Advanced
Technology
Group

**Accelerate with ATG: GDPS 4.6 Update**

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# Meet the Speaker

David Petersen – IBM Z, IBM Systems, 470 Springpark Place, Suite 1000A & 950 Herdon, United States of America (email: petersen@us.ibm.com). Mr. Petersen is an IBM Distinguished Engineer in the IBM Z platform. He has over 20 years of experience with IBM and responsible for the overall IBM zSystems  Platform continuous availability, disaster recovery, and cyber resiliency strategy. David is the chief technologist / program manager of the GDPS continuous availability / disaster recovery / cyber resiliency solution, is responsible for the overall strategy, and leads the worldwide development organization. He is recognized throughout the IT industry as a resiliency expert.

# GDPS Level-set

# IBM GDPS is installed in several of the largest enterprises in the world.

**83%** of the top **30** banks around-the-world use GDPS[1]

**25** years of experience

Almost **1200** licenses in **51** countries and dozens of references
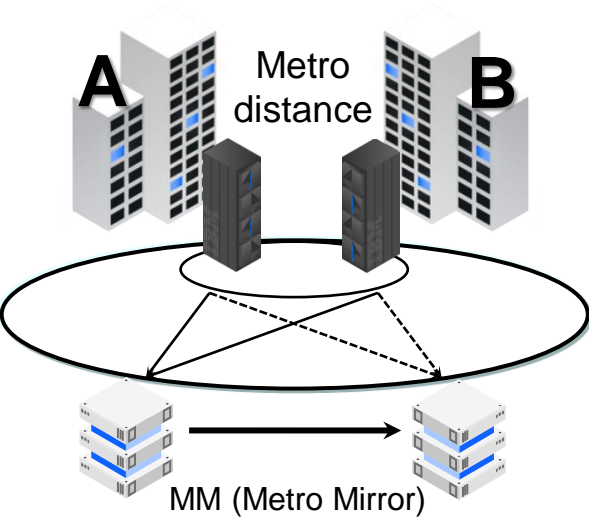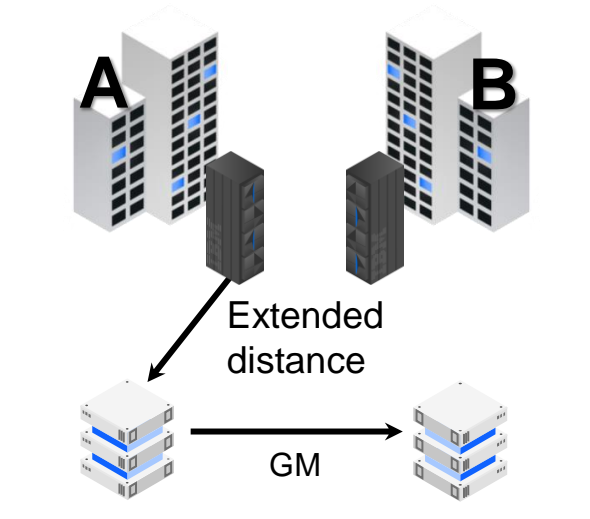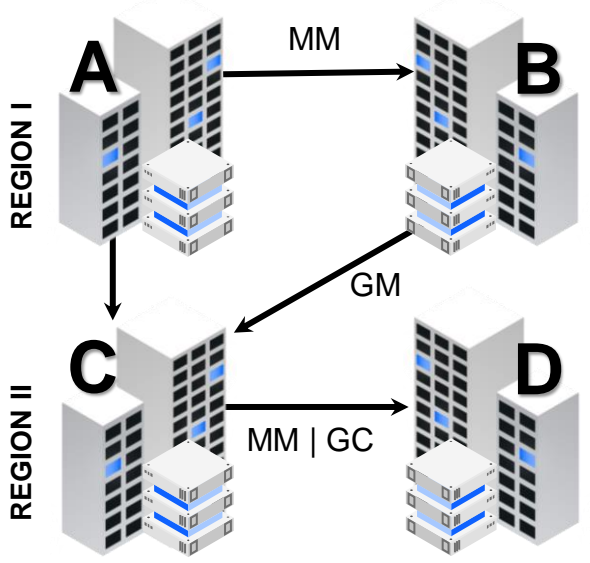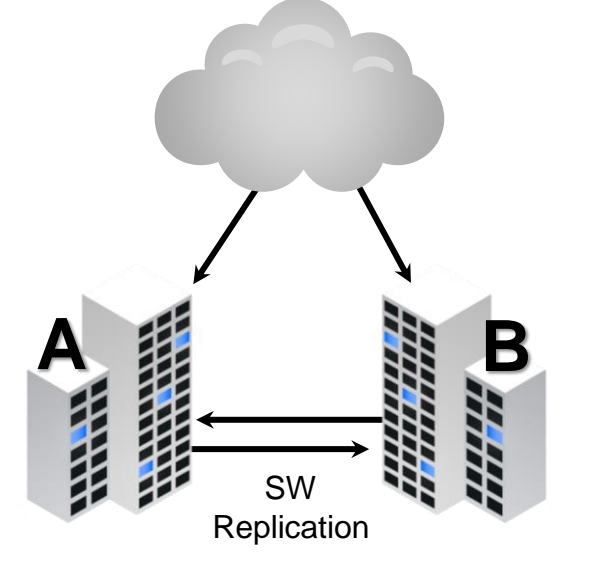
**+98%** of the new GDPS deployments are with DS8K

**2 MLOC** in GDPS

**+50** people work on GDPS

[1] https://pages.marketintelligence.spglobal.com/SM-Global-Bank-Ranking-Regional-with-Demo-Request-form.html

