Why? GDPS*

a GDPS Overview

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* Geographically Dispersed Parallel Sysplex

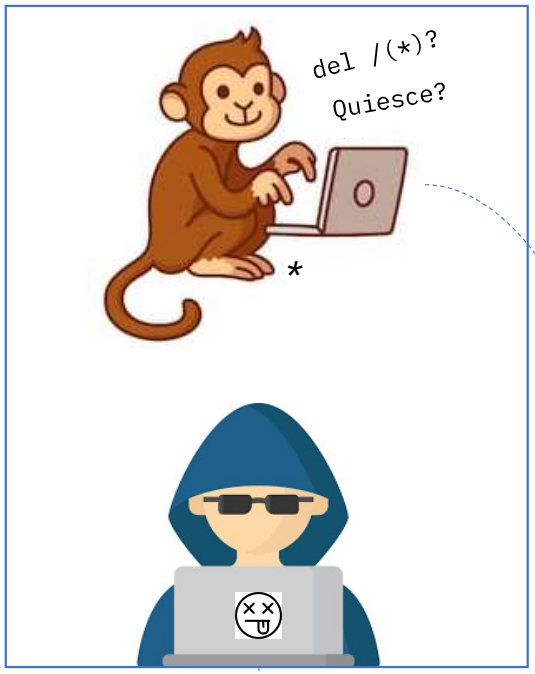
GDPS team

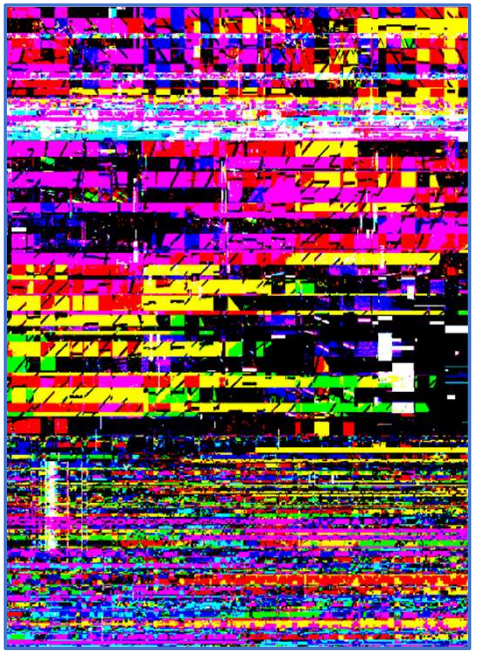
50 people WW:

- Developers
- Testers
- Information Developers
- Pre-Sales …
- …and beyond in Services

Multiple threats on our IT infrastructure

Hardware failure





Data corruption

* *(Funny developer or « creative » sysadmin)*

When do we need HA/DR solution?

Global disaster

- Hurricane
- Earthquake
- Power plants failure..

Do we have safe backup?
Do we have system ready to start outside of the region?

Local disaster

- Fire
- Power supply problem
- Unplanned IT Failure

Could we avoid downtime and data loss?
Is there a procedure to restart systems?

Maintenance

- Hardware & software update.
- Switch to a new datacenter
- Test

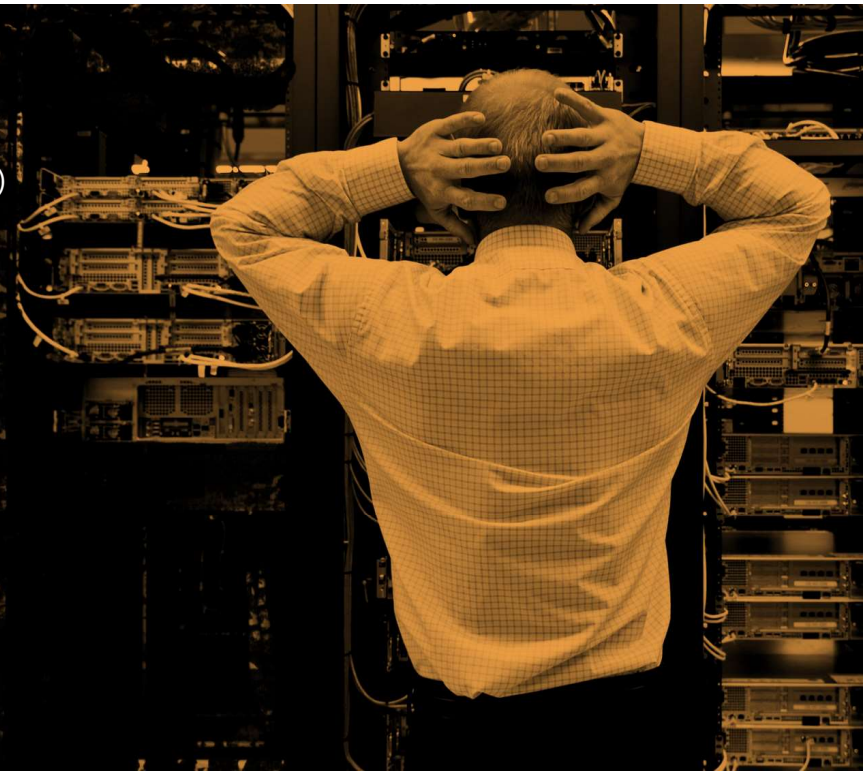
Can we do that transparently?
How to reduce the risk of a rolling problem during a maintenance scenario?

How much interruption can your business tolerate?

31% have experienced an IT downtime incident in the past year (1)

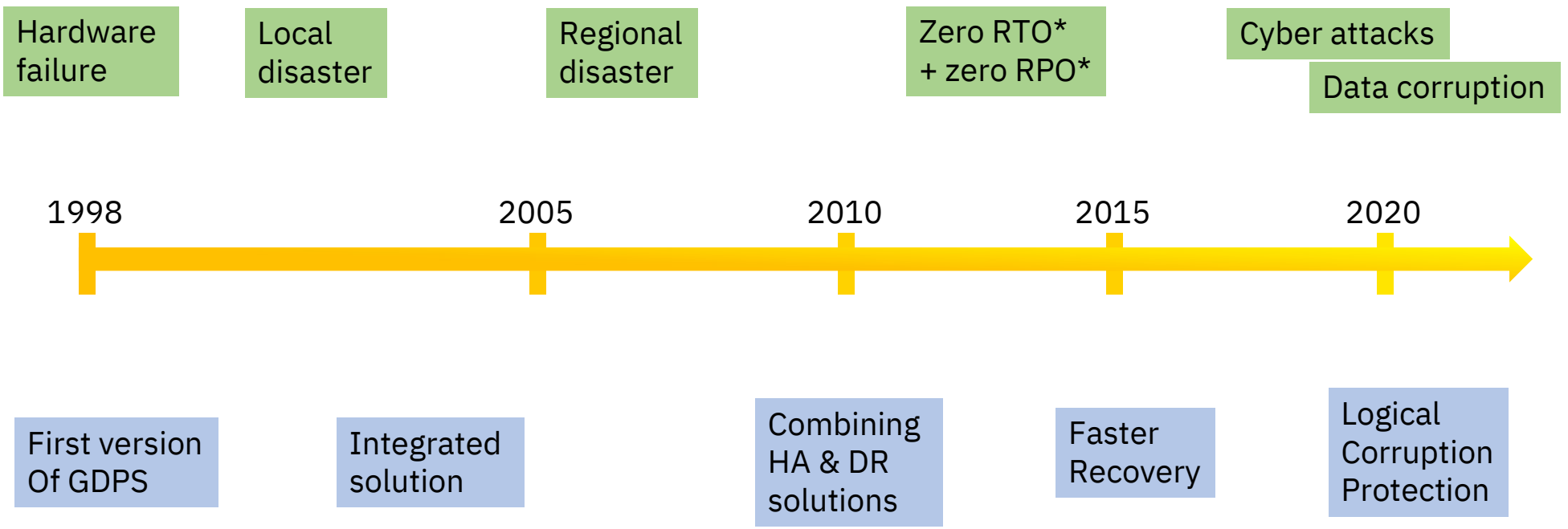
60% of organizations have had to execute their disaster recovery plan due to a services disruption (and 40% within past 2 years) (2)

