PowerHA Tools for IBM i Quick-Install of Full System FlashCopy with Physical-Virtual Isolation

Version 4.6 – Updated on February 22, 2022
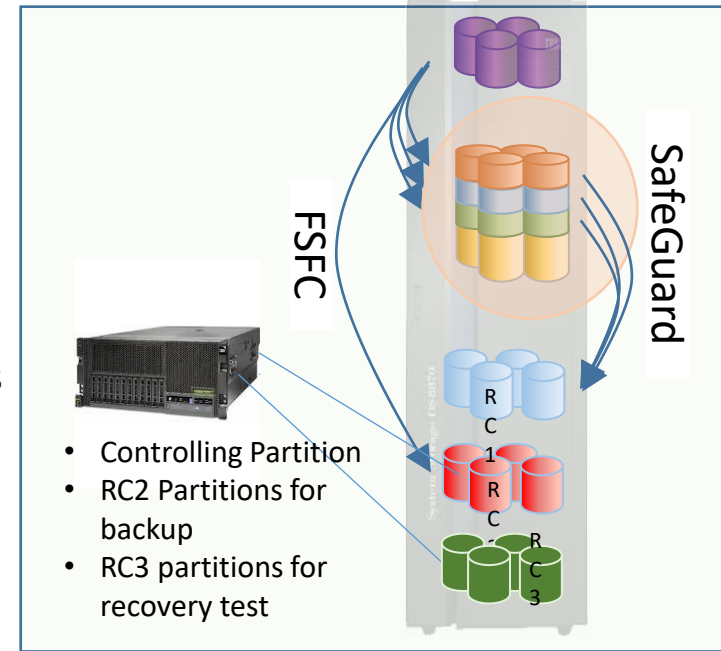Christian Aasland – aasland@us.ibm.com

What is this document for?

- This is a quick-install guide for configuring the Full System FlashCopy Manager using Physical-Virtual Isolation (PVI).

- PVI is currently only supported for DS8K managed with CSM and Safeguarded Copies.

- It does not explain detail or how to handle errors or special / complex situations.

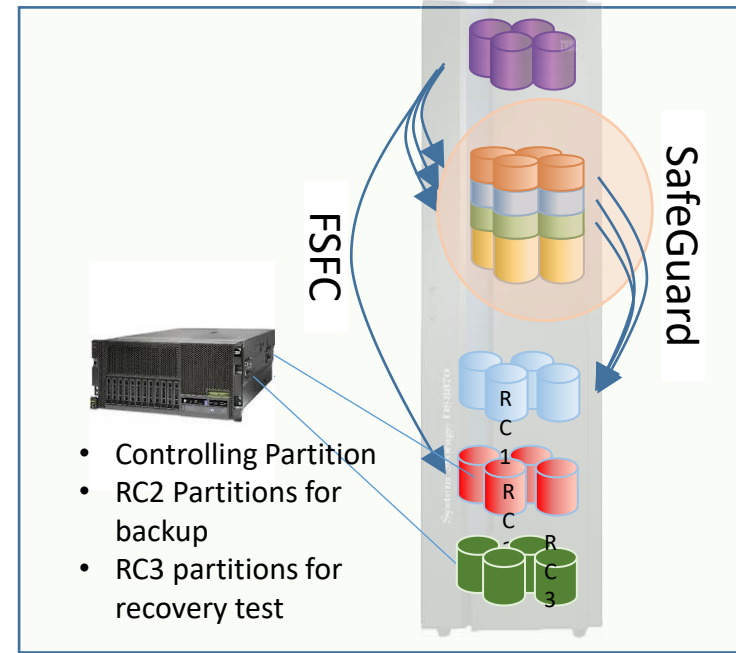- The primary documentation for the toolkit is on the Wiki: https://ibm.biz/BdsULY

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SafeGuard vs. FSFC

o SafeGuard:

    o Purpose is to *create and keep multiple copies* of LUN sets *for recovery.*

    o Built-in DS8K function which allows keeping multiple copies of LUN sets

    o Uses FlashCopy technology to create incremental copies of LUN sets

    o Copies based on # of iterations and/or date of copies

    o No preparation performed on the source or target LUNs

    o No IPL from the SafeGuard LUNs

    o No backups from the SafeGuard LUNs

    o CSM manages the creation, deletion, recovery and maintenance of SafeGuard copies

    o PowerHA Tools for IBM i provides an interface to CSM to create, delete and maintain SafeGuard copies

        o Stores CSM sessions and credentials

        o Can be combined with GMIR

        o Integrated with BRMS

FSFC

SafeGuard

- Controlling Partition
- RC2 Partitions for backup
- RC3 partitions for recovery test

