GDPS® Update & Implementation

August 3, 2010
Session 6876

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IBM Corporation

Agenda

➤ **What is GDPS ?**

➤ **Continuous Availability of Data (single site) & Metro Distance Continuous Availability / Disaster Recovery (two sites)**

➤ **Extended Distance Disaster Recovery (two sites)**

➤ **Continuous Availability and Disaster Recovery (three sites)**

➤ **Application End-to-End Continuous Availability / Disaster Recovery**
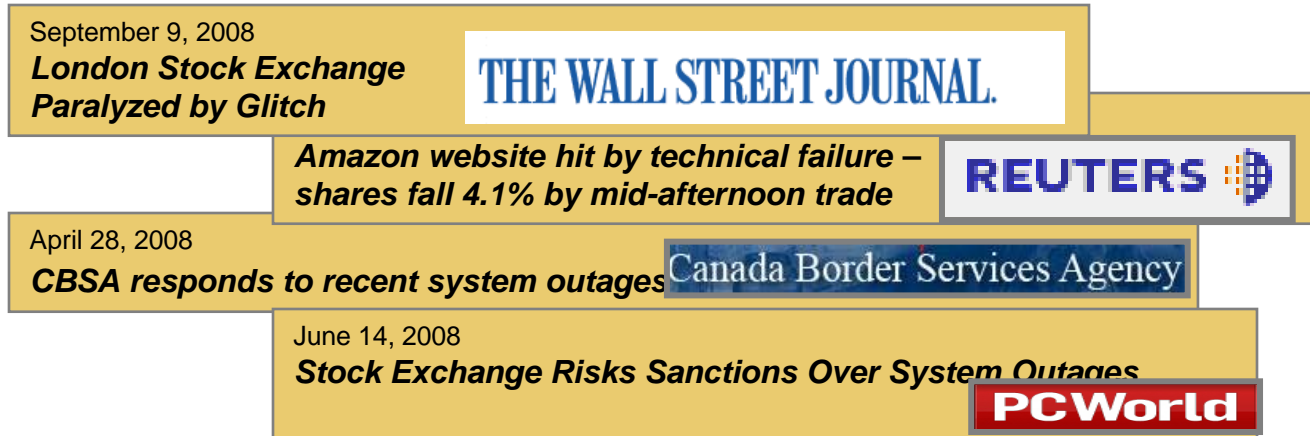
➤ **GDPS 3.7 Update**

➤ **Summary**

What is GDPS ?

Disruptions affect more than the bottom line …

September 9, 2008
London Stock Exchange Paralyzed by Glitch

THE WALL STREET JOURNAL.

Amazon website hit by technical failure – shares fall 4.1% by mid-afternoon trade

REUTERS

April 28, 2008
CBSA responds to recent system outages

Canada Border Services Agency

June 14, 2008
Stock Exchange Risks Sanctions Over System Outages

PCWorld

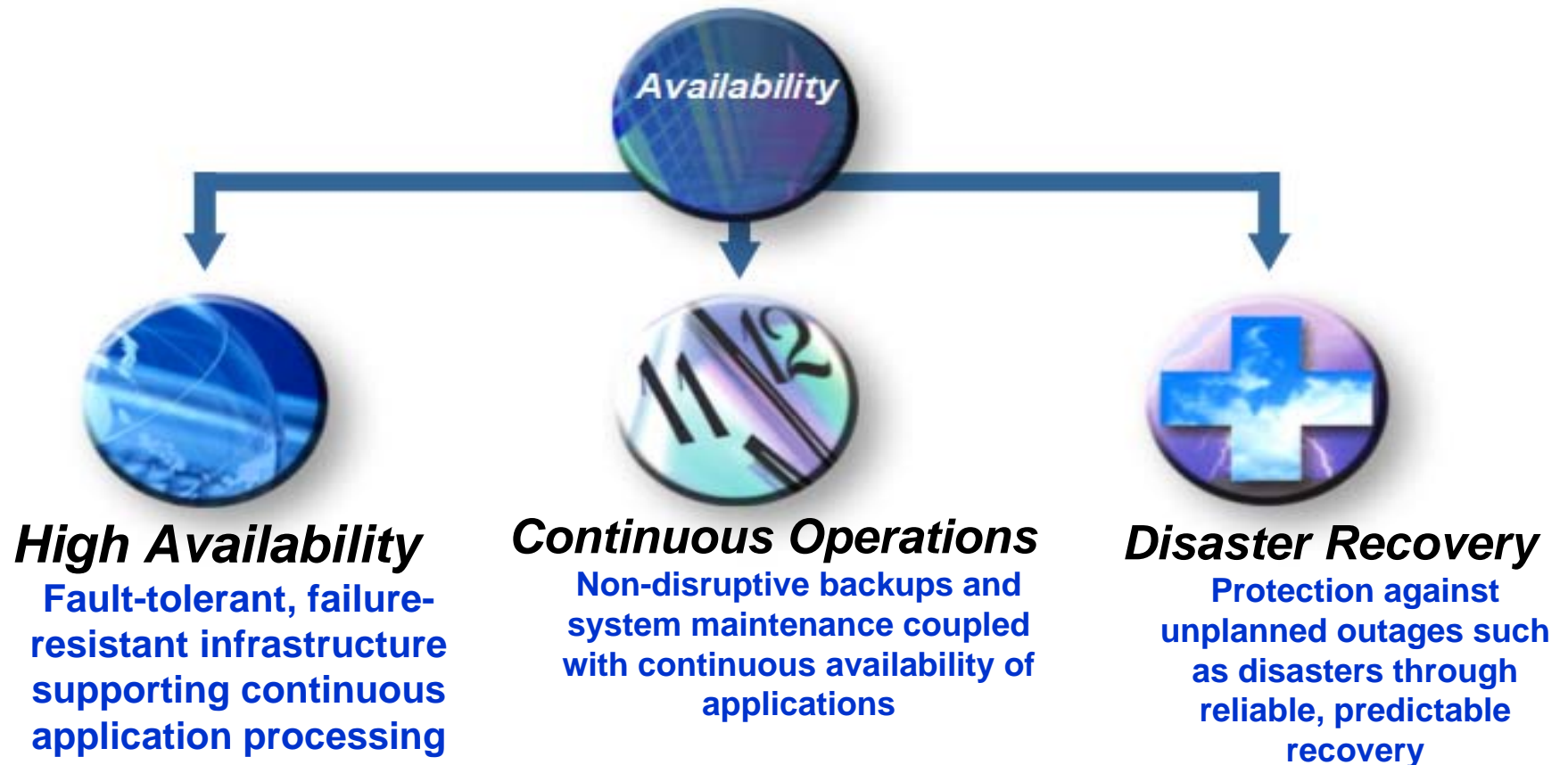## . . .   with enormous impact on the business

➢ **Downtime costs can equal up to 16 percent of revenue [1]**
➢ **4 hours of downtime severely damaging for 32 percent of organizations, [2]**
➢ **Data is growing at explosive rates – growing from 161EB in 2007 to 988EB in 2010[3]**
➢ **Some industries fine for downtime and inability to meet regulatory compliance**
➢ **Downtime ranges from 300–1,200 hours per year, depending on industry[1]**

1 Infonetics Research, *The Costs of Enterprise Downtime: North American Vertical Markets 2005*, Rob Dearborn and others, January 2005.
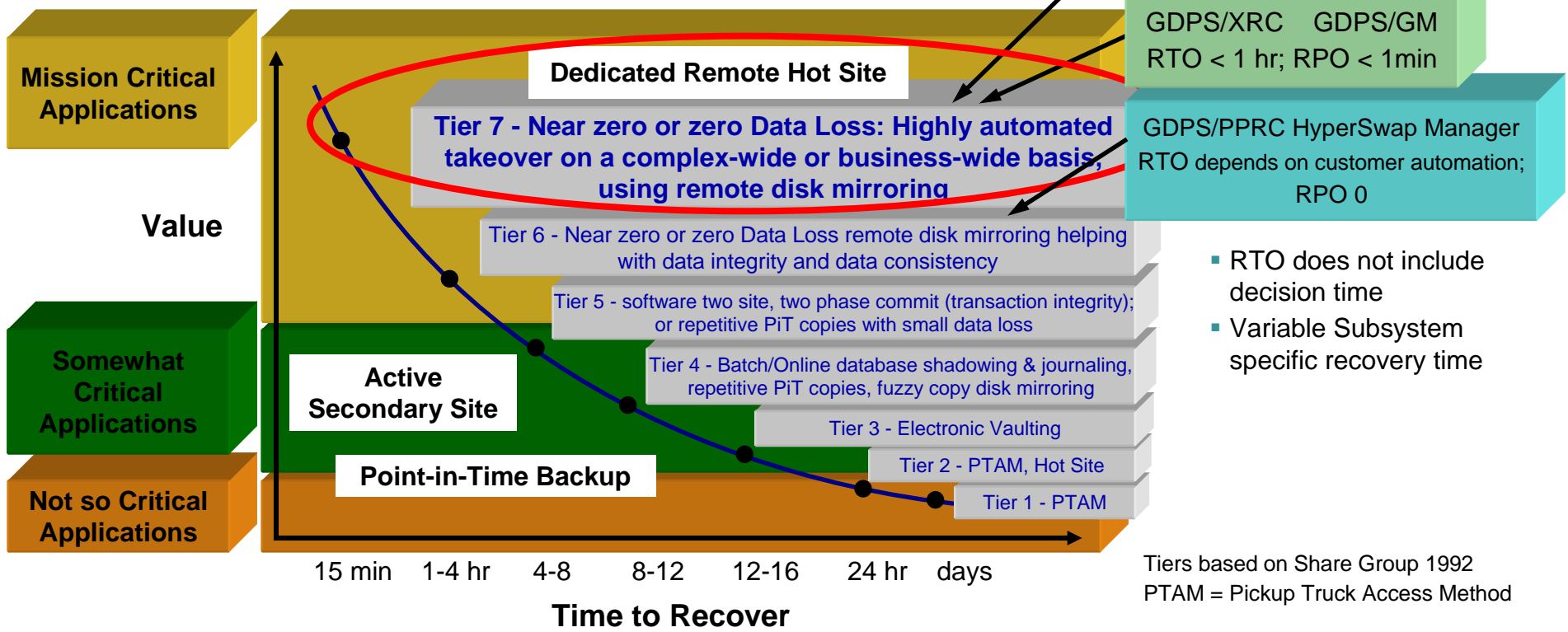
2 Continuity Central, "Business Continuity Unwrapped," 2006, http://www.continuitycentral.com/feature0358.htm

3 The Expanding Digital Universe: A Forecast of Worldwide Information Growth Through 2010, IDC white paper #206171, March 2007

Aspects of Availability

Availability

High Availability
Fault-tolerant, failure-resistant infrastructure supporting continuous application processing

Continuous Operations
Non-disruptive backups and system maintenance coupled with continuous availability of applications

Disaster Recovery
Protection against unplanned outages such as disasters through reliable, predictable recovery

Tiers of Disaster Recovery: Level Setting GDPS

GDPS/PPRC
RTO < 1 hr; RPO 0

GDPS/XRC   GDPS/GM
RTO < 1 hr; RPO < 1min

GDPS/PPRC HyperSwap Manager
RTO depends on customer automation;
RPO 0

Mission Critical Applications

Value

Somewhat Critical Applications

Not so Critical Applications

Dedicated Remote Hot Site

Tier 7 - Near zero or zero Data Loss: Highly automated takeover on a complex-wide or business-wide basis, using remote disk mirroring

Tier 6 - Near zero or zero Data Loss remote disk mirroring helping with data integrity and data consistency

Tier 5 - software two site, two phase commit (transaction integrity); or repetitive PiT copies with small data loss

Active Secondary Site

Tier 4 - Batch/Online database shadowing & journaling, repetitive PiT copies, fuzzy copy disk mirroring

Tier 3 - Electronic Vaulting

Point-in-Time Backup

Tier 2 - PTAM, Hot Site

Tier 1 - PTAM

- RTO does not include decision time
- Variable Subsystem specific recovery time

15 min   1-4 hr   4-8   8-12   12-16   24 hr   days

Time to Recover

Tiers based on Share Group 1992
PTAM = Pickup Truck Access Method

Best D/R practice is blend tiers of solutions in order to maximize application coverage at lowest possible cost . One size, one technology, or one methodology does not fit all applications.