Average Outage cost is $ 8,850 per minute (3)



(1) 8th Annual Global Data Center Survey. August 2018. Uptime Institute. https://uptimeinstitute.com/2018-data-center-industry-survey-results
(2)The respondent base consisted of BCDR leaders based in the U.S. and Canada who work in primarily in executive and managerial roles, including more than 60 percent who are Directors of IT or CIOs. Survey participants work for companies spanning 19 industries – including manufacturing, financial services and health care – ranging in size from less than 100 employees to more than 10,000.
(3)Cost of Outage : Emerson Data Center IQ Survey, Ponemon Institute and Emerson Network Power, January 2016

Evolution of the risks



** Recovery Time/Point Objective*

Build for continuous availability and disaster recovery

- Automation
  - Automate actions
  - React to events
  - Synchronize operations

- Single point of control
  - Clear view of your systems and storages devices status
  - Simply presents faults and warnings

- Storage best synergy with IBM DS8K, but also HDS and EMC disk

- Heterogeneous platform (z/VM, Linux, ...)

Most large companies have GDPS installed

2 Sites	Metro + Distant sites	*Continuous Availability*
		

83% of the 30 World's Largest Banks use GDPS (2018 by total assets)

More than 1000 licenses
in 49 countries
Dozens of references

Metro distance between sites (<200km)

GDPS METRO

Key features

- With Hyperswap, minimal impact in case of failure.
- No data loss!
- More automated operation

Protection against:

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

* Recovery Point/Time Objective

Extended distance between sites

GDPS GLOBAL

Key features

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

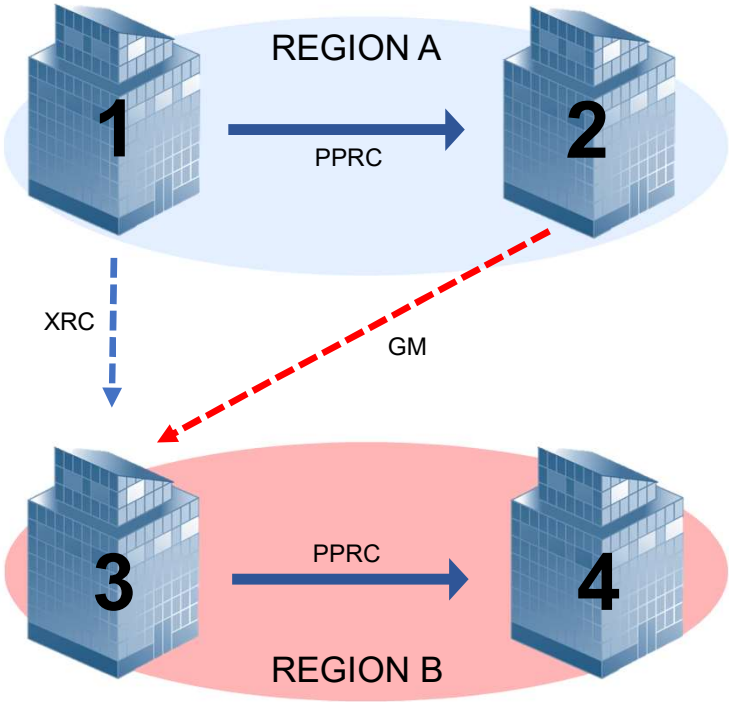
Protection against:

Site failure & Major disaster

RPO = seconds

RTO < 1 hour

GDPS Metro Global, why moving to this solution?



Key features

- Local high availability (Site 1 + 2)
- Disaster recovery (Site 3 + 4)
- Incremental resync capability

Protection against:

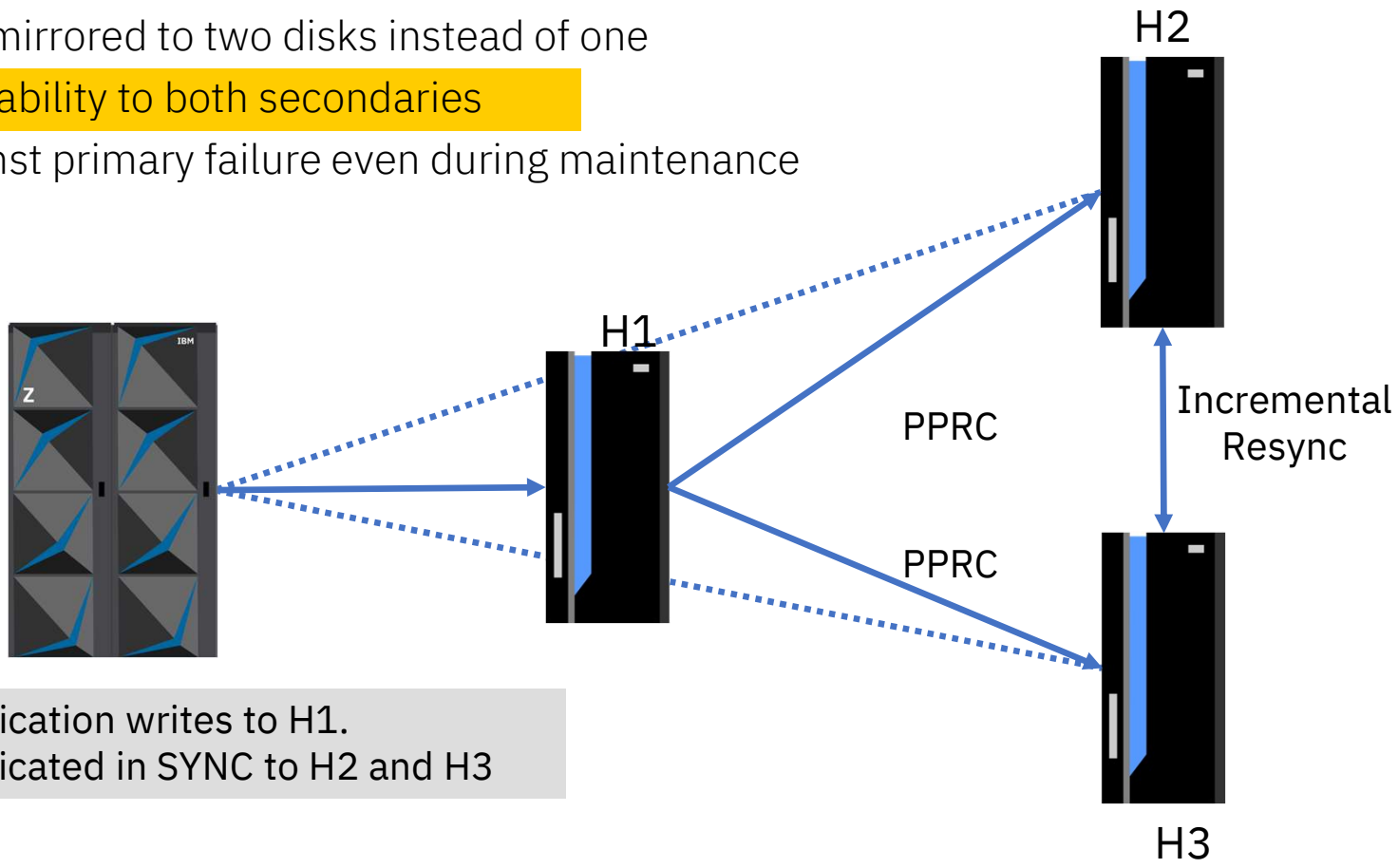
- Storage failure
- Site failure & Major disaster (powerplant failure, natural disaster,...)

