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What's New in DFSMSdss

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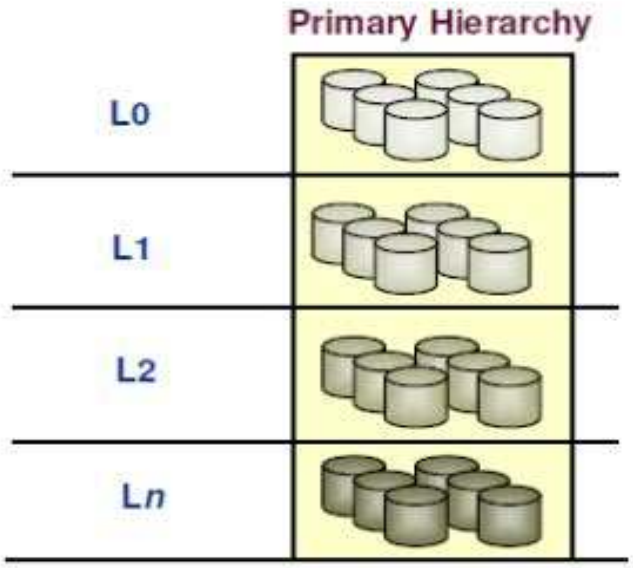
Agenda

- **Preview of z/OS V2.1**
  - Storage Tiers
  - RLS for Catalogs
  - Reset during Restore
  - Reset for mounted zFSs
  - Physical DS Rename and Replace
  - Physical DS Alternate SMS Volume
  - FlashCopy for Extended Format Sequential DS
  - FlashCopy Consistency Group Verification
- **Support for DFSMS V2.1 items**
  - GDG Support for PDSE
  - ACS Variable for EAV
- **Recent DFSMSdss APARs**
  - EAV: OA40210 OA40081 OA38942
  - FlashCopy: OA39330 OA39520 OA39039
- **V1.13 and APAR Enhancements**

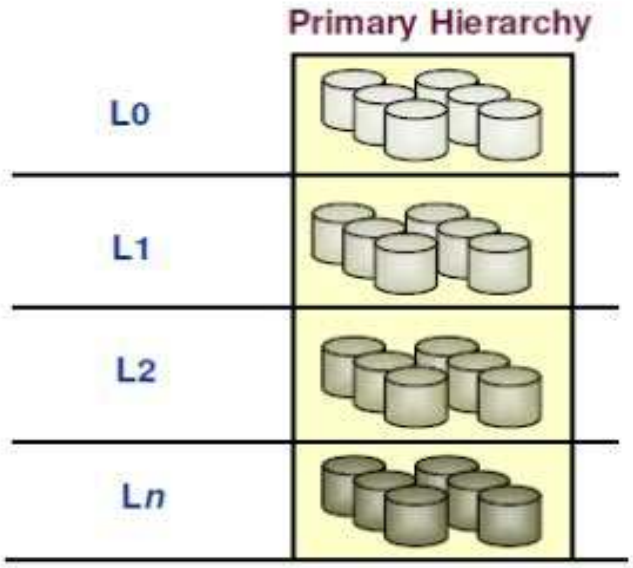
Preview z/OS V2.1
Storage Tiers

- A storage tier is a class of devices that has a defined set of performance, availability, accessibility and capacity characteristics
- HSM Primary Space Management will drive class transitions within Ln tiers
  - Example of tier characteristics:
    - L0 consists of mirrored SSD
    - L1 consists of non-mirrored SSD
    - L2 consists of mirrored FC
    - L3 consists of non-mirrored FC
    - L4 consists of SATA
    - Ln devices are directly accessible by the user (DASD)



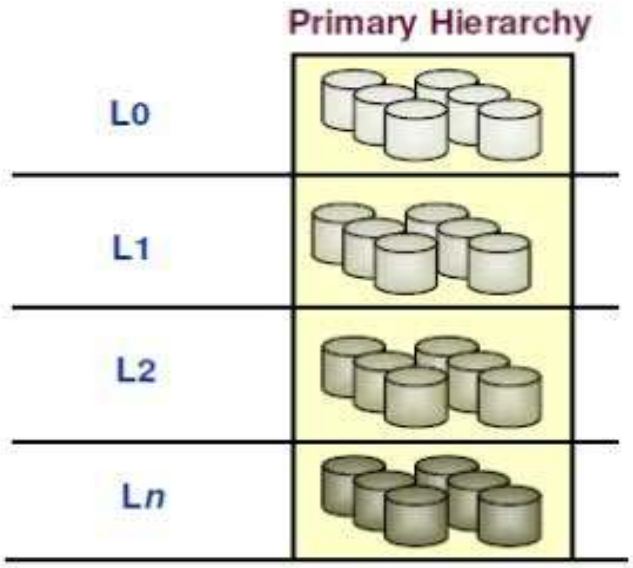
Preview z/OS V2.1
Storage Tiers

- Each tier would be assigned a storage class and storage group through the ACS routines
  - ACS routines are used to direct data to a particular tier
  - ACS routines do not 'understand' the particular characteristics of each tier
    - Left to the user to assign accordingly
- Class transition attributes will consist of
  - Time since creation
  - Time since last used
  - Periodic



