Quick-install of the PowerHA Full System Replication Manager
Version 4.3

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Thursday, June 27, 2019
What the heck is this document for?

- This is a quick-install guide for configuring the Full System Replication 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 Systems Lab Services consultant
- It does not explain details or how to handle errors or special/complex situations

- Primary documentation is the FSR Manager Wiki
- Has more detail and explanations
Overview of Full System Replication topography

**Master/Auxiliary or Preferred Source/Target:** Denotes the site, does not change.

**Primary/Secondary:** Denotes replication direction (from Primary to Secondary)
Customer actions prior to our engagement

- Provide Systems 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 (Enterprise Edition) installed and licensed
    - We will help you set up the clusters
  - Place FSR Manager savefile QZRDHASM43 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

<p>| | | | |</p>
<table>
<thead>
<tr>
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## Source LPAR PTFs

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</tr>
</tbody>
</table>

**RED PTF's may require an IPL.**
Storage Setup Selector

Click here for SVC setup

Click here for DS8K setup
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
- LUNs
- Host connections
- Licenses (Replication, Thin-provision, etc)
- 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
Creating the SVC partnerships

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<td>ctchav7kb</td>
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<td>ctchav7kc</td>
<td>Remote</td>
<td>✓ Fully Configured</td>
<td>Fibre Channel</td>
<td></td>
</tr>
</tbody>
</table>

Local SVC  

Remote SVC  

Cluster IPs  

Replication IPs or FC ports  

Ethernet Ports

The Ethernet ports can be used for iSCSI connections, host attachment, and remote copy.
Creating the partnerships … details

- First create the IP replication or FC ports, LAN or SAN switch configuration etc.
- If multiple IP addresses or ports are available via multiple networks, they can be configured to:
  - Combine bandwidth (active/active)
    - Place the ports in the same Remote Copy group
  - Use for redundancy failover (active/inactive)
    - Place the ports in different Remote Copy groups
- When creating the partnership, specify the Cluster IP’s, not the replication IP’s.
  - The SVC’s will share their port information and use the replication IP’s
  - Specify the max bandwidth on the connection
    - This will be the max aggregate throughput the SVC will use for all replication
  - Specify the max % used for background copy
    - Background copy includes initial sync and all GMCV replication
- From a command (ssh/putty) use these commands to troubleshoot:
  - Isportip to verify which ports are active or for failover
  - Ping –srcip4 <local ip> <remote ip> to check connectivity
Creating the replication consistency group (RCCG)… details

- The initial sync can take a long time and should be performed the week before we arrive.
- To create a consistency group, select “Remote Copy” then “Create Consistency Group”
- Give it a useful name

Indicate where you want to replicate to

Where are the auxiliary volumes located?
- On this system
- On another system
  
  ctchav7kb
Creating the replication consistency group (RCCG)

- Select “yes” to add relationships
- Select the copy type
  - Skip the next panel to use existing relationships
- Pick the primary and secondary volumes

Do you want to add relationships to this group?
- Yes, add relationships to this group
- No, create an empty consistency group

Select the type of copy that you want to create:
- Metro Mirror
- Global Mirror
- Global Mirror with Change Volumes

Master
- cttciha9m_ls10
  - Capacity: 5.00 GiB

Auxiliary
- SteveTest15
  - Add
Creating the replication consistency group (RCCG)

- For GMCV, you should create the master change volumes now

Do you want to add a master Global Mirror change volume?
- Yes, add a master volume.
  
  An auxiliary volume can be added from the auxiliary system.

- No, do not add a master volume.

