High Availability and Disaster Recovery architectures for z Systems

GDPS solutions, what are their objectives, how
they are implemented by the customers and we'll also talk about the future of the solution with the newest features added to GDPS version 3.12.

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Agenda

Introduction

Configurations for 2 sites

- Metro distance
- Extended distance

Configurations 3 & 4 sites

Heterogeneous platform

What's new and Roadmap

Most of large companies in the world have GDPS installed

2 Sites METRO

- Air France
- ARZ
- Bancaja
- Banca Popolare di Milano
- Bankinter
- Bank of Montreal
- BIT
- BRZ
- Deutsche Bank
- EQUENS
- La Caixa
- Central Bank of Turkey
- Credit Suisse
- Danske Bank
- Deere & Company
- Finanz Informatik
- GAD
- Generali Informatik Services
- Lloyds Banking Group
- Monte Paschi di Siena
- Postbank
- Royal Bank of Scotland
- Sparda Bank (SDV)
- Svenska Handelsbanken
- Toronto Dominion Bank
- UBS
- ZIVIT
- Signal Iduna

2 Sites Distants

XRC

- Jack Henry
- Sun Trust Bank

GM

- American Express

Active-Active

- Large Chinese Bank

3 sites (2 Metro + 1 Distant)

XRC

- Barclays Bank
- British Telecom
- Cedacri S.p.A.
- Garanti Bank
- HMLR
- ICBC
- Regions Financial Corp.
- Royal Bank of Canada
- Large US Bank

GM

- Baloise
- BPVN
- Charles Schwab
- BNP Paribas
- Itau
- Intesa Sanpaolo
- Six Group
- Unicredit

2 Regions - Symetric

- JPMC
- Nationwide

More than 790 licenses
in 46 countries
Dozens of references

Multiple pressures on IT Services to improve availability

Business Growth

Reduce Planned Outages

Reduce incident impacts

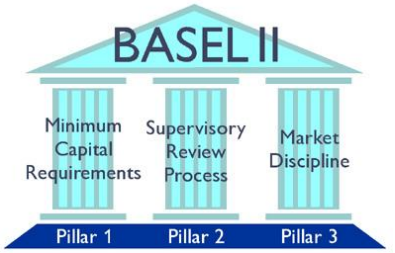
New Apps
New Products

Governments

24*7*365 access

Entreprise Data

New rules



Reporting & Documentation

Demographic

Reduce Costs

When do we need HA/DR solution?

Global disaster	Local disaster	Maintenance
- Hurricane - Earthquake - Power plants failure...	- Fire - Power supply problem - Unplanned IT Failure	- Hardware & software update. - Switch to a new datacenter - Test
Do we have safe backup? Do we have system ready to start outside of the region?	Could we avoid downtime and data loss? Is there a procedure to restart systems?	Can we do that transparently? How to reduce the risk of a rolling problem during a maintenance scenario?

The added value for…
… high availability and disaster recovery

- **Automation**

GDPS based on Netview and System Automation is able to manage and automate actions and to react to events.

This key point has a lot of benefits:

- Reduce risk
- Reduce dependency on people.
- Enhance recovery performance
- Help you to be consistent across all your environment

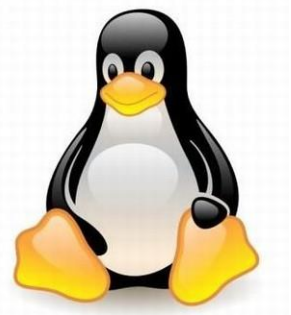
The added value for…
… system monitoring and management

- **Single point of control**
  - Clear view of your systems and storages devices status
  - Simply presents faults and warnings
- **System management and maintenance**
  - Introduction of a system of script to manage their complex environment
    - **Simple**
    - **Flexible**
    - **Easy to use**

The added value…
… in an heterogeneous environment

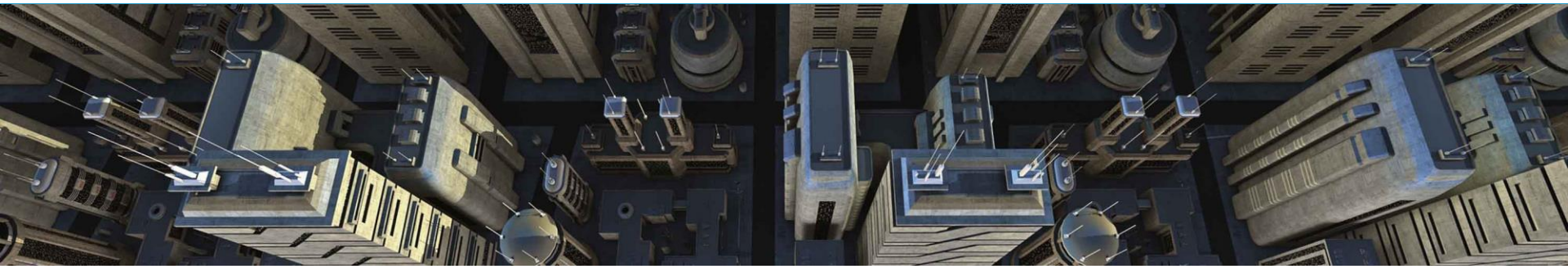
- **Heterogeneous type of storage**
  - GDPS can manage a configuration with a mix of multiple kind of storage platform such as **IBM DS8K, Hitachi/HDS Disks, EMC disk…**

- **Heterogeneous platform**
  - GDPS includes solution designed for platform such as **zVM, Linux**, Aix, Windows with additional capability.
    - DCM – Distributed Cluster Management (Since 2008)
    - xDR – Extended Disaster Recovery (Since 2005)

