALIAS RQUERY  OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS RSESSION OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS RVOLUME  OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS TSOENV  OF COPIED PRIMARY IKJTSOEV   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS UADSREFM OF COPIED PRIMARY IKJRBBU0   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS XADD  OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS XADDPAIR OF COPIED PRIMARY ANTXITSO    HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS XADVANCE OF COPIED PRIMARY ANTXITSO    HAS BEEN COPIED
 AND REPLACED
```

```
IGW01554I ALIAS XCLIP  OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS XCOUPLE  OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS XDEL  OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS XDELPAIR OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS XEND  OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS XQUERY  OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS XRCV  OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS XRECOVER OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS XSET  OF COPIED PRIMARY ANTXITSO   HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS XSTART OF COPIED PRIMARY ANTXITSO  HAS BEEN COPIED
 AND REPLACED
                          IEBCOPY MESSAGES AND CONTROL STATEMENTS
PAGE     3
IGW01554I ALIAS XSTATUS OF COPIED PRIMARY ANTXITSO  HAS BEEN COPIED
 AND REPLACED
IGW01554I ALIAS XSUSPEND OF COPIED PRIMARY ANTXITSO  HAS BEEN COPIED
 AND REPLACED
IGW01550I 64 OF 64 SPECIFIED MEMBERS WERE COPIED
IEB147I  END OF JOB - 0 WAS HIGHEST SEVERITY CODE
```

Scenario 10

We illustrated the functions of the COPYGROUP statement when processing PDS to PDS functions. COPYGROUP expanded on COPYGRP functions by including the capability to handle PDS to PDS that were not available with COPYGRP. COPYGRP when used on PDS behaves like COPY; that is it does *not* copy the related members.

In Example 7-21, you find the job used to demonstrate that COPYGRP only copies what is specified. In this case member AD was selected, which is one alias of the main member name IRRENV00, which was not selected.

Example 7-21 JCL for job to show COPYGRP on PDS not copying the group of data sets

```
//MHLRES2C JOB (999,POK),'MHLRES2',CLASS=A,MSGCLASS=T,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=*
/* example of use of COPYGRP to contrast with COPYGROUP
//S1      EXEC PGM=IEBCOPY
//SYSPRINT DD  SYSOUT=*
//INDD     DD  DISP=SHR,DSN=SYS1.LINKLIB
//OUTDD    DD  DISP=SHR,DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
//SYSIN    DD  *
 COPYGRP   INDD=INDD,OUTDD=OUTDD
 SELECT MEMBER=(AD)
```

In Example 7-22 on page 120, we show that IEBCOPY COPYGRP only copied member AD, which is an alias.

Example 7-22 IEBCOPY messages showing only member AD was copied

```
IEBCOPY MESSAGES AND CONTROL STATEMENTS                              PAGE     1
IEB1135I IEBCOPY  FMID HDZ2210  SERVICE LEVEL UA70502  DATED 20130821 DFSMS
02.01.00 z/OS    02.01.00 HBB7790  CPU 2827
IEB1035I MHLRES2C S1    12:33:21 THU 19 SEP 2013 PARM=''
 COPYGRP  INDD=INDD,OUTDD=OUTDD                      00010007
 SELECT MEMBER=(AD)                                 00020007
IEB1013I COPYING FROM PDS  INDD=INDD  VOL=Z21RB1 DSN=SYS1.LINKLIB
IEB1014I            TO PDS  OUTDD=OUTDD    VOL=MLDA39
DSN=MHLRES2.SYS1.LINKLIB.IEBCOPY1
IEB167I FOLLOWING MEMBER(S) COPIED FROM INPUT DATA SET REFERENCED BY INDD
IEB154I AD     HAS BEEN SUCCESSFULLY COPIED
IEB1098I 1 OF 1 MEMBERS COPIED FROM INPUT DATA SET REFERENCED BY INDD
IEB144I THERE ARE 651 UNUSED TRACKS IN OUTPUT DATA SET REFERENCED BY OUTDD
IEB149I THERE ARE 35 UNUSED DIRECTORY BLOCKS IN OUTPUT DIRECTORY
IEB147I END OF JOB - 0 WAS HIGHEST SEVERITY CODE
```

Example 7-23 shows the resulting members in the output data set. Alias name AD was copied, and has retained the information that it is an alias of main member of IRRENV00.

Also shown are member names IKJTSOEV and RQUERY. The member name IRRENV00, which should be between those two is missing.

This situation can be corrected by running IEBCOPY with COPYGRP or COPY statement and selecting the main member name IRRENV00 and all the aliases.

Alternatively, the COPYGROUP statement can be used to correct the situation more easily but only after the member AD has been deleted. If member AD is not deleted, a CONFLICT will occur.

Example 7-23 Listing of the output data set showing member AD as alias of IRRENV00

```
LIBRARY          MHLRES2.SYS1.LINKLIB.IEBCOPY1          Row 0000001 of 0000078
Command ===>                                                 Scroll ===> CSR
   Name     Prompt         Alias-of      Size       TTR      AC    AM     RM
_ ABA                      ARCABA      00004140    000107    00     31     24
_ ACCOUNT                  IKJEFA00    00001430    003C16    00     24     24
_ AD                       IRRENV00    0004D708    005B08    01     31     24
.
.
.
.
_ IKJTSOEV                             000000D8    004219    00     31    ANY
_ RQUERY                   ANTXITS0    00069CD8    004A04    01     31    ANY
```

Scenarios 1 - 10 illustrate the advantage of using the DFSMS V2.1 new COPYGROUP statement.

PDS or PDSE to PDS operations

The original COPYGRP statement does work for PDSE output data sets. The restriction is only for PDS output data sets when COPYGRP behaves if the COPY statement had been specified, subject to the syntax rules for COPYGRP.

Unloading PDS to PDSE data sets to physical sequential data sets

COPYGRP will only work (in group mode) for PDSE to physical sequential (PS). If the input is a PDS, only the name specified on a SELECT statement will be copied.

COPYGROUP will work for PDSE or PDS to PS.

Loading unloaded PDS or PDSE data sets from PS data sets

COPYGRP will only work for PS to PDSE.

COPYGROUP will work for PS to PDS or to PDSE.

Compatibility

The COPYGROUP statement is not available on DFSMS releases before DFSMS V2.1.

The COPYGRP statement as provided in DFSMS V2.1 is functionally the same as on releases before DFSMS V2.1.

7.2 IEBCOPY user exit capabilities

There are significant enhancements to the user exit capability for IEBCOPY. They are only available when IEBCOPY is invoked from another program. The new exit capability allows:

- Generation of an input stream for IEBCOPY without using a JCL-managed SYSIN stream.
- Feedback of output to be added to the SYSPRINT stream.

7.2.1 Exit capabilities

There are two exit options, either one or both can be used. We created an example of the use of the control statement exit to supply SYSIN statements.

Control statement exit

The control statement exit can be used to specify statements to be passed as though from SYSIN, and to provide data to be passed to the IEBCOPY SYSPRINT stream.

We created a program (IEBCPYL) to illustrate the use of the control statement exit, while also using the page number setting option that was available before DFSMS V2.1.

The assembler source for IEBCPYL is provided in the appendix at Example C-6 on page 394.

In Example 7-24, we show the JCL to run the program IEBCPYL that invokes the IECOPY copy program to use the control statement exit. The IEBCPYL program is for illustrative purposes only and issues diagnostic write to operator (WTO) messages. The JCL is standard for IEBCOPY but note that no SYSIN is present. Normally, the absence of a SYSIN JCL statement would cause IEBCOPY to generate an internal COPY from DD SYSUT1 to DD SYSUT2 to pass to the SYSIN stream.

The exit generates the following statements:

- COPY INDD=SYSUTX,OUTDD=SYSUTY
- SELECT MEMBER=A

Example 7-24 JCL to invoke IEBCPYL to use the Control Statement Exit capability

```
//MHLRES2E JOB (1234567,COMMENT),MHLRES2,TIME=10,
```

```
// MSGCLASS=J,
// REGION=1M,
// MSGLEVEL=1,CLASS=A,
// NOTIFY=&SYSUID
/*JOBPARM S=*
//COPY     EXEC PGM=IEBCPYL,REGION=1M
//STEPLIB  DD DISP=SHR,DSN=MHLRES2.IEBCOPY.DFSMS21.LOAD
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSUTX   DD DISP=SHR,DSN=SYS1.SIEALNKE
//SYSUTY   DD DISP=(,DELETE),UNIT=SYSALLDA,SPACE=(TRK,(050,1,100)),
//         DCB=(SYS1.SIEALNKE),DSNTYPE=LIBRARY
```

We show the result of running program IEBCPYL in two parts. The first part is the job log that shows the WTO messages along with the usual SYSOUT. The second part shows the IEBCOPY messages.

The control statement exit invoked by IEBCPYL is called IEBCPYC for this example.

The assembler source for IEBCPYC is provided in the appendix in Example C-8 on page 396.

In Example 7-25, we show the system output from running the IEBCPYL program. The WTO messages are:

- GOT TO IEBCPYEC: Issued each time the IEBCPYC is entered
- CPLST_CONTROL_INIT: Issued when IEBCOPY calls IEBCPYC for initialization
- CPLST_CONTROL_DATA - n: Issued when IEBCOPY calls IEBCPYC for data or to END

Example 7-25 Output resulting from running IEBCPYL (JOBLOG)

```
J E S 2  J O B  L O G  --  S Y S T E M  S C 6 4  --  N O D E  W T S C P L X 2

15.17.46 JOB19260 ---- SUNDAY,  27 OCT 2013 ----
15.17.46 JOB19260 IRR010I USERID MHLRES2 IS ASSIGNED TO THIS JOB.
15.17.46 JOB19260  ICH70001I MHLRES2  LAST ACCESS AT 15:17:11 ON SUNDAY, OCTOBER
27, 2013
15.17.46 JOB19260  $HASP373 MHLRES2E STARTED - INIT 1    - CLASS A        - SYS
SC64
15.17.46 JOB19260 IEF403I MHLRES2E - STARTED - TIME=15.17.46 - ASID=0024 - SC64
15.17.46 JOB19260  +GOT TO IEBCPYEC
15.17.46 JOB19260  +CPLST_CONTROL_INIT
15.17.46 JOB19260  +GOT TO IEBCPYEC
15.17.46 JOB19260  +CPLST_CONTROL_DATA - 1
15.17.46 JOB19260  +GOT TO IEBCPYEC
15.17.46 JOB19260  +CPLST_CONTROL_DATA - 2
15.17.46 JOB19260  +GOT TO IEBCPYEC
15.17.46 JOB19260  +CPLST_CONTROL_DATA - 3
15.17.46 JOB19260  +GOT TO IEBCPYEC
15.17.46 JOB19260  +CPLST_CONTROL_DATA - E
15.17.46 JOB19260 PROGRAM : IEBCPYL IN STEP : COPY   - COND CODE : 0000
15.17.46 JOB19260 TOTAL CPU (SECS)  BLKS READ/WRITE   TOTAL SWAPS
15.17.46 JOB19260         0.07        1.154
15.17.46 JOB19260 IEF404I MHLRES2E - ENDED - TIME=15.17.46 - ASID=0024 - SC64
15.17.46 JOB19260  $HASP395 MHLRES2E ENDED
------ JES2 JOB STATISTICS ------
 27 OCT 2013 JOB EXECUTION DATE
       13 CARDS READ
```

```
      111 SYSOUT PRINT RECORDS
        0 SYSOUT PUNCH RECORDS
        6 SYSOUT SPOOL KBYTES
     0.01 MINUTES EXECUTION TIME
        1 //MHLRES2E JOB (1234567,COMMENT),MHLRES2,TIME=10,
JOB19260
          // MSGCLASS=J,
00020000
          // REGION=1M,
00030018
          // MSGLEVEL=1,CLASS=A,
00040000
          // NOTIFY=&SYSUID
00050000
          IEFC653I SUBSTITUTION JCL -
(1234567,COMMENT),MHLRES2,TIME=10,MSGCLASS=J,REGION=1M,MSGLEVEL=1,CLASS=A,
      NOTIFY=MHLRES2
        2 /*JOBPARM S=*
00060000
        3 //COPY     EXEC PGM=IEBCPYL,REGION=1M
00070018
        4 //STEPLIB  DD DISP=SHR,DSN=MHLRES2.IEBCOPY.DFSMS21.LOAD
00080000
        5 //SYSPRINT DD SYSOUT=*
00090000
        6 //SYSUDUMP DD SYSOUT=*
00100000
        7 //SYSUTX   DD DISP=SHR,DSN=SYS1.SIEALNKE
00110019
        8 //SYSUTY   DD DISP=(,DELETE),UNIT=SYSALLDA,SPACE=(TRK,(050,1,100)),
00120019
          //         DCB=(SYS1.SIEALNKE),DSNTYPE=LIBRARY
00130000
 STMT NO. MESSAGE
-
    8 IGD01008I SC ACS GETS CONTROL &ACSENVIR=ALLOC
     8 IGD01008I STORCLAS SET TO
ICH70001I MHLRES2  LAST ACCESS AT 15:17:11 ON SUNDAY, OCTOBER 27, 2013
IEF236I ALLOC. FOR MHLRES2E COPY
IEF237I 960D ALLOCATED TO STEPLIB
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I JES2 ALLOCATED TO SYSUDUMP
IEF237I 960D ALLOCATED TO SYSUTX
IGD100I A72B ALLOCATED TO DDNAME SYSUTY  DATACLAS (     )
GOT TO IEBCPYEC
CPLST_CONTROL_INIT
GOT TO IEBCPYEC
CPLST_CONTROL_DATA - 1
GOT TO IEBCPYEC
CPLST_CONTROL_DATA - 2
GOT TO IEBCPYEC
CPLST_CONTROL_DATA - 3
GOT TO IEBCPYEC
CPLST_CONTROL_DATA - E
IEF142I MHLRES2E COPY - STEP WAS EXECUTED - COND CODE 0000
```

```
IEF285I  MHLRES2.IEBCOPY.DFSMS21.LOAD          KEPT
IEF285I   VOL SER NOS= Z21RE1.
IEF285I  MHLRES2.MHLRES2E.JOB19260.D0000101.?     SYSOUT
IEF285I  MHLRES2.MHLRES2E.JOB19260.D0000102.?     SYSOUT
IEF285I   SYS1.SIEALNKE                      KEPT
IEF285I   VOL SER NOS= Z21RE1.
IEF285I  SYS13300.T151746.RA000.MHLRES2E.R0111849   DELETED
IEF285I   VOL SER NOS= SBOX76.
*********************************************************************
* DDNAME  :  BLKS READ/WRITE                          *
* STEPLIB             3                             *
* SYSPRINT                                          *
* SYSUDUMP                                          *
* SYSUTX            649                             *
* SYSUTY            502                             *
*********************************************************************
IEF373I STEP/COPY   /START 2013300.1517
IEF032I STEP/COPY   /STOP  2013300.1517
     CPU:   0 HR  00 MIN  00.07 SEC   SRB:   0 HR  00 MIN  00.00 SEC
     VIRT:  1024K  SYS:  352K  EXT:    40K  SYS:   50724K
      ATB- REAL:             20K  SLOTS:              0K
         VIRT- ALLOC:     3M SHRD:     0M
IEF375I  JOB/MHLRES2E/START 2013300.1517
IEF033I  JOB/MHLRES2E/STOP  2013300.1517
         CPU:      0 HR   00 MIN   00.07 SEC     SRB:      0 HR   00 MIN   00.00 SEC
```

In Example 7-26, we show the IEBCOPY output resulting from running program IEBCPYL.

- The page number has been set to PAGE 4 to illustrate use of the PAGE NUM option.
- The COPY INDD=SYSUTX,OUTDD=SYSUTY statement has been generated and executed. The copy step failed due to lack of space in the output data set.
- The COPY INDD=SYSUTX,OUTDD=SYSUTY has been generated again, together with the SELECT MEMBER=A statement. The copy step failed because member A is not in the input data set.

Example 7-26 Output resulting from running IEBCPYL (IEBCOPY)

```
IEBCOPY MESSAGES AND CONTROL STATEMENTS                          PAGE     4
IEB1135I IEBCOPY  FMID HDZ2210  SERVICE LEVEL UA70502  DATED 20130821 DFSMS
02.01.00 z/OS    02.01.00 HBB7790  CPU 2827
IEB1035I MHLRES2E COPY   15:17:46 SUN 27 OCT 2013 PARM=''
 COPY INDD=SYSUTX,OUTDD=SYSUTY
IEB1013I COPYING FROM PDSE INDD=SYSUTX  VOL=Z21RE1 DSN=SYS1.SIEALNKE
IEB1014I            TO PDSE  OUTDD=SYSUTY    VOL=SBOX76
DSN=SYS13300.T151746.RA000.MHLRES2E.R0111849
IGW01172T OUT OF SPACE CONDITION ENCOUNTERED DURING MEMBER CREATE
 PROCESSING FOR MEMBER IRRSPIM , WITH REASON CODE = X'00000E37'
IGW01173S UNEXPECTED RESULTS FROM AN SMSX SERVICE. RETURN CODE WAS 20
 AND REASON CODE WAS X'050BC005'
IGW01550I 0 OF 172  MEMBERS WERE COPIED
IEB1130E A TERMINATING MESSAGE FROM FAMS PROCESSING APPEARS ABOVE -- DIAGNOSTIC
INFORMATION IS X'281D00AD'
 COPY INDD=SYSUTX,OUTDD=SYSUTY
 SELECT MEMBER=A
IEB1013I COPYING FROM PDSE INDD=SYSUTX  VOL=Z21RE1 DSN=SYS1.SIEALNKE
```

```
IEB1014I            TO PDSE OUTDD=SYSUTY    VOL=SBOX76
DSN=SYS13300.T151746.RA000.MHLRES2E.R0111849
IGW01550I 0 OF 1 SPECIFIED MEMBERS WERE COPIED
IEB177I A     WAS SELECTED BUT NOT FOUND IN ANY INPUT DATA SET
IEB151I JOB HAS TERMINATED WITH ERROR(S)
IEB147I END OF JOB - 8 WAS HIGHEST SEVERITY CODE
```

Member selection exit

The member selection exit can be used to refine the list of members from a data set to be processed. It is invoked by IEBCOPY if requested, and is called by IEBCOPY, which passes a data area like the one passed to the control statement exit. Additional data is provided relating to the member list.

Compatibility

The enhanced user exit capability is not provided on systems before DFSMS V2.1.

Note: The PARM list that can be passed to DFP utilities is extended to four addresses for IEBCOPY with DFSMS V2.1. The fourth address is for use with the new IEBCOPY exits.

It is possible that some existing programs have three addresses specified but have not indicated that the third address is the last provided. This would not have mattered before DFSMS V2.1 since IEBCOPY was only looking for up to three addresses. With DFSMS V2.1, if the third address is not flagged as the last one, IEBCOPY attempts to process a fourth address with unpredictable results.

7.3 IEBCOPY return code feedback

If IEBCOPY is invoked from another program, feedback is available in DFSMS V2.1 to assist with diagnosis of any problems with the FAMS routines. The information is returned in General Register 0. The return code presented in Register 15 is not new.

The FAMS code is used when processing data sets in PDSE format.

We have written sample code that shows a way to document the special diagnosis information that is available starting with DFSMS V2.1.

To test the analysis routine for the data that might be returned in Register 0, the program accepts a PARM value that can be set up to simulate what might be returned in register 0.

The program calls IEBCOPY then presents messages with the results of the analysis.

In Example 7-27, we show the JCL to run program IEBCPYF. The program is in data set MHLRES2.IEBCOPY.DFSMS21.LOAD. The source for this program is in the appendix in Example C-1 on page 390.

As shown in Example 7-27, the PARM is not used because there is a blank before the keyword PARM.

Example 7-27 JCL to run program IEBCPYF

```
//MHLRES2E JOB (1234567,COMMENT),MHLRES2,TIME=10,
// MSGCLASS=J,
// REGION=500K,
```

```
// MSGLEVEL=1,CLASS=A,
// NOTIFY=&SYSUID
/*JOBPARM S=*
//COPY     EXEC PGM=IEBCPYF,REGION=500K PARM='TESTREG0:123456789ABCDEF'
//STEPLIB  DD DISP=SHR,DSN=MHLRES2.IEBCOPY.DFSMS21.LOAD
//SYSPRINT DD SYSOUT=*
//PRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSUT1   DD DISP=SHR,DSN=SYS1.SIEALNKE
//SYSUT2   DD DISP=(,DELETE),UNIT=SYSALLDA,SPACE=(TRK,(050,1,100)),
//         DCB=(SYS1.SIEALNKE),DSNTYPE=LIBRARY
//SYSIN    DD DUMMY
```

Example 7-28 shows the messages resulting from running the JCL in Example 7-27 on page 125.

This job was set up so that it would have problems with the IEBCOPY operation, but the problems are not in the FAMS code.

The IEBCOPY process ends with return code 8, which is also reflected in the messages from IEBCPYF. In this case, since the FAMS code did *not* abend, register 0 was set to all zeros.

Example 7-28 Messages from running IEBCPYF sample with no PARM

```
IEBCOPY MESSAGES AND CONTROL STATEMENTS                          PAGE     1
IEB1135I IEBCOPY  FMID HDZ2210  SERVICE LEVEL UA70502  DATED 20130821 DFSMS
02.01.00 z/OS    02.01.00 HBB7790  CPU 2827
IEB1035I MHLRES2E COPY  15:48:31 WED 02 OCT 2013 PARM=''
COPY  COPY  INDD=SYSUT1,OUTDD=SYSUT2    GENERATED STATEMENT
IEB1013I COPYING FROM PDSE INDD=SYSUT1 VOL=Z21RE1 DSN=SYS1.SIEALNKE
IEB1014I            TO PDSE OUTDD=SYSUT2   VOL=SBOX82
DSN=SYS13275.T154831.RA000.MHLRES2E.R0100507
IGW01172T OUT OF SPACE CONDITION ENCOUNTERED DURING MEMBER CREATE
 PROCESSING FOR MEMBER IRRSPIM , WITH REASON CODE = X'00000E37'
IGW01173S UNEXPECTED RESULTS FROM AN SMSX SERVICE. RETURN CODE WAS 20
 AND REASON CODE WAS X'050BC005'
IGW01550I 0 OF 172  MEMBERS WERE COPIED
IEB1130E A TERMINATING MESSAGE FROM FAMS PROCESSING APPEARS ABOVE -- DIAGNOSTIC
INFORMATION IS X'281D00AD'
IEB151I JOB HAS TERMINATED WITH ERROR(S)
IEB147I END OF JOB - 8 WAS HIGHEST SEVERITY CODE
 REGISTER CONTENTS AFTER LINK TO IEBCOPY
 ON EXIT FROM IEBCOPY R15=0008
 ON EXIT FROM IEBCOPY R0=0000000000000000
```

In order to exercise the Register 0 analysis code, the program accepts a PARM of the form PARM='TESTREG0:xxxxxxxxxxxxxxx', where the xxxxxxxxxxxxxxx string can be set to any value.

The JCL used was the same as in Example 7-27 on page 125 but the blank before the PARM= operand was removed so that the PARM takes effect. In Example 7-29, we show the effect of running with a PARM.

Example 7-29 Messages from running IEBCPYF program with PARM

```
IEBCOPY MESSAGES AND CONTROL STATEMENTS                          PAGE     1
```

```
IEB1135I IEBCOPY  FMID HDZ2210  SERVICE LEVEL UA70502  DATED 20130821 DFSMS
02.01.00 z/OS    02.01.00 HBB7790  CPU 2827
IEB1035I MHLRES2E COPY   15:47:52 WED 02 OCT 2013 PARM=''
COPY   COPY   INDD=SYSUT1,OUTDD=SYSUT2    GENERATED STATEMENT
IEB1013I COPYING FROM PDSE INDD=SYSUT1  VOL=Z21RE1 DSN=SYS1.SIEALNKE
IEB1014I            TO PDSE OUTDD=SYSUT2   VOL=SBOX76
DSN=SYS13275.T154752.RA000.MHLRES2E.R0100506
IGW01172T OUT OF SPACE CONDITION ENCOUNTERED DURING MEMBER CREATE
 PROCESSING FOR MEMBER IRRSPIM , WITH REASON CODE = X'00000E37'
IGW01173S UNEXPECTED RESULTS FROM AN SMSX SERVICE. RETURN CODE WAS 20
 AND REASON CODE WAS X'050BC005'
IGW01550I 0 OF 172  MEMBERS WERE COPIED
IEB1130E A TERMINATING MESSAGE FROM FAMS PROCESSING APPEARS ABOVE -- DIAGNOSTIC
INFORMATION IS X'281D00AD'
IEB151I JOB HAS TERMINATED WITH ERROR(S)
IEB147I END OF JOB - 8 WAS HIGHEST SEVERITY CODE
 REGISTER CONTENTS AFTER LINK TO IEBCOPY
 ON EXIT FROM IEBCOPY R15=0008
 ON EXIT FROM IEBCOPY R0=F1F2F3F4F5F6F7F8
 *** WARNING - RUNNING WITH TEST PARM
 REGISTER 0 CONTENTS ANALYSIS
 IEBRSN_ABENDED FLAG IS ON INDICATING THAT AN ABEND OCCURRED IN FAMS
 IEBRSN_ABENDED FLAG IS ON AND ABEND CODE IS: 7F8
  IEBRSN_ABENDED FLAG IS ON AND REASON CODE IS: F1F2
```

Compatibility

The Register 0 feedback is not formally provided on systems before DFSMS V2.1. The contents of register 0 may not have been set explicitly, so although the program could run, any interpretation would be unreliable.

7.4 Open Close and End of volume (OCE) partial release

In this section, we describe the Open, Close, and End of volume (OCE) partial release enhancements in DFSMS V2.1. First, we look at the OCE partial release in systems before DFSMS V2.1.

7.4.1 Before DFSMS V2.1

In systems before DFSMS V2.1, unused space at the end of a data set is released under these conditions:

- Sequential or partitioned data set.
- RLSE is coded on the DD statement or the management class specifies it.
- During DFSMShsm space management or when a program closes the data set that is open for writing.

If the data set has multiple volumes, the space is released only on one volume. Space is not released on subsequent volumes that the data set may have expanded to previously. An exception is for striped data sets where space is released on all volumes if possible.

7.4.2 DFSMS V2.1 enhancement

If a data set is SMS-managed, all the unused space in the data set on all volumes will be released:

- The Format 1 or 8 data set control block (DSCB) will remain with no extents.
- The catalog entry will still show the volume serials.
- Space is released even if the storage class specifies Guaranteed Space.

7.4.3 Illustration scenarios

We generated an environment to show the different behavior of partial release between a DFSMS V1.13 system and DFSMS V2.1 system. Scenario 1 to scenario 3 are from a DFSMS V1.13 system.

Scenario 1

In this scenario, we created a data set specifying that it occupy three volumes.

In Example 7-30 we show the JCL used to allocate the sample data set called MHLRES2.TESTREL.PS. This allows use of three volumes for data set MHLRES2.TESTREL.PS. Ten cylinders primary plus 15 extents will be allocated on the first volume then 16 extents on each of the other two volumes, making 48 extents in all.

Example 7-30 JCL to allocate data set MHLRES2.TESTREL.PS on three volumes

```
//MHLRES2H JOB (999,POK),'MHLRES2',CLASS=A,MSGCLASS=T,
// NOTIFY=&SYSUID,TIME=1440,REGION=6M
//* ALLOCATE SEQUENTIAL DATA SET ON 3 VOLUMES
/*JOBPARM L=999,SYSAFF=*
//TSO     EXEC PGM=IEFBR14
//ALLOC    DD  DSN=MHLRES2.TESTREL.PS,DISP=(NEW,CATLG),
//             UNIT=(SYSDA,3),SPACE=(CYL,(10,1)),
//             DCB=(LRECL=80,RECFM=FB,BLKSIZE=160)
```

To illustrate the effect of using a data set to its full extent then show the effect of releasing space after the data set had been used to a much smaller extent, we created a program to use the data set. The sample program code is provided in the appendix section “Sample job to initialize data set for OCE Partial Release” on page 414.

The program has two modes:

- Run until the data set was full and all extents used (ending with abend SB37)
- Run and write only 1000 records

Scenario 2

In Example 7-31, we show the JCL to write records to completely fill the data set MHLRES2.TESTREL.PS. The JCL statement containing the **RLSE** parameter is commented out.

Example 7-31 JCL to write to data set on three volumes

```
//MHLRES2H JOB (1234567,COMMENT),MHLRES2,TIME=10,
// MSGCLASS=J,
// REGION=500K,
// MSGLEVEL=1,CLASS=A,
// NOTIFY=&SYSUID
```

```
/*JOBPARM S=*
//COPY     EXEC PGM=GENREC1,REGION=500K PARM='SHORT'
//STEPLIB  DD DISP=SHR,DSN=MHLRES2.IEBCOPY.DFSMS21.LOAD
//SYSPRINT DD SYSOUT=*
//PRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//GENDCB   DD DISP=SHR,DSN=MHLRES2.TESTREL.PS
//*        SPACE=(TRK,1,RLSE)
//SYSIN    DD DUMMY
```

In Example 7-32, we show that the data set MHLRES2.TESTREL.PS has had 57 cylinders allocated in 48 extents.

Example 7-32 ISPF display of initialized data set MHLRES2.TESTREL.PS

```
Data Set Information
 Command ===>

 Data Set Name . . . . : MHLRES2.TESTREL.PS

 General Data                            Current Allocation
  Management class . . : MCDB22           Allocated cylinders : 57
  Storage class  . . . : STANDARD         Allocated extents . : 48
   Volume serial . . . : MLD83A +
   Device type . . . . : 3390
  Data class . . . . . : **None**
   Organization  . . . : PS              Current Utilization
   Record format . . . : FB               Used cylinders  . . : 57
   Record length . . . : 80               Used extents  . . . : 48
   Block size  . . . . : 160
   1st extent cylinders: 10
   Secondary cylinders : 1               Dates
   Data set name type  :                  Creation date . . . : 2013/10/12
   SMS Compressible. . : NO               Referenced date . . : 2013/10/12
                                          Expiration date . . : ***None***



 To display multiple volumes press Enter or enter Cancel to Exit.
```

In Example 7-33, we show the three volumes the data set MHLRES2.TESTREL.PS is allocated on.

Example 7-33 ISPF display of volumes used by data set MHLRES2.TESTREL.PS

```
Data Set Information
 C Essssssssss Volume Information sssssssssN
   e                                      e
 D e Command ===>                         e
   e                                      e
 G e All allocated volumes:               e Allocation
   e                           More:    + e ed cylinders : 57
   e  Number of volumes allocated: 3      e ed extents . : 48
   e                                      e
   e  MLD83A  MLDB35  MLD32E              e
   e                                      e
```

```
   e                                          e Utilization
   e                                          e linders  . . : 57
   e                                          e tents  . . . : 48
   DsssssssssssssssssssssssssssssssssssssssssM
   1st extent cylinders: 10
   Secondary cylinders : 1              Dates
   Data set name type  :                 Creation date . . . : 2013/10/12
   SMS Compressible. . : NO              Referenced date . . : 2013/10/12
                                         Expiration date . . : ***None***


 To display multiple volumes press Enter or enter Cancel to Exit.
```

In Example 7-34, we show that on the first of the three volumes that data set MHLRES2.TESTREL.PS is allocated on has used 375 tracks. This is 25 cylinders (1 of 10 plus 15 of 1 cylinder each).

Example 7-34 ISPF display showing data set MHLRES2.TESTREL.PS on the first volume

```
Menu  Options  View  Utilities  Compilers  Help
 sssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
 DSLIST - Data Sets on volume MLD83A                              Row 22 of 38
 Command ===>                                                  Scroll ===> CSR

 Command - Enter "/" to select action                       Tracks %Used   XT
 ------------------------------------------------------------------------------
          MHLRES2.TESTREL.PS                                  375  100    16
```

In Example 7-35, we show that on the second of the three volumes that data set MHLRES2.TESTREL.PS is allocated on has used 240 tracks. The 240 tracks are 16 cylinders. The same attributes apply on the third volume, which is not shown.

Example 7-35 ISPF display showing data set MHLRES2.TESTREL.PS on the second volume

```
DSLIST - Data Sets on volume MLDB35                          CHARS '.PS' found
Command ===>                                                  Scroll ===> CSR

Command - Enter "/" to select action                       Tracks %Used   XT
------------------------------------------------------------------------------
         MHLRES2.TESTREL.PS                                  240  100    16
```

Scenario 3

In this scenario, we write 1000 records (the number itself is not significant but it is much less than could fit in the full three volume data set. In this case, we specify that unused space is to be released by including the JCL statement containing the RLSE statement.

The program PARM specified PARM=SHORT, which causes it to write only 1000 records.

In Example 7-36, we show the JCL that was used to write 1000 records to the data set MHLRES2.TESTREL.PS.

Example 7-36 JCL to write 1000 records in data set MHLRES2.TESTREL.PS

```
//MHLRES2H JOB (1234567,COMMENT),MHLRES2,TIME=10,
// MSGCLASS=J,
```

```
// REGION=500K,
// MSGLEVEL=1,CLASS=A,
// NOTIFY=&SYSUID
/*JOBPARM S=*
//COPY     EXEC PGM=GENREC1,REGION=500K,PARM='SHORT'
//STEPLIB  DD DISP=SHR,DSN=MHLRES2.IEBCOPY.DFSMS21.LOAD
//SYSPRINT DD SYSOUT=*
//PRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//GENDCB   DD DISP=SHR,DSN=MHLRES2.TESTREL.PS,
//         SPACE=(TRK,1,RLSE)
//SYSIN    DD DUMMY
```

In Example 7-37, we show that after writing only 1000 records in the data set MHLRES2.TESTREL.PS on a DD statement that specified the **RLSE** parameter, the overall allocation reduced from 57 to 33 cylinders. This reduction has occurred on the first volume of the three because the 1000 records were written to only the first volume. There are two volumes with 16 cylinders each still allocated and unused.

Example 7-37 ISPF display showing that data set MHLRES2.TESTREL.PS using 33 CYLs

```
Data Set Information
 Command ===>

 Data Set Name . . . . : MHLRES2.TESTREL.PS

 General Data                          Current Allocation
  Management class . . : MCDB22         Allocated cylinders : 33
  Storage class  . . . : STANDARD       Allocated extents . : 33
   Volume serial . . . : MLD83A +
   Device type . . . . : 3390
  Data class . . . . . : **None**
   Organization  . . . : PS            Current Utilization
   Record format . . . : FB             Used cylinders  . . : 1
   Record length . . . : 80             Used extents  . . . : 2
   Block size  . . . . : 160
   1st extent cylinders: 1
   Secondary cylinders : 1             Dates
   Data set name type  :                Creation date . . . : 2013/10/12
   SMS Compressible. . : NO             Referenced date . . : 2013/10/12
                                        Expiration date . . : ***None***

To display multiple volumes press Enter or enter Cancel to Exit.
```

Scenario 4

In this scenario, we repeated scenario 3 but this time running on a DFSMS V2.1 system.

We ran the JCL as in Example 7-36 on page 130 with the only change being to run it on a DFSMS V2.1 system. The ISPF data set information panel is shown in Example 7-38.

Example 7-38 ISPF display showing data set MHLRES2.TESTREL.PS has reduced to 1 CYL

```
Data Set Information
 Command ===>
                                                                More:     +
```

```
 Data Set Name . . . . : MHLRES2.TESTREL.PS

 General Data                            Current Allocation
  Management class . . : MCDB22           Allocated cylinders : 1
  Storage class  . . . : STANDARD         Allocated extents . : 3
   Volume serial . . . : MLD83A +
   Device type . . . . : 3390
  Data class . . . . . : **None**
   Organization  . . . : PS              Current Utilization
   Record format . . . : FB               Used cylinders  . . : 1
   Record length . . . : 80               Used extents  . . . : 1
   Block size  . . . . : 160
   1st extent cylinders: 1
   Secondary cylinders : 1               Dates
   Data set name type  :                  Creation date . . . : 2013/10/12
                                          Referenced date . . : 2013/10/12
                                          Expiration date . . : ***None***
   SMS Compressible  . : NO
```

The potential allocation attributes remain even though there is no space allocated on the additional two volumes.

The data set can be expanded to the three volumes by providing suitable JCL SPACE attributes. The space allocated depends on what is specified in the run that writes to the data set, not in what was originally allocated.

In Example 7-39, we show the JCL to write to fill data set MHLRES2.TESTREL.PS based on SPACE=(CYL,(10,1)) SPACE attributes that will be added to what was retained in the data set after releasing the space.

Example 7-39 JCL to fill data set MHLRES2.TESTREL.PS based on SPACE=(CYL,(10,1))

```
//MHLRES2H JOB (1234567,COMMENT),MHLRES2,TIME=10,
// MSGCLASS=J,
// REGION=500K,
// MSGLEVEL=1,CLASS=A,
// NOTIFY=&SYSUID
/*JOBPARM S=*
//COPY     EXEC PGM=GENREC1,REGION=500K PARM='SHORT'
//STEPLIB  DD DISP=SHR,DSN=MHLRES2.IEBCOPY.DFSMS21.LOAD
//SYSPRINT DD SYSOUT=*
//PRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//GENDCB   DD DISP=SHR,DSN=MHLRES2.TESTREL.PS,
//         SPACE=(CYL,(10,1))
//SYSIN    DD DUMMY
```

Example 7-40 shows that data set MHLRES2.TESTREL.PS has expanded to 46 cylinders allocated across 48 extents, which is the limit for three volumes.

Example 7-40 ISPF display showing data set MHLRES2.TESTREL.PS after expansion

```
Data Set Information
 Command ===>
                                                                More:     +
 Data Set Name . . . . : MHLRES2.TESTREL.PS
```

```
General Data                            Current Allocation
 Management class . . : MCDB22           Allocated cylinders : 46
 Storage class  . . . : STANDARD         Allocated extents . : 48
  Volume serial . . . : MLD83A +
  Device type . . . . : 3390
 Data class . . . . . : **None**
  Organization  . . . : PS              Current Utilization
  Record format . . . : FB               Used cylinders  . . : 46
  Record length . . . : 80               Used extents  . . . : 48
  Block size  . . . . : 160
  1st extent cylinders: 1
  Secondary cylinders : 1               Dates
  Data set name type  :                  Creation date . . . : 2013/10/12
                                         Referenced date . . : 2013/10/12
                                         Expiration date . . : ***None***
  SMS Compressible  . : NO
```

Compatibility

The enhanced space release function is not provided in releases before DFSMS V2.1.

A data set that has had space partially released on a pre-DFSMS V2.1 system will have all unused space released if it is written to a DFSMS V2.1 system, even if the new data only goes to the first volume of two or more volumes. That is, as data sets are processed on DFSMS V2.1 their excess space is released.

7.5 OCE RAS enhancements

There are three enhancements: reliability, availability, and serviceability (RAS):

- S837 RC08 ABEND elimination
- Comments in SYS1.PARMLIB IEAAPPxx member
- DCBE invalidation message IEC190I

7.5.1 S837 RC08 ABEND elimination

In order to access data on DISK or TAPE, tasks must set up the necessary definitions. Whether from job control language (JCL) or via dynamic allocation, data sets need to be allocated.

For output data sets, it is also necessary for at least one volume to be specified. This can be specified directly or through the System Managed Storage (SMS) function.

A volume count can be specified in the JCL or via SMS, but it is by default five. Until DFSMS V2.1, if any more than five volumes are required, the higher number (including the initial five) must be specified.

When access to a data set is defined, a Job File Control Block (JFCB) is allocated in storage, and one of the fields in the JFCB has room for up to five volumes.

If provision for more than five volumes is specified, a JFCB Extension is required. If a volume count of more than five is specified in JCL or via dynamic allocation, the JFCB extension is also created then.

Until the DFSMS V2.1 enhancement was implemented, if a task required more than five volumes and had not been specified, the task would issue S837 RC08 abend and fail. The task would typically have to be restarted with an update to specify provision for more volumes. DFSMS V2.1 automatically creates a JFCB extension for the additional volumes.

We created a job that required more than five volumes for output without specifying a volume count to demonstrate that the automatic creation of a JFCB extension works.

The JCL for the job is shown in Example 7-41. On the TAPE DD statement, there is no VOL specification.

Example 7-41 Tape job that requires more than five volumes running without a volume count in JCL

```
//MHLRES2D  JOB 99990000,UAALF0,CLASS=A,NOTIFY=&SYSUID
/*JOBPARM S=*
//DFDSS PROC
//DFDSS EXEC PGM=ADRDSSU,REGION=0M
//SYSPRINT DD SYSOUT=A
// PEND
// EXEC DFDSS
//DASD DD DISP=SHR,UNIT=3390,VOL=SER=SERVR1
//TAPE DD UNIT=VT3590,
// DISP=(NEW,PASS),
// DSN=MHLRES2.DSSDUMP.Z21RA1
//SYSIN DD *
  DUMP  OUTDDNAME(TAPE) INDD(DASD) ALLEXCP ALLDATA(*) OPTIMIZE(4)
```

The job ran and used 18 volumes. Select parts of the job output are shown in Example 7-42.

Example 7-42 Output from TAPE job requiring more than five volumes without a volume count specified

```
//MHLRES2D  JOB 99990000,UAALF0,CLASS=A,NOTIFY=&SYSUID
/*JOBPARM S=*
//DFDSS PROC
//DFDSS EXEC PGM=ADRDSSU,REGION=0M
//SYSPRINT DD SYSOUT=A
// PEND
// EXEC DFDSS
//DASD DD DISP=SHR,UNIT=3390,VOL=SER=SERVR1
//TAPE DD UNIT=VT3590,
// DISP=(NEW,PASS),
// DSN=MHLRES2.DSSDUMP.Z21RA1
//SYSIN DD *
  DUMP  OUTDDNAME(TAPE) INDD(DASD) ALLEXCP ALLDATA(*) OPTIMIZE(4)
IEC502E RK 0442,VT0027,SL,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1
IEC501A M 0442,PRIVAT,SL,COMP,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1
IEC705I TAPE ON 0442,VT0028,SL,COMP,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1,MEDIA5
IEC502E RK 0442,VT0028,SL,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1
IEC501A M 0442,PRIVAT,SL,COMP,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1
IEC705I TAPE ON 0442,VT0029,SL,COMP,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1,MEDIA5
IEC502E RK 0442,VT0029,SL,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1
IEC501A M 0442,PRIVAT,SL,COMP,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1
IEC705I TAPE ON 0442,VT0030,SL,COMP,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1,MEDIA5
IEC502E RK 0442,VT0030,SL,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1
IEC501A M 0442,PRIVAT,SL,COMP,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1
IEC705I TAPE ON 0442,VT0031,SL,COMP,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1,MEDIA5
IEC502E RK 0442,VT0031,SL,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1
```

```
IEC501A M 0442,PRIVAT,SL,COMP,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1
IEC705I TAPE ON 0442,VT0033,SL,COMP,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1,MEDIA5
IEC502E RK 0442,VT0033,SL,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1
IEC501A M 0442,PRIVAT,SL,COMP,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1
IEC705I TAPE ON 0442,VT0034,SL,COMP,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1,MEDIA5
IEC502E RK 0442,VT0034,SL,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21RA1
.
.
Several more IEC705I and IEC502E messages
and other output, through to
..
IEF285I   MHLRES2.DSSDUMP.Z21RA1                          DELETED
IEF285I   VOL SER NOS= VT0024,VT0025,VT0026,VT0027,VT0028,
IEF285I   VOL SER NOS= VT0029,VT0030,VT0031,VT0033,VT0034,
IEF285I   VOL SER NOS= VT0035,VT0036,VT0037,VT0038,VT0039,
IEF285I   VOL SER NOS= VT0040,VT0041,VT0042.
IEF375I  JOB/MHLRES2D/START 2013255.2216
IEF033I  JOB/MHLRES2D/STOP  2013255.2226
        CPU:     0 HR  00 MIN  04.11 SEC    SRB:     0 HR  00 MIN  00.64 SEC
PAGE 0001     5695-DF175  DFSMSDSS V2R01.0 DATA SET SERVICES     2013.255 22:16
  DUMP  OUTDDNAME(TAPE) INDD(DASD) ALLEXCP ALLDATA(*) OPTIMIZE(4) +     0013000
        ADMIN
ADR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'DUMP '
ADR109I (R/I)-RI01 (01), 2013.255 22:16:09 INITIAL SCAN OF USER CONTROL STATEME
ADR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (001)-STEND(01), 2013.255 22:16:09 EXECUTION BEGINS
ADR006I (001)-STEND(02), 2013.255 22:26:26 EXECUTION ENDS
ADR013I (001)-CLTSK(01), 2013.255 22:26:26 TASK COMPLETED WITH RETURN CODE 0000
ADR012I (SCH)-DSSU (01), 2013.255 22:26:26 DFSMSDSS PROCESSING COMPLETE. HIGHES
```

The IEF285I messages show that 18 volumes were used.

7.5.2 S837 RC08 ABEND in DFSMS V1.13

As an illustration of the consequence of omitting a volume count on an output DD statement when more than five volumes could be required, we ran the same job on a z/OS V1.13 system. The JCL is in Example 7-41 on page 134. The output illustrated in Example 7-43 shows that the job failed.

Example 7-43 Output from TAPE job running on z/OS V1.13 showing ABEND S837 RC08

```
utput from TAPE job requiring more than 5 volumes without a volume count specifi
10.36.16 JOB12856  IEC502E RK 042A,VT0051,SL,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.Z21R
10.36.16 JOB12856 *IEC501A M 042A,PRIVAT,SL,COMP,MHLRES2D,DFDSS,MHLRES2.DSSDUMP.
10.36.16 JOB12856  IEC705I TAPE ON 042A,VT0052,SL,COMP,MHLRES2D,DFDSS,MHLRES2.DS
10.36.53 JOB12856  IEC028I 837-08,IFG0554A,MHLRES2D,DFDSS,TAPE,042A,VT0052,  677
   677             MHLRES2.DSSDUMP.Z21RA1
10.36.53 JOB12856  -                                          --TIMINGS (MINS.)--
10.36.53 JOB12856  -JOBNAME  STEPNAME PROCSTEP    RC   EXCP    CPU    SRB  CLOCK
10.36.53 JOB12856  -MHLRES2D          DFDSS       08  46667    .02    .00   3.15
10.36.53 JOB12856  IEF234E K 042A,VT0052,PVT,MHLRES2D
10.36.53 JOB12856  IEF404I MHLRES2D - ENDED - TIME=10.36.53 - ASID=001E - SC63
10.36.53 JOB12856  -MHLRES2D ENDED.  NAME-UAALF0              TOTAL CPU TIME=
10.36.53 JOB12856  $HASP395 MHLRES2D ENDED
------ JES2 JOB STATISTICS ------
```

```
  13 SEP 2013 JOB EXECUTION DATE
           13 CARDS READ
           89 SYSOUT PRINT RECORDS
            0 SYSOUT PUNCH RECORDS
            7 SYSOUT SPOOL KBYTES
         3.15 MINUTES EXECUTION TIME
        1 //MHLRES2D  JOB 99990000,UAALF0,CLASS=A,NOTIFY=&SYSUID
          /*JOBPARM S=SC63
          IEFC653I SUBSTITUTION JCL - 99990000,UAALF0,CLASS=A,NOTIFY=MHLRES2
        2 //DFDSS PROC
          //DFDSS EXEC PGM=ADRDSSU,REGION=0M
          //SYSPRINT DD SYSOUT=A
          // PEND
        3 // EXEC DFDSS
        4 ++DFDSS PROC
        5 ++DFDSS EXEC PGM=ADRDSSU,REGION=0M
        6 ++SYSPRINT DD SYSOUT=A
        7 //DASD DD DISP=SHR,UNIT=3390,VOL=SER=SERVR1
        8 //TAPE DD UNIT=VT3590,
          // DISP=(NEW,PASS),
          // DSN=MHLRES2.DSSDUMP.Z21RA1
        9 //SYSIN DD *
 STMT NO. MESSAGE
        3 IEFC001I PROCEDURE DFDSS WAS EXPANDED USING INSTREAM PROCEDURE DEFINIT
ICH70001I MHLRES2  LAST ACCESS AT 23:28:19 ON THURSDAY, SEPTEMBER 12, 2013
IEF236I ALLOC. FOR MHLRES2D DFDSS
IEF237I JES2 ALLOCATED TO SYSPRINT
IEF237I 6619 ALLOCATED TO DASD
IGD100I 042A ALLOCATED TO DDNAME TAPE     DATACLAS (        )
IEF237I JES2 ALLOCATED TO SYSIN
IEC028I 837-08,IFG0554A,MHLRES2D,DFDSS,TAPE,042A,VT0052,
MHLRES2.DSSDUMP.Z21RA1
IEF142I MHLRES2D DFDSS - STEP WAS EXECUTED - COND CODE 0008
IEF285I   MHLRES2.MHLRES2D.JOB12856.D0000102.?         SYSOUT
IEF285I   SYS13256.T103344.RA000.MHLRES2D.R0402778     KEPT
IEF285I   VOL SER NOS= SERVR1.
IEF285I   MHLRES2.MHLRES2D.JOB12856.D0000101.?         SYSIN
IEF373I STEP/DFDSS   /START 2013256.1033
IEF032I STEP/DFDSS   /STOP  2013256.1036
        CPU:     0 HR  00 MIN  01.30 SEC    SRB:     0 HR  00 MIN  00.27 SEC
        VIRT:  2172K  SYS:   348K  EXT:    11732K  SYS:    10352K
IEF285I   MHLRES2.DSSDUMP.Z21RA1                       DELETED
IEF285I   VOL SER NOS= VT0048,VT0049,VT0050,VT0051,VT0052.
IEF375I  JOB/MHLRES2D/START 2013256.1033
IEF033I  JOB/MHLRES2D/STOP  2013256.1036
        CPU:     0 HR  00 MIN  01.30 SEC    SRB:     0 HR  00 MIN  00.27 SEC
PAGE 0001     5695-DF175  DFSMSDSS V1R13.0 DATA SET SERVICES     2013.256 10:33
  DUMP  OUTDDNAME(TAPE) INDD(DASD) ALLEXCP ALLDATA(*) OPTIMIZE(4) ADMIN 00130004
ADR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'DUMP '
ADR109I (R/I)-RI01 (01), 2013.256 10:33:44 INITIAL SCAN OF USER CONTROL STATEMEN
ADR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (001)-STEND(01), 2013.256 10:33:44 EXECUTION BEGINS
ADR049E (001)-STEND(01), 2013.256 10:36:53 DFSMSDSS FUNCTION TASK ABEND RECOVERY
                         CODE=0008
ADR006I (001)-STEND(02), 2013.256 10:36:53 EXECUTION ENDS
```

```
ADR013I (001)-CLTSK(01), 2013.256 10:36:53 TASK COMPLETED WITH RETURN CODE 0008
ADR012I (SCH)-DSSU (01), 2013.256 10:36:53 DFSMSDSS PROCESSING COMPLETE. HIGHEST
                         TASK    001
```

Compatibility

The enhancement to eliminate the ABEND S837 RC08 is not provided for releases before DFSSMS V2.1

7.6 IEAAPPxx comments

The SYS1.PARMLIB IEAAPPxx member is used to specify I/O appendages for special circumstances.

Before DFSMS V2.1, it was not possible to add comments to the IEAAPPxx member requiring documentation of the reason for particular settings to be held elsewhere.

DFSMS V2.1 has been updated to allow comments in two forms:

- An asterisk (*) in column one is typically used for comments at the start of the member.
- Comments anywhere in the member enclosed in the */* *comment* */* sequence.

An example of comments used in an IEAAPP00 sample member is shown in Example 7-44.

Example 7-44 IEAAPP00 member of SYS1.PARMLIB with comments

```
* MEMBER IEAAPPXX OF SYS1.PARMLIB SPECIFIES THE AUTHORIZED
* I/O APPENDAGES THAT ARE TO BE LOADED FOR SPECIAL I/O SITUATIONS.
* A CHANGE WITH DFSMS V2.1 ALLOWS COMMENTS IN THE MEMBER.
* THE COMMENTS MAY BE SPECIFIED BY * IN COLUMN 1
* AS IN THIS PART OF THE MEMBER, TYPICALLY USED FOR A PREFIX FOR
* THE MAIN CONTENTS.
* THE ENTRIES IN THIS MEMBER DENOTE THE SUFFIXES TO MODULES
* WHERE THE FIRST 6 CHARACTERS ARE IGGO19
* COMMENTS CAN ALSO BE INSERTED ANYWHERE IN THE MEMBER IF ENCLOSED
* IN THE /* */ SEQUENCE OF CHARACTERS.
 /* THIS WOULD TYPICALLY BE USED TO DOCUMENT THE REASON FOR A */
 /* PARTICULAR LINE IN THE MEMBER */
 SIOAPP Y1,Y2,
 EOEAPP X1,Z2,X3,X4,X5,X6,    /* IGGO19X3 IS USED FOR EOEAPP */
 PCIAPP X3                    /* AND FOR PCIAPP              */
```

Compatibility

The enhancement to allow comments in IEAAPPxx is not provided for releases before DFSMS V2.1.

7.7 DCBE invalidation message IEC190I

The Data Control Block Extension (DCBE) is a designed extension to the standard DCB that is required for various data management functions.

The DCBE and related functions can only be used successfully if the linkages to the DCBE are correctly set up.

One of the major uses of the DCBE is to enable DASD EAV volume access. If this form of DASD is not being used, there may be no apparent effect caused by the incomplete setup. However, if EAV volumes are implemented at a later stage, problems will occur.

To proactively identify and correct these problems, with DFSMS V2.1 a check is made when a data set is opened to verify that the setup is complete.

If the setup is not complete, a version of message IEC190I is issued. The program issuing this message may continue to work when DASD EAV volumes are not in use, but the warning is issued to allow the program to be corrected.

7.7.1 Maintenance

During z/OS V2.1, testing a number of IBM products has been identified as requiring maintenance.

The following APARs relating to DFSMS V2.1 changes have been identified by searching IBMLINK. There are other instances of message IEC190I that relate to other conditions not changed with DFSMS V2.1.

Users may perform a similar search to determine whether there are any additional cases.

z/OS V2.1 by itself and z/OS V2.1 related programs

The APARs listed in this section are likely to be incorporated in the delivered system code. They are presented here as examples of problems you might encounter. The APAR number and the description text are listed:

- OA42701 AMATERSE INVOCATION RESULTS IN MSGIEC190I

  APAR OA42701 is an example of the situation where message IEC190I is issued, but the program continues to run.

- OA42694 ABEND0C4 IFG0554P

  APAR OA42694 is an example of a situation where message IEC190I is issued, but the using task abends. The presence of the IEC190I provides valuable information for program diagnosis.

- OA43037 IRRDBU00 MSGIEC190I

- OA43000 IEC190I DURING RECALL OF PDSE DATA SET

  OA42406 OCE FIX ROLLUP FOR HDZ2210

APARs OA42701

The content of the text for APAR OA42701 is shown in Example 7-45.

If this situation arises, it is an indication that the DCB/DCBE structure is incomplete. This may not cause problems with traditional DASD volumes but could cause problems with EAV DASD volumes.

Example 7-45 APAR OA42701: message issued and program continues

```
APAR Identifier ...... OA42701      Last Changed ........ 13/09/04
  AMATERSE INVOCATION RESULTS IN MSGIEC190I

  Symptom ...... IN INCORROUT         Status ........... CLOSED  PER
  Severity ................... 3      Date Closed ......... 13/07/26
  Component .......... 5752SC112      Duplicate of ........
  Reported Release ......... 790      Fixed Release ............ 999
```

```
Component Name SVA UTILITIES        Special Notice
Current Target Date ..13/08/15      Flags
SCP ...................
Platform ............

Status Detail: SHIPMENT - Packaged solution is available for
                          shipment.

PE PTF List:

PTF List:
Release 790   : UA70061 available 13/08/07 (F308 )


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
Under certain conditions executing an AMATERSE with the PACK
option will result in a successful execution, but MSGIEC190I
xxxxxx,STEP,SYSUT3 INVALID DCBE: STORAGE NOT ADDRESSABLE is
issued.


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All users of AMATERSE on release HBB7790.    *
****************************************************************
* PROBLEM DESCRIPTION: AMATERSE MSGIEC190I INVALID DCBE:       *
*                      STORAGE NOT ADDRESSABLE                 *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
While PACK/ UNPACKing a PDS data set, AMATERSE may successfully
complete, but MSGIEC190I is issued. Also, AMATERSE fails to use
system determined blocksize for PACK/SPACK output.


PROBLEM CONCLUSION:
AMATERSE's PACK and UNPACK processing is updated to correctly
set the relevant DCB data, to prevent the IEC190I message. Also,
AMATERSE's processing is changed to allow System Determined
Blocksize for the PACK/SPACK output data set.


TEMPORARY FIX:


COMMENTS:
```

```
  MODULES/MACROS:   AMADECS  AMAENCS

  SRLS:      NONE

  RTN CODES:

  CIRCUMVENTION:

  MESSAGE TO SUBMITTER:
```

APARs OA42694

The content of the text for APAR OA42694 is shown in Example 7-46. This problem is one that needs to be corrected.

Example 7-46 APAR OA42694: message issued and invoking task fails

```
APAR Identifier ...... OA42694      Last Changed ........ 13/08/02
  ABENDOC4 IFG0554P


  Symptom ...... AB ABENDOC4          Status ............ CLOSED  PER
  Severity ................... 3      Date Closed ......... 13/07/01
  Component .......... 5695DF107      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............. 999
  Component Name DATA MGMT SUPPO      Special Notice
  Current Target Date ..13/07/20      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release 210   : UA69759 available 13/07/30 (F307 )


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  0c4 in IFG0554P incorrectly accessing a 24bit ucb address
  as a 31bit address with a dirty high order byte.


  LOCAL FIX:


  PROBLEM SUMMARY:
```

```
*****************************************************************
* USERS AFFECTED: All.                                          *
*****************************************************************
* PROBLEM DESCRIPTION: Abend0c4, invalid IEC190I                *
*****************************************************************
* RECOMMENDATION:                                               *
*****************************************************************
Abend0c4 out of IFG0554P due to dirty high order UCB address.
Also invalid IEC190I INVALID DCBE: EXCP DCB WITHOUT A
FOUNDATION EXTENSION.


PROBLEM CONCLUSION:
Abend0C4 and invalid IEC190I will no longer occur.


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   IFG019RA IFG0193A IFG0554P


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

Program products

Fixes for IBM software products will not normally be delivered as part of the z/OS V2.1 code, so fixes for these situations must be addressed specifically. Here, we listed errors related to message IEC190I and the associated description that should be investigated:

- PM94936 z/OS 2.1 Compatibility fixes.
- IO18269 MSGIEC190I WHEN MODIFYING THE TARGET VOLUME ON THE VOLUMES AND STORAGE CLASSES PANEL OF Z/OSMF SOFTWARE DEPLOYMENT PLUGIN.
- PM96778 MSG IEC190I RECEIVED RUNNING IBM QMF™ WITH Z/OS 2.1

Non IBM program products

The term independent software vendor (ISV) is used to describe vendors that create products to use IBM software and hardware. There is often a close relationship between IBM and certain ISVs. IBM collects information about compatibility with its operating systems and the ISVs. It is primarily the responsibility of the users to obtain the latest information from the vendors.

Compatibility

The enhancement to message IEC190I is not provided in releases before DFSMS V2.1. However, in prior releases where the task is not affected the invalidation of the DCBE is still taking place. If this results in a set of control blocks that are incompatible with the DASD access intended, there may be an abend.

7.8 XTIOT HealthCheck

The SYS1.PARMLIB DEVSUPxx member allows specification of the NON_VSAM_XTIOT=YES option. This option allows application programs to use options on dynamic allocation with BSAM, BPAM, and QSAM and affects EXCP.

This is not a new feature but the default is NON_VSAM_XTIOT=NO and as a consequence may be overlooked.

7.8.1 XTIOT HealthCheck enablement

DFSMS V2.1 introduces a check to verify whether NON_VSAM_XTIOT=YES is set or not. This check is automatically included in the health check process and requires no set up.

7.8.2 XTIOT HealthCheck verification

After the health check process has run, typically immediately after an IPL, the results will be available from SDSF.

1. To view the status of this check, access SDSF and enter the **CK** command. The result is a list of all the checks. To locate the XTIOT check issue the **SORT NAME** command.
2. Scroll down the list to find OCE_XTIOT_CHECK.
3. Select this entry with **S** in column 1.

An example of output that shows that NON_VSAM_XTIOT=YES has not been set is shown in Example 7-47.

Example 7-47 Example of XTIOT HealthCheck result

```
CHECK(IBMOCE,OCE_XTIOT_CHECK)
SYSPLEX:    SANDBOX   SYSTEM: SC64
START TIME: 09/09/2013 10:34:43.397162
CHECK DATE: 20110410  CHECK SEVERITY: LOW

* Low Severity Exception *

IECH0101E OPEN macro support for XTIOT, uncaptured UCBs and DSAB
above the line is not enabled for non-VSAM. IBM recommends setting
NON_VSAM_XTIOT=YES in the DEVSUPxx member of PARMLIB.

  Explanation:  IBM suggests setting NON_VSAM_XTIOT=YES in the DEVSUPxx
    member of PARMLIB to decrease the chances of running out of virtual
    storage when allocating and concurrently opening many sequential and
    partitioned data sets.

  System Action:  The system continues processing.
```

7.8.3 XTIOT HealthCheck implementation considerations

Care must be taken when deciding to set NON_VSAM_XTIOT=YES because control blocks get relocated from 24-bit addressing to 31-bit addressing. Whether all program and application code can support this change depends on the way they have been written.

The XTIOT HealthCheck is new with DFSMS V2.1 and may prompt users to enable the function. This applies to releases before DFSMS V2.1 because NON_VSAM_XTIOT=YES is not new with DFSMS V2.1.

To check IBM product compatibility and recommended maintenance, search IBMLINK using keyword XTIOT.

Refer to “APAR OA42267 XTIOT use (also applicable to DFSMS V1.13)” on page 267.

It is advisable to check with the vendors of non IBM code as to whether their code can handle NON_VSAM_XTIOT=YES. If a test system is available that can be used to test all applications, the DEVSUPxx update can be made, and the tests run.

If a problem arises typically (but not exclusively), a system ABENDS0C4 is issued. If this does occur, the DEVSUPxx member can be updated with NON_VSAM_XTIOT=NO and the command **SET DEVSUP=xx** can be issued to reset the option dynamically.

Compatibility

The enhanced HealthCheck for the use of NON_VSAM_XTIOT=YES is not provided in release before DFSMS V2.1.

8

DFSMSdss enhancements

This chapter provides an overview of the features and function in DFSMSdss included in z/OS V2.1. The following enhancements are provided:

- DFSMSdss data set change indicator reset with RESTORE
- DEBUG option SMSMSG
- RESTORE command
- zFS change activity support

8.1 DFSMSdss data set change indicator reset with RESTORE

DASD volumes have a volume table of contents (VTOC) in which control information for all data sets that are on the volume. This control information is stored in the data set control block (DSCB). There are several DSCB formats. For the purposes of this section, we are only concerned with Formats 1 and 8. These are the primary DSCBs for data sets on the original DASD configured volumes, and for DASD EAV volumes, respectively. The specific entry that relates to the information here is the data-set-changed or data set changed indicator (DS1DSCHA) bit, which is at the same relative offset in both format DSCBs.

DFSMSdss is used on its own or as part of a DFSMShsm system to make copies of data sets. Different options are available in DFSMSdss for this purpose. Making copies of data sets is usually a housekeeping task and is usually configured to avoid making copies if a copy already exists and the source data set has not changed. The appropriate setting of the DS1DSCHA bit is essential to that function.

When a task accesses a data set, the DS1DSCHA bit will normally be turned ON so that the data set will be included in housekeeping tasks. When a copy of a data set is taken by DFSMSdss, it is available to be RESTORED.

After a data set has been RESTORED, the setting of the DS1DSCHA bit, for any data set, controls whether new copies will be made or not when housekeeping tasks are run.

If an entire volume is RESTORED, the setting of the DS1DSCHA bit for all data sets must be managed to avoid making new copies of each data set.

8.1.1 DFSMSdss setting of DS1DSCHA before DFSMS V2.1

DFSMSdss full volume RESTORE unconditionally resets (turns OFF) DS1DSCHA for each data set it restores. This indicates that until the data set is changed, it will not be selected by any housekeeping process that looks for changed data sets. In some circumstances, this process is not granular enough.

8.1.2 DFSMSdss setting of DS1DSCHA options when using DFSMS V2.1

If DFSMShsm is in use in an installation, care must be taken when using DFSMSdss outside the control of DFSMShsm. DFSMShsm normally manages data set copies (backups) and volume DUMPs, and in this process manages the DS1DSCHA bit in the DSCB. If a DFSMSdss process is run that changes the DS1DSCHA bit without DFSMShsm knowledge, the results may be other than expected.

There are DFSMSdss PATCH options that can control the setting of the DS1DSCHA bit, so these must be reviewed to avoid conflict with this enhancement.

DFSMSdss RESET keyword

The DFSMSdss **RESET** keyword specified when setting up a full volume or a tracks restore (from a full volume) may be used to control the action DFSMSdss is to take.

With DFSMS V2.1 the new options are:

- RESET(DUMP)

  This is the default. It is a conditional setting depending on what was set at DUMP time. If RESET was specified when the DUMP was run on a DFSMS V2.1 system, the

DS1DSCHA indicators will be turned off. If RESET was *not* specified when the DUMP was run, the DS1DSCHA indicators will not be changed from what they were on the source volume.

- RESET(YES)

  Unconditionally turn DS1DSCHA off regardless of what was set at DUMP time.

- RESET(NO)

  Unconditionally *do not* change DS1DSCHA settings from what they were on the source volume.

Running on DFSMS V2.1 and using a DFSMSdss DUMP from a prior release, the options are changed as follows:

- If RESET(DUMP) is specified, it is treated as though RESET(NO) was specified.
- If RESET is not specified the default is RESET(NO).

Important: The use of the RESET(DUMP) option described below for RESTORE requires that the DUMP RESET option has been used on a DFSMS V2.1 system.

8.1.3 Scenarios of the effects of DUMP options

We ran several jobs to show what the effect of the DUMP RESET and RESTORE RESET(DUMP|YES|NO) are.

In order to check what the DS1DSCHA setting is for data sets on a volume, we created a program to read the VTOC and report on up to 20 data sets. The common VTOC access facility (CVAF) returns DSCBs in the order that they are on the volume. Contrast, for example, with ISPF, which returns the data set in collating order.

The source of the program is in Example C-10 on page 399.

Scenario 1: Data set change indicator reset by DFSMShsm backup

In Example 8-1, we show the JCL that was used to run the VTOC listing. The volume to be listed must be specified on the CVAFDD statement.

Example 8-1 JCL to run VTOC listing program showing DS1DSCHA setting

```
//MHLRES2Q JOB (1234567,COMMENT),UAALF0,TIME=10,
// MSGLEVEL=1,CLASS=A,
// NOTIFY=&SYSUID
/*JOBPARM S=*
//CVSEQ80 PROC
//RUN      EXEC PGM=CVSEQ8D,REGION=0M
//STEPLIB DD DISP=SHR,DSN=MHLRES1.EAV.LOAD
//SYSUDUMP DD SYSOUT=*
//OUTDD    DD SYSOUT=*
// PEND
//  EXEC CVSEQ80
//CVAFDD  DD DISP=SHR,UNIT=3390,VOL=SER=SBOX1L
```

In Example 8-2 on page 148, we show the output from the VTOC listing program. This program has code in it to check the status of the EADSCB option since it is important that the environment is correct before using the output information.

The program lists up to 20 entries, but in this case one of the first 20 data sets on the volume is a Format 5 DSCB, so it is not listed.

In the listing, the DS1DSCHA flag follows the data set name and is set as follows:

- Y if the bit is *on* indicating that the data set has changed since last backup.
- N if the bit is *off* indicating that the data set has not changed since last backup.

As can be seen in the output, of the first 20 data sets on the volume only one has DS1DSCHA set to Y. That is the MHLRES2.CNTL.JCL data set.

Example 8-2 Listing of volume SBOX1I showing DS1DSCHA setting following the dsname

```
CVSEQ8D START OF OUTPUT MESSAGES VOLUME: SBOX1L

 CVAFSEQ  CALL: EADSCB KEYWORD NOT CODED
 CV4EADOK BIT IS NOT SET / EADSCB=NOTOK
 RC00 VERIFIED - THE REQUEST WAS SUCCESSFUL
  CVSTAT CODE: X"00"   DEC"000"

 CVAFSEQ  CALL: EADSCB=NOTOK CODED
 CV4EADOK BIT IS NOT SET / EADSCB=NOTOK
 RC00 VERIFIED - THE REQUEST WAS SUCCESSFUL
  CVSTAT CODE: X"00"   DEC"000"

 CVAFSEQ  CALL: EADSCB=OK CODED
 CV4EADOK BIT SET / EADSCB=OK
 RC00 VERIFIED - THE REQUEST WAS SUCCESSFUL
  CVSTAT CODE: X"00"   DEC"000"

 DATASETS ON THE VOLUME LISTED IN PHYSICAL SEQUENTIAL ORDER:
  DSN: SYS1.VTOCIX.SBOX1L                  N
  DSN: OMVS.SC65.USERS.OLD                 N
  DSN: SYS1.VVDS.VSBOX1L                   N
  DSN: OMVS.SC64.USRLOCAL                  N
   DSN: OMVS.SC63.HERING.TEST.HFS                    N
   DSN: OMVS.SC63.WEB.DB2V7                          N
   DSN: MHLRES3.SMSTEST.PSSTRIP2                     N
   DSN: OMVS.TWSRES6.HFS                             N
   DSN: OMVS.TROWELL.HFS                             N
   DSN: OMVS.DB8A02S.HFS                             N
   DSN: OMVS.D8F202S.HFS.DATA                        N
   DSN: MHLRES2.CNTL.JCL                             Y
   DSN: OMVS.XXXX.AMNTTEST.SC65.ZFS.DATA             N
   DSN: MHLRES2.SELECT                               N
   DSN: OMVS.SC63.WPS5PB1.BS01.CONFIG.ZFS.DATA       N
   DSN: OMVS.BARI.HFS.DATA                           N
  END OF DATA REACHED - ALL DATASETS PROCESSED

CVSEQ8D END OF OUTPUT MESSAGES
```

The DS1DSCHA bit is set off when a DFSMShsm backup of the data set is done. To demonstrate the effect of a DFSMShsm backup, the `HBACKDS 'MHLRES2.CNTL.JCL'` command was issued.

After receiving a message from DFSMShsm indicating that the backup had been run, we ran the VTOC listing program using JCL as shown in Example 8-1 on page 147.

In Example 8-3, we show the data set listing part of the VTOC listing program showing that the DS1DSCHA bit has been set off for the MHLRES2.CNTL.JCL data set.

Example 8-3 Listing of volume SBOX1L showing DS1DSCHA settings after data set backup

```
DATASETS ON THE VOLUME LISTED IN PHYSICAL SEQUENTIAL ORDER:
  DSN: SYS1.VTOCIX.SBOX1L                          N
  DSN: OMVS.SC65.USERS.OLD                         N
  DSN: SYS1.VVDS.VSBOX1L                           N
  DSN: OMVS.SC64.USRLOCAL                          N
  DSN: OMVS.SC63.HERING.TEST.HFS                   N
  DSN: OMVS.SC63.WEB.DB2V7                         N
  DSN: MHLRES3.SMSTEST.PSSTRIP2                    N
  DSN: OMVS.TWSRES6.HFS                            N
  DSN: OMVS.TROWELL.HFS                            N
  DSN: OMVS.DB8AO2S.HFS                            N
  DSN: OMVS.D8F2O2S.HFS.DATA                       N
  DSN: MHLRES2.CNTL.JCL                            N
  DSN: OMVS.XXXX.AMNTTEST.SC65.ZFS.DATA            N
  DSN: MHLRES2.SELECT                              N
  DSN: OMVS.SC63.WPS5PB1.BSO1.CONFIG.ZFS.DATA      N
  DSN: OMVS.BARI.HFS.DATA                          N
 END OF DATA REACHED - ALL DATASETS PROCESSED

CVSEQ8D END OF OUTPUT MESSAGES
```

Scenario 2: DFSMSdss DUMP

In order to demonstrate the effect of the DFSMSdss RESTORE RESET options, we needed to create a physical DUMP of a volume using the RESET option. We chose volume SBOX1B for this demonstration.

We listed the first 20 data sets on volume SBOX1B using JCL similar to that shown in Example 8-1 on page 147. For this scenario, we changed the volume on the CVAFDD line from SBOX1L to SBOX1B.

In Example 8-4, we show data sets from volume SBOX1B. There are several data sets with the change indicator set to Y.