What type of master volume do you want to use?
- Create a new master volume
- Use existing volume for the master volume

Repeat for each volume pair. If you have many volumes (> 30 or so) we have a better method using spreadsheets and ssh (not covered here)
For GMCV, create auxiliary change volumes

- The auxiliary change volumes must be created on the auxiliary SVC after creating the RCCG
- Right click on each relationship in the RCCG
  - Select “Global Mirror Change Volumes” then “Create New”

- To change the replication type, cycling mode or period:
  - On a paused RCCG select “Edit consistency group”
  - Cycling mode of “Multiple” indicates GMCV
  - Cycle Period of 300 is the minimum
    - The interface allows 60 seconds to be input but the cycling periods will never be less than 300 seconds
Initial volume synchronization

- An initial volume synchronization is not needed if you have not yet loaded IBM i5/OS on the primary volumes.
- If you have already loaded i5/OS or added the volumes to an ASP, the initial synchronization must be performed.
- Best Practice Recommendation:
  - Create the volumes (primary and secondary) without formatting them
  - Start replication, indicate they are already synchronized
  - Start loading i5/OS on the primary volumes.
  - As the volumes are formatted and loaded, these changes will be replicated to the secondary volumes.

Are the volumes already synchronized?

- Yes, the volumes are already synchronized.
- No, the volumes are not synchronized.

Select “Yes, start copying now”

- If these are GMCV volumes, you can’t start copying until you create change volumes for auxiliary volumes, in case select “No”.

Do you want to start copying now?

- Yes, start copying now.
- No, do not start copying.
To start the replication, right-click on the RCCG and select “start”

The RCCG will go to “Inconsistent Synchronized”
- “Inconsistent” means the secondary is useless
- To monitor the replication, click on the clipboard in the lower left corner and select “Remote-Copy operations”

Once the progress reaches 100% the RCCG will go to “Consistent Copying” or “Consistent Synchronized”
- If using GMCV, the freeze time will update.
- Each freeze time will get progressively closer to your cycle period, depending on the speed of your link.

Click here to continue to HMC setup
DS8K setup prior to our engagement

- 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)
  - 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
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

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

Add User
User Information
User ID: qlpar
Description: FSFC Toolkit

Authentication
LDAP Authentication
Kerberos Authentication

Details
Password:
Confirm password:

Select Managed Resource Roles
- AllSystemResources

Select Task Roles
- hmcsvcirep
- hmcviewer
- hmcoperator
- hmcpe
- Hmcsuperadmin

OK Cancel Help

Allow remote access via the web

User Properties...

Hmcsuperadmin

Minimum time in days between password changes: 0

Session timeout minutes: 0
Verify timeout minutes: 15
Idle timeout minutes: 0

Disable for inactivity in days: 0
Never disable for inactivity

OK Cancel Help
```
HMC Configuration

Enable remote command execution

Remote Command Execution

Enable the following option to provide remote command execution through ssh.

- Enable remote command execution using the ssh facility
HMC Configuration

Allow ssh (port 22) through the firewall (on all adapters)
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
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.

- On both controllers:
  - STRTCPSVR *INETD
  - CHGTCPSVR *INETD AUTOSTART(*YES)
  - CHGNETA ALWADDCLU(*ANY)

- On the Master controller
  - CRTCLU CLUSTER(FSR) START(*YES), PF4, fill in Master Controller node name and IP address
  - ADDCLUNODE CLUSTER(FSR) NODE(Auxiliary Controller node name and IP)

- On Auxiliary controller:
  - WRKCLU, validate cluster is started
  - Option 7, create a device domain
    - Enter one node name first, press enter
    - Option 6, add the other node name
Restoring, creating QLPAR, access codes, setup on both **Controllers**

- Place the toolkit savefile in QGPL (FTP, scp etc)
  - scp QZRDHASM43.savf `user@hostname:/qsys.lib/qgpl.lib/QZRDHASM43.file`

- Restore the toolkit library:
  - RSTLIB SAVLIB(QZRDHASM) DEV(*SAVF) SAVF(QZRDHASM43)
    - The ‘43’ refers to the release and may change
  - ADDLIBE QZRDHASM

- The access code is based on serial number will be provided by the Systems Lab Services consulting team
  - ADDPRDACS SRLNBR(*CURRENT) ACSCDE(xxxx)

- Run the setup program
  - SETUPFSR NODEROLE(*CTL)

- Modify startup program on each node to start the cluster
  - After IP and QSYSWRK start, before applications,
  - STRCLUNOD CLUSTER(FSR) NODE(Master or Auxiliary controller nodes)
    - This requires *IOSYSCFG so QSTRUPJD should specify a profile like QLPAR
    - 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/0.1.52/jsch-0.1.52.jar/download](http://sourceforge.net/projects/jsch/files/jsch.jar/0.1.52/jsch-0.1.52.jar/download)
- Don't download a different version. It won't work.
- The Java Secure Channel is an open-source implementation of ssh which allows the FSR 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

