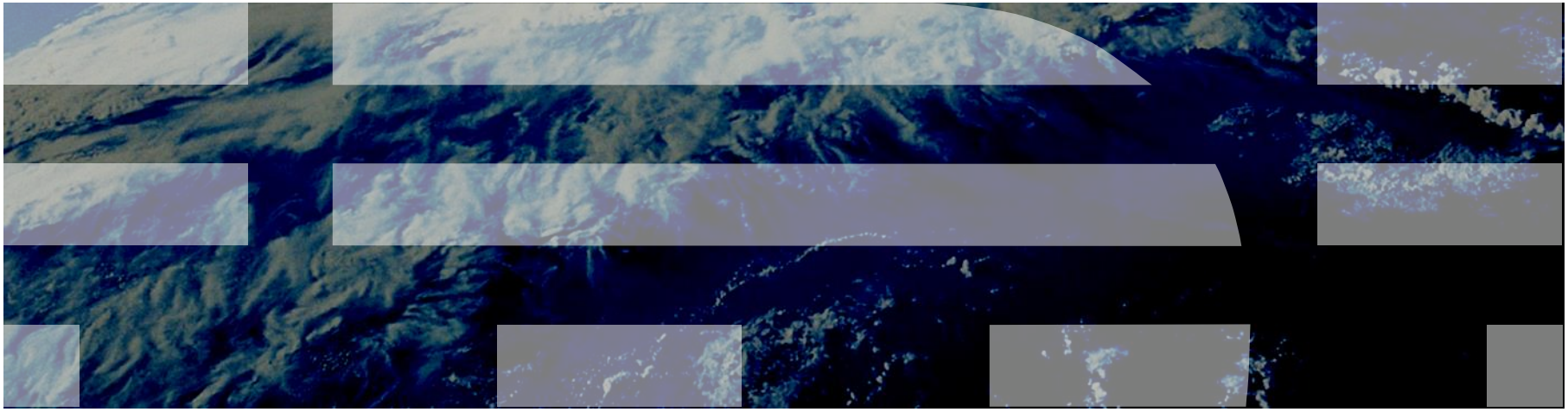
Quick-install of the PowerHA Full System Flashcopy Manager

Version 4.5

Christian Aasland
Tuesday, June 16, 2020



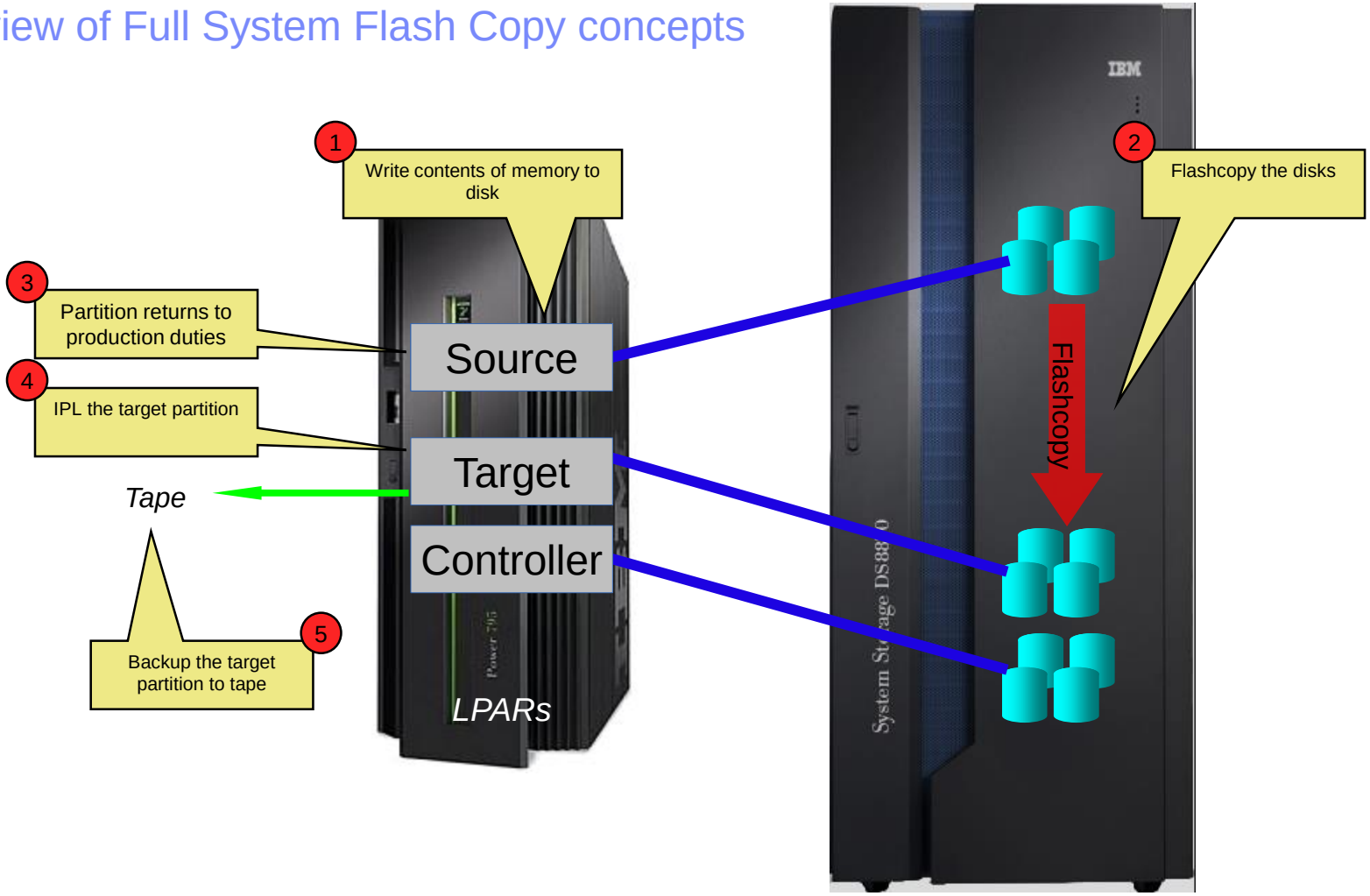
aasland@us.ibm.com
ibm.com/systems/services/labservices

What the heck is this document for?