Example 8-4 Listing of data sets from volume SBOX1B showing DS1DSCHA bit settings are mixed

```
DATASETS ON THE VOLUME LISTED IN PHYSICAL SEQUENTIAL ORDER:
  DSN: SYS1.VTOCIX.SBOX1B                          N
  DSN: HFS.SC65.ILMRECON.HFS                       Y
  DSN: SYS1.VVDS.VSBOX1B                           N
  DSN: OMVS.SC65.XXX.HFS                           Y
  DSN: HFS.SC70.DEV                                Y
  DSN: HFS.SC64.ETC                                Y
  DSN: OMVS.SC63.DOMR5.MAIL3.HFS                   Y
  DSN: OMVS.SC63.USERS.DSSDUMP.ALLDATA             Y
  DSN: OMVS.SC63.XML.HFS                           Y
  DSN: OMVS.HERING.SUBHFS2.TEST                    Y
  DSN: OMVS.ROGERS.TEST6.SAV                       Y
  DSN: OMVS.PRADIER.HFS                            Y
```

```
  DSN: OMVS.ROGERS.TEST.SAV.DATA                    Y
  DSN: OMVS.MORGAR1.HFS                             Y
  DSN: LUTZ.LOADLIB                                 Y
  DSN: OMVS.EJESWEB.HFS.DATA                        Y
  DSN: OMVS.MHLRES3.HFS                             Y
  DSN: MHLEAV1.TEST                                 N
  DSN: OMVS.WATERS.HFS.DATA                         Y
 END OF DATA REACHED - ALL DATASETS PROCESSED
```

In Example 8-5, we show the job used to create the DFSMSdss DUMP of volume SBOX1B. In this case, the significant option is RESET on the **DUMP** command.

Example 8-5 JCL to run DSS job to DUMP volume SBOX1B

```
//MHLRES2D  JOB 99990000,UAALF0,CLASS=A,NOTIFY=&SYSUID
/*JOBPARM S=*
//* JOB TO DUMP A VOLUME USING THE RESET OPTION SO THAT
//* THE DECISION TO RESET THE CHANGED BIT WHEN RESTORING.
//DFDSS PROC
//DFDSS EXEC PGM=ADRDSSU,REGION=0M
//SYSPRINT DD SYSOUT=A
// PEND
// EXEC DFDSS
//DASD DD DISP=SHR,UNIT=3390,VOL=SER=SBOX1B
//TAPE DD UNIT=VT3590,
// DISP=(NEW,CATLG),
// DSN=MHLRES2.DSSDUMP.SBOX1B
//SYSIN DD *
  DUMP  OUTDDNAME(TAPE) INDD(DASD) ALLEXCP ALLDATA(*) OPTIMIZE(4)-
  ADMIN RESET
```

In Example 8-6, we show the messages issued by DFSMSdss when running the DUMP with RESET option. The significant message is:

ADR342I (001)-DDTFP(01), DATA SET CHANGE INDICATOR HAS BEEN RESET FOR ALL QUALIFIED DATA SETS ON VOLUME SBOX1B

Example 8-6 DSS messages from running job to DUMP volume SBOX1B

```
PAGE 0001  5695-DF175 DFSMSDSS V2R01.0 DATA SET SERVICES  2013.267 00:45
 DUMP OUTDDNAME(TAPE) INDD(DASD) ALLEXCP ALLDATA(*) OPTIMIZE(4)-  00130006
  ADMIN RESET                                          00140006
ADR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'DUMP '
ADR109I (R/I)-RI01 (01), 2013.267 00:45:38 INITIAL SCAN OF USER CONTROL STATEMENTS
COMPLETED
ADR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (001)-STEND(01), 2013.267 00:45:38 EXECUTION BEGINS
ADR342I (001)-DDTFP(01), DATA SET CHANGE INDICATOR HAS BEEN RESET FOR ALL
QUALIFIED DATA SETS ON VOLUME SBOX1B
ADR006I (001)-STEND(02), 2013.267 00:47:26 EXECUTION ENDS
ADR013I (001)-CLTSK(01), 2013.267 00:47:26 TASK COMPLETED WITH RETURN CODE 0000
ADR012I (SCH)-DSSU (01), 2013.267 00:47:26 DFSMSDSS PROCESSING COMPLETE. HIGHEST
RETURN CODE IS 0000
```

We used the VTOC listing program on volume SBOX1B to verify that the DS1DSCHA bit had been reset. In Example 8-7, we show the output from the VTOC listing program showing that all DS1DSCHA settings have been RESET to N.

Example 8-7 Listing of data sets from volume SBOX1B showing DS1DSCHA bit settings are all N

```
DATASETS ON THE VOLUME LISTED IN PHYSICAL SEQUENTIAL ORDER:
  DSN: SYS1.VTOCIX.SBOX1B                          N
  DSN: HFS.SC65.ILMRECON.HFS                       N
  DSN: SYS1.VVDS.VSBOX1B                           N
  DSN: OMVS.SC65.XXX.HFS                           N
  DSN: HFS.SC70.DEV                                N
  DSN: HFS.SC64.ETC                                N
  DSN: OMVS.SC63.DOMR5.MAIL3.HFS                   N
  DSN: OMVS.SC63.USERS.DSSDUMP.ALLDATA             N
  DSN: OMVS.SC63.XML.HFS                           N
  DSN: OMVS.HERING.SUBHFS2.TEST                    N
  DSN: OMVS.ROGERS.TEST6.SAV                       N
  DSN: OMVS.PRADIER.HFS                            N
  DSN: OMVS.ROGERS.TEST.SAV.DATA                   N
  DSN: OMVS.MORGAR1.HFS                            N
  DSN: LUTZ.LOADLIB                                N
  DSN: OMVS.EJESWEB.HFS.DATA                       N
  DSN: OMVS.MHLRES3.HFS                            N
  DSN: MHLEAV1.TEST                                N
  DSN: OMVS.WATERS.HFS.DATA                        N
 END OF DATA REACHED - ALL DATASETS PROCESSED
```

Scenario 3: RESTORE without RESET(DUMP|YES|NO) specified

In this scenario, we ran a DFSMSdss RESTORE job without specifying RESET so that the default would take effect.

Since the input DUMP data set was created with RESET specified, the result was expected to be that the target volume data sets had their DS1DSCHA indicator turned off.

In Example 8-8, we show the job to RESTORE volume SBOX1B to volume ML9E87. The COPYVOLID statement is required.

Example 8-8 JCL to RESTORE volume SBOX1B to volume ML9E87 with default RESET option

```
//MHLRES2D JOB 99990000,UAALF0,CLASS=A,NOTIFY=&SYSUID
/*JOBPARM S=*
//*
//REST EXEC PGM=ADRDSSU,REGION=0M
//SYSPRINT DD SYSOUT=A
//DASD     DD UNIT=3390,DISP=OLD,VOL=SER=ML9E87
//TAPE     DD DISP=(OLD,KEEP),
// DSN=MHLRES2.DSSDUMP.SBOX1B
//SYSIN    DD *
  RESTORE INDD(TAPE) OUTDD(DASD) PURGE COPYVOLID
/*
```

In Example 8-9, we show the results of the RESTORE. The ADR342I message shows that the data set change indicators have been set to N (off). This is a result of the RESET option having been chosen when the DUMP was created, and that the REST(DUMP) option is the default for the RESTORE.

The ADR320I and ADR344I messages arose as a result of the COPYVOLID on the **RESTORE** command. Volume ML9E87 has been renamed to SBOX1B. Since it is a duplicate, it has been made unavailable, which in z/OS terms means that it is taken offline.

Example 8-9 DSS messages from RESTORE without RESET specified

```
PAGE 0001  5695-DF175 DFSMSDSS V2R01.0 DATA SET SERVICES  2013.267 11:44
 RESTORE INDD(TAPE) OUTDD(DASD) PURGE COPYVOLID           00110005
ADR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'RESTORE '
ADR109I (R/I)-RI01 (01), 2013.267 11:44:52 INITIAL SCAN OF USER CONTROL STATEMENTS
COMPLETED
ADR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (001)-STEND(01), 2013.267 11:44:52 EXECUTION BEGINS
ADR780I (001)-TDFP (01), THE INPUT DUMP DATA SET BEING PROCESSED IS IN FULL VOLUME
FORMAT AND WAS CREATED BY Z/OS DFSMSDSS VERSION
           2 RELEASE 1 MODIFICATION LEVEL 0 ON 2013.267 00:45:38
ADR342I (001)-TDFP (01), DATA SET CHANGE INDICATOR HAS BEEN RESET FOR ALL
QUALIFIED DATA SETS ON VOLUME ML9E87
ADR320I (001)-SBRTN(01), VOLUME SERIAL ML9E87 ON UNIT 9E87 IS CHANGED TO SBOX1B
ADR344I (001)-SBRTN(01), VOLSER ON UCB 9E87 IS A DUPLICATE. VOLUME MADE
UNAVAILABLE
ADR006I (001)-STEND(02), 2013.267 11:46:43 EXECUTION ENDS
ADR013I (001)-CLTSK(01), 2013.267 11:46:43 TASK COMPLETED WITH RETURN CODE 0000
ADR012I (SCH)-DSSU (01), 2013.267 11:46:43 DFSMSDSS PROCESSING COMPLETE. HIGHEST
RETURN CODE IS 0000
```

We ran a job to rename the duplicate SBOX1B back to ML9E87 so that we can put it back online and list the data sets on it.

In Example 8-10, we show the job to rename offline volume SBOX1B to ML9E87 using the ICKDSF program **REFORMAT** command.

Example 8-10 JCL to rename duplicate volume SBOX1B to ML9E87

```
//MHLRES2L JOB (99990000),UAALF0,CLASS=A,NOTIFY=&SYSUID
/*JOBPARM S=*
// EXEC PGM=ICKDSF,REGION=5012K
//SYSPRINT DD SYSOUT=A
//SYSIN DD *
 REFORMAT  UNIT(9E87)   -
   VERIFY(SBOX1B)   -
 VOLID(ML9E87)
```

The messages from the job in Example 8-10 are shown in Example 8-11.

Example 8-11 ICKDSF messages showing volume rename

```
ICKDSF - MVS/ESA    DEVICE SUPPORT FACILITIES 17.0             TIME: 11:52:04
09/24/13     PAGE   1

 REFORMAT UNIT(9E87)  -                                 00060003
  VERIFY(SBOX1B)  -                                    00070003
```

```
 VOLID(ML9E87)                                          00080003
ICK00700I DEVICE INFORMATION FOR 9E87 IS CURRENTLY AS FOLLOWS:
       PHYSICAL DEVICE = 3390
       STORAGE CONTROLLER = 2107
       STORAGE CONTROL DESCRIPTOR = E8
       DEVICE DESCRIPTOR = 0C
      ADDITIONAL DEVICE INFORMATION = 4A00003C
      TRKS/CYL = 15, # PRIMARY CYLS = 10017
ICK04000I DEVICE IS IN SIMPLEX STATE
ICK00091I 9E87 NED=002107.900.IBM.75.0000000L3331
ICK03091I EXISTING VOLUME SERIAL READ = SBOX1B
ICK00001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0
       11:52:27   09/24/13

ICK00002I ICKDSF PROCESSING COMPLETE. MAXIMUM CONDITION CODE WAS 0
```

After the successful rename volume ML9E87 was still offline. The **V 9E87, ONLINE** command was issued to make it available again. We then used the VTOC listing program to show the data sets on the restored volume.

We ran the JCL as in Example 8-1 on page 147 but defining volume ML9E87 in place of SBOX1B. In Example 8-12, we show that the data set change indicators are all N (OFF) as expected.

The first data set listed is SYS1.VTOCIX.SBOX1B, which came from the original SBOX1B volume.

Example 8-12 Listing of data sets from volume ML9E87 showing DS1DSCHA bit settings are all N

```
DATASETS ON THE VOLUME LISTED IN PHYSICAL SEQUENTIAL ORDER:
  DSN: SYS1.VTOCIX.SBOX1B                          N
  DSN: HFS.SC65.ILMRECON.HFS                       N
  DSN: SYS1.VVDS.VSBOX1B                           N
  DSN: OMVS.SC65.XXX.HFS                           N
  DSN: HFS.SC70.DEV                                N
  DSN: HFS.SC64.ETC                                N
  DSN: OMVS.SC63.DOMR5.MAIL3.HFS                   N
  DSN: OMVS.SC63.USERS.DSSDUMP.ALLDATA             N
  DSN: OMVS.SC63.XML.HFS                           N
  DSN: OMVS.HERING.SUBHFS2.TEST                    N
  DSN: OMVS.ROGERS.TEST6.SAV                       N
  DSN: OMVS.PRADIER.HFS                            N
  DSN: OMVS.ROGERS.TEST.SAV.DATA                   N
  DSN: OMVS.MORGAR1.HFS                            N
  DSN: LUTZ.LOADLIB                                N
  DSN: OMVS.EJESWEB.HFS.DATA                       N
  DSN: OMVS.MHLRES3.HFS                            N
  DSN: MHLEAV1.TEST                                N
  DSN: OMVS.WATERS.HFS.DATA                        N
 END OF DATA REACHED - ALL DATASETS PROCESSED
```

Scenario 4: RESTORE with RESET(NO) specified

In this scenario, we ran a DFSMSdss RESTORE job specifying RESET(NO) so that the RESET setting in the DUMP data set would be overridden.

In Example 8-13, we show the job to RESTORE volume SBOX1B to ML9E87 with the RESET(NO) option. This was expected to result in data sets on the restored volume having the data set change indicators set as they were when the volume was dumped.

Example 8-13 JCL to RESTORE volume SBOX1B to volume ML9E87 with RESET (NO) option

```
//MHLRES2D JOB 99990000,UAALF0,CLASS=A,NOTIFY=&SYSUID
/*JOBPARM S=*
//*
//REST EXEC PGM=ADRDSSU,REGION=0M
//SYSPRINT DD SYSOUT=A
//DASD     DD UNIT=3390,DISP=OLD,VOL=SER=ML9E87
//TAPE     DD DISP=(OLD,KEEP),
// DSN=MHLRES2.DSSDUMP.SBOX1B
//SYSIN    DD *
  RESTORE INDD(TAPE) OUTDD(DASD) PURGE COPYVOLID RESET(NO)
/*
```

In Example 8-14, we show the DFSMSdss messages from running the RESTORE with RESET(NO) specified. There are no messages indicating that the data set change indicators have been reset. The ADR320I and ADR344I are issued as expected.

Example 8-14 DSS messages from RESTORE with RESET(NO) specified

```
PAGE 0001  5695-DF175 DFSMSDSS V2R01.0 DATA SET SERVICES  2013.267 12:05
 RESTORE INDD(TAPE) OUTDD(DASD) PURGE COPYVOLID RESET(NO)      00110006
ADR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'RESTORE '
ADR109I (R/I)-RI01 (01), 2013.267 12:05:44 INITIAL SCAN OF USER CONTROL STATEMENTS
COMPLETED
ADR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (001)-STEND(01), 2013.267 12:05:44 EXECUTION BEGINS
ADR780I (001)-TDFP (01), THE INPUT DUMP DATA SET BEING PROCESSED IS IN FULL VOLUME
FORMAT AND WAS CREATED BY Z/OS DFSMSDSS VERSION
           2 RELEASE 1 MODIFICATION LEVEL 0 ON 2013.267 00:45:38
ADR320I (001)-SBRTN(01), VOLUME SERIAL ML9E87 ON UNIT 9E87 IS CHANGED TO SBOX1B
ADR344I (001)-SBRTN(01), VOLSER ON UCB 9E87 IS A DUPLICATE. VOLUME MADE
UNAVAILABLE
ADR006I (001)-STEND(02), 2013.267 12:07:16 EXECUTION ENDS
ADR013I (001)-CLTSK(01), 2013.267 12:07:16 TASK COMPLETED WITH RETURN CODE 0000
ADR012I (SCH)-DSSU (01), 2013.267 12:07:16 DFSMSDSS PROCESSING COMPLETE. HIGHEST
RETURN CODE IS 0000
```

We ran the same job as in Example 8-10 on page 152 to rename the duplicate volume SBOX1B back to ML9E87.

We then ran the same job as in Example 8-12 on page 153 to list the data sets with the VTOC listing program.

In Example 8-15, we show the results of running the CVOL listing program. The list shows that the data set changed indicators are the same as they were before running the DUMP job. This listing can be compared with the one in Example 8-4 on page 149.

Example 8-15 Listing of data sets from volume ML9E87 showing DS1DSCHA bit settings are mixed

```
DATASETS ON THE VOLUME LISTED IN PHYSICAL SEQUENTIAL ORDER:
 DSN: SYS1.VTOCIX.SBOX1B                          N
 DSN: HFS.SC65.ILMRECON.HFS                       Y
```

```
 DSN: SYS1.VVDS.VSBOX1B                          N
 DSN: OMVS.SC65.XXX.HFS                          Y
 DSN: HFS.SC70.DEV                               Y
 DSN: HFS.SC64.ETC                               Y
 DSN: OMVS.SC63.DOMR5.MAIL3.HFS                  Y
 DSN: OMVS.SC63.USERS.DSSDUMP.ALLDATA            Y
 DSN: OMVS.SC63.XML.HFS                          Y
 DSN: OMVS.HERING.SUBHFS2.TEST                   Y
 DSN: OMVS.ROGERS.TEST6.SAV                      Y
 DSN: OMVS.PRADIER.HFS                           Y
 DSN: OMVS.ROGERS.TEST.SAV.DATA                  Y
 DSN: OMVS.MORGAR1.HFS                           Y
 DSN: LUTZ.LOADLIB                               Y
 DSN: OMVS.EJESWEB.HFS.DATA                      Y
 DSN: OMVS.MHLRES3.HFS                           Y
 DSN: MHLEAV1.TEST                               N
 DSN: OMVS.WATERS.HFS.DATA                       Y
END OF DATA REACHED - ALL DATASETS PROCESSED
```

8.1.4 Security protection over use of RESET with DUMP or RESTORE

Security protection on the use of the RESET option on the **DUMP** command and on the RESET(YES) option on the **RESTORE** command is available.

RACF users

Resources are in the FACILITY CLASS. If these resources are not defined, all users have access to the RESET options. If the resources are defined, users must have READ access authorization to the RACF resource to use the RESET options:

- **DUMP** command RESET option

  Read access to the STGADMIN.ADR.DUMP.RESET resource is required.

- **RESTORE** command RESET(YES) option

  Read access to the STGADMIN.ADR.RESTORE.RESET.YES resource is required.

Other security system users

If using a security system other than RACF, it might be necessary to implement the equivalent of the RACF FACILITY profiles before the RESET option can be used.

8.2 DEBUG option SMSMSG

When DFSMSdss allocates data sets, it may use the System Managed Storage (SMS) function. SMS applies rules to the allocation of data sets, and may fail a request.

As an aid to problem resolution, several commands have a DEBUG option. To facilitate problem analysis when using SMS, the SMSMSG sub-option is provided in DFSMS V2.1. SMSMSG may be used with other DEBUG sub operands where appropriate.

When specified, the option DEBUG(SMSMSG) causes certain SMS messages produced by the control routines to be externalized.

The DEBUG(SMSMSG) option may be used with the following DFSMSdss commands:

- CONVERTV: Convert existing volumes to and from SMS management.
- COPY: For logical and physical data sets.
- RESTORE: For logical and physical data sets.

There may be ACS WRITE statements in the ACS routines. These are not affected by the DFSMSdss SMSMSG option of DEBUG. If coded, they may appear as well as any messages generated by SMSMSG.

Note: The DEBUG(SMSMSG) option depends on DFSMSdss using the ACS routines. If the DFSMSdss BYPASSACS option is specified, DEBUG(SMSMSG) will have no effect.

We provide scenarios to illustrate the use of the DEBUG(SMSMSG) option on the COPY and RESTORE statements.

Scenario 1: DFSMSdss COPY

In Example 8-16, we show the job to illustrate use of DEBUG(SMSMSG) with BYPASSACS specified. There are two copy statements in the job, DEBUG(SMSMSG) has to be specified on each.

We specified DEBUG(SMSMSG), but the presence of BYPASSACS resulted in no messages generated.

Example 8-16 JCL to run a DSS COPY job with DEBUG(SMSMSG) and BYPASSACS specified

```
//MHLRES2C JOB (999,POK),'MHLRES2',CLASS=A,MSGCLASS=T,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=*
//COPY    EXEC PGM=ADRDSSU
//*N       DD  VOL=SER=MLD00B,UNIT=3390,DISP=OLD
//OUT      DD  VOL=SER=MLDB35,UNIT=3390,DISP=OLD
//OUT2     DD  VOL=SER=MLDB35,UNIT=3390,DISP=OLD
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  *
 COPY DATASET(INCLUDE(MHLRES2.SRCHFOR.LIST)) -
      DEBUG(SMSMSG)          -
      OUTDD(OUT) -
      ALLDATA(*) ALLEXCP -
      STORCLAS(HSMFR) RENAMEU(YYY) -
      BYPASSACS(**) ADMIN SHR
 COPY DATASET(INCLUDE(MHLRES2.SUPERC.LIST)) -
      DEBUG(SMSMSG)           -
      OUTDD(OUT2) -
      ALLDATA(*) ALLEXCP -
      STORCLAS(HSMFR) RENAMEU(YYY) -
      BYPASSACS(**) ADMIN SHR
```

In Example 8-17 on page 157, we show the effect of specifying DEBUG(SMSMSG). No message ADR803I is written. However, the IGD01010I messages that are from specific WRITE statements in the ACS routines do appear.

Example 8-17 DSS messages from COPY job with DEBUG(SMSMSG) specified showing no ADR803I

```
PAGE 0001   5695-DF175 DFSMSDSS V2R01.0 DATA SET SERVICES   2013.270 14:38
 COPY DATASET(INCLUDE(MHLRES2.SRCHFOR.LIST)) -              00170001
     DEBUG(SMSMSG)       -                                 00170104
     OUTDD(OUT) -                                          00171000
     ALLDATA(*) ALLEXCP -                                  00180000
     STORCLAS(HSMFR) RENAMEU(YYY) -                        00181000
     BYPASSACS(**) ADMIN SHR                               00190000
ADR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'COPY '
 COPY DATASET(INCLUDE(MHLRES2.SUPERC.LIST)) -               00191001
     DEBUG(SMSMSG)       -                                 00191104
     OUTDD(OUT2) -                                         00192001
     ALLDATA(*) ALLEXCP -                                  00193001
     STORCLAS(HSMFR) RENAMEU(YYY) -                        00194001
     BYPASSACS(**) ADMIN SHR                               00195001
ADR101I (R/I)-RI01 (01), TASKID 002 HAS BEEN ASSIGNED TO COMMAND 'COPY '
ADR109I (R/I)-RI01 (01), 2013.270 14:38:02 INITIAL SCAN OF USER CONTROL STATEMENTS
COMPLETED
ADR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (001)-STEND(01), 2013.270 14:38:02 EXECUTION BEGINS
ADR709E (001)-VDSS (01), AN ERROR OCCURRED IN THE STORAGE MANAGEMENT SUBSYSTEM WHILE
ALLOCATING DATA SET MHLRES2.SRCHFOR.LIST WITH
              NEWNAME YYY.SRCHFOR.LIST. SMS MESSAGES FOLLOW.
 IGD01010I SG ACS GETS CONTROL &ACSENVIR=ALLOC
 IGD01010I &STORCLAS = HSMFR
IGD01010I &STORGRP = SG1
IGD17206I VOLUME SELECTION HAS FAILED - THERE ARE NOT ENOUGH VOLUMES
WITH SUFFICIENT SPACE FOR DATA SET
YYY.SRCHFOR.LIST
IGD17277I THERE ARE (1) CANDIDATE VOLUMES OF WHICH (1) ARE ENABLED OR QUIESCED
IGD17331I DATA SET YYY.SRCHFOR.LIST COULD
NOT BE ALLOCATED. PREFERRED FAST REPLICATION WAS SPECIFIED
BY THE CALLER.
IGD17290I THERE WERE 1 CANDIDATE STORAGE GROUPS OF WHICH THE FIRST 1
WERE ELIGIBLE FOR VOLUME SELECTION.
THE CANDIDATE STORAGE GROUPS WERE:SG1
IGD17279I 1 VOLUMES WERE REJECTED BECAUSE THEY WERE NOT ON THE INCLUDE LIST
DR809I (001)-VDSS (01), ADDITIONAL DIAGNOSTIC DATA FOR PRECEDING MESSAGE:
                SC=HSMFR MC=MCDB22 DC=
             REQPRI=0000000020BLK REQSEC=0000004096BLK REQVOLS=01
DR801I (001)-DDDS (01), 2013.270 14:38:02 DATA SET FILTERING IS COMPLETE. 1 OF 1 DATA SETS
WERE SELECTED: 0 FAILED SERIALIZATION
               AND 0 FAILED FOR OTHER REASONS
DR455W (001)-DDDS (02), THE FOLLOWING DATA SETS WERE NOT SUCCESSFULLY PROCESSED
                MHLRES2.SRCHFOR.LIST
DR006I (001)-STEND(02), 2013.270 14:38:02 EXECUTION ENDS
DR013I (001)-CLTSK(01), 2013.270 14:38:02 TASK COMPLETED WITH RETURN CODE 0008
DR016I (002)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (002)-STEND(01), 2013.270 14:38:02 EXECUTION BEGINS
ADR405E (002)-DYNA (02), DYNAMIC ALLOCATION OF VOLUME MLD30C FAILED. ERROR CODE 0218.
INFORMATION CODE 0000
ADR283W (002)-FILTC(01), DATA SET MHLRES2.SUPERC.LIST WAS NOT SELECTED, 2
PAGE 0002   5695-DF175 DFSMSDSS V2R01.0 DATA SET SERVICES   2013.270 14:38
ADR383W (002)-DDDS (01), DATA SET MHLRES2.SUPERC.LIST NOT SELECTED
ADR455W (002)-DDDS (03), THE FOLLOWING DATA SETS WERE NOT SUCCESSFULLY PROCESSED
                 MHLRES2.SUPERC.LIST
ADR470W (002)-DDDS (04), NO DATA SETS SELECTED FOR PROCESSING
ADR006I (002)-STEND(02), 2013.270 14:38:02 EXECUTION ENDS
ADR013I (002)-CLTSK(01), 2013.270 14:38:02 TASK COMPLETED WITH RETURN CODE 0008
```

```
ADR012I (SCH)-DSSU (01), 2013.270 14:38:02 DFSMSDSS PROCESSING COMPLETE. HIGHEST RETURN
CODE IS 0008 FROM:
                 TASK   001
                        TASK    002
```

In Example 8-18, we show the effect of coding message ADR803I on a command that *does not* have the BYPASSACS option.

We see that the ADR803I message indicates that the STORCLAS was found to not be NULL. It was set to HSMFR as specified in the COPY statement**.**

The IGD01010I message also reports that variable &STORCLAS is set to HSMFR.

The significance, and usefulness, of the ADR803I message is that it shows the internal processing that resulted in the STORCLAS setting. If the DFSMSdss processing had not worked due to storage class problems, the indication that the HSMFR storage class was being used might lead to what the problem was.

We see that in this example there are several problems due to other situations, but they do not result in any further ADR803I messages.

Example 8-18 DSS messages from COPY job with DEBUG(SMSMSG) and no BYPASSACS specified

```
PAGE 0001   5695-DF175 DFSMSDSS V2R01.0 DATA SET SERVICES   2013.270 14:43
 COPY DATASET(INCLUDE(MHLRES2.SRCHFOR.LIST)) -              00170001
    DEBUG(SMSMSG)       -                                  00170104
    OUTDD(OUT) -                                           00171000
    ALLDATA(*) ALLEXCP -                                    00180000
    STORCLAS(HSMFR) RENAMEU(YYY) -                             00181000
              ADMIN SHR                                    00190005
ADR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'COPY '
 COPY DATASET(INCLUDE(MHLRES2.SUPERC.LIST)) -                00191001
    DEBUG(SMSMSG)        -                                 00191104
    OUTDD(OUT2) -                                          00192001
    ALLDATA(*) ALLEXCP -                                    00193001
    STORCLAS(HSMFR) RENAMEU(YYY) -                             00194001
              ADMIN SHR                                    00195005
ADR101I (R/I)-RI01 (01), TASKID 002 HAS BEEN ASSIGNED TO COMMAND 'COPY '
ADR109I (R/I)-RI01 (01), 2013.270 14:43:28 INITIAL SCAN OF USER CONTROL STATEMENTS
COMPLETED
ADR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (001)-STEND(01), 2013.270 14:43:28 EXECUTION BEGINS
ADR803I (001)-ACS  (01), SMS DIAGNOSTIC MESSAGES:
 IGD01008I STORCLAS NOT NULL. SET TO HSMFR
ADR709E (001)-VDSS (01), AN ERROR OCCURRED IN THE STORAGE MANAGEMENT SUBSYSTEM WHILE
ALLOCATING DATA SET MHLRES2.SRCHFOR.LIST WITH
              NEWNAME YYY.SRCHFOR.LIST. SMS MESSAGES FOLLOW.
SG ACS GETS CONTROL &ACSENVIR=ALLOC
IGD01010I &STORCLAS = HSMFR
IGD01010I &STORGRP = SG1
IGD17206I VOLUME SELECTION HAS FAILED - THERE ARE NOT ENOUGH VOLUMES
WITH SUFFICIENT SPACE FOR DATA SET
YYY.SRCHFOR.LIST
IGD17277I THERE ARE (1) CANDIDATE VOLUMES OF WHICH (1) ARE ENABLED OR QUIESCED
IGD17331I DATA SET YYY.SRCHFOR.LIST COULD
NOT BE ALLOCATED. PREFERRED FAST REPLICATION WAS SPECIFIED
BY THE CALLER.
IGD17290I THERE WERE 1 CANDIDATE STORAGE GROUPS OF WHICH THE FIRST 1
WERE ELIGIBLE FOR VOLUME SELECTION.
THE CANDIDATE STORAGE GROUPS WERE:SG1
```

```
IGD17279I 1 VOLUMES WERE REJECTED BECAUSE THEY WERE NOT ON THE INCLUDE LIST
ADR809I (001)-VDSS (01), ADDITIONAL DIAGNOSTIC DATA FOR PRECEDING MESSAGE:
               SC=HSMFR MC=MCDB22 DC=
             REQPRI=0000000020BLK REQSEC=0000004096BLK REQVOLS=01
ADR801I (001)-DDDS (01), 2013.270 14:43:28 DATA SET FILTERING IS COMPLETE. 1 OF 1 DATA SETS
WERE SELECTED: 0 FAILED SERIALIZATION
               AND 0 FAILED FOR OTHER REASONS
ADR455W (001)-DDDS (02), THE FOLLOWING DATA SETS WERE NOT SUCCESSFULLY PROCESSED
                MHLRES2.SRCHFOR.LIST
ADR006I (001)-STEND(02), 2013.270 14:43:28 EXECUTION ENDS
ADR013I (001)-CLTSK(01), 2013.270 14:43:28 TASK COMPLETED WITH RETURN CODE 0008
ADR016I (002)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (002)-STEND(01), 2013.270 14:43:28 EXECUTION BEGINS
PAGE 0002   5695-DF175 DFSMSDSS V2R01.0 DATA SET SERVICES   2013.270 14:43
ADR405E (002)-DYNA (02), DYNAMIC ALLOCATION OF VOLUME MLD30C FAILED. ERROR CODE 0218.
INFORMATION CODE 0000
ADR283W (002)-FILTC(01), DATA SET MHLRES2.SUPERC.LIST WAS NOT SELECTED, 2
ADR383W (002)-DDDS (01), DATA SET MHLRES2.SUPERC.LIST NOT SELECTED
ADR455W (002)-DDDS (03), THE FOLLOWING DATA SETS WERE NOT SUCCESSFULLY PROCESSED
                  MHLRES2.SUPERC.LIST
ADR470W (002)-DDDS (04), NO DATA SETS SELECTED FOR PROCESSING
ADR006I (002)-STEND(02), 2013.270 14:43:28 EXECUTION ENDS
ADR013I (002)-CLTSK(01), 2013.270 14:43:28 TASK COMPLETED WITH RETURN CODE 0008
ADR012I (SCH)-DSSU (01), 2013.270 14:43:28 DFSMSDSS PROCESSING COMPLETE. HIGHEST RETURN
CODE IS 0008 FROM:
                  TASK   001
                        TASK    002
```

Scenario 2: DFSMSdss RESTORE

When DFSMSdss is used to RESTORE a data set and the operation requires space to be allocated, the ACS routines would be used to select a suitable location.

The DEBUG(SMSMSG) option is expected to provide information about what the ACS chose to do. Without SMSMSG, the storage class selected for the allocation might not have been as selected, and to find out what was used it would be necessary to list the allocation.

In Example 8-19, we show the job to run DFSMSdss RESTORE with DEBUG(SMSMSG) specified. The job restores the HSM.BCDS data set with a rename to HSM.BCDS.TEST2, which does not exist on the selected output volume.

Example 8-19 JCL to run DSS RESTORE using DEBUG(SCSMSG) with new allocation

```
//MHLRES2D JOB 99990000,UAALF0,CLASS=A,NOTIFY=&SYSUID
/*JOBPARM S=*
//*
//REST EXEC PGM=ADRDSSU,REGION=0M
//SYSPRINT DD SYSOUT=A
//DASD     DD UNIT=3390,DISP=OLD,VOL=SER=SBOX1B
//TAPE     DD DISP=(OLD,KEEP),
// DSN=MHLRES2.DUMP.HSM.BCDS
//SYSIN    DD *
  RESTORE INDD(TAPE) OUTDD(DASD) -
          DEBUG(SMSMSG) -
          REPLACEUNCONDITIONAL -
          DATASET(INCLUDE(HSM.BCDS)) -
          RENAMEU((HSM.BCDS,MHLRES2.HSM.BCDS.TEST2))
/*
```

In Example 8-20, we show the DFSMSdss messages resulting from RESTORE with DEBUG(SCSMSG).

The significant message is IDR803I, which shows IGD01008I STORCLAS NOT NULL. SET TO SCRLS. This information would not have been shown if DEBUG(SCSMSG) had not been set.

Example 8-20 DSS messages resulting from RESTORE with DEBUG(SMSMSG)

```
PAGE 0001   5695-DF175 DFSMSDSS V2R01.0 DATA SET SERVICES   2013.270 18:06
 RESTORE INDD(TAPE) OUTDD(DASD) -                          00110000
       DEBUG(SMSMSG) -                                    00110110
       REPLACEUNCONDITIONAL -                              00110200
      DATASET(INCLUDE(HSM.BCDS)) -                         00111009
     RENAMEU((HSM.BCDS,MHLRES2.HSM.BCDS.TEST2))            00112011
ADR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'RESTORE '
ADR109I (R/I)-RI01 (01), 2013.270 18:06:04 INITIAL SCAN OF USER CONTROL STATEMENTS
COMPLETED
ADR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (001)-STEND(01), 2013.270 18:06:04 EXECUTION BEGINS
ADR780I (001)-TDDS (01), THE INPUT DUMP DATA SET BEING PROCESSED IS IN PHYSICAL DATA SET
FORMAT AND WAS CREATED BY Z/OS DFSMSDSS
            VERSION 2 RELEASE 1 MODIFICATION LEVEL 0 ON 2013.268 19:31:03
ADR803I (001)-ACS (01), SMS DIAGNOSTIC MESSAGES:
 IGD01008I STORCLAS NOT NULL. SET TO SCRLS
ADR395I (001)-SB105(01), DATA SET HSM.BCDS.DATA ALLOCATED WITH NEWNAME
MHLRES2.HSM.BCDS.TEST2.DATA, ON VOLUME(S): SBOX1B
ADR395I (001)-SB105(02), DATA SET HSM.BCDS.INDEX ALLOCATED WITH NEWNAME
MHLRES2.HSM.BCDS.TEST2.INDEX, ON VOLUME(S): SBOX1B
ADR418I (001)-SB105(01), THE FOLLOWING COMPONENTS FOR CLUSTER MHLRES2. ON SBOX1B MAY HAVE
TO BE CATALOGED IN CATALOG UCAT.VSBOX01
               COMPONENT MHLRES2.HSM.BCDS.TEST2.DATA
               COMPONENT MHLRES2.HSM.BCDS.TEST2.INDEX
ADR378I (001)-TDDS (02), THE FOLLOWING DATA SETS WERE SUCCESSFULLY PROCESSED FROM VOLUME
SBXHS8
                HSM.BCDS                        HSM.BCDS.DATA
                          HSM.BCDS                                    HSM.BCDS.INDEX
```

In Example 8-21, we show the results from the IDCAMS listing, which shows STORAGECLASS SCRLS, which corresponds to the ADR803I message as in Example 8-20.

By using DEBUG(SMSMSG) for diagnostic purposes, the additional overhead of setting up and running the IDCAMS job is avoided.

Example 8-21 IDCAMS display of details of MHLRES2.HSM.BCDS.TEST2

```
IDCAMS  SYSTEM SERVICES                                          TIME: 18:10:50
09/27/13     PAGE      1

 /* IDCAMS COMMAND */
   LISTCAT ENTRIES(MHLRES2.HSM.BCDS.TEST2) -
         CLUSTER -
         ALL
CLUSTER ------- MHLRES2.HSM.BCDS.TEST2
    IN-CAT --- UCAT.VSBOX01
    HISTORY
    DATASET-OWNER-----(NULL)   CREATION--------2013.270
    RELEASE----------------2   EXPIRATION------0000.000
    SMSDATA
```

```
    STORAGECLASS ------SCRLS   MANAGEMENTCLASS--MCNOACT
    DATACLASS --------HSMCDS   LBACKUP ---0000.000.0000
     CA-RECLAIM---------(YES)
     EATTR-------------(NULL)
    BWO STATUS------00000000   BWO TIMESTAMP---00000 00:00:00.0
     BWO---------------(NULL)
    RLSDATA
        LOG ------------------NONE   RECOVERY REQUIRED --(NO)     FRLOG
------------(NULL)
       VSAM QUIESCED -------(NO)    RLS IN USE ---------(NO)
LOGREPLICATE-------------(NO)
    LOGSTREAMID-------------------------------NONE
       RECOVERY TIMESTAMP LOCAL-----X'0000000000000000'
```

Compatibility

The DEBUG option is available on releases before DFSMS V2.1, but the SMSMSG suboption is not.

8.3 RESTORE command

There are updates to existing **RESTORE** command keywords in DFSMS V2.1:

- The **REPLACEUNCONDITIONAL** keyword on the **RESTORE** command now works for physical data sets.
- The **RENAMEUNCONDITIONAL** keyword on the **RESTORE** command, which previously worked only on non-VSAM physical data sets, will now work on VSAM physical data sets, as well.

In this section, we look at the keywords and provide scenarios to show how they work.

8.3.1 Scenarios for RESTORE keywords

We ran several jobs to demonstrate the updates to the DFSMSdss RESTORE command REPLACEUNCONDITIONAL and RENAMEUNCONDITIONAL keywords to show the effect of running these jobs in DFSMS V2.1 and in DFSMS V1.13.

We created a PHYSICAL format DFSMSdss DUMP of a non-VSAM, and of a VSAM data set to use later for the DFSMSdss RESTORE jobs.

DFSMSdss DUMP creation jobs

In Example 8-22 on page 162, we show the job to create a PHYSICAL format DUMP of the data set MHLRES2.CNTL.JCL, which is a non-VSAM data set. These enhancements to DFSMSdss RESTORE in DFSMS V2.1 relate to the RESTORE from a PHYSICAL DFSMSdss DUMP so the essential parameter is the option PHYSINDDNAME(IN).

The data set MHLRES2.CNTL.JCL was in use so the TOLERATE(ENQF) option was used, which specifies that even if the data set is in use (enqueued or serialized), the enqueue failure should be tolerated.

Example 8-22 JCL to create DSS DUMP of non-VSAM data set

```
//MHLRES2D JOB (999,POK),'MHLRES2',CLASS=A,MSGCLASS=T,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=*
//COPY    EXEC PGM=ADRDSSU
//IN       DD  DISP=SHR,DSN=MHLRES2.CNTL.JCL
//OUT      DD  DSN=MHLRES2.DUMP.CNTL.JCL,DISP=(NEW,CATLG),
//             SPACE=(TRK,(500,150),RLSE)
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  *
 DUMP DATASET(INCLUDE(MHLRES2.CNTL.JCL)) -
      OUTDD(OUT) -
      TOLERATE(ENQF) -
      ALLDATA(*) ALLEXCP -
      PHYSINDDNAME(IN)
/*
```

In Example 8-23, we show the DFSMSdss messages from the job creating the PHYSICAL format DFSMSdss DUMP data set. There are no messages explicitly confirming that the DUMP data set is in PHYSICAL format.

The return code 04 from this job is generated because of the message ADR411W in Example 8-23.

Example 8-23 DSS messages from job to create DSS PHYSICAL format DUMP of non-VSAM data set

```
PAGE 0001  5695-DF175 DFSMSDSS V2R01.0 DATA SET SERVICES  2013.268 15:51
 DUMP DATASET(INCLUDE(MHLRES2.CNTL.JCL)) -              00170035
    OUTDD(OUT) -                                     00171000
    TOLERATE(ENQF) -                                  00171135
    ALLDATA(*) ALLEXCP -                               00172000
    PHYSINDDNAME(IN)                                  00173035
ADR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'DUMP '
ADR109I (R/I)-RI01 (01), 2013.268 15:51:07 INITIAL SCAN OF USER CONTROL STATEMENTS
COMPLETED
ADR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (001)-STEND(01), 2013.268 15:51:07 EXECUTION BEGINS
ADR411W (001)-FDSDU(02), DATA SET MHLRES2.CNTL.JCL ON VOLUME SBOX1L WAS NOT
SERIALIZED ON REQUEST
ADR378I (001)-DTDS (01), THE FOLLOWING DATA SETS WERE SUCCESSFULLY PROCESSED FROM
VOLUME SBOX1L
               MHLRES2.CNTL.JCL
ADR006I (001)-STEND(02), 2013.268 15:51:11 EXECUTION ENDS
ADR013I (001)-CLTSK(01), 2013.268 15:51:11 TASK COMPLETED WITH RETURN CODE 0004
ADR012I (SCH)-DSSU (01), 2013.268 15:51:11 DFSMSDSS PROCESSING COMPLETE. HIGHEST
RETURN CODE IS 0004 FROM:
                          TASK     001
```

In Example 8-24 on page 163, we show the job to create a PHYSICAL format DUMP of the data set HSM.BCDS, which is a VSAM data set. These enhancements to DFSMSdss RESTORE in DFSMS V2.1 relate to the RESTORE from a PHYSICAL DFSMSdss DUMP so the essential parameter is the option PHYSINDDNAME(IN).

In Example 8-22, we specified TOLERATE(ENQF).

Example 8-24 JCL to create DSS DUMP of VSAM data set

```
//MHLRES2D JOB (999,POK),'MHLRES2',CLASS=A,MSGCLASS=T,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=*
//COPY    EXEC PGM=ADRDSSU
//IN       DD  DISP=SHR,DSN=HSM.BCDS
//OUT      DD  DSN=MHLRES2.DUMP.HSM.BCDS,DISP=(NEW,CATLG),
//             SPACE=(TRK,(500,150),RLSE)
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  *
 DUMP DATASET(INCLUDE(HSM.BCDS)) -
      OUTDD(OUT) -
      TOLERATE(ENQF) -
      ALLDATA(*) ALLEXCP -
      PHYSINDDNAME(IN)
/*
```

In Example 8-23 on page 162, we show the DFSMSdss messages from the job creating the PHYSICAL format DFSMSdss DUMP data set. There are no messages explicitly confirming that the DUMP data set is in PHYSICAL format.

There is an indication that the data set HSM.BCDS has been recognized as a VSAM data set as shown in the ADR730W message: ADR730W (001)-FDSDU(01), CLUSTER HSM.BCDS IS OPEN

CLUSTER is a VSAM construct that does not apply to non-VSAM data sets. The return code 04 from this job was generated because of the message:

ADR411W (001)-DYNA (01), DATA SET HSM.BCDS IN CATALOG CATALOG.HSM ON VOLUME SBXHS8 WAS NOT SERIALIZED ON REQUEST

Example 8-25 DSS messages from job to create DSS PHYSICAL format DUMP of VSAM data set

```
PAGE 0001  5695-DF175 DFSMSDSS V2R01.0 DATA SET SERVICES  2013.268 19:30
 DUMP DATASET(INCLUDE(HSM.BCDS)) -                    00170036
    OUTDD(OUT) -                                    00171000
    TOLERATE(ENQF) -                                 00171100
    ALLDATA(*) ALLEXCP -                              00172000
    PHYSINDDNAME(IN)                                 00173000
ADR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'DUMP '
ADR109I (R/I)-RI01 (01), 2013.268 19:30:59 INITIAL SCAN OF USER CONTROL STATEMENTS
COMPLETED
ADR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (001)-STEND(01), 2013.268 19:30:59 EXECUTION BEGINS
ADR730W (001)-FDSDU(01), CLUSTER HSM.BCDS IS OPEN
ADR411W (001)-DYNA (01), DATA SET HSM.BCDS IN CATALOG CATALOG.HSM ON VOLUME SBXHS8
WAS NOT SERIALIZED ON REQUEST
ADR378I (001)-DTDS (01), THE FOLLOWING DATA SETS WERE SUCCESSFULLY PROCESSED FROM
VOLUME SBXHS8
                HSM.BCDS
ADR006I (001)-STEND(02), 2013.268 19:31:04 EXECUTION ENDS
ADR013I (001)-CLTSK(01), 2013.268 19:31:04 TASK COMPLETED WITH RETURN CODE 0004
ADR012I (SCH)-DSSU (01), 2013.268 19:31:04 DFSMSDSS PROCESSING COMPLETE. HIGHEST
RETURN CODE IS 0004 FROM:
                         TASK    001
```

DFSMSdss RESTORE jobs running on DFSMS V2.1

In this part, we demonstrate the use of the updated REPLACEUNCONDITIONAL and RENAMEUNCONDITIONAL operands as used on DSS RESTORE commands.

Non-VSAM data set restore with rename

In Example 8-26, we show the job to RESTORE the data set MHLRES2.CNTL.JCL as a copy named MHLRES2.CNTL.JCL.REST1. The option REPLACEUNCONDITIONAL is specified so that if the data set MHLRES2.CNTL.JCL.REST1 already exists it will be replaced.

The RENAMEUNCONDITIONAL option is abbreviated to RENAMEU.

Example 8-26 JCL to restore and rename non-VSAM data set

```
//MHLRES2D JOB 99990000,UAALF0,CLASS=A,NOTIFY=&SYSUID
/*JOBPARM S=*
//*
//REST EXEC PGM=ADRDSSU,REGION=0M
//SYSPRINT DD SYSOUT=A
//DASD     DD UNIT=3390,DISP=OLD,VOL=SER=SBOX1B
//TAPE     DD DISP=(OLD,KEEP),
// DSN=MHLRES2.DUMP.CNTL.JCL
//SYSIN    DD *
  RESTORE INDD(TAPE) OUTDD(DASD) -
          REPLACEUNCONDITIONAL -
          DATASET(INCLUDE(MHLRES2.CNTL.JCL)) -
          RENAMEU((MHLRES2.CNTL.JCL,MHLRES2.CNTL.JCL.REST1))
/*
```

In Example 8-27, we show the DSS messages resulting from the RESTORE.

In this case, we have confirmation that the input data set is in PHYSICAL format as shown by message ADR780I.We see that the data set MHLRES2.CNTL.JCL.REST1 was ALLOCATED.

Example 8-27 DSS messages from RESTORE of non-VSAM data set where newname is new data set

```
PAGE 0001  5695-DF175 DFSMSDSS V2R01.0 DATA SET SERVICES  2013.268 16:53
 RESTORE INDD(TAPE) OUTDD(DASD) -                     00110007
     DATASET(INCLUDE(MHLRES2.CNTL.JCL)) -             00111008
    RENAMEU((MHLRES2.CNTL.JCL,MHLRES2.CNTL.JCL.REST1))    00112008
ADR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'RESTORE '
ADR109I (R/I)-RI01 (01), 2013.268 16:53:11 INITIAL SCAN OF USER CONTROL STATEMENTS
COMPLETED
ADR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (001)-STEND(01), 2013.268 16:53:11 EXECUTION BEGINS
ADR780I (001)-TDDS (01), THE INPUT DUMP DATA SET BEING PROCESSED IS IN PHYSICAL
DATA SET FORMAT AND WAS CREATED BY Z/OS DFSMSDSS
                        VERSION 2 RELEASE 1 MODIFICATION LEVEL 0 ON 2013.268
15:51:11
ADR395I (001)-TDPNV(02), DATA SET MHLRES2.CNTL.JCL ALLOCATED WITH NEWNAME
MHLRES2.CNTL.JCL.REST1, ON VOLUME(S): SBOX1B
ADR378I (001)-TDDS (01), THE FOLLOWING DATA SETS WERE SUCCESSFULLY PROCESSED FROM
VOLUME SBOX1L
                         MHLRES2.CNTL.JCL                              RESTORED ON
SBOX1B
ADR006I (001)-STEND(02), 2013.268 16:53:11 EXECUTION ENDS
ADR013I (001)-CLTSK(01), 2013.268 16:53:11 TASK COMPLETED WITH RETURN CODE 0000
```

```
ADR012I (SCH)-DSSU (01), 2013.268 16:53:11 DFSMSDSS PROCESSING COMPLETE. HIGHEST
RETURN CODE IS 0000
```

We ran the job as shown in Example 8-26 on page 164 again. In Example 8-28, we show the DFSMSdss messages resulting from the DFSMSdss RESTORE when the new data set name already exists. In this case, we see message ADR442I, which indicates that the data set was PREALLOCATED.

In this situation, the REPLACEUNCONDITIONAL option ensured that the data set was replaced.

Example 8-28 DSS messages from RESTORE of non-VSAM data set where newname exists

```
PAGE 0001  5695-DF175 DFSMSDSS V2R01.0 DATA SET SERVICES  2013.268 16:56
 RESTORE INDD(TAPE) OUTDD(DASD) -                    00110007
      REPLACEUNCONDITIONAL -                        00110108
     DATASET(INCLUDE(MHLRES2.CNTL.JCL)) -             00111008
    RENAMEU((MHLRES2.CNTL.JCL,MHLRES2.CNTL.JCL.REST1))     00112008
ADR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'RESTORE '
ADR109I (R/I)-RI01 (01), 2013.268 16:56:15 INITIAL SCAN OF USER CONTROL STATEMENTS
COMPLETED
ADR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (001)-STEND(01), 2013.268 16:56:15 EXECUTION BEGINS
ADR780I (001)-TDDS (01), THE INPUT DUMP DATA SET BEING PROCESSED IS IN PHYSICAL
DATA SET FORMAT AND WAS CREATED BY Z/OS DFSMSDSS
                         VERSION 2 RELEASE 1 MODIFICATION LEVEL 0 ON 2013.268
15:51:11
ADR442I (001)-TDPNV(01), DATA SET MHLRES2.CNTL.JCL PREALLOCATED WITH NEW NAME
MHLRES2.CNTL.JCL.REST1, ON VOLUME(S): SBOX1B
ADR378I (001)-TDDS (01), THE FOLLOWING DATA SETS WERE SUCCESSFULLY PROCESSED FROM
VOLUME SBOX1L
                          MHLRES2.CNTL.JCL                              RESTORED ON
SBOX1B
ADR006I (001)-STEND(02), 2013.268 16:56:15 EXECUTION ENDS
ADR013I (001)-CLTSK(01), 2013.268 16:56:15 TASK COMPLETED WITH RETURN CODE 0000
ADR012I (SCH)-DSSU (01), 2013.268 16:56:15 DFSMSDSS PROCESSING COMPLETE. HIGHEST
RETURN CODE IS 0000
```

VSAM data set restore with rename

In Example 8-29, we show the job to restore data set HSM.CDS with rename to MHLRES2.HSM.BCDS. There is no requirement to identify this as a VSAM data set, DFSMSdss determines that from the DFSMSdss DUMP data set.

Example 8-29 JCL to RESTORE VSAM data set HSM.BCDS with rename

```
//MHLRES2D JOB 99990000,UAALF0,CLASS=A,NOTIFY=&SYSUID
/*JOBPARM S=*
//*
//REST EXEC PGM=ADRDSSU,REGION=0M
//SYSPRINT DD SYSOUT=A
//DASD     DD UNIT=3390,DISP=OLD,VOL=SER=SBOX1B
//TAPE     DD DISP=(OLD,KEEP),
// DSN=MHLRES2.DUMP.HSM.BCDS
//SYSIN    DD *
  RESTORE INDD(TAPE) OUTDD(DASD) -
          REPLACEUNCONDITIONAL -
```

```
          DATASET(INCLUDE(HSM.BCDS)) -
          RENAMEU((HSM.BCDS,MHLRES2.HSM.BCDS))
/*
```

In Example 8-30, we show the messages resulting from the RESTORE. In this case, since the restored data set was a VSAM data set, additional messages are produced.

DFSMSdss has recognized that there is a DATA and INDEX component in the VSAM data set and has allocated these with the MHLRES2.HSM.BCDS prefix.

DFSMSdss has issued message ADR418I advising that the DATA and INDEX components may have to be cataloged. We found that the data set components MHLRES2.HSM.BCDS.DATA and MHLRES2.HSM.BCDS.INDEX were not cataloged.

Example 8-30 DSS messages resulting from RESTORE of VSAM data set

```
PAGE 0001   5695-DF175 DFSMSDSS V2R01.0 DATA SET SERVICES   2013.268 19:34
 RESTORE INDD(TAPE) OUTDD(DASD) -                          00110000
      REPLACEUNCONDITIONAL -                              00110100
      DATASET(INCLUDE(HSM.BCDS)) -                         00111009
     RENAMEU((HSM.BCDS,MHLRES2.HSM.BCDS))                    00112009
ADR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'RESTORE '
ADR109I (R/I)-RI01 (01), 2013.268 19:34:24 INITIAL SCAN OF USER CONTROL STATEMENTS
COMPLETED
ADR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (001)-STEND(01), 2013.268 19:34:24 EXECUTION BEGINS
ADR780I (001)-TDDS (01), THE INPUT DUMP DATA SET BEING PROCESSED IS IN PHYSICAL DATA SET
FORMAT AND WAS CREATED BY Z/OS DFSMSDSS
            VERSION 2 RELEASE 1 MODIFICATION LEVEL 0 ON 2013.268 19:31:03
ADR395I (001)-SB105(01), DATA SET HSM.BCDS.DATA ALLOCATED WITH NEWNAME
MHLRES2.HSM.BCDS.DATA, ON VOLUME(S): SBOX1B
ADR395I (001)-SB105(02), DATA SET HSM.BCDS.INDEX ALLOCATED WITH NEWNAME
MHLRES2.HSM.BCDS.INDEX, ON VOLUME(S): SBOX1B
ADR418I (001)-SB105(01), THE FOLLOWING COMPONENTS FOR CLUSTER MHLRES2. ON SBOX1B MAY HAVE
TO BE CATALOGED IN CATALOG UCAT.VSBOX01
                COMPONENT MHLRES2.HSM.BCDS.DATA
                COMPONENT MHLRES2.HSM.BCDS.INDEX
ADR378I (001)-TDDS (02), THE FOLLOWING DATA SETS WERE SUCCESSFULLY PROCESSED FROM VOLUME
SBXHS8
                 HSM.BCDS                          HSM.BCDS.DATA
                 HSM.BCDS                         HSM.BCDS.INDEX
ADR006I (001)-STEND(02), 2013.268 19:34:25 EXECUTION ENDS
ADR013I (001)-CLTSK(01), 2013.268 19:34:25 TASK COMPLETED WITH RETURN CODE 0000
ADR012I (SCH)-DSSU (01), 2013.268 19:34:25 DFSMSDSS PROCESSING COMPLETE. HIGHEST RETURN
CODE IS 0000
```

In Example 8-31, we show the job to create the catalog entries for the VSAM data set components MHLRES2.HSM.BCDS.DATA and MHLRES2.HSM.BCDS.INDEX.

Example 8-31 JCL to catalog VSAM DATA and INDEX components

```
//MHLRES2D JOB (999,POK),'MHLRES2',CLASS=A,MSGCLASS=T,
//             NOTIFY=&SYSUID,TIME=1440,REGION=6M
/*JOBPARM L=999,SYSAFF=*
//IDCAMS  EXEC PGM=IDCAMS
//HSMBCDS  DD  UNIT=3390,VOL=SER=SBOX1B,DISP=SHR
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  *
  DEFINE CLUSTER(NAME(MHLRES2.HSM.BCDS) VOLUMES(SBOX1B) -
```

```
          RECATALOG          ) -
         DATA(NAME(MHLRES2.HSM.BCDS.DATA) -
                                ) -
         INDEX(NAME(MHLRES2.HSM.BCDS.INDEX) -
                               )
/*
```

In Example 8-32, we show the messages from the IDCAMS job to create the catalog entries for MHLRES2.HSM.BCDS.DATA, MHLRES2.HSM.BCDS.INDEX, and for the VSAM cluster name MHLRES2.HSM.BCDS.

When DFSMSdss allocated the DATA and INDEX components on the specified volume, it also stored data in the VSAM VOLUME RECORD (VVR) on the volume, and the IDCAMS job then used that information to complete the catalog information.

Example 8-32 IDCAMS messages from the catalog job

```
IDCAMS  SYSTEM SERVICES                                          TIME: 19:48:13
09/25/13      PAGE       1

 DEFINE CLUSTER(NAME(MHLRES2.HSM.BCDS) VOLUMES(SBOX1B) -      00151007
       RECATALOG      ) -                              00156007
     DATA(NAME(MHLRES2.HSM.BCDS.DATA) -                      00157007
                         ) -                            00158007
     INDEX(NAME(MHLRES2.HSM.BCDS.INDEX) -                    00159007
                        )                               00159107
IDC0508I DATA ALLOCATION STATUS FOR VOLUME SBOX1B IS 0
IDC0509I INDEX ALLOCATION STATUS FOR VOLUME SBOX1B IS 0
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

IDC0002I  IDCAMS  PROCESSING COMPLETE. MAXIMUM CONDITION CODE WAS 0
```

DFSMSdss RESTORE jobs running on DFSMS V1.13

We ran the jobs to DFSMSdss RESTORE of non-VSAM and VSAM data sets on DFSMS V1.13 to demonstrate the effect of using the **REPLACEUNCONDITIONAL** and **RENAMEUNCONDITIONAL** keywords when used on earlier systems.

In Example 8-33, we show the DFSMSdss messages resulting from trying to use the REPLACEUNCONDITIONAL and RENAMEUNCONDITIONAL options when running on DFSMS V1.13 and restoring from a physical format DUMP data set.

DFSMSdss issued message ADR780I, which indicates that the DUMP data has been recognized as being in physical format.

DFSMSdss messages ADR392E advises that the data set (using its new name) already exists, and because the REPLACEUNCONDITIONAL option is not supported for physical format DUMP data sets it is an error.

DFSMSdss message ADR415W warns that no processing has occurred.

Example 8-33 DSS messages from job to restore non-VSAM data set run on DFSMS V1.13

```
PAGE 0001  5695-DF175 DFSMSDSS V1R13.0 DATA SET SERVICES  2013.269 01:29
 RESTORE INDD(TAPE) OUTDD(DASD) -                    00110007
      REPLACEUNCONDITIONAL -                        00110108
     DATASET(INCLUDE(MHLRES2.CNTL.JCL)) -             00111008
```

```
   RENAMEU((MHLRES2.CNTL.JCL,MHLRES2.CNTL.JCL.REST1))     00112008
ADR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'RESTORE '
ADR109I (R/I)-RI01 (01), 2013.269 01:29:11 INITIAL SCAN OF USER CONTROL STATEMENTS
COMPLETED
ADR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (001)-STEND(01), 2013.269 01:29:11 EXECUTION BEGINS
ADR780I (001)-TDDS (01), THE INPUT DUMP DATA SET BEING PROCESSED IS IN PHYSICAL
DATA SET FORMAT AND WAS CREATED BY DFSMSDSS VERSION
          2 RELEASE 1 MODIFICATION LEVEL 0 ON 2013.268 15:51:11
ADR392E (001)-TDPNV(01), MHLRES2.CNTL.JCL EXISTS ON SBOX1B WITH NEWNAME
MHLRES2.CNTL.JCL.REST1
ADR382W (001)-TDDS (01), THE FOLLOWING DATA SETS WERE NOT PROCESSED FROM VOLUME
SBOX1L DUE TO ERRORS
              MHLRES2.CNTL.JCL
ADR415W (001)-TDDS (01), NO DATA SETS WERE COPIED, DUMPED, OR RESTORED FROM
LOGICALVOLUME SBOX1L
ADR415W (001)-TDDS (02), NO DATA SETS WERE COPIED, DUMPED, OR RESTORED FROM ANY
VOLUME
ADR006I (001)-STEND(02), 2013.269 01:29:11 EXECUTION ENDS
ADR013I (001)-CLTSK(01), 2013.269 01:29:11 TASK COMPLETED WITH RETURN CODE 0008
ADR012I (SCH)-DSSU (01), 2013.269 01:29:11 DFSMSDSS PROCESSING COMPLETE. HIGHEST
RETURN CODE IS 0008 FROM:
                         TASK     001
```

In Example 8-34, we show the DFSMSdss messages resulting from running a job on DFSMS V1.13 with RENAMEUNCONDITIONAL specified:

- DFSMSdss issued message ADR780I that indicates that the input data set is in DFSMSdss DUMP physical format.
- DFSMSdss issued message ADR332E advising that VSAM CLUSTER HSM.BCDS was not processed.
- DFSMSdss issued messages ADR382W and ADR415W, which expands on the ADR332E message.

Example 8-34 DSS messages from job to restore VSAM data set run on DFSMS V1.13

```
PAGE 0001  5695-DF175 DFSMSDSS V1R13.0 DATA SET SERVICES  2013.268 19:58
 RESTORE INDD(TAPE) OUTDD(DASD) -                    00110000
      REPLACEUNCONDITIONAL -                        00110100
      TOLERATE(ENQF) -                             00110210
     DATASET(INCLUDE(HSM.BCDS)) -                    00111000
    RENAMEU((HSM.BCDS,MHLRES2.HSM.BCDS13))           00112010
ADR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'RESTORE '
ADR109I (R/I)-RI01 (01), 2013.268 19:58:58 INITIAL SCAN OF USER CONTROL STATEMENTS
COMPLETED
ADR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
ADR006I (001)-STEND(01), 2013.268 19:58:58 EXECUTION BEGINS
ADR780I (001)-TDDS (01), THE INPUT DUMP DATA SET BEING PROCESSED IS IN PHYSICAL
DATA SET FORMAT AND WAS CREATED BY DFSMSDSS VERSION
          2 RELEASE 1 MODIFICATION LEVEL 0 ON 2013.268 19:31:03
ADR411W (001)-DYNA (01), DATA SET HSM.BCDS IN CATALOG CATALOG.HSM ON VOLUME SBOX1B
WAS NOT SERIALIZED ON REQUEST
ADR332E (001)-TDDS (01), CLUSTER HSM.BCDS IN CATALOG CATALOG.HSM NOT PROCESSED.
PHYSICAL DATA SET OPERATION DOES NOT SUPPORT RENAME
              OF VSAM DATA SETS
```

```
ADR382W (001)-TDDS (02), THE FOLLOWING DATA SETS WERE NOT PROCESSED FROM VOLUME
SBXHS8 DUE TO ERRORS
               HSM.BCDS
ADR415W (001)-TDDS (01), NO DATA SETS WERE COPIED, DUMPED, OR RESTORED FROM
LOGICALVOLUME SBXHS8
ADR415W (001)-TDDS (02), NO DATA SETS WERE COPIED, DUMPED, OR RESTORED FROM ANY
VOLUME
ADR006I (001)-STEND(02), 2013.268 19:59:02 EXECUTION ENDS
ADR013I (001)-CLTSK(01), 2013.268 19:59:02 TASK COMPLETED WITH RETURN CODE 0008
ADR012I (SCH)-DSSU (01), 2013.268 19:59:02 DFSMSDSS PROCESSING COMPLETE. HIGHEST
RETURN CODE IS 0008 FROM:
```

8.4 zFS change activity support

The zFS change activity support is an enhancement that addresses a difference in the way zFS files must be handled compared to HFS files.

This support does not require any user interaction. The enhancement that it provides allows zFS files to be handled in a similar manner to other data sets as described in 8.1, “DFSMSdss data set change indicator reset with RESTORE” on page 146.

9

System Data Mover enhancements

This chapter introduces a change in DFSMS V2.1 addressing a performance issue in System Data Mover (SDM). SDM primary volumes are now allowed to be offline when volumes are added in an XRC session. Before this enhancement, the start of a session had to wait for all volumes to come online delaying a fast creation of an XRC session.

The following enhancements are described in this chapter:

- XRC offline volumes
- Migration and coexistence considerations

9.1 XRC offline volumes

Adding volumes in an XRC session with the **XSTART** command to restart a session or issuing an **XADDPAIR** command to resume suspended volumes will now allow the primary volumes in an XRC session to be offline. Previously, these actions would require the primary volumes to be online and would delay the resume of a suspended session for several minutes. Having to wait while the volumes were varied online impacts the recovery point objective (RPO) time.

Having the primary volumes in offline status can also remove the risk in having primary volumes known to other systems in online status, and potentially receive writes from these systems. In addition, being able to have XRC volumes offline, will also enable moving XRC volumes to Alternate Channel Subsets, where the current restriction is that these cannot be online.

The first time that you initialize an XRC session, you still must have all primary volumes online, but when the session is initialized, you can vary these offline.

Trying to add an offline volume to a new XRC session fails, as shown in Example 9-1.

Example 9-1 Error message displayed if XRC session is initialized with primary volume offline

```
ANTA5107E XADDPAIR FAILED FOR VOLUME PAIR(ML91AA,ML9BAF) FOR
SESSION(ITSO01), RC=464 REAS=418
```

To see how an offline primary volume appears in an XRC query on a session that was resumed by XSTART or XADDPAIR, we put device address 91AA with volser ML91AA offline and then issued the **TSO XQUERY DATASET(XRC.XQUERY) VOLUME(ALL)** command.

The output from this command is shown in Example 9-2.

Example 9-2 Output from XQUERY command having put device 91AA offline

```
ANTQ8200I XQUERY STARTED FOR SESSION(ITSO01) ASNAME(ANTAS001)
ANTQ8202I XQUERY VOLUME REPORT - 003
ANTQ8211I PRIM   SEC     ERROR  SYNCH
ANTQ8212I VOL    VOL     LEVEL    % STA CMD OP -------TIMESTAMP--------
ANTQ8203I ------------------------------------------------------------
ANTQ8213I ML91AA ML9BAF SESSION     DUP
ANTQ8213I ML91A9 XRCUTL          -- UTL
ANTQ8213I ML92AB ML98AE SESSION     DUP
ANTQ8213I ML92A9 XRCUTL          -- UTL
ANTQ8213I ML93A4 XRCUTL          -- UTL
ANTQ8213I ML93A7 ML99AB SESSION     DUP
ANTQ8213I ML94AC XRCUTL          -- UTL
ANTQ8213I ML94AD ML9AA9 SESSION     DUP
ANTQ8213I ML96AB XRCUTL          -- UTL
ANTQ8213I ML96AC ML9CAF SESSION     DUP
ANTQ8238I TOTAL=10  DUP=5  CPY=0  PND=0  SUS=0  SEQ=0  UTL=5
ANTQ8260I PAV=0
ANTQ8231I DATA CONSISTENT(NO_TIME_AVAILABLE)   IDLE(06:13:58.5)
ANTQ8240I DATA EXPOSURE(NO_TIME_AVAILABLE)
ANTQ8232I SESSIONTYPE(XRC)  ERRORLEVEL(SESSION)  HLQ(SDM)
ANTQ8233I DEFAULT TIMEOUT(STORAGE_CONTROL_DEFAULT)
ANTQ8201I XQUERY VOLUME REPORT COMPLETE FOR SESSION(ITSO01)
```

As displayed above, the volser ML91AA still appears in the output listing with the volser identification and not just with the UCB address. This is exactly how the primary volumes appear in online status.

A new **XQUERY CONFIGURATION** command with the STATUS keyword will have options OFL or ONL. Using this command, you are able to identify either offline or online volumes depending on option setting.

Issuing the command: **XQUERY ITSO01 DATASET(XRC.XQUERY) DISP(SHR) CONFIGURATION VOLUME(ALL) STATUS(OFL**) gives you all offline volumes, as shown in Example 9-3.

Example 9-3 Display of all XRC primary in offline status

```
ANTQ8200I XQUERY STARTED FOR SESSION(ITSO01) ASNAME(ANTASO01)
ANTQ8202I XQUERY CONFIGURATION REPORT - 003
ANTQ8281I ---------PRIMARY----------  -----SECONDARY------
ANTQ8284I      SC SC
ANTQ8282I SSID SN ID DVCN CCA VOLSER  SSID DVCN CCA VOLSER
ANTQ8203I ------------------------------------------------------------
ANTQ8283I 8943 -- 01 91AA 2A  ML91AA  8957 9BAF 2F  ML9BAF
ANTQ8206I 1 VOLUME(S) MEET REQUESTED SPECIFICATION
ANTQ8238I TOTAL=10  DUP=5  CPY=0  PND=0  SUS=0  SEQ=0  UTL=5
ANTQ8260I PAV=0
ANTQ8231I DATA CONSISTENT(NO_TIME_AVAILABLE)   IDLE(00:37:26.2)
ANTQ8240I DATA EXPOSURE(NO_TIME_AVAILABLE)
ANTQ8232I SESSIONTYPE(XRC)  ERRORLEVEL(VOLUME)  HLQ(SDM)
ANTQ8201I XQUERY CONFIGURATION REPORT COMPLETE FOR SESSION(ITSO01)
```

Note: Utility volumes and secondary volumes still must remain.

9.2 Migration and coexistence considerations

XRC primary volumes should be defined as coming offline at IPL by default, even though the initial XADDPAIR requires the volumes to be online. After a successful ADDPAIR, you can vary the primary volumes offline and leave them in this status.

It is also suggested to remove all unnecessary **VARY ONLINE** commands from scripts that are related to the previous requirement of having these volumes online.

If you are using any performance or capacity tool on this environment, you might have to move the task that collects information to an application LPAR that has the volumes online.

9.2.1 Additional support

XRC will now listen for ENF 31 and 32, preventing a dynamic activation from removing (or modifying) devices that are in the XRC configuration.

A UCB must be pinned before invoking IOS offline device service (IOSODS) macro and pinned while in use. This prevents a device from being deleted by a dynamic activate while the device is in use. The data mover listener goes through the list of devices to be deleted, and if any are devices “owned” by XRC, the device is pinned by the listen routine.

Documentation

Refer to the manuals *z/OS DFSMS Advanced Copy Services,* SC35-0428; and *z/OS MVS System Messages Volume 1 (ABA - AOM),* SA22-7631 for more details about setting up XRC.

10

SMS exploiting hardware enhancements

In this chapter, we look at features and function in z/OS V2.1 that take advantage of hardware functions and attributes in their implementation.

The following enhancements are described in this chapter:

- Cluster and extent pool exploitation
- DFSMShsm storage tiers
- JES3 SMS tape support
- DADSM CVAF/DEVICE support

10.1 Cluster and extent pool exploitation

Before DFSMS V2.1, volume selection will try to allocate or extend a multivolume data set in the same Storage Facility Image (SFI), when the storage class accessibility attribute is set to Continuous or Continuous Preferred.

An SFI can also be translated as a storage control unit. With new support in DFSMS V2.1, DFSMS volume selection will have awareness of cluster and extent pool boundaries in the IBM System Storage® DS8000. This enables DFSMS to select volumes according to accessibility on fast copy replications and assure optimum performance on data striping.

Cluster and extent pools will have a close relationship in the DS8000, as Cluster 0 (also called server 0) and Cluster 1 (called server 1) will have one or more dedicated extent pools assigned to either even LCUs or odd LCUs. The extent pools will consist of a number of extents depending on the physical capacity installed. For mainframe storage, an extent will be 1113 cylinders (3390 mod 1). These extents can be put together forming logical volumes from 3390 mod 1 up to the EAV size of 1 TB.

10.1.1 Volume selection for multi-volume data sets

When allocating a new multi-volume data set or extending an existing one, DFSMS volume selection will now select a volume in the same cluster (and extent pools assigned to this cluster) if the **ACCESSIBILITY** parameter in the storage class is set to Continuous or Continuous Preferred. If a new allocation cannot occur within the same cluster, the allocation will be done within the same SFI (across the two clusters).

A notification is sent to the job log if your preference is not met, as shown in Example 10-1.

Example 10-1 Example of message if Accessibility requirement is not met

```
IGD17395I DATA SET MHLRES1.SFI.TEST001
WAS NOT ALLOCATED IN THE SAME STORAGE FACILITY IMAGE
BECAUSE SELECTED VOLUMES HAD HIGHER PREFERENCE VALUE
```

Before DFSMS V2.1, DFSMS issued IGD17395I if a multi-volume data set was not allocated or extended to volumes in the same SFI. DFSMS issues a new variant of IGD17395I if a multi-volume data set was allocated or extended to volumes in the same SFI, but not in the same cluster.

Volume selection for DFSMSdss Fast Replication operation

When copying data with a Fast Replication option, the target volume will now be selected within the same cluster if possible. If DFSMS fails to do so, allocation will be able to occur within the same SFI.

Volume selection for striped data sets

In releases before DFSMS V2.1, volume selection would try to distribute striped data sets across LCUs. For striped data sets, the support will now enable DFSMS volume selection to spread the allocation (stripes) over multiple extent pools. This will assure that different volumes are used and the individual stripes have no performance impact on one another. When extending a striped data set to a new volume, DFSMS volume selection prefers extent pools that are not already assigned to active stripes.