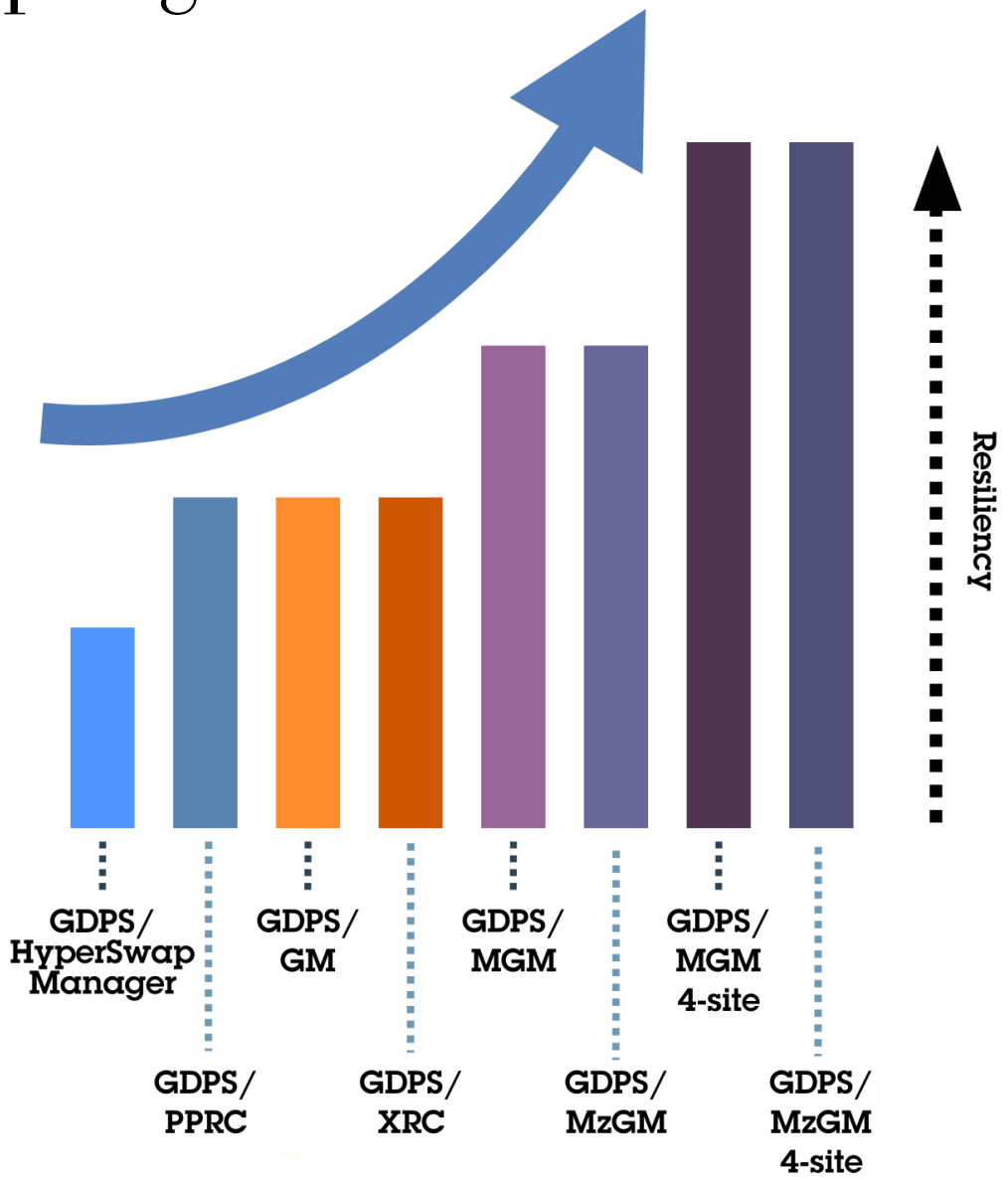


Designed for Linux on z consolidation

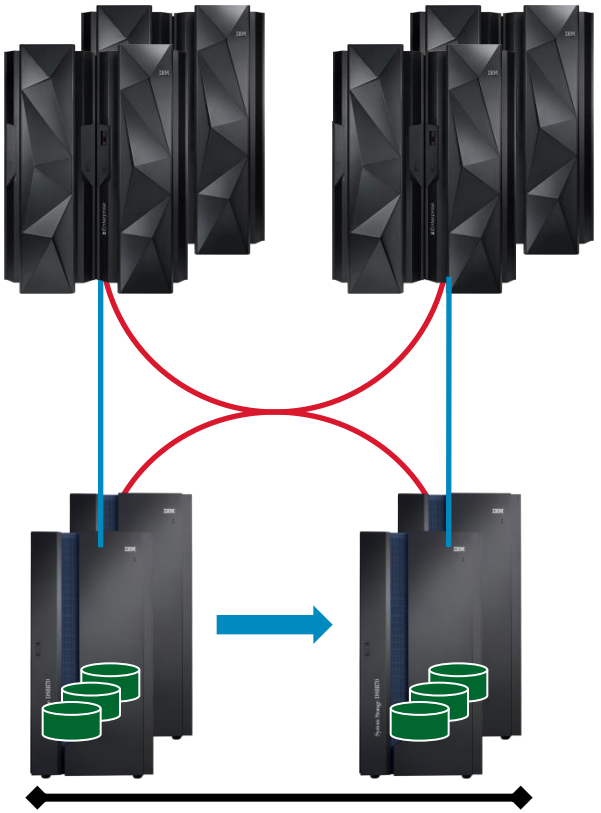
GDPS Topologies and solutions



GDPS Topologies



GDPS/HM & GDPS/PPRC – Synchronous replication



HyperSwap technology

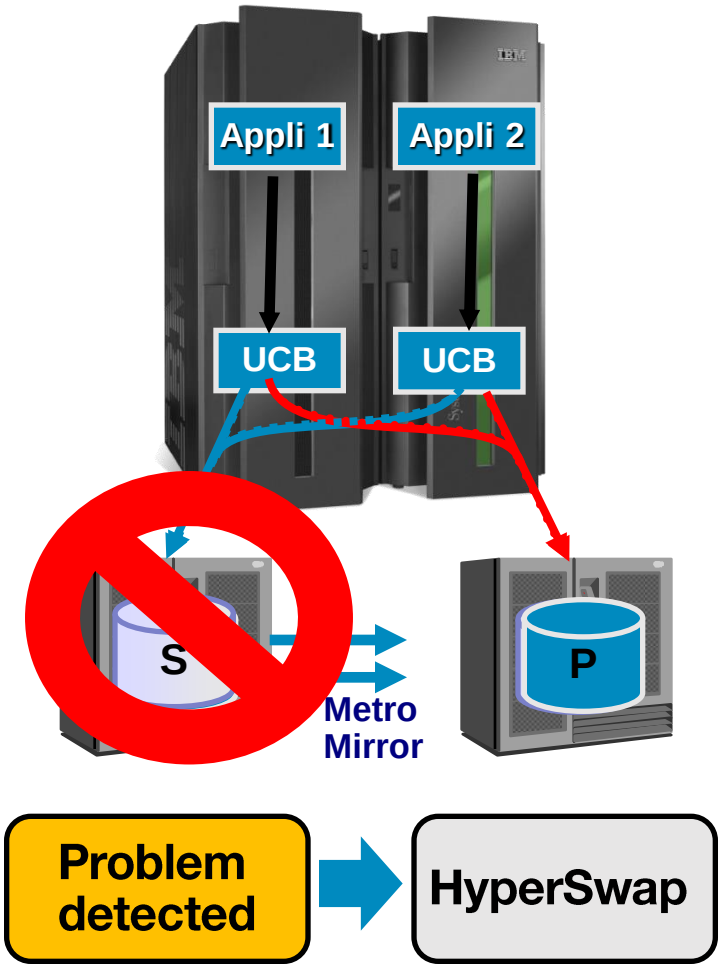
Added value / Key features

- Minimal impact in case of failure
- No data loss!
- Simplified maintenance and test
- Planned outage support
- More automated operation

Protection against:

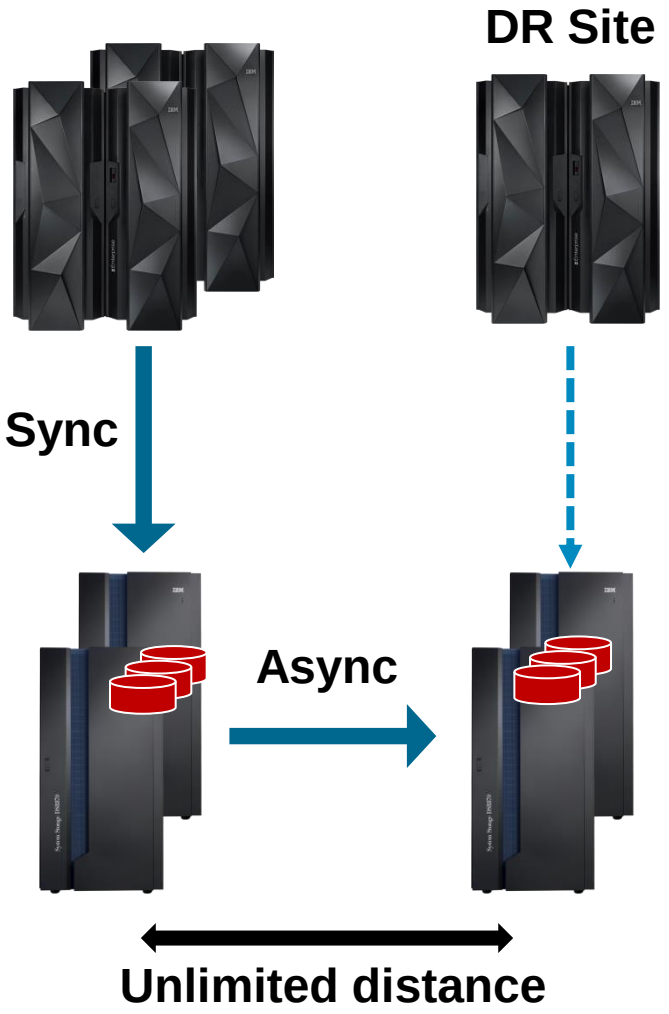
- Storage/disk failure
- Partition failure