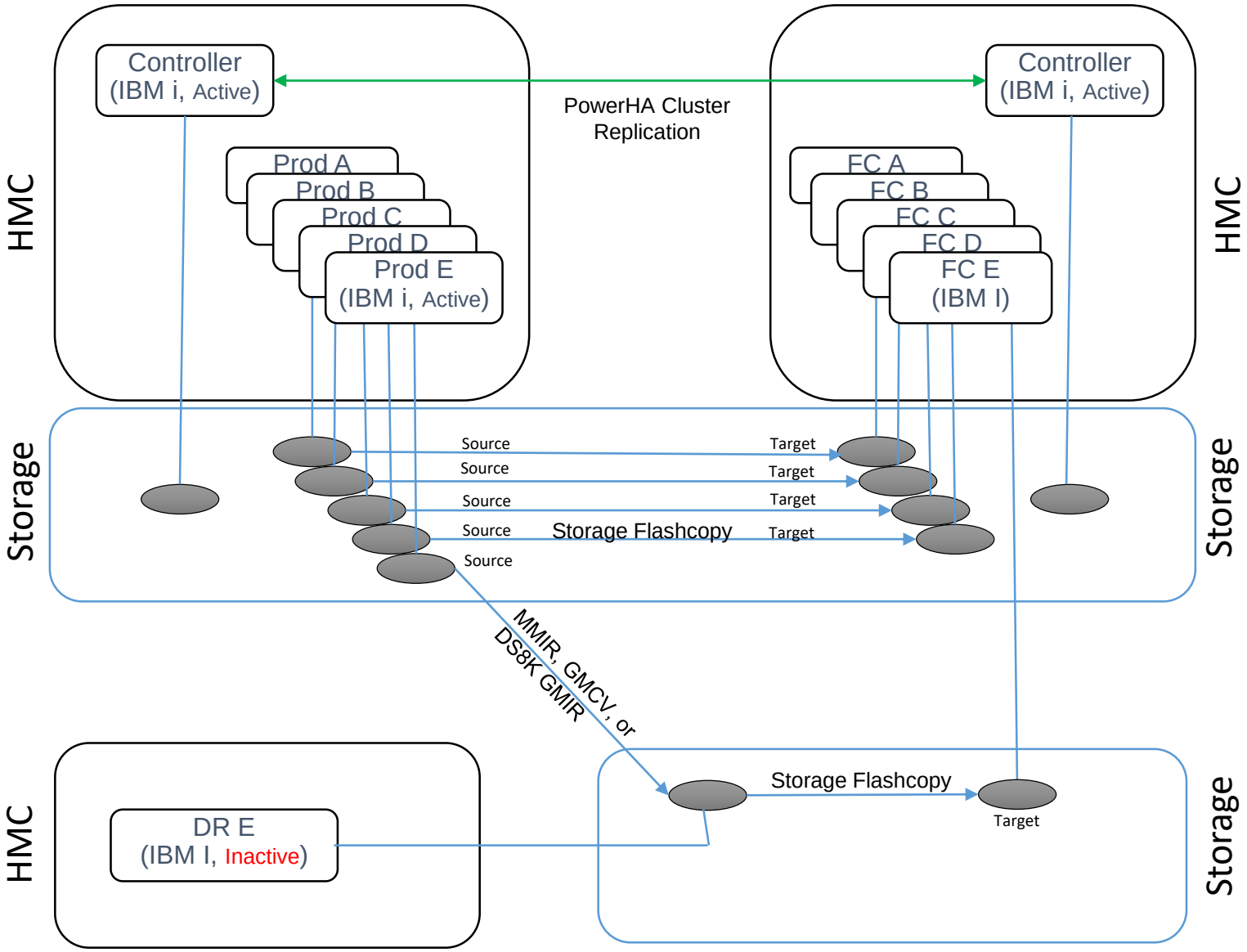
- This is a quick-install guide for configuring the Full System Flashcopy Manager for the following storage products:
  - SVC family (V3700, V5000, V7000, V9000)
  - DS8K family
- Customers can have it, but it is designed to be performed by a Lab Services consultant
- It does not explain details or how to handle errors or special/complex situations

- Primary documentation is the FSFC Manager Wiki
- Has more detail and explanations
  - https://ibm.biz/BdsULY

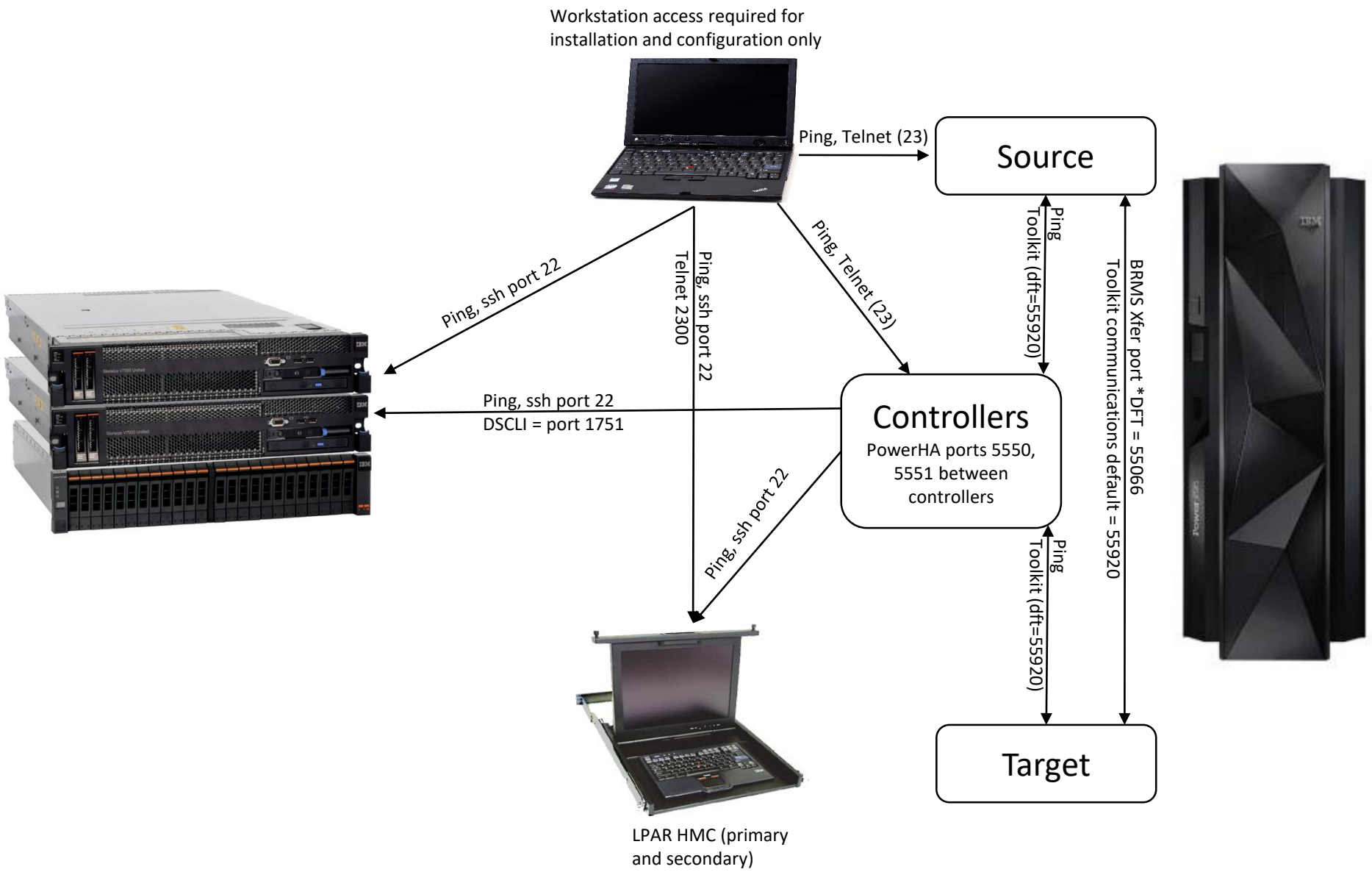
Overview of Full System Flash Copy concepts



Overview of Full System Flashcopy topography



Firewall access



Customer actions prior to our engagement

- Provide Lab Services with the IBM i serial numbers so we can generate license keys
- Source and Controlling LPARs configured with IBM i OS
  - Install the LPP's and PTF's on pages 5 and 6
  - PowerHA (Standard Edition) installed and licensed
    - We will help you set up the clusters
  - Place FSFC Manager savefile PHATOOLS45 in QGPL on the controlling and production LPARs
    - We will send this to you before we arrive
- Get IP addresses, administrative user IDs and passwords for:
  - HMC
  - LPAR's (including the secondary)
  - Storage devices (SVC / DS8K)

Controlling LPAR LPPs and PTFs

7.2	7.3	7.4
5733SC1 *Base, 1	5733SC1 *Base, 1	5733SC1 *Base, 1
5770SS1 30, 33, 41	5770SS1 30, 33, 41	5770SS1 30, 33, 41
5770JV1 *Base, 14	5770JV1 *Base, 16	5770JV1 *Base, 16
5770HAS *Base, 2	5770HAS *Base, 2	5770HAS *Base, 2
Group PTFs SF99776, SF99716	Group PTFs SF99876, SF99725	Group PTFs SF99666, SF99665
5770HAS PTF SI57302, SI62180 5770999 PTF MF62565	5770999 PTF MF62566	

Source LPAR PTFs

7.2	7.3	7.4
5770999 PTF MF62565, MF64640	5770999 PTF MF62566, MF64641	SI71911 SI72142
If using BRMS, the following PTF's are required (superceding PTF's are ok) :		
SI70366 (BR1) SI53860 (SS1)	SI70367 (BR1)	SI70368 (BR1)

RED PTF's may require an IPL.

