Follow @IBMGDPS

#SHAREorg

SHARE
Technology · Connections · Results

# What's New in GDPS 3.10?

Dave Clitherow
IBM
dave.clitherow@uk.ibm.com

Wednesday, August 14th
Session 13636

SHARE in Boston

# Trademarks

**The following are trademarks of the International Business Machines Corporation in the United States and/or other countries.**

| | | |
|---|---|---|
| IBM* | ESCON* | Redbooks* |
| IBM (logo)* | FlashCopy* | Sysplex Timer* |
| Ibm.com* | GDPS* | System p* |
| AIX* | HyperSwap | System z* |
| DB2* | IBM* | Tivoli* |
| DS6000 | IBM logo* | z/OS* |
| DS8000 | Parallel Sysplex* | z/VM* |
| Dynamic Infrastructure* | POWER5 | |

* Registered trademarks of IBM Corporation

**The following are trademarks or registered trademarks of other companies.**

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.
Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license there from.
Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.
Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.
InfiniBand is a trademark and service mark of the InfiniBand Trade Association.
Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.
UNIX is a registered trademark of The Open Group in the United States and other countries.
Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.
ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office.
IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency, which is now part of the Office of Government Commerce.

**Notes**:

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.

All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.

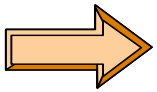
This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

# Agenda



- Introduction & Level set

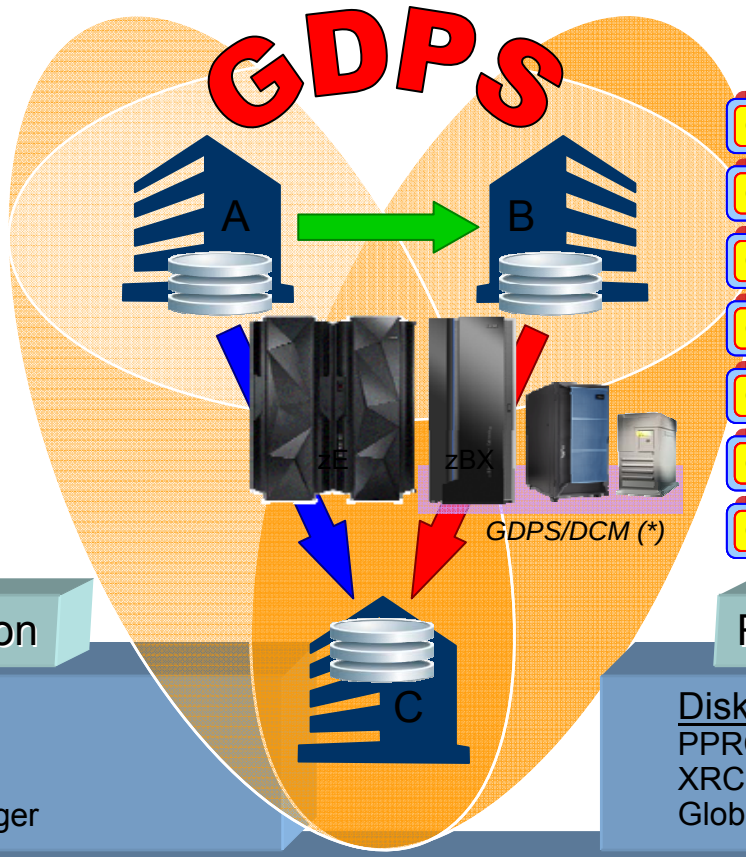
- GDPS 3.10 Enhancements (and some 3.9 + 3.10 SPEs)
  - Heterogeneous Systems & Data Management
  - Availability
  - System z and Storage Synergy
  - Scalability
  - Systems Management
- Other Information and Summary

# GDPS Family of Solutions

## 15 years and still going strong

### Manage & Automate

- **Central Point of Control**
  - System z and Distributed Servers
  - Remote Copy infrastructure
- **Real-time Monitoring & Alert Mgt.**
- **Automated Recovery**
  - Planned & Unplanned Outages
- **Site Management**
  - Single or Multiple Sites
- **Automated Provisioning**
  - System z CBU




### Solutions

| | |
|---|---|
| GDPS/PPRC HM | PPRC HyperSwap Manager |
| GDPS/PPRC | PPRC (Metro Mirror) |
| GDPS/XRC | XRC (z/OS Global Mirror) |
| GDPS/GM | Global Mirror |
| GDPS/MzGM | z/OS Metro Global Mirror |
| GDPS/MGM | Metro Global Mirror |
| GDPS/A-A | Active-Active |