R C 1

R C 2

R C 3

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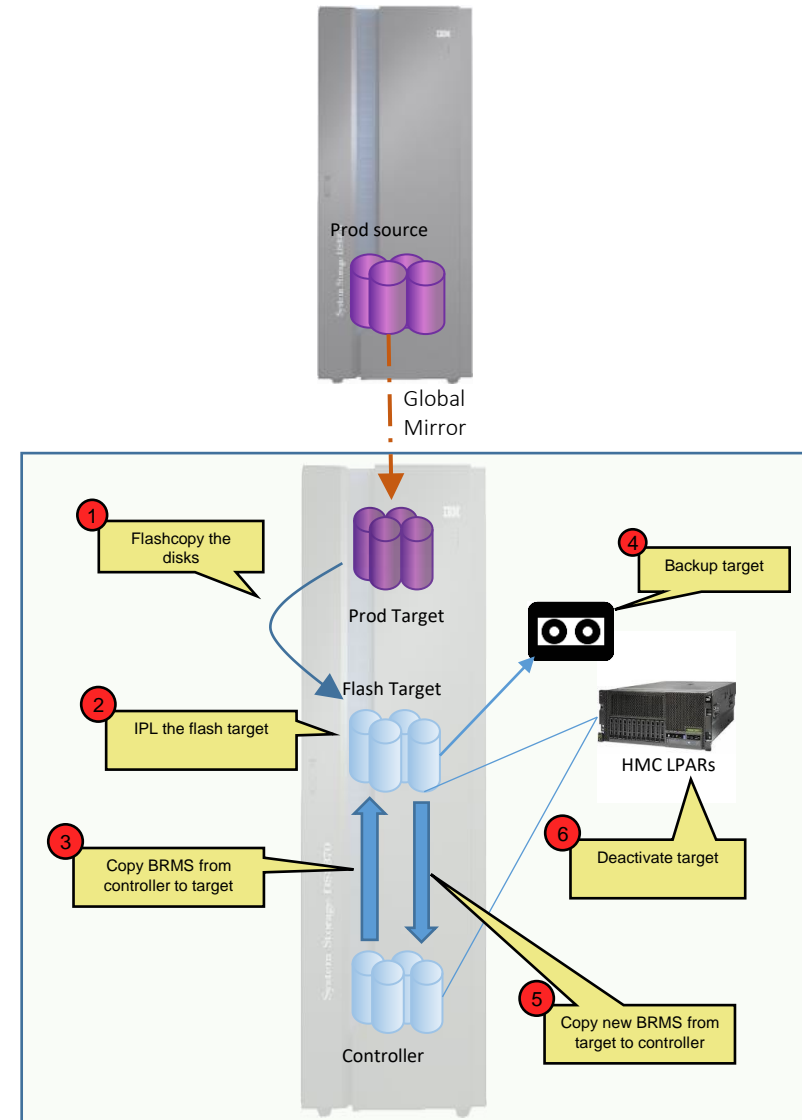
SafeGuard vs. FSFC

- FSFC:
    - Purpose is to *create one temporary copy* of a LUN set *for backups to tape* (physical or virtual)
    - Use FlashCopy technology for zero-impact full system backups
    - Requires production LPAR preparation
    - Performs a FlashCopy, changes host connections, IPLs target LPAR and starts backups
    - PowerHA Tools for IBM i provides automation and interfaces to create the FlashCopy, IPL from it and start the backups
        - Communicates with CSM and LPAR HMCs
        - Can be combined with GMIR
        - Integrated with BRMS

FSFC

SafeGuard

- Controlling Partition
- RC2 Partitions for backup
- RC3 partitions for recovery test
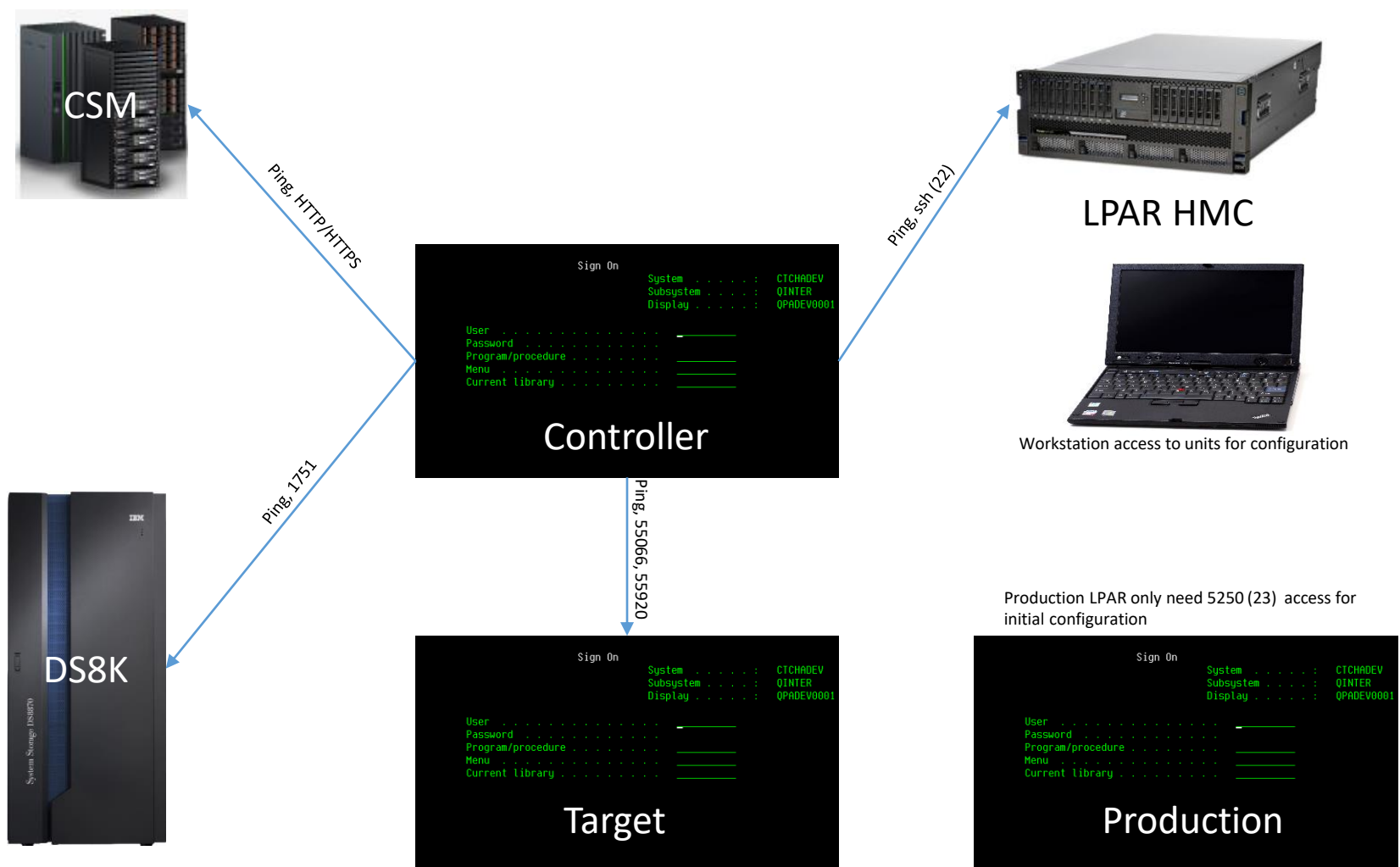
RC1