SVC setup prior to our engagement

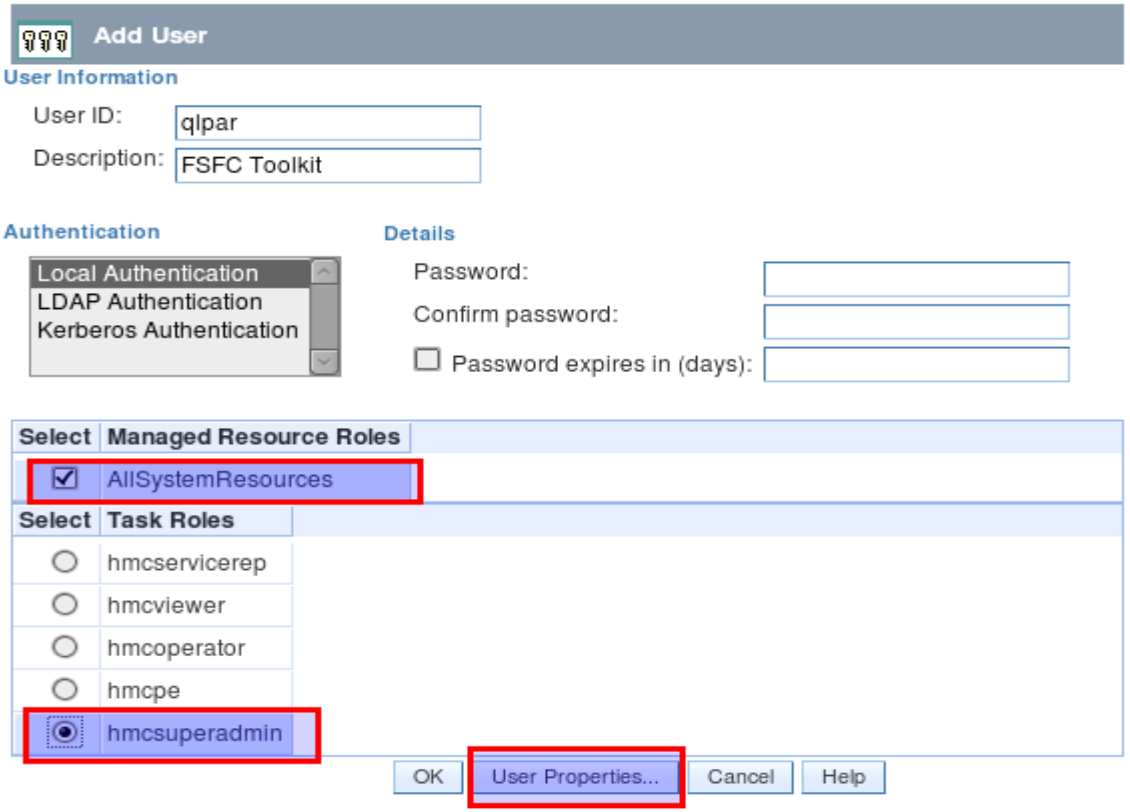
- Configure the storage unit for Primary, Secondary and Controlling LPAR.
  - Firmware level 7.5.0.3 or newer
    - If using FS910 with GMCV and the change volumes are in a data reduction pool (DRP), the SVC must be at firmware level 8.2.1.1 or higher
  - Create or select user profile
    - Must be assigned to CopyOperator (or better) user group
    - If changing host connections, must be Administrator
  - LUNs
    - For source and target LPARs
  - Host connections
  - Licenses (Replication, Thin-provision, etc)
  - If using replication:
    - Partnerships
      - We can remotely help you set this up (also ensures you have communication between the SVC's before we arrive)
    - Start replication
      - Replication should be completed before we're onsite so that won't have to wait for it to catch up

DS8K 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 Primary, Secondary and Controlling LPAR.
  - Recent firmware level
    - Install DSCLI on the IBM i from the DS8K CD
    - Bundle 87.10.91.0 or newer (required for creating GMIR D-Copy)
  - Create fixed block volumes (requires ranks, arrays, extent pools, space efficient repositories, etc)
    - For source and target LPARs
  - Volume groups, ports and host connections
  - Licenses (Replication, Space Efficient, etc)
  - PPRC Paths
    - We can remotely help you set this up (also ensures you have communication between the DS's before we arrive)
  - Start replication
    - Replication should be completed before we're onsite so that won't have to wait for it to catch up

