

Z12

Enhancing Parallel Sysplex Availability with improved Data Availability

Noshir Dhondy (dhondy@us.ibm.com)



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Agenda

- Overview
 - Business Continuity
 - GDPS Solutions
- GDPS® /PPRC HyperSwap™ Manager (HM)
 - HyperSwap technology
 - Benefits and Functions
 - Continuous Availability (CA) of Data within a "single site"
 - Metropolitan Distance CA/Disaster Recovery (D/R) Solution (2 sites)
 - Configuration Options
 - Planned and Unplanned Site Reconfiguration with HyperSwap
- Continuous Availability/Disaster Recovery (3 sites)
 - z/OS® data only
 - z/OS® and Open data (target 4Q05)
- Summary
- Appendix



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Overview

Business Continuity
Tiers of Disaster Recovery
GDPS solutions

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Business Continuity

Business Continuity is not simply IT Disaster Recovery... it is a management process that relies on each component in the business chain to sustain operations at all times.

- Effective Business Continuity depends on ability to:
 - Reduce the risk of a business interruption
 - Stay in business when an interruption occurs
 - Respond to customers
 - Maintain public confidence
 - Comply with requirements:
 - Audit
 - Regulator/Legislative
 - Insurance
 - Health and Safety

... An end-to-end Business Continuity program is only as strong as its weakest link

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Business Continance Objectives

- Determine your Objectives for Business Continance (by application)**
 - Recovery Time Objective (RTO)
 - how long can you afford to be without your systems?
 - Recovery Point Objective (RPO)
 - when it is recovered, how much data can you afford to recreate?
 - Network Recovery Objective (NRO)
 - how long to switch over network?
- Determine cost / recovery time curve**
 - If I spend a little more, how much *faster* is Disaster Recovery?
 - If I spend a little less, how much *slower* is Disaster Recovery?

Determining the cost vs. RTO recovery curve is the key to selecting proper solution(s)

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Tiers of Disaster Recovery: Level Setting GDPS

The graph plots 'Value' (Mission Critical, Somewhat Critical, Not so Critical Applications) against 'Time to Recover (hrs)' (15 Min, 1-4, 4-6, 6-8, 8-12, 12-16, 24, 72). A red curve shows the progression from Tier 1 (PTAM*) to Tier 7 (Near zero or zero Data Loss). Specific solutions are mapped to tiers: Tier 1 (PTAM*), Tier 2 (PTAM, Hot Site), Tier 3 (Electronic Vaulting), Tier 4 (Batch/Online database shadowing & journaling, repetitive PIT copies, fuzzy copy disk mirroring), Tier 5 (software two site, two phase commit), Tier 6 (Near zero or zero Data Loss remote disk mirroring), and Tier 7 (Near zero or zero Data Loss: Highly automated takeover on a complex-wide or business-wide basis, using remote disk mirroring). Specific GDPS solutions are also mapped: GDPS/PPRC (RTO < 1 hr; RPO 0), GDPS/XRC (RTO < 2 hr; RPO < 1min), and GDPS/PPRC HyperSwap Manager (RTO depends on customer automation; RPO = 0).

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

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What is GDPS?

- Automated solution that manages application and data availability in and across sites
 - Monitors systems, disk & tape subsystems
 - Builds on (multi-site) Sysplex and data mirroring technologies
 - Manages planned and unplanned exception conditions
 - System maintenance / failure
 - Site maintenance / failure

Designed for Near-Continuous Application & Data Availability
Single point of control
Delivered through IBM Services

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GDPS: End to End Solution

- **GDPS is more than just remote copy disaster recovery technology**

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GDPS Solutions -Synchronous

Continuous Availability of Data (Single Site)

Solution	Target Customer	Value
GDPS/PPRC HyperSwap Manager	Parallel Sysplex	Continuous Availability of Data

Metropolitan Distance CA/DR (2 sites)

Solution	Target Customer	Value
RCMF/PPRC	Disk Mirroring	PPRC Management Ease of Use
GDPS/PPRC HyperSwap Manager	Entry Level Disaster Recovery (DR)	Planned & Unplanned reconfiguration RPO=0; RTO depends on customer automation
GDPS/PPRC Sysplex/PPRC across 2 sites Prod systems in same site or Prod systems in 2 sites)	DR for zSeries and Open Data Continuous zSeries Data availability	Planned & Unplanned reconfiguration RPO=0; RTO< 1 hr
GDPS/PPRC BRS config Sysplex in one site PPRC across 2 sites	DR for zSeries and Open Data	Planned & Unplanned reconfiguration RPO=0; RTO< 4 hrs

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GDPS Solutions - Asynchronous

Unlimited Distance D/R (2 sites)