GDPS Metro Dual Leg, why moving to this solution?

Primary disk is mirrored to two disks instead of one

HyperSwap capability to both secondaries

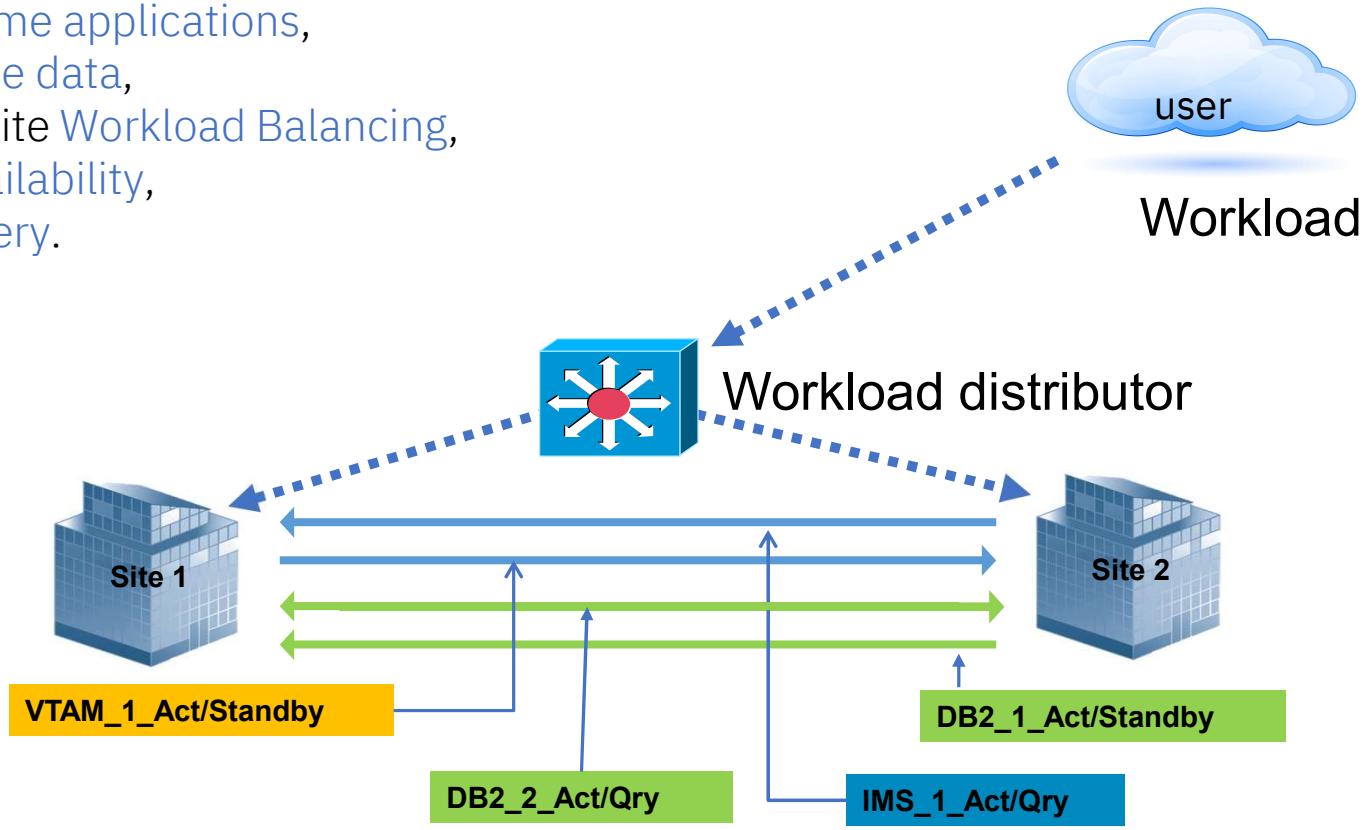
Protection against primary failure even during maintenance



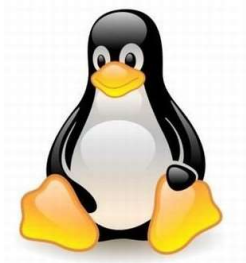
Application writes to H1.
Data are replicated in SYNC to H2 and H3

GDPS Continuous Availability

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



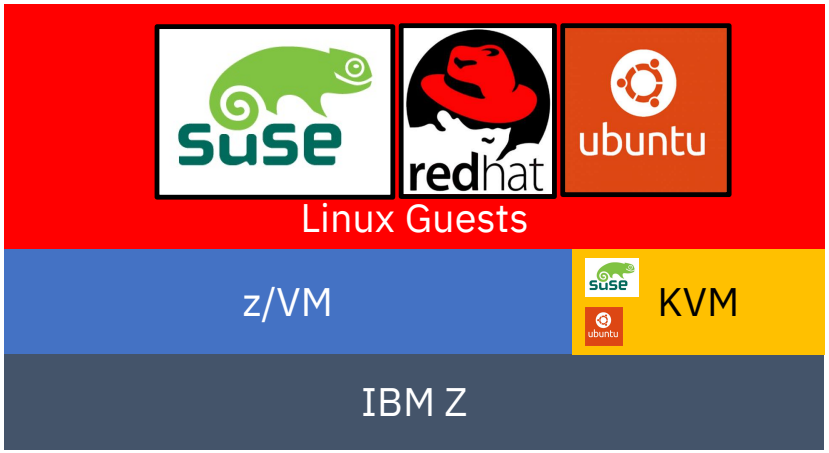
Linux on z consolidation with xDR!



