
IMS DB Replication for Enhanced System Resiliency

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Agenda

- Background
- GDPS Active/Active Sites solution
- InfoSphere IMS Replication for z/OS

How Much Interruption can your Business Tolerate?

Ensuring Business Continuity:

- Standby
-
- **Disaster Recovery**
 - Restore business after an unplanned outage
 - **High-Availability**
 - Meet Service Availability objectives
e.g., 99.9% availability or
8.8 hours of down-time a year
 - **Continuous Availability**
 - No downtime (planned or unplanned)
- Active/Active

Global Enterprises that operate across time-zones no longer have any 'off-hours' window. Continuous Availability is required.

The cost of 1 hour of downtime during core business hours

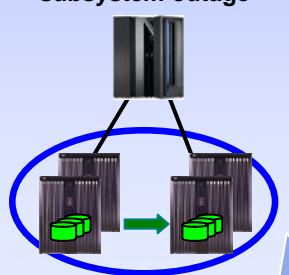
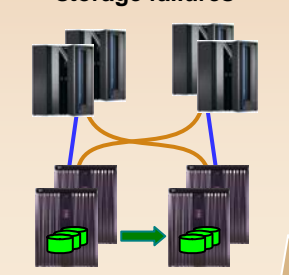
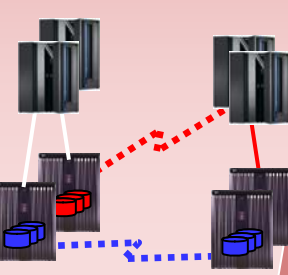
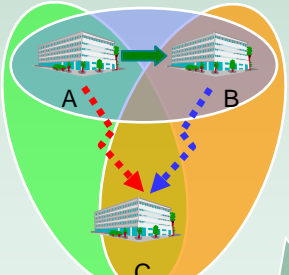
<u>Industry Sector</u>	<u>Loss per Hour</u>
Financial	\$8,213,470
Telecommunications	\$4,611,604
Information Technology	\$3,316,058
Insurance	\$2,582,382
Pharmaceuticals	\$2,058,710
Energy	\$1,468,798
Transportation	\$1,463,128
Banking	\$1,145,129
Chemicals	\$1,071,404
Consumer Products	\$989,795

Source: Robert Frances Group 2006, "Picking up the value of PKI: Leveraging z/OS for Improving Manageability, Reliability, and Total Cost of Ownership of PKI and Digital Certificates."

What are Customers doing Today?

RPO – Recovery Point Objective
 RTO – Recovery Time Objective



<p>Continuous Availability of Data within a Data Center</p>	<p>Continuous Availability w/ Disaster Recovery within a Metropolitan Region</p>	<p>Disaster Recovery at Extended Distance</p>	<p>Regional Continuous Availability w/ Disaster Recovery @ Extended Distance</p>
<p>GDPS/HyperSwap Mgr</p> <p>RPO = 0 / RTO = 0</p>	<p>GDPS/PPRC</p> <p>RPO = 0 / RTO <1hr (>20 km) RPO = 0 / RTO = 0 (<20 km)</p>	<p>GDPS/GM & GDPS/XRC</p> <p>RPO secs / RTO <1 hr</p>	<p>GDPS/MGM & GDPS/MzGM</p>
<p>Single Data Center Applications remain active</p> <p>Continuous access to data in the event of a storage subsystem outage</p> 	<p>Two Data Centers Systems remain active</p> <p>Multi-site workloads can withstand site and/or storage failures</p> 	<p>Two Data Centers Rapid Systems Disaster Recovery with "seconds" of Data Loss</p> <p>Disaster recovery for out of region interruptions</p> 	<p>Three Data Centers High availability for site disasters</p> <p>Disaster recovery for regional disasters</p> 
<p>Components</p> <p>Tivoli – NetView, SAz System z, DS8K, PPRC GDPS control code, Services</p>	<p>Tivoli – NV, SAz, SA-MP, AppMan System z, DS8K, VTS, PPRC GDPS control code, Services</p>	<p>Tivoli – NV, SAz System z, DS8K, Global Mirror, XRC GDPS control code, Services</p>	<p>Tivoli – NV, SAz System z, DS8K, MGM, MzGM GDPS control code, Services</p>

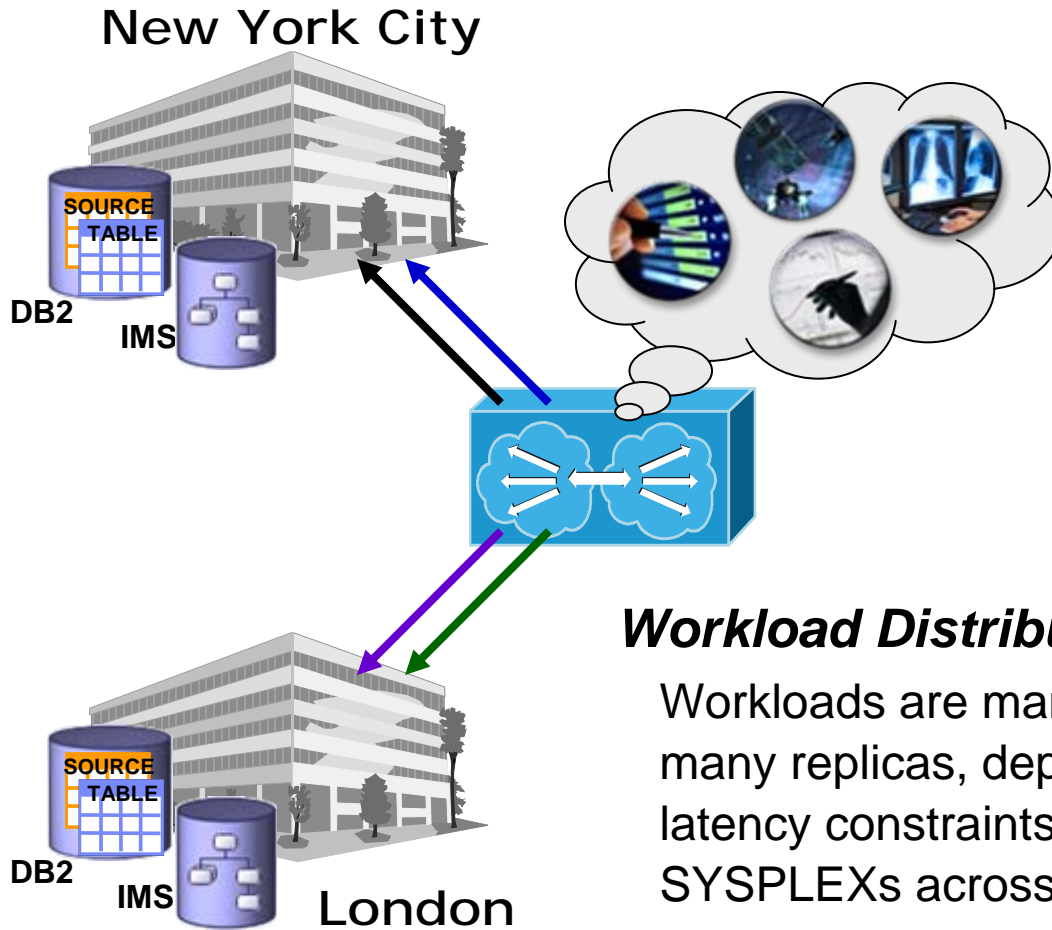
Customer Requirements Behind GDPS/Active-Active

