

GDPS Active-Active

GDPS/ActiveActive,
the newest generation of GDPS solution and a fundamental paradigm shift
to near continuous availability solutions.

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SHARE is an independent volunteer-run information technology association
that provides **education, professional networking and industry influence.**



Multiples pressures on IT Services to improve availability

Business Growth



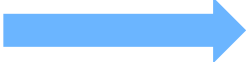
Reduce Planned Outages



Reduce incident impacts



24*7*365 access

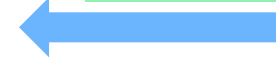


Enterprise Data

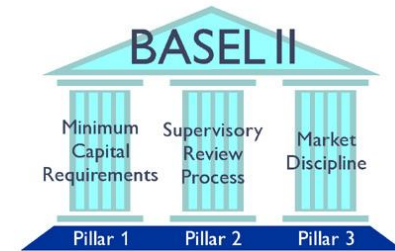
New Apps
New Products



New rules



Governments



Reporting & Documentation

Demographic



Reduce Costs



When do we need HA/DR solution?

Global disaster

- Hurricane
- Earthquake
- Power plants failure...

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

Local disaster

- Fire
- Power supply problem
- Unplanned IT Failure

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

Maintenance

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

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



The added value for... ... high availability and disaster recovery

■ Automation

GDPS based on Netview and System Automation is able to manage and automate actions and to react to events.

This key point has a lot of benefits:

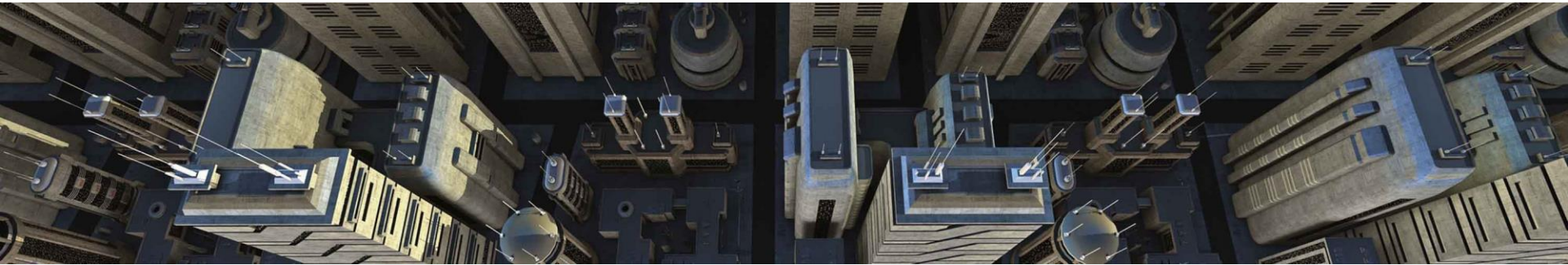
- Reduce risk & dependency on people.
- Enhance recovery performance

■ Single point of control

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

Agenda

- **Concept**
- Solution overview
- Typical cases
- New v1.4 & 1.5 features
- Conclusion & roadmap



Evolving customer requirements

We create Active-Active to answer to the following need.

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

“Active-Active Sites is positioned as
the next generation of GDPS”

From High Availability to Continuous Availability

GDPS/PPRC	GDPS/XRC GDPS/GM
Failover model	Failover model
Recovery time < 1 min	Recovery time < 1 hour
Distance < 20 KM	Unlimited distance

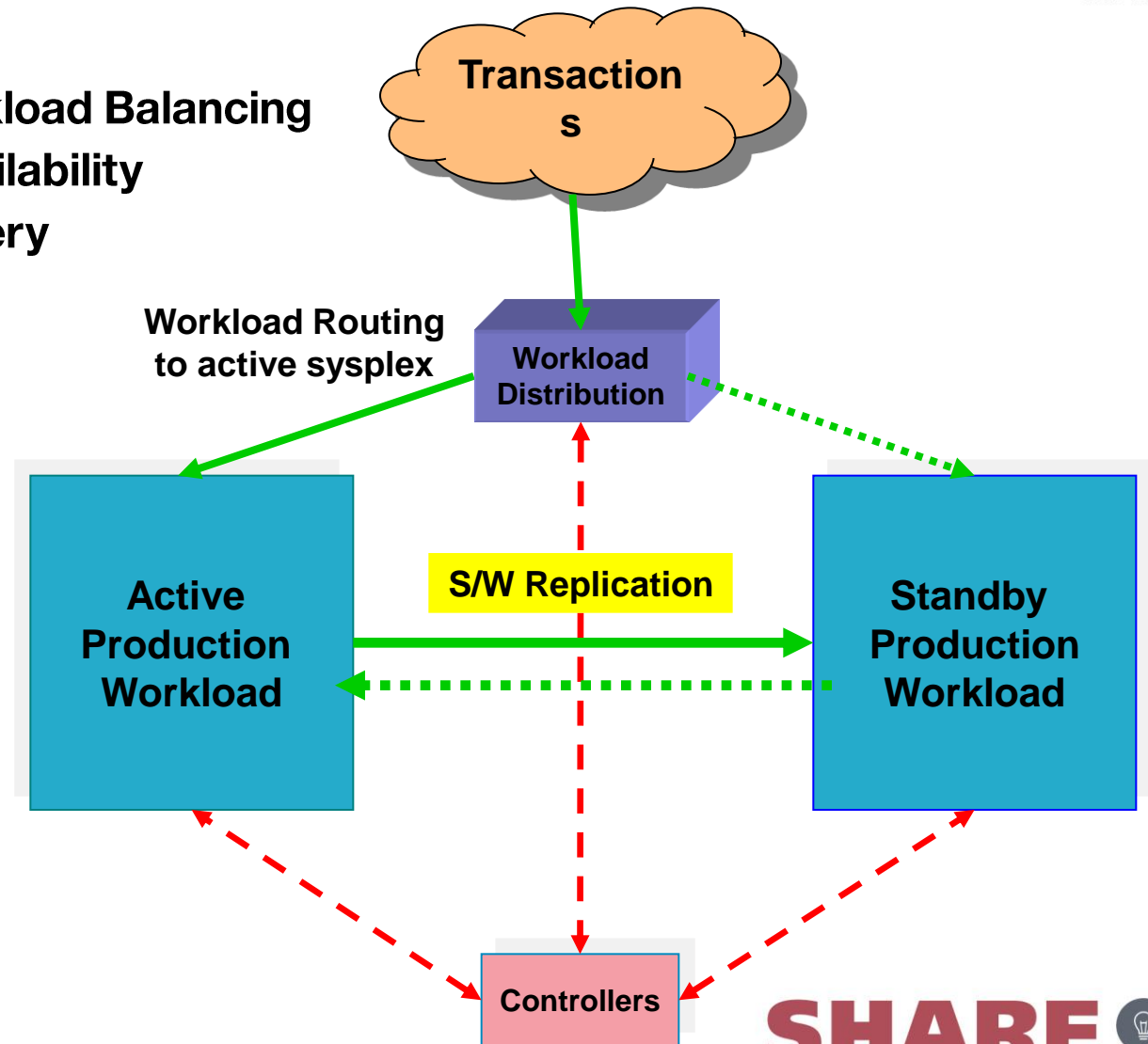
GDPS/Active-Active
Near Continuous Availability model
Recovery time < 1 min
Unlimited distance

