

# Hitachi Business Continuity Manager

## 8.1.4-00 Release Notes

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### About this document

This document (RN-00HS270-27, April, 2015) provides late-breaking information about the Hitachi Business Continuity Manager 8.1.4-00 (FMID: CHYK807). It includes information that was not available at the time the technical documentation for this product was published, as well as a list of known problems and solutions.

### Intended audience

This document is intended for customers and Hitachi Data Systems partners who license and use the Hitachi Business Continuity Manager.

## Getting help

The Hitachi Data Systems customer support staff is available 24 hours a day, seven days a week. If you need technical support, log on to the Hitachi Data Systems Portal for contact information: <https://portal.hds.com>. If you purchased this product from an authorized HDS reseller, contact that reseller for support.

## About this release

This release is a major release that adds new features.

## Product package contents

Medium	CD-ROM	Revision
Software	Hitachi Business Continuity Manager	8.1.4-00
Documents	Hitachi Business Continuity Manager User Guide	MK-94RD247-26
	Hitachi Business Continuity Manager Installation Guide	MK-95HC104-23
	Hitachi Business Continuity Manager Reference Guide	MK-96HC135-22
	Hitachi Business Continuity Manager Messages	MK-94RD262-25

## New features and important enhancements

### For 8.1.4-00

#	Item	New Features and Enhancements
1.	Operation improvement	For creating or updating a disk configuration definition file, a volume, a storage class, or the type of the device can be specified as an option.
2.		When the Remote scan or the NG scan executed in the range of volumes including a journal volume, journal volume information will be excluded.
3	Storage System features	A volume with a capacity of more than 262,668 cylinders is available.

## System requirements

### Operating system requirements

#	Operating System
1	z/OS™ V1R10 to V2R1

### License keys

#	License Keys
1	You cannot use the license keys that you installed for the release 05-03. This version requires a new style license key. The new style license key length is 75 characters.

**Firmware levels**

No.	Storage system	Required microcode version	Storage System Support Function
1	Hitachi Virtual Storage Platform G1000	80-01-01 or later	0x40 or lower
2	Hitachi Virtual Storage Platform	70-00-35 or later	0x33 or lower
3	Hitachi Universal Storage Platform V	60-02-33 or later	0x23 or lower
4	Hitachi Universal Storage Platform VM	60-02-33 or later	0x23 or lower
5	Hitachi Universal Storage Platform	50-09-11 or later	0x16 or lower
6	Hitachi Network Storage Controller	50-09-11 or later	0x16 or lower
7	Lightning 9900V Series	21-14-28 or later	0x04 or lower

Hereafter, Hitachi Virtual Storage Platform G1000 is abbreviated to VSP G1000.

Hitachi Virtual Storage Platform is abbreviated to VSP.

Hitachi Universal Storage Platform V and Hitachi Universal Storage Platform VM are abbreviated to USP V.

Hitachi Universal Storage Platform and Hitachi Network Storage Controller are abbreviated to USP.

**Prerequisite programs**

#	Program name	Notes
1	DFSMS™	Standard OS component
2	ISPF	Standard OS component
3	TSO/E	Standard OS component
4	TSO/E REXX	Standard OS component
5	Security Server	To use the resource access control facility (RACF™)
6	IBM™ Library for REXX on zSeries™ Release 4 (FMID HWJ9140) or IBM Library for REXX on zSeries Alternate Library (FMID HWJ9143)	The REXX Alternate Library is included in standard OS component.

**Related Programs**

- When linking Replication Manager

The following software programs are required when Replication Manager is used to collect mainframe system storage information.

#	Program name	Description	Notes
1	IBM Communication Server	A communication program	Standard OS component
2	Replication Manager	A program required to define, use, and monitor copy pairs.	8.1.4 or later
3	IBM HTTP Server for z/OS	An optional product bundled with WebSphere™ Application Server for z/OS. This is required when establishing IPv6 connections or HTTPS communication with Replication Manager.  In addition, z/OS Security Level3 is required when establishing HTTPS communication with Replication Manager.	Use version 6.1.

- When operating z/OS™ on z/VM™

The following software programs are required when operating BC Manager z/OS on z/VM.

#	Program name	Notes
1	z/VM	V5R3 (PTF is necessary) Please confirm the support versions other than V5R3 to Hitachi Data Systems.

Refer to the following document that Hitachi Data Systems for the operating conditions and the settings in a VM environment.

Title: Hitachi Business Continuity Manager Software Running in a z/VM

Virtual Machine User's Guide

Doc Number: MK-98RD6725

- When performing operations in a 2DC configuration with HyperSwap and Universal Replicator

The following software program is required when running BC Manager in a 2DC configuration with HyperSwap and Universal Replicator.

#	Program name	Notes
1	IBM Tivoli™ Storage Productivity Center for Replication for System z™	4.2.0 or later

**Memory and disk space requirements**

- Virtual memory requirements

The following indicates the user region necessary to run BC Manager.

- For a user region of 16 MB or less

1,024 KB

- For an extended user region of 16 MB or more

- For TSO/E:

4,000 KB + (2 × number of volumes) KB

- For Batch:

4,000 KB + ↑(1.5 × number of volumes) ↑ KB

*number of volumes*: Number of all volumes included in DAD used. When two or more copy groups are operated, they are sum totals of the number of volumes that each copy group uses.

The following indicates the user region necessary when linking with Replication Manager. The PREFIX parameter and DEVN parameter in the formula below are the initialization parameters of the BC Manager agent.

- For a user region of 16 MB or less

2,048 KB

- For an extended user region of 16 MB or more

6,000 KB + A KB

+ ↑(512 × number-of-specified-PREFIX-parameters) ÷ 1,024 ↑ KB

+ ↑(64 × number-of-specified-DEVN-parameters) ÷ 1,024 ↑ KB

A: The larger value of the following: the value of (1.5 × D) and the result of (3 × P)

*D*: Among the numbers of devices specified for the DEVN parameters, the highest number of devices.

*P*: Among the copy groups used by the BC Manager agent, the highest number of copy pairs in any group.

The amount of memory required to use BCM Monitor is shown below.

- For a user region of 16 MB or less

2,048 KB

- For an extended user region of 16 MB or more

$6,000 \text{ KB} + (3 \times \text{number-of-copy-pairs}) \text{ KB}$

$+ (C + S) \times 1 \text{ KB}$

*C*: Number of copy group parameters specified in the YKMONCG file.

*S*: Number of action parameters specified in the YKMONCG file.

– Disk space requirements

Files to be installed	Required space (in unit of tracks)	Number of Directories
HDSYSAMT	15 tracks	5
HDSYLNKT	90 tracks	30
HDSYLPAT	1 track	1
HDSYPRCT	5 tracks	10
HDSYEXET	45 tracks	10
HDSYEXVT	45 tracks	10
HDSYPNLT	60 tracks	200
HDSYMSGT	5 tracks	5
HDSYTABT	5 tracks	5

## Resolved problems

None

## Known problems

None

## Installation precautions

Please review the following manual references for installation:

- Before starting installation, please ensure that there is sufficient dataset capacity and the number of directories in the distribution libraries and the target libraries that are required for installation.
- See the chapter "Installing Business Continuity Manager" in the "Hitachi Business Continuity Manager Installation Guide" for full details on the installation of BC Manager.

## Version description

The Main Menu panel displays the version number of this product as follows:

- Version 8.1.4-00

The ISPF Setting Information panel and the YKINSCHK command YKK001I message output display the version number of this product as follows:

- Version 8.1.4-00 (02)

The YKDSPENV command YKT400I message output displays the version number of this product as follows:

- 8.1.4-00

The YKY001I message output when Agent starts displays the version number of this product as follows:

- 8.1.4-00

The YKENV command displays the version number of this product as follows:

- 8.1.4-00(02)

The YK8001I message output when BCM Monitor starts displays the version number of this product as follows:

- 8.1.4-00

In the chapter "Installing Business Continuity Manager" and "Modifying Sample JCL" in the "Hitachi Business Continuity Manager Installation Guide", replace CHYKnnn and Vnnnnnn as follows:

#	In the manual	Replace with
1	CHYKnnn	CHYK807
2	Vnnnnnn	V081400

**User SVC version that corresponds to this product version**

The User SVC version that corresponds to this product version is as follows:

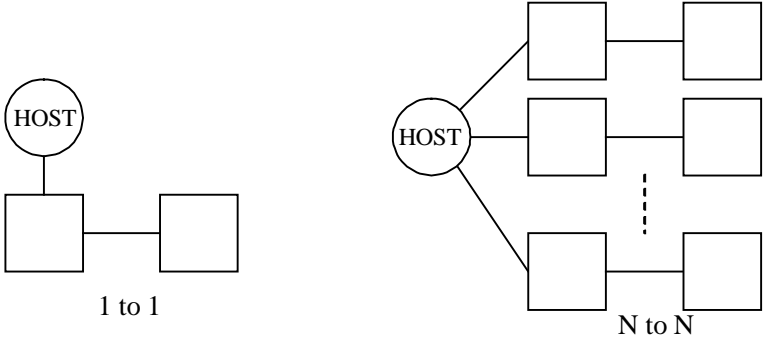
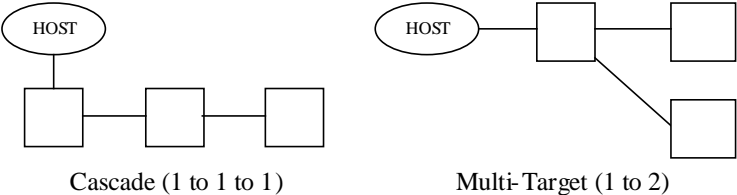
- Version 7.5.0-00(00) or later

This information appears in the User SVC Information panel and execution result of YKINSCHK command.



