What’s New in DFSMSdss and System Data Mover

Session 9945

Jeff Suarez
IBM Corporation
jrsuarez@us.ibm.com
Legal Disclaimer

NOTICES AND DISCLAIMERS

Copyright © 2011 by International Business Machines Corporation.

No part of this document may be reproduced or transmitted in any form without written permission from IBM Corporation.

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

References in this document to IBM products, programs, or services does not imply that IBM intends to make such products, programs or services available in all countries in which IBM operates or does business. Consult your local IBM representative or IBM Business Partner for information about the product and services available in your area.

Any reference to an IBM Program Product in this document is not intended to state or imply that only that program product may be used. Any functionally equivalent program, that does not infringe IBM's intellectually property rights, may be used instead. It is the user's responsibility to evaluate and verify the operation of any non-IBM product, program or service.

THE INFORMATION PROVIDED IN THIS DOCUMENT IS DISTRIBUTED "AS IS" WITHOUT ANY WARRANTY, EITHER EXPRESS OR IMPLIED. IBM EXPRESSLY DISCLAIMS ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT. IBM shall have no responsibility to update this information. IBM products are warranted according to the terms and conditions of the agreements (e.g., IBM Customer Agreement, Statement of Limited Warranty, International Program License Agreement, etc.) under which they are provided. IBM is not responsible for the performance or interoperability of any non-IBM products discussed herein.
Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not necessarily tested those products in connection with this publication and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

The provision of the information contained herein is not intended to, and does not, grant any right or license under any IBM patents or copyrights. Inquiries regarding patent or copyright licenses should be made, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.
Trademarks

The following are trademarks of the International Business Machines Corporation in the United States and/or other countries.

<table>
<thead>
<tr>
<th>Product Name</th>
<th>IBM Product</th>
<th>IBM Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>BookManager*</td>
<td>Enterprise Storage Server*</td>
<td></td>
</tr>
<tr>
<td>CICS*</td>
<td>ES/9000*</td>
<td>IP PrintWay</td>
</tr>
<tr>
<td>DB2*</td>
<td>FlashCopy*</td>
<td>Language Environment*</td>
</tr>
<tr>
<td>DB2 Universal Database</td>
<td>GDPS*</td>
<td>Lotus*</td>
</tr>
<tr>
<td>developerWorks*</td>
<td>HiperSockets</td>
<td>Multiprise*</td>
</tr>
<tr>
<td>DFSMSdfp</td>
<td>IBM eServer</td>
<td>MVS</td>
</tr>
<tr>
<td>DFSMSdss</td>
<td>IBM e(logo)server*</td>
<td>Notes*</td>
</tr>
<tr>
<td>DFSMSshm</td>
<td>IBM logo*</td>
<td>OS/390*</td>
</tr>
<tr>
<td>DFSMSrmm</td>
<td>IMS</td>
<td>Parallel Sysplex*</td>
</tr>
<tr>
<td>DFSORT</td>
<td>InfoPrint*</td>
<td>RACF*</td>
</tr>
<tr>
<td>Domino</td>
<td></td>
<td>RAMAC*</td>
</tr>
</tbody>
</table>

Intel is a trademark of the Intel Corporation in the United States and other countries.
Java and all Java-related trademarks and logos are trademarks or registered trademarks of Sun Microsystems, Inc., in the United States and other countries.
Microsoft, Windows and Windows NT are registered trademarks of Microsoft Corporation.
UNIX is a registered trademark of The Open Group in the United States and other countries.

* All other products may be trademarks or registered trademarks of their respective companies.

Notes:
Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.

All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.

This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.

Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

This presentation and the claims outlined in it were reviewed for compliance with US law. Adaptations of these claims for use in other geographies must be reviewed by the local country counsel for compliance with local laws.
Agenda

▪ **What’s New in System Data Mover**
  • Functions available in z/OS V1R12
  • Preview of New Functions in z/OS V1R13
  • New Function APARs

▪ **What’s New in DFSMSdss**
  • Functions available in z/OS V1R12
  • New Function APARs
  • Preview of New Functions in z/OS V1R13
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 ANTTREEXX

• CALL ANTTREXX ‘FCQUERY’ , ‘INOUT’
  • or
• result=ANTTREXX(?
• 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