```
ftp> bin
200 Representation type is binary IMAGE.
ftp> put jsch-0.1.52.jar /QIBM/qzrdhasm/ssh/jsch-0.1.52.jar
local: jsch-0.1.52.jar remote: /QIBM/qzrdhasm/ssh/jsch-0.1.52.jar
227 Entering Passive Mode (9,5,168,177,167,46).
150-NAMEFMT set to 1.
150 Sending file to /QIBM/qzrdhasm/ssh/jsch-0.1.52.jar
226 File transfer completed successfully.
249282 bytes sent in 0.742 secs (336.12 Kbytes/sec)
ftp>
```
Create the credentials on either **controller**

- FSR uses userid/password to log into the HMCs, SVCs and DS8Ks. Use WRKCSECRDL or ADDCSECRDE to manage these credentials.
- Enter the IP address, userid, password and a description of the host for:
  - Master and auxiliary SVCs
  - Local and remote HMCs
  - Local and remote DS8Ks
- This information is encrypted and placed into the device data domain and it kept consistent on both of the controllers.
- WRKCSECRDL uses PowerHA to keep the controllers in synch

```
Add CSE Credential Entry (ADDCSECRDE)
Type choices, press Enter.
Host IP address .........  > '1.2.3.4'   nn.nn.nn.nn
User ID .................  User ID
Password ...............  
Confirm password .......  
Host description ........  Local SVC
```
SVC vs. DS8K configuration

SVC Environment Configuration

DS8K Credentials and Environment Configuration
An FSR 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.

On the SVC, remote copy consistency groups can be changed between MMIR, GMIR and GMCV, but environment types are static. If you plan to change a consistency group type, create multiples types of environments.

NOTE: F6 to validate only works after we have created the CSE data (that’s next).

Create the SVC environments on the controller.
Finding the Remote copy consistency group Id

- The environment requires the Remote copy consistency group Id.
- It can be different on the master and auxiliary SVCs.
- To find it, view the remote copy consistency groups and enable the Id column.

Click here to continue with CSE Data.
Create the DS environments on the controller

- An FSR 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.

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

Environment name ...............: FSR
Storage type .............: DS8K

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

CSM information:
  CSM Replication .................: *NO

Production node ..............: CTCHAFS2

Metro Mirroring DS unit information:
  Source device ..............: IBM.2107-75XA511
  Target device .............: IBM.2107-75HH571
```
Enter the DS information

Enter the DS information (IP addresses and LUNs). Ignore the password field.

Change a MMIR Environment.

Type choices, press Enter.

DS unit SMC information:
Source hmc1 ........................................... 9.5.167.58 IPv4
Source hmc2 ........................................... IPv4
Source port ........................................... 1751 1750, 1751
Target hmc1 ........................................... 9.5.168.11 IPv4, *SAME
Target hmc2 ........................................... IPv4, *SAME
Target port ........................................... 1751 1750, 1751

Comment:
Text ...........................................

Press Enter and fill in the source and target LUNs

Add, Change or Delete Volumes

Environment : FSR
Type : MMIR
Volume sets : 6

Source device : IBM.2107-75XA511
Target device : IBM.2107-75HH571

Type Volume options; 1=Add, 2=Change, 4=Delete, press Enter.

<table>
<thead>
<tr>
<th>Opt</th>
<th>Source Volumes</th>
<th>Target Volumes</th>
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</thead>
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<tr>
<td>_</td>
<td>8910-8912</td>
<td>8910-8912</td>
</tr>
</tbody>
</table>
DS8K Credentials

- Past versions of the toolkit used password files.
- Starting in version 4.2, the toolkit now uses encrypted userid/passwords.
- Enter your DS8K userid / password into WRKCSCERDL
  - It does not have to be QLPAR.
- Test communications with WRKCSE opt 14, then opt 9, F10 on the lsfbvol_PS.script script.
- You should receive a list of the fixed block volumes.