# Balanced solutions designed to address different requirements

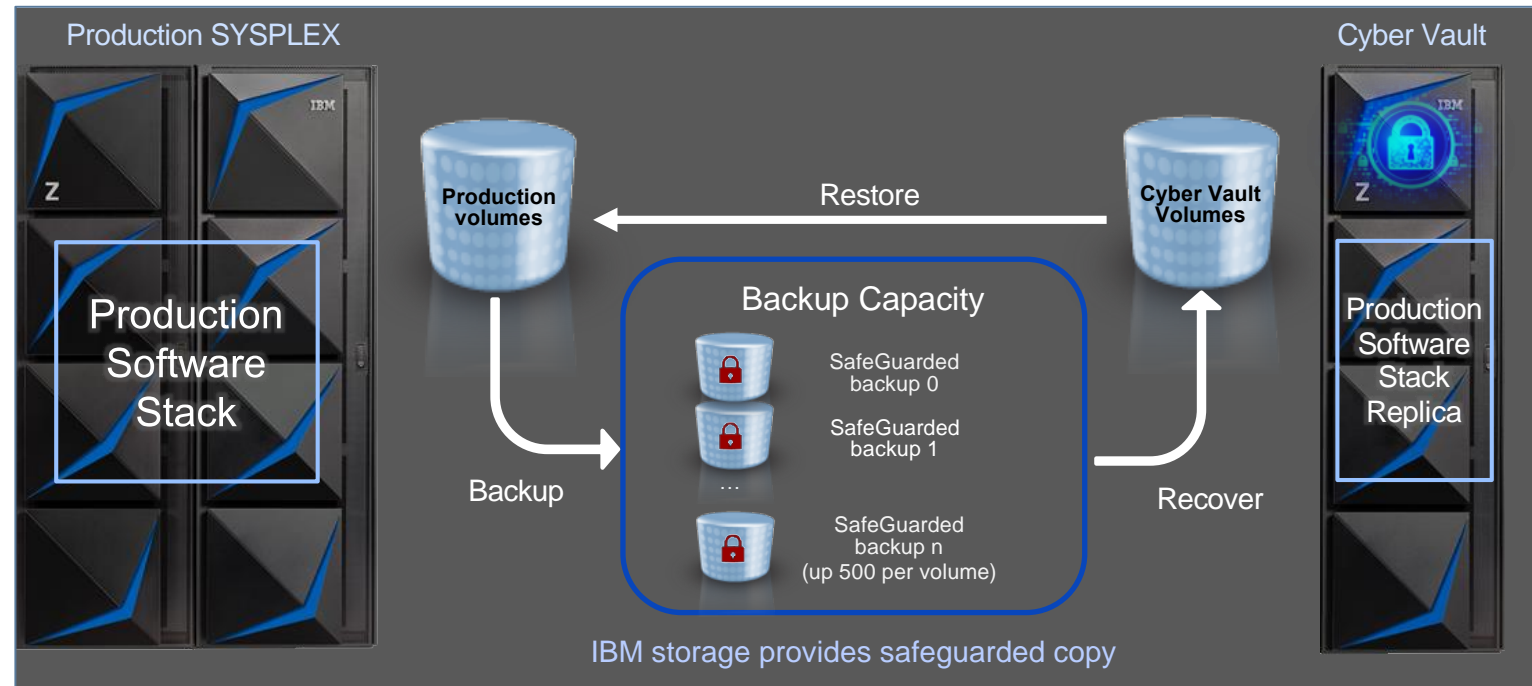| GDPS Metro | GDPS Global | GDPS Metro Global | GDPS Continuous Availability |
|---|---|---|---|
| **Near-continuous availability and recovery at metro distances** | **Disaster recovery at extended distance** | **Near-continuous availability regionally & recovery for 3-4 sites** | **Near-continuous availability, recovery & workload balancing** |
| Systems remain active<br><br>Multisite workloads can withstand site and storage failures | Rapid systems DR with "seconds" of data loss | Metro near-continuous availability and out of region disaster recover | Continuous availability at unlimited distances |

# IBM Z Cyber Vault

## Principle Idea:

• Reduce the time to recovery from days to minutes, by implementing a data corruption protection solution that compliments your D/R strategy

## Cyber Vault Environment:

• Additional storage with Safeguarded Copy to provide immutable, consistent point-in-time copies of data
• Highly secure, isolated environment to prevent unauthorized access or intrusion to PIT data copies
• Manage solution with GDPS LCP
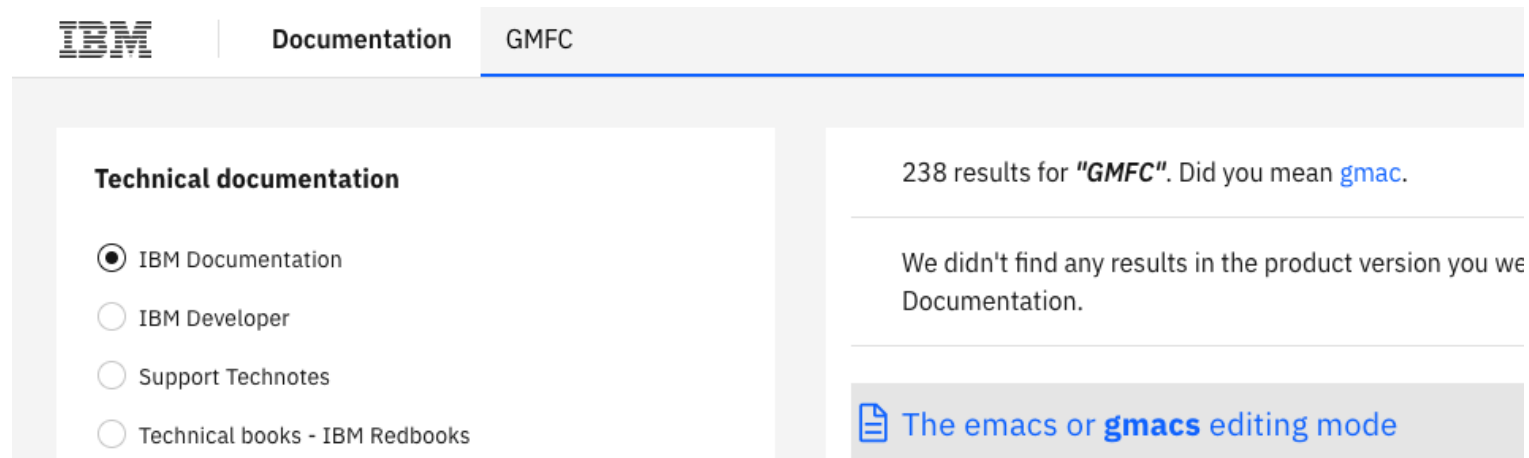• Added software for enhanced validation

Production SYSPLEX

Cyber Vault

Production Software Stack

Production volumes

Restore

Cyber Vault Volumes

Production Software Stack Replica

Backup Capacity

SafeGuarded backup 0

SafeGuarded backup 1

...