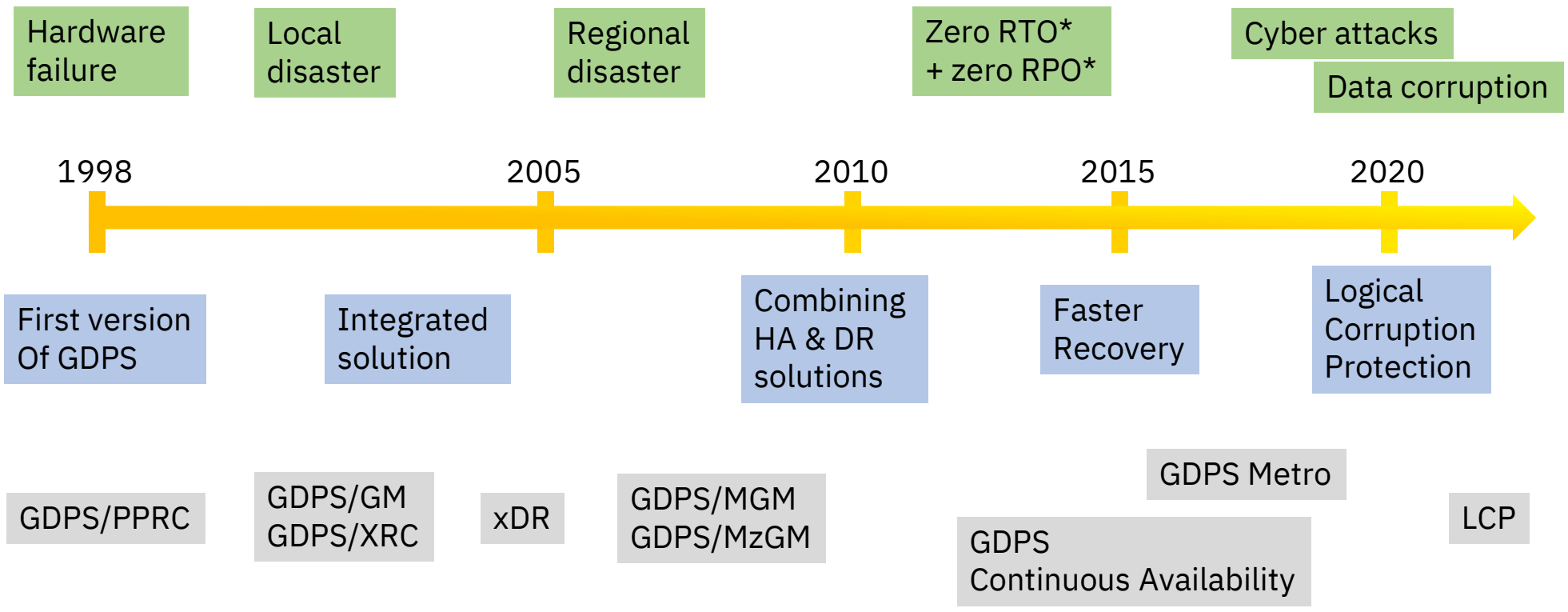
xDR : cross platform DR (solution provided on GDPS Metro)

Capability to manage z/VM & KVM partitions
Manage IBM Z and Open disks (CKD and FBA)
Manage SSI cluster (z/VM clustering)

End to end continuous availability
Support Live Guest Reallocation
Hyperswap capability (CKD only)