Preview z/OS V2.1
Storage Tiers

- DSS will drive moving the data between tiers
  - COPY with DELETE
  - Will serialize the data set
  - If serialization cannot be obtained because the data set is open to an application, DSS will close the data set, move it, and reopen it
    - This will be done for DB2, CICS, and zFS data sets
    - A management class attribute will determine what application DSS is to drive to close/open the data set
    - A new user exit option also added
    - Coexistence PTFs will be available
  - See session #12972 for details



Preview z/OS V2.1
Storage Tiers

- DSS Closing/Opening CICS data set - ADR568I

```
  COPY DS(INC(C9SDSS.CICSTS.V4R1.ENT1)) -
     STORCLAS(SC9TCICS) -
    DELETE -
    BYPASSACS(*) -
    TOLERATE(ENQF) -
    ALLDATA(*) -
    ALLEXCP -
    SPHERE -
    ADMIN
DR101I (R/I)-RI01 (01), TASKID 001 HAS BEEN ASSIGNED TO COMMAND 'COPY '
DR109I (R/I)-RI01 (01), 2011.255 15:04:58 INITIAL SCAN OF USER CONTROL STATEMENTS COMPLETED
DR050I (001)-PRIME(01), DFSMSDSS INVOKED VIA APPLICATION INTERFACE
DR016I (001)-PRIME(01), RACF LOGGING OPTION IN EFFECT FOR THIS TASK
DR006I (001)-STEND(01), 2011.255 15:04:59 EXECUTION BEGINS
DR568I (001)-EXCIC(01), INVOCATION OF CICS INTERFACES BEGIN
                         *============= DFSMSdss EXCI Client Program (ADREXCIC) ==========*
                         *    Input Parameters: CICS CLOS APPLID=CICSIVP1 DSN=C9SDSS.CICSTS.V4R1.ENT1
                         *    Linking to CICS EXCI server routine ADREXCIS
                         *    The EXEC CICS server request completed, data set is CLOSED
                         *============= End of DFSMSdss EXCI Client Program (ADREXCIC) ===*
DR711I (001)-NEWDS(01), DATA SET C9SDSS.CICSTS.V4R1.ENT1 HAS BEEN ALLOCATED USING STORCLAS SC9TCICS, NO DATACLAS, AND NO MGMTCLAS
DR806I (001)-T0MI (03), DATA SET C9SDSS.CICSTS.V4R1.ENT1 COPIED USING A FAST REPLICATION FUNCTION
DR431I (001)-XVSAM(01), DATA SET C9SDSS.CICSTS.V4R1.ENT1 IN CATALOG TEST.CAT.C9SDSS HAS BEEN DELETED
DR568I (001)-EXCIC(01), INVOCATION OF CICS INTERFACES BEGIN
                         *============= DFSMSdss EXCI Client Program (ADREXCIC) ==========*
                         *    Input Parameters: CICS OPEN APPLID=CICSIVP1 DSN=C9SDSS.CICSTS.V4R1.ENT1
                         *    Linking to CICS EXCI server routine ADREXCIS
                         *    The EXEC CICS server request completed, data set is OPENED
                         *============= End of DFSMSdss EXCI Client Program (ADREXCIC) ===*
DR801I (001)-DDDS (01), 2011.255 15:05:04 DATA SET FILTERING IS COMPLETE. 1 OF 1 DATA SETS WERE SELECTED: 0 FAILED SERIALIZATION
                        AND 0 FAILED FOR OTHER REASONS
DR454I (001)-DDDS (01), THE FOLLOWING DATA SETS WERE SUCCESSFULLY PROCESSED
                         C9SDSS.CICSTS.V4R1.ENT1
```

Preview z/OS V2.1
RLS for Catalogs

- Why the need for RLS for Catalogs
  - Performance
    - Contention on SYSIGGV2 bcsname when updating catalogs
  - Availability
    - Need to split for contention issues
    - Lack of availability when splitting and recovering
  - Integrity
    - Catalog damaged due to utilities updating while CAS is updating
    - Lack of sysplex control of serializing catalogs
  - Recovery
    - Difficult and error prone process