RPO = Recovery Point Objective - how much data to recreate?

**RTO = Recovery Time Objective - how long being without service?**

What is GDPS?

➢Integrated / Automated solution

➢Manages application and data availability in and across sites

  ➢**Monitors systems, disk & tape subsystems**

  ➢**Manages planned and unplanned activities**

    ➢**System/disk maintenance / failure**

    ➢**Site maintenance / failure**

➢Builds on proven high availability technologies

  ➢**Clustering**

  ➢**Remote copy (disk and tape)**

  ➢**Automation**

➢Easy to use interface

  ➢**Intuitive panel interface**

  ➢**Simple scripting**

GDPS/PPRC
Hyper Swap Manager
RCMF/PPRC

GDPS/PPRC

GDPS/GM | GDPS Metro/ Global Mirror | GDPS Metro/ z/OS Global Mirror | GDPS/XRC
RCMF/XRC

Delivered by IBM Global Technology Services (GTS)
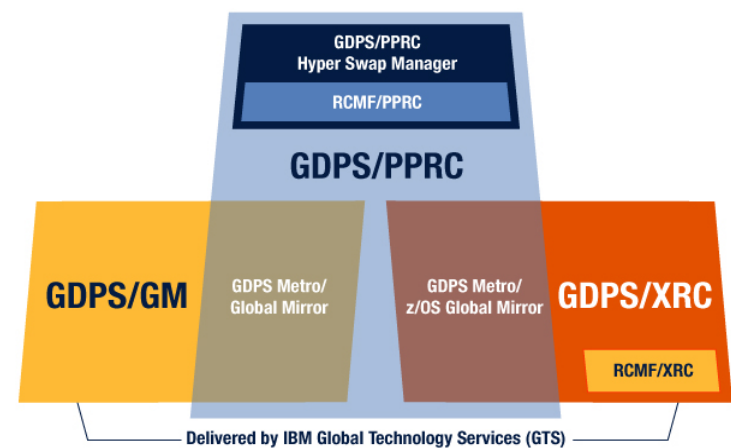
GDPS Policy Based Automation Actions

> D/R team dependencies?
>> Network connectivity
>> Travel to D/R site
> Remove systems from Sysplex
> Perform disk reconfiguration
> Perform tape reconfiguration
> Perform CF reconfiguration
> Perform CDS reconfiguration
> Perform Capacity Backup & On/Off Capacity On Demand Activation.
> Shut down discretionary workload on Site 2

> Modify activation profile on HMC
>> Target server
>> IPL Address
> IPL Prod LPARs
> Respond to NIP messages
> Initiate application startup
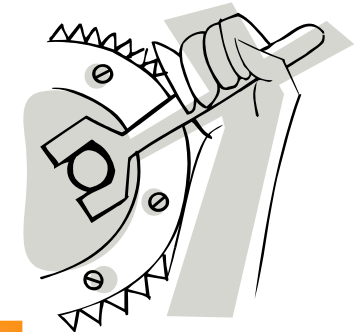
Done with GDPS Automation

The right level of business continuity protection for your business –
GDPS family of offerings

➤ *GDPS®* : An end-to-end disaster recovery solution to enable:
➤ Automated recovery removes people as Single Point of Failure
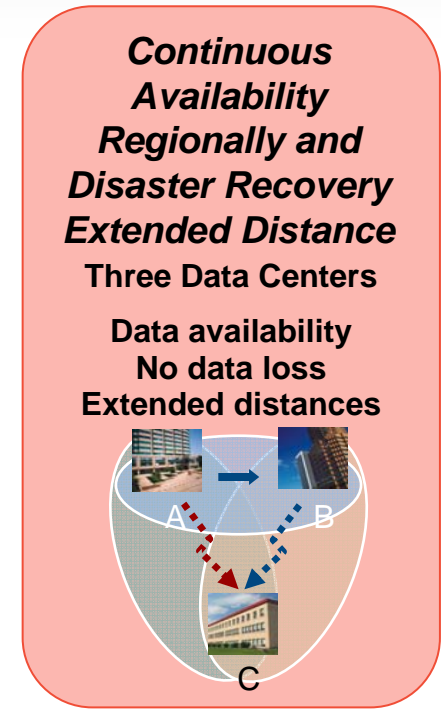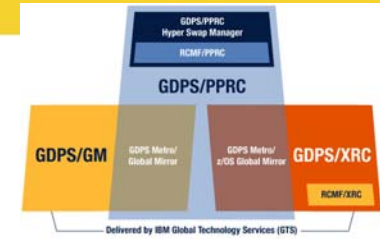➤ A single point of control across enterprise

Continuous Availability of Data Within a Data Center	*Continuous Availability / Disaster Recovery Metropolitan Region*	*Disaster Recovery at Extended Distance*	*Continuous Availability Regionally and Disaster Recovery Extended Distance*
Single Data Center Applications remain active **Near-continuous availability to data**	**Two Data Centers Systems remain active** **Automated D/R across site or storage failure No data loss**	**Two Data Centers** **Automated Disaster Recovery "seconds" of Data Loss**	**Three Data Centers** **Data availability No data loss Extended distances**
GDPS/PPRC HM	**GDPS/ PPRC HM GDPS/PPRC**	**GDPS/GM GDPS/XRC**	**GDPS/MGM GDPS/MzGM**
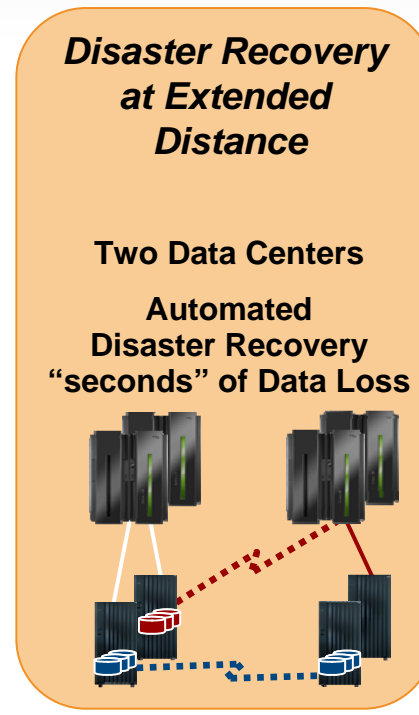
Continuous Availability of Data (Single Site) or Metro Distance Continuous Availability & D/R Protection (Two Sites)
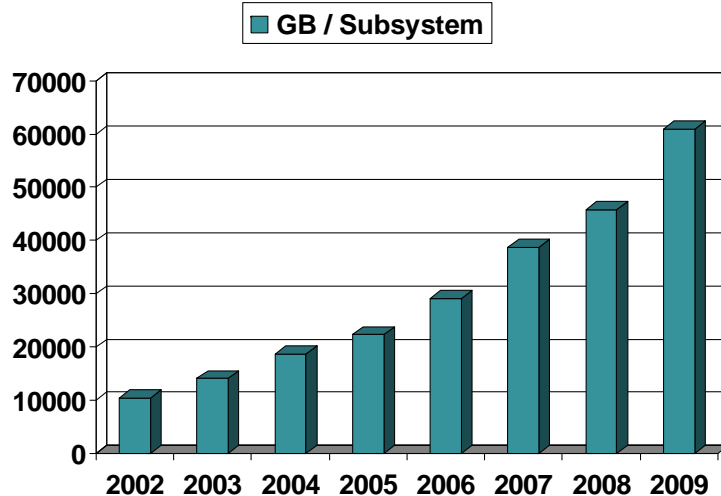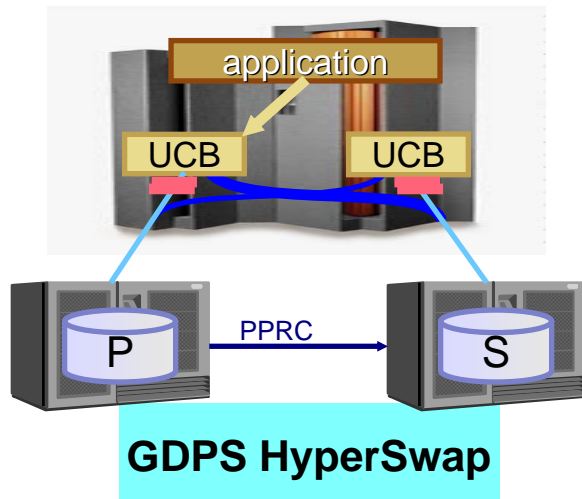
GDPS/PPRC HyperSwap: Near Continuous Data Availability

Business impact of subsystem failure

GB / Subsystem

Source: IBM Market Intelligence

GDPS HyperSwap

✓ **Designed to Provide Continuous Availability of Data for System z**
  - ✓ **Facilitated by new PPRC microcode functionality and z/OS® IOS code**

✓ **GDPS/PPRC HyperSwap™ is:**
  - ✓ **Integration of very fast swapping of PPRC'd disk subsystems with z/OS, System z hardware, and GDPS**
  - ✓ **Switching to alternate copy of System z data can be accomplished in seconds to minutes**
  - ✓ **Supported on Synchronous PPRC**