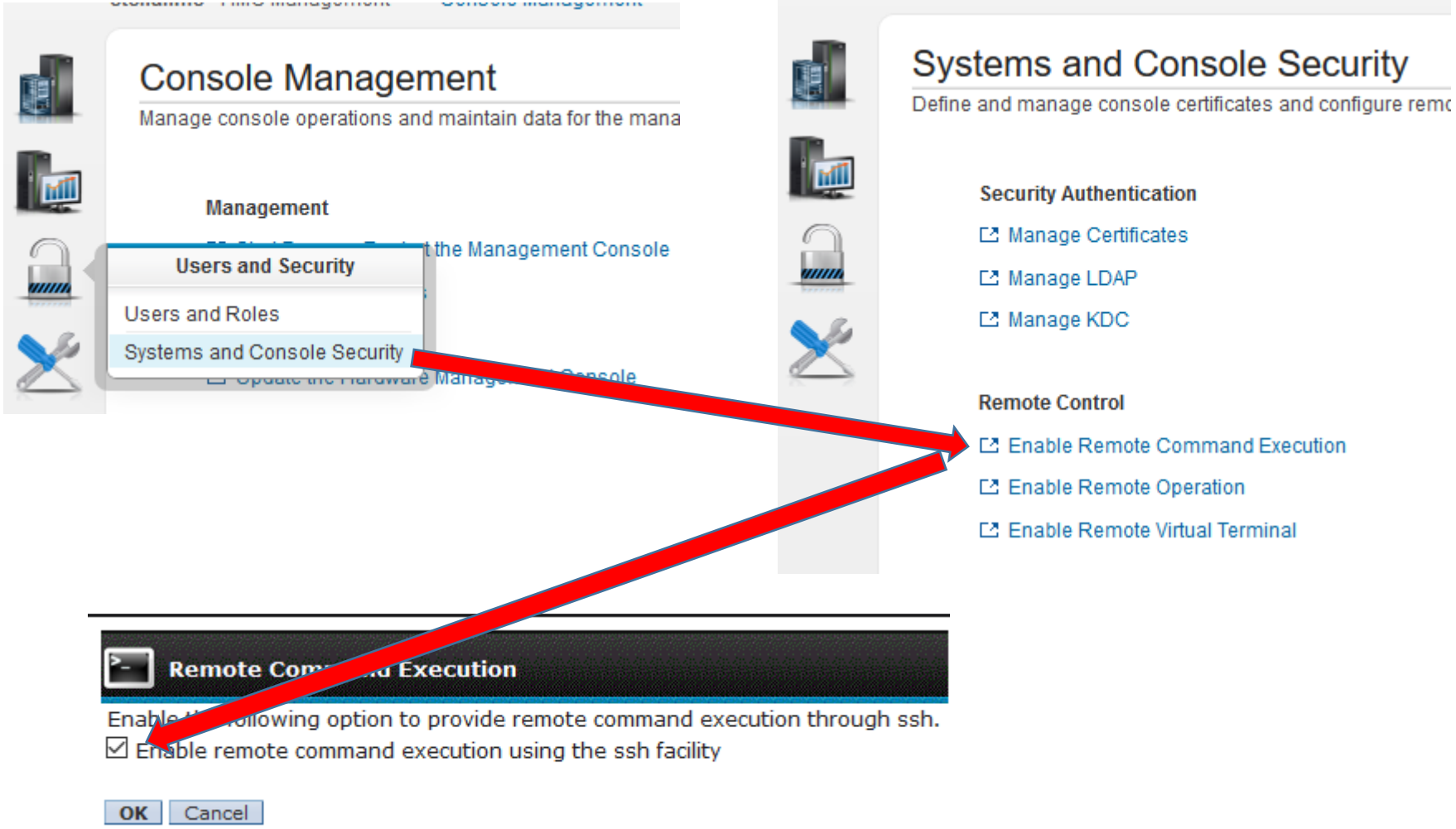
HMC Configuration

- Create a user on the LPAR HMCs
- Any user name will do (as long as you remember it)
- Password is required
- Hmcsuperadmin with AllSystemResources



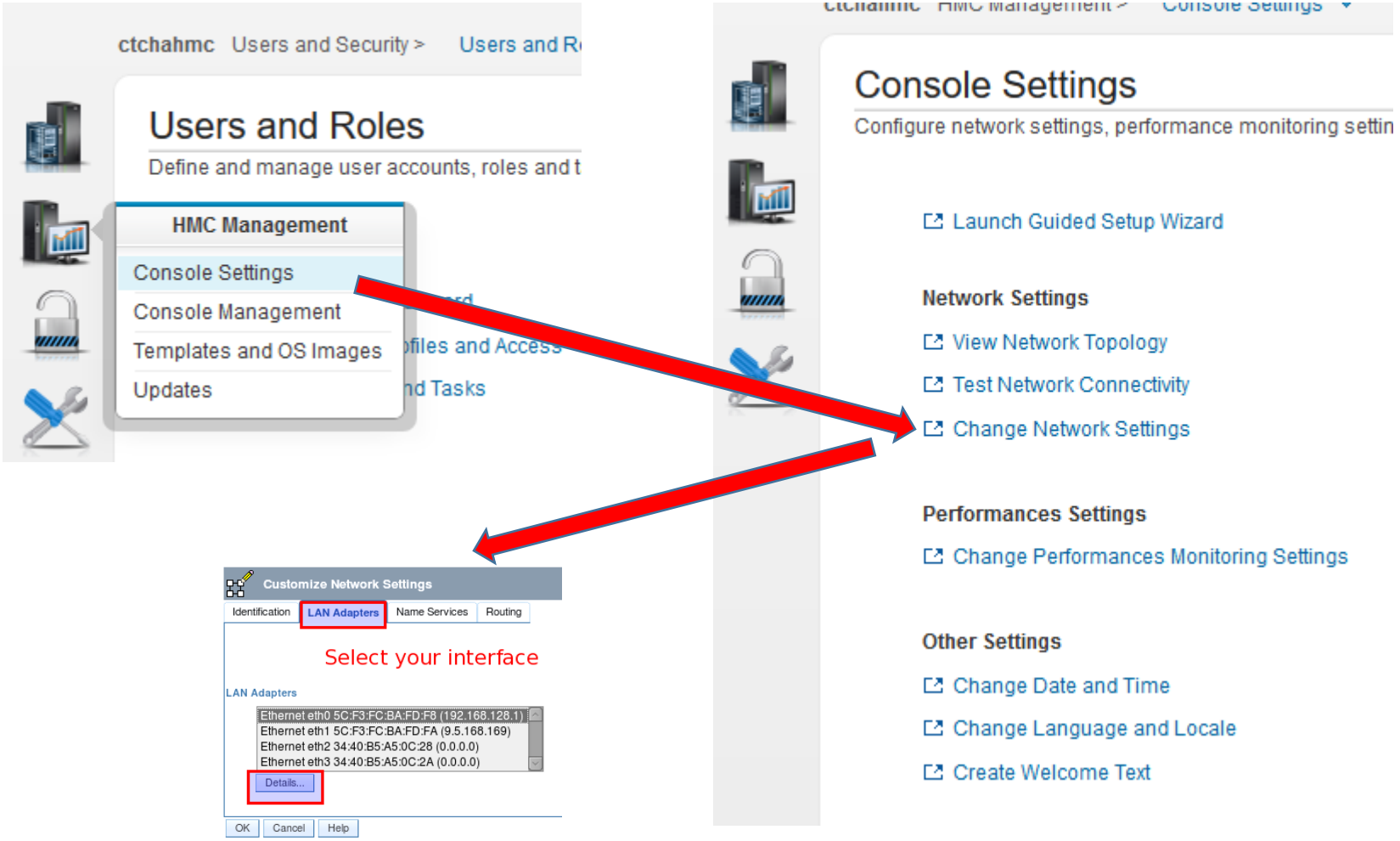
HMC Configuration

Remote command execution must be enabled (It usually is by default)