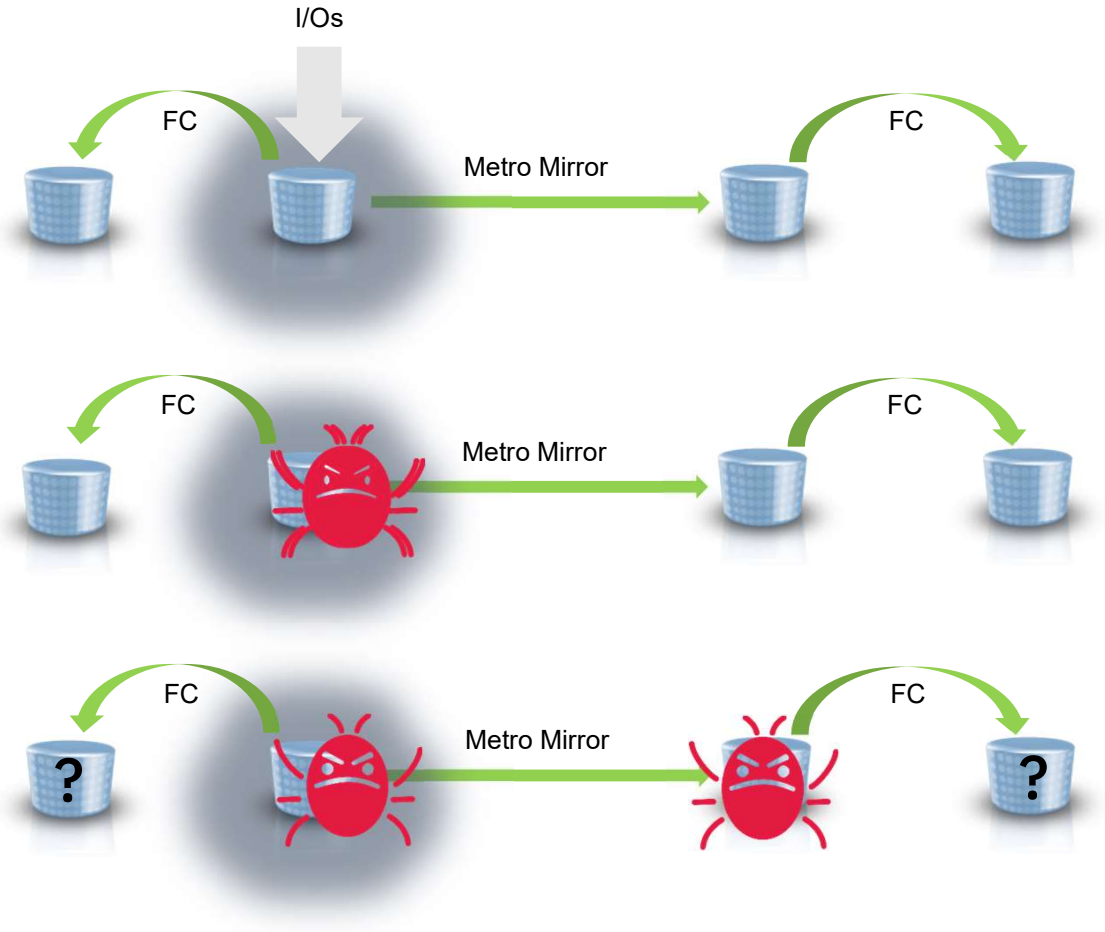
Evolution of the risks



** Recovery Time/Point Objective*

Logical Corruption Protection

Data corruption in a classic Metro environment

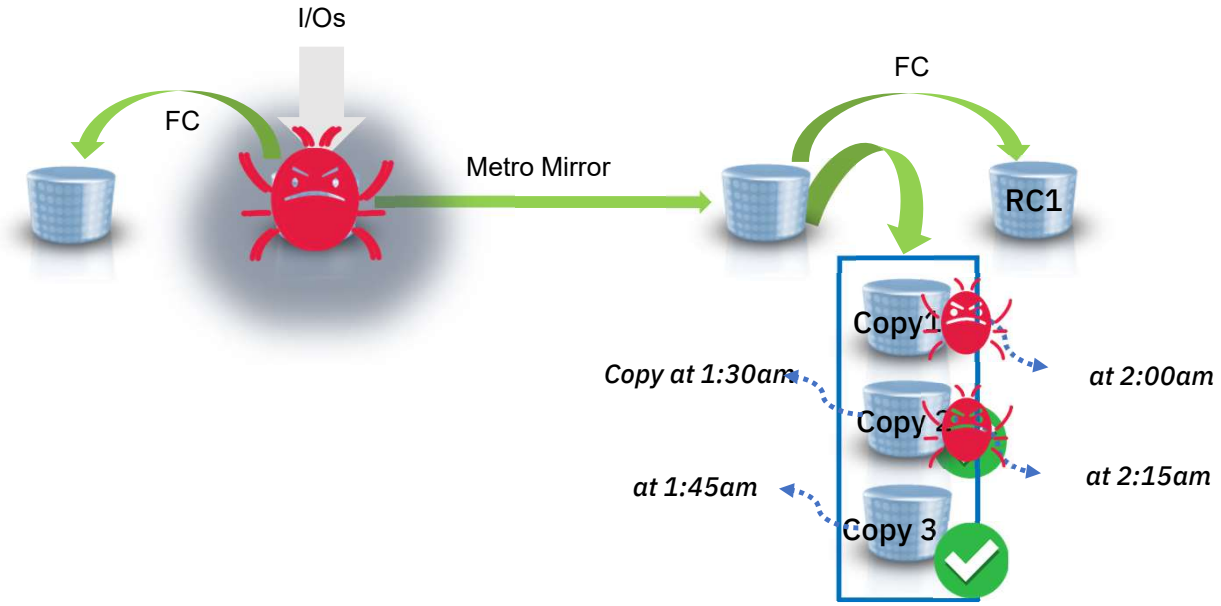


"Classic" config with two disks synchronized by Metro Mirror + One FC copy per site

If a data corruption is done on a disk, the corruption is transmitted synchronously to the other site via Metro Mirror

The only disks "usable" are the two FC Copies but how old are they? 1 days, 2 days, 1 week?

Data corruption in an LCP environment



Flashcopy taken every 15 minutes…

Data corruption is introduced at **1:50**

Corruption is transferred to site2 via Metro Mirror

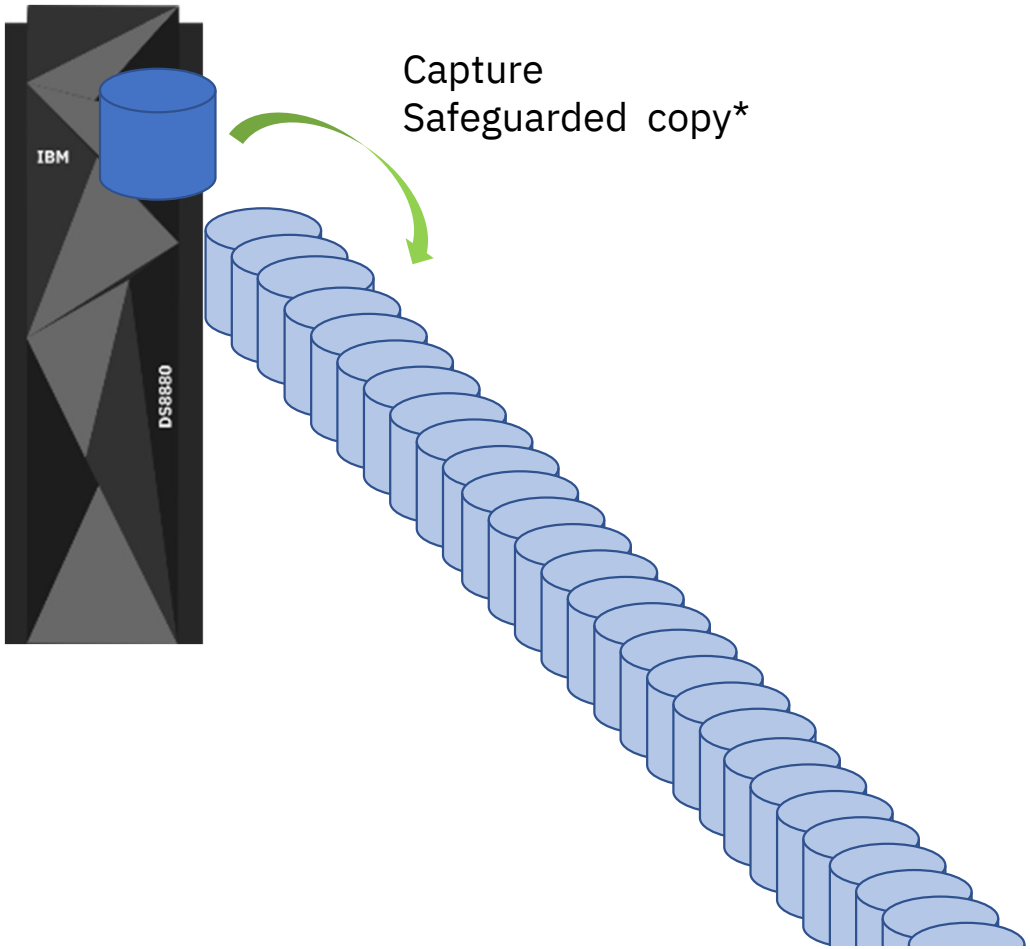
At **2:20**, corruption is identified.

Action: We want to recover the last “good” copy of data.

Copy 3 (taken at 1:45) is identified by system admin as the last “good” copy.

You can restore your Copy Set 3 to your RC1 disk to restart with a non-corrupted version of your data and analyse the problem.

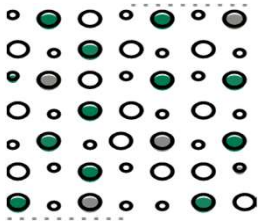
Concept: SafeGuarded Copy



Safeguarded copy allows up to 500 copies of a primary information

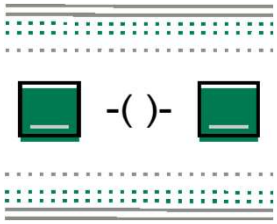
*Available in IBM DS8K

Objectives and requirements for Logical Data Protection Copies



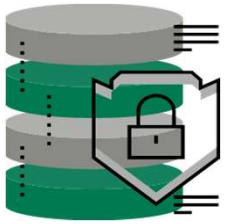
Granularity

We must be able to create multiple safety copies in order to minimize data loss in case of a corruption incident



Isolation

The safety copies must be isolated from the active production data so that it cannot be corrupted by a compromised host system (this is also known as air gap)

