What's new in FSFC and FSR 4.5 ?

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ibm.com/systems/services/labservices
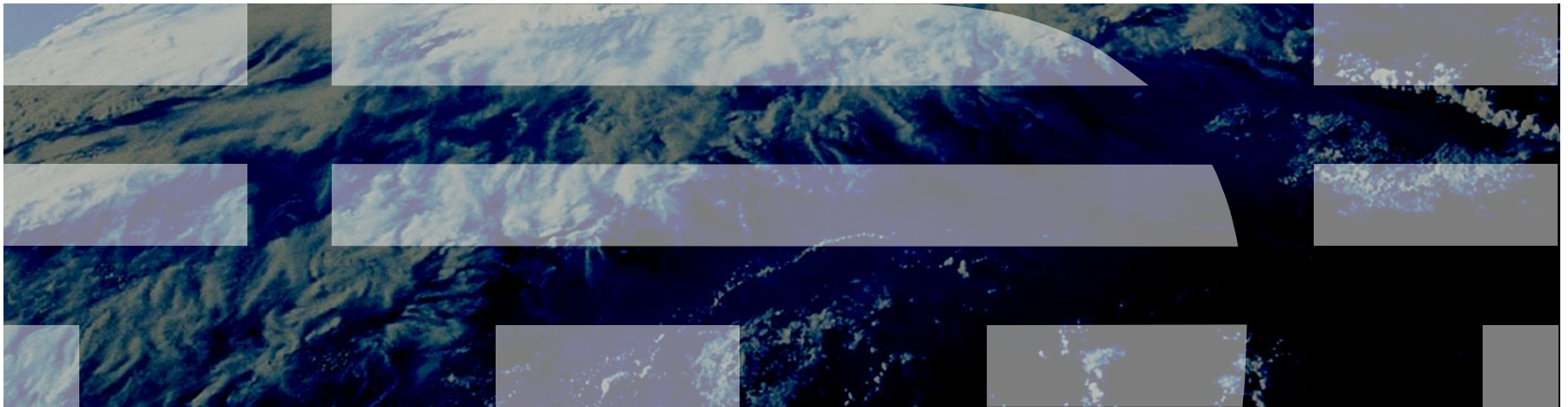
Current status of FSFC/FSR 4.5

- o Code is done

- o Testing is done

- o Documentation:
    - o In Box: https://ibm.box.com/s/synyx03by72l32du1tck04q7snuqkc03
        - o Quicksetup guides are ready
        - o User/Installation guides are ready
    - o Webpages are prepared and ready to to go
        - o Will be published next week

- o Toolkit is ready for installation

Releases

- Toolkit is built at IBM i 7.2, restorable on 7.3 and 7.4

- IBM i 7.1 is not supported

- FSFC and FSR 4.4 were created to support DS8K Safeguarded Copies which included:
  - More WRKCSE environments (thousands)
    - CSM support for Full System Flashcopy
    - FSFC Physical-Virtual Isolation
      - Production LPAR was isolated from controller and target
    - Save, restore and migration of DDD data
      - WRKCSE
      - WRKCSEDTA
      - WRKCSECRDL

- Those features are also in 4.5+

- We have pushed all the lower priority new features to 4.6
  - This document only covers what we added to 4.4 and 4.5

Credentials (WRKCSECRDL)

New column: Role

*USER
  The user ID is used for normal operations for storage and servers other than CSM,
   i.e. Storewise, DS8K, HMC

*CSM
  For CSM environments, the user ID used in CSM requests. If dual control is enabled in
  the CSM server, this user ID is used to initiate requests. This was necessary to allow
  multiple userid's on the same IP address

*CSMAUT
  For CSM environments with dual control enabled, this is user ID
  used to approve any pending actions initiated by the *CSM user ID.

