


Bit Bucket x'3E'

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(and others...)



SHARE
Virtual Experience
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UNIX Back-Up Catch-Up (Ed Jaffe)

z/OS UNIX Backup Current Status

- We were early adopters of HSM z/OS UNIX file backup support
- I reported much difficulty attempting to use this support in my z/OS 2.4 User Experience presentation at SHARE two years ago
- There have been many APARs taken since that time and IMHO we are finally starting to see the light at the end of the tunnel
- Two APARs are must-haves before I can recommend its use:
 - OA61080 - Slow z/OS UNIX backup performance (OPEN, no PTFs yet)
 - OA61711 - HRECOVERed files are corrupt (HIPER - PTFs Available)
 - Get current with everything else HSM related! (Lotsa OC4s & such)
- I also recommend splitting your existing HSM into CLASSIC Mode and FILE Mode HSMs (FILE Mode HSM handles z/OS UNIX only)
 - Won't impact your existing HSM workload
 - Each mode has unique MCDS, BCDS, OCDS & JRNL



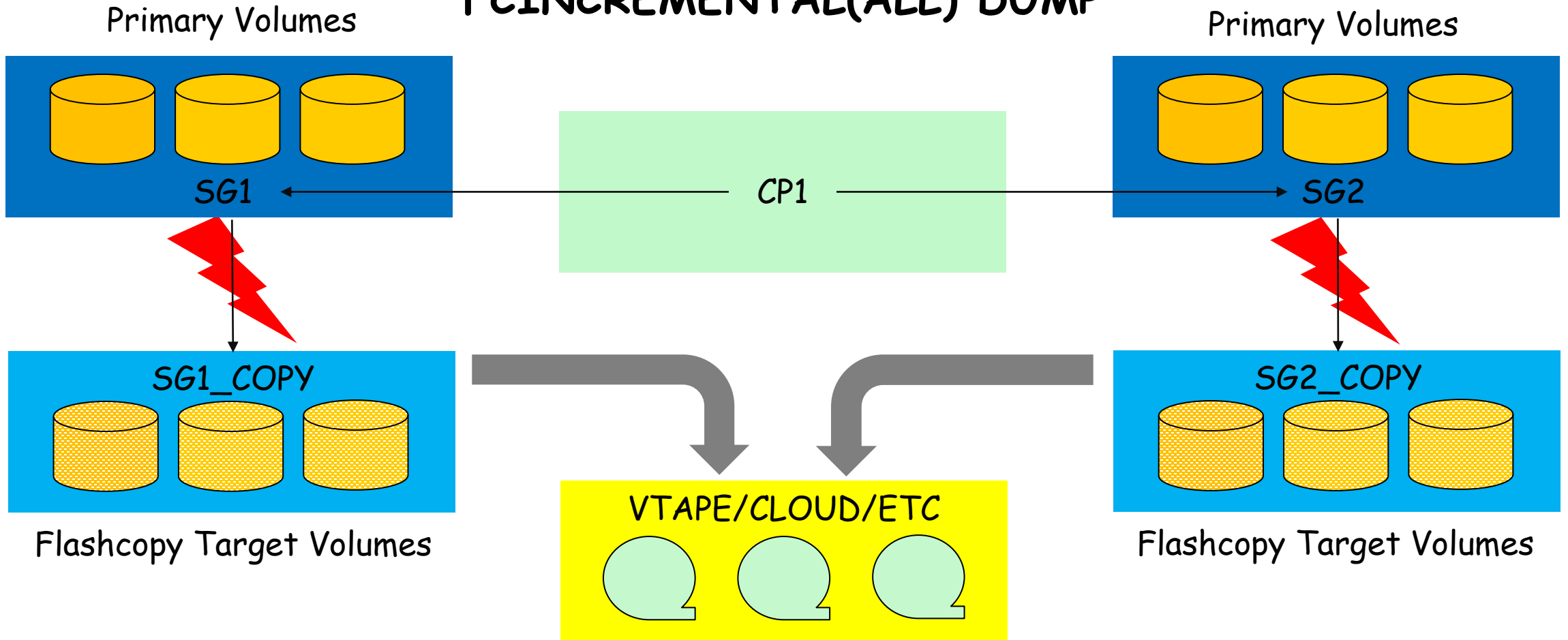
Done in a Flash
(Ed Jaffe)

Fast-Replicating HSM Full Volume Dumps For Non-SMS Volumes

- For the past several years, HSM development has been steadily adding and improving support for fast replication full-volume dump of SMS-managed volumes
- This support relies upon SMS constructs (storage groups, copy pools, and copy pool storage groups) as well as a suite of "FR" commands (FRBACKUP, FRDELETE, FRRECOV)
- No similar support exists for Non-SMS managed volumes
 - However, there is concurrent copy support e.g.,
SETSYS VOLUMEDUMP(ANYPREFERRED)
- We wanted a fast-replication solution for our Non-SMS managed z/OS volumes that was still (mostly) under HSM control so we have reporting, automatic dump volume expiration, command-based volume restore, etc.