- Site failure
- RPO = 0, RTO = seconds

HyperSwap technology



- Substitutes Metro Mirror secondary for primary device
  - Automatic – No operator interaction
  - Fast – Can swap large number of devices
  - Non-disruptive – applications keep running
  - Includes volumes with Sysres, page DS, catalogs
- Disk no longer Single Point of Failure

GDPS/XRC and GM – Asynchronous replication



Added value / Key features

- Unlimited distance support.
- Performance impact negligible.
- Automated recovery

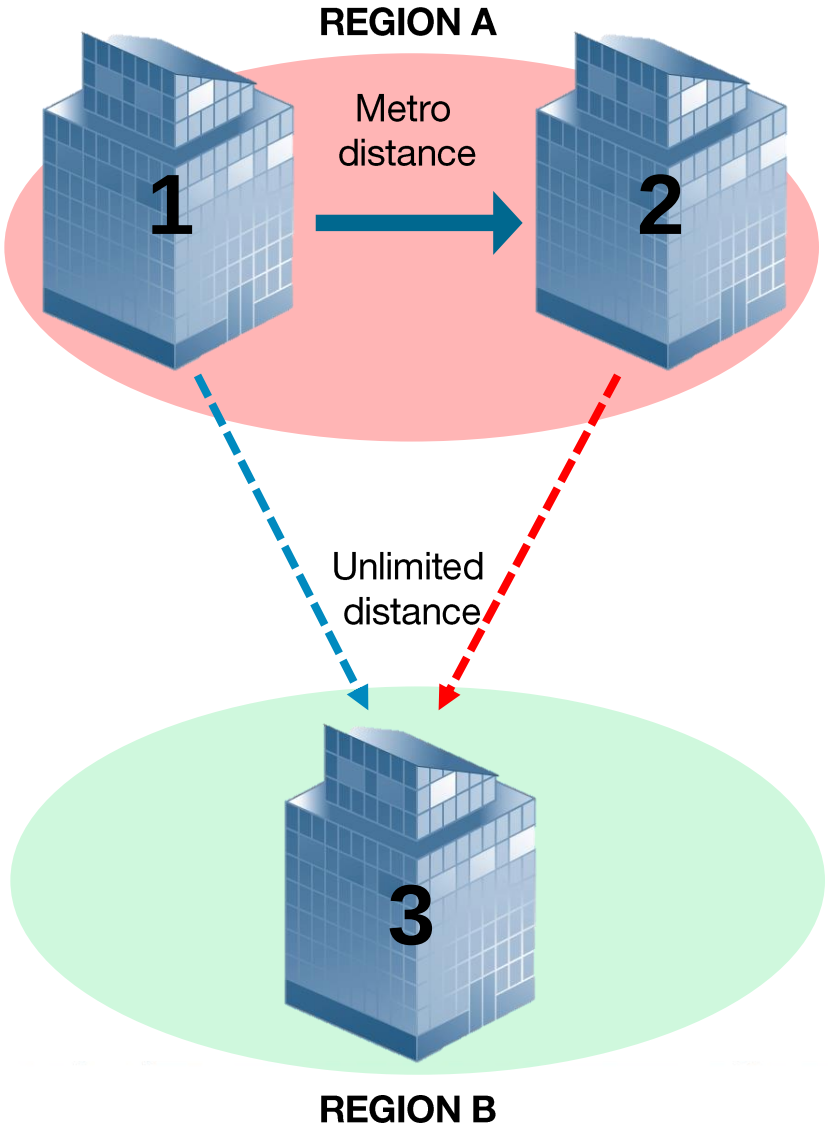
Protection against:

- Site failure
- Major disaster (Powerplant failure, natural disaster,…)

RPO = seconds or minutes

RTO < 1 hour

MGM & MzGM, why moving to these solutions?



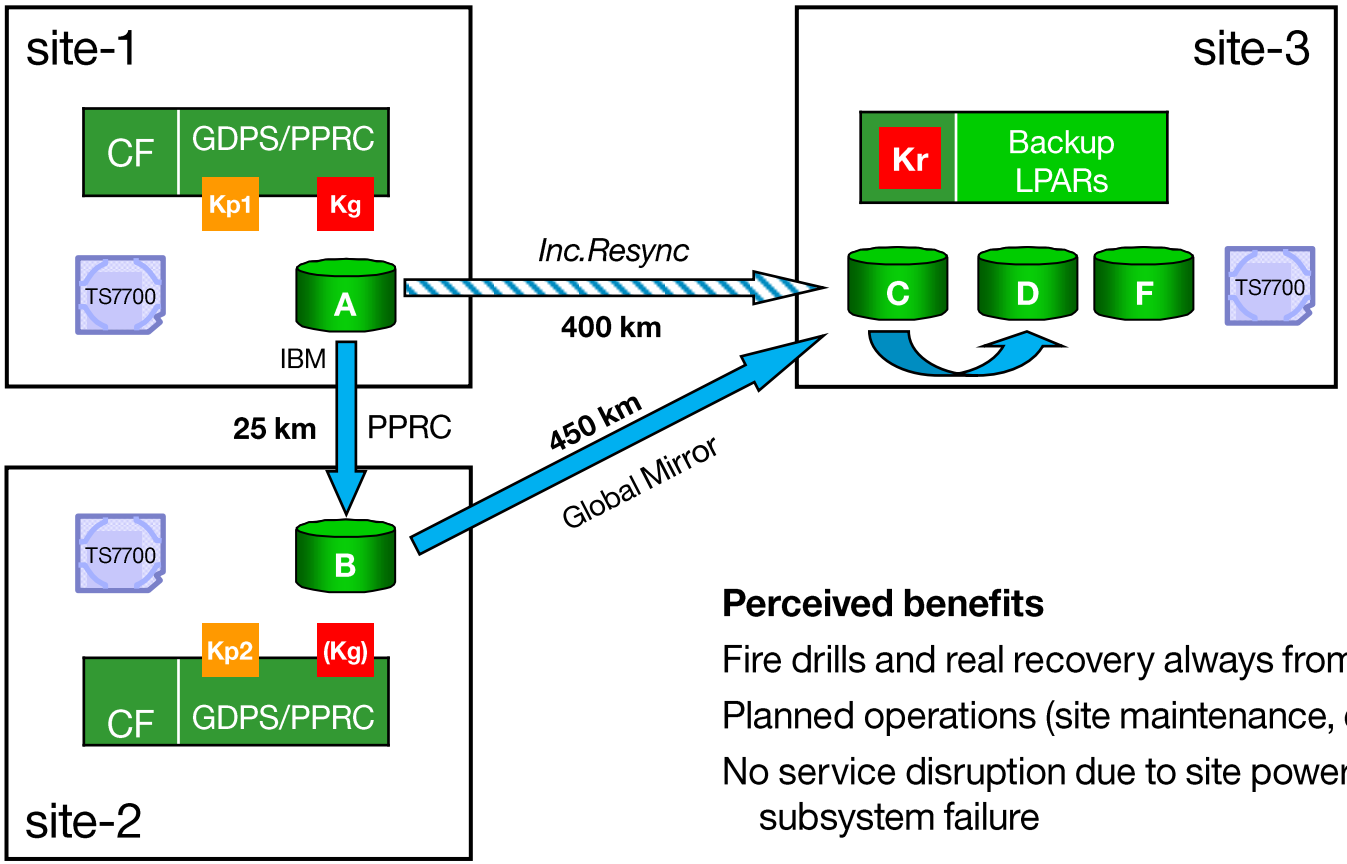
Added value / Key features

- Local high availability (Site 1 + 2)
  - No dataloss!
- Disaster recovery (Site 3)
  - Automated recovery within a minimal period of time in case of major issue.
- Incremental resync capability

Protection against:

- Site failure
- Major disaster (Powerplant failure, natural disaster,…)

GDPS/MGM Implementation



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Perceived benefits

Fire drills and real recovery always from the practice FC copy (F)

Planned operations (site maintenance, code /storage upgrade)

No service disruption due to site power failure or primary subsystem failure

GDPS /PPRC # LPs	Number PPRC Volumes	Planned HS Suspend [UIT]	Unplanned HS [UIT]	Number GM Volumes	Average Data in Flight (remote RPO)	Simulated Regional D/R (remote RTO)
16+2	14,716 pairs 149 LSS	16 sec	19 sec	14,719 pairs 149 LSS	30 sec	< 4hrs

XRC (MzGM) or Global Mirror (MGM)?