If DFSMS fails to be able to allocate stripes across extent pools, the allocation happens according to the previous implementation (across LCUs).

10.2 DFSMShsm storage tiers

DFSMShsm Primary Space Management is the function to maintain your primary disk as related to volumes and data sets. Only the most recently created and referenced data is typically retained on primary disk. If no longer needed, data is either deleted based on policy or migrated off the disk to tape. Space release is done along with extent consolidation on the individual data sets to optimize the environment.

Primary disk can either be DFSMS-managed volumes or non-DFSMS managed volumes added to DFSMShsm through the **ADDVOL** command.

10.2.1 Primary Space Management

Primary Space Management is initiated by the AUTOMIGRATE=YES option on the storage group definition for the DFSMS-managed volumes, or by command for the non-DFSMS managed volumes. DFSMShsm automigration happens in two phases.

Phase 1

The first phase includes functions, where no data is being moved. Examples are deletion of temporary and expired data sets, partial release, and Fast Subsequent Migration.

All data set actions are controlled by the management class settings. The management class settings determine if release, delete, or migration must be done. In the first phase, migration is limited to Fast Subsequent Migration.

Phase 2

The second phase consists of migrating eligible data sets until the low threshold is reached on the storage group. This may have been accomplished by phase 1 and extent reduction. Extent reduction ignores low threshold, as it usually does not actually free space on the volume. It combines extents so that the data set can continue to grow without running out of extents.

Note: If deletion of expired data sets, Fast Subsequent Migration, and space reduction of the remaining data sets achieves the specified free space, phase 2 will never start.

Migration will continue until the low water mark is reached or there are no more candidates to migrate. Eligible data sets are put onto the migration queue in a priority order based on the size and the age of the data set and are processed accordingly.

10.2.2 DFSMShsm V2.1 Storage Tier basics

The new Storage Tier function in DFSMShsm supports moving data from the DFSMShsm-managed primary volumes to the most optimum hardware tier solid-state device (SSD), normal response time disk (NRT) (also referred to as Enterprise disk) or long response time disk (also called Nearline or SATA disk) and ultimately to tape. Movement of data will happen as a class transition as part of the Primary Space Management function outlined previously.

To take advantage of the DFSMShsm Storage Tier function, the environment must be set up at a storage group level according to the different types of hardware tiers. Basically, each tier corresponds to one or more DFSMS storage groups. Data is directed to a specified tier according to the storage group requirement.

DFSMShsm has no awareness of the specific hardware types, only about the storage groups representing the tier. Class transition as used today for object data supports moving data between the tiers (storage groups) or assures that a recall happens to the correct tier. This support applies for zFS, IBM DB2® and CICS where the Serialization Exit provides special processing support for each of these.

Implementing Storage Tier requires some planning as to how to fit it into your current environment. Storage Tiering implementation most likely has a different approach than separating data in the current storage groups. Storage group distribution of data is most commonly based on type of data and requirements for backup and other requirements for separation. Separation requirements include having production separated from development data or isolation of system data, batch data, database data, and temporary files.

You might have an environment already optimized with the fewest possible storage groups and you will probably not want to add too many to support DFSMShsm Storage Tier. You might only have Enterprise disk (normal response time disk), and then you would stay with your current setup.

You might also have Nearline disk (long response disk) or plan to implement these along with Nearline disk. In this case, implement tiering of your primary disk in two tiers. If this would be possible by adding just one storage group for the nearline tier depends on your setup. Consider if you would put all your lower priority primary data in one storage group without taking into account the type of data (for example, database data or sequential data).

The intention of implementing Storage Tier is to assure that your data is always on the most optimum level as to performance and cost. In the graphical presentation in Figure 10-1, you see an example of two primary disk Storage Tiers (Enterprise and Nearline disk). Data will stay 90 days on the most expensive media, and then move to Nearline disk with a lower cost per GB before data will be migrated to tape after 366 days.

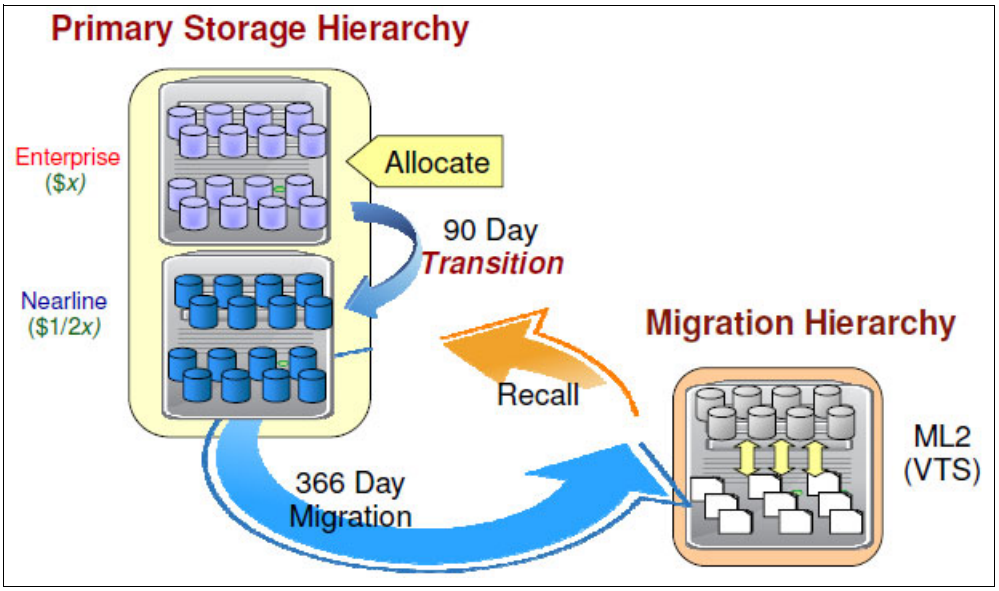

Figure 10-1 Storage Tier concept with two tiers

10.2.3 Storage Tier process

A new flag that enables Storage Tier function per default will be defined in the MCVT. This new function will be active during primary space management by default with DFSMS V2.1.

To summarize the functions in primary space management with the new Storage Tier process:

- Delete expired data sets
- Release unused space and free up extents
- Process data sets in scope for transition
  - Move data sets eligible for class transition to a different storage tier if storage class or storage group changed
  - Change management class only if required
- Move migration candidates from Primary disk to ML1 or tape

Storage group priority setting

A new priority setting on the DFSMS storage group application decides the priority sequence in which storage groups are processed. The value can be in the range 1 - 100 with 50 being the default (1 the lowest, while 100 is the highest priority). This value has been added to make it possible to prioritize the sequence in which your storage groups will be processed during class transition. This assures that the most important storage groups are processed first and data offloaded to make the storage group ready to receive new allocations.

The Processing Priority field in the storage group application in ISMF is shown in Example 10-2.

Example 10-2 New storage group processing priority parameter

```
POOL STORAGE GROUP ALTER         Page 2 of 2
Command ===>

SCDS Name . . . . . : SYS1.SMS.MHLRES3.SCDS
Storage Group Name  : BIGSTUFF

To ALTER Storage Group, Specify:

 Allocation/migration Threshold :     High    99   (1-100)  Low . . 1   (0-99)
 Alloc/Migr Threshold Track-Managed:  High    99   (1-100)  Low . . 1   (0-99)
 Guaranteed Backup Frequency  . . . . . .          (1 to 9999 or NOLIMIT)
 BreakPointValue  . . . . . .                      (0-65520 or blank)
 Processing Priority  . . . . . . . . . . 50       (1-100)
```

You distinguish between your storage groups as to class transition using this to manage the sequence in which these storage groups are serviced by DFSMShsm class transition.

Class transition processing

Before the migration-eligibility checking, DFSMShsm determines if the data set is eligible for a class transition based on the class transition settings in the management class and DSCB information in VTOC.

DFSMShsm has an interface to the ACS routines already. In DFSMS V2.1, a new ACS environment of SPMGCLTR is defined to support class transitions. This is similar to the ones used for class transition on OAM object data.

If the data set is eligible for transition, DFSMShsm invokes the DFSMS ACS routines with ACS environment SPMGCLTR to determine if there will be a new management class, storage class, and storage group values assigned. If a data set is going to have a new management

class and keep the existing storage class and an existing storage group, DFSMShsm will invoke alter of the management class only.

If the storage class and the storage group are subject to change, and a class transition is going to happen, DFSMShsm places a Migration Data Set Queue Element (MDQE) at the top of the migration queue. Priority will be the highest, not as it is normally based on data set size and age.

Class transition happens in the second phase of primary space management. The individual MDQEs will also have a priority order based on type of transition. Preference order will be as follows:

1. All MDQEs that are candidates for both extent reduction and transition will be done first without checking storage group threshold.
2. All MDQEs that are candidates for extent reduction and migration will be processed next. This is done without checking the storage group threshold as extent reduction is mandatory. Data sets will just be migrated as extent reduction will happen on recall.
3. Next in line are the MDQEs that are candidates for class transition and migration. Storage group low threshold will be checked. If utilization is above the threshold, these data sets will be migrated.
4. Last in line, the MDQEs that are candidates for class transition only will be processed, but only if storage group low threshold is exceeded.

Besides the overall priority explained above, data sets will be copied based on size and age of the data set within the initial criteria selected. Copy will stop when the DFSMShsm low threshold is reached or if target storage group is out of capacity.

The reason behind putting transitions at the top of the queue is that the transitions may meet the need for offloading data from the individual volume (having met the low threshold for this volume). As DFSMShsm selects each data set for migration, it transfers control to the spacemanagement exit (ARCMDEXT) if the exit is installed and enabled.

Transition rules as to migration versus transition based on eligibility and the return code from the migration exit can be summarized as shown in Table 10-1.

Table 10-1 Transition rules: migration versus class transition

Eligibility status	Migration Exit RC=0 (Allow Migration)	Migration Exit RC=8 (Disable Migration)	Migration Exit RC=52 (Disable Migration and Class Transition)
Eligible for migration only	Migration	Data set processing fails with RC=45, reason 92	Data set processing fails with RC=45, reason 92
Eligible for migration and class transition	Migration	Class transition	Data set processing fails with RC=45, reason 92
Eligible for class transition only	Class transition	Class transition	Data set processing fails with RC=45, reason 92

Transition Copy Technique

For the actual class transition move of the individual data set, DFSMShsm will call DFSMSdss for all data set types. DFSMShsm will obtain the class Transition Copy Technique from the

management class. The new class transition field in the ISMF management class application is shown in Figure 10-2.

```
 MANAGEMENT CLASS ALTER               Page 5 of 6
Command ===>

SCDS Name . . . . . . : SYS1.SMS.MHLRES3.SCDS
Management Class Name : MCSATA

To ALTER Management Class, Specify:
  Class Transition Criteria

    Transition Copy Technique  . . . . STD    (FRP, FRR, STD, PMP or PMR)
    Serialization Error Exit . . . . . NONE   (DB2, CICS, ZFS, EXIT or NONE)
```

Figure 10-2 Transition Copy Technique options on management class

The Transition Copy Technique will decide how the copy is going to happen (Fast Replication or normal I/O processing) and the type of action on failure (managed by preferred or required option). The following possible settings occur on the Transition Copy Technique:

- FRP: Fast replication preferred
- FRR: Fast replication required
- STD: Standard
- PMP: Flashcopy to PPRC primary (preserve mirror preferred)
- PMR: Flashcopy to PPRC primary (preserve mirror required)

DFSMSdss performs the transition copy with the appropriate copy option and gives back control to DFSMShsm at the end of the copy. DFSMShsm issues a message on completion. For a copy using Fast Replication, this is handled differently by DFSMShsm. If there is not a valid backup, the request is handled as follows:

- Request for transition fails if FASTREPLICATION option is REQUIRED.
- If FASTREPLICATION option is PREFERRED, the copy is performed using standard I/O.

If there is a valid current backup, all replication requests will be processed as normal.

In a PPRC environment, the FCTOPPRCPRIMARY and RESERVEMIRRROR replication keywords may also be used with the PREFERRED or REQUIRED options. If option PREFERRED is set, standard IO operation is used if FCTOPPRCPRIMARY PRESERVEMIRROR cannot happen using Fast Replication copy. For a Fast Replication copy with the REQUIRED keyword set, Fast Replication using FCTOPPRCPRIMARY PRESERVEMIRROR will fail if this is not possible for some reason.

Class transition messages

The message issued by DFSMShsm after a successful transition of a data set is ARC0734I, displaying the result of the transition is shown in Example 10-3.

Example 10-3 Message displayed when class transition has happened to a data set

```
ARC0522I SPACE MANAGEMENT STARTING ON VOLUME ML921C(SMS) AT 06:39:21 ON 2013/10/11, SYSTEM SC64
ARC0734I ACTION=CLASS-TR FRVOL=ML9B14 TOVOL=MLD83A TRACKS=        4 RC=   0, REASON=    0, AGE=
7,
 DSN=MHLRES1.SFI.TEST001
```

By default, failing messages are not issued for data sets that fail a transition because exclusive serialization could not be obtained. It is recommended that these data sets should

be analyzed by post processing the FSR records with failing return code RC68 and reason code if wanted. If the messages should be needed, you can issue the DFSMShsm patch in Example 10-4, and have the messages displayed.

Example 10-4 Patch enabling RC68 indicating serialization problem

```
PATCH .MGCB.+EF BITS(...1....)
```

Last Successful Class Transition Date

To support class transition, a new field was created in the NVR/VVR called *Last Successful Class Transition Date* (LSCTD).

The LSCTD field is set and used by DFSMShsm to manage class transitions. DFSMShsm will use this field to determine if a data set has already been transitioned and should not be reprocessed. The LSCTD, if it exists, can be displayed for a particular data set with the **LISTCAT** command, as shown in Example 10-5.

Example 10-5 LISTCAT of data set having a nonzero value in Last Transition

```
NONVSAM ------- STORTIER.M01.S01.D01.N01.PSFB
     IN-CAT --- STRTRFVT.USERCAT
     HISTORY
       DATASET-OWNER-----(NULL)     CREATION--------2012.001
       RELEASE----------------2     EXPIRATION------0000.000
       ACCOUNT-INFO-----------------------------------(NULL)
     SMSDATA
       STORAGECLASS ---SCLASS22     MANAGEMENTCLASS-MCLASS01
       DATACLASS ------DCLASS01     LBACKUP ---2012.001.0701
       LAST TRANSITION-2012.013
     VOLUMES
       VOLSER------------LSMS12     DEVTYPE------X'3010200F'
     ASSOCIATIONS--------(NULL)
     ATTRIBUTES
```

LSCTD field is also available via DCOLLECT output.

When a data set is successfully transitioned, LSCTD is set to zero. This occurs when the management class was changed, or set to the current date if the management class was not changed. DFSMShsm attempts to transition a data set if it has met the transition criteria and the LSCTD is zero.

Criteria on management class deciding class transition

The new Storage Tier class transition is based on criteria in the management class already being used for Object Management. Your criteria will depend on your environment (tiers in scope and data availability requirements) and requirement when to move data to the next tier or off to tape. There are three options that you must consider using when implementing storage tiering:

- TIME SINCE CREATION

  Time given in years, months, or days, since creation that must have elapsed before transition can happen. A value of 9999/12/31 will cause transition to not happen at all.

- TIME SINCE LAST USE

  Time given in years, months, or days, since the last reference of data that must have elapsed before transition can happen.

- PERIODIC

  A class transition can be scheduled to happen at a determined sequence monthly, quarterly, or yearly.

You can only set one of the options per management class. If your data has individual requirements, each group of data must have a transition management class assigned that meets the specific requirement for each group as related to transition.

Recall of data sets in a class transition environment

Data sets may miss class transition while being migrated. Imagine a data set is on Enterprise disk when being migrated. During the time the data set is migrated, it may meet the criteria set for a class transition to Nearline disk. Based on the creation date and the last referenced date stored in the MCD record, DFSMShsm is able to determine if a data set missed a transition. If so, DFSMShsm will run the ACS routines with the SPMGCLTR code and have any new, changed constructs returned. And in this case the data set will end up on Nearline disk.

The constructs and candidate storage groups will be handed over to DFSMSdss to have the recall occur to the correct tier.

Note: For RECOVER, ARECOVER, and FRRECOV a class transition change will not be verified.

Reporting on class transition

The FSR records will be updated to contain information about the new transition function. The **REPORT** command will have a new parameter **FUNCTION(TRANSITION)** that will extract reporting on class transition statistics only.

If REPORT is used without a keyword for a specific FUNCTION, all FUNCTIONS are listed including the new transition function. Example 10-6 shows the class transition report only.

Example 10-6 Example of REPORT on class transition function

```
NUMBER  ------READ----- -----WRITTEN------  ------REQUESTS---- AVERAGE ------AVERAGE TIME------
  HSM FUNCTION DATASETS TRK/BLK    K-BYTES  TRK/BLK K-BYTES SYSTEM USER FAILED AGE  QUEUED WAIT PROCESS TOTAL

CLASS TRANSITION
PRIMARY - PRIMARY 0000003  00000053 000001347K 00000034000001368K 000000 00003 00000 0000 0000  00000  00000 00000
-DFSMSHSM STATISTICS REPORT ------- AT 21:23:27 ON 2013/09/29 FOR SYSTEM=SC64
```

Using the REPORT function with **SUMMARY** subparameter, the report will limit to the information as displayed in Example 10-7.

Example 10-7 REPORT function on class transition using the SUMMARY subparameter

```
Data set class transition = 00000003 requested, 00000000 failed
```

A new ARC0277I message now appears on the **QUERY STATISTICS** command. This display shows the number of data sets moved by class transition, the number of failed transitions, and the number of tracks and bytes moved. Example 10-8 on page 184 shows the output of the command.

Example 10-8 Example of output from a QUERY STATISTICS command

```
ARC0277I DS TRANSITIONED=00000000, DS TRANSITION
ARC0277I (CONT.) FAIL=000, TRKS TRANSITIONED=00000000,   BYTES
ARC0277I (CONT.) TRANSITIONED=000000000
```

Class transition in an IM and ODM environment

Class transition was designed to only happen in the primary space management cycle. However, if volumes and their corresponding data sets are only part of an on-demand migration (ODM) or interval migration (IM) migration type, class transition will not happen for these volumes.

An additional option has been added to support this scenario. Class transition will, through a **SETSYS** command, be able to occur in an environment with ODM or IM active. An example of this command is shown in Example 10-9.

Example 10-9 Example of class transition SETSYS command in an ODM or IM environment

```
SETSYS CLASSTRANSITION(EVENTDRIVENMIGRATION(Y|N SERIALIZATIONEXIT(Y|N)))
```

You can abbreviate the preceding **SETSYS** parameters as shown in Example 10-10.

Example 10-10 Abbreviated form of CLASSTRANSITION

```
SETSYS CLTR(EDM(Y|N SERL(Y|N)))
```

The default for EVENTDRIVENMIGRATION is Y (YES). With a setting of N (NO), class transition will not occur in an ODM or IM environment.

The subparameter **SERIALIZATIONEXIT** will decide whether the user data set serialization error exit during event driven migration should be used or not.

These additional defaults will apply to the EVENTDRIVENMIGRATION setting:

- If EDM is not specified, or if EDM is specified without keywords, the default is Y for EDM and for SERIALIZATIONEXIT it is N.
- If EDM is set to Y and there is no setting on SERIALIZATIONEXIT, the default for this will be N.

Serialization support

If the serialization exit is called through class transition, the Serialization Error Exit field in the management class decides which action should be taken. The following values are possible for this field:

- DB2
- CICS
- ZFS
- EXIT (call to user exit)
- NONE

If the call is for a DB2 table and SERIALIZATION(Y) is set, DB2 will be called and asked to close the table, if possible. The same is the case for the other applications listed, just different procedures. For a ZFS data set, this will be an unmount as an example. If the data set close is not successful, transition of this particular data set will not happen.

If the setting is NONE, the data set will not be transitioned if an exclusive enqueue fails. Class transition will continue with other candidates.

Figure 10-3 is the new management class panel in ISMF, where the Serialization Error Exit setting is displayed and updated.

```
 MANAGEMENT CLASS ALTER               Page 5 of 6
Command ===>

SCDS Name . . . . . . : SYS1.SMS.MHLRES3.SCDS
Management Class Name : MCSATA

To ALTER Management Class, Specify:
  Class Transition Criteria

    Transition Copy Technique  . . . . STD    (FRP, FRR, STD, PMP or PMR)
    Serialization Error Exit . . . . . NONE   (DB2, CICS, ZFS, EXIT or NONE)
```

Figure 10-3 Management panel for updating class transition serialization option

As this setting is application-oriented, each application should have a management class assigned with a setting that matches this specific application (DB2, CICS, or ZFS).

Ensure that only DB2, CICS, or zFS data sets are assigned to a management class with a Serialization Exit specified to one of these types.

Getting started with Storage Tier

Migrating to DFSMS V2.1, class transition is enabled by default, but you will need a few additional steps to have all requirements in place. This section will outline the steps you must go through.

Start identifying your needs and the benefit of doing class transition. Based on your environment and available tiers, determine what data should be included. You may be in a position where new hardware will be installed introducing new tiers or you just want to take advantage of the DFSMShsm Storage Tier function on your current multi-tier environment.

In ISMF you must complete these preparation tasks:

- Create one or more management classes to set the (individual) criteria for transitioning data between tiers. Criteria that you must look into is Time Since Creation, Time Since Last Use, or Periodic for the transition criteria. The Transition Copy Technique for the data mover is also important.
- Create at least one storage class with the accessibility option you have settled on (C,P, S, or N). This setting works with the management class option Transition Copy Technique.
- Create one or more target storage groups that match your tiers.
- Create transition code in the ACS routines that will capture the data sets in scope and direct these to the correct target tiers.

Also, consider your need for having Class Transition occur for IM or ODM managed data by deciding the settings for EVENTDRIVENMIGRATION and SERIALIZATION as discussed earlier in this chapter.

Having created the constructs for Class Transition, the ACS routines will need to have code added similar to the example in Example 10-11 on page 186. The ACS routine code will assure capture of the right data at the appropriate time moving these to the appropriate defined tiers.

Example 10-11 covers the management class ACS routine code that enters the SPMGCLTR environment called by DFSMShsm. A candidate data set is found. It may only have the management class changed, or it may also be transitioned depending on criteria being met.

Example 10-11 ACS routine code that will do transition on management class

```
IF &ACSENVIR = 'SPMGCLTR' THEN
     SELECT (&MGMTCLAS)
         WHEN ('MCNORMAL')   SET &MGMTCLAS = 'MCSATA'
         OTHERWISE          SET &MGMTCLAS = &MGMTCLAS
     END
```

In Example 10-12, the storage class routine is invoked and assigns a storage class designed for NEARLINE disk (SATA).

Example 10-12 Storage class ACS routine code invoking Class Transition

```
IF &ACSENVIR = 'SPMGCLTR' THEN
    SELECT (&STORCLAS)

         WHEN ('ENTERPRISE') SET &STORCLAS = 'SCSATA'
         OTHERWISE             SET &STORCLAS = &STORCLAS
    END
 ELSE ...
```

For the actual transition to occur, data must be moved in this case from ENTERPRISE disk to Nearline. A new storage group covering Nearline (SATA) disk is assigned and DFSMSdss is called to do the actual transfer of the data set from the current tier (storage group) to the new tier.

Example 10-13 shows the ACS routine code that supports such a transition.

Example 10-13 Storage group ACS routine supporting class transition to new tier

```
IF &ACSENVIR = 'SPMGCLTR' THEN
    SELECT (&STORCLAS)

         WHEN ('SCSATA')    SET &STORGRP = 'SGSATA'
        OTHERWISE            SET &STORGRP = &STORGRP
END
 ELSE ...
```

Data will now have moved to a new tier (storage group). The new management class will determine the time data will reside on this tier before eventually being migrated to tape.

Exceptions from class transition

When FORCENONSMS is used in a **RECALL** command, this will happen as in pre-DFSMS V2.1 releases. The data set will be recalled to a non-SMS managed volume.

For extent reduction, DFSMShsm will migrate the data set and immediately schedule a recall to the same volume (with same storage class and management class as when the data set was migrated). ACS routines will not be invoked in this case.

Common Recall Queue has been changed to have an indicator for Class Transition to be used for a recall.

New or changed messages

This section lists the new and changed messages in support of class transition.

ARC0277I message

The new ARC0277I message is now issued for QUERY STATISTICS (see Example 10-8 on page 184). The message provides the data sets moved by class transition, the number of failed transitions, the number of tracks moved, and the number of bytes moved.

ARC0278I message

The new ARC0278I message is additionally issued to display EVENTDRIVENMIGRATION and SERIALIZATIONEXIT values as the result of the **QUERY SETSYS** command.

ARC1271I message

The new ARC1271I CLASS TRANSITION FAILED message is issued when IDCAMS return code is given in the ARC0734I message. These reason codes may be included:

- 9999 Abend during **ALTER** command processing
- 9998 Abend during obtain Last Successful Class Transition Date
- 9997 Abend during Last Successful Class Transition Date setting

ARC0734I message

ARC0734I message with the new ACTION=CLASS-TR value after class transition processing is issued at the end of the class transition.

ARC0784I message

ARC0784I message with the new LAST SUCCESSFUL CLASS TRANSITION DATE value is issued when:

- Class transition is disabled (MCVTF_CLTR=OFF) and Last Successful Class Transition Date (LSTD) is not zero
- The data set is recalled as in before DFSMS V2.1 if the LSCTD exists

ARC1280I message

ARC1280I message with the new CLASS TRANSITION value is issued when DFSMShsm attempted class transition, but determined that the data set needed to be backed up.

Coexistence support

The following APARs are required on systems before DFSMS V2.1.

- OA36576: DFSMShsm coexistence support for Storage Tier

  Because of the changes in the record sizes in DFSMS V2.1, lower-level systems accessing those records should be sure to install the DFSMShsm PTF for OA36576 on each of the systems in the sysplex.

- OA37582: DFSMSdss coexistence support for Storage Tier

  This APAR provides support for data set COPY and RESTORE to detect data sets that have a last class transition date in the SMS subcell of a VVR.

For status on the general status on APARs related to Storage Tier, see Appendix A, “APARs to be reviewed for DFSMS V2.1” on page 237.

Documentation

For more details about DFSMShsm Storage Tier, consult the following documentation:

- *z/OS DFSMS Installation Exits*, SC23-6850

- *z/OS DFSMShsm Storage Administration*, SC23-6871
- *z/OS DFSMSdss Storage Administration,* SC23-6868
- *z/OS DFSMShsm Diagnosis*, GC52-1387
- *z/OS DFSMSrmm Reporting*, SC23-6875
- z/OS *DFSMShsm Implementation and Customization Guide*, SC23-6869
- *z/OS MVS System Messages, Volume 2 (ARC-ASA)*, SA22-7632

10.3 JES3 SMS tape support

This new TS7700 support for JES3 will be available with the release of DFSMS V2.1. For JES2, the Device Allocation Assistance (DAA) support was introduced in release 1.5 of the TS7700 virtual engine in December 2008. Scratch Allocation Assistance (SAA) came with the TS7700 2.0 release in May 2011.

To be able to take advantage of the new support, all systems in the JES3 plex must be at the DFSMS V2.1 level. JES3 can be at an earlier level, but you need to make changes to the INISH deck to enable the function.

10.3.1 Device Allocation Assistance (private/specific mounts)

Release 1.5 of the TS7700 code introduced DAA. Device Allocation Assistance is a function that allows the host to query the TS7700 Virtualization Engine to determine which clusters should be preferred for a private (specific) mount request. DAA returns an ordered allocation list of subsystems (logical control units with 16 devices per control unit image). The list is built in, and presented in preferred cluster order. This is to maximize local cache hits and minimize remote cache hits, but also at the same time balance the workload across a multi-cluster grid. With this support, scratch allocations were still randomized across eligible libraries and devices.

10.3.2 Scratch Allocation Assistance (Scratch Mounts)

SAA was introduced with the TS7700 2.0 code. SAA selects the cluster for scratch mount allocation based on management class. In a mixed environment consisting of both TS7720 and TS7740, users start to request allocations from specific workloads like DFSMShsm to go to TS7720 for better response time. A new management class option has been introduced enabling the user to direct scratch mounts to a specific cluster. If no cluster is available, standard MVS allocation will be used (WTOR, WAITHOLD, WAITNOH, CANCEL). With 256 drives available, this will hardly be a problem in normal operation.

Figure 10-4 illustrates a configuration where two different types of workload are directed to a specific cluster (TS7740 or TS7720). One management class points to cluster 0 (TS7720) and another to cluster 1 (TS7740). Cluster 2 is used for a remote application.

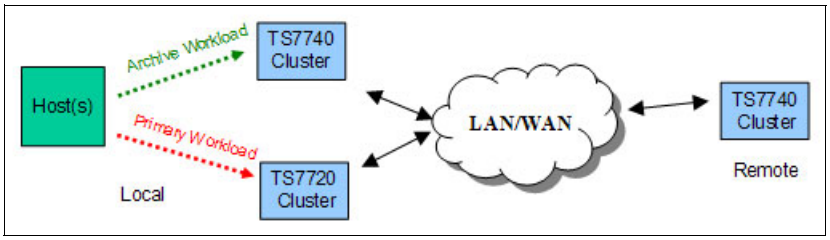

Figure 10-4 Example of three-cluster grid where workload is split through management class setting

When the allocation request is issued for cluster 0 or cluster 1, only the candidate clusters LCUs and devices are returned. MVS Allocation selects a device from this list without any awareness of cluster.

10.3.3 Implementing TS7700 Allocation Assistance for JES3

All systems in a JES3 plex must migrate to DFSMS V2.1 before implementing the TS7700 Allocation Assistance.

To enable the support, a new keyword JES3_ALLOC_ASSIST=YES|NO in DEVSUPxx member in SYS1.PARMLIB must be added.

If option YES is set, the Allocation Assistance support is enabled for use with JES3. Before enabling the support, refer to *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide For Tape Libraries,* SC23-6867 for more detail.

To enable this feature without an IPL, issue the **SET DEVSUP=xx** command.

A new esoteric (library-specific distributed name) is introduced to support Allocation Assistance support. The new esoteric must be added in the JES3 INISH deck.

Make sure that you have the outboard management classes in place that point to the specific libraries. Define this in the Add/Copy Management Classes panel on the TS7700 as shown in Figure 10-5. Only those clusters specified through the assigned management class are considered for the scratch mount request.

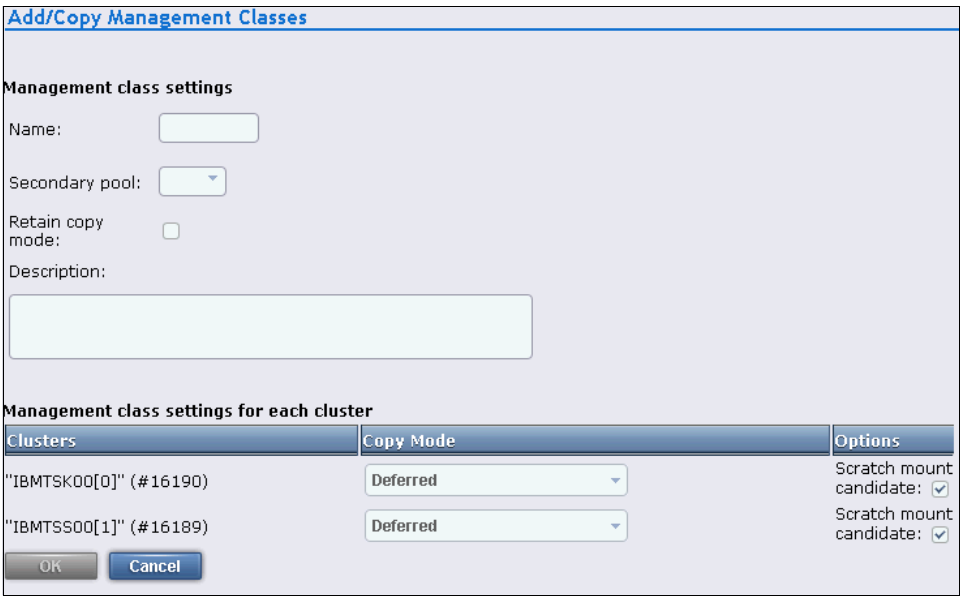

Figure 10-5 Display of management class definition in TS7700

Additionally, the Scratch and Device Allocation Assistance support must be explicitly enabled on the TS7700 through the **LIBRARY REQUEST** command. See Example 10-14.

Example 10-14 LIBRARY REQUEST commands that enable Allocation support in TS7700

```
LIBRARY REQUEST,composite-libraryname,SETTING,DEVALLOC,SCRATCH,ENABLE
LIBRARY REQUEST,composite-libraryname,SETTING,DEVALLOC,PRIVATE,ENABLE
```

The default for Scratch Allocation support is DISABLED, while for PRIVATE mounts, the default is ENABLED.

Consider defining the allocation preference in the ALLOCxx member as shown in Example 10-15.

Example 10-15 Setting the Library preference across multiple TS7700 libraries

```
TAPELIB_PREF(EQUAL|BYDEVICES)
```

This setting specifies the policy for balancing non-specific tape library requests (for example, scratch tape requests) across multiple tape libraries. The description of the TAPELIB_PREF parameters are:

- EQUAL

  Indicates that for non-specific tape library requests, all tape libraries must be treated as equal, and receive an equal share of the requests.

- BYDEVICES

  Indicates that non-specific tape library requests must be balanced across all tape libraries according to the number of online tape devices in the tape library. Tape libraries with more online tape devices will receive more non-specific tape requests than libraries with fewer online devices when all devices have the same attributes.

JES3 allocation requirements

In a JES3 environment, the setup consists of one processor called the global processor, while the remaining processors are called local processors. The global processors manage most of the JES3 processing like allocating resources to jobs before this is sent to the local processor for execution.

Depending on individual user setup, converter and interpreter processing may happen in the global processor or in one of the local processors. Furthermore, the processor in which the converter and interpreter processing happens may not be the same as the executing processor. It is suggested that all tape devices in the IBM Tape Library are connected to all processors in a JES3 plex to have these working on the same candidate list.

JES3 esoterics

The existing esoterics used in a JES3 environment for system-managed tape libraries and IBM Tape Libraries will continue to be used. The JES3 esoterics are listed below:

- Complex-wide name
- Library-specific name
- Library-specific device name
- Complex-wide device type

The new esoteric *library-specific distributed name* will have an eight character string consisting of LDX followed by a five-digit library number for the distributed library. This will only be used if DAA or SAA support is enabled.

JES3 INISH deck

The JES3 INISH deck must be updated if you migrate to the new TS7700 Allocation assistance support for JES3. The existing device statements covering, for example two libraries, must be split to be able to point to a specific library. An example of how this is done is in Example 10-16 on page 191.

Example 10-16 Example of JES3 device statements in INISH deck before and after update

```
DEVICE,XTYPE=(CLB12345,CA),XUNIT=(1100,*ALL,,OFF),NUMDEV=512

line above splits into >>>>

DEVICE,XTYPE=(DLB10001,CA),XUNIT=(1100,*ALL,,OFF),NUMDEV=256
DEVICE,XTYPE=(DLB10002,CA),XUNIT=(1200,*ALL,,OFF),NUMDEV=256
```

The SETNAME statements must have the new esoteric library-specific distributed name added to the existing esoterics as shown in Example 10-17.

Example 10-17 Example of JES3 SETNAME statements updated with the new esoteric.

```
SETNAME,XTYPE=DLB10001,NAMES=(LDGW3495,LDG12345,LDG3490E,LDE12345,LDX10001)
SETNAME,XTYPE=DLB10002,NAMES=(LDGW3495,LDG12345,LDG3490E,LDE12345,LDX10002)
```

One of the factors used by JES3 in selecting devices for volume mounting is the **ADDRSORT** parameter on the SETPARAM initialization statement. This parameter specifies that devices are either allocated in the same order as the DEVICE statement defining them (ADDRSORT=NO) or allocated by the order of their device numbers in ascending order (ADDRSORT=YES the default).

Documentation

For further detail, consult the following documentation:

- IBM TS7700 Virtualization Engine Customer Information Center

  http://publib.boulder.ibm.com/infocenter/ts7700/cust/index.jsp
- z/OS Host Command Line Request User's Guide Version 3.0

  ibm.co/1qwVJya
- *z/OS DFSMS Object Access Method Planning, Installation, and Storage Administration Guide for Tape Libraries,* SC23-6867

10.4 DADSM CVAF/DEVICE support

DFSMS V2.1provides DADSM/CVAF improvements as discussed in this section.

10.4.1 Rebuilding of VTOC index in VTOC full scenario

Before DFSMS V2.1, it was not possible to rebuild a VTOC index after the corresponding VTOC was full. Consequently, you had to go through a somewhat time consuming and disruptive process of extending and even moving the VTOC to accomplish this.

With DFSMS V2.1, it is possible for the CVAF convert routine to return VTOC records with free space so that these do not need to be written to disk. Rebuild of the INDEX is able to occur without the need for deleting data sets. Less time is spent on problem determination and impact on the system is reduced.

The ICK01322I message is set when the conversion has detected that there is room to expand the VTOC physically on the volume, as shown in Example 10-18 on page 192.

Prerequisites for this function are ICKDSF R17 and PM36724.

Example 10-18 New message when VTOC is successfully expanded

```
ICK01322I THE VTOC HAS BEEN EXPANDED TO ***** TRACKS
```

10.4.2 Reclaim of orphaned FORMAT 3 DSCBs in DADSM convert routine

This enhancement in DADSM converts routine identifies orphaned DSCBs during conversion from INDEXED to OS VTOC. The convert routine is called to build free space chains, but will now additionally identify orphaned FORMAT3 DSCBs and also convert these to FORMAT 0, creating more free DSCBs in the VTOC through this.

10.4.3 CVAFFILT macro uses the multi-DSCB read interface of CVAF

The CVAFFILT macro, with its underlying services is provided to obtain information about the data sets on an indexed or non-indexed VTOC. CVAFFILIT has been modified in DFSMS V2.1 to use the multi-DSCB Read Interface making it possible to read all DSCBs for one data set into CVAFDIR in one operation. The most important functions of CVAFDIR are:

- Reads or write one or more DSCBs by specifying the name of the data set they represent.
- Reads or write one or more DSCBs by specifying their addresses.

10.4.4 PARTREL macro enhancement

The PARTREL macro is called at data set close, at restart processing, during DFSMShsm space management processing, or when directly called. PARTREL would not be attempted in some cases where module IGG020D1 determined that there were not enough format 0 DSCBs available to update the free space chain on an OS VTOC volume. In DFSMS V2.1, it is modified to account for all FORMAT 0 DSCBs, including those released in PARTREL processing.

10.4.5 Erase On Scratch enhancement

The purpose of this enhancement is to replace existing channel program used to erase tracks with Locate Record with Erase operation code. The existing Erase On Scratch (EOS) algorithm builds a Format Write R0 channel program to erase one track at a time. The main objective for this change has been to improve performance and to position for the future.

Basically the new EOS algorithm uses an LR Erase operation code and specifies 1 to N tracks. Specifying a range of tracks in a single channel program increases throughput.

11

DFSMShsm enhancements

This chapter describes the various enhancements, functions, and features introduced with DFSMShsm V2.1. The following DFSMShsm functions are described in this chapter:

- Exploiting Storage Tiers in space management
- Extend number of tape volumes for migrated or backed up data sets
- Migration subtasking throughput enhancements
- GDG support for PDSE
- DFSMShsm Fast Replication enhancements
- Reliability, availability, serviceability, and usability improvements

11.1 Exploiting Storage Tiers in space management

Before z/OS V2.1, DFSMShsm treated all data in Level 0 (L0) as being in one single tier in the overall storage hierarchy. There were no policies to enable automated data movement within that L0 tier. In z/OS V2.1, DFSMShsm is enhanced to move data from one class of devices to another within the L0 hierarchy. DFSMShsm V2.1 implements class transition, when a data set migrates from an ML0 volume to an ML0 volume.

11.1.1 Storage Tiers migration concept

DFSMS V2.1 provides a policy-based automation for moving data sets within the ML0 volumes including active (opened) data sets.

The reason you would want to migrate data sets among ML0 3390 volumes is that these volumes are not the same as far as performance is concerned based on the disk technology. For example, in a DS8870 the 3390 volumes may be associated with physical disks, such as:

- Fast solid-state devices (SSDs)
- Medium fast enterprise-class drives that can be full disk encryption or not
- Slower Nearline SAS disk that also can be full disk encryption or not
- Slower SATA drives

Each layer of disk technology is called a *tier*. The association of a 3390 volume with the disks in the array of a tier is done through the DS8000 hardware console (DS storage manager).

The association of data sets and 3390 volumes at creation (or recall) time is done through assigning an SMS storage group (SG) to the data set. The SMS construct has the 3390 volumes candidates to contain the data sets assigned to this SG.

Concerning those tiers, to have the best performance for your business, two automatic mechanisms must be in place:

- To avoid bad performance (meaning higher I/O disconnect time) caused by 3390 data set volumes hot spots. It means data set extents with high I/O activity being located at 3390 associated with a slow tier. The solution is to use the DS8000 easy tier function. It has the automated capability of moving hot spots 3390 data set extents from a slower tier to a faster tier, such as SSD.
- To avoid bad performance (meaning higher I/O disconnect time) for 3390 volumes data sets with a not so high I/O activity (not a hot spot participant) but with key I/O operations for the system, such as catalogs, RACF database, JES2 checkpoint, important customer data sets. The solution is to allocate initially such data sets at ML0 3390 volumes associated with faster tiers and ask DFSMShsm to later do a “class transition” (in this case, we do not use the word migration). Class transition means to move such data sets to ML0 3390 volumes associated with slower tiers after some time of no use. As expected, the MVS catalog is updated as a part of the class transition movement.

As an example, a user may tell DFSMShsm to use data set class transition from a 3390 volume associated with an SSD tier to a 3390 volume associated with a SATA disk tier after five days of no use, and then becoming eligible for migration to ML2 after 30 days of continuous inactivity. Refer to Figure 11-1 on page 195, where three tiers are pictured.

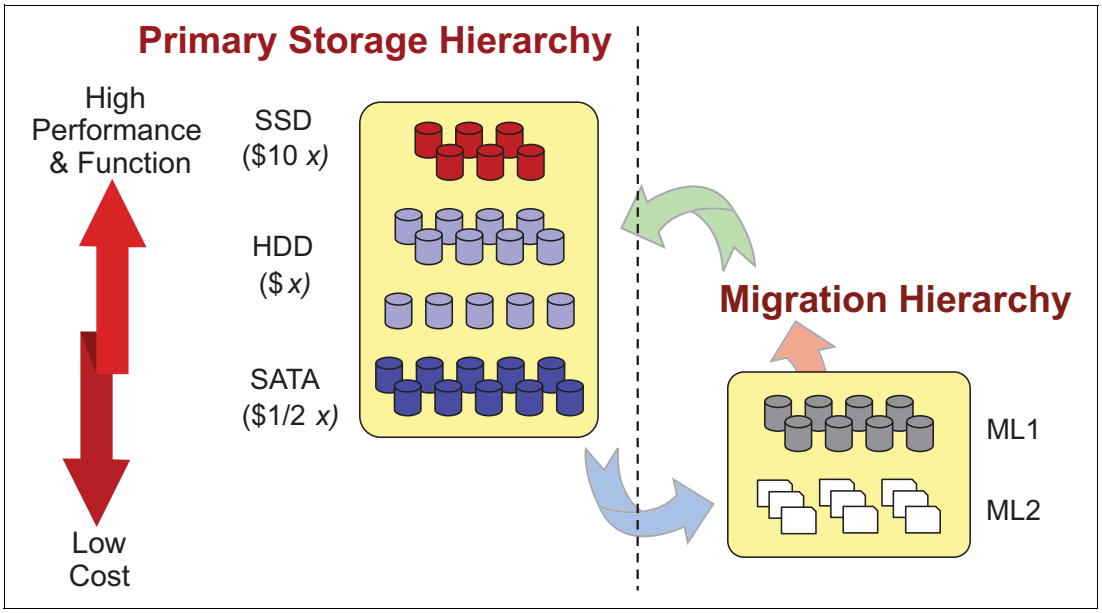

Figure 11-1 ML0 volumes with three tiers

The definition of DFSMShsm space management function has been updated:

"DFSMShsm using policy-based automation ensures that 3390 volumes within the primary storage hierarchy (ML0) have enough free space for new data sets and to ensure that data sets are stored at the lowest acceptable tier (performance wise) in the storage hierarchy."

With DFSMS V2.1, we have the following functions for the DFSMShsm space management:

- Automatic volume space management
  - Primary space management

    It is executed on each requested DFSMShsm-managed volume at a specified time of day. It has two phases:

    - Phase one deletes expired and temporary data sets, releases unused over allocated space.
    - Phase two migrates data sets (under control of the data set management class) optionally first from ML0 to ML0 (class transition), and second from ML0 to ML1 or to ML2. Migrations and optional class transition occur until the volume reaches its low threshold. This phase is executed if the first phase does not free enough space on the volume, that is, reaches the low threshold.
  - Interval space migration

    Ensures on an hourly basis that a specified amount of space is available on DFSMShsm-managed ML0 volumes. It also has the two same phases of primary space management optionally including class transitioning operations. Interval space management only runs against storage groups that have this function enabled through the storage group SMS construct.
  - On-demand migration

    Introduced in DFSMS V1.13, it performs space management on a volume, as soon as it goes over high threshold. It is an optional replacement for on-the-hour interval space migration processing. It has the same two phases that include optionally class transition, as well.

- Automatic secondary space management.

  Secondary space migration moves data sets (under control of the data set management class) from ML1 to ML2 volumes and processes the migration cleanup function. Secondary space management is usually run before primary space management.

The **SETSYS** command may indicate if event-driven migration (on demand migration) and interval migration should process class transitions. Refer to the section"Class transition in an IM and ODM environment" on page 184 for more information about this **SETSYS** command.

Due to the introduction of class transition, some installations may need to adjust the number of DFSMShsm tasks executing space management to keep the same performance.

The advantages of class transitioning a data set (compared with migrating) are:

- Keep the data set at the business performance required tier.
- Data set is always available to the program task, that is, no need for a recall delay.
- The class transition may be applied to an opened data set under certain circumstances.
- Increase the number of days that the data set must be unreferenced before migrating directly to ML2.
- Class transition operation is faster and less resource consuming because it may use the DS8000 FlashCopy function. However, such function is only applied between volumes of the same physical DS8000. As a reminder, the previous releases of DFSMShsm already use FlashCopy for back-up purposes.

The following data sets would benefit from class transition:

- Data sets currently not eligible for migration because they always need to be immediately accessible. Or in other words, the recall delay is unacceptable.
- Data sets that are eligible for migration today, but there would be a benefit to keep them online for a longer period of time as the ones that go through cycles of activity and inactivity. In this case with class transition, you may avoid the data set going through many migration and recall iterations.

For the complete description of Storage Tiers in DFSMShsm V2.1 and how to implement it, refer to 10.2, "DFSMShsm storage tiers" on page 177, and 6.5, "DFSMS storage tiers" on page 98.

11.2 Extend number of tape volumes for migrated or backed up data sets

DFSMShsm migration and backup data sets can span up to a maximum of 40 tape volumes. Since the size of a virtual tape is limited to 6 GB, DFSMShsm cannot migrate or back up data sets larger than 600 GB to virtual tape volumes, assuming a 2.5:1 compaction factor. This fact is now a limitation for some users, mainly the ones using the typically small tape volume sizes configured for virtual tape subsystems, such as VTS.

11.2.1 Using and invocation

The solution is to extend the maximum number of volumes that a migration or backup tape data set can span 40 - 254 volumes.

The tape recycle function is also enhanced to process connected sets of up to 254 volumes. The recycle function provides the capability of moving the valid data sets out from the original tapes and consolidates the data on another tape. This makes one tape with all unexpired data sets and leaving the recycled tapes available for reuse.

There is no user option to implement this new function in DFSMShsm V2.1. DFSMShsm automatically spans up to 254 tape volumes during data set migration, backup, and recycle.

FSR records have been extended from a maximum of 1260 bytes in length to 6396 bytes in order to contain up to 508 volume serials (254 input and 254 output):

- FSRs that list more than 144 tape volumes truncates when written to the DFSMShsm LOG log data sets. The existing 2048 fixed logical record length (RECL) prevents FSRs with more than 144 volumes from being written to the DFSMShsm log data sets in their entirety.
- Truncated FSRs affect ARCPRLOG and ARCPEDIT output. These are IBM supplied programs to list the DFSMShsm log data set.
- ARCPRLOG output displays only the portion of each FSR that was written to the log.
- When RECYCLE volumes are truncated, ARCPRLOG and ARCPEDIT output will display “TOVOL=******”.

11.3 Migration subtasking throughput enhancements

DFSMShsm migrates a data set in several steps:

- Preprocessing: This includes eligibility checking, enqueue for serialization, CDS updates, and catalog update
- Data movement: Moving ML0 data sets to ML0 (class transition), or to ML1 or to ML2
- Postprocessing: This includes dequeue, CDS updates, catalog update, and scratch

The target of this enhancement in DFSMShsm V2.1 is to increase the parallelism of data set migration, and consequently increase the data set migration throughput.

11.3.1 Subtasking before DFSMShsm V2.1

Before DFSMS V2.1, multitasking allows the parallel processing of multiple data sets migration (each one in each migration task). However, data set migration internal operations such as pre-processing, data movement, and postprocessing of each data set during are still performed sequentially. Figure 11-2 on page 198 shows an example of three data sets being migrated to ML2 (tapes) by one migration task. Only one task is shown for ease of explanation.

However, if the migration is to tapes, there is only one concurrent data movement to tape device per migration task, as shown in Figure 11-2 on page 198.

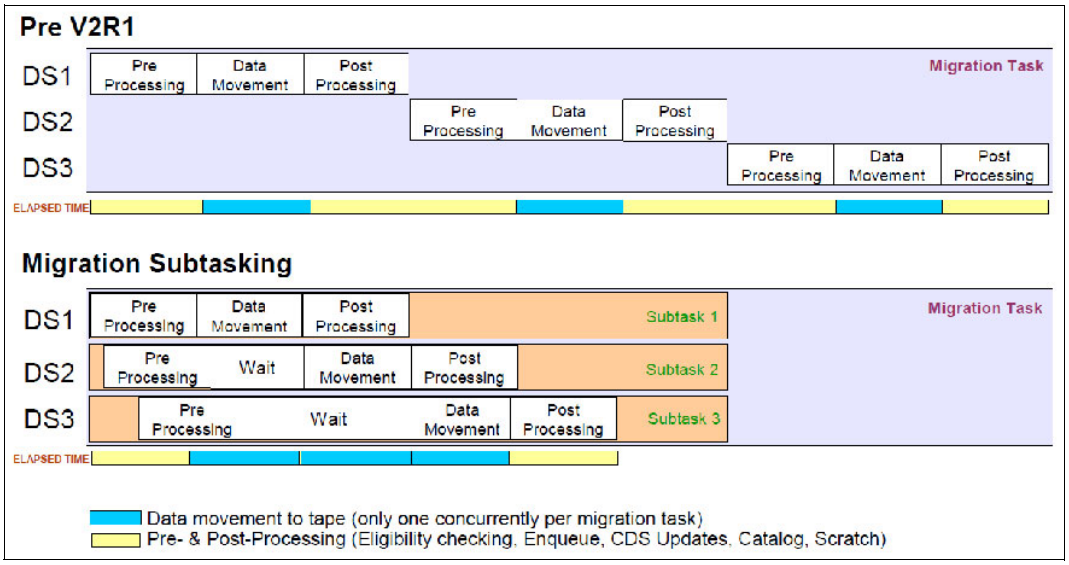

Figure 11-2 Migration throughput enhancements due to multitask

By implementing subtask migration, the aggregate throughput of all the migration tasks is improved.

11.3.2 Migration subtasks implementation

Two new keywords of the **SETSYS** command are added in DFSMShsm V2.1:

- MIGRATIONSUBTASKS(YES | NO)

  With the YES option, DFSMShsm runs multiple subtasks concurrently under each migration task for primary space management, on-demand migration, and interval migration. The number of these subtasks per migration task is decided internally by DFSMShsm.

- ADDITIONALSUBTASKS(nn)

  This is a subparameter of the **MIGRATION SUBTASKS** parameter. It allows you to dynamically change the number of additional subtasks that DFSMShsm can define, running under each migration task. These additional subtasks add to the number of subtasks that DFSMShsm already uses when the **MIGRATIONSUBTASKS** parameter is specified.

The total number of subtasks (per task) in a moment can vary, and it is lower, if a large value is specified with the maximum former migration tasks (MAXMIGRATIONTASKS) parameter. Conversely, the total migration subtasks used is higher, up to 15, if a smaller value is specified in the **MAXMIGRATIONTASKS** parameter.

11.4 GDG support for PDSE

DFSMShsm V2.1 is updated so that it can support PDSEs that are generation data sets. Generation data sets defined with DSNTYPE=LIBRARY will be PDSEs. As a result, DFSMShsm invokes DFSMSdss to dump and restore those data sets. Each of the DFSMShsm functions provides this support:

- Backup
- Recover

- Migration
- Recall
- Aggregate backup
- Aggregate recover

Systems before z/OS V2R1 that are running DFSMShsm ABACKUP and ARECOVER will detect SMS-managed PDSE GDS in the ALLOCATE list and fail the command.

DFSMShsm migration, recall, backup, and recovery functions will invoke DFSMSdss. The following existing messages were updated in both DFSMShsm and DFSMSdss:

- ARC1001I dsn MIGRATE FAILED, RC=0087, REAS=0006
- ARC1287I A DISCREPANCY WAS FOUND IN THE DATA SET VTOC ENTRY
- ARC1001I dsn BACKDS FAILED, RC=0087, REAS=0006
- ARC1387I A DISCREPANCY WAS FOUND IN THE DATA SET VTOC ENTRY
- ARC6172E DATA SET dsn IS NOT SUPPORTED IN AN ALLOCATE LIST FOR AGGREGATE GROUP group_name
- ADR285E DATA SET dsn WAS NOT PROCESSED BECAUSE pre-allocated DATA SET TYPE IS NOT SUPPORTED IN THIS RELEASE, 15
- ADR778E DATA SET dsn WAS NOT SELECTED BECAUSE THE DATA SET TYPE IS NOT SUPPORTED IN THIS RELEASE, 20

11.5 DFSMShsm Fast Replication enhancements

DFSMShsm may use fast replication for backing up data sets. Fast replication uses, through DFSMSdss, the FlashCopy function of DS8000 controllers. FlashCopy is point-in-time implementation that gives the appearance of an almost instantaneous data set (or volume) copy.

The DFSMShsm V2.1 fast replication enhancements are:

- DFSMSdss physical data set **COPY** and **RESTORE** commands
- DFSMShsm fast replication and physical data set recovery functionality

11.5.1 Concept review

Here, we introduce certain basic concepts:

- Consistency group is designed to guarantee the sequence of the multiple I/O operations connected to a non-atomic write along a process of Metro Mirror or FlashCopy, when a rolling over disaster is unfolding. A non-atomic write has several sequenced I/O operations, such as an update in place (read, update in memory and writes back). Consistency group guarantees (for integrity purpose) that the sequence of the I/O operation associated with dependent write are the same in the primary and in the secondary volume.
- Let us refresh the concept of restore and recovery in DFSMShsm. The data set level recovery is the opposite action of backup and the volume level restore is the opposite action of dump. By the way, DFSMShsm does not automatically recover or restore a data set, if it becomes damaged. The recover and restore process is driven by manual commands.

Fast replication uses volume-level fast replication to create backup versions for sets of storage groups. You can define a set of storage groups through the SMS copy pool construct. The DFSMShsm **FRBACKUP** command creates a fast replication backup version for each volume in every storage group defined within a copy pool.

11.5.2 Implementation and use

Here we discuss considerations for the implementation and use of the Fast Replication enhancements in DFSMS V2.1.

- DFSMSdss physical data set **COPY** and **RESTORE** commands

  Here, we have two sub items:

  – DS RENAME and REPLACE for **COPY** and **RESTORE** commands

  Before DFSMShsm V2R1, DFSMSdss only allows the rename of non-VSAM data sets during physical DS COPY and RESTORE.

  In DFSMS V2.1, a NEWNAME(newdsname) parameter has been added to the **FRRECOV** command. It allows DFSMShsm to use a new, VSAM fully qualified data set name for the recovered backup version or dump copy. It does not apply to VSAM alternate Index cluster. This function gives users access to the production data set and restored data set without having to restore the entire volume. The benefit of such improvement would allow users to recover a data set to another name for analysis without replacing the production data. This function is not implemented for VSAM data set restore operations.

  – Physical DS alternate SMS volume

  Before DFSMShsm V2.1, DFSMSdss physical DS **COPY** and **RESTORE** commands only support one output volume. Volume selection is not an option. If the target volume does not have enough space, the operation fails, like in the scenarios:

  - COPY FULL from source to target, COPY DS from target to source
  - DUMP FULL from target to tape, RESTORE DS from tape to source

  Space might no longer be available on source if the data set size changed. The pre allocated target might have had to be scratched/reallocated.

  DFSMShsm at V2R1 will no longer be restricted to recovering data sets back to the original volumes. If DFSMShsm is not able to recover a data set to the original volumes, it instead selects the most eligible volumes with the most free space within the storage group. There are no changes to the DFSMShsm commands.

  This enhancement is implemented by adding of a new user interaction module (UIM) exit:

  - Physical DS Alternate SMS Volume (EIOPTION 30)
  - Added to ADREID0 mapping
  - Allows program to pass a list of volumes that DFSMSdss can use to attempt to allocate data set on during physical DS copy and restore, when necessary

  This exit is only called when original target volume could not be used.

- DFSMShsm fast replication and physical data set recovery functionality

  Here, we have three sub items:

  – FlashCopy consistency group

  When application data set resides on multiple volumes, data-consistent copy might need to be created across multiple volumes for **FRBACKUP** command. Before DFSMS

V2R2, DFSMShsm does not have this support, although DFSMSdss has already implemented it.

At DFSMShsm V2R1 fast replication backup supports FlashCopy consistency groups. It freezes the source volumes causing subsequent writes to be held. After FlashCopy has completed, the held I/O is resumed.

Note: The consistency group must be formed and completed within a (default 2-minute) time window, therefore it is intended for backing up small LOG copy pools.

Specify whether the FlashCopy consistency group option is required to be used when the copy pool is backed up to disk with the new SMS copy pool settings:

- FlashCopy Consistency Group (Y or N)

  Y: yes, perform consistency group FlashCopy.

  N (default): no, do not perform consistency group FlashCopy.

  If you specify Yes, DFSMShsm FRBACKUP function invokes DFSMSdss specifying:

- FCFREEZE on the COPY commands. “Freeze” places the source volume in an extended long busy state (suspended). All subsequent writes to the source volume are held. Associated dependent writes to any volumes also cannot complete.
- CGCREATED ACCVOL FCCGVERIFY command (in DFSMSdss) to thaw the source volumes after all volumes have been copied. The previously held I/O resumes. FCCGVERIFY validates the consistency of the copy.

DFSMSdss accepts multiple volume serial numbers on the FCCGVERIFY keyword of the **CGCREATED** command. The keyword accepts up to 255 volume serial numbers.

If the FlashCopy consistency group function fails, the **FRBACKUP** command is terminated and the new or in-process copy pool backup version is invalidated. An ARC1806E message is issued in the console:

ARC1806E FAST REPLICATION BACKUP HAS FAILED FOR COPY POOL cpname, RC=90

RC90 means that a data-consistent copy pool backup version could not be created successfully. The FlashCopy consistency group timer might have expired or reset before FRBACKUP finished processing all the volumes

The FlashCopy consistency group option can be used in combination with other FlashCopy options, as:

- LIST COPYPOOL(cpname) command can be used to display (at FCCG=Y/N field) and determine whether the copy pool backup version was created using the FlashCopy consistency group option. Refer to Figure 11-3 on page 202 to see the output of such command.

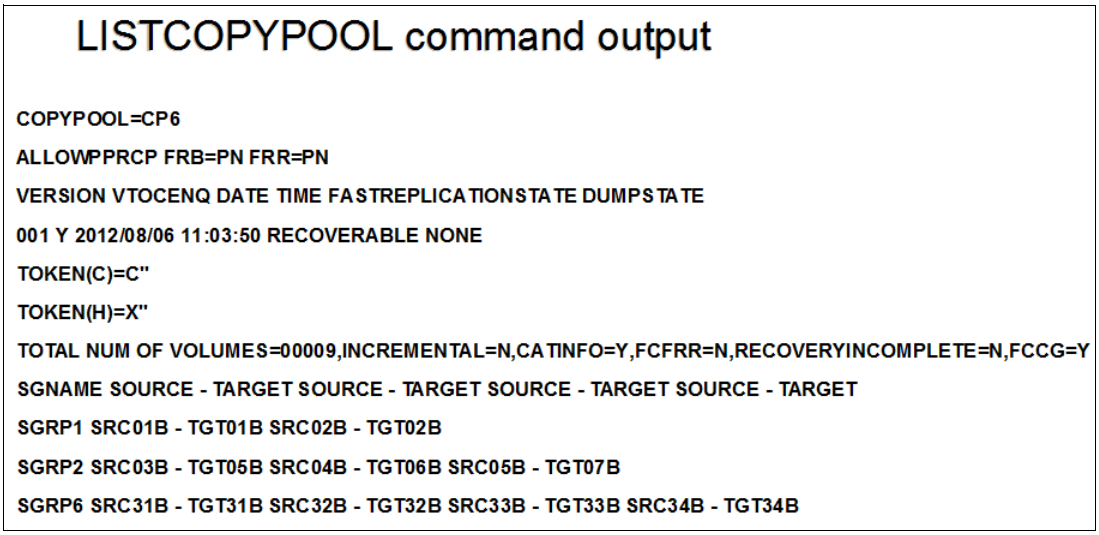

Figure 11-3 LISTCOPYPOOL command output

Now, data-consistent copy can be created across multiple volumes. For example, DB2 customers can use this option on the LOG copy pool for a consistent, non-fuzzy backup of the logs and BSDS.

– Fast replication data set recovery to different volumes

Before DFSMShsm V2R1, fast replication data set recovery must recover data sets to the original volumes where they resided at the time of backup. In order to achieve that, DFSMShsm currently captures catalog information at the time of the fast replication backup to recover deleted and moved data sets back to the original volumes. However, the recovery might fail for reasons such as insufficient space.

Now, at DFSMShsm V2R1, customers are able to recover data sets to different volumes than the original volumes.

DFSMShsm will first attempt to recover the data set to the original volumes.

If the initial allocation attempt failed, DFSMShsm performs SMS volume selection within the primary storage group and retry data set recovery.

– Fast replication data set recovery with rename

Before DFSMShsm V2R1, fast replication data set recovery does not allow data sets to be recovered to a new name.

Also, the **RECOVER** command currently does not allow VSAM data sets to be renamed when restoring from dump.

The solution at DFSMShsm V2R1 is to enhance:

- **FRBACKUP** command to allow data set to be recovered to a new name
- **RECOVER** command to remove the restriction that VSAM data set must be recovered to the original name when restoring from dump

A new optional parameter: NEWNAME(newdsname) introduces the new name. If a data set exists with the same name as the new data set name you are specifying, you must specify the existing REPLACE parameter to replace the existing data set.

The benefit of such improvement would allow users to recover a data set to another name for analysis without replacing the production data.

11.6 Reliability, availability, serviceability, and usability improvements

Since the very beginning, there is a non-stop effort on the z/OS platform for improving reliability, availability, and serviceability (RAS). A list of the improvements for DFSMShsm at V2.1 are:

- DFSMShsm no longer captures unit control blocks (UCBs) into below the 16-M line
- Automatic recycle retry for a tape takeaway
- Automatic recycle retry for a duplex error
- QUERY ACTIVE(TCBADDRESS) command improvements
- Enhance ARC0936I with catalog return/reason code
- Update ARCHRCAL macro to use different TCB
- SMSVSAM server termination handling

11.6.1 DFSMShsm no longer captures UCBs into below the 16-M line

UCB is a control block used by the MVS component Input Output Supervisor (IOS) to represent a device or an additional alias address of a device, if you implement Parallel Access Volume (PAV). All UCBs are located above the 16-M line in ESQA. They can be:

- Captured UCBs, although located above the 16-M line, are also mapped and accessible by AMODE24 programs for compatibility needs. This is possible through the implementation of the IBM z/Architecture® concept of shared pages, that is, two virtual pages pointing to the same real storage frame.
- Non-capture UCBs, as defined in an HCD. They are not mapped below the 16-M line.

Because captured UCBs consume virtual storage below the 16-M line, large customers face periodic 878-Abends in the DFSMShsm address space. DFSMShsm has increased the available virtual storage below the 16-M line by not capturing UCBs below the line anymore.

11.6.2 Automatic recycle retry for a tape takeaway

DFSMShsm V2R1 can automatically generate a new Recycle command for the same original target tape when this Recycle must terminate due to:

- Takeaway process. A takeaway happens when a recall request needs the tape that is currently being written to by a space management task as migration to ML2, or
- When the recycle input tape is in use by another DFSMShsm task

Before DFSMShsm V2R1 space management task closes the ML2 cartridge after the takeaway. The space management task then requests a new scratch tape, and the partially filled ML2 tape is not reused to append any more data to it. This can result in many cartridges being only partially full and becoming candidates for subsequent recycles.

Automatically retrying a recycle is managed by the new option at **SETSYS** command:

```
SETSYS RECYCLETAKEAWAYRETRY(YES MAXRETRYATTEMPTS(nn) DELAY(mmmm) | NO)
```

- RECYCLETAKEAWAYRETRY is an optional parameter used to generate a new Recycle command for the same original tape when the original Recycle must terminate due to the takeaway process or when the input tape is in use by the other DFSMShsm task.

- MAXRETRYATTEMPTS(nn) sets the maximum number of recycle retry attempts.
- DELAY(mmmm) sets the delay in seconds between recycle attempts.

  Range and defaults:

  - nn: the value can be 1 – 99. The default value is 12.
  - mmmm: the value can be 1 – 9999. The default value is 300.

11.6.3 Automatic recycle retry for a duplex error

Before DFSMShsm V2R1, when an alternate tape of a duplex copy pair fails to be created, DFSMShsm generates an automatic request to create a tape copy of the original. At DFSMShsm V2R1, when such error occurs, an option is available to generate a **RECYCLE** command instead of **TAPECOPY** command to create a new original and alternate tape.

This can be done through a new SETSYS option added to the Duplex Tape function. When an error occurs on the duplex alternate tape, the alternate tape is dismounted and discarded, DFSMShsm continues to write to the original tape. When DFSMShsm has completed writing the original tape, a TCN record for Recycle is created and written to OCDS. DFSMShsm starts RECYCLE of the original tape to create a new duplex pair of tapes.

The new option CONTINUE (RECYCLE) creates a new duplex pair of tapes via the Recycle command after the original finishes:

SETSYS DUPLEX (BACKUP (Y ERRORALTERNATE(CONTINUE(TAPECOPY| RECYCLE)) | N) MIGRATION(Y ERRORALTERNATE(CONTINUE(TAPECOPY| RECYCLE) | MARKFULL) | N))

11.6.4 QUERY ACTIVE(TCBADDRESS) command improvements

At DFSMShsm V2R1, the QUERY ACTIVE(TCBADDRESS) command is improved to display on top of the TCB address for data movement tasks to show: the tape volser, device address and task name. It is very clear that just the TCB address is not enough for task identification. This helps users with correctly identifying which TCB should be canceled. Users often know which tape drive that is in error, but do not know how to relate that to a particular DFSMShsm TCB.

11.6.5 Enhance ARC0936I with catalog return and reason code

DFSMShsm ARC0936I message now contains additional diagnostic information. When FAST VVDS ACCESS interface returns RC12, REAS98, DFSMShsm uses the information in the FVVPPROB field to put it into SUBREAS field of the ARC0936I message.

11.6.6 Update ARCHRCAL macro to use different TCB

The ARCHRCAL macro allows customer programs to recall a migrated data set. The syntax of the ARCHRCAL macro is changed to use a different TCB. A new TCBTOKEN=CURRENT parameter is added to the syntax. This parameter is provided to support changes in BCP for batch job recall processing.

11.6.7 SMSVSAM server termination handling

This support greatly improves the usability and robustness of DFSMShsm regarding its response to SMSVSAM server errors. When an SMSVSAM server error occurs, DFSMShsm detects the error, and quiesces all DFSMShsm CDS I/O activity. Once the SMSVSAM server initializes, DFSMShsm automatically closes and reopens the CDSs and resumes all requests waiting on CDS I/O operations.

12

DFSMSrmm enhancements

The DFSMSrmm enhancements in z/OS V2.1 DFSMS provide improvements in the areas of usability and maintainability. New function in this release includes the following:

- SMS management class expiration attributes for tape
- RETENTIONMETHOD(EXPDT) enhancements
- DFSMSrmm conversion support

The following DFSMSrmm enhancements are described in this chapter:

- DFSMSrmm overview
- SMS management class expiration attributes for tape
- RETENTIONMETHOD(EXPDT) enhancements
- Testing MCATTR and RETENTIONMETHOD settings
- DFSMSrmm conversion support

At the end of the chapter, you should be able to use the retention specified in your SMS management classes. You should understand how to select different retention methods for your volumes and to exclude some of your data sets from vital record processing.

12.1 DFSMSrmm overview

DFSMSrmm is a z/OS feature. In your enterprise, you probably store and manage removable media in several types of media libraries. For example, in addition to your traditional tape library, a room with tapes, shelves, and drives, you might have several automated, virtual, and manual tape libraries. You probably also have both onsite libraries and off-site storage locations, also known as *vaults* or *stores*.

With DFSMSrmm, you can manage your removable media as one enterprise-wide library across systems and SYSPLEXes. DFSMSrmm manages your installation's tape volumes and the data sets on those volumes. DFSMSrmm also manages the shelves where volumes reside in all locations except in automated tape libraries.

DFSMSrmm manages all tape media, such as cartridge system tapes and 3420 reels, as well as other removable media you define to it. For example, DFSMSrmm can record the shelf location for optical disks and track their vital record status. It does not manage the objects on optical disks.

12.2 SMS management class expiration attributes for tape

You can now set the expiration date in DFSMSrmm for a tape data set with a DFSMS management class (MC). When you enable use of management class attributes by DFSMSrmm, the management class expiration attributes (except the management class Expiration attribute Retention limit) are retrieved by DFSMSrmm during OPEN for output and used to set the expiration date for the tape data set, and also to set the LASTREF extra days in the tape data set record on retention method EXPDT managed volumes. Regardless of whether the expiration attributes are retrieved from the management class, from a DFSMSrmm default parmlib option, or from an installation exit, an expiration date is calculated and will be used to manage expiration. Any attributes needed to continue management of retention, such as *days non-usage* are bound to the data set record in the DFSMSrmm CDS, depending on the retention method. This is a one-time action, thus avoiding any overhead of repeating the policy decisions as part of inventory management.

At OPEN for input the management class attributes are not considered for processing. At OPEN for output with disposition MOD the management class attributes are not considered for processing. The enablement in DFSMSrmm provides options to use or not use these management class attributes for all volumes. It provides an option for VRSEL managed volumes to exclude the management class attribute *Expire after Date/Days*. This last option is recommended if it is wanted that the processing of VRSEL managed volumes not change with DFSMSrmm V2.1.

Management class attributes for tape management

You can use ACS routines to assign a management class to a data set to allow DFSMSrmm to:

- Retrieve and use the management class attributes relevant for tape management.

  DFSMSrmm calls ACS routines directly to provide support for non-system-managed tape if you have enabled it with the EDGRMMxx parmlib option SMSACS. This DFSMSrmm processing enables you to use an SMS management class to manage system-managed and non-system-managed the usage of the management class attributes. The SMS management class attributes that can be retrieved are the expiration attributes Expire after Days Non-usage and Expire after Date/Days. They are bound to the DFSMSrmm data set attributes EXPDT and LASTREF when the data set is first written.

- Match a DFSMSrmm data set vital record specification to the management class name.

  This processing applies only when the VRSEL retention method is used. DFSMSrmm calls ACS routines directly to provide support for non-system-managed tape, if you have enabled it with the EDGRMMxx parmlib option SMSACS. This DFSMSrmm processing enables you to use an SMS management class to manage system-managed and non-system-managed tape data sets.

Using SMS ACS processing you have an automated way to set the expiration date and LASTREF extra days of a data set from the management class expiration attributes 'Expire after Date/Days' and 'Expire after Days Non-usage'. You can tailor the use of the management class attributes by DFSMSrmm with the EDGRMMxx parmlib option MCATTR.

Using SMS ACS processing, you can consolidate policy assignment decisions in a single place whether you use system-managed tape or not. You can use SMS ACS routines to assign management class for your data sets instead of using vital record specification management values assigned by the EDG_EXIT100 exit. You can assign a management policy by name to either a non-system-managed or a system-managed tape data set.

If the use of the management class attributes is enabled by the EDGRMMxx parmlib OPTION MCATTR, you can use the management class Expiration Attributes (Expire after Date/Days and Expire after Days Non-usage) to set the data set EXPDT and LASTREF attributes, where appropriate.

You can use the SMS management class attributes for both system-managed and non-system-managed volumes. For non-system-managed volumes, you must set the EDGRMMxx parmlib option SMSACS(YES).