**System Automation**

SA for z/OS
NetView for z/OS
SA Multi-Platform
SA Application Manager

**Replication**

Disk
PPRC
XRC
Global Mirror

Software
InfoSphere for DB2
InfoSphere for IMS

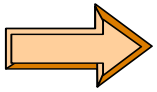
**Technology**

First GDPS installation 1998, almost 700 licences in 44 countries

(*) Distributed Cluster Manager

# Agenda

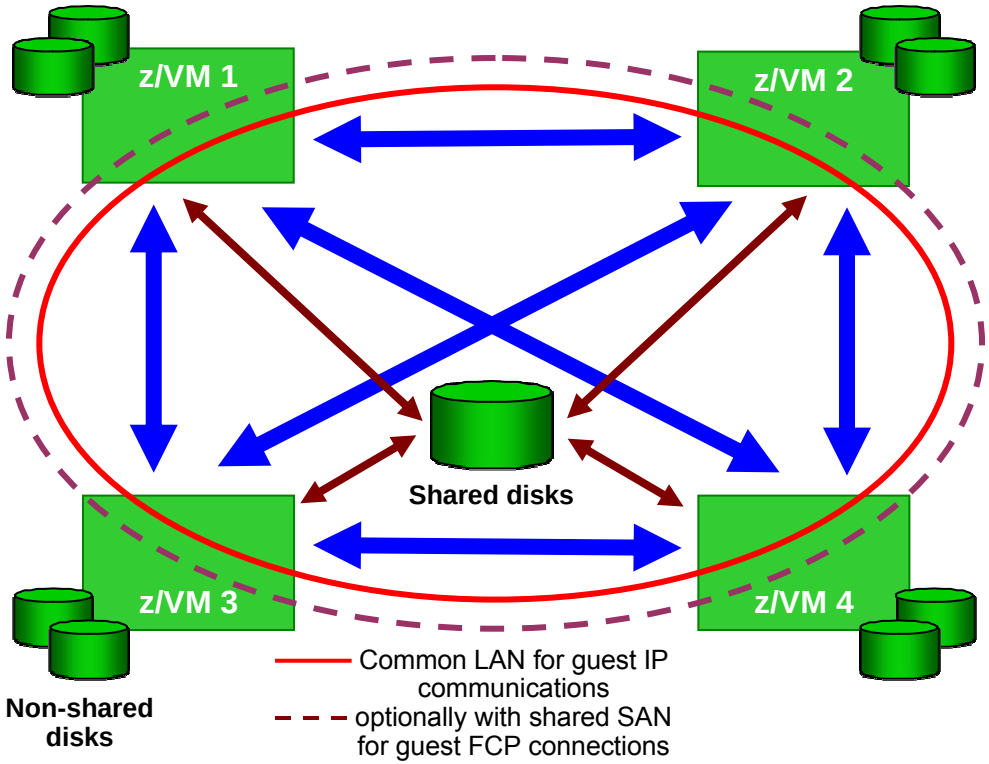
- Introduction & Level set
- GDPS 3.10 Enhancements



- Heterogeneous Systems & Data Management
  - Availability
  - System z and Storage Synergy
  - Scalability
  - Systems Management
- Other Information and Summary

# z/VM Single System Image (SSI) Clustering

- **Available with z/VM 6.2**
- **Up to 4 z/VM systems** as members of a **Single System Image cluster**
- **A set of shared resources** for member systems and hosted virtual machines **(directory, minidisks, spool files, virtual switch MAC addresses)**
- Cluster members can be run on same or different System z servers
- An SSI cluster is a **multi-system environment** in which the z/VM member systems can be **managed as single resource pool**
- Dynamically move Linux guests from one z/VM member to another with **Live Guest Relocation** (LGR)




**Simplifies Systems Management of a multi-z/VM environment**

# GDPS xDR SSI Clustering support & exploitation

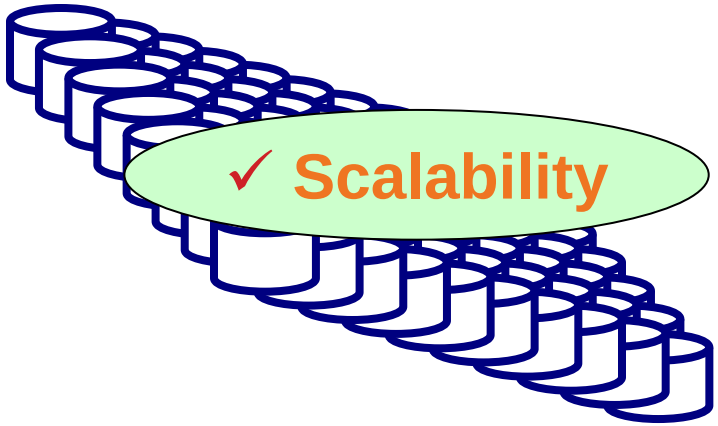
- **GDPS xDR supports clustered z/VM SSI systems – 3.9 SPE**
  - GDPS recognizes that a VM system is member of SSI Cluster
    - When a system is reset via GDPS, GDPS ensures the system is marked down and taken out of the cluster PDR (similar to z/OS partitioning from sysplex CDS)
    - Automatic reply to VM IPL time prompt concerning systems not taken out cleanly
- **GDPS xDR exploits SSI Live Guest Relocation (LGR)**
  - Ability to relocate Linux guests non-disruptively from one z/VM image in the SSI to another
    - Supported via panels and scripts
    - Together with HyperSwap, facilitates non disruptive planned site switch of z/VM workloads

**LGR + HyperSwap facilitates non-disruptive planned site switch**

# GDPS xDR VM MSS1 support (3.10 SPE)

- zVM 6.3 introduces support for the PPRC secondary devices to be defined in MSS1
  - Allows nearly 64000 pairs
- Supported with GDPS 3.10 + SPE
  - LOAD Standard Action support
  - GEOPARM definition support
  - HyperSwap support
- Requires SA MP 3.2.2.4 or higher on the proxies

**PPRC secondaries in alternate logical subchannel set**




**Increased scalability for large xDR configurations**

# GDPS xDR support of PPRCSUM and storage controller health alerts

- zVM 6.3 provides support for summary notification of PPRC suspension events similar to z/OS
  - Disk subsystems will report PPRC suspension events to z/VM systems that are enabled for PPRCSUM with a summary notification on an LSS basis rather than on an individual device basis
- GDPS adds support for triggering freeze if one or more GDPS-managed devices are indicated to be affected by the summary event notification
  - Enabling PPRCSUM greatly reduces the message traffic associated with PPRC suspension and messages for GDPS
- New '*proactive*' unplanned HyperSwap trigger
  - Disk subsystem notifies zVM which notifies GDPS to swap for '*acute*' error conditions
    - Systems continue to run on swapped-to disk and not impacted by error recovery
    - Prereqs zVM 6.3 and IBM DS8700/DS8800 u-code in support of the Storage Controller Health Message function