- **Shift from a failover model to a nearly-continuous availability model**
RTO near zero, and RPO near zero
- **Multi-sysplex, multi-platform solution**
 - Access data from any site across unlimited distance between sites
 - Provide workload distribution between sites
 - Route around failed sites
 - Dynamically select sites based on ability to handle workload
- **Provide application level granularity**
"Recover my business rather than my platform technology"
 - Current solutions employ an all-or-nothing approach
e.g. complete disk mirroring, requiring extra network capacity
 - Some workloads may require immediate access from every site.
 - Less critical workloads may only need to update other sites every 24 hours.
- **Ensure successful recovery via automated processes**
Suitable for less-skilled operators, like other GDPS technologies
 - No application changes
 - Replace RYO solutions

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- InfoSphere IMS Replication for z/OS

Active/Active Sites Concept



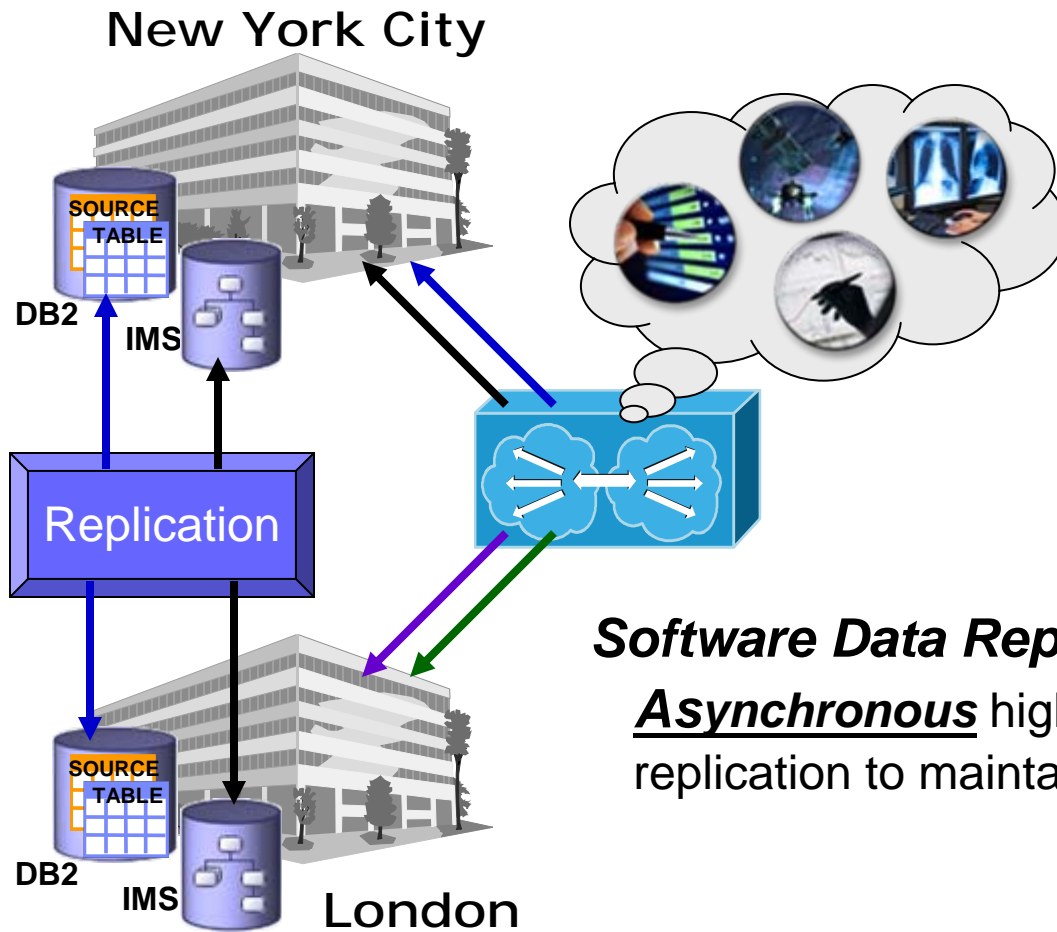
Two sites,

- separated by **unlimited** distances,
- running the same applications
- having the same data to provide:
 - Cross-site Workload Balancing
 - **Continuous** Availability
 - Disaster Recovery

Workload Distributor:

Workloads are managed by a client and routed to one of many replicas, depending upon workload weight and latency constraints, extending workload balancing to SYSPLEXs across multiple sites!

