

Improve your RTO & RPO with Multi-site Resiliency Solutions

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Agenda

Early solutions that exploited mirroring to provide HA and DR

Catalyst for change

New requirements for even higher levels of resilience

Latest topology

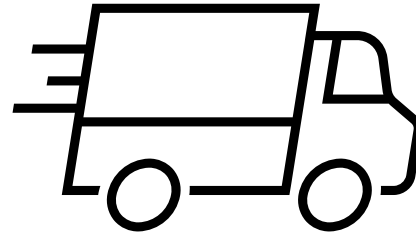
Summary



EARLY SOLUTIONS THAT EXPLOITED MIRRORING TO PROVIDE DR

Disaster Recovery prior to mirroring

Prior to mirroring, there was PTAM (Pickup Truck Access Method)



In the late 90's, mirroring was introduced



- Significantly reduced RPO – dictated by mirroring latency vs. backup frequency
- Significantly reduced RTO – hauling tapes to the DR site and restoring the entire environment from tape eliminated

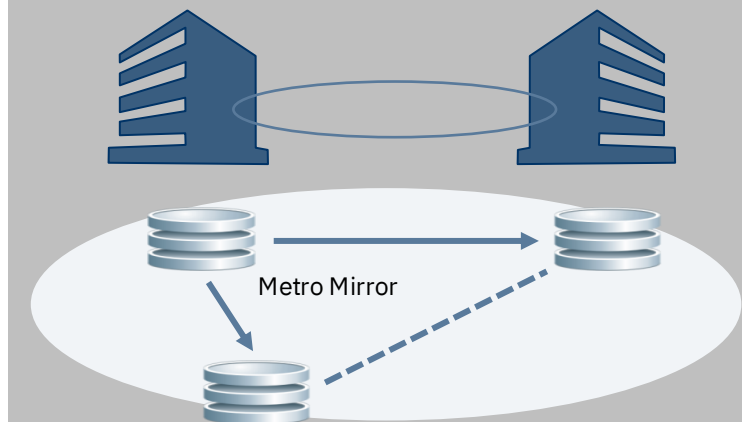
GDPS Metro

- Maintains up to three copies of data synchronously replicated
- Provides near-continuous availability and DR in a single data center or in a two data center environment within Metro Mirror distances
- Supports RTO of about 2 minutes (Multi-Site Workload) / less than one hour (Single-Site Workload) and RPO of zero
- Provides autonomic recovery for primary disk failures and CEC failures
- Provides Sysplex and server management in addition to storage replication and recovery management
- Automates management of temporary capacity on demand (Flexible Capacity for Cyber Resiliency, CBU, OOCoD, CPE, BOOST)
- Provides FlashCopy capabilities for resync protection and offline backup
- Protects Linux on IBM Z environments (z/VM, KVM, and native in LPAR) as well as Secure Service Containers
- Monitors the environment and reports on events that could prevent rapid recovery

Continuous availability (CA) and disaster recovery (DR) within a metropolitan region

Two/three data centers (2 server sites, 3 disk locations)

Multi-site workloads can withstand site and/or storage failures



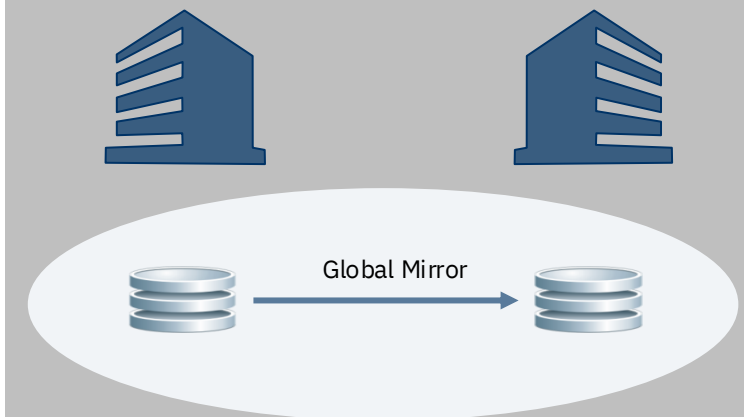
RPO = 0 and RTO ≈ 2 mins / < 1 hour

- Automates management of the Global Mirror technology
- Manages multiple consistency groups (scalable)
- Automates recovery of the IBM Z applications at the recovery site
- Supports RTO of less than one hour and a RPO as low as two seconds
- Uses FlashCopy management for data protection and to facilitate data recovery testing with minimal impact to DR position
- Automates management of temporary capacity on demand (Flexible Capacity for Cyber Resiliency, CBU, OOCoD, CPE, BOOST)
- Monitors the environment and reports on events that could prevent rapid recovery

Disaster Recovery at Extended Distance

Two Data Centers

Rapid Systems Disaster Recovery with
“seconds” of Data Loss
Disaster recovery for out of region interruptions



RPO = 2-5 secs, RTO = an hour or less



CATALYST FOR CHANGE

Catalyst for change

- In the late 1990's, early 2000's, a large majority of GDPS clients used GDPS Metro across two metro sites, many within 10 KMs due to ESCON limitations
- Sept 11, 2001 terrorism and Interagency Paper on Sound Practices to Strengthen the Resilience of the U.S. Financial System [Docket No. R-1128] (April 7, 2003):
 - *Maintain sufficient geographically dispersed resources to meet recovery and resumption objectives*
 - *Routinely use or test recovery and resumption arrangements*

GDPS Metro Global – GM 3-site (aka MGM 3-site)

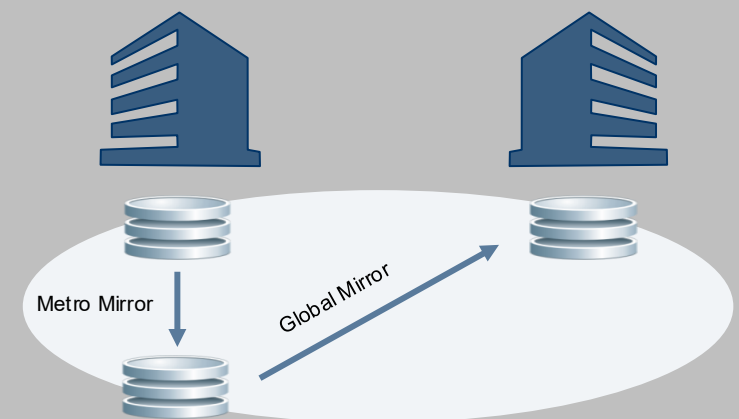
- Provides continuous availability and long-distance DR in a two or three data center environment
- Supports RTO of less than one hour and RPO of zero for local failure events
- Supports RTO of less than one hour and RPO as low as two seconds* for regional failure events
- Monitors and manages all sites from a single point of control
- Powerful scripting commands that highly automate recovery operations
- Automated DR testing with minimal impact to RPO