RC2

RC3

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FSFC – PVI Overview

- FSFC is an automated solution that starts backups with little or no impact to the production LPAR.

- PVI adds an 'airgap' between the production LPAR and the controller and target LPARs, i.e. flashcopy preparation and repatriation of BRMS information is not possible.

  - No *SYSBAS *SUSPEND – only *FRCWRT

  - Target IPLs with customer startup program

  - BRMS details:

    - Target LPAR BRMS is cleared (i.e. nothing retained from the production LPAR).

    - New BRMS System Name defined

    - Select data imported from the controller before backups.

    - Select data exported to the controller after backups.

    - All BRMS media, policies etc. to use on the target LPAR must exist on the controller.

CSM

LPAR HMC

Ping, HTTP/HTTPS

Ping, ssh (22)

```
                          Sign On

                                 System  . . . . . :   CTCHADEV
                                 Subsystem . . . . :   QINTER
                                 Display . . . . . :   QPADEV0001

   User  . . . . . . . . . . . . . .
   Password  . . . . . . . . . . . .            _____
   Program/procedure . . . . . . . .            _____
   Menu  . . . . . . . . . . . . . .            _____
   Current library . . . . . . . . .            _____
```

Controller

Workstation access to units for configuration

Ping, 1751

Ping, 55066, 55920

DS8K

Production LPAR only need 5250 (23) access for initial configuration

```
                          Sign On

                                 System  . . . . . :   CTCHADEV
                                 Subsystem . . . . :   QINTER
                                 Display . . . . . :   QPADEV0001

   User  . . . . . . . . . . . . . .
   Password  . . . . . . . . . . . .            _____
   Program/procedure . . . . . . . .            _____
   Menu  . . . . . . . . . . . . . .            _____
   Current library . . . . . . . . .            _____
```

Target

```
                          Sign On

                                 System  . . . . . :   CTCHADEV
                                 Subsystem . . . . :   QINTER
                                 Display . . . . . :   QPADEV0001

   User  . . . . . . . . . . . . . .
   Password  . . . . . . . . . . . .            _____
   Program/procedure . . . . . . . .            _____
   Menu  . . . . . . . . . . . . . .            _____
   Current library . . . . . . . . .            _____
```

Production

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Pre-requisites

o Pre-requisites are listed on the wiki:
   http://ibm.biz/FSFCPreInstallRequirements
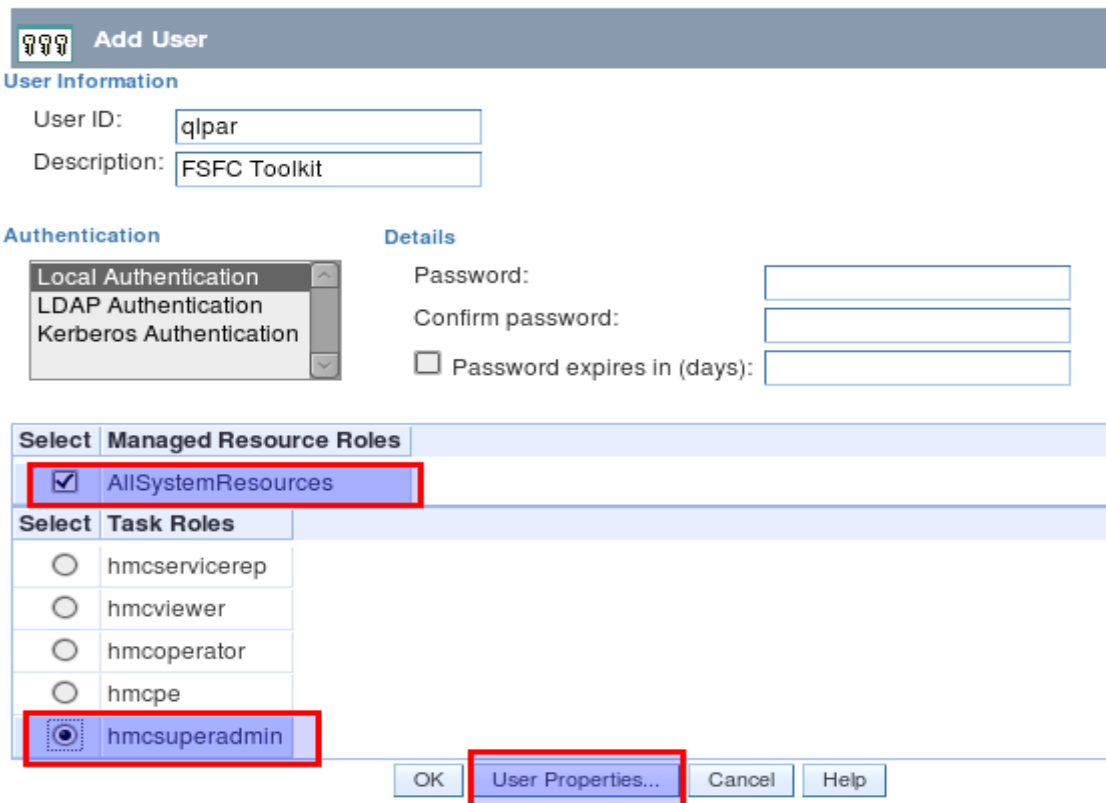
o All hardware should be installed and cabled.

