# Avoiding Potential Data Loss When Using the z/VM Hyperswap function and FlashCopy

## Abstract

IBM has identified a hardware configuration which could affect z/VM users, z/VM guests and other System z operating systems using the combination of HyperSwap and FlashCopy replication and certain IBM disk subsystem logical configurations. Specifically, there is a small timing window in which a FlashCopy replication command executing during a disk swap operation could be redirected to the other disk subsystem (i.e., the PPRC partner disk subsystem) and incorrectly overwrite data on this disk subsystem that was not intended to be overwritten. This issue is not specific to any particular release or level of z/VM, nor any particular release or level of IBM disk subsystem hardware or licensed internal code (LIC), nor any particular release or level of disk swap enablement software (GDPS or IBM Tivoli Storage Productivity Center for Replication).

### Details

The following users are not affected:

- Users that do not use HyperSwap
- Users that do not perform FlashCopy from their PPRC devices (neither their primary nor their secondary PPRC devices).
- Users that only perform FlashCopy from their PPRC devices when the PPRC pairs are suspended (e.g., for disaster recovery testing or prior to a resync operation).

This issue will also only arise in the context of specific disk subsystem configurations. Specifically, the logical subsystem (LSS – a.k.a. control unit address/CUADD) and the channel connection address (CCA) used for the PPRC primary and secondary devices must meet certain criteria.

- 1. If the LSS/CCA for each and every PPRC primary device is different than the LSS/CCA for its corresponding secondary device then FlashCopy commands issued during the swap window will be rejected by IBM disk subsystems causing the operation to fail but there are no data overwrite implications. Refer to Page 1 of the attached file.
- 2. If the LSS/CCA for each and every PPRC primary device is the same as the LSS/CCA for its corresponding secondary device, then:
  - A. If the FlashCopy target volume is a PPRC device, then this issue will not arise. Refer to Page 2 of the attached file.
  - B. If the FlashCopy target volume is not a PPRC device and no device exists in the PPRC partner disk subsystem that has the same LSS/CCA as the FlashCopy target device, then FlashCopy commands issued during the swap window will be rejected by IBM disk subsystems causing the operation to fail, but there are no data overwite implications. Refer to Page 3 of the attached file.
  - C. If the FlashCopy target volume is not a PPRC device and a device does exist in the PPRC partner disk subsystem that has the same LSS/CCA as the FlashCopy target device, then FlashCopy commands issued during the swap window will overwrite the device, in the PPRC partner disk subsystem, that has the same LSS/CCA as the FlashCopy target device. This is not an issue if this device in the PPRC partner disk subsystem is a FlashCopy target device. However, if this device is intended for other purposes, then a FlashCopy operation that is issued during the HyperSwap window can overwrite data on this device. Depending on the data involved, this could cause impacts including system outages or loss of application data. Refer to Page 4 of the attached file.
- 3. If there is a mix of matching LSS/CCAs and mismatching LSS/CCAs for the PPRC primary and secondary devices within a disk subsystem pair, then a FlashCopy operation that is issued during the swap window can overwrite data on a volume other than the one intended. This is true regardless of whether or not the

FlashCopy target device is a PPRC device. Depending on the exact data involved, this could cause impacts including system outages or loss of application data. Refer to Page 5 of the attached file.

### Mitigation

The issue can be avoided by adhering to the following recommended disk subsystem configuration. The recommended configuration is one in which the LSS/CCA for each and every PPRC primary device is the same as the LSS/CCA for its corresponding secondary device. With this configuration, users that are performing FlashCopy operations from PPRC devices to non-PPRC devices must also ensure that all devices in the PPRC partner disk subsystem that have LSS/CCAs that match the FlashCopy target volumes are intended for FlashCopy.

A configuration in which the LSS/CCA for each and every PPRC primary device is different than the LSS/CCA for its corresponding secondary device also circumvents the issue. With this type of configuration, FlashCopy commands issued during the swap window may fail but there are no data overwrite implications.

An existing disk subsystem configuration that is exposed to the issue can be reconfigured without a loss of access to the PPRC primary production volumes, but with a disruption to the swap/disaster recovery environment, using the following procedure:

- 4. Terminate the PPRC pairs.
- 5. Reconfigure the secondary disk subsystem as required.
- 6. Re-establish the PPRC pairs and perform a full copy.

#### Resolution

This issue is resolved for z/VM users and z/VM guests by APAR VM65052. PTFs will be provided for z/VM releases 5.4, 6.2 and 6.2. Target availability is December 9<sup>th</sup>, 2011.

The APAR text will be updated with the details of the solution when they are available.