*RPO (Data loss) is workload and bandwidth-dependent

**Continuous availability (CA) locally
and DR at extended distances**

Two or three data centers

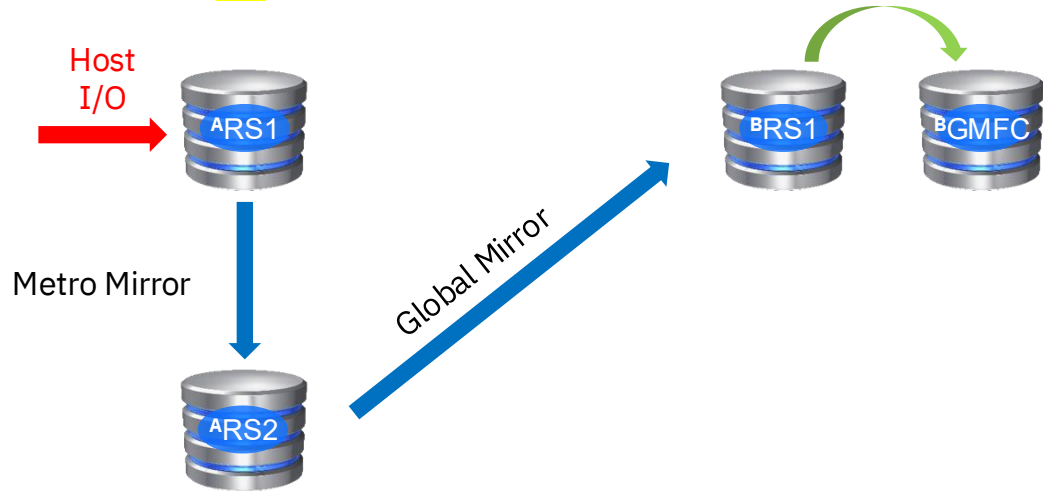
**High availability for site disasters
Disaster recovery (DR) for regional disasters**