12.2.1 Using SMS management class in a system-managed tape environment

To use the SMS management class expiration attributes, you must change the MCATTR option in the EDGRMMnn parmlib member from the default MCATTR(NONE) to ALL or VRSELXDI to enable the use of DFSMS management class expiration attributes.

Update EDGRMMnn parmlib member

In Figure 12-1, you can see the MCATTR and RETENTIONMETHOD settings in the EDGRMMnn parmlib member to use DFSMS management class expiration attributes.

```
OPTION OPMODE(P)                 /* protect mode         */ -
       ACCOUNTING(J)             /* Account information  */ -
       BACKUPPROC(RMMBKUP)       /* backup procedure     */ -
       BLP(RMM)                  /* bypass label process */ -
       CATRETPD(12)              /* catalog retention    */ -
...
       MAXRETPD(NOLIMIT)         /* maximum retention    */ -
       MCATTR(VRSELXDI)          /* management class use */ -
...
       RETENTIONMETHOD(VRSEL)    /* VRSEL retain process */ -
       RETPD(0)                  /* default retention    */ -
...
      SMSACS(YES)                /* SMSACS option        */ -
...
```

Figure 12-1 Sample EDGRMMnn parmlib member

The following values apply to Figure 12-1 on page 209:

- **MAXRETPD**: Specifies the maximum retention period that a user can request for data sets on volumes. The following values are valid:
  - **NOLIMIT:** Specify NOLIMIT to use the dates 99365 or 99366, which mean to never expire. If the calculated date is 31 December 1999, the expiration date 1 January 2000 is used. The default is MAXRETPD(NOLIMIT)**.**
  - **nnnnn:** Specify a value 0 - 93000 days. When a value 0 - 93000 days is specified, the value is added to the current.
- **MCATTR:** Specifies whether DFSMSrmm should be enabled to use DFSMS management class expiration attributes that apply to tape management. The following values are valid:
  - **ALL:** The use of all applicable management class attributes is enabled. The management class attributes are used as they are appropriate, depending on the retention method. The management class attribute Retention Limit is not applied.
  - **NONE:** No management class attributes are used. This is the default.
  - **VRSELXDI:** The use of management class attributes is enabled. The management class attributes are used as they are appropriate, depending on the retention method. The exception is the Expire after Date/Days attribute, which is ignored if the data set is on a volume managed by the VRSEL retention method. The management class Retention Limit attribute is not applied. VRSELXDI is recommended if it is wanted that the processing of VRSEL managed volumes is the same as in prior DFSMSrmm releases.
- **RM:** RETENTIONMETHOD can be abbreviated as RM. Use this operand to set the system-wide retention method default for new tape volume sets. New tape volume sets may be created during Open/Close/End-of-Volume (O/C/EOV) processing, or through DFSMSrmm commands. A tape volume set may be a multivolume set, or a single tape volume. The following values are valid:
  - **EXPDT:** Specify EXPDT to set the default retention method for new tape volume sets to be based on EXPDT. Data sets and volumes managed by this retention method are never processed by VRSEL inventory management. When you specify the EXPDT retention method, the DFSMSrmm inventory management EXPROC processing always attempts to return volumes to scratch on the same run as the volume is released (this is as though the SCRATCHIMMEDIATE attribute is set for the volume). DFSMSrmm maintains a consistent expiration date and time for all data set records of a multivolume data set, unless the volume set is retained by first file. EXPDT can be specified either as EXPDT or EXPDT(options). The available options are:
    - **LASTREF:** LASTREF specifies the default for the data set record LASTREF attribute. The LASTREF attribute specifies the number of days that the data set will be retained after the data set was last referenced by a read or write operation. LASTREF applies only to data sets on volumes managed by the EXPDT retention method. The parameter *extra_days* is a decimal number 0 - 93000. The value must not exceed the maximum retention period (MAXRETPD) specified in the EDGRMMxx parmlib member. An extra_days value of 0 has the same effect as the NOLASTREF operand. When a data set is added to DFSMSrmm on a volume managed by the EXPDT retention method and neither LASTREF nor NOLASTREF are specified for the data set, then DFSMSrmm uses the default LASTREF value. DFSMSrmm uses the data set LASTREF value to determine the data set expiration date. The extra days are added to the date of last reference. The data set expiration date is set to the maximum of the date calculated using data set LASTREF value and the date resulting from applying the EXPDT, RETPD, or default RETPD. Any reference to the data set by a read or write operation will change the expiration date.

- **NOLASTREF**: NOLASTREF is the default setting for the data set record LASTREF attribute. If neither LASTREF or NOLASTREF are specified in parmlib, NOLASTREF is used by default. NOLASTREF specifies that DFSMSrmm does not consider the data set last reference date when determining the data set expiration date. NOLASTREF applies only to data sets on volumes managed by the EXPDT retention method.
- **RETAINBY:** RETAINBY specifies how DFSMSrmm is to retain volumes or multivolume sets that are managed by the EXPDT retention method. In a multivolume set, RETAINBY is assigned only to the first volume in a multivolume sequence. All other volumes added to the set assume the same RETAINBY. It has several valid values described in “Using RETAINBY option” on page 220.

– **VRSEL:** Specify VRSEL to set the default retention method for new tape volume sets to be VRSEL. This option enables DFSMSrmm inventory management to attempt to match data sets and volumes to vital record specifications, and if a match is found, to determine if the data set or volume is to be retained by VRS. The VRSEL retention method is controlled by all the other VRS-related options in parmlib including OPTION RETAINBY MOVEBY. The default is RETENTIONMETHOD(VRSEL). For volumes managed by the VRSEL retention method, use the RETAINBY option to obtain a similar function.

- **RETPD**: Specifies the default retention period for all new data sets on volumes. Specify a value 0 - 93000 days. The specified value is added to the current date to determine the expiration date. Select a default retention for parmlib RETPD that is a small value to ensure that all tape data created outside the service levels is released as soon as possible. The MAXRETPD value that you specify in the parmlib limits the calculated expiration date. The default is RETPD(5).
- **SMSACS**: Specify this operand to control whether DFSMSrmm calls SMS ACS processing to enable use of storage group and management class values with DFSMSrmm for non-system managed data. The following values are valid:

  – **NO**: Specify NO to prevent DFSMSrmm from calling the SMS ACS processing to obtain management class and storage group names. DFSMSrmm system-based scratch pooling, and scratch pooling and VRS management values based on the EDG_EXIT100 installation exit are used. The default is SMSACS(NO).

  – **YES**: Specify YES to enable DFSMSrmm calls to the SMS ACS processing to obtain management class and storage group names. If values are returned by the SMS ACS routines the values are used instead of the DFSMSrmm and EDG_EXIT100 decisions. If there is no expiration date in the JFCB or management class, DFSMSrmm uses the EDGRMMxx RETPD value to calculate the new expiration date. If the RETPD value allows the volume to be retained longer, DFSMSrmm uses that date to update the volume’s expiration date.

Figure 12-2 on page 212 shows you the result of the **`LISTCONTROL OPTION`** subcommand if you have the default MCATTR option setting.

```
System options:
PARMLIB Suffix  = 02           Operating mode  = P
Control data set name      = RMM.CONTROL.DSET
Journal file data set name = RMM.JOURNAL.DSET
Journal threshold          = 75%              Journal transaction = NO
Catalog SYSID              = Notset
Scratch procedure name     = EDGXPROC
Backup procedure name      = EDGCDSBK
IPL date check  = N        Date format    = J       RACF support   = N
SMF audit       = 0        SMF security   = 42      CDS id         = SC70
MAXHOLD value   = 100      Lines per page = 54      System ID      = SC70
BLP             = RMM      TVEXT purge    = RELEASE Notify         = N
                                days       = 0
Uncatalog       = Y                                 Message case   = M
MASTER overwrite= USER     Accounting     = J
Disp DD name    = DISPDD   Disp msg ID    = EDG4054I
PREACS          = NO       SMSACS         = YES     CMDAUTH OWNER  = NO
Reuse bin       = CONFIRMMOVE                       CMDAUTH DSN    = YES
Local tasks     = 10                                Media name     = 3480

Retention period: Default = 0     Maximum = NOLIMIT
                  Catalog = 6     hours
Use of Management Class Attributes = VRSELXDI
Retention method: Default = VRSEL

RM(VRSEL) defaults:              RM(EXPDT) defaults:
  Retain by         = SET          Retain by          = VOLUME
  Move By           = SET
  VRS selection     = NEW          LASTREF extra days = 0
  VRS change        = INFO
  VRSMIN action     = INFO
  VRSMIN count      = 1
  VRS job name      = 2
  GDG duplicate     = BUMP
  GDG cycle by      = GENERATION
```

Figure 12-2 EDGRMMnn parmlib member without using MC attributes

12.2.2 Update your tape-related SMS management classes

You have to specify your expiration settings in the SMS management classes related for tape. Figure 12-3 on page 213 shows an SMS management class used for tape data sets with specific expiration date settings.

```
                          MANAGEMENT CLASS ALTER              Page 1 of 6
Command ===>

SCDS Name . . . . . : SYS1.SMS.MHLRES3.SCDS
Management Class Name : NSRMMMC

To ALTER Management Class, Specify:

  Description ==> SPECIAL MANAGEMENT CLASS TO SUPPORT DFSMSRMM SMS ACS SUPPORT
              ==>

  Expiration Attributes
    Expire after Days Non-usage  . . 10          (1 to 93000 or NOLIMIT)
    Expire after Date/Days . . . . . 20          (0 to 93000, yyyy/mm/dd or
                                                 NOLIMIT)

  Retention Limit  . . . . . 30          (0 to 93000 or NOLIMIT)



Use ENTER to Perform Verification; Use DOWN Command to View next Panel;
```

Figure 12-3 Sample SMS management class expiration setting

The following values apply to Figure 12-3:

- **EXPIRE AFTER DAYS NON-USAGE**: This attribute is used to specify when each data set in this management class will expire. The data sets will expire if they are not used within the number of days you specify. If you do not want the data sets to expire, specify NOLIMIT. This attribute is valid only if the retention period (RETPD) or expiration date (EXPDT) is not specified or is not derived from the data class. The *retention* attributes override the *migration* attributes. The following values are valid:
  - **1 to 93000**: Specify any value 1 - 5 digits.
  - **NOLIMIT**: Specify this attribute if you want to ignore the expiration time.
- **EXPIRE AFTER DATE/DAYS**: To specify either the expiration date for data sets or objects in this management class or the number of days before data sets or objects expire, beginning with the creation date. This attribute is valid only if the retention period (RETPD) or expiration date (EXPDT) is not specified or is not derived from the data class. The retention attributes override the migration attributes. The following values are valid:
  - **yyyy/mm/dd**: Specify four digits that specify a year, the month as 01 to 12, the day as 01 to 31.
  - **NOLIMIT**: Specify if you want the data set to not expire.
  - **0 to 93000**: One to five digits to specify the number of days.
- **RETENTION LIMIT**: To control what a user or data class can specify for retention period (RETPD) or expiration date (EXPDT) during allocation. The following values are valid:
  - **0**: Do not use the RETPD and EXPDT that the user or data class specified.
  - **1 to 93000**: Use this value only if the RETPD or EXPDT is more than this value.
  - **NOLIMIT**: Do not set a limit to the allowable RETPD or EXPDT.

Important: If both EXPIRE AFTER DAYS NON-USAGE and EXPIRE AFTER DATE/DAYS specify NOLIMIT, the data sets or objects never expire. If either field has a value of NOLIMIT and the other field specifies an expiration date or the number of days until expiration, the data sets or objects expire at that specified time. If both fields specify an expiration date or the number of days until expiration, the data sets or objects expire on the later date.

The use of the management class is illustrated further in this chapter. We provide examples that show you what is happened with the different DFSMSrmm PARMLIB settings.

12.2.3 SMS management class in a non-system-managed tape environment

For non-system managed tape, DFSMSrmm calls the ACS routines to obtain a management class. The management class is used in place of the vital record specification management value assigned by the EDG_EXIT100 installation exit. When a management class name is assigned using ACS routines, the EDG_EXIT100 installation exit is not called for a vital record specification management value. The decision to call the EDG_EXIT100 installation exit is made each time a new data set is created on a tape based on whether a construct is assigned by ACS processing. You have the flexibility to identify one request to be handled by ACS and the next request to be handled by the EDG_EXIT100 installation exit. For compatibility, DFSMSrmm passes the vital record specification management value that is determined by the EDG_EXIT100 installation exit by using the pre-ACS interface in the MSPOLICY variable. You might use the vital record specification management value in the MSPOLICY variable as the base for management class assignment for system managed tape. Even when you use SMS ACS support to assign management class names, you can have separate policies for retention and movement by using a primary data set name vital record specification and a secondary management class vital record specification. Use the ACS routine to assign the management class as the secondary vital record specification and the DFSMSrmm data set name vital record specification to assign the primary vital record specification.

Note: You can still use the EDG_EXIT100 installation exit to check for either EXPDT= or ACCODE= specifying special values and override them to ensure correct retention processing by DFSMSrmm.

Management class assignment

In addition to the description in the section 12.2.1, “Using SMS management class in a system-managed tape environment” on page 209, you must enable this by specifying the OPTION SMSACS in your EDGRMM parmlib member.

To assign a management class, you must have the SMS subsystem active and have a valid SMS configuration.

You use the ACS routines to process the special calls that DFSMSrmm makes to the SMS subsystem for ACS processing. DFSMSrmm requests that the management class routine is run. The environment variable is set to RMMVRS so that you can differentiate allocation requests for system-managed data sets from requests by DFSMSrmm for a management class name. When DFSMSrmm calls the ACS routines with the &ACSENVIR variable set to either RMMPOOL or RMMVRS, the storage class (&STORCLAS variable) is set to the word USERMM.

DFSMSrmm calls the ACS routines to request the assignment of storage group and management class names for non-system managed tape data sets. Table 12-1 lists the read-only variables that are set for DFSMSrmm requests.

Table 12-1 SMS read-only variables set by DFSMSrmm

Variables			
&ACCT_JOB	&ACCT_STEP	&ACSENVIR	&DD
&DSN	&DSORG	&DSTYPE	&EXPDT
&FILENUM	&GROUP	&HLQ	&JOB
&LABEL	&LIBNAME	&LLQ	&NQUAL
&PGM	&STORGRP	&SYSNAME	&SYSPLEX
&UNIT	&USER	&XMODE	

Note: The SMS pre-ACS exit variables &MSPOOL, &MSPOLICY, &MSDEST, and &MSPARM read-only variables can be used by a tape management system only.

The following values apply to Table 12-1:

- **&ACCT_JOB**: The accounting information from the JOB statement. The maximum value is 142 characters.
- **&ACCT_STEP**: The accounting information from the STEP statement. The maximum value is 142 characters.
- **&ACSENVIR**: The environment on which the ACS routine was invoked. The following values are valid:
  - **RECALL**: For data set recall operations.
  - **RECOVER**: For data set recover operations.
  - **RENAME**: For data set alter rename operations.
  - **RMMPOOL**: For DFSMSrmm requests for a storage group name.
  - **RMMVRS**: For DFSMSrmm requests for a management class name.
  - **CONVERT**: For data set convert in place operations.
  - **ALLOC**: For new data set allocations. This is the default.
  - **STORE**: OSREQ object store environment.
  - **CHANGE**: OSREQ object change environment.
  - **CTRANS**: OSMC object class transition environment.
  - **other**: Installation exit can set its own value before reinvoking ACS. Max value: 8 characters.
- **&DD**: DDNAME in the DD statement of the data set.
- **&DSN**: The name of the data set or collection for which ACS processing is taking place. For VSAM data sets, only the cluster name is passed to the ACS routine. The component names are not. If the data set has an absolute or relative generation number, it is stripped from &DSN. The generation number is the low-level qualifier of the data set name.
- **&DSORG**: The data set organization. The following are valid values:
  - **PS**: Physical sequential

  - **PO**: Partitioned
  - **VS**: VSAM organization
  - **DA**: BDAM organization
  - **null**: No value specified
- **&DSTYPE**: The data set type. The following are valid values:
  - **GDS**: One generation data set of a generation data group, or any data set allocated with a relative generation number (such as A.B.C(+1)) or an absolute generation number (such as A.B.C.G0000V00).
  - **PERM**: Standard permanent data sets.
  - **TEMP**: Temporary data sets.
  - **null**: None of the above.
- **&EXPDT**: The expiration date in the form of YYYYDDD where YYYY is the four-digit number for the year. The maximum allowable value for yyyy is 9799. DDD is the three-digit number for the day of the year from 1 to 366. Note that expiration dates of 99365 and 99366 are considered NEVER-SCRATCH dates.
- **&FILENUM**: The value of the FILENUM ACS read-only variable. This variable corresponds to the data set sequence number on the JCL LABEL parameter. The default is 1. This field is optional.
- **&GROUP**: The RACF defined group to which you are connected, or the group specified in the GROUP keyword on the JCL JOB statement. If the environment is recall or recover, &GROUP is set only if the requester of the recall or recover is not a DFSMShsm authorized user. When DFSMShsm invokes the ACS routines, &GROUP is the group associated with &USER.
- **&HLQ**: The high-level qualifier of the data set or collection name.
- **&JOB**: The job name, the started task name, or the TSO/E user ID from the JOB statement, depending on the execution mode (&XMODE).
- **&LABEL**: The value of the LABEL ACS read-only variable. This variable corresponds to the label field of the JCL LABEL parameter. Allowable values are NL, AL, SL, NSL, SUL, AUL, BLP, LTM, or blank. The default is IBM Standard Label. This field is optional.
- **&LIBNAME**: The name for the LIBNAME ACS read-only variable, can contain a 1 - 8 character tape library name. This field is optional.
- **&LLQ**: The low-level (last) qualifier of the data set or collection name.
- **&MSPDEST**: The destination, specified in data set name format, for a tape management system-driven tape allocation. This value is specified through the AMS pre-ACS installation exit. The data set name format lets you specify a sequence of destinations to be identified, where each qualifier is a specific destination. For example, a data set vaulted first at location OUTD and then sent to OLTS can have an MSPDEST of 'OUTD.OLTS'. The actual values depend on the support provided by your tape management system.
- **&MSPARM**: Additional information related to a tape management system-driven tape allocation. This is a variable length field that can be indexed. The value is specified through an external exit.
- **&MSPOLICY**: The name of a management policy associated with tape data for a tape management system-driven allocation. You can use the DFSMSrmm EDGUX100 installation exit to set MSPOLICY to a VRS management value name. You can also set the value of this variable using the SMS pre-ACS installation exit, or allow your tape management system to set it using the pre-ACS installation exit.

- **&MSPOOL**: A tape pool name associated with the data set being allocated. In a system-managed tape environment with scratch pool support, you can use this variable to specify a default storage group, where the tape storage group is equivalent to the tape pool specified in the variable. If you use the DFSMSrmm EDGUX100 installation exit, you can set this variable to the pool name or prefix determined by the DFSMSrmm scratch pool processing. This variable can also be set through the pre-ACS installation exit.
- **&NQUAL**: The number of qualifiers in the data set or collection name.
- **&PGM**: The name of the program the system is running.
- **&SYSNAME**: Specifies the system name of the system on which the ACS routine is executing. This field is optional.
- **&SYSPLEX**: Specifies the Parallel Sysplex name of the system on which the ACS routine is executing. This field is optional.
- **&UNIT**: IBM supplied or installation defined generic name for a device type (for example, 3380, SYSDA).

  A slash (/) preceding a four-digit number represents a unit address (for example, /3380).

  When you allocate a tape data set with DISP=MOD, and no unit information is specified in the JCL, this variable is blank and SMS might attempt to manage the tape data set as a DASD-resident data set.
- **&USER**: The user ID of the person allocating the data set. When DFSMShsm invokes the ACS routines, &USER is either the requestor of the recall or recover, or the user ID of the DFSMShsm address space. If the environment is recall or recover, the variable is set only if the requestor of the recall or recover is not a DFSMShsm authorized user.
- **&XMODE**: The execution mode in which the data set is being allocated. Following are valid values:
  - **BATCH**: Batch execution mode
  - **TSO**: TSO execution mode
  - **TASK**: A started address space

Set up your SMS management class routine to ask for the ACSENVIR RMMVRS environment and select a management class setup for tape data sets. Example 12-1 is a sample management class routine for managing non-system-managed volumes. In this sample, all data set names starting with RMM, MHLRES7 or SCHLUM will be assigned a management class of NSRMMMC. All other tape data sets will become the management class catalog, except if a special meaning expiration date is selected.

Example 12-1 Sample management class routine for managing non-system-managed volumes

```
PROC 1 MGMTCLAS
    ...
    FILTLIST RMMDSN INCLUDE(RMM.**, MHLRES7.**, SCHLUM.**)   /* §02 */
    ...
    IF &MGMTCLAS ^= ' ' THEN DO   /* IF THE DATA SET ALREADY        */
       EXIT                       /* HAS A MANAGEMENT CLASS         */
                                  /* USE IT                         */
    END                           /*                                */
    /*****************************************************************/
    /* RMM POLICY FILTER LISTS                                       */
    /*****************************************************************/
    IF &ACSENVIR = 'RMMPOOL' THEN EXIT                      /* §01 */
    ...
    IF &ACSENVIR = 'RMMVRS' THEN DO                         /* §02 */
```

```
    /*****************************************************************/
    /* RMM VRS ASSIGNMENT DECISIONS                                  */
    /*****************************************************************/
       SELECT                                                 /* §02 */
         WHEN (&RETPD=1990000 OR                              /* §02 */
               &RETPD=1999000)                                /* §02 */
            SET &MGMTCLAS = 'MC99000'                         /* §02 */
         WHEN (&RETPD=1990001)                                /* §02 */
            SET &MGMTCLAS = 'MC90001'                         /* §02 */
         ...
         WHEN (&RETPD=1990365)                                /* §02 */
            SET &MGMTCLAS = 'MC90365'                         /* §02 */
         WHEN (&RETPD=1998001)                                /* §02 */
            SET &MGMTCLAS = 'MC98001'                         /* §02 */
         ...
         WHEN (&RETPD=1998365)                                /* §02 */
            SET &MGMTCLAS = 'MC98365'                         /* §02 */
         WHEN (&RETPD=1999001)                                /* §02 */
            SET &MGMTCLAS = 'MC99001'                         /* §02 */
         ...
         WHEN (&RETPD=1999364)                                /* §02 */
            SET &MGMTCLAS = 'MC98364'                         /* §02 */
         WHEN (&HLQ=&RMMDSN)                                  /* §03 */
            SET &MGMTCLAS = 'NSRMMMC'                         /* §03 */
         OTHERWISE SET &MGMTCLAS = 'CATALOG'                  /* §02 */
       END                                                    /* §02 */
       EXIT                                                   /* §02 */
    END                                                       /* §02 */
    ...
END
```

12.3 RETENTIONMETHOD(EXPDT) enhancements

With DFSMSrmm V2.1, there are two new attributes added to the RETENTIONMETHOD expiration data setting. They are listed here:

LASTREF Specifies the default for the data set record LASTREF attribute. The LASTREF attribute specifies the number of days that the data set will be retained after the data set was last referenced by a read or write operation. LASTREF applies only to data sets on volumes managed by the EXPDT retention method.

RETAINBY Specifies how DFSMSrmm is to retain volumes or multivolume sets that are managed by the EXPDT retention method.

These new options apply only to the EXPDT retention method, not to the VRSEL expiration method. The processing of volume sets managed by the VRSEL retention method is unchanged. The use of the new RETENTIONMETHOD settings is shown in Figure 12-4 on page 219.

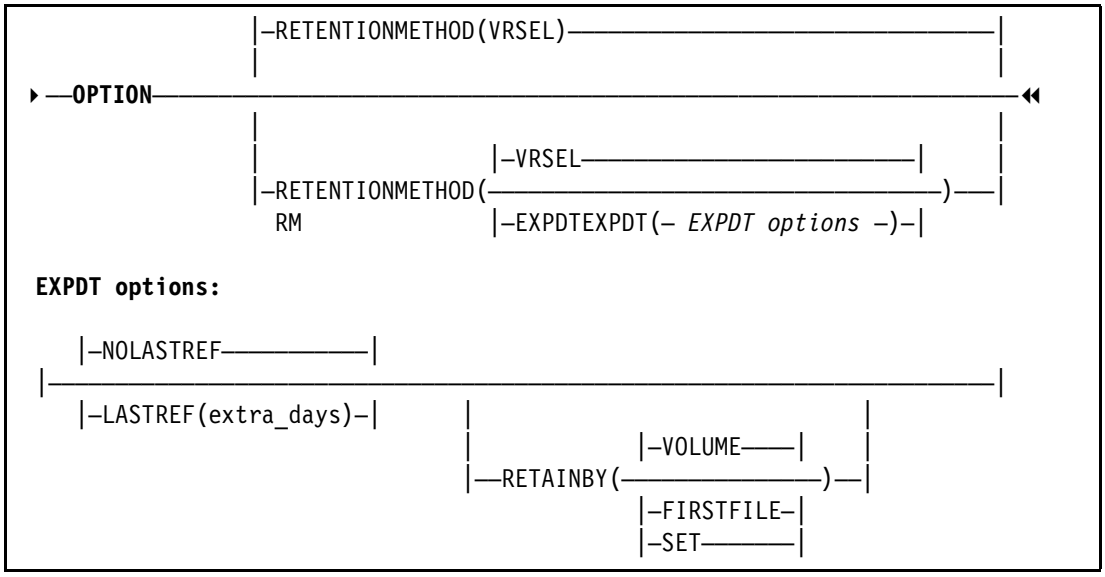

Figure 12-4 EDGRMMnn RETENTIONMETHOD operand

12.3.1 Using LASTREF option

LASTREF extra days is added to the data set record for data sets on volumes managed by the EXPDT retention method. Then, the installation can manage its data based on the number of days since the data set was last read or written on volumes managed by the EXPDT retention method.

The LASTREF extra days apply to data sets on RM(EXPDT) managed volumes. LASTREF extra days cannot be specified for data sets on VRSEL-managed volumes. Extra days means the number of days that the data set will be retained after the data set was last referenced.

DFSMSrmm uses the LASTREF extra days to evaluate the data set expiration date. The extra days are added to the date of last reference. The data set expiration date is set to the maximum of the date calculated using LASTREF extra days, and the date from applying the EXPDT RETPD or default RETPD. Any reference to the data set by a write or read operation will redetermine the expiration date.

The LASTREF extra days option can be set only for data sets on volumes managed by the EXPDT retention method.

You can set the LASTREF extra days retention option in several ways:

- By the management class, when the use of the management class attributes is enabled by the EDGRMMxx member option MCATTR and there is a value in Expiry after days non-usage in the management class. The advantage is that you do not need to define the function to each data set explicitly through the JCL, data class, TSO DFSMSrmm command, or using the EDGRMMxx member. With management class assignment, we implement automation in the process. Refer to “Update your tape-related SMS management classes” on page 212 to see how to implement LASTREF extra days retention option in an SMS management class.
- By DFSMSrmm **ADDDATASET** subcommand, when the data set record is created.
- By DFSMSrmm **CHANGEDATASET** subcommand any time after the data set record has been created.

If the volume set is retained by SET or VOLUME, the LastReferenceDays data set attribute will be kept equal for all files of a multi-volume data set. The latest LastReferenceDays update to a single file in a multivolume data set is propagated to all files that belong to the same multi-volume data set. However, for volume set retained by FIRSTFILE the LastReferenceDays data set attribute will be set but not equalized across the multi-volume data set because the expiration date depends only of the first file of the first volume, and its LastReferenceDays.

Additional information about the EXPDT options LASTREF and NOLASTREF can be found in 12.2.1, “Using SMS management class in a system-managed tape environment” on page 209.

12.3.2 Using RETAINBY option

EXPDT retention method now allows retention to be based on a single volume or volume set, or on a controlling first file. You now have the option of retaining volumes with the EXPDT retention method based on a single volume or volume set, or on a controlling first file. Use the RETAINBY keyword of the RETENTIONMETHOD option to specify one of the following retention methods:

VOLUME DFSMSrmm expires volumes in a multi-volume set at the volume level. Each volume in the set has its own expiration date. Each file on a volume can increment the volume expiration date. RETAINBY(VOLUME) is the default value.

SET DFSMSrmm expires volumes in a multi-volume set at the volume set level. All volumes in the set have the same expiration date, which is the maximum expiration date of all volumes in the set (except if changed by the CV command). Any file on any volume of the set can increment the volume expiration date.

FIRSTFILE DFSMSrmm expires volumes in a multi-volume set at the volume set level. All volumes in the set have the same expiration date, which is the expiration date of the first file in the volume set (here a single volume is treated as a volume set with only one volume in it). The volumes will be released to scratch in the same run of DFSMSrmm inventory management.

12.3.3 Using EDGUX100 exit to specifying the retention method to be used

You can use the EDGUX100 installation exit to set the retention method to be used for new tape data sets. When you create a new tape volume set or rewrite an existing set from the first file, you can override the system default retention method. Example 12-2 is a sample EDGUX100 exit.

Example 12-2 Sample EDGUX100 retention method selection table

```
....
*********************************************************************
* Table to match job/data set/program name combinations for
* setting the Retention Method (RM).
* Entries are 8-byte jobname, 8-byte program name, and 44-byte
* dataset name. If an entry is matched, the retention method is set.
* Partial generic entries are supported - '%' may be used to
* represent a single non-blank character, and '*' is supported
* at the end of an entry only, to indicate a generic prefix.
* Some sample commented out entries are included. If you decide to
```

```
* change the format of this table, remember to update the RMENT
* DSECT accordingly.
*********************************************************************
         SPACE 1                                                    §NSC
EDGUX100 CSECT                                                      §NSC
RMTAB    DS    0F                 START OF RM TABLE                §NSC
         SPACE 1                                                    §NSC
         DC    CL8'*'             JOBNAME                          §NSC
         DC    CL44'*'                DATA SET NAME                §NSC
         DC    CL8'*'             PROGRAM NAME                     §NSC
         DC    AL1(PL100_RM_VRSEL) RETENTION METHOD VRSEL          §NSC
         DC    XL3'00'            RESERVED                         §NSC
         SPACE 1                                                    §NSC
         DC    CL8'*'             JOBNAME                          §NSC
         DC    CL44'MHLRES7.*'        DATA SET NAME                §NSC
         DC    CL8'*'             PROGRAM NAME                     §NSC
         DC    AL1(PL100_RM_EXPDT) RETENTION METHOD VRSEL          §NSC
         DC    XL3'00'            RESERVED                         §NSC
         SPACE 1                                                    §NSC
         DC    CL8'*'             JOBNAME                          §NSC
         DC    CL44'RMM.*'            DATA SET NAME                §NSC
         DC    CL8'*'             PROGRAM NAME                     §NSC
         DC    AL1(PL100_RM_EXPDT) RETENTION METHOD EXPDT          §NSC
         DC    XL3'00'            RESERVED                         §NSC
         SPACE 1                                                    §NSC
         DC    CL8'RM END'        END OF RM TABLE MARKER           §NSC
*********************************************************************
* Table to match job/data set/program name combinations for
* setting the VRSELEXCLUDE attribute (VX).
* Entries are 8-byte jobname, 8-byte program name, and 44-byte
* dataset name. If an entry is matched, the VRSELEXCLUDE
* attribute is set.
* Partial generic entries are supported - '%' may be used to
* represent a single non-blank character, and '*' is supported
* at the end of an entry only, to indicate a generic prefix.
* Some sample commented out entries are included. If you decide to
* change the format of this table, remember to update the RMENT
* DSECT accordingly.
*********************************************************************
VXTAB    DS    0F                 START OF VX TABLE                §NSC
         SPACE 1                                                    §NSC
         DC    CL8'*'             JOBNAME                          §NSC
         DC    CL44'HSM.*'        DATA SET NAME                    §NSC
         DC    CL8'*'             PROGRAM NAME                     §NSC
         SPACE 1                                                    §NSC
         DC    CL8'*'             JOBNAME                          §NSC
         DC    CL44'OAM.*'        DATA SET NAME                    §NSC
         DC    CL8'*'             PROGRAM NAME                     §NSC
         SPACE 1                                                    §NSC
         DC    CL8'VX END'        END OF VX TABLE MARKER           §NSC
*--------------------------------------------------------------------
* DSECT to map RMTAB table entries
*--------------------------------------------------------------------
RMENT    DSECT ,                  map of a RMTAB table entry       §NSC
RMJOBN   DS    CL8                jobname                          §NSC
```

```
RMDSN    DS    CL44               data set name                  §NSC
RMNAME   DS    CL8                program name                   §NSC
RMMETHOD DS    FL1                retention method               §NSC
         DS    XL3                reserved                       §NSC
RMENTL   EQU   *-RMENT            length of an entry             §NSC
         SPACE 1                                                 §NSC
*-------------------------------------------------------------------
* DSECT to map VXTAB table entries
*-------------------------------------------------------------------
VXENT    DSECT ,                  map of a VXTAB table entry     §NSC
VXJOBN   DS    CL8                jobname                        §NSC
VXDSN    DS    CL44               data set name                  §NSC
VXNAME   DS    CL8                program name                   §NSC
VXENTL   EQU   *-VXENT            length of an entry             §NSC
         EJECT ,                                                 §NSC
...
```

The following values apply to Example 12-2 on page 220:

RMTAB All data set names **'*'** will be retained by the VRSEL retention except the data set names starting with **'MHLRES7.*'** and **'RMM.*'**

VXTAB All data set names starting with **'HSM.*'** and **'OAM.*'** are excluded from VRSEL processing as they are created or rewritten.

Important: The order in which the table entries are listed is important because the exit scans the table until it finds the first entry where the job name, data set name, and program name masks match the current request. You can change the priority of matching by changing the order of the table entries.

12.3.4 Show new retention method settings

The DFSMSrmm Volumes panel displays the values for RetentionMethod (RM), RetainBy, and Set Retained in the Ret column as shown in Figure 12-5 on page 223.

```
                  DFSMSrmm Volumes (Page 1 of 2)            Row 1 to 13 of 18
Command ===>                                                 Scroll ===> CSR

Enter HELP or PF1 for the list of available line commands
Use the RIGHT command to view other data columns
   Volume          Assigned   Expir./                          Dest-    T Data
S  serial Owner    date       Retn. date Ret Status  Location  ination  R sets
-- ------ -------- ---------- ---------- --- ------- --------  -------- - -----
   THS000 MHLRES7  2013/273   2014/008   V   VRS     LIB2                N 1
   THS002 MHLRES7  2013/273   2014/008   V   VRS     LIB2                N 1
   THS001 MHLRES7  2013/273   2013/363   EV  MASTER  LIB2                N 1
   THS005 MHLRES7  2013/273   2013/363   ES  MASTER  LIB2                N 1
   THS010 MHLRES7  2013/273   2013/363   ES  MASTER  LIB2                N 1
   THS012 MHLRES7  2013/273   2013/273   EV  MASTER  LIB2                N 1
   THS017 MHLRES7  2013/274   2013/294   EV  MASTER  LIB2                N 1
   THS021 MHLRES7  2013/273   2014/008   ES  MASTER  LIB2                N 1
   THS022 MHLRES7  2013/270   2013/293   ES  MASTER  LIB2                N 1
   THS024 MHLRES7  2013/270   2013/363   EV  MASTER  LIB2                N 1
   THS025 MHLRES7  2013/270   2013/363   EV  MASTER  LIB2                N 1
   THS027 MHLRES7  2013/270   2013/363   EV  MASTER  LIB2                N 1
```

Figure 12-5 DFSMSrmm Volumes panel example

Each subcolumn is one character wide. The retention method is displayed in the first subcolumn, RetainBy in the second, Set Retained in the third. RetainBy is only provided for RM(EXPDT) volumes, Set Retained is only provided for RM(VRSEL) volumes. The possible values are listed here:

- Retention Method
  - E indicates Retention Method EXPDT
  - V indicates Retention Method VRSEL
- RetainBy
  - V indicates RetainBy value VOLUME
  - S indicates RetainBy value SET
  - F indicates RetainBy value FIRSTFILE
- Set Retained
  - Y indicates Volume is Set Retained
  - Blank indicates Volume is not Set Retained

12.3.5 ADDDATASET and CHANGEDATASET subcommand enhancements

Figure 12-6 on page 224 shows the new operands of the RMM **ADDDATASET** and **CHANGEDATASET** subcommands.

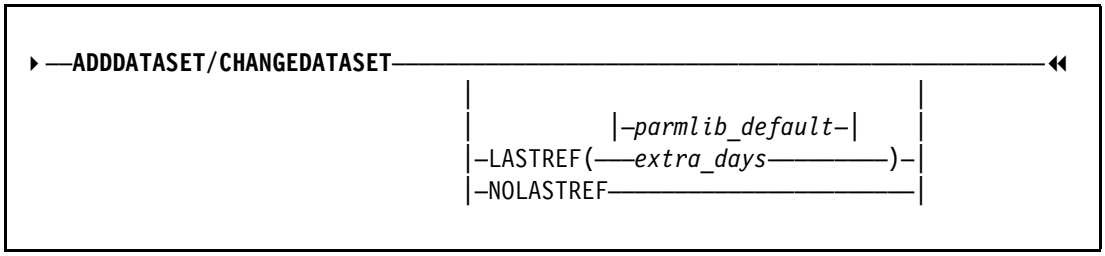

Figure 12-6 ADDDATASET and CHANGEDATASET subcommands

The following values apply to Figure 12-6:

LASTREF Specifies the number of days that the data set will be retained after the data set was last referenced. LASTREF(extra_days) applies only to data sets on EXPDT-managed volumes. LASTREF cannot be specified for data sets on VRSEL-managed volumes.

extra_days is a decimal number 0 - 93000. The value must not exceed the maximum retention period (MAXRETPD) specified in the DFSMSrmm EDGRMMxx parmlib member. An extra_days value of 0 has the same effect as using NOLASTREF. DFSMSrmm uses the LASTREF extra days to evaluate the data set expiration date. The extra days are added to the date of last reference. The data set expiration date is set to the maximum of the date calculated using LASTREF extra days, and the date resulting from applying the EXPDT, RETPD, or default RETPD. Any reference to the data set by a read or write operation redetermines the expiration date.
If neither LASTREF or NOLASTREF is specified for a new data set, DFSMSrmm uses the LASTREF default value specified in OPTION RETENTIONMETHOD(EXPDT) command in the parmlib member EDGRMMxx.

NOLASTREF Specifies that DFSMSrmm does not consider the data set last reference date when evaluating the data set expiration date.

NOLASTREF applies only to data sets on volumes managed by the EXPDT retention method. NOLASTREF cannot be specified for data sets on volumes managed by the VRSEL retention method.

When a file is added to a multivolume data set, the LASTREF or NOLASTREF attribute is copied from the preceding file. For a volume set retained by VOLUME or SET DFSMSrmm ensures that the LASTREF(extra_days) or NOLASTREF data set attribute is the same for all files of a multivolume data set. For a volume set retained by FIRSTFILE, no additional processing is performed to keep the LASTREF extra days attribute consistent across the multivolume data set because the expiration date depends only on the LASTREF extra days attribute of the first file of the first volume.

If neither NOLASTREF or LASTREF is specified for a new data set, DFSMSrmm uses the LASTREF default value specified by the OPTION RETENTIONMETHOD(EXPDT) command in the parmlib member EDGRMMxx.

12.3.6 ADDVOLUME and CHANGEVOLUME subcommand enhancements

Figure 12-7 shows the new operands of the RMM **ADDDATASET** and **CHANGEDATASET** subcommands.

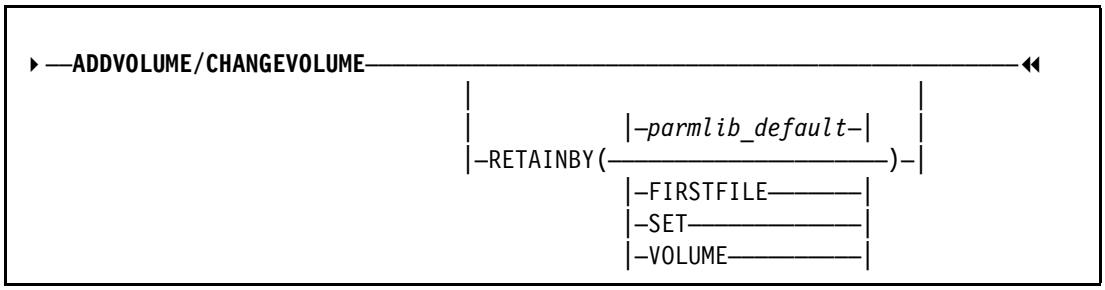

Figure 12-7 ADDDATASET and CHANGEDATASET subcommands

The following values apply to Figure 12-7:

- **RETAINBY**: Specifies how DFSMSrmm is to retain an EXPDT-retained volume or multi-volume set:
  - **FIRSTFILE**: The expiration date of the first file is used to determine the expiration date of a single volume or a multi-volume set. All volumes in a multi-volume set will have the same expiration date and will be released to scratch in the same run of DFSMSrmm inventory management.

    Additional data sets added later to a volume or to a multi-volume set can have different expiration dates that are independent of the volume expiration date.
  - **SET**: DFSMSrmm uses the highest expiration date of all volumes in the set. All volumes in the set will have the same expiration date and will be released to scratch on the same run of DFSMSrmm inventory management.
  - **VOLUME**: The expiration date of the volume is considered for each volume separately and each file on a volume can increment the volume expiration date.

The RETAINBY operand cannot be specified for a volume managed by the VRSEL retention method. Use the RETAINBY operand only for volume sets that use the EXPDT retention method.

When a RETAINBY value is defined for a non-scratch volume, it is not overridden to the default during OPEN output processing, but can be changed using the **CHANGEVOLUME** subcommand.

If RETAINBY is omitted, the EXPDT(RETAINBY) value specified in parmlib is used as the default value.

12.3.7 New REXX exec variables

Table 12-2 on page 226 lists the new variables in RMM subcommand order that you can use in your REXX execs.

Table 12-2 New REXX exec variables

Variable name	Abbreviation of subcommands	Contents	Format
EDG@EXRB	LC OPT, LV VOL	RETENTIONMETHOD EXPDT RETAINBY	Nine characters
EDG@LRED	LC OPT, LD	Last reference extra days	Numeric: 0 - 93000
EDG@MCAT	LC OPT	SMS management class attributes	ALL, NONE VRSELXDI
EDG@RMSB	LV VOL	Retention method set by	Up to 10 characters. One of: CMD CMD_DEF CNVT EXPORT_DEF INERS_DEF LASTREF LCS_DEF OCE_DEF OCE_EXIT UNDEFINED
EDG@XDSB	LV VOL, LD	Expiration date set by	10 characters: blank (not set) CMD CMD_DEF CMD_VOLCAT CNVT EXPORT LASTREF LCS LCS_DEF OCE_DEF OCE_EXIT OCE_JFCB OCE_MAX OCE_MC OCE_VOLCAT TVEXTPURGE

12.3.8 Using RMM TSO subcommands with system REXX

DFSMSrmm displays the ID of the user that caused the most recent change to a record. If the most recent change was made by DFSMSrmm processing, the ID starts with an asterisk (*). Internal IDs include these values:

***CAT** Updates due to catalog status changes

***HKP** Updates due to inventory management

***MIM** Updates due to SARS MIM message interception

***OAM** Updates due to system-managed tape support

***OCE** Updates due to Open/Close/EOV support

***UT** Updates due to execution of EDGUTIL

***WTO** Updates due to message interception

12.4 Testing MCATTR and RETENTIONMETHOD settings

In this section, we use actual jobs to provide an overview of how the different MCATTR and RETENTIONMETHOD settings work. We used the same JCL to create four data sets in both an SMS-managed environment and a non-SMS managed environment. As you can see in the JCL in Figure 12-8, we created data sets both with and without a retention date set in the JCL.

```
//STEP01   EXEC PGM=IEBGENER
//SYSPRINT DD   SYSOUT=*
//SYSUT1   DD   DSN=RMM.ADDONS.CNTL(IEBGENER),DISP=SHR
//SYSUT2   DD   DSN=RMM.TEST.RM.VRSEL.MCATTR.SETTINGS,DISP=(,KEEP),
//         UNIT=ATL3,LABEL=(1,SL),MGMTCLAS=NSRMMMC,RETPD=90
//SYSIN    DD   DUMMY
//STEP01A  EXEC PGM=IEBGENER
//SYSPRINT DD   SYSOUT=*
//SYSUT1   DD   DSN=RMM.ADDONS.CNTL(IEBGENER),DISP=SHR
//SYSUT2   DD   DSN=RMM.TEST.RM.VRSEL.MCATTR.SETTINGS,DISP=(,KEEP),
//         UNIT=ATL3,LABEL=(1,SL),MGMTCLAS=NSRMMMC RETPD=90
//SYSIN    DD   DUMMY
//STEP02   EXEC PGM=IEBGENER
//SYSPRINT DD   SYSOUT=*
//SYSUT1   DD   DSN=RMM.ADDONS.CNTL(IEBGENER),DISP=SHR
//SYSUT2   DD   DSN=RMM.RM.VRSEL.MCATTR.ALL,DISP=(,KEEP),
//         UNIT=VT3590,LABEL=(1,SL),MGMTCLAS=NSRMMMC,RETPD=90
//SYSIN    DD   DUMMY
//STEP02A  EXEC PGM=IEBGENER
//SYSPRINT DD   SYSOUT=*
//SYSUT1   DD   DSN=RMM.ADDONS.CNTL(IEBGENER),DISP=SHR
//SYSUT2   DD   DSN=RMM.RM.VRSEL.MCATTR.ALL,DISP=(,KEEP),
//         UNIT=VT3590,LABEL=(1,SL),MGMTCLAS=NSRMMMC
//SYSIN    DD   DUMMY
```

Figure 12-8 Sample JCL used to test the different settings

To test the vital record processing as well, we specified a DSNAME VRS matching the data sets as shown in Figure 12-9 on page 228.

```
                        DFSMSrmm Display Data Set VRS
Command ===>

                                                                      More:     +
Data set mask . : 'RMM.**'                                          GDG . : NO
     Job name mask . :

Count . . . : 100                   Retention type  . . . . . : DAYS
                                    While cataloged . . . . . : NO
Delay . . . : 0   Days              Until expired . . . . . . : NO

Location  . . . . . : CURRENT
Number in location  : 100
Priority  . . . . . : 0
                                    Release options:
Next VRS in chain . :               Expiry date ignore  . . . : NO
    Chain using . . :               Scratch immediate . . . . : NO

Owner . . . . . : MHLRES7
Description . . :
Last reference  : 2013/275    18:10:43  ( YYYY/DDD  HH:MM:SS )
```

Figure 12-9 Sample DSNAME VRS

The following values apply to Figure 12-9:

- **Count**: Specifies how many days or how many cycles of a data set should be retained in the location specified in the Location field. How the cycles or days are counted is determined by the Retention type field. For example, if the retention type is BYDAYC the count specifies the number of cycles retained and each cycle is all data sets created on the same day.
- **Retention type**: Specifies how data sets are retained as vital records. The retention type specifies how each instance of a data set is managed and moved while under the control of this VRS. Possible values for the Retention type field are listed here:
  - **CYCLES**: Each occurrence of a data set is managed as a separate cycle.
  - **BYDAYC**: All data set occurrences that are created on the same date are managed as a cycle.
  - **DAYS**: Retention is based on days since creation.
  - **REFDAYS**: Retention is based on days since last referenced.
  - **XTRDAYS**: Is only valid on NAME type VRSs. Retention is based on days since the NAME VRS gained control of the data set.

12.4.1 MCATTR(VRSELXDI) and RETENTIONMETHOD(VRSEL)

Table 12-3 on page 229 shows you the result of the allocation of the data sets in Figure 12-8 on page 227 if you specified MCATTR(VRSELXDI), SMSACS(NO) and RETENTIONMETHOD(VRSEL) in your EDGRMMnn parmlib member.

Table 12-3 Retention method VRSEL and MCATTR VRSELXDI

Data set allocated	1	2	3	4
Retention Method	VRSEL	VRSEL	VRSEL	VRSEL
MCATTR	VRSELXDI	VRSELXDI	VRSELXDI	VRSELXDI
SMSACS	NO	NO	NO	NO
JCL EXPDT/RETPD	90	default	90	default
SMS-managed Volume	yes	yes	no	no
Volume information	THS004	THS021	VT0058	VT0059
Assign date	2013/273	2013/273	2013/273	2013/273
Expiration date Set by	2013/363 OCE_JFCB	2013/273 OCE_DEF	2013/363 OCE_JFCB	2013/273 OCE_DEF
Original expiration date	2013/363		2013/363	
Retention Method Set by	VRSEL LCS_DEF	VRSEL LCS_DEF	VRSEL OCE_DEF	VRSEL OCE_DEF
EXPDT Retain by				
Retention date after VRS	2014/008	2014/008	2014/008	2014/008
Data set information				
Creation date	2013/273	2013/273	2013/273	2013/273
Expiration Date Set by	2013/363 OCE_JFCB	2013/273 OCE_DEF	2013/363 OCE_JFCB	2013/273 OCE_DEF
Original expiration date	2013/363		2013/363	
LASTREF extra days	0	0	0	0
VRS selected	yes	yes	yes	yes

12.4.2 MCATTR(ALL) and RETENTIONMETHOD(VRSEL)

Table 12-3 shows you the result of the allocation of the data sets in Figure 12-8 on page 227 if you specified MCATTR(ALL), SMSACS(NO), and RETENTIONMETHOD(VRSEL) in your EDGRMMnn parmlib member.

Table 12-4 Retention method VRSEL and MCATTR VRSELXDI

Data set allocation	1	2	3	4
Retention Method	VRSEL	VRSEL	VRSEL	VRSEL
MCATTR	ALL	ALL	ALL	ALL
SMSACS	NO	NO	NO	NO
JCL EXPDT/RETPD	90	default	90	default
SMS-managed Volume	yes	yes	no	no
Volume information	THS011	THS000	VT0060	VT0061
Assign date	2013/273	2013/273	2013/273	2013/273

Data set allocation	1	2	3	4
Expiration date Set by	2013/363 OCE_JFCB	2013/293 OCE_MC	2013/363 OCE_JFCB	2013/273 OCE_DEF
Original expiration date	2013/363		2013/363	
Retention Method Set by	VRSEL LCS_DEF	VRSEL LCS_DEF	VRSEL OCE_DEF	VRSEL OCE_DEF
EXPDT Retain by				
Retention date after VRS	2014/008	2014/008	2014/008	2014/008
Data set information				
Creation date	2013/273	2013/273	2013/273	2013/273
Expiration Date Set by	2013/363 OCE_JFCB	2013/293 OCE_MC	2013/363 OCE_JFCB	2013/273 OCE_DEF
Original expiration date	2013/363		2013/363	
LASTREF extra days	0	0	0	0
VRS selected	yes	yes	yes	yes

12.4.3 MCATTR(NONE) and RETENTIONMETHOD(VRSEL)

Table 12-3 on page 229 shows you the result of the allocation of the data sets in Figure 12-8 on page 227 if you have specified MCATTR(NONE), SMSACS(NO), and RETENTIONMETHOD(VRSEL) in your EDGRMMnn parmlib member.

Table 12-5 Retention method VRSEL and MCATTR VRSELXDI

Data set allocation	1	2	3	4
Retention Method	VRSEL	VRSEL	VRSEL	VRSEL
MCATTR	NONE	NONE	NONE	NONE
SMSACS	NO	NO	NO	NO
JCL EXPDT/RETPD	90	default	90	default
SMS-managed Volume	yes	yes	no	no
Volume information	THS002	THS016	VT0062	VT0063
Assign date	2013/273	2013/273	2013/273	2013/273
Expiration date Set by	2013/363 OCE_JFCB	2013/293 OCE_MC	2013/363 OCE_JFCB	2013/273 OCE_DEF
Original expiration date	2013/363		2013/363	
Retention Method Set by	VRSEL LCS_DEF	VRSEL LCS_DEF	VRSEL OCE_DEF	VRSEL OCE_DEF
EXPDT Retain by				
Retention date after VRS	2014/008	2014/008	2014/008	2014/008

Data set allocation	1	2	3	4
Data set information				
Creation date	2013/273	2013/273	2013/273	2013/273
Expiration Date Set by	2013/363 OCE_JFCB	2013/293 OCE_DEF	2013/363 OCE_JFCB	2013/273 OCE_DEF
Original expiration date	2013/363		2013/363	
LASTREF extra days	0	0	0	0
VRS selected	yes	yes	yes	yes

12.4.4 MCATTR(VRSELXDI) and RETENTIONMETHOD(EXPDT)

Table 12-3 on page 229 shows you the result of the allocation of the data sets in Figure 12-8 on page 227 if you specified MCATTR(ALL), SMSACS(NO), and RETENTIONMETHOD(VRSEL) in your EDGRMMnn parmlib member.

Table 12-6 Retention method VRSEL and MCATTR VRSELXDI

Data set allocation	1	2	3	4
Retention Method	EXPDT	EXPDT	EXPDT	EXPDT
MCATTR	VRSELXDI	VRSELXDI	VRSELXDI	VRSELXDI
SMSACS	NO	NO	NO	NO
JCL EXPDT/RETPD	90	default	90	default
SMS-managed Volume	yes	yes	no	no
Volume information	THS025	THS027	VT0066	VT0067
Assign date	2013/273	2013/273	2013/273	2013/273
Expiration date Set by	2013/363 OCE_JFCB	**2013/293** **OCE_MC**	2013/363 OCE_JFCB	2013/273 OCE_DEF
Original expiration date	2013/363		2013/363	
Retention Method Set by	EXPDT LCS_DEF	EXPDT LCS_DEF	EXPDT OCE_DEF	EXPDT OCE_DEF
EXPDT Retain by	**VOLUME**	**VOLUME**	**VOLUME**	**VOLUME**
Retention date after VRS				
Data set information				
Creation date	2013/273	2013/273	2013/273	2013/273
Expiration Date Set by	2013/363 OCE_JFCB	**2013/293** OCE_MC	2013/363 OCE_JFCB	2013/273 OCE_DEF
Original expiration date	2013/363		2013/363	
LASTREF extra days	**10**	**10**	0	0
VRS selected	no	no	no	no

12.4.5 MCATTR(ALL) and RETENTIONMETHOD(EXPDT)

Table 12-3 on page 229 shows you the result of the allocation of the data sets in Figure 12-8 on page 227 if you specified MCATTR(ALL), SMSACS(NO), and RETENTIONMETHOD(VRSEL) in your EDGRMMnn parmlib member.

Table 12-7 Retention method VRSEL and MCATTR VRSELXDI

Data set allocation	1	2	3	4
Retention Method	EXPDT	EXPDT	EXPDT	EXPDT
MCATTR	ALL	ALL	ALL	ALL
SMSACS	NO	NO	NO	NO
JCL EXPDT/RETPD	90	default	90	default
SMS-managed Volume	yes	yes	no	no
Volume information	THS025	THS027	VT0066	VT0067
Assign date	2013/273	2013/273	2013/273	2013/273
Expiration date Set by	2013/363 OCE_JFCB	**2013/293** **OCE_MC**	2013/363 OCE_JFCB	2013/273 OCE_DEF
Original expiration date	2013/363		2013/363	
Retention Method Set by	EXPDT LCS_DEF	EXPDT LCS_DEF	VRSEL OCE_DEF	VRSEL OCE_DEF
EXPDT Retain by				
Retention date after VRS				
Data set information				
Creation date	2013/273	2013/273	2013/273	2013/273
Expiration Date Set by	2013/363 OCE_JFCB	**2013/293** OCE_DEF	2013/363 OCE_JFCB	2013/273 OCE_DEF
Original expiration date	2013/363		2013/363	
LASTREF extra days	**10**	**10**	0	0
VRS selected	no	no	no	no

12.4.6 MCATTR(NONE) and RETENTIONMETHOD(EXPDT)

Table 12-3 on page 229 shows you the result of the allocation of the data sets in Figure 12-8 on page 227 if you specified MCATTR(NON), SMSACS(NO), and RETENTIONMETHOD(VRSEL) in your EDGRMMnn parmlib member.

Table 12-8 Retention method VRSEL and MCATTR VRSELXDI

Data set allocation	1	2	3	4
Retention Method	EXPDT	EXPDT	EXPDT	EXPDT
MCATTR	ALL	ALL	ALL	ALL
SMSACS	NO	NO	NO	NO

Data set allocation	1	2	3	4
JCL EXPDT/RETPD	90	default	90	default
SMS-managed Volume	yes	yes	no	no
Volume information	THS010	THS012	VT0068	VT0069
Assign date	2013/273	2013/273	2013/273	2013/273
Expiration date Set by	2013/363 OCE_JFCB	2013/273 OCE_DEF	2013/363 OCE_JFCB	2013/273 OCE_DEF
Original expiration date	2013/363		2013/363	
Retention Method Set by	EXPDT LCS_DEF	EXPDT LCS_DEF	VRSEL OCE_DEF	VRSEL OCE_DEF
EXPDT Retain by	**VOLUME**	**VOLUME**		
Retention date after VRS				
Data set information				
Creation date	2013/273	2013/273	2013/273	2013/273
Expiration Date Set by	2013/363 OCE_JFCB	2013/273 OCE_DEF	2013/363 OCE_JFCB	2013/273 OCE_DEF
Original expiration date	2013/363		2013/363	
LASTREF extra days	0	0	0	0
VRS selected	no	no	no	no

12.4.7 MCATTR(ALL) with RETENTIONMETHOD(EXPDT) and SMSACS(YES)

Table 12-3 on page 229 shows you the result of the allocation of the data sets in Figure 12-8 on page 227 if you specified MCATTR(ALL), SMSACS(YES), and RETENTIONMETHOD(VRSEL) in your EDGRMMnn parmlib member. In this case, the non-SMS managed tape volumes will get the SMS management class retention attributes as well.

Table 12-9 Retention method VRSEL and MCATTR VRSELXDI

Data set allocation	3	4
Retention Method	EXPDT	EXPDT
MCATTR	ALL	ALL
SMSACS	NO	NO
JCL EXPDT/RETPD	90	default
SMS-managed volume	no	no
Volume information	VT0072	VT0073
Assign date	2013/274	2013/274
Expiration date Set by	2013/364 OCE_JFCB	**2013/294** **OCE_MC**
Original expiration date	2013/364	

Data set allocation	3	4
Retention Method Set by	EXPDT OCE_DEF	EXPDT OCE_DEF
EXPDT Retain by	**VOLUME**	**VOLUME**
Retention date after VRS		
Data set information		
Creation date	2013/274	2013/274
Expiration Date Set by	2013/364 OCE_JFCB	**2013/364** **OCE_MC**
Original expiration date	2013/363	
LASTREF extra days	**10**	**10**
VRS selected	no	no

12.5 DFSMSrmm conversion support

Historically, DFSMSrmm provides conversion programs to simplify conversion from ISV tape management programs to DFSMSrmm. Beginning with z/OS V2.1, the DFSMSrmm conversion samples and documentation have been moved from SYS1.SAMPLIB to the “as-is z/OS downloads” web page as a compressed sequential XMIT file of a PDS. It can be found at the following site:

http://www-03.ibm.com/systems/z/os/zos/tools/downloads/index.html#asis

Figure 12-10 on page 235 shows you the z/OS DFSMSrmm conversion part of the “as-is z/OS downloads”.

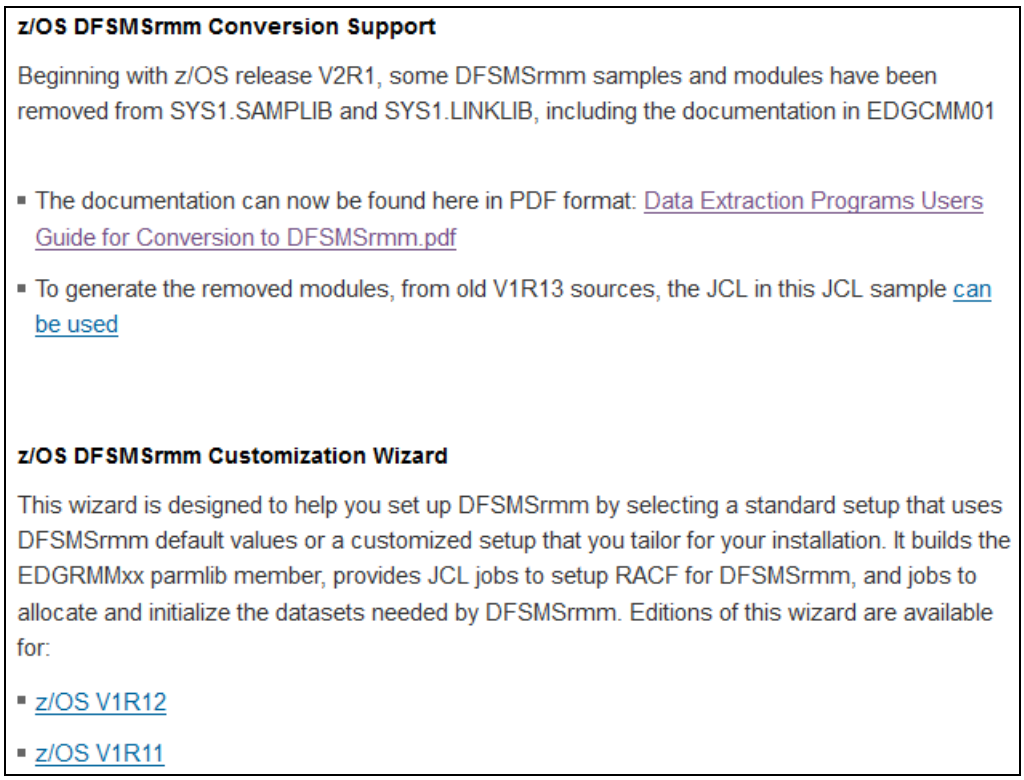

Figure 12-10 DFSMSrmm conversion samples

12.5.1 Conversion samples provided

In this section, we list the z/OS DFSMSrmm conversion samples that are still shipped with the product. Currently, the provided samples support conversions to DFSMSrmm from CA-1, TLMS, Control-M/Tape up to release 7.0, ZARA/Automedia up to release 1.7, TAPE2000 and ICF user catalogs.

Load module samples

The load module samples shipped with the product are listed here:

EDGCDYNM	Source for TLMS extract program
EDGCSVDS	Source for CA-1 extract program
EDGC5BIN	Source for CA-1 5.0 and above extract program
EDGC5LDR	Source for CA-1 5.0 and above extract program
EDGCRFMT	Source for CA-1 5.0 and above extract program
EDGCSRDS	Source for CA-1 extract program
EDGCVRSX	Sample EDGUX100 exit
EDGCVRSG	Macro used for EDGCVRSX/F
EDGCVRSF	Part of sample EDGUX100 table
EDGCVRSE	Part of sample EDGUX100 table
EDGCVRSL	Sample to load EDGUX100 table
EDGC1PRM	Parameters extract program from TMS parmlib
EDGC5UJL	Convert data sets using unique Julian date
EDGCSPCC	CA-1 special character conversion
EDGC1PPL	Maps the TMS parameter area

REXX exec samples

The REXX exec samples shipped with the product and a brief description are listed here:

EDGRACS	For TMS to create MC ACS statements
EDGRCSCR	For TMS 5.0 and above pool conversion
EDGCVTC0	To create LISTCAT commands by using the LISTCAT UCAT command
EDGCVTC4	To create ADDRACK, ADDVOLUME, and CHANGEVOLUME commands to build an RMM CDS from the ICF-CATALOG input
EDGCVTC5	To create additional ADDVOLUME and CHANGEVOLUME commands
EDGCVTC6	To create CHANGEVOLUME commands to build the volume chains
EDGRT2EX	For TAPE2000 extract exec
EDGRCTT1	To create the extended Control-M/Tape record
EDGRCTT2	For Control-M/Tape media database (MDB) extract
EDGRCTT3	For Control-M/Tape Rules extract
EDGRCZA1	To modify the unloaded ZARA/AutoMedia records for future processing
EDGRCZA2	To create L-, D-, K-, and O-Records for the EDGCNVT conversion program
EDGRCZA3	To create K-Records out of a ZARA/Automedia expiration report
EDGCLMS	Sample conversion CLIST

JCL samples

The JCL samples shipped with the product are listed here:

EDGJYPRE	To compile and link EDGCDYNM
EDGJDYNM	To execute EDGCDYNM
EDGJ5PRE	To compile and link the provided load module samples
EDGJSRDS	To execute EDGCSRDS and EDGRACS
EDGJ5BIN	To execute EDGC5BIN
EDGJ5LDR	To execute EDGC5LDR and reformat the RDS and VPDD
EDGJCSCR	To execute exec EDGRCSCR
EDGJVTC1	To convert from manual management part 1
EDGJVTC2	To convert from manual management part 2
EDGJVTC3	To convert from manual management part 3
EDGJT2EX	To execute EDGRT2EX TAPE2000 conversion exec
EDGJCTT1	To execute EDGRCTT1 CONTROL-M/Tape conversion exec
EDGJCTT2	To execute EDGRCTT2 CONTROL-M/Tape conversion exec
EDGJCTT3	To execute EDGRCTT3 CONTROL-M/Tape conversion exec
EDGJCZA1	To execute EDGRCZA1 ASG-ZARA/AutoMedia conversion exec
EDGJCZA2	To execute EDGRCZA2 ASG-ZARA/AutoMedia conversion exec
EDGJCZA3	To execute EDGRCZA3 ASG-ZARA/AutoMedia conversion exec
EDGJSVDS	To execute EDGCSVDS and reformat the RDS and VPDD
EDGCVRSP	Procedure to run EDGCVRSL

A

APARs to be reviewed for DFSMS V2.1

The APARs listed in this appendix should be reviewed for impact to your installation before implementing z/OS V2.1 DFSMS.

Where APAR text is shown, it is at time of writing of this IBM Redbooks publication. The current version should be checked for updates. When an APAR has had a PTF shipped, and a problem is then found, the PTF will be marked “PE”, and also the original APAR may be updated to show the fixing APAR numbers.

There are two APAR lists in this IBM Redbooks publication. One for fixes that should be applied to DFSMS V2.1 before it is used, and one that should be applied to DFSMS V1.13 or DFSMS V1.12 before DFSMS V2.1 is used.

The lists that follow do not include every APAR that might be required, but is representative. If the PTFs for the listed APARs are applied, many other APARs will also be included.

The information in this Appendix is for DFSMS V2.1. The corresponding list for DFSMS V1.13 and V1.12 can be found at Appendix B, “APARs to be reviewed for DFSMS V1.13 or DFSMS V1.12” on page 303.

DFSMS V2.1 suggested APARS

The APARs in this appendix are divided into two sections. There are informational APARs and then APARs that correct errors.

Information APARS

There are a number of Information APARS that provide additional information, or provide links to other Information APARS.

APAR II14670 LISTCAT LEVEL change in DFSMS V2.1

Example A-1 contains the cover letter for APAR II14670.

Example A-1 II14670

```
APAR Identifier ...... II14670      Last Changed ........ 13/09/27
  LISTCAT LEVEL CHANGE IN 2.1


  Symptom ...... IN INFO              Status ........... INTRAN
  Severity ................... 3     Date Closed .........
  Component .......... INFOV2LIB     Duplicate of ........
  Reported Release ......... 001     Fixed Release ............
  Component Name V2 LIB INFO ITE     Special Notice
  Current Target Date ..             Flags
  SCP ...................
  Platform ............

  Status Detail: Not Available

  PE PTF List:

  PTF List:


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  The LISTCAT LEVEL function has been corrected in release 2.1 to
  report on entries matching the level specified where in prior
  releases a LISTCAT LEVEL may return a non-zero return code if no
  entries matching the level with additonal qualifiers were found.

  For example:


  DEFINE GDG MY.GDG.BASE
  (no GDSs defined)

  @ 1.13
```

```
LISTCAT LVL(MY.GDG.BASE)

IDC3012I ENTRY MY.GDG.BASE NOT FOUND
IDC3007I ** VSAM CATALOG RETURN-CODE IS 8
IDC1566I ** MY.GDG.BASE NOT LISTED

IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 4

@ 2.1
LISTCAT LVL(MY.GDG.BASE)

GDG BASE ------ MY.GDG.BASE
     IN-CAT --- MY.USER.CAT

                            LISTING FROM CATALOG --

         THE NUMBER OF ENTRIES PROCESSED WAS:
                   AIX -------------------0
                   ALIAS -----------------0
                   CLUSTER ---------------0
                   DATA ------------------0
                   GDG -------------------1

IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

In 2.1, the behavior of LISTCAT LEVEL has been updated to mimic
that expected of ISPF 3.4 which returns entries matching the key
of the level specified as well as any keys with additional
qualifiers.

II14250 explains past enhancements to the LISTCAT LEVEL command

CATKEYS: CAT2013 IDC2013 IDCLISTC IDCNEW IDCOUTPUT CATINFO
IDCINFO


LOCAL FIX:
Use the IDCNOGFL interface or change the LISTCAT LEVEL(A.B.C) to
a LISTCAT ENT(A.B.C.*) for comparable results to 1.13 and below.
```

APAR II14708 PDSE maintenance for DFSMS V2.1

Example A-2 contains the cover letter for APAR II14708.

Example A-2 II14708

```
APAR Identifier ...... II14708      Last Changed ........ 13/05/30
  ZOS DFSMS 2.1 HDZ2210 CURRENT PDSE MAINTENANCE


  Symptom ...... DD DOC               Status ............ INTRAN
  Severity ................... 3      Date Closed .........
  Component .......... INFOV2LIB      Duplicate of ........
  Reported Release ......... 001      Fixed Release .............
  Component Name V2 LIB INFO ITE      Special Notice
```

```
Current Target Date ..              Flags
SCP ...................
Platform ............

Status Detail: Not Available

PE PTF List:

PTF List:


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
This informational APAR contains a current list of DFSMS HDZ2210
apars/ptfs for PDSE which includes both HIPER and non-HIPER
maintenance.

         Compid: 5695DF115  Fmid: HDZ2210

DFSMS HDZ2210 will be found on z/OS 2.1 systems.

We encourage you to install all current maintenance and refer
frequently to PSP upgrade ZOSV2R1 subset DFSMS for HIPER
maintenance.
.
Reference II14255 for current PTFs for HDZ1180.
Reference II14403 for current PTFs for HDZ1190.
Reference II14459 for current PTFs for HDZ1A10.
Reference II14519 for current PTFs for HDZ1B10.
Reference II14580 for current PTFs for HDZ1C10.
Reference II14632 for current PTFs for HDZ1D10

*****************************************************************
* PTFs for DFSMS HDZ2210 ( R210 )                               *
*****************************************************************


LOCAL FIX:
none
```

Fix APARs

There are fixes required for pre-DFSMS V2.1 systems. Some of these are conditioning fixes that must be installed and in use on all systems in a SYSPLEX *before* any DFSMS V2.1 system is added to the SYSPLEX. See Appendix B, “APARs to be reviewed for DFSMS V1.13 or DFSMS V1.12” on page 303.

Note: In some cases, there are no PTFs for the listed APARs, and some might have been superseded. The current listing from IBMLINK should be checked for current status and PTFs.

APAR OA42081 NFS applicable to DFSMS V1.13

Example A-3 contains the cover letter for APAR OA42081.