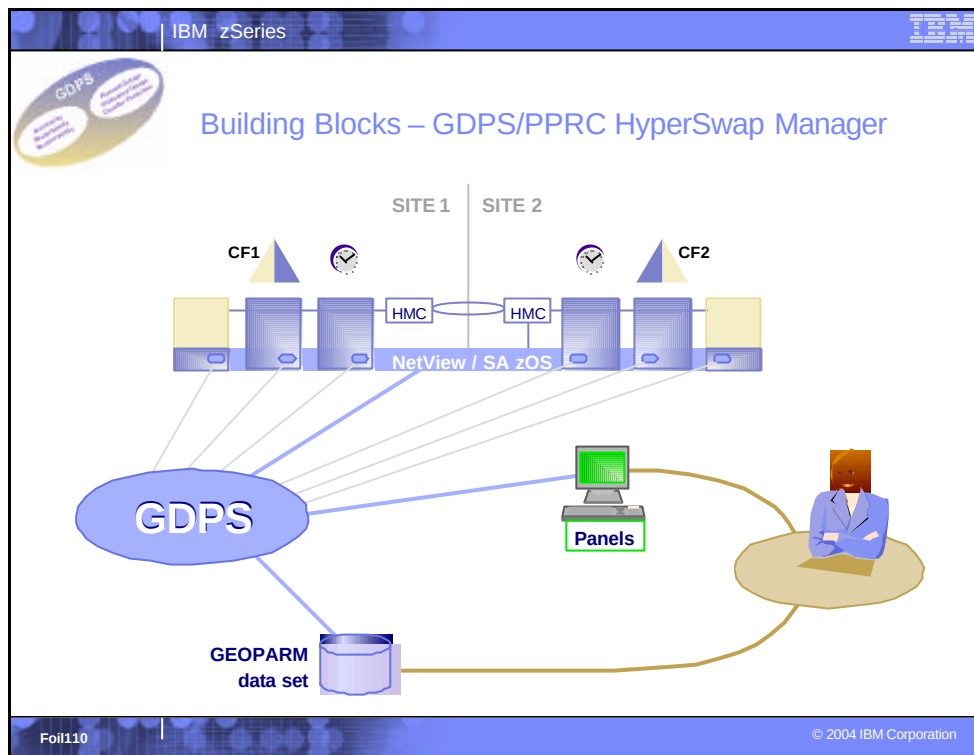
Solution	Target Customer	Value
RCMF/XRC	Disk Mirroring	XRC Management Ease of Use
GDPS/XRC	DR (zSeries Only)	Site failover RTO = 1-2 hrs; RPO < 1 min
GDPS/Global Mirror	DR (zSeries & Open data)	Site failover RTO = 1-2 hrs ; RPO < 1 min

CA/DR 3 sites (Metro + Unlimited Distance)

Solution	Target Customer	Value
GDPS/PPRC & GDPS/XRC (z/OS data only)	Economically essential businesses; Ultimate Bus Continuity	Metro distance CA for zSeries data & unlimited distance DR
GDPS Metro/Global Mirror (1) (z/OS & Open Data)	Economically essential businesses; Ultimate Bus Continuity	Metro distance CA & unlimited distance DR

(1) 4Q05 target

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GDPS/PPRC HyperSwap Manager

HyperSwap technology
Benefits and Functions
Continuous Availability of data within a "single site"
Metropolitan Distance CA/DR solution (2 sites)

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Need for Time Consistency



Recovery

Process measured in hours or days

Restore last set of Image Copy tapes
Apply log changes to bring database up to
point of failure

Restart

Process measured in minutes

To start a DB application following an
outage without having to restore the
database



Protection against mirroring failures

- Many examples where the start of one write is time dependent on the completion of a previous write

- Database & log
- Index & data components
- Time sequence could be exposed



- GDPS automation ensures consistency
 - Across any number of primary subsystems

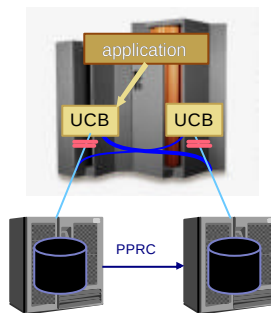


- Consistency enables Restart instead of Recovery

- Even if second copy can be trusted, disk switch is disruptive for the entire workload*



GDPS/PPRC HyperSwap – the Technology



- Substitutes PPRC secondary for primary device
 - No operator interaction - GDPS-managed
 - Can swap large number of devices - fast
 - Includes volumes with Sysres, page DS, catalogs
 - Non-disruptive - applications keep using same device addresses

Brings different technologies together to provide a comprehensive application and data availability solution

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GDPS/PPRC HyperSwap Manager (HM) Benefits

- Availability
 - Extends Parallel Sysplex Availability to disk subsystems
- System Management
 - Simplifies management of Remote Copy configuration, reducing storage management costs
 - Reduces time required for remote copy implementation
 - Combines the features of Remote Copy management with the automation of GDPS
- Effective entry level offering for customers that require high levels of availability
 - Attractively priced Tivoli NetView and System Automation products
 - Positioned to upgrade to full GDPS

*Parallel Sysplex is designed to provide Near-Continuous Availability of systems, servers and applications within a single site
(degree of availability depends on exploitation of Parallel Sysplex)*

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GDPS/PPRC HM Functional Overview

- Single point of control to manage the remote copy configuration
 - zSeries and Open data
 - Cannot HyperSwap Open Data; Open data will be "frozen" to maintain data consistency
- Unplanned HyperSwap
 - Masks primary disk subsystem failures by transparently switching to use secondary disks
- Planned HyperSwap
 - Provides ability to perform disk maintenance without requiring applications to be quiesced
- Enables data consistency in the event of failures or disaster
- FlashCopy support
 - Auto initiated by GDPS prior to resynchronization
 - User initiated
- User interface through panels
 - Status and planned actions
 - Facilitates Primary/Secondary disk swaps for Planned Disk/Site Maintenance

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PPRC Configuration Management with Data Consistency