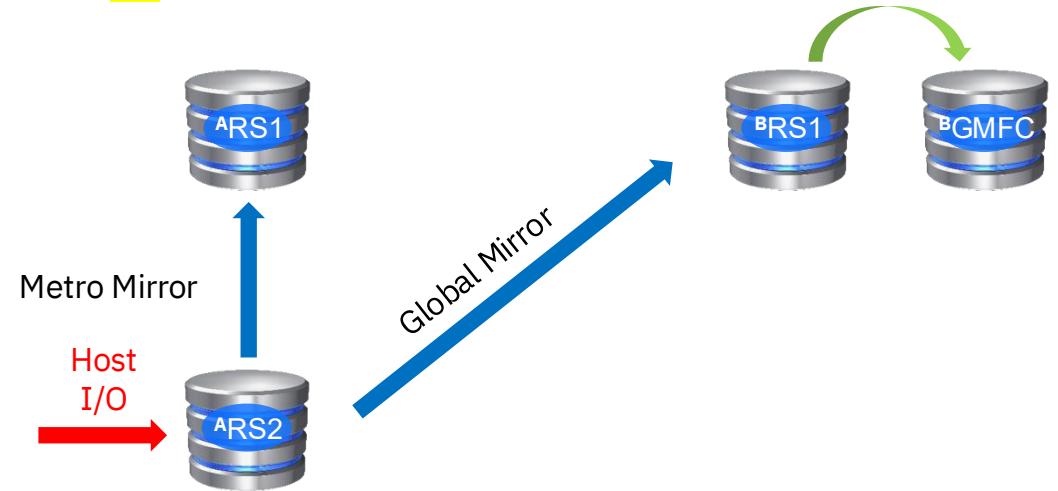
RPO = 2-5 secs, RTO = an hour or less

Scenarios – HyperSwap while running cascaded

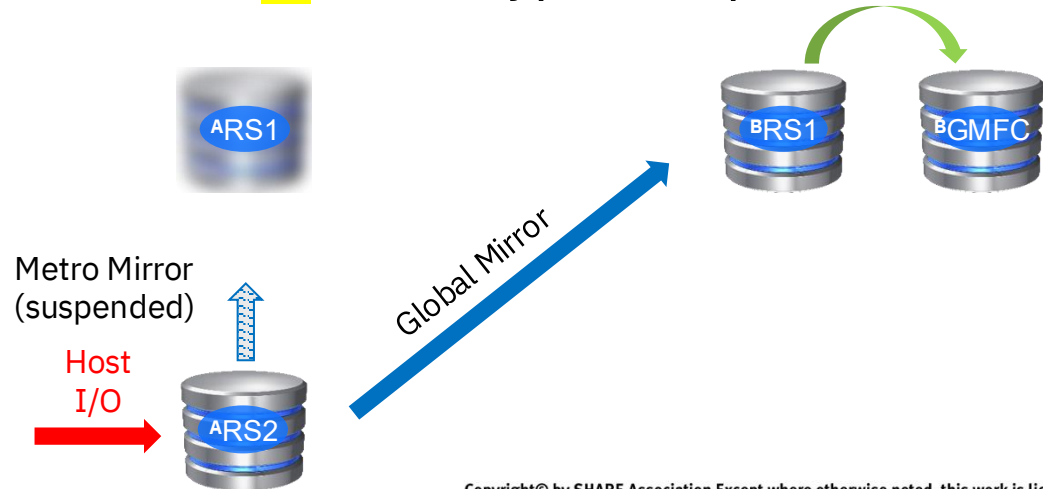
1. Starting config - cascaded



3. After resync – multi-target config

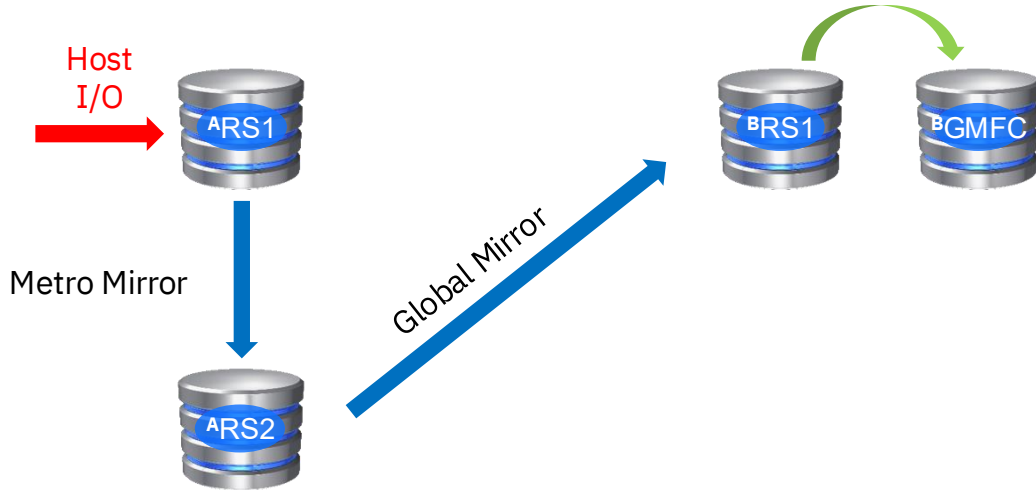


2. After HyperSwap

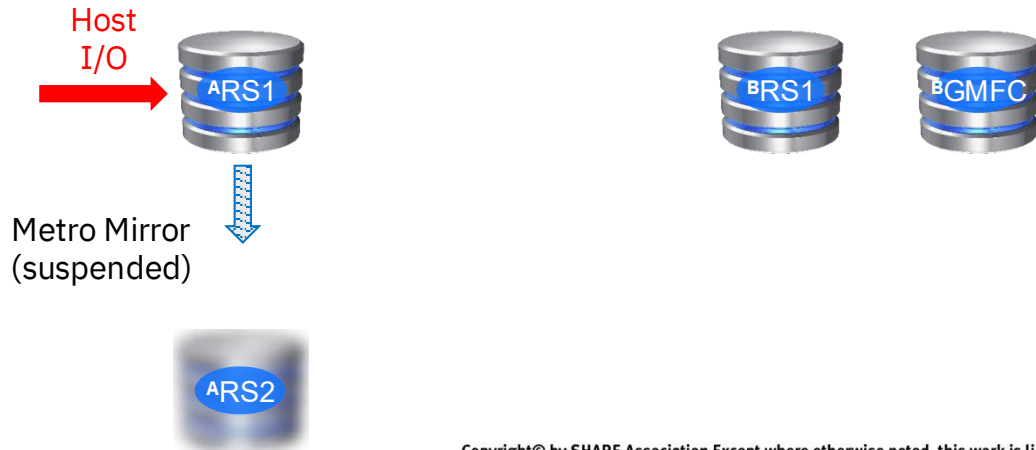


Scenarios – Loss of A.RS2

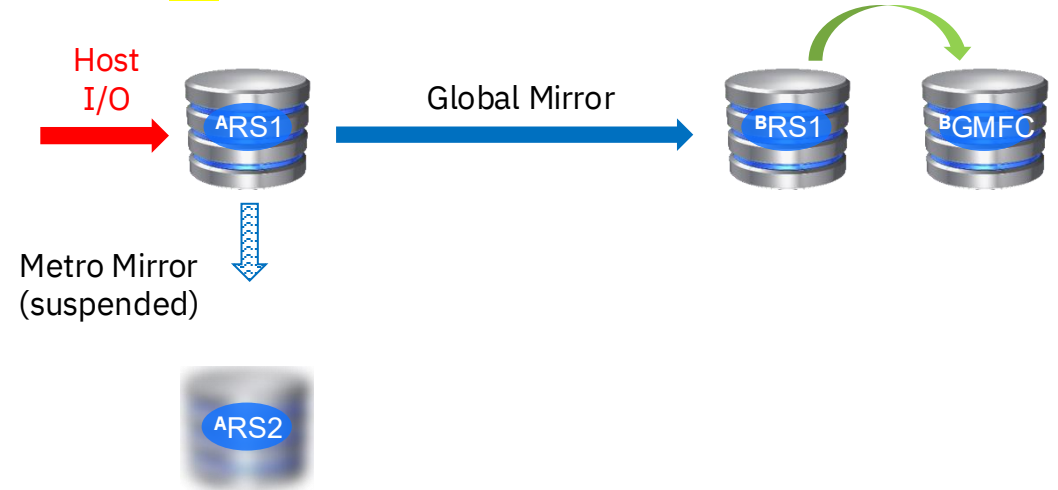
1. Starting config - cascaded



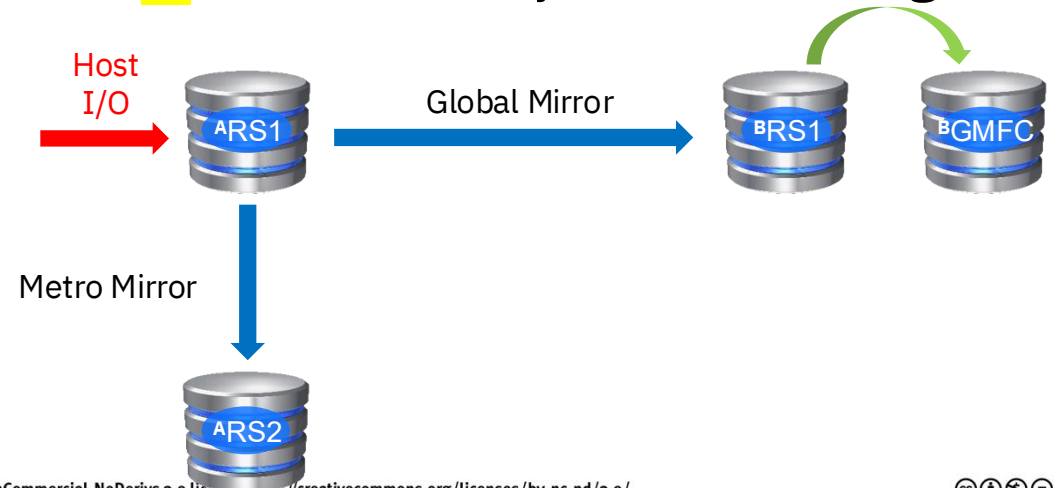
2. ARS2 is lost



3. After GM incremental resync



4. After MM resync – multi-target





NEW REQUIREMENTS FOR EVEN HIGHER LEVELS OF RESILIENCE

Requirements become more stringent

- Clients hesitant to declare DR...
 - DR testing doesn't provide sufficient confidence that production can actually run in the DR region under peak workloads
- Financial services sector clients being encouraged by regulators perform regular region toggles that verify DR capability, that prove production can run in the DR region under peak workloads, and that demonstrates ability to return home after a DR event...Region Toggle (aka “switch and stay”)