Active/Active Sites Concept



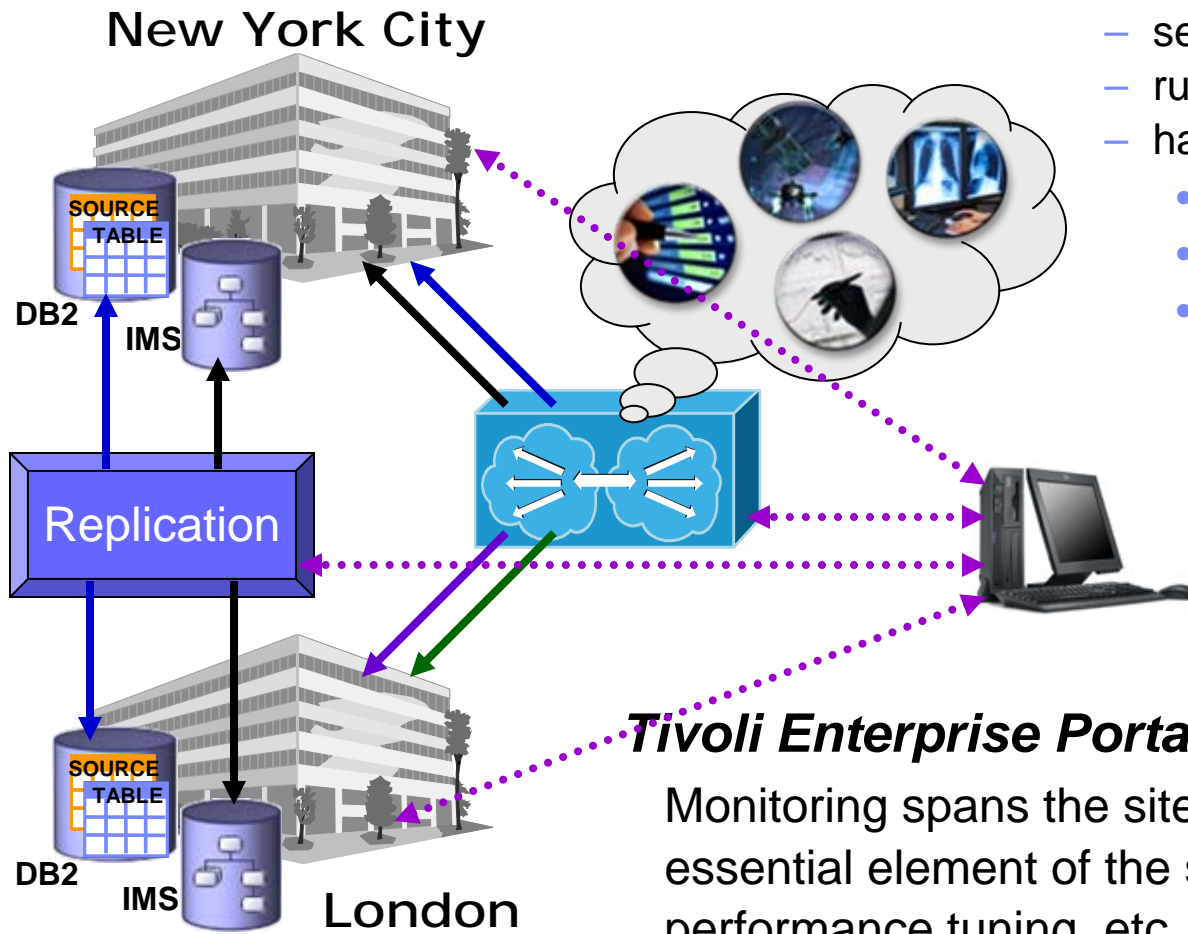
Two sites,

- separated by **unlimited** distances,
- running the same applications
- having the same data to provide:
 - Cross-site Workload Balancing
 - **Continuous** Availability
 - Disaster Recovery

Software Data Replication:

Asynchronous high throughput low latency data replication to maintain replicas at the dispersed sites.

Active/Active Sites Concept



Two or more sites,

- separated by **unlimited** distances,
- running the same applications
- having the same data to provide:
 - Cross-site Workload Balancing
 - **Continuous** Availability
 - Disaster Recovery

Tivoli Enterprise Portal:

Monitoring spans the sites and now becomes an essential element of the solution for site health checks, performance tuning, etc.

GDPS/Active-Active Sites Configurations

- Configurations
 1. **Active-Standby – Delivered**
 2. *Active-Query – Highest priority for next enhancement*
 3. ...

- A configuration is specified on a workload basis

- A workload is the aggregation of these components
 - **Software:** user written applications (e.g., COBOL program) and the middleware run time environment (e.g., IMS, DB2, CICS...)
 - **Data:** related set of objects that must preserve transactional consistency and optionally referential integrity constraints (e.g., IMS Database)
 - **Network connectivity:** one or more TCP/IP addresses & ports (e.g., 10.10.10.1:80)

Active/Active Sites functions

- Start/stop a controller – start and stop an A/A Sites controller
- Start/stop a site – start and stop individual sysplexes (each sysplex maps to a site)
- Stop/start a workload – start and stop individual workloads
- Monitoring – monitor the A/A Sites configuration and, if any conditions that will potentially impact a workload and/or site switch, generate an alert
- Planned workload switch – switch the workload site to the other site initiated by operator action
- Unplanned workload switch – switch failed workload to the other site, either automatically or based upon operator prompt, after the workload failure detection interval
- Planned site switch – switch all workloads executing to the other site initiated by operator action
- Unplanned site switch – switch the failed site's workloads to the other site, either automatically or based upon operator prompt, after the site failure detection interval

GDPS/Active-Active Components

- Operating system
 - z/OS V1R11
- Applications/Middleware
 - DB2 for z/OS V9
 - IMS 10
 - WS MQ V7.0
- Replication
 - InfoSphere Replication Server (DB2) V10
 - InfoSphere IMS Replication for z/OS V10.1
- Management and monitoring
 - GDPS/Active-Active V1.1
 - NetView for z/OS V6.1
 - System Automation for z/OS V3.3
 - IBM Multi-site Workload Lifeline V1.1
 - IBM Tivoli Monitoring V6.2.2
 - Optional OMEGAMON products (required only if the customer wants to monitor the behavior of the respective products/resources that they deal with (IMS, DB2, storage, etc.)

Site G4

Site G5



GDPS Web Interface

System	CA	Status	PLType	Lepr	PLMode	Auto	Leadstart	Leadpath
G4P1	A	ACTIVE	NORMAL	S23	NORMAL	YY	2000	2000G4P1
G4P2	A	ACTIVE	NORMAL	S23	NORMAL	YY	2000	2000G4P2
G4T			NORMAL	S09	NORMAL	00		

TEP Interface

GDPS Web Interface

Primary Controller **G4C1**

Netview Master
GDPS Code

LLAdvisor
Primary

TEMS & TEMA

LB 2° Tier
Sysplex
Distrib

G4 Production 2 **G4P2**

G4 Production 1 **G4P1**

LLAgent

LLAgent

Netview & SA

Netview & SA

DB2

IMS

Backup Controller **G5C1**

GDPS Code
Netview Backup

LLAdvisor
Secondary

TEMS & TEMA

LB 2° Tier
Sysplex
Distrib

G5 Production 1 **G5P1**

G5 Production 2 **G5P2**

LLAgent

LLAgent

Netview & SA

Netview & SA

IMS

DB2

Site G4

Site G5



The GDPS Web Interface shows a system status table with columns: System, CA, Status, IPLType, Lpar, IPLMode, Auto, Loadable, and Loadparm. The table lists three systems: G4P1, G4P2, and G4T.