## Usage precautions

### System Configuration

#	Usage Precautions
1	<p>BC Manager supports 2DC configuration (1:1). By making multiple units of 2DC configurations, it is possible to create N:N configurations.</p>  <p>The diagram illustrates two configurations. On the left, a '1 to 1' configuration shows a circular 'HOST' connected to a square DC, which is connected to another square DC. On the right, an 'N to N' configuration shows a circular 'HOST' connected to a vertical column of three square DCs. Each of these DCs is connected to a corresponding square DC in a second vertical column. A dashed vertical line between the two columns indicates that there are more than three DCs in each column.</p>
2	<p>BC Manager supports 3DC (TC-Sync and UR) configurations (Cascade configurations and Multi-Target configurations). Please note that 3DC configurations are supported only when all Storage Systems in the configurations are USP, USP V, VSP, or VSP G1000. N:1 configuration and a configuration that consists of four or more DCs are not supported.</p>  <p>The diagram illustrates two configurations. On the left, a 'Cascade (1 to 1 to 1)' configuration shows a circular 'HOST' connected to a square DC, which is connected to a second square DC, which is then connected to a third square DC. On the right, a 'Multi-Target (1 to 2)' configuration shows a circular 'HOST' connected to a square DC, which is then connected to two separate square DCs.</p>
3	<p>BC Manager supports 4x4 and 4x4x4 Multi-Target configurations. Note that the configuration should consist entirely of USP, USP V, VSP, or VSP G1000.</p>
4	<p>BC Manager supports 4x4x4 Cascade configurations. Note that the configuration should consist entirely of USP, USP V, VSP, or VSP G1000.</p>

**Remote DKC control function**

#	Usage Precautions
1	When using Remote DKC control function, please use a Fibre Channel links for the connection between Storage Systems. An ESCON™ links are not supported. When you define the logical path between the CUs for Remote DKC control function, you must define the path between CUs that belong to the command device volumes.
2	To share a command device among multiple OSs, please ensure that "&YKCMDIF" variable is either defined in the IEASYM member or set by START YKSETENV command.
3	When allocating a command device, please note the following items: <ul style="list-style-type: none"> <li>● A parity group cannot be moved if a command device is defined within the parity group.</li> <li>● A parity group type cannot be changed if the command device is defined within the parity group.</li> <li>● The command device between LCUs cannot be moved.</li> <li>● The volume size of the command device cannot be changed (550 cylinders are required for Lightning 9900V).</li> </ul>
4	When defining a multiple command device line, BCM recommends the following command device setting to reduce CLI command's response time: <ul style="list-style-type: none"> <li>● The number of command devices for a head storage system of a route list should be seventeen or less.</li> </ul>

**Copy types**

#	Usage Precautions
1	There should not be a mix of copy types within a single copy group. Please ensure that all volumes are SIMPLEX in the initial state. BC Manager does not display the pair status correctly in the following conditions: <ul style="list-style-type: none"> <li>● A copy group definition is changed when not all pairs are SIMPLEX.</li> <li>● A pair configuration in a copy group definition differs from the actual pair configuration.</li> </ul>

## Others

#	Usage Precautions
1	From BC Manager 04-00, CLI Command-Execution Logs are output to SYSLOG. This applies to the CLI commands that are executed from within the ISPF panels of BC Manager. Therefore, large amounts of data will be output to SYSLOG when there are frequent BC Manager operations or many CLI commands are issued.
2	BC Manager does not support the multiplatform volume.
3	From z/OS V1R8, a console ID cannot be specified to the CN operand of TSO/E SEND command. Because of this, a console ID cannot be specified for the CN operand of the YKWATCH command when using it. If the console ID is specified, TSO/E SEND command that is used in the YKWATCH command will fail and the YKWATCH does not return the expected message.
4	From BC Manager 06-00, it becomes impossible to use the configuration file made by versions earlier than 02-00. (APIInfo Level in the configuration file is "1.1.0" or earlier)
5	After the Storage System microcode is replaced, scan the Storage System
6	Specify a different Storage System serial number for P-VOL and S-VOL when you define the copy group definition of the copy type other than SI.
7	Do not specify a different DADID from the DADID in a copy group definition when you specify a DADID in the Set Defaults panel or in the YKLOAD command's operand.
8	From BC Manager 06-00, it is necessary to set up Resource Access Control Facility (RACF) to use the CLI commands or the BC Manager agent.
9	Do not perform PPRC operations to BCM copy pairs. If you perform PPRC operations to the BCM copy pairs, dissolve and re-establish the copy pairs using BCM. You can resynchronize copy pairs with the CESTPAIR operation with the default operands only if you perform the CSUSPEND operation with the default operands on the BCM copy pairs as a TC copy group without the C/T group ID.
10	If there is already a Configuration file generated by the YKP2A command of the Mainframe Agent program, make sure to use a different prefix value for BC Manager so that it does not reference the Configuration file generated by the YKP2A command. BC Manager does not accept a Configuration file generated by the YKP2A command. If such a file is used for any BC Manager operations, it will cause an error.
11	With BC Manager versions earlier than V6.1, user SVCs cannot be used to suppress output of IOS002A messages when the I/O path between the host and the Storage System is disconnected while device scanning is being performed. Therefore, in a mixed-version environment, make sure to always use user SVCs of BC Manager version V6.1 or later.

## Documentation

### Available documents

Manual Name	Manual No.	Issue Date
Hitachi Business Continuity Manager User Guide	MK-94RD247-26	April, 2015
Hitachi Business Continuity Manager Installation Guide	MK-95HC104-23	April, 2015
Hitachi Business Continuity Manager Reference Guide	MK-96HC135-22	April, 2015
Hitachi Business Continuity Manager Messages	MK-94RD262-25	April, 2015

### Documentation errata

None

**About Storage System features**

#	Storage System features
1	4x4x4 Multi-Target Configurations without the Delta Resync Function is available. Refer to the Explanation and Usage document "4x4x4 Multi-Target Configuration without the Delta Resync Function" for details.

**Conventions: Abbreviations**

This document uses the following abbreviations for product names:

Abbreviation	Full Name
BC Manager	Hitachi Business Continuity Manager
Replication Manager	Hitachi Replication Manager Software

**Conventions: KB, MB, GB, and TB**

This document uses the following conventions unless otherwise specified:

- 1 KB (kilobyte) is 1,024 bytes.
- 1 MB (megabyte) is 1,024<sup>2</sup> bytes.
- 1 GB (gigabyte) is 1,024<sup>3</sup> bytes.
- 1 TB (terabyte) is 1,024<sup>4</sup> bytes.

## Temporary Restrictions

### Restrictions

#	Restrictions
1	In the configuration in which Lightning 9900V, USP, USP V VSP, and VSP G1000 coexist, BC Manager can manage this configuration only when it consists of devices whose serial numbers are not duplicated (i.e. each device in the configuration has a unique serial number).
2	If you issue either YKQUERY, YKQRYDEV or YKEWAIT commands to a SI copy group in a Lightning 9900V immediately after execution of YKDELETE command, these commands may report the status of a copy pair to be SIMPLEX even though the actual status is in the middle of transition to SIMPLEX (not fully becoming SIMPLEX). Therefore, when issuing YKMAKE command to the same SI volumes after execution of YKDELETE command, please pause for approximately ten seconds before issuing YKMAKE command.
3	When using BC Manager to operate from L-site in a 4x4x4 Multi-Target configuration with Delta Resync, do not perform a Resync operation on a UR copy pair that was automatically suspended after performing Reverse Resync on TC copy pairs to avoid forming a 3DC Cascade configuration.
4	When using BC Manager to operate from L-site in a 4x4x4 Multi-Target configuration with Delta Resync, start business operations after TC and UR copy pairs are formed so that the Multi-Target configuration is established.
5	<p>BC Manager does not support a recovery procedure from a failure in 4x4x4 Multi-Target configuration with Delta Resync by some misoperation. In this case, the procedure is provided as necessary in the following process.</p> <p>If you need to call the Hitachi Data Systems customer support, make sure to provide as much information about the problem as possible, including:</p> <ul style="list-style-type: none"> <li>➤ The circumstances surrounding the error or failure.</li> <li>➤ The circumstances surrounding the error or failure.</li> <li>➤ The content of any error message(s) displayed on the host system(s).</li> <li>➤ The content of any error message(s) displayed on Storage Navigator.</li> <li>➤ The Storage Navigator configuration information (use the FD Dump Tool).</li> <li>➤ The service information messages (SIMs), including reference codes and severity levels, displayed by Storage Navigator.</li> </ul> <p>The Hitachi Data Systems customer support is available 24 hours a day, seven days a week. To reach us, please visit the support Web site for current telephone numbers and other contact information:</p> <p style="text-align: center;"><a href="http://www.hds.com/services/support/">http://www.hds.com/services/support/</a>.</p> <ul style="list-style-type: none"> <li>➤ If you purchased this product from an authorized HDS reseller, contact that reseller for support.</li> </ul>