✓ **Intended Benefits:**
  - ✓ **Designed to offer continuous availability of data**
    - ✓ **Disk Maintenance**
    - ✓ **Site Maintenance**
    - ✓ **Data Migration**
    - ✓ **Disk Failure**
    - ✓ **Site Failure**
  - ✓ **Fast and Scalable System z Enterprise Data Center swap: scales to very large configurations**
  - ✓ **Repeatable, reliable, confident recovery: No operator interaction, GDPS automation managed**

What is GDPS/PPRC? (Metro Mirror)

NETWORK

GDPS/PPRC

SITE 2

NETWORK

200 km

SITE 1
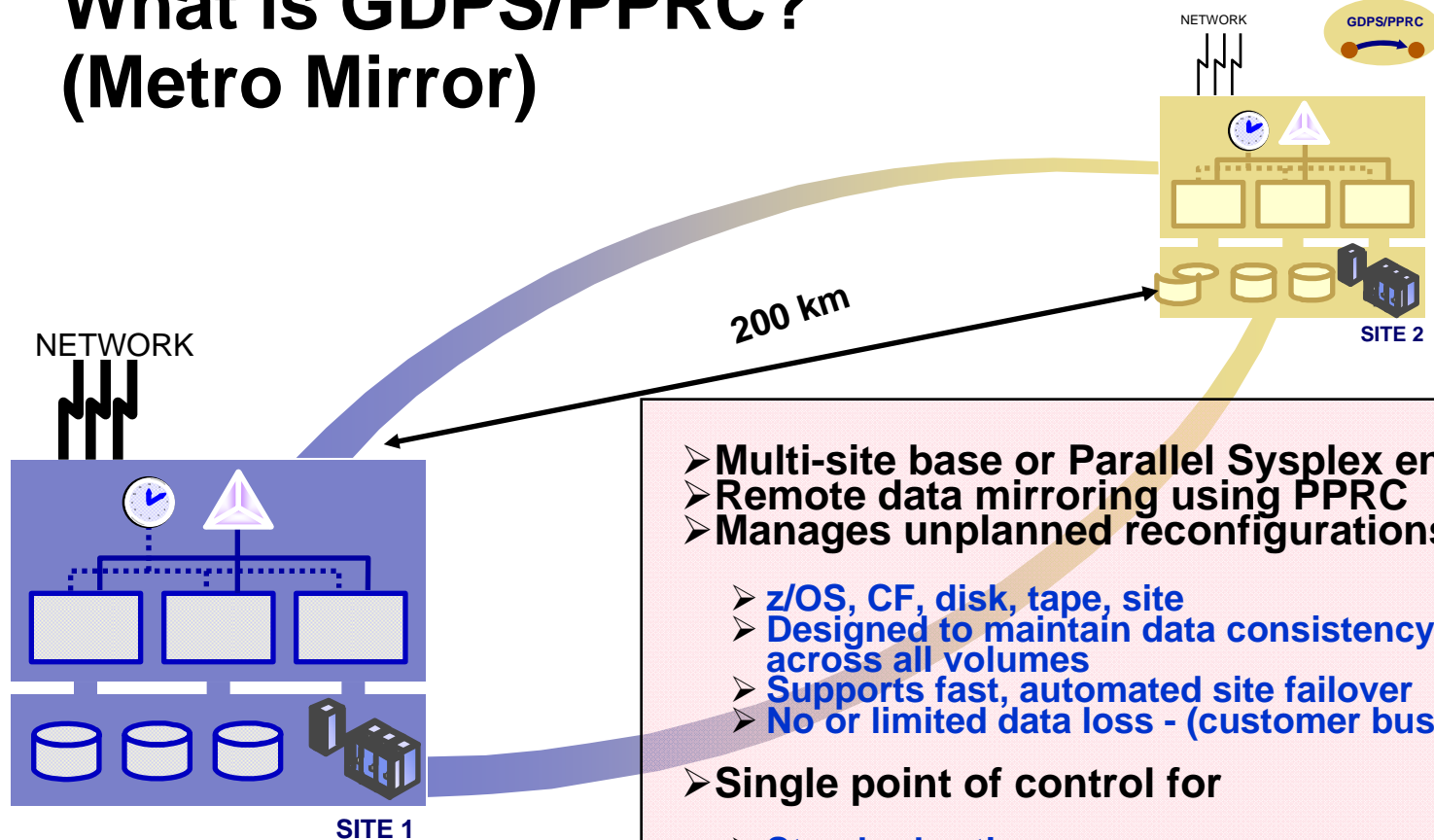
Planned and Unplanned exception conditions

- ➢ **Multi-site base or Parallel Sysplex environment**
- ➢ **Remote data mirroring using PPRC**
- ➢ **Manages unplanned reconfigurations**

  - ➢ z/OS, CF, disk, tape, site
  - ➢ Designed to maintain data consistency and integrity across all volumes
  - ➢ Supports fast, automated site failover
  - ➢ No or limited data loss - (customer business policies)

- ➢ **Single point of control for**

  - ➢ Standard actions
    - ➢ Stop, Remove, IPL system(s)
  - ➢ Parallel Sysplex Configuration management
    - ➢ Couple data set (CDS), Coupling Facility (CF) management
  - ➢ User defined script (e.g. Planned Site Switch)
  - ➢ PPRC Configuration management

Extended Distance Disaster Recovery (Two Sites)
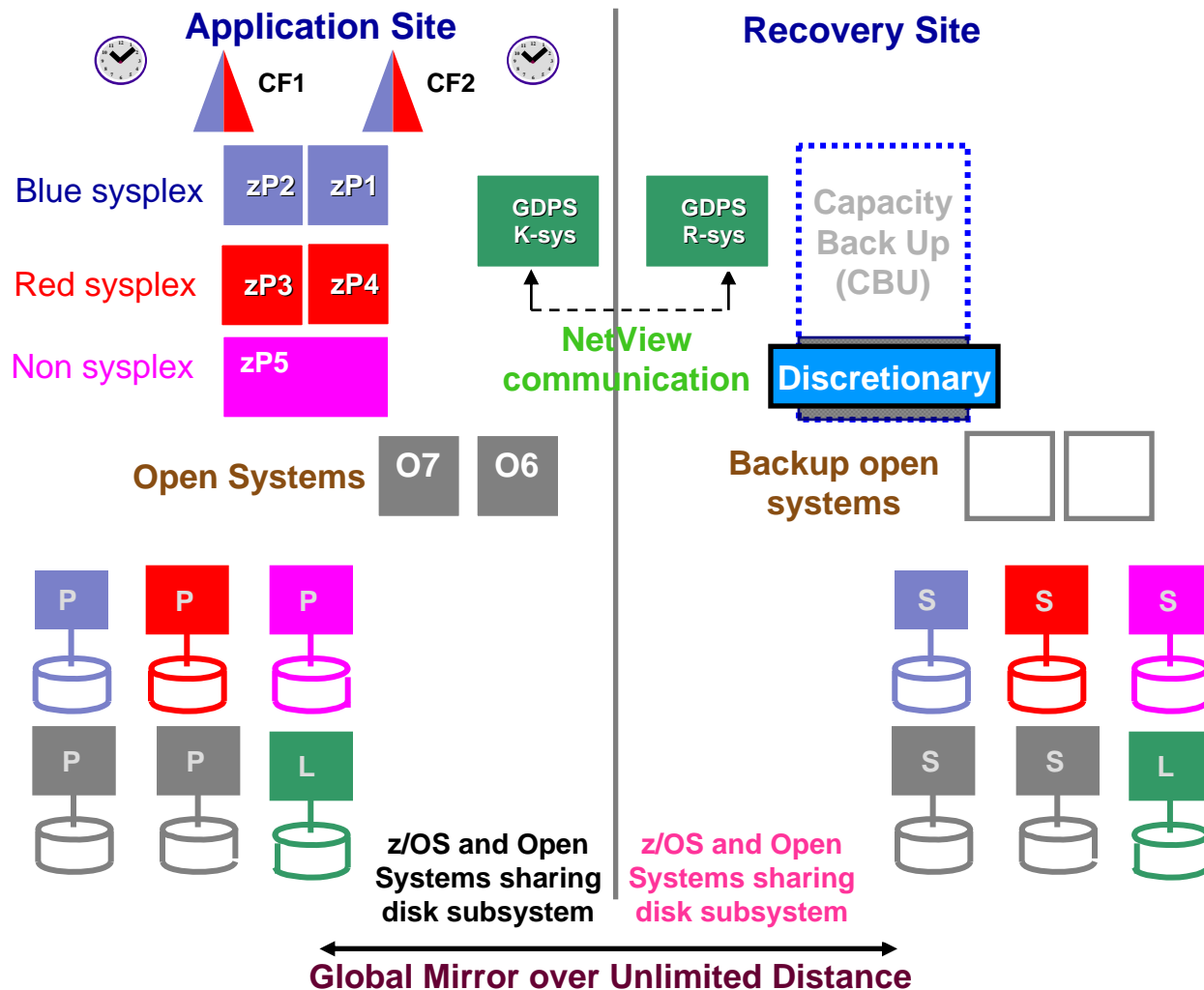
What is GDPS/XRC ?
(z/OS Global Mirror)

z/OS Global Mirror (XRC)

SDM systems
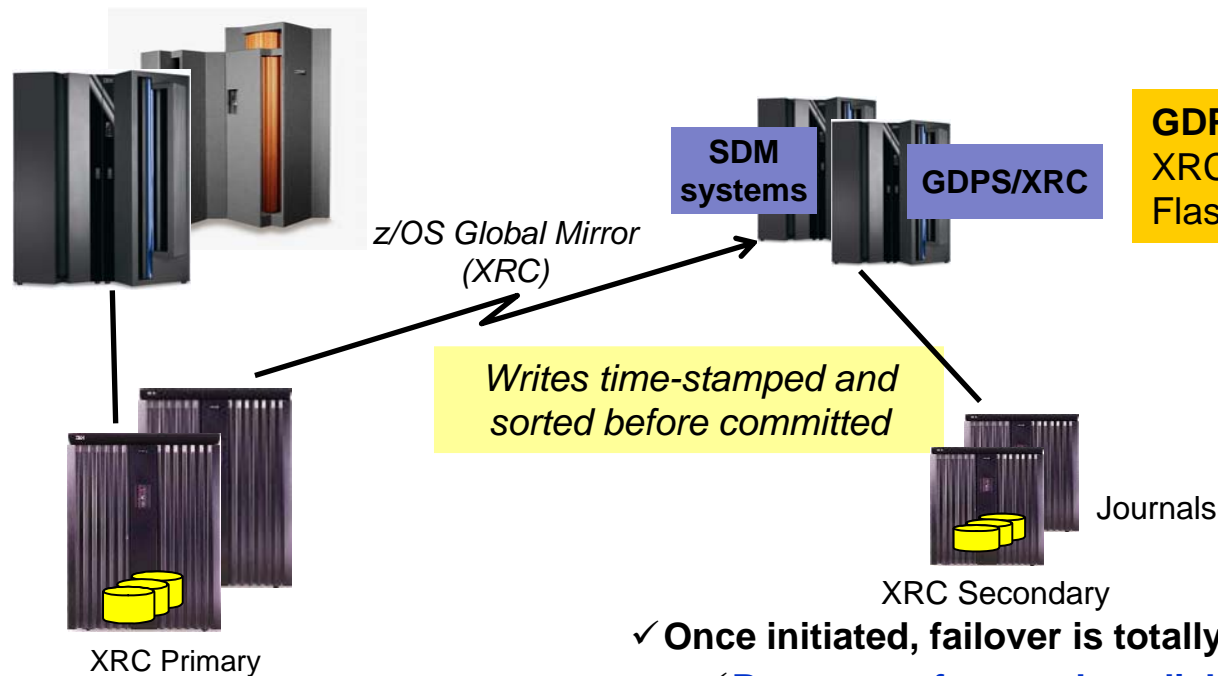
GDPS/XRC

GDPS/XRC manages:
XRC failover automation
FlashCopy, CBU, PtP VTS

Writes time-stamped and sorted before committed

Journals

XRC Secondary

XRC Primary

✓ **Virtually unlimited distance**
✓ **Multi-Storage Vendor**
✓ **GDPS manages remote copy**
  ✓ **Extended remote copy (XRC)**
  ✓ **Asynchronous**
  ✓ **Minimal (seconds) data loss**
✓ **Failover initiated by user**