---

Storage configuration is finished – continue with configuration
Enter the Copy Services Environment (CSE) Data on either **Controller**

- The CSE Data describes the non-storage elements of an environment.
- This data is stored in the Cluster Resource Group (CRG) and the CRG Name must match the environment name
  - The toolkit will create the CRG. It will always remain inactive
- **WRKCSEDTA, CRTCSEDTA, CHGCSEDTA and DSPCSEDTA** can be used to work with this information.
- Stored in the CRG so the data is synchronized between the controllers
- To delete the CSE data, remove the CRG (WRKCLU, opt 9, opt 4)
Power Down Command on the Controller

- The “Power down command” must be entered and it will be called on the production LPAR.
- Use PWRDWNSYS or another command that will perform any necessary shutdown tasks.
- The LPAR should be NOT be restarted (let FSR do that for you)

Create CSE CRG
Supply all required values, press Enter.

Preferred target details:
- IP address
- HMC LPAR name
- HMC Profile name
- HMC managed system
- Primary HMC IP
- Secondary HMC IP

Power down command
Restoring toolkit, access codes, setup on each Production LPAR

- Place the toolkit savefile in QGPL (FTP, scp etc)
  - scp QZRDHASM43.savf user@hostname:/qsys.lib/qgpl.lib/QZRDHASM43.file

- Restore the toolkit library:
  - RSTLIB SAVLIB(QZRDHASM) DEV(*SAVF) SAVF(QZRDHASM43)
    - The ‘43’ refers to the release and may change
  - ADDLIBLE QZRDHASM

- The access code is based on serial number and will be provided by the Systems Lab Services consulting team. You should have two keys, one for each serial number
  - ADDPRDACS SRLNBR(*CURRENT) ACSCDE(??)
  - ADDPRDACS SRLNBR(Auxiliary serial #) ACSCDE(??)

- Run the setup program
  - SETUPFSR NODEROLE(*PRD) PORT(*DFT)
    - The default port is 55920 and must match what we entered into CRTCSEDTA on the controller
### Setting up **Production** LPAR resources: IP Addresses

- The Preferred Source (*PS) is where your production normally runs
- The Preferred Target (*PT) is where your production LPAR switches to for DR purposes
- If the PT will have a different line description or IP address than the PS, create them on the PS
  - FSR will only bring online the correct resources
- Use WRKSTRPRSC *CMN to indicate to the toolkit which lines to bring online
- *IPADDR and *LINE indicates FSR will populate the data from the current LPAR
- At IPL, FSR will find the resource at the specified location (CMNxx) and assign it to the specified line description.

```
<table>
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<th>*PT</th>
<th>*PS, *PT</th>
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<td>IPv4 address</td>
</tr>
<tr>
<td>Line Description</td>
<td>*IPADDR</td>
<td>Name, *IPADDR</td>
</tr>
<tr>
<td>Resource Location</td>
<td>*LINE</td>
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</tbody>
</table>

| Port | 0-32 |
```

```
<table>
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<tr>
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<th>IP Interface</th>
<th>Line Desc</th>
<th>Hardware Resource Location</th>
<th>Port</th>
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</thead>
<tbody>
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<td>U8205.E6B.06BD50P-V22-C2-T1</td>
<td>0</td>
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<td>_</td>
<td>*PS</td>
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<td>ETHLINE</td>
<td>U8205.E6B.06BD50P-V22-C2-T1</td>
<td>0</td>
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<tr>
<td>_</td>
<td>*PT</td>
<td>9.5.167.109</td>
<td>ETHLINE</td>
<td>U9179.MHD.1016B4P-V8-C2-T1</td>
<td>0</td>
</tr>
</tbody>
</table>
```
Finding communication resource bus locations on the Production