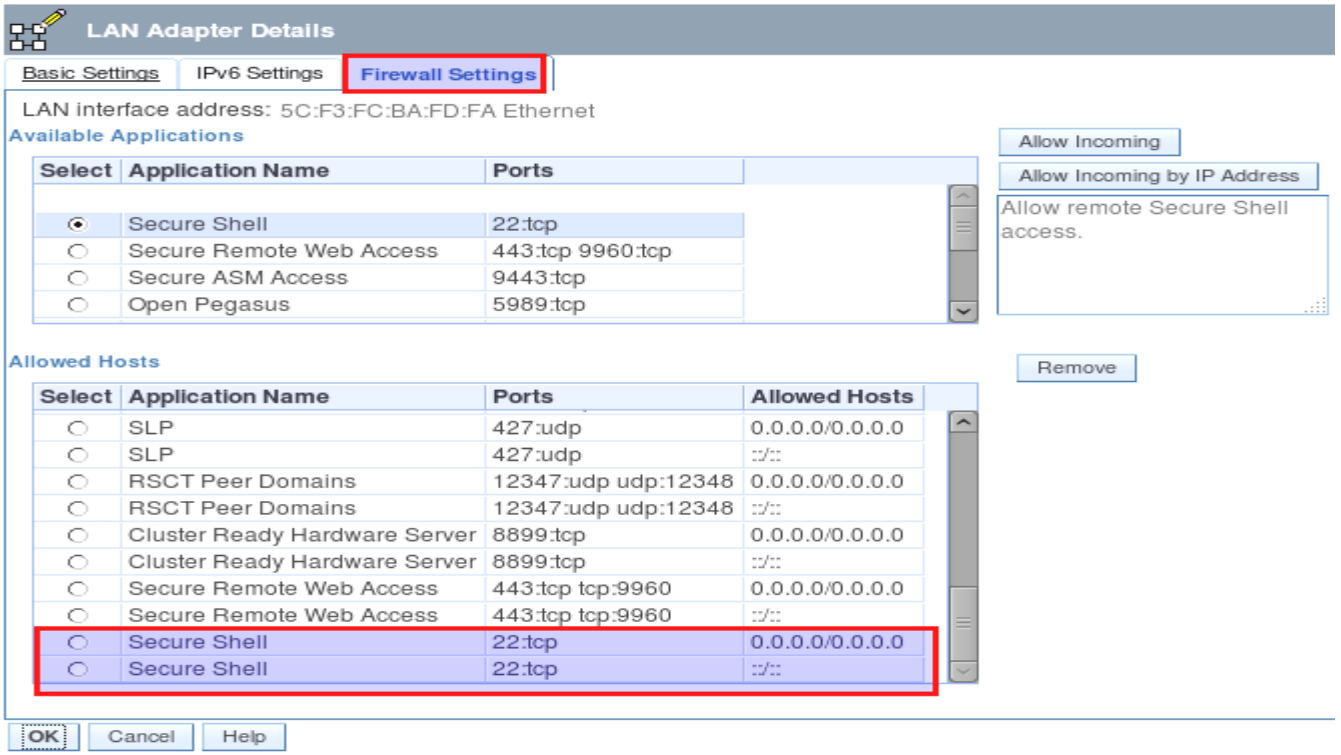
HMC Configuration

Ssh must be enabled through the firewall



HMC Configuration

Secure Shell (port 22:tcp) must be allowed.
- Allow all hosts: 0.0.0.0/0.0.0.0
- Allow specified hosts: at least specify the IP of your controlling LPAR



Restoring toolkit library, setup on **Production** LPARs

- Place the toolkit savefile in QGPL (FTP, scp etc)
- Restore the toolkit library:
  - RSTLIB SAVLIB(QZRDHASM) DEV(*SAVF) SAVF(QZRDHASM45)
    - The ‘45' refers to the release and may change
  - ADDLIBLE QZRDHASM
- Run the setup program
  - SETUPFSFC NODEROLE(*SRC) ACSCODE(<your license access code>)
    - Press PF9 and specify the line description, TCPIP interface and subnet mask to create on the controller for the target to use
  - The port number is used for toolkit communications from the controllers, *DFT is 55920
  - The line description and IP interfaces will be created
  - Will create user profile QLPAR without a password, initialize files etc.
- If the target LPAR is on a different serial number:
  - A license key for the target LPAR must be entered.
  - Use ADDPRDACS on the Production LPAR to enter the serial number and license for the target LPAR.
- If the customer is on IBM i 7.4 and using cloud-init they will need to disable it for FSFC functions:
  - CALL PGM(QSYS/QAENGCHG) PARM('WAITTIME=0’)
    - Note: no blank before and after "="

Enter the controller information on the **Production** LPARs

- If using multiple controllers, set up the toolkit so STRFSLASH can be issued on the production LPAR and connect to the first available controller.
- Use WRKSTRPRSC *CMN and enter the controller information:

```
                        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
```

- STRFSFLASH CTLR(*AUTO) will use this information to connect to the first available controller.
- STRFSFLASH can still be run from the controller with CTLR(*LOCAL)

Modifying the Startup Program on **Production** LPARs

- Modify startup program on each node to prevent QSTRUPPGM from running on the target.
  - This is optional but adds a layer to safety.
  - QZRDHASM/RUNLPARCMD SRLN(xxxxxxx) LPAR(xx) CMD(CALL PGM(QZRDHASM/QZRDENDSBS))
    - Specify the target LPAR serial and LPAR numbers
    - Review QZRDHASM/QCLSRC QZRDENDSBS for changes
    - Include MONMSG CPF0000 after RUNLPARCMD

- Modify startup program on each node to start the subsystem:
  - This is not necessary if FSR is also installed (CFGSTRPRSC will start the subsystem)
  - After IP and QSYSWRK start, before applications,
  - STRSBS QZRDHASM/QZRDFSR

Creating the cluster on the **controllers**

- If there is only one controller, you must create a single-node cluster. Perform the following steps on the single node only.
- If multiple controllers are to be configured, issue these messages on all of them:
  - STRTCPSVR *INETD
  - CHGTCPSVR *INETD AUTOSTART(*YES)
  - CHGNETA ALWADDCLU(*ANY)
- On the Master controller
  - CRTCLU CLUSTER(FSFC) START(*YES), 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)
    - Enter one node name first, press enter
    - Option 6, add the other node name
- On Auxiliary controller:
  - WRKCLU, validate cluster is started

Restoring toolkit library, setup on both **Controllers**

- Place the toolkit savefile in QGPL (FTP, scp etc)
- Restore the toolkit library:
  - RSTLIB SAVLIB(QZRDHASM) DEV(*SAVF) SAVF(QZRDHASM45)
    - The ‘45' refers to the release and may change
  - ADDLIBLE QZRDHASM
- Run the setup program
  - SETUPFSFC NODEROLE(*CTL) PORT(*DFT) ACSCODE(<your license access code>)
  - The port is used to receive communications from the production LPARs, *DFT is 55920
  - Will create user profile QLPAR without a password, initialize files 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
```

Update the startup program on the **controllers**

- Modify the startup program (after IP has been started) on each controller to:
  - Start the subsystem if any process will be initiated from the production LPAR:
    - STRSBS QZRDHASM/QZRDFSR
  - Start the cluster if there are multiple nodes using the DDD:
    - STRCLUNOD CLUSTER(FSFC) NODE(Master or Auxiliary controller nodes)
      - **This requires *IOSYSCFG so QSTRUPJD should specify a profile like QLPAR so after compiling the startup program issue this command:**
        - **CHGJOBD JOBD(QSTRUPJD) USER(QLPAR)**

Download the Java Secure Channel code (on the **Controllers**)

- Download Java Secure Channel to /QIBM/qzrdhasm/ssh from
  - http://sourceforge.net/projects/jsch/files/jsch.jar/0.1.55/jsch-0.1.55.jar/download
  - Use the latest version, ensure the file /QIBM/Qzrdhasm/ssh/jsch.jar links to what you downloaded. To create a new jsch.jar that points to the jar file, use this command:
    - ADDLNK NEWLNK('/QIBM/Qzrdhasm/ssh/jsch.jar') OBJ('/QIBM/Qzrdhasm/ssh/jsch-0.1.55.jar')
- The Java Secure Channel is an open-source implementation of ssh which allows the FSFC toolkit to issue ssh calls programmatically and to review the results.
- Because it is open-source, IBM Legal requires that you download it yourself (i.e. we can't bundle it with our toolkit)
- Download to desktop, FTP to both IBM i controllers, place it into directory /QIBM/qzrdhasm/ssh/

```
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>
```

Create the credentials on either **controller**

- FSFC uses userid/password to log into the HMCs, DS8Ks and SVCs. Use WRKCSECRDL or ADDCSECRDE to manage these credentials.
- The 'Role' should be *USER if the host is not a CSM server
- Enter the IP address, user ID, password and a description of the host for:
  - SVCs
  - DS8Ks
  - HMCs
- This information is encrypted and placed into the device data domain and is kept consistent on both of the controllers.
- WRKCSECRDL uses PowerHA to keep the controllers in sync