System	CA	Status	IPLType	Lpar	IPLMode	Auto	Loadable	Loadparm
G4P1	A	ACTIVE	NORMAL	S23	NORMAL	YY	2000	2000G4P1
G4P2	A	ACTIVE	NORMAL	S23	NORMAL	YY	2000	2000G4P2
G4T	A	ACTIVE	NORMAL	S23	NORMAL	YY	2000	2000G4T

TEP Interface

GDPS Web Interface

Primary Controller G4C1

Netview Master
GDPS Code

LLAdvisor
Primary

TEMS & TEMA

LB 2° Tier
Sysplex
Distrib

G4 Production 2 **G4P2**

G4 Production 1 **G4P1**

LLAgent

LLAgent

Netview & SA

Netview & SA

Workload 2

Workload 1

Workload 2

Workload 1

CICS/DB2
Appl

IMS Appl

CICS/DB2
Appl

IMS Appl

IMS Rep

DB2

IMS

Backup Controller G5C1

GDPS Code
Netview Backup

LLAdvisor
Secondary

TEMS & TEMA

LB 2° Tier
Sysplex
Distrib

G5 Production 1 **G5P1**

G5 Production 2 **G5P2**

LLAgent

LLAgent

Netview & SA

Netview & SA

Workload 2

Workload 1

Workload 2

Workload 1

CICS/DB2
Appl

IMS Appl

CICS/DB2
Appl

IMS Appl

IMS Rep

IMS

DB2



Site G4

Site G5



GDPS Web Interface

System	CA	Status	PLType	Lpar	PLMode	Act	Leadstart	Leadend
G4P1	A	ACTIVE	NORMAL	S23	NORMAL	YY	2000	2000G4P1
G4P2	A	ACTIVE	NORMAL	S23	NORMAL	YY	2000	2000G4P2
G4T	A	ACTIVE	NORMAL	S09	NORMAL	MM		

Primary Controller G4C1

Netview Master	GDPS Code
LLAdvisor Primary	
TEMS & TEMA	

Backup Controller G5C1

GDPS Code	Netview Backup
LLAdvisor Secondary	
TEMS & TEMA	

LB 1° Tier

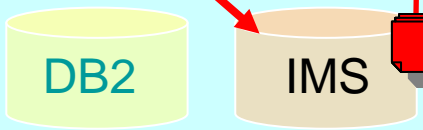
Workload 1 :
START ROUTING
G4

LB 2° Tier
Sysplex
Distrib

LB 2° Tier
Sysplex
Distrib

G4 Production 2 G4P2		G4 Production 1 G4P1	
LLAgent		LLAgent	
Netview & SA		Netview & SA	
Workload 2 Active	Workload 1 Active	Workload 2 Active	Workload 1 Active
CICS/DB2 Appl	IMS Appl	CICS/DB2 Appl	IMS Rep
			IMS Appl

G5 Production 1 G5P1		G5 Production 2 G5P2	
LLAgent		LLAgent	
Netview & SA		Netview & SA	
Workload 2 Standby	Workload 1 Standby	Workload 2 Standby	Workload 1 Standby
CICS/DB2 Appl	IMS Appl	CICS/DB2 Appl	IMS Rep
			IMS Appl



Site G4

Site G5



TEP Interface

GDPS Active Active									
ENCL	19 May 2011	15:46:31	JAPR1	G4C1	GDPS Page 1/10/14/14/14				
Return Refresh Print Screen AutoRefresh On Logoff Help STOP System									
Selected Site G4									
System	CA	Status	PLType	Lpar	PLMode	Auto	Leadstart	Leadparm	
G4P1	A	ACTIVE	NORMAL	S230	NORMAL	YY	2000	2000G4P1	
G4P2	A	ACTIVE	NORMAL	S230	NORMAL	YY	2000	2000G4P2	
G4C1	A	ACTIVE	NORMAL	S600	NORMAL	00			

GDPS Web Interface

Primary Controller G4C1

Netview Master	GDPS Code
LLAdvisor Primary	
TEMS & TEMA	

Backup Controller G5C1

GDPS Code	Netview Backup
LLAdvisor Secondary	
TEMS & TEMA	

LB 1° Tier CSM

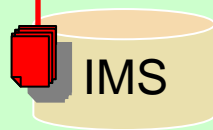
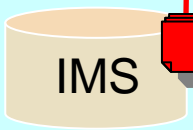
Workload 1 : STOP ROUTING G4

LB 2° Tier Sysplex Distrib

LB 2° Tier Sysplex Distrib

G4 Production 2 G4P2		G4 Production 1 G4P1	
LLAgent		LLAgent	
Netview & SA		Netview & SA	
Workload 2 Active	Workload 1 Active	Workload 2 Active	Workload 1 Active
			IMS Rep
CICS/DB2 Appl	IMS Appl	CICS/DB2 Appl	IMS Appl

G5 Production 1 G5P1		G5 Production 2 G5P2	
LLAgent		LLAgent	
Netview & SA		Netview & SA	
Workload 2 Standby	Workload 1 Standby	Workload 2 Standby	Workload 1 Standby
			IMS Rep
CICS/DB2 Appl	IMS Appl	CICS/DB2 Appl	IMS Appl



Site G4

Site G5



TEP Interface

GDPS Active Active									
ENCL	19 May 2011	15:40:31	JAPR1	G4C1	GDPS Page 1/10/11/12/13/14/15/16/17/18/19/20				
Selected Site G4									
System	CA	Status	PLType	Lpar	PLPriority	Auto	Leadname	Leadparm	
G4P1	A	ACTIVE	NORMAL	S230	NORMAL	YY	Z900	Z900G4P1	
G4P2	A	ACTIVE	NORMAL	S230	NORMAL	YY	Z900	Z900G4P1	
G4C1	A	ACTIVE	NORMAL	S400	NORMAL	00			

GDPS Web Interface

LB 1° Tier CSM

Backup Controller **G5C1**

Primary Controller **G4C1**

GDPS Code	Netview Master
LLAdvisor Primary	
TEMS & TEMA	

GDPS Code	Netview Backup
LLAdvisor Secondary	
TEMS & TEMA	

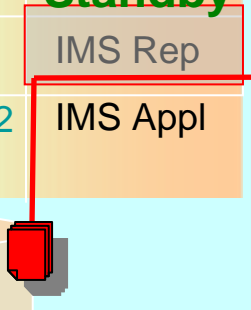
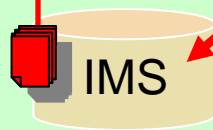
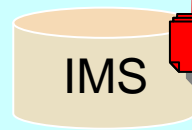
LB 2° Tier Sysplex Distrib

LB 2° Tier Sysplex Distrib

Workload 1 : START ROUTING G5

G4 Production 2 G4P2	G4 Production 1 G4P1
LLAgent	LLAgent
Netview & SA	Netview & SA
Workload 2 Active	Workload 1 Standby
CICS/DB2 Appl	IMS Rep
IMS Appl	IMS Appl

G5 Production 1 G5P1	G5 Production 2 G5P2
LLAgent	LLAgent
Netview & SA	Netview & SA
Workload 2 Standby	Workload 1 Active
CICS/DB2 Appl	IMS Rep
IMS Appl	IMS Appl