- WRKHDWRSC *CMN, opt 7
- The “Port” is on the second page, but is usually 0 for VIOS managed virtual adapters
- The format of the location code for the *PT can be inferred
  - V22 = LPAR number 22
  - C2 = Virtual slot 2

```
Resource name ..................: CMN03
Text ..............................: Ethernet Port
Type-model ......................: 268C-002
Serial number .................: 00-00000
Part number .................: ...

Location : U8205.E6B.06BD50P-V22-C2-T1
```
Setting up **Production** LPAR resources: Storage (i.e. backup devices)

- Use WRKSTRPRSC *STG to indicate to the toolkit which tape devices to bring online
- During IPL, FSR will find the resource based on serial number (TAPxx or TAPMLBxx) and assign it to the device description and vary it on.
- The serial number can be for either the library or the tape drive.
  - If there are multiple logical libraries then the tape drive serial number will let you select a drive in a specific library with a common serial number
- The device description is what your backup application uses
- The device type indicates whether FSR should vary on the tape drive or the media library
  - If a tape drive serial number is specified with Type = *MLB then FSR will vary on the media library the tape drive is in

<table>
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<th>Usage</th>
<th>Storage Resource</th>
<th>Device Description</th>
<th>Device Type</th>
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<tr>
<td>_</td>
<td>*PS</td>
<td>78-78F1101</td>
<td>TS3400</td>
<td>*MLB</td>
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<tr>
<td>_</td>
<td>*PT</td>
<td>78-78F1039</td>
<td>TS3400</td>
<td>*MLB</td>
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</table>
Setting up **Production** LPAR resources: Routes

- Use WRKSTRPRSC *RTE to indicate to the toolkit which routes to use
- If no routes are specified, no changes are made to the routes (CFGTCPI opt 2)
- If any routes are specified, all existing routes will be removed

### Add or change Routing Entry Resources

*Enter details, press Enter.*

<table>
<thead>
<tr>
<th>Usage</th>
<th>Destination</th>
<th>Subnet Mask</th>
<th>Next Hop</th>
<th>Preferred Interface</th>
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<tbody>
<tr>
<td>*PS, *PT</td>
<td>IPv4 address</td>
<td>nnn.nnn.nnn.nnn</td>
<td>9.5.167.1</td>
<td>*NONE</td>
</tr>
<tr>
<td>*DFROUTE</td>
<td>*NONE</td>
<td>IPv4 address</td>
<td>9.5.167.1</td>
<td>*NONE</td>
</tr>
<tr>
<td>*DFROUTE</td>
<td>*NONE</td>
<td>IPv4 address</td>
<td>9.5.168.1</td>
<td>*NONE</td>
</tr>
<tr>
<td>*DFROUTE</td>
<td>*NONE</td>
<td>IPv4 address</td>
<td>9.5.167.1</td>
<td>*NONE</td>
</tr>
<tr>
<td>*DFROUTE</td>
<td>*NONE</td>
<td>IPv4 address</td>
<td>9.5.168.1</td>
<td>*NONE</td>
</tr>
<tr>
<td>*DFROUTE</td>
<td>*NONE</td>
<td>IPv4 address</td>
<td>9.5.167.1</td>
<td>*NONE</td>
</tr>
</tbody>
</table>
Setting up **Production** LPAR resources: BRMS Changes

<table>
<thead>
<tr>
<th>Usage</th>
<th>Object Type</th>
<th>Attribute</th>
<th>New Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>__</td>
<td>____________</td>
<td>__________</td>
<td>__________</td>
</tr>
<tr>
<td>*PS</td>
<td>DEVICE</td>
<td>LOC</td>
<td>ts3400prod</td>
</tr>
<tr>
<td>*PT</td>
<td>DEVICE</td>
<td>LOC</td>
<td>TS3400hadr</td>
</tr>
</tbody>
</table>
Setting up **Production** LPAR resources: Startup Program Changes

- While WRKSTRPRSC defines the resources, FIXSTRPRSC will effect the changes
- Place a call to QZRDHASM/FIXSTRPRSC early in QSTRUPPGM, before any resources need access to TCP
- FIXSTRPRSC will configure resources, but it will not start TCP
- After calling FIXSTRPRSC, call STRTCP after all the subsystems have been started (like right before :DONE)
- Since TCP is started from the startup program, don’t start it during IPL
  - CHGIPLA STRTCP(*NO)
- Other useful commands:
  - **RUNLPARCMD**: Execute command based on where the LPAR is running
  - **RTVLPARINF**: Retrieve *PS or *PT into a variable to control program flow

---

**Fix startup resources (FIXSTRPRSC)**

Type choices, press Enter.