6	<p>Do not specify the following values to the DADID of a Disk Configuration Definition, a copy group or a route list. Specifying those values may cause the information displayed in Discover Hitachi Storage System panel to become incorrect.</p> <ul style="list-style-type: none"> <li>● "R"</li> <li>● "CMD"</li> <li>● "I"</li> <li>● "K"</li> <li>● "RC"</li> </ul> <p>Examples: that cannot be specified:</p> <ul style="list-style-type: none"> <li>● "R"</li> <li>● "xx.R"</li> <li>● "R.xx"</li> <li>● "xx.R.xx"</li> </ul> <p>where xx is an arbitrary string of one or more characters.</p>
7	<p>The YKWATCH command is not available for monitoring a copy pair status transition if the PPRCSUM feature in DEVSUPxx is enabled in z/OS V1R13 or later. Use the YKEWAIT command to monitor, instead.</p>

## Specification differences from the previous versions

This section describes the specification differences between V8.1.0 and V8.1.4 of BC Manager.

### Overall

Item	Specification in V8.1.0	New specification in V8.1.4	Version
Remote scan / NG scan	When the Remote scan or the NG scan executed in the range of volumes including a journal volume, journal volume information is included.	When the Remote scan or the NG scan executed in the range of volumes including a journal volume, journal volume information will be excluded.	8.1.4-00
Storage System features	The limit of a volume capacity is less than 262,668.	A volume with a capacity of more than 262,668 cylinders is available.	8.1.4-00

### Commands

Item	Specification in V8.1.0	New specification in V8.1.4	Version
YKBTSCAN	-	STORCLAS/ UNIT/ VOLUME parameters are added.	8.1.4-00
YKSCAN	-	CFGUPDTE/ STORCLAS/ VOLUME/ UNIT parameters are added.	8.1.4-00
YKIMPORT			8.1.4-00

**ISPF panels**

Item	Specification in V8.1.0	New specification in V8.1.4	Version
Set Default	-	Added the following attributes : <ul style="list-style-type: none"> <li>• Configuration update</li> <li>• Storage class</li> <li>• Volume serial</li> <li>• Device type</li> </ul>	8.1.4-00

**Messages**

Item	Specification in V8.1.0	New specification in V8.1.4	Version
YK7005E	-	Newly added.	8.1.4-00
YKB103E			8.1.4-00
YKH103E			8.1.4-00
YKJ003E			8.1.4-00
YKM780E			8.1.4-00
YKM781E			8.1.4-00
YKM782E			8.1.4-00
YKM783E			8.1.4-00
YKS087E			8.1.4-00
YKS088E			8.1.4-00
YKS089E			8.1.4-00

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## Appendix A. 4x4x4 Multi-Target Configuration without the Delta Resync Function Explanation and Usage

- What can be achieved by a Multi-Target Configuration without the Delta Resync Function
 

4x4x4 Multi-Target configuration without the Delta Resync Function is a combination of 4x4 configuration and 3DC Multi-Target configuration without the Delta Resync Function. Even when one site went down because of disaster or other failure, it is possible to maintain 2DC configuration between remaining two sites.
- Operating configuration
 

Figure A-1 shows a basic operating 4x4x4 Multi-Target Configuration without the Delta Resync Function using TC and 4x4 UR.

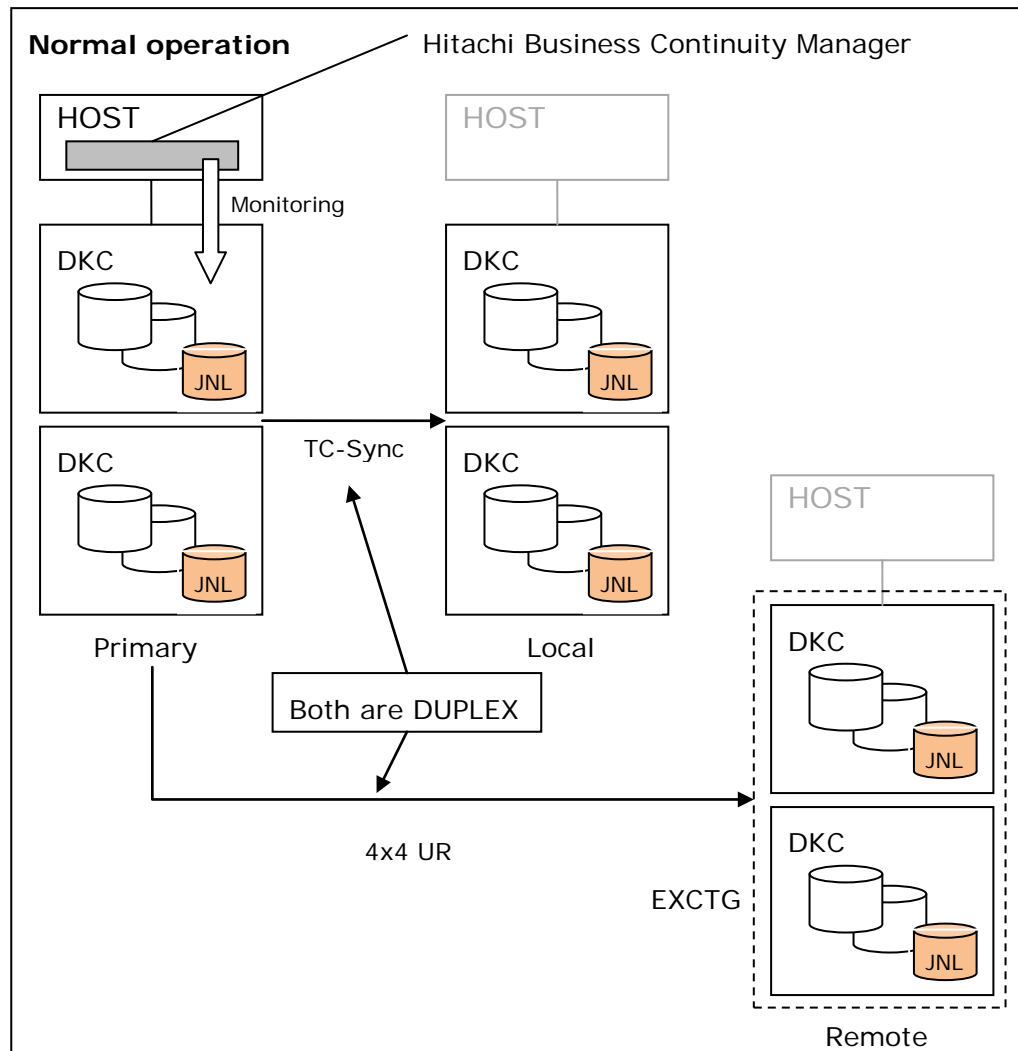


Figure A-1 Operating configuration in normal status

Figure A-2 shows example of operating configuration upon host failure of the Primary site. If the host failure of the Primary site occurs, TC copy pairs can be established between the Local site and the Primary site by using the Reverse Resync function. As a result, you can switch to the business continuance on the Local site with keeping 2DC configuration.