SafeGuarded backup n (up 500 per volume)

Backup

Recover

IBM storage provides safeguarded copy

| Data Validation | Forensic Analysis | Surgical Recovery | Catastrophic Recovery | Offline Backup |
|---|---|---|---|---|
| Detect data corruption early or certify that the copy is clear | Investigate the problem and determine the best recovery action | Extract data from the copy and logically restore back to production environment | Recover the entire environment back to a point in time copy | Backup copy of the clean environment to offline tape media |

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# GDPS Docs go online

# GDPS Online Docs
## PDFs also available on FTP site for 4.6

➢ URL: https://www.ibm.com/docs/en/gdps

➢ Access for is restricted by email domain associated with your IBM ID

➢ Restricted just to the GDPS solution & features you are currently licensed for

➢ Be aware that search seems a little quirky in IBM Docs:
When in a book, search first looks in that book, but if no results found it then looks across the whole of IBM Docs with a potentially modified search argument!

# GDPS goes online within IBM Docs

# GDPS goes online within IBM Docs

IBM **Documentation**    Search in GDPS Metro

**GDPS**

Change version

4.6

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GDPS Metro 4.6
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Planning
Installation
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  Disk remote copy configuration customization
  Loading your initial disk configuration
  Configuring GDPS to manage Heat Map Transfer
  **Setting up the GDPS Site Table**
    IPLMODE and IPLSET considerations
    IPLTYPE Considerations
  Defining Sysplex Resources to GDPS
  GDPS scripts
  Keywords for Takeover, Control and Batch scripts
  GDPS Exits

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All products / GDPS / GDPS Metro / 4.6 /

Was this topic helpful?   Yes 👍   No 👎

## Setting up the GDPS Site Table

Last Updated: 2023-03-29

GEOGROUP defines the images (systems and LPARs) that you intend to manipulate using GDPS. These are the images belonging to your GDPS, as well as images not in your GDPS that you wish to manage with GDPS. GEOGROUP using the location and system elements defines the NORMAL and ABNORMAL (if applicable) LPAR location for these objects. You must perform additional customization in GDPS to define the relevant load address and load parameters you wish to use for your GDPS systems and other systems you want to manage using GDPS. We refer to this as the GDPS Site Table customization.

When a **SYSPLEX LOAD SYSTEM** *(sysname)* command is issued, either from a script or the Standard Actions panel, the current settings of IPLTYPE and IPLMODE/IPLSET are used, together with sysname, to identify the LPAR, load address, and load parms (in the site table definition) that will be used for the actual IPL. IPLTYPE is used to select the LPAR, and the combination of IPLTYPE and IPLMODE/IPLSET are used to select the Load Address and Load Parms that will be used to load target system into the target LPAR.

For example, for system name SYS1, when the IPLTYPE is NORMAL, and IPLMODE is set to RS1, and IPLSET is set to A1, these act as an 'index' into the site table definitions and as a result the load address of 1000 and load parms of 10018A will be provided along with the LPAR name of C101 (see table *Sample site table for system SYS1*).

When you initiate a stand-alone dump using GDPS using the Dump (U) option from the Standard Actions panel, the information provided in the currently selected entry in the Site Table for DUMP address and DUMP parameters is used, along with the current IPLTYPE for the target system. In the same example as for LOAD, the stand-alone dump program will be loaded into LPAR C101 from device 1002 using the parameters SO. For more information about stand-alone dump and its load parameters, refer to *z/OS MVS Diagnosis: Tools and Service Aids* ; GA22-7589.

Table 1. Sample site table for system SYS1

| IPLTYPE | IPLMODE | LPAR | IPLSET | LOAD Address | LOAD Parms | DUMP Address | DUMP Parms |
|---------|---------|------|--------|--------------|------------|--------------|------------|
| NORMAL | RS1 | C101 | A1 | 1000 | 10018A | 1002 | SO |
| NORMAL | RS2 | C101 | A1 | 2000 | 20018B | 2002 | SO |
| NORMAL | RS3 | C101 | A1 | 3000 | 30018C | 3002 | SO |
| NORMAL | RS1 | C101 | B1 | 1500 | 15018A | 1502 | SO |

# GDPS 4.6 Overview
## including content delivered by continuous delivery since 4.5 became generally available

# GDPS Metro Highlights - Summary

- **Reconfiguration Wizard** (first iteration for Metro Secondary disk)
- **Linux in LPAR** – Linux running natively in an LPAR on IBM Z HW
- **Role-based security for Health Checks and Debug**
- **IBM Z synergy – z16**
  - Additional System Recovery Boost exploitation (load configuration during HyperSwap prepare)
  - Automatic BCPii Suspend/Resume
  - Management of FLEXible Capacity for Cyber Resiliency temporary capacity records via CAPACITY script statement
- **BCPii RAS enhancements (FFDC)**
  - GEO292I issued in SDF as well as the syslog
  - Monitor1 automatically detects when SE session is resumed
  - NetView log populated even when debug mode off in case of failures
  - Automatic SA/HW trace activation during temp capacity function
  - Dynamic connection to local and target CPC for standard actions

- **z/VM V7R3: 8-member SSI support**
- **Simplification:** **GDPSIVP** Installation Verification Program updated to validate the z/VM dump volumes and IPLPARMs
- **Usability:** Improved **SE/CPC status** on the CPC Operations panel (VPCPCOPS and GUI equivalent) and display of the **STP roles**
- **GDPS Enterprise Portal now display STP roles** in the physical view
- **GDPS Metro** extension support for **KVM to RHEL 8.4 or later**
- **Support for Red Hat Enterprise Linux 8.4 or later + SUSE Linux Enterprise Server SLES 15.4 or later + Ubuntu 22.04 or later**
- **HA/DR and Cyber Resilience for RHOCP on IBM Z and IBM LinuxONE**
- **Processing enhancement: 16 target secondary subsystems** support when executing a path query to a PPRC primary volume
- For Remote Script Execution **(RSE), SDF Trace entries** enhanced to provide an insert identifying the target domain and the remote script token.