- Preferred source serial number: __________ 06BD50P, Character value
- Preferred source LPAR number: __________ 00022, 0–127, *ANY
- Preferred target serial number: __________ 06BD50P, Character value
- Preferred target LPAR number: __________ 00022, 0–127, *ANY
Schedule Log Cleanup on all the LPARs

- CLNICSMLOG will prune FSR Logs to save on space
  - Tell it how many days of log entries to retain
  - ADDJOBS CDE JOB(CLNICSMLOG) FRQ(*WEEKLY) CMD(QZRDHASM/CLNICSMLOG RETAIN(120))
    SCDDATE(*NONE) SCDDAY(*ALL) SCDTIME('10:00')

Clean ICSM Logs (CLNICSMLOG)

Type choices, press Enter.

Days of information to retain  . > 10  *NONE, days
CHKCSE

- CHKCSE is a toolkit command used to check whether you can perform a scheduled switch. It performs more checks than SWCSE or WRKCSE, including verifying that the LUNs reported to the production LPAR are being replicated.
- Run the command interactively now to test it.
- Schedule CHKCSE to run periodically and monitor for escape messages. An escape message indicates a switch may fail.

```
Check Copy Services Environ. (CHKCSE)

Type choices, press Enter.

Environment name ............ Name
```
WRKCSE is the main command for working with the storage. We have already created an environment, now we can do more things with it.

Go into WRKCSE and take option 12 on the environment.

Note the status – it should be “Consistent synchronized” or “Consistent copying” before doing a detach.

![Work with SVC PPRC Environment](image)

Environment ............: FSR4PMPMM
MMIR Status ............: **Consistent synchronized**
Direction ..............: Normal

Select one of the following:

2. Pause
3. Resume
5. Switch
6. Start Replication after Switch
8. Detach
9. Reattach
10. Display replication
Test detach with WRKCSE

- Take option 10 (Display Replication) to view the relationships, then PF11 to view the progress.
- The “Progress” column should be nearly caught up (~100%) or blank, and the “Freeze time” (if using GMCV) should be within the past few minutes.
- If the progress or freeze time is far behind, then a detach or scheduled switch will take a long time to complete.

<table>
<thead>
<tr>
<th>Relationship</th>
<th>State / in sync?</th>
<th>Freeze time</th>
<th>Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>rcrel24</td>
<td>consistent_synchronized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>rcrel32</td>
<td>consistent_synchronized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>rcrel33</td>
<td>consistent_synchronized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>rcrel34</td>
<td>consistent_synchronized</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Test detach with WRKCSE

- A **Detach** will prepare the primary LPAR, pause replication, and IPL the secondary LPAR in manual restricted state.
  - Detach for SVC is supported for MMIR and GMCV replication, not GMIR.
  - Detach for DS8K is supported for GMIR, not MMIR
- Once detached, the replication status will be “Idle”.

```
Work with SVC PPRC Environment

Environment . . . . . . . : FSR4PMPMM
MMIR Status . . . . . . . : Consistent synchronized
Direction . . . . . . . . . : Normal

Select one of the following:

2. Pause
3. Resume
5. Switch
6. Start Replication after Switch
8. Detach
9. Reattach
10. Display replication

Selection 8

F1=Help    F3=Exit    F5=Refresh Status    F9=View log    F12=Cancel

Current SRC for ctcihamp is C20060F0.
```
Test detach with WRKCSE

- A **Reattach** will deactivate the secondary LPAR and resume replication.
  - If both LPARs are deactivated, the toolkit will ask which direction to resume replication in.
  - After a Reattach, it is recommended to change the secondary HMC LPAR properties to IPL in B-Normal (the toolkit leaves it in B-Manual)
  - The replication status will go to “Inconsistent copying”.