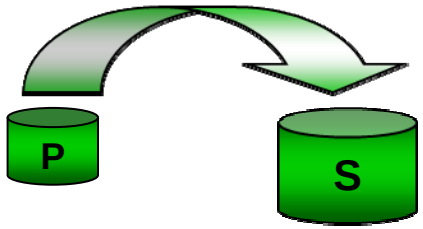
**Extends existing z/OS exploitation to xDR environments**

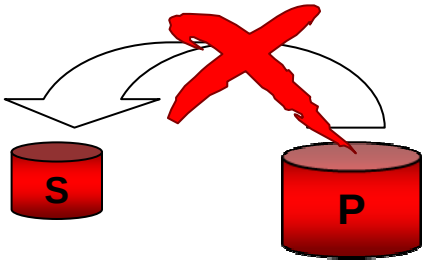
# Agenda

- Introduction & Level set
- GDPS 3.10 Enhancements
  - Heterogeneous Systems & Data Management
  - Availability
  - System z and Storage Synergy
  - Scalability
  - Systems Management
- Other Information and Summary

# GDPS/PPRC & GDPS/HM disk size configuration check

- **PPRC architecture allows replication from smaller to larger size disk**
  - HyperSwap from smaller to larger disk can be useful for a disk migration scenario
  - Attempt to reverse such a PPRC configuration will fail
- **Config processing enhanced to check for size mismatch** for each pair in the GDPS configuration
  - Config process can be optionally failed if there is a mismatch
  - Mismatch also checked at other points such as HyperSwap enablement
- **Disk switches that would fail are disallowed**
  - Non-disruptive swap of PPRC configuration (via HyperSwap with RESYNCH option)
  - Disruptive switch of PPRCed DASD and PPRC mirror direction (SWITCH DELPAIR)




**Avoids disk switch failures** as a resulting from accidental introduction of mismatched disks

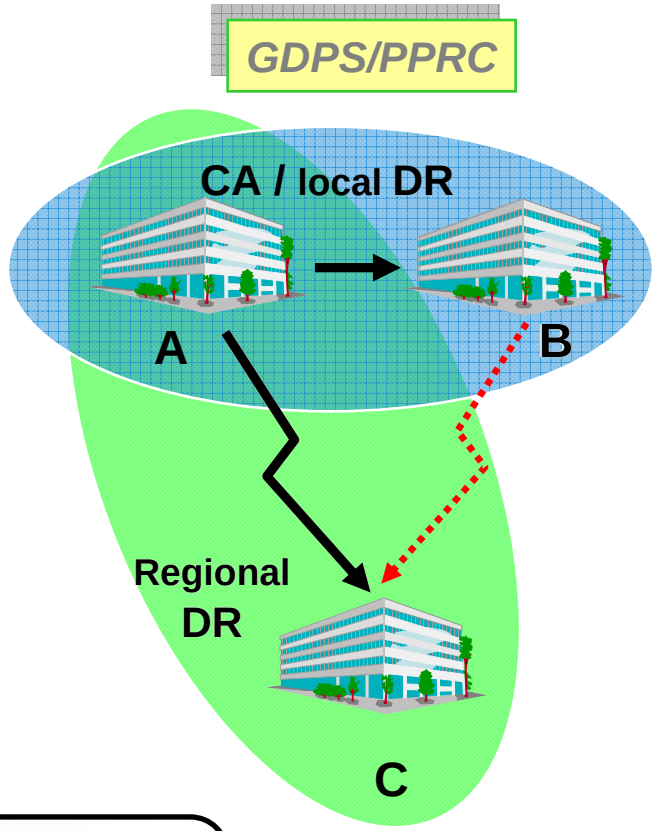
# GDPS/PPRC & GDPS/HM Consistent FlashCopy

- Providing **dependent-write consistency** to Metro Mirror FlashCopy
  - GDPS/PPRC primary or secondary as source
  - GDPS/HM secondary as source
- Exploiting **FlashCopy Freeze capability** of the disk subsystem
  - GDPS provides customizable parameter to limit Freeze time
  - HyperSwap is disabled for just a few seconds during FC freeze; PPRC freeze remains enabled
  - Consistent FlashCopy of secondary not allowed when mirroring NOK
- **No need to suspend / resync** to get a **consistent secondary FC**
- **No need to stop systems / applications for a primary FC**

**Facilitates expanded and more frequent use of FlashCopy**

# GDPS/MzGM Automatic XRC Incremental Resync - GDPS 3.9 SPE

- After planned / unplanned HyperSwap A to B (or B to A)
  - XRC must be resynchronized to C from new, swapped-to PPRC primary (Incremental Resynchronization – IR)
  - *IR previously manually initiated*
- **IR can optionally be automatically initiated by GDPS** immediately after a planned or unplanned swap HyperSwap
  - Requires pre-coded **AutoIR TAKEOVER** script
- **Minimize operator intervention**