	GDPS/XRC	GDPS/Global Mirror
Replication	Asynchronous. No app. impact	
Distance	Virtually unlimited distance	
Type of disk managed	System z data only • z/OS • Linux on system z (LPAR or Guest) • zVM	System z & **distributed data** (ckd + scsi)
Requires…	…additional MIPS & LPARs on secondary site to support SDMs (zIIP)	…additional disk for additional FlashCopy version
Scalability	Highly Scalable. Up to 182 coupled SDMs	Max 8 subsystems (w/o RPQ) 17 subsystems (with RPQ)
Work with…	**Supported by multiple vendors (IBM, Hitachi, EMC,…)**	Currently supported on IBM disk

Linux on z consolidation with xDR!

xDR

Capability to manage **Linux on z** and **z/VM** partition

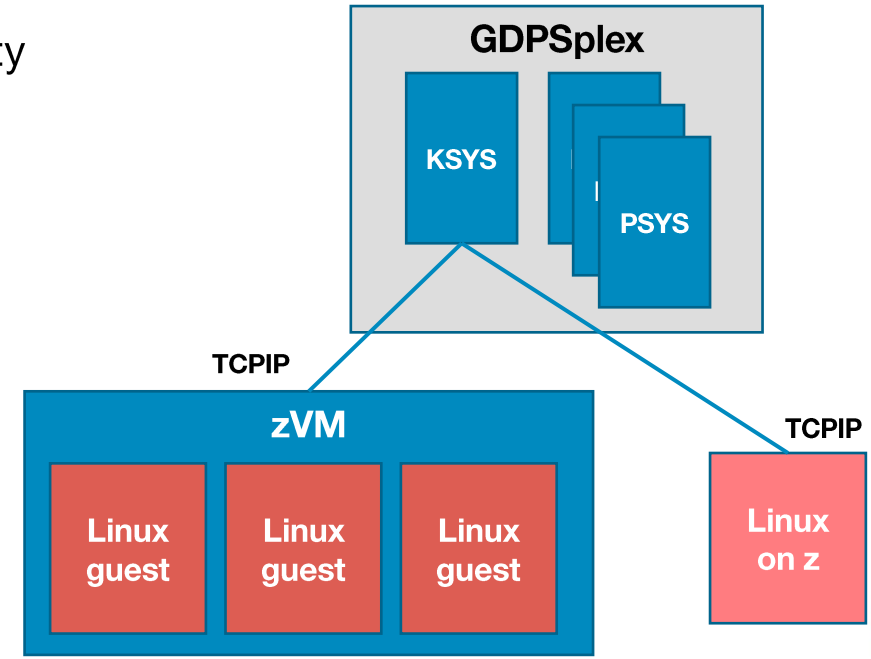
Manage CDK **+ SCSI disks**

Manage SSI cluster (zVM clustering)

End to end continuous availability

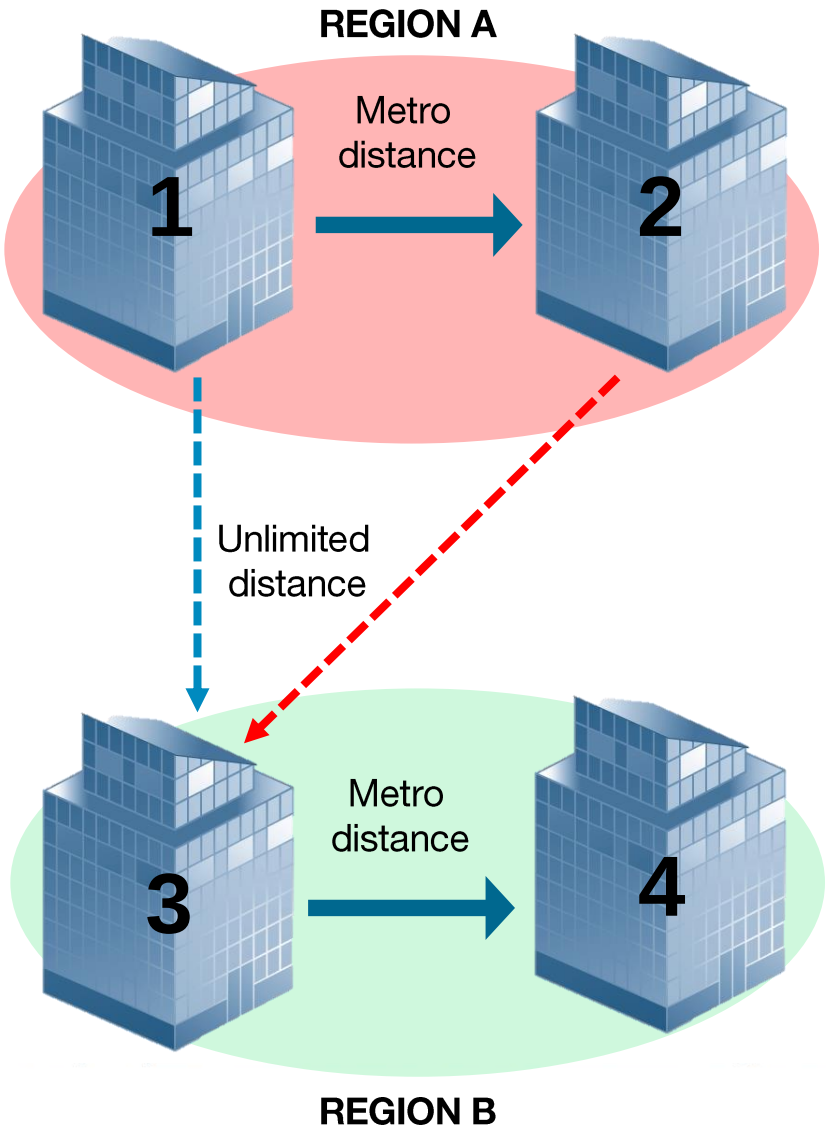
Support Live Guest Reallocation

Hyperswap capability



What's new?