Important:

Active-Active is NOT intended to substitute for local availability solutions such as Parallel SYSPLEX

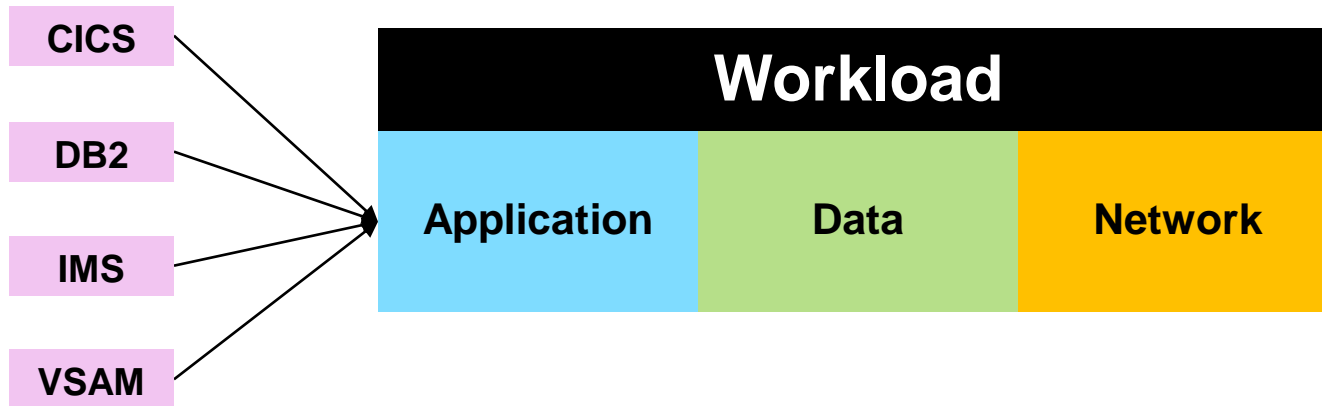
Active-Active concept

- Cross-site Workload Balancing
- Continuous Availability
- Disaster Recovery
- Monitoring



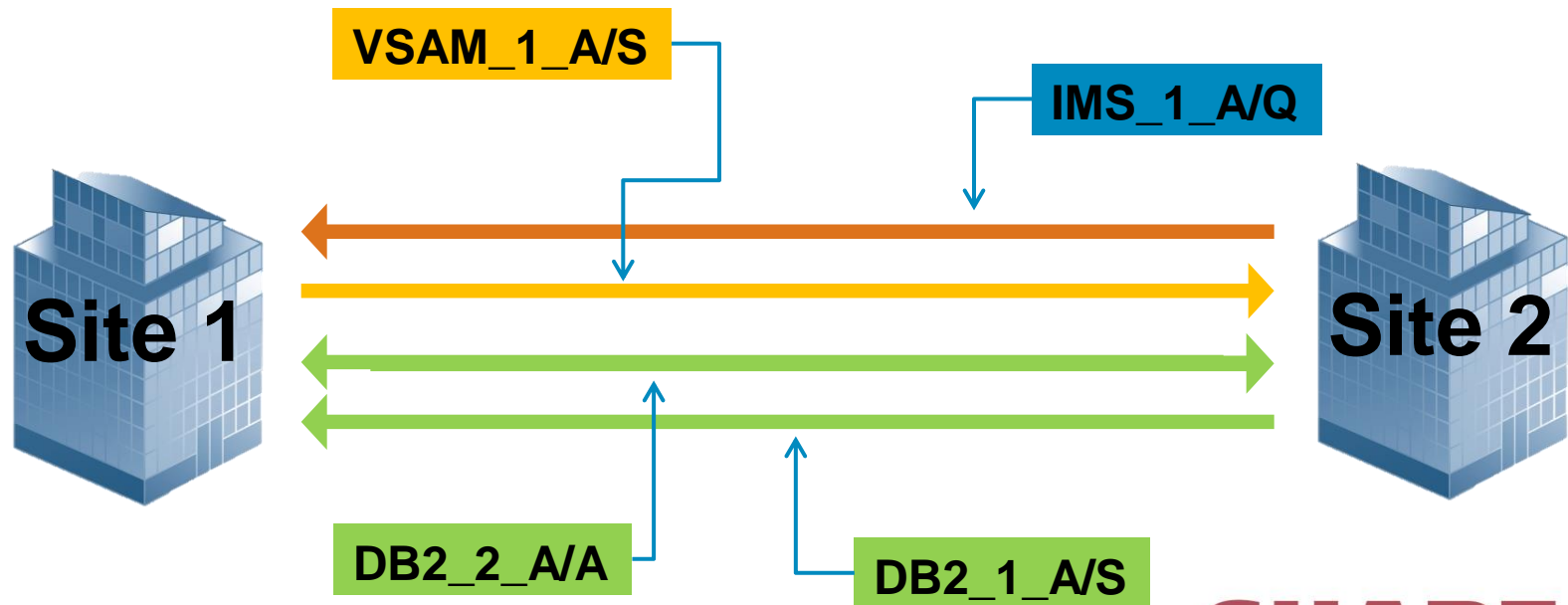
What is an Active-Active Workload?