```
                          Work with CSE Credentials List

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

Opt     IP Address          Role        User ID              Description

        9.5.95.139          *USER       qlpar                CTCHAHMC2
        9.5.167.58          *USER       qlpar                IBM.2107-75XA511
```

SVC vs. DS8K configuration

SVC Environment Configuration

DS8K Credentials and Environment Configuration

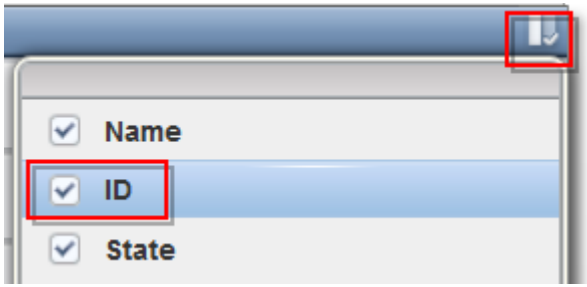
Create the SVC environments on the **controller**

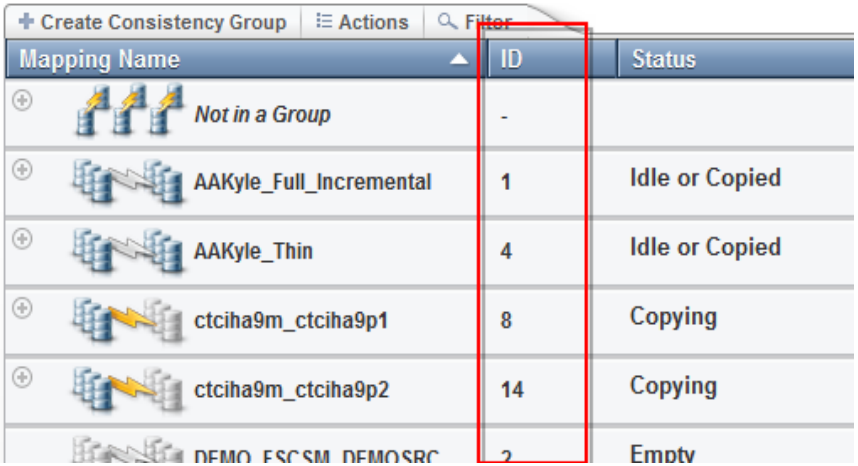
- An FSFC Environment describes the storage to the toolkit. Use WRKCSE to manage the environments.
  - Option 1 creates a new environment
  - Enter *NONE when prompted for ASP Copy Descriptions
- The environments are stored in the device data domain and is kept in sync with both controllers.
- On the SVC, flashcopy consistency groups define background copy rates, full or incremental etc. The toolkit just manages the consistency groups.

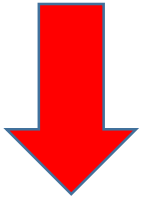
```
                              Change a FLASH Environment
 Type choices, press Enter.

 Environment name . . . . . :   TEST
 Storage Type . . . . . :   SVC

 FlashCopy SVC information:
   Flash SVC IP Address . . . . . .   1.2.3.4                 IPv4
   FlashCopy consistency group Id . .   2                     Id
   GMCV Source SVC IP Address . . . .                         IPv4
   Remote copy consistency group Id                           Id

 Comment:
   Text . . . . . .   Something meaningful to humans


Bottom
 F1=Help    F3=Exit    F6=Validate    F12=Cancel
```

Finding the Flashcopy consistency group Id

- The environment requires the Flashcopy consistency group Id.
- To find it, view the flash copy consistency groups and enable the Id column







Click here to continue with CSE Data

Create the DS environments on the controller

- An FSFC Environment describes the storage to the toolkit. Use WRKCSE to manage the environments.
  - Option 1 creates a new environment
- The environments are stored in the device data domain and is kept in sync with both controllers.
- Enter the requested information then PAGE DOWN

```
Change 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 . . .
```

Enter the DS information

- Enter the flashcopy details
- Enter the DS unit details
- If the IP address isn't in WRKCSECRDL yet, pressing enter will take you there to add it.

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

 FlashCopy IASP Manager options:
   Full FlashCopy . . . . . .   *NO                    *YES, *NO
   Resync FlashCopy . . . . . .   *NO                  *YES, *NO
   Multi incremental resync . . . . .   *YES           *YES, *NO
   Space Efficient FlashCopy  . . . .   *NO            *YES, *NO
   Target PPRC  . . . . . .   *NO                      *YES, *NO
   GMIR D-Copy target flash . . . . .   *NO            *YES, *NO

 DS unit SMC information:
   Flash hmc1 . . . . . .                             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.
```

Enter the DS information

- Enter the volume details

```
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
```

Enter the DS information – host connections

- From WRKCSE, use option 16 to manage the target LPAR host connections
- Note the use of F4 to prompt for hosts, and F6 to import LUNs

```
                                Work with Host Connections

  Environment  . :   FSFC137              Device . . . . :   XBM.2107-75XA511
  Type . . . . . :   FLASH

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

                                Number
  Opt     Host name            Volumes

          CTCCSM1                   1

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

Enter the Copy Services Environment (CSE) Data on either **Controller**

- The CSE Data describes the non-storage elements of an environment.
- This data is also stored in CRG's. The toolkit will create the CRG. It will always remain inactive when viewed in WRKCLU opt 9.
- CRTCSEDTA, CHGCSEDTA, DLTCSEDTA and DSPCSEDTA can be used to work with this information.
  - Stored in the CRG so the data is synchronized between the controllers
- WRKCSEDTA displays all the data 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:
===>
```

Enter the Copy Services Environment (CSE) Data on either **Controller**

- Use CRTCSEDTA or WRKCSEDTA opt 1 to enter the flashcopy operational details
- The command will prompt for details depending on what you enter
- Start with *FRCWRT, no BRMS integration.

```
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

Source LPAR IP address . . .   9.4.153.4        IPv4 address
Source host alias  . . . . .   SOURCE           Name
Target host alias  . . . . .   TARGET           Name

Method to flush memory . . .   *FRCWRT          *QUIESCE, *FRCWRT, *IPL



                                                                More...
```

Enter the Copy Services Environment (CSE) Data on either **Controller**

- If the source or target LPARs participate in LPM or LUN switches, specify *SEARCH on the HMC Managed System Name parameter.
- Note that you can prompt on the system, LPAR and Profile names using F6

```
                          Create Full System FlashCopy CSE Data

Supply all required values, press Enter.

Target LPAR Information:
  Primary HMC IP . . . . . .   1.2.3.4           IPv4 address
  Secondary HMC IP . . . . . .                   IPv4 address
  HMC managed system . . . . .   *SEARCH
  HMC LPAR name  . . . . . .   lparName
  HMC Profile name . . . . . .   lparProfile
  Shutdown target before
    FlashCopy  . . . . . .   *YES               *YES, *NO
  Restart target after
    FlashCopy  . . . . . .   *YES               *YES, *NO, *INQ, *FRCINQ,
                                                  *PAUSE, *COPIED

                                                                      More...
F1=Help    F3=Exit    F4=Prompt    F6=Query HMC    F12=Cancel
```

Enter the Copy Services Environment (CSE) Data on either **Controller**

- Do not specify a backup command yet

```
Change Full System FlashCopy CSE Data

Supply all required values, press Enter.

Target LPAR Device Setup:

  Backup device description    *NONE             *NONE, device name
  Device serial number . . .   *NONE

      + for more values  . .

Target LPAR backup command     *NONE


      + for more values  . .




                                                                More...
```

Enter the Copy Services Environment (CSE) Data on either **Controller**

- Target keylock position set to *MANUAL

```
Change Full System FlashCopy CSE Data

Supply all required values, press Enter.

Wait for ENDFSFLASH  . . . .   *NO              *YES, *NO
FlashCopy Exit program . . .   *NONE
  Library  . . . . . . . . .     *LIBL          *LIBL, library
Hold scheduled jobs  . . . .   *YES             *YES, *NO
Target keylock position  . .   *MANUAL          *PANEL, *AUTO, *MANUAL
Stop target after backups      *NO              *YES, *NO, *RMV

Text . . . . . . . . . . . .

                                                                  Bottom
```

Save the Copy Services Environment (CSE) Data on both **Controllers**

- The command SAVDDD will put all the DDD and CRG information into an IFS directly.
- Create a directory first
  - MKDIR ‘/someplace/PHAT_save’
- Save to it:
  - SAVDDD ‘/someplace/PHAT_save’
  - Subsequent saves will overwrite prior saves
- Add the SAVDDD to a BRMS control group immediately before *ALLUSR
- In the even of a restore, create the directory and issue RSTDDD
- Add the restore command to the end of the recovery report. It should be done after re-establishing the cluster and DDD.