MGM 4-site & MzGM 4-site



Added value / Key features

- Symetrical architecture
- No « pure DR region » but two regions that are equivalent.
- High Availability in both region

Protection against:

- Site failure
- Major disaster (Powerplant failure, natural disaster,…)

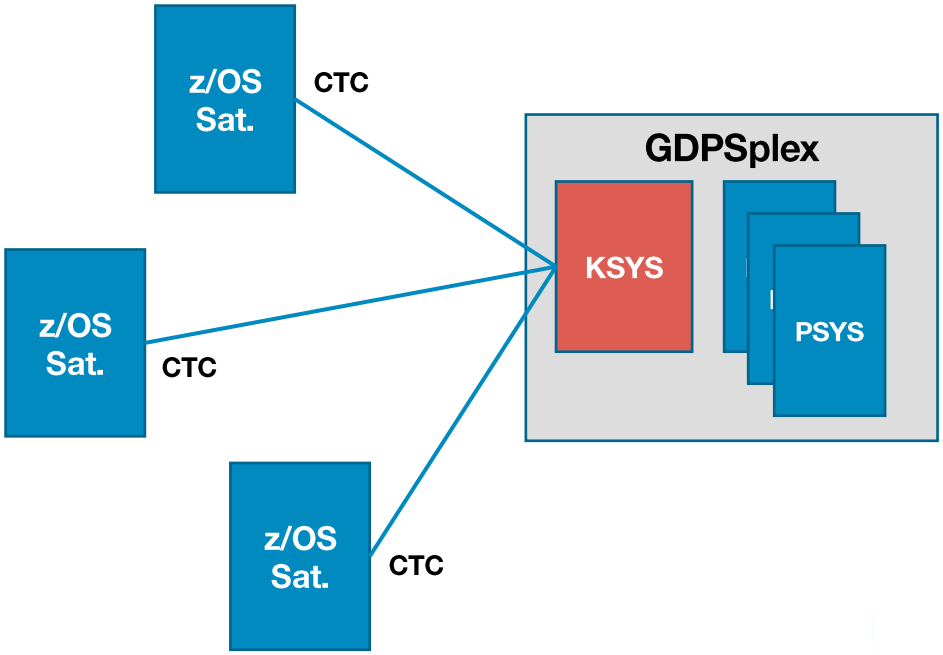
What's new? – z/OS Proxy

z/OS Proxy

Capability to manage **z/OS system that are outside of the sysplex.**

This system will act as « **satellite** » connected via CTC to the controlling system.

Up to 24 systems can be managed with this feature.



What's new? - GDPS Appliance

Use the One UI web interface

- View z/VM System and xDR Proxy
- HyperSwap planned/unplanned
- Site Switch planned/unplanned
- Freeze planned/unplanned
- Start/Stop z/VM image
- Start/Stop z/VM guest
- Manage Linux clusters

Common interface across IBM storage systems

- Intuitive actions
- Reduces learning curve

Disk vendor independent

Provides non-z/OS customers the same benefits of high availability and D/R which were only available to z/OS customers

Provides additional benefit for moving workloads to Linux on z System

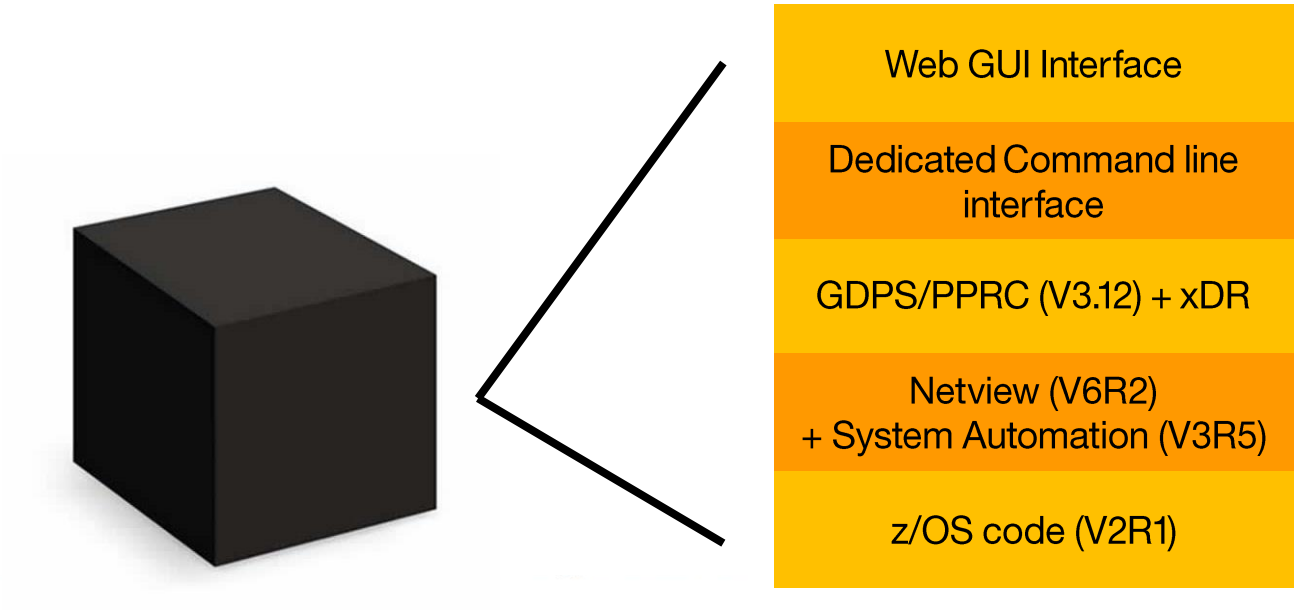
GDPS Appliance – What do we have in the box?

Step1. Download the package and install it from a Linux on z partition on disks that will be dedicated to the appliance.

Step2. Load the new partition via the HMC

Step3. Access to the appliance via a dedicated command line interface (for updates, etc...)

Step4. Admin can manage his GDPS control system via the new dedicated interface!