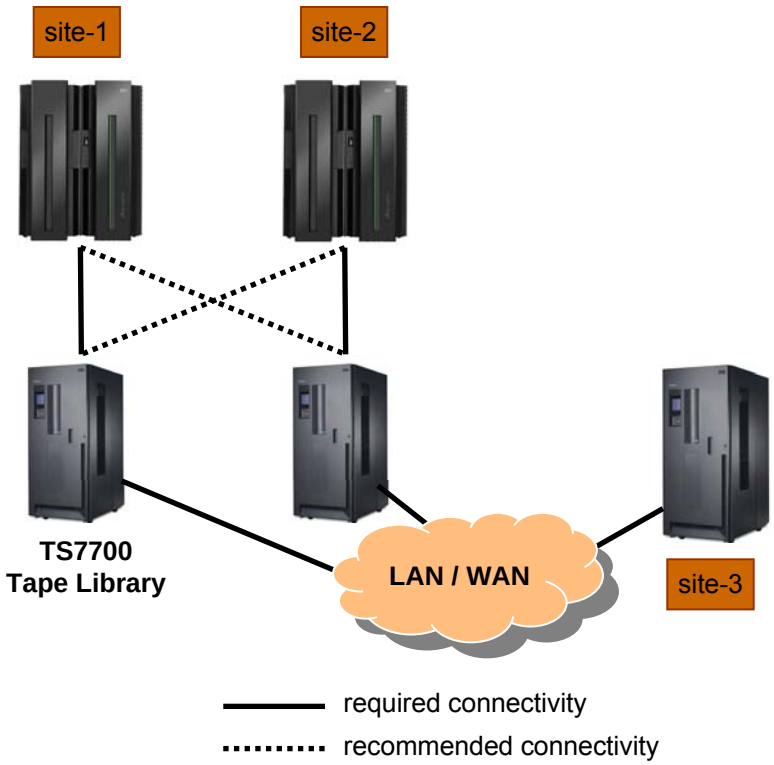

**Minimize elapsed time between the completion of a HyperSwap event and the subsequent resynchronization of XRC**

# Agenda

- Introduction & Level set
- GDPS 3.10 Enhancements
  - Heterogeneous Systems & Data Management
  - Availability
  - **System z and Storage Synergy**
  - Scalability
  - Systems Management
- Other Information and Summary

# GDPS/PPRC TS7700 'in-doubt' tape support

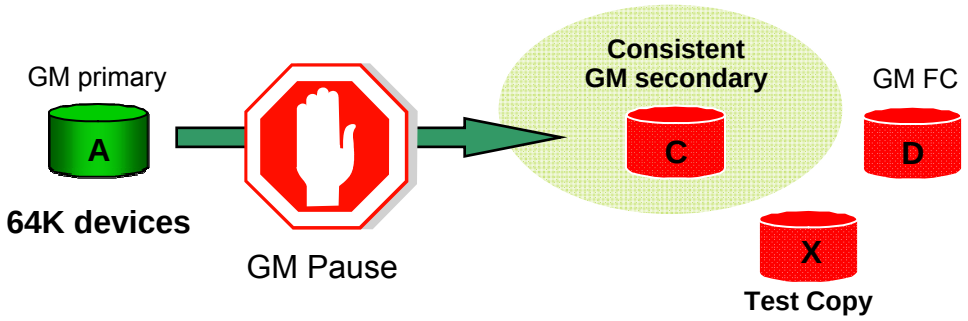
- GDPS support for **TS7700 Bulk Volume Information Retrieval** (BVIR) **for 'in doubt' tape reporting**
- Report on **inconsistencies between libraries in the TS7700 cluster**
  - Inconsistencies can indicate that tape does not exist or is back level in a particular location and recovery may require special action (such as re-running a batch job)
  - **Automatically invoked** for unplanned tape replication interruption in a library
  - Can be **manually invoked** from the panel at any time for a specific library
- Display report on panel and in NetView log




**Facilitates recovery of tape-related applications**

# GDPS/GM Test Copy support (3.10 SPE)

- Exploits DS8000 Global Mirror Consistency Group Pause
- Pause GM session such that GM secondary disks are consistent
- No need to recover GM secondary disks to make a usable ‘test copy’
  - Test copy can be FC1 (practice FlashCopy) or
  - *New!* PPRC-XD (Global Copy) secondary X-disk
  - Faster resynchronization of GM session once test copy is made




**Improved RPO when making test copy – 12 sec for 5000+ vols**

# GDPS/PPRC & GDPS/HM Soft Fence (3.10 SPE)

- Using long ELB for protection may not be sufficient
  - ELB can timeout if not set long enough
  - ELB does not persist across IML
- DS8000 Soft Fence
  - Can be used together with ELB
  - Persists across disk subsystem IML
- GDPS Soft Fence implementation:
  - Automatic Soft Fence of former primary devices (CKD & FB)
    - After a planned/unplanned HyperSwap (except with RESYNCH option)
    - Disk recovery
    - Freeze&Stop scenarios
  - Automatic unfence during DASD START SECONDARY (HYPERSW RESTORE)
  - New GDPS command HYPERSW UNFENCE
    - Belts & Suspenders in case actions are performed outside of GDPS control and Site1 or Site2 disks remain fenced
  - Fenced status shown on GDPS panels
    - SSID pairs panel shows which set of disk is fenced: SITE1, SITE2, NONE
    - Query of individual PPRC pair shows SF state for device that is fenced
- All disk subsystems must be *Defined ERP Capable* + z/OS APAR

