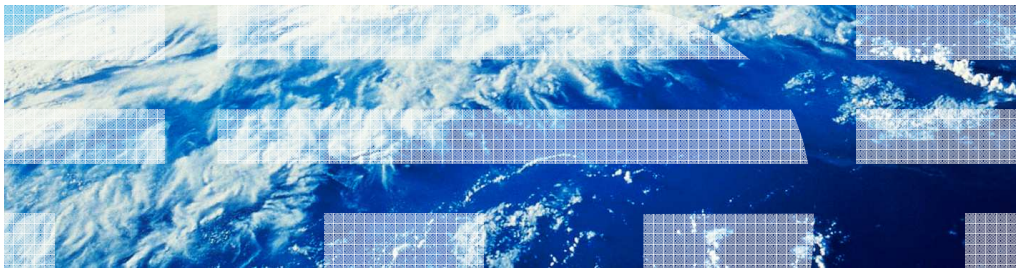
z/OS V1R13

DFSMSoam: Continued zGrowth - Archiving / filesystem support



Systems and servers

Overview (1 of 2)

- Problem Statement / Need Addressed
  - Provide an additional “Disk” destination in OAM storage hierarchy Note: Existing hierarchy can consist of Disk (implemented via DB2 tables on DASD), Optical, and Tape
  - Customer requirements addressed:
    - MR00045125_1: Transition from fast DASD to slower DASD
    - MR0426056115: Additional storage hierarchy targets such as slow DASD
    - MR081402473: Provide non-DB2 disk storage in OAM storage hierarchy
    - MR0427075256: Native DASD support in OAM
    - IBM internal requirements for archiving solutions on z/OS and support of file serving storage products

Overview (2 of 2)

- Solution
  - New OAM storage hierarchy file system destination for primary objects stored as files in z/OS UNIX file system hierarchy
    - zFS (on native attached DASD)
    - NFS (wide variety of storage options and technologies on network attached NFS file servers)
  - Disk Level now comprised of
    - Disk sublevel 1 (existing DB2 sublevel using DB2 tables)
    - Disk sublevel 2 (new file system sublevel using zFS or NFS)
- Benefit / Value
  - Additional flexibility in constructing OAM storage hierarchy
  - Reuse older/slower DASD devices for zFS file system storage
  - May reduce storage costs with NFS file servers
  - Can use file system as “cache” in OAM with 'Recall to Disk' functionality

Usage and invocation (1 of 8)

- ISMF Storage Class
  - OAM Sublevel value of 2 when Initial Access Response Seconds=0 directs objects to new file system sublevel of OAM storage hierarchy

Usage and invocation (2 of 8)

- PARMLIB
  - New SETDISK statement in CBROAMxx to configure file system
    - Specify file system type (zFS or NFS)
    - Specify file system directory location within z/OS UNIX file system hierarchy where file system is mounted
  - New configuration for existing SETOPT statement in CBROAMxx
    - Specify 'Automatic Access to Backup' for file system errors
  - New configuration for existing SETOSMC statement in CBROAMxx
    - Specify disk sublevel for 'Recall to Disk'
      - 1 – existing DB2 sublevel
      - 2 – new file system sublevel

Usage and invocation (3 of 8)

- DB2
  - Existing ODINSTID field in OAM Object Directory now may contain value to identify unique instances of OAM files in file system sublevel
  - Existing ODLOCFL field in OAM Object Directory now may contain new values
    - 'E' when object located in new file system sublevel
    - '2' when object recalled to new file system sublevel
  - New File System Delete Table to identify objects to be deleted from the file system:
    - Deferred delete for “delete” requests from file system
    - Undo write for uncommitted “store” requests to file system

Usage and invocation (4 of 8)

- OSREQ Application Programming
  - New stated requirement that OSREQ application must perform a DB2 “commit” within 24 hours of storing object in file system sublevel
  - New OSREQ QUERY output value for “Retrieval Response Time” for file system sublevel
  - New OSREQ return/reason code combinations for file system errors

Usage and invocation (5 of 8)

- OSMC (OAM Storage Management Component) Functions and Utilities

OSMC Function / Utility	Changes
Storage Management Cycle	Can now transition primary objects to/from new file system sublevel; backups and expiration for primary objects in new file system sublevel
Volume Recovery	Recovery of a backup volume now can include use of primary objects in new file system sublevel
Single Object Recovery	Can restore a single object in new file system sublevel
Recall to Disk	Can temporarily recall a primary object to new file system sublevel (in addition to DB2 sublevel)
Immediate Backup	Can now create an "immediate" backup for a primary object in new file system sublevel following an OSREQ store

Usage and invocation (6 of 8)