Example A-3 OA42081

```
APAR Identifier ...... OA42081      Last Changed ........ 13/07/02
  REGR TESTS FOR #176 D1N IN SAF MODE WITH CHECKLIST'  /HFS/
  <NOSAF> SETTING FAILED:

  Symptom ...... IN INCORROUT         Status ........... CLOSED  PER
  Severity ..................... 3     Date Closed ......... 13/06/07
  Component ..... 5695DF121           Duplicate of ........
  Reported Release ......... 21N      Fixed Release ............. 999
  Component Name NETWORK FILE SY      Special Notice
  Current Target Date ..13/06/28      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release C1N   : UA69454 available 13/06/26 (F306 )
  Release D1N   : UA69455 available 13/06/26 (F306 )
  Release 21N   : UA69456 available 13/06/26 (F306 )


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
   Regr tests for #176 D1N in SAF mode with checklist'  /hfs/
  <nosaf> setting failed:


  LOCAL FIX:


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: All NFSS users.                              *
  ****************************************************************
  * PROBLEM DESCRIPTION: The function v4_access(  returns        *
  *                      invalid result in SAFEXP mode with the  *
  *                      export entry  /hfs/ <nosaf>.            *
  ****************************************************************
  * RECOMMENDATION:                                              *
  ****************************************************************
  The local variable mode in h4_access(  is not initialized if SAF
  mode and bypassaf flag in MB is set.
```

```
PROBLEM CONCLUSION:
Add MB->bypassaf check in h4_access( .


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:
GFSA4UMC


SRLS:
NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42239 PDSE DFSMS V2.1 roll up

Example A-4 contains the cover letter for APAR OA42239.

Example A-4 OA42239

```
APAR Identifier ...... OA42239      Last Changed ........ 13/07/02
  SMS V2R1 ROLLUP APAR


  Symptom ...... IN INCORROUT         Status ........... CLOSED  PER
  Severity ................... 4      Date Closed ......... 13/05/24
  Component .......... 5695DF101      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............ 999
  Component Name STORAGE MGMT SU      Special Notice
  Current Target Date ..              Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release 210   : UA69253 available 13/06/22 (F306 )
```

```
Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
SMS V2R1 ROLLUP APAR FIXES


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: HDZ2210 USERS WHO UPGRADE THEIR SYSTEMS TO   *
*                 DFSMS HDZ2210 DRIVER                         *
****************************************************************
* PROBLEM DESCRIPTION: THIS IS THE SMS V2R1 ROLLUP APAR. THIS  *
*                      APAR CONTAINS THE z/OS V2R1 FIXES FOR:  *
*                      ------------------------------------    *
*                      ENHANCEMENT: ADD A NEW MESSAGE VARIANT  *
*                               FOR IGDO68I TO BE ISSUED WHEN  *
*                               AN OPERATOR ATTEMPTS TO        *
*                               ACTIVATE A COMMUNICATION DATA  *
*                               SET OR AN ACTIVE CONFIGURATION *
*                               DATA SET BY SPECIFYING IT IN   *
*                               THE IGDSMSxx PARMLIB MEMBER TO *
*                               ENHANCE USABILITY AND          *
*                               SERVICEABILITY.                *
*                      ENHANCEMENT: ADD CODES TO DISREGARD THE *
*                               NEW IGDSMSxx PARMLIB PARAMETER *
*                               HONOR_DSNTYPE_PDSE WHEN THERE  *
*                               IS NO DSNTYPE SPECIFIED ON     *
*                               EITHER JCL OR DATA CLASS.      *
*                      OA42065: SMS ALLOWS COPY POOL BACKUP    *
*                               STORAGE GROUP NAME TO START    *
*                               WITH A NON-ALPHABETIC          *
*                               CHARACTER.                     *
*                      OA42227: ABENDOBO RC08 ATTEMPTING TO    *
*                               EXTEND A DATA SET TO A NEW     *
*                               VOLUME. JFCBX TOKEN IS ZEROES. *
*                      OA41461: OVERALLOCATION OF PS EXTENDED  *
*                               FORMAT DATASET WHEN ALLOCATING *
*                               IN BLOCKS AND USING DSS AND/OR *
*                               HSM RESTORE/RECALL.            *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
SUMMARY: THIS IS A SMS V2R1 ROLLUP APAR FOR OA42065, OA42227,
OA41461. PLEASE SEE THE SUMMARIES FOR THOSE APARS.


PROBLEM CONCLUSION:
THIS IS THE SMS V2R1 ROLLUP APAR FOR OA42065, OA42227, OA41461.
PLEASE SEE PROBLEM CONCLUSIONS FOR THOSE APARS.
```

```
THE NEW MESSAGE VARIANT FOR IGD068I SHOULD BE AS FOLLOWING:

IGD068I cds_type dsname SPECIFIED IS THE SAME AS THE ACTIVE
        cds_type - ACTIVE cds_type IS STILL IN EFFECT

Explanation: An operator attempts to activate the active control
data set or a communication data set by specifying it in the
IGDSMSxx PARMLIB member, but that is the same as the currently
active one.

In the message text:

cds_type
    The configuration data set types:
    ACDS   - Active Configuration Data Set
    COMMDS - Communication Data Set
dsname
    The data set name

System action: Validation processing rejected the SMS request.
The currently active configuration data sets are still in effect
. The other PARMLIB parameters specified are still processed.

Operator response: Contact the system programmer.

System programmer response: No further action if there is no
need to change the system configuration. Otherwise, specify a
different configuration data set.

Source: Storage Management Subsystem (SMS)


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   IGDCSDTV IGDICMGC IGDMCSMT IGDOPCDM IGDVTSCM
IGDVTSCR IGDVTSC1 IGDVTSDP


SRLS:      SA38067500


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42283 PDSE

Example A-5 contains the cover letter for APAR OA42283.

Example A-5 OA42283

```
APAR Identifier ...... OA42675      Last Changed ........ 13/09/26
  ABENDOC4 PIC38 IGWIRRDB+0CB0 @ HDZ2210


  Symptom ...... AB ABENDOC4          Status ........... CLOSED  PER
  Severity ..................... 3     Date Closed ......... 13/07/03
  Component ..... 5695DF115           Duplicate of ........
  Reported Release ......... 210      Fixed Release ............ 999
  Component Name EXTENDED DATA S      Special Notice           HIPER
  Current Target Date ..13/08/15      Flags
  SCP ...................
  Platform ............                                  DATALOSS

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release 210   : UA69767 available 13/07/11 (F307 )


  Parent APAR:    OA42051
  Child APAR list:


  ERROR DESCRIPTION:
  ABENDOF4 PIC39 CSECT=IGWIRRDB+0CB0 @ HDZ2210 base
  ABENDOC1 IGWIRPAD+0B4E @ HDZ2210 base
  ABENDOC1 IGWIRPAD+17D4 @ HDZ2210 base
  ABENDOC1 IGWIRPND+1848 @ HDZ2210 base
  ABENDOF4 IGWIRPAD RSN1419A084 1419A084


  LOCAL FIX:
  None


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: PDSE which has been updated extensively on   *
  *                 a release lower than 2.1 may                 *
  *                 have a sparce index.  When 2.1 updates the   *
  *                 the index may be broken,                     *
  ****************************************************************
  * PROBLEM DESCRIPTION: See users affected.                     *
  ****************************************************************
  * RECOMMENDATION:                                              *
  ****************************************************************
  Modify PDSE processing to position to the correct place in the
```

```
index before attempting to remove empty pages,

PROBLEM CONCLUSION:
See Problem Summary

TEMPORARY FIX:
* HIPER *
*********

COMMENTS:

MODULES/MACROS:   IGWIRCMT IGWIRDIS IGWIRICR IGWIRIEM IGWISTAM

SRLS:      NONE

RTN CODES:

CIRCUMVENTION:

MESSAGE TO SUBMITTER:
```

APAR OA42300 PDSE

Example A-6 contains the cover letter for APAR OA42300.

Example A-6 OA42300

```
APAR Identifier ...... OA42300      Last Changed ........ 13/07/02
  PERFORMANCE DEGRADATION IN RLS


  Symptom ...... PF PERFM             Status ............ CLOSED  PER
  Severity ................... 3      Date Closed ......... 13/05/30
  Component .......... 5695DF122      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............. 999
  Component Name VSAM REC LEV SH      Special Notice           HIPER
  Current Target Date ..13/08/01      Flags
  SCP ...................                                 PERFORMANCE
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release 210   : UA69307 available 13/06/04 (F306 )
```

```
Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
A degradation of RLS performance is detected when
processing clusters opened in rls, record-level sharing.


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: ALL VSAM RECORD-LEVEL SHARING, RLS USERS     *
*                 WITH RELEASE HDZ2210.                        *
****************************************************************
* PROBLEM DESCRIPTION: PERFORMANCE DEGRADATION WHEN PROCESSING *
*                      RLS REQUESTS INCLUDING GET, PUT, ERASE. *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
PERFORMANCE DEGRADATION DURING RLS REQUEST PROCESSING.


PROBLEM CONCLUSION:
RLS REQUEST PERFORMANCE IS CORRECTED.
 KEYWORDS: RLSPSP/K


TEMPORARY FIX:
*********
* HIPER *
*********


COMMENTS:


MODULES/MACROS:
IDAVRR10 IDAV193S IGWLJO20 IGWMRTE3 IGWSDRDM IGWSDRDS IGWSDSVT
IGWSDWRM IGWSDWRS IGWSRDPD IGWSSCAN IGWSSCN2 IGWSSDCN IGWSSNOM
IGWSSSCS IGW8RBID IGW8RCID IGW8RRES


SRLS:
NONE


RTN CODES:


CIRCUMVENTION:
```

```
  MESSAGE TO SUBMITTER:
```

APAR OA42347 DFSMShsm

Example A-7 contains the cover letter for APAR OA42347.

Example A-7 OA42347

```
APAR Identifier ...... OA42347      Last Changed ........ 13/08/02
  DFSMSHSM MIGRATES BEYOND STORAGE GROUP MIGRATION LOW THRESHOLD
  DURING SPACE MANAGEMENT.

  Symptom ...... IN INCORROUT         Status ........... CLOSED  PER
  Severity ..................... 4     Date Closed ......... 13/06/25
  Component .......... 5695DF17O      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............. 999
  Component Name DFSMSHSM, ISMF       Special Notice       ATTENTION
  Current Target Date ..13/08/16      Flags
  SCP ...................
  Platform ............               PERVASIVE


  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release 210   : UA69550 available 13/07/10 (F307 )


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  DFSMShsm migrates beyond storage group MIGR LOW threshold during
  space management.


  LOCAL FIX:
  N/A


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: All users of DFSMShsm Space Management       *
  *                 functions on z/OS V2R1.                      *
  ****************************************************************
  * PROBLEM DESCRIPTION: DFSMShsm migrates beyond storage group  *
  *                      migration low threshold during Space    *
  *                      Management.                             *
  ****************************************************************
```

```
* RECOMMENDATION:                                                *
****************************************************************
DFSMShsm migrates beyond storage group migration low threshold
during Space Management.


PROBLEM CONCLUSION:
DFSMShsm has been modified to correct this problem.


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   ARCSMPMQ


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42358 PDSE

Example A-8 is the controlling APAR for the PDSE member generations update. There are many other APARs that constitute the whole collection.

Example A-8 OA42358

```
This is the APAR for SPE Line Item PDSE Member generations

Local fix

Problem summary


  ****************************************************************

  * USERS AFFECTED: All PDSE users in z/OS V2R1            *

  ****************************************************************

    * PROBLEM DESCRIPTION: PDSE is being enhanced to allow a user  *
    *                       to save a fixed number of previous      *
    *                       generations of each member, the number  *
    *                       of generations for each member is       *
    *                       specified when the data set is created. *
    *                       A new generation of each member will be *
```

```
  *                    saved whenever a member is replaced or  *
  *                    deleted, PDF will provide services to   *
  *                    view saved generations of members.      *
  *                                                            *
  *                    This feature will work only on PDSE     *
  *                    Version 2 datasets.                     *
  *                                                            *
  *                    Toleration APAR for this project is     *
  *                    OA43433 (Install the PTFs for this APAR *
  *                    in R12 and R13 to avoid abnormal errors *
  *                    when using a PDSE (V2 and MAXGENS > 0)) *
  *                    in the lower releases.                  *
  *                                                            *
  *                    PDF is enhanced to access generations   *
  *                    and identify data sets which have       *
  *                    generations. (OA42247 and OA42248)      *
  *                                                            *
  *                    New functions                           *
  *                    DESERV FUNC=GET_G                       *
  *                    DESERV FUNC=GET_ALL_G                   *
  *                                                            *
  *                    New PARMS for FIND Macro:               *
  *                    G - Find a member generation            *

*                              *

  *                    New PARMS for STOW Macro:               *
  *                    DG - delete a member generation         *
  *                    RG - replace an old member generation.  *
  *                    RECOVERG - Recover a member generation. *
  *                                                            *
  *                    For further details please read the     *
  *                    latest refresh of the manuals to know   *
  *                    more about this new function.           *
  *                                                            *
  ************************************************************
  * RECOMMENDATION:                                          *
  ************************************************************
  Provide new functions for PDSEs (See Description)
```

APAR OA42390 PDSE

Example A-9 contains the cover letter for APAR OA42390.

Example A-9 OA42390

```
APAR Identifier ...... OA42390      Last Changed ........ 13/07/02
  PDF REPORTS NO MEMBERS FOR NON-EMPTY PDSE ON HDZ2210


  Symptom ...... IN INCORROUT         Status ........... CLOSED  PER
  Severity ................... 2      Date Closed ......... 13/06/11
  Component .......... 5695DF115      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............ 999
  Component Name EXTENDED DATA S      Special Notice           HIPER
```

```
Current Target Date ..13/06/30      Flags
SCP ...................
Platform ............                                DATALOSS

Status Detail: SHIPMENT - Packaged solution is available for
                          shipment.

PE PTF List:

PTF List:
Release 210   : UA69489 available 13/06/26 (F306 )


Parent APAR:
Child APAR list: OA42573


ERROR DESCRIPTION:
Existing PDSE appears to have no members.  Read of directory for
 PDSE will return no member data for certain data sets.


LOCAL FIX:
You may be able to bypass this by adding a member to the PDSE wi
th a very low key '#       ' for example.
The problem is related to an empty directory block and can be re
solved by adding a record to that block.


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: Users access PDSEs updated on systems below  *
*                 the HDZ2210 level may find the PDSE seems to *
*                 be empty on HDZ2210. The problem is most     *
*                 likely on PDSEs where the members with the   *
*                 first member names are deleted.              *
****************************************************************
* PROBLEM DESCRIPTION: See Users affected.                     *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
Add code to the PDSE Index manager to tolerate empty Directory
Blocks.


PROBLEM CONCLUSION:
See Problem Summary.


TEMPORARY FIX:
  HIPER   AA42390

ADD MEMBER WITH VERY LOW KEY '#       ' TO THE PDSE
```

```
COMMENTS:


MODULES/MACROS:
IGWDABDN IGWDACN2 IGWDADCD IGWDADPD IGWDARD1 IGWDDCR3 IGWDDDSF
IGWDLALR IGWDLCLS IGWDLDES IGWDPDMP IGWDRLDR


SRLS:
NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42406 OCE Fix roll up

Example A-10 contains the cover letter for APAR OA42406.

Example A-10 OA42406

```
APAR Identifier ...... OA42406      Last Changed ........ 13/08/02
  OCE FIX ROLLUP FOR HDZ2210


  Symptom ...... IN INCORROUT         Status ........... CLOSED  PER
  Severity ................... 3      Date Closed ......... 13/06/25
  Component .......... 5695DF107      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............. 999
  Component Name DATA MGMT SUPPO      Special Notice
  Current Target Date ..13/08/30      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release 210   : UA69690 available 13/07/30 (F307 )


  Parent APAR:
  Child APAR list:
```

```
ERROR DESCRIPTION:
Fixes PCK in IFGO19TR. Also adds ALIAS name in SMF14/15. Also
fixes an invalid IEC19OI EXCP DCB without a foundation
extension..


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: This is a rollup APAR for HDZ221O.           *
****************************************************************
* PROBLEM DESCRIPTION: This APAR fixes 3 problems and          *
*                      adds 1 additional function.             *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
3 problems fixed:
1. Extraneous characters in IEC999I DEBADDR= message.
2. PCK in IFGO19TR.
3. IEC19OI invalid DCBE: EXCP DCB without foundation ext
   is invalidly issued.
Additional function:
1. Alias data set name added to SMF14 Additional Data Set
characteristics section (type 5).


PROBLEM CONCLUSION:
See problem summary.
SMF14 Additional data set characteristics section (type 5):

New bit in SMF14: Byte SMF14BFGO:
SMF14ALS  EQU  X'1O'     ALIAS NAME PRESENT

New Alias name 44 character field:
SMF14ALI                 ALIAS DATA SET NAME


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   IFGSMF14 IFGOTCOA IFGO19RA IFGO19TR IFGO2O2H
IFGO2O2I


SRLS:      SA22763025


RTN CODES:
```

```
  CIRCUMVENTION:

  MESSAGE TO SUBMITTER:
```

APAR OA42488 IEBCOPY user exit

Example A-11 contains the cover letter for APAR OA42488.

Example A-11 OA42488

```
APAR Identifier ...... OA42488      Last Changed ........ 13/07/02
  IEB1169T USING IEBCPARM AND IEBCPLST


  Symptom ...... MS MSGIEB1169T       Status ........... CLOSED  PER
  Severity ................... 3      Date Closed ......... 13/06/12
  Component .......... 5695DF102      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............ 999
  Component Name BASE ACCESS MET      Special Notice
  Current Target Date ..13/07/31      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release 210   : UA69515 available 13/06/26 (F306 )


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  IEBCPARM and IEBCPLST are not presenently included SYS1.MACLIB


  LOCAL FIX:
  n/a


  PROBLEM SUMMARY:
  ************************************************************
  * USERS AFFECTED: Users wishing to use the IEBCOPY user exits *
  *                 shipped in HDZ2210.                        *
  ************************************************************
  * PROBLEM DESCRIPTION: The required macros were not shipped.  *
  *                      They should have been in SYS1.MACLIB.  *
  ************************************************************
  * RECOMMENDATION:                                            *
```

```
************************************************************
The required macros were not shipped.


PROBLEM CONCLUSION:
The macros are shipped.

The description of the new IEBCOPY user exits is incomplete.

These IEBCPLST fields are expected to be updated by the user
exit:
CPLST_PARMLIST_RC
CPLST_PARMLIST_USR
CPLST_PARMLIST_MAXRETC
CPLST_PARMLIST_MAXRSNC
CPLST_CONTROL_OFLAGS
CPLST_CONTROL_DATA_ADDR
CPLST_CONTROL_DATA_LEN
CPLST_MEMBER_OFLAGS
CPLST_MEMBER_RC
CPLST_MEMBER_NEWNAME_ADDR

If the control statement user exit gives a return code 4, it
signals IEBCOPY to process all currently pending control
statements. Otherwise, IEBCOPY will automatically execute the
"in progress step" whenever it receives (from the exit  a new
"IEBCOPY command" (such as COPY, COPYGRP, etc.  control
statement.
A control statement user exit may choose to never use return
code 4 and completely depend on the standard IEBCOPY
processing rules, but it must always return an RC=32 to
signal an "End of control statement input data".


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:
IEBCPARM IEBCPLST


SRLS:
NONE


RTN CODES:


CIRCUMVENTION:
```

```
MESSAGE TO SUBMITTER:
```

APAR OA42540 PDSE binder

Example A-12 contains the cover letter for APAR OA42540.

Example A-12 OA42540

```
APAR Identifier ...... OA42540      Last Changed ........ 13/08/02
  ABENDOF4 RC24 RSN141AA7FE IGWIRPND+ODE2 @ OA42051


  Symptom ...... AB ABENDxxx          Status ............ CLOSED  PER
  Severity ................... 3      Date Closed ......... 13/06/27
  Component .......... 5695DF115      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............ 999
  Component Name EXTENDED DATA S      Special Notice           HIPER
  Current Target Date ..13/09/15      Flags
  SCP ...................
  Platform ............                                DATALOSS

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release 210   : UA69724 available 13/07/11 (F307 )


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  HSM back up of a PDSE data set on z/OS 2.1 LPAR failed with
  ABENDOF4 RC24 RSN141AA7FE IGWIRPND+ODE2 @ OA42051.

  RSN141AA7FE equates IMF_DirStorePageBad1 indicating that the
  front and rear compression data for LONG_NAME_PROCESS_RECORD is
  not what is expected.


  LOCAL FIX:
  None


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: PDSE binder users.                           *
  ****************************************************************
  * PROBLEM DESCRIPTION: AbendOF4 when accessing PDSEs contain   *
  *                      long alias names.                       *
  ****************************************************************
  * RECOMMENDATION:                                             *
```

```
********************************************************************
Long alias names that were not compressed were being
uncompressed unnecessarily.


PROBLEM CONCLUSION:
The index manager has been updated to handle non compressed
records correctly.


TEMPORARY FIX:
*********
* HIPER *
*********
INSTALL ++APAR AA42540.


COMMENTS:


MODULES/MACROS:   IGWDAALN IGWDABDN IGWDACRN IGWDDCR2 IGWDDCR3
IGWIRCMT IGWIRPAD IGWIRPND


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42541 Catalog

Example A-13 contains the cover letter for APAR OA42541.

Example A-13 OA42541

```
APAR Identifier ...... OA42541      Last Changed ........ 13/10/02
  ABEND S130 IN IDA02OOT AFTER INSTALLING PTFS FOR OA36916


  Symptom ...... IN INCORROUT         Status ........... CLOSED  PER
  Severity ................... 2      Date Closed ......... 13/08/02
  Component .......... 5695DF106      Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name DFSMS VSAM           Special Notice    PE
  Current Target Date ..13/08/31      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
```

```
                          shipment.

PE PTF List:    UA68644 UA68643

PTF List:
Release A10   : PTF not available yet
Release B10   : PTF not available yet
Release C10   : UA70130 available 13/08/28 (F308 )
Release D10   : UA70131 available 13/08/28 (F308 )
Release 210   : UA70146 available 13/08/28 (F308 )


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
An abend S130 may occur in IDA02O0T at offset X'360O' aftre
installing the PTFs for OA36916. The error is a dequeue for a
resource that is not held.
The dequeue will show a request to dequeue SYSVSAM with a
catalog name as the resource and ending in a "N".


LOCAL FIX:
Remove the PTFs for OA36916
PEX/ UA68641
PEX/ UA68642


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All z/OS 1.10 VSAM users and above who       *
*                 OPEN and CLOSE a catalog as a normal         *
*                 VSAM Data Set.                               *
****************************************************************
* PROBLEM DESCRIPTION: While closing a user catalog that has   *
*                      been opened with multiple ACBs, an      *
*                      ABEND S130 will result.                 *
****************************************************************
* RECOMMENDATION: Apply PTF.                                   *
****************************************************************
VSAM CLOSE processing was not correctly verifing
the last close for a user catalog.


PROBLEM CONCLUSION:
VSAM CLOSE processing was modified to correctly
determine the last close for a user catalog.
KEYWORDS: ZOS0201C/K


TEMPORARY FIX:
```

```
COMMENTS:

MODULES/MACROS:   IDA0200T

SRLS:      NONE

RTN CODES:

CIRCUMVENTION:

MESSAGE TO SUBMITTER:
```

APAR OA42543 XTIOT Health Checker

Example A-14 contains the cover letter for APAR OA42543.

Example A-14 OA42543

```
APAR Identifier ...... OA42543      Last Changed ........ 13/08/02
  MSGIECH0101E IECH0101E HEALTH CHECKER
  MSGIECH0100I IECH0100I

  Symptom ...... MS IECH0101E         Status ........... CLOSED  PER
  Severity ..................... 2     Date Closed ......... 13/07/02
  Component .......... 5695DF107      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............. 999
  Component Name DATA MGMT SUPPO      Special Notice       ATTENTION
  Current Target Date ..13/08/30      Flags
  SCP ...................
  Platform ............               PERVASIVE


  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release 210   : UA69765 available 13/07/31 (F307 )


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  When the system is dynamically updated via the MVS command
  SET DEVSUP=xx, the following message is issued even though
  NON_VSAM_XTIOT=YES is specified in SYS1.PARMLIB(DEVSUPxx):
```

```
IECH0101E OPEN macro support for XTIOT, uncaptured UCBs and DSAB
above the line is not enabled for non-VSAM. IBM recommends
setting NON_VSAM_XTIOT=YES in the DEVSUPxx member of PARMLIB.

When this situation occurs ensure the following:

1) Check SYS1.PARMLIB(DEVSUPxx) to ensure commas are used for
   multi-line statements.  Without the commas, only one line
   will be read.

2) If you are using multiple DEVSUPxx members then ensure
   NON_VSAM_XTIOT=YES is specified in all members.

If DEVSUPxx is updated successfully then a dynamic update
from SET DEVSUP=xx will issue message IEA253I:

IEA253I DEVSUP XTIOT FOR NON-VSAM IS SUPPORTED

!!!NOTE:  A dynamic update of DEVSUPxx will NOT update health
checker.  Health Checker will need to be refreshed by
implementing one of the following:

- Restarting health checker via commands:
  F HZSPROC,STOP
  S HZSPROC
- Go to SDSF CK panel selecting R and E (refresh)
- F HZSPROC,RUN,CHECK=(IBMOCE,OCE_XTIOT_CHECK)
- F HZSPROC,REFRESH,CHECK=(IBMOCE,OCE_XTIOT_CHECK)

After Health Checker is refreshed, IECH0100I will be issued
instead of IECH0101E.  After this APAR is implemented, message
IECH0100I will move from an "exception" to an "information"
message class.


LOCAL FIX:
n/a


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All.                                         *
****************************************************************
* PROBLEM DESCRIPTION: Incorrect message class.                *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
The original submitter text was based on the incorrect
assumption that updating DEVSUPxx keyword: NON_VSAM_XTIOT
followed by system command: SET DEVSUP=xx would immediately
be reflected in the Health Checker display for the
OCE_XTIOT_CHECK.
After updating DEVSUPxx and issuing command SET DEVSUP=xx the
following commands will reexecute the health checker:
 F HZSPROC,RUN,CHECK=(IBMOCE,OCE_XTIOT_CHECK)
```

```
 F HZSPROC,REFRESH,CHECK=(IBMOCE,OCE_XTIOT_CHECK)
This APAR however,does change the message class for IECH0100I
to "information" from "exception".


PROBLEM CONCLUSION:
IECH0100I issued when NON_VSAM_XTIOT=YES is specified
and activated in DEVSUPxx has been changed to message
class "Information".


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   IFGHCM01 IFGHCOC1 IFGHCOC2


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42551 RLS DSS

Example A-15 contains the cover letter for APAR OA42551.

Example A-15 OA42551

```
APAR Identifier ...... OA42551      Last Changed ........ 13/10/02
  ADR952E ADR957I DURING LOGICAL DUMP OF USERCATALOG WITH DSS DUE
  TO A FAILURE IN RLS DURING QUIESCE PROCESS 13/06/14 PTF PECHANGE

  Symptom ...... MS MSGADR952E        Status ........... CLOSED  PER
  Severity ................... 2      Date Closed ......... 13/06/21
  Component .......... 5695DF122      Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name VSAM REC LEV SH      Special Notice    PE
  Current Target Date ..13/07/31      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.
```

```
PE PTF List:    UA68643 UA68644

PTF List:
Release A10   : PTF not available yet
Release B10   : PTF not available yet
Release C10   : UA69623 available 13/07/23 (F307 )
Release D10   : UA69624 available 13/07/23 (F307 )
Release 210   : UA69625 available 13/07/23 (F307 )


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
A logical dump of a usercat defined with a large number
of extents (approximatly 30 and more) will fail with DSS
messages:

ADR952E (001)-DTDSC(01), THE IDAQDMP MACRO FAILED DURING QUIESCE
PROCESSING FOR FOR CLUSTER dsname WITH RETURN CODE
00000008 AND REASON CODE 61FF0001

This issue occurs after application of OA36422 and OA36403

Problem is due to workarea shortage during RLS locate request
for catalog information.

ADDITIONAL KEYWORDS:
RLSPSP/K
SMSVSAM RLS VSAMRLS


LOCAL FIX:
You can use DSS patch to circumvent the RLS quiesce processing
described in DFSMSdss Storage Administration
1.14.30 Bypassing RLS processing (OW32817)
PEX/ UA68641
PEX/ UA68642


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All Catalog users who issue DSS DUMP         *
*                 command to backup user catalog data sets.    *
****************************************************************
* PROBLEM DESCRIPTION: When performing the DSS DUMP function   *
*                      to backup user catalog data sets with   *
*                      about 30 extents, the following error   *
*                      is generated:                           *
*                                                              *
*                      ADR952E (001)-DTDSC(01), THE IDAQDMP    *
*                      MACRO FAILED DURING QUIESCE PROCESSING  *
*                      FOR CLUSTER dsname WITH RETURN CODE     *
*                      00000008 AND REASON CODE 61FF0001       *
```

```
*****************************************************************
* RECOMMENDATION:                                               *
*****************************************************************
If a user catalog data set has approximately 30 or more extents,
any attempt to back it up using the DSS DUMP will failed with
ADR952E error message.


PROBLEM CONCLUSION:
The error is due to the work area being too small to handle a
user catalog with many extents. The fix will allocate a larger
work area and retry the operation when detecting the work area
too small error.
KEYWORDS: RLSPSP/K ZOSO201C/K


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   IDAVQCAT


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42553 SDM

Example A-16 contains the cover letter for APAR OA42553.

Example A-16 OA42553

```
APAR Identifier ...... OA42553      Last Changed ........ 13/10/03
  AUTHORIZATION CHECKING FOR ANTRQST STATESAVE CALLERS


  Symptom ...... IN INCORROUT         Status ............ CLOSED  PER
  Severity ................... 3      Date Closed ......... 13/08/20
  Component .......... 5695DF117      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............. 999
  Component Name SYSTEM DATA MOV      Special Notice
  Current Target Date ..13/10/31      Flags
  SCP ...................
  Platform ............
```

```
Status Detail: SHIPMENT - Packaged solution is available for
                          shipment.

PE PTF List:

PTF List:
Release 210   : UA70479 available 13/09/18 (F309 )


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
Change authorization checking for callers of
ANTRQST STATESAVE


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: Users of ANTRQST API.                        *
****************************************************************
* PROBLEM DESCRIPTION: A return code 7010 can occur indicating *
*                      that a caller is not authorized even if *
*                      the caller is in an authorized key and  *
*                      in supervisor state.                    *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************



PROBLEM CONCLUSION:
The problem has been corrected.
 KEYWORDS: SDMAPI/K


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:
ANTCDPI


SRLS:
NONE


RTN CODES:
```

```
  CIRCUMVENTION:

  MESSAGE TO SUBMITTER:
```

APAR OA42654 SDM

Example A-17 contains the cover letter for APAR OA42654.

Example A-17 OA42654

```
APAR Identifier ...... OA42654      Last Changed ........ 13/09/04
  HANG IN SMSVSAM BETWEEN LOCK ALTER AND LOCK GRANT PROCESSING


  Symptom ...... IN INCORROUT         Status ............ CLOSED  PER
  Severity ................... 2      Date Closed ......... 13/08/01
  Component .......... 5695DF122      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............. 999
  Component Name VSAM REC LEV SH      Special Notice           HIPER
  Current Target Date ..13/08/15      Flags
  SCP ...................               FUNCTIONLOSS
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release 210   : UA70040 available 13/08/08 (F308 )


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  Hang encountered between two SMLS threads attempting to process
  the same lock. D SMS,SMSVSAM,DIAG(C) display shows contention
  building on the RHT latch:
  .
  IGW343I VSAM RLS DIAG STATUS (V.01)
  |----RESOURCE---| |------ WAITER ------| |--HOLDER---| ELAPSED
  TYPE        ID    JOB NAME ASID   TASK   ASID   TASK     TIME
  -------- -------- -------- ---- -------- ---- -------- ---------
  LATCH    7F5B93F8 CICS2ACA 01A3 00000000 000A 70C2D0C0  00:12:45
  LATCH    7F5B93F8 CICS2ACB 01A2 00000000 000A 70C2D0C0  00:13:15
  LATCH    7F5B93F8 CICS2ACC 01A6 00000000 000A 70C2D0C0  00:13:16
  LATCH    7F5B93F8 CICS2ACA 01A3 00000000 000A 70C2D0C0  00:13:20
  LATCH    7F5B93F8 CICS2ACA 01A3 00000000 000A 70C2D0C0  00:13:20
  .
  The holder is a thread attempting to ALTER the Component2 lock
```

```
and is waiting for the request to be granted. A waiter is also
processing the same lock attempting to grant it, but is
waiting on the RHT latch held by the first thread.
.
Additional Problems
During rebuild a cancel of CICS regions can orphan GRSLatch
and Sidb latch causing the REBUILD to hang

Additional keywords:
RLSHANG SMSVSAM IGWLNL17 IGWLNL77 IGWLNL19 IGWLNL78
DIWA COMP2 RHT SPLIT
RLS_GRS_LATCH_SET


LOCAL FIX:
Restart SMSVSAM


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All VSAM RLS users.                          *
****************************************************************
* PROBLEM DESCRIPTION: Hang in SMSVSAM between lock alter and  *
*                      Lock grant processing.                  *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
Problem #1.
Problem occurs if 3 or more jobs are competing for a component2
lock. Job A is the holder and Job C (same system) waits for the
lock. Job A is about to release the lock and Job B (from other
system) tries to obtain it. Due to an un-initialized parameter
that SMSVSAM uses for lock processing, Job A may wait for Job B
to complete before it can grant the lock to the waiter (Job C),
resulting in a deadlock situation.
Problem #2.
Cancelling a job during record lock request processing can hang
due to internal routine error not releasing some of the internal
latches.


PROBLEM CONCLUSION:
Problem #1.
The code has been modified to initialize the parameter
correctly to prevent the deadlock situation.
Problem #2.
The code has been modified to release all the internal latches
if cancel occurs during record lock request processing.
 KEYWORDS: RLSPSP/K


TEMPORARY FIX:
*********
* HIPER *
*********
```

```
COMMENTS:


MODULES/MACROS:
IDAVRCLO IGWLNL12 IGWLNL17 IGWLNL19 IGWLNL2O IGWLNL36 IGWLNL4O
IGWLNL6O IGWLNL77 IGWLNL78 IGWLNR1O


SRLS:
NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42267 XTIOT use (also applicable to DFSMS V1.13)

Example A-18 contains the cover letter for APAR OA42267.

Example A-18 OA42267

```
APAR Identifier ...... OA42267      Last Changed ........ 13/10/01
  IEC999I IFGO194D ABENDOC1 ABENDOC4 NON_VSAM_XTIOT DEVSUPXX
  TRKCALC RCO4 IECOSCR1

  Symptom ...... AB ABENDOC4          Status ............ CLOSED  PER
  Severity ................... 2      Date Closed ......... 13/09/16
  Component .......... 5695DF1O7      Duplicate of ........
  Reported Release ......... D1O      Fixed Release ............. 999
  Component Name DATA MGMT SUPPO      Special Notice
  Current Target Date ..13/09/3O      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release D1O   : UA7O761 available 13/10/01 (1000 )
  Release 21O   : UA7O762 available 13/10/01 (1000 )


  Parent APAR:
  Child APAR list:
```

```
ERROR DESCRIPTION:
When keyword NON_VSAM_XTIOT is set to YES in PARMLIB member
DEVSUPxx, IFG0194D +x'186A' UA68824 makes a TRKCALC call
without LOC=ANY and the UCB is a 31-bit address pulled directly
from the XTIOT.  TRKCALC module IECOSCR1 takes an ABENDOC4 as a
result.  IFG0194D may also take an intentional ABENDOC1 to
header IFG0194D TRKCALC_ERROR_SEE_R15 ERROR when register 15 is
set to RC04.  The joblog will show an IEC999I IFG0194D message.


LOCAL FIX:
Set NON_VSAM_XTIOT to NO in PARMLIB member DEVSUPxx


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All.                                         *
****************************************************************
* PROBLEM DESCRIPTION: AbendOc1 in IFG0194D.                   *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
IEC999I IFG0194D,POFFOR,POFFOR,TRKCALC ERROR SEE R15
due to an intentional abendOc1 after a TRKCALC failure.
TRKCALC is passed a 31bit UCB address without including
keyword: LOC=ANY in the macro invocation. OPEN is processing
with an XTIOT containing 31bit UCB addresses.


PROBLEM CONCLUSION:
IFG0194D now issues TRKCALC with the LOC=ANY keyword.


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   IFG0194D


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42675 PDSE

Example A-19 contains the cover letter for APAR OA42675.

Example A-19 OA42675

```
APAR Identifier ...... OA42675      Last Changed ........ 13/09/26
  ABENDOC4 PIC38 IGWIRRDB+0CB0 @ HDZ2210


  Symptom ...... AB ABENDOC4          Status ........... CLOSED  PER
  Severity ..................... 3     Date Closed ......... 13/07/03
  Component ..... 5695DF115           Duplicate of ........
  Reported Release ......... 210      Fixed Release ............ 999
  Component Name EXTENDED DATA S      Special Notice           HIPER
  Current Target Date ..13/08/15      Flags
  SCP ...................
  Platform ............                                  DATALOSS

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release 210   : UA69767 available 13/07/11 (F307 )


  Parent APAR:    OA42051
  Child APAR list:


  ERROR DESCRIPTION:
  ABENDOF4 PIC39 CSECT=IGWIRRDB+0CB0 @ HDZ2210 base
  ABENDOC1 IGWIRPAD+0B4E @ HDZ2210 base
  ABENDOC1 IGWIRPAD+17D4 @ HDZ2210 base
  ABENDOC1 IGWIRPND+1848 @ HDZ2210 base
  ABENDOF4 IGWIRPAD RSN1419A084 1419A084


  LOCAL FIX:
  None


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: PDSE which has been updated extensively on   *
  *                 a release lower than 2.1 may                 *
  *                 have a sparce index.  When 2.1 updates the   *
  *                 the index may be broken,                     *
  ****************************************************************
  * PROBLEM DESCRIPTION: See users affected.                     *
  ****************************************************************
  * RECOMMENDATION:                                              *
  ****************************************************************
  Modify PDSE processing to position to the correct place in the
```

```
index before attempting to remove empty pages,

PROBLEM CONCLUSION:
See Problem Summary

TEMPORARY FIX:
* HIPER *
*********

COMMENTS:

MODULES/MACROS:   IGWIRCMT IGWIRDIS IGWIRICR IGWIRIEM IGWISTAM

SRLS:      NONE

RTN CODES:

CIRCUMVENTION:

MESSAGE TO SUBMITTER:
```

APAR OA42986 NFS applies to DFSMS V1.13 as well

Example A-20 contains the cover letter for APAR OA42986.

Example A-20 OA42986

```
APAR Identifier ...... OA42986      Last Changed ........ 13/10/03
  ZNFSC VN_TRUNC SOC4 DUE TO UNINITIALIZED VARIABLE


  Symptom ...... AB ABENDOC4          Status ............ CLOSED  PER
  Severity ................... 3      Date Closed ......... 13/08/22
  Component .......... 5695DF121      Duplicate of ........
  Reported Release ......... 21N      Fixed Release ............. 999
  Component Name NETWORK FILE SY      Special Notice
  Current Target Date ..13/09/13      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release C1N   : UA70539 available 13/09/04 (F309 )
```

```
Release D1N   : UA70540 available 13/09/04 (F309 )
Release 21N   : UA70541 available 13/09/04 (F309 )


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
zNFSC vn_trunc SOC4 due to uninitialized variable


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: Users of zOS NFS Client                      *
****************************************************************
* PROBLEM DESCRIPTION: OC4 abend in vn_trunc when accessing a  *
*                      file in an NFSv4 mount                  *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
An uninitialized variable led to attempting to write to
incorrect memory, leading to an OC4 abend.


PROBLEM CONCLUSION:
Properly initializing the pRes variable in the vn_trunc NFSv4
path eliminated an OC4 abend.


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:
GFSCVNAC


SRLS:
NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42846 Single striped, multi-volume sam tailored compressed data set

Example A-21 contains the cover letter for APAR OA42846.

Example A-21 OA42846

```
APAR Identifier ...... OA42846      Last Changed ........ 13/09/12
  APAR OA41459 CAN CAUSE LOOP IN IFGO232D


  Symptom ...... LP LOOP              Status ........... CLOSED  PER
  Severity ..................... 2   Date Closed ......... 13/08/05
  Component ..... 5695DF107           Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name DATA MGMT SUPPO      Special Notice    PE
  Current Target Date ..13/09/15      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:    UA68273 UA68272 UA68824 UA68823

  PTF List:
  Release C10   : UA70205 available 13/09/12 (1000 )
  Release D10   : UA70204 available 13/09/12 (1000 )
  Release 210   : UA70203 available 13/09/12 (1000 )


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  APAR OA41459 can cause a LOOP in IFGO232D when there are fewer
  than 5 used physical blocks on the last volume for tailored
  compressed data sets during CLOSE TYPE=T (TCLOSE), this LOOP
  will hold ENQ on SYSZTIOT.


  LOCAL FIX:
  remove PTF for OA41459


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: users of single striped, multi-volume sam    *
  *                 tailored compressed data sets.               *
  ****************************************************************
  * PROBLEM DESCRIPTION: users of single striped, multi-volume   *
  *                      sam tailored compressed data sets may   *
  *                      see loops when close type=t leave is    *
  *                      issued when open for input or issued    *
  *                      tiwce when open for output on the last  *
  *                      volume and there is very little data    *
```

```
*                     (less than five physical blocks) on the *
*                     current volume.                          *
*****************************************************************
* RECOMMENDATION:                                               *
*****************************************************************
users of single striped, multi-volume sam tailored compressed
data sets may see loops when close type=t leave is issued.


PROBLEM CONCLUSION:
Change code so that the count of physical blocks used by the
tailored dictionary are ignored for the second and subsequent
volumes of a single striped, multi-volume data set.


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   IFG0232D


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42891 PDSE

Example A-22 contains the cover letter for APAR OA42891.

Example A-22 OA42891

```
APAR Identifier ...... OA42891      Last Changed ........ 13/10/03
  IEC036I 002-94 MAXIMUM ALLOWABLE NUMBER OF MEMBERS OF PDSE
  EXCEEDED

  Symptom ...... AB ABEND             Status ........... CLOSED  PER
  Severity ..................... 3     Date Closed ......... 13/08/13
  Component .......... 5695DF115      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............. 999
  Component Name EXTENDED DATA S      Special Notice
  Current Target Date ..13/10/31      Flags
  SCP ...................
  Platform ............
```

```
Status Detail: SHIPMENT - Packaged solution is available for
                          shipment.

PE PTF List:

PTF List:
Release 210   : UA70333 available 13/09/04 (F309 )


Parent APAR:    OA40985
Child APAR list:


ERROR DESCRIPTION:
ABEND002 RC94 received when adding to a pdse that has less
than the maximum Number of members allowed for a PDSE as
displayed by ISPF 3.4 Info - I .

S002 rsn94 msgIEC036I


LOCAL FIX:
IEBCOPY PDSE to a newly allocated PDSE


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: Users who create new PDSE members.           *
****************************************************************
* PROBLEM DESCRIPTION: An Abend002 RC94 occurs when adding a   *
*                      new member to a PDSE                    *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
Prevent Member counts from going negative


PROBLEM CONCLUSION:
A total member count was invalid and misrepresented that the
maximun count had been reached.
The code has been modified to prevent the member counts from
reaching an invalid range


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:
IGWIRCMT


SRLS:
```

```
  NONE

  RTN CODES:

  CIRCUMVENTION:

  MESSAGE TO SUBMITTER:
```

APAR OA42904 z/HPF

Example A-23 contains the cover letter for APAR OA42904.

Example A-23 OA42904

```
APAR Identifier ...... OA42904      Last Changed ........ 13/08/02
  EXPOSURE IN Z/HPF IN R2.1: CHECK FOR FCX_FMTWRITE TO
  IFG0555H

  Symptom ...... IN INCORROUT         Status ........... CLOSED  PER
  Severity ..................... 3     Date Closed ......... 13/07/29
  Component ..... 5695DF107           Duplicate of ........
  Reported Release ......... 210      Fixed Release ............. 999
  Component Name DATA MGMT SUPPO      Special Notice           HIPER
  Current Target Date ..13/08/30      Flags
  SCP ...................
  Platform ............                                  DATALOSS

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release 210   : UA70011 available 13/07/31 (F307 )


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  Check for FCX_FmtWrite to IFG0555H


  LOCAL FIX:
  none


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: All users of SAM z/HPF writing multi-volume  *
  *                 data sets.                                   *
```

```
*****************************************************************
* PROBLEM DESCRIPTION: Data may be lost when writing a SAM     *
*                      z/HPF data set if the control unit is   *
*                      not at the latest EC level.             *
*****************************************************************
* RECOMMENDATION:                                               *
*****************************************************************
Data may be lost when writing SAM z/HPF data if the control unit
microcode is not at the latest level.


PROBLEM CONCLUSION:
Added check to verify the correct control unit microcode level
before writing with z/HPF.


TEMPORARY FIX:
*********
* HIPER *
*********


COMMENTS:


MODULES/MACROS:
IFG0555H


SRLS:
NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42935 IEBCOPY

Example A-24 contains the cover letter for APAR OA42935.

Example A-24 OA42935

```
APAR Identifier ...... OA42935      Last Changed ........ 13/10/03
  ABEND C03 UNLOADING AN EMPTY PDSE USING IEBCOPY


  Symptom ...... AB ABENDC03          Status ........... CLOSED  PER
  Severity ..................... 2     Date Closed ......... 13/08/21
  Component .......... 5695DF114      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............ 999
```

```
Component Name DFSMS UTILITIES      Special Notice
Current Target Date ..13/09/16      Flags
SCP ...................
Platform ............

Status Detail: SHIPMENT - Packaged solution is available for
                          shipment.

PE PTF List:

PTF List:
Release 210   : UA70502 available 13/09/12 (F309 )


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
When attempting to do an UNLOAD of an Empty PDSE using IEBCOPY
an Abend C03 occurs.

Errors received resemble:

IEC999I IFGOTC0A,IFGOTC0B,TEST2   ,UNLOAD  ,
        DEB ADDR=8C2394-1,DSN = xxxxx.xxxxxx

SYSTEM COMPLETION CODE=C03

When the PDSE to be unloaded is empty, module IEBCFAMS is not
closing the output DCB, which causes the C03 abend during task
termination, since the DCB has been previously freed.

The SYSTRACE shows this storage was freed up as part of a large
area by IEBVTM1 + x'C0E'.


LOCAL FIX:
n/a


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: Users trying to unload an empty PDSE using   *
*                 IEBCOPY.                                     *
****************************************************************
* PROBLEM DESCRIPTION: Users trying to unload an empty PDSE    *
*                      using IEBCOPY will see an abend C03     *
*                      during step termination.                *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
Abend C03 unloading an empty PDSE using IEBCOPY.
```

```
PROBLEM CONCLUSION:
Removed an asterisk that commented out a call to close the
output data set.


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:
IEBCFAMS


SRLS:
NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA43003 VSAM RLS

Example A-25 contains the cover letter for APAR OA43003. DFSMS V1.13 equivalent APAR is OA42947.

Example A-25 OA43003

```
APAR Identifier ...... OA43003      Last Changed ........ 13/09/19
  POSSIBLE INCORRECT RBA RETURNED AFTER ESDS PUT UPDATE OR DELETE


  Symptom ...... IN INCORROUT         Status ........... CLOSED  PER
  Severity ................... 3      Date Closed ......... 13/09/19
  Component .......... 5695DF106      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............. 999
  Component Name DFSMS VSAM           Special Notice
  Current Target Date ..13/10/31      Flags
  SCP ...................
  Platform ............

  Status Detail: TESTPACKAGING - Packaged solution is being tested.

  PE PTF List:

  PTF List:
  Release 210   : PTF not available yet
```

```
Parent APAR:    OA42947
Child APAR list:


ERROR DESCRIPTION:
For ESDS processing, it is possible for the RBA to be corrupted
by application programs after it's initially passeed in
correctly. An application program specifies the correct RBA for
a GET UPDATE request, VSAM RLS processes the GET UPDATE with the
correct RBA successfully, then the application somehow corrupts
the RBA, possibly by mistake, followed by a PUT UPDATE request.
RLS also processes the PUT UPDATE successfully since RBA is not
required. However, the incorrect RBA is returned at the end of
the processing.


LOCAL FIX:
Avoid corrupting the RBA between requests.


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: VSAM users running with non-keyed GET, PUT   *
*                 and ERASE processing.                        *
****************************************************************
* PROBLEM DESCRIPTION: A user application can corrupt the      *
*                      input RBA value after a GET UPDate      *
*                      request and the subsequent PUT or ERASE *
*                      request can return with an incorrect    *
*                      RBA value.                              *
****************************************************************
* RECOMMENDATION: APPLY PTF                                    *
****************************************************************
A user application specifies a correct RBA value for the GET
UPDate request, then the application corrupts the RBA value.
Since VSAM is already positioned to the record, the next PUT or
ERASE request can run successfully but the returned RBA value in
RPL area is still corrupted.


PROBLEM CONCLUSION:
VSAM will save the input RBA value for non-keyed GET request
and the subsequent PUT or ERASE request will restore the RBA
value in RPL before returning to user application.


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   IDA019R1
```

```
  SRLS:      NONE

  RTN CODES:

  CIRCUMVENTION:

  MESSAGE TO SUBMITTER:
```

APAR OA43112 VSAM

Example A-26 contains the cover letter for APAR OA43112.

Example A-26 OA43112

```
APAR Identifier ...... OA43112      Last Changed ........ 13/09/23
  IDA019RV+05A0 FEEDBACK CODE: 010804F8, IDA019RZ+61A PLH STACK
  ERROR

  Symptom ...... IN INCORROUT         Status ........... OPEN
  Severity ..................... 3     Date Closed .........
  Component ..... 5695DF106           Duplicate of ........
  Reported Release ......... 210      Fixed Release .............
  Component Name DFSMS VSAM           Special Notice
  Current Target Date ..13/12/31      Flags
  SCP ...................
  Platform ............

  Status Detail: DESIGN/CODE - APAR solution is being designed
                               and coded.

  PE PTF List:

  PTF List:


  Parent APAR:    OA40707
  Child APAR list:


  ERROR DESCRIPTION:
  VSAM produces dump titled:
  VSAM DYNAMIC RPL DUMP - IDA019RV+05A0 FEEDBACK CODE: 010804F8.
  The dump shows (in the first entry in the PLH stack) that
  IDA019RZ+61A was attempting to return using a zero stack
  pointer and so he had no module to return to. This produced
  the RPL error code and dump.
  The application is using LSR buffer pools, Asynchronous
  VSAM calls, with many TCBs multitasking, and it is very busy.
  The call that received the error was an Asynchronous Direct PUT
  to a cluster with an AIX.

  The nature of this problem is very timing dependent and, we
```

```
would expect, rarely seen. The sequence leading to the
error can be seen by closely reviewing entries in the MVS
SYSTRACE for this call, processing at the same time from
the same TCB for other asynchronous calls. This current  call
had gone to VSAM for the PUT, the IO was started, but we then
were interrupted by a timer interrupt (EXT 1005) in
IDA019RZ+57E (IDA019RZ is base 1.12 code). At this point
the MVS supervisor saves the regs for this Ext, interrupt in the
TCB.
Other work gets done under this same  TCB, as long as it is
only IRB related work, or stems from IRB work, such as
previously started VSAM IO for this TCB.
Before we get to redispatch this TCB after the EXT. interrupt
PSW,  the PLH gets reused for AIX processing for another
request. This is all under this same TCB same. The AIX request
processes, the PLH stack is reused and goes to zero as the
AIX request completes.
We then dispatch the Externally interrupted work in IDA019RZ+57E
using the regs saved in the TCB. He expects the PLH stack to
be as he left it, when the EXT. interrupt occurred, but the
stack is zeros. He then  gets rpl feedback code 010804F8
when he tries to "return" at IDA019RZ+61A.
=========================================================
This is a sysroute of OA40707 for 2.1 only. The design of
the serviceability enhancement for OA40707 was restricted
by the storage available in the footsteps.  This is a more
complete version and will include a timestamp and other
information.
=========================================================


LOCAL FIX:
none
```

APAR OA43128 DFSMSrmm applicable to DFSMS V2.1 and V1.13

Example A-27 contains the cover letter for APAR OA43128.

Example A-27 OA43128

```
APAR Identifier ...... OA43128      Last Changed ........ 13/10/03
  GARBLED TEXT ON JAPANESE PANEL EDGP@LIB


  Symptom ...... IN INCORROUT         Status ............ CLOSED  PER
  Severity ................... 3      Date Closed ......... 13/08/27
  Component .......... 5695DF186      Duplicate of ........
  Reported Release ......... 21K      Fixed Release ............. 999
  Component Name DFSMSRMM             Special Notice
  Current Target Date ..13/10/17      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.
```

```
PE PTF List:

PTF List:
Release C1K   : UA70581 available 13/09/28 (F309 )
Release D1K   : UA70582 available 13/09/28 (F309 )
Release 21K   : UA70583 available 13/09/28 (F309 )


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
Unreadable characters appear on Japanese panel EDGP@LIB,
  shipped with z/OS V2.1 ( R21K ) PTF/APAR UA69568 / OA42135.
Additional Keywords:
  DFSMSrmm DFRMM RMM RMMCJH KANJI


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All DFSMSrmm users using KANJI panels.       *
****************************************************************
* PROBLEM DESCRIPTION: There is a problem with the Kanji panel *
*                      EDGP@LIB:                               *
*                       - in release V2R1 the panel contains   *
*                         garbled text;                        *
*                       - in releases V1R12, V1R13 the panel   *
*                         is missing.                          *
****************************************************************
* RECOMMENDATION: Apply the applicable PTS(s).                 *
****************************************************************



PROBLEM CONCLUSION:
The problem has been fixed.


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:
EDGP@LIB TDGP@LIB


SRLS:
NONE
```

```
  RTN CODES:


  CIRCUMVENTION:


  MESSAGE TO SUBMITTER:
```

APAR OA43153 VSAM

Example A-28 contains the cover letter for APAR OA43153.

Example A-28 OA43153

```
APAR Identifier ...... OA43153      Last Changed ........ 13/09/27
  PLH "ROUND ROBIN" PROBLEM UNDER R210.


  Symptom ...... IN INCORROUT         Status ........... OPEN
  Severity ................... 2      Date Closed .........
  Component .......... 5695DF106      Duplicate of ........
  Reported Release ......... 210      Fixed Release .............
  Component Name DFSMS VSAM           Special Notice
  Current Target Date ..13/12/01      Flags
  SCP ...................
  Platform ............

  Status Detail: REVIEW - APAR solution is being reviewed.

  PE PTF List:

  PTF List:


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  PLH "round robin" problem under r210.
  Under r210 a POINT returns RPL FEEDBACK = x'93080010', and the
  following GET returns x'00000000' along with the 1st record in
  data set.
  Under previous releases the POINT returned x'93080010' and the
  following GET returned x'58080058' and no record.


  LOCAL FIX:
  If a POINT request is rejected, failed it should not be used as
  the basis for a following GET NEXT (sequential GET).  Since the
  POINT request failed, if it is used with a subsequent GET the
```

```
results are unpredictable.
```

APAR OA43162 DSS Storage Tier

Example A-29 contains the cover letter for APAR OA43162.

Example A-29 OA43162

```
APAR Identifier ...... OA43162      Last Changed ........ 13/09/25
  COPY USING STORAGE TIER, WITH DB2 DATABASE, LDS, ISGQUERY
  RECEIVES ADR564E WITH RC4 AND RSN051B0405

  Symptom ...... MS MSGADR564E        Status ........... OPEN
  Severity ..................... 2     Date Closed .........
  Component .......... 5695DF175      Duplicate of ........
  Reported Release ......... 210      Fixed Release .............
  Component Name DFSMSDSS, ISMF       Special Notice
  Current Target Date ..              Flags
  SCP ...................
  Platform ............

  Status Detail: DESIGN/CODE - APAR solution is being designed
                               and coded.

  PE PTF List:

  PTF List:


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  Customer running Storage Tier through HSM, copy of a DB2
  database, which is a VSAM LDS, customer will receive the
  following message:

  ADR564E (001)-DDFLT(01), ISGQUERY ISSUED A RETURN CODE OF
  00000004 AND REASON CODE OF 051B0405 FOR DATA SET xxxxxxxx

  ISGQUERY returns information indicating with return code x'4',
  which indicated the ISGQUERY succeeded, but a warning is issued.
  For reason code xxxx0405, the AnswerAreaFull indicator has been
  returned.  Either the answer area for the query is too small, or
  a RESUMETOKEN was not used correctly.
  Additional info: STORTIERS/K


  LOCAL FIX:
  N/A
```

APAR OA43169 DFSMShsm

Example A-30 contains the cover letter for APAR OA43169.

Example A-30 OA43169

```
APAR Identifier ...... OA43169      Last Changed ........ 13/10/03
  ABEND878 OUT-OF-STORAGE CONDITION DUE TO ORPHANED X'11F8' BYTE
  ALLOCATIONS IN SUBPOOL 0 KEY 8.            13/09/10 PTF PEREMOVE

  Symptom ...... AB ABEND878          Status ........... CLOSED  PER
  Severity ..................... 2     Date Closed ......... 13/09/10
  Component ..........  5695DF170     Duplicate of ........
  Reported Release ......... 210      Fixed Release ............ 999
  Component Name DFSMSHSM, ISMF       Special Notice           HIPER
  Current Target Date ..13/09/27      Flags
  SCP ...................               FUNCTIONLOSS
  Platform ............                 PERVASIVE

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release 210   : UA70684 available 13/09/24 (F309 )


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  S878 ABEND occurs because of orphaned X'11F8' byte allocations
  in SPO Key8.  These allocations will exhaust user region above
  the 16M line and then proceed to exhaust it below the 16M line.
  In IPCS, " IP VERBX VSMDATA 'NOG SUM' " will show thousands
  of the following orphaned storage obtains:

     DQE:  Addr 007C3000 Size     2000
              FQE: Addr 007C41F8 Size      E08


  LOCAL FIX:
  Determine size of storage leak by seeing how long HSM was up
  prior to the S878 ABEND.  Schedule regular restarts of HSM
  accordingly.


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: All z/OS DFSMShsm release hdz2210 users.     *
  ****************************************************************
  * PROBLEM DESCRIPTION: Customer is experiencing ABEND878       *
  *                      during DFSMShsm space management.       *
  ****************************************************************
```

```
* RECOMMENDATION:                                                *
****************************************************************
AB878 is occurring during DFSMShsm space management. Getmained
storage is not being freed.


PROBLEM CONCLUSION:
Apply the PTF for this APAR to resolve this problem.


TEMPORARY FIX:
*********
* HIPER *
*********


COMMENTS:


MODULES/MACROS:   ARCATTEC ARCMDSUV ARCMSTAI ARCMVDS


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:
Apply ++APAR temporary fix when available. Estimated
availability date is September 9, 2013.


MESSAGE TO SUBMITTER:
```

APAR OA43191 RLS

Example A-31 contains the cover letter for APAR OA43191.

Example A-31 OA43191

```
APAR Identifier ...... OA43191      Last Changed ........ 13/09/30
  HANG DURING REBUILD / REALLOCATE OF SMSVSAM LOCK STRUCTURE
  RLS_GRS_LATCH_SET

  Symptom ...... WS WAIT              Status ........... OPEN
  Severity ................... 2     Date Closed .........
  Component .......... 5695DF122     Duplicate of ........
  Reported Release ......... 210     Fixed Release .............
  Component Name VSAM REC LEV SH     Special Notice
  Current Target Date ..14/03/31     Flags
  SCP ...................
  Platform ............

  Status Detail: REVIEW - APAR solution is being reviewed.
```

```
PE PTF List:

PTF List:


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
A hang can be seen during a REBUILD or REALLOCATE of the SMSVSAM
lock structure.  The hang is seen when the lock structure is in
SIMPLEX state.   A large amount of contention will be reported
on RLS_GRS_LATCH_SET with several holders and requestors for
SHARED state and 1 requestor (Rebuild) for exclusive.


Additional Keyword:
RLS_GRS_LATCH_SET
NAME=SMSVSAM/RLS_GRS_LATCH_SET
RLSHANG
RLSPSP/K
SMSVSAM RLS VSAMRLS DF122


LOCAL FIX:
Restart SMSVSAM
```

APAR OA43195 Catalog

Example A-32 contains the cover letter for APAR OA43195.

Example A-32 OA43195

```
APAR Identifier ...... OA43195      Last Changed ........ 13/09/26
  BAD RB ERROR 246-24 IN IGGOCLXA AT 2.1


  Symptom ...... IN INCORROUT         Status ........... OPEN
  Severity ................... 2      Date Closed .........
  Component .......... 5695DF105      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............
  Component Name ICF CATALOG & I      Special Notice
  Current Target Date ..13/12/31      Flags
  SCP ...................
  Platform ............

  Status Detail: DESIGN/CODE - APAR solution is being designed
                               and coded.

  PE PTF List:

  PTF List:
```

```
  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  APAR OA36157 introduced a new error to capture a doc when
  control is improperly transferred between user address spaces
  and CAS.

  In 2.1, new code was introduced in support of RLS Catalogs and
  related commands. One such code path will issue an informational
  message to inform a user of any suspended catalogs (IEC367W
  message) that are waiting for SMSVSAM to become available. It is
  possible, however, for this timer code path to be invoked for
  terminated catalogs as well as suspended catalogs. This causes
  the timer pop code to be erroneously called for terminated
  catalogs, leading to unexpected IRB interrupts, and 246-24
  errors.


  LOCAL FIX:
  n/a
```

APAR OA43198 PDSE

Example A-33 contains the cover letter for APAR OA43198.

Example A-33 OA43198

```
APAR Identifier ...... OA43198      Last Changed ........ 13/09/02
  ADD PDSE DATA SET NAME IN EREP SYMPTOM RECORD FOR ABENDOF4 RC24
  IGWIRRDB RSN141FA7FD

  Symptom ...... IN INCORROUT         Status ............ OPEN
  Severity ................... 2      Date Closed .........
  Component .......... 5695DF115      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............
  Component Name EXTENDED DATA S      Special Notice
  Current Target Date ..13/12/31      Flags
  SCP ...................
  Platform ............

  Status Detail: ANALYSIS - APAR is being investigated or debugged.

  PE PTF List:

  PTF List:


  Parent APAR:
  Child APAR list:
```

```
  ERROR DESCRIPTION:
  The intent of this apar is to externalize the pdse data set name
  in the erep symptom record ( symrec ) for the ABENDOF4 141FA7FD
  detected from module IGWIRRDB to assist in the identification of
  the PDSE data set involved with the abend.


  LOCAL FIX:
```

APAR OA43214 PDSE

Example A-34 contains the cover letter for APAR OA43214.

Example A-34 OA43214

```
APAR Identifier ...... OA43214      Last Changed ........ 13/09/23
  ABENDOC1 IGWIRCMT COPYING INTO A PDSE DATA SET WITH A SPARSE ND
  NAME DIRECTORY INDEX

  Symptom ...... AB ABEND             Status ........... CLOSED  PER
  Severity ................... 3      Date Closed ......... 13/09/23
  Component .......... 5695DF115      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............. 999
  Component Name EXTENDED DATA S      Special Notice
  Current Target Date ..13/12/31      Flags
  SCP ...................
  Platform ............

  Status Detail: TESTPACKAGING - Packaged solution is being tested.

  PE PTF List:

  PTF List:
  Release 210   : PTF not available yet


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  IEBCOPY to copy a PDSE to a PDSE data set with sparse ND index
  results in following errors :

  IGWO1173S RC36 RSNO6105AF8
  ABENDOC1 out of IGWIRCMT+92EC @ UA69767



  LOCAL FIX:


  PROBLEM SUMMARY:
  ****************************************************************
```

```
* USERS AFFECTED: PDSE which have been process on system      *
*                 levels below HDZ2210 and have very empty    *
*                 indices,  can cause HDZ2210 to fail when    *
*                 attempting to add members to the PDSE.  The *
*                 emptiness of the PDSE indices can be        *
*                 determined by running the IEBPDSE untility  *
*                 against the data set.                       *
*                 The error is most likely when the ND free   *
*                 space is greater than 75%.                  *
*                 +IGW700I PDSE Directory Validation Successf *
*                 +DSN:SYSPLEX.T1#04031.PDSE01                *
*                 +ADPages:164 IXRecords:10056                *
*                 +ADPagesInCore:11 ADPagesRead:153           *
*                 +ADTreeLevels:3                             *
*                 +NDPages:3506 IXRecords:4000                *
*                 +NDPagesInCore:1 NDPagesRead:3505           *
*                 +NDTreeLevels:3                             *
*                 +AD ND Tree Nodes:4000                      *
*                 +ADPercentFree:43 NDPercentFree:96<------   *
*                 +Version:1                                  *
*                                                             *
*                                                             *
*                                                             *
*                                                             *
*                                                             *
*                                                             *
*                                                             *
*************************************************************
* PROBLEM DESCRIPTION: See Users Affected.                    *
*************************************************************
* RECOMMENDATION:                                            *
*************************************************************
PDSE processing will be changed to correctly handle empty
directory blocks and almost empty blocks.


PROBLEM CONCLUSION:
See Problem Summary.


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   IGWIRCMT IGWIRPAD IGWIRPND


SRLS:      NONE


RTN CODES:
```

```
  CIRCUMVENTION:


  MESSAGE TO SUBMITTER:
```

APAR OA43220 DSS Storage Tier

Example A-35 contains the cover letter for APAR OA43220.

Example A-35 OA43220

```
APAR Identifier ...... OA43220      Last Changed ........ 13/09/25
  MSGADR560E DB2 CAF CONNECT FUNCTION RC08 RSN00F30012 ISSUED WHEN
  DOING CLASS TRANSITION IN HSM PSM TO TIER2 OF A DB2 TABLE SPACE

  Symptom ...... MS MSGadr560e        Status ............ OPEN
  Severity ................... 2      Date Closed .........
  Component .......... 5695DF175      Duplicate of ........
  Reported Release ......... 210      Fixed Release .............
  Component Name DFSMSDSS, ISMF       Special Notice
  Current Target Date ..              Flags
  SCP ...................
  Platform ............

  Status Detail: DESIGN/CODE - APAR solution is being designed
                               and coded.

  PE PTF List:

  PTF List:


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  Four systems exist in the sysplex all running DB2 which has a
  table space in use on each system in the sysplex.  HSM primary
  space management starts and begins processing class transition
  to move a DB2 table space to tier2 dasd.  This fails with
  msgadr560e (001)-DDFLT(01), DB2 CAF CONNECT FUNCTION ISSUED A
  RETURN CODE OF 00000008 AND REASON CODE OF 00F30012 FOR
  SUBSYSTEM DBX3
  additional info: STORTIERS/K


  LOCAL FIX:
  n/a
```

APAR OA43221 DSS Storage Tier

Example A-36 contains the cover letter for APAR OA43221.

Example A-36 OA43221

```
APAR Identifier ...... OA43221      Last Changed ........ 13/09/27
  ABENDOF4 IN IGWLNR1O + 6E4 AFTER APPLICATION OF OA42654


  Symptom ...... AB ABENDOF4          Status ........... CLOSED  PER
  Severity ..................... 3     Date Closed ......... 13/09/27
  Component ..... 5695DF122           Duplicate of ........
  Reported Release ......... 210      Fixed Release ............ 999
  Component Name VSAM REC LEV SH      Special Notice           HIPER
  Current Target Date ..13/12/31      Flags
  SCP ...................               FUNCTIONLOSS
  Platform ............

  Status Detail: TESTPACKAGING - Packaged solution is being tested.

  PE PTF List:

  PTF List:
  Release 210   : PTF not available yet
  Release 210   : Relief is available in the form of: CALL IBM


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  After applying fix for OA42654, testing received ABENDOF4 in
  IGWLNR1O+O6E4 due to all latches not being owned.

  Symptom string:
  COMPID=DF122,CSECT=IGWLNR1O+O6E4,DATE=O7/24/13,MAINTID=OA42654
  ,ABND=0F4,RC=OOOOOO24,RSN=66F32O5O


  LOCAL FIX:
  None


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: All VSAM RLS users.                          *
  ****************************************************************
  * PROBLEM DESCRIPTION: ABENDOF4 in IGWLNR1O at offset X'6E4'   *
  *                      after application of OA42654            *
  ****************************************************************
  * RECOMMENDATION:                                              *
  ****************************************************************
  Cancelling a job waiting for a lock request can cause an abend
  due to an internal routine having erroneously released some of
```

```
  the internal latches which were not owned.


  PROBLEM CONCLUSION:
  IGWLNR1O is modified to release all the internal latches
  only if they are owned.
   KEYWORDS: RLSPSP/K


  TEMPORARY FIX:
  *********
  * HIPER *
  *********


  COMMENTS:


  MODULES/MACROS:   IGWLNR1O


  SRLS:      NONE


  RTN CODES:


  CIRCUMVENTION:


  MESSAGE TO SUBMITTER:
```

APAR OA43234 PDSE

Example A-37 contains the cover letter for APAR OA43234.

Example A-37 OA43234

```
APAR Identifier ...... OA43234      Last Changed ........ 13/09/18
  ABENDOF4 RSN5E0611OO IGWFB12O BTREE INVALID TOPNODE


  Symptom ...... AB ABEND             Status ........... CLOSED  PER
  Severity ................... 3      Date Closed ......... 13/09/10
  Component .......... 5695DF115      Duplicate of ........
  Reported Release ......... 21O      Fixed Release ............. 999
  Component Name EXTENDED DATA S      Special Notice
  Current Target Date ..13/12/31      Flags
  SCP ...................
  Platform ............

  Status Detail: TESTPACKAGING - Packaged solution is being tested.

  PE PTF List:
```

```
PTF List:
Release 210   : PTF not available yet


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
 TITLE=COMPID=DF115,CSECT=IGWFB120+2838,DATE=03/12/13,MAINTID=
NONE   ,ABND=0F4,RC=00000024,RSN=5E061100

Subcomponent: PDSE B-Tree Services
Module name : IGWFB120
Reason      : BTree_InvalidTopNode

Module flow :  IGWFB125 <- IGWIRLRU <- IGWIRLRT


LOCAL FIX:


PROBLEM SUMMARY:
*****************************************************************
* USERS AFFECTED: Abend can occur if the PDSE LRU returns a    *
*                 page buffer and the block is reassigned      *
*                 immediately.                                 *
*****************************************************************
* PROBLEM DESCRIPTION: See Users affected.                      *
*****************************************************************
* RECOMMENDATION:                                               *
*****************************************************************
Correct logic to save next block in btree before the block may
be deleted.


PROBLEM CONCLUSION:
See Summary.


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   IGWIRLRU


SRLS:      NONE


RTN CODES:
```

```
  CIRCUMVENTION:

  MESSAGE TO SUBMITTER:
```

APAR OA43234 PDSE

Example A-38 contains the cover letter for APAR OA43234.

Example A-38 OA43234

```
APAR Identifier ...... OA43234      Last Changed ........ 13/09/18
  ABENDOF4 RSN5E06110O IGWFB12O BTREE INVALID TOPNODE


  Symptom ...... AB ABEND             Status ........... CLOSED  PER
  Severity ................... 3      Date Closed ......... 13/09/10
  Component .......... 5695DF115      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............ 999
  Component Name EXTENDED DATA S      Special Notice
  Current Target Date ..13/12/31      Flags
  SCP ...................
  Platform ............

  Status Detail: TESTPACKAGING - Packaged solution is being tested.

  PE PTF List:
```

APAR OA43417 DSS Storage Tier

Example A-39 contains the cover letter for APAR OA43417.

Example A-39 OA43417

```
APAR Identifier ...... OA43417      Last Changed ........ 13/09/25
  MSGADR567E RC67 RSN105 EXCI ERROR WHEN ATTEMPTING COPY A CICS
  RLS DATA SETS USING STORAGE TIER PROCESSING.

  Symptom ...... MS MSGadr567e        Status ........... OPEN
  Severity ................... 2      Date Closed .........
  Component .......... 5695DF175      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............
  Component Name DFSMSDSS, ISMF       Special Notice
  Current Target Date ..              Flags
  SCP ...................
  Platform ............

  Status Detail: DESIGN/CODE - APAR solution is being designed
                               and coded.

  PE PTF List:

  PTF List:
```

```
Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
Processing CICS RLS data set using storage tiers to copy the
data set receives the following error:
ADR568I (001)-EXCIC(01), INVOCATION OF CICS INTERFACES BEGIN
*===========DFSMSdss EXCI Client Program (ADREXCIC)=======*
* Input Parameters: CICS CLOS APPLID="            "
* Linking to CICS EXCI server routine ADREXCIS
* The EXEC CICS LINK PROGRAM request failed. Return codes are:
*    RESP=00000058  RESP2=000001AD. ABCODE:
*================End of DFSMSdss EXCI Client Program
(ADREXCIC)=====*
ADR567E (001)-DDFLT(01), INVOCATION OF EXCI CICS INTERFACES FOR
DATA

 SET RLSTEST.VF01D.BANKACCT FAILED WITH RETURN CODE 00000008

                          AND REASON CODE 00000067

                           DIAGNOSTIC CODE IS 0C000105

Error is due to an invalid applid being used by ADRDSOCS.
additional info: STORTIERS/K


LOCAL FIX:
none
```

APAR OA43418 DSS Storage Tier

Example A-40 contains the cover letter for APAR OA43418.

Example A-40 OA43418

```
APAR Identifier ...... OA43418      Last Changed ........ 13/09/25
  LOOP IN ADRDSOC +X'D04' THROUGH X'D8E' TRYING TO LOOP THROUGH
  THE ANSWER AREA RETURNED BY GRS.

  Symptom ...... LP LOOP              Status ........... OPEN
  Severity ................... 2      Date Closed .........
  Component .......... 5695DF175      Duplicate of ........
  Reported Release ......... 210      Fixed Release .............
  Component Name DFSMSDSS, ISMF       Special Notice
  Current Target Date ..              Flags
  SCP ...................
  Platform ............

  Status Detail: DESIGN/CODE - APAR solution is being designed
                               and coded.

  PE PTF List:
```

```
  PTF List:


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  Using Storage tier processing in DFSMShsm to process CICS
  non-RLS data sets appears to hang.  Analysis of the dump shows
  we are in a loop in ADRDSOC from +x'dO4' through x'D8e' while
  processing the data returned in the answer area (ISGYQUAAR) by
  GRS.

  additional information: STORTIERS/K


  LOCAL FIX:
  none
```

APAR OA43430 DFSMSdfp

Example A-41 contains the cover letter for APAR OA43430.

Example A-41 OA43430

```
APAR Identifier ...... OA43430      Last Changed ........ 13/09/20
  BAD IEC2O5I MESSAGE AFTER 1O VOLSERS IN Z/OS2.1


  Symptom ...... MS MSGIEC2O5I        Status ............ OPEN
  Severity ................... 3      Date Closed .........
  Component .......... 5695DF1O7      Duplicate of ........
  Reported Release ......... 21O      Fixed Release .............
  Component Name DATA MGMT SUPPO      Special Notice
  Current Target Date ..              Flags
  SCP ...................
  Platform ............

  Status Detail: DESIGN/CODE - APAR solution is being designed
                               and coded.