Test the configuration on either **Controller**

- Use CHKFSFLASH to verify communications configurations first
- Resolve issues until it is successful

```
CHKFSFLASH CSEDTA(FSFC9M9P1)
Acquired lock on LPAR CTCIHA9M.
Validating flashcopy consistency group 8
Validating flashcopy mappings
Consistency group 8 validated.
Successfully performed local verifications.
Performing Full System FlashCopy verifications on CTCIHA9M.
Released lock on LPAR CTCIHA9M.
Log file used : /QIBM/Qzrdhasm/fsfc/FSFC9M9P1/ctl.log.
CHKFSFLASH validation for FSFC9M9P1 completed successfully.
```

Before you test the Flash Copy

- On the production LPAR, do QCTL and QSYSWRK have prestart or autostart jobs?
  - DSPSBSD SBSD(QSYS/QCTL) option 5, option 3 and 10
  - DSPSBSD SBSD(QSYS/QSYSWRK) option 5, option 3 and 10
  - If YES then you'll need to use the exit program QZRDIAFFEX
    - Remove them at *QUIESCE and add them back at *POSTFLASH (include MONMSG CPF0000)
      - RMVAJE SBSD(QSYS/QCTL) JOB(jobname)
      - RMVPJE
      - ADDAJE SBSD(QSYS/QCTL) JOB(jobname) JOBD(job description)
      - ADDPJE
    - Add them to the BRMS Recovery report (we'll do this later when we edit QO1AUSRRCY)
    - Update the CSE Data to call the exit program
- Did you add RUNLPARCMD to the startup program?
- On the target LPAR, do any comm adapters (virtual and physical) have the same slot numbers (Cxx) as the comm adapters on the source LPAR?
  - If yes, move them to other slots
  - This will prevent the OS from using them with the existing line descriptions.

Test the configuration on either **Controller**

- Did you read the previous slide?
- Use STRFSFLASH to perform a flashcopy
- The target will IPL into manual mode
- Sign on to the target LPAR console
- Continue to IPL the LPAR to restricted state.
- When you've got a command line, verify the startup program is QZRDHASM/QZRDIASTRP
  - DSPSYSVAL QSTRUPPGM
- Continue the IPL
  - STRSBS QCTL
- Get the information needed for the communications interface
  - DSPHDWRSC *CMN
  - Get the location code
- Get the information needed for the tape devices
  - DSPHDWRSC *STG
  - Get the serial number
- On the target, execute command QZRDHASM/ENDFSFLASH to finish the process

Update the configuration on either **Controller**: Communications

- Using CHGCSEDTA, update:
  - Communications interface location code
    - Vxx = LPAR number XX
    - Cxx = slot number xx
  - Line description
  - IP Address

```
Change Full System FlashCopy CSE Data

Supply all required values, press Enter.

Target Comm Interfaces:

  Identifier Type  . . . . .   *LOC               *SRLN, *LOC, *NONE
  IO card identifier . . . .   U8233.E8B.10001AP-V4-C2-T1

  Line Description . . . . .   FSFCLINE          line name, *VIRTUALIP
  IO card IP interface . . .   9.5.167.93        IPv4 address

      + for more values  . .

Target LPAR default route:
  Binding interface  . . . .   *NOCHANGE         IPv4 address
  Next hop . . . . . . . . .                     IPv4 address
```

Update the configuration on either **Controller**: Tape devices

- Using CHGCSEDTA, update:
  - Device descriptions that the backups will use
  - Serial numbers of the devices
    - If using logical libraries, use the tape drive serial numbers

```
Change Full System FlashCopy CSE Data

Supply all required values, press Enter.

Target LPAR Device Setup:

  Backup device description    TS3400PROD        *NONE, device name
  Device serial number . . .   78-78F1101

      + for more values  . .
```

Update the configuration on either **Controller**: BRMS

- Using CHGCSEDTA, update:
  - BRMS Integration = *YES
  - Change the defaults if necessary
- Note Custom SYSBAS Timestamp defaults to *BOTH

```
Use BRMS integration . . . . .   *YES              *YES, *NO
BRMS information:
  BRMS transfer method . . . .   *ALL              *ALL, *CHGONLY
  BRMS transfer port . . . . .   *DFT              *DFT, 1024-65535
  Encrypt BRMS transfer  . . .   *NO               *YES, *NO
  Custom SYSBAS Timestamp  . .   *BOTH             *NONE, *BOTH, *QSYS *IFS
  Lock BRMS  . . . . . . . . .   *SRCONLY          *BOTH, *NO, *SRCONLY,
                                                    *TGTONLY
  Lock type  . . . . . . . . .   *FCNUSG           *ALL, *FCNUSG, *HOLD
  Base media class . . . . . .   *NONE             class, *NONE
  Base media class suffix  . .   *NONE             suffix, *NONE
  Restricted media class(es)     *NONE             *NONE, class
      + for more values  . . .
```

Update the configuration on either **Controller**: BRMS

- Using CHGCSEDTA, update:
  - BRMS Integration = *YES
  - Change the defaults if necessary

```
Use BRMS integration . . . .   *YES              *YES, *NO
 BRMS information:
   Lock BRMS  . . . . . . . .   *SRCONLY          *BOTH, *NO, *SRCONLY,
                                                   *TRGONLY
   Lock type  . . . . . . . .   *FCNUSG           *ALL, *FCNUSG, *HOLD
   Base media class . . . . .   *NONE             class, *NONE
   Base media class suffix      *NONE             suffix, *NONE
   BRMS Transfer Method . . .   *CHGONLY          *ALL, *CHGONLY, *NONE
   BRMS Transfer port . . . .   *DFT              *DFT, 1024-65535
   BRMS save compression  . .   *MEDIUM           *DEV, *YES, *NO, *HIGH,
                                                   *MEDIUM, *LOW
   Restricted media class(es)   *NONE             *NONE, class
       + for more values  . .
```

Update the configuration on either **Controller**: BRMS

- Specify a BRMS command
  - If SBMJOB(*YES) then specify a job description that ensures it will run (i.e. if QBATCH isn't started don't send it to QBATCH)
    - JOBD(QLPARJOBD) sends it to job queue QSYSNOMAX which sends to QSYSWRK

Target LPAR backup command	STRBKUBRM CTLGRP(BACKUPS) SBMJOB(*YES or *CTLSBS)

- Prompting (F4) is available on the command

But … it is prompted on the local (controlling) LPAR, not where the command will run (on the source LPAR). Select a default control group (like *BKUGRP) then change it to the desired control group after pressing enter.