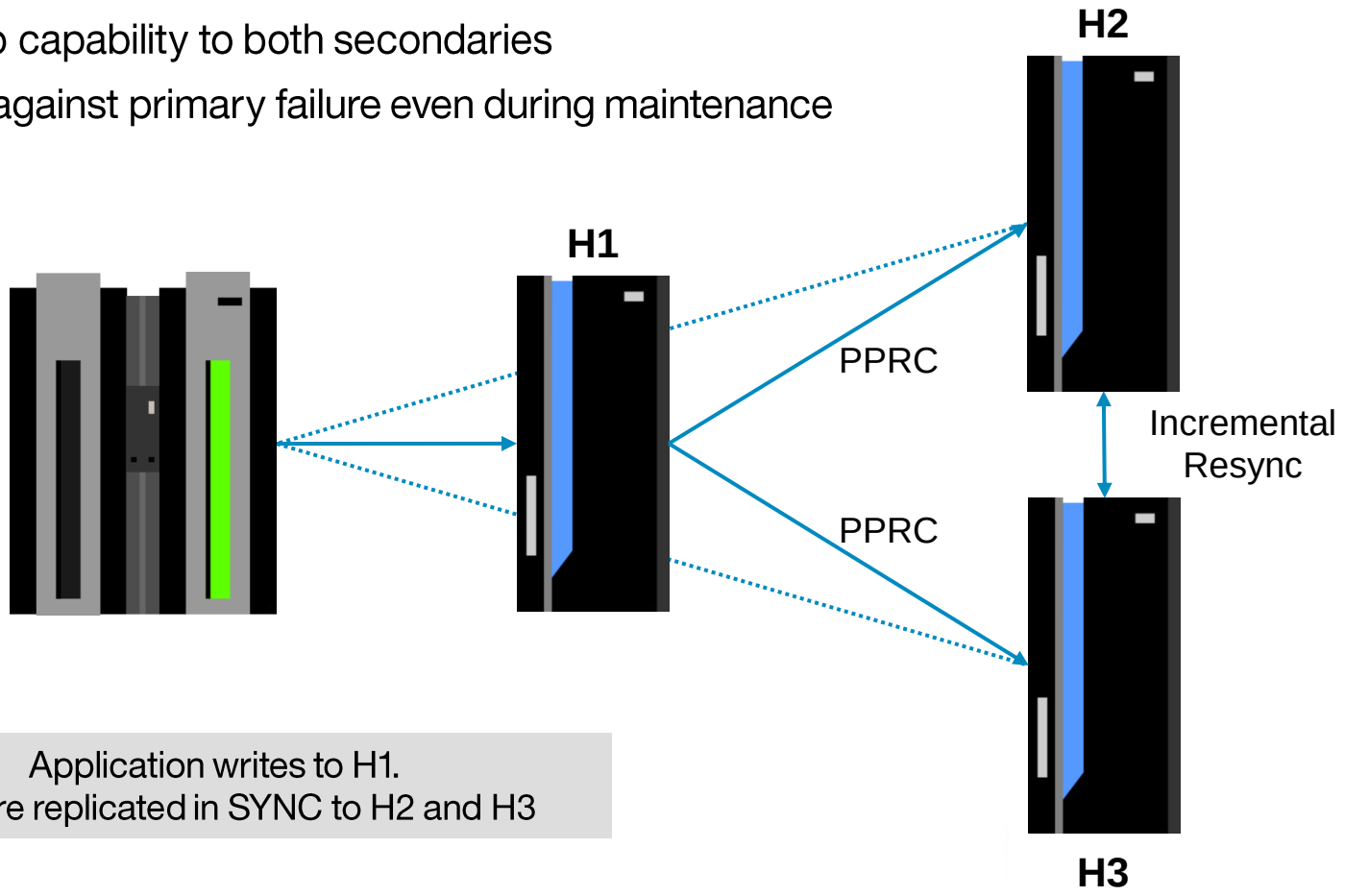
What's new?

GDPS/MTMM (MultiTarget MetroMirror)

Primary disk is mirrored to two disks instead of one

HyperSwap capability to both secondaries

Protection against primary failure even during maintenance



Application writes to H1.
Data are replicated in SYNC to H2 and H3

GDPS/MTMM, what is new?

- New interface & options

	Locations		HyperSwap	Mirror	Preferred policies	PRIMARYFAILURE policy	PPRCFAILURE policy
_	RL1	H1-H2	ENABLED	OK	PREF,RPFC	SWAP,GO	GO
_	RL2	H1-H3	ENABLED	OK		SWAP,GO	GO
_	RL3	H2-H3		MTIR		SWAP,GO	GO

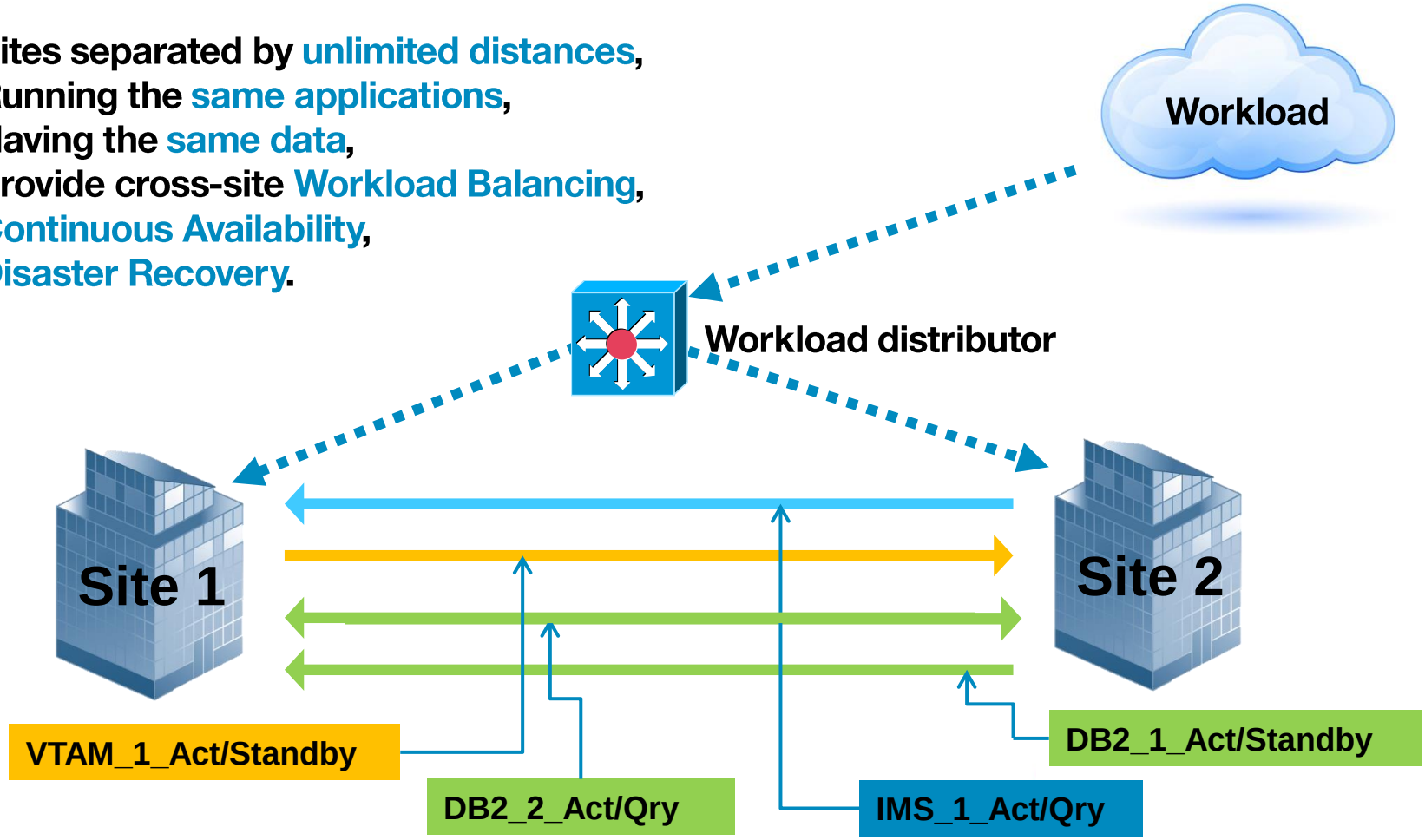
```
 Primary device: H1                          Number of PPRC relations: 2
 Device number : 05200                       SSID   LSS    CCA   SERIAL
        Volser : PX1RS1                      520A   57     00    00FGLP1

_
 PPRC state to : H2                          PPRC state to : H3
 State         : PRIMARY   DUPLEX            State         : PRIMARY   DUPLEX
```