Preview z/OS V2.1
RLS for Catalogs

- Implementation
  - New parameters added for DEFINE, ALTER, DELETE
    - LOG(NONE) parameter allows the catalog to become eligible for RLS access for DEFINE and ALTER
  - Many new MODIFY commands introduced

Preview z/OS V2.1
RLS for Catalogs

- DSS serialization change for catalogs
  - SYSIGGV2 resource not obtained for catalogs open in RLS
    - SMSVSAM will hold SYSIGGV2 bcsname SHARE while a catalog is opened for RLS access
      - Ensures integrity from programs relying on SYSIGGV2
  - When restoring catalogs
    - If replacing existing catalog it must first be locked or suspended
    - BCSRECOVER(LOCK|SUSPEND) keyword
      - LOCK will invoke a sysplex wide close of the catalog and lock the catalog (failing new unaurthorized requests), if the catalog is not already locked or suspended. If DSS locks the catalog, it will unlock it at the end of the restore
      - SUSPEND will invoke a sysplex wide close of the catalog and suspend new unauthorized requests in the client space if the catalog is not already locked or suspended. If DSS suspends requests, it will resume the requests at the end of the restore

Preview z/OS V2.1
RLS for Catalogs

- When restoring catalogs (continued)
  - **Migration Action:** Existing catalog must be locked or suspended prior to invoking Restore (ADR439E issued)
    - Must specify either
      - BCSRECOVER(LOCK|SUSPEND) keyword on RESTORE
      - F CATALOG,RECOVER,LOCK|SUSPEND(bcsname) before initiating the RESTORE command
      - IGG.CATLOCK Facility Class Profile must be defined
- When copying or dumping catalogs
  - DSS will quiesce (QUICOPY) the catalog to ensure any updates being made are held until DSS ends the quiesce (QUIEND)
  - Ensures catalog is not being updated across the sysplex while moving or backing up the catalog

Preview z/OS V2.1
RLS for Catalogs

- Coexistence PTFs will be available
  - When attempting to COPY or DUMP a catalog open in RLS in V2.1 on a lower release error will be issued during filtering
  - ADR724E with return and reason codes indicating catalog is open in RLS on another system
    - VSAM open errors will also be issued to SYSLOG
- See sessions #12977 and #12978 for details

Preview z/OS V2.1
Reset during Restore

- Problem: DSS unconditionally resets the data-set-changed indicator (DS1DSCHA) for all data sets restored during full volume restore
  - Share Requirements SSMVSS07002, SSMVSS07009
  - 5 Marketing Requirements
    - MR0418071919, MR0302074136, MR0409076057, MR1119075914, MR0604021857

- Solution: New keyword RESET(YES|NO|DUMP) during full volume RESTORE
  - Allow users to specify how DSS should set the DS1DSCHA indicator for all data sets restored to the target volume

Preview z/OS V2.1
Reset during Restore

- RESET(YES|NO|DUMP) keyword
  - RESET(DUMP) - default
    - If RESET is specified during DUMP FULL then the target will resemble volume **after** it was dumped
    - DS1DSCHA bits will be turned off for all data sets residing on volume
  - RESET(YES)
    - DS1DSCHA bits will be turned off for all data sets residing on volume
    - This is behavior prior to V2.1
  - RESET(NO)
    - The target will return to the state **prior** to the dump
      - DS1DSCHA bits for data sets on volume will remain untouched
    - If RESET is not specified during DUMP then this essentially becomes default
    - This applies to volumes dumped prior to V2.1
  - New options also provided in ADRUFO to override keyword specification

HSM users: Please note new RECOVERRESET(YES|NO|DUMP) in V2.1

Preview z/OS V2.1
Reset during Restore

- New RACF Facility Class for RESET keyword
  - Applies to both DUMP and RESTORE
  - The new RACF Facility Class profiles are
    - STGADMIN.ADR.DUMP.RESET for DUMP
    - STGADMIN.ADR.RESTORE.RESET.YES for RESTORE
  - When the corresponding profile is defined
    - Users without READ access to the corresponding RACF Facility Class profile will not be able to specify the RESET keyword
    - ADR707E will be issued

Preview z/OS V2.1
Reset for mounted zFS data sets

- Problem: DSS RESET during logical DUMP is ignored for mounted zFS data sets
  - DSS only resets the DS1DSCHA bit if exclusive serialization can be obtained
  - For mounted zFS data sets, DSS invokes Unix System Services (USS) to quiesce the file system to take a consistent backup
  - Incremental backup was also not supported
  - New function will now allow DSS to reset DS1DSCHA bit for mounted zFS data sets while quiesced