- 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
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
  • Please see APAR OA26522 for more details
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
• CC Parm Lib Support for member ANTMIN00
  • CCREADAHEAD(3-64)
    • Allows SDM to read updated track data from the controller cache at an installation determined maximum rate
    • Value controls the number of additional buffers obtained at the host for the read I/O for each CC session
    • Example: if the CCREADAHEAD value is set to 32, SDM will obtain 32 additional data buffers from Auxiliary Storage (32*64k=2MB) and back these in fixed storage during the I/O
  • CCATTNTHROTTLE(YES|NO)
    • Aids in tuning the system to operate more efficiently during periods of high application updates
    • YES: Throttles parallel attention behavior to a maximum of two parallel processes per controller session
    • NO: Does not restrict parallel attention
    • Both can be set via MODIFY ANTMAIN command
Preview for SDM in z/OS V1R13

• XRC TIMESTAMP Suppression
  • Continuation of OA24780
    • Added the ability to suppress channel program timestamping on XRC data mover systems
    • APAR enabled zapping or patching a bit in a SYS1.NUCLEUS
  • Line item adds an ANTXIN00 PARMLIB parameter, SuppressTimestamp(NO|YES), default is NO
  • The recommended use of this parameter is:
    • SuppressTimestamp(NO) on application systems with a common time reference
    • SuppressTimestamp(YES) on remote systems processing XRC, GDPS control systems (K-systems) and z/OS systems that have access to XRC primary volumes and do not share a common time reference with production systems.

• Do not use SuppressTimestamp(YES) on application systems,
  • Would defeat the data consistency mechanism of XRC
Preview for SDM in z/OS V1R13

- PPRC CQUERY LINKINFO
  - New option to query PPRC linkage
  - Linkage info displays subchannel set, node name, and ID’s of primary and secondary linkage adapters
New Function APARs for SDM

• OA33715: zIIPEnable Parmlib option to ANTXIN00
  • Addresses problem where not all XRC work was being offloaded to zIIIP
  • zIIPEnable = YES|FULL: ANTAS000, ANTAS0nn, and ANTCL0nn address spaces are enabled for running on zIIIP
  • zIIPEnable = NO: ANTAS000, ANTAS0nn, and ANTCL0nn address spaces are enabled for running on zIIIP
New Function APARs for SDM

- OA32141: Zero Suspend FlashCopy Enhancement
  - Background: Ability to FlashCopy XRC secondary to make a tertiary copy
    - Prior to this a SUSPEND and resync was needed to Flash secondary's
    - Flash can be established as background copy or nocopy
  - New option to request FlashCopy be established as incremental
    - Reduces background copy time
New Function APARs for SDM

• OA32141: DS8000 Resource Groups (available in R6.1)
  • Ability to administratively specify policy-based limitations which volumes can participate in copy services relationships with other volumes
  • Prevents a user from accidentally targeting a volume in a copy services relationship that was not supposed to be overwritten by a user or application
  • Applies to FlashCopy, Metro Mirror, and Global Mirror
  • DS/CLI must be used to configure Resource Group
    • Volumes and LSS are associated with a single resource group
    • APAR includes message support when failures occur due to violation
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
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
      - Elapsed time improvement up to 36% (~20-30%)
    - 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 BLKSIZE Lim on Dump data set DD statement
  - supports values between 65520 and 2GB
  - values 32760 through 65519 are treated as if BLKSIZE Lim 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
  - 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
    - Can COPYDUMP to nonEF data set so it can be used prior to V1R12
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
Stop updates to the A volume

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

Once the background copy B>A is complete, Flash A back to B
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
New Function APARs for DSS

- OA33789: New message ADR987I
  - Issued when two specific FlashCopy errors are encountered
  - When target tracks are currently in a source FlashCopy relationship
  - When target tracks are currently involved in an existing copy services relationship
    - CC, Metro Mirror, Global Mirror, zOS Global Mirror (XRC)
  - Only applies to logical copy
New Function APARs for DSS

- 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 &ACSENVVR2 = '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
Preview for DFSMSdss in z/OS V1R13

- 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
Preview for DFSMSdss in 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
Preview for DFSMSdss in z/OS V1R13

- 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 may be added together to get combinations of messages
    - For example: Timestamps on warning and error messages set the value to X'60'
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 Server User’s Guide
Summary

• DFSMS SDM What’s New
• DFSMSdss What’s New
• Questions?