- ◆ Central point of control - full screen
 - ◆ TSO commands not needed
- ◆ Initialize & maintain Remote Copy configuration
 - ◆ Initiate functions per pair, subsystem or all
 - ◆ Automatically establish target configuration at system startup
 - ◆ Suspend / resume remote copy operation
 - ◆ Add, move, remove pairs, subsystems, links
- ◆ Monitoring
- ◆ Exception reporting via alerts
- ◆ Freeze function assures secondary data consistency allowing systems and applications to be restarted in site 2
 - ◆ Restart has to be invoked by customer

Manage Remote Copy configuration vs Remote Copy pairs

Assure data consistency in the event of failures

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```

WS - [24 x 80]
Edit View Communication Actions Window Help
VPCPPNLI          GDPS - Disaster/Recovery System          GDPS V3.R2.M0

System             = CSK      SRVCK      Primary Dasd = OK   SITE1  SITE1
Current Master     = CSK      SRVCK      Primary Tape =
Parallel mode      = YES                      Dasd Config = 2005-04-14 16:13:18
HyperSwap F0/FB    = ENABLED YES          FREEZE Date  =
Debug              = OFF                      Time      =

      1           Dasd Remote Copy
      2           Tape Remote Copy
      3           Standard Actions

      5           Net Management
      6           Planned Actions
      7           Sysplex Resource Management
      8           Debug ON/OFF
      9           View Definitions

      C           Config Management

Selection ==> -
      F1=Help          F3=Return          F6=Roll

      C                                           22/018
connected to remote server/host: sg0eip.pdl.pok.ibm.com using port 23
  
```

```

VPCPQSTC  Dasd Mirroring Status = OK      Monitor2 time = 08:20:52
Actions: Q ueryPath Z QueryReverse V iew devices X ceptions D elpath E stpath
Tot Pairs: 1032
-PRI-SSID-SEC- F CP ----- LINKS (LINK-STATUS) -----
_ 4000 ==== 6000 Y NF 00200020-13 00000000-13
_ 4100 ==== 6100 Y NF 00200020-13 00000000-13
_ 4200 ==== 6200 Y NF 00200020-13 00000000-13
_ 4300 ==== 6300 Y NF 00200020-13 00000000-13
_ 4400 ==== 6400 Y NF 00200020-13 00000000-13
_ 4500 ==== 6500 Y NF 00200020-13 00000000-13
_ 4666 ==== 6600 Y NF 00200020-13 00000000-13
_ 4700 ==== 6700 Y NF 00200020-13 00000000-13
_ 4800 ==== 6800 Y NF 00200020-13 00000000-13
_ 4900 ==== 6900 Y NF 00200020-13 00000000-13
_ 4A00 ==== 6A00 Y NF 00200020-13 00000000-13
_ 4B00 ==== 6B00 Y NF 00200020-13 00000000-13
_ 4C00 ==== 6C00 Y NF 00200020-13 00000000-13
_ 4D00 ==== 6D00 Y NF 00200020-13 00000000-13
_ 4E00 ==== 6E00 Y NF 00200020-13 00000000-13
_ 4F00 ==== 6F00 Y NF 00200020-13 00000000-13
1 Epair 2 Dpair 3 Suspend 4 Resynch 5 Monitor2 6 Q Paths 7 Epath 8 Dpath
10 P/DAS 11 Find 21 FCEp 22 FCEs 23 FCWp 24 FCWs
Selection ==>
F1=Help F3=Return F6=Roll F7=Up F8=Down F11=Right
c 14/018

```

```

VPCPQST1  Dasd Mirroring Status= OK      Monitor2 time= 08:20:52
Actions: D elpair E stpair S uspend T Dasd-Mgmt R esynch Q uery
P /DAS Y RecSec
Pairs: 64 SSIDs: Pri=4800 Sec=6800 F=Y C=N Devices: All
_ 4808 6808 DUP _ 4818 6818 DUP _ 4828 6828 DUP _ 4838 6838 DUP
_ 4809 6809 DUP _ 4819 6819 DUP _ 4829 6829 DUP _ 4839 6839 DUP
_ 480A 680A DUP _ 481A 681A DUP _ 482A 682A DUP _ 483A 683A DUP
_ 480B 680B DUP _ 481B 681B DUP _ 482B 682B DUP _ 483B 683B DUP
_ 480C 680C DUP _ 481C 681C DUP _ 482C 682C DUP _ 483C 683C DUP
_ 480D 680D DUP _ 481D 681D DUP _ 482D 682D DUP _ 483D 683D DUP
_ 480E 680E DUP _ 481E 681E DUP _ 482E 682E DUP _ 483E 683E DUP
_ 480F 680F DUP _ 481F 681F DUP _ 482F 682F DUP _ 483F 683F DUP
_ 4810 6810 DUP _ 4820 6820 DUP _ 4830 6830 DUP _ 4840 6840 DUP
_ 4811 6811 DUP _ 4821 6821 DUP _ 4831 6831 DUP _ 4841 6841 DUP
_ 4812 6812 DUP _ 4822 6822 DUP _ 4832 6832 DUP _ 4842 6842 DUP
_ 4813 6813 DUP _ 4823 6823 DUP _ 4833 6833 DUP _ 4843 6843 DUP
_ 4814 6814 DUP _ 4824 6824 DUP _ 4834 6834 DUP _ 4844 6844 DUP
_ 4815 6815 DUP _ 4825 6825 DUP _ 4835 6835 DUP _ 4845 6845 DUP
_ 4816 6816 DUP _ 4826 6826 DUP _ 4836 6836 DUP _ 4846 6846 DUP
_ 4817 6817 DUP _ 4827 6827 DUP _ 4837 6837 DUP _ 4847 6847 DUP
1 Estpair 2 Delpair 3 Suspend 4 Resynch 5 Query 6 RecSec 7 All 8 Exceptions
10 P/DAS 11 VOLSERs 21 FCQueryP 22 FCQueryS
Selection ==>
F1=Help F3=Return F6=Roll F7=Up F8=Down F11=Right
c 23/018

```