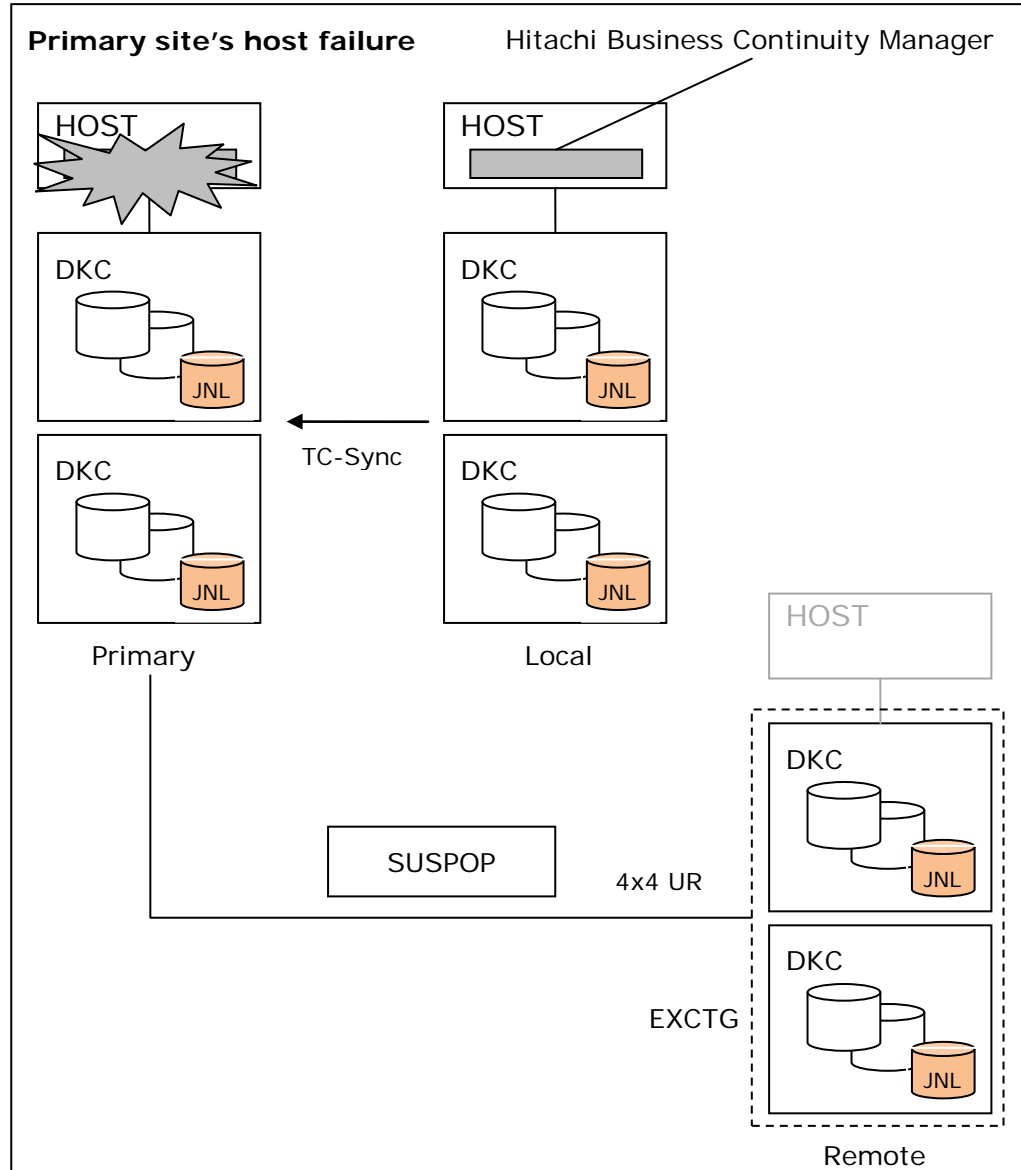


Figure A-2 Operating configuration upon Primary site's host failure

Figure A-3 shows example of operating configuration upon DKC failure of the Primary site. If the DKC failure of the Primary site occurs, UR copy pairs can be established between the Local site and the Remote site. As a result, you can switch to the business continuance on the Local site with keeping 2DC configuration.

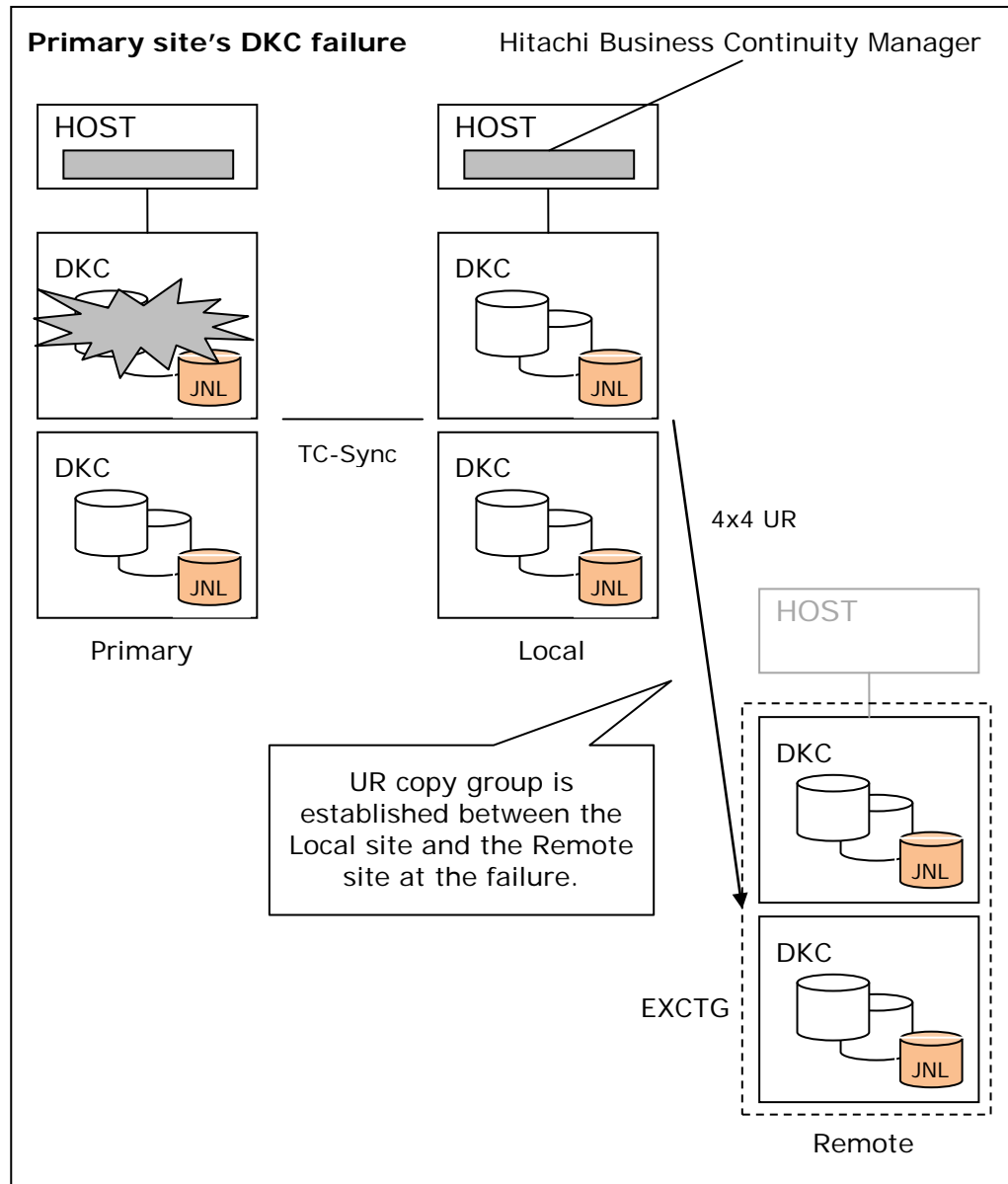


Figure A-3 Operating configuration upon Primary site's DKC failure

➤ Prerequisite conditions

Tables A-1 through A-4 show the prerequisite conditions for a 4x4x4 Multi-Target Configuration without the Delta Resync Function.

Table A-1 Prerequisite hardware

Item	Description	Remarks
Host	Primary site: one host Local site: one host Remote site: one host if operation is to be performed from the Remote site.	None
DKC	Primary site: one to four USP V, VSP, or VSP G1000 Local site: one to four USP V, VSP, or VSP G1000 Remote site: one to four USP V, VSP, or VSP G1000	Up to four DKCs are supported for each site.
Inter-DKC link (physical path)	Primary site ↔ Local site: Fibre Channel, bi-directional Primary site ↔ Remote site: Fibre Channel, bi-directional Local site ↔ Remote site: Fibre Channel, bi-directional Arbitration path in Remote site: Fibre Channel, single direction from the supervisor DKC to each subordinate DKC.	Arbitration paths must be set up via SVP.