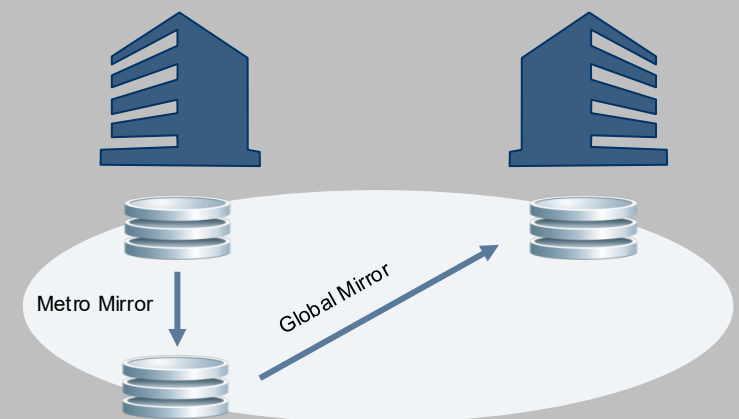
Switch and stay in a GDPS Metro Global – GM 3-site environment not desirable

- DR data center does not provide the same level of resilience as the production data center
 - Only one copy of data, no HA for storage
- Different operational procedures
 - GDPS Metro running and managing systems and sysplex resources in production data center, no GDPS Metro running in the DR data center
- No DR protection while running in the DR data center

Continuous availability (CA) locally and DR at extended distances

Two or three data centers

High availability for site disasters
Disaster recovery (DR) for regional disasters



RPO = 2-5 secs, RTO = an hour or less

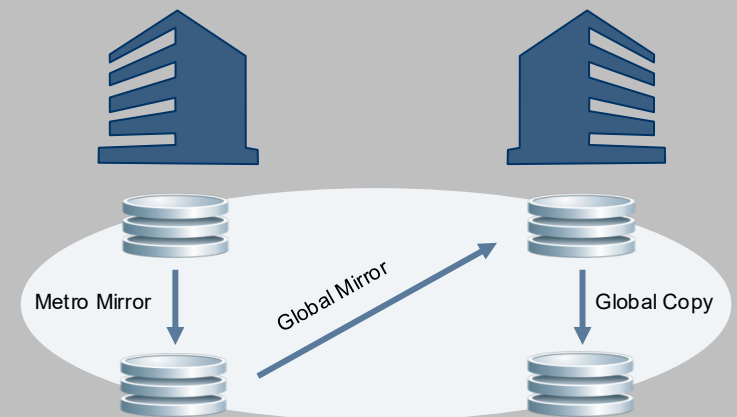
GDPS Metro Global – GM 4-site (aka MGM 4-site)

- Provides continuous availability and long-distance DR in a two, three, or four data center environment
- Supports RTO of less than one hour and a RPO as low as two seconds*
- Monitors and manages all sites from a single point of control
- Powerful scripting commands that highly automate recovery operations
- Symmetric configuration provides same levels of resilience and same operational procedures in both regions – facilitating region toggle (“switch and stay”)

**Continuous availability (CA) locally
and DR at extended distances**

Two, three, or four data centers

**High availability for site disasters
Disaster recovery (DR) for regional disasters**



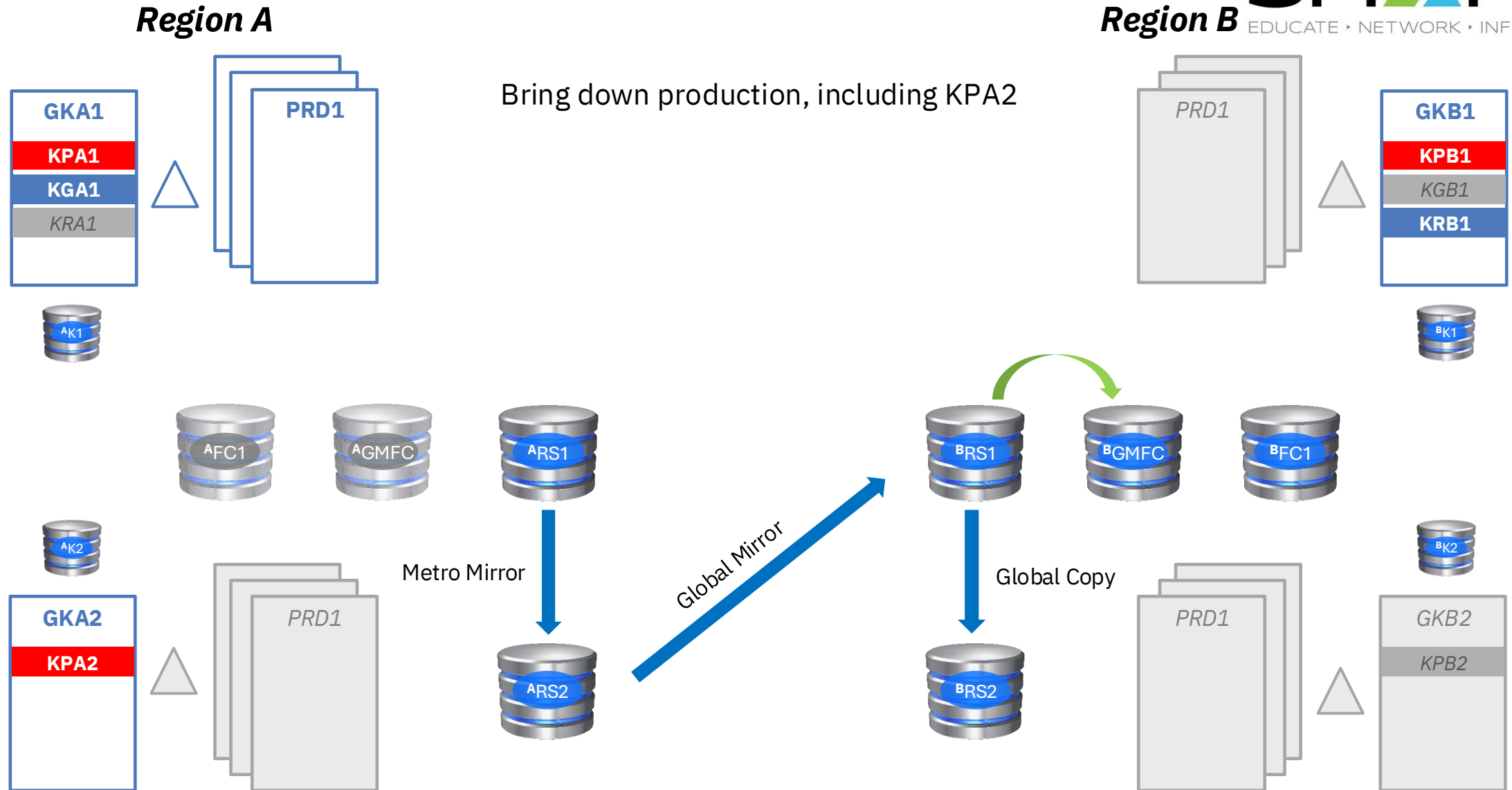
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*RPO (Data loss) is workload and bandwidth-dependent