Full System LUN Switch – DS8K Only

A Full System LUN Switch is like an FSR switch except that we change the host connections to IPL a different LPAR from the same LUNs.
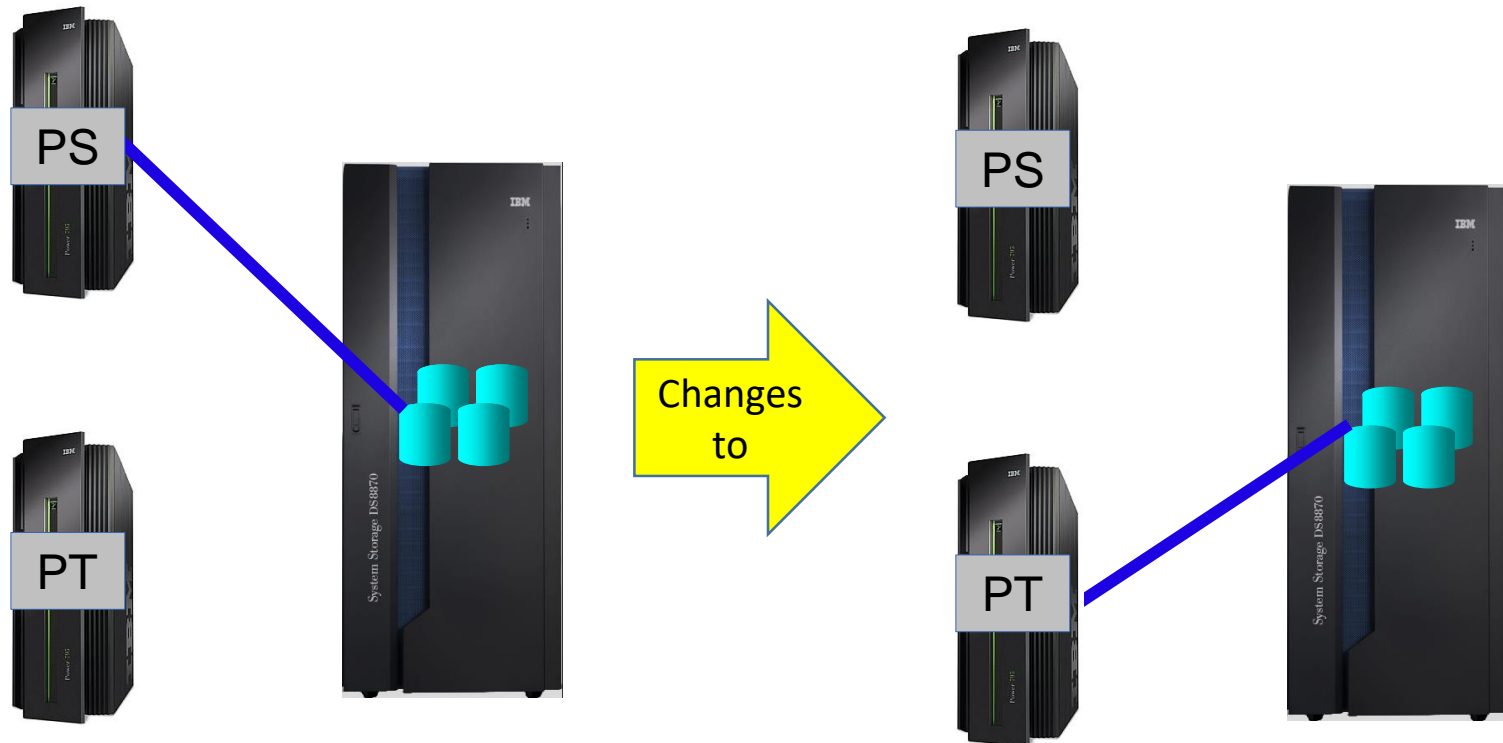
Full System LUN Switch Process

A Full System LUN Switch will:

○ Shut down the preferred source LPAR

○ Change the host connections to attach LUNs to a different LPAR

○ IPL the preferred target LPAR

To set this up:

○ In WRKCSE create an environment for FS LUNS Swap:

```
                              Add an Environment

Enter Copy Services and ASP information

Environment name . . . . :    TESTLS
Copy Service Type  . . . :    LUN

Primary ASP  . . . . . . .    *SYSTEM                  33 - 255, *SYSTEM
```