  PE PTF List:

  PTF List:


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  When creating a Multi-volume data set and not specifying a
  volume count the IEC2O5I message will not reflect correctly the
```

```
volume serial numbers after the 10th volume.
Following is an example of the bad message:
IEC205I TAPE,TGAIR@,BACKUP,FILESEQ=1, COMPLETE VOLUME LIST,  917
DSN=TGAIR.M9SG03.DUMP,
VOLS=A00760,A00761,A00762,A00763,A00764,A00765,A00766,A00767,
VOLS=A00768,A00769,3 TIONAL VOLS,       TOTALBLOCKS=454


LOCAL FIX:
Provide a volume count in JCL
```

APAR OA43583 PDSE (also applies to pre-DFSMS V2.1)

Example A-42 contains the cover letter for APAR OA43583.

Example A-42 OA43583

```
APAR Identifier ...... OA43583      Last Changed ........ 13/10/21
  ABEND0F4 RC14 RSN25400018 IGWDLCLS+0C32 @ UA68850


  Symptom ...... AB ABEND0F4          Status ........... CLOSED  PER
  Severity ..................... 2     Date Closed ......... 13/10/21
  Component ..... 5695DF115           Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name EXTENDED DATA S      Special Notice           HIPER
  Current Target Date ..14/01/15      Flags
  SCP ...................
  Platform ............                                  DATALOSS

  Status Detail: TESTPACKAGING - Packaged solution is being tested.

  PE PTF List:

  PTF List:
  Release C10   : PTF not available yet
  Release D10   : PTF not available yet
  Release 210   : PTF not available yet


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  ABEND0F4 RC14 RSN25400018 out of the module IGWDLCLS+0C32 at
  UA68850 maintenance level.

  The reason code RSN25400018 translates to GETMAIN_FAILED.

  VSM summary data  (IP VERBX VSMDATA 'NOG SUMM') shows that
  SMSPDSE1 extended private storage is almost exhausted:

  LOCAL STORAGE MAP
```

```
 |                            |80000000  <- Top of Ext. Private
 | Extended                   |
 | LSQA/SWA/229/230           |80000000  <- Max Ext. User Region
Address
 |____________________________|32914000  <- ELSQA Bottom
 |                            |
 | (Free Extended Storage)    |
 |____________________________|32908000  <- Ext. User Region Top
 |                            |
 | Extended User Region       |
 |____________________________|32900000  <- Ext. User Region
```

An IP VERBX SMSXDATA 'F(POOLS) JOBNAME(SMSPDSE1)' will show an extremely large allocation for the "JCDM DSC POOL FOR LSTB DREFD" pool:

```
*****************************************************************
   Below the Bar Storage
Exts   TotSize         TotCells  InUseCells SP  Key Description
*****************************************************************
11315  1,205,002,240   1,131,500  1,131,500 124 50 JCDM DSC POOL
                                                  FOR LSTB
                                                  DREFD
```

The build up of the LSTB control structures is the result of PDSE index code that is attempting to join two index pages.

This failure can occur on PDSE data sets that are shared in a sysplex with mixed z/OS levels where at least one LPAR is at the HDZ2210 / z/OS 2.1 level.

LOCAL FIX:
Restart the SMSPDSE1 address space

PROBLEM SUMMARY:

```
*****************************************************************
* USERS AFFECTED: PDSE index records can rarely be broken when *
*                 the data set is updated on a release HDZ2210 *
*                 which had been updated on a lower release.   *
*****************************************************************
* PROBLEM DESCRIPTION: See Users Affected.                      *
*****************************************************************
* RECOMMENDATION:                                               *
*****************************************************************
```

PDSE index manager will be modified to now join index pages which have created on HDZ2210 and a lower release.

PROBLEM CONCLUSION:
See Problem summary.

TEMPORARY FIX:

```
*********
* HIPER * AA45383
*********


COMMENTS:


MODULES/MACROS:
IGWIRCMT IGWIVRJ2


SRLS:
NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA43701 SAM EF V2 (also applies to pre-DFSMS V2.1)

Example A-43 contains the cover letter for APAR OA43701.

Example A-43 OA43701

```
APAR Identifier ...... OA43701      Last Changed ........ 13/10/28
  VOLUME LABEL MAY BE OVERWRITTEN BY SAM EXTENDED FORMAT VERSION 2
  DATA SET - Z/OS 2.1 ONLY

  Symptom ...... IN INCORROUT         Status ........... CLOSED  PER
  Severity ................... 2      Date Closed ......... 13/10/28
  Component .......... 5695DF102      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............ 999
  Component Name BASE ACCESS MET      Special Notice           HIPER
  Current Target Date ..13/12/15      Flags
  SCP ...................
  Platform ............                 PERVASIVE      DATALOSS

  Status Detail: TESTPACKAGING - Packaged solution is being tested.

  PE PTF List:

  PTF List:
  Release C10   : PTF not available yet
  Release D10   : PTF not available yet
  Release 210   : PTF not available yet


  Parent APAR:
  Child APAR list:
```

```
ERROR DESCRIPTION:
If a multi-volume single striped SAM Extended Format Version 2
data set is allocated using Guaranteed Space and then opened for
EXTEND or opened for OUTPUT or OUTIN when allocated DISP=MOD,
the volume label on the second to last volume may be overwritten
by user data.


LOCAL FIX:
Do not use Version 2 if using Guaranteed Space allocation and
either OPEN EXTEND or OPEN OUTPUT/OUTIN and DISP=MOD is used.
To bypass this problem you must do one of the following:
1) Specify DSNTYPE=(EXT,1) or DSNTYPE=(EXT) on the JCL
OR
2) Specify EXT_VERSION(1) in IGDSMSxx parmlib member AND do NOT
specify DSNTYPE=(EXT,2) on the JCL.


The volume can be recovered by varying it offline to all
systems and running the following job.
//*************************************************************/
//*  THIS STEP REBUILDS CYL 0 HEAD 0 TO POINT TO VTOC       */
//*  CHANGE THE VOLID TO THE VOLSER REQUIRED, UNIT TO DEVICE*/
//*  NUMBER AND THE START OF THE VTOC TO THE CYLINDER and   */
//*  HEAD where it is
//*************************************************************/
//RFMT     EXEC  PGM=ICKDSF
//SYSPRINT DD SYSOUT=*
//SYSIN    DD  *
 REFORMAT UNIT(dddd) NVFY VTOCPTR(Cyl,HD) PURGE VOLID(vvvvvv)
/*
A successful vary online is a good indication all should be
fine.


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All users of multi-volume single striped SAM *
*                 extended format data sets allocated using    *
*                 guaranteed space.                            *
****************************************************************
* PROBLEM DESCRIPTION: Multi-volume single striped SAM         *
*                      extended format version 2 data sets     *
*                      allocated using guaranteed space may    *
*                      overlay the volume label on the second  *
*                      to last volume if the first OPEN is for *
*                      EXTEND or for OUTPUT or OUTIN and       *
*                      DISP=MOD is specified.  In some cases,  *
*                      such as ISPF browse, OPEN for INPUT or  *
*                      INOUT will position to the volume       *
*                      label.  Though version 2 data sets may  *
*                      not be created on releases prior to     *
*                      HDZ2210, this problem could occur if    *
```

```
*                     the data set was allocated on HDZ2210   *
*                     and first opened on an earlier release. *
*****************************************************************
* RECOMMENDATION:                                               *
*****************************************************************
Multi-volume single striped SAM extended format version 2 data
sets allocated using guaranteed space may overlay the volume
label on the second to last volume.


PROBLEM CONCLUSION:
Changed code to correctly build internal control blocks to only
allow access to the data set extents on the last volume.


TEMPORARY FIX:
*********
* HIPER * AA43701
*********

COMMENTS:


MODULES/MACROS:
IGG0193V

SRLS:
NONE


RTN CODES:

CIRCUMVENTION:

MESSAGE TO SUBMITTER:
```

B

APARs to be reviewed for DFSMS V1.13 or DFSMS V1.12

This APARs listed in this appendix should be reviewed for impact to your installation before implementing z/OS 2.1 DFSMS.

Where APAR text is shown, it is at time of writing of this IBM Redbooks publication. The current version should be checked for updates. When an APAR has had a PTF shipped, and a problem is then found, the PTF will be marked “PE”, and also the original APAR may be updated to show the fixing APAR numbers.

There are two lists in this Redbooks publication. One for fixes that should be applied to DFSMS V2.1 before it is used, and one that should be applied to DFSMS V1.13 or DFSMS V1.12 before DFSMS V2.1 is used.

The lists that follow do not include every APAR that might be required, but is representative. If the PTFs for the listed APARs are applied, many other APARs will also be included.

This list is for DFSMS V1.13 and DFSMS V1.12.

The corresponding list for DFSMS V2.1 can be found at Appendix A, “APARs to be reviewed for DFSMS V2.1” on page 237.

DFSMS suggested and required fixes for pre-DFSMS V2.1

In some cases, there are no PTFs for the listed APARs, and some may have been superseded. The current listing from IBMLINK should be checked for current status and PTFs.

Some of the APARs listed in this part are also applicable to DFSMS V2.1.

APAR OA35808 RMM

Example B-1 contains the cover letter for APAR OA35808.

Example B-1 OA35808

```
APAR Identifier ...... OA35808      Last Changed ........ 13/06/03
  NF - TOLERATION FOR Z/OS DFSMSRMM V2R1


  Symptom ...... NF NF                Status ........... CLOSED  UR1
  Severity ..................... 4     Date Closed ......... 13/04/16
  Component .......... 5695DF186      Duplicate of ........
  Reported Release ......... A10      Fixed Release ............. 999
  Component Name DFSMSRMM             Special Notice       ATTENTION
  Current Target Date ..13/05/08      Flags
  SCP ...................                            NEW FUNCTION
  Platform ............


  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release A10   : UA68801 available 13/05/02 (     )
  Release B10   : UA68802 available 13/05/02 (     )
  Release C10   : UA68803 available 13/05/03 (F305 )
  Release D10   : UA68804 available 13/05/03 (F305 )


  Parent APAR:
  Child APAR list: OA42058


  ERROR DESCRIPTION:
  Toleration for future new function


  LOCAL FIX:


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: All users of DFSMSrmm.                       *
  ****************************************************************
```

```
* PROBLEM DESCRIPTION: This ARAR provides toleration           *
*                      for z/OS V2R1 DFSMSrmm.                 *
*                      ZOSO2O1C/K                              *
****************************************************************
* RECOMMENDATION: Apply the applicable PTF(s).                 *
****************************************************************
APAR OA358O8 provides coexistence support to allow systems at
z/OS V1R1O (HDZ1A1O) and above to coexist in an RMMplex with
a z/OS V2R1 (HDZ221O) level system. This APAR is required on
the lower level systems to tolerate new support introduced
in z/OS V2R1, or for backout of the new function.

OA358O8 recognizes and supports the new data set attribute
LASTREF, and a new volume attribute RETAINBY.

Coexistence support pertains an existing set of consistent
LASTREF extra_days in formation for a multi-volume data set
created or maintained in V2R1 whenever retention information
for a file in that set is added or changed in a lower release.
New single data set records will get extra_days O assigned.
An extra_days value of O has the same effect as using NOLASTREF.
When an existing multi volume data set is enlarged with MOD and
a new data set record is added to the RMM CDS because of EOV
then the extra_days value for LASTREF is taken from the existing
previous data set record.

Coexistence support pertains an existing volume set of
consistent RETAINBY information and consistent volume
expiration date for a multi-volume set created or maintained
in V2R1 whenever retention information for a file or a volume
in that set is added or changed in a lower release. EXPDT
equalization for volume sets depending on the RETAINBY attribute
will be rolled down. New single volumes will get RETAINBY O
assigned. This has the same effect as using RETAINBY(VOLUME).
When an existing multi volume set is enlarged and a new volume
record is added to the RMM CDS because of EOV then the RETAINBY
is taken from the existing previous volume record.


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
NF - TOLERATION FOR Z/OS DFSMSRMM V2R1
ZOSO2O1C/K

There are two new messages in
z/OS MVS System Messages, Vol 5 (EDG-GFS) SA22-7635

EDG3369I FILE EXPIRATION ATTRIBUTES ACCEPTED BUT IGNORED
FOR THE VOLUME EXPIRATION BECAUSE VOLUME IS RETAINED BY
FIRSTFILE
```

Explanation: You issued an ADDDATASET or a CHANGEDATASET subcommand with a RETPD, EXPDT, or LASTREF operand for a file which is not the first file of the volume set. RMM detects that the data set resides on a volume managed by the EXPDT retention method with the RETAINBY(FIRSTFILE) attribute. The data set will get the new expiration date or LASTREF attribute assigned, but the effective expiration date of the volume is unchanged as long the first file of the volume set is not changed.

System Action: The subcommand ends with return code 4 reason code 278
Operator Response: n/a.

Application Programmer Response: Check the expiration date of the volume. If it is lower than the needed expiration date of the data set, you can enlarge the expiration date of the first file of the volume set.
Source: DFSMSrmm

Source: DFSMSrmm

Detecting Module: EDGMTSO

EDG3372I CHANGE OF EXPIRATION DATE NOT ALLOWED FOR VOLUMES RETAINED BY FIRST FILE

Explanation: You issued a CHANGEVOLUME subcommand with a RETPD or an EXPDT operand for a volume or volume set defined with RETAINBY(FIRSTFILE) attribute. This is not supported. System action: The subcommand ends with return code 12 reason code 284.

Operator Response: n/a.

Application Programmer Response: To change the expiration date of all volumes of the set you can issue a CHANGEDATASET subcommand for the first file of the volume set. Alternatively the RETAINBY attribute of the volume set can be changed to RETAINBY(VOLUME) or RETAINBY(SET).

Source: DFSMSrmm

Detecting Module: EDGMTSO

MODULES/MACROS: EDGDOC EDGDOCS EDGEXTSY EDGMFIO EDGMTAB EDGMTSO EDGSOCE EDGSOCS EDGTSO EDGTSORT EDGXMLAP

```
SRLS:      SA22763516 SA22763518 SA22763519 SA22763521

RTN CODES:

CIRCUMVENTION:

MESSAGE TO SUBMITTER:
```

APAR OA36403 RLS

Example B-2 contains the cover letter for APAR OA36403.

Example B-2 OA36403

```
APAR Identifier ...... OA36403      Last Changed ........ 13/09/13
  NEW FUNCTION


  Symptom ...... NF NF                Status ........... CLOSED  UR1
  Severity ..................... 3     Date Closed ......... 13/04/05
  Component .......... 5695DF122      Duplicate of ........
  Reported Release ......... B10      Fixed Release ............. 999
  Component Name VSAM REC LEV SH      Special Notice       ATTENTION
  Current Target Date ..13/04/30      Flags
  SCP ...................                            NEW FUNCTION
  Platform ............


  Status Detail: APARCLOSURE - APAR is being closed.

  PE PTF List:

  PTF List:
  Release A10   : UA68641 available 13/04/15 (     )
  Release B10   : UA68642 available 13/04/15 (     )
  Release C10   : UA68643 available 13/04/16 (F304 )
  Release D10   : UA68644 available 13/04/16 (F304 )


  Parent APAR:
  Child APAR list: OA36409 OA36414 OA36422 OA36492 OA36916


  ERROR DESCRIPTION:
  New function.


  LOCAL FIX:


  PROBLEM SUMMARY:
  ****************************************************************
```

```
* USERS AFFECTED: ALL RLS users.                                  *
****************************************************************
* PROBLEM DESCRIPTION: RLS Toleration APAR.                       *
****************************************************************
* RECOMMENDATION:                                                *
****************************************************************
RLS Toleration APAR.
ZOSO2O1C/K


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
RLS Toleration APAR.
 KEYWORDS: RLSPSP/K


MODULES/MACROS:   IDAVCBLK IDAVCBL2 IDAVCMAT IDAVCUBL IDAVOMAT
IDAVQCAT IDAVQDMP IDAVQDRV IDAVQENA IDAVQPCP IDAVQSET IDAVQSRL
IDAVQSXT IDAVQUAC IDAVRRND IDAVRRN2 IDAVRRST IDAVRSSF IDAVUACK
IDAVXMAT IGWLNIO1 IGWLNI16 IGWLPQYS IGWSDISP IGWSDIS2 IGWSGMSG
IGWSRTE3 IGW8QEXR


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA36409 RLS

Example B-3 contains the cover letter for APAR OA36409.

Example B-3 OA36409

```
APAR Identifier ...... OA36409      Last Changed ........ 13/09/13
  NEW FUNCTION


  Symptom ...... NF NF                Status ........... CLOSED  UR1
  Severity ................... 3      Date Closed ......... 13/04/05
  Component .......... 5695DF119      Duplicate of ........
  Reported Release ......... B10      Fixed Release ............. 999
  Component Name COMM FUNCTION/R      Special Notice       ATTENTION
  Current Target Date ..13/04/30      Flags
```

```
SCP ...................                              NEW FUNCTION
Platform ............


Status Detail: APARCLOSURE - APAR is being closed.

PE PTF List:

PTF List:
Release A10   : UA68641 available 13/04/15 (     )
Release B10   : UA68642 available 13/04/15 (     )
Release C10   : UA68643 available 13/04/16 (F304 )
Release D10   : UA68644 available 13/04/16 (F304 )


Parent APAR:    OA36403
Child APAR list:


ERROR DESCRIPTION:
New function.


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: ALL RLS users.                               *
****************************************************************
* PROBLEM DESCRIPTION: RLS Toleration APAR.                    *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
RLS Toleration APAR.
ZOSO201C/K


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
RLS Toleration APAR.


MODULES/MACROS:   INTLPRTS


SRLS:      NONE


RTN CODES:
```

```
  CIRCUMVENTION:

  MESSAGE TO SUBMITTER:
```

APAR OA36414 DFSMShsm RLS

Example B-4 contains the cover letter for APAR OA36414.

Example B-4 OA36414

```
APAR Identifier ...... OA36414      Last Changed ........ 13/05/03
  NEW FUNCTION - DFSMSHSM TOLERATION COEXISTENCE SUPPORT FOR RLS
  USER CATALOGS

  Symptom ...... NF NF                Status ............ CLOSED  UR1
  Severity ................... 3      Date Closed ......... 13/04/08
  Component .......... 5695DF170      Duplicate of ........
  Reported Release ......... B10      Fixed Release ............. 999
  Component Name DFSMSHSM, ISMF       Special Notice
  Current Target Date ..13/07/31      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release A10   : UA68663 available 13/04/15 (     )
  Release B10   : UA68664 available 13/04/15 (     )
  Release C10   : UA68665 available 13/04/16 (F304 )
  Release D10   : UA68666 available 13/04/16 (F304 )


  Parent APAR:    OA36403
  Child APAR list:


  ERROR DESCRIPTION:
  DFSMShsm toleration coexistence support for RLS user catalogs.


  LOCAL FIX:


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: Users with DFSMShsm hosts on z/OS V2R1       *
  *                 which share CDSs and ICF catalogs with       *
  *                 hosts running at z/OS V1R13, V1R12, V1R11,   *
```

```
*                 and/or V1R10                                  *
****************************************************************
* PROBLEM DESCRIPTION: Changes in the RLS ICF user catalog     *
*                      function in z/OS V2R1 require that      *
*                      z/OS V1R10 through V1R13 hosts be       *
*                      updated. This APAR provides toleration  *
*                      support for Record Level Sharing (RLS)  *
*                      user catalogs that are processed        *
*                      using DFSMShsm.                         *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
Changes in the RLS ICF user catalog function in z/OS V2R1
require that z/OS V1R13 through V1R10 hosts be updated.
.
Additional keywords:
ZOS0201C/K


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
DFSMShsm has been modified such that the RLS user catalog
support for z/OS V2R1 can be detected and processed
appropriately.
.
With the toleration/coexistence PTFs installed, DFSMShsm will
invoke DFSMSdss to support backup and recover of SMS managed
RLS-eligible user catalogs on z/OS pre-V2R1 systems.
.
See DFSMSdss OA36422 for more information.


MODULES/MACROS:   ARCBUDS  ARCKUCAT ARCNCAT  ARCNVFYA ARCWCNT
ARCWDEFC ARCWLSTC


SRLS:      NONE

RTN CODES:

CIRCUMVENTION:

MESSAGE TO SUBMITTER:
```

APAR OA36415 RLS

Example B-5 contains the cover letter for APAR OA36415.

Example B-5 OA36415

```
APAR Identifier ...... OA36415      Last Changed ........ 13/05/03
  NEW FUNCTION TOLERATION


  Symptom ...... NF NEWFUNCTION       Status ........... CLOSED  UR1
  Severity ..................... 4     Date Closed ......... 13/04/10
  Component ..... 5695DF122           Duplicate of ........
  Reported Release ......... A10      Fixed Release ............ 999
  Component Name VSAM REC LEV SH      Special Notice
  Current Target Date ..13/09/30      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release A10   : UA68691 available 13/04/15 (     )
  Release B10   : UA68692 available 13/04/15 (     )
  Release C10   : UA68693 available 13/04/17 (F304 )
  Release D10   : UA68694 available 13/04/17 (F304 )


  Parent APAR:
  Child APAR list: OA36443


  ERROR DESCRIPTION:
  Toleration apar for new function


  LOCAL FIX:
  No local fix


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: All users of z/OS HDZ1A10 and above.         *
  ****************************************************************
  * PROBLEM DESCRIPTION: New function APAR.                      *
  ****************************************************************
  * RECOMMENDATION:                                              *
  ****************************************************************
  New function apar.
  ZOS0201C/K


  PROBLEM CONCLUSION:
```

```
TEMPORARY FIX:


COMMENTS:
New function APAR.
 KEYWORDS: RLSPSP/K


MODULES/MACROS:   IDAV192A IDAV192B IDAV192C IDAV192F IDAV193A
IDAV194A IDAV200B IDAV200T IDAV201T IDAV202T IDAV203T IDAV231T
IDAV232T IDAV233T IGWMCOLD IGWMPROP IGWSDCD2 IGWSDRDM IGWSDRDS
IGWSDWRM IGWSDWRS IGWSXMSG


SRLS:      SA22763714


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA36422 DSS RLS

Example B-6 contains the cover letter for APAR OA36422.

Example B-6 OA36422

```
APAR Identifier ...... OA36422      Last Changed ........ 13/06/26
  NEW FUNCTION - DFSMSDSS SUPPORT OF RLS USER CATALOGS TOLERATION/
  COEXISTENCE

  Symptom ...... NF NF               Status ............ CLOSED  UR1
  Severity ................... 3     Date Closed ......... 13/04/05
  Component .......... 5695DF175     Duplicate of ........
  Reported Release ......... B10     Fixed Release ............. 999
  Component Name DFSMSDSS, ISMF      Special Notice       ATTENTION
  Current Target Date ..             Flags
  SCP ...................                              NEW FUNCTION
  Platform ............


  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release A10   : UA68646 available 13/04/15 (     )
  Release B10   : UA68647 available 13/04/15 (     )
```

```
Release C10   : UA68648 available 13/05/03 (F304 )
Release D10   : UA68649 available 13/05/03 (F304 )


Parent APAR:    OA36403
Child APAR list:


ERROR DESCRIPTION:
New function - Toleration/coexistence for DFSMSdss handling of
RLS user Catalogs.


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: Users of DFSMSdss processing User            *
*                 Catalogs.                                    *
****************************************************************
* PROBLEM DESCRIPTION: This APAR provides toleration support   *
*                      for Record Level Sharing ( RLS )        *
*                      User Catalogs ( BCS ) that are          *
*                      processed using DFSMSdss commands.      *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
ZOSO201C/K


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
Users of DFSMSdss attempting to process a User h
in any release prior to zOS V2.1 that is opened in RLS
mode will be failed on lower level systems. Errors that
could be encountered while attempting to process a User
Catalog that is opened in RLS mode in a prior release are
the following:
IEC161I 006-0122
IEC331I 4-86
ADR724E
ADR380E

If a User Catalog is not open in RLS mode on zOS V2.1,
DFSMSdss will successfully process the User Catalog on a
lower level system if no errors are encountered.

Documentation changes for OA36422:
```

```
The following new reason code Explanation and Application
Programmer Response will be added in the zOS V1.13
MVS System Messages, Vol 1 (ABA-AOM) under existing
message ADR380E.

Explanation:  87  The data set is a Catalog open for use
with RLS access.

Application Programmer Response:  Process the RLS Catalog
using z/OS V2R1 or higher.



MODULES/MACROS:   ADRCATLG ADRDDFLT ADRDTDSC ADRFMSCT ADRKVDSN
ADRTDDS  ADRTDLOG


SRLS:      SA22763100


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER: corrected APAR number in responder text.
```

APAR OA36443 RLS related

Example B-7 contains the cover letter for APAR OA36443.

Example B-7 OA36443

```
APAR Identifier ...... OA36443      Last Changed ........ 13/09/13
  NEW FUNCTION TOLERATION


  Symptom ...... NF PERFM             Status ........... CLOSED  UR1
  Severity ................... 4      Date Closed ......... 13/04/10
  Component .......... 5695DF106      Duplicate of ........
  Reported Release ......... A10      Fixed Release ............ 999
  Component Name DFSMS VSAM           Special Notice
  Current Target Date ..13/06/30      Flags
  SCP ...................
  Platform ............

  Status Detail: APARCLOSURE - APAR is being closed.

  PE PTF List:

  PTF List:
  Release A10   : UA68691 available 13/04/15 (     )
  Release B10   : UA68692 available 13/04/15 (     )
  Release C10   : UA68693 available 13/04/17 (F304 )
```

```
Release D10   : UA68694 available 13/04/17 (F304 )


Parent APAR:    OA36415
Child APAR list:


ERROR DESCRIPTION:
Toleration for new funtion


LOCAL FIX:
No local fix


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All users of z/OS HDZ1A10 and above.         *
****************************************************************
* PROBLEM DESCRIPTION: New function apar.                      *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
New funtion APAR.
ZOSO201C/K


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
New funtion toleration.


MODULES/MACROS:   IDAOA05B IDAO192A IDAO192D IDAO192G IDAO200B
IDAO200T IDAO231B IDAO557E


SRLS:      NONE

RTN CODES:

CIRCUMVENTION:

MESSAGE TO SUBMITTER:
```

APAR OA36492 RLS and catalog

Example B-8 contains the cover letter for APAR OA36492.

Note: PTF fixes are in error. See APAR OA42551 and APAR OA42541.

Example B-8 OA36492

```
APAR Identifier ...... OA36492      Last Changed ........ 13/08/02
  NEW FUNCTION TOLERATION APAR


  Symptom ...... NF NF                Status ............ CLOSED  UR1
  Severity ................... 3      Date Closed ......... 13/04/05
  Component .......... 5695DF105      Duplicate of ........
  Reported Release ......... A10      Fixed Release ............ 999
  Component Name ICF CATALOG & I      Special Notice
  Current Target Date ..              Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release A10   : UA68641 available 13/04/15 (     )
  Release B10   : UA68642 available 13/04/15 (     )
  Release C10   : UA68643 available 13/04/16 (F304 )
  Release D10   : UA68644 available 13/04/16 (F304 )


  Parent APAR:    OA36403
  Child APAR list: OA41517 OA42462


  ERROR DESCRIPTION:
  New function.

  CATKEYS: CAT2012 CATRLS CATNEW


  LOCAL FIX:


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: New Function                                 *
  ****************************************************************
  * PROBLEM DESCRIPTION: TOLERATION SUPPORT for RLS for Catalog. *
  *                      ZOS0201C/K                              *
  ****************************************************************
  * RECOMMENDATION:                                              *
  ****************************************************************
```

```
TOLERATION SUPPORT for RLS for Catalog function.


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
None
 **** PE13/06/14 FIX IN ERROR. SEE APAR OA42551  FOR DESCRIPTION
 **** PE13/06/14 FIX IN ERROR. SEE APAR OA42541  FOR DESCRIPTION


MODULES/MACROS:   IGGOCLAH IGGOCLA9 IGGOCLC1 IGGOCLFA IGGOCLFB
IGGOCLFH IGGOCLFK IGGOCLFN IGGOCLFO IGGOCLKO IGGOCLKV


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA36536 PDSE member size

Example B-9 contains the cover letter for APAR OA36536.

Example B-9 OA36536

```
APAR Identifier ...... OA36536      Last Changed ........ 13/05/03
  COEXISTANCE APAR FOR PDSE


  Symptom ...... NF NEWFUNCTION       Status ........... CLOSED  UR1
  Severity ................... 2      Date Closed ......... 13/04/11
  Component .......... 5695DF102      Duplicate of ........
  Reported Release ......... A10      Fixed Release ............ 999
  Component Name BASE ACCESS MET      Special Notice
  Current Target Date ..13/05/15      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
```

```
Release A10   : UA68751 available 13/04/15 (     )
Release B10   : UA68752 available 13/04/15 (     )
Release C10   : UA68753 available 13/04/16 (F304 )
Release D10   : UA68754 available 13/04/16 (F304 )


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
COEXISTANCE APAR for PDSE.


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All users of PDSEs that have z/OS release    *
*                 2.1 installed.                               *
****************************************************************
* PROBLEM DESCRIPTION: Compatibility for PDSE.                 *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
Compatibility PTF for PDSE z/OS release 2.1


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
Compatibility/coexistence PTF for PDSE member size limitation.
ZOS0201C/K

MODULES/MACROS:   IGG019BK

SRLS:      NONE

RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA36576 DFSMShsm Storage Tiers

Example B-10 contains the cover letter for APAR OA36576.

Note: PTFs for this APAR are in error. See APAR OA42529.

Example B-10 OA36576

```
APAR Identifier ...... OA36576      Last Changed ........ 13/08/14
  NEW FUNCTION: Coexistence for Storage Tiers - DFSMShsm Support.


  Symptom ...... NF NEW FUNCTION      Status ............ CLOSED  UR1
  Severity ................... 4      Date Closed ......... 13/04/10
  Component .......... 5695DF17O      Duplicate of ........
  Reported Release ......... A1O      Fixed Release ............. 999
  Component Name DFSMSHSM, ISMF       Special Notice       ATTENTION
  Current Target Date ..13/05/31      Flags
  SCP ...................
  Platform ............
                                      XSYSTEM

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release A1O   : UA68714 available 13/04/15 (     )
  Release B1O   : UA68715 available 13/04/15 (     )
  Release C1O   : UA68716 available 13/04/17 (F3O4 )
  Release D1O   : UA68717 available 13/04/17 (F3O4 )


  Parent APAR:
  Child APAR list: OA37582


  ERROR DESCRIPTION:
  NEW FUNCTION


  LOCAL FIX:
  NEW FUNCTION


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: All users of an HSMplex with V2R1 and lower  *
  *                 level DFSMShsm releases.                     *
  ****************************************************************
  * PROBLEM DESCRIPTION: z/OS V1R13, V1R12, V1R11, V1R1O         *
  *                      levels of DFSMShsm need to tolerate     *
  *                      the DSR, MCD and VSR records expanded   *
  *                      due to the class transition function    *
```

```
*                      introduced in V2R1 DFSMShsm release.    *
*****************************************************************
* RECOMMENDATION:                                               *
*****************************************************************
z/OS V1R13, V1R12, V1R11 and V1R10 levels of DFSMShsm need to
tolerate the DSR, MCD and VSR records expanded due to the class
transition function introduced in V2R1 DFSMShsm release.


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
With the new class transition function there is a new type of
FSR record. ARCDSR and ARCVSR records derived from ARCFSR
records are expanded to contain the new function information.
To avoid record truncation on lower systems, these records
must be also expanded and all affected modules recompiled.
Work areas using these fields must be expanded as well.
To tolerate the expansion of the MCD record, all affected
modules must also be recompiled.

Recall.
Recalls will be processed normally if no Last Successful Class
Transition Date (LSCTD) exists or the data set Management Class
does not contain Class Transition parameters. Recalls will be
directed to a V2.1 host using the Common Recall Queue (CRQ) if
a CRQ V2R1 host available in the Sysplex and if a LSCTD
exists or the data set Management Class does not contain Class
Transition parameters. If there is no V2.1 host or CRQ is not
established and a data set has gone through a Class Transition
rules, then the recalls will fail. The failing message
(ARC1179I Reason=7(new)) will be issued to state that the data
set should be recalled on a V2.1 system where Class
Transition rules can be followed.
DFSMShsm will not issue a warning message for RECOVER, FRRECOV
and ARECOVERs when a LSCTD is lost because backup/recover
processing does not lend itself to transitions as space
management does.
If a user wants to recall a data set on the pre-V2.1 system then
the new MCVTF_SKIP_CLTR flag should be patched ON
(PATCH .MCVT.+286 BITS(...1....) ). The warning ARC0784I
message 'LAST SUCCESSFUL CLASS TRANSITION DATA FOR DATA SET
dsname NOT RETAINED DURING THE CLASS TRANSITION' will be issued
for the data sets recalled on pre-V2.1 system for which LSCTD
exists.
The default value of MCVTF_SKIP_CLTR flag is OFF.

++HOLD(DOC)

V1R10, V1R11, V1R12 and V1R13 MVS System Messages Vol 2(ARC-ASA)
SRL: SA22763218, SA22763219, SA22763220, SA22763221
```

```
1. A new reason code RSN07 will be added for RC79 for the
ARC1179I message:

Explanation:
7 - Class Transition rules are not followed for recall
    of this data set.

Application Programmer Response:
    Use DFSMShsm V2.1 or higher to recall this data set.

2. ARC0784I message will be extended:

 ARC0784I {EXTENDED ATTRIBUTES | LAST SUCCESSFUL CLASS
 TRANSITION DATE} FOR DATA SET dsname {WERE | WAS} NOT


 RETAINED DURING THE RECALL | RECOVER | ARECOVER

Explanation:
  The data set was recalled from a migration copy, but
  Class Transition rules are not followed for the recall
  of this data set.


z/OS V1R13 DFSMShsm Data Areas
SRL:GC521083XX

MCDMigration Control Data Set Data Set Record
  (Table 84) will be modified:

456(1C8) 392(188) FIXED 4  MCDCSZ_HO High order for MCDSZ.
460(1CC) 396(18C) FIXED 15 MCD_STGR_LENGTH FIXED Storage
                                      group name length
462(1CE) 398(18E) CHAR  30 MCD_STGR_NAME Storage group name
492(1EC) 428(1AC) CHAR  4  MCD_CLTR_DATE CHAR The last class
                                    transition date or zero
496(1F0) 432(1B0) CHAR  24

520(208) 456(1C8) CHARACTER MCDEND End of record.


++HOLD(A0)
SPECIAL CONDITIONS:
          A0: MSG=ARC1179I CHANGE=New RSN 07
      A0: MSG=ARC0784I NEW=TEXT-INSERT
          A0: ENDA0 COMMENT='***End of the list of changes
                  that could affect your automated
                  operations.  The DOC text has
                  details of the changes.***'


++HOLD MTS
This PTF will not be fully effective on the system it is being
applied until the PTF(s) are applied to all systems in the
```

```
sysplex.

New release        Keyword
z/OS V2R1          ZOSO201C/K
 **** PE13/06/13 FIX IN ERROR. SEE APAR OA42529  FOR DESCRIPTION


MODULES/MACROS:   ARCASTAI ARCAUDIT ARCAUDMS ARCAXREP ARCAZWC
ARCCP    ARCCPQST ARCCPRTN ARCCSTAI ARCCTL   ARCCVSR  ARCDCOLL
ARCDSTAI ARCESTAI ARCFCRE  ARCFDEL  ARCFSTAI ARCGDSRV ARCGSTAI
ARCGVDS  ARCISTAT ARCJRELP ARCJRPLT ARCJRSEL ARCJSTAE ARCJSTAI
ARCKBLDC ARCKCDSR ARCKDELA ARCKMITA ARCKMIT1 ARCKOTHR ARCKSDSP
ARCKWRIT ARCKWRTT ARCMDSMV ARCMDSUV ARCMLCLN ARCMRECN ARCMSCLN
ARCMSG   ARCMSTAI ARCMVCLN ARCMVDS  ARCNCDSW ARCNDELR ARCNMVR1
ARCNMVR2 ARCNOTR1 ARCNRCHK ARCNRDSI ARCNRDS1 ARCNVRFY ARCNVRF1
ARCNWRIT ARCPRLOG ARCPRQ   ARCRCYPQ ARCREUIM ARCRNVDS ARCRPT
ARCRSTR  ARCRVDS  ARCSMINT ARCUDATA ARCUTIL  ARCWSMS  ARCXSTAI
ARCYSTAI ARCZMSGS ARCZREAD ARCZRNXT ARCZUPDT


SRLS:      SA22763218 GC521083XX SA22763219 SA22763220
SA22763221


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA36916 RLS

Example B-11 contains the cover letter for APAR OA36916.

Example B-11 OA36916

```
APAR Identifier ...... OA36916      Last Changed ........ 13/09/13
  NEW FUNCTION COMPROUTE OA36403


  Symptom ...... NF NF                Status ........... CLOSED  UR1
  Severity ..................... 3     Date Closed ......... 13/04/05
  Component ..... 5695DF106           Duplicate of ........
  Reported Release ......... A10      Fixed Release ............. 999
  Component Name DFSMS VSAM           Special Notice
  Current Target Date ..13/04/30      Flags
  SCP ...................
  Platform ............

  Status Detail: APARCLOSURE - APAR is being closed.

  PE PTF List:
```

```
  PTF List:
  Release A10   : UA68641 available 13/04/15 (     )
  Release B10   : UA68642 available 13/04/15 (     )
  Release C10   : UA68643 available 13/04/16 (F304 )
  Release D10   : UA68644 available 13/04/16 (F304 )

Parent APAR:    OA36403
  Child APAR list:

  ERROR DESCRIPTION:
  New function.

  LOCAL FIX:

  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: ALL RLS users.                               *
  ****************************************************************
  * PROBLEM DESCRIPTION: RLS Toleration APAR.                    *
  ****************************************************************
  * RECOMMENDATION:                                              *
  ****************************************************************
  RLS Toleration APAR.
  ZOS0201C/K

  PROBLEM CONCLUSION:

  TEMPORARY FIX:


  COMMENTS:
  RLS Toleration APAR.


  MODULES/MACROS:   IDA0192A IDA0192C IDA0192X IDA0200B IDA0200T


  SRLS:      NONE


  RTN CODES:


  CIRCUMVENTION:


  MESSAGE TO SUBMITTER:
```

APAR OA37336 PDSE in GDG DSS support

Example B-12 contains the cover letter for APAR OA37336.

Example B-12 OA37336

```
APAR Identifier ...... OA37336      Last Changed ........ 13/05/03
  NEW FUNCTION - DFSMSDSS TOLERATION/COEXISTENCE OF PDSE DATA SETS
  DEFINED AS A GENERATION DATA SET ( GDS ).

  Symptom ...... NF NEWFUNCTION       Status ........... CLOSED  UR1
  Severity ..................... 3     Date Closed ......... 13/04/10
  Component .......... 5695DF175      Duplicate of ........
  Reported Release ......... A10      Fixed Release ............. 999
  Component Name DFSMSDSS, ISMF       Special Notice       ATTENTION
  Current Target Date ..              Flags
  SCP ...................                              NEW FUNCTION
  Platform ............


  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release A10   : UA68720 available 13/04/15 (     )
  Release B10   : UA68721 available 13/04/15 (     )
  Release C10   : UA68722 available 13/04/16 (F304 )
  Release D10   : UA68723 available 13/04/16 (F304 )


  Parent APAR:
  Child APAR list: OA37349


  ERROR DESCRIPTION:
  TOLERATION/COEXISTENCE for DFSMSdss handling of PDSE
  data sets defined as a Generation Data Set ( GDS )


  LOCAL FIX:



  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: Users of DFSMSdss COPY, DUMP, RESTORE and    *
  *                 CONVERTV.                                    *
  ****************************************************************
  * PROBLEM DESCRIPTION: This APAR provides toleration support   *
  *                      for PDSE data sets defined as a GDS     *
  *                      (Generation Data Set ) that are         *
  *                      processed using DFSMSdss commands.      *
  ****************************************************************
  * RECOMMENDATION:                                              *
```

```
*****************************************************************

PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
ZOS0201C/K

Users of DFSMSdss attempting to process an SMS-managed PDSE
data set defined as a GDS in any release prior to z/OS V2.1
will be failed.

Documentation changes for OW37336:

The following new reason code explanation will be added
to the zOS V1.13 MVS System Messages, Vol 1 (ABA-AOM)
under existing message ADR285E:

Explanation: 15  The PDSE data set is defined as a generation
                 data set (GDS).

The following new reason code explanation will be added
to the zOS V1.13 MVS System Messages, Vol 1 (ABA-AOM)
under existing message ADR778E:

Explanation: 20  The PDSE data set is defined as a GDS.


MODULES/MACROS:   ADRDDFLT ADRDTDSC ADRFDSDU ADRFDSRL ADRFDSRS
ADRFRLBO ADRKVDSF ADRPCNVS ADRPPRNV ADRPREDS


SRLS:      SA22763100


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA37349 PDSE in GDG DFSMShsm support

Example B-13 contains the cover letter for APAR OA37349.

Example B-13 OA37349

```
APAR Identifier ...... OA37349      Last Changed ........ 13/05/03
  NEW FUNCTION - DFSMSHSM TOLERATION COEXISTENCE FOR PDSE DATA
```

```
SETS DEFINED AS GENERATION DATA SETS ( GDS )

Symptom ...... NF NEWFUNCTION       Status ........... CLOSED  UR1
Severity ..................... 4     Date Closed ......... 13/04/10
Component .......... 5695DF170      Duplicate of ........
Reported Release ......... A10      Fixed Release ............ 999
Component Name DFSMSHSM, ISMF       Special Notice
Current Target Date ..13/07/31      Flags
SCP ...................
Platform ............

Status Detail: SHIPMENT - Packaged solution is available for
                          shipment.

PE PTF List:

PTF List:
Release A10   : UA68728 available 13/04/15 (     )
Release B10   : UA68729 available 13/04/15 (     )
Release C10   : UA68730 available 13/04/17 (F304 )
Release D10   : UA68731 available 13/04/17 (F304 )


Parent APAR:    OA37336
Child APAR list:


ERROR DESCRIPTION:
DFSMShsm toleration / coexistence support for PDSE generation
data sets ( GDS ).



LOCAL FIX:



PROBLEM SUMMARY:
*****************************************************************
* USERS AFFECTED: Users with DFSMShsm hosts on z/OS V2R1       *
*                 which share CDSs and process PDSEs that are  *
*                 generation data sets on hosts running at     *
*                 z/OS V1R13, V1R12, V1R11, and/or V1R10       *
*****************************************************************
* PROBLEM DESCRIPTION: The generation data groups (GDGs)       *
*                      support for PDSE generation data sets   *
*                      (GDSs) in z/OS V2R1 requires z/OS       *
*                      V1R10 through V1R13 hosts to be         *
*                      updated.                                *
*****************************************************************
* RECOMMENDATION:                                              *
*****************************************************************
Changes in the GDG support for PDSE in z/OS V2R1 require that
z/OS V1R10 through V1R13 hosts to be updated.
.
```

```
Additional keywords:
ZOS0201C/K
DFSMSdss OA37366


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
DFSMShsm has been modified so that the new PDSE generation
data sets can be detected and handled appropriately.
.
With the toleration/coexistence PTF installed, SMS managed
PDSE generation data sets created by z/OS V2R1 hosts will be
failed by DFSMShsm or DFSMSdss on z/OS pre-V2R1 hosts with an
existing DFSMShsm message or the new DFSMSdss MSGADR778E RC20.
.
MSGARC1001I dsn MIGRATE FAILED, RC=0087, REAS=0006
MSGARC1287I A DISCREPANCY WAS FOUND IN THE DATA SET VTOC ENTRY
.
MSGARC1001I dsn BACKDS FAILED, RC=0087, REAS=0006
MSGARC1387I A DISCREPANCY WAS FOUND IN THE DATA SET VTOC ENTRY
.
MSGARC6172E DATA SET dsn IS NOT SUPPORTED IN AN ALLOCATE LIST
FOR AGGREGATE GROUP group_name
.
MSGADR778E DATA SET dsn WAS NOT SELECTED BECAUSE THE DATA SET
TYPE IS NOT SUPPORTED IN THIS RELEASE, 20
.
The following publication updates will be made:
z/OS MVS System Messages, Vol 2 (ARC-ASA), SA22-7632
SRL: SA22763218, SA22763219, SA22763220, SA22763221
Update the Application Programmer Response section and add
the following to the examples of unsupported situations for
ABACKUP:
 - datasetname represents an SMS-managed PDSE generation
   data set. Use DFSMShsm V2R1 or higher release to process
   the data set.
.
Add following text to the ARECOVER section:
  Ensure the data sets specified in the ALLOCATE list are
  acceptable for processing. Some examples of unsupported
  data sets are:
  - datasetname represents an SMS-managed PDSE generation
    data set. Use DFSMShsm V2R1 or higher release to process
    the data set.

MODULES/MACROS:   ARCKALLC ARCKBLDC ARCMDSUV ARCNOTR1


  SRLS:      SA22763218 SA22763219 SA22763220 SA22763221
```

```
  RTN CODES:


  CIRCUMVENTION:


  MESSAGE TO SUBMITTER:
```

APAR OA37582 DSS support of DFSMShsm Storage Tier

Example B-14 contains the cover letter for APAR OA37582.

Example B-14 OA37582

```
APAR Identifier ...... OA37582      Last Changed ........ 13/05/03
  NEW FUNCTION - DFSMSDSS SUPPORT OF LAST CLASS TRANSITION DATE
  TOLERATION/COEXISTENCE

  Symptom ...... NF NEW FUNCTION      Status ............ CLOSED  UR1
  Severity ................... 4      Date Closed ......... 13/04/10
  Component .......... 5695DF175      Duplicate of ........
  Reported Release ......... A10      Fixed Release ............. 999
  Component Name DFSMSDSS, ISMF       Special Notice       ATTENTION
  Current Target Date ..              Flags
  SCP ...................                              NEW FUNCTION
  Platform ............


  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release A10   : UA68710 available 13/04/15 (     )
  Release B10   : UA68711 available 13/04/15 (     )
  Release C10   : UA68712 available 13/04/16 (F304 )
  Release D10   : UA68713 available 13/04/16 (F304 )


  Parent APAR:    OA36576
  Child APAR list:


  ERROR DESCRIPTION:
  NEW FUNCTION - Toleration/Coexistence for DFSMSdss handling
  of DFSMShsm Storage Tiers last class transition date


  LOCAL FIX:
  NEW FUNCTION


  PROBLEM SUMMARY:
```

```
*****************************************************************
* USERS AFFECTED: All users of DFSMSdss V1R13, V1R12, V1R11    *
*                 and V1R10 attempting to COPY or RESTORE a    *
*                 data set with a last class transition date   *
*                 from a DFSMShsm storage tier process.        *
*****************************************************************
* PROBLEM DESCRIPTION: This APAR provides toleration support   *
*                      when attempting to restore or copy a    *
*                      data set that has a last class          *
*                      transition date from a DFSMShsm         *
*                      storage tier process.                   *
*****************************************************************
* RECOMMENDATION:                                              *
*****************************************************************
ZOSO201C/K


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
z/OS DFSMSdss V1R13, V1R12, V1R11 and V1R10 are modified to
restore or copy data that has a last class transition date
from a DFSMShsm storage tier process.

The last successful class transition date will be maintained
the same except for preserving the date from the source. For
these cases, message ADR556W will be issued with reason code
of 3 to indicate that the class transition date was lost.

For preallocated data sets that are replaced, the date will not
be modified.  For preallocated data sets that are scratched and
re-allocated, the date will be lost and ADR556W is issued.

When a data set is not replacing a preallocated target, but is
being renamed or the management class is changing, then
the date is cleared and ADR556W is not issued.

When a data set is not replacing a preallocated target, not
being renamed and the management class didn't change, then
the message ADR556W is issued indicating the date was lost.

ADR556W is an existing message, but reason code 3 is new.
Also, the word "EXTENDED" has been removed from the message
text.

ADR556W (ttt)-,mmmm(yy), ATTRIBUTES FOR DATA SET dsname
         WERE NOT RETAINED DURING {COPY | RESTORE},rsn

Explanation: The data set was copied or restored but some
extended attributes were lost for the following reasons
(rsn):
```

```
  1 Vendor attributes from the F9 DSCB of the dumped data set
    were not retained for the target data set because the
    volume on which it was placed did not support F8/F9 DSCBs.
  2 Vendor attributes from the F9 DSCB of the dumped or copied
    data set were not retained for the target data set due to
    problems updating the target's F9 DSCB.
  3 The last successful class transition date of the dumped or
    copied data set was not retained for the target data set
    because the release of z/OS on which it was processed did
    not support it.
  System action: None.
  Application Programmer Response:
  1. If the extended attributes are desired, rerun the COPY or
     RESTORE and specify target volumes or an SMS group
     that supports F8/F9 DSCBs.
  2. An error occurred while reading or writing an F9 DSCB.
     Retry the restore or copy for the data set.
  3. If the last successful class transition date is desired,
     rerun the COPY or RESTORE on a release that supports it.


  MODULES/MACROS:   ADRCNVSM ADRCVSAM ADRMSGS  ADRPCNVX ADRPCVSX
  ADRSB105 ADRTDDS  ADRTDLOG ADRTDPNV ADRXVSAM


  SRLS:      SA22763100


  RTN CODES:


  CIRCUMVENTION:


  MESSAGE TO SUBMITTER:
```

APAR OA38185 EXCP support for zHPF on z/OS V1.12 and V1.13

Example B-15 contains the cover letter for APAR OA38185.

Example B-15 OA38185

```
APAR Identifier ...... OA38185      Last Changed ........ 13/10/07
  NEW FUNCTION APAR - EXCP VIRTUAL SUPPORT FOR ZHPF


  Symptom ...... NF FUNCTION          Status ............ CLOSED  UR1
  Severity ................... 3      Date Closed ......... 12/10/04
  Component .......... 5752SC1C3      Duplicate of ........
  Reported Release ......... 770      Fixed Release ............. 999
  Component Name IOS                  Special Notice       ATTENTION
  Current Target Date ..              Flags
  SCP ...................                            NEW FUNCTION
  Platform ............
```

```
Status Detail: APARCLOSURE - APAR is being closed.

PE PTF List:

PTF List:
Release 770   : UA66846 available 12/10/17 (F210 )
Release 780   : UA66847 available 12/10/17 (F210 )


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
NEW FUNCTION APAR


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: Users at HBB770 and above.                    *
****************************************************************
* PROBLEM DESCRIPTION: New function APAR to further enhance    *
*                      the High Performance FICON for System z *
*                      (zHPF) facility.                        *
*                      (D/T2817, D/T2818, D/T2107)             *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
New function APAR to further enhance the High Performance
FICON for System z (zHPF) facility.



PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
This APAR provides EXCP virtual support for zHPF.

The following Publication updates will be made:

. z/OS MVS System Codes (SA22-7626)

  ABEND Code 800

  Explanation: During processing of an I/O request, execute
  channel program (EXCP) processing encountered an error.
  ...
```

```
  Code Explanation
| 01   An error occurred during channel program validity check
|      processing.  Either an access protection error or a
|      page fix error occurred when:

       * The EXCP IDAW routine tried to access the IDAW using
         an incorrect storage protection key.

       * The EXCP CCW validity check routine tried to access
         the virtual channel program using an incorrect
         storage protection key.

       * The CCW channel program attempted to execute a
         restricted operation.

|      * The EXCP zHPF validity check routine tried to access
|        the virtual channel program using an incorrect
|        storage protection key.
|
|      * An error occurred during page-fix or page-unfix
|        processing. A page-fix error can occur if the EXCP
|        processor tries to fix pages that are not assigned to
|        the caller's address space identifier (ASID).
|
|      Note: An access protection or page-fix error can occur
|      when there is an error in the channel program. Correct
|      the channel program.

  02   System error. Search problem reporting databases for a
       fix for the problem. If no fix exists, contact the IBM
       Support Center.

| 03   An error occurred during page-fix processing for a
|      data extent block (DEB) for an EXCP V=R request.

       ...

| 09   The IOBE specified that this is a zHPF channel program
|      request, but zHPF channel programs are only supported
|      for EXCPVR and EXCP virtual requests for non-VIO data
|      sets.  They are not not supported for VIO data sets or
|      EXCP V=R requests.



       ...

| 0D   A zHPF channel program for an EXCP virtual request
|      specified a TCCB that crosses a page boundary.
|
| 0E   The number of virtual TIDAWs in a zHPF channel program
|      has exceeded the maximum allowed value (65,536).  This
|      can occur due to an error in the channel program.  For
|      example:
```

```
|
|      * A virtual TIDAW in the list is linked to a previous
|        virtual TIDAW causing a loop.
|
|      * An incorrect TIDAL virtual storage address is
|        specified in the TCW.
|
|      * The last virtual TIDAW in the list does not have the
|        last TIDAW in the list flag turned on.

   ...

.*-------------------------------------------------------------|

. MVS Data Areas Volume 2 (GA32-0854)

  TCCW Translator Fix List(IECDFIX)

  Update to FIX Information section:

  FIX Map:
  --------
  OFFSET
   HEX  TYPE      LENGTH  NAME (DIM)    DESCRIPTION
  ===== ========= ======  ============= ======================
   (0)  STRUCTURE      0   FIX
   (0)  ADDRESS        4    FIXCHAIN     Fix block chain
                                         pointer
|  (4)  ADDRESS        1    FIXInUse     Number of fix list
|                                         entries in use - used
|                                         only by the zHPF
|                                         translator
|  (5)  CHARACTER      3    *            Reserved.

   ...
   (8)  ADDRESS        4    FIXLSTST     Start address of area
                                         to be fixed
        1...  ....           FIXCONT     "X'80'" Fix list
                                         continuation flag
   (C)  ADDRESS        4    FIXLSTEN     End address of area
                                         to be fixed
        1...  ....           LASTENT     "X'80'" Last fix
                                         entry flag
|       1...  ....           FIXLast     "X'80'" Last fix
                                         entry flag


   ...

   FIX List Equates

   (C)  X'8'           0    FIXHL        "FIXLSTST-FIX" Header
                                         length
   (C)  X'8'           0    FIXEL        "FIXLSTEN+L'FIXLSTEN-
                                         FIXLSTST" Fix list
```

```
                                        entry length
   (C)  X'13'          0    FIXNE       "19" Number of fix
                                        list entries- 160
                                        byte block caller
   (C)  X'1E'          0    FIXNEL      "30" Number of fix
                                        list entries- 248
                                        byte block caller
|  (C)  X'F8'          0    FIXBL       "FIXHL+FIXEL*FIXNEL"
                                        Size of fix list
                                        block

.*-------------------------------------------------------------|

. MVS Data Areas Volume 3 (GA32-0855)

  zHPF Channel Program Information Area (IOSDZHPF)

  Update to IOSDZHPF Information section:

  IOSDZHPF Map:
  -------------
  OFFSET
   HEX  TYPE      LENGTH NAME (DIM)     DESCRIPTION
  ===== ================ ============= ======================
    (0) STRUCTURE     32 ZHPF_INFO     zHPF Channel Program
                                       Information Area
    (0) UNSIGNED       1  ZHPF_VERSION  Version number
    (1) UNSIGNED       1  ZHPF_FLAG1    Capabilities flag 1
        1... ....          ZHPF_BIDI    bidirectional data
                                        transfer Indicates that
                                        all of the online paths
                                        for the device support
                                        bidirectional data for
                                        zHPF I/O requests.
        .1.. ....      1   ZHPF_EXCPVR  zHPF is supported for
                                        EXCPVR requests
        ..1. ....      1   ZHPF_Incorrect_Len The incorrect
                                        length facility is
                                        supported by the
                                        processor
|       ...1 ....      1   ZHPF_EXCP    zHPF is supported for
|                                       EXCP virtual requests
|       .... 1111          *            Reserved
    (2) CHARACTER      2  *             Reserved
    (4) UNSIGNED       4  ZHPF_MAXXFERSIZE
                                        Maximum amount of data
                                        (in bytes) that can be


                                        transferred in a single
                                        Transport Control Area
                                        (TCA)
    ...

.*-------------------------------------------------------------|
```

```
. MVS Data Areas Volume 6 (GA32-0858)

  Channel Program Scan Exit Parm List/Work Area (IECXCPS)

  Update to XCPS Information section:

  XCPS Map:
  ---------
  OFFSET
   HEX  TYPE      LENGTH  NAME (DIM)    DESCRIPTION
  ===== ================  ============ ======================
    (0) STRUCTURE      0  CPS
    (0) CHARACTER      4   CPSCPS      CPS acronym
    (4) BITSTRING      1   CPSENTRY    Entry reason byte
         .... ...1          CPSENSIO    "X'01'" STARTIO entry
         .... ..1.          CPSENIOE    "X'02'" I/O error entry
         .... ..11          CPSENEOE    "X'03'" End of Extent
                                        entry
         .... .1..          CPSENNML    "X'04'" Normal-end
                                        entry
    (5) CHARACTER      3   CPSRESV1    Reserved
    (8) ADDRESS        4   CPSRQE      EXCP RQE address
    (C) ADDRESS        4   CPSIOSB     EXCP IOSB address
   (10) ADDRESS        4   CPSCPX      CPS extension address
   (14) CHARACTER     12   CPSRESV2    Reserved
   (20) CHARACTER    216   CPSWA       Work area for use by the
                                       channel program scan
                                       exit, includes prefix
                                       CCWs, set to 0's on
                                       initial entry
|  (20) CHARACTER    104   CPS_THPFRegs IECVTHPF register save
|                                      area during zHPF
|                                      channel program
|                                      translation
    (20) X'F8'           0   CPSLEN      "*" CPS block length

 KEYWORDS: ZHPF/K


MODULES/MACROS:   IECDFIX  IECDXCPS IECVEXCP IECVEXFR IECVEXPR
IECVPBLK IECVTHPF IECVXCCW IOSDIOBE IOSDZHPF IOSVZHPF


SRLS:      SA22762600 GA32085400 GA32085500 GA32085800


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA39530 PDSE V2

Example B-16 contains the cover letter for APAR OA39530.

Example B-16 OA39530

```
APAR Identifier ...... OA39530      Last Changed ........ 13/06/03
  COEXISTANCE APAR FOR PDSE


  Symptom ...... NF NEWFUNCTION       Status ........... CLOSED  UR1
  Severity ..................... 2     Date Closed ......... 13/04/17
  Component ..... 5695DF115           Duplicate of ........
  Reported Release ......... B10      Fixed Release ............ 999
  Component Name EXTENDED DATA S      Special Notice
  Current Target Date ..13/05/31      Flags
  SCP ...................
  Platform ............

  Status Detail: APARCLOSURE - APAR is being closed.

  PE PTF List:

  PTF List:
  Release C10   : UA68849 available 13/05/07 (F305 )
  Release D10   : UA68850 available 13/05/07 (F305 )


  Parent APAR:
  Child APAR list: OA41790 OA41864


  ERROR DESCRIPTION:
  Coexistance Apar for PDSE


  LOCAL FIX:


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: All PDSE users that have the ability to      *
  *                 create PDSE V2 (z/OS V2R1) and want to be    *
  *                 able to access in lower releases (R12 and    *
  *                 R13).                                        *
  ****************************************************************
  * PROBLEM DESCRIPTION: This APAR will allow to process PDSE V2 *
  *                      datasets in Releases 12 and 13. PDSE V2 *
  *                      datasets are created in V2R1 and above  *
  *                      releases.                               *
  ****************************************************************
  * RECOMMENDATION:                                              *
  ****************************************************************
  Modify PDSE code to allow the process of PDSE V2 datasets in R12
  and R13
```

```
PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
Allow the process of PDSE V2 datasets in lower releases (R12 and
R13)
ZOSO201C/K - coexistence keyword for z/OS v2.1


MODULES/MACROS:   IGWAMAMT IGWAMCVO IGWAMOPO IGWBIRP1 IGWBIWP1
IGWBVLP1 IGWBVRP1 IGWDAASU IGWDACND IGWDACN2 IGWDACRD IGWDARD1
IGWDAVOO IGWDAV1O IGWDAV2O IGWDBHOM IGWDDCR2 IGWDDCR3 IGWDDDSF
IGWDLCLS IGWDLFAS IGWDLFNS IGWDLGAS IGWDLINI IGWDLLSA IGWDLNAS
IGWDLRFL IGWDPRSP IGWDRRDR IGWDRRD3 IGWDRRRC IGWDRRRX IGWDRSVF
IGWDRUPR IGWDSRNA IGWDSSTX IGWICONM IGWICPSC IGWICPSG IGWICPSP
IGWICREM IGWIFCOM IGWIFMLT IGWIGSIB IGWIIDEL IGWIIIUW IGWIMAIN
IGWINEWT IGWINITM IGWIREAD IGWISRCH IGWISTRE IGWIVRJN IGWIVRJ2
IGWIVRSC IGWIVRSG IGWIVRSP IGWIOIP3


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA39551 SAM EF V2 compatibility

Example B-17 contains the cover letter for APAR OA39551.

Example B-17 OA39551

```
APAR Identifier ...... OA39551      Last Changed ........ 13/06/03
  NEW FUNCTION TOLERATION


  Symptom ...... NF NEW FUNCTION      Status ........... CLOSED  UR1
  Severity ................... 3      Date Closed ......... 13/04/17
  Component .......... 5695DF1O7      Duplicate of ........
  Reported Release ......... D1O      Fixed Release ............. 999
  Component Name DATA MGMT SUPPO      Special Notice
  Current Target Date ..13/05/15      Flags
  SCP ...................
  Platform ............

  Status Detail: APARCLOSURE - APAR is being closed.
```

```
PE PTF List:

PTF List:
Release C10   : UA68823 available 13/05/02 (F305 )
Release D10   : UA68824 available 13/05/03 (F305 )


Parent APAR:
Child APAR list: OA39869


ERROR DESCRIPTION:
Coexistence for future new function.


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All users of SAM EF version 2 data sets.     *
****************************************************************
* PROBLEM DESCRIPTION: Compatibility support for SAM EF        *
*                      version 2 data sets.  z/OS version 2.1  *
*                      is required to create SAM EF version 2  *
*                      data sets.                              *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
Compatibility support for SAM EF version 2 data sets.


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
Compatibility/coexistence support for SAM EF version 2 data
sets.  ZOSO201C/K


MODULES/MACROS:   IECEQU   IECPDINI IEZDEB   IFGSMF14 IFGWAX
IFGO19RS IFGO193A IFGO194D IFGO195H IFGO196V IFGO202I IFGO232D
IFGO55OP IFGO553X IFGO554N IFGO555H


SRLS:      NONE


RTN CODES:
```

```
  CIRCUMVENTION:

  MESSAGE TO SUBMITTER:
```

APAR OA39618 Catalog

Example B-18 contains the cover letter for APAR OA39618.

Example B-18 OA39618

```
APAR Identifier ...... OA39618      Last Changed ........ 13/05/03
  CO-EXISTENCE APAR FOR NEW FUNCTION


  Symptom ...... NF NEWFUNCTION       Status ............ CLOSED  UR1
  Severity ................... 4      Date Closed ......... 13/04/08
  Component .......... 5695DF105      Duplicate of ........
  Reported Release ......... D10      Fixed Release ............ 999
  Component Name ICF CATALOG & I      Special Notice
  Current Target Date ..13/04/30      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release A10   : UA68659 available 13/04/15 (     )
  Release B10   : UA68660 available 13/04/15 (     )
  Release C10   : UA68661 available 13/04/16 (F304 )
  Release D10   : UA68662 available 13/04/16 (F304 )


  Parent APAR:
  Child APAR list: OA39619 OA39620 OA39621


  ERROR DESCRIPTION:
  THIS IS A CO-EXISTENCE APAR FOR NEW FUNCTION

  CATKEYS: CAT2012 CATNEW


  LOCAL FIX:
  N/A


  PROBLEM SUMMARY:
  ************************************************************
  * USERS AFFECTED: All users of z/OS HDZ1A10 and above.      *
  ************************************************************
  * PROBLEM DESCRIPTION: NEW FUNCTION APAR.                   *
```

```
*****************************************************************
* RECOMMENDATION:                                               *
*****************************************************************
SUMMARY:
NEW FUNCTION APAR

ZOS0201C/K


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
NEW FUNCTION APAR


MODULES/MACROS:   IGGOCLEQ IGGOCLEV


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA39619 VSAM

Example B-19 contains the cover letter for APAR OA39619.

Example B-19 OA39619

```
APAR Identifier ...... OA39619      Last Changed ........ 13/09/13
  CO-EXISTENCE APAR FOR NEW FUNCTION


  Symptom ...... NF NEWFUNCTION       Status ............ CLOSED  UR1
  Severity ................... 4      Date Closed ......... 13/04/08
  Component .......... 5695DF106      Duplicate of ........
  Reported Release ......... D10      Fixed Release ............ 999
  Component Name DFSMS VSAM           Special Notice
  Current Target Date ..13/04/30      Flags
  SCP ...................
  Platform ............

  Status Detail: APARCLOSURE - APAR is being closed.

  PE PTF List:
```

```
PTF List:
Release A10   : UA68659 available 13/04/15 (     )
Release B10   : UA68660 available 13/04/15 (     )
Release C10   : UA68661 available 13/04/16 (F304 )
Release D10   : UA68662 available 13/04/16 (F304 )


Parent APAR:    OA39618
Child APAR list:


ERROR DESCRIPTION:
THIS IS A CO-EXISTENCE APAR FOR NEW FUNCTION


LOCAL FIX:
N/A


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All users of z/OS HDZ1A10 and above.         *
****************************************************************
* PROBLEM DESCRIPTION: NEW FUNCTION APAR.                      *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
NEW FUNCTION APAR

ZOS0201C/K


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
Co-existence support for new function.


MODULES/MACROS:   IDA0192C


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:
```

```
  MESSAGE TO SUBMITTER:
```

APAR OA39620 DSS

Example B-20 contains the cover letter for APAR OA39620.

Example B-20 OA39620

```
APAR Identifier ...... OA39620      Last Changed ........ 13/05/03
  CO-EXISTENCE APAR FOR NEW FUNCTION


  Symptom ...... NF NEWFUNCTION       Status ............ CLOSED  UR1
  Severity ................... 4      Date Closed ......... 13/04/11
  Component ..... 5695DF175          Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name DFSMSDSS, ISMF       Special Notice       ATTENTION
  Current Target Date ..              Flags
  SCP ...................                            NEW FUNCTION
  Platform ............


  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release A10   : UA68740 available 13/04/15 (     )
  Release B10   : UA68741 available 13/04/15 (     )
  Release C10   : UA68742 available 13/04/16 (F304 )
  Release D10   : UA68743 available 13/04/16 (F304 )


  Parent APAR:    OA39618
  Child APAR list:


  ERROR DESCRIPTION:
  THIS IS A CO-EXISTENCE APAR FOR NEW FUNCTION


  LOCAL FIX:
  N/A


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: All users of DFSMSdss z/OS HDZ1A10           *
  *                 and above.                                   *
  ****************************************************************
  * PROBLEM DESCRIPTION: NEW FUNCTION APAR.                      *
  ****************************************************************
  * RECOMMENDATION:                                              *
  ****************************************************************
```

```
ZOS0201C/K

PROBLEM CONCLUSION:

TEMPORARY FIX:

COMMENTS:
NEW FUNCTION APAR

MODULES/MACROS:   ADRBLDCN ADRCATLG ADRDDFLT ADRDTDSC ADRFDSDU
ADRFDSRL ADRKVDSF ADRPCVSM ADRSB004 ADRTDDS

SRLS:      SA22763100

RTN CODES:

CIRCUMVENTION:

MESSAGE TO SUBMITTER:
```

APAR OA39621 DFSMShsm

Example B-21 contains the cover letter for APAR OA39621.

Example B-21 OA39621

```
APAR Identifier ...... OA39621      Last Changed ........ 13/05/30
  NEW FUNCTION: Coexistence for DFSMShsm Non-SMS VSAM LDS > 4GB
  Support

  Symptom ...... NF INCORROUT         Status ........... CLOSED  UR1
  Severity ................... 4      Date Closed ......... 13/04/11
  Component .......... 5695DF170      Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name DFSMSHSM, ISMF       Special Notice       ATTENTION
  Current Target Date ..13/05/31      Flags
  SCP ...................
  Platform ............
                                      XSYSTEM

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release A10   : UA68756 available 13/04/15 (     )
```

```
Release B10   : UA68757 available 13/04/15 (     )
Release C10   : UA68758 available 13/04/17 (F304 )
Release D10   : UA68759 available 13/04/17 (F304 )


Parent APAR:    OA39618
Child APAR list:


ERROR DESCRIPTION:
THIS IS A CO-EXISTENCE APAR FOR NEW FUNCTION


LOCAL FIX:
N/A


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All users of DFSMShsm in an HSMplex with     *
*                 V2R1 and lower level DFSMShsm releases.      *
****************************************************************
* PROBLEM DESCRIPTION: z/OS V1R10, V1R11, V1R12 and V1R13      *
*                      levels of DFSMShsm need to fail         *
*                      backup, migration and ABACKUP of        *
*                      non-SMS VSAM LDS with the Extended      *
*                      Addressability(EA) attribute            *
*                      specified.                              *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
z/OS V1R10, V1R11, V1R12 and V1R13 levels of DFSMShsm need to
fail backup, migration and ABACKUP of non-SMS VSAM LDS
with the Extended Addressability(EA) attribute specified.
New release        Keyword
z/OS V2R1          ZOS0201C/K


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
On V2R1, non-SMS VSAM LDS's with the Extended
Addressability(EA) are fully supported.
The z/OS V1R10, V1R11, V1R12 and V1R13 levels of DFSMShsm
need to fail backup, migration and ABACKUP this type of
data set.

Non-SMS EA LDSes migrated, backed up or ABACKUPed on V2.1
system will be able to be recalled, recovered or arecovered on
V1R10, V1R11, V1R12 and V1R13 levels of DFSMShsm.
```

```
++HOLD(DOC)

V1R10, V1R11, V1R12 and V1R13
MVS System Messages Vol 2 (ARC-ASA)
SRL: SA22763218, SA22763219, SA22763220, SA22763221


1. New reason code RSN67 will be added for RC58
   for the ARC1258I message
Explanation:
67 - The data set being migrated is a non-SMS-managed
  VSAM linear data set which has the Extended Addressable(EA)
  attribute specified. This data set type is not supported
  for migration in pre-V2R1 systems.
Application Programmer Response:
    Use DFSMShsm V2R1 or higher to migrate this data set.


2. New reason code RSN67 will be added for RC56
   for the ARC1356I message
Explanation:
67 - The data set being backed up is a non-SMS-managed
 VSAM linear data set which has the Extended Addressable(EA)
 attribute specified. This data set type is not supported
 for backup in pre-V2R1 systems.
Application Programmer Response:
    Use DFSMShsm V2R1 or higher to backup this data set.


3. New reason code RSN67 will be added for RC58
   for the ARC1358I message
Explanation:
67 - The data set being backed up is a non-SMS-managed
 VSAM linear data set which has the Extended Addressable(EA)
 attribute specified. This data set type is not supported
 for backup in pre-V2R1 systems.
Application Programmer Response:
    Use DFSMShsm V2R1 or higher to backup this data set.


4. ARC6172E message - a new text will be added to
the Application Programmer Response section.

Application Programmer Response: For ABACKUP, ensure


that all data sets specified in the INCLUDE, ALLOCATE,
or ACCOMPANY lists are acceptable for processing.
Some examples of unsupported situations are:
- data-set-name represents a GDG base.
- The data set organization is unsupported.
- The data set BLOCKSIZE or LRECL is invalid or
larger than supported by the ABARS release being executed.
- data-set-name does not reside on a supported device.
- data-set-name is in the ACCOMPANY list, but is migrated.
```

```
- data-set-name is a z/FS data set.
- Non-VSAM data-set-name data set has Format 8 DSCB.
- Non-SMS VSAM linear data set which has the Extended
 Addressable(EA)attribute specified. Use DFSMShsm V2R1
 or higher to perform ABACKUP for this data set.


New release        Keyword
z/OS V2R1          ZOSO201C/K


MODULES/MACROS:   ARCBDSMP ARCKALLC ARCKBLDC ARCKFILT ARCKFIL1
ARCKFIND ARCKGDGR ARCKPAG1 ARCKUCAT ARCNDELR ARCNFIND ARCNGDGD
ARCNVFYA ARCNVRFY ARCVVSC  ARCWCLOC ARCWCNT  ARCWCTL  ARCWGLOC
ARCWLOC  ARCWLSTC


SRLS:      SA22763218 SA22763219 SA22763220 SA22763221


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA39869 SAM EF V2

Example B-22 contains the cover letter for APAR OA39869.