FRBACKUP (SMS Volume) Overview

FRBACKUP CP(CP1) EXECUTE
FCINCREMENTAL(ALL) DUMP



We transfer the data through
IBM Z to Optica zVT virtual tape

What We Did To Simulate This for Non-SMS Volumes

- We defined Flashcopy target volumes (one for each source volume)
 - Descriptive volume names were chosen to make them easy to recognize on an HSM report since HSM has no awareness of this relationship
- We added the Flashcopy target volumes to HSM as primary volumes eligible for automatic dump and no other management activities
- We created DSS JCL (started via Brian Westerman's AUTO), that runs a few moments before HSM automatic dump executes
- This JCL initiates incremental Flashcopy operations as needed
 - We specify DUMPCOND(itioning) on the COPY commands to ensure no CLIP (i.e., DSF REFORMAT) needed if volume must be restored

PARALLEL

```
COPY ALLD (*) ALLX ADMIN IDY(A4RES1) ODY(#A4RS1) PRG FCINCR DUMPCOND
```

```
COPY ALLD (*) ALLX ADMIN IDY(A4RES2) ODY(#A4RS2) PRG FCINCR DUMPCOND
```

```
COPY ALLD (*) ALLX ADMIN IDY(A4SYS1) ODY(#A4SYS) PRG FCINCR DUMPCOND
```

... etc.

Restoring z/OS Volumes Dumped Using This Process

- If the volume can be restored with the system up, use the standard HSM RECOVER command with TOVOLUME(flashcopyvolser) and TARGETVOLUME(originalvolser)
 - E.g., TOVOLUME(#A4RS1) TARGETVOLUME(A4RES1)
- If you must use DSS JCL to restore the volume, specifying COPYVOLID will restore the *source* volser and not the Flashcopy target volser

```
//INPUT DD DSN=DFHSM.DMP.dumpclass.V#A4RS1.Dyyddd.Thhmmss ,  
...  
... (etc)  
...  
//SYSIN DD *  
  RESTORE FULL INDDNAME (INPUT) OUTDYNAM(MYVOL) ADMIN PURGE CPYV  
//
```

 This will be volume A4RES1 after restore

Dealing With z/VSE and Linux for Z Volumes

- z/VSE and Linux for Z volumes are handled similarly
- Neither have indexed VTOCs, so you cannot use DUMPCOND
PARALLEL
COPY ALLD(*) ALLX ADMIN IDY(DOS620) ODY(#OS620) PRG FCINCR
COPY ALLD(*) ALLX ADMIN IDY(LNX400) ODY(#NX400) PRG FCINCR
... etc.
- Expect a warning for the z/VSE volumes (no Format-5 Label)
0ADR310W (022)-DDTFP(01), ERROR FOUND IN VTOC. UNALLOCATED SPACE WILL BE
PROCESSED FOR VOLUME DOS620
- Backup is performed using the HSM BACKVOL command
BACKVOL DUMP(DUMPCCLASS(dclass1)) UNIT(3390) -
VOLUMES(#OS620 #NX400 etc...)
- CLIP required after HSM RECOVER command (due to implied CPYV)
- No CLIP required after DSS JCL RESTORE if OUTDYNAM
references the correct volser and COPYVOLID not specified

Dealing With z/VM Volumes

- Many z/VM volumes have no VTOC so we copy them by TRACKS

```
COPY TRKS(0,0,10016,14) ADMIN CPVOL IDY(710RES) ODY(#710RS) PRG FCINCR  
COPY TRKS(0,0,10016,14) ADMIN CPVOL IDY(710COM) ODY(#710CM) PRG FCINCR
```

- We dump them up to large, zEDC-compressed, SMS-managed DASD data sets and immediately MIGRATE them using an HSM command

```
DUMP TRKS(0,0,10016,14) IDY(#710RS) ODD(DASD) ADMIN CPVOL OPT(4) ZCOMP(PREF)  
...  
HSEND WAIT MIGRATE DSN(&DSPFX..VMFVD.D&DATEQ..V&V) ML2
```

- We explicitly re-MIGRATE the DASD backup after a DSS restore

```
RESTORE TRKS(0,0,10016,14) IDD(DASD) ODY(&VOLSER.) PRG ADMIN CPVOL  
...  
HSEND WAIT MIGRATE DSN(&DSPFX..VMFVD.D&DATEQ..V&V) ML2
```

Summary

- It is possible to use HSM to manage fast-replication full volume dumps of Non-SMS managed z/OS volumes
- You need your own job to initiate the Flashcopy each day
- The only “strangeness” is the appearance of the Flashcopy target volume names in reports and in RECOVER/RESTORE commands
- Extend this concept to cover z/VSE and Linux for Z volumes
- z/VM volumes are strange “beasts,” but still managed easily
- Bottom Line: You can obtain fast-replication point-in-time FVDs of your entire mainframe “world” from z/OS using HSM (and probably its ISV competitor products as well)

Acknowledgements Knowing and Unknowing

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