Table A-2 Prerequisite software

Item	Description	Remarks
z/OS	Versions supported by BC Manager V8.1.4.	None
BC Manager	V8.1.4 ➤ Basic License ➤ UR 4x4 Extended CTG License	None

Table A-3 Hardware settings

Item	Description	Remarks
Arbitration command devices	DKCs at the Remote site: One or more arbitration command devices for each subordinate DKC.	Arbitration command devices must be set up via SVP.
Journal groups	Journal groups for UR. Timer type must be "System".	<ul style="list-style-type: none"> <li>➤ Required at the Primary site, the Remote site and the Local site.</li> <li>➤ Journal groups must be set up via Storage Navigator before operation.</li> </ul>
Journal Volumes	Journal volumes for UR.	<ul style="list-style-type: none"> <li>➤ One or more of journal volumes are required at each of the Primary site, the Remote site and the Local site.</li> </ul>
Command devices	Needs three devices for each DKC. Ex: In 2x2x2 configuration three devices for each DKC, eighteen devices in total.	None
Logical paths	<p>Between the Primary site and the Local site: Inter-CU logical paths (bi-directional)</p> <p>Between the Primary site and the Remote site: Inter-DKC logical paths (bi-directional)</p> <p>Between the Local site and the Remote site: Inter-DKC logical paths (bi-directional)</p>	None

Table A-4 Software settings (OS and BC Manager)

Item	Description	Remarks
Route list (Configuration file)	As in the basic 3DC Multi-Target configuration with Delta Resync pairs, the host at each site must have its own route list.  Refer to the Reference Guide to set up a route list.	None
TC copy group (Configuration file)	<ul style="list-style-type: none"> <li>➤ TC Consistency Preservation function must be applied.</li> <li>➤ Prepare the copy group that the unit of DKC or each CT group divided for the operation at the failure.</li> </ul>	None
4x4 UR copy group (Configuration file)	<ul style="list-style-type: none"> <li>➤ 4x4 UR copy groups are required for the Primary-Remote sites and the Local-Remote sites.</li> <li>➤ The S-VOL journal group of the UR copy pairs for the Primary-Remote sites must be the same as the S-VOL journal group of UR copy pairs for the Local-Remote sites, but they must have the different mirror ID specified.</li> <li>➤ EXCTG ID of a forward direction of two UR copy groups (EXCTG in the Remote site) must be the same.</li> <li>➤ Prepare the copy group that the unit of DKC or each journal group divided for the operation at the failure. And, do not use 4x4 function in the divided copy groups.</li> </ul>	None

➤ Example configurations of DKC

Figure A-4 shows an example configuration of DKC deployment of 4x4x4 Multi-Target Configuration without the Delta Resync Function (as a 2x2x2 configuration). This chapter explains the operational procedure based on this example configuration.

The copy group name shown in the operation procedure corresponds as shown in the table A-5. At the following, the Primary site is omitted with P-site, the Local site is omitted with L-site, and the Remote site is omitted with R site in the operation procedure. APP1 shows the host on the Primary site, APP2 shows the host on the Local site.

Table A-5 Correspondence of copy group name

Copy group name	Copy group that corresponds
TCPL	TC copy groups for the Primary-Local sites (G1, G4)
URPR	4x4 UR copy groups for the Primary-Remote sites (G2, G5)
URLR	4x4 UR copy groups for the Local-Remote sites (G3, G6) *1
G1	TC copy group for the Primary DKC (L1)-Local DKC (L2)

G2	4x4 UR copy group for Primary DKC (L1)-Remote DKC (L3)
G3	4x4 UR copy group for Local DKC (L2)-Remote DKC (L3) *1
G4	TC copy group for the Primary DKC (L4)-Local DKC (L5)
G5	4x4 UR copy group for Primary DKC (L4)-Remote DKC (L6)
G6	4x4 UR copy group for Local DKC (L5)-Remote DKC (L6) *1

\*1: This copy group is not used in normal operation.

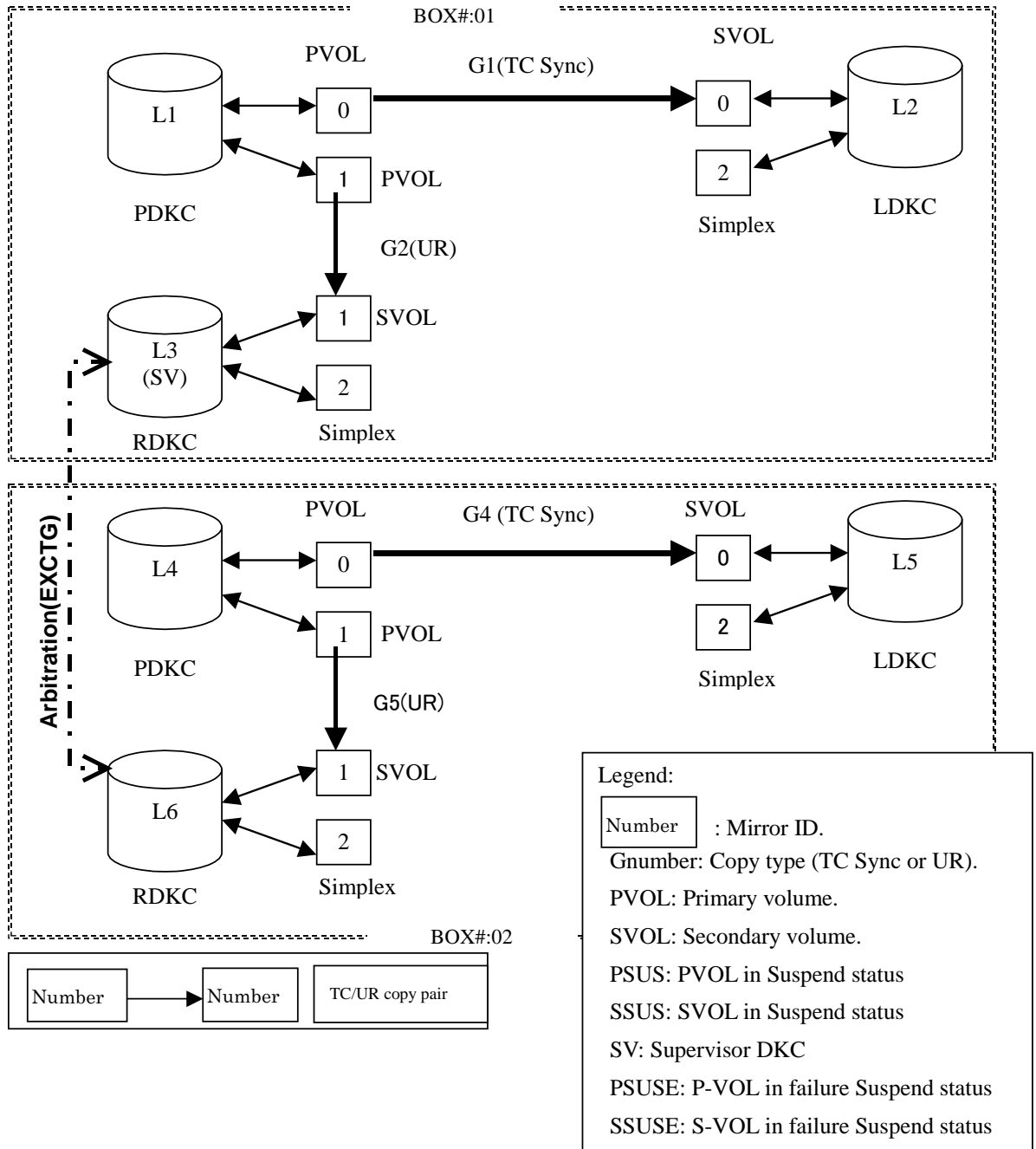


Figure A-4 Basic configuration



➤ Normal operation

Setup procedure of 4x4x4 Multi-Target Configuration without the Delta Resync Function is equivalent to that of 4x4 configuration and Delta Resync configuration. Refer to 2.Prerequisite condition for the details. For the details about setting up 4x4 configuration and Delta Resync configuration, refer to the Business Continuity Manager User's Guide.

Operation of 4x4x4 Multi-Target Configuration without the Delta Resync Function is same as that of 4x4 configuration and 3DC Multi-Target configuration without Delta Resync because you do not establish the UR copy group for the Local-Remote sites. Refer to Table A-6 for the details.

Table A-6 Operational procedure of 4x4x4 Multi-Target Configuration without the Delta Resync Function

#	Operation procedure	Description	Configuration	Difference from 3DC Multi-Target configuration
Preparation				
1	Hardware setup	<ul style="list-style-type: none"> <li>➤ Bi-directional paths must be set between P-L, P-R and L-R sites.</li> <li>➤ One or more Journal groups in each site.</li> <li>➤ Arbitration paths and arbitration command devices.</li> </ul>	1DC	Arbitration paths and command devices for 4x4 configuration are necessary.
2	Route list	Create a route list of 3DC Multi-Target configuration that contains definition or routes that start from each site. This route list is equivalent to that of Delta Resync configuration.	1DC	A command device is necessary for each DKC.
3	Definition of copy pairs	Create a copy group definition file for TC between P-site and L-site (TCPL/G1/G4), 4x4 UR between P-site and R-site (URPR/G2/G5), and 4x4 UR between L-site and R-site (URLR/G3/G6).	1DC	TC must be with C/T ID, and UR must be of 4x4 UR
4	Establish TC copy pairs	Establish TC copy group (TCPL).	2DC	None.
5	Establish UR copy pairs	Establish UR copy group (URPR).	3DC	None.
Normal operation				
7	----	Keep DUPLEX status on both TC (G1/G4) and UR (G2/G5) copy groups.	3DC	None.