o Controller and production LPAR installed and licensed

   o Specified LPPs and PTFs installed

   o PowerHA licensed on controllers (minimum Standard Edition)

      o We will create the cluster with you

   o BRMS installed and functional on production and controlling LPARs

   o Tape device(s) configured and zoned to target and controlling LPARs

   o Network configuration finished (firewalls etc)

o IP addresses, user IDs and passwords for:

   o IBM i LPARs

   o LPAR HMC

   o DS8K HMC

   o CSM

o We'll supply the toolkit savefile and product access code

   o We need the IBM i serial numbers to generate the access code

   o Place savefile QZRDHASM44 in QGPL

o <u>Any items not finished prior to our arrival will increase the duration of our engagement</u>

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Storage setup prior to our engagement

- Create a user profile on the DS8K
    - Can be other than QLPAR, make a member of the admin group
    - Remember the password, set to not expire
        - chpass –expire 0
    - Configure the storage unit for Source, Target and Controlling LPARs.
        - Recent firmware level
            - Install DSCLI to the controller LPAR from the DS8K CD
        - Create fixed block volumes (requires ranks, arrays, extent pools, space efficient repositories, etc)
        - Volume groups, ports and host connections
        - Licenses (replication, space efficient, flashcopy, etc)
        - PPRC Paths if replicating
            - We can help you remotely set this up
            - Start replications
- Create a user profile on the CSM
    - Configure to manage the DS8K
    - Configure sessions for replication and flashcopy

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HMC Configuration – user ID

o Create a user on the LPAR HMCs

o Any user name will do (as long as you remember it)

o A password is required

o Configure with hmcsuperadming and AllSystemResources roles

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HMC Configuration – remote command execution

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HMC Configuration - ssh

o Allow ssh (port 22) through the firewall

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HMC Configuration – ssh (continued)

- o Secure Shell (port 22:tcp) must be either:
  - o Allow all hosts: 0.0.0.0/0.0.0.0
  - o Allow specied hosts: At least specify the IP of your controlling LPAR

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- Place the toolkit savefile in QGPL (use FTP, scp, etc)
- Restore the toolkit library:
  - RSTLIB SAVLIB(QZRDHASM) DEV(*SAVF) SAVF(QZRDHASM44)
    - The '44' refers to the release and may change
  - ADDLIBLE QZRDHASM
- Run the setup program
  - SETUPFSFC NODELROLE(*SRC) ACSCODE('access-code')
    - PressPF9 and specify the line description, TCPIP interface and subnet mask to create on the source for the target to use
      - The line description and IP interface will be created
      - Customize as needed
    - User profile QLPAR (no password) will be created, files initialized etc.
  - ENDSBS QZRDFSR *IMMED
    - SETUPFSFC starts this subsystem but it isn't needed for PVI-FSFC
- Add the license keys for the target LPAR
  - Use ADDPRDACS to enter the serial number and license keys for the target LPAR

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Source LPAR: Modify startup program

- Modify the startup program on each node to call the toolkit program CFGSTRPRSC at the beginning. This will detect where the LPAR is running and initiate system changes and start the backups:

```
DCL VAR(&IPLTYPE) TYPE(*CHAR) LEN(5) VALUE('?????')

/* BEGIN POWERHA TOOLS FOR IBM i - FSFC */
QZRDHASM/CFGSTRPRSC RTNVAR(&IPLTYPE)
MONMSG      MSGID(CPF0000)
IF          COND((%SST(&IPLTYPE 1 3) *EQ '*FC') *OR +
                 (%SST(&IPLTYPE 1 5) *EQ '*DTCH') *OR +
                 (%SST(&IPLTYPE 1 5) *EQ '?????')) +
            THEN(RETURN)
STRTCP
MONMSG      MSGID(CPF0000)
/* END POWERHA TOOLS FOR IBM I - FSFC */
```

- WRKSTRPRSC is used to tell the toolkit what to do depending on where it IPLs.
  - The changes specified by WRKSTRPRSC are implemented by CFGSTRPRSC
  - WRKSTRPRSC is also used by FSR
- For PVI-FSFC there should be:
  - At least one *FCxx System Information Entry
  - At least one *FCxx and *CTLx Communications Startup Resources
    - The *CTLx specify the IP address and ports to connect on the controllers
    - The target location code (i.e. U8233.E8B.10001AP-V4-C2-T1) consists of:
      - Vxx = LPAR number xx
      - Cyy = slot number yy