# GDPS GM and MGM Highlights - Summary

- IBM Z synergy – z16
  - Management of Flexible Capacity for Cyber Resiliency temporary capacity records via CAPACITY script statement
  - Automatic BCPii Suspend/Resume

- BCPii RAS enhancements
- STP roles now displayed on CPC Operations panel
- STP roles now displayed visually in the GDPS Enterprise Portal physical view
- **Procedure Handler enhanced - Procedures that have previously failed can now be re-started from the beginning (new WTOR for restart options)**
- DS8K synergy -  event notification enhancements

- **New procedures MGM4SITE_CGPAUSE and MGM4SITE_RESUME for pausing with consistency/resuming the GM session**
- Role-based security for Health Checks and Diagnostics and for Debug
- Usability:  Improved SE/CPC status on the CPC Operations panel
- Processing enhancement: 16 target secondary subsystems support when executing a path query to a PPRC primary volume
- For RSE, SDF Trace entries enhanced to provide an insert identifying the target domain and the remote script token.

# LCP Enhancements

- **Significant monitoring and alerting for LCP resources (taking advantage of DS8000 Cluster Event Notification functionality)**

  - New SGC Monitor – monitors SGC virtual capacity and internal capture roll-offs

  - Monitor3 enhanced to monitor storage pool capacity (for all replication sites – not limited to SGC storage pools)

  - Real time out-of-space event notifications for offline/undefined device sets

- **SGC Backup Capacity management enhancements (SGC Dynamic Expansion Manager)**

  - Commands to determine which backup volumes need to be expanded and to generate the DSCLI commands to do the expansions (EXPAND TARGET [%])

  - Ability to export virtual and physical capacity statistics for further offline analysis

- **Virtual isolation LCP in the active production region for MGM4SITE environments**

- **MSS2 support for Metro dual leg environments with external LCP**

- **Incremental restore to production support for the catastrophic use case in the following topologies:**

  - MGM3SITE external LCP

  - MGM4SITE external LCP

  - MGM3SITE internal LCP from the GM secondary

- **Direct FlashCopy to RC1 support for GM-based LCP Manager** (GM2SITE and MGM3SITE)

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# CA Highlights

➢ IBM Z synergy – z16

   ▪ Management of Flexible Capacity for Cyber Resiliency temporary capacity records via CAPACITY script statement

   ▪ Automatic BCPii Suspend/Resume

➢ BCPii RAS enhancements

➢ **Multi-DBMS support, previously provided for IMS/DB2 workloads, now extended to support workloads that consist of VSAM and DB2 replication**

➢ GDPS Enterprise Portal support – logical view of the CA environment

# GDPS Reconfiguration Wizard

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# GDPS Reconfiguration wizard

Objective is to provide a simple way to perform complex operations when making modifications to your remote copy environment

- ➢ Launched from within the GDPS GUI

- ➢ Initial release provides capability to replace secondary disk storage subsystem (using MTPPRC)

  - ▪ Gathers information required to perform the task and validate against the scenario

  - ▪ Defines GDPS managed LSS and devices in the new storage subsystem

  - ▪ Creates PPRC paths between ports on primary and new secondary subsystem

  - ▪ Initiates mirroring from primary to new secondary subsystem in XD

  - ▪ Monitors the replication until SYNCTGT in CopyOptions is reached then convert to SYNC

  - ▪ Prompt user to update and activate the new Host configuration

  - ▪ Automatically updates and loads the GDPS config (GEOPARM)

# GDPS STP Role Awareness

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# CPC Operations panels updated to show STP roles

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# GDPS
# FLEXible Capacity Management

# Proactively avoid disruptions, manage capacity and workloads
## Flexible Capacity for Cyber Resiliency enables compliance, DR, testing across sites

| | | |
|---|---|---|
| Provide increased flexibility and control to shift production workloads between participating IBM z16™ machines at different sites and remain operational at the target site for up to one year. | Designed to help you gain confidence in compliance efforts and for disaster recovery (DR) testing and real DR scenarios up to 12x per year. | Allows full client control over end-to-end process for production site swap. Can be fully automated using GDPS. |

| Disaster recovery and DR Testing | Frictionless compliance | Proactive avoidance | Facility maintenance |
|---|---|---|---|
| Transfer the production capacity you need at your DR site to continue to run your business workloads. | Provides a highly automated and fast process to demonstrate a production site swap. | Migrate your critical workloads to an alternate site before your business gets impacted. | Run your production workloads from your alternate site while you perform maintenance on your primary site. |