✓ **Once initiated, failover is totally automated**
  ✓ **Recovery of secondary disks**
  ✓ **Activation of CBU**
  ✓ **Reconfiguration of the recovery site servers**
  ✓ **Restart of production systems in the recovery site**
✓ **GDPS 3.6 Updates (z/OS, zVM & zLinux Data)**
  ✓ **Multiple Reader Support**
  ✓ **Extended Distance Ficon**
  ✓ **GDPS/MzGM w/HyperSwap IR**
 ✓ **SDM Mips offloaded to zIIP Engines**

What is GDPS/GM ?
(Global Mirror)

Application Site

CF1   CF2

Blue sysplex — zP2 | zP1

Red sysplex — zP3 | zP4

Non sysplex — zP5

Open Systems — O7 | O6

GDPS K-sys   GDPS R-sys

NetView communication

Recovery Site

Capacity Back Up (CBU)

Discretionary

Backup open systems

P | P | P
P | P | L

S | S | S
S | S | L

z/OS and Open Systems sharing disk subsystem   z/OS and Open Systems sharing disk subsystem

Global Mirror over Unlimited Distance

- ➤ **z/OS and open systems data**
- ➤ **K-sys activities**
  - ➤ **Manages multiple Global Mirror sessions**
  - ➤ **Sends device info, scripts, alterts to R-sys**
- ➤ **R-sys activities:**
  - ➤ **Secondary disk recovery, CBU activation, activate backup LPARs, IPLs systems.**
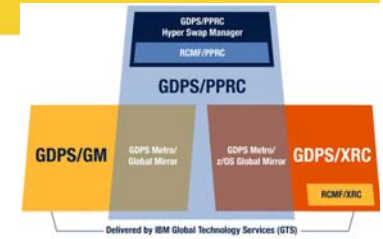
Continuous Availability and Disaster Recovery (Three Sites)

Cascading vs Multi-target Configurations

GDPS/MGM (Cascading: A->B->C)
GDPS/PPRC

**CA / local DR**

A → B

Regional DR

C   GDPS/GM
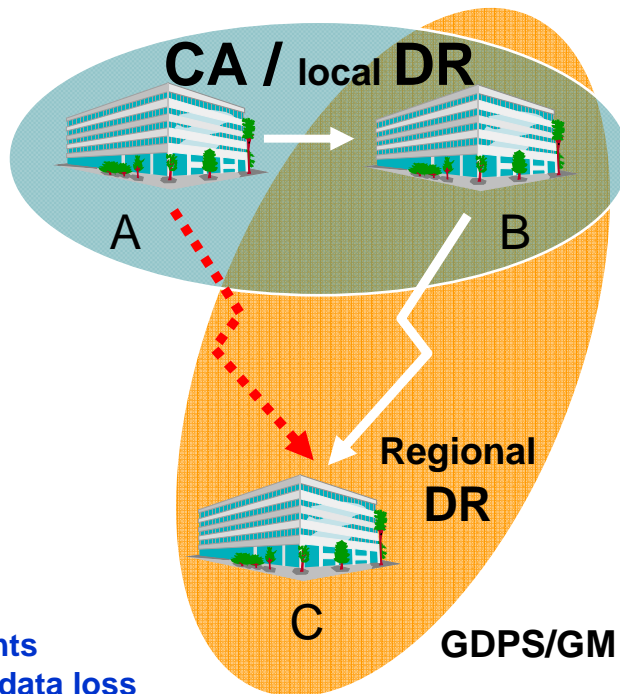
> Comments
>> No data loss
>> System z & distributed
>> Scalable bandwidth (trade-off RPO)
>> A to C network connectivity required for IR
>> If A fails, A restarted in B and DR maintained
>> If B fails, reconfig needed to restore DR

GDPS/MzGM (Multi-target: A->B, A->C)
GDPS/PPRC

CA / local DR

A   B

Regional DR

GDPS/XRC

C
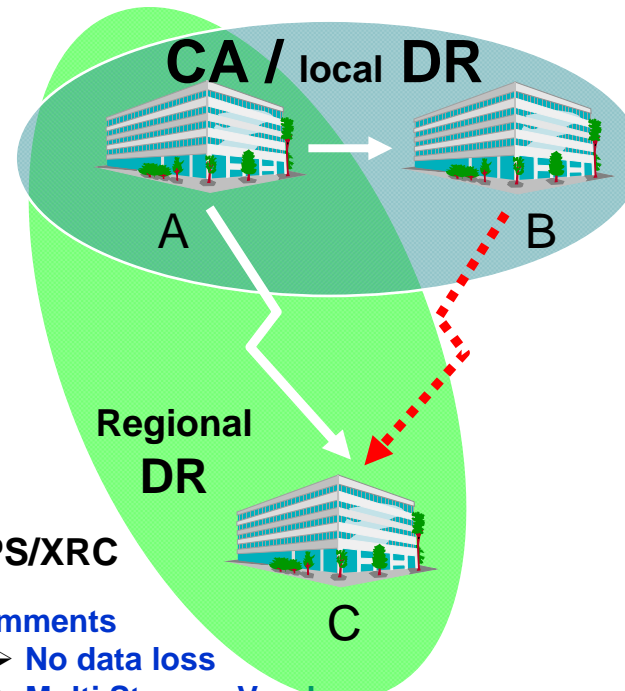
> Comments
>> No data loss
>> Multi Storage Vendor
>> System z only
>> Peak bandwidth (no RPO impact)
>> B to C network connectivity required for IR
>> Mitigates system logger overhead (XRC+)
>> Maturity
>> If A fails, A restarted in B and reconfig needed to restore DR
>> If B fails, no reconfig needed to restore DR

GDPS/MzGM w/HyperSwap Incremental Resync
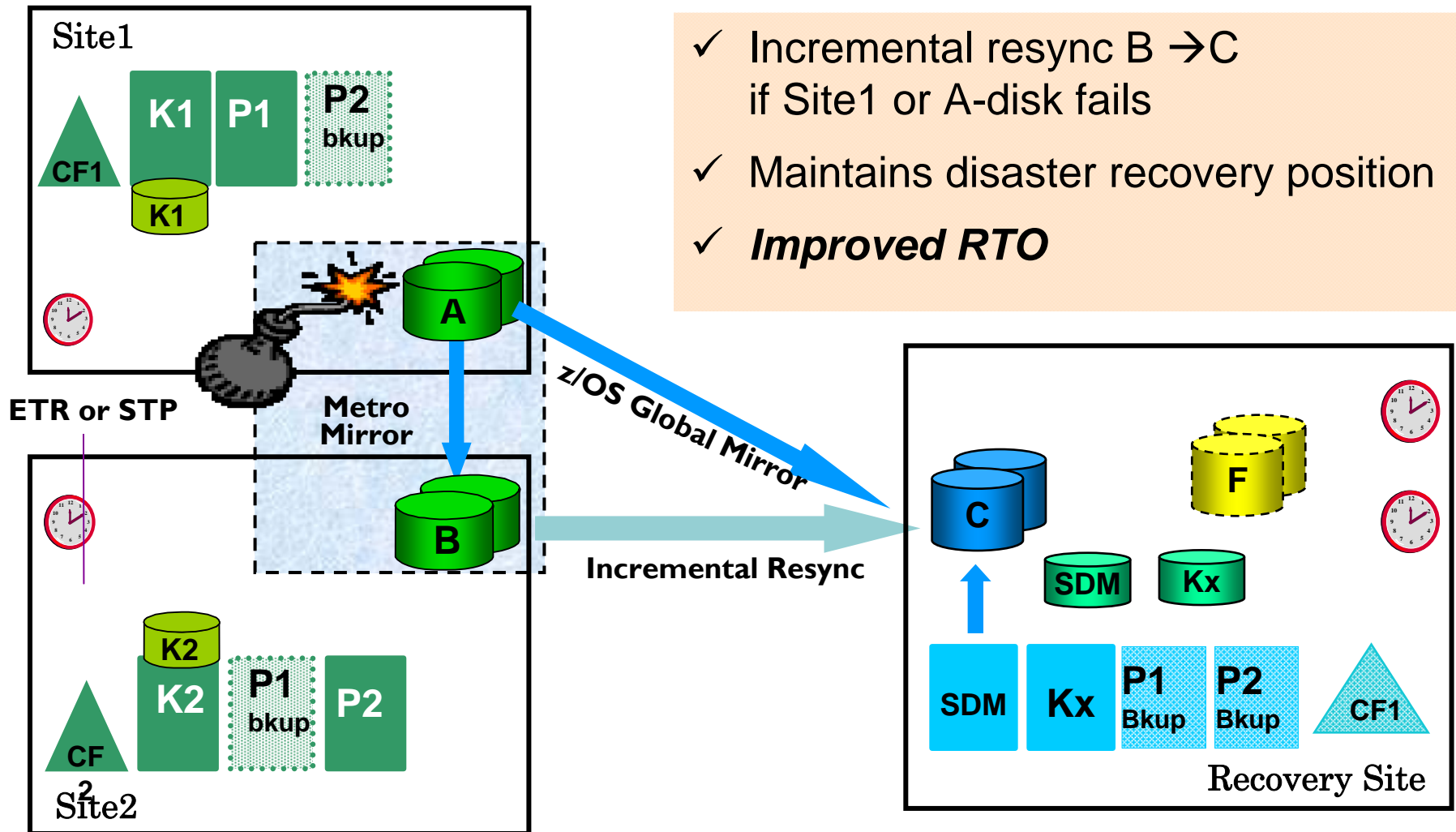
✓ Incremental resync B →C if Site1 or A-disk fails