➤ Failover and Failback scenario

Table A-7 shows basic failover and failback cases.

Table A-7 Failover and Failback scenario

#	Maintenance or failure	Item	Remarks
1	Maintenance	L-site maintenance.	None
2		P-site maintenance (host maintenance)	None
3		P-site maintenance (DKC maintenance)	None
4		R-site maintenance	None
5	Failure	L-site failure (G1 link failure)	None
6		L-site failure (DKC failure (in case that Shared Memory is not volatilized))	None
7		L-site failure (DKC failure (in case that Shared Memory is volatilized))	None
8		P-site failure (host failure)	None
9		P-site failure (DKC failure (in case that Shared Memory is not volatilized))	None
10		P-site failure (DKC failure (in case that Shared Memory is volatilized))	None
11		R-site failure (DKC failure (in case that Shared Memory is not volatilized))	None
12		R-site failure (DKC failure (in case that Shared Memory is volatilized))	None

- ✓ The number described in figure, for example (2) G1 (TC Sync), shows the state when the number shown in the procedure is operated.
- ✓ The hatching in figure shows the failure system.

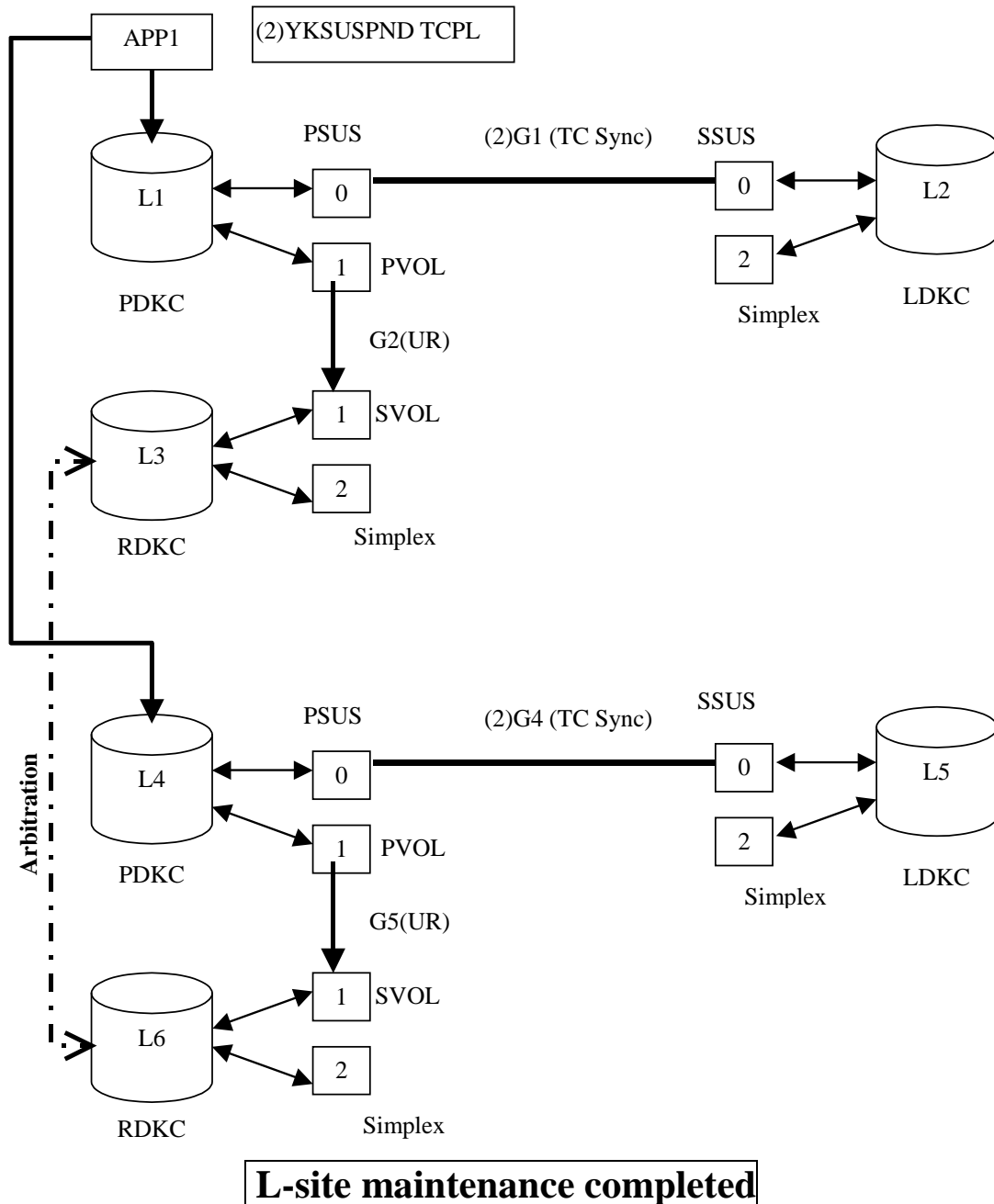
Note the following respect when operating 4x4x4 Multi-Target Configuration without the Delta Resync Function.

- ✓ Specify the value of the STEM parameter specified by the YKLOAD command when you specify the operated copy group by each command.
- ✓ Get the pair state of the copy group by YKQUERY or YKEWAIT command before each command execution.
- ✓ BC Manager does not support recovery procedure from failure in 4x4x4 Multi-Target Configuration without the Delta Resync Function by error in operation. In this case, RSD shall provide the procedure as necessary.

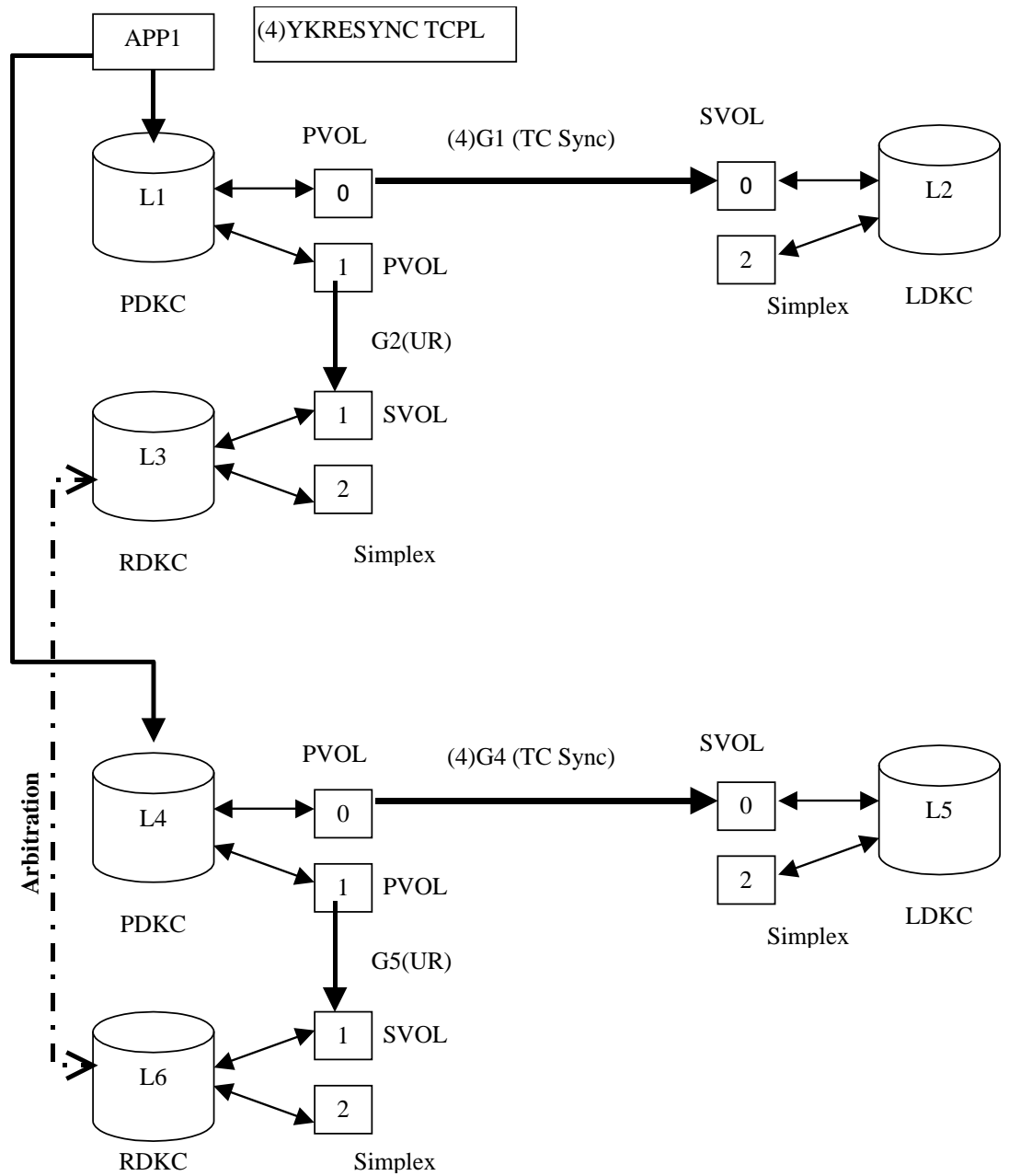
**Procedure 1: L-site maintenance**

- (1) YKFREEZE TCPL from APP1. (YKFREEZE TCPL)
- (2) Suspend the TC Sync copy pairs from APP1. (YKSUSPND TCPL)
- (3) YKRUN TCPL from APP1. (YKRUN in this case can be issued without waiting for all pairs to become suspended. Any write I/O after YKRUN is kept as differential data at the MCU of TC Sync. YKRUN TCPL)

➤ L-site maintenance started.