# GDPS with BOOST and Flexible Capacity records



z16

z15

# GDPS
# Multi-platform Resiliency Enhancements

# The best of the mainframe and the innovation of Cloud

**CLOUD PAKS**

**OPENSHIFT**

**Public cloud**

**Private cloud**

**SaaS**
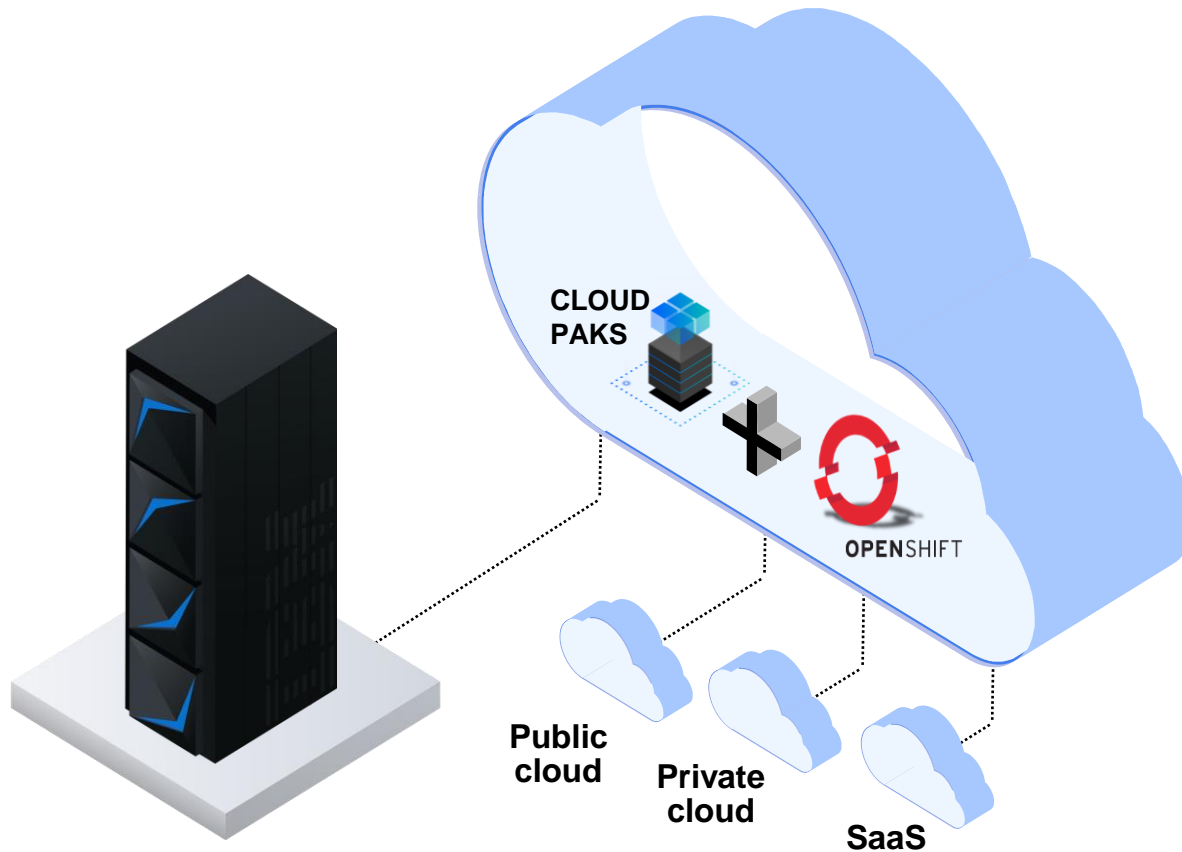
- Significantly expand your talent pool

- Bring an enterprise-wide DevOps practice

- Easily access IBM Z data without moving off-platform

- Optimize costs

- Maintain the option of repatriating cloud applications

*Good news!  Your existing GDPS HA/DR and Cyber protection applies to OpenShift!*

# GDPS Metro Linux in LPAR Mode
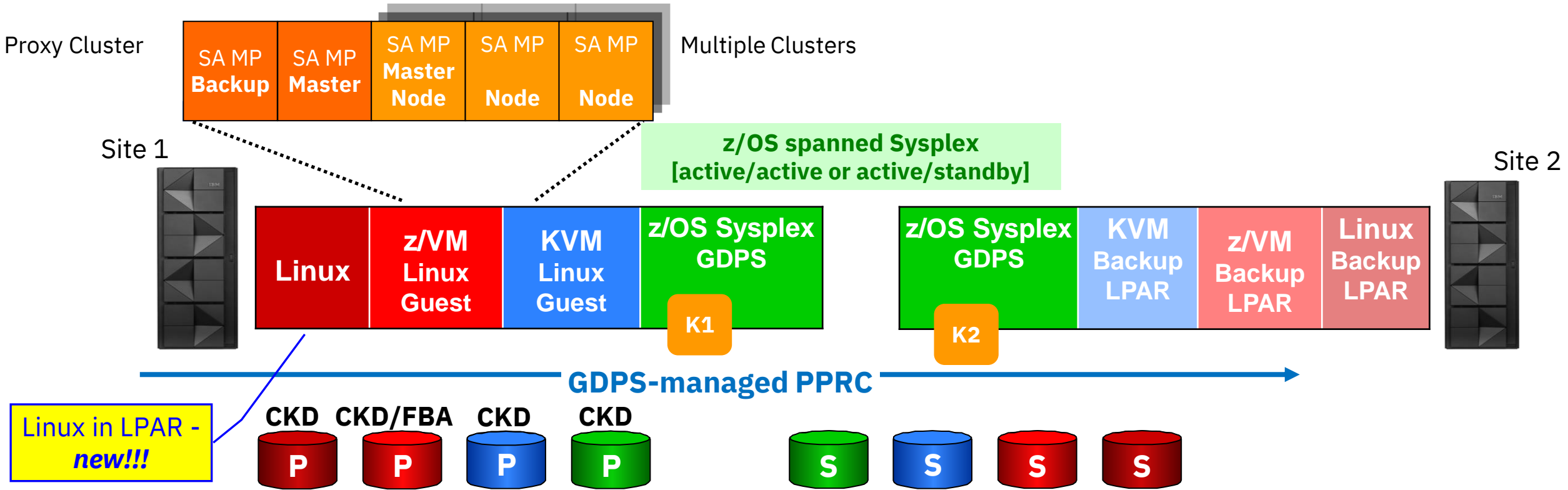


- Coordinated HyperSwap – z/OS, z/VM with its guests
- Graceful shutdown and startup (re-IPL in place) of Linux clusters or nodes
- zVM SSI Live Guest relocation
- Graceful shutdown of z/VM, KVM, Linux in LPAR

- Coordinated takeover – recovery from a Linux node or cluster failure
- Coordinated site switch for planned purposes
- Multiple SA MP Linux clusters are supported as are multiple z/VM systems, KVM systems, and Linux LPARs