- Operator Commands / Displays

Operator Command	New	Changed Syntax	Changed Results / Display
F OAM,START,AB... F OAM,STOP,AB...	N	Y	'Automatic Access to Backup' can be started or stopped for file system errors
F OAM,UPDATE,SETOSMC...	N	Y	'Recall to Disk' can be configured to recall objects to DB2 or file system
F OAM,START,DIAGMSGS,OSREQFS... F OAM,STOP,DIAGMSGS,OSREQFS...	Y	-	Diagnostic messages for OSREQ initiated file system requests can be started or stopped
F OAM,DISPLAY,OAM...	N	N	Displays 'Automatic Access to Backup' status for file system errors
F OAM,DISPLAY,SETOPT...	N	N	Displays configuration from SETOPT statement for 'Automatic Access to Backup' for file system errors
F OAM,DISPLAY,SETOSMC...	N	N	Displays configuration from SETOSMC statement for 'Recall to Disk' (recall to DB2 sublevel or file system sublevel)
F OAM,DISPLAY,SETDISK...	Y	-	Displays configuration from new SETDISK statement for file system
F OAM,DISPLAY,OSMC,TASK...	N	N	Displays work item status for OSMC services including new read from file system service and new write to file system service
F OAM,DISPLAY,STORGRP...	N	N	Displays storage group information including file system sublevel configuration
F OAM,QUERY...	N	N	Displays summary and detail information about active and waiting requests including new file system read and write requests

Usage and invocation (7 of 8)

- SMF – Existing OAM SMF Record Type 85 (x'55') Changes:
  - Existing subtypes 2,3,6,10 will indicate when OSREQ activity involves the new file system sublevel
  - Existing subtypes 32,33,34,35 will indicate when OSMC storage management activity involves the new file system sublevel
  - Existing subtype 36 will indicate when OSMC Single Object Recovery is to the new file system sublevel
  - Existing subtype 38 will indicate when OSMC Recall to Disk is to the new file system sublevel
  - Existing subtype 39 will indicate when OSMC Immediate Backup is for a primary object in the new file system sublevel
  - New subtypes 90,91,92,93 to report on new LCS (library control system) file system write, read, and delete activity

Usage and invocation (8 of 8)

- OAMPLEX / SYSPLEX with file system sublevel requires:
  - SCDS storage group definitions set to ENABLE for all systems in OAMPLEX
  - SETDISK statements in CBROAMxx member of PARMLIB identical for all systems in OAMPLEX
  - File systems identified in SETDISK statements must be a z/OS UNIX “shared file system” available to all systems in OAMPLEX

Interactions and dependencies

- Software Dependencies
  - none
- Hardware Dependencies
  - none
- Exploiters
  - none

Migration and coexistence considerations

- Migration
  - CBRSMR1D sample migration job to add the new DB2 File System Delete Table
  - Modify and run installation tailored CBRPBIND, CBRIBIND, CBRABIND, CBRHBIND, and any application BINDs
- Coexistence
  - PTF for V1R13 coexistence APAR OA33022 must be installed on any pre-V1R13 level systems prior to starting OAM the first time on V1R13
  - Note: OAM on pre-V1R13 level systems will not process objects in the file system sublevel

Installation

- If implementing OAM file system sublevel:
  - Security Server (RACF) definition of user (uid) and group (gid) to be associated with OAM address space
  - For each OAM object storage group:
  - File system created (zFS aggregate or NFS server definition)
  - Create new mount point directory in Unix file system hierarchy
  - Mount file system at mount point directory and for directory:
    - Change owner/group to uid/gid for OAM address space
    - Change permissions to '700' (rwx - only OAM address space)
  - Create OAM “sentinel” file in file system at mount point and for file:
    - Change owner/group to uid/gid for OAM address space
    - Change permissions to '600' (rw - only OAM address space)
  - Add SETDISK statement to CBROAMxx
  - Create/update SMS storage class, ACS routines, activate SCDS

Session summary

- New OAM file system sublevel
  - zFS or NFS
  - Fully integrated into OAM
    - PARMLIB statements in CBROAMxx
    - OSREQ Store, Retrieve, Delete, Query
    - OSMC Functions and Utilities
    - Operator commands, SMF records, etc.
  - DB2
    - DB2 Object Directory changes (meta-data)
    - New DB2 File System Delete Table and deferred delete processing

Appendix - References

- *z/OS DFSMS Object Access Method (OAM) Planning, Installation, and Storage Administration Guide for Object Support,* SC35-0426
- *z/OS Object Access Method (OAM) Application Programmer's Reference,* SC35-0425
- *z/OS DFSMS Introduction,* SC26-7397
- *z/OS DFSMS Using the New Functions,* SC26-7473
- *z/OS DFSMSdfp Diagnosis,* GY27-7618
- *z/OS DFSMSdfp Storage Administration,* SC26-7402
- *z/OS Introduction and Release Guide,* GA22-7502
- *z/OS Planning for Installation,* GA22-7504
- *z/OS Migration,* GA22-7499
- *z/OS MVS System Messages Vol 4 (CBD-DMO),* SA22-7634

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