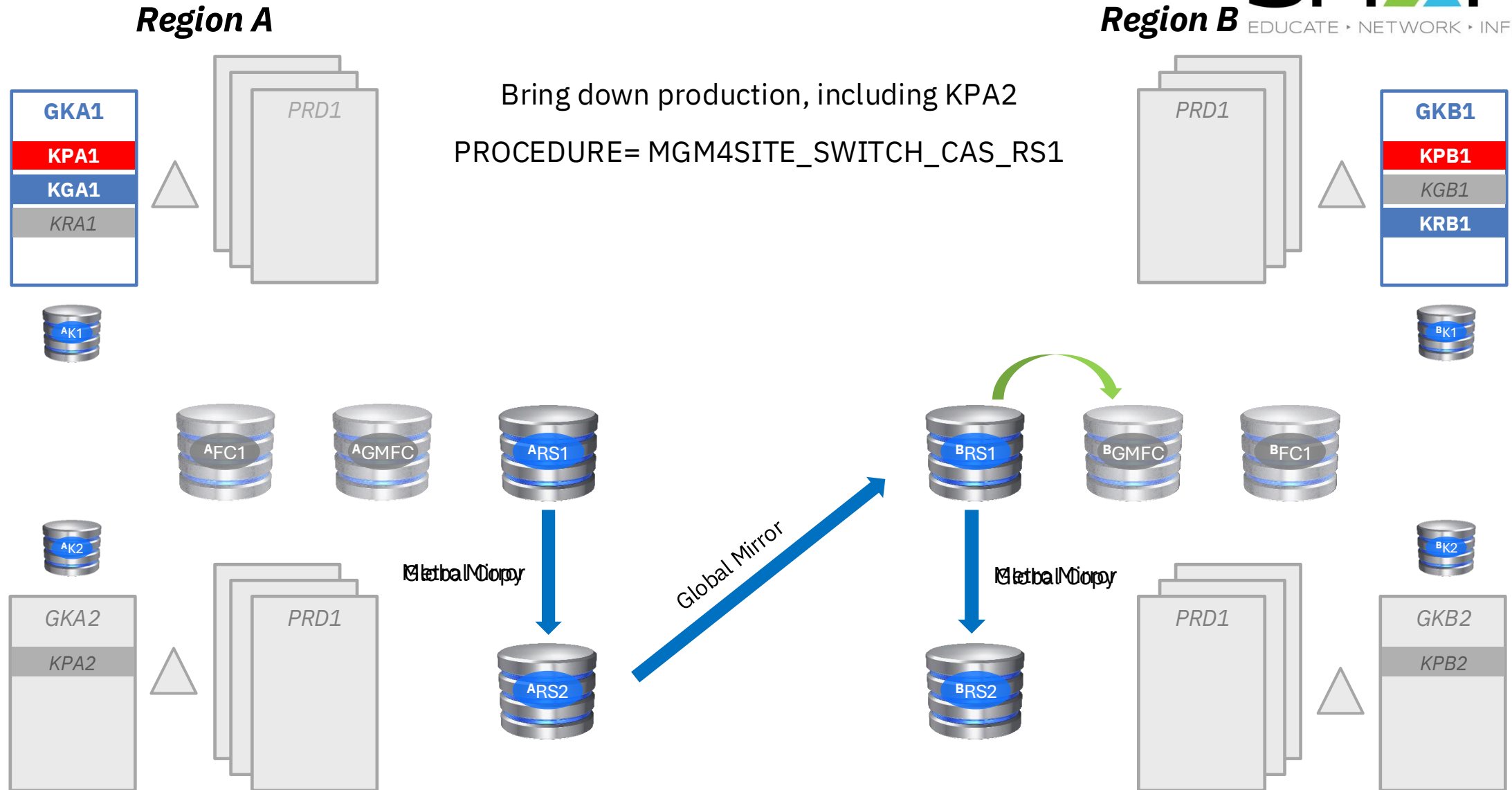
4-site scenarios

- All the 3-site scenarios, regardless of which region production is running in
- Region toggle (switch and stay)

Planned region switch - MGM 4-site

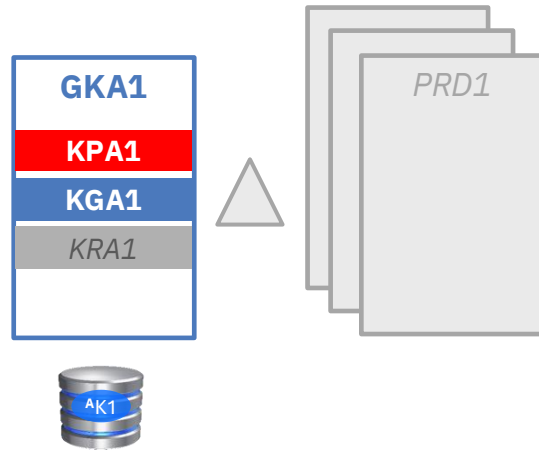


Planned region switch - MGM 4-site



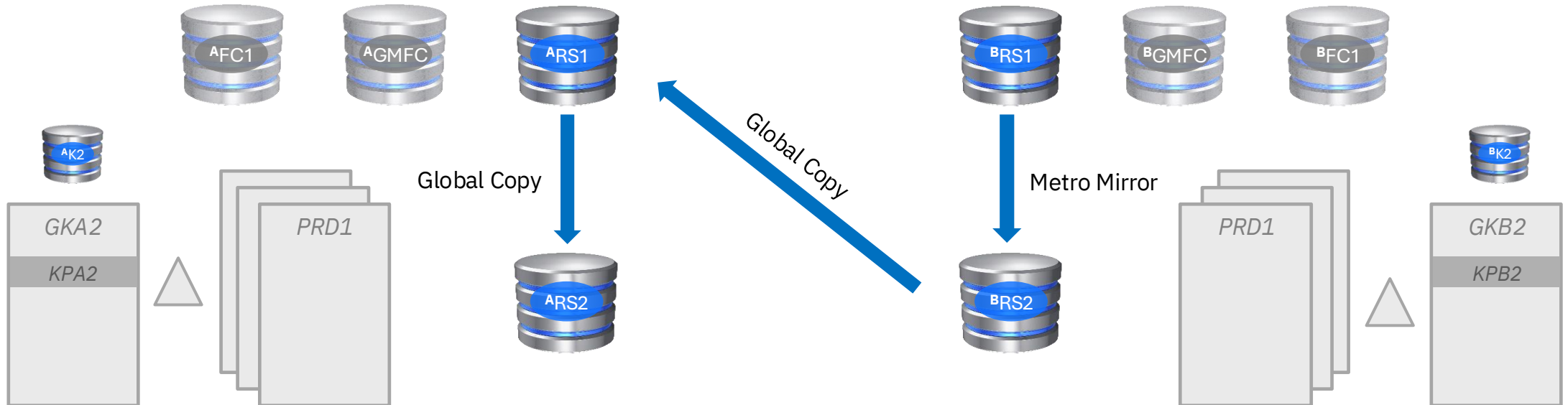
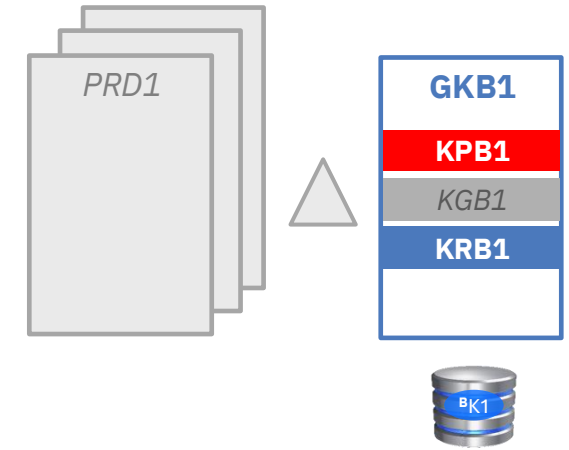
Planned region switch - MGM 4-site