```

VPCMSG2                                PPRC-Pair
PRImary device WWNN                    SECondary device WWNN
4808 5005076300C0ABCB                6808 5005076300C0AC5B

VOLSER: G1MQ01      CGRPLB: Y      CRIT: N

      LEVEL   STATE   PATHSTATUS      LEVEL   STATE   PATHSTATUS
      PRIMARY  DUPLEX  ACTIVE        SECONDARY DUPLEX  ACTIVE

      SSID    LSS    CCA    SERIAL      SSID    LSS    CCA    SERIAL
PRI   4800    08     08    0028211     4800    08     08    0028211
SEC   6800    08     08    0028355     6800    08     08    0028355

Link/status: 00000000 13
              00200020 13

                        F3=Return      F5=Refresh

c                                          01/001

```

```

VPCPPNLI      GDPS - Disaster/Recovery System      GDPS V3.R2.M0

System         = CIMA      SU60C      Primary Dasd = FRZ  SITE1  SITE1
Current Master = CIMA      SU60C      Primary Tape =
Parallel mode  = YES       Dasd Config = 2005-04-28 13:49:21
HyperSwap F0/FB = DISABLE YES  FREEZE Date = 2005-05-11
Debug         = OFF       Time = 17:31:34.925557

      1      Dasd Remote Copy
      2      Tape Remote Copy
      3      Standard Actions

      5      Net Management
      6      Planned Actions
      7      Sysplex Resource Management
      8      Debug ON/OFF
      9      View Definitions

      C      Config Management

Selection ==> 1_
F1=Help      F3=Return      F6=Roll

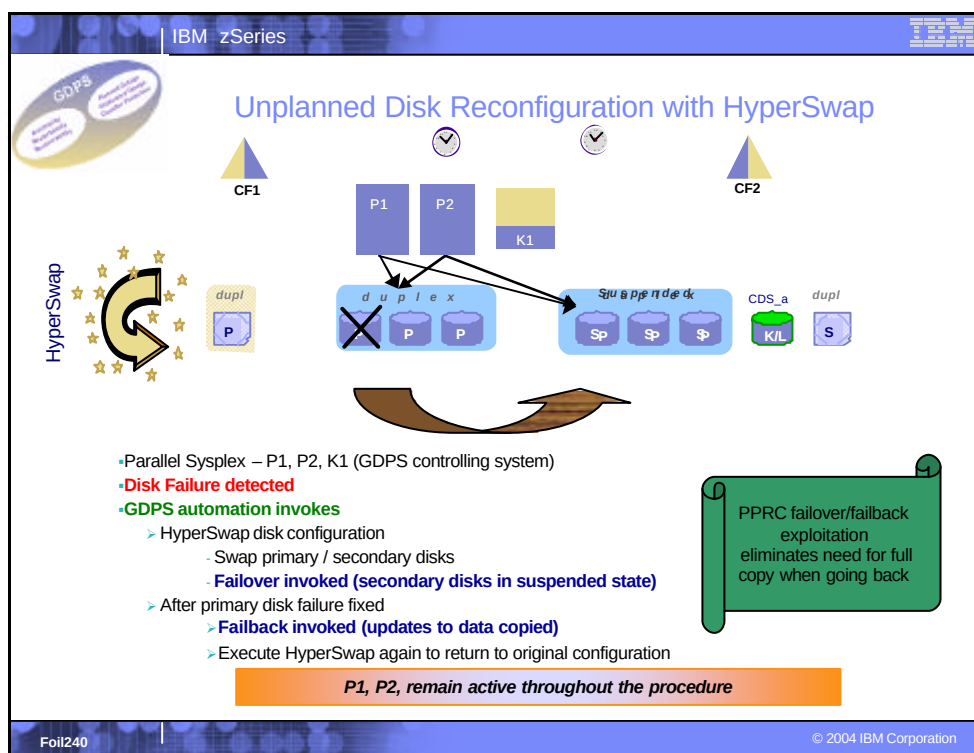
```

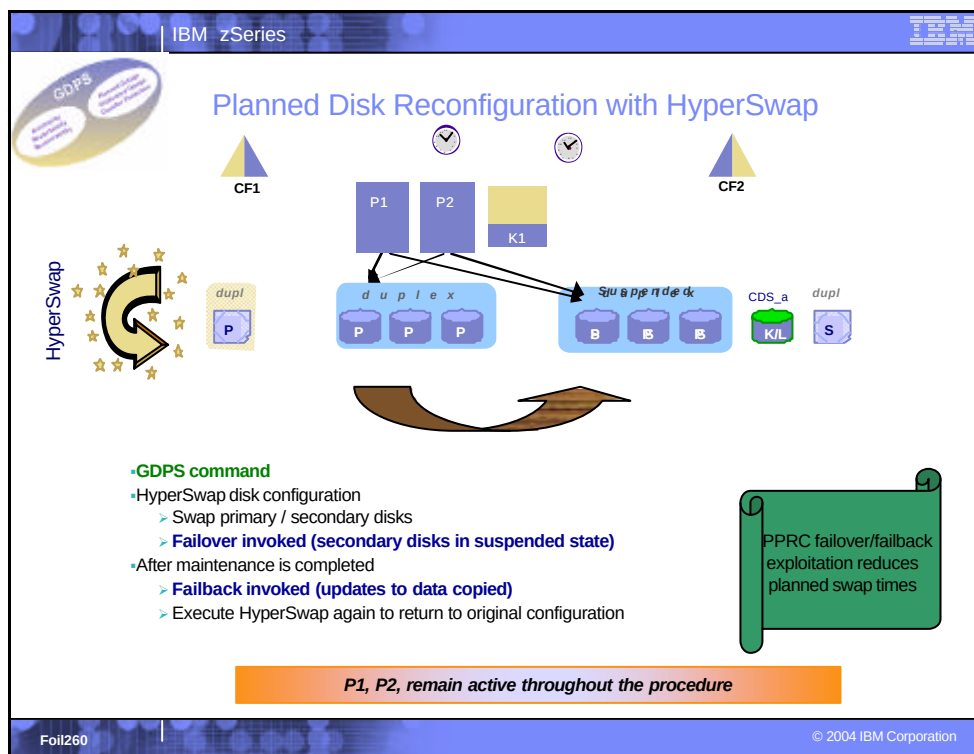
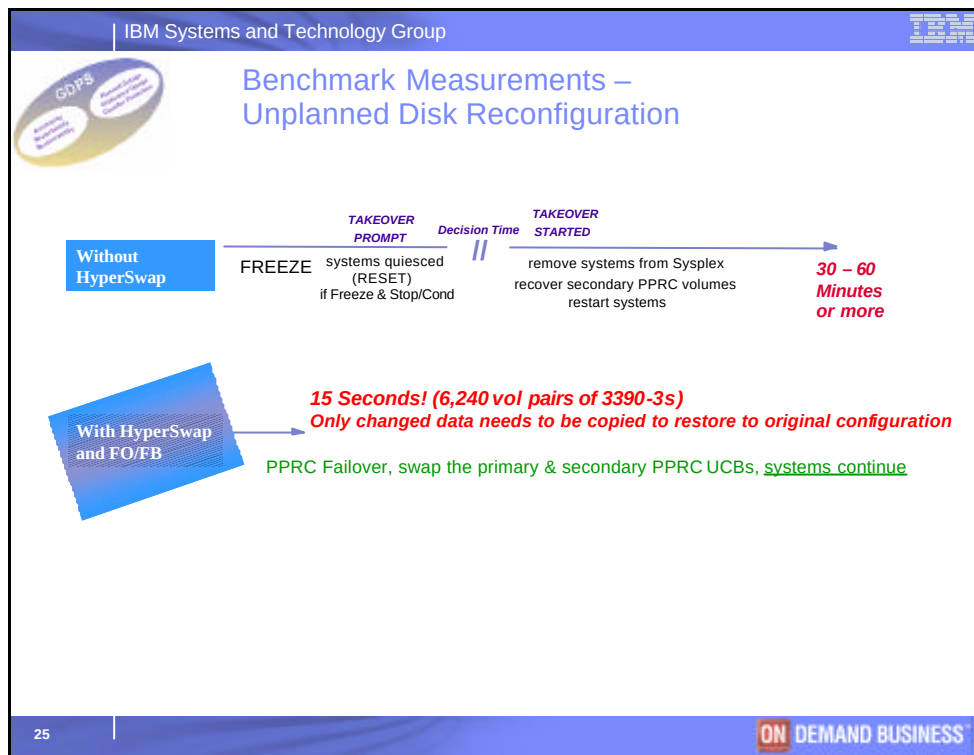
```