# GDPS Non-Disruptive State Save support (3.10 SPE)

- IBM unable to diagnose some problems without State Save
  - Clients often not willing to take full State Save that is required for PD/PSI
- Non-Disruptive State Save (NDSS) is as indicated by the name!!!
  - Fuzzy but can still help diagnose problems
- GDPS implementation
  - GDPS/PPRC & GDPS/HM
    - Take NDSS of former primary during unplanned HyperSwap (best effort and async)
    - Take NDSS of secondary for a freeze event (DS8K take primary)
  - GDPS/GM
    - Take NDSS of all primary and secondary if GM session goes FATAL
  - GDPS/XRC
    - None (DS8K takes primary if a session suspends)
  - ALL
    - New panel option to list disk subsystems and initiate NDSS for any selected subsystem
- All disk subsystems must support NDSS + z/OS APAR

# PPRC Dynamic Bitmap

- DS8K Copy Services operations use ‘bitmap magic’
  - PPRC Failover requires Out of Sync (OOS) bitmaps to be initialized in cache for PPRCed volumes
  - HyperSwap incorporates a PPRC Failover
  - Bitmap initialization can take time for certain volumes and elongate HyperSwap user impact times
    - FATA/SATA drives are slow devices
    - EAVs have large bitmaps
- Dynamic Bitmap capability pre-initializes OOS bitmaps
- Time required for a PPRC failover (HyperSwap) operation no longer dependent on the size nor speed of the drives

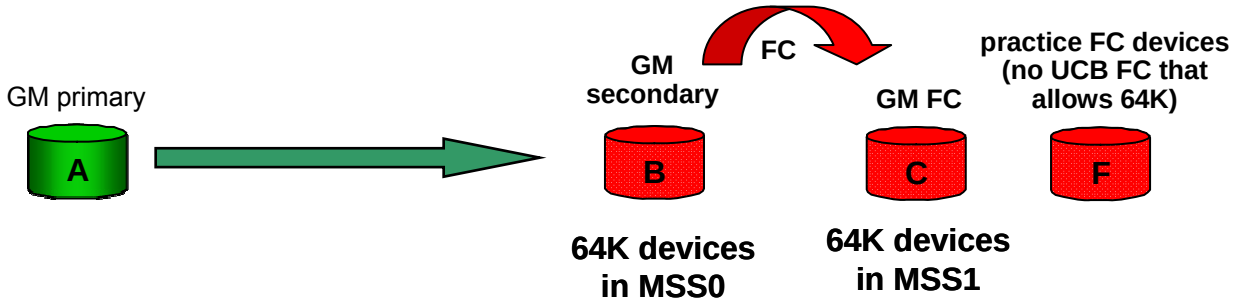
**Potential for reduced HyperSwap user impact times**

# Agenda

- Introduction & Level set
- GDPS 3.10 Enhancements
  - Heterogeneous Systems & Data Management
  - Availability
  - System z and Storage Synergy
  - Scalability
  - Systems Management
- Other Information and Summary

# GDPS/GM Alternate Subchannel Set support

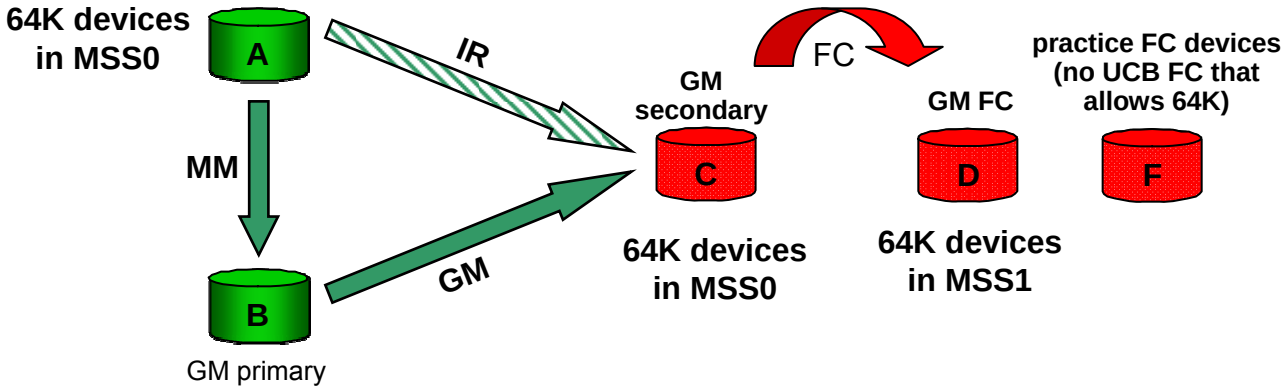
- Previously GM R-sys needed to directly address GM secondary and GM FlashCopy (GMFC) devices
  - Restricted the number of GM primary devices to less than 32K
- GDPS/GM 3.10 supports defining GMFC devices in MSS1
- **GDPS can now manage GM for up to 64K primary devices**




**Increased scalability for large GDPS/GM configurations**

# GDPS/MGM Alternate Subchannel Set support

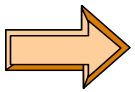
- Previously MGM IR Kg-sys needed to address both A-disk and B-disk
  - Restricted number of GM primary devices to less than 32K
- GDPS/MGM supports GM primary (B-disk) in MSS1 & GM FlashCopy (GMFC) in MSS1
- **Together with GMFC MSS1 support, GDPS can now manage up to 64K primary devices in a GDPS/MGM configuration**




**Increased scalability for large GDPS/MGM configurations**

# Agenda

- Introduction & Level set
- GDPS 3.10 Enhancements
  - Heterogeneous Systems & Data Management
  - Availability (RAS)
  - System z and Storage Synergy
  - Scalability