✓ Maintains disaster recovery position

✓ *Improved RTO*

Optional: CFs / Prod systems in Site2
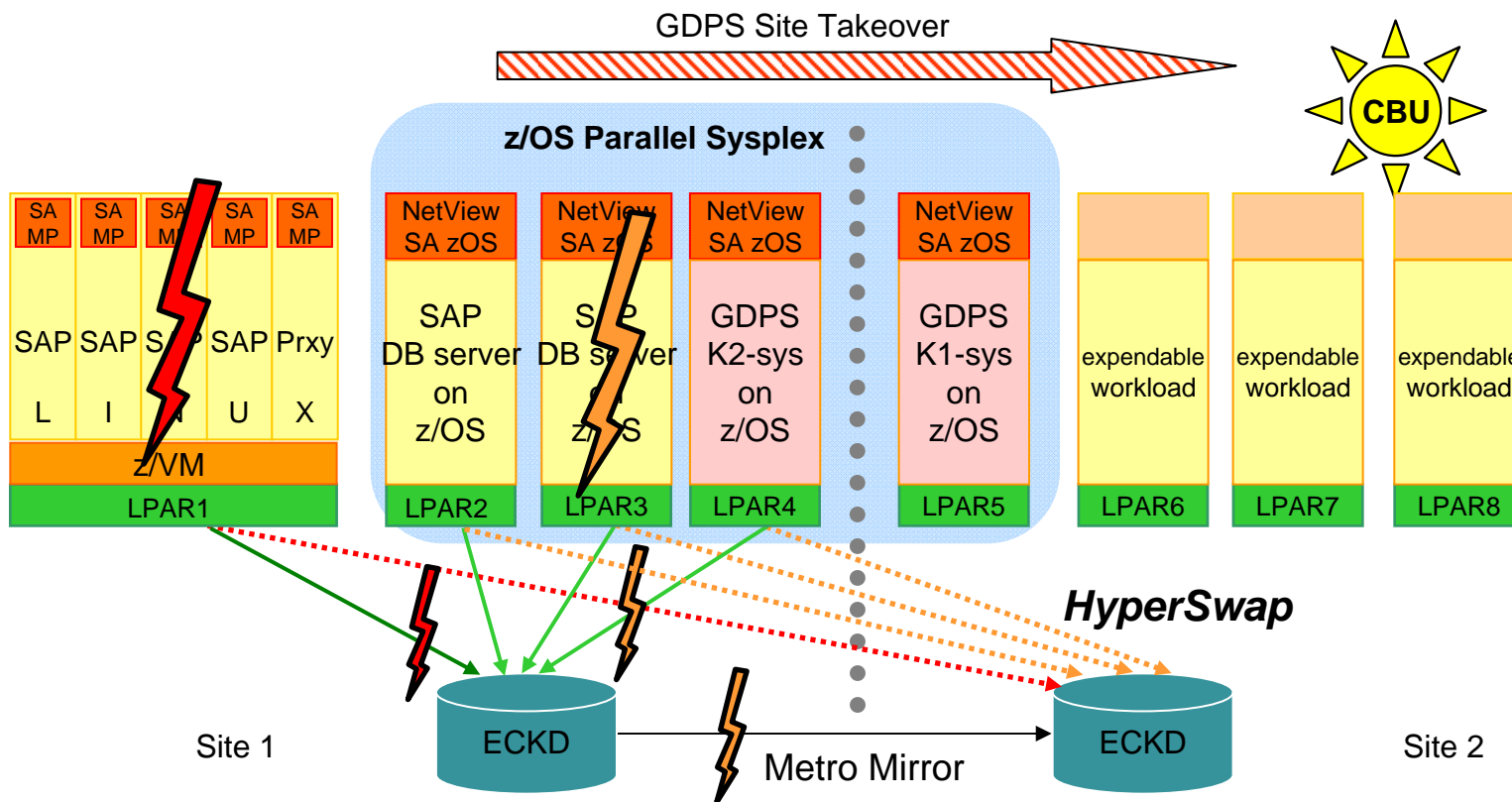
F Recommended for FlashCopy

Heterogeneous Platform Extensions

xDR Overview

- **Extends GDPS to support not only z/OS but also Linux on System z**
  - Disk error detection
  - Heartbeat for sanity checks
  - Re-IPL in place
  - Coordinated Site Takeover
  - Coordinated HyperSwap

- **Requires:**
  - GDPS
  - System Automation for Multiplatforms
  - Linux
    - SLES or RHEL if running as guest under z/VM
    - SLES if running native in its own partition
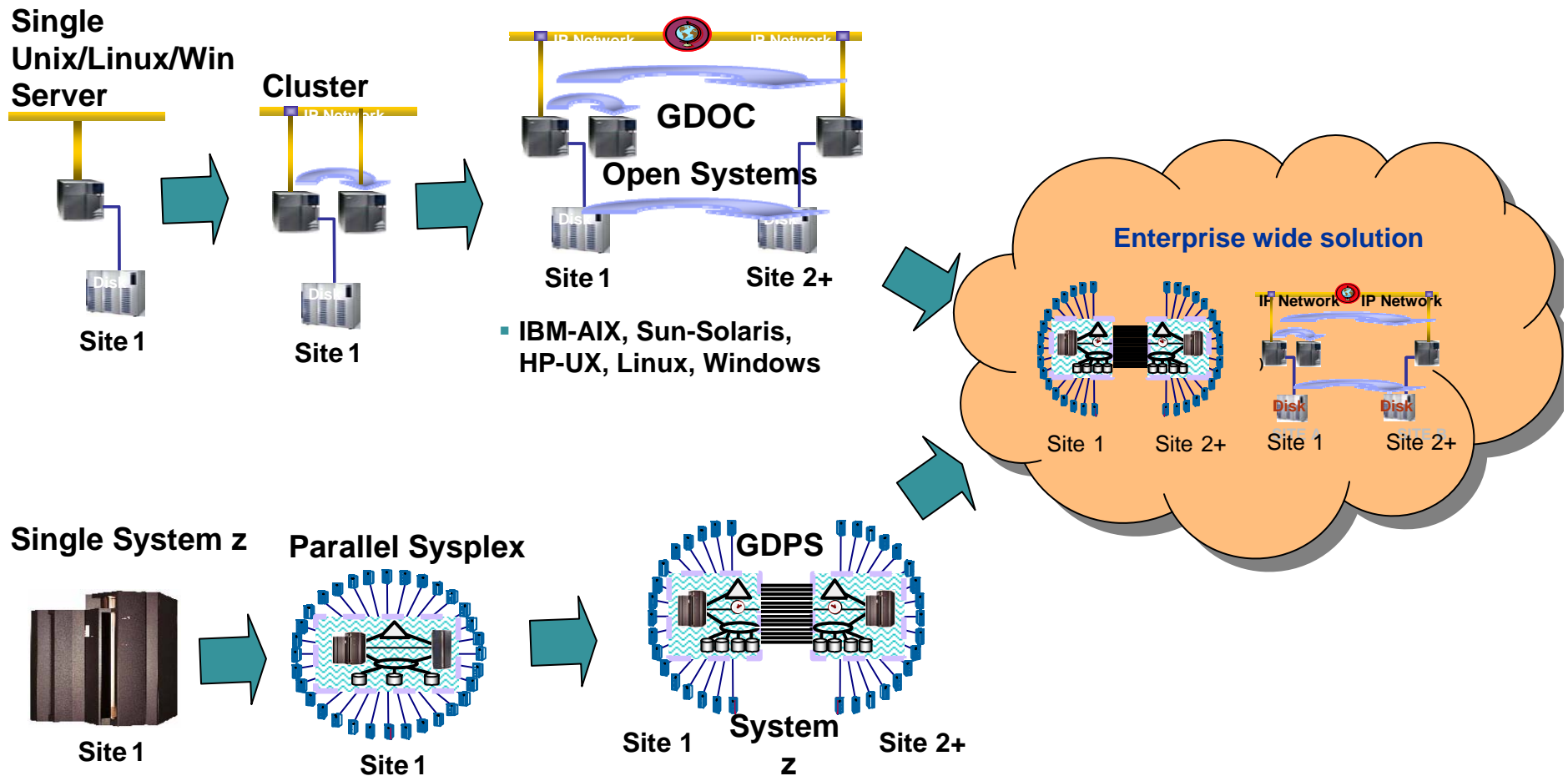 - VM, if Linux is running on z/VM

Continuous Availability for z/OS and Linux for System z

GDPS Site Takeover

CBU

z/OS Parallel Sysplex

SA MP	SA MP	SA MP	SA MP	SA MP
SAP	SAP	SAP	SAP	Prxy
L	I	N	U	X

z/VM

LPAR1

NetView SA zOS	NetView SA zOS	NetView SA zOS		NetView SA zOS
SAP DB server on z/OS	SAP DB server on z/OS	GDPS K2-sys on z/OS		GDPS K1-sys on z/OS
LPAR2	LPAR3	LPAR4		LPAR5

expendable workload	expendable workload	expendable workload
LPAR6	LPAR7	LPAR8

HyperSwap

Site 1   ECKD   Metro Mirror   ECKD   Site 2

Linux on System z can also run natively in its own partition

Coordinated recovery for planned unplanned events z/OS and Linux for System z

Evolution of an Enterprise wide solution

Single Unix/Linux/Win Server

Cluster

Site 1

Site 1

GDOC

Open Systems

Site 1

Site 2+

- IBM-AIX, Sun-Solaris, HP-UX, Linux, Windows

Enterprise wide solution

IP Network — IP Network

Site 1   Site 2+   Site 1   Site 2+

Single System z

Parallel Sysplex

GDPS

Site 1

Site 1

Site 1   **System z**   Site 2+

GDPS and GDOC Integration

- **Geographically Dispersed Open Clusters (GDOC)**
  - **Multi-vendor solution, runs on Unix, Linux, VMWare, and Windows**
  - **Disk independent (HW or SW mirroring)**
  - **Central point of control**
    - **Planned and unplanned site switch**
    - **Monitoring, Testing**
  - **Includes IBM integration, consulting and project management**
  - **Leverages Veritas Cluster Server (Symantec)**

- **GDPS and VCS ~ DCM**
  - **Coordinated recovery across System z and open**
    - **Data replication management**
    - **Automated server management**
    - **Workload management**
    - **Recovery management**