Region A

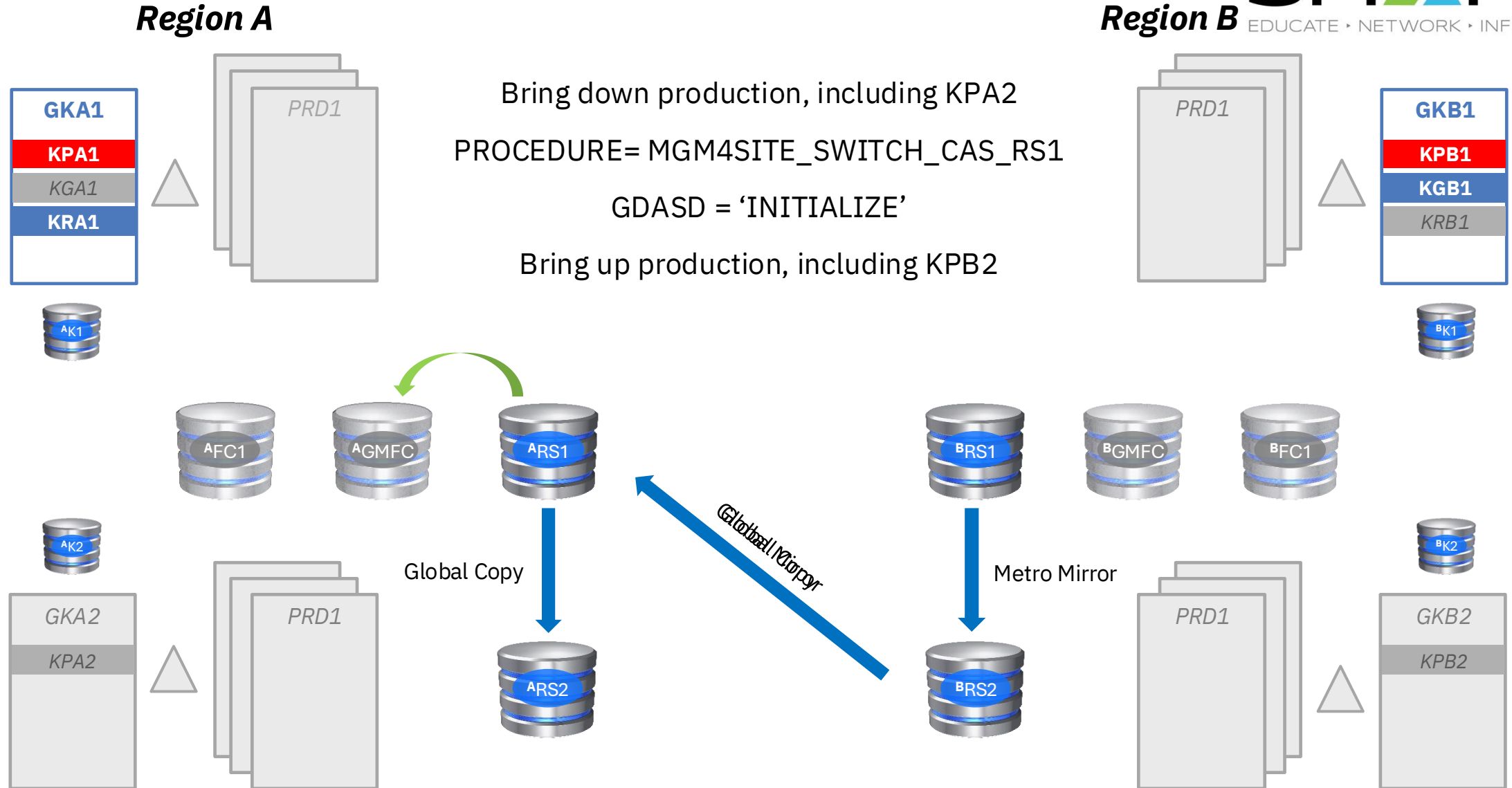


Bring down production, including KPA2
 PROCEDURE= MGM4SITE_SWITCH_CAS_RS1
 GDASD = 'INITIALIZE'

Region B

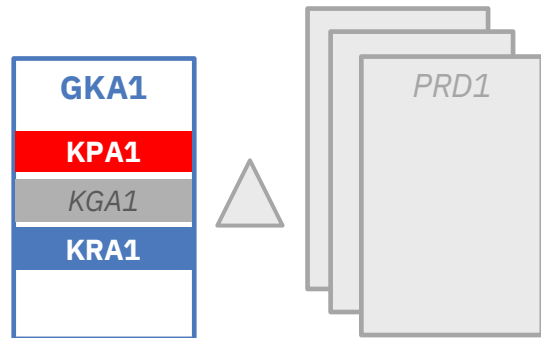


Planned region switch - MGM 4-site



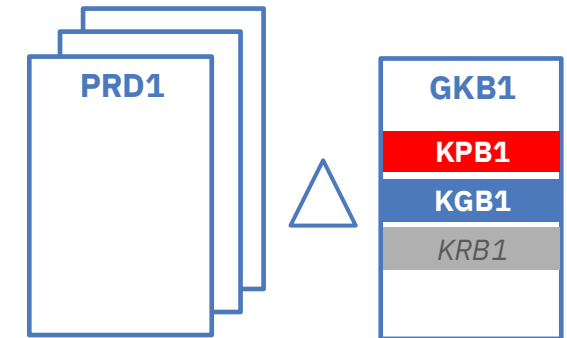
Planned region switch - MGM 4-site

Region A

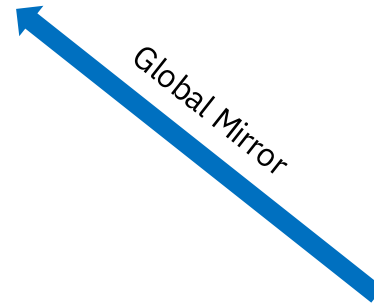


Bring down production, including KPA2
 PROCEDURE= MGM4SITE_SWITCH_CAS_RS1
 GDASD = 'INITIALIZE'
 Bring up production, including KPB2