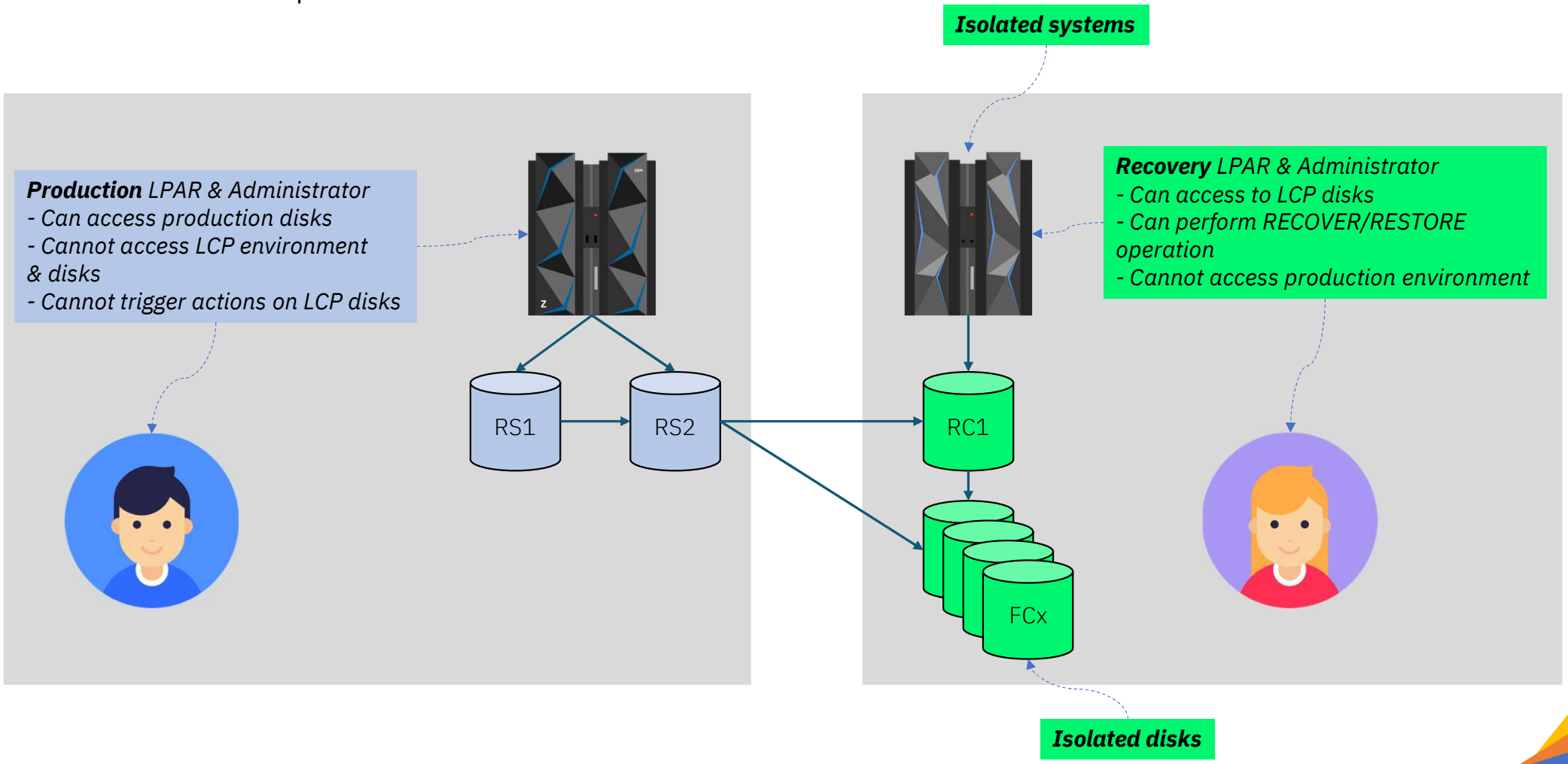


Immutability

The safety copies must be protected against unauthorized manipulation

Isolating, capturing, restoring, recovering...

Concept: Isolation



What is inside?

Technologies involved in the solution

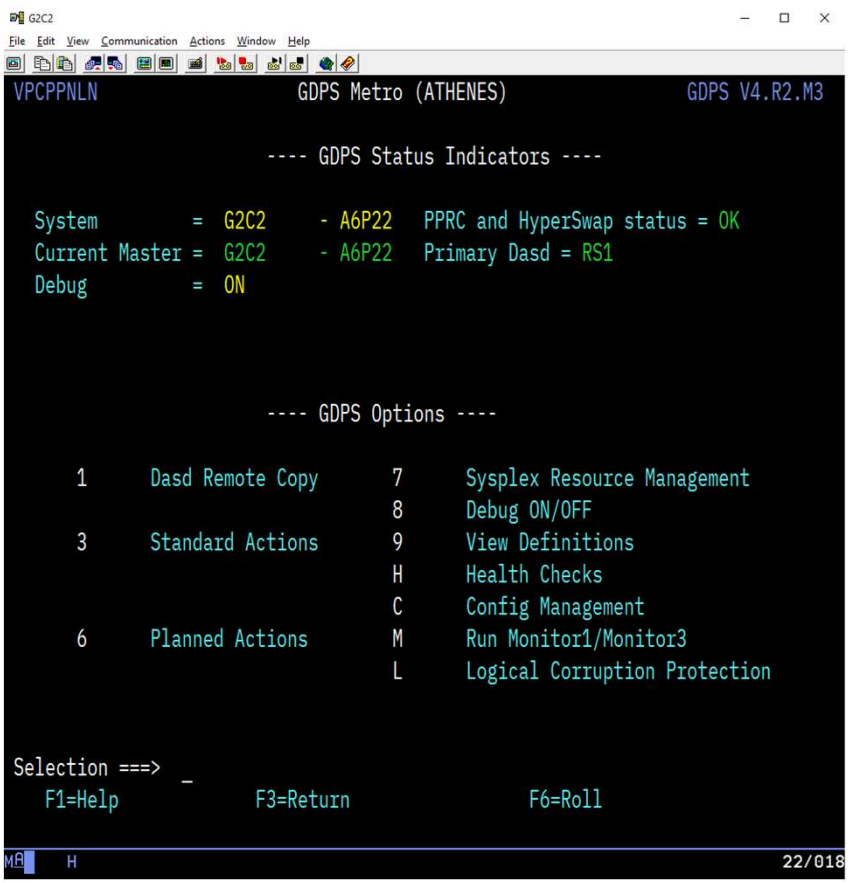
GDPS is based on proven technologies with the highest level of performance to provide continuous availability and disaster recovery.