○ Opt 16 to specify the Production and HA Node host mappings:

```
                              Work with Host Connections
Environment   . :     FSLUN
Type . . . . . :      LUN
Device . . . . :      IBM.2107-75HH571

Type option, press Enter.
  1=Add    2=Change    4=Remove    6=Work with volumes

          Production Node       HA Node                     Volume
  Opt     Host Name             Host Name                   Count
  _       ctchafs1              ha8fsfc2                        6
```
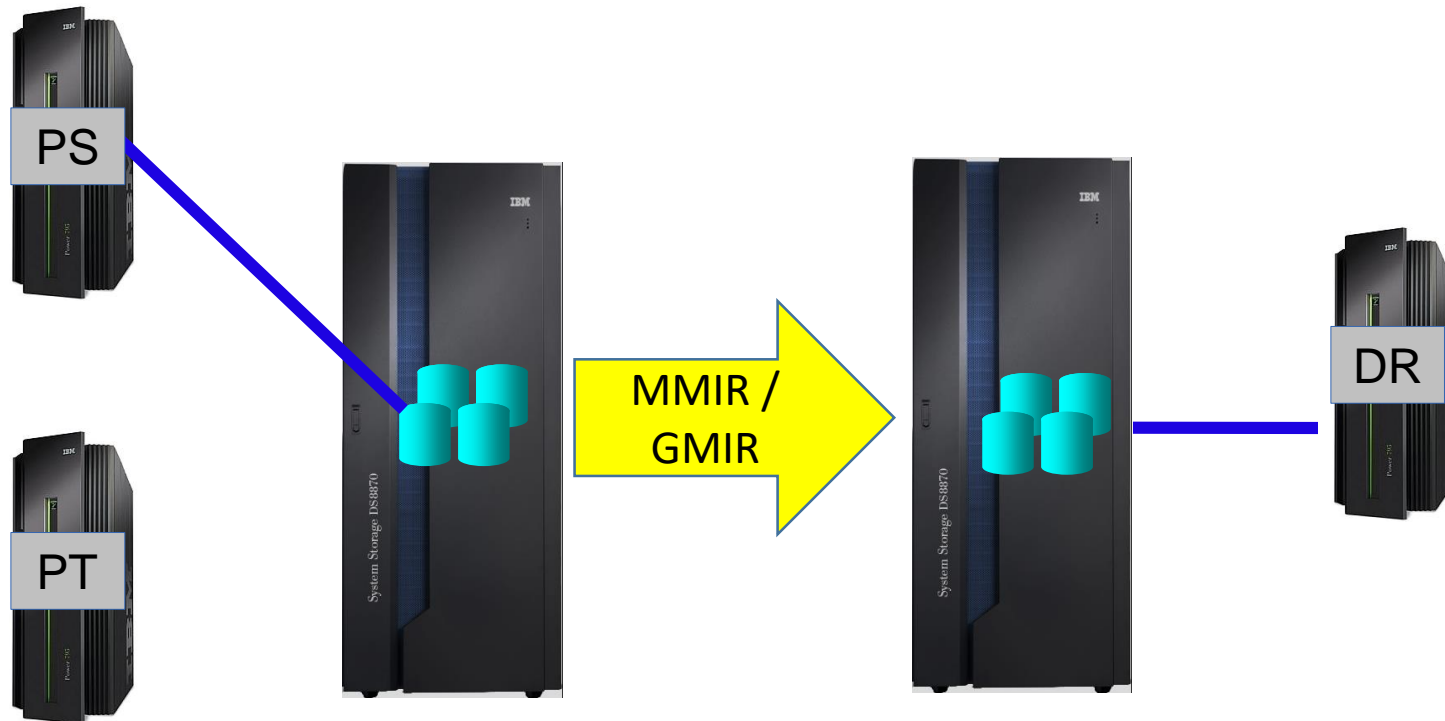
○ Then create a FSR CSEDTA, specifying the LUN swap environment.

○ Use CHKCSE and SWCSE to check and do the switch.

What about 3-LPAR Full System LUN Switch + Replication ?

The LUN Switch could be combined with FSR for a 3-LPAR solution … but it isn't pretty. This will be better addressed in a future release

Save and restore DDD

Our toolkit places data in the device data domain and syncs that with an optional second controller. Even a full system backup does not save the DDD; PowerHA's reasoning is that it is protected by being in a cluster. However, most FSFC customers only have one controller, which means all of their DDD is lost if they have to do a bare metal restore.

So we created SAVDDD and RSTDDD, and brought them back to version 4.3.

To use SAVDDD:

o Create an IFS directory
  o Timestamps are good!
    o mkdir '/tmp/20190827_phat_ddd'

o Call SAVDDD specifying that directory
  o SAVDDD PATH('/tmp/20190827_phat_ddd')

o Stuff is saved into that directory, and that directory can then be saved to tape

Use RSTDDD to restore the DDD from that directory

o RSTDDD PATH('/tmp/20190827_phat_ddd')
  o Will overwrite existing WRKCSE/WRKCSEDTA and add new ones

This is still rudimentary, we will put effort into future improvements (autogenerate timestamps etc). For now, we recommend customers add this to a control group exit.

Migrating data on updates

Starting at version 4.5, we now have the ability to migrate the CSE Data from version 4.3 or 4.4.