Preview z/OS V2.1
Physical DS Rename and Replace

- Problem: DSS does not allow renaming of VSAM data sets during physical DS COPY and RESTORE
  - Only supported for nonVSAM today
  - 7 Marketing Requirements
    - MR1011075120, MR030912475, MR0309124752, MR1011013327, MR1114053052, MR0819115958, MR0907116329
  - Gives users access to production data set and restored data set without having to restore entire volume
    - Ability to unload data from the backup version

Preview z/OS V2.1
Physical DS Rename and Replace

- Solution: RENAMEUnconditional will be supported for VSAM
  - RENAME will continue to remain unsupported for VSAM RESTORE
  - Recataloging after DSS processing remains necessary
  - VSAM Alternate Indexes will continue to remain unsupported
  - REPLACEUnconditional will also be supported for physical DS RESTORE
    - Physical DS COPY supports REPLACEU today

Preview z/OS V2.1
Physical DS Alternate SMS Volume

- Problem: Physical DS Copy and Restore only supports one output volume
  - Volume selection is not an option
  - If target does not have the space the operation fails
    - Scenarios:
      - COPY FULL from SRC to TGT, COPY DS from TGT to SRC
      - DUMP FULL from TGT to tape, RESTORE DS from tape to SRC
    - Space may no longer be available on SRC if data set size changed
      - Preallocated target may have had to be scratched/reallocated
- Solution: DSS adding a new user interaction module (UIM) exit
  - Physical DS Alternate SMS Volume (EIOPTION 30)
  - Added to ADREID0 mapping
  - Allows progam to pass a list of volumes that DSS may use to attempt to allocate DS on, when necessary
    - Only called if original target volume could not be used

Preview z/OS V2.1
FlashCopy Extended Format Sequential DS

- Problem: If you have a single-striped multivolume data set FlashCopy cannot be used
  - There is a suffix in each block that contains block number for volume
  - Same issue if source is single-striped single volume but target requires multiple volumes
  - DSS must use a utility to copy the data set (ADR918I RC 12)
- Solution: Support a new version for extended format sequential data sets called version 2
  - Volume boundary awareness is removed
  - A new PS_EXT_VERSION=1|2 keyword will be supported in IGDSMSxx member of PARMLIB
  - Newley created data sets will be the version type specified in PARMLIB
  - You can set it also via the SETSMS command with PS_EXT_VERSION(n)

Preview z/OS V2.1
FlashCopy Extended Format Sequential DS

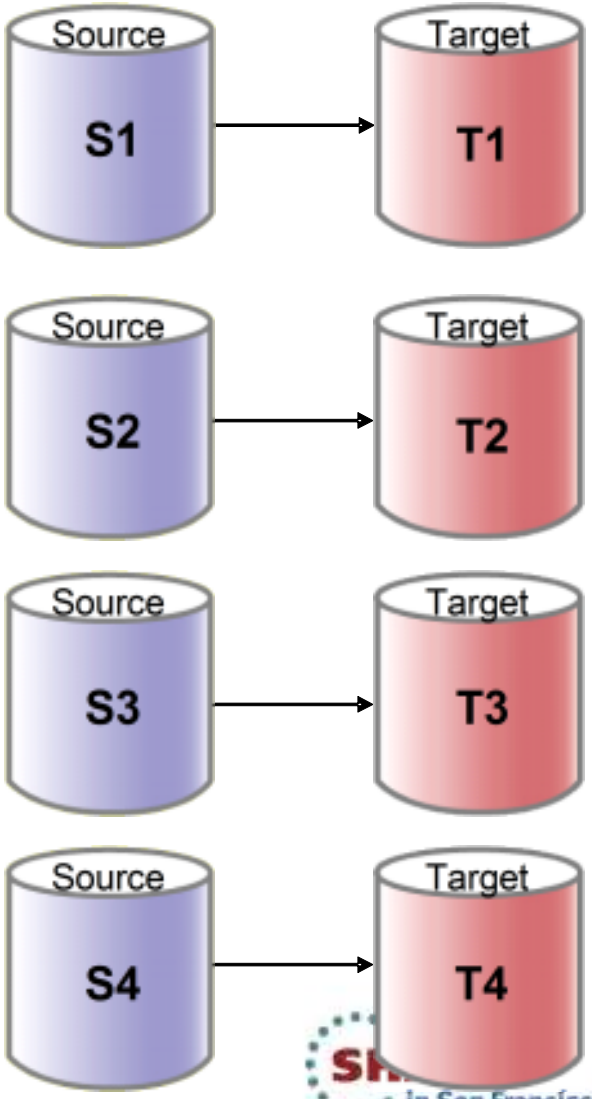
- DSS Changes
  - DSS will use FlashCopy only if input and output are version 2
    - V2.1 only
    - If source is V2 and target is V1 then FlashCopy will not be used
    - For new DSS allocations version type will be the version type of source
    - Preallocated version type will be preserved (for logical, not physical)
    - DSS allocations will not be controlled using PARMLIB
  - New ADR918I RC of 28 will be issued to indicate that the source extended format version type does not match that of the target
  - New ADR918I RC of 29 will be issued to indicate that the version 2 source extended format data set has an EOF on the non-last volume