- A workload is the aggregation of these components
 - **Software:** user written applications and the middleware run time environment
 - **Data:** related set of objects that must preserve transactional consistency and optionally referential integrity constraints
 - **Network connectivity:** one or more TCP/IP addresses & ports



Active-Active Sites Configurations

- Configurations
 - Active/Standby – Since June 2011
 - Active/Query – October 2013
 - Active-Active – Intended direction
- A configuration is specified on a workload basis



Agenda

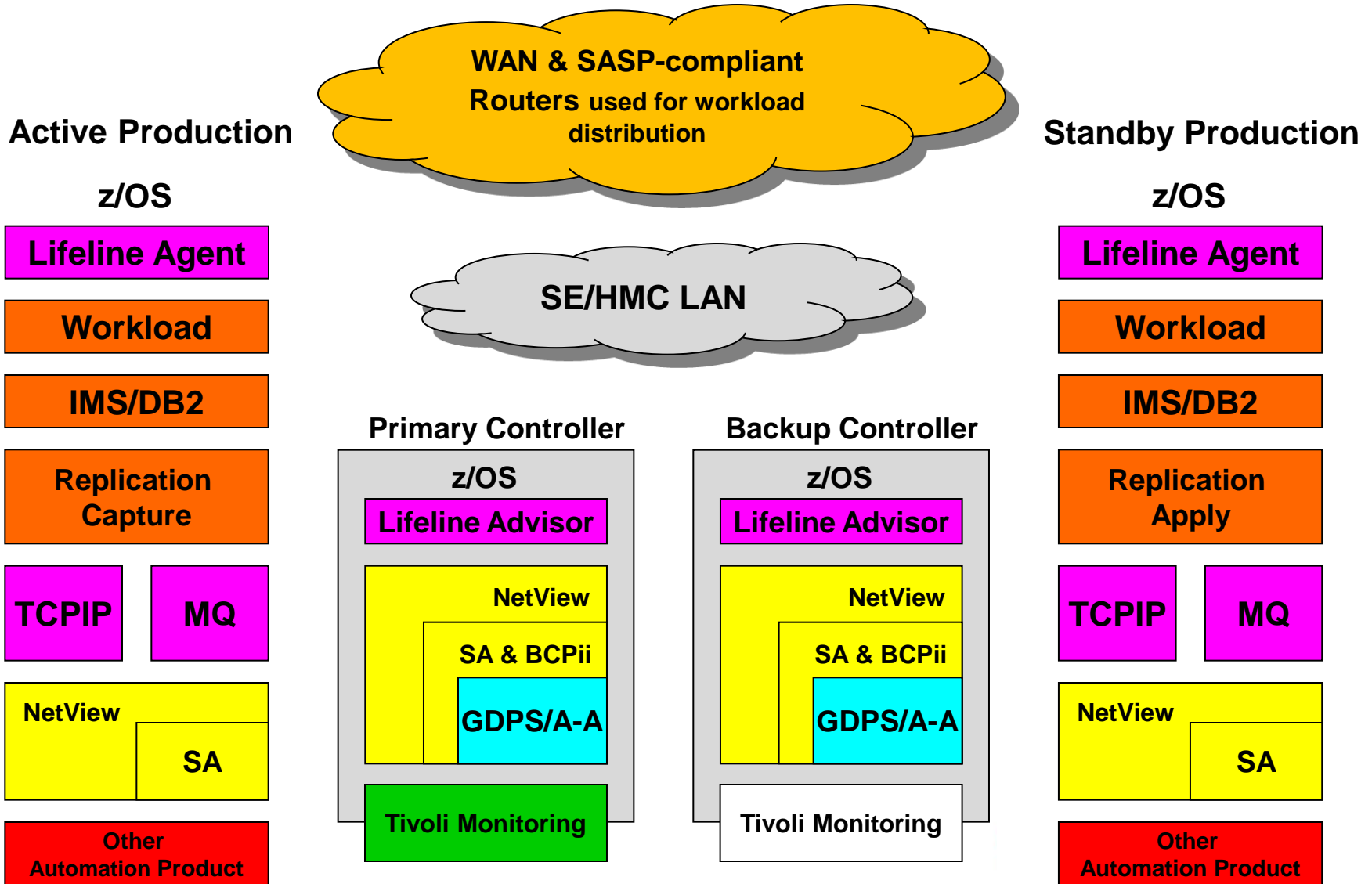
- Concept
- **Solution overview**
- Typical cases
- New v1.4 & 1.5 features
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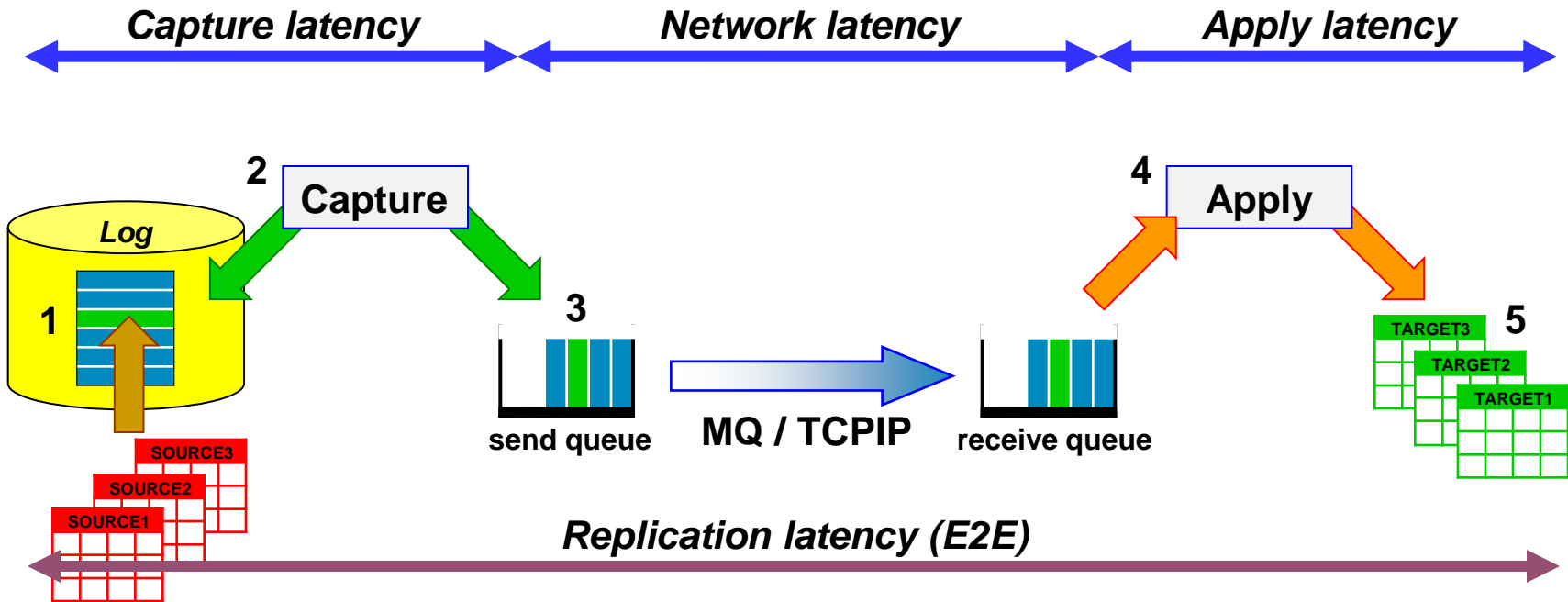
What is a GDPS/Active-Active environment?