Example B-22 OA39869

```
APAR Identifier ...... OA39869      Last Changed ........ 13/06/03
  NEW FUNCTION - TOLERATION


  Symptom ...... NF NEW FUNCTION      Status ........... CLOSED  UR1
  Severity ................... 3      Date Closed ......... 13/04/17
  Component .......... 5695DF102      Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name BASE ACCESS MET      Special Notice
  Current Target Date ..13/05/15      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release C10   : UA68823 available 13/05/02 (F305 )
  Release D10   : UA68824 available 13/05/03 (F305 )
```

```
Parent APAR:    OA39551
Child APAR list: OA39870 OA39871 OA39872 OA39873 OA39875 OA40259
 OA40477


ERROR DESCRIPTION:
Coexistence for future new function.


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All users of SAM EF version 2 data sets.     *
****************************************************************
* PROBLEM DESCRIPTION: Compatibility support for SAM EF        *
*                      version 2 data sets.  z/OS version 2.1  *
*                      is required to create SAM EF version 2  *
*                      data sets.                              *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
Compatibility support for SAM EF version 2 data sets.


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
Compatibility/coexistence support for SAM EF version 2 data
sets.  ZOS0201C/K


MODULES/MACROS:   IGGESDR0 IGGESDR1 IGGESDR2 IGGESDR3 IGG019BW
IGG019VX IGG019V7 IGG019V8 IGG019V9 IGG0191N IGG0193V IGG0193W
IGG0196I IGG0201V IGG055V1


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA39871 SAM EF V2

Example B-23 contains the cover letter for APAR OA39871.

Example B-23 OA39871

```
APAR Identifier ...... OA39871      Last Changed ........ 13/05/03
  NEW FUNCTION TOLERATION


  Symptom ...... NF NEW FUNCTION      Status ........... CLOSED  UR1
  Severity ..................... 3     Date Closed ......... 13/04/10
  Component ..... 5695DF103           Duplicate of ........
  Reported Release ......... D10      Fixed Release ............ 999
  Component Name ACCESS METHOD S      Special Notice
  Current Target Date ..13/06/30      Flags
  SCP ...................
  Platform ............

  Status Detail: APARCLOSURE - APAR is being closed.

  PE PTF List:

  PTF List:
  Release C10   : UA68732 available 13/04/16 (F304 )
  Release D10   : UA68733 available 13/04/16 (F304 )


  Parent APAR:    OA39869
  Child APAR list:


  ERROR DESCRIPTION:
  Coexistence for future new function.


  LOCAL FIX:


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: All users of SAM EF version 2 data sets      *
  *                 created on a z/OS V2R1 or above system.      *
  ****************************************************************
  * PROBLEM DESCRIPTION: Compatibility support for SAM EF        *
  *                      version 2 data sets.  z/OS version 2.1  *
  *                      is required to create SAM EF version 2  *
  *                      data sets.                              *
  ****************************************************************
  * RECOMMENDATION:                                              *
  ****************************************************************
  Summary: Compatibility support for SAM EF version 2 data sets.
  FIXCAT KEYWORD: ZOS0201C/K
  This APAR COREQs OA39872.
```

```
PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
Compatibility/coexistence support for SAM EF version 2 data
sets.  FIXCAT KEYWORD: ZOS0201C/K



MODULES/MACROS:   IDCDC01  IDCDC02  IDCDC03  IDCDOUT  IDCLC01
IDCLC02  IDCLC03  IDCLC04  IDCLC05  IDCLC06  IDCLC07  IDCLC08
IDCLC09  IDCLC10  IDCRP01  IDCTSLC0


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA39872 Catalog

Example B-24 contains the cover letter for APAR OA39872.

Example B-24 OA39872

```
APAR Identifier ...... OA39872      Last Changed ........ 13/05/03
  NEW FUNCTION TOLERATION


  Symptom ...... NF NEW FUNCTION      Status ........... CLOSED  UR1
  Severity ................... 3      Date Closed ......... 13/04/10
  Component .......... 5695DF105      Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name ICF CATALOG & I      Special Notice
  Current Target Date ..13/09/30      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release C10   : UA68732 available 13/04/16 (F304 )
  Release D10   : UA68733 available 13/04/16 (F304 )
```

```
Parent APAR:    OA39869
Child APAR list:


ERROR DESCRIPTION:
Coexistence for future new function.

CATKEYS: CAT2013 CATNEW


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All users sharing systems with z/OSV2R1      *
*                 or above.                                    *
****************************************************************
* PROBLEM DESCRIPTION: Toleration for new function in z/OS     *
*                      V2R1.                                   *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
Summary: FIXCAT KEYWORD: ZOS0201C/K
This APAR COREQs OA39871.


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
Apply maintenance if sharing with a system using z/OS V2R1 or
above.


MODULES/MACROS:   IGGOCLEO IGGOCLFE IGGOCLKN


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA39873 SAM EF V2 DSS

Example B-25 contains the cover letter for APAR OA39873.

Example B-25 OA39873

```
APAR Identifier ...... OA39873      Last Changed ........ 13/06/03
  NEW FUNCTION - DFSMSDSS SUPPORT FOR VERSION 2 EXTENDED FORMAT
  SEQUENTIAL DATA SETS TOLERATION/COEXISTENCE

  Symptom ...... NF NEW FUNCTION      Status ........... CLOSED  UR1
  Severity ..................... 3     Date Closed ......... 13/04/17
  Component ..... 5695DF175           Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name DFSMSDSS, ISMF       Special Notice       ATTENTION
  Current Target Date ..              Flags
  SCP ...................                              NEW FUNCTION
  Platform ............


  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release C10   : UA68831 available 13/05/02 (F305 )
  Release D10   : UA68832 available 13/05/03 (F305 )


  Parent APAR:    OA39869
  Child APAR list:


  ERROR DESCRIPTION:
  NEW FUNCTION - TOLERATION/COEXISTENCE for DFSMSdss handling
  of version 2 extended format sequential data sets.



  LOCAL FIX:


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: Users of DFSMSdss copy and restore           *
  *                 processing single striped multi-volume       *
  *                 extended format sequential data sets.        *
  *                                                              *
  ****************************************************************
  * PROBLEM DESCRIPTION: This APAR provides toleration support   *
  *                      for single striped multi-volume         *
  *                      extended format sequential Version 2    *
  *                      data sets.                              *
  ****************************************************************
  * RECOMMENDATION:                                              *
```

```
*****************************************************************


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
DFSMSdss will be modified to process version 2
extended format single striped multi-volume sequential
data sets during copy, dump, and restore.  Processing
version 2 extended format single striped data sets
that were defined in z/OS V2.1 in a prior release
may result in the version type to be converted.  Whether
the data set is converted or not the data set will be
successfully copied, dumped, and restored if no errors
are encountered.

During logical copy and restore if the target has to
be allocated it will result in the target data
set not defined as a verions 2 type. If the target
is preallocated the version type of the target
will be preserved.  If the target has to be scratched
and reallocated the version type will not be preserved.

During physical data set copy and restore, the target
version type will be the version type of the source
data set.

ZOS0201C/K


MODULES/MACROS:   ADRCNVSM ADRDALOC ADRDTDSC ADREXTND ADRFDSCO
ADRFDSRL ADRFILTC ADRFRLBO ADRMRPAM ADRMRRFM ADRPROTD ADRPSECM
ADRPSEDM ADRPSERM ADRSBRTN ADRSB105 ADRSB106 ADRSB107 ADRSB108
ADRTDDS  ADRTDEXT ADRTDLOG ADRTDNVS ADRTDPNV ADRTDPVL ADRTDRF1
ADRTDUNL ADRTDVSM


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA40252 DFSMShsm Fast Replication

Example B-26 contains the cover letter for APAR OA40252

Example B-26 OA40252

```
APAR Identifier ...... OA40252      Last Changed ........ 13/05/03
  NEW FUNCTION - DFSMSHSM TOLERATION COEXISTENCE SUPPORT FOR
  FLASHCOPY CONSISTENCY GROUP AND CAPTURE CATALOG INFO FUNCTIONS

  Symptom ...... NF NEW FUNCTION      Status ........... CLOSED  UR1
  Severity ..................... 4     Date Closed ......... 13/04/11
  Component ..... 5695DF17O           Duplicate of ........
  Reported Release ......... D1O      Fixed Release ............ 999
  Component Name DFSMSHSM, ISMF       Special Notice       ATTENTION
  Current Target Date ..13/05/31      Flags
  SCP ...................
  Platform ............
                                      XSYSTEM

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release A1O   : UA68734 available 13/04/15 (     )
  Release B1O   : UA68735 available 13/04/15 (     )
  Release C1O   : UA68736 available 13/04/17 (F3O4 )
  Release D1O   : UA68737 available 13/04/17 (F3O4 )


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  This APAR provides DFSMShsm toleration coexistence support for
  FlashCopy Consistency Group support and catalog information
  data set (CIDS) compatibility.



  LOCAL FIX:


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: DFSMShsm fast replication users of           *
  *                  - FlashCopy consistency group function, or  *
  *                  - Capture Catalog Information REQUIRED/     *
  *                    PREFERRED option                          *
  *                with DFSMShsm hosts on z/OS V2R1 which        *
  *                share SMS configurations, DFSMShsm CDSs,      *
  *                and applicable catalog information data       *
  *                sets (CIDS) with hosts running at V1R13,      *
```

```
*                 V1R12, V1R11, and/or V1R10.                   *
****************************************************************
* PROBLEM DESCRIPTION: Changes in the fast replication         *
*                      function in z/OS V2R1 require that      *
*                      z/OS V1R10 through V1R13 DFSMShsm       *
*                      hosts to be updated. This APAR          *
*                      provides toleration support for the     *
*                      DFSMShsm FlashCopy consistency group    *
*                      function and CIDS compatibility.        *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
This PTF must be installed and active on all DFSMShsm systems
using fast replication function in the SYSPLEX before V2R1 is
installed into an existing SYSPLEX or before OA41298 can be
applied to any system within the SYSPLEX, if DFSMShsm fast
replication with CAPTURE CATALOG INFORMATION REQUIRED/
PREFERRED function is used.
.
An HSM restart is required to activate this fix on each system
of the SYSPLEX, however, a rolling restart is sufficient to
accomplish the activation.
.
Additional keyword:
ZOSO201C/K


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
DFSMShsm has been modified such that
1. the new FlashCopy consistency group specification for z/OS
   V2R1 can be detected and handled appropriately.
2. When the Capture Catalog Information REQUIRED or PREFERRED
   option is specified for the copy pool, catalog information
   data sets (CIDS) created in either V2R1 or prior releases
   can be handled appropriately.
.
The following function has been updated: Fast Replication
Backup (FRBACKUP). Copy pools that have the new FlashCopy
Consistency Group field set to YES are required to be backed
up by a V2R1 or later host.
FRBACKUP will fail backup of copy pools defined with FlashCopy
Consistency Group = YES and issue existing MSGARC1806E with
new RC89.
Backup versions with FRBF_FCCG_VER flag set (indicating it was
created with with FlashCopy Consistency Group option at time
of backup) will be deleted or rolled off normally.
.
LIST and ARCXTRCT functions will ignore the FRBF_FCCG_VER
setting. Other fast replication command processing remains
```

```
the same.
.
+HOLD(DOC)
The following publication updates will be made:
z/OS V2R1 MVS System Messages, Vol 2 (ARC-ASA), SA22-7632
SRL: SA22763218, SA22763219, SA22763220, SA22763221
  Add new RC89 to the existing message ARC1806E.

 ARC1806E FAST REPLICATION {BACKUP | RECOVERY | *****} HAS
  FAILED FOR {COPY POOL cpname | VOLUME volser | *****},
  RC=retcode
  Explanation:
  Retcode Meaning
  89      FlashCopy consistency group setting of Yes was
          defined for the copy pool but the function is
          not supported in the host environment where
          the FRBACKUP command was being processed.
  Application Programmer Response:
  Retcode Meaning
  89      The fast replication backup command for copy
          pool cpname cannot be processed in a z/OS
          pre-V2R1 environment. Issue the FRBACKUP
          command for this copy pool on a system that
         supports the FlashCopy consistency group
          option.
.
++HOLD(AO)
SPECIAL CONDITIONS:
          AO: MSG=ARC1806E CHANGE=New RSN 89
          AO: ENDAO COMMENT='***End of the list of changes
                  that could affect your automated
                  operations.  The DOC text has
                  details of the changes.***'


.
++HOLD(MTS)
This PTF must be installed and active on all DFSMShsm systems
using fast replication function in the SYSPLEX before V2R1 is
installed into an existing SYSPLEX or before OA41298 can be
applied to any system within the SYSPLEX, if DFSMShsm fast
replication with CAPTURE CATALOG INFORMATION REQUIRED/
PREFERRED function is used.
.
An HSM restart is required to activate this fix on each system
of the SYSPLEX, however, a rolling restart is sufficient to
accomplish the activation.


MODULES/MACROS:   ARCFRBM  ARCZCSI


SRLS:      SA22763218 SA22763219 SA22763220 SA22763221
```

```
RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA40259 EF V2

Example B-27 contains the cover letter for APAR OA40259.

Example B-27 OA40259

```
APAR Identifier ...... OA40259      Last Changed ........ 13/06/03
  NEW FUNCTION - TOLERATION


  Symptom ...... NF NEW FUNCTION      Status ............ CLOSED  UR1
  Severity ................... 3      Date Closed ......... 13/04/17
  Component .......... 5695DF117      Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name SYSTEM DATA MOV      Special Notice
  Current Target Date ..13/05/15      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release C10   : UA68825 available 13/05/02 (F305 )
  Release D10   : UA68826 available 13/05/03 (F305 )


  Parent APAR:    OA39869
  Child APAR list:


  ERROR DESCRIPTION:
  Coexistence for future new function.


  LOCAL FIX:


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: Users of DFSMSdss copy and restore           *
  *                 processing single striped multi-volume       *
  *                 extended format sequential data sets.        *
  ****************************************************************
  * PROBLEM DESCRIPTION: This APAR provides toleration support   *
```

```
*                     for single striped multi-volume         *
*                     extended format sequential Version 2    *
*                     data sets.                              *
*************************************************************
* RECOMMENDATION:                                            *
*************************************************************


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
DFSMSdss will be modified to process version 2
extended format single striped multi-volume sequential
data sets during copy, dump, and restore.  Processing
version 2 extended format single striped data sets
that were defined in z/OS V2.1 in a prior release
may result in the version type to be converted.  Whether
the data set is converted or not the data set will be
successfully copied, dumped, and restored if no errors
are encountered.

During logical copy and restore if the target has to
be allocated it will result in the target data
set not defined as a verions 2 type. If the target
is preallocated the version type of the target
will be preserved.  If the target has to be scratched
and reallocated the version type will not be preserved.

During physical data set copy and restore, the target
version type will be the version type of the source
data set.
KEYWORDS: D/T2105 D/T2107 ZOS0201C/K


MODULES/MACROS:   ANTS8000 ANTS8001


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA40587 RLS

Example B-28 contains the cover letter for APAR OA40587.

Example B-28 OA40587

```
APAR Identifier ...... OA40587      Last Changed ........ 13/05/03
  LARGE NUMBER OF ALTER REQUESTS IXC530I AND IXC534I FOR RLS
  CACHE STRUCTURES

  Symptom ...... IN INCORROUT         Status ........... CLOSED  PER
  Severity ..................... 2     Date Closed ......... 13/03/01
  Component ..... 5695DF122           Duplicate of ........
  Reported Release ......... D10      Fixed Release ............ 999
  Component Name VSAM REC LEV SH      Special Notice
  Current Target Date ..13/04/30      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release C10   : UA68236 available 13/04/10 (F304 )
  Release D10   : UA68237 available 13/04/10 (F304 )


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  The data element to dir entry ratio for RLS caches is
  controlled by RLS and when necessary RLS will issue an ALTER
  request to adjust the ratio.  These requests result in IXC530I
  and IXC534I indicating an XCF Alter was requested.

  Some Alter activity is expected but in some cases can become
  excessive due to an improperly used variable in the RLS
  algorithm.  This apar may reduce the number of ALTER's
  experienced due to RLS element/entry ratio adjustment requests

  Additional Keywords:
  RLSPSP/K


  LOCAL FIX:
  n/a


  PROBLEM SUMMARY:
  ****************************************************************
  * USERS AFFECTED: All VSAM RLS users.                          *
  ****************************************************************
```

```
* PROBLEM DESCRIPTION: Users will see a high number of XCF     *
*                      messages IXC530I and IXC534I for        *
*                      RLS cache structures. A high number     *
*                      of these messages indicate that         *
*                      SMSVSAM is issuing ALTER requests       *
*                      to adjust the data element to directory *
*                      entry ratio too often. This could also  *
*                      cause a CPU usage increase.             *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
The data element to directory entry ratio for RLS caches
structures is controlled by an RLS algorithm. When necessary RLS
will issue an ALTER request to adjust the ratio. Some alter
requests are expected but in some cases they can become
excessive due to an improperly used variable in the RLS
algorithm.


PROBLEM CONCLUSION:
The algorithm to adjust the element to directory ratio has been
fixed to use the right variable. This reduces the number of
cache structure ALTER requests initiated by SMSVSAM.
 KEYWORDS: RLSPSP/K


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   IGWSDADR


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA40844 PDSE V2

Example B-29 contains the cover letter for APAR OA40844.

Example B-29 OA40844

```
APAR Identifier ...... OA40844      Last Changed ........ 13/06/03
  DF102 (ISITMGD) TOLERATION APAR FOR LI3039
```

```
Symptom ...... NF NEWFUNCTION       Status ........... CLOSED  UR1
Severity ..................... 2     Date Closed ......... 13/04/18
Component .......... 5695DF102      Duplicate of ........
Reported Release ......... C10      Fixed Release ............. 999
Component Name BASE ACCESS MET      Special Notice
Current Target Date ..              Flags
SCP ...................
Platform ............

Status Detail: APARCLOSURE - APAR is being closed.

PE PTF List:

PTF List:
Release C10   : UA68849 available 13/05/07 (F305 )
Release D10   : UA68850 available 13/05/07 (F305 )


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All PDSE users that have the ability to      *
*                 create PDSE V2 (z/OS V2R1) and want to be    *
*                 able to access in lower releases (R12 and    *
*                 R13).                                        *
****************************************************************
* PROBLEM DESCRIPTION: This APAR will allow to process PDSE V2 *
*                      datasets in Releases 12 and 13. PDSE V2 *
*                      datasets are created in V2R1 and above  *
*                      releases.                               *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
Modify BAM code to allow the process of PDSE V2 datasets in R12
and R13


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
Allow the process of PDSE V2 datasets in lower releases (R12 and
```

```
R13)
ZOS0201C/K - coexistence keyword for z/OS v2.1


MODULES/MACROS:   IGGONOPL IGG0194S IGWCIMGD


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA41517 AMS

Example B-30 contains the cover letter for APAR OA41517.

Example B-30 OA41517

```
APAR Identifier ...... OA41517      Last Changed ........ 13/05/03
  NEW FUNCTION TOLERATION APAR


  Symptom ...... NF NEWFUNCTION       Status ............ CLOSED  UR1
  Severity ................... 3      Date Closed ......... 13/04/12
  Component .......... 5695DF103      Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name ACCESS METHOD S      Special Notice
  Current Target Date ..13/05/31      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release A10   : UA68787 available 13/04/15 (     )
  Release B10   : UA68788 available 13/04/15 (     )
  Release C10   : UA68789 available 13/04/16 (F304 )
  Release D10   : UA68790 available 13/04/16 (F304 )


  Parent APAR:    OA36492
  Child APAR list:


  ERROR DESCRIPTION:
  New function.
```

```
CATKEYS: CAT2012 CATRLS CATNEW


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: New Function                                 *
****************************************************************
* PROBLEM DESCRIPTION: TOLERATION SUPPORT for RLS for Catalog  *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
 Summary: TOLERATION SUPPORT for RLS for Catalog function.
FIXCAT KEYWORD: ZOS0201C/K


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
None


MODULES/MACROS:   IDCLC01


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA41790 PDSE V2

Example B-31 contains the cover letter for APAR OA41790. This APAR provides a MACRO that is required by OA39530 and OA40844.

Example B-31 OA41790

```
APAR Identifier ...... OA41790      Last Changed ........ 13/06/03
  COEXISTANCE APAR FOR PDSE


  Symptom ...... NF NEWFUNCTION       Status ........... CLOSED  UR1
```

```
Severity ................... 2      Date Closed ......... 13/04/17
Component .......... 5695DF102      Duplicate of ........
Reported Release ......... C10      Fixed Release ............ 999
Component Name BASE ACCESS MET      Special Notice
Current Target Date ..13/05/31      Flags
SCP ...................
Platform ............

Status Detail: APARCLOSURE - APAR is being closed.

PE PTF List:

PTF List:
Release C10   : UA68849 available 13/05/07 (F305 )
Release D10   : UA68850 available 13/05/07 (F305 )


Parent APAR:    OA39530
Child APAR list:


ERROR DESCRIPTION:
Coexistance Apar for PDSE


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All PDSE users that have PDSE V2 installed   *
*                 (Multiple releases with V2R1 or higher as    *
*                 one of the releases)                         *
****************************************************************
* PROBLEM DESCRIPTION: This is a toleration APAR that will go  *
*                      along with the zOSV2R1 changes made for *
*                      a new PDSE Version2                     *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
Toleration APAR for PDSE Version 2 development item


PROBLEM CONCLUSION:


TEMPORARY FIX:


COMMENTS:
Modified IS it Managed macro to be used by PDSE Toleration
OA39530 and BAM Toleration APAR OA40844 for PDSE Version 2
development line item.
ZOS0201C/K - coexistence keyword for z/OS v2.1
```

```
  MODULES/MACROS:   IGWCISM

  SRLS:      NONE

  RTN CODES:

  CIRCUMVENTION:

  MESSAGE TO SUBMITTER:
```

APAR OA41864 PDSE

Example B-32 contains the cover letter for APAR OA41864.

Example B-32 OA41864

```
APAR Identifier ...... OA41864      Last Changed ........ 13/09/30
  PDSE ABENDOF4 with RSN14C6A424, RSN14C6A426, RSN13240323 or
  RSN150A001E

  Symptom ...... NF ABEND             Status ............ CLOSED  UR1
  Severity ................... 2      Date Closed ......... 13/04/16
  Component .......... 5695DF115      Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name EXTENDED DATA S      Special Notice           HIPER
  Current Target Date ..13/06/30      Flags
  SCP ...................
  Platform ............                                  DATALOSS

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release A10   : UA68807 available 13/04/29 (     )
  Release B10   : UA68808 available 13/04/29 (     )
  Release C10   : UA68809 available 13/04/30 (F304 )
  Release D10   : UA68810 available 13/04/30 (F304 )


  Parent APAR:    OA39530
  Child APAR list:


  ERROR DESCRIPTION:
  An error in the code that performs PDSE index record compression
  may result in PDSE data set index corruption

  Possible symptoms include, but are not limited to:
```

```
ABENDOF4 RC24 RSN14C6A424 out of the module IGWIVRJ2
ABENDOF4 RC24 RSN14C6A426 out of the module IGWIVRJ2
ABENDOF4 RC24 RSN13240323 out of the module IGWLHV01
ABENDOF4 RC20 RSN150A001E out of in the module IGWBITX1
Messages from IEBPDSE or IGWPIT indicating doubly allocated
index pages and including but not limited to:
ABENDOF4 RC24 RSN01188011 out of the module IGWDAV00


================================================
This item is a coexistance Apar for PDSE 2.1, however; the
underlying issue exists in all supported releases and
previously releases of PDSE.  Therefore all PDSE user need to
apply this maintenance.


LOCAL FIX:
None


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: Users sharing PDSE's in fix release with     *
*                 release 2.1 and later.                       *
****************************************************************
* PROBLEM DESCRIPTION: Possible symptoms are abends at         *
*                      IGWLHV01+1418, IGWBITX1+10F8,           *
*                      IGWIVRJ2+13B6 and doubly allocated      *
*                      pages from IGWPIT.                      *
*                                                              *
*                      TITLE=COMPID=DF115,CSECT=IGWIVRJ2+13B6  *
*                          ,DATE=03/04/13,MAINTID=0A39530      *
*                          ,ABND=0F4,RC=00000004,RSN=14C6A426  *
*                      TITLE=COMPID=DF115,CSECT=IGWLHV01+1418  *
*                          ,DATE=03/18/11,MAINTID= NONE        *
*                          ,ABND=0F4,RC=00000024,RSN=13240323  *
*                      TITLE=COMPID=DF115,CSECT=IGWBITX1+10F8  *
*                          ,DATE=03/18/11,MAINTID= NONE        *
*                          ,ABND=0F4,RC=00000020,RSN=150A001E  *
*                                                              *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
The PDSE is broken because an index record insert caused an
incorrect recompression of subsequent records.


PROBLEM CONCLUSION:

ZOS0201C/K - coexistence keyword for z/OS V2.1


TEMPORARY FIX:
```

```
COMMENTS:
The recompression has been corrected to account for earlier
recompression attributes.
ZOS0201C/K - coexistence keyword for z/OS V2.1


MODULES/MACROS:   IGWICPIN


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42058 RMM

Example B-33 contains the cover letter for APAR OA42058.

Example B-33 OA42058

```
APAR Identifier ...... OA42058      Last Changed ........ 13/06/03
  AE OA35808 FIX COMPLETION


  Symptom ...... AE                   Status ............ CLOSED  PER
  Severity ................... 2      Date Closed ......... 13/04/23
  Component .......... 5695DF186      Duplicate of ........
  Reported Release ......... A10      Fixed Release ............ 999
  Component Name DFSMSRMM             Special Notice
  Current Target Date ..              Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:

  PTF List:
  Release A10   : PTF not available yet
  Release B10   : PTF not available yet
  Release C10   : UA68803 available 13/05/03 (F305 )
  Release D10   : UA68804 available 13/05/03 (F305 )


  Parent APAR:    OA35808
  Child APAR list:
```

```
ERROR DESCRIPTION:
OA35808 AE fix compleition.


LOCAL FIX:


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: NONE                                         *
****************************************************************
* PROBLEM DESCRIPTION: OA35808 fix completion                  *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************



PROBLEM CONCLUSION:
The problem has been fixed


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   EDGMFIO  EDGMLCS


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42043 SAM EF V2

Example B-34 contains the cover letter for APAR OA42043.

Example B-34 OA42043

```
APAR Identifier ...... OA42043      Last Changed ........ 13/09/04
  NEW FUNCTION - Coexistence for DFSMShsm SAM EF V2 data set
  support

  Symptom ...... NF INCORROUT         Status ........... CLOSED  UR1
```

```
Severity ................... 4      Date Closed ......... 13/07/25
Component .......... 5695DF170      Duplicate of ........
Reported Release ......... C10      Fixed Release ............ 999
Component Name DFSMSHSM, ISMF       Special Notice       ATTENTION
Current Target Date ..13/08/15      Flags
SCP ...................                              NEW FUNCTION
Platform ............


Status Detail: SHIPMENT - Packaged solution is available for
                          shipment.

PE PTF List:

PTF List:
Release C10   : UA70008 available 13/08/07 (F308 )
Release D10   : UA70009 available 13/08/07 (F308 )


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
NEW FUNCTION


LOCAL FIX:
NEW FUNCTION


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All users of DFSMShsm in an HSMplex with     *
*                 V2R1 and lower level DFSMShsm releases.      *
****************************************************************
* PROBLEM DESCRIPTION: z/OS V1R12 and V1R13 levels of          *
*                      DFSMShsm need to fail ARECOVER of SAM   *
*                      Extended Format (EF) Version 2 (V2)     *
*                      data sets on the ALLOCATE list.         *
*                                                              *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
z/OS V1R12 and V1R13 levels of DFSMShsm need to fail ARECOVER
of SAM EF V2 data sets on the ALLOCATE list.
New release        Keyword
z/OS V2R1          ZOS0201C/K


PROBLEM CONCLUSION:


TEMPORARY FIX:
```

```
COMMENTS:
On V2R1 SAM Extended Format (EF) Version 2 (V2) data sets
are fully supported. The z/OS V1R12 and V1R13 levels of
DFSMShsm need to fail ARECOVER of this type of data set when
it is on the ALLOCATION list with the existing message
ARC6172E (MSGARC6172E). ARECOVER of this data set on the
INCLUDE list will be successful.

SAM EF V2 data sets migrated and backed up on a
V2.1 system will be able to be recalled and recovered
on V1R12 and V1R13 levels of DFSMShsm.

New release        Keyword
z/OS V2R1          ZOSO201C/K


++HOLD DOC
V1R12 and V1R13
MVS System Messages Vol 2 (ARC-ASA)
SRL: SA22763220, SA22763221

ARC6172E message - a new text will be added to
the Application Programmer Response section:
For ARECOVER, ensure that all data sets specified
in the INCLUDE, ALLOCATE, or ACCOMPANY lists
are acceptable for processing:
- SAM data set which has the Extended Format of
 version 2 specified. Use DFSMShsm V2R1 or higher
 to perform ARECOVER for this data set.



MODULES/MACROS:
ARCNVRFY


SRLS:
SA22763220
SA22763221


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42529 DFSMShsm

Example B-35 contains the cover letter for APAR OA42529.

Example B-35 OA42529

```
APAR Identifier ...... OA42529      Last Changed ........ 13/10/02
  ARC0187I I/O ERROR REPORTED FOR A 'D' RECORD BUT ERROR MESSAGE
  SHOWS VSR RECORD WITH OA36576 APPLIED TO A 13/06/13 PTF PECHANGE

  Symptom ...... MS MSGARC0187I       Status ........... CLOSED  PER
  Severity ..................... 2     Date Closed ......... 13/08/14
  Component ..........  5695DF17O      Duplicate of ........
  Reported Release ......... D1O      Fixed Release ............. 999
  Component Name DFSMSHSM, ISMF       Special Notice    PE
  Current Target Date ..13/09/12      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:    UA68717 UA68716

  PTF List:
  Release A1O   : PTF not available yet
  Release B1O   : PTF not available yet
  Release C1O   : UA7O225 available 13/08/23 (F3O8 )
  Release D1O   : UA7O229 available 13/08/23 (F3O8 )


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  With OA36576 applied to at least one HSM image in an HSMPlex,
  ARC0187I I/O error messages can occur during HSM Secondary
  Space Management.  The message will indicate that the error
  occured on a 'D' type record, although the record key shows that
  HSM was trying to read a VSR ('S'-type record):

  ARC0187I I/O ERROR POSITIONING TO AN DFSMSHSM CONTROL DATA SET D
  RECORD, KEY= VSRABCOO1   , RC=OO12

  SSM will continue to process. The VSR records that received the
  ARC0187I message will not be checked for expiration processing
  during that run of SSM.


  LOCAL FIX:
  Apply OA36576 to the HSM image that performs SSM.


  PROBLEM SUMMARY:
  ****************************************************************
```

```
* USERS AFFECTED: All z/OS V1R10,V1R11,V1R12 and V1R13         *
*                 DFSMShsm users.                               *
****************************************************************
* PROBLEM DESCRIPTION: With OA36576 applied to at least        *
*                      one DFSMShsm image in an HSMPlex,       *
*                      ARC0187I I/O error messages can occur   *
*                      during DFSMShsm Secondary Space         *
*                      Management (SSM).                       *
*                      OA42529 was created to resolve this     *
*                      issue.                                  *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
With OA36576 applied to at least one DFSMShsm image in an
HSMPlex, ARC0187I I/O error messages can occur during DFSMShsm
Secondary Space Management (SSM).
OA42529 was created to resolve this issue.


PROBLEM CONCLUSION:
OA42529 was created to back off DSR/VSR records to pre-OA36576
length and prepare systems for the application of the
coexistence enablement APAR OA42562. OA42529 must be applied
to all systems in an HSMplex before OA42562 is applied.

++HOLD(MULTSYS) - The PTFs for OA42529 must be installed
and active on all systems in the SYSPLEX before the PTFs for
APAR OA42562 can be applied to any system within the sysplex.
KEYWORDS: ZOSO201C/K


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   ARCASTAI ARCAUDIT ARCAZWC  ARCCPQST ARCCSTAI
ARCCTL   ARCCVSR  ARCDCOLL ARCDSTAI ARCESTAI ARCFCRE  ARCFDEL
ARCFSTAI ARCGSTAI ARCISTAT ARCJSTAE ARCJSTAI ARCMLCLN ARCMSCLN
ARCMSTAI ARCMVCLN ARCPRLOG ARCRPT   ARCUDATA ARCUTIL  ARCXSTAI
ARCYSTAI ARCZMSGS


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42541 Catalog

Example B-36 contains the cover letter for APAR OA42541.

Example B-36 OA42541

```
APAR Identifier ...... OA42541      Last Changed ........ 13/10/02
  ABEND S130 IN IDA0200T AFTER INSTALLING PTFS FOR OA36916


  Symptom ...... IN INCORROUT         Status ........... CLOSED  PER
  Severity ..................... 2     Date Closed ......... 13/08/02
  Component ..... 5695DF106           Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name DFSMS VSAM           Special Notice    PE
  Current Target Date ..13/08/31      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:    UA68644 UA68643

  PTF List:
  Release A10   : PTF not available yet
  Release B10   : PTF not available yet
  Release C10   : UA70130 available 13/08/28 (F308 )
  Release D10   : UA70131 available 13/08/28 (F308 )
  Release 210   : UA70146 available 13/08/28 (F308 )


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  An abend S130 may occur in IDA0200T at offset X'3600' aftre
  installing the PTFs for OA36916. The error is a dequeue for a
  resource that is not held.
  The dequeue will show a request to dequeue SYSVSAM with a
  catalog name as the resource and ending in a "N".


  LOCAL FIX:
  Remove the PTFs for OA36916
  PEX/ UA68641
  PEX/ UA68642


  PROBLEM SUMMARY:
  ************************************************************
  * USERS AFFECTED: All z/OS 1.10 VSAM users and above who       *
  *                 OPEN and CLOSE a catalog as a normal         *
  *                 VSAM Data Set.                               *
  ************************************************************
```

```
* PROBLEM DESCRIPTION: While closing a user catalog that has   *
*                      been opened with multiple ACBs, an      *
*                      ABEND S130 will result.                 *
****************************************************************
* RECOMMENDATION: Apply PTF.                                   *
****************************************************************
VSAM CLOSE processing was not correctly verifing
the last close for a user catalog.


PROBLEM CONCLUSION:
VSAM CLOSE processing was modified to correctly
determine the last close for a user catalog.
KEYWORDS: ZOS0201C/K


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   IDA0200T


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42551 RLS DSS

Example B-37 contains the cover letter for APAR OA42551.

Example B-37 OA42551

```
APAR Identifier ...... OA42551      Last Changed ........ 13/10/02
  ADR952E ADR957I DURING LOGICAL DUMP OF USERCATALOG WITH DSS DUE
  TO A FAILURE IN RLS DURING QUIESCE PROCESS 13/06/14 PTF PECHANGE

  Symptom ...... MS MSGADR952E        Status ........... CLOSED  PER
  Severity ................... 2      Date Closed ......... 13/06/21
  Component .......... 5695DF122      Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name VSAM REC LEV SH      Special Notice    PE
  Current Target Date ..13/07/31      Flags
  SCP ...................
  Platform ............
```

```
Status Detail: SHIPMENT - Packaged solution is available for
                          shipment.

PE PTF List:    UA68643 UA68644

PTF List:
Release A10   : PTF not available yet
Release B10   : PTF not available yet
Release C10   : UA69623 available 13/07/23 (F307 )
Release D10   : UA69624 available 13/07/23 (F307 )
Release 210   : UA69625 available 13/07/23 (F307 )


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
A logical dump of a usercat defined with a large number
of extents (approximatly 30 and more) will fail with DSS
messages:

ADR952E (001)-DTDSC(01), THE IDAQDMP MACRO FAILED DURING QUIESCE
PROCESSING FOR FOR CLUSTER dsname WITH RETURN CODE
00000008 AND REASON CODE 61FF0001

This issue occurs after application of OA36422 and OA36403

Problem is due to workarea shortage during RLS locate request
for catalog information.

ADDITIONAL KEYWORDS:
RLSPSP/K
SMSVSAM RLS VSAMRLS


LOCAL FIX:
You can use DSS patch to circumvent the RLS quiesce processing
described in DFSMSdss Storage Administration
1.14.30 Bypassing RLS processing (OW32817)
PEX/ UA68641
PEX/ UA68642


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All Catalog users who issue DSS DUMP         *
*                 command to backup user catalog data sets.    *
****************************************************************
* PROBLEM DESCRIPTION: When performing the DSS DUMP function   *
*                      to backup user catalog data sets with   *
*                      about 30 extents, the following error   *
*                      is generated:                           *
*                                                              *
```

```
*                     ADR952E (001)-DTDSC(01), THE IDAQDMP    *
*                     MACRO FAILED DURING QUIESCE PROCESSING  *
*                     FOR CLUSTER dsname WITH RETURN CODE     *
*                     00000008 AND REASON CODE 61FF0001       *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
If a user catalog data set has approximately 30 or more extents,
any attempt to back it up using the DSS DUMP will failed with
ADR952E error message.


PROBLEM CONCLUSION:
The error is due to the work area being too small to handle a
user catalog with many extents. The fix will allocate a larger
work area and retry the operation when detecting the work area
too small error.
KEYWORDS: RLSPSP/K ZOS0201C/K


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   IDAVQCAT


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42562 DFSMShsm Storage Tiers

Example B-38 contains the cover letter for APAR OA42562.

Example B-38 OA42562

```
APAR Identifier ...... OA42562      Last Changed ........ 13/09/13
  STORAGE TIERS COEXISTENCE ENABLEMENT


  Symptom ...... IN INCORROUT         Status ........... CLOSED  PER
  Severity ................... 2      Date Closed ......... 13/08/15
  Component .......... 5695DF170      Duplicate of ........
  Reported Release ......... A10      Fixed Release ............ 999
```

```
Component Name DFSMSHSM, ISMF       Special Notice
Current Target Date ..13/09/12      Flags
SCP ...................
Platform ............

Status Detail: SHIPMENT - Packaged solution is available for
                          shipment.

PE PTF List:

PTF List:
Release A10   : UA70331 available 13/08/21 (     )
Release B10   : UA70332 available 13/08/21 (     )
Release C10   : UA70338 available 13/08/23 (F308 )
Release D10   : UA70373 available 13/08/23 (F308 )


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
Storage Tiers coexistence enablement


LOCAL FIX:
N/A


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All V1R10,V1R11,V1R12 and V1R13 DFSMShsm     *
*                 users.                                       *
****************************************************************
* PROBLEM DESCRIPTION: Enlarge DSR/VSR record lengths for      *
*                      for Storage Tiers coexistence.          *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
Enlarge DSR/VSR record lengths for Storage Tiers coexistence.


PROBLEM CONCLUSION:
DFSMShsm will be changed to increase DSR/VSR record lengths
for Storage Tiers coexistence.

++HOLD(MULTSYS) - The PTF(s) for OA42529 must be installed
and active on all systems in the SYSPLEX before the PTF(s) for
APAR OA42562 can be applied to any system within the sysplex.
The PTFs for OA42529 are UA70197, UA70198, UA70225, UA70229

++HOLD(MULTSYS) - OA42562 PTF(s) will not be fully effective
on the system it is being applied to until the PTF(s) for
this APAR are are applied to all systems in the SYSPLEX.
```

```
New release        Keyword
z/OS V2R1          ZOS0201C/K


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:
ARCASTAI ARCAUDIT ARCAZWC  ARCCPQST ARCCSTAI ARCCTL   ARCCVSR
ARCDCOLL ARCDSTAI ARCESTAI ARCFCRE  ARCFDEL  ARCFSTAI ARCGSTAI
ARCISTAT ARCJSTAE ARCJSTAI ARCMLCLN ARCMSCLN ARCMSTAI ARCMVCLN
ARCPRLOG ARCRPT   ARCUDATA ARCUTIL  ARCXSTAI ARCYSTAI ARCZMSGS


SRLS:
NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42267 XTIOT use

Example B-39 contains the cover letter for APAR OA42267. This APAR is applicable to DFSMS V1.13 as well.

Example B-39 OA42267

```
APAR Identifier ...... OA42267      Last Changed ........ 13/10/01
  IEC999I IFG0194D ABENDOC1 ABENDOC4 NON_VSAM_XTIOT DEVSUPXX
  TRKCALC RC04 IECOSCR1

  Symptom ...... AB ABENDOC4          Status ........... CLOSED  PER
  Severity ..................... 2     Date Closed ......... 13/09/16
  Component ..... 5695DF107           Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name DATA MGMT SUPPO      Special Notice
  Current Target Date ..13/09/30      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:
```

```
PTF List:
Release D10   : UA70761 available 13/10/01 (1000 )
Release 210   : UA70762 available 13/10/01 (1000 )


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
When keyword NON_VSAM_XTIOT is set to YES in PARMLIB member
DEVSUPxx, IFG0194D +x'186A' UA68824 makes a TRKCALC call
without LOC=ANY and the UCB is a 31-bit address pulled directly
from the XTIOT.  TRKCALC module IECOSCR1 takes an ABENDOC4 as a
result.  IFG0194D may also take an intentional ABENDOC1 to
header IFG0194D TRKCALC_ERROR_SEE_R15 ERROR when register 15 is
set to RC04.  The joblog will show an IEC999I IFG0194D message.


LOCAL FIX:
Set NON_VSAM_XTIOT to NO in PARMLIB member DEVSUPxx


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All.                                         *
****************************************************************
* PROBLEM DESCRIPTION: AbendOc1 in IFG0194D.                   *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
IEC999I IFG0194D,POFFOR,POFFOR,TRKCALC ERROR SEE R15
due to an intentional abendOc1 after a TRKCALC failure.
TRKCALC is passed a 31bit UCB address without including
keyword: LOC=ANY in the macro invocation. OPEN is processing
with an XTIOT containing 31bit UCB addresses.


PROBLEM CONCLUSION:
IFG0194D now issues TRKCALC with the LOC=ANY keyword.


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   IFG0194D


SRLS:      NONE


RTN CODES:
```

```
  CIRCUMVENTION:

  MESSAGE TO SUBMITTER:
```

APAR OA42846 Single Striped, Multi-volume SAM Tailored Compressed data set

Example B-40 contains the cover letter for APAR OA42846.

Example B-40 OA42846

```
APAR Identifier ...... OA42846      Last Changed ........ 13/09/12
  APAR OA41459 CAN CAUSE LOOP IN IFG0232D


  Symptom ...... LP LOOP              Status ........... CLOSED  PER
  Severity ..................... 2     Date Closed ......... 13/08/05
  Component .......... 5695DF107      Duplicate of ........
  Reported Release ......... D10      Fixed Release ............. 999
  Component Name DATA MGMT SUPPO      Special Notice    PE
  Current Target Date ..13/09/15      Flags
  SCP ...................
  Platform ............

  Status Detail: SHIPMENT - Packaged solution is available for
                            shipment.

  PE PTF List:    UA68273 UA68272 UA68824 UA68823

  PTF List:
  Release C10   : UA70205 available 13/09/12 (1000 )
  Release D10   : UA70204 available 13/09/12 (1000 )
  Release 210   : UA70203 available 13/09/12 (1000 )


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  APAR OA41459 can cause a LOOP in IFG0232D when there are fewer
  than 5 used physical blocks on the last volume for tailored
  compressed data sets during CLOSE TYPE=T (TCLOSE), this LOOP
  will hold ENQ on SYSZTIOT.


  LOCAL FIX:
  remove PTF for OA41459


  PROBLEM SUMMARY:
```

```
*****************************************************************
* USERS AFFECTED: users of single striped, multi-volume sam    *
*                 tailored compressed data sets.               *
*****************************************************************
* PROBLEM DESCRIPTION: users of single striped, multi-volume   *
*                      sam tailored compressed data sets may   *
*                      see loops when close type=t leave is    *
*                      issued when open for input or issued    *
*                      tiwce when open for output on the last  *
*                      volume and there is very little data    *
*                      (less than five physical blocks) on the *
*                      current volume.                         *
*****************************************************************
* RECOMMENDATION:                                              *
*****************************************************************
users of single striped, multi-volume sam tailored compressed
data sets may see loops when close type=t leave is issued.


PROBLEM CONCLUSION:
Change code so that the count of physical blocks used by the
tailored dictionary are ignored for the second and subsequent
volumes of a single striped, multi-volume data set.


TEMPORARY FIX:


COMMENTS:


MODULES/MACROS:   IFG0232D


SRLS:      NONE


RTN CODES:


CIRCUMVENTION:


MESSAGE TO SUBMITTER:
```

APAR OA42947 VSAM RLS

Example B-41 contains the cover letter for APAR OA42947. The DFSMS V2.1 equivalent APAR is OA43003.

Example B-41 OA42947

```
APAR Identifier ...... OA42947      Last Changed ........ 13/08/02
  POSSIBLE INCORRECT RBA RETURNED AFTER ESDS PUT UPDATE OR DELETE
```

```
  Symptom ...... IN INCORROUT         Status ........... OPEN
  Severity ..................... 3     Date Closed .........
  Component .......... 5695DF122      Duplicate of ........
  Reported Release ......... D10      Fixed Release ............
  Component Name VSAM REC LEV SH      Special Notice
  Current Target Date ..14/03/30      Flags
  SCP ...................
  Platform ............

  Status Detail: DESIGN/CODE - APAR solution is being designed
                               and coded.

  PE PTF List:

  PTF List:


  Parent APAR:
  Child APAR list: OA43003


  ERROR DESCRIPTION:
  For ESDS processing, it is possible for the RBA to be corrupted
  by application programs after it's initially passeed in
  correctly. An application program specifies the correct RBA for
  a GET UPDATE request, VSAM RLS processes the GET UPDATE with the
  correct RBA successfully, then the application somehow corrupts
  the RBA, possibly by mistake, followed by a PUT UPDATE request.
  RLS also processes the PUT UPDATE successfully since RBA is not
  required. However, the incorrect RBA is returned at the end of
  the processing.


  LOCAL FIX:
  Avoid corrupting the RBA between requests.
```

APAR OA43537 ICF Catalog hang

Example B-42 contains the cover letter for APAR OA43537.

Example B-42 OA43537

```
APAR Identifier ...... OA43537      Last Changed ........ 13/10/21
  IDC3009I 50-43 ERROR FOLLOWED BY SYSZVVDS SYSIGGV2 HANG


  Symptom ...... IN INCORROUT         Status ........... OPEN
  Severity ..................... 2     Date Closed .........
  Component .......... 5695DF105      Duplicate of ........
  Reported Release ......... D10      Fixed Release ............
  Component Name ICF CATALOG & I      Special Notice    PE
  Current Target Date ..14/01/31      Flags
  SCP ...................
  Platform ............
```

```
  Status Detail: DESIGN/CODE - APAR solution is being designed
                               and coded.

  PE PTF List:    UA68643 UA68644

  PTF List:


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  When multiple DELETE / EXPORT DISCONNECT jobs are ran to remove
  user catalogs from the master catalog simultaneously, a 50-43
  error can occur followed by a hang oinvolving SYSZVVDS and
  SYSIGGV2 for the master.  This timing issue only occurs during
  maintenance related procedures that involve this type of
  workload and would not occur during typical production. the
  50-43 was introduced in OW45703 to detect cases where a VVDS Get
  for Update was issued and the next request was not the
  corresponding Put or End Update.  In this case, two tasks failed
  to serialize with each other on the VVDS parameter control block
  which resulted in put/end updates not being issued
  and enqueues not being released

  CAS DYNAMIC DUMP-IGGOCLEO RC50  RSN43

  ISG343I 01.23.45 GRS STATUS 841
  S=SYSTEMS SYSZVVDS volser
  S=SYSTEMS SYSIGGV2 master.catalog


  CATKEYS: CAT2013 CATHANG CATBCS CATVVDS


  LOCAL FIX:
  F CATALOG,LIST will help identify holders of resources.  F
  CATALOG,ABEND(id) can be issued to abend a specific task.  F
  CATALOG,RESTART can alternatively be used to free the hang.
```

APAR OA43583 PDSE (also applies to DFSMS V2.1)

Example B-43 contains the cover letter for APAR OA43583.

Example B-43 OA43583

```
APAR Identifier ...... OA43583      Last Changed ........ 13/10/21
  ABENDOF4 RC14 RSN25400018 IGWDLCLS+0C32 @ UA68850


  Symptom ...... AB ABENDOF4          Status ............ CLOSED  PER
  Severity ................... 2      Date Closed ......... 13/10/21
```

```
Component .......... 5695DF115      Duplicate of ........
Reported Release ..... D10      Fixed Release ............ 999
Component Name EXTENDED DATA S      Special Notice          HIPER
Current Target Date ..14/01/15      Flags
SCP ...................
Platform ............                                  DATALOSS

Status Detail: TESTPACKAGING - Packaged solution is being tested.

PE PTF List:

PTF List:
Release C10   : PTF not available yet
Release D10   : PTF not available yet
Release 210   : PTF not available yet


Parent APAR:
Child APAR list:


ERROR DESCRIPTION:
ABENDOF4 RC14 RSN25400018 out of the module IGWDLCLS+0C32 at
UA68850 maintenance level.

The reason code RSN25400018 translates to GETMAIN_FAILED.

VSM summary data  (IP VERBX VSMDATA 'NOG SUMM') shows that
SMSPDSE1 extended private storage is almost exhausted:

LOCAL STORAGE MAP

 _____________________________
|                             |80000000  <- Top of Ext. Private
| Extended                    |
| LSQA/SWA/229/230            |80000000  <- Max Ext. User Region
Address
|_____________________________|32914000  <- ELSQA Bottom
|                             |
| (Free Extended Storage)     |
|_____________________________|32908000  <- Ext. User Region Top
|                             |
| Extended User Region        |
|_____________________________|32900000  <- Ext. User Region

An IP VERBX SMSXDATA 'F(POOLS) JOBNAME(SMSPDSE1)' will show an
extremely large allocation for the "JCDM DSC POOL FOR LSTB
DREFD" pool:

*****************************************************************
   Below the Bar Storage
Exts   TotSize         TotCells  InUseCells SP  Key Description
*****************************************************************
11315  1,205,002,240   1,131,500  1,131,500 124 50 JCDM DSC POOL
                                                  FOR LSTB
                                                  DREFD
```

```
The build up of the LSTB control structures is the result of
PDSE index code that is attempting to join two index pages.

This failure can occur on PDSE data sets that are shared in a
sysplex with mixed z/OS levels where at least one LPAR is at the
HDZ2210 / z/OS 2.1 level.


LOCAL FIX:
Restart the SMSPDSE1 address space


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: PDSE index records can rarely be broken when *
*                 the data set is updated on a release HDZ2210 *
*                 which had been updated on a lower release.   *
****************************************************************
* PROBLEM DESCRIPTION: See Users Affected.                     *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
PDSE index manager will be modified to now join index pages
which have created on HDZ2210 and a lower release.


PROBLEM CONCLUSION:
See Problem summary.


TEMPORARY FIX:
*********
* HIPER * AA45383
*********


COMMENTS:


MODULES/MACROS:
IGWIRCMT IGWIVRJ2


SRLS:
NONE


RTN CODES:


CIRCUMVENTION:
```

```
MESSAGE TO SUBMITTER:
```

APAR OA43701 SAM EF V2 (also applies DFSMS V2.1)

Example B-44 contains the cover letter for APAR OA43701.

Example B-44 OA43701

```
APAR Identifier ...... OA43701      Last Changed ........ 13/10/28
  VOLUME LABEL MAY BE OVERWRITTEN BY SAM EXTENDED FORMAT VERSION 2
  DATA SET - Z/OS 2.1 ONLY

  Symptom ...... IN INCORROUT         Status ............ CLOSED  PER
  Severity ................... 2      Date Closed ......... 13/10/28
  Component .......... 5695DF102      Duplicate of ........
  Reported Release ......... 210      Fixed Release ............ 999
  Component Name BASE ACCESS MET      Special Notice           HIPER
  Current Target Date ..13/12/15      Flags
  SCP ...................
  Platform ............                 PERVASIVE      DATALOSS

  Status Detail: TESTPACKAGING - Packaged solution is being tested.

  PE PTF List:

  PTF List:
  Release C10   : PTF not available yet
  Release D10   : PTF not available yet
  Release 210   : PTF not available yet


  Parent APAR:
  Child APAR list:


  ERROR DESCRIPTION:
  If a multi-volume single striped SAM Extended Format Version 2
  data set is allocated using Guaranteed Space and then opened for
  EXTEND or opened for OUTPUT or OUTIN when allocated DISP=MOD,
  the volume label on the second to last volume may be overwritten
  by user data.


  LOCAL FIX:
  Do not use Version 2 if using Guaranteed Space allocation and
  either OPEN EXTEND or OPEN OUTPUT/OUTIN and DISP=MOD is used.
  To bypass this problem you must do one of the following:
  1) Specify DSNTYPE=(EXT,1) or DSNTYPE=(EXT) on the JCL
  OR
  2) Specify EXT_VERSION(1) in IGDSMSxx parmlib member AND do NOT
  specify DSNTYPE=(EXT,2) on the JCL.


  The volume can be recovered by varying it offline to all
  systems and running the following job.
```

```
//*************************************************************/
//*  THIS STEP REBUILDS CYL 0 HEAD 0 TO POINT TO VTOC       */
//*  CHANGE THE VOLID TO THE VOLSER REQUIRED, UNIT TO DEVICE*/
//*  NUMBER AND THE START OF THE VTOC TO THE CYLINDER and   */
//*  HEAD where it is
//*************************************************************/
//RFMT     EXEC  PGM=ICKDSF
//SYSPRINT DD SYSOUT=*
//SYSIN    DD  *
 REFORMAT UNIT(dddd) NVFY VTOCPTR(Cyl,HD) PURGE VOLID(vvvvvv)
/*
A successful vary online is a good indication all should be
fine.


PROBLEM SUMMARY:
****************************************************************
* USERS AFFECTED: All users of multi-volume single striped SAM *
*                 extended format data sets allocated using    *
*                 guaranteed space.                            *
****************************************************************
* PROBLEM DESCRIPTION: Multi-volume single striped SAM         *
*                      extended format version 2 data sets     *
*                      allocated using guaranteed space may    *
*                      overlay the volume label on the second  *
*                      to last volume if the first OPEN is for *
*                      EXTEND or for OUTPUT or OUTIN and       *
*                      DISP=MOD is specified.  In some cases,  *
*                      such as ISPF browse, OPEN for INPUT or  *
*                      INOUT will position to the volume       *
*                      label.  Though version 2 data sets may  *
*                      not be created on releases prior to     *
*                      HDZ2210, this problem could occur if    *
*                      the data set was allocated on HDZ2210   *
*                      and first opened on an earlier release. *
****************************************************************
* RECOMMENDATION:                                              *
****************************************************************
Multi-volume single striped SAM extended format version 2 data
sets allocated using guaranteed space may overlay the volume
label on the second to last volume.


PROBLEM CONCLUSION:
Changed code to correctly build internal control blocks to only
allow access to the data set extents on the last volume.


TEMPORARY FIX:
*********
* HIPER * AA43701
*********


COMMENTS:
```

```
MODULES/MACROS:
IGGO193V

SRLS:
NONE

RTN CODES:

CIRCUMVENTION:

MESSAGE TO SUBMITTER:
```

C

Sample assembler code

This appendix contains source for sample programs developed during this project to exercise features and functions in z/OS V2.1 DFSMS.

IEBCOPY FAMS abend diagnosis

In Example C-1 together with continuation in subsequent examples we show sample code to analyze the IEBCOPY REGISTER 15 and REGISTER 0 data that could be returned if the FAMS routine has an abend.

This example is provided as an example of what could be done. If the code needs to be assembled and linked, an example is provided in Example C-5 on page 393.

Example C-1 IEBCPYF program to display FAMS abend data 1 of 4

```
         MACRO                                                          00010099
&NAME    SEGSTART                                                       00020099
         AMODE 24                                                       00030099
&NAME    STM   14,12,12(13)           SAVE HIS REGS IN HIS SAVE AREA    00040099
R0       EQU   0                                                        00050099
R1       EQU   1                                                        00060099
R2       EQU   2                                                        00070099
R3       EQU   3                                                        00080099
R4       EQU   4                                                        00090099
R5       EQU   5                                                        00100099
R6       EQU   6                                                        00110099
R7       EQU   7                                                        00120099
R8       EQU   8                                                        00130099
R9       EQU   9                                                        00140099
R10      EQU   10                                                       00150099
R11      EQU   11                                                       00160099
RB       EQU   12                                                       00170099
R13      EQU   13                                                       00180099
R14      EQU   14                                                       00190099
R15      EQU   15                                                       00200099
         BALR  12,0                   SET UP ADDRESSABILITY             00210099
         USING *,12                   USE REG 12 AS BASE REG            00220099
         ST    13,SAVEREGS+4          SAVE @ OF HIS SAVEAREA IN MINE    00230099
         LA    03,SAVEREGS            LOAD @ OF MY SAVE AREA IN REG 3   00240099
         ST    03,8(13)               SAVE @ OF MY SAVE AREA IN HIS     00250099
         LR    13,03                  LOAD @ OF MY SAVE AREA IN REG 13  00260099
         MEND                                                           00270099
         MACRO                                                          00280099
&NAME    SEGEND                                                         00290099
&NAME    L     13,SAVEREGS+4          LOAD REG13 WITH @ OF HIS SAVE     00300099
         LM    14,12,12(13)           RESTORE REGS FROM HIS SAVEAREA    00310099
         XR    R15,R15                                                  00320099
         BR    14                     RETURN TO CALLING RTN VIA REG 14  00330099
SAVEREGS DC    18F'0'                 SET UP SAVE AREA                  00340099
         MEND                                                           00350099
         MACRO                                                          00360099
&NAME    HEXTEXT8 &KEY                                                  00370099
         UNPK  &KEY.(09),SAVR0(5)                                       00380099
         TR    &KEY.(08),HEXTAB-240                                     00390099
         UNPK  &KEY.+8(09),SAVR0+4(5)                                   00400099
         TR    &KEY.+8(08),HEXTAB-240                                   00410099
         MVI   &KEY.+16,X'40' BLANK THE EXTRA BYTE                      00420099
         MEND                                                           00430099
```

Example C-2 IEBCPYF program to display FAMS abend data 2 of 4

```
IEBCPYF   SEGSTART                                                      00440099
*  THIS IS A SIMPLE PROGRAM TO LINK TO IEBCOPY THEN DISPLAY THE         00450099
*  CONTENTS OF REGISTER 15, AND OF REGISTER 0                           00460099
*                                                                       00470099
*  R3    PARM                                                           00480099
*  R4    IEBCREAS DSECT                                                 00490099
*  R12   OVERALL BASE REGISTER                                          00500099
START    DS    0H                                                       00510099
         MVI   TESTPARM,C'N'                                            00520099
         L     R15,0(R1) GET ADDRESS OF PARM                            00530099
         LH    R3,0(R15) GET LENGTH OF PARM                             00540099
         CH    R3,=H'0'  CHECK PARM LENGTH                              00550099
         BE    NOPARM                                                   00560099
         SH    R3,=H'1'  REDUCE FOR EXECUTE                             00570099
         EX    R3,MVCPARM                                               00580099
         MVC   SAVR0(8),SYSPARM+9                                       00590099
         MVI   TESTPARM,C'Y'                                            00600099
NOPARM   DS    0H                                                       00610099
         LINK  EP=IEBCOPY,PARAM=(OPTIONS),VL=1                          00620099
* SAVE R15 AND R0                                                       00630099
         ST    R15,SAVR15                                               00640099
         CLI   TESTPARM,C'Y'                                            00650099
         BE    SKIPR0                                                   00660099
         STG   R0,SAVR0                                                 00670099
SKIPR0   DS    0H                                                       00680099
         OPEN  (PRINTDCB,(OUTPUT))                                      00690099
         PUT   PRINTDCB,PRINTHD1                                        00700099
* PREPARE R15 FOR PRINTING AND PRINT                                    00710099
         L     R15,SAVR15                                               00720099
         CVD   R15,CVDWRK                                               00730099
         UNPK  UNPKWRK+3(5),CVDWRK+4(4)                                 00740099
         OI    UNPKWRK+7,X'F0'                                          00750099
         MVC   MSG15V,UNPKWRK+4                                         00760099
         MVC   PRTBUF,BLANK                                             00770099
         MVC   PRTBUF(MSG15L),MSG15                                     00780099
* PREPARE R0  FOR PRINTING AND PRINT                                    00790099
         LA    R4,SAVR0                                                 00800099
         USING IEBRSNAREA,R4                                            00810099
         HEXTEXT8 MSGOV                                                 00820099
         PUT   PRINTDCB,PRTBUF                                          00830099
* PRINT  HEX FORM OF THE CONTENTS OF REGISTER 0                         00840099
         MVC   PRTBUF,BLANK                                             00850099
         MVC   PRTBUF(MSG0L),MSG0                                       00860099
         PUT   PRINTDCB,PRTBUF                                          00870099
         CLI   TESTPARM,C'N'                                            00880099
         BE    NOTTEST                                                  00890099
* IN TEST MODE                                                          00900099
         MVC   PRTBUF,BLANK                                             00910099
         PUT   PRINTDCB,PRINTHD3                                        00920099
```

Example C-3 IEBCPYF program to display FAMS abend data 3 of 4

```
NOTTEST  DS   0H                                                        00930099
* PREPARE ANALYSUS OF WHAT THE CONTENTS OF R0 MEAN                      00940099
```

```
         TM    IEBRSN_FLAGS,IEBRSN_ABENDED                              00950099
         BNO   FINISH                                                   00960099
         PUT   PRINTDCB,PRINTHD2                                        00970099
* ABEND DID OCCUR IN FAMS                                              00980099
         MVC   PRTBUF,BLANK                                             00990099
         MVC   PRTBUF(MSG04L),MSG04                                     01000099
         PUT   PRINTDCB,PRTBUF                                          01010099
         MVC   PRTBUF,BLANK                                             01020099
*        MVC   MSG05V,IEBRSN_ABNDCODE                                   01030099
         MVC   MSG05V,MSG0VAB                                           01040099
         MVC   PRTBUF,BLANK                                             01050099
         MVC   PRTBUF(MSG05L),MSG05                                     01060099
         PUT   PRINTDCB,PRTBUF                                          01070099
*        MVC   MSG06V,IEBRSN_ABNDRSN                                    01080099
         MVC   MSG06V,MSG0VRC                                           01090099
         MVC   PRTBUF(MSG06L),MSG06                                     01100099
         PUT   PRINTDCB,PRTBUF                                          01110099
FINISH   DS    0H                                                       01120099
         SEGEND                                                         01130099
         ORG                                                            01140099
WORKAREA DC    C'******** WORKAREA ************'                        01150099
         DS    0D                                                       01160099
CVDWRK   DC    CL8'EMPTY'                                               01170099
UNPKWRK  DC    9XL1'F0'                                                 01180099
SAVR0    DC    D'0'                                                     01190099
SAVR15   DC    F'0'                                                     01200099
OPTIONS  DC    H'0'                                                     01210099
HEXTAB   DC     C'0123456789ABCDEF' TRANSLATE TABLE                     01220099
BLANK    DC    CL133' '                                                 01230099
PRTBUF   DS    CL133                                                    01240099
MSG15    DC    C' ON EXIT FROM IEBCOPY R15='                            01250099
MSG15V   DC    CL4'NNNN'                                                01260099
MSG15L   EQU   *-MSG15                                                 01270099
MSG0     DC    C' ON EXIT FROM IEBCOPY R0='                             01280099
MSG0V    DC    CL16'NNNNNNNNNNNNNNNN'                                   01290099
MSG0VAB  EQU   MSG0V+13                                                 01300099
MSG0VRC  EQU   MSG0V+0                                                  01310099
MSG0L    EQU   *-MSG0                                                   01320099
MSG04    DC    C' IEBRSN_ABENDED FLAG '                                 01330099
MSG04V   DC    C'IS ON INDICATING THAT AN ABEND OCCURRED IN FAMS'       01340099
MSG04L   EQU   *-MSG04                                                 01350099
MSG05    DC    C' IEBRSN_ABENDED FLAG '                                 01360099
         DC    C'IS ON AND ABEND CODE IS: '                             01370099
MSG05V   DC    CL3'XXX'                                                 01380099
MSG05L   EQU   *-MSG05                                                 01390099
```

Example C-4 IEBCPYF program to display FAMS abend data 4 of 4

```
MSG06    DC    C' IEBRSN_ABENDED FLAG '                                 01400099
         DC    C'IS ON AND REASON CODE IS: '                            01410099
MSG06V   DC    CL4'XXX'                                                 01420099
MSG06L   EQU   *-MSG06                                                 01430099
PRINTHD1 DC    CL133' REGISTER CONTENTS AFTER LINK TO IEBCOPY'          01440099
PRINTHD2 DC    CL133' REGISTER 0 CONTENTS ANALYSIS'                     01450099
PRINTHD3 DC    CL133' *** WARNING - RUNNING WITH TEST PARM'             01460099
```

```
SYSPARM  DC   CL100'SYSPARM SYSPARM'                                    01470099
MVCPARM  MVC  SYSPARM(0),2(R15)                                        01480099
TESTPARM DC   C'N'                                                     01490099
PRINTDCB DCB DDNAME=PRINT,DSORG=PS,MACRF=(PM),LRECL=133                01500099
         ORG                                                           01510099
         IEBCREAS                                                      01520099
         END                                                           01530099
```

In order to use the source code, it must first be stored in a data set with member name IEBCPYF. The data set name used in this example is MHLRES2.IEBCOPY.DFSMS21.PDS. The data set can be PDSE or PDS. The only restriction is that the RECFM be F or FB and LRECL must be 80.

It is also necessary to create a data set to link the load module into. In this example the data set name used is MHLRES2.IEBCOPY.DFSMS21.LOAD. The LOAD data set can be PDS or PDSE and have RECFM U.

Once the source has been successfully assembled and linked, the program can be run using the example code in Example 7-27 on page 125.

In Example C-5, we show sample JCL to assemble and link program IEBCPYF.

Example C-5 JCL to assemble and link program IEBCPYF

```
//MHLRES2E JOB (1234567,COMMENT),MHLRES2,TIME=10,                      00010000
// MSGCLASS=J,                                                         00020000
// MSGLEVEL=1,CLASS=A,                                                 00030000
// NOTIFY=&SYSUID                                                      00040000
/*JOBPARM S=*                                                         00041000
//ASMHCL PROC                                                         00050000
//ASM      EXEC PGM=ASMA90,REGION=0M,                                 00060000
//             PARM='OBJECT,NODECK'                                   00070000
//SYSLIN   DD  DSN=&&OBJ,DISP=(NEW,PASS),UNIT=SYSDA,                  00080000
//             SPACE=(TRK,(10,2)),DCB=BLKSIZE=3120                    00090000
//SYSLIB   DD  DISP=SHR,DSN=SYS1.MACLIB                               00100000
//SYSPRINT DD  SYSOUT=*                                               00110000
//SYSUT1   DD  DSN=&&SYSUT1,UNIT=SYSDA,SPACE=(CYL,(5,5))              00120000
//*                                                                   00130000
//LKED     EXEC PGM=HEWL,REGION=2048K,COND=(8,LE,ASM),                00140000
//             PARM='XREF,LIST,LET'                                   00150000
//SYSLIN   DD  DSN=&&OBJ,DISP=(OLD,DELETE)                            00160000
//         DD  DDNAME=SYSIN                                           00170000
//SYSPRINT DD  SYSOUT=*                                               00180000
//SYSUT1   DD  DSN=&&SYSUT1,UNIT=SYSDA,SPACE=(CYL,(5,5))              00190000
// PEND                                                               00200000
//  EXEC ASMHCL                                                       00210000
//ASM.SYSIN DD DISP=SHR,DSN=MHLRES2.IEBCOPY.DFSMS21.PDS(IEBCPYFA)     00220007
/*                                                                    00230000
//LKED.SYSLMOD  DD DISP=SHR,DSN=MHLRES2.IEBCOPY.DFSMS21.LOAD          00240000
//LKED.SYSIN   DD *                                                   00250000
 SETSSI 00002100                                                     00260000
 NAME IEBCPYF(R)                                                     00270007
```

IEBCOPY User Exit Capability illustration sample code

In order to demonstrate the IEBCOPY User Exit Capability, we generated two programs:

- The program (IEBCPYL) to invoke the Control Statement Exit
- The Control Statement Exit module (IEBCPYC)

In Example C-6, we show the assembler source for the IEBCPYL program to load IEBCOPY and invoke the control statement exit IEBCPYC.

The use of the IEBCPARM DSECT=NO statement generates the work area passed to IEBCOPY. When IEBCOPY has been invoked, it will link to the IEBCPYC exit module until told to stop.

Example C-6 Assembler source for IEBCPYL program

```
         MACRO
&NAME    SEGSTART
         AMODE 24
&NAME    STM   14,12,12(13)            SAVE HIS REGS IN HIS SAVE AREA
R0       EQU   0
R1       EQU   1
R3       EQU   3
R4       EQU   4
RB       EQU   12
R13      EQU   13
R14      EQU   14
R15      EQU   15
         BALR  12,0                    SET UP ADDRESSABILITY
         USING *,12                    USE REG 12 AS BASE REG
         ST    13,SAVEREGS+4           SAVE @ OF HIS SAVEAREA IN MINE
         LA    03,SAVEREGS             LOAD @ OF MY SAVE AREA IN REG 3
         ST    03,8(13)                SAVE @ OF MY SAVE AREA IN HIS
         LR    13,03                   LOAD @ OF MY SAVE AREA IN REG 13
         MEND
         MACRO
&NAME    SEGEND
&NAME    L     13,SAVEREGS+4           LOAD REG13 WITH @ OF HIS SAVE
         LM    14,12,12(13)            RESTORE REGS FROM HIS SAVEAREA
         XR    R15,R15
         BR    14                      RETURN TO CALLING RTN VIA REG 14
SAVEREGS DC    18F'0'                  SET UP SAVE AREA
         MEND
IEBCPYF   SEGSTART
*  THIS IS A SIMPLE PROGRAM TO LINK TO IEBCOPY INSTRUCTING IT TO
*  INVOKE THE CONTROL STATEMENT EXIT MODULE.
*
*  R3    PARM
*  R4    IEBCREAS DSECT
*  R12   OVERALL BASE REGISTER
START    DS    0H
         LA    R1,CPARM_PARMLIST
         MVC   CPARM_OPTIONS_SIZE,=H'0'
         MVC   CPARM_DDNAMES_SIZE,=H'0'
         MVC   CPARM_PAGENUM_SIZE,=H'4'
         MVC   CPARM_PAGENUM_TEXT,=CL4'0004'
```

```
         LOAD  EPLOC=IEBCPYEC
         ST    R0,CPARM_EXIT_CONTROLSTMT_ADD
         OI    CPARM_PARMLIST_EXITS,CPARM_PARMLIST_LASTFLAG
         LA    R1,CPARM_PARMLIST
         LINK  EP=IEBCOPY
FINISH   DS    0H
         SEGEND
         ORG
         DS   0D
IEBCPYEC DC  C'IEBCPYC '  EXIT  FOR CONTROL STATEMENTS
         ORG
         IEBCPARM DSECT=NO
         IEBCREAS
         END
```

In Example C-7, we show example JCL to generate program IEBCPYL. It processes the source from data set MHLRES2.IEBCOPY.DFSMS21.PDS(IEBCPYLA) and creates the program in MHLRES2.IEBCOPY.DFSMS21.LOAD, which must be shown as a STEPLIB when executing program IEBCPYL.

Example C-7 JCL to assemble and link the IEBCPYL program

```
//MHLRES2E JOB (1234567,COMMENT),MHLRES2,TIME=10,
// MSGCLASS=J,
// MSGLEVEL=1,CLASS=A,
// NOTIFY=&SYSUID
/*JOBPARM S=*
//ASMHCL PROC
//ASM      EXEC PGM=ASMA90,REGION=0M,
//             PARM='OBJECT,NODECK'
//SYSLIN   DD  DSN=&&OBJ,DISP=(NEW,PASS),UNIT=SYSDA,
//             SPACE=(TRK,(10,2)),DCB=BLKSIZE=3120
//SYSLIB   DD  DISP=SHR,DSN=SYS1.MACLIB
//SYSPRINT DD  SYSOUT=*
//SYSUT1   DD  DSN=&&SYSUT1,UNIT=SYSDA,SPACE=(CYL,(5,5))
//*
//LKED     EXEC PGM=HEWL,REGION=2048K,COND=(8,LE,ASM),
//             PARM='XREF,LIST,LET'
//SYSLIN   DD  DSN=&&OBJ,DISP=(OLD,DELETE)
//         DD  DDNAME=SYSIN
//SYSPRINT DD  SYSOUT=*
//SYSUT1   DD  DSN=&&SYSUT1,UNIT=SYSDA,SPACE=(CYL,(5,5))
// PEND
//  EXEC ASMHCL
//ASM.SYSIN DD DISP=SHR,DSN=MHLRES2.IEBCOPY.DFSMS21.PDS(IEBCPYLA)
/*
//LKED.SYSLMOD  DD DISP=SHR,DSN=MHLRES2.IEBCOPY.DFSMS21.LOAD
//LKED.SYSIN   DD *
 SETSSI 00002100
 NAME IEBCPYL(R)
```

Program IEBCPYL loads module IEBCPYC as the control statement exit.

In Example C-8, we show the source for the IEBCPYC module.

The statement IEBCPLST is significant because it generates the map of the area that is passed by IEBCOPY as a result of being invoked with the PARAM that names the IEBCPYC exit.

Communication back to IEBCOPY is through updates to specific areas of the data area mapped by IEBCPLST. In particular, note that R15 must not be used to send return codes to IEBCOPY.

This example code is intended to illustrate the possibilities for use of the control statement exit and as such contains diagnostic code.

The sections of code labeled CTRL1/2/3 and E manage the return of information to IEBCOPY then the last call to inform IEBCOPY not to return for further control statements.