# GDPS can fully protect container infrastructure and workloads on IBM Z
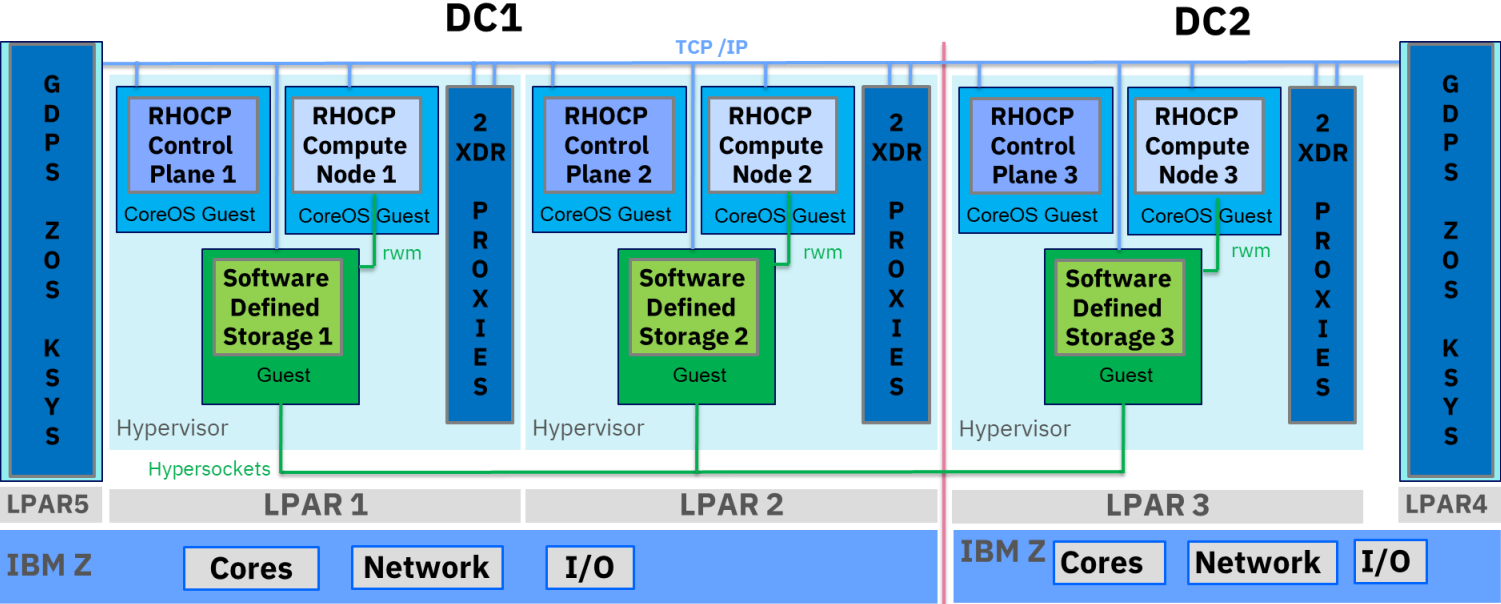


GDPS can provide full HA / DR and cyber resilience for containers including:

– Hypervisor local storage (container infrastructure nodes )

– Shared software defined storage (container required persistent storage)

z/VM SSI Live Guest Relocation driven by GDPS for optimized High Availability across several LPARS
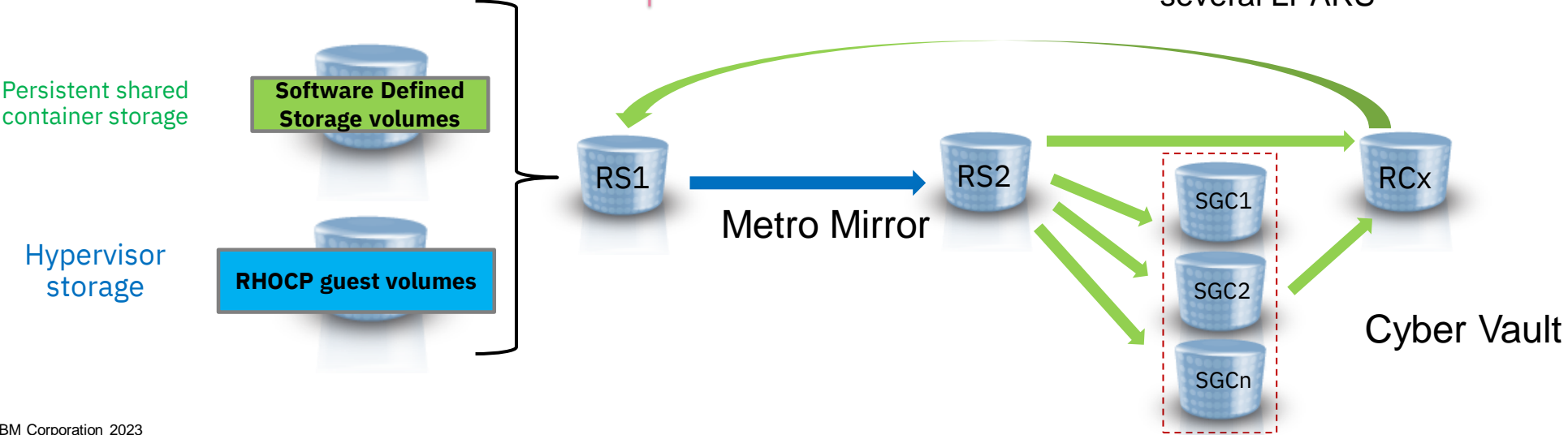
# GDPS
# Role-based Security enhancements

# New Role-based Security Capabilities

Both Health Checks and DEBUG options have added granularity to control access to the different functions within each of these areas of GDPS.
Initial support was to allow or deny access to Health Checks or the DEBUG option were at the main menu level.

**Health Checks** now have controls on each of the sub commands/options, to allow or deny people access, for example, you can grant people the ability to select a health check, but not run/activate or purge the check.