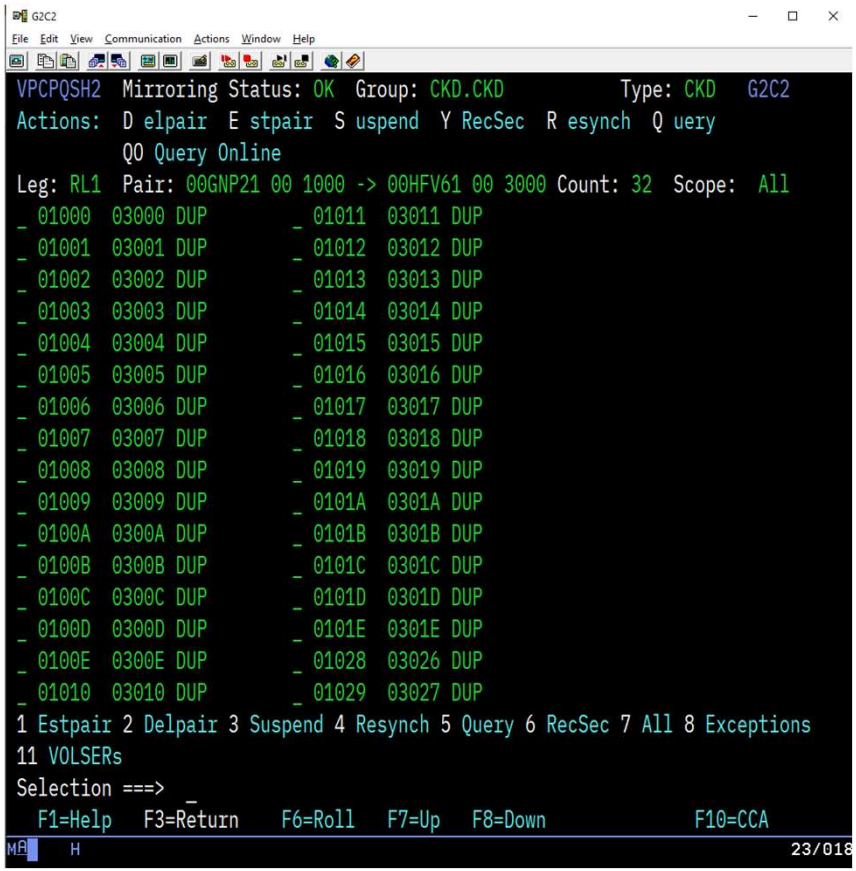
Work in close relationship with Netview, System Automation team, and DS8k teams.

Automation
System Automation (terminology) NetView for z/OS SA Multi-Platform SA Application Manager Multi-site Workload Lifeline

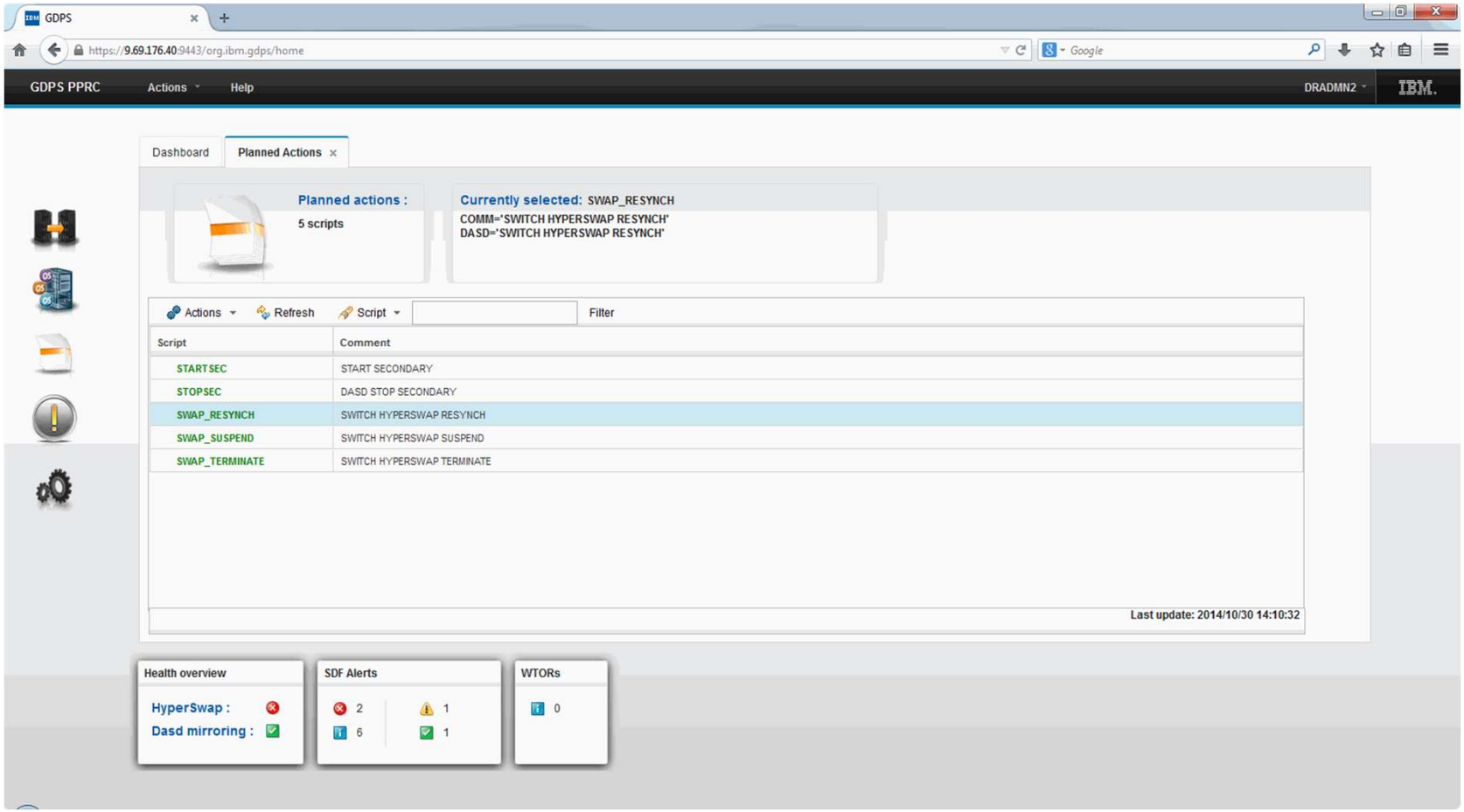
Replication	
Disk & Tape	Software
Metro Mirror z/OS Global Mirror Global Mirror DS8000/TS7700	IBM InfoSphere Data Replication (IIDR) for DB2 IIDR for IMS IIDR for VSAM

