What's New in DFSMSdss and System Data Mover

Jeff Suarez
IBM Corporation
jrsuarez@us.ibm.com

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Agenda

- **What's New in System Data Mover**
  - ANTTREXX Interface Support
  - Support for Alternate Subchannel Set defined devices

- **DFSMSdss What's New in z/OS V1R12**
  - VSAM IMBED, REPLICATE or KEYRANGE attributes
  - BSAM I/O for DUMP output, COPYDUMP, and RESTORE input
  - Fast Reverse Restore FlashCopy
  - Extended Address Volume Support

- **DFSMSdss What's New Preview in z/OS V1R13**

- **Miscellaneous Enhancements**

What's New in DFSMS SDM z/OS V1R12 ANTTREXX

- Previously unsupported SDM interface to copy services
- In use by small set of customers
  - Several marketing requirements for formal support going back several years
  - Goal was to update the interface so it could be supported, while not impacting customers using the interface unsupported

What's New in DFSMS SDM z/OS V1R12 ANTTREXX

- ANTTREXX Callable from any REXX environment with 2 positional input parameters
  - First parameter = request type
    - Matches ANTRQST request types (e.g., FCQUERY or PFREEZE)
  - Second parameter = REXX compound variable containing keywords for the request
- The commands and keywords supported by ANTTREXX are not case sensitive.
- REXX commands use same facility classes as their associated ANTRQST requests

What's New in DFSMS SDM z/OS V1R12 ANTTREXX

- CALL ANTTREXX 'FCQUERY' , 'INOUT'
    - or
- result=ANTTREXX(?FCQUERY?,?INOUT?)
- Command parameters passed in the input compound variable, cannot contain imbedded blanks.
    - For instance, code 'DEVN(0A00)', but not 'DEVN (0A00)' or 'DEVN(0A00)'.

What's New in DFSMS SDM z/OS V1R12 ANTTREXX

- Message changes
  - All messages updated to have unique message numbers for unique message text
  - Completion messages expanded to include request type and return codes
    - ANTR8810I OK

    Modified to:
    - ANTR8810I OK request SUCCESSFUL|ACCEPTED

    - ANTR8811E ERROR ANTRQST RETCODE: xxxx

    Now
    - ANTR8811E ERROR request RETURN_CODE xxxx <RSNCODE yyyy>

What's New in DFSMS SDM z/OS V1R12 ANTTREXX

- Keyword changes
  - FlashCopy keywords changed:
    - SRCEXTN – Source track range(s)
    - SRCEXTNA – All source tracks
    - TGTEXTN – Target track range(s)
    - TGTEXTNA – All target tracks
  - Both 'old' and 'new' keywords will work, but only 'new' are documented
  - Not all API keywords included
    - ECB
    - ASYNC

What's New in DFSMS SDM z/OS V1R12 ANTTREXX

- Samples
  - ANTFREXX for FlashCopy commands
  - ANTPREXX for PPRC commands
  - ANTRREXX for Global Mirror commands
  - ANTXREXX for XRC commands
  - Can actually use any of the above for all commands, differ only slightly
- Samples shipped in SYS1.DGTCLIB
- Query output available via variable or printed in dump format

HyperSwap Exploitation of Alternate Subchannel Set
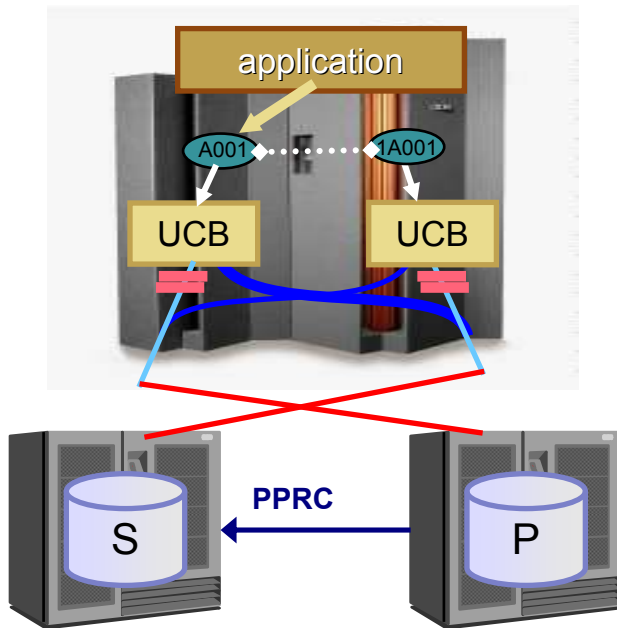
- ➤ HyperSwap Setup
  - ➤ **Only one device of PPRC pair ever online**
    - ➤ Define 2 UCBs, With Same 4 digit device #.
      - ➤ *Primary devices defined as 3390-B in Subchannel Set 0.*
      - ➤ *Secondary 'paired' device defined as 3390-D in Subchannel Set 1.*
  - ➤ **Application I/O directed to PPRC primary**
  - ➤ **Hyperswap substitutes subchannel 1 PPRC secondary for subchannel 0 primary device**
  - ➤ **Non-disruptive – applications keep running**
  - ➤ **After HyperSwap Event**
    - ➤Application still does I/O to same 4-digit device number
    - ➤Subchannels associated with 'partner' UCBs
    - ➤Non-disruptive – applications keep running
    - ➤Single device number used
- ➤ Management of devices simplified with a Cloned I/O Configuration.
- ➤ Same as today, but without 'wasting' device number