- **Two Production Sysplex environments (also referred to as sites) in different locations**
 - Software-based replication between the two sysplexes/sites
- **Two Controller Systems**
 - Primary/Backup
- **Workload balancing/routing switches**
 - Must be Server/Application State Protocol compliant (SASP)
 - RFC4678 describes SASP
 - **What switches/routers are SASP-compliant?**
 - Cisco Catalyst 6500 Series Switch Content Switching Module
 - F5 Big IP Switch
 - Citrix NetScaler Appliance
 - Radware Alteon Application Switch (bought Nortel appliance line)

GDPS Active-Active solution overview



S/w replication technique (for example DB2)



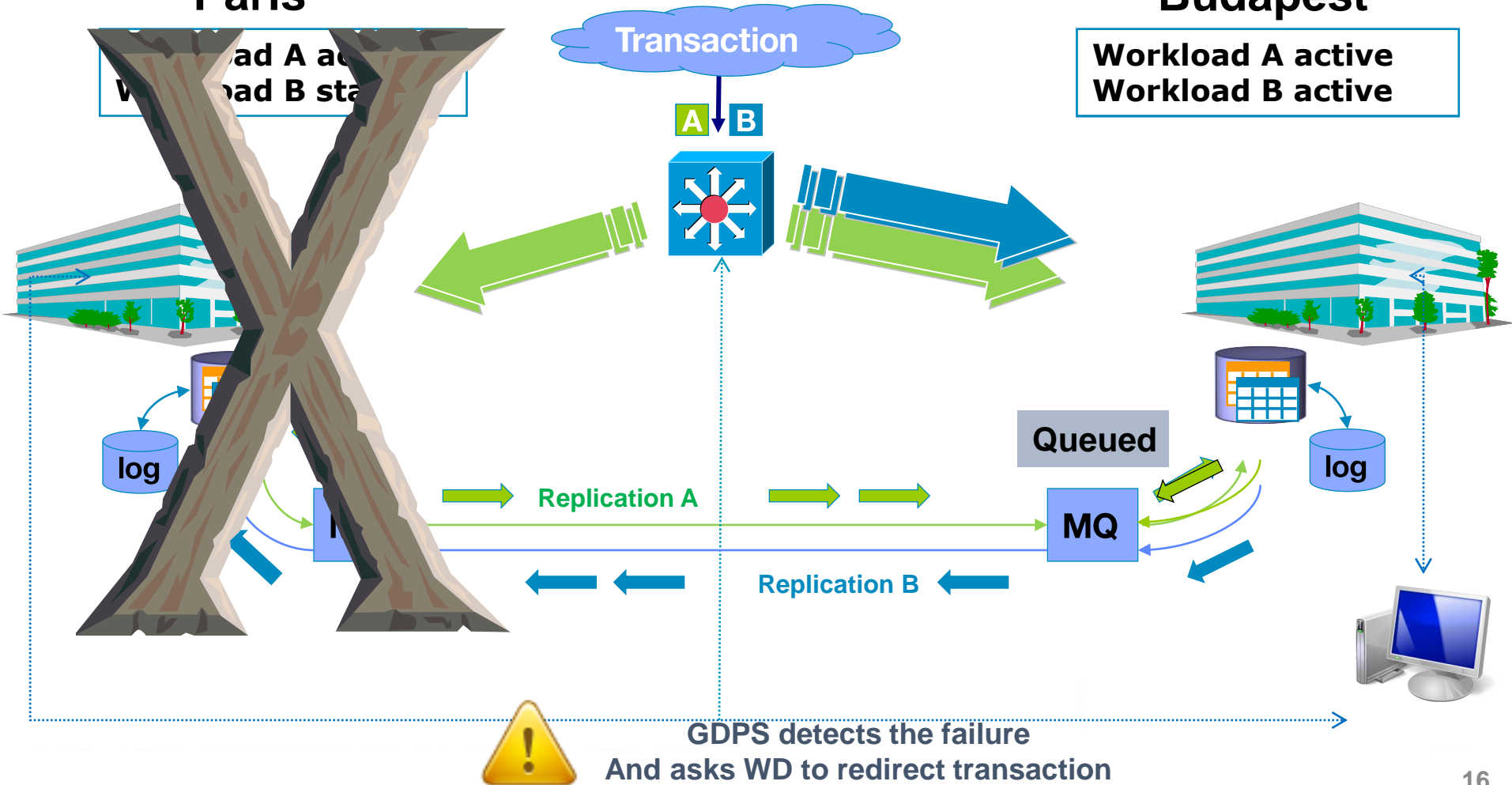
1. Transaction committed
2. Capture read the DB updates from the log
3. Capture put the updates on the send-queue
4. Apply received the updates from the receive-queue
5. Apply copied the DB updates to the target databases

Active/Standby Configuration

Workload A (green – Cash withdrawal) use an Active/Standby configuration
 Workload B (blue – HR Management) use an Active/Standby configuration