Preview z/OS V2.1
FlashCopy Extended Format Sequential DS

- The version type will reside in the NVR and will be displayed in IDCAMS LISTCAT and DCOLLECT
- Coexistence APARs will be available for down-level systems
  - COPY/DUMP/RESTORE of v2 on down level releases are supported
  - Target COPY|RESTORE will be allocated as V1
  - Preallocated V2 will also be supported
  - If V2 is preallocated and must be scratched and reallocated, it will be reallocated as V1
  - FlashCopy of V2 single striped multi-volume will not be supported
- Do not set version 2 until all sharing and backup systems are at this release or you install compatibility PTFs

Preview z/OS V2.1
FlashCopy Consistency Group Verification

- Overview
  - FlashCopy S1 to T1 with FCCGFREEZE
    - Writes cannot proceed on S1
    - Any writes occurring on S2-S4 are not dependent writes
  - FlashCopy S2 to T2
    - Writes cannot proceed on S1 or S2
    - Any writes occurring on S3-S4 are not dependent writes
  - FlashCopy S3 to T3 and S4 to T4
  - T1-T4 contain a consistent copy
  - Issue CGCREATED to ”UNFREEZE”
    - Specify FCCGVERFIY on S1
    - Writes may proceed on S1-S4



Preview z/OS V2.1
FlashCopy Consistency Group Verification

- DSS will be modified to accept multiple volume serial numbers on the FCCGVERIFY keyword of the CGCREATED command
  - Today FCCGVERIFY allows one volser
    - FCCGVERIFY during the CGCREATED command tells DSS to query the volume to see if it is still "FROZEN"
  - V2.1 will allow FCCGVERIFY to accept up to 255 volsers
    - Useful if the consistency group being formed spans many LSS's or subsystems that may not have the same timer
  - DSS will verify all volumes specified within the FCCGVERIFY keyword whether any volume fails verification or not
    - A new bit will be available in ADRUFO to instruct DSS to stop verifying volumes specified within the FCCGVERIFY keyword once a volume has failed verification
      - Default is to verify all volumes specified

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  - Storage Tiers
  - RLS for Catalogs
  - Reset during Restore
  - Reset for mounted zFSs
  - Physical DS Rename
  - Physical DS Alternate SMS Volume
  - FlashCopy for Extended Format Sequential DS
  - FlashCopy Consistency Group Verification
- **Support for DFSMS V2 R1 items**
  - GDG Support for PDSE
  - ACS Variable for EAV
- **Recent DFSMSdss APARs**
  - EAV: OA40210 OA40081 OA38942
  - FlashCopy: OA39330 OA39520 OA39039
- **V1.13 and APAR Enhancements**

Preview z/OS V2.1
GDG Support for PDSE

- Problem: Customers have expressed interest in being able to define a PDSE as a GDS
  - Sequential, Partitioned (PDS), and Direct Access data sets can be GDS's today
    - IDC3009I 48-152 when attempting to define a PDSE as a member of a GDG base
- Solution: PDSE can be defined as a GDS
  - Using DSNTYPE = LIBRARY or through DATACLAS
  - IDCAMS LISTCAT will display both GDG Status and DSNTYPE (SMS only)
  - DSS TGTGDS keyword for COPY and RESTORE supported
    - ACTIVE, DEFERRED, ROLLEDOFF, SOURCE are options
    - Preallocated GDS status is preserved
    - Coexistance PTFs will be available

Preview z/OS V2.1
ACS Variable for EAV (DEBUG SMSMSG)

- Problem: EATTR keyword is supported for JCL, dynamic allocations, AMS Define and DATACLAS, but not in ACS Routines
  - Does not allow SMS volume selection to select a volume for allocation based on EATTR specification
- Solution: DSS will pass EATTR specification to SMS for an allocation request
  - Will allow SMS to consider EATTR setting when deriving Storage Class and Storage Groups
  - New DEBUG(SMSMS(MINIMAL|SUMMARIZED|DETAILED)) Keyword
    - Can be specified during COPY, RESTORE, and CONVERTV
    - Instructs DSS to output SMS messages and ACS Write requests to the DSS job log
    - SMS messages will be under the new ADR803I message for successful allocations
    - ADR709E will continue to be issued for failures
    - New bits representing DEBUG SMSMSG options will also be added to ADRUFO