GDPS/XRC
GDPS/PPRC

GDPS Distributed Cluster Manager (DCM) for VCS

CA / DR within a metropolitan region	DR at extended distance	DR at extended distance
Two data centers - systems remain active; designed to provide no data loss	Rapid systems recovery with only 'seconds" of data loss	Rapid systems recovery with only "seconds" of data loss
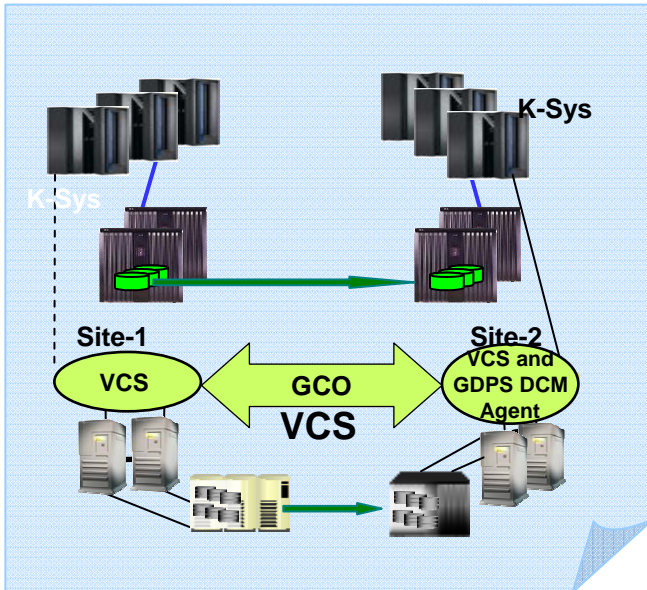
K-Sys

K-Sys

Site-1 VCS — GCO — Site-2 VCS and GDPS DCM Agent

VCS

SDM   K-sys

Site-1 VCS — GCO — Site-2 VCS and GDPS DCM Agent

VCS

R-sys

K-sys

Site-1 VCS — GCO — Site-2 VCS and GDPS DCM Agent
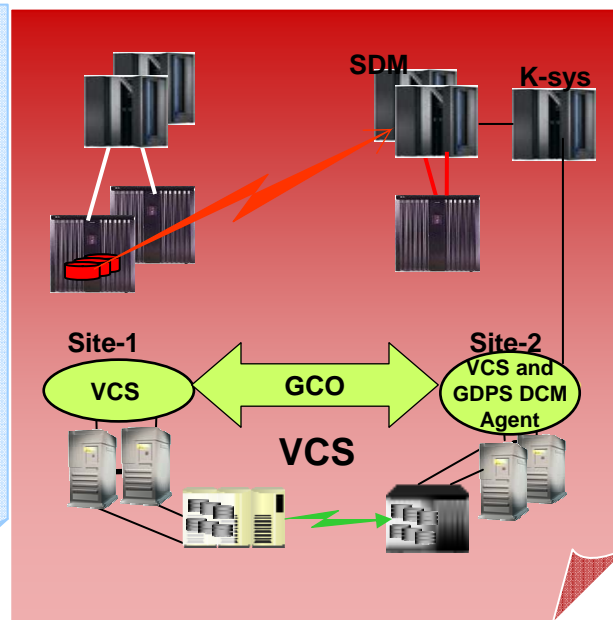
VCS managed data replication
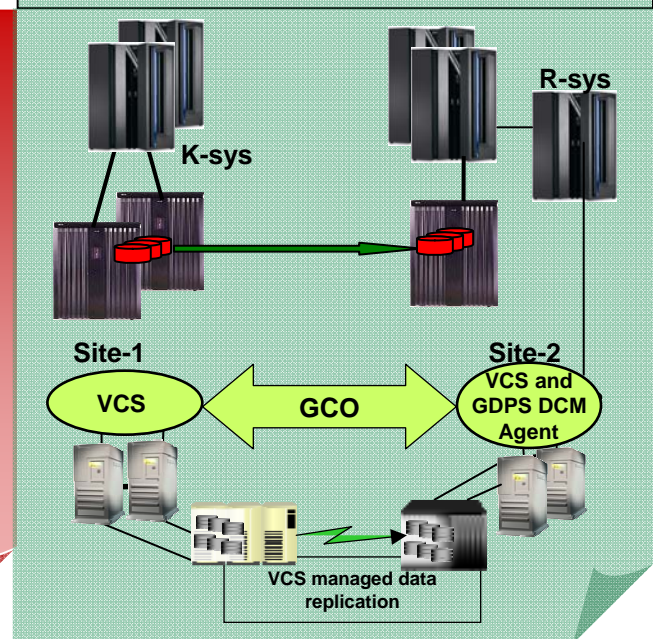
➢ **GDPS/PPRC +GCO VCS-managed synch replication for distributed servers**

➢ Enables cross-platform communication between System z™ and non- System z systems (IBM-AIX, SUN-Solaris, HP-UX, Linux, VMWare, Windows)

➢ Offers coordinated site switch for planned and unplanned outages

➢ VCS can detect incidents and notify GDPS
  ➢ DCM related failures
  ➢ GDPS issues takeover prompt depending on policy and manage failover

✓**GDPS/XRC + GCO VCS-managed async replication for distributed servers**
✓Enables cross-platform communication between System z™ and non-System z systems (IBM-AIX, SUN-Solaris, HP-UX, Linux, VMWare, Windows)
✓Offers coordinated site switch for planned and unplanned outages
✓GDPS/XRC can issue a takeover prompt
  ✓DCM related failures
  ✓XRC suspension events
✓Potential reduction of problem determination time thus reducing total RTO

✓**GDPS/GM + GCO VCS-managed async replication for distributed servers**
✓Enables cross-platform communication between System z and non-System z systems (IBM-AIX®, SUN-Solaris, HP-UX, Linux®)
✓Coordinated site switch for planned and unplanned outages

✓VCS can detect incidents and notify GDPS
✓GDPS issues takeover prompt depending on policy and manage failover
  ✓Potential reduction of problem determination time, reducing RTO

GDPS Family Support for Tivoli SA Application Manager

GDPS

z/OS Sysplex

GDPS K-System

SA Application Manager

SA AppMan

Clustered Applications

PPRC

Site 1

Site 2
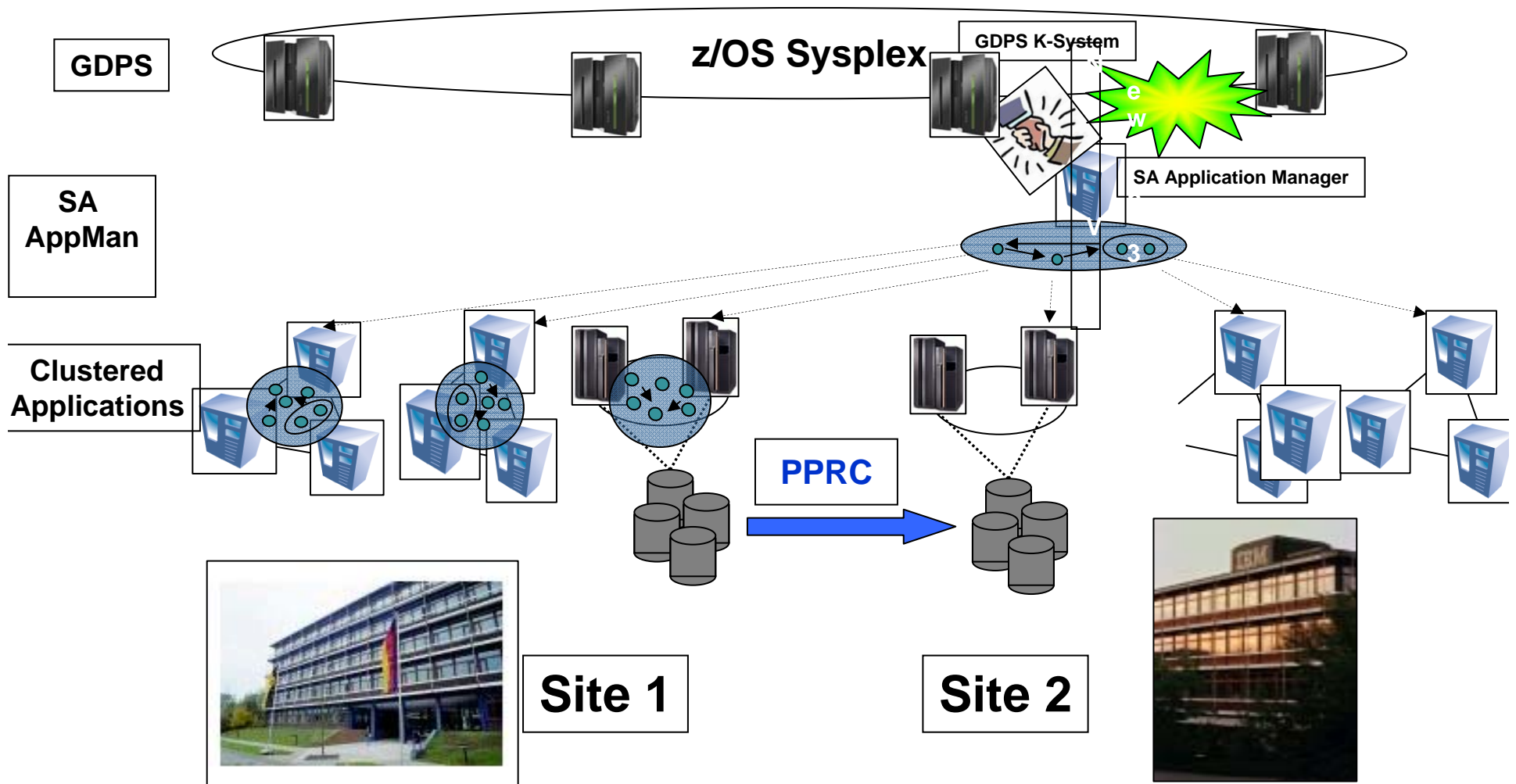
GDPS and SA AppMan Integration

- ➢ GDPS manages servers, data replication and has site awareness
    - ➢ System z scope for servers
    - ➢ System z and open systems scope for data replication
- ➢ SA AppMan automation manages applications
    - ➢ End to end scope,
    - ➢ cross cluster dependencies,
    - ➢ resource grouping (customer defined)
- ➢ Shouldertapping between GDPS and SA AppMan automation

GDPS/PPRC

SA Application Manager was previously called
SA for Multi-Platform End-to-End

GDPS 3.7 Update

SHARE in Boston

GDPS V3.7 – Enterprise-wide Continuous Availability & D/R solution

➢ **Improved coordinated heterogeneous planned and unplanned events:**

  ➢ **Extending the platforms supported**
    ➢ Already support IBM AIX, HP-UX, Linux, Sun Solaris, VMWare ESX
    ➢ New: Microsoft Windows servers support added with GDPS V3.7

  ➢ **Multiple xDR enhancements**
    ➢ Dynamic changes to GDPS/PPRC options without SA for MP refresh
    ➢ Coordinated startup/shutdown of z/VM and guests
    ➢ z/VM guests HyperSwap I/O timing trigger