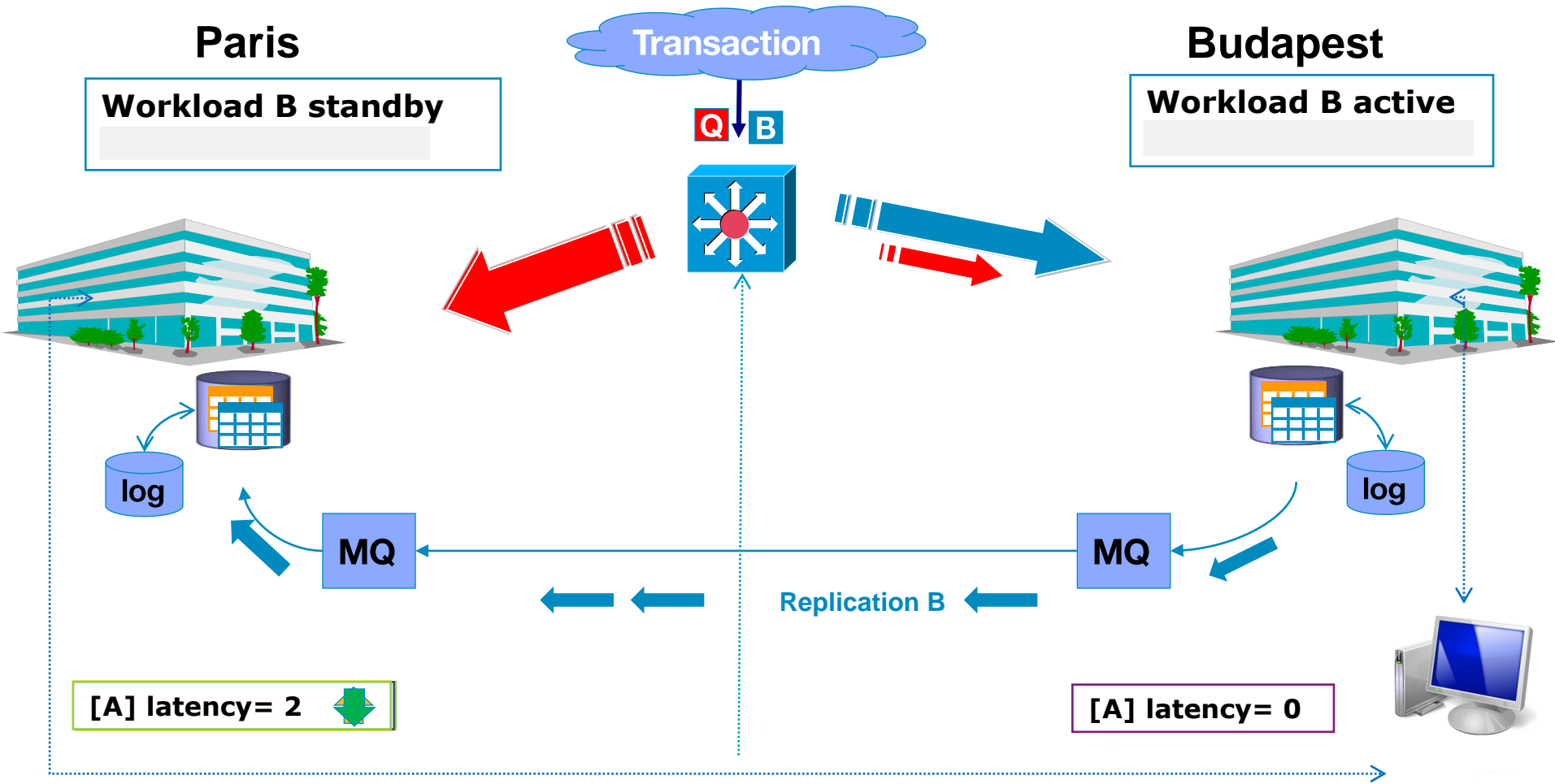
Paris

Budapest



Active/Query Configuration

Workload B (HR Management) has Active/Standby configuration



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- Solution overview
- **Testing results**
- New v1.4 & 1.5 features
- Conclusion & roadmap



Preliminary testing results*

Configuration:

- 9 * CICS-DB2 workloads + 1 * IMS workload
- Distance between site 300 miles (≈500kms)

Test1:

Planned site switch *

GDPS Active-Active

70-80 seconds

GDPS/XRC
GDPS/GM

≈ 1-2 hour

Test2:

Unplanned site switch
After a site failure
(Automatic)

GDPS Active-Active

20-30 seconds

GDPS/XRC
GDPS/GM

≈ 1 hour

*Test1: Gracefull Switch with fast switch and fence at database level

* IBM laboratory results; actual results may vary.