Site G4

Site G5



GDPS Web Interface

System	CA	Status	PLType	Lepr	PLMode	Actd	Leadstart	Leadpath
G4P1	A	ACTIVE	NORMAL	S23	NORMAL	YY	2000	2000G4P1
G4P2	A	ACTIVE	NORMAL	S23	NORMAL	YY	2000	2000G4P1
G4C1		ACTIVE	NORMAL	S00	NORMAL	00		

Primary Controller G4C1

Netview Master
GDPS Code

LLAdvisor
Primary

TEMS & TEMA

Backup Controller G5C1

GDPS Code Netview Backup

LLAdvisor
Secondary

TEMS & TEMA

LB 1° Tier CSM

LB 2° Tier Sysplex Distrib

LB 2° Tier Sysplex Distrib

G4 Production 2 G4P2		G4 Production 1 G4P1	
LLAgent		LLAgent	
Netview & SA		Netview & SA	
Workload 2 Active	Workload 1 Active	Workload 2 Active	Workload 1 Active
			IMS Rep
CICS/DB2 Appl	IMS Appl	CICS/DB2 Appl	IMS Appl



Site G4

Site G5



TEP Interface



GDPS Web Interface

Primary Controller G4C1

GDPS Code

Netview Master

LLAdvisor Primary

TEMS & TEMA

Backup Controller G5C1

GDPS Code

Netview Backup

LLAdvisor Secondary

TEMS & TEMA

LB 1° Tier CSM

LB 2° Tier Sysplex Distrib

LB 2° Tier Sysplex Distrib

Workload 1 :
STOP ROUTING G5

G4 Production 2 G4P2		G4 Production 1 G4P1	
LLAgent		LLAgent	
Netview & SA		Netview & SA	
Workload 2 Active	Workload 1 Active	Workload 2 Active	Workload 1 Active
			IMS Rep
CICS/DB2 Appl	IMS Appl	CICS/DB2 Appl	IMS Appl



Automatic switch or not ?



Site G4

Site G5



TEP Interface

GDPS Active-Active									
System	CA	Status	PLType	Lpar	PLMode	Auto	Leadstart	Leadparm	
G4P1	A	ACTIVE	NORMAL	S230	NORMAL	YY	2000	2000G4P1	
G4P2	A	ACTIVE	NORMAL	S230	NORMAL	YY	2000	2000G4P1	
G4C1		ACTIVE	NORMAL	S400	NORMAL	MM			

GDPS Web Interface

Primary Controller **G4C1**

Netview Master	GDPS Code
LLAdvisor Primary	
TEMS & TEMA	

Backup Controller **G5C1**

GDPS Code	Netview Backup
LLAdvisor Secondary	
TEMS & TEMA	

LB 1° Tier CSM

Workload 1 : START ROUTING G4

LB 2° Tier Sysplex Distrib

LB 2° Tier Sysplex Distrib

G4 Production 2 G4P2	G4 Production 1 G4P1
LLAgent	LLAgent
Netview & SA	Netview & SA

Workload 2 Active	Workload 1 Active	Workload 2 Active	Workload 1 Active
CICS/DB2 Appl	IMS Appl	CICS/DB2 Appl	IMS Rep



Active-Standby Configuration Testing

Scenario	Active/Standby switch time	Traditional GDPS product restart time
Planned workload switch	20 seconds	Not possible
Unplanned workload switch	120 seconds*	Not possible
Planned site switch (10 workloads)	20 seconds	About 1-2 hours
Unplanned workload switch (10 workloads)	107 seconds*	About 1 hour

* Failure Detection Interval of 60 seconds

* Internal IBM testing. Your results may vary

GDPS/Active-Active Positioning

GDPS/Active-Active is for mission critical workloads that have stringent recovery objectives that can not be achieved using existing GDPS solutions.

- RTO measured in seconds for unplanned outages
- RPO measured in seconds for unplanned outages
- Non-disruptive site switch of workloads for planned outages
- At any distance
- NOT intended to substitute for local availability solutions (eg: Parallel SYSPLEX enabled applications)

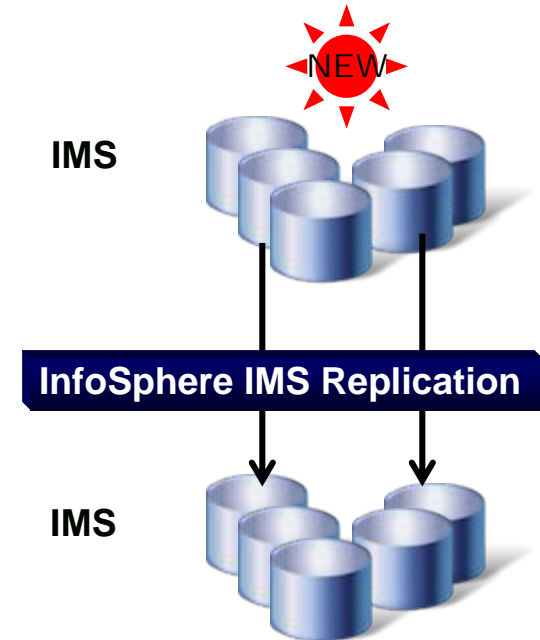
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- InfoSphere IMS Replication for z/OS