What's New in DFSMS SDM z/OS V1R12 Support for Alternate Subchannel Set

- Alternate Subchannel Set Devices
  - A *special device* is one that is defined in the alternate subchannel set 1 (not subchannel set 0, which where real devices are defined)
  - In HCD, the device type is shown as "3390D" for secondary devices
  - Defining devices in alternate subchannel set frees up devices numbers for later usage
  - Intended to be used in a Hyperswap environment
  - New keywords added to FlashCopy, PPRC, and XRC commands to request subchannel
    - For example for ANTRQST FCESTABLISH and FCWITHDRAW SUBCHSET=0|1 and TSUBCHSET=0|1 is valid
  - Shipped in APAR OA26522

What's New in DFSMSdss z/OS V1R12

- Indexed VSAM defined with IMBED, REPLICATE, or KEYRANGE attributes:
  - Less efficient than more recent enhancements to VSAM
  - Customers have requested assistance in identifying and converting these data sets
  - Solution
    - New messages identifying indexed VSAM data sets with these attributes and will convert some data sets automatically
  - Benefit
    - Reduces customer effort to identify and convert their data sets

What's New in DFSMSdss z/OS V1R12

- Indexed VSAM defined with IMBED, REPLICATE, or KEYRANGE attributes:
  - IMBED/REPLICATE
    - Will be restored without these attributes
    - ADR507I will be issued identifying the data sets being converted
      - *ADR507I DATA SET dsn WAS RESTORED WITHOUT THE IMBED OR REPLICATE ATTRIBUTES*

      ADR442I (001)-FRLBO(01), DATA SET C9SDSS.VRDS.REPIMB01 PREALLOCATED
      WITH NEW NAME TARGET.VRDS.REPIMB01, IN CATALOG
      TEST.CAT.TARGET ON VOLUME(S): T9SS02

      ADR507I (001)-TDVSM(01), DATA SET C9SDSS.VRDS.REPIMB01 IS BEING
      RESTORED WITHOUT THE IMBED OR REPLICATE ATTRIBUTES

What's New in DFSMSdss z/OS V1R12

- Indexed VSAM defined with IMBED, REPLICATE, or KEYRANGE attributes:
  - IMBED/REPLICATE/KEYRANGE
    - During Logical/Physical DS DUMP/RESTORE ADR508I will be issued when encountered (not converted)
      - ADR508I THE FOLLOWING DATA SETS REQUIRE SOME ACTION TO BE TAKEN

      ADR508I (001)-TDDS (01), THE FOLLOWING DATA SETS REQUIRE SOME ACTION TO BE TAKEN
      TARGET.KSDS.IMBEDX01
      TARGET.KSDS.IMBREP01
      TARGET.KSDS.IMBREP02
      TARGET.KSDS.REPLICAT

BSAM I/O for DUMP, COPYDUMP, RESTORE

- Problem Statement / Need Addressed:
  - Reason behind enhancement, for example:
    - Performance
  - Customer requirements addressed
    - MR1012016646, MR0201023028, MR0104024924, MR0614075419, MR0929036619, MR1213042842

- Solution:
  - Allow more options for DFSMSdss produced backups

- Benefit:
  - Increased flexibility for dump data set types
  - Elapsed time improvement up to 36% (~20-30%)

Overview

- With BSAM I/O

    - Use the DFSMSdss DUMP, COPYDUMP and RESTORE commands to

        - Create copy and restore backups on tape with larger than 65520 byte blocks
        - Create copy and restore backups in the extended format on DASD
        - Fallback to the old method of EXCP instead of BSAM at the JOB, application or installation level

- Value:

    - Faster throughput, shorten batch window for backups

    - Backups greater than 4GB, SMS compression, striped backups

Overview

- Using the new support:

    - BSAM I/O is the default method for backups on tape and extended format data sets on DASD

    - EXCP I/O continues to be the default method for basic and large format sequential backups on DASD
        - EXCP fall back support valid values are YES or NO
            - Invoked by a new PARM on the EXEC statement called USEEXCP
            - Applications can set UFOUEXCP=ON during EXIT 13
            - System administrators can set UFOUEXCP=ON in installation wide options exit (ADRUIXIT)
            - Overridden when EXCP is inappropriate for the dump data set during RESTORE

Overview

- The DFSMSdss DUMP command now supports BLKSZLIM on Dump data set DD statement

  - supports values between 65520 and 2GB

  - values 32760 through 65519 are treated as if BLKSZLIM was not specified

  - values over 262,144 are currently rounded down to 262,144

Installation

- Prerequisites for installation
    - Coexistence PTFs must be installed on all the systems in a SYSPLEX environment before using the new function
        - APAR OA30822
    - Allows the ability for backups on tape with larger than 65520 byte blocks to be restored in V1R10 and V1R11
    - Does not allow backups that reside on extended format on DASD to be restored

What's New in DFSMSdss z/OS V1R12

- BSAM I/O for DUMP output, COPYDUMP, and RESTORE input
  - EXCP fall back support valid values are YES or NO
    - Invoked by a new PARM on the EXEC statement called USEEXCP
    - Applications can set UFOUEXCP=ON during EXIT 13
    - System administrators can set UFOUEXCP=ON in installation wide options exit (ADRUIXIT)
    - Overridden when EXCP is inappropriate for the dump data set

What's New in DFSMSdss z/OS V1R12

- BSAM I/O for DUMP output, COPYDUMP, and RESTORE input
  - Changed Messages
    - ADR009T – Invalid value in PARM statement
    - ADR030I - Indicates DCB values have been modified
    - ADR331E – Output block size greater than input block size on COPYDUMP
    - ADR347E – Permanent I/O error

What's New in DFSMSdss z/OS V1R12

- BSAM I/O for DUMP output, COPYDUMP, and RESTORE input
  - New Messages
    - ADR054I Indicates USEEXCP was specified
    - ADR502I Indicates USEEXCP=YES was specified but DFSMSdss is going to ignore the request and use BSAM instead
      - Issued during a RESTORE when USEEXCP=YES was specified but EXCP cannot be used to process the input dump data set
  - Exploiters
    - DFSMShsm BACKVOL DUMP and Automatic DUMP
    - Applications that invoke DFSMSdss and do not specify a block size and dumping to tape

What's New in DFSMSdss z/OS V1R12

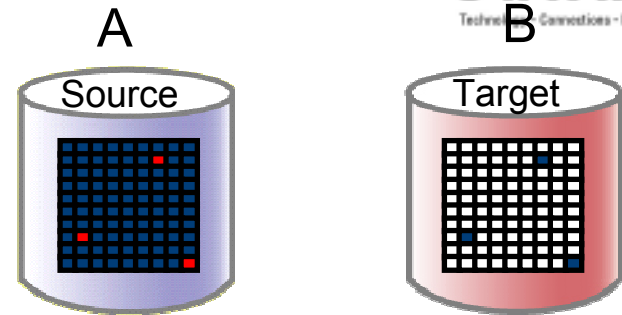- FlashCopy Fast Reverse Restore
  - Allows recovery from an active FlashCopy target volume back to original source volume
    - Does not have to wait for the background copy to finish
    - Only allowed when the volume pair is in a full-volume (tracks 0-n) FlashCopy relationship
    - Allowed during COPY FULL and COPY TRACKS operations
      - COPY TRACKS operations when all tracks (0 –n) are specified