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A/A Sites – v1.2

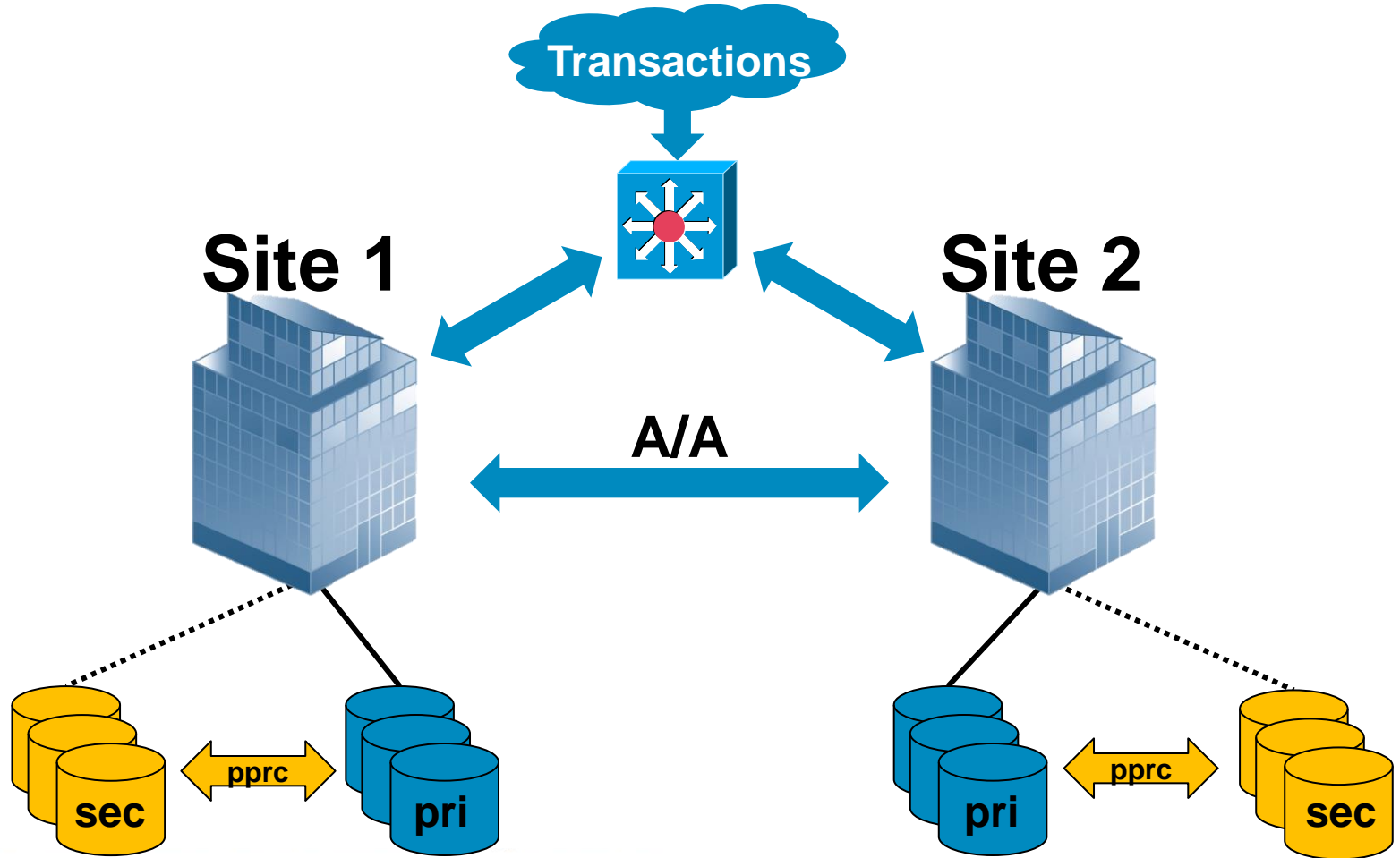
- Active/Standby config
- Base Content
- DB2 and IMS support

A/A Sites – v1.4

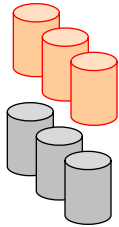
- Active/Query config
- Co-existence with GDPS/PPRC and GDPS/HM
- VSAM replication
- Q-rep MCG
- Disk integration
- Graceful switch
- DB2/IMS connect extensions
- Requirements

Co-existence with GDPS/PPRC or GDPS/HM

- Manage coexistence between PPRC or HM and Active-Active
- Prevent Active-Active to perform load on the wrong set of disks

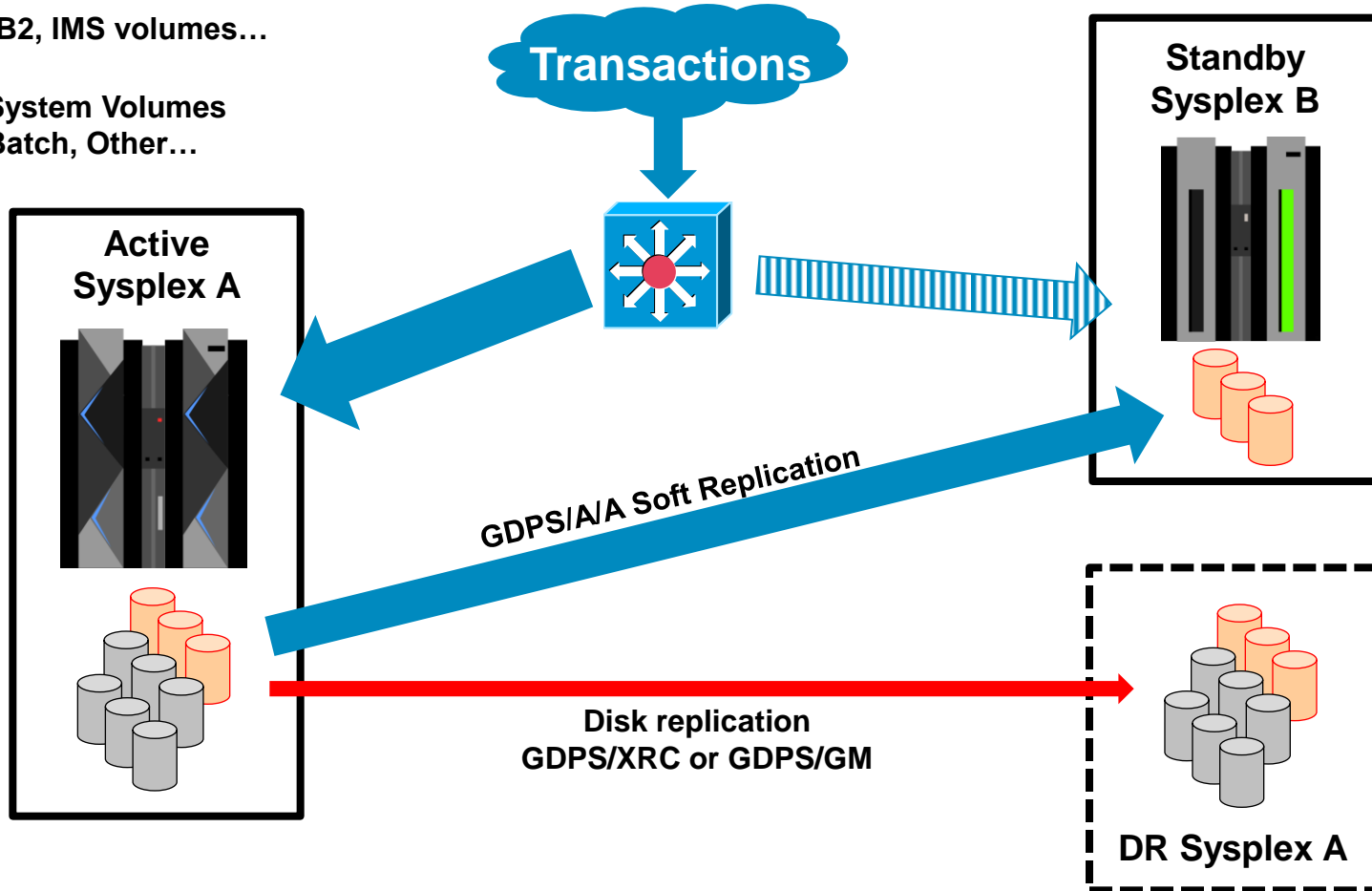


Disk integration



DB2, IMS volumes...