Region B



Global Copy



Metro Mirror



Powerful scripting capabilities

- Script statements and procedures to manage disk reconfiguration
 - Intelligence to query the environment to determine starting position (cascaded or multi-target)
 - Perform required actions based on that position
- Procedures are provided to support a number of scenarios, for example
 - Planned region switch and return home
 - Unplanned recovery in Recovery Region (real DR event) and return home
 - DR validation test on Recovery Region FC1 or X-disk
 - Move GM sessions incrementally when GM primary is lost

Resiliency requirements continue to get more stringent



GDPS Metro provides:

- Continuous availability
...BUT at limited distance

Clients need:

- UNLIMITED distance between sites for protection against regional failures

GDPS Global provides:

- Disaster recovery at unlimited distance
...BUT no continuous availability
 - Must switch whole site, impacting all business operations
 - Full recovery could take over an hour

Clients need the ability to:

- Switch a failed workload or all workloads in less than 30 seconds
- Keep critical workloads available during planned outages

RTO of seconds across unlimited distance not possible with the traditional failover model of recovery

GDPS Continuous Availability for OLTP workloads

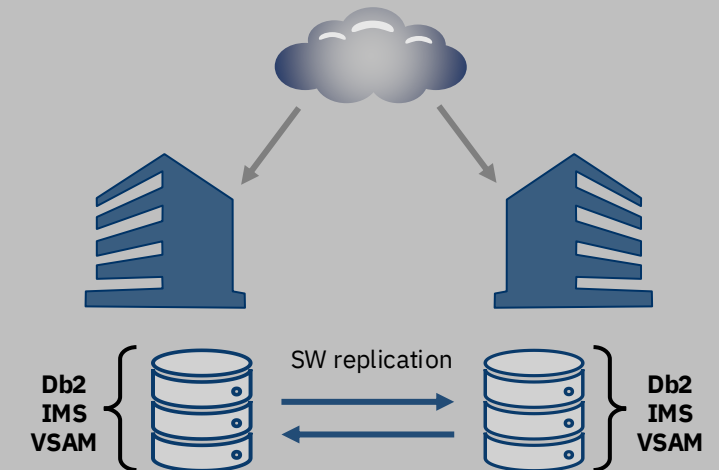


- Manages availability at a workload level
- Provides a central point of monitoring and control
- Manages replication between sites at any distance
- Provides the ability to perform a controlled workload site switch
- Recovery time and recovery point objectives – measured in seconds
- Provides near-continuous availability and simplifies disaster recovery with an automated, centralized solution
- Facilitates better regulatory compliance management

Near continuous availability at extended distance

Two data centers, two distinct Sysplexes

Workload balancing, continuous operations and recovery for out of region interruptions

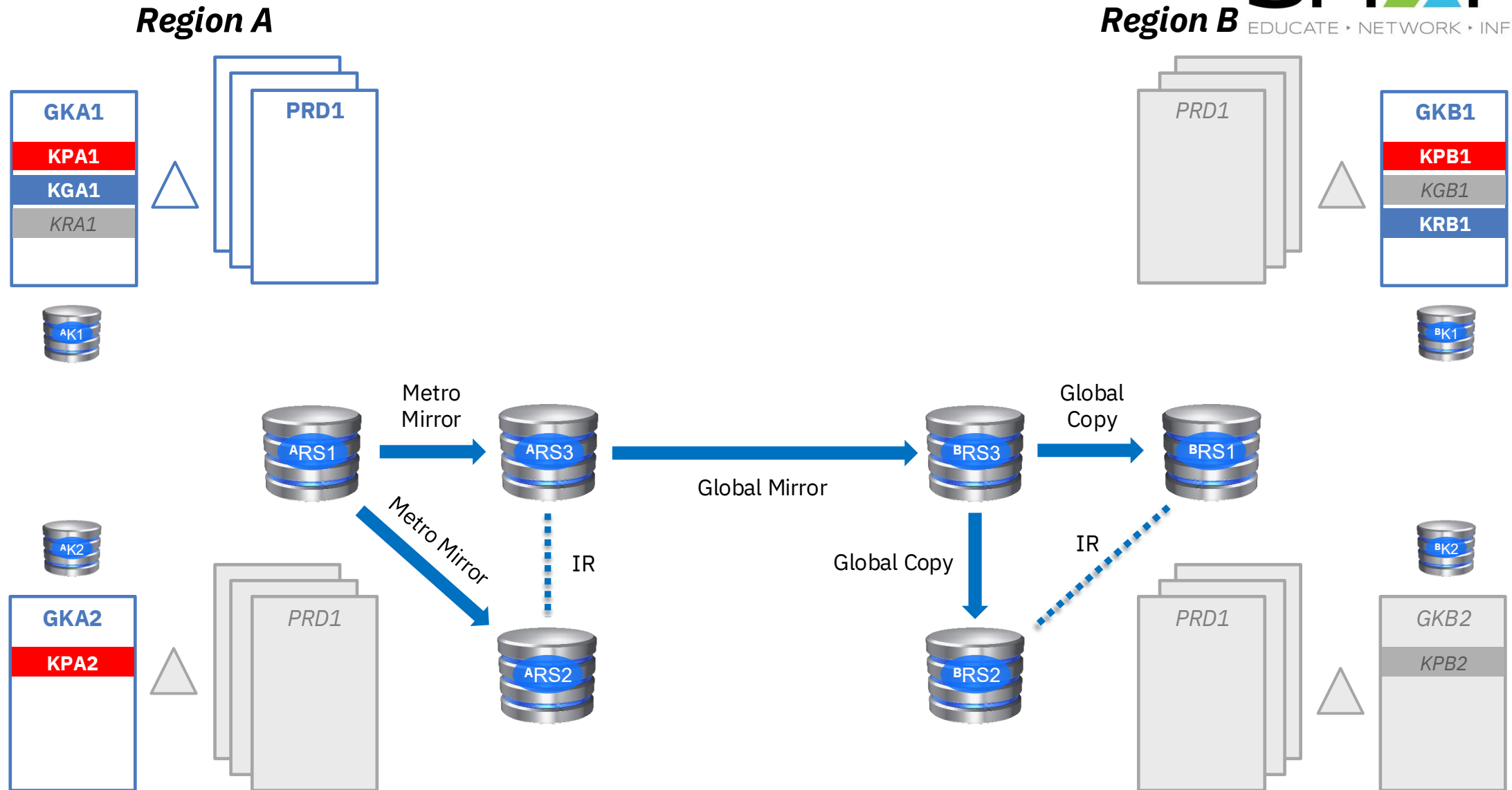


RPO = 0-5 secs, RTO = 20-30 seconds



LATEST TOPOLOGY

GDPS Metro Global – GM 6-site (aka MGM 6-site) *



* GDPS will be enhanced to support clients who have the requirement for MM3SITE in both regions as opposed to MM2SITE (MGM6SITE) SOD addressed in GDPS 4.8 (GA 3/25)