Example C-8 Assembler source for IEBCPYC module

```
&NAME    SEGSTART
         MACRO
&NAME    SEGSTART
         AMODE 24
&NAME    STM   14,12,12(13)            SAVE HIS REGS IN HIS SAVE AREA
R1       EQU   1
R3       EQU   3
R4       EQU   4
R5       EQU   5
RB       EQU   12
R13      EQU   13
R14      EQU   14
R15      EQU   15
         BALR  12,0                    SET UP ADDRESSABILITY
         USING *,12                    USE REG 12 AS BASE REG
         ST    13,SAVEREGS+4           SAVE @ OF HIS SAVEAREA IN MINE
         LA    03,SAVEREGS             LOAD @ OF MY SAVE AREA IN REG 3
         ST    03,8(13)                SAVE @ OF MY SAVE AREA IN HIS
         LR    13,03                   LOAD @ OF MY SAVE AREA IN REG 13
         MEND
         MACRO
&NAME    SEGEND
&NAME    L     13,SAVEREGS+4           LOAD REG13 WITH @ OF HIS SAVE
         LM    14,12,12(13)            RESTORE REGS FROM HIS SAVEAREA
         XR    R15,R15
         BR    14                      RETURN TO CALLING RTN VIA REG 14
SAVEREGS DC    18F'0'                  SET UP SAVE AREA
         MEND
IEBCPYC   SEGSTART
*  THIS IS A SIMPLE PROGRAM TO GENERATE IEBCOPY CONTROL
*  STATEMENTS TO PASS TO IEBCOPY.
*
*  R3    PARM
*  R4    WORK
*  R5    CPLST DATA AREA
*  R12   OVERALL BASE REGISTER
START    DS    0H
         LR    R3,R1
         WTO 'GOT TO IEBCPYEC'
```

```
         USING CPLST_PARMLIST,R3
         USING CPLST_CONTROL_AREA,R5
         TM    CPLST_PARMLIST_CONTROL_FLAGS,CPLST_CONTROL_INIT
         BO    INIT
         TM    CPLST_PARMLIST_CONTROL_FLAGS,CPLST_CONTROL_DATA
         BO    CONTROL
         DC    H'0'
INIT     DS    0H
         WTO   'CPLST_CONTROL_INIT'
         LA    R4,CPLST_RC_INIT
         B     SETRC
CONTROL  DS    0H
         CLI   CONTROLF,C'1'
         BE    CTRL1
         CLI   CONTROLF,C'2'
         BE    CTRL2
         CLI   CONTROLF,C'3'
         BE    CTRL3
         CLI   CONTROLF,C'E'
         BE    CTRLE
* LAST TIME IN
CTRLE    WTO   'CPLST_CONTROL_DATA - E'
         LA    R4,CPLST_RC_END
         LA    R4,CPLST_RC_FINISH
         B     SETRC
CTRL1    WTO   'CPLST_CONTROL_DATA - 1'
         MVI   CONTROLF,C'2'
         L     R5,CPLST_PARMLIST_ENTRY_ADD
         LA    R4,COPY1
         ST    R4,CPLST_CONTROL_DATA_ADD
         LA    R4,L'COPY1
         ST    R4,CPLST_CONTROL_DATA_LEN
         OI    CPLST_CONTROL_OFLAG1,CPLST_CONTROL_IN
         LA    R4,CPLST_RC_CONTROL
         B     SETRC
CTRL2    WTO   'CPLST_CONTROL_DATA - 2'
         MVI   CONTROLF,C'3'
         L     R5,CPLST_PARMLIST_ENTRY_ADD
         LA    R4,COPY1
         ST    R4,CPLST_CONTROL_DATA_ADD
         LA    R4,L'COPY1
         ST    R4,CPLST_CONTROL_DATA_LEN
         OI    CPLST_CONTROL_OFLAG1,CPLST_CONTROL_IN
         LA    R4,CPLST_RC_CONTROL
         B     SETRC
CTRL3    WTO   'CPLST_CONTROL_DATA - 3'
         MVI   CONTROLF,C'E'
         L     R5,CPLST_PARMLIST_ENTRY_ADD
         LA    R4,COPY2
         ST    R4,CPLST_CONTROL_DATA_ADD
         LA    R4,L'COPY2
         ST    R4,CPLST_CONTROL_DATA_LEN
         OI    CPLST_CONTROL_OFLAG1,CPLST_CONTROL_IN
         LA    R4,CPLST_RC_CONTROL
         B     SETRC
```

```
SETRC    DS    0H
         ST    R4,CPLST_PARMLIST_RC
FINISH   DS    0H
         SEGEND
COPY1    DC    CL72'  COPY INDD=SYSUTX,OUTDD=SYSUTY   '
COPY2    DC    CL72' SELECT MEMBER=A                  '
CONTROLF DC    C'1'   NEXT ACTION, OR 'E' TO FINISH
         IEBCPLST
         ORG
         END
```

In Example C-9, we show example JCL to generate module IEBCPYC. It processes the source from data set MHLRES2.IEBCOPY.DFSMS21.PDS(IEBCPYC) and creates the module in MHLRES2.IEBCOPY.DFSMS21.LOAD, which must be shown as a STEPLIB when executing program IEBCPYL.

Example C-9 JCL to assemble and link the IEBCOPYC module

```
//MHLRES2E JOB (1234567,COMMENT),MHLRES2,TIME=10,
// MSGCLASS=J,
// MSGLEVEL=1,CLASS=A,
// NOTIFY=&SYSUID
/*JOBPARM S=*
//ASMHCL PROC
//ASM      EXEC PGM=ASMA90,REGION=0M,
//             PARM='OBJECT,NODECK'
//SYSLIN   DD  DSN=&&OBJ,DISP=(NEW,PASS),UNIT=SYSDA,
//             SPACE=(TRK,(10,2)),DCB=BLKSIZE=3120
//SYSLIB   DD  DISP=SHR,DSN=SYS1.MACLIB
//SYSPRINT DD  SYSOUT=*
//SYSUT1   DD  DSN=&&SYSUT1,UNIT=SYSDA,SPACE=(CYL,(5,5))
//*
//LKED     EXEC PGM=HEWL,REGION=2048K,COND=(8,LE,ASM),
//             PARM='XREF,LIST,LET'
//SYSLIN   DD  DSN=&&OBJ,DISP=(OLD,DELETE)
//         DD  DDNAME=SYSIN
//SYSPRINT DD  SYSOUT=*
//SYSUT1   DD  DSN=&&SYSUT1,UNIT=SYSDA,SPACE=(CYL,(5,5))
// PEND
//  EXEC ASMHCL
//ASM.SYSIN DD DISP=SHR,DSN=MHLRES2.IEBCOPY.DFSMS21.PDS(IEBCPYC)
/*
//LKED.SYSLMOD  DD DISP=SHR,DSN=MHLRES2.IEBCOPY.DFSMS21.LOAD
//LKED.SYSIN   DD *
 SETSSI 00002100
 NAME IEBCPYC(R)
```

Sample job to list VTOC to show DS1DSCHA flag

In Example C-10, and in the successive examples, we show the assembler source code for the program to display the data set changed indicator (DS1DSCHA) for up to 20 data sets on a volume. This program also checks various EAV indicators on the volume.

Example C-10 Source for CVSEQ8D part 1 of 19

```
CVSEQ8D TITLE 'CVAF CVAFSEQ TEST MODULE'                                00010008
CVSEQ8D CSECT                                                           00020008
CVSEQ8D AMODE 31                                                        00030008
CVSEQ8D RMODE 24                                                        00040008
*********************************************************************** 00050000
*                                                                     * 00060000
*    CVSEQ8D - MODULE THAT ISSUES THE CVAFSEQ MACRO AND PROCESS A     * 00070008
*              A VOLUME TO RETURN DSCBS, 20 AT A TIME, IN PHYSICAL    * 00080000
*              SEQUENTIAL ORDER USING A STARTING CCHHR OF ZERO.       * 00090000
*                                                                     * 00100000
*              THE CVAFSEQ MACRO CALL WILL BE ISSUED THREE TIMES      * 00110000
*              USING THE FOLLOWING EADSCB KEYWORD SETTINGS:           * 00120000
*              - EADSCB KEYWORD NOT CODED (DEFAULTS TO EADSCB=NOTOK)  * 00130000
*              - EADSCB=NOTOK CODED                                   * 00140000
*              - EADSCB=OK CODED                                      * 00150000
*              CV4EADOK BIT SETTING WILL BE DETERMINED FOR EACH CALL.* 00160000
*                                                                     * 00170000
*              FOR A NON EAV VOLUME:                                  * 00180000
*              WILL EXPECT ALL DSCBS ON THE VOLUME RETURNED IN THE    * 00190000
*              WILL EXPECT ALL DSCBS ON THE VOLUME RETURNED IN THE    * 00190000
*              ORDER THE DATASETS WERE CREATED.                       * 00200000
*                                                                     * 00210000
*              FOR A EAV VOLUME:                                      * 00220000
*              WILL EXPECT RC04 / STAT082 RETURNED FROM CVAFSEQ CALL  * 00230000
*              WHEN THE EADSCB KEYWORD IS NOT CODED OR EADSCB=NOTOK   * 00240000
*              IS CODED.                                              * 00250000
*              WILL EXPECT ALL DSCBS ON THE VOLUME RETURNED IN THE    * 00260000
*              ORDER THE DATASETS WERE CREATED WHEN EADSCB=OK IS      * 00270000
*              CODED.                                                 * 00280000
*                                                                     * 00290000
*              THIS PROGRAM WILL CREATE AN OUTPUT REPORT THAT         * 00300000
*              SHOULD BE SIMILAR TO THE EXAMPLES LISTED BELOW.        * 00310000
```

Example C-11 Source for CVSEQ8D part 2 of 19

```
*--------------------------------------------------------------------* 00320000
*                                                                     * 00330000
*   EXAMPLE 1: NON EAV VOLUME WITH OS VTOC                            * 00340000
*   ---------------------------------------                           * 00350000
*                                                                     * 00360000
*   CVSEQ8D START OF OUTPUT MESSAGES                                  * 00370008
*                                                                     * 00380000
*    CVAFSEQ  CALL: EADSCB KEYWORD NOT CODED                          * 00390000
*    CV4EADOK BIT IS NOT SET / EADSCB=NOTOK                           * 00400000
*    RC00 VERIFIED - THE REQUEST WAS SUCCESSFUL                       * 00410000
*     X"00"    DEC"000"    00 - CVSTAT CODE VERIFIED                  * 00420000
*                                                                     * 00430000
```

```
*    CVAFSEQ  CALL: EADSCB=NOTOK CODED                                * 00440000
*    CV4EADOK BIT IS NOT SET / EADSCB=NOTOK                           * 00450000
*    RC00 VERIFIED - THE REQUEST WAS SUCCESSFUL                       * 00460000
*     X"00"    DEC"000"    00 - CVSTAT CODE VERIFIED                  * 00470000
*                                                                     * 00480000
*    CVAFSEQ  CALL: EADSCB=OK CODED                                   * 00490000
*    CV4EADOK BIT SET / EADSCB=OK                                     * 00500000
*    RC00 VERIFIED - THE REQUEST WAS SUCCESSFUL                       * 00510000
*     X"00"    DEC"000"    00 - CVSTAT CODE VERIFIED                  * 00520000
*                                                                     * 00530000
*    DATASETS ON THE VOLUME LISTED IN PHYSICAL SEQUENTIAL ORDER:      * 00540000
*     DSN: CVS5MSC2.SEQ01                                           *   00550000
*     DSN: CVS5MSC2.PDS01                                           *   00560000
*     DSN: CVS5MSC2.VSAM01.DATA                                     *   00570000
*     DSN: SYS1.VVDS.V1P9503                                         *  00580000
*     DSN: CVS5MSC2.PDSE01                                          *   00590000
*     DSN: CVS5MSC2.SEQ02                                           *   00600000
*     DSN: CVS5MSC2.VSAM02.DATA                                     *   00610000
*     DSN: CVS5MSC2.PDSE02                                          *   00620000
*    END OF DATA REACHED - ALL DATASETS PROCESSED                     * 00630000
*                                                                     * 00640000
*   CVSEQ8D END OF OUTPUT MESSAGES                                    * 00650008
*                                                                     * 00660000
```

Example C-12 Source for CVSEQ8D part 3 of 19

```
*   EXAMPLE 2: EAV VOLUME WITH OS VTOC                                * 00670000
*   ----------------------------------                                * 00680000
*                                                                     * 00690000
*   CVSEQ8D START OF OUTPUT MESSAGES                                  * 00700008
*                                                                     * 00710000
*    CVAFSEQ  CALL: EADSCB KEYWORD NOT CODED                          * 00720000
*    CV4EADOK BIT IS NOT SET / EADSCB=NOTOK                           * 00730000
*    RC04 VERIFIED - LOGICAL ERROR STATUS IN CVSTAT                   * 00740000
*     X"52"    DEC"082"    52 - CVSTAT CODE VERIFIED                  * 00750000
*                                                                     * 00760000
*    CVAFSEQ  CALL: EADSCB=NOTOK CODED                                * 00770000
*    CV4EADOK BIT IS NOT SET / EADSCB=NOTOK                           * 00780000
*    RC04 VERIFIED - LOGICAL ERROR STATUS IN CVSTAT                   * 00790000
*     X"52"    DEC"082"    52 - CVSTAT CODE VERIFIED                  * 00800000
*                                                                     * 00810000
*    CVAFSEQ  CALL: EADSCB=OK CODED                                   * 00820000
*    CV4EADOK BIT SET / EADSCB=OK                                     * 00830000
*    RC00 VERIFIED - THE REQUEST WAS SUCCESSFUL                       * 00840000
*     X"00"    DEC"000"    00 - CVSTAT CODE VERIFIED                  * 00850000
*                                                                     * 00860000
*    DATASETS ON THE VOLUME LISTED IN PHYSICAL SEQUENTIAL ORDER:      * 00870000
*     DSN: CVS5MSC2.SEQ01                                           *   00880000
*     DSN: CVS5MSC2.PDS01                                           *   00890000
*     DSN: CVS5MSC2.VSAM01.DATA                                     *   00900000
*     DSN: SYS1.VVDS.V1P9503                                         *  00910000
*     DSN: CVS5MSC2.PDSE01                                          *   00920000
*     DSN: CVS5MSC2.SEQ02                                           *   00930000
*     DSN: CVS5MSC2.VSAM02.DATA                                     *   00940000
*     DSN: CVS5MSC2.PDSE02                                          *   00950000
```

```
*    END OF DATA REACHED - ALL DATASETS PROCESSED                    * 00960000
*                                                                    * 00970000
*   CVSEQ8D END OF OUTPUT MESSAGES                                   * 00980008
*                                                                    * 00990000
```

Example C-13 Source for CVSEQ8D part 4 of 19

```
*   EXAMPLE 3: NON EAV VOLUME WITH IX VTOC                           * 01000000
*   -------------------------------------                            * 01010000
*                                                                    * 01020000
*   CVSEQ8D START OF OUTPUT MESSAGES                                 * 01030008
*                                                                    * 01040000
*    CVAFSEQ  CALL: EADSCB KEYWORD NOT CODED                         * 01050000
*    CV4EADOK BIT IS NOT SET / EADSCB=NOTOK                          * 01060000
*    RC00 VERIFIED - THE REQUEST WAS SUCCESSFUL                      * 01070000
*     X"00"    DEC"000"    00 - CVSTAT CODE VERIFIED                  * 01080000
*                                                                    * 01090000
*    CVAFSEQ  CALL: EADSCB=NOTOK CODED                               * 01100000
*    CV4EADOK BIT IS NOT SET / EADSCB=NOTOK                          * 01110000
*    RC00 VERIFIED - THE REQUEST WAS SUCCESSFUL                      * 01120000
*     X"00"    DEC"000"    00 - CVSTAT CODE VERIFIED                  * 01130000
*                                                                    * 01140000
*    CVAFSEQ  CALL: EADSCB=OK CODED                                  * 01150000
*    CV4EADOK BIT SET / EADSCB=OK                                    * 01160000
*    RC00 VERIFIED - THE REQUEST WAS SUCCESSFUL                      * 01170000
*     X"00"    DEC"000"    00 - CVSTAT CODE VERIFIED                  * 01180000
*                                                                    * 01190000
*    DATASETS ON THE VOLUME LISTED IN PHYSICAL SEQUENTIAL ORDER:     * 01200000
*     DSN: SYS1.VTOCIX.VP9503                                        * 01210000
*     DSN: CVS5MSC2.SEQ01                                          *   01220000
*     DSN: SYS1.VVDS.V1P9502                                        *  01230000
*     DSN: CVS5MSC2.PDS01                                          *   01240000
*     DSN: CVS5MSC2.VSAM01.DATA                                    *   01250000
*     DSN: CVS5MSC2.PDSE01                                         *   01260000
*     DSN: CVS5MSC2.SEQ02                                          *   01270000
*     DSN: CVS5MSC2.VSAM02.DATA                                    *   01280000
*     DSN: CVS5MSC2.PDSE02                                         *   01290000
*    END OF DATA REACHED - ALL DATASETS PROCESSED                      * 01300000
*                                                                      * 01310000
*   CVSEQ8D END OF OUTPUT MESSAGES                                     * 01320008
*                                                                      * 01330000
```

Example C-14 Source for CVSEQ8D part 5 of 19

```
*   EXAMPLE 4: EAV VOLUME WITH IX VTOC                               * 01340000
*   ----------------------------------                               * 01350000
*                                                                    * 01360000
*   CVSEQ8D START OF OUTPUT MESSAGES                                 * 01370008
*                                                                    * 01380000
*    CVAFSEQ  CALL: EADSCB KEYWORD NOT CODED                         * 01390000
*    CV4EADOK BIT IS NOT SET / EADSCB=NOTOK                          * 01400000
*    RC04 VERIFIED - LOGICAL ERROR STATUS IN CVSTAT                  * 01410000
*     X"52"    DEC"082"    52 - CVSTAT CODE VERIFIED                  * 01420000
*                                                                    * 01430000
*    CVAFSEQ  CALL: EADSCB=NOTOK CODED                               * 01440000
*    CV4EADOK BIT IS NOT SET / EADSCB=NOTOK                          * 01450000
```

```
*    RC04 VERIFIED - LOGICAL ERROR STATUS IN CVSTAT                  * 01460000
*     X"52"    DEC"082"    52 - CVSTAT CODE VERIFIED                 * 01470000
*                                                                    * 01480000
*    CVAFSEQ  CALL: EADSCB=OK CODED                                  * 01490000
*    CV4EADOK BIT SET / EADSCB=OK                                    * 01500000
*    RC00 VERIFIED - THE REQUEST WAS SUCCESSFUL                      * 01510000
*     X"00"    DEC"000"    00 - CVSTAT CODE VERIFIED                 * 01520000
*                                                                    * 01530000
*    DATASETS ON THE VOLUME LISTED IN PHYSICAL SEQUENTIAL ORDER:     * 01540000
*     DSN: SYS1.VTOCIX.VP9503                                        * 01550000
*     DSN: CVS5MSC2.SEQ01                                          *   01560000
*     DSN: SYS1.VVDS.V1P9502                                        *  01570000
*     DSN: CVS5MSC2.PDS01                                          *   01580000
*     DSN: CVS5MSC2.VSAM01.DATA                                    *   01590000
*     DSN: CVS5MSC2.PDSE01                                         *   01600000
*     DSN: CVS5MSC2.SEQ02                                          *   01610000
*     DSN: CVS5MSC2.VSAM02.DATA                                    *   01620000
*     DSN: CVS5MSC2.PDSE02                                         *   01630000
*    END OF DATA REACHED - ALL DATASETS PROCESSED                      * 01640000
*                                                                    * 01650000
*   CVSEQ8D END OF OUTPUT MESSAGES                                   * 01660008
*                                                                    * 01670000
*    NOTE: THIS MODULE REQUIRES THE USE OF THE CVSTCHK MODULE WHICH  * 01680000
*          IS CALLED TO INTERPRET THE CVSTAT CODE RETURNED.          * 01690000
*                                                                    * 01700000
*----------------------------------------------------------------------* 01710000
```

Example C-15 Source for CVSEQ8D part 6 of 19

```
********************************************************************** 01720000
*                                                                    * 01730000
*    CVSEQ8D - LOGIC NOTES                                           * 01740008
*                                                                    * 01750000
*    THIS MODULE WILL PERFORM THE FOLLOWING:                         * 01760000
*                                                                    * 01770000
*    INITIALIZATION                                                  * 01780000
*    - OBTAIN THE NECESSARY INFORMATION FROM THE DASD VOLUME         * 01790000
*    - OPEN THE OUTPUT FILE AND WRITE NECESSARY OUTPUT MESSAGES      * 01800000
*    - SET STARTING CCHHR TO ZERO                                    * 01810000
*    - SET END OF DATA SWITCH TO NO END OF DATA                      * 01820000
*                                                                    * 01830000
*    MAINLINE                                                        * 01840000
*    - LOAD THE TABLE WITH DSCB ADDRESSES TO USE FOR CVAFSEQ CALL    * 01850000
*    - INITIALIZE BUFFER LIST                                        * 01860000
*    - INVOKE CVAFSQ1 ROUTINE - EADSCB KEYWORD NOT CODED             * 01870000
*      - REPORT ON RETURN CODE AND CVSTAT CODE RETURNED FROM CALL    * 01880000
*    - INITIALIZE BUFFER LIST                                        * 01890000
*    - INVOKE CVAFSQ2 ROUTINE - EADSCB=NOTOK CODED                   * 01900000
*      - REPORT ON RETURN CODE AND CVSTAT CODE RETURNED FROM CALL    * 01910000
*    - INITIALIZE BUFFER LIST                                        * 01920000
*    - INVOKE CVAFSQ3 ROUTINE - EADSCB=OK CODED                      * 01930000
*    - INVOKE CVAFSQ3 ROUTINE - EADSCB=OK CODED                      * 01930000
*      - REPORT ON RETURN CODE AND CVSTAT CODE RETURNED FROM CALL    * 01940000
*    - DO WHILE MORE TABLE ENTRIES TO PROCESS                        * 01950000
*      - INVOKE PRTBRTN ROUTINE TO PROCESS DSCBS RETURNED FROM CVAFSEQ* 01960000
```

```
*        - PRINT OUT ALL DSNAMES ON THE VOLUME IN SEQUENTIAL ORDER    * 01970000
*                                                                     * 01980000
*    FINALIZATION                                                     * 01990000
*    - WRITE NECESSARY MESSAGES AND CLOSE THE OUTPUT FILE AND EXIT    * 02000000
*                                                                     * 02010000
*    CVSEQ8D - JOB INFORMATION                                        * 02020008
*                                                                     * 02030000
*    NORMAL END OF JOB:                                               * 02040000
*    - RC=00 AND OUTDD OUTPUT AS DETAILED ABOVE                       * 02050000
*                                                                     * 02060000
*    ABNORMAL END OF JOB:                                             * 02070000
*    - ABEND 100 - ERROR OPENING VTOC ON THE DASD VOLUME THAT IS      * 02080000
*                  ASSOCIATED WITH THE CVAFDD DD STATEMENT            * 02090000
*    - ABEND 101 - ERROR OPENING THE OUTDD DATASET                    * 02100000
*    - ABEND 102 - ERROR CLOSING THE OUTDD DATASET                    * 02110000
```

Example C-16 Source for CVSEQ8D part 7 of 19

```
********************************************************************** 02120000
*                                                                    * 02130000
* HOUSEKEEPING                                                       * 02140000
* - SAVE CALLER'S REGISTERS AND ESTABLISH A NEW REGISTER SAVE AREA    * 02150000
*                                                                    * 02160000
         STM   R14,R12,12(R13)    STANDARD LINKAGE CONVENTION         02170000
         BALR  R11,0              DCL R11 AS IMPLIED BASE REG         02180000
         USING BASE,R11,R12       R12 IS ALSO BASE REG                02190000
BASE     L     R12,BASEADDR       SET UP ADDRESSING FOR R12           02200000
         B     CV000000           BRANCH AROUND DECLARES              02210000
BASEADDR DC    A(BASE+4096)       ADDRESSING FOR R12                  02220000
CV000000 DS    0H                 CONTINUE...                         02230000
         ST    R13,SAVE+4         SAVE PTR TO CALLER'S SAVE AREA      02240000
         LA    R14,SAVE           GET ADDRESS OF THE NEW SAVE AREA    02250000
         ST    R14,8(,R13)        CHAIN CALLER'S AREA TO OURS         02260000
         LR    R13,R14            ESTABLISH THE NEW SAVE AREA         02270000
*                                                                     02280000
********************************************************************** 02290000
*                                                                    * 02300000
* INITIALIZATION                                                     * 02310000
*                                                                    * 02320000
INITIAL  DS    0H                 INITIALIZATION SECTION              02330000
         BAL   R14,IDVOLRTN       INVOKE RTN TO IDENTIFY THE VOLUME(S) 02340000
         OPEN  (OUTFILE,(OUTPUT)) OPEN THE OUTPUT MESSAGE FILE        02350000
         TM     OUTFILE+48,X'10'      IF OPEN OF OUTPUT FILE NOT OK  02360000
         BO     OK1                                                  02370000
            ABEND 101               ISSUE USER ABEND 101             02380000
OK1      DS    0H                                                   02390000
         L     R1,UCBADD                                            02400000
         MVC   VOLSER(6),28(R1)                                     02410000
         PUT   OUTFILE,STRTMSG    WRITE A RECORD TO THE OUTPUT FILE   02420000
         PUT   OUTFILE,BLNKLINE   WRITE A RECORD TO THE OUTPUT FILE   02430000
         MVC   CCHHRS,CCHHR0      INIT CCHHR START TO ZERO            02440000
         MVI   SWEOD,NOEOD        SET SWITCH TO NO END OF DATA        02450000
*                                                                     02460000
********************************************************************** 02470000
*                                                                    * 02480000
```

Example C-17 Source for CVSEQ8D part 8 of 19

```
* MAINLINE                                                          * 02490000
*                                                                    02500000
MAINLINE DS    OH                MAINLINE SECTION                  02510000
         BAL   R14,LDTABRTN      INVOKE LDTABRTN TO LOAD TABLE     02520000
         BAL   R14,INITBRTN      INVOKE INITBRTN TO INIT BUFF LIST 02530000
         BAL   R14,CVAFSQ1       INVOKE CVAFSQ1 TO ISSUE CVAFSEQ   02540000
         PUT   OUTFILE,BLNKLINE  WRITE THE REC TO OUTPUT FILE      02550000
         BAL   R14,INITBRTN      INVOKE INITBRTN TO INIT BUFF LIST 02560000
         BAL   R14,CVAFSQ2       INVOKE CVAFSQ2 TO ISSUE CVAFSEQ   02570000
         PUT   OUTFILE,BLNKLINE  WRITE THE REC TO OUTPUT FILE      02580000
         BAL   R14,INITBRTN      INVOKE INITBRTN TO INIT BUFF LIST 02590000
         BAL   R14,CVAFSQ3       INVOKE CVAFSQ3 TO ISSUE CVAFSEQ   02600000
         PUT   OUTFILE,BLNKLINE  WRITE THE REC TO OUTPUT FILE      02610000
         PUT   OUTFILE,MSG0      WRITE THE REC TO OUTPUT FILE      02620000
*                                                                   02630000
         CLI   SWEOD,EOD          DOWHILE TABLE DATA TO PROCESS    02640000
         BE    TABDONE                                             02650000
         BAL R14,PRTBRTN            INVOKE PRTBRTN TO PROCESS TBL 02660000
*                                                                   02670000
TABDONE  DS   0H                                                   02680000
         PUT   OUTFILE,EODMSG    WRITE THE REC TO OUTPUT FILE      02690000
*                                                                   02700000
********************************************************************** 02710000
*                                                                  * 02720000
* FINALIZATION                                                     * 02730000
*                                                                    02740000
FINAL    DS    0H                FINALIZATION SECTION              02750000
         PUT   OUTFILE,BLNKLINE  WRITE A RECORD TO THE OUTPUT FILE 02760000
         PUT   OUTFILE,ENDMSG    WRITE A RECORD TO THE OUTPUT FILE 02770000
         CLOSE (OUTFILE)         CLOSE OUTPUT FILE                 02780000
         C     R15,RCODE00       IF FILE CLOSE IS NOT OK           02790000
         BE    OK2                                                 02800000
            ABEND 102             ISSUE USER ABEND 102             02810000
OK2      DS    0H                                                  02820000
         L     R13,4(R13)        RESTORE REGISTER                  02830000
         LM    R14,R12,12(R13)   RESTORE CALLERS REGISTERS         02840000
         LA    R15,0             SET RC TO 0                       02850000
         BR    R14               RETURN TO CALLER                  02860000
*                                                                   02870000
********************************************************************** 02880000
```

Example C-18 Source for CVSEQ8D part 9 of 19

```
*                         IDVOLRTN                                 * 02890000
*     - OBTAIN THE NECESSARY INFORMATION FROM THE DASD VOLUME      * 02900000
IDVOLRTN DS    0H                IDENTIFY VOLUME ROUTINE           02910000
         ST    R14,IDVLSAVE      STORE C(R14) INTO SAVE AREA       02920000
         RDJFCB (VTOCDCB,(INPUT)) READ JFCB / OPEN VTOC            02930000
         MVI   JFCB1,X'04'       PUT IN ID FOR FORMAT 4            02940000
         MVC   JFCB1+1(43),JFCB1 SETUP FOR VTOC OPEN               02950000
         OPEN  (VTOCDCB,(INPUT)),TYPE=J  OPEN VTOC (OPEN TYPE=J)   02960000
         TM    VTOCDCB+48,X'10'     IF OPEN OF VTOC NOT OK       02970000
         BO    OK3                                               02980000
            ABEND 100              ISSUE USER ABEND 100           02990000
```

```
OK3      DS    0H                                                       03000000
         SLR   R3,R3              INIT R3 FOR DEB PTR                   03010000
         SLR   R4,R4              INIT R4 FOR UCB PTR                   03020000
         ICM   R3,B'0111',VTOCDCB+45 GET DEB ADDRESS                    03030000
         ST    R3,DEBADD          SAVE DEB ADDRESS                      03040000
         ICM   R4,B'0111',33(R3)  GET UCB ADDRESS                       03050000
         ST    R4,UCBADD          STORE UCB ADDRESS                     03060000
IDVLEXIT DS    0H                 EXIT FROM IDVOLRTN                    03070000
         L     R14,IDVLSAVE       LOAD C(IDVLSAVE) INTO R14             03080000
         BR    R14                EXIT                                  03090000
*                                                                       03100000
************************************************************************ 03110000
*                          LDTABRTN                                    * 03120000
*  - LOAD 20 ENTRY TABLE WITH DSCB ADDRESSES TO USE                    * 03130000
*                                                                       03140000
LDTABRTN DS    0H                 LOAD TABLE ROUTINE                    03150000
         ST    R14,LDTBSAVE       STORE C(R14) INTO SAVE AREA           03160000
         LA    R4,DSCB01          LOAD R4 WITH ADDRESS OF DSCB01        03170000
         ST    R4,TDSCB01         STORE ADDRESS OF DSCB01 INTO TABLE    03180000
         LA    R4,DSCB02          LOAD R4 WITH ADDRESS OF DSCB02        03190000
         ST    R4,TDSCB02         STORE ADDRESS OF DSCB02 INTO TABLE    03200000
         LA    R4,DSCB03          LOAD R4 WITH ADDRESS OF DSCB03        03210000
         ST    R4,TDSCB03         STORE ADDRESS OF DSCB03 INTO TABLE    03220000
         LA    R4,DSCB04          LOAD R4 WITH ADDRESS OF DSCB04        03230000
         ST    R4,TDSCB04         STORE ADDRESS OF DSCB04 INTO TABLE    03240000
         LA    R4,DSCB05          LOAD R4 WITH ADDRESS OF DSCB05        03250000
         ST    R4,TDSCB05         STORE ADDRESS OF DSCB05 INTO TABLE    03260000
         LA    R4,DSCB06          LOAD R4 WITH ADDRESS OF DSCB06        03270000
         ST    R4,TDSCB06         STORE ADDRESS OF DSCB06 INTO TABLE    03280000
         LA    R4,DSCB07          LOAD R4 WITH ADDRESS OF DSCB07        03290000
         ST    R4,TDSCB07         STORE ADDRESS OF DSCB07 INTO TABLE    03300000
         LA    R4,DSCB08          LOAD R4 WITH ADDRESS OF DSCB08        03310000
         ST    R4,TDSCB08         STORE ADDRESS OF DSCB08 INTO TABLE    03320000
^^^^^^^^ST    R4,TDSCB08         STORE ADDRESS OF DSCB08 INTO TABLE    03320000
        LA    R4,DSCB09          LOAD R4 WITH ADDRESS OF DSCB09        03330000
        ST    R4,TDSCB09         STORE ADDRESS OF DSCB09 INTO TABLE    03340000
        LA    R4,DSCB10          LOAD R4 WITH ADDRESS OF DSCB10        03350000
        ST    R4,TDSCB10         STORE ADDRESS OF DSCB10 INTO TABLE    03360000
```

Example C-19 Source for CVSEQ8D part 10 of 19

```
^^^^^^^^LA    R4,DSCB11          LOAD R4 WITH ADDRESS OF DSCB11        03370000
        ST    R4,TDSCB11         STORE ADDRESS OF DSCB11 INTO TABLE    03380000
        LA    R4,DSCB12          LOAD R4 WITH ADDRESS OF DSCB12        03390000
        ST    R4,TDSCB12         STORE ADDRESS OF DSCB12 INTO TABLE    03400000
        LA    R4,DSCB13          LOAD R4 WITH ADDRESS OF DSCB13        03410000
        ST    R4,TDSCB13         STORE ADDRESS OF DSCB13 INTO TABLE    03420000
        LA    R4,DSCB14          LOAD R4 WITH ADDRESS OF DSCB14        03430000
        ST    R4,TDSCB14         STORE ADDRESS OF DSCB14 INTO TABLE    03440000
        LA    R4,DSCB15          LOAD R4 WITH ADDRESS OF DSCB15        03450000
        ST    R4,TDSCB15         STORE ADDRESS OF DSCB15 INTO TABLE    03460000
        LA    R4,DSCB16          LOAD R4 WITH ADDRESS OF DSCB16        03470000
        ST    R4,TDSCB16         STORE ADDRESS OF DSCB16 INTO TABLE    03480000
        LA    R4,DSCB17          LOAD R4 WITH ADDRESS OF DSCB17        03490000
        ST    R4,TDSCB17         STORE ADDRESS OF DSCB17 INTO TABLE    03500000
```

```
        LA    R4,DSCB18          LOAD R4 WITH ADDRESS OF DSCB18        03510000
        ST    R4,TDSCB18         STORE ADDRESS OF DSCB18 INTO TABLE    03520000
        LA    R4,DSCB19          LOAD R4 WITH ADDRESS OF DSCB19        03530000
        ST    R4,TDSCB19         STORE ADDRESS OF DSCB19 INTO TABLE    03540000
        LA    R4,DSCB20          LOAD R4 WITH ADDRESS OF DSCB20        03550000
        ST    R4,TDSCB20         STORE ADDRESS OF DSCB20 INTO TABLE    03560000
LDTBEXIT DS    0H                 EXIT FROM LDTABRTN                    03570000
          L     R14,LDTBSAVE       LOAD C(LDTBSAVE) INTO R14             03580000
          BR    R14                EXIT                                  03590000
 *                                                                      03600000
 ********************************************************************** 03610000
*                          INITBRTN                                   * 03620000
*  - INITIALIZE THE BUFFER LIST                                       * 03630000
*                                                                       03640000
INITBRTN DS    0H                 INITIALIZE BUFFER LIST ROUTINE        03650000
         ST    R14,INITSAVE       STORE C(R14) INTO SAVE AREA           03660000
         LA    R7,BUFLISTE        LOAD R7 WITH ADDRESS OF BUFLIST ENTRY 03670000
         USING BFLE,R7            ESTABLISH ADDRESSABILITY TO BFLE      03680000
         LA    R8,BUFLISTH        LOAD R8 WITH ADDRESS OF BUFLIST HDR   03690000
         USING BFLHDR,R8          ESTABLISH ADDRESSABILITY TO BFLHDR    03700000
         LA    R2,TABLE           LOAD R2 WITH ADDRESS OF TABLE         03710000
         USING TBLMAP,R2          ESTABLISH ADDRESSABILITY USING TBLMAP 03720000
         XC    BFLHDR(BFLHLN+TBLNBR*BFLELN),BFLHDR CLEAR BUFLIST       03730000
         OI    BFLHFL,BFLHDSCB    DSCBS TO BE READ WITH BUFFER LIST     03740000
         MVC   BFLEARG,CCHHRS     MOVE STARTING CCHHR TO ARG            03750000
         MVI   BFLHNOE,TBLNBR     MOVE NBR OF TBL ENTRIES TO BUFF NBR   03760000
         SLR   R4,R4              INIT R4 WITH ZERO                     03770000
         IC    R4,BFLHNOE         NBR OF BUFFER ENTRIES IN R4           03780000
         ST    R4,COUNT           NBR OF BUFFER ENTRIES IN COUNT        03790000
*                                                                       03800000
```

Example C-20 Source for CVSEQ8D part 11 of 19

```
INIT0010 DS    0H                 INIT BUFFER LIST WITH DSCB ADDR/LENG  03810000
         L     R5,DSCBA           LOAD R5 WITH DSCB ADDRESS FROM TABLE  03820000
         ST    R5,BFLEBUF-BFLE(,R7)      PLACE IN BUFFER LIST          03830000
         MVI   BFLELTH-BFLE(R7),DSCBLTH  FULL DSCB READ                03840000
         OI    BFLEFL,BFLECHR     CCHHR TO BE RETURNED                  03850000
         LA    R2,TBLLNG(,R2)     POINT TO NEXT TABLE ENTRY             03860000
         LA    R7,BFLELN(,R7)     POINT TO NEXT BUFFER LIST ENTRY       03870000
         BCT   R4,INIT0010        BRANCH TO INIT0010 IF C(R4) GT ZERO   03880000
         DROP  R2,R8              DROP R2,R7,R8                         03890010
*        DROP  R2,R7,R8           DROP R2,R7,R8                         03891010
INITEXIT DS    0H                 EXIT FROM INITBRTN                    03900000
         L     R14,INITSAVE       LOAD C(INITSAVE) INTO R14             03910000
         BR    R14                EXIT                                  03920000
*                                                                       03930000
********************************************************************** 03940000
*                          PRTBRTN                                    * 03950000
*  - PROCESS TABLE WHICH CONTAINS ADDRESS OF DSCB FOR EACH ENTRY      * 03960000
*    RETURNED FROM CVAFSEQ CALL.                                      * 03970000
*    TABLE IS CURRENTLY 20 ENTRIES.                                   * 03980000
*                                                                       03990000
PRTBRTN  DS    0H                 PROCESS TABLE ENTRIES                 04000000
         ST    R14,PRTBSAVE       STORE C(R14) INTO SAVE AREA           04010000
```

```
         L     R4,COUNT          LOAD COUNT IN R4                        04020000
         LA    R2,TABLE          LOAD ADDRESS OF TABLE INTO R2           04030000
         USING TBLMAP,R2         ESTABLISH ADDRESSABILITY TO TABLE       04040000
PRTB0000 DS    0H                PROCESS ENTRIES                         04050000
         L     R3,DSCBA          ADDRESSABILITY TO DSCBA                 04060000
         CLC   0(1,R3),FMT4      IS IT A FMT4?                           04070000
         BNE   PRTB0010          NO, THEN CONTINUE TO PROCESS DSN        04080000
         B     PRTB0060          YES, BRANCH TO POINT TO NEXT ENTRY      04090000
PRTB0010 DS    0H                FMT5 CHECK                              04100000
         CLC   0(1,R3),FMT5      IS IT A FMT5?                           04110000
         BNE   PRTB0020          NO, THEN CONTINUE TO PROCESS DSN        04120000
         B     PRTB0060          YES, BRANCH TO POINT TO NEXT ENTRY      04130000
PRTB0020 DS    0H                FMT7 CHECK                              04140000
         CLC   0(1,R3),FMT7      IS IT A FMT7?                           04150000
         BNE   PRTB0024          NO, THEN CONTINUE TO PROCESS DSN        04160000
         B     PRTB0060          YES, BRANCH TO POINT TO NEXT ENTRY      04170000
PRTB0024 DS    0H                FMT9 CHECK                              04180000
         CLC   0(1,R3),FMT9      IS IT A FMT9?                           04190000
         BNE   PRTB0030          NO, THEN CONTINUE TO PROCESS DSN        04200000
         B     PRTB0060          YES, BRANCH TO POINT TO NEXT ENTRY      04210000
PRTB0030 DS    0H                DETERMINE IF END OF DATA WAS REACHED    04220000
         CLC   0(1,R3),NODSN     IS THERE '00' IN FIRST BYTE             04230000
         BNE   PRTB0040          NO, THEN CONTINUE TO PROCESS DSN        04240000
         B     PRTB0060          YES, BRANCH TO POINT TO NEXT ENTRY      04250000
```

Example C-21 Source for CVSEQ8D part 12 of 19

```
PRTB0040 DS    0H                PROCESS DSN - FORMAT                    04260000
         USING IECSDSL1,R3                                               04261011
         MVC   DSNMSG(44),DS1DSNAM OVE DSN TO PRINT LINE                 04270010
         MVI   DSNCHA,C'N'                                               04270113
         TM    DS1DSIND,DS1DSCHA  IS THE CHANGED BIT ON                  04270213
*        TM    DS1DSCHA,DS1IND02  IS THE CHANGED BIT ON                  04270313
         BNO   DSNCHANO                                                  04270413
         MVI   DSNCHA,C'Y'                                               04270513
DSNCHANO EQU   *                                                       04270613
*        MVC   DSNMSG(44),0(R3)   MOVE DSN TO PRINT LINE                04271011
PRTB0050 DS    0H                PROCESS / FORMAT CCHHR                  04280000
         PUT   OUTFILE,MSG1      WRITE A RECORD TO THE OUTPUT FILE       04290000
PRTB0060 DS    0H                PREPARE TO PROCESS NEXT TABLE ENTRY     04300000
         LA    R2,TBLLNG(R2)     POINT TO NEXT TABLE ENTRY               04310000
         BCT   R4,PRTB0000       BRANCH TO PRTB0000 IF C(R4) GT ZERO     04320000
         MVI   SWEOD,EOD         YES, SET SWITCH TO END OF DATA          04330000
PRTBEXIT DS    0H                EXIT FROM PRTBRTN                       04340000
         L     R14,PRTBSAVE      LOAD C(PRTBSAVE) INTO R14               04350000
         BR    R14               EXIT                                    04360000
*                                                                       04370000
*********************************************************************** 04380000
*                          TSTRCRTN                                   * 04390000
*            - TEST RETURN CODE FROM CVAFSEQ                          * 04400000
*            - FORMAT AND PRINT MESSAGES AS NEEDED                    * 04410000
*            - INVOKE CVSTAT MODULE TO CHECK CVSTAT CODE              * 04420000
*                                                                       04430000
TSTRCRTN DS    0H                CHECK RETURN CODE ROUTINE               04440000
         ST    R14,TSTRSAVE      STORE C(R14) INTO SAVE AREA             04450000
```

```
         L     R15,RETCODE        LOAD R15 WITH SAVED RETURN CODE       04460000
         C     R15,RCODE16                                              04470000
         BNL   PRCERMSG                                                 04480000
         B     PROCESS(R15)                                             04490000
         SPACE                                                          04500000
PROCESS  EQU   *                                                        04510000
         B     PRC00MSG            0    RC MESSAGE                     04520000
         B     PRC04MSG            4    RC MESSAGE                     04530000
         B     PRC08MSG            8    RC MESSAGE                     04540000
         B     PRC12MSG           12    RC MESSAGE                     04550000
         B     PRC16MSG           16    RC MESSAGE                     04560000
         SPACE                                                          04570000
PRC00MSG   PUT OUTFILE,RC00MSG      WRITE RC00 MESSAGE                 04580000
           B   PUTMSGE                                                  04590000
```

Example C-22 Source for CVSEQ8D part 13 of 19

```
PRC04MSG   PUT OUTFILE,RC04MSG      WRITE RC04 MESSAGE                 04600000
           B   PUTMSGE                                                  04610000
PRC08MSG   PUT OUTFILE,RC08MSG      WRITE RC08 MESSAGE                 04620000
           B   PUTMSGE                                                  04630000
PRC12MSG   PUT OUTFILE,RC12MSG      WRITE RC12 MESSAGE                 04640000
           B   PUTMSGE                                                  04650000
PRC16MSG   PUT OUTFILE,RC16MSG      WRITE RC16 MESSAGE                 04660000
           B   PUTMSGE                                                  04670000
PRCERMSG   PUT OUTFILE,RCERMSG      WRITE RC ERROR MESSAGE             04680000
PUTMSGE  DS    0H                                                       04690000
         MVC   WCVSTCD(1),CVSTAT  MOVE CVSTAT CODE TO WCVSTCD          04700000
         BAL   R14,CALLCVST       INVOKE CALLCVST TO CALL CVSTCHK MOD  04710000
TSTREXIT DS    0H                 EXIT FROM TSTRCRTN                   04720000
         L     R14,TSTRSAVE       LOAD C(TSTRSAVE) INTO R14            04730000
         BR    R14                EXIT                                 04740000
*                                                                       04750000
************************************************************************ 04760000
*                          CALLCVST                                    * 04770000
*     - ROUTINE TO CALL CVSTCHK TO INTERPRET CVSTAT TABLE              * 04780000
*                                                                       04790000
CALLCVST DS    0H                 CALL TO CVSTCHK ROUTINE              04800000
         ST    R14,CALLSAVE       STORE C(R14) INTO SAVE AREA          04810000
         LA    R1,PARADDR1        LOAD R1 WITH PARMLIST FOR CALL       04820000
         L     R15,=V(CVSTCHK)    SET UP CALL TO CVSTCHK               04830000
         BALR  R14,R15            INVOKE CVSTCHK EXTERNAL SUBPROGRAM   04840000
         PUT   OUTFILE,WFMTREC1   WRITE A RECORD TO THE OUTPUT FILE    04850000
CALLEXIT DS    0H                 EXIT FROM CALLCVST                   04860000
         L     R14,CALLSAVE       LOAD C(CALLSAVE) INTO R14            04870000
         BR    R14                EXIT                                 04880000
*                                                                       04890000
************************************************************************ 04900000
*                           CVAFSQ1                                    * 04910000
*     - INVOKE THE CVAFSEQ MACRO AND READ THE DSCBS                    * 04920000
*       EADSCB KEYWORD NOT CODED - DEFAULTS TO EADSCB=NOTOK            * 04930000
*                                                                       04940000
CVAFSQ1  DS    0H                 CVAFSEQ - ROUTINE1                   04950000
         ST    R14,CVS1SAVE       STORE C(R14) INTO SAVE AREA          04960000
         LA    R2,CVPLIST         LOAD R2 WITH ADDR OF CVPLIST         04970000
```

```
         L     R3,UCBADD          LOAD R3 WITH UCB ADDRESS              04980000
         PUT   OUTFILE,CALLMR11   WRITE A REC TO OUTPUT FILE            04990000
*                                                                       05000000
         CVAFSEQ ACCESS=GT,                                            X05010000
               UCB=(R3),                                               X05020000
               BRANCH=(YES,PGM),                                       X05030000
               BUFLIST=BUFLISTH,                                       X05040000
               MF=(E,(R2))                                              05050000
*                                                                       05060000
         ST    R15,RETCODE        STORE RC INTO RETCODE                 05070000
*                                                                       05080000
```

Example C-23 Source for CVSEQ8D part 14 of 19

```
* REPORT ON CV4EADOK BIT SETTING                                        05090000
*                                                                       05100000
         TM    CVFL4,CV4EADOK    SELECT BASED ON FLAG4                 05110000
         BNO   NOTOK1                                                  05120000
         PUT OUTFILE,OKMSG        WRITE OK MSG RECORD                  05130000
         B   OK4                                                       05140000
NOTOK1     PUT OUTFILE,NOTOKMSG     WRITE NOTOK MSG RECORD             05150000
OK4      DS   OH                                                       05160000
*                                                                       05170000
         BAL   R14,TSTRCRTN       INVOKE ROUTINE TO CHECK RC/STAT      05180000
*                                                                       05190000
CVS1EXIT DS    OH                 EXIT FROM CVAFSQ1                    05200000
         L     R14,CVS1SAVE       LOAD C(SAVE AREA) INTO R14           05210000
         BR    R14                EXIT                                 05220000
*                                                                       05230000
************************************************************************05240000
*                           CVAFSQ2                                   * 05250000
*     - INVOKE THE CVAFSEQ MACRO AND READ THE DSCBS                   * 05260000
*       EADSCB=NOTOK IS CODED                                         * 05270000
*                                                                       05280000
CVAFSQ2  DS    OH                 CVAFSEQ - ROUTINE2                   05290000
         ST    R14,CVS2SAVE       STORE C(R14) INTO SAVE AREA          05300000
         LA    R2,CVPLIST         LOAD R2 WITH ADDR OF CVPLIST         05310000
         L     R3,DEBADD          LOAD R3 WITH DEB ADDRESS             05320000
         PUT   OUTFILE,CALLMR12   WRITE A REC TO OUTPUT FILE           05330000
*                                                                       05340000
         CVAFSEQ ACCESS=GT,                                            X05350000
               DEB=(R3),                                               X05360000
               BRANCH=(YES,PGM),                                       X05370000
               BUFLIST=BUFLISTH,                                       X05380000
               EADSCB=NOTOK,                                           X05390000
               MF=(E,(R2))                                              05400000
*                                                                       05410000
         ST    R15,RETCODE        STORE RC INTO RETCODE                 05420000
*                                                                       05430000
* REPORT ON CV4EADOK BIT SETTING                                        05440000
*                                                                       05450000
         TM    CVFL4,CV4EADOK    SELECT BASED ON FLAG4                 05460000
         BNO   NOTOK2                                                  05470000
         PUT OUTFILE,OKMSG        WRITE OK MSG RECORD                  05480000
         B   OK5                                                       05490000
```

```
NOTOK2     PUT OUTFILE,NOTOKMSG     WRITE NOTOK MSG RECORD              05500000
OK5      DS   OH                                                        05510000
*                                                                       05520000
         BAL   R14,TSTRCRTN       INVOKE ROUTINE TO CHECK RC/STAT       05530000
*                                                                       05540000
CVS2EXIT DS    OH                 EXIT FROM CVAFSQ2                    05550000
         L     R14,CVS2SAVE       LOAD C(SAVE AREA) INTO R14           05560000
         BR    R14                EXIT                                 05570000
*                                                                       05580000
************************************************************************05590000
```

Example C-24 Source for CVSEQ8D part 15 of 19

```
*                           CVAFSQ3                                   * 05600000
*     - INVOKE THE CVAFSEQ MACRO AND READ THE DSCBS                   * 05610000
*       EADSCB=OK IS CODED                                            * 05620000
*                                                                       05630000
CVAFSQ3  DS    OH                 CVAFSEQ - ROUTINE3                   05640000
         ST    R14,CVS3SAVE       STORE C(R14) INTO SAVE AREA          05650000
         LA    R2,CVPLIST         LOAD R2 WITH ADDR OF CVPLIST         05660000
         L     R3,DEBADD          LOAD R3 WITH DEB ADDRESS             05670000
         PUT   OUTFILE,CALLMR13   WRITE A REC TO OUTPUT FILE           05680000
*                                                                       05690000
         CVAFSEQ ACCESS=GT,                                           X05700000
               DEB=(R3),                                              X05710000
               BRANCH=(YES,PGM),                                      X05720000
               BUFLIST=BUFLISTH,                                      X05730000
               EADSCB=OK,                                             X05740000
               MF=(E,(R2))                                             05750000
*                                                                       05760000
         ST    R15,RETCODE        STORE RC INTO RETCODE                05770000
*                                                                       05780000
* REPORT ON CV4EADOK BIT SETTING                                       05790000
*                                                                       05800000
         TM    CVFL4,CV4EADOK    SELECT BASED ON FLAG4                 05810000
         BNO   NOTOK3                                                  05820000
         PUT OUTFILE,OKMSG        WRITE OK MSG RECORD                  05830000
         B   OK6                                                       05840000
NOTOK3     PUT OUTFILE,NOTOKMSG     WRITE NOTOK MSG RECORD             05850000
OK6      DS   OH                                                       05860000
*                                                                       05870000
         BAL   R14,TSTRCRTN        INVOKE ROUTINE TO CHECK RC/STAT     05880000
*                                                                       05890000
CVS3EXIT DS    OH                 EXIT FROM CVAFSQ3                    05900000
         L     R14,CVS3SAVE       LOAD C(SAVE AREA) INTO R14           05910000
         BR    R14                EXIT                                 05920000
************************************************************************05930000
*                      WORKING  STORAGE                             * 05940000
         DS    OD                                                      05950000
         DC    CL36'CVSEQ8D-WORKING STORAGE BEGINS HERE'               05960008
*                                                                       05970000
************************************************************************05980000
```

Example C-25 Source for CVSEQ8D part 16 of 19

```
*                          EQUATES                                * 05990000
R0       EQU    0                                                  06000000
R1       EQU    1                                                  06010000
R2       EQU    2                                                  06020000
R3       EQU    3                                                  06030000
R4       EQU    4                                                  06040000
R5       EQU    5                                                  06050000
R6       EQU    6                                                  06060000
R7       EQU    7                                                  06070000
R8       EQU    8                                                  06080000
R9       EQU    9                                                  06090000
R10      EQU   10                                                  06100000
R11      EQU   11                                                  06110000
R12      EQU   12                                                  06120000
R13      EQU   13                                                  06130000
R14      EQU   14                                                  06140000
R15      EQU   15                                                  06150000
********************************************************************** 06160000
*                         SAVE AREAS                              * 06170000
SAVE     DC    18F'0'             MAIN PROGRAM SAVE AREA           06180000
IDVLSAVE DC    F'0'               IDENTIFY VOLUME ROUTINE SAVE AREA 06190000
CALLSAVE DC    F'0'               CALL CVSTAT ROUTINE SAVE AREA    06200000
LDTBSAVE DC    F'0'               LOAD TABLE ROUTINE SAVE AREA     06210000
INITSAVE DC    F'0'               INIT BUFFER ROUTINE SAVE AREA    06220000
PRTBSAVE DC    F'0'               PRINT TABLE ROUTINE SAVE AREA    06230000
TSTRSAVE DC    F'0'               TEST RETURN CODE ROUTINE SAVE AREA 06240000
CVS1SAVE DC    F'0'               CVAFSEQ READ 1 ROUTINE SAVE AREA 06250000
CVS2SAVE DC    F'0'               CVAFSEQ READ 2 ROUTINE SAVE AREA 06260000
CVS3SAVE DC    F'0'               CVAFSEQ READ 3 ROUTINE SAVE AREA 06270000
********************************************************************** 06280000
*                         CONSTANTS                               * 06290000
RCODE00  DC    F'0'               RETURN CODE 0                    06300000
RCODE04  DC    F'4'               RETURN CODE 4                    06310000
RCODE08  DC    F'8'               RETURN CODE 8                    06320000
RCODE12  DC    F'12'              RETURN CODE 12                   06330000
RCODE16  DC    F'16'              RETURN CODE 16                   06340000
CCHHRS   DC    XL5'0000000000'    STARTING CCHHR                   06350000
CCHHR0   DC    XL5'0000000000'    INIT WITH ZERO                   06360000
FMT4     DC    XL1'04'            FMT4?                            06370000
FMT5     DC    XL1'05'            FMT5?                            06380000
FMT7     DC    XL1'07'            FMT7? (ONLY CERTAIN DEVICE TYPES) 06390000
FMT9     DC    XL1'09'            FMT9? (ONLY CERTAIN DEVICE TYPES) 06400000
NODSN    DC    XL1'00'            END OF DATA?                     06410000
********************************************************************** 06420000
```

Example C-26 Source for CVSEQ8D part 17 of 19

```
*                  PROGRAM MESSAGES                               * 06430000
BLNKLINE DC    CL133' '                                           06440000
STRTMSG  DC    CL133'CVSEQ8D START OF OUTPUT MESSAGES              ' 06450008
VOLTEXT  ORG   STRTMSG+33                                         06460000
         DC    C'VOLUME: '                                        06470000
VOLSER   DC    CL6' '                                             06480000
         ORG                                                      06490000
```

```
ENDMSG   DC    CL133'CVSEQ8D END OF OUTPUT MESSAGES                  '  06500008
CALLMR11 DC    CL133' CVAFSEQ  CALL: EADSCB KEYWORD NOT CODED        ' 06510000
CALLMR12 DC    CL133' CVAFSEQ  CALL: EADSCB=NOTOK CODED              ' 06520000
CALLMR13 DC    CL133' CVAFSEQ  CALL: EADSCB=OK CODED                 ' 06530000
RC00MSG  DC    CL133' RC00 VERIFIED - THE REQUEST WAS SUCCESSFUL     ' 06540000
RC04MSG  DC    CL133' RC04 VERIFIED - LOGICAL ERROR STATUS IN CVSTAT  ' 06550000
RC08MSG  DC    CL133' RC08 VERIFIED - LOGICAL ERROR STATUS IN CVSTAT  ' 06560000
RC12MSG  DC    CL133' RC12 VERIFIED - LOGICAL ERROR STATUS IN CVSTAT  ' 06570000
RC16MSG  DC    CL133' RC16 VERIFIED - LOGICAL ERROR STATUS IN CVSTAT  ' 06580000
RCERMSG  DC    CL133' UNEXPECTED RETURN CODE RETURNED FROM CVAFSEQ    ' 06590000
OKMSG    DC    CL133' CV4EADOK BIT SET / EADSCB=OK                    ' 06600000
NOTOKMSG DC    CL133' CV4EADOK BIT IS NOT SET / EADSCB=NOTOK          ' 06610000
EODMSG   DC    CL133' END OF DATA REACHED - ALL DATASETS PROCESSED    ' 06620000
MSG0     DS    0CL133                                                  06630000
         DC    CL50' DATASETS ON THE VOLUME LISTED IN PHYSICAL SEQUENT' 06640000
         DC    CL83'IAL ORDER:'                                        06650000
MSG1     DS    0CL133                                                  06660000
         DC    CL7'  DSN: '                                            06670000
DSNMSG   DS    CL44' '                                                 06680000
DSNCHA   DS    C' '                                                    06681012
         DC    CL82' '                                                 06690000
********************************************************************** 06700000
*                        WORK AREAS                                  * 06710000
BUFLST   DS    0F              BUFFER LIST WORK AREA                   06720000
BUFLISTH DC    2F'0'           BUFFER LIST HEADER (2 FULL WORD)        06730000
BUFLISTE DC    60F'0'          20 BUFFER LIST ENTRIES (3 WORDS EACH)   06740000
*                                                                      06750000
UCBADD   DC    F'0'            UCB ADDRESS SAVE AREA                   06760000
DEBADD   DC    F'0'            DEB ADDRESS SAVE AREA                   06770000
COUNT    DC    F'0'            TABLE COUNTER                           06780000
         DS    D                                                       06790000
DSCB01   DS    XL140           DSCB01 BUFFER AREA                      06800000
DSCB02   DS    XL140           DSCB02 BUFFER AREA                      06810000
DSCB03   DS    XL140           DSCB03 BUFFER AREA                      06820000
DSCB04   DS    XL140           DSCB04 BUFFER AREA                      06830000
DSCB05   DS    XL140           DSCB05 BUFFER AREA                      06840000
DSCB06   DS    XL140           DSCB06 BUFFER AREA                      06850000
DSCB07   DS    XL140           DSCB07 BUFFER AREA                      06860000
DSCB08   DS    XL140           DSCB08 BUFFER AREA                      06870000
DSCB09   DS    XL140           DSCB09 BUFFER AREA                      06880000
DSCB10   DS    XL140           DSCB10 BUFFER AREA                      06890000
DSCB11   DS    XL140           DSCB11 BUFFER AREA                      06900000
DSCB12   DS    XL140           DSCB12 BUFFER AREA                      06910000
DSCB13   DS    XL140           DSCB13 BUFFER AREA                      06920000
```

Example C-27 Source for CVSEQ8D part 18 of 19

```
DSCB14   DS    XL140           DSCB14 BUFFER AREA                      06930000
DSCB15   DS    XL140           DSCB15 BUFFER AREA                      06940000
DSCB16   DS    XL140           DSCB16 BUFFER AREA                      06950000
DSCB17   DS    XL140           DSCB17 BUFFER AREA                      06960000
DSCB18   DS    XL140           DSCB18 BUFFER AREA                      06970000
DSCB19   DS    XL140           DSCB19 BUFFER AREA                      06980000
DSCB20   DS    XL140           DSCB20 BUFFER AREA                      06990000
*                                                                      07000000
```

```
RETCODE  DC    F'999'            RETURN CODE SAVE AREA                  07010000
WFMTREC1 DS    CL133' '          WORK FORMAT RECORD FOR OUTPUT          07020000
WCVSTCD  DC    XL1'FF'           CVSTAT CODE WORK AREA                  07030000
*********************************************************************** 07040000
*           PARAMETER LIST FOR EXTERNAL SUBROUTINE                   * 07050000
         DS    0D                                                       07060000
PARADDR1 DC    A(WCVSTCD,WFMTREC1)                                      07070000
*********************************************************************** 07080000
*                  DCB - OUTPUT FILE (OUTFILE)                       * 07090000
OUTFILE  DCB   DDNAME=OUTDD,                                           X07100000
               DSORG=PS,RECFM=FB,LRECL=133,BLKSIZE=1330,MACRF=PM        07110000
*********************************************************************** 07120000
*                    TABLES                                          * 07130000
TABLE    DC    0H                START OF TABLE DSCB ADDR             07140000
TDSCB01  DS    F'0'              DSCB01 ADDRESS (140 BYTE DSCB)       07150000
TBLLNG   EQU   *-TABLE           LENGTH OF TABLE ENTRY                07160000
TDSCB02  DS    F'0'              DSCB02 ADDRESS (140 BYTE DSCB)       07170000
TDSCB03  DS    F'0'              DSCB03 ADDRESS (140 BYTE DSCB)       07180000
TDSCB04  DS    F'0'              DSCB04 ADDRESS (140 BYTE DSCB)       07190000
TDSCB05  DS    F'0'              DSCB05 ADDRESS (140 BYTE DSCB)       07200000
TDSCB06  DS    F'0'              DSCB06 ADDRESS (140 BYTE DSCB)       07210000
TDSCB07  DS    F'0'              DSCB07 ADDRESS (140 BYTE DSCB)       07220000
TDSCB08  DS    F'0'              DSCB08 ADDRESS (140 BYTE DSCB)       07230000
TDSCB09  DS    F'0'              DSCB09 ADDRESS (140 BYTE DSCB)       07240000
TDSCB10  DS    F'0'              DSCB10 ADDRESS (140 BYTE DSCB)       07250000
TDSCB11  DS    F'0'              DSCB11 ADDRESS (140 BYTE DSCB)       07260000
TDSCB12  DS    F'0'              DSCB12 ADDRESS (140 BYTE DSCB)       07270000
TDSCB13  DS    F'0'              DSCB13 ADDRESS (140 BYTE DSCB)       07280000
TDSCB14  DS    F'0'              DSCB14 ADDRESS (140 BYTE DSCB)       07290000
TDSCB15  DS    F'0'              DSCB15 ADDRESS (140 BYTE DSCB)       07300000
TDSCB16  DS    F'0'              DSCB16 ADDRESS (140 BYTE DSCB)       07310000
TDSCB17  DS    F'0'              DSCB17 ADDRESS (140 BYTE DSCB)       07320000
TDSCB18  DS    F'0'              DSCB18 ADDRESS (140 BYTE DSCB)       07330000
TDSCB19  DS    F'0'              DSCB19 ADDRESS (140 BYTE DSCB)       07340000
TDSCB20  DS    F'0'              DSCB20 ADDRESS (140 BYTE DSCB)       07350000
TBLNBR   EQU   (*-TABLE)/TBLLNG  NBR OF TABLE ENTRIES                 07360000
*********************************************************************** 07370000
*                       SWITCHES                                     * 07380000
SWEOD    DC    XL1'00'           SWITCH - END OF DATA ?               07390000
EOD      EQU   X'FF'             END OF DATA DETECTED                 07400000
NOEOD    EQU   X'00'             END OF DATA NOT DETECTED             07410000
*********************************************************************** 07420000
```

Example C-28 Source for CVSEQ8D part 19 of 19

```
*                    VTOC DCB AREA                                   * 07430000
VTOCDCB  DCB   DDNAME=CVAFDD,MACRF=E,EXLST=XLST1,DSORG=PS,DCBE=VTOCDCBE 07440000
XLST1    DC    X'87'                                                  07450000
         DC    AL3(JFCB1)                                             07460000
JFCB1    DS    0CL176                                                 07470000
TESTNAME DS    CL44                                                   07480000
         DS    CL8                                                    07490000
         DS    BL1                                                    07500000
         DS    CL123                                                  07510000
VTOCDCBE DCBE  EADSCB=OK                                              07520000
```

```
*********************************************************************** 07530000
*                          DSECTS                                     * 07540000
         ICVAFBFL DSECT=YES                                             07550000
*                                                                       07560000
         IECSDSL1 (1)                                                   07570000
DSCBLTH  EQU   *-IECSDSL1         LENGTH OF DSCB                        07580000
TBLMAP   DSECT                   DUMMY CONTROL SECTION FOR TABLE MAP   07590000
DSCBA    DS    F                 DSCB ADDRESS ENTRY                    07600000
*********************************************************************** 07610000
*                      CVAF PARAMETER LISTS                           * 07620000
CVSEQ8D CSECT                                                          07630008
CVPLIST  CVAFSEQ MF=L                                                  07640000
         ORG   CVPLIST                                                 07650000
CVPLMAP  ICVAFPL DSECT=NO                                              07660000
         END   CVSEQ8D            END OF CVSEQ8D                      07670008
```

Sample job to initialize data set for OCE Partial Release

In Example C-29 and Example C-30 on page 415, we show the assembler that was used for the OCE Partial Release scenarios in Chapter 7, “DFSMSdfp enhancements” on page 103. It is not intended to be run and is presented as illustration of how the scenarios were set up.

Example C-29 Assembler code to initialize a data set for demonstration (1 of 2)

```
&NAME    SEGSTART                                                      00001099
         MACRO                                                         00010000
&NAME    SEGSTART                                                      00020000
         AMODE 24                                                      00030000
&NAME    STM   14,12,12(13)           SAVE HIS REGS IN HIS SAVE AREA   00040000
R1       EQU   1                                                       00060000
R3       EQU   3                                                       00080000
R4       EQU   4                                                       00090000
RB       EQU   12                                                      00170000
R13      EQU   13                                                      00180000
R14      EQU   14                                                      00190000
R15      EQU   15                                                      00200000
         BALR  12,0                   SET UP ADDRESSABILITY            00210000
         USING *,12                   USE REG 12 AS BASE REG           00220000
         ST    13,SAVEREGS+4          SAVE @ OF HIS SAVEAREA IN MINE   00230000
         LA    03,SAVEREGS            LOAD @ OF MY SAVE AREA IN REG 3  00240000
         ST    03,8(13)               SAVE @ OF MY SAVE AREA IN HIS    00250000
         LR    13,03                  LOAD @ OF MY SAVE AREA IN REG 13 00260000
         MEND                                                          00270000
         MACRO                                                         00280000
&NAME    SEGEND                                                        00290000
&NAME    L     13,SAVEREGS+4          LOAD REG13 WITH @ OF HIS SAVE    00300000
         LM    14,12,12(13)           RESTORE REGS FROM HIS SAVEAREA   00310000
         XR    R15,R15                                                 00320000
         BR    14                     RETURN TO CALLING RTN VIA REG 14 00330000
SAVEREGS DC    18F'0'                 SET UP SAVE AREA                 00340000
         MEND                                                          00350000
GENREC1   SEGSTART                                                     00440099
*  THIS IS A SIMPLE PROGRAM TO GENERATE RECORDS TO FILL UP A DATA SET.  00450099
*  UNITL THE TASK GETS SB37 BY DEFAULT.                                 00460099
```

```
*  PARM=SHORT WILL CAUSE THE PROGRAM TO WRITE ONLY 1000 RECORDS.        00461099
*                                                                       00470000
*  R3    PARM                                                           00480000
*  R4    RECORD COUNT                                                   00490099
*  R12   OVERALL BASE REGISTER                                          00500000
START    DS    0H                                                       00510000
         MVI   SHORTRUN,C'N'                                            00520099
         L     R15,0(R1) GET ADDRESS OF PARM                            00530000
         LH    R3,0(R15) GET LENGTH OF PARM                             00540000
         CH    R3,=H'0'  CHECK PARM LENGTH                              00550000
         BE    EXPARM                                                   00560099
         SH    R3,=H'1'  REDUCE FOR EXECUTE                             00570000
         EX    R3,MVCPARM                                               00580099
         CLC   SYSPARM(5),=C'SHORT'                                     00590099
         BNE   EXPARM                                                   00591099
```

Example C-30 Assembler code to initialize a data set for demonstration (2 of 2)

```
^^^^^^^^^MVI   SHORTRUN,C'Y'                                           00600099
         LA    R4,1000                                                  00601099
EXPARM   DS    0H                                                       00610099
         OPEN  (GENDCB,(OUTPUT))                                        00690099
LOOPBK   DS    0H                                                       00691099
         PUT   GENDCB,PRINTHD1                                          00700099
         CLI   SHORTRUN,C'N'                                            00701099
         BE    LOOPBK  KEEP GOING UNTIL THE DATA SET IS FULL            00710099
*  ONLY DO 1000 WRITES                                                 00710199
         BCT   R4,LOOPBK                                                00711099
FINISH   DS    0H                                                       01120000
         SEGEND                                                         01130000
         ORG                                                            01140000
PRINTHD1 DC   CL80' TEST DATA RANDOM AS IT CAN BE WITHOUT THINKING'     01440099
GENDCB DCB DDNAME=GENDCB,DSORG=PS,MACRF=(PM)                            01500099
SHORTRUN DS   C                                                         01501099
SYSPARM  DC   CL100'SYSPARM SYSPARM'                                    01502099
MVCPARM  MVC  SYSPARM(0),2(R15)                                         01503099
         ORG                                                            01510000
         END                                                            01530000
```

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this book.

IBM Redbooks

The following IBM Redbooks publications provide additional information about the topic in this document. Note that some publications referenced in this list might be available in softcopy only.

- *z/OS DFSMShsm Primer,* SG24-5272
- *z/OS V1.13 DFSMS Technical Update*, SG24-7961
- *DFSMSrmm Primer*, SG24-5983

You can search for, view, download or order these documents and other Redbooks, Redpapers, Web Docs, draft and additional materials, at the following website:

ibm.com/redbooks

Other publications

These publications are also relevant as further information sources:

- *z/OS DFSMS OAM Planning, Installation, and Storage Administration Guide For Tape Libraries,* SC23-6867
- *z/OS DFSMS Installation Exits*, SC23-6850
- *z/OS DFSMShsm Storage Administration*, SC23-6871
- *z/OS DFSMSdss Storage Administration,* SC23-6868
- *z/OS DFSMShsm Diagnosis*, GC52-1387
- *z/OS DFSMSrmm Reporting*, SC23-6875
- z/OS *DFSMShsm Implementation and Customization Guide*, SC23-6869
- *z/OS MVS System Messages, Volume 2 (ARC-ASA)*, SA22-7632
- *z/OS DFSMS Using New Functions,* SC23-6857
- *z/OS DFSMSdfp Storage Administration*, SC23-6860
- *z/OS DFSMSdfp Diagnosis,* SC23-6863
- *MVS System Messages, Vol 2 (ARC-ASA),* SA38-0669
- *z/OS DFSMS Managing Catalogs*, SC23-6853
- *z/OS DFSMS Access Method Services Commands*, SC23-6846
- *z/OS MVS Initialization and Tuning Guide*, SA23-1379
- *z/OS MVS Initialization and Tuning Reference*, SA23-1380

Online resources

These websites are also relevant as further information sources:

- z/OS V2.1 Information Center

  http://pic.dhe.ibm.com/infocenter/zos/v2r1/index.jsp

- z/OS Hot Topics

  http://www-03.ibm.com/systems/z/os/zos/library/hot-topics/hot-topics.html

- TS7700 Customer Information Center

  http://publib.boulder.ibm.com/infocenter/ts7700/cust/index.jsp

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IBM support and downloads

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IBM z/OS V2.1 DFSMS Technical Update

(0.5” spine)
0.475”<->0.873”
250 <-> 459 pages

IBM z/OS V2.1 DFSMS Technical Update

Understand the features and functions of z/OS V2.1 DFSMS

Contains implementation hints and tips

Provides functional hands-on code samples

Each release of IBM z/OS DFSMS builds upon the previous version to provide enhanced storage management, data access, device support, program management, and distributed data access for the z/OS platform in a system-managed storage environment.

This IBM Redbooks publication provides a summary of the functions and enhancements integrated into z/OS V2.1 DFSMS. It provides you with the information that you need to understand and evaluate the content of this DFSMS release, along with practical implementation hints and tips.

This book is written for storage professionals and system programmers who have experience with the components of DFSMS. It provides sufficient information so that you can start prioritizing the implementation of new functions and evaluating their applicability in your DFSMS environment.

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