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Source LPAR: Modify System Values

o CHGIPLA STRTCP(*NO)

    o The startup program will start TCP if needed (next page)

o Review autostart and prestart entries on the controlling and QSYSWRK subsystems

    o DSPSBSD QSYS/QCTL, opt 3

    o DSPSBSD QSYS/QSYSWRK, opt 3

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- If additional processing is needed (BRMS maintenance, recovery reports, autostart jobs, license keys, etc) use the Exit Program
- Copy the Toolkit example to your utilities library / file:

```
CPYSRCF FROMFILE(QZRDHASM/QCLSRC) TOFILE(YOURLIB/QCLSRC)  FROMMBR(QZRDIAFFEX)  TOMBR(QZRDIAFFEX)

STRSEU SRCFILE(YOURLIB/QCLSRC) SRCMBR(QZRDIAFFEX) OPTION(2)

CRTCLPGM PGM(YOURLIB/QZRDIAFFEX) SRCFILE(YOURLIB/QCLSRC)
```

- At TGTPSTTCP, add license keys, start TCP server etc. These are optional, only enter if needed:

```
ADDLICKEY  PRDID(5770BR1) LICTRM(V7R3M0) FEATURE(5050) SERIAL(1234567) PRCGRP(*ANY)
LICKEY(123456 123456 123456) USGLMT(*NOMAX)

STRTCPSVR *SSHD
```

- At TGTBRMSAV, perform BRMS maintenance and create recovery reports:

```
STRMNTBRM  PRTRCYRPT(*NONE) PRTSYSINF(*YES)
STRRCYBRM  USRRCYINF(*ADD)
```

- Create and empty exit program on the controller:

```
CRTCLPGM PGM(YOURLIB/QZRDIAFFEX) SRCFILE(QZRDHASM/QCLSRC)
```

- Specify the exit program on the final page in CRTCSEDTA (a few pages later)

Controlling LPAR: Preparing BRMS

o The target LPAR will retrieve BRMS information from the controlling LPAR therefore BRMS must be configured on the controlling LPAR.

o On the controller, set up BRMS as normal. Note:

    o WRKPCYBRM *SYS opt 1 – Allow backups in batch

    o WRKPCYBRM *SYS opt 4 – Neither source nor target LPAR should be in the list

o Enroll media on the controller – it will be owned by the controller

o Determine what the BRMS System Name of the target LPAR will be

    o Backups for that source LPAR will be associated with that name

    o Records on the controller will be associated with that name

    o Toolkit will set that BRMS Name to that name

o Assign a subset of the controller's media to that BRMS System Name

    o CHGBRMSOBJ OBJTYPE(*MEDIA) OBJ(vol_name*) ATTR(*SYSNAME) VALUE(target_brms_name)

    o Media must be owned by the controller and expired

o Create a control group for the target LPAR to use

    o Since multiple target LPARs may exist there will be a control group for each target LPAR, so select a namespace that allows it to be unique

    o If the target LPAR will have IASPs attached then the controller must also have and IASP attached to allow creating control group entries that specify an IASP. Use the following command to change the IASP name in the entries:

        o CHGBRMSOBJ OBJTYPE(*CTLGENTRY) OBJ(cg_name) ATTR(*IASP) VALUE(IASP01)

    o It will not change *SYSBASE or *ALLAVL entries

    o In the control group attributes set the Backup Item Exit Program to QZRDHASM/QZBRMSEXIT

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Controlling LPAR: Preparing BRMS Control Groups

- Create a control group for the target LPAR to use
  - Since multiple target LPARs may exist there will be a control group for each target LPAR, so select a namespace that allows it to be unique
  - If the target LPAR will have IASPs attached then the controller must also have and IASP attached to allow creating control group entries that specify an IASP. Use the following command to change the IASP name in the entries:
    - CHGBRMSOBJ OBJTYPE(*CTLGENTRY) OBJ(cg_name) ATTR(*IASP) VALUE(IASP01)
  - It will not change *SYSBASE or *ALLAVL entries
  - In the control group attributes set the Backup Item Exit Program to QZRDHASM/QZBRMSEXIT
- WRKCTLGBRM Opt 9 to manage the subsystem
  - They should NOT be set to start:

```
                          Subsystems to Process

Use . . . . . . . . . . :   *BKU
Control group . . . . :   SAVSYSALL


Type choices, press Enter.
                                End
  Seq     Subsystem      Library      Option      Delay      Restart

   10      *ALL           *ALL         *CNTRLD     30         *NO
```

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Controlling LPAR: BRMS Control Attributes

- WRKCTLGRBM opt 8, page down to the bottom panel
- Do not allow STRBKUBRM to manage servers
  - Change them with iNav or don't copy a control group that has them set

```
Additional Backup Policy Properties


Client backup policy . . . . . . . . . . : SAVSYSALL


Type information, press Enter.


Allow activity overrides . . . . . . . . *YES          *NO, *YES
Allow retention overrides  . . . . . . . *YES          *NO, *YES
Additional management:
  TCP/IP servers . . . . . . . . . . . . *NO           *NO, *END, *RESTART, *BOTH
  Lotus servers  . . . . . . . . . . . . *NO           *NO, *END, *RESTART, *BOTH
  Integrated Windows servers . . . . . . *NO           *NO, *VARYOFF, *VARYON ...
  Guest partitions . . . . . . . . . . . *NO           *NO, *VARYOFF, *VARYON ...
Unmount user-defined file systems  . . . *NO           *NO, *YES
Run maintenance after backup . . . . . . *NO           *NO, *YES
```