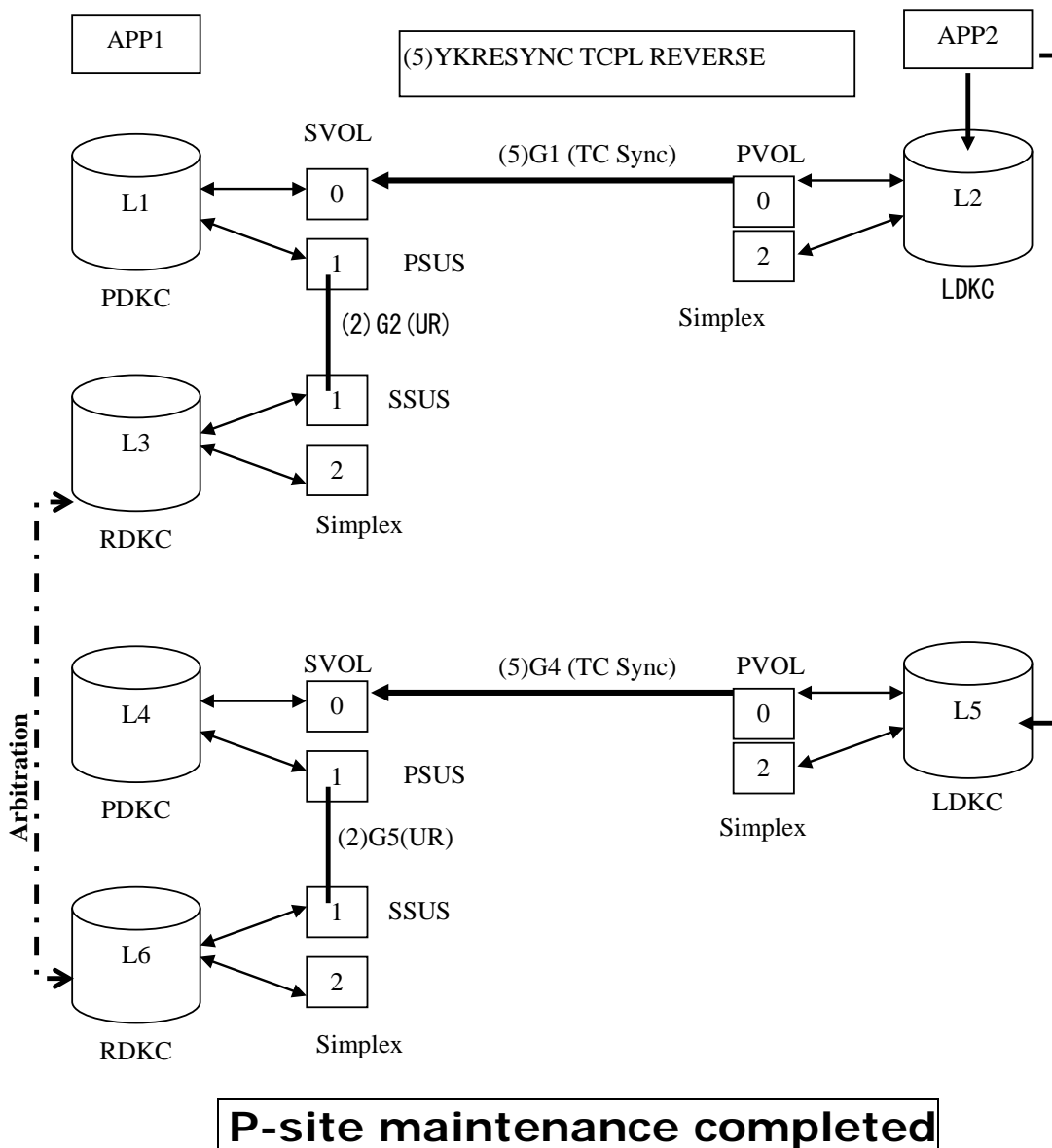


(4) After L-site maintenance has completed, resynchronize TC Sync copy pairs from APP1. (YKRESYNC TCPL)

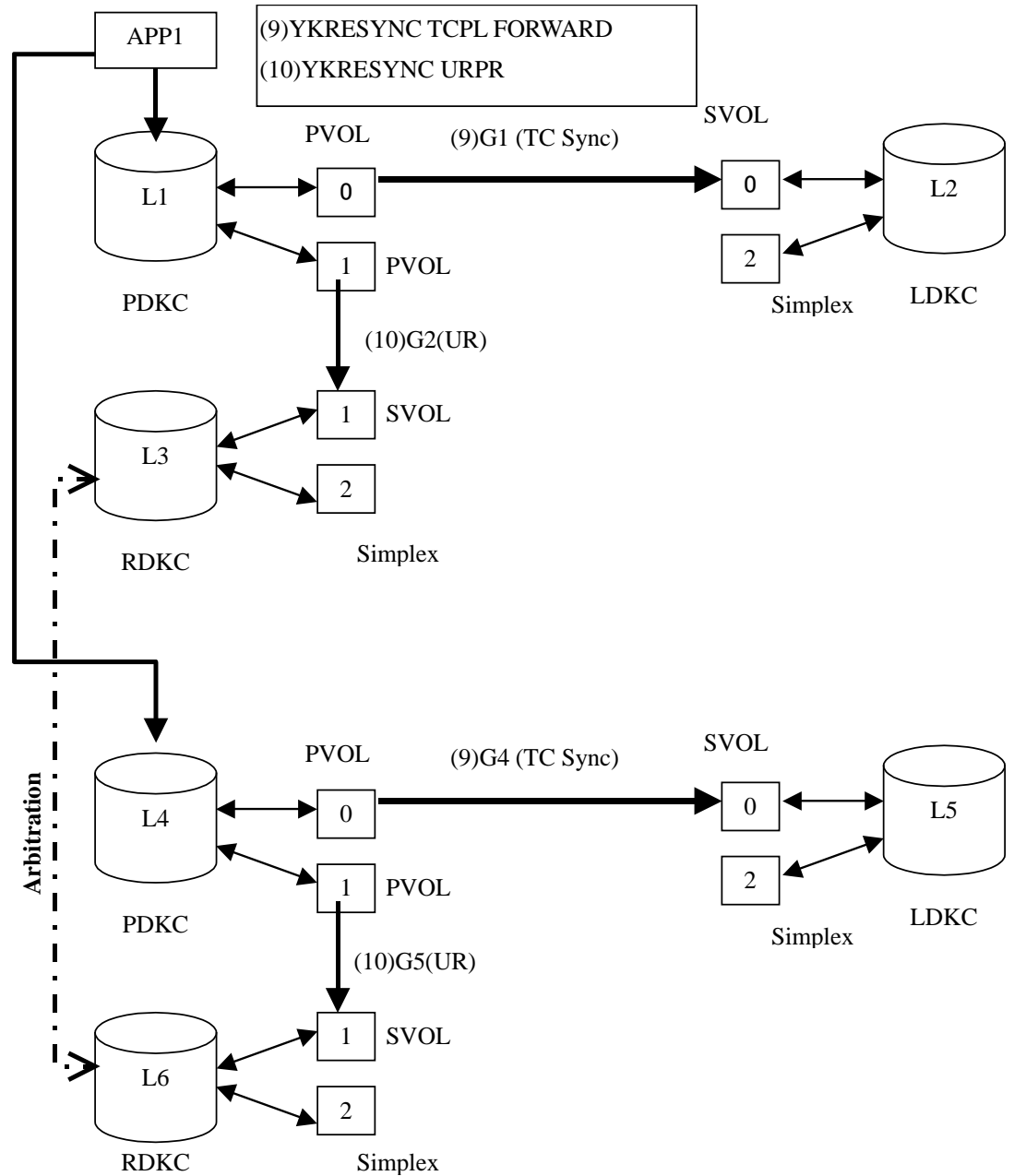


**Procedure 2: P-site maintenance (host maintenance)**

- (1) Stop I/O from APP1.
  - (2) Perform Flush Suspend on UR copy pairs from APP2. (YKSUSPND URPR  
You have to wait for copy pair status to be SUSPOP. (YKEWAIT URPR  
GOTO(SUSPEND))
  - (3) Perform Reverse Suspend on TC Sync copy pairs from APP2. (YKSUSPND  
TCPL REVERSE)
  - (4) Start I/O from APP2.
  - (5) Perform Reverse Resync on TC Sync copy pairs from APP2. (YKRESYNC TCPL  
REVERSE)
- P-site maintenance started.