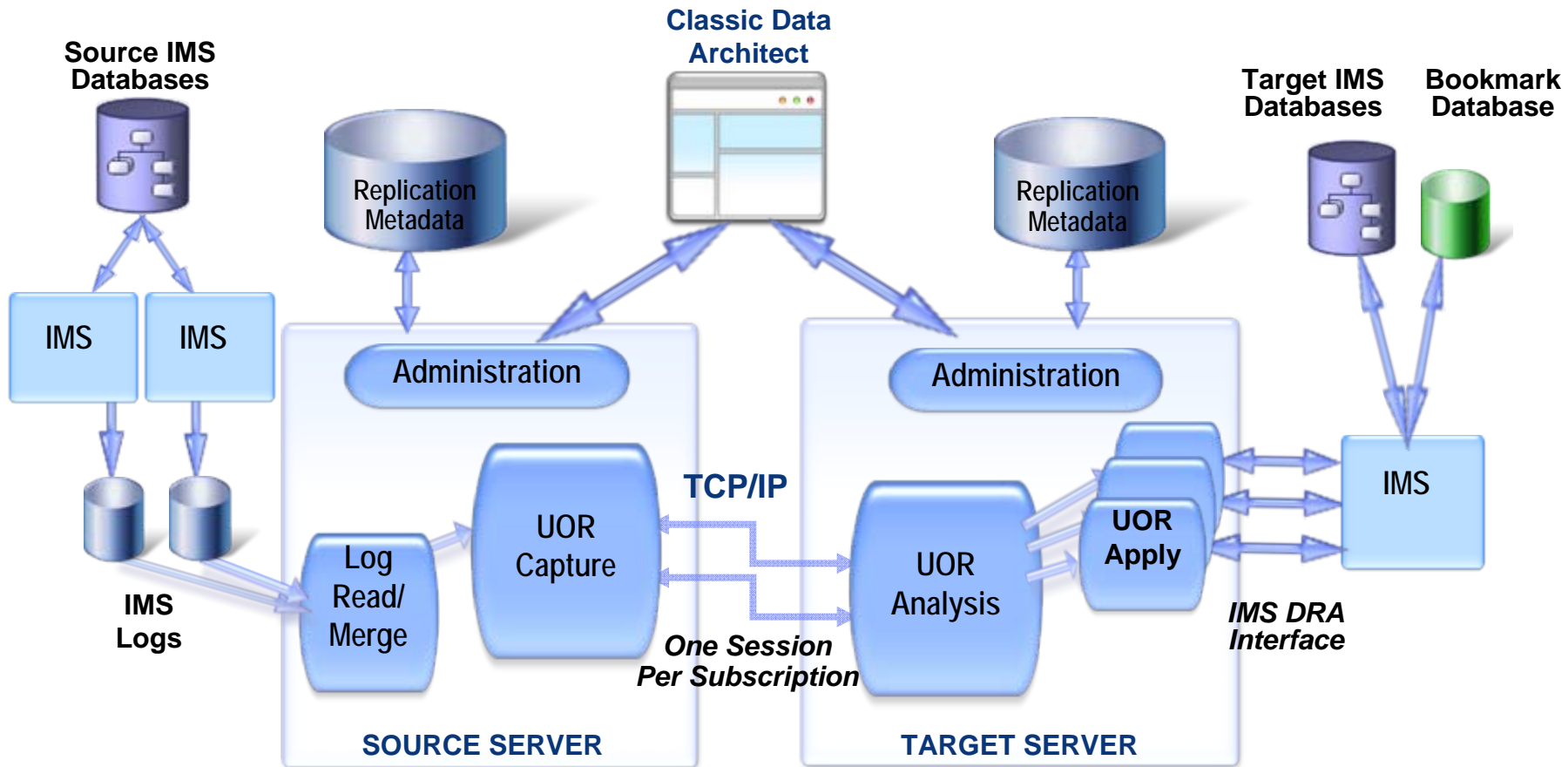
IMS Software-Based Data Mirroring

InfoSphere IMS Replication

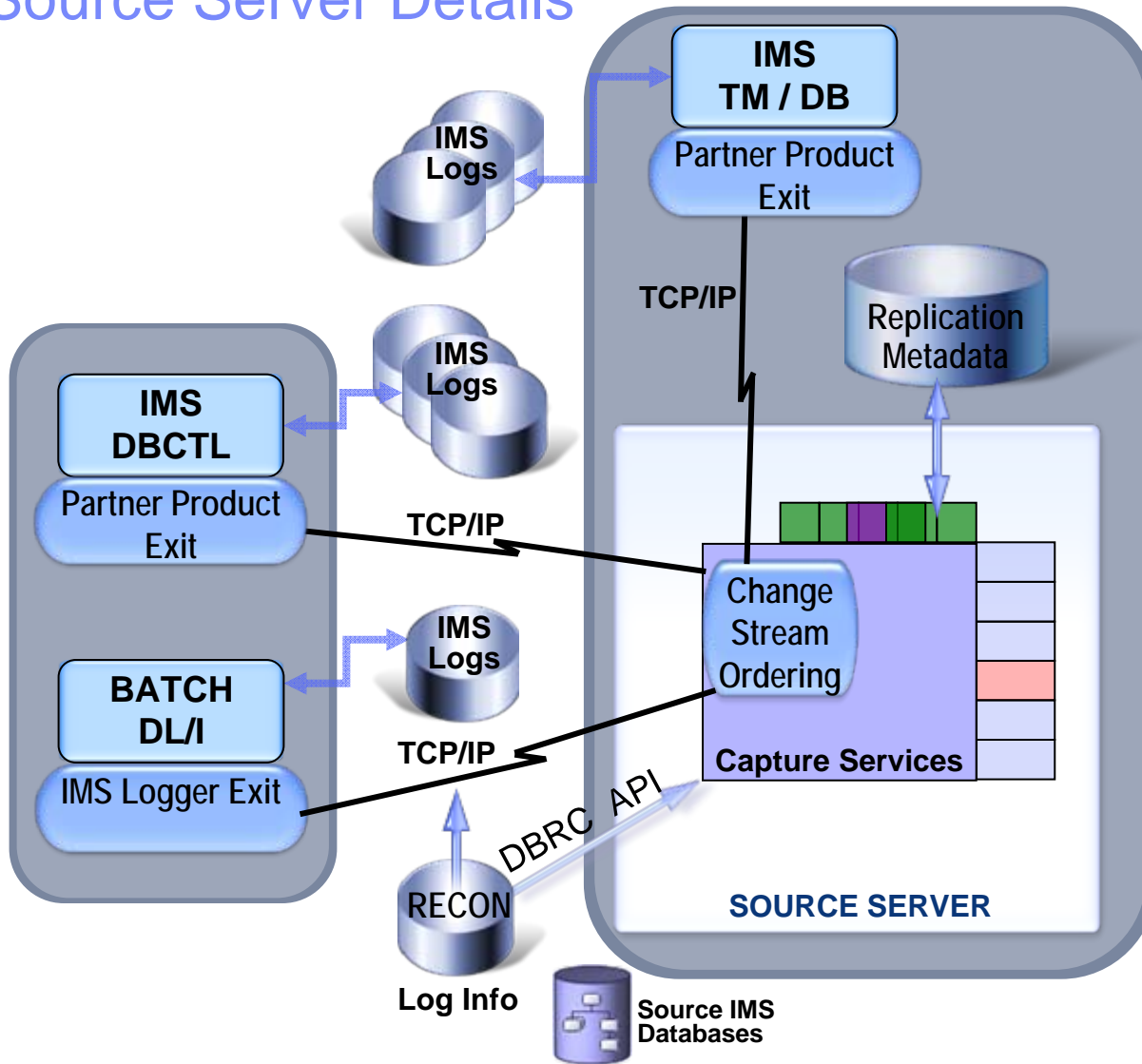
- Unidirectional Replication of IMS data
 - All or nothing at DB level
 - Transaction consistency
 - External initial load of target DB
 - Basic replication monitoring
- IMS “Capture”
 - DB/TM, DBCTL, Batch DL/I, XRF, FDBR
 - Capture x'99' log records
 - Increase in log volume due to change data capture records
- IMS “Apply”
 - Uses IMS Database Resource Adapter interface
 - Parallel Apply
- Classic Data Architect
 - Administration (some administration can be done via z/OS console commands)
 - Basic replication monitoring