- Systems Management

- Other Information and Summary

# Other GDPS/GM & GDPS/MGM 3.10 enhancements

- **GDPS/MGM Query services**
  - **Support for GDASD query** added (for queries on Kg-sys / Kr-sys NetView)
  - Returns **information on the active/standby relationships**

- **GDPS/GM Multiple R-sys co-location**
  - NetView instances for multiple R-sys can be co-located on same z/OS (GDPS 3.9)
  - **With 3.10, scripts can be run simultaneously** on such instances

**Allows flexible, parallel operations for co-located R-sys instances**

# System Automation for z/OS V3.4 synergy

- **Policy cleanup** (all GDPS products)
  - System Automation (SA) 3.4 provides new INGCLEAN command
  - INGCLEAN command coordinates with GDPS
    - Clean up in-storage data model
  - Removal of deleted scripts **no longer requires NetView recycle**

- **Dynamic SDF** (GDPS/PPRC only at this time)
  - SA provides a dynamic SDF panel that can be used with GDPS
    - Does not require any customization unless you want to change fixed text or predefined PF keys.
  - **Simplified SDF implementation**

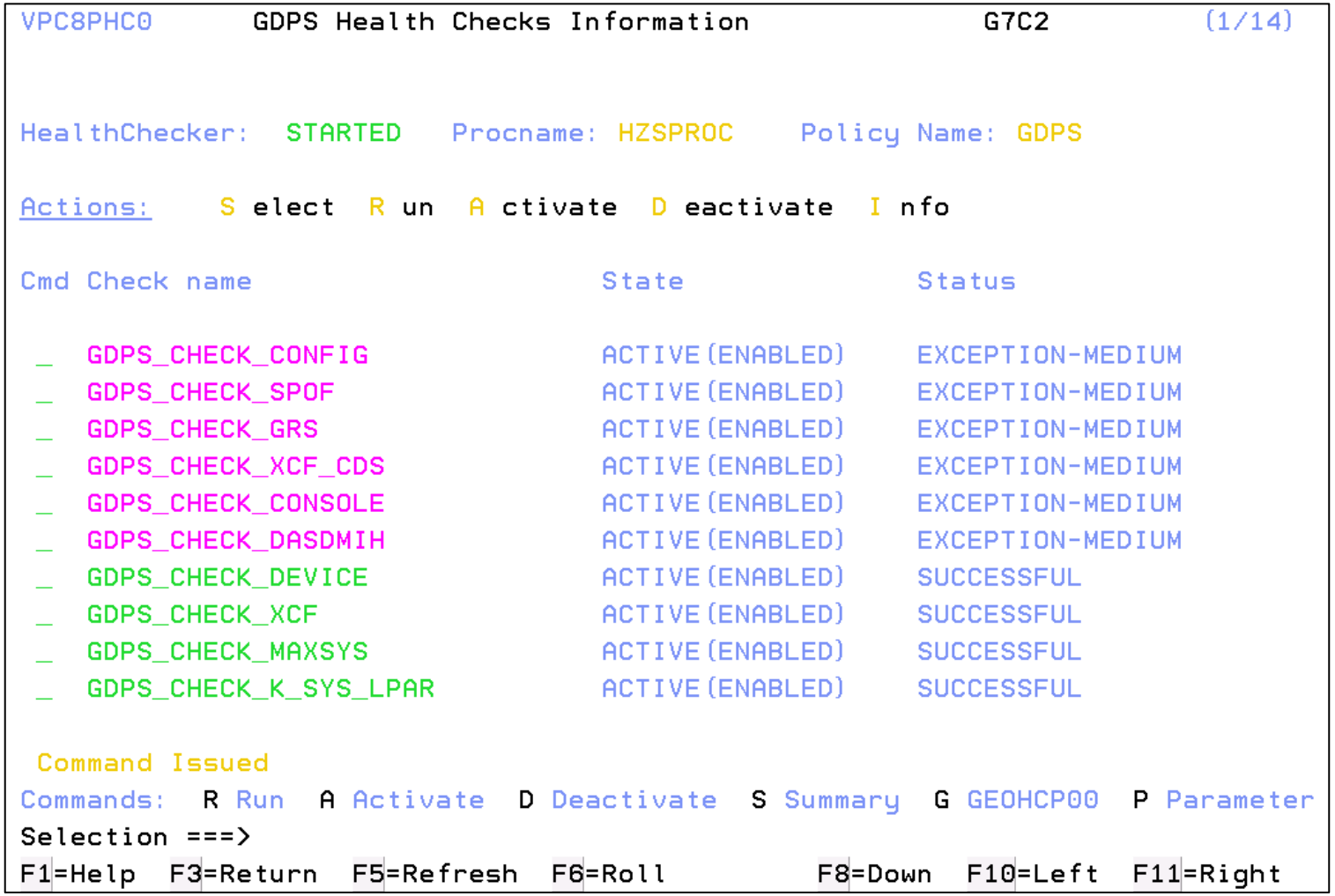
# New & Extended GDPS Health Checks

- **GDPS/PPRC + GDPS/HM**
- **Ksys disk site check** (GDPS 3.9 SPE)
  - Check that Ksys using volumes on local disk subsystems in site where that Ksys is running
- **Mirrored volume & GDPS configuration check**
  - Check that PPRCed devices used by production systems are defined to GDPS
- **CICS staging datasets on mirrored device check**
  - Check that CICS Logstreams are unconditionally duplexed to PPRCed disk
- **GRS Contention Notification System check**
  - Raise exception if Ksys is GRS CNS