System Volumes
Batch, Other...

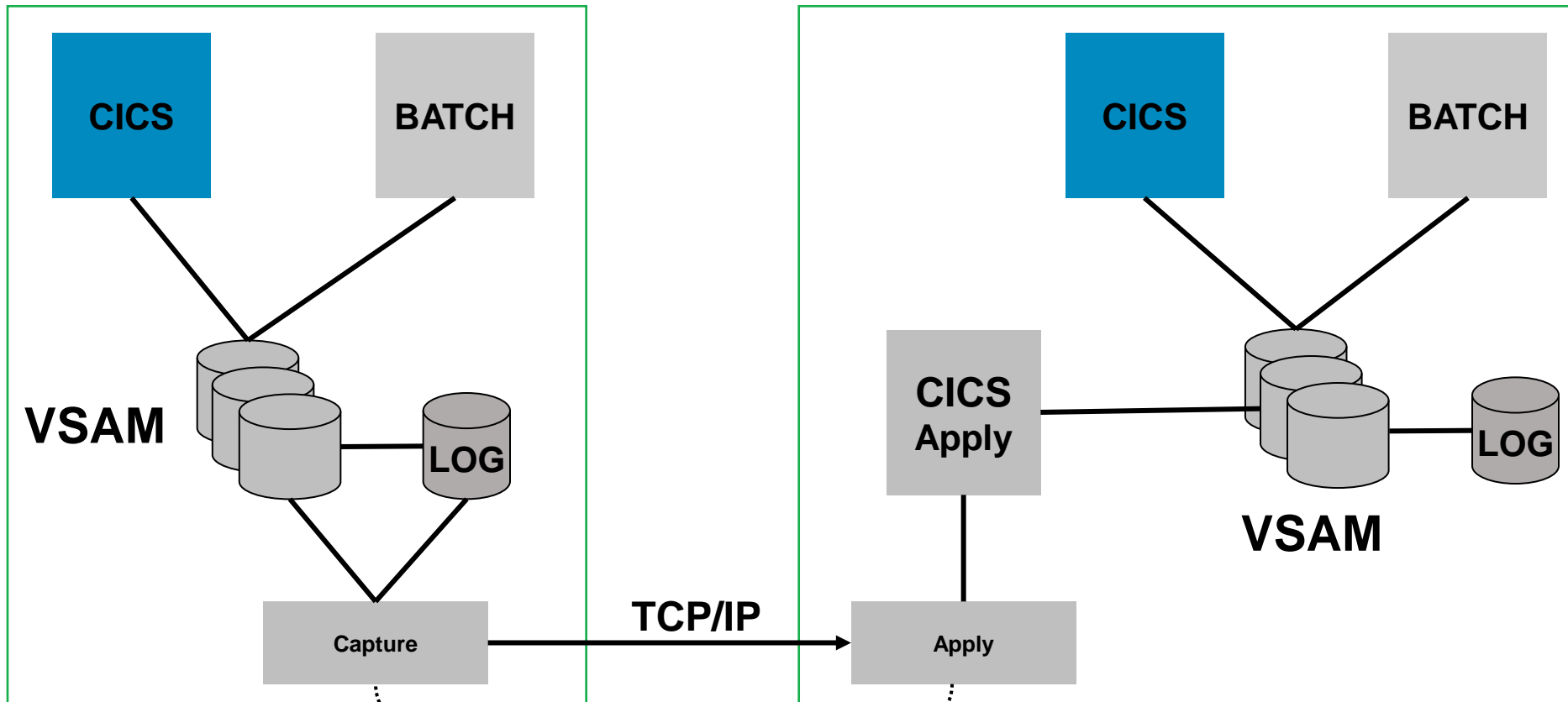


Two options for Sysplex A problems ...

Workload Switch – switch to SW copy (B); once problem is fixed, simply restart SW replication
Region Switch – switch to SW copy (B) and restart DR Sysplex A from the disk copy