---

**Work with SVC PPRC Environment**

```
Environment ............: FSR4PMPMM
MMIR Status ............: Idling
Direction ...............:
```

Select one of the following:

2. Pause
3. Resume
5. Switch
6. Start Replication after Switch

8. Detach
9. Reattach
10. Display replication

Selection 9

F1=Help F3=Exit F5=Refresh Status F9=View log F12=Cancel

Waiting for partition ctcibamp on managed system CTCMOBILE to power down.
Perform a scheduled switch with WRKCSE

- **A Scheduled Switch** will shut down the primary LPAR, reverse replication, and then IPL the secondary LPAR.
  - This requires an outage of the LPAR!
- A scheduled switch requires the primary LPAR to be active and reachable at its IP address.
- WRKCSE option 5 will prompt on SWCSE and it will be performed interactively. Press enter.
- On the primary LPAR, an inquiry message will be posted to QSYSOPR

```
Switch Copy Services Environ. (SWCSE)

Type choices, press Enter.

Environment name ................ > FSR4PMPMM  Name
Switch type ........................ > *SCHEDULED  *SCHEDULED, *UNSCHEDULED
Type .................................. > *  ,  *GMIR, *MMIR
Auto replicate ...................... > *DFT  *DFT, *YES, *NO
```

```
Additional Message Information

Message ID .......................: IAS0029  Severity .............: 60
Message type .....................: Inquiry
Date sent .......................: 12/03/15  Time sent .............: 07:53:14

Message .......................: Perform full system switch? (G C)
Cause ...........................: A scheduled SWCSE command was issued by job on node . If you reply Go to this message, the system will be powered down. Possible choices for replying to the message are:
G -- Go  = Perform full system switch.
C -- Cancel = Do not perform full system switch.
```
Perform unscheduled switch back with SWCSE

- An **Unscheduled Switch** will reverse replication, and then IPL the secondary LPAR.
  - This requires an outage of the LPAR!

- An unscheduled switch requires that the primary LPAR be powered down. In the event of a disaster, you will be performing an unscheduled switch.

- SWCSE can be submitted to batch.

- When SWCSE is called interactively, you will be presented with this message:

```
Unscheduled SWCSE Warning

You have issued an unscheduled MMIR switch for *SYSTEM.
This process assumes that the current production node is not accessible and eliminates any normal switchover release actions for external storage disk volumes that are accessible on the production node. If the production node is active, cancel this switchover by pressing F12.
Press F10 to continue the unscheduled MMIR switchover.
```
Failures can happen, you need to know how to set things back to normal.

This usually involves the following manual steps:

- Determine the current state of the master and auxiliary LPARs (i.e. which should be active or inactive)
- Determine the desired of LPARs and replication direction
- Deactivating LPARs if needed, using the HMC web interface
- Manually changing the replication direction if needed, using the SVC web interface
- Activating an LPAR if needed, using the HMC web interface

Tell the toolkit the correct current state of the replication

On the controller, CHGCSEDTA and modify these fields:

- Status to *READY
- Direction to *NORMAL or *REVERSED
- Request type to 0

<table>
<thead>
<tr>
<th>PPRC status</th>
<th>*READY</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPRC direction</td>
<td>*NORMAL</td>
</tr>
<tr>
<td>Request type</td>
<td>0</td>
</tr>
</tbody>
</table>
Where can I find the logs for troubleshooting?

- Controller logs are in the following place:
  - /QIBM/Qzrdhasm/qzrdhasm.log
  - /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.

- On the primary LPAR:
  - /QIBM/Qzrdhasm/qzrdhasm.log
  - /QIBM/Qzrdhasm/joblogs/*
  - WRKJOB QZRDIAEXT2 and view the joblog
  - WRKJOB QSTRUPJD and view the joblog
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
Contacting support if you have problems

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

- Current System i Software Maintenance Agreement
- Current FSR 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, reach out to IBM Support:


To assist IBM personnel in correctly routing your problem, request support for the iSeries Systems Lab Services “Copy Services Toolkit – Full System Replication” using component identifier 5798CST00.