Update the configuration on either **Controller**: Keylock

- Using CHGCSEDTA, update:
  - Target keylock position = *AUTO

```
 Change Full System FlashCopy CSE Data

Supply all required values, press Enter.

Wait for ENDFSFLASH  . . . .   *YES             *YES, *NO
FlashCopy Exit program . . .   *NONE
  Library  . . . . . . . . .     *LIBL          *LIBL, library
Hold scheduled jobs  . . . .   *YES             *YES, *NO
Target keylock position  . .   *AUTO            *PANEL, *AUTO, *MANUAL
Stop target after backups      *NO              *YES, *NO, *RMV

Request type . . . . . . . .   0                Number
Auto start cluster . . . . .   *YES             *YES, *NO
Wait time  . . . . . . . . .   0                Number of seconds
Message Queue  . . . . . . .   *SYSOPR          name, *SYSOPR
  Library  . . . . . . . . .                    library name

Text . . . . . . . . . . . . .
```

BRMS Changes on the **Source** LPAR

- Change the system policy to allow backups in batch:
  - WRKPCYBRM *SYS, Option 1, Page down

```
 V7R3M0                    Change System Policy                    CTCIHA9L

Type choices, press Enter.

 End all subsystems options
   Controlled end delay time  . . . . . 1200          1-99999 seconds,*IMMED
   Abnormal end delay time  . . . . . . *NOLIMIT      10-999 minutes,*NOLIMIT
   End servers wait time  . . . . . .    0           0-9999 seconds
 Controlling subsystem:
   Allow backups in batch . . . . . . . *YES         *NO, *YES
   Restricted state time limit  . . . . *NOMAX       5-9999 minutes, *NOMAX
 Allow alternate input media. . . . . . *YES         *NO, *YES
 Volume prefix  . . . . . .            *            Prefix
 Enable Full System FlashCopy . . . . . *YES         *NO, *YES
 BRMS submitted jobs:
   Job description. . . . . . . . . . . *USRPRF      Name, *USRPRF
     Library. . . . . . . . . . . . . .              Name, *LIBL, *CURLIB
   Job queue. . . . . . . . . . . . . . *JOBD        Name, *JOBD
     Library. . . . . . . . . . . . . .              Name, *LIBL, *CURLIB
 BRMS flight recorder size  . . . . . . 050          001-999 megabytes
```

BRMS Changes on the **Source** LPAR

- Modify the control group to call the toolkit exit program
  - WRKCTLGBRM, Opt 8, page down to Backup item exit program
  - Set the exit program to QZRDHASM/QZBRMSEXIT format BKUI0100

```
  Change Backup Control Group Attributes

Group  . . . . . . . . . . . . . . . . . : TESTEXIT

Type information, press Enter.

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

BRMS Changes on the **Source** LPAR - Subsystems

- Subsystems should NOT be set to start
  - WRKCTLGBRM, Opt 9

```
                                  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
```

BRMS Changes on the **Source** LPAR - Attributes

- Do not run STRMNTBRM or manage servers after control group
  - WRKCTLGBRM, Opt 8, page down all the way

```
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
```

Modify BRMS recovery report user-added steps

- Insert custom message into the recovery reports to change system settings to start IP etc.
  - STRSEU SRCFILE(QUSRBRM/QO1AUSRRCY) SRCMBR(STEP014)
  - Insert the following text:
    After restoring the configuration settings, run the following commands:
    CHGSYSVAL SYSVAL(QSTRUPPGM) VALUE('QSTRUP QSYS ')
    CHGLINETH LIND(ETHLINE) ONLINE(*YES)
    CHGTCPIFC INTNETADR('1.2.3.4') AUTOSTART(*YES)
    CHGIPLA STRTCP(*YES)
    ADDAJE SBSD(QSYS/QSYSWRK) JOB(QBRMSTRUP) JOBD(QBRM/Q1ASTRJD)
- Modify the recovery report creation to include the user info
  - Add the parameter USRRCYINF(*ADD)
  - If STRMNTBRM is used to generate the reports
    - Modify the STRMNTBRM call with PRTRCYRPT(*NONE)
    - Add STRRCYBRM USRRCYINF(*ADD) to the job scheduler, to run 15 minutes (or so) after STRMNTBRM
  - Consider using the Flashcopy Exit Program
    - WRKMBRPDM QZRDHASM/QCLSRC member QZRDIAFFEX
      - Copy the source files to utility libraries
      - Compile a blank program for the controller, and one that calls STRMNTBRM and STRRCYBRM at exit *FINISH on the source

Test the configuration on either **Controller**

- Use CHKFSFLASH to verify communications configurations first
- Resolve issues until it is successful

```
CHKFSFLASH CSEDTA(FSFC9M9P1)
Acquired lock on LPAR CTCIHA9M.
Validating flashcopy consistency group 8
Validating flashcopy mappings
Consistency group 8 validated.
Successfully performed local verifications.
Performing Full System FlashCopy verifications on CTCIHA9M.
Released lock on LPAR CTCIHA9M.
Log file used : /QIBM/Qzrdhasm/fsfc/FSFC9M9P1/ctl.log.
CHKFSFLASH validation for FSFC9M9P1 completed successfully.
```

Test the configuration on either **Controller**

- Use STRFSFLASH to perform a flashcopy
- Flashcopy target LPAR IPL etc will occur
- If this is a SAVSYS backup then the HMC SRC will be A900 3C70 while in Batch Restricted State
- After backups, BRMS will be transferred to the source LPAR
  - If not, check /tmp/qzrdiash.log on the target
- On the source LPAR, verify backups are complete
  - DSPLOGBRM
  - WRKMEDIBRM
  - BRMS Recovery reports
    - Look for the customer recovery steps after RSTCFG.
    - This is usually step 14 – if not, find the correct step and move the text in member QUSRBRM/QO1AUSRRCY STEP014 to the correct member.

Schedule Log Cleanup on all the LPARs

- CLEANLOGS will prune toolkit logs to save on space
  - 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  .                *NONE, days

                                    Additional Parameters

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

How to reset after failure

- Failures can happen, you need to know how to set things back to normal.
- To abandon the backups:
  - On the target: QZRDHASM/ENDFSFLASH *FAILBKU
  - On the source: QZRDHASM/ENDFSFLASH *RSTFCNUSG
- The wiki contains additional recovery steps

Saving and Restoring WRKCSE, WRKCSEDTA and WRKCSECRDL

- WRKCSE, WRKCSEDTA and WRKCSECRDL information is stored on the controller in PowerHA device data domains (DDD)
- The DDD's are not saved/restored with the usual commands SAVCFG, SAVOBJ etc or even GO SAVE opt 21
- The Toolkit includes two commands to save and restore the DDD:
  - SAVDDD
    - Saves all the DDD information to an existing IFS directory
      - Use mkdir to create the directory first
  - RSTDDD
    - Restores all the DDD information from an existing IFS directory
- Recommendation is to run SAVDDD prior to an upgrade or backup of the controlling LPAR

Where can I find the logs for troubleshooting?

- Logs are in the following place:
  - /QIBM/Qzrdhasm/qzrdhasm.log
  - /QIBM/Qzrdhasm/fsfc/<CSE Data name>/*
  - /QIBM/Qzrdhasm/qzrdhasm.log.bak
  - /QIBM/Qzrdhasm/java.logs/*
  - /QIBM/Qzrdhasm/joblogs/*
- DMPINF ENV(*ALL) EXTDLOGS(*YES) will grab all these files and put them in a zip file.
  - Specify the failing job information on Job Name:

```
                        Dump ICSM Information (DMPINF)

Type choices, press Enter.

Environment name . . . . . .   *ALL          Name, *ALL
Type . . . . . .   *ALL          *ALL, *FLASH, *GMIR, *LUN...
Extended logging . . . . . .   *YES          *YES, *NO
Job name . . . . . .   *NONE         Name, *CURRENT, *NONE, *LAST
  User . . . . . .                   Name
  Number . . . . . .                 000000-999999
Days of logs to keep . . . . . .   90           days, *NONE, *NOMAX
```

Contacting support if you have problems

Support for the FSFC Toolkit is to customers who meet the following criteria:

- Current System i Software Maintenance Agreement
- 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 iesspt@us.ibm.com

For immediate 24x7 assistance, 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 iSeries

Lab Services “Copy Services Toolkit – Full System Flashcopy” using component

identifier 5798CST00.