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Controlling LPAR: Restoring the toolkit

o Place the toolkit savefile in QGPL (FTP, scp, etc)

o Restore the toolkit library:

    o RSTLIB SAVLIB(QZRDHASM) DEV(*SAVF) SAVF(QZRDHASM44)

        o The '44' refers to the release and may change

    o ADDLIBLE QZRDHASM

o Run the setup program

    o SETUPFSFC NODELROLE(*CTL) PORT(*DFT) ACSCODE('access code')

        o The port is used to receive communications from the target LPAR.

            o *DFT is 55920

        o User profile QLPAR (no password) will be created, files initialized etc.

```
          Set up IBM Pwr HA tools - FSFC (SETUPFSFC)


Type choices, press Enter.


Node role . . . . . . . . . . . . > *CTL           *CTL, *PRD
FSFC communications port . . . .   *DFT            1-65535, *SAME, *DFT
Toolkit access code  . . . . . .   12345
```

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o If there is only one controller, you must create a single-node cluster.

o If multiple controllers are to be configured, issue these commands on each one:

> `STRTCPSVR *INETD`
>
> `CHGTCPSVR *INETD AUTOSTART(*YES)`
>
> `CHGNETA ALWADDCLU(*ANY)`

o On the Master (or only) controller:

> `CRTCLU CLUSTER(FSFC) START(*YES)`
>
> > o PF4 – fill in Primary Controlling node name and IP address
>
> `ADDCLUNODE CLUSTER(FSFC) NODE(Secondary Controlling node name and IP)`
>
> `WRKCLU` – Option 7, create a device domain (call it whatever you'd like)
>
> > o Enter one node name first, press enter
> >
> > o Option 6, add the other node name

o On Auxilliary controller (if present):

> `WRKCLU`, validate cluster is started

o Modify the startup program on each node to start the cluster and subsystem:

> Where: after IP and QSYSWRK start, before applications
>
> What: `STRCLUNOD CLUSTER(FSFC) NODE(Master or Auxiliary controller nodes)`
>
> > o Requires *IOSYSCFG so QSTRUPJD should specify a profile like QLPAR
> >
> > o `CHGOBJD JOBD(QSTRUPJD) USER(QLPAR)`
>
> `STRSBS QZRDHASM/QZRDFSR`

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Controlling LPAR: Download the Java Secure Channel

- Download the Java Secure Channel to /QIBM/Qzrdhasm/ssh from:

  https://sourceforge.net/projects/jsch/files/jsch.jar/0.1.55/jsch-0.1.55.jar/download

- The Java Secure Channel is an open-source implementation of ssh which allows the FSFC toolkit to issue ccal programmatically and to review the results.

- Because it is open-source, IBM Legal requires that the customer download and agree to the EULA so we can't bundle it with our toolkit.

- To install, download to the desktop then FTP to all IBM i controllers.

- Place it into directory /QIBM/qzrdhasm/ssh/

- If a different version than 0.1.55 is used, update the symbolic link /QIBM/qzrdhasm/ssh/jsch to point to it

```
ftp> bin
200 Representation type is binary IMAGE.
ftp> put jsch-0.1.55.jar /QIBM/qzrdhasm/ssh/jsch-0.1.55.jar
local: jsch-0.1.55.jar remote: /QIBM/qzrdhasm/ssh/jsch-0.1.55.jar
227 Entering Passive Mode (9,5,168,177,167,46).
150-NAMEFMT set to 1.
150 Sending file to /QIBM/qzrdhasm/ssh/jsch-0.1.55.jar
226 File transfer completed successfully.
249282 bytes sent in 0.742 secs (336.12 Kbytes/sec)
ftp>
```

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Controlling LPAR: Create the credentials

o FSFC uses user ID / Password to log into the HMCs, DS8Ks and CSMs. Use WRKCSECRDL or ADDCSECRDE to manage these credentials.

o Enter the IP address, user ID, password and a host description (i.e. "Prod HMC") for:

  o CSM servers

  o DS8Ks

  o HMCs

o This information is encrypted and stored into the device data domain and is kept consistent on both of the controllers.

o WRKCSECRDL uses PowerHA to keep the controllers in sync so it is only necessary to enter this information on one LPAR.

```
 Add CSE Credential Entry (ADDCSECRDE)


Type choices, press Enter.


Host IP address  . . . . . . . . . > '1.2.3.4'
nn.nn.nn.nn
User ID  . . . . . . . . . . . .     User
Password . . . . . . . . . . . .
Confirm password . . . . . . . .
Host description . . . . . . . .     Host name display
```

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Controlling LPAR: Create the DS8K environments

o An FSFC environment describes the storage to the toolkit. Use WRKCSE to manage the environments.

o The environments are stored in the device data domain and is kept in sync with both controllers.

o Type WRKCSE then Option 1

    o Enter an environment and type of data FLASH

    o Enter *NONE for copy descriptions

o Enter the requested information then PAGE DOWN

```
                        Create a FLASH Environment
     Type choices, press Enter.

     Environment name . . . . . . . . . :    TEST
     Storage Type . . . . . . . . . . . :    DS8K

     FlashCopy Power HA, ASP information:
       Device name  . . . . . . . . . . .    *SYSTEM            *SYSTEM, Name
       Source Copy Description  . . . . .    *NONE              *NONE, Name
       Target Copy Description  . . . . .    *NONE              *NONE, Name

     FlashCopy DS unit information:
       Device . . . . . . . . . . . . . .    IBM.1234-1234565   Name


                                                                More . . .
```