IMS Replication Architecture

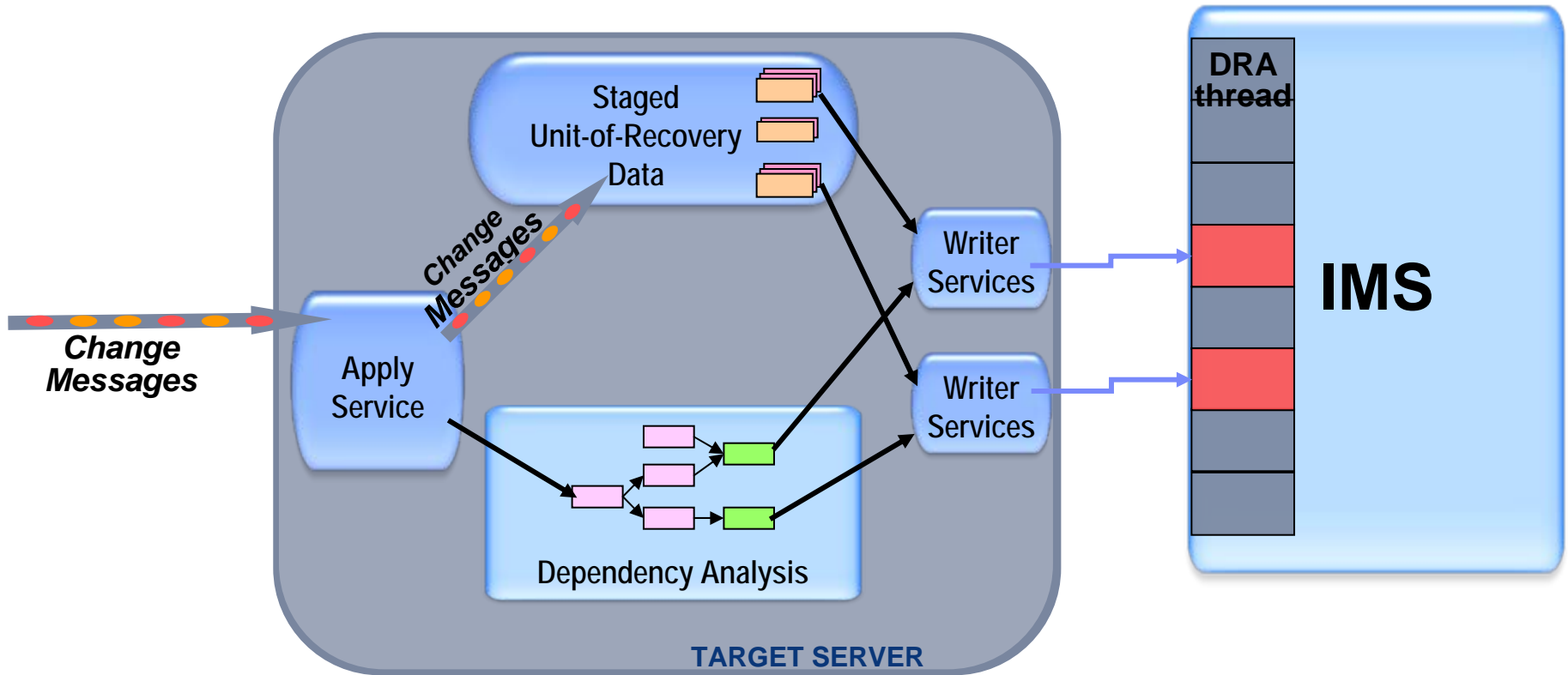


Source Server Details



- User exits to notify server of new IMS instance
- Merge Waits for Batch DL/I to complete
- Idle IMS regions can slow processing

Target Server Details



- Parallelism based on dependency analysis within a subscription
- Database and root key used for analysis

Classic Data Architect – Replication Management

The screenshot displays the 'Classic Replication Management - Classic Data Architect' application window. The main interface shows a 'Subscription' table with 'TEST121' selected. A 'Modify Subscription' dialog is open, showing a table of DBDs. An 'Add DBDs' dialog is also open, showing search results and selected DBDs.

Subscription Table:

Subscription	Status
TEST121	U

Modify Subscription - Add/Remove Replication Mappings Table:

DBD Name	Apply Type	Log Position
DEDBJN22	Standard	2009-12-16
DBOHIDK5	Standard	2009-12-15
DBVHDJ05	Standard	2009-12-15
DBHDK01	Standard	2009-12-15
DBHDOJ01	Standard	2009-12-15
DEDBDD01	Standard	2009-12-15
DBOVLFFC	Standard	2009-12-15

Add DBDs Dialog:

Enter search:

Search Results:

- D2XHDJ05
- D2XHIDK5
- DBHIDJ03
- DEDBJN21
- DEDBJN23
- DEDBJN24
- DH41SK01
- DHVNTK03
- DSVNTZ30
- DX41SK01
- DXVNTZ02

Selected DBDs:

- DHVNTZ02
- DIVNTZ02

Number of DBDs selected: 2

Classic Data Architect - Monitoring Throughput

Classic Replication Management - V95VersionTesting/create_ORDMST08_IMS_table.sql - Classic Data Architect

File Edit Navigate Search Project Run Script Window Help

Console Explorer Subscriptions

Subscription	Replication State	Latency	Source	Target	Target URL
CR42	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR42B	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.111/5002
CR43	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR44	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR44B	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.111/5002
CR45	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR46	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR46B	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.111/5002
CR47	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR48	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR48B	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.111/5002
CR4B	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.111/5002
CR5	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR6	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR6B	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.111/5002
CR7	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR8	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR8B	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.111/5002
CR9	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
FP2	Replicating Continuous	Normal	PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001

Properties Cache Meters

Replication Mappings Event Log Latency Throughput Diagnostic Metrics

Metric	Current In/sec	Cumulative In	Current Out/sec	Cumulative Out
Source				
Bytes	14372489	7401268804	14496657	7399872948
Commits	154	80190	155	80175
Operations	54055	28066500	54522	28061250
Inserts	0	0	0	0
Updates	54055	28066500	54522	28061250
Deletes	0	0	0	0
Target				
Bytes	14062236	7401268804	14455270	7397825238
Commits	151	80190	155	80153
Operations	52888	28066500	54366	28053550
Inserts	0	0	0	0
Updates	52888	28066500	54366	28053550
Deletes	0	0	0	0

Collection started: 2011-09-26 08:07:04 PM Collection stopped:

50% of 152M

Classic Data Architect - Monitoring Latency

Classic Replication Management - V95VersionTesting/create_ORDMST08_IMS_table.sql - Classic Data Architect