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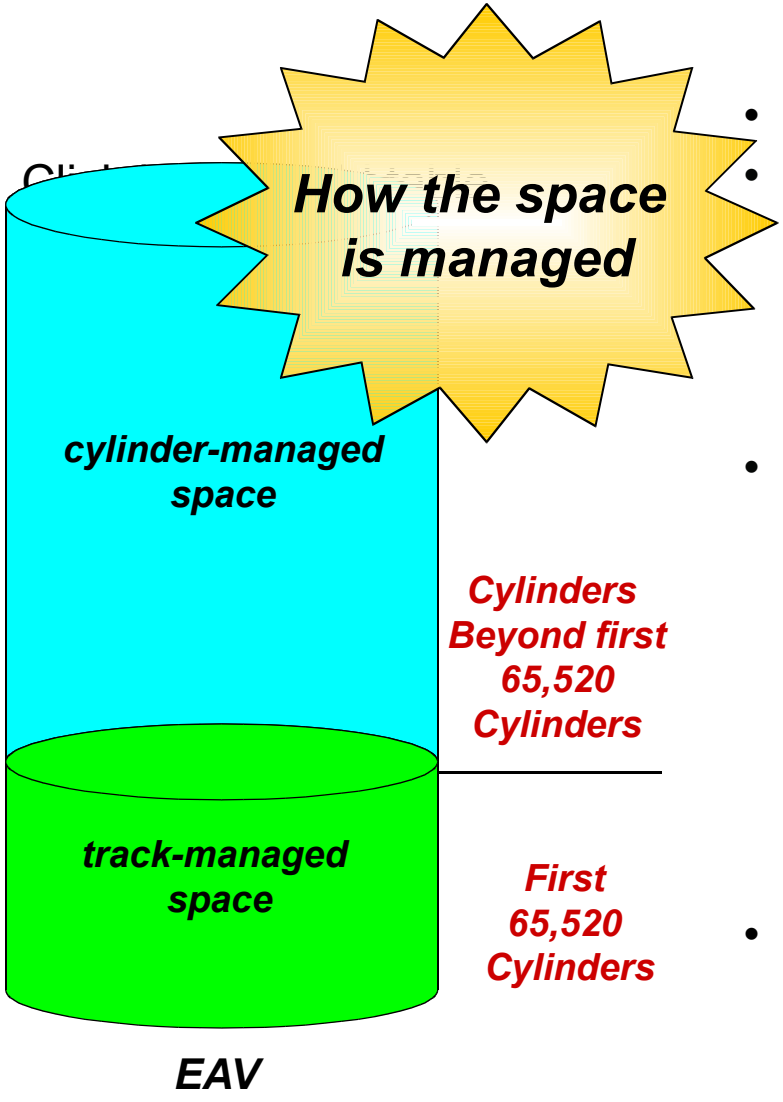
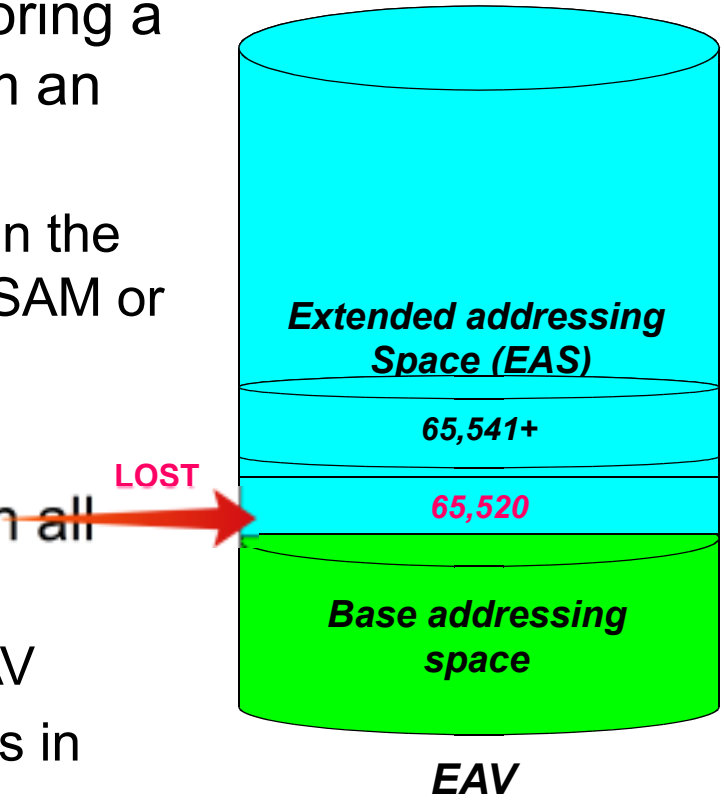
EAV Key Design Points