To do the migration, follow these steps:

○ Prior to restoring the new code, save the DDD on at least one controller (assuming the cluster nodes are consistent) using SAVDDD

○ Restore the new library on all the controllers
  ○ All the cluster nodes must be a the same VRM!

○ Run the program QZRDIAMIGW (no parameters) on any controller

○ Run SETUPFSFC/SETUPFSR/RUNSETUP etc.

It is also possible to split the cluster and only update one node. If that is performed then take care when merging the nodes back into the cluster to the new data is retained.

All of these steps are included on the Wiki.

Alternate Java Home

- o Default JDK will be that which the toolkit is build with

- o Some aspects of the toolkit may need different Java versions, for example when communicating with ssh vs. CSM etc.

- o Environment variables allow an alternate Java Home location be set.
  - o QIBM_CSM_ALT_JAVA_HOME
  - o QIBM_DSCLI_ALT_JAVA_HOME
  - o QIBM_SSH_ALT_JAVA_HOME

New WRKCSEDTA options

o New options on WRKCSEDTA:

```
                         Work with CSE Data

Type options, press Enter.
  1=Create    2=Change    3=Copy    4=Delete    5=Display    6=Print    7=Rename
  8=Check     9=Start     14=View FSFC logs
```

- o 6 = Print
- o 7 = Rename
- o 8 = Check (CHKCSE or CHKFSFLASH)
- o 9 = Start (SWCSE or STRFSFLASH)
  - o Option to submit to batch
- o 14 = Work with logs

```
              Confirm start of Full System FlashCopy

The following command will be run:

    STRFSFLASH CSEDTA(FSFC9J9K)

Type choice, press Enter.
Press F12=Cancel to return and cancel the command.

Run in batch job . .   N       Y=Yes, N=No


F1=Help   F12=Cancel
```

```
Opt    Object link                Type
 _     .                          DIR
 _     ..                         DIR
 _     ctl.log                    STMF
 _     src.log                    STMF
 _     trg.log                    STMF
 _     2017-06-21_0950_CT  >      STMF
 _     2017-06-21_1104_CT  >      STMF
 _     2017-09-20_1459_CT  >      STMF
 _     2017-09-20_1504_CT  >      STMF
```

CSEDTA API's

○ CRT/CPY/DSP/CHGCSEDTA is an interactive command but we now have API's

○ Documentation in the user's guide

```c
int main(int argc, char *argv[])
{
 _CDTA0100_t fsr;

 char format[8];
 char name[10] = "FSR01     ";
 int bytesAvailable;
 int provided = sizeof(fsr);

 // Retrieve current config data
 QZRDRTVCDT(name, provided,
         &bytesAvailable, format, (void*)&fsr);

 // Set port
 fsr.port = 55921;
 memcpy(fsr.text, "CSEDATA changed", 15);

 // Write the changed data back out
 QZRDWRTCDT(name, "M", "CDTA0100", (void*)&fsr );

 return 0;
}
```

FSFC
Enhancements

Run STRFSFLASH from the source to any controller

Most customers schedule STRFSFLASH from the controller, but if there are multiple controllers they need to duplicate the job scheduler entry and be smart about which one is held vs. active. At version 4.5 we would like to steer customers toward initiating STRFSFLASH from the source (production) LPAR, so that it will use whichever controller is active.

On the production LPAR, use WRKSTRPRSC *CMN to enter the IP addresses for the controllers (only two are allowed):

```
                    Work with Communications Startup Resources

Type options, press Enter.
  1=Add    2=Change    4=Remove

Opt  Usage  IP Interface      Line Desc  Hardware Resource Location      Port
 _   _____  _____
 _   *CTL1  1.2.3.4           N/A        PRIMARY CONTROLLER              *DFT
 _   *CTL2  1.2.3.5           N/A        SECONDARY CONTROLLER            *DFT
```

Run STRFSFLASH from the source to any controller

Schedule the STRFSFLASH on the source LPAR and specify *AUTO for controller IP address:

```
                    Start Full System Flash (STRFSFLASH)

Type choices, press Enter.

CSE Data . . . . . . . . . . .   CSEDTANAME     Name

                        Additional Parameters

Controller IP Address  . . . . . > *AUTO
Port . . . . . . . . . . . . .   55920          Number
```

If the customer has multiple production IP addresses we will have better log messages to indicate which one is used. It is possible to turn off IP checking, future releases will handle this better.