  ➢ **Low impact initial copy / resync for distributed LUNs using GDPS/PPRC**

GDPS V3.7 – Enterprise-wide continuous availability and D/R solution

➢**Improved scalability:**
  ➢**UCB constraint relief with Metro Mirror secondary in alt subchannel set**

➢**Increased availability:**
  ➢**GDPS/ Metro Global Mirror (GDPS/MGM) incremental resync tool**
    ➢**Reduces exposure from hours down to minutes**

➢**Simplified system management:**
  ➢**Simpler installation / maintenance with less manual definitions**
  ➢**Freeze policy simplified and extended with additional options**
  ➢**BCPii automatic reconnect**
  ➢**Additional GDPS Health Checks**

GDPS/PPRC HyperSwap & HyperSwap Manager
Alternate Subchannel sets for Metro Mirror Secondary Disk

- ✓ **z/OS subchannels used for**
  - ✓ **Primary disk**
  - ✓ **Secondary disk**
  - ✓ **FlashCopy Targets**
  - ✓ **HyperPavs & PAVs**
- ✓ **Metro Mirror secondaries now in alternate subchannel set**
- ✓ **Allows up to 64K pairs**
- ✓ **GDPS/PPRC GDPS/PPRC HyperSwap Manager**

Metro Mirror secondaries in different logical subchannel set
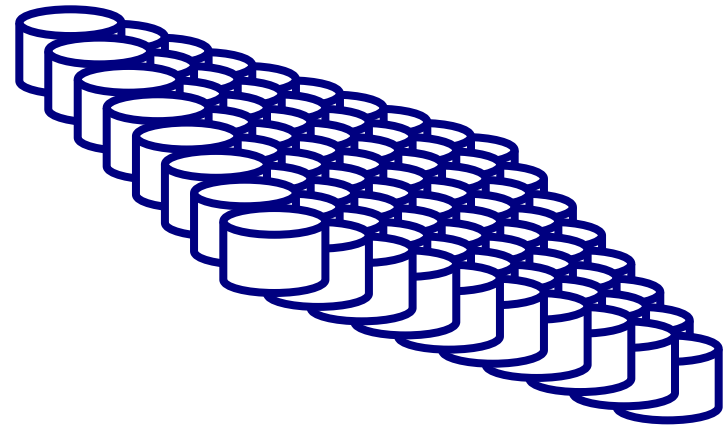
Allows larger disk configuration

GDPS/MGM w/HyperSwap Incremental Resync – Phase 1 w/GDPS 3.6.
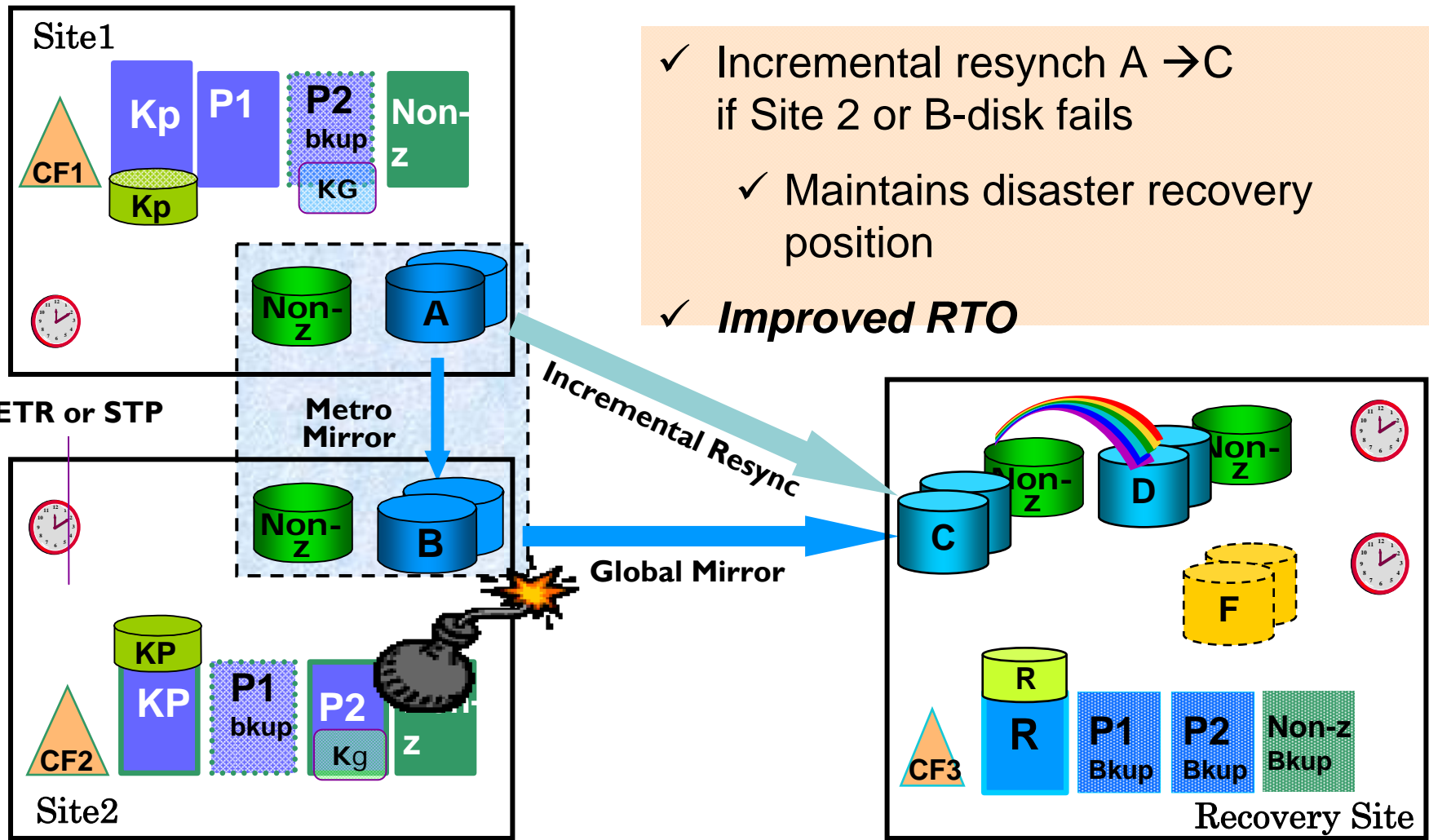
✓ Incremental resynch A →C
  if Site 2 or B-disk fails

  ✓ Maintains disaster recovery
    position

✓ *Improved RTO*

- ❑ **Optional** CFs / Prod systems in Site2
- ❑ **Non-z**: Unix, Linux, Linux on z, Win

F Recommended for FlashCopy

31

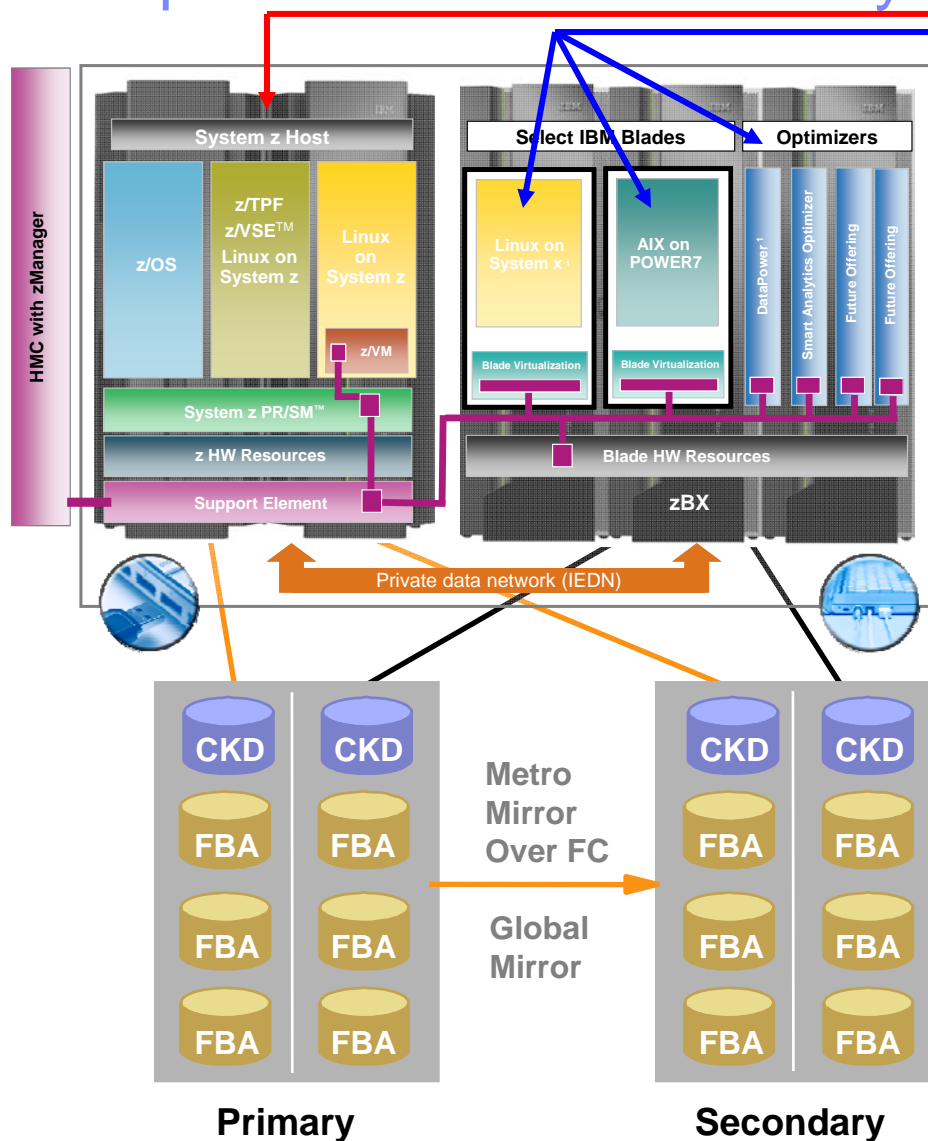# GDPS/MGM w/HyperSwap Incremental Resync Phase 2 w/GDPS 3.7
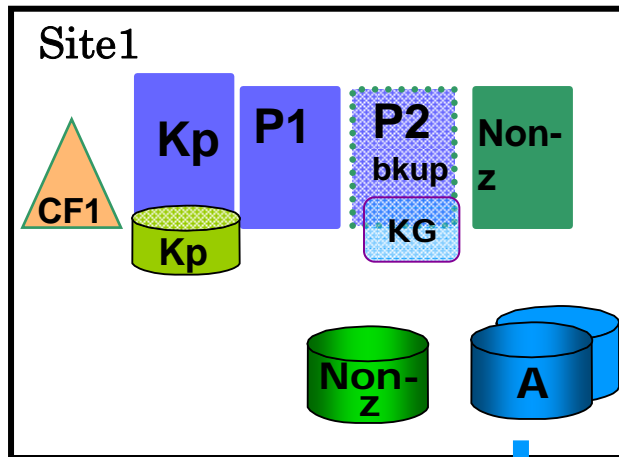
- ✓ **Continue to have DR protection while restoring B copy**
- ✓ **Incremental copy when B disk available**
- ✓ **Can avoid full volume copies**
- ✓ **Reduces exposure from hours to minutes**