File Edit Navigate Search Project Run Script Window Help

Console Explorer Subscriptions

Subscription	Replication State	Latency	Source	Target	Target URL
CR42	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR42B	Inactive		PLX67_Capture_SRV_...	Not Connected	SKT/9.30.128.111/5002
CR43	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR44	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR44B	Inactive		PLX67_Capture_SRV_...	Not Connected	SKT/9.30.128.111/5002
CR45	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR46	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR46B	Inactive		PLX67_Capture_SRV_...	Not Connected	SKT/9.30.128.111/5002
CR47	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR48	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR48B	Inactive		PLX67_Capture_SRV_...	Not Connected	SKT/9.30.128.111/5002
CR4B	Inactive		PLX67_Capture_SRV_...	Not Connected	SKT/9.30.128.111/5002
CR5	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR6	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR6B	Inactive		PLX67_Capture_SRV_...	Not Connected	SKT/9.30.128.111/5002
CR7	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR8	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
CR8B	Inactive		PLX67_Capture_SRV_...	Not Connected	SKT/9.30.128.111/5002
CR9	Inactive		PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001
FP2	Replicating Continuous	Normal	PLX67_Capture_SRV_...	PLX67_Apply_SRV_ST...	SKT/9.30.128.114/5001

Properties Value

Replication Mappings Event Log Latency Throughput Diagnostic Metrics

Latency	Current/ms	High/ms	Average/ms
End-to-End	1216	37689	12632
Capture	748	36565	6067
Network	5	9	5
Apply	461	22537	6559

Metric	Capture Cache	Apply Cache
Current depth	1%	2%
Status	Normal	Normal

Log time of last source DBMS record applied: 2011-09-26 08:18:05 PM EDT

Collection started: 2011-09-26 08:07:04 PM Collection stopped:

Select chart: End-to-End Latency

Current (ms)

Apply Network Capture

20:14:33 20:15:03 20:15:33 20:16:03 20:16:33 20:17:03 20:17:33

55M of 152M

Adaptive Apply

- Adaptive apply error handling is the default behavior
 - Can be set to standard apply, which does not tolerate conflicts
- If a conflict is detected, the action will be to ignore update
- Conflicts are:
 - Before image mismatch
 - Unable to locate segment to process update
- All conflicts are logged in the event log
 - Manual resolution will be required

Current Restrictions

- All segments for a DB must have change capture logging enabled and will be replicated
 - Must augment the DBD with the EXIT=(...,LOG) specification
 - IMS change capture restrictions

- Workload Restrictions
 - All logically related DBs must be in the same subscription
 - Workload with logically related DBs will be serialized
 - UORs with unkeyed or non-unique keyed segments will be serialized

- External load of target DB
 - Must be a static image copy

Performance considerations

- Transactional consistency vs. Parallelism
 - All updates for a given UR processed as a single transaction during apply
 - All transactions involving the same 'resource' will be serially processed in commit order
 - Running transactions in parallel can have application consistency implications

- Increase in log data

- Multiple source IMSs to 1 Apply Target implications

- Internally achieved 53K updates per second
 - ~116,000 updates per second when deploying two apply servers
 - sustained <2sec latency
 - your results may vary

Summary

- **Asynchronous Replication**
 - Allows for unlimited distance support
- **Low Latency through parallelism**
 - Allows for almost immediate data availability and low RTO
- **Transaction Consistency**
 - Access with integrity on target system and low RTO
- **Subscription independence**
 - Switch can be at a workload level vs. system level

The GDPS " Family "

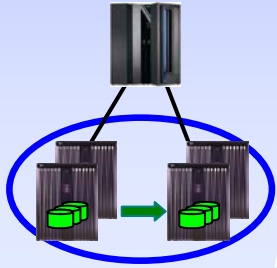


Continuous Availability of Data within a Data Center

GDPS/HyperSwap Mgr
RPO = 0 / RTO = 0

Single Data Center
Applications remain active

Continuous access to data in the event of a storage subsystem outage



Components

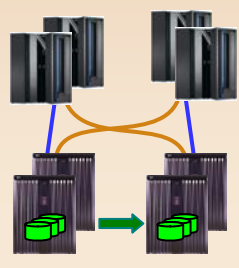
Tivoli – NetView, SAz, System z, DS8K, PPRC, GDPS control code, Services

Continuous Availability w/ Disaster Recovery within a Metropolitan Region

GDPS/PPRC
RPO = 0 / RTO <1hr (>20 km)
RPO = 0 / RTO = 0 (<20 km)

Two Data Centers
Systems remain active

Multi-site workloads can withstand site and/or storage failures



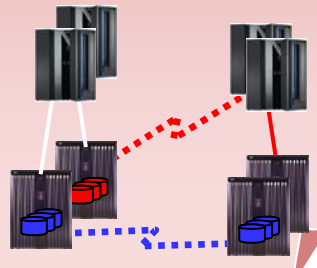
Tivoli – NV, SAz, SA-MP, AppMan, System z, DS8K, VTS, PPRC, GDPS control code, Services

Disaster Recovery at Extended Distance

GDPS/GM & GDPS/XRC
RPO secs / RTO <1 hr

Two Data Centers
Rapid Systems Disaster Recovery with "seconds" of Data Loss

Disaster recovery for out of region interruptions



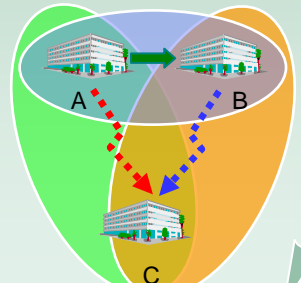
Tivoli – NV, SAz, System z, DS8K, Global Mirror, XRC, GDPS control code, Services

Regional Continuous Availability w/ Disaster Recovery @ Extended Distance

GDPS/MGM & GDPS/MzGM

Three Data Centers
High availability for site disasters

Disaster recovery for regional disasters



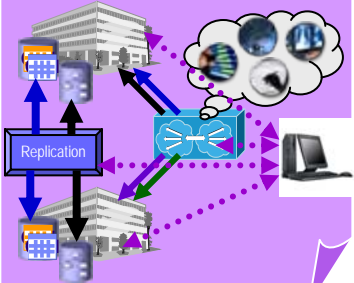
Tivoli – NV, SAz, System z, DS8K, MGM, MzGM, GDPS control code, Services

Continuous Availability, Disaster Recovery, and Cross-site Workload Balancing at Extended Distance

GDPS Active-Active Sites
RPO seconds / RTO seconds

Two or More Data Centers

All sites active



Tivoli – SA, NetView, Multi-site Workload Lifeline, DB2 & IMS replication, System z, DS8K, Global Copy, GDPS control code, Services

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