- Maintains 3390 track format
- **Track-managed space:** the area on an EAV located within the first 65,520 cylinders
  - Space is allocated in track and cylinder units
  - Storage for “small” data sets
- **Cylinder-managed space:** the area on an EAV located above the first 65,520 cylinders
  - Space is allocated in **multicylinder units**
    - A fixed unit of disk space that is larger than a cylinder. Currently on an EAV it is 21 cylinders
    - System may round space requests up
  - Storage for “large” data sets
- Track-managed space comparable to same space on non-EAVs

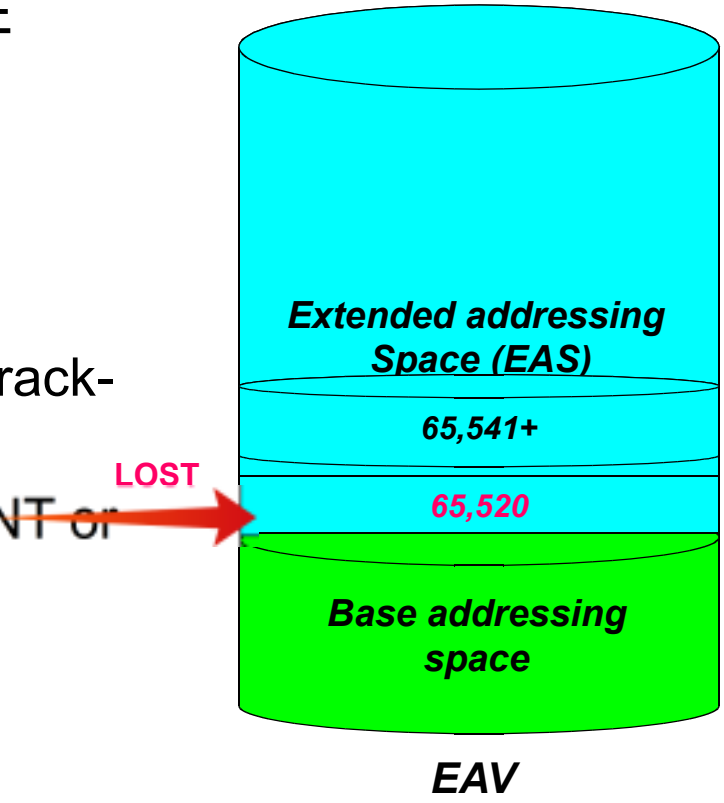
DFSMSdss APARs
EAV: OA38942 OA40081 OA40210

- OA38942: ADR351E issued when restoring a data set that was logically dumped from an EAV
  - Occurs when 2 or more extents reside in the EAS that are not in ascending order (VSAM or nonVSAM)
- OA40081: Copy target does not contain all source data
  - Occurs when going from EAV to nonEAV
  - Source must have had at least 2 extents in EAS
  - FlashCopy not used



DFSMSdss APARs
EAV: OA38942 OA40081 OA40210

- OA40210: DEFRAG or CONSOLIDATE corrupts data set
  - Must be >21 cyl in size residing in EAS
  - Corruption occurs after an attempt to FlashCopy the extent failed (ADR946I)
  - DSS redrives moving the extent using track-level I/O
  - Error seen when running IDCAMS PRINT or REPRO of the affected data set



DFSMSdss APARs
FlashCopy: OA39039 OA39330 OA39520

- OA39039: Lifting ADR918I RC26 for LDSs (DB2, zFS)
  - Prevented the use of FlashCopy when source HURBA=HARBA and targets HARBA > source HARBA
  - DSS was protecting the case for the lack of a SW EOF, which doesn't exist of LDSs

- OA39330: ICH408I issued indicating user not authorized STGADMIN.ADR.COPY.FLASHCPY Facility Class Profile name when FASTREPLICATION(PREFERRED) was used as default
  - Applies to DEFRAG and CONSOLIDATE profiles as well
  - DFSMSdss has been modified to suppress the ICH408I when the FASTREPLICATION keyword is not specified for COPY, DEFRAG, and CONSOLIDATE functions

DFSMSdss APARs
FlashCopy: OA39039 OA39330 OA39520

- OA39520: ADR815W during FCWITHDRAW on a Space Efficient volume
  - Space Efficient volumes can only be processed at a full volume level (no track or extent level processing)
  - DSS does perform track level processing for CPVOLUMES
    - Entire volume has to be specified so FlashCopy can be used
    - DSS withdraw processing changed to only specify device for FC Withdraw request

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  - ACS Variable for EAV
- **Recent DFSMSdss APARs**
  - EAV: OA40210 OA40081 OA38942
  - FlashCopy: OA39330 OA39520 OA39039
- **V1.13 and APAR Enhancements**