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Controlling LPAR: Enter the CSM information

o Specify *YES for CSM Safeguarded copy / FlashCopy and enter the CSM details.

o Enter the DS unit details

o If the IP address isn't in WRKCSECRDL yet, pressing ENTER will invoke ADDCSECRDE to add it.

```
                        Create a FLASH Environment
 Type choices, press Enter.

 CSM Safeguarded copy / FlashCopy . .    *YES                    *YES, *NO
  CSM Primary server . . . . . . . .     9.5.168.189             IPv4
  CSM Secondary server . . . . . . .                             IPv4
  CSM Safeguard session name . . . .     HA9T_SG                 Name, *NONE
  CSM GMIR session name  . . . . . .     HA_9T_GMSG              *NONE, Name
  CSM FlashCopy session name . . . .     HA_9T_SGFLASH           *NONE, Name
  Max number of Safeguarded copies       5                       2-500
  Action when max copies exceeded        *EXPIRE                 *EXPIRE, *FAIL

DS unit SMC information:
  Flash hmc1 . . . . . . . . . . . .     9.5.216.11              IPv4
  Flash hmc2 . . . . . . . . . . . .                             IPv4
  Port . . . . . . . . . . . . . . .     1751                    1750, 1751
 Comment:
   Text . . . . . . . . . . . . . . .

Press Enter to add DS8K credentials for 1.2.3.4, press F12 to cancel.
```

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Controlling LPAR: Enter the LUNs

o Enter the LUN details

o Press ENTER to save this information

o Use WRKCSE opt 16 if the toolkit must modify TARGET LPAR host connections to volume groups prior to the IPL

```
Add, Change or Delete Volumes

  Environment  . :   TEST              Source device  :   IBM.123
  Type . . . . . :   FLASH             Target device  :   IBM.123
  Volume sets  . :   0

Type Volume options; 1=Add, 2=Change, 4=Delete, press Enter.
            Source          Flash
  Opt       Volumes         Volumes
   1        0100            0200
```

Controlling LPAR: The CSE Data

o The CSE Data describes the non-storage elements of an environment.

o This data is also encrypted and stored in the DDD, so it is available to both controllers.

o CRTCSEDTA, CHGCSEDTA, DLTCSEDTA and DSPCSEDTA can be used to work with this information.

o WRKCSEDTA displays all the data's created:

```
                        Work with CSE Data

Type options, press Enter.
  1=Create   2=Change   3=Copy    4=Delete    5=Display


                         CRG
Opt      CSE Data       type        Text

         FSR9M2         FSR          FSR from 9M to 9O
         HA8FSR2        FSR          DS8K FSR from HA8FSR1 to HA8FSR2
         FSFC9J9K       FSFC
         FSFC9M9N       FSFC         GMCV Flash
         FSFC9M9P1      FSFC
         FSR9J2         FSR
         FSFC9M9P2      FSFC
         FSFC9F9G       FSFC
                                                               More...
Parameters or command:
===>
```

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Controlling LPAR: Creating the CSE Data

- Use CRTCSEDTA or WRKCSEDTA op1 to enter the flashcopy operational details.
- The command will prompt for details depending on what youi enter
- Specify *YES for Physical-Virtual Isolation FlashCopy

```
                    Create Full System FlashCopy CSE Data

  Supply all required values, press Enter.

  CSE Data Name  . . . . . . . :    TEST
  Use  . . . . . . . . . . . . :    *SYSTEM
  Copy type  . . . . . . . . . :    *FLASH

  Environment  . . . . . . . .      TEST                Name
  Primary controlling node . .      NODE1               Name
  Secondary controlling node        node2               Name
  Communications port  . . . .      55920

  Physical-Virtual Isolation
    FlashCopy  . . . . . . . . .     *YES                *YES, *NO

  Target host alias  . . . . .      TARGET              Name


                                                        More...
```

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Controlling LPAR: Target LPAR information

○ Enter the information required for the target LPAR:

```
Target LPAR Information:
  HMC LPAR name  . . . . . . .    ctciha8x
  HMC Profile name . . . . . .    default_profile
  HMC managed system . . . . .    CTCHA2
  Primary HMC IP . . . . . . .    9.5.95.139         IPv4 address
  Secondary HMC IP . . . . . .                       IPv4 address
  Shutdown target before
    FlashCopy  . . . . . . . .    *YES               *YES, *NO
  Restart target after
    FlashCopy  . . . . . . . .    *YES               *YES, *NO, *INQ, *FRCINQ,
                                                       *PAUSE
                                                            More...
```

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Controlling LPAR: BRMS Information

o If using BRMS, enter that information.

o The BRMS System Name is what the toolkit will set the target LPAR BRMS system name to.

    o On the controller, there must be media owned by that BRMS System Name.

    o That is the media that will be used on the target LPAR.

o PAGE DOWN and set 'Wait for ENDFSFLASH' to *YES

o Press ENTER and save the CSE Data

```
                        Create Full System FlashCopy CSE Data

Use BRMS integration . . . . .    *YES               *YES, *NO
BRMS information:
  BRMS System name . . . . . .    CTCIHA9T            Name
  BRMS transfer port . . . . .    *DFT               *DFT, 1024-65535
  Minimum expired volumes  . .    2                  0-99
  Number days to retain BRMS
    Logs . . . . . . . . . . .    91                 1-500

Target LPAR backup command #1:   STRBKUBRM (DAILYFSFC) SBMJOB(*CTLSBS)

     + for more values  . . .




                                                                 More...
```