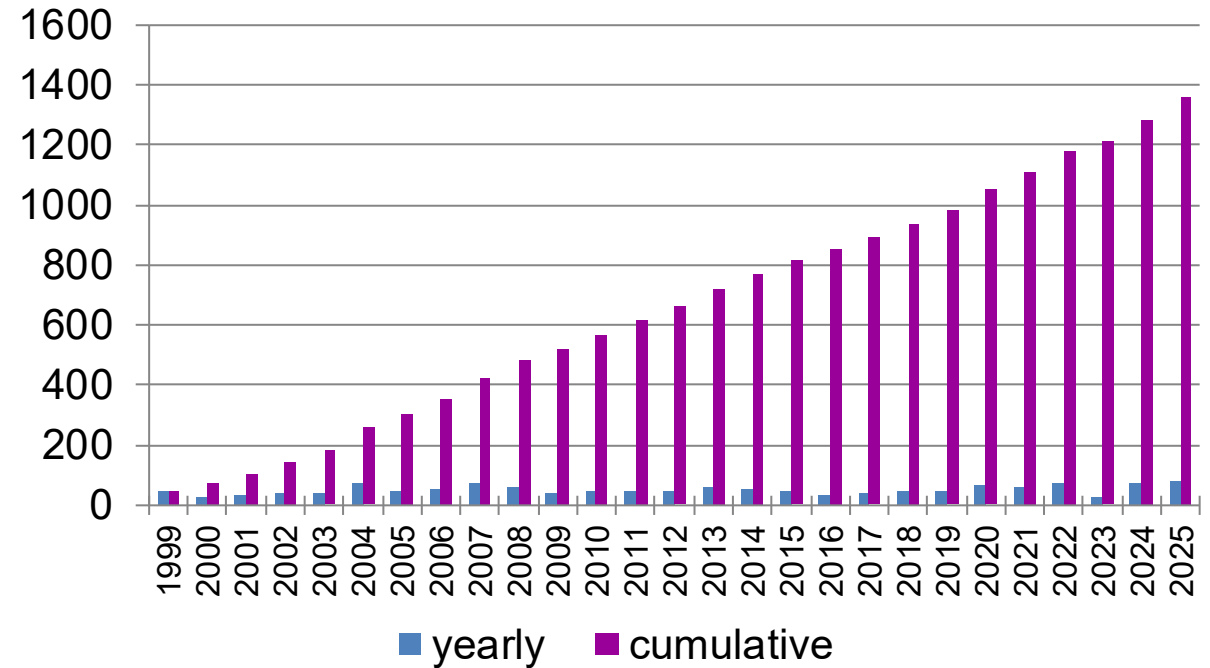


SUMMARY

GDPS License Demographics (year-end 2025)



- GDPS provides a complete solution for High Availability, Disaster Recovery and Cyber Resiliency in IBM Z environments
- Replication management, system management, automated workflows and deep integration with z/OS and parallel sysplex
- DS8000 provides significant benefits for GDPS users due to close cooperation between development team
- More than 1350 licences sold since inception (1359 at YE25)
- Solid Multi Site Install base, and growing
- Significant traction for GDPS Logical Corruption Protection (LCP), providing automation, monitoring and management of Safeguarded copies



Multi site configuration	Environments		Customers	
	2024	2025	2024	2025
MGM3	155	177	92	97
MGM4	75	88	32	35
LCP feature	132	192	53	68

What value can the IBM GDPS solution offer your organization?

Experience	Commitment		Value		Vision
<p>Client acceptance</p> <ul style="list-style-type: none"> – Approaching 1300 GDPS licenses installed in 51 countries worldwide – Tested technology to support automated and repeatable results – Complete implementation guided by experienced consultants 	<p>Open industry standards</p> <ul style="list-style-type: none"> – IBM GDPS supports industry-accepted, open replication architectures (Metro Mirror, Global Mirror and Fibre Channel) – Architectures licensed by all enterprise storage vendors – GDPS qualification program for GDPS Metro (IBM, Hitachi) 	<p>Investment protection</p> <ul style="list-style-type: none"> – Designed to be easily upgradeable – Common code base for each product 	<p>Product maturity</p> <ul style="list-style-type: none"> – Generally available since 1998 – Suite of products – Enterprise-to-enterprise capability – Many years of IBM Z production experience – HA, DR, & cyber resiliency best of breed – Continually enhanced 	<p>Client focus</p> <ul style="list-style-type: none"> – GDPS Design Council – Synergy with IBM development labs – Incorporates several IBM patents – New release planned every year – GDPS advocate program 	<p>IBM support</p> <ul style="list-style-type: none"> – Fully supported via standard IBM support structure – Fixes through normal IBM Z channels

Additional information

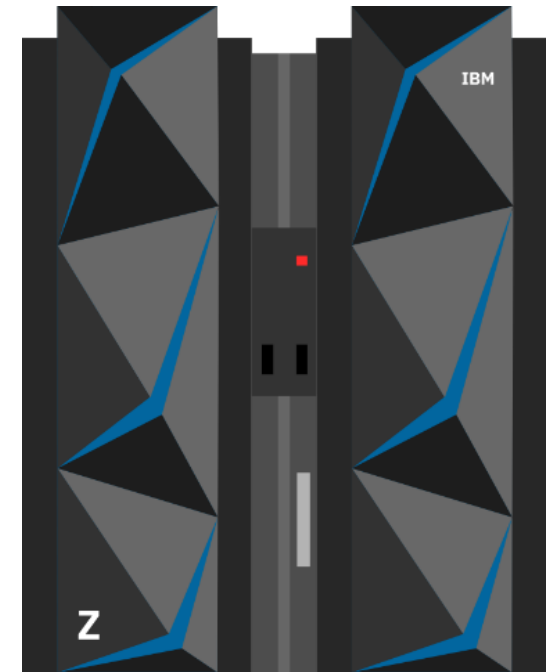
Web sites:

- GDPS <https://www.ibm.com/products/gdps>
- IBM Z <https://www.ibm.com/z>
- IBM Z 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

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