Site1

CF1 | Kp | P1 | P2 bkup | Non-z
Kp | KG
Non-z | A

Site2

CF2 | KP | KP | P1 bkup | P2 Kg | Non-z
Non-z | B

Recovery Site

Non-z | C | Non-z | D | Non-z
F
CF3 | R | R | P1 Bkup | P2 Bkup | Non-z Bkup

Global Mirror

Global Copy
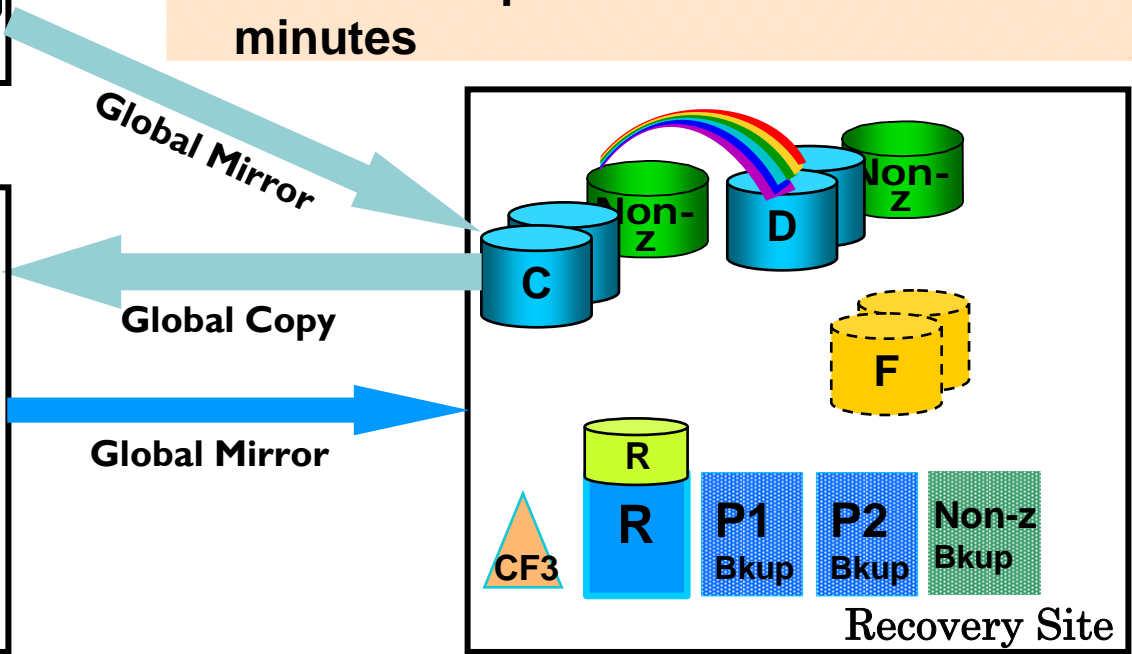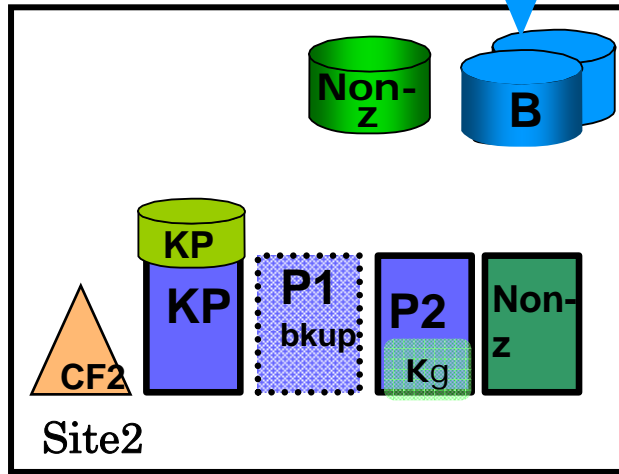
Global Mirror

zEnterprise Business Continuity using GDPS

- **Management of Metro Mirror or Global Mirror remote copy configurations**
  - Open LUN management
  - Data consistency across z/OS and distributed systems running in zBX

- **Infrastructure management solution for z/OS and Linux applications on System z (guests or running native)**
  - xDR support
  - Data consistency, HyperSwap, Planned/Unplanned site switches

- **Management and coordination of**
  - Planned and unplanned outages
  - z196 and distributed servers in zBX using clustering solutions
  - Distributed Cluster management (DCM) support for

    Tivoli System Automation Application Manager (SA AppMan)

    Veritas Cluster Server (VCS)

System z is the Business Continuity management hub

Summary

GDPS Value Proposition

The Ultimate Availability Solution

Support

Customer Focus

Product Maturity

Investment Protection

Open Industry Standards

Vision

Value

Customer Acceptance

Commitment

Experience

- +550 GDPS licenses installed in 38 countries worldwide
- Proven technology, automated, and repeatable result
- Complete implementation by experienced consultants

- GDPS supports industry accepted, *open* replication architectures (PPRC, XRC, GM, and FC)
- Architectures licensed by all enterprise storage vendors
- GDPS qualification program

- Easily upgradeable
- Common code base for each product

- Generally available since 1998
- Suite of products
- E2E capability
- Several years of Sys z production experience
- CA/DR best of breed
- Continually enhanced

- GDPS Design Council
- Synergy with IBM development labs
- Incorporates several IBM patents
- Dedicated dev & solution test lab
- New V.R every year

- Fully supported via standard IBM support structure
- Fixes through normal Sys z channels

"Using the GDPS/PPRC HyperSwap technology is a significant step forward in achieving continuous availability. The benefits in our GDPS environments are that planned switches of the disk configuration took 21-33 seconds without application outage. The user impact time of unplanned disk reconfigurations was 9-16 seconds; with 8 seconds to swap a configuration of over 4,600 PPRC volume pairs. Without HyperSwap planned and unplanned reconfigurations had resulted into a service outage of almost two hours in our Sysplex/GDPS with 10 systems."

Wolfgang Dungl, Manager of Availability, Capacity and Performance Management
Wolfgang Schott, GDPS Project Manager   *iT-AUSTRIA*

A History of Growth & Enhancement

GDPS is IBM's Industry-Leading Continuous/High Availability & Recovery IT Infrastructure Solution

- ▪ IBM support
- ▪ Customer focus
- ▪ Established Solution
- ▪ Investment protection
- ▪ Open industry standards
- ▪ Customer acceptance

Vision

2010+ 2009 2008 2007 2006 2005 2004 2003 2002 2001 2000 1999 1998

Value

Commitment

Experience

- ★ GDPS/PPRC Announced

- ★ GDPS/XRC available
- ★ GDPS/MzGM available
- ★ 1st 100 licenses installed

- ★ GDPS/PPRC FlashCopy
- ★ GDPS/PPRC Tape support
- ★ 1st cross-platform data freeze across z/OS and Open Systems Data (open LUN)
- ★ MOP Solution Test Platform established

- ★ GDPS/PPRC: Planned & unplanned HyperSwap
- ★ GDPS/XRC: FlashCopy
- ★ GDPS 3.1 GA
- ★ GDPS/PPRC Storage Manager (SM) available
- ★ 1st GDPS Design Council

- ★ GDPS/PPRC HyperSwap Manager (HM) available
- ★ GDPS/Global Mirror (GM) available
- ★ GDPS/Metro/ Global Mirror (MGM) available
- ★ GDPS Vendor qualification program

- ★ xDR for Guest Linux on z
- ★ xDR for native Linux on z
- ★ GDPS Distributed Cluster Manager (DCM) -1st solution to provide an entire data center failover/fallback
- ★ GDPS/MGM Incremental Resync (Stg 1)
- ★ GDPS/MzGM Incremental Resync

- ★ GDPS 3.7 GA (3/10)
- ★ GDPS/PPRC/HM Alternate subchannel set support
- ★ 7th GDPS Design Council (6/10)
- ★ 12th year anniversary (11/10)
- ★ +550 licenses installed

GDPS Demographics (thru June 30, 2010)

GDPS Product Installations

600
500
400
300
200
100
0

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

■ Annual □ Cumulative

One or two site GDPS installations

product	installs	percentage
RCMF/PPRC	52	9.5%
RCMF/XRC	16	2.9%
GDPS/PPRC HM	77	14.0%
GDPS/PPRC	278	50.5%
GDPS/XRC	90	16.4%
GDPS/GM	37	6.7%
Totals	550	100.0%

Three site GDPS installations

product	installs
GDPS/MzGM *	35
GDPS/MGM **	24

GDPS solution by Industry sector

sector	installs	percentage
Communications	36	6.5%
Distribution	25	4.5%
Finance	402	73.1%
Industrial	28	5.1%
Public	45	8.2%
Internal IBM	10	1.8%
SMB	4	0.7%
Total	550	100.0%

GDPS solution by geography

major geo	installs	percentage
AG	133	24.2%
AP	62	11.3%
EMEA	355	64.5%
Totals	550	100.0%

* - GDPS/MzGM consists of GDPS/PPRC HM or GDPS/PPRC and GDPS/XRC. the GDPS licenses are counted in the prior table

** - GDPS/MGM consists of GDPS/PPRC HM or GDPS/PPRC and GDPS/GM. the GDPS licenses are counted in the prior table

Additional Information

- **Detailed GDPS Presentation and Information e-mail:**
  - **gdps@us.ibm.com**
- **White Papers:**
  - **Business Continuity Considerations and the IBM eServer zSeries**
  - **GDPS - The Ultimate e-business Availability Solution – GF22-5114**
  - **IBM Storage Infrastructure for Business Continuity – redp4605 (Red Paper)**
- **Publications:**
  - **GDPS Family of Offerings Introduction to Concepts and Capabilities - SG24-6374 TotalStorage Disaster Recovery Solutions Redbook – SG24-6547**
  - **z/OS Advanced Copy Services – SC35-0428**
  - **ESS Copy Services on zSeries Redpiece - SG24-5680**
  - **ESS Copy Services on Open Redpiece – SG24-5757**
- **GDPS Services Offerings**
  - **GDPS Announcement**
  - **GDPS/XRC Announcement**
- **www.ibm.com/servers/eserver/zseries/gdps**

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