- (6) Stop I/O from APP2.
- (7) Perform Reverse Suspend on TC Sync copy pairs from APP1. (YKSUSPND TCPL FORWARD)
- (8) Start I/O from APP1.
- (9) Perform Reverse Resync on TC Sync copy pairs from APP1. (YKRESYNC TCPL FORWARD)
- (10) Resynchronize UR copy pairs from APP1. (YKRESYNC URPR)



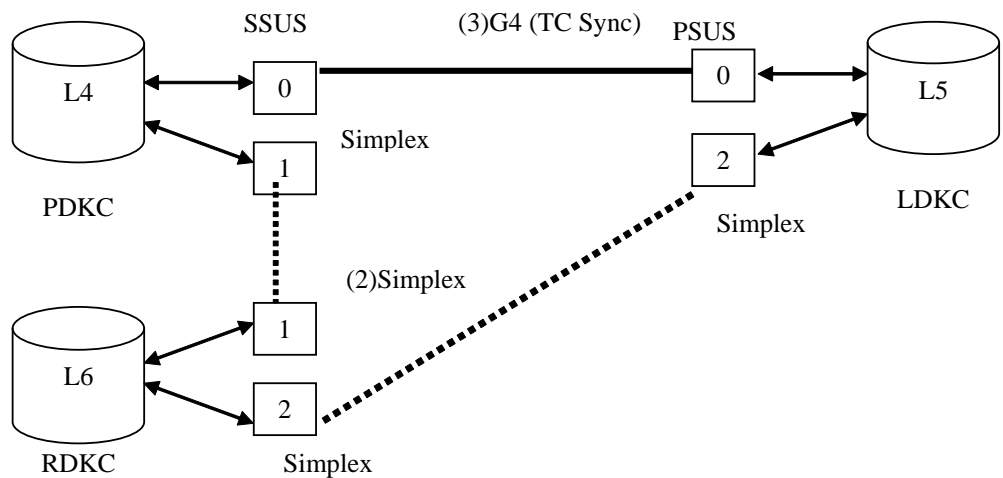
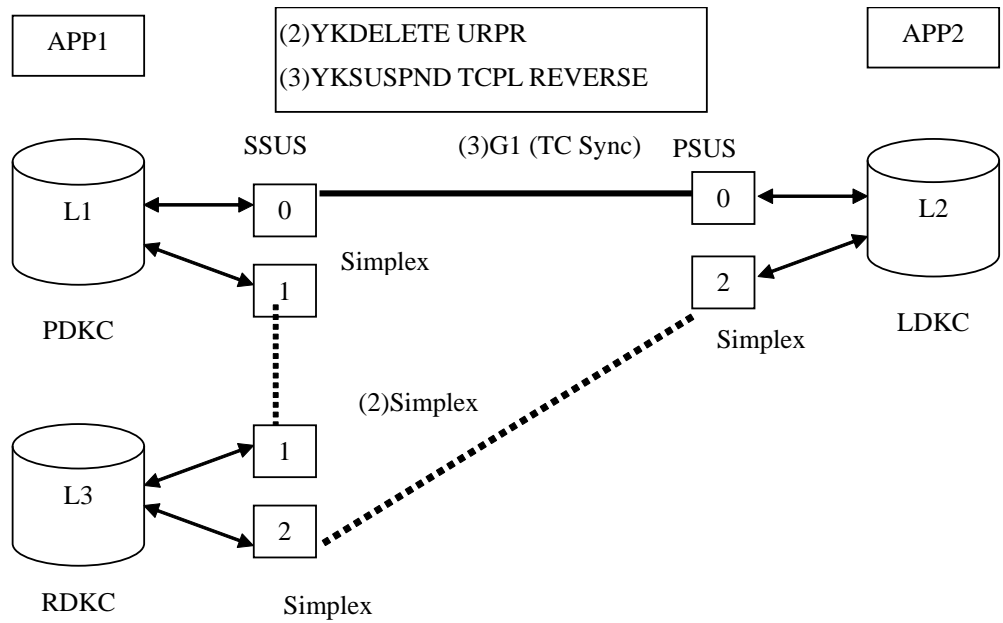
**Procedure 3: Procedure 3: P-site maintenance (DKC maintenance)**

(1) Stop I/O from APP1.

(2) Dissolve on UR copy pairs from APP2. (YKDELETE URPR)

Note: After (2) is executed, EXCTG is dissolved.

(3) Perform Reverse Suspend on TC Sync copy pairs from APP2. (YKSUSPND TCPL REVERSE)

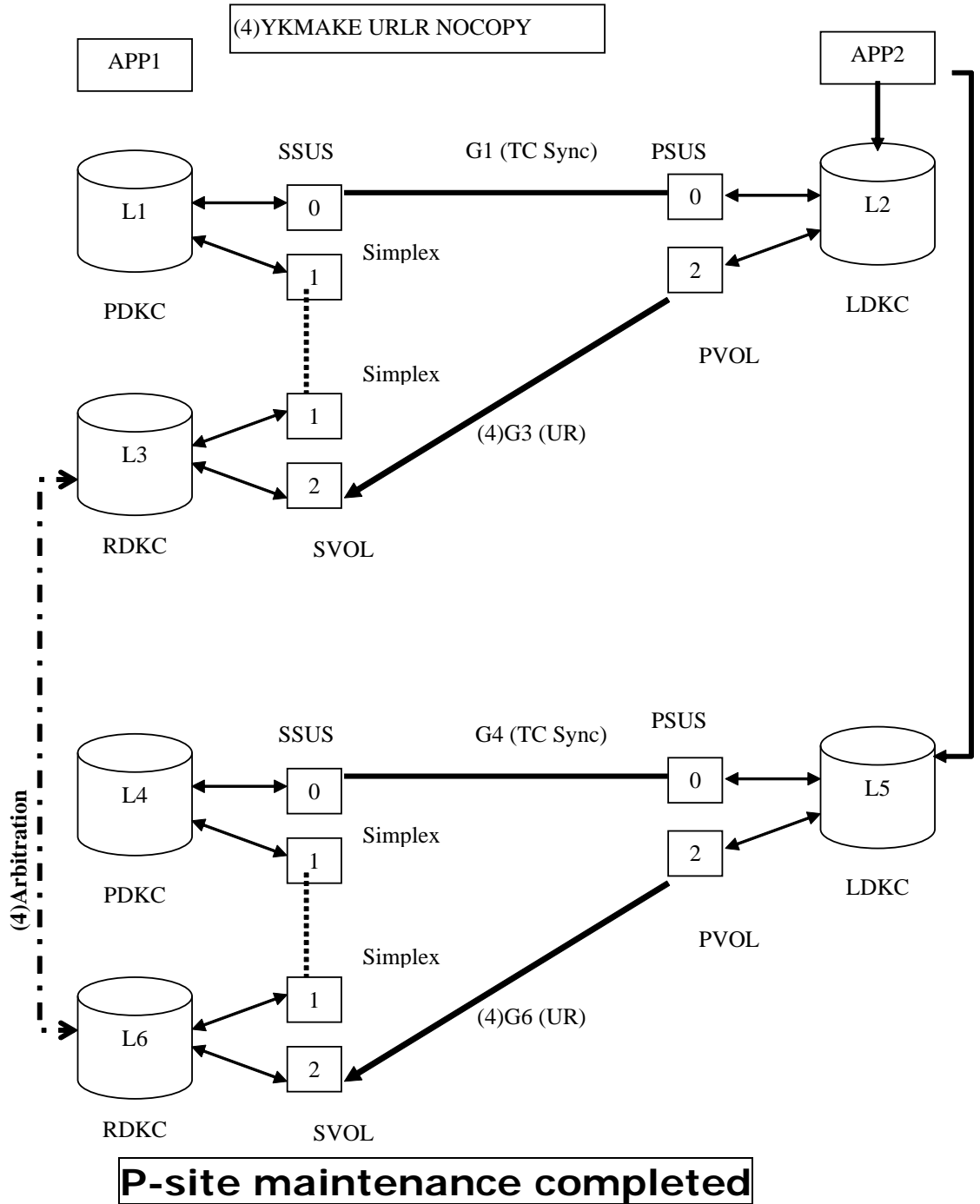


(4) Establish UR copy pairs with NOCOPY parameter from APP2. (YKMAKE URLR NOCOPY)

Note: After (4) is executed, EXCTG is registered.

(5) Start I/O from APP2.

