IBM Education Assistance z/OS V2R3

Migrate HFS to zFS non-disruptively

Element/Component: USS

Agenda

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Trademarks

- See url http://www.ibm.com/legal/copytrade.shtml for a list of trademarks.
- Additional Trademarks:
  - None.

Session Objectives

- Learn about online migration from HFS to zFS
- Understand the use of the migration command, bpxwmigf
- Understand steps that need to be taken before and after the migration
- Get some insight as to how the migration functions

Overview

- Problem Statement / Need Addressed
  - HFS has been stabilized for quite some time. Support for HFS will end in the not too distant future. It is therefore necessary for data residing in HFS file systems to migrate to zFS file systems. Tools such as BPXWH2Z have been provided, however, file system must effectively be taken offline to perform the migration. This approach has not been acceptable for data for some critical applications.
- Solution
  - An online migration facility is provided to replicate and replace an HFS file system with a zFS file system, while mounted and in use.
- Benefit / Value
  - Use of this facility obviates the need to take application or system outages to migrate data off of HFS

Usage & Invocation

- The command to initiate, modify, and monitor migration is BPXWMIGF
- BPXWMIGF is available from TSO, the UNIX shell, and console (SYSREXX)
- Migration occurs in two phases
- Data is mirrored and the active mirror is maintained until swap
  - Applications continue to run and are unaffected during this phase
- The zFS file system is swapped in replacing the HFS
  - Access to the file system is briefly quiesced during the swap
- These phases can be scheduled independently
- Migration must be initiated from the HFS owning system
- BPXWMIGF can either initiate the migration and end or wait for completion
- BPXWMIGF has three basic functions
  - Initiate and modify migrations (requires superuser or BPX.SUPERUSER)
  - Query migrations
  - Cancel migrations (requires superuser or BPX.SUPERUSER)

Usage & Invocation

- Initiate and modify migrations
  - -source <source HFS> names the mounted file system to migrate or migration to modify
  - -target <target zFS> names the pre-allocated zFS file system to replace the HFS
    - Migration is initiated when both source and target are specified
    - If target not specified, migration parameters are modified
  - -mode <rw|ro|asis> sets the mode for the zFS after the swap
  - -parm <zFS parms> | -noparm sets the zFS file system parms after the swap
  - -swap | -noswap initiate or do not initiate swap when mirroring is complete
  - -srename <new HFS name> | -nosrename after swap rename the HFS to <new HFS name>
  - -trename [<new zFS name>]| -notrename after swap rename the zFS to the HFS name or specified name
  - -wait <minutes> wait up to specified number of minutes for completion
  - -status <minutes> print status at specified interval while waiting
  - -priority <1-9> priority (default 2). A higher number slows the migration and decreases performance impact to applications using the file system during migration.

Usage & Invocation

- Query migrations
  - -query [<source HFS>] queries migration for the specified file system or all migrating file systems
    .
- Cancel migration
  - -cancel <source HFS> cancels migration for specified file system prior to swap

- Console usage
  - Logon the console with a userid that has an OMVS segment
  - Need superuser or BPX.SUPERUSER to start, modify, or cancel a migration
  - Probably most useful for query and cancel
  - Runs as a SYSREXX command
  - Ex: if sysrexx prefix is / /bpxwmigf -query

Usage & Invocation

- Examples
  - Start a migration
    - bpxwmigf -source omvs.wjs.hfs -target omvs.wjs.temp -srename omvs.wjs.old -trename omvs.wjs.zfs
  - Check migration status
    - bpxwmigf -query
  - After mirroring complete, update mount statements and do the swap
    - bpxwmigf -source omvs.wjs.hfs -swap
- Note: you might want to use a temp name for the new zFS just to make sure it does not accidentally get mounted if the migration does not complete

Usage & Invocation

- Before starting migration
  - All systems in the OMVS sharing group must be 2.3
  - Review mount statements or policies for mounting a file system to be migrated
  - HFS file system must be mounted
  - zFS file system must be allocated and formatted
    - Ensure file system is properly sized
    - Do not mount the file system
- After migration
  - Ensure mount statements or policies will mount the zFS file system

Usage & Invocation

- Migration processing
  - bpxwmigf initiates the migration but does not do the work
  - Tasks inside of the OMVS address space process directories and files in the HFS, copying the objects to the zFS
  - All attributes except access time are replicated
  - File FIDs and the devno are preserved
  - System calls that result in updates to the HFS are replicated on the zFS under the same serialization when that update impacts something already mirrored
  - Any errors occurring during migration cancels the migration
  - Unmounting or moving ownership of the HFS cancels migration

Migration & Coexistence Considerations

- Toleration/coexistence APARs/PTFs
  - None
- Coexistence
  - Function can only be used if all systems in the OMVS sharing group are at 2.3
  - No coexistence is accommodated for down-level systems

Session Summary

- HFS file systems can be migrated to zFS file systems while in use
- If configured sysplex(yes) all systems must be at V2.3
- Migration is initiated and monitored using the bpxwmigf utility
- Be very careful about managing mount statements or policies to ensure the old file system does not get mounted and used after a successful migration

Appendix

- Publication references:
  - z/OS UNIX System Services Planning
  - z/OS UNIX System Services Command Reference
  - z/OS Distributed File Service zFS Administration
  - z/OS MVS System Messages, Vol 3 (ASB-BPX)
  - z/OS UNIX System Services Messages and Codes