3270 interface



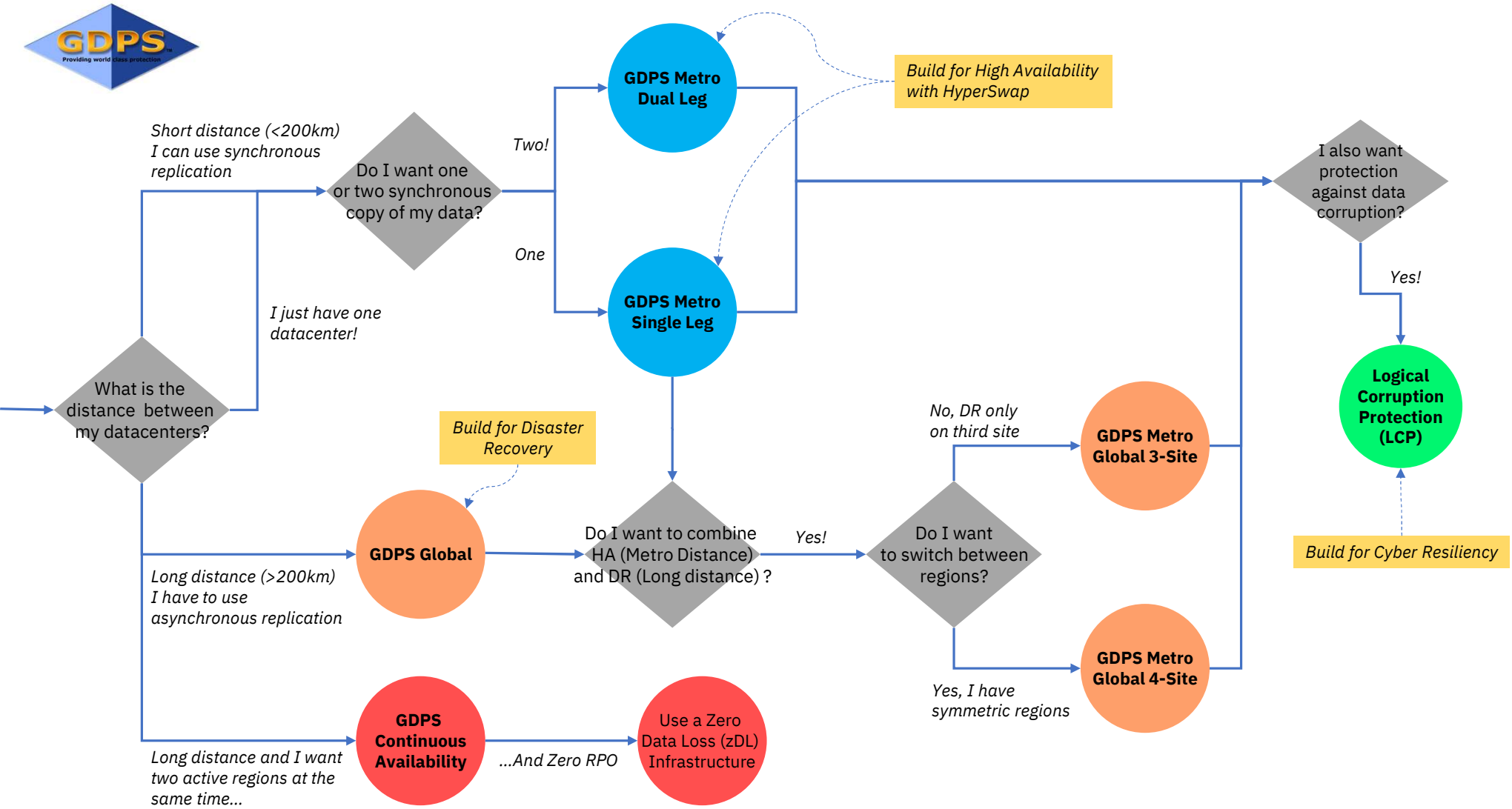


Web Interface


GDPS
https://9.69.176.40:9443/org.ibm.gdps/home
Google
GDPS PPRC
Actions
Help
DRADMN2
IBM.
Dashboard
Planned Actions
Planned actions :
5 scripts
Currently selected: SWAP_RESYNCH
COMM='SWITCH HYPERSWAP RESYNCH'
DASD='SWITCH HYPERSWAP RESYNCH'
Actions
Refresh
Script
Filter
Script
Comment
STARTSEC
START SECONDARY
STOPSEC
DASD STOP SECONDARY
SWAP_RESYNCH
SWITCH HYPERSWAP RESYNCH
SWAP_SUSPEND
SWITCH HYPERSWAP SUSPEND
SWAP_TERMINATE
SWITCH HYPERSWAP TERMINATE
Last update: 2014/10/30 14:10:32
Health overview
HyperSwap :
Dasd mirroring :
SDF Alerts
2
1
6
1
WTORs
0

Which solution?

(in one slide)


GDPS
Providing world class protection
What is the distance between my datacenters?
Short distance (<200km) I can use synchronous replication
I just have one datacenter!
Do I want one or two synchronous copy of my data?
Two!
One
GDPS Metro Dual Leg
GDPS Metro Single Leg
Build for High Availability with HyperSwap
I also want protection against data corruption?
Yes!
Logical Corruption Protection (LCP)
Build for Cyber Resiliency
Build for Disaster Recovery
GDPS Global
Long distance (>200km) I have to use asynchronous replication
Do I want to combine HA (Metro Distance) and DR (Long distance) ?
Yes!
Do I want to switch between regions?
No, DR only on third site
GDPS Metro Global 3-Site
Yes, I have symmetric regions
GDPS Metro Global 4-Site
GDPS Continuous Availability
Long distance and I want two active regions at the same time...
...And Zero RPO
Use a Zero Data Loss (zDL) Infrastructure

Trends & directions in the field

- Moving from Metro Single Leg to Dual Leg
- Moving from Metro to Metro Global
- Moving from 3 to 4 sites
- Adding LCP Capability to existing environment
- Adding z/OS Proxies to an existing environment

Trends & directions of our products

- **Better auditability** (knowing who did what when…)
- **Granular security** (UserX can do this, UserY can do that…)
- **Better performance** (Continuous effort to reduce the RTO)
- **Simplified utilization** (GUI, IVP, Configuration Wizard, …)

On your end :

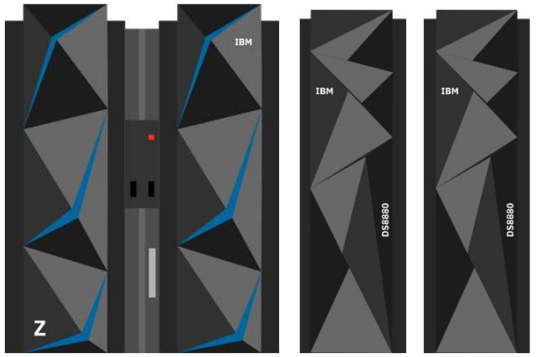
- Automate your processes
- Test, “challenge” your infrastructure and check its resilience
- Be prepared for the worst-case scenario…

Additional Information

- Web sites:

GDPS	www.ibm.com/systems/z/gdps
Parallel Sysplex	www.ibm.com/systems/z/pso
Bus Resiliency z	www.ibm.com/systems/z/resiliency
Bus Resiliency	www.ibm.com/systems/business_resiliency

- IBM Z www.ibm.com/systems/z/hardware
  Storage www.ibm.com/systems/storage
  Redbooks®GDPS Family: An Introduction to Concepts and Capabilities
  www.redbooks.ibm.com/abstracts/sg246374.html?Open
- GDPS Web Site White Papers and Presentations
  - GDPS: The Ultimate e-business Availability Solution
  - IBM Implementation Services for GDPS Global Mirror
  - GDPS Business Continuity Solutions
  - Consistency Groups in a Nutshell
  - DS8000™ Data Replication
  - GDPS Solutions
- e-mail: gdps@us.ibm.com



Thank you for your attention!

Contact: mf.narbey@fr.ibm.com