VSAM Workload

New type of workload used mainly for CICS workload and batch



Infosphere VSAM Replication

Graceful Switch

Current region switch

We stop all new connection at the distributor level



We wait 10sec and we move the workload to the new region

Graceful switch

We stop all new transaction at the distributor level



We verify if there is no batch running



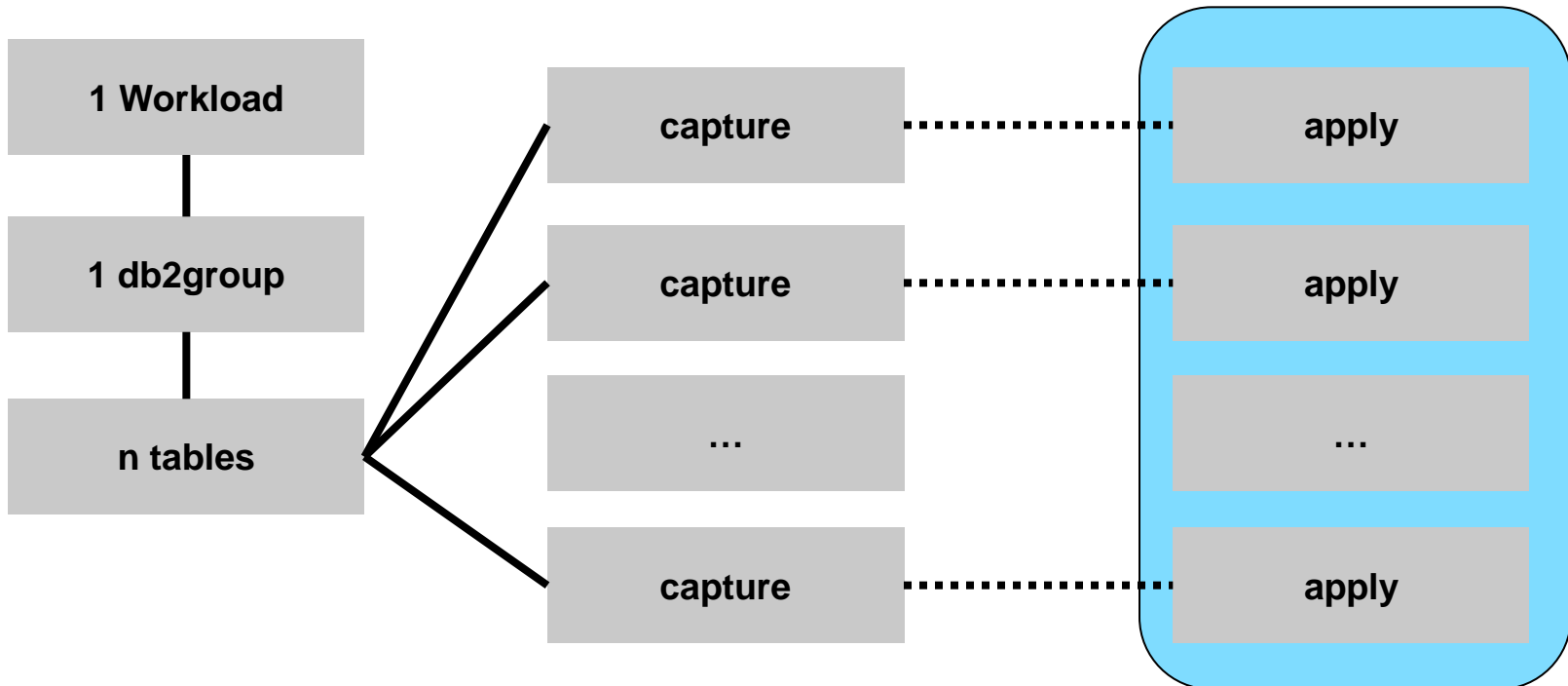
We switch to the new region



We set the former primary region in « read + replication only » mode

Multiple Consistency Groups (MCGs)

- Before MCGs
1 Workload = 1 db2group = n tables = 1 capture / 1 apply
- With MCGs



Multiple Consistency Groups (MCGs)

- Higher flexibility
 - A single workload can replace multiples workload
 - Apply engines use the capability to perform synchronized commit of the update they have done in the secondary site.
- Higher scalability
 - Support more than 100 000 updates/seconds for a specific workload.

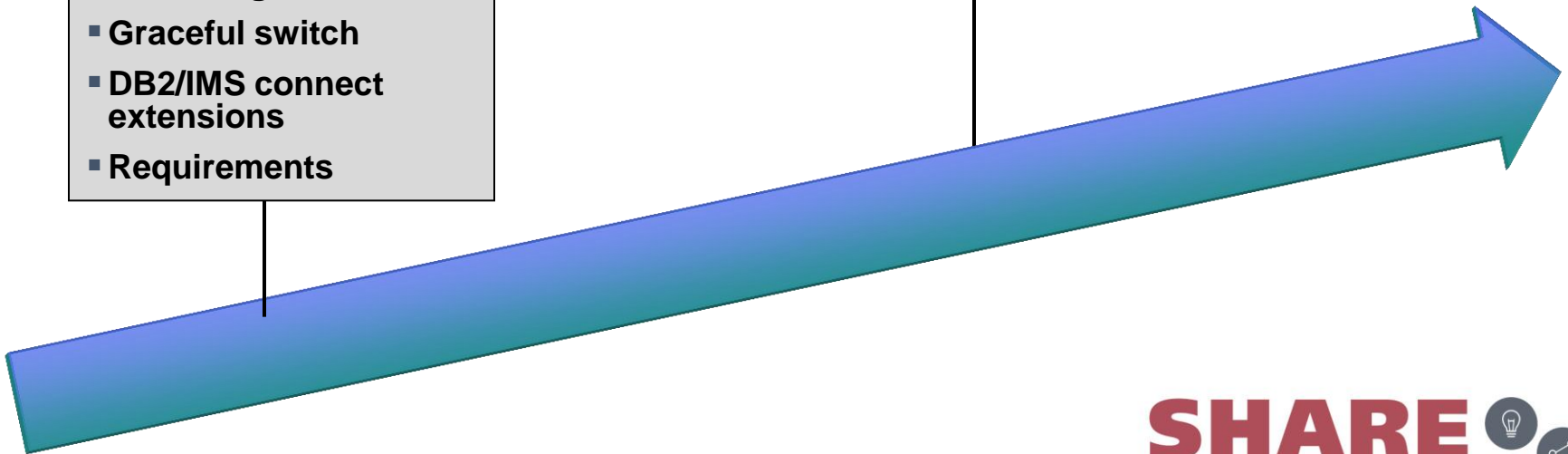
Version v1.5 – GA. July 10th 2015

A/A Sites – 1.4

- Active/Query config
- Co-existence with GDPS/PPRC and GDPS/HM
- VSAM replication
- Q-rep MCG
- Disk integration
- Graceful switch
- DB2/IMS connect extensions
- Requirements

A/A Sites 1.5

- Extend A/A Sites to support legacy SNA appl
- Scalability enhancements
- DB2/IMS connect extensions
- Requirements



Extend A/A Sites to support legacy SNA appl

- SNA APPLID could now be specified under GDPS to monitor the SNA application.
- Better performance and better control.
- Workload failure capability for these applications

- Legacy application (3270) are often based on SNA
- SNA-based workload support – A/A Sites applications are currently based upon TCP/IP based networks; however, some clients still have applications based upon SNA based networks. This will extend A/A Sites capability to TN3270, remote API, & message broker SNA based applications.

Scalability enhancements

- Taking advantage of Lifeline 2.5 to improve scalability and performance
- Less contention → More Workload can be managed

DB2/IMS connect extensions

- Support of DB2 connect and IMS connect application.
- DB2 API only, no COBOL application

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Summary

Eliminates planned outages and reduces impact of unplanned outages

Provide cross-site Workload Balancing

Unlimited distances, can handle heavy workload

Thank you for your attention!

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