LPM Support, HMC prompting

We added LPM Support. In the CSE Data, specify *SEARCH (upper case!) on the Managed System parameter:

```
Target LPAR Information:
  Primary HMC IP . . . . . . .   9.5.168.29        IPv4 address
  Secondary HMC IP . . . . . .                     IPv4 address
  HMC managed system . . . . .   *SEARCH
  HMC LPAR name  . . . . . . .   ctciha9k
  HMC Profile name . . . . . .   ctciha9k
```

The toolkit will search all the systems managed by the HMC and use the first one it finds with the specified LPAR name.

We also added the ability to **prompt** on HMC details. Enter the IP address and press F6 on the Managed System, LPAR name and Profile name prompts:

```
Select choice, press Enter.
  1=Select Managed System

Opt      Managed system
  _      CTCHA1
  _      CTCHA9
  _      CTCHA4
  _      CTCMOBILE
```

```
Select choice, press Enter.
  1=Select LPAR

Opt      LPAR
         ctciha9i
  _      ctciha9u
  _      ctciha9t
  _      ctciha9s
  _      ctciha9r
  _      ctciha9n
  _      ctciha9e
  _      ctciha9o
```

```
Select choice, press Enter.
  1=Select          Partition
Profile

         Partition
Opt      profile
  _      ctciha9i
  _      ctciha9u
  _      ctciha9t
  _      ctciha9s
  _      ctciha9r
  _      ctciha9n
  _      ctciha9e
```

WRKCSEDTA – Prompt on shutdown and backup command

- ○ WRKCSEDTA opt 1 and 2 now support prompting (F4) on some parameters
  - ○ FSR and FSFC shutdown commands
  - ○ FSFC backup commands

- ○ Caveat: These commands are validated on the controlling LPAR, but during the switch or flashcopy they actually run on the target LPAR. That means, for example, that you can't do <F4> STRBKUBRM <F4> and expect to select control groups from the source LPAR.

```
Power down command . . . . . . .    pwrdwnsys delay(30) restart(*no)


Auto start cluster                  *NO              *YES  *NO
```

```
Target LPAR backup command #1    *NONE


     + for more values  . . .    _
```

Cascading flashcopies on DS8K

DSCLI 8.3 removed the requirement for any checking or removing of flashcopy volumes at the GMIR target. Thus, in the toolkit we removed a number of checks and actions to allow this as part of an unscheduled switch, including:

○ Failing the flash if D-Copy is not found

○ Removing the D-Copy if multi-incremental flash is used

This applies to both FSR and IASP operations.

Also updated toolkit to support ESE D-Copy when scripts are created

DS uses hosts/volumes instead of ports/volgrps

- ○ Applies to FSFC and IASP.

- ○ WRKCSE opt 16 – Note prompting = F4 !

- ○ 4.5 Requires converting DS from ports/volgrps to hosts/volumes

```
                              Work with Host Connections

    Environment   . :    A_9RSG                    Device . .
    Type . . . . . :     FLASH

Type options, press Enter.
  1=Add    2=Change    4=Delete    6=Work with Volumes

                                      Number
    Opt        Host name             Volumes
     _         _____
     _         Stev10                   198

F1=Help    F3=Exit    F4=Prompt    F12=Cancel
```

DS Host Connections

F6 = Import volumes

```
                                            Work
 Environment  .  :     A_9RSG
 Type  .  .  .  .  :    FLASH
.  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
:
:
:
:   Type option, press Enter.
:    1=Select Target Host
:
:   Opt       Host name
:    _        Stev10
:    _        Stev10-b
:    _        Stev10-c
:    _        Stev10-d
:    _        Stev10-e
:    _        Stev31
:    _        Stev32
:
:   F1=Help    F12=Cancel
:
:
:
```

```
                      Change Host Volume List

 Storage device .  .  .  .  .  .  :    IBM.2107-75FPT91
 Target Host name .  .  .  .  .  :    Stev10


 Type choices, press Enter

 Volume ranges:
  0414-0414   0520-0520   0936-09F9   _____   _____
  _____   _____   _____   _____   _____
  _____   _____   _____   _____   _____
  _____   _____   _____   _____   _____
  _____   _____   _____   _____   _____
  _____   _____   _____   _____   _____
  _____   _____   _____   _____   _____
  _____   _____   _____   _____   _____


 F1=Help    F3=Exit    F6=Import volumes    F12=Cancel

 Volume Ids imported successfully...press Enter to accept.
```

Start, stop SVC Flashcopy Mappings

WRKCSE opt 12 on SVC Flashcopy environments:

```
                    Work with FlashCopy Environment

   Environment  . :    FSFC9E4P1
   Status . . . . :    idle_or_copied

Select one of the following:

     1. Start
     2. Stop

    17. Work with SVC FlashCopy Mappings
```