Example profile:
 *GDPSADMIN.GDPSCTL.HEALTHCHECKS.domain_id.SELECT.<check_name>*

**DEBUG**, you can now set the access so users can either just view, or change the debug setting using READ access to view and ALTER to allow changes to the following profile:

*Profile name:*
 *GDPSADMIN.GDPSCTL.GDPSDEBUG.domain_id*

# GDPS
# LCP  Manager enhancements

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# LCP Enhancements
## SGC Incremental Restore to Production

Provides an incremental copy from the recovery copy set back to the RS1 target copy set

**Automated incremental copy**

Recovery Sysplex

Metro Mirror

RS1 → RS2 → RC1
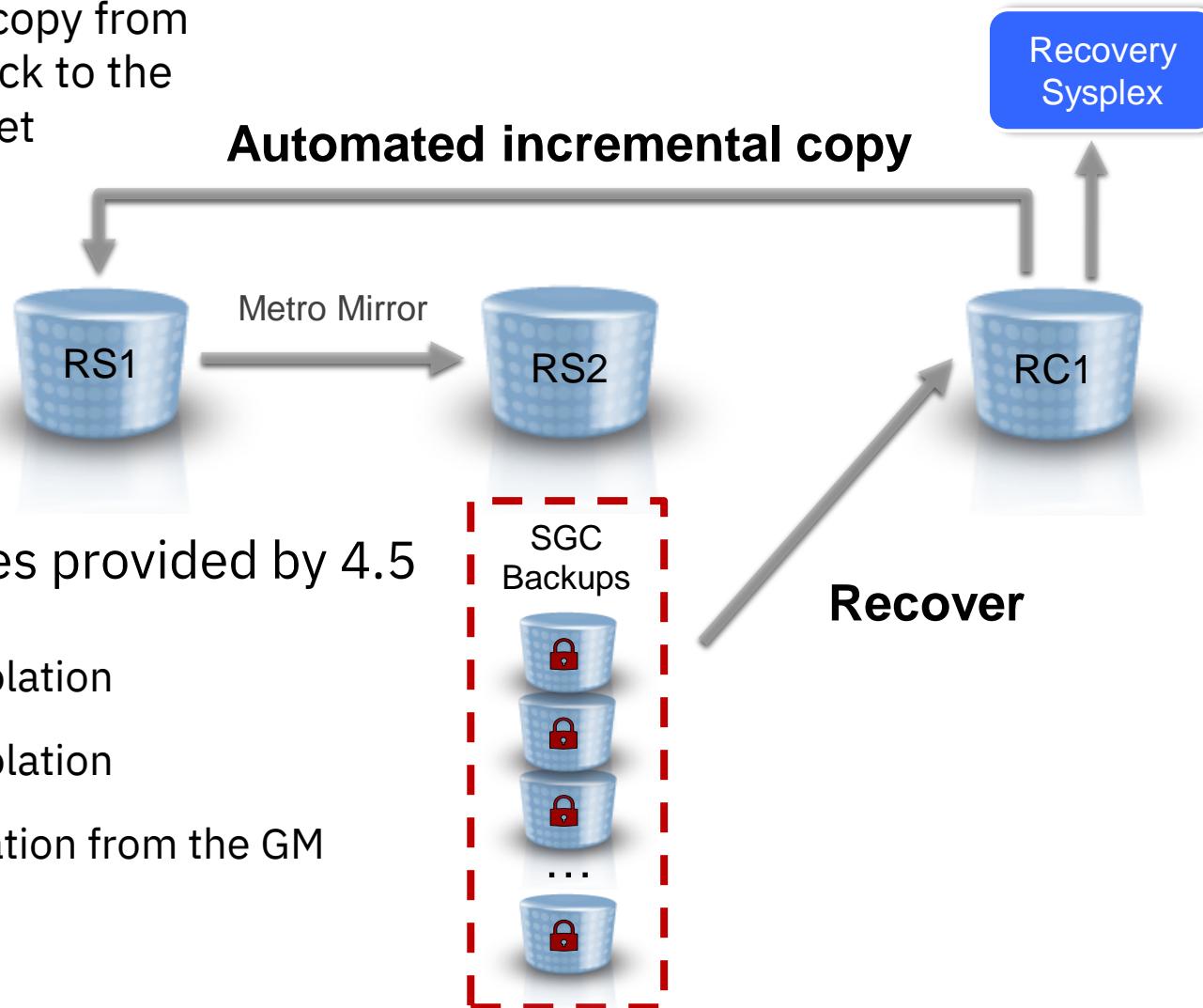
Support for new topologies provided by 4.5 SPEs:

- MGM3SITE physical isolation

- MGM4SITE physical isolation

- MGM3SITE virtual isolation from the GM secondary

SGC Backups

**Recover**

# LCP Enhancements

## Cluster Event Notification

➢ New cluster-specific CEN device defined in GEOPARM (can be existing utility device) – one per cluster

- Creates framework for GDPS to receive notification of events for devices that are not online, but we are interested in

- Following messages now generated for such devices:

  ✓ **IEA499E dev, volser, epid, ssid, sfiid, message text**

  ✓ **IEC817I dev,volser,epid,ssid,sfiid,message text**

➢ Complimentary to the GDPS SGC Monitoring, additional exploitation is planned

# LCP Enhancements

## LCP Monitoring

➤ **Monitor 3 Pool Capacity Monitor – wider application than just LCP!**

  ✓ Analyzes the DS8000 Pools Statistics for each replication site of each consistency group with report written to Netlog (in Dasd Remote Copy Option 1)

➤ **SafeGuarded Copy Monitor – reports to Netlog and SDF alerts issued if exceptions found**

  ✓ **Virtual Capacity Monitor** – analyzes the SGC virtual backup capacity usage

  ✓ **Internal Rolloff Monitor** – determines if a SGC backup has been internally rolled off by the DS8000

  ✓ **Backup Expansion Monitor** (Previously existed but now moved from Monitor 3)

New GDPS Operator GEOLCP1/AUTLCP1 is required

# GDPS
# Upcoming SPEs

# Upcoming SPEs

- **Bidirectional GM** – more about this on the next slide

- **Dynamically refresh Site Table** GEOGROUP definitions

- **Improved accuracy of the SGC Captures timestamp**

- **Automated, periodic capture of Safeguarded Copy backups including ability to quiesce/resume**

- **Optional automatic release of expired SGC backups**

- **MGM 4-site Region awareness**

- **MGM 4-site Virtual isolation LCP in the DR region**

- **Automatically remove bad PPRC links** encountered during a Establish Path operation

