

Adding IASP disk units to an existing DS8000 IASP Manager MT-PPRC environment

When increasing the capacity of an existing IASP Copy Services Manager environment you need to plan carefully to ensure the current environment is protected throughout the entire process.

There are different ways of adding disk units into an existing configuration. This document outlines the preferred approach which keeps the IASP available to the system while preserving the HA/DR copy.

The process described is the fastest and least disruptive manner in which to add new volumes into an IASP Manager environment. The HA/DR copy of the IASP is protected during the process because the PPRC relationship on the existing volumes continues while the new volumes are included in the PPRC relationship before they are added to the IASP.

Fast format versus slow format

When adding disk units on an IBM i partition (either SYSBAS or IASP volumes), the DS8000 will default to using an internal quick initialization. This function allows the DS8000 to quickly return a “format completed” status to the IBM i partition making the volumes available to the host.

However, if a PPRC relationship is active on a volume the DS8000 cannot use the quick initialization function and reverts to a much slower sector-by-sector format procedure. This process can be very time consuming and resource intensive. Due to the extended duration and potential negative impact on production performance this formatting procedure should be avoided.

Additional Notes:

- If a PPRC relationship exists on the new volumes, but the new volumes have not been “initialized and formatted” (Step 3 below) then remove any PPRC relationship that was started on the new volumes.
- If the system is IPL'd after the disk units have been “initialized and formatted” (Step 3 below) but before the disk units have been “added to the IASP” (Step 7), the process must be restarted at Step 3. However before continuing at Step 3 remove any PPRC relationship that were started on the new volumes.
- If using IASP Manager 4.3 or 4.4, run ENDFLASH to end any active Flash Copy operations. If the OS version is i 7.1 or higher run WRKASPCPYD (Work with ASP Copy Descriptions) on any active cluster node and verify there are no ACS Session Type *FLASHCOPY.
- After successfully adding the new volumes to the IASP, run STRASPBAL (Start ASP Balance) on the IASP (to prevent performance issues caused by IBM i utilizing the new volumes for all new writes).
- Considerations for configuring new volumes:
 - It is beneficial to extend the existing LSS's for the new volumes
 - The new volume IDs should follow the last existing volume ID such that a contiguous volume range is maintained. This results in DSCSI scripts that are simple and easy to maintain.
- After the new volumes have been added to the IASP on the production node they will remain as non-configured disk units on the FLASH, MMIR, and GMIR nodes until a STRFLASH or SWPPRC operation is performed. The new volumes will not appear on the LUN-level switch node until a SWPPRC operation is performed.
- Creating a CSV file for adding the disk in CSM is preferable as it greatly reduces the time and potential errors by selecting volumes manually. To create the file, first export the existing volumes into a CSV file, and use that format to create a new CSV file with the new volumes

Recommended process

1. Display Cluster Information and verify node status
Run DSPCLUINF (Display Cluster Information)
Ensure all nodes are Active in the cluster.
Ensure all nodes are Active in the device domain.
2. Configure the new volumes and attach to the various IBM i partitions in the environment.
The new volumes should appear as non-configured disks units in SST.
 - STRSST (System Service Tools) and sign on
 - Select 3. Work with disk units
 - Select 1. Display disk configuration
 - Select 4. Display non-configured units
 - Exit SST

Verify non-configured disk units appear on all cluster nodes in the device domain.

3. Initialize and format new disk units (run on production node only):
 - STRSST and sign on
 - Select 3. Work with disk units
 - Select 3. Work with disk unit recovery
 - Select 2. Disk unit problem recovery procedures
 - Select 1. Initialize and format disk unit
 - Select 1 on the new disk units, press Enter and F10 to confirm
 - Wait for message "Initialize and format completed successfully"
 - Exit SST

This process sets a "flag" informing the IBM i OS the disk unit has been formatted. If the system is IPL'd (before successfully completing steps 4-8) this information is lost and you will be required to initialize and format the new disk units again with no PPRC configured on these volumes.

4. To maintain high availability/DR use DSCLI to start replication on the new volumes (mkpprc)
Metro Mirror – type is *mmir*. Global Mirror – type is *gcp*.

Note - the sample scripts are in the WRKCSE environments for MMIR and GMIR. Copy the `mkpprc_from_PS.script` & `mkpprc_GM_from_PS.script` from the respective environments and modify them for the new volumes

```
mkpprc -dev IBM.2107-75ZF7XX -remotedev IBM.2107-75HH5YY -type mmir 7202-7203:7002-7003
mkpprc -dev IBM.2107-75ZF7XX -remotedev IBM.2107-75FPTZZ -type gcp 7202-7203:EE14-EE15
```

5. List the status of the replication on the new volumes (lspprc -l)
Metro Mirror environment - wait for *State* to have a *Full Duplex* status
Global Mirror environment - wait for *Out of Sync Tracks* to approach 0 and *First Pass Status* = *True*
6. Use CSM to Add Copy Sets to the MT-PPRC environment for the new IASP volumes
 - Select the MT-PPRC session
 - Select the action to "Add Copy Sets"

If the PPRC relationship is active on the existing IASP volumes a RLSASPIO is not required on the HA/DR node (as the volumes are already target host inhibited).