FlashCopy Fast Reverse Restore
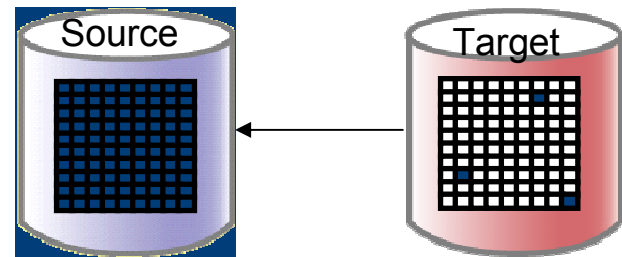
A
B

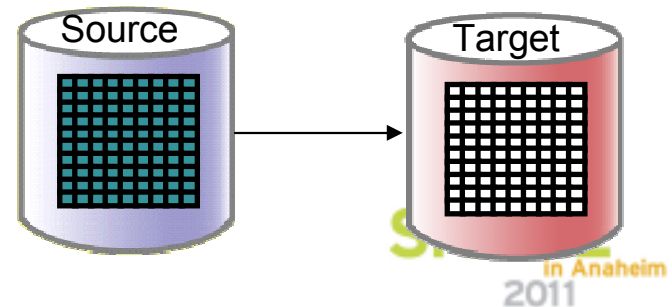Stop updates to the A volume

A Source

B Target

Perform a Fast Reverse Restore B>A to create consistent data on the A volume

Source

Target

Once the background copy B>A is complete, Flash A back to B

Source

Target

What's New in DFSMSdss z/OS V1R12

- FlashCopy Fast Reverse Restore
  - FCFastReverseRestore Keyword
    - Option to restore the FlashCopy source from its FlashCopy target
    - If volume specified are not in a full volume FC relationship with each other operation will fail
    - Relationship reversed may be Space Efficient or Incremental
      - Not required
  - FCFullVolumeRelation Keyword
    - Option to create a single FlashCopy relationship that covers the entire volume
    - When not specified DFSMSdss excludes free space
      - Relationship is not eligible for Fast Reverse Restore
    - Only applies if FlashCopy is used as the data mover

What's New in DFSMSdss z/OS V1R12

- FlashCopy Fast Reverse Restore
  - ADRUFO Installation-wide options
    - Option UFFCFRRT bit at offset 20 (X'14')
      - RETRY FLASHCOPY WITHOUT FAST REVERSE RESTORE OPTION
      - Creates a new FC relation
    - Option UFBYFRVF bit at offset 20 (X'14')
      - BYPASS VERIFICATION DURING FAST REVERSE RESTORE
      - Debugging FCFRR problems will be cumbersome
  - New RACF Facility Class Profile
    - STGADMIN.ADR.COPY.FCFRR
      - When defined user must have READ access to use FCFRR keyword

What's New in DFSMSdss z/OS V1R12

- FlashCopy Fast Reverse Restore
    - Changed Messages
        - ADR835E, ADR842E, ADR846E, ADR931W
    - New Messages
        - ADR851I
            - Gives specific reason why FCFRR could not be used
            - More for debugging purposes
            - Will not be issued if Installation Exit requests bypass verification
        - ADR852E
            - Will usually follow ADR851I
                - Unless Installation Exit requests retry option
    - Support has been rolled back to V1R10/R11 in OA31765

What's New in DFSMSdss z/OS V1R12

- Extended Address Volume Support
  - Introducing support of the remaining unsupported data set types
    - In z/OS V1R10 VSAM data sets (except catalogs and VVDSs)
    - In z/OS V1R11 Extended Format sequential data sets
    - In z/OS V1R12 All sequential, partitioned data sets, catalogs, and VVDSs
  - Data sets that remain ineligible for the EAS are:
    - HFS
    - VTOC (continues to be restricted to within first 64K-1 tracks)
    - VTOC index
    - Page data sets
    - VSAM data sets with imbed or keyrange attributes
    - VSAM data sets with incompatible CA sizes
      - Compatible CA sizes are 1, 3, 5, 7, 9 and 15 tracks

Preview for DFSMSdss z/OS V1R13

- Sysplex-wide Event Notification 64 (ENF64)
  - REFUCB option
    - ENABLE/DISABLE(REFUCB)
      - Activate using DEVSUPxx in Parmlib or MODIFY DEVMAN cmd
    - 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*
      - *Automatically refreshes the UCB*
      - *Eliminates the need to manually vary the volume offline then online*
  - OA31795
    - 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

Preview for DFSMSdss z/OS V1R13

- 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

Miscellaneous Enhancments

- 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 in an async copy*
    - Must have OA32101 (DSS) and OA32103 (SMS) installed

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

Reference Materials

- Publications:
    - SC35-0428: DFSMS Advanced Copy Services
    - SC35-0423: DFSMSdss Storage Administration
    - GA22-7499: z/OS V1R12 Migration

- Redbooks
    - SG245680: IBM TotalStorage Enterprise Storage Server Implementing ESS Copy Services with IBM eServer zSeries
    - SC26-7445: IBM TotalStorage Enterprise Storage ServerUser's Guide

Summary

- DFSMS SDM What's New
- DFSMSdss What's New in z/OS V1R12
- Preview of z/OS V1R13
- Questions?