One source, two targets

What's new?

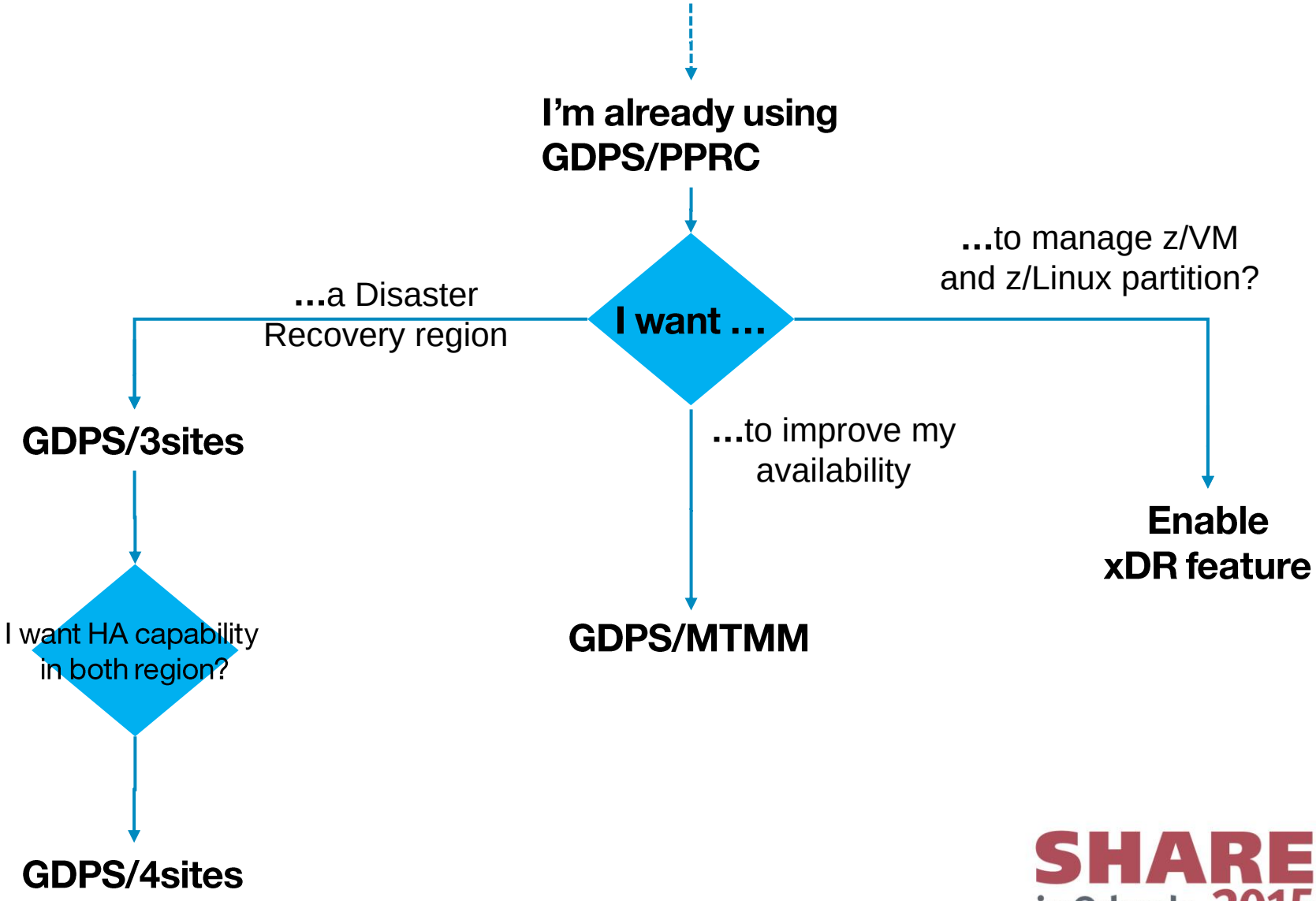
GDPS/Active-Active v1.5

Sites separated by unlimited distances,
Running the same applications,
Having the same data,
Provide cross-site Workload Balancing,
Continuous Availability,
Disaster Recovery.



Conclusion

Improving his HA/DR capability



Benefits of GDPS

- Central point of control
  - System z (z/OS, z/VM and Linux for System z) and distributed servers
  - Replication infrastructure
  - 1, 2, 3, and 4 sites
- Real time monitoring and alert management
- Automated Recovery
  - HyperSwap for Continuous Availability
  - Planned and unplanned outages
- Automated provisioning
  - CBU and sysplex components

Values of GDPS

- Lowest RPO and RTO possible
  - No downtime or minimal downtime in case of disaster
  - Minimal recovery time if you need to use your disaster recovery site
- Automated procedures reduce dependencies on people during incident or disaster
- High level of synergy with the disks
  - High performance level
- End to end continuous availability solution
  - Manage z/OS, z/VM, Linux on z and even distributed servers

Thank you for your attention!

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