7. Add new disk units to ASP (on production node only)

- STRSST and sign on
- Select 3. Work with disk units
- Select 2. Work with disk configuration
- Select 2. Add units to ASPs
- Select 3. Add units to existing ASPs
- Specify the existing IASP number to each new drive and press Enter
- Press Enter to confirm your choice for Add units.
- Wait for message "Selected units have been added successfully"
- Exit SST

Note - If an error occurs during the add indicating that an IASP is in use,

Release IASP IO on all Flash Copy nodes with QZRDHASM/RLSASPIO IASPNAME(*iaspname*)
TYPE(*FLASH)

Ensure IASP is varied off on Flash Copy node(s).

After the Add is completed

Run QZRDHASM/RESETASPIO IASPNAME(*iaspname*) on all FlashCopy nodes

8. Modify the Advanced Copy Services for PowerHA on i Toolkit environment (on production node)

[Metro Mirror environment if applicable](#)

- ADDLIBL QZRDHASM
- WRKCSE (Work with Copy Services Environment)
- Select 2 (Change) on the MMIR environment and press Enter
- Press Enter to display the "Add, Change or Delete Volume" screen
- Select 2 (Change) on the volume range to be modified, update the volume range and press Enter.

9. Modify the Advanced Copy Services for PowerHA on i Toolkit environment (on production node)

[Global Mirror environment if applicable](#)

- ADDLIBL QZRDHASM
- WRKCSE (Work with Copy Services Environment)
- Select 2 (Change) on the GMIR environment and press Enter
- Press Enter to display the "Add, Change or Delete Volume" screen
- Select 2 (Change) on the volume range to be modified, update the volume range and press Enter.

10. Modify the Advanced Copy Services for PowerHA on i Toolkit environment (on production node)

[Global Mirror 2 environment if applicable](#)

- ADDLIBL QZRDHASM
- WRKCSE (Work with Copy Services Environment)
- Select 2 (Change) on the GMIR2 environment and press Enter
- Press Enter to display the "Add, Change or Delete Volume" screen
- Select 2 (Change) on the volume range to be modified, update the volume range and press Enter.

11. Modify the Advanced Copy Services for PowerHA on i Toolkit environment (on Flash Copy node)

[Flash Copy environment if applicable](#)

- ADDLIBL QZRDHASM
- WRKCSE (Work with Copy Services Environment)
- Select 2 (Change) on the FLASH environment and press Enter
- A message should appear indicating "The source and/or target Copy Descriptions does not match the Advanced Copy Services data..."
This is expected due to the mismatch with the PPRC environment
- Press F10 to continue and press Enter

- Press Enter to display the “Add, Change or Delete Volume” screen
 - Select 2 (Change) on the volume range to be modified, update the volume range and press Enter.
12. If using IASP Manager 4.3 or 4.5, run WRKASPCPYD (Work with ASP Copy Descriptions) on any cluster node
- Select 5 (Display copy) to verify the new volume range has been updated to the respective ASP Copy Description
13. Run CHKPPRC *MMIR on the HA node to verify switch readiness.
14. Run CHKPPRC *GMIR on the DR node to verify switch readiness.

Additional Protection while adding disk

The best method to provide additional protection and having a fast backout method for any storage change is to take a FlashCopy prior to making any changes. This FlashCopy can be reversed and the disk returned to the preFlash state in case of an error.

Another method is to pause the Metro Mirror of the multi target environment prior to adding the disk. And example of the steps for this would be

- After the disk are added in CSM. Suspend the H1-H2 PPRC relationship via CSM
- Add the disk to the IASP
- Once the disk add is completed and no errors are found, start the H1->H2 PPRC relationship again via CSM
- Continue the process as normal

To back out the disk add if necessary (this requires full resyncs of the data)

- Ensure the IASP is varied off on Production
- Starting with H1-H2 paused and H1-H3 active, use CSM to select failover, then accept the H2 failover on the next screen
- Release IASP IO on the HA node QZRDHASM/RLSASPIO IASPNAME (*iaspname*) TYPE(*MMIR)
- Wait 30 seconds
- Run QZRDHASM/RESETASPIO IASPNAME (*iaspname*)
- Wait 60 seconds
- RESETMPATH (*iaspname*)
- Vary on the IASP
- Terminate the session in CSM
- Set the production to H2
- Start H2-H1 H2-H3 This will perform a full resync
- Change the CSEDTA to MMIR *READY REVERSED and GMIR2 to *READY NORMAL