VPCPQSTC  Dasd Mirroring Status =  FRZ  Monitor2 time = 01:00:15
Actions: Q ueryPath Z QueryReverse V iew devices X ceptions D elpath E stpath
Tot Pairs: 124
  -PRI-SSID-SEC-  F CP ----- LINKS (LINK-STATUS) -----
v B300 ==== EC00  Y NF 00030332- 01030332- 00030203- 01030203-  More
_ B340 ==== EC40  Y NF 00030332- 01030332- 00030203- 01030203-  More
_ B380 ==== EC80  Y NF 00030332- 01030332- 00030203- 01030203-  More
_ B3C0 ==== ECC0  Y NF 00030332- 01030332- 00030203- 01030203-  More

1 Epair 2 Dpair 3 Suspend 4 Resynch 5 Monitor2 6 Q Paths 7 Epath 8 Dpath
10 P/DAS 11 Find 21 FCEp 22 FCEs 23 FCWp 24 FCWs
Selection ==>
  F1=Help  F3=Return          F6=Roll  F7=Up    F8=Down  F11=Right

```





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Benchmark Measurements – Planned Disk Reconfiguration

Without HyperSwap

PLANNED ACTION INITIATED

shutdown systems, remove systems from Sysplex, reverse PPRC (suspend PPRC), restart systems

1-2 hrs (approx)

With HyperSwap and FO/FB

15 Seconds! (6,545 vol pairs of 3390-3s)!

PPRC Failover, swap the primary & secondary PPRC UCBs, systems continue

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Single Site Workload - Cross-site Sysplex Near Continuous Availability Configuration

SITE 1

CF1

P1 P2 P3

P P P P

SITE 2

CF2

K1

S S S S K/L

- Sysplex with production systems in site1 and Controlling system in site 2
- Sites separated by 100 fiber km (max)
- Expendable workload and/or CBU capable processors in site 2
- Primary disks (tape) in site 1 ; Secondary disks (tape) in site 2

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Single Site Workload - Cross-site Sysplex Near Continuous Availability Configuration

- ❑ Designed to support continuous access to data from Site 1
- ❑ Unplanned and Planned Disk reconfiguration with HyperSwap
- ❑ Site1 Failure
 - ❑ HyperSwap disks or Freeze secondary disks (GDPS automation task)
 - ❑ Recover secondary disks for a Freeze trigger (from GDPS panels)
 - ❑ Invoke CBU; re -IPL systems; restart applications (Customer task)

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Multiple Site Workload - Cross-site Sysplex Continuous Availability Configuration

- ❑ Sysplex with production systems in both sites 1 and 2 and Controlling system in site 2
- ❑ Expendable workload and/or CBU capable processors in both sites (optional) or site 2
- ❑ Primary disks (tape) in site 1 ; Secondary disks (tape) in site 2

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Multiple Site Workload - Cross-site Sysplex Continuous Availability Configuration

- Designed to provide continuous access to data from either site
- Unplanned and Planned Disk and Site Maintenance with HyperSwap
- Site1 Failure
 - HyperSwap disks or Freeze secondary disks (GDPS automation task)
 - Recover secondary disks for a Freeze trigger (from GDPS panels)
 - Invoke CBU; re-IPL systems; restart applications (Customer task)

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Sysplex in a single site; PPRC across sites (aka BRS config)

- Sysplex with production systems and Controlling system in site 1
- Site 2 can be customer site or 3rd party D/R facility
- Primary disks (tape) in site 1 ; Secondary disks (tape) in site 2
 - Site 1 systems need connectivity to secondary disks (FICON limit 100 km)
- Site1 Failure
 - HyperSwap disks or Freeze secondary disks (GDPS automation task)
 - IPL K-sys in site 2 (Customer task)
 - Recover secondary disks for a Freeze trigger (from GDPS panels)
 - Invoke CBU; re-IPL systems; restart applications (Customer task)

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Common Functions "Single Site" or 2 sites

FlashCopy
Management of Open Systems LUNs

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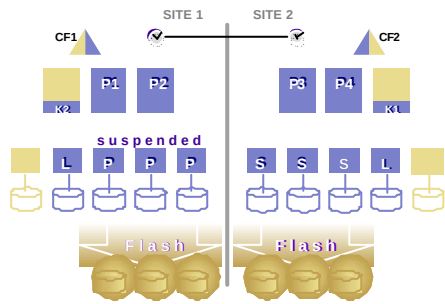


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FlashCopy Support

"Single Site" or 2 sites





- ◆ GDPS-initiated FlashCopy
 - ◆ Before resynchronization
 - ◆ Maintain D/R readiness while resynchronizing
- ◆ User-initiated FlashCopy
 - ◆ Requested from GDPS panel
 - ◆ Facilitates Disaster Recovery testing at any time
 - ◆ Enables parallel processing against tertiary copy: (point in time) backup, data mining, . .

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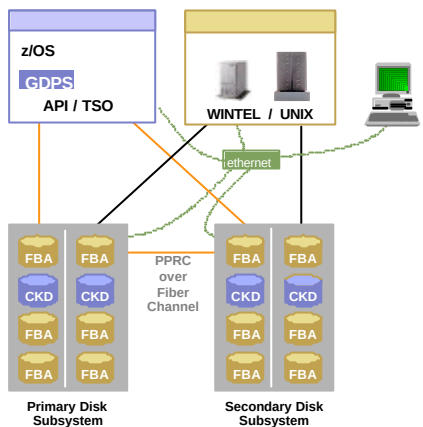
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GDPS/PPRC management of Open Systems LUNs

"Single Site" or 2 sites





- Extends GDPS/PPRC technology to manage distributed applications across multiple platforms
 - z/OS and open systems data (Unix, NT, Linux)
- GDPS/PPRC running in a z/OS system manages the PPRC status of devices that belong to the other platforms
- Provides data consistency across both z/OS and/or open systems data when failures occur
- Requires
 - Some CKD capacity in disk subsystem
 - PPRC level 4
- Support details
 - Supports x-platform or platform level Freeze
 - FlashCopy not supported for Open
 - No GDPS Code running on Open Systems host - suspend reported through SNMP alert