- **Script Filter by name** under Option 6

- **Support for z/OS Validated Boot**

- **Further synergy between GDPS actions and BCPii** to inform SA and the IBM Z Support Element that a GDPS action is ongoing

# Bidirectional GDPS Global – GM 2-site
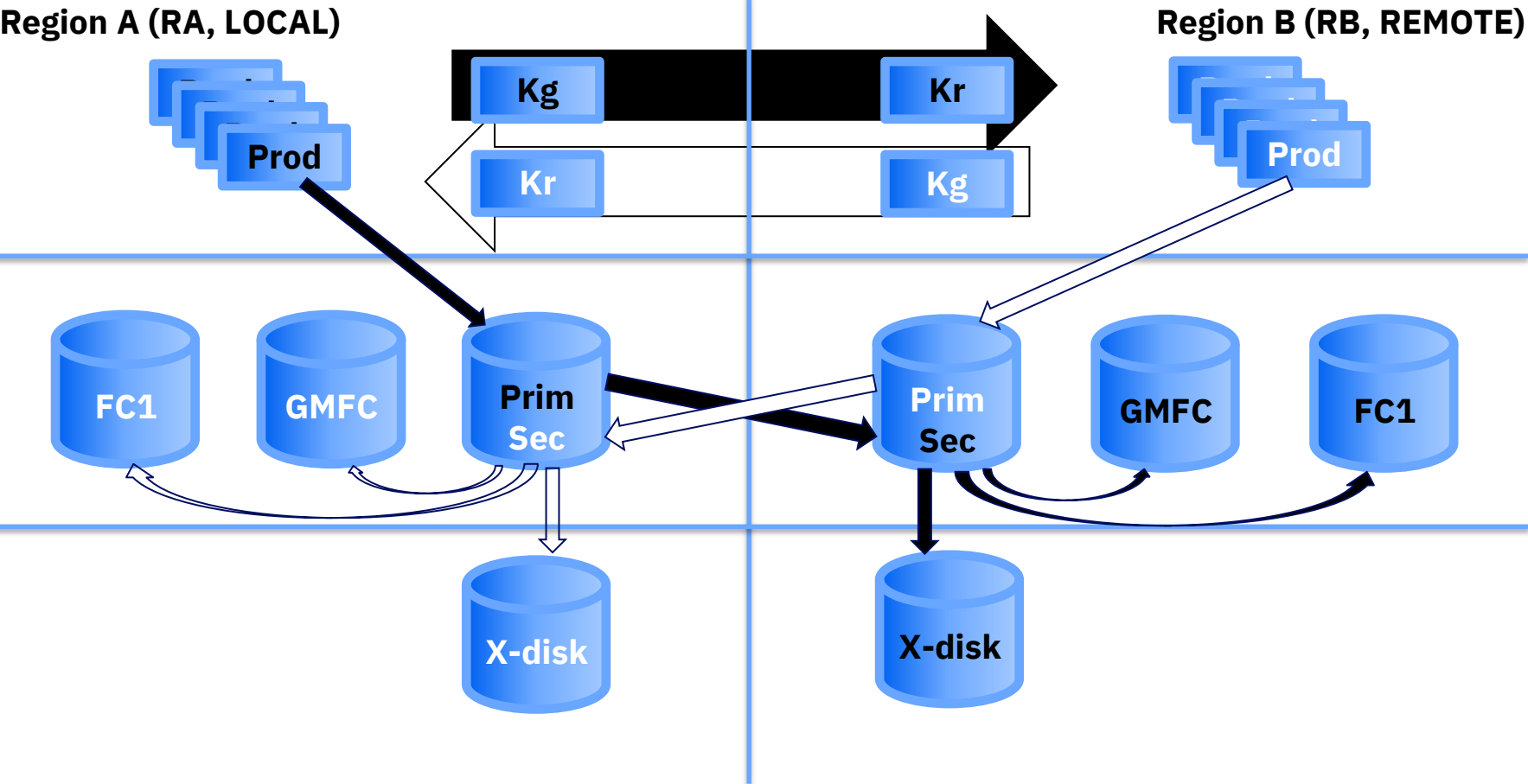


- Builds on region switch capable GDPS GM 2-site

- Consolidated XML GEOPARM for both directions, with all systems in the same group

- Allows the Kg/Kr pairs for both directions to operate simultaneously

- Allows multiple GM sessions to switch direction independently

- Region switch using Procedure Handler

# GDPS
# Statements of Direction

# Statements of direction

➢ GDPS plans to extend the **Logical Corruption Protection (LCP) Manager capabilities to integrate with GDPS HM and CSM – to deliver a Cyber Vault** automation platform for clients using GDPS HM and CSM for replication management.

➢ GDPS will provide an automation framework as part of the **LCP Manager for regular Data Validation in the IBM Z Cyber Vault**.

➢ GDPS will introduce **Dual Control for GDPS LCP Manager** to provide a maker/checker function for pervasive changes, on top of the role elevation capability that is possible with the existing role-based security controls.

➢ GDPS LCP Manager will be enhanced to provide stronger integration with **IZBR with particular focus on surgical use cases related to IBM Z Cyber Vault.**

➢ GDPS will be enhanced to support clients who have the requirement for MM3SITE in both regions as opposed to MM2SITE (**MGM6SITE**).

# Thank you!

# Backup Charts

# Additional Information

## Web sites:

- GDPS  https://www.ibm.com/products/gdps

- IBM zSystems  https://www.ibm.com/z

- IBM zSystems Resiliency https://www.ibm.com/z/resiliency

- Storage  https://www.ibm.com/storage

- Redbook –  GDPS Family: An Introduction to Concepts and Capabilities
    http://www.redbooks.ibm.com/abstracts/sg246374.html?Open


## GDPS Web site resources

- GDPS: The Enterprise Continuous Availability / Disaster Recovery Solution white paper

- GDPS pre-requisite information

- GDPS training schedule links

- GDPS hardware qualification letters

- E-mail:  gdps@us.ibm.com