- **GDPS/XRC**
- **Links Single Point of Failure (SPOF) check**
  - Check for SPOF from each SDM to production & recovery site disk subsystems for each XRC session active, for example, device has all online paths go through one switch
- **System GRS structure and RNL definition check**
  - Check that RNL definitions required for XRC RECOVER CONTROLLING are present
- **SuppressTimeStamp setting check** (new setting in z/OS 1.13)
  - Check that setting is NO on SDM systems and GDPS Kx-sys, YES on SDMs

- Existing **NetView REXX environments check enhanced** to allow an override parameter
- Existing **Critical Paging check enhanced** to allow parameter to disable check on Ksystems
- **Health Check information can be queried through Query Services** (all GDPS)

# New GDPS Health Check management panels
## (all GDPS products)



```
VPC8PHC0       GDPS Health Checks Information                G7C2          (1/14)


HealthChecker:  STARTED   Procname: HZSPROC    Policy Name: GDPS

Actions:     S elect  R un  A ctivate  D eactivate  I nfo

Cmd Check name                        State              Status

 _  GDPS_CHECK_CONFIG                 ACTIVE(ENABLED)    EXCEPTION-MEDIUM
 _  GDPS_CHECK_SPOF                   ACTIVE(ENABLED)    EXCEPTION-MEDIUM
 _  GDPS_CHECK_GRS                    ACTIVE(ENABLED)    EXCEPTION-MEDIUM
 _  GDPS_CHECK_XCF_CDS                ACTIVE(ENABLED)    EXCEPTION-MEDIUM
 _  GDPS_CHECK_CONSOLE                ACTIVE(ENABLED)    EXCEPTION-MEDIUM
 _  GDPS_CHECK_DASDMIH                ACTIVE(ENABLED)    EXCEPTION-MEDIUM
 _  GDPS_CHECK_DEVICE                 ACTIVE(ENABLED)    SUCCESSFUL
 _  GDPS_CHECK_XCF                    ACTIVE(ENABLED)    SUCCESSFUL
 _  GDPS_CHECK_MAXSYS                 ACTIVE(ENABLED)    SUCCESSFUL
 _  GDPS_CHECK_K_SYS_LPAR             ACTIVE(ENABLED)    SUCCESSFUL

 Command Issued
Commands:  R Run  A Activate  D Deactivate  S Summary  G GEOHCP00  P Parameter
Selection ===>
F1=Help  F3=Return  F5=Refresh  F6=Roll          F8=Down  F10=Left  F11=Right
```

# GDPS/XRC Integrated Performance Monitoring

- GDPS/XRC Performance Monitoring Toolkit was available June 2012
  - Supported repackaging of existing prototype tools
  - Supplements, but does not replace, the XRC Performance Monitor (XPM) product

- Next step is to **begin enhancing GDPS control code to incorporate monitoring**
  - Key objectives are to reduce complexity and XRC administration cost

- **First installment delivered in GDPS 3.10**
  - GDPS becomes aware of SDM monitor data
  - Provides **function to replace XPM Batch Exception Monitor**
  - **New alerts, logging, and improved automated suspension**
    - Suspension proximity warnings (warnings based on exceeding thresholds such as cache full percentage or residual counts)
    - Suspension based on session exposure time

# GDPS/XRC & GDPS/MzGM Region Switch & Return Home

- GDPS 3.9 provided new facilities in support of GDPS/XRC 2-site configuration Region Toggle and Return Home
  - Support originally restricted to XRC + FC volume disk configurations in both regions
- GDPS 3.10 **extends support for additional GDPS/XRC 2-site configurations**
  - D/R configuration with XRC + FC volume in recovery region only
  - D/R configuration with no FlashCopy in application or recovery region
- GDPS 3.10 also **extends support to GDPS/MzGM configurations**
- **Writable target option** added for Incremental FC – removes requirement to wait for Background Copy for final increment to complete during region switch operations