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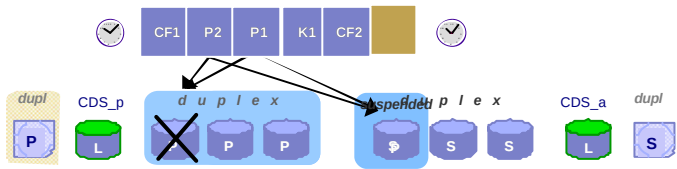
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HyperSwap Extensions (4Q05)



- Single Site HyperSwap with disk subsystem Granularity (4Q05)
 - Availability
 - HyperSwap protection remaining for disk subsystem pairs not swapped
 - System Management
 - Only need to resynchronize failed subsystem



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GDPS
Planned Outage
Unplanned Outage
Transfer Protection



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Continuous Availability/Disaster Recovery (3 sites)

z/OS data only

z/OS and Open Systems data



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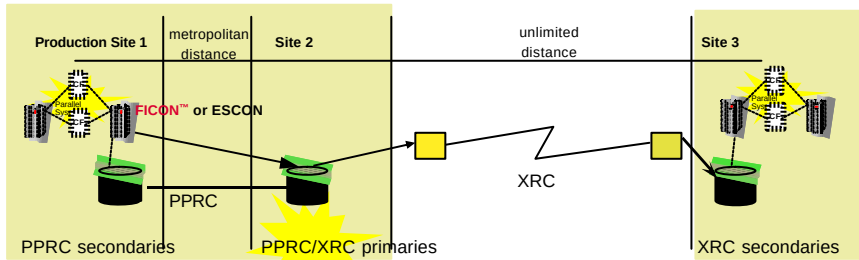
GDPS
Planned Outage
Unplanned Outage
Transfer Protection

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Continuous Availability and Disaster Recovery at unlimited distance

zSeries Solution



Continuous Availability
GDPS/PPRC HM or
GDPS/PPRC

Disaster/Recovery
GDPS/XRC

- Designed to provide continuous availability and no data loss between sites 1 and 2
- Sites 1 and 2 can be same building or campus distance to minimize performance impact

- Production site 1 failure
 - ƒ Site 3 can recover with no data loss in most instances
- Site 2 failure
 - ƒ Production can continue with site 1 data (P')
- Site 1 and 2 failure
 - ƒ Site 3 can recover with minimal loss of data

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GDPS

Continuous Availability

Disaster Recovery

Continuous Availability and Disaster Recovery at unlimited distance (Metro / Global Mirror) (10/05)

zSeries and Open Solution

Production Site 1

metropolitan distance

Site 2

unlimited distance

Site 3

PPRC primaries

PPRC secondaries

GM primaries

GM secondaries

Continuous Availability

GDPS/PPRC HM or

GDPS/PPRC

Disaster/Recovery

GDPS/XRC

Designed to provide continuous availability and no data loss between sites 1 and 2

Sites 1 and 2 can be same building or campus distance to minimize performance impact

Production site 1 failure

Site 3 can recover with no data loss in most instances

Site 2 failure

Production can continue with site 1 data (P')

Site 1 and 2 failure

Site 3 can recover with minimal loss of data

GDPS Managed coordinated solution for zSeries and open systems

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Continuous Availability

Disaster Recovery

GDPS vs other D/R options

GDPS/PPRC HyperSwap Manager

GDPS/XRC

GDPS/PPRC

planned

unplanned

D/R

GDPS Offering /Function	PTAM	Electr Vault	Data Repl	Data Mirr	PPRC HyperSwap Mgr	GDPS/XRC	GDPS/PPRC
Event monitoring					+	+	+
Remote copy config. mgt.					+	+	+
Application/system Start-up/shutdown						+	+
Disk subsystem maint.					+		
User defined actions						+	+
Application failure						+	+
zOS image failure						+	+
Processor failure						+	+
CF failure						+	+
Disk subsystem failure				?	+	+	+
Tape subsystem failure				?		+	+
Site failure	+	+	+	+	+	+	+
Sysplex-wide freeze					+	+	+
Recovery Point Objective	24-48h	12h	<5m	0/<1m	0/<1m	<1m	0/<1m
Recovery Time Objective	24-48h	24-48h	12-24h	4-6h	Depends on cust automation	<2h	<1h

Continuous Availability !!

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Implementation Services for GDPS/PPRC HyperSwap Manager

- The end-to-end solution services set includes:
 - Project management
 - Implementation planning based on customer requirements and system configuration
 - Installation Assistance for PPRC, Tivoli Netview for GPDS/PPRC HM and Tivoli System Automation for GDPS/PPRC HM
 - On-site delivery, configuration, implementation and testing assistance for the GDPS/PPRC HM automation code.
 - Customer education on GDPS/PPRC HM setup and operation
 - Remotely delivered support for GDPS/PPRC HM automation code for first 12 months after delivery
 - Annual service after 1st year

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Summary

- Flexible configuration options to meet a wide-range of Business Continuity requirements
 - Continuous Availability of data within a single site
 - Masks disk failures and disk maintenance
 - Entry level Disaster Recovery solution
- In case of disaster
 - Designed to enable data consistency and integrity
 - No or minimal data loss
 - Offers prompt, responsive disaster recovery through end-to-end automation
- Simplifies routine management of disk subsystems and data mirroring
 - Single point of control to manage z/OS and Open Systems data
- Solution is application independent

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Reference Information



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GDPS/PPRC HM Prerequisites



- Currently supported release of z/OS or z/OS.e V1.3 or higher
- IBM Tivoli System Automation for GDPS/PPRC HyperSwap Manager with NetView V1.1 which includes the required NetView functions **or**
- IBM Tivoli NetView for z/OS V5.1 or higher **and one of the following**
 - IBM Tivoli System Automation for GDPS/PPRC HyperSwap Manager, V1.1 for existing NetView installations **or**