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Controlling LPAR: CHKFSFLASH

- Use CHKFSFLASH to verify communications is working
- Resolve issues until it is successful
- Note that using an exit program may change the output

```
CHKFSFLASH CSEDTA(AGFC9T)
 20200 - QSYS/RCLACTGRP ACTGRP(Q1ABRMS)
Activation group Q1ABRMS not found.
      - RETURN        /* RETURN due to end of CL program */
Program     QGPL/QZRDIAFFEX completed.
Successfully performed local verifications.
Job 197007/QLPAR/QLPARJOBD submitted to job queue QSYSNOMAX in library
  QSYS.
Program     QGPL/QZRDIAFFEX completed.
Log file used : /QIBM/Qzrdhasm/fsfc/AGFC9T/ctl.log
CHKFSFLASH validation for AGFC9T completed successfully.
```

Controlling LPAR: STRFSFLASH

- Before you start the Flash Copy with STRFSFLASH:
    - Does the production LPAR have autostart jobs on the controlling subsystem?
    - Did you add CFGSTRPRSC to the startup program?
    - Did you enter data on WRKSTRPRSC?
- Then use STRFSFLASH to perform the Flash Copy.
    - The flash will occur
    - Host connections (if defined) will be changed
- The Target LPAR will:
    - IPL and call the startup program which calls CFGSTRPRSC
    - The toolkit determines it is running as *FCxx (based on serial and LPAR #)
    - Startup program (QSTRUPPGM) changed to *NONE
    - Basic jobscheduler entries are saved and held
    - The specified comm adapter will be used to start the specified IP address
    - Toolkit will reach out to CTL1 or fail and try CTL2
        - Subsystem QZRDSFSR with program QZRDIAEXT2 must be active on controller
    - Retrieve the default CSE Data (as defined in WRKSTRPRSC) from the controller
    - Reset BRMS and retrieve from the controller the BRMS media and save history for the BRMS system name in the default CSE Data. Will also retrieve other BRMS classes and policies.
    - Run the specified backups (it will probably go into restricted state, i.e. A9003C70)

Controlling LPAR: Target LPAR – after the backups

o After the backups, BRMS will start QCTL then call the final control group exit

o The toolkit will start and connect to the controlling LPAR

o The toolkit exit program will run

    o This is where STRMNTRBM and STRRCYBRM creates the reports

o Selected BRMS records (media, save history, logs and control group status) are saved and sent to the controller's QUSRBRM

o Log files are sent to the controller

    o Toolkit logs are sent to /QIBM/Qzrdhasm/fsfc/<cse data>/*

    o BRMS logs are sent to /QIBM/Qzrdhasm/fsfc/<cse data>/BRMS*

        o BRMS flight recorders are included as a zip file

    o Main toolkit log is /QIBM/Qzrdhasm/qzrdhasm.log

    o Java logs are in /QIBM/Qzrdhasm/java.logs

    o Additional joblogs are in /QIBM/Qzrdhasm/joblogs/*

o To gather logs for support:

    o DMPINF ENV(*ALL) EXTDLOGS(*YES)

    o That will create a zip file with all those logs and joblogs

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Controlling LPAR: Managing Logs

o CLEANLOGS will prune toolkit logs to save on space

   o Tell it how many days of log entries to retain

   ADDJOBSCDE JOB(CLEANLOGS) FRQ(*WEEKLY) CMD(QZRDHASM/CLEANLOGS RETAIN(120))
   SCDDATE(*NONE) SCDDAY(*ALL) SCDTIME('10:00')

```
                      Clean Toolkit Logs (CLEANLOGS)

Type choices, press Enter.

Days of information to retain  . > 120            *NONE, days

                            Additional Parameters

FSFC environment . . . . . . . . > *ALL           Name, *NONE, *ALL
```

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Controlling LPAR: Saving/Restoring the DDD

o WRKCSE, WRKCSEDTA and WRKCSECRDL information is stored on the controller in PowerHA device data domains (DDD)

o The DDD's are not saved/restored with the usual commands SAVCFG, SAVOBJ etc or even GO SAVE opt 21

o The Toolkit includes two commands to save and restore the DDD:

   o SAVDDD

       o Saves all the DDD information to an existing IFS directory

       o Use mkdir to create the directory first

   o RSTDDD

       o Restores all the DDD information from an existing IFS directory

o Recommendation is to run SAVDDD prior to an upgrade or backup of the controlling LPAR

Controlling LPAR: Contacting Support

- First check the troubleshooting section on the wiki:

  http://ibm.biz/FSFCSupport

- Support for the FSFC Toolkit defects is to customers who meet the following criteria:
  - Current IBM i Software Maintenance Agreements
  - Current FSFC Toolkit Software Maintenance Agreement
- For non-urgent issues or questions contact the consultant who installed the Toolkit. To reach a Toolkit developer for non-urgent issues and questions, or to report a bug, send an email to iessspt@us.ibm.com

- For immediate 24x7 assistance with a toolkit defect, reach out to IBM Support:
  - US: http://www.ibm.com/planetwide/us/
  - Worldwide: http://www.ibm.com/planetwide/
- To assist IBM personnel in correctly routing your problem, request support for the Systems Lab Services "Copy Services Toolkit – Full System FlashCopy" using component identifier 5798CST00.

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