V1.13 and APAR Enhancements

- Customized Offering Driver
  - A stand-alone z/OS driving system available at no additional charge to new or currently licensed z/OS customers
  - Using the COD applies if you
    - Don't have an existing system to use as a driving system
    - Or your existing system does not meet driving-system requirements
  - Previously only available on tape media
    - 34xx support withdrawn
    - 359x only choice
  - COD now available in DVD format
    - Consists of DSS full volume dumps
    - Will IPL the DVD using the HMC to bring up DSS SA program
    - Can then execute SA RESTORE
  - NOVERIFY support
  - "Rated z: The hottest DVD release from IBM" article
    - Hot Topics article August 2011

V1.13 and APAR Enhancements

- Sysplex-wide Event Notification 64
  - REFUCB option in DEVSUPxx Parmlib
    - Applies to COPY and RESTORE (FULL/TRACKS) target volumes
    - When VOLSER or VTOC size/location change
    - Unconditional vary online is issued to devices online to sharing systems
      - Allows UCB to be refreshed
      - Must specify REFUCB in DEVSUPxx parmlib
  - OA31785
    - Support to issue ENF64 when VVDS changes
    - Applies to COPY and RESTORE (FULL/TRACKS) target devices
    - Allows VVDS Manager to refresh VVDS
    - Available in all supported releases

V1.13 and APAR Enhancements

- Timestamp in DSS SYSPRINT messages
  - Capability to have DSS add timestamp to messages
  - Requested through new EXEC PARM or ADRPATCH
  - PARM='MSGTIME=I|W|E|T'
  - Patch byte at offset X'58'
    - X'80' Informational messages
    - X'40' Warning messages
    - X'20' Error messages
    - X'10' Terminating messages
  - Patch values and MSGTIME values may be added together
    - ADRPATCH: Set to X'60'
    - PARM: Set MSGTIME=IWET
    - IMS APAR: PM80222

V1.13 and APAR Enhancements

- DFSMSdss FlashCopy Batch Protection
  - Directs data set Flashcopies to a specified Storage Group
    - No need to change existing batch jobs *
    - Must add the following line to SG ACS routine

      IF &ACSENVR2 = 'FLASHCPY' THEN SET &STORGRP = 'fcstrgrp';

      fcstrgrp can be either a new or existing Storage Group that contain volsers that DFSMSdss is to use for allocation

    - Must ensure that the target volume specified in the fcstrgrp are capable of FlashCopy
      - *Don't include volumes that are XRC or GM*
    - Must have OA32101 (DSS) and OA32103 (SMS) installed

* So as long as jobs are NOT specifying a GS storclass

V1.13 and APAR Enhancements

- OA38606: Performance Improvement during writes
  - Allows concurrent writes to a dataset extent
  - HW serializes write processing when volumes are PPRC primaries
  - Should see an improvement in I/O during DSS COPY (nonFC) and RESTORE processing
  - Must also install OA38579 (requires IPL)

- OA35034: 1 TB Support
  - Support converts VSAM track allocated VSAM data sets to cylinder allocation
  - When source has >16777214 tracks and was track allocated

Summary

- Significant number of new and enhanced functions
  - Emphasis on addressing customer requirements
  - Expanding the use of FlashCopy
  - New functions being delivered in z/OS V2.1 for DFSMSdss will be the most ever in a single release

    - Demonstrates IBM's commitment to continual improvement of the DFSMSdss product

System z Social Media Channels

- Top Facebook pages related to System z:
  - IBM System z
  - IBM Academic Initiative System z
  - IBM Master the Mainframe Contest
  - IBM Destination z
  - Millennial Mainframer
  - IBM Smarter Computing
- Top LinkedIn groups related to System z:
  - System z Advocates
  - SAP on System z
  - IBM Mainframe- Unofficial Group
  - IBM System z Events
  - Mainframe Experts Network
  - System z Linux
  - Enterprise Systems
  - Mainframe Security Gurus
- Twitter profiles related to System z:
  - IBM System z
  - IBM System z Events
  - IBM DB2 on System z
  - Millennial Mainframer
  - Destination z
  - IBM Smarter Computing
- YouTube accounts related to System z:
  - IBM System z
  - Destination z
  - IBM Smarter Computing

- Top System z blogs to check out:
  - Mainframe Insights
  - Smarter Computing
  - Millennial Mainframer
  - Mainframe & Hybrid Computing
  - The Mainframe Blog
  - Mainframe Watch Belgium
  - Mainframe Update
  - Enterprise Systems Media Blog
  - Dancing Dinosaur
  - DB2 for z/OS
  - IBM Destination z
  - DB2utor

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THANK YOU!

What's New in DFSMSdss

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SHARE in San Francisco 2013