 - IBM Tivoli System Automation for z/OS V2.2 or higher
- 9672-G5, 9672-G6, or IBM eServer zSeries server
- Convert all reserves to global enqueues
- Disk subsystems that support PPRC level 3 (Extended CQUERY)
- All disk volumes must be PPRCed and in duplex mode
 - Except Couple Data Set volumes
- The PPRC configuration must have one to one correspondence between each primary PPRC SSID and secondary PPRC SSID
- HyperSwap devices cannot attach to systems outside sysplex
- Production systems must have sufficient channel bandwidth to primary and secondary PPRC disk subsystems

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Business Continuity Services Offerings

- GDPS Technical Consulting Workshop (TCW)
 - Designed to determine that the GDPS Availability & Recovery solution can meet the Client's business requirements as they relate to near -continuous availability and recovery. The workshop will look at the site-to-site connectivity necessary to implement GDPS and identify the high level tasks that will be needed to implement.
- Business Continuity Solution Workshop
 - This program is designed to introduce the elements of IBM's products and services that form a Business Continuity Solution. Your time will be divided between interactive presentations tailored to your specific requirements and "hands on labs" that allow you to actually experience the capabilities of each element. Over the course of three days at our Washington System Center you will explore topics such as: Disk and Tape Copy Services, Network Options, Server Considerations, System Performance Planning, and Implementation Services.
- BCRS Business Continuity Health Check
 - The Health Check is an independent review that creates an action plan addressing continuity issues such as existing capabilities, costs, future technology, and resource requirements.
- I/O Bandwidth Analysis
 - IBM will use trace data collected from the customer environment to determine the requirements to configure and implement Remote Copy. IBM will create a written report of the I/O Sizing and Bandwidth Analysis of your existing environment. The report will include an analysis of your full mainframe DASD environment, as well as an analysis of a subset of that environment representing the minimum DASD required to support Remote Copy.

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Additional Information

- Detailed GDPS Presentation and Information e-mail:
 - gdps@us.ibm.com
- Web Pages References
 - [GDPS Home Page](#)
 - [Installation Services for GDPS](#)
 - [Business Continuity and Recovery Services](#)
 - [ITS Global Brand Services – GDPS \(Internal\)](#)
 - [ITS GDPS Home \(Internal\)](#)
 - [Customer Reference data base](#)
- [TotalStorage Business Continuance Sales Kit](#)
- White Papers:
 - [Business Continuity Considerations and the IBM eServer zSeries](#)
 - [GDPS - The Ultimate e-business Availability Solution](#)
- Publications:
 - [TotalStorage Disaster Recovery Solutions Redbook](#) – SG24-6547-01
 - [z/OS Advanced Copy Services](#) – SC35-0428
 - [ESS Copy Services on zSeries Redpiece](#) - SG24-5680
 - [ESS Copy Services on Open Redpiece](#)– SG24-5757

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Appendix

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PPRC and XRC Overview

PPRC

- Synchronous remote data mirroring
 - Application receives "I/O complete" when both primary and secondary disks are updated
- Typically supports metropolitan distance
- Performance impact must be considered
 - Latency of 10 us/km

XRC

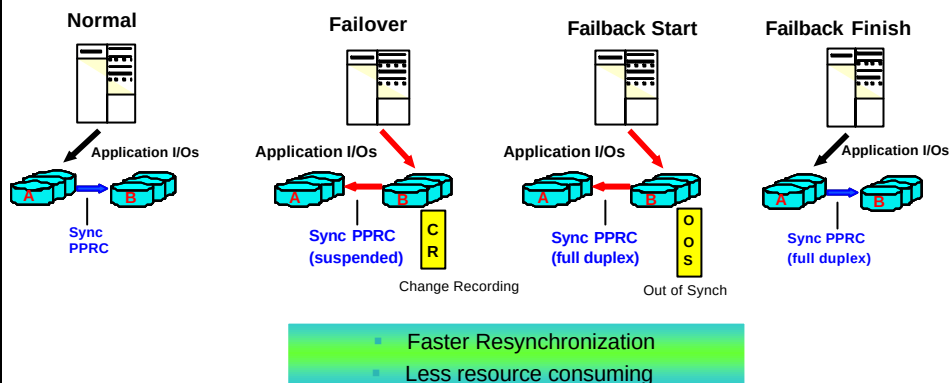
- Asynchronous remote data mirroring
 - Application receives "I/O complete" as soon as primary disk is updated
- Unlimited distance support
- Performance impact negligible
- System Data Mover (SDM) provides
 - Data consistency of secondary data
 - Central point of control

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PPRC Failover / Failback (FO/FB)

- The new primary volumes (at the remote site) records changes while in failover mode.
- The original mode of the volumes at the local site is preserved as it was when the failover was initiated.
- Only need to resynchronize from time of failover, not entire data set



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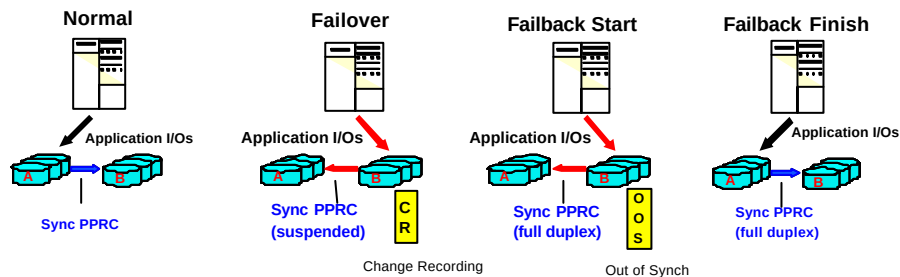
Failover / Failback

Failover

- f Issue "failover" command to site B volumes
 - reverses direction of PPRC pairs
 - establish pairs (will succeed even if B>A paths down)
- f Start production on secondary site (B) volumes
- f Bit maps at secondary site (B) keep track of all changed tracks since failover

Failback

- f Issue "failback" command to site B volumes
 - establishes B>A paths
 - resyncs B>A (full duplex)
- f Quiesce production IO to B
- f Remove B>A paths & establish A>B paths
- f Issue "failover" command to site A volumes
 - terminates B>A relationships
 - establishes A>B relationships
- f Issue "failback" command to site A volumes
- f Restart production IO on primary site volumes



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