View and change SVC Flashcopy Mappings Copy

WRKCSE opt 12 opt 17:

```
        Mapping        Copy   Copy   Clean   Source          Target
Opt       Id     Inc   rate   %      %       volume          volume
  _        5     N     150    100%   100%    ctciha9e_ls0    ctciha4p1_ls0
  _       34     N     150    100%   100%    ctciha9e_ls2    ctciha4p1_ls2
  _       35     N     150    100%   100%    ctciha9e_ls1    ctciha4p1_ls1
  _       40     N     150    100%   100%    ctciha9e_ls3    ctciha4p1_ls3
  _       41     N     150    100%   100%    ctciha9e_ls4    ctciha4p1_ls4
```

```
          Change SVC FlashCopy Copy and Clean rates

     Id . . . . . . . . :    5
     FC mapping name  . :    fcmap5
     Copy rate . . . . .     150             0 - 150
     Cleaning rate . . .     150             0 - 150

     Appy to all mappings   *NO             *YES, *NO


     F1=Help   F12=Cancel
```

FSFC – Wait for copy to finish before target IPL

o WRKCSEDTA has a new option on parameter "Restart target after Flashcopy" : *COPIED

o Only valid for Storwize

o Flash will occur as normal, but the target LPAR will not IPL until all the flashcopy mappings have reached 100%

o This is for customers who do not want to incur the penalty of reading from the source LUNs

```
Restart target after
  FlashCopy . . . . . . . .    *COPIED          *YES, *NO, *INQ, *FRCINQ,
                                                *PAUSE, *COPIED
```

```
*COPIED
    When the target partition is ready to be started, the toolkit
    will delay until the flashcopy is finished copying and has
    reached 100%. This value is only valid for Storwize operations.
```

FSFC is Hyperswap-aware

o   Only for DS8K

o   Create two environments
  o   One for each storage unit / LUNs

o   Create two LPAR HMC profiles
  o   Each one should have different FC adapters, zoned to each DS
  o   The profiles should be similar or tape and communications resources may not configure correctly.

o   On CRTCSEDTA specify the 'main' environment and then the Hyperswap one

```
Environment  . . . . . . . .    MAIN ENV
Hyperswap environment  . . . .  OTHER ENV
```

o   Also specify the Hyperswap profile

```
HMC Profile name . . . . . .   DfofileName2
HMC HyperSwap Profile name
```

o   CHK/STRFSFLASH will query the source LPAR for Hyperswap status
  o   Will match the environment to the primary DS
  o   If it uses the Hyperswap env, it will also use the Hyperswap LPAR Profile

o   This is NOT compatible with RESTART TARGET(*PAUSE) so don't try to do a RSMFSFLASH after a hyperswap

Warn or Fail if source LPAR is set to IPL to restricted state

o If source LPAR is set to IPL to restricted state backups won't start.

o By default, CHK/STRFSFLASH will only warn about it.

```
> chkfsflash fsfc9j9k
  Acquired lock on LPAR S0905A70D.
  Validating flashcopy consistency group 1
  Validating flashcopy mappings
  Consistency group 1 validated.
  Successfully performed local verifications.
  Performing Full System FlashCopy verifications on CTCIHA9J.
  CTCIHA9J is set to IPL to restricted state.
  Released lock on LPAR S0905A70D.
  Log file used : /QIBM/Qzrdhasm/fsfc/FSFC9J9K/ctl.log
  CHKFSFLASH validation for FSFC9J9K completed successfully.
```

o But to make it fail … on the source LPAR, create system env variable
QZ_FSFC_STRRSTD_FAIL *(don't forget to restart QZRDFSR)*
- If exists, send message to controller to fail.
- If not exists, send message to controller to warn.

```
  CTCIHA9J is set to IPL to restricted state.
  Released lock on LPAR S0905A70D.
  Object copied.
  Log file used : /QIBM/Qzrdhasm/fsfc/FSFC9J9K/ctl.log
  CHKFSFLASH validation for FSFC9J9K failed.
```

BRMS Custom Timestamp for *SYSBAS

○ Flashcopy occurs at 1am, backup occurs at 3am

○ Customers want backups to reflect 1am point in time

○ Turn on in CSE DTA:

```
BRMS information:
  BRMS transfer method . . . .    *ALL              *ALL, *CHGONLY
  BRMS transfer port . . . . .    *DFT              *DFT, 1024-65535
  Encrypt BRMS transfer  . . .    *NO               *YES, *NO
  Custom SYSBAS Timestamp  . .    *NONE             *NONE, *BOTH, *QSYS *IFS
```