# Agenda

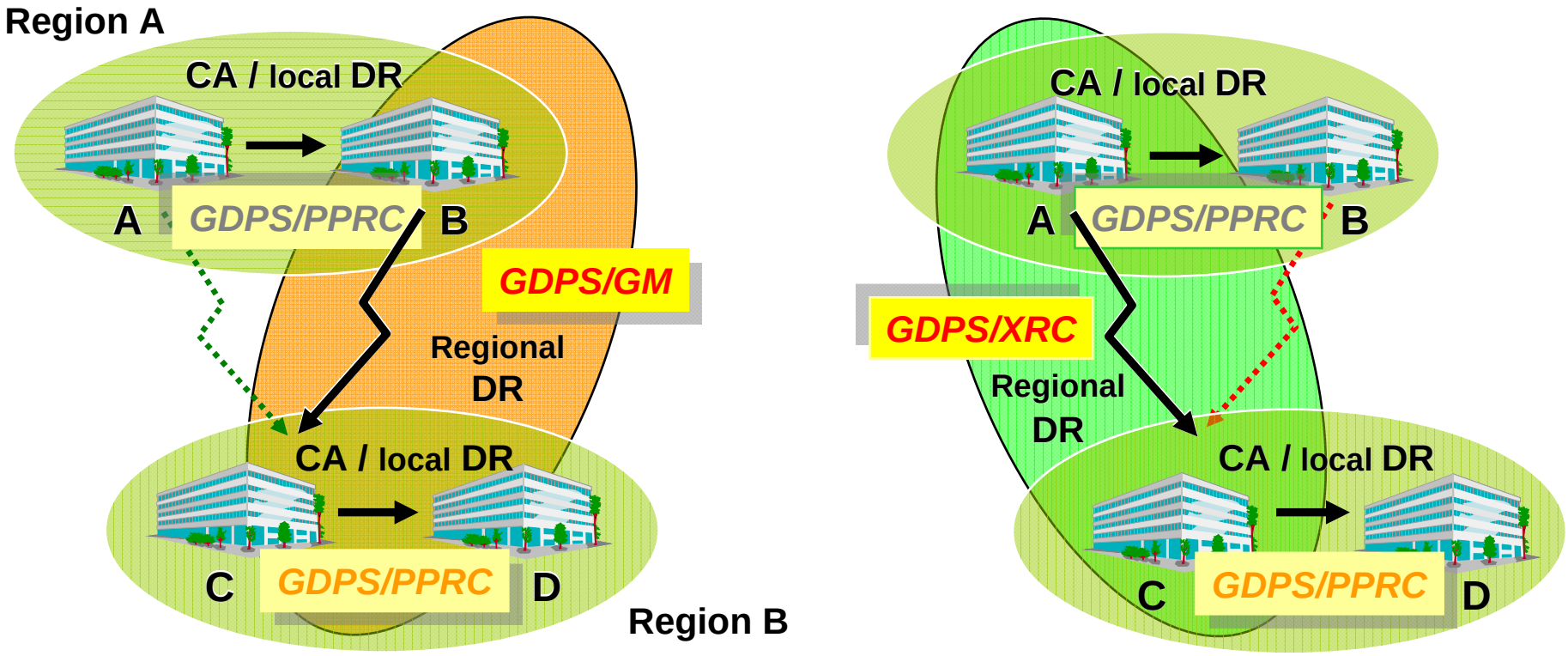
- Introduction & Level set
- GDPS 3.10 Enhancements
  - Heterogeneous Systems & Data Management
  - Availability (RAS)
  - System z and Storage Synergy
  - Scalability
  - Systems Management
- Other Information and Summary

Statement of Direction:

# GDPS Four Site configurations

## GDPS / Four Site *Symmetrical* MGM

## GDPS / Four Site *Symmetrical* MzGM




**Same availability characteristics and operational procedures in both regions**
**Facilitates more frequent region switching for D/R validation**

# MzGM 4-site functions – Limited Availability

- GDPS extended with a number of new capabilities in support of a 4-site configuration and scenarios.
  - Remote script execution
    - synchronously call a script in another GDPS environment and wait for execution completion – provides single point of control
  - Ability in GDPS/PPRC to recover the secondary disks ready for testing with 'production' systems continuing to use the primary disk
    - ie: the SDM systems using the XRC secondary disk
  - Simultaneous script execution in Kp and Kx in the same system/sysplex
  - Enhanced scripting to manage Online/Offline states in GDPS/PPRC
  - Incremental FlashCopy enhancements
    - Allow writeable target volume without having to withdraw the incremental relationship
    - Allow online target volume

# New GDPS Tools

- **Distributed System Hardware Management Tool - *GDPS/PPRC, GDPS/GM and GDPS/XRC***
  - BCP Internal Interface-like capability for distributed hardware & virtual machines
  - USERPROC REXX script templates
    - Samples to monitor / control IBM AIX HMC, VMware ESX server, IBM BladeCenters, and standalone x86 servers with Remote Supervisor Adapter II (RSA) cards

- ***GDPS/XRC* Performance Toolkit**
  - Complementary to XRC Performance Monitor (XPM)

- **GEOASSISTANT Tool - *GDPS/PPRC & GDPS/PPRC HM***
  - Simplified and extended GEOPARM management
    - Create graphical view (display on a variety of devices and easily share)
    - Analysis and statistics
    - Step by step guidance for creating statements

# GDPS 3.10 Summary

- **Systems Management**
  - GDPS policy cleanup (ALL)
  - H/C management panel (ALL)
  - MGM query services
  - XRC integrated performance monitoring
  - XRC region switch extensions
  - MzGM region switch
- **GDPS, System z & Storage Synergy**
  - T7700 In-doubt tape support (PPRC)
  - DS8000 dynamic bit map support
  - Global Mirror Pause
  - Non-Disruptive State Save
  - Soft Fence
- **Heterogeneous Systems & Data Management**
  - xDR z/VM SSI & LGR support
  - PROCOPTS INTERNAL2 extension
- **Availability**
  - New H/Cs (HM, PPRC, XRC)
  - Consistent FC (HM, PPRC)
  - Disk size check (HM, PPRC)
  - CCTERM default change (HM, PPRC)
  - MzGM automatic XRC IR
  - CFRECOVER extension (PPRC)
- **Scalability**
  - GM FC devices in MSS1
  - MGM B-disk devices in MSS1
  - Multiple R-sys co-location extension
  - MSS1 support in zVM & xDR
  - PPRCSUM support for xDR
- **Statement of Direction**
  - Support for GDPS / 4-site symmetrical GDPS/MGM and MzGM configurations

# QR Code for Evaluations

Dank u
Dutch

Merci
French

Спасибо
Russian

Gracias
Spanish

شكراً
Arabic

감사합니다
Korean

děkuji
Czech

धन्यवाद
Hindi

תודה רבה
Hebrew

Teşekkür ederim
Turkish

Obrigado
Brazilian Portuguese

# Thank You

Dankon
Esperanto

谢谢
Chinese

ありがとうございます
Japanese

Trugarez
Breton

Danke
German

Tak
Danish

Grazie
Italian

நன்றி
Tamil

ขอบคุณ
Thai

Tack så mycket
Swedish

go raibh maith agat
Gaelic