○ Choose *QSYS, *IFS, *BOTH or *NONE (most common, default)

○ Will recommend for all new implementations

○ Included in quicksetup guide

○ Requires source LPAR have BRMS Advanced Feature installed and licensed

Monitor BRMS control groups for abnormal end

o Prior to 4.5 we put ENDFSFLASH in the last exit of the BRMS control group, would not get called if control group ended abormally.

o BRMS control groups end one of three ways:
  o Success
    o All exits are processed
  o With error
    o All exits are processed
  o Abnormal
    o No exits processed after failure

o In 4.5 we have a new BRMS function for an exit program that is called on every exit, including abnormal end.
  o This will replace ENDFSFLASH in the last *EXIT (which is still supported)
  o The new exit program name is QZRDHASM/QZBRMSEXIT, format BKUI0100
    o WRKCTLGBRM opt 8 pgdn

```
Type information, press Enter.

Backup item exit program . . . . . . . .   QZBRMSEXIT   Name, *NONE, *BKUPCY
   Exit program library  . . . . . . . .   QZRDHASM     Name
   Exit program format . . . . . . . . .   BKUI0100     BKUI0100
```

BRMS control groups: What happens?

o If it's a success, all proceeds as normal.

o But if it ends abnormally ...

```
Waiting for ENDFSFLASH notification from CTCIHA9K until Tue Mar 17
   19:33:04 2020.
Backups on CTCIHA9K have failed. Intervention required.
```

```
622172 2020-03-16 14:13:07          Waiting for ENDFSFLASH notification from CTCIHA9K
622172 2020-03-16 14:13:07   Error   Target system backups have a problem.
```

```
BRMS Xfer Port: 55066.
        Joblog saved. (saveJobLog)
Error   EXIT9J9K: FSFC failure. (ENDFSFLASH)
```

o And in QSYSOPR on the controller:

```
Message ID . . . . . . . :    IAS0652       Severity . . . . . . . . :    40
Message type . . . . . :    Diagnostic
Date sent  . . . . . . . :    03/16/20      Time sent  . . . . . . . :    14:13:07

Message . . . . :    Backups on CTCIHA9K have failed. Intervention required.
Cause . . . . . . :    Backups on CTCIHA9K have failed. The process has been
  converted to REQNFY(*YES) and requires manual intervention on CTCIHA9K.
Recovery  . . . : You have several choices for recovery:
   - Cancel the operation. To cancel the operation, issue the command
  ENDFSFLASH ACTION(*FAILBKU) from CTCIHA9K. QUSRBRM will not be transferred
  and CTCIHA9J will be made the active BRMS instance.
   - Resolve the problem with the backups, restart the backups, and issue
  ENDFSFLASH *SBMNORMAL or *NORMAL on CTCIHA9K. QUSRBRM will be transferred to
  CTCIHA9J and will be made the active BRMS instance.
```

BRMS control groups: Restricted State Progress

o Using the aforementioned exit program we can now send messages from the target LPAR while it is in restricted state.

```
Type command, press Enter.
===> strfsflash ext9j9kall
_


F3=Exit    F4=Prompt    F9=Retrieve    F10=Exclude detailed messages
F11=Display full         F12=Cancel    F13=Information Assistant    F24=
Processed 1 entry in CTLG EXITPGMALL, sequence 20, item: *IBM
```

```
Partition CTCIHA9K is online.
Waiting for ENDFSFLASH notification from CTCIHA9K until Fri Mar 20
  09:58:56 2020.
Processed 1 entry in CTLG EXITPGMALL, sequence 10, item: *SAVSYS
Processed 1 entry in CTLG EXITPGMALL, sequence 20, item: *IBM
```

```
           Waiting for ENDFSFLASH notification from CTCIHA9K
 Warning Target is in restricted state.
           Issuing info message from CTCIHA9K: &1 [Processed 1 entry in CTLG EXITPGMALL, sequence 10,]
           Issuing info message from CTCIHA9K: &1 [Processed 1 entry in CTLG EXITPGMALL, sequence 20,]
           Issuing info message from CTCIHA9K: &1 [Processed 1 entry in CTLG EXITPGMALL, sequence 30,]
           Issuing info message from CTCIHA9K: &1 [Processed 1 entry in CTLG EXITPGMALL, sequence 40,]
           Target has left restricted state.
           Waiting for ENDFSFLASH notification from CTCIHA9K
```

o The command SNDBRMMSG can be called on the target LPAR to send additional messages.

 o It is not restricted to BRMS operations and can be called from SAVSYSBCH

 o Will start and stop TCP

Miscellaneous FSFC enhancements

o Allow QSTRUPPGM to be *NONE

o If not shutting down target LPAR before flashcopy, check that it's not running on the target LUNs
  - o The target LPAR must be available on the IP address listed in WRKCSEDTA
  - o If target LPAR is up but no IP access, toolkit will proceed with a warning

o CLNICSMLOG renamed to CLEANLOGS

o CHKCSE and CHKFSFLASH will issue warning if log file is > 20 MBs

```
Message ID . . . . . . :   IAS1625      Severity . . . . . . . . :     20
Message type . . . . . :   Diagnostic
Date sent  . . . . . . :   02/24/20     Time sent  . . . . . . . :   15:16:08

Message . . . . :     Log file /QIBM/Qzrdhasm/fsfc/FSFC9J9K/ctl.log is greater
  than 20MB in size.
Consider using the CLEANLOGS CL command to reduce the size of the logfile.
```

o CHK/STRFSFLASH checks that QLPAR on the source is neither *EXPIRED nor *DISABLED

o When QUSRBRM has been transferred send completion messages to QSYSOPR

o FSFC Start Target after Flashcopy *PAUSE is enabled for BRMS xfer method *ALL

o *CHGONLY merges two additional QUSRBRM files:
  - o QA1AZCG (PRTRPTBRM *CTLGSTAT)
  - o QA1ADXR (DSPDUPBRM)

More Miscellaneous FSFC enhancements

- Don't allow quotes in CSEDTA location fields

- Do not allow restricted media classes with BRMS Xfer *ALL

- ENDFSFLASH *CLNDYNMED restores functional usage

- PowerHA licenses are allocated and released

- CHKFSFLASH/STRFSFLASH will start subsystem QZRDFSR

- DS Ping (due to firewall restrictions etc) can be disabled for FSFC operations:
  - On the controller, create a system environment variable called QZ_FSFC_NO_DS_PING

FSR
Enhancements

FSR Aggregate communication lines

In WRKSTRPRSC we added more fields for multiple hardware locations to support aggregate ethernet line descriptions.

```
                    Add or Change Communication Resources
Enter details, press Enter.

     Usage . . . . . . . .     *PS                  *PS, *PT, *FCxx, *CTLx
     IP Interface  . . . .     9.5.167.97           IPv4 address
     Line Description  . .     ETHLINAGG            Name, *LINE, *NONE
     Resource Location . .     U8205.E6B.06BD50P-V21-C23-T1
                                                    Name, *LINE, blank
     Resource Location . .     U8205.E6B.06BD50P-V21-C12-T1
                                                    Name, *LINE, blank
     Resource Location . .     U8205.E6B.06BD50P-V21-C93-T1
                                                    Name, *LINE, blank
     Resource Location . .     U8205.E6B.06BD50P-V21-C2-T1
                                                    Name, *LINE, blank
     Resource Location . .     U8205.E6B.06BD50P-V21-C56-T1
                                                    Name, *LINE, blank
     Resource Location . .     U8205.E6B.06BD50P-V21-C8-T1
                                                    Name, *LINE, blank
     Resource Location . .     U8205.E6B.06BD50P-V21-C7-T1
                                                    Name, *LINE, blank
```

CHKCSE verifies LUNs in SYSBASE are replicated

This can prevent customers from having issues when they configure more LUNs and forget to add them to PPRC or RCCG's.

o Will WARN if more LUNs are replicated than configured

o Will FAIL if configured LUNs are not replicated

o Will FAIL if using vSCSI

- o We don't support vSCSI but customers still use it anyway
- o Turn off LUN checking if environment variable QZ_DISABLE_LUN_CHECK exists on the controlling LPAR

Miscellaneous FSR enhancements

o CFGSTRPRSC to replace FIXSTRPRSC (details in quick-start guide)

o Replication isn't started until the target finishes IPL
  o Idea is to not replicate back until we know the target can IPL from the data

o If a detach fails change the production LPAR attributes back to normal

o FSR license not required to create full system DS8K PPRC environments
  o Allows parity with version 7.70
  o Requires FSR license for any automation or creating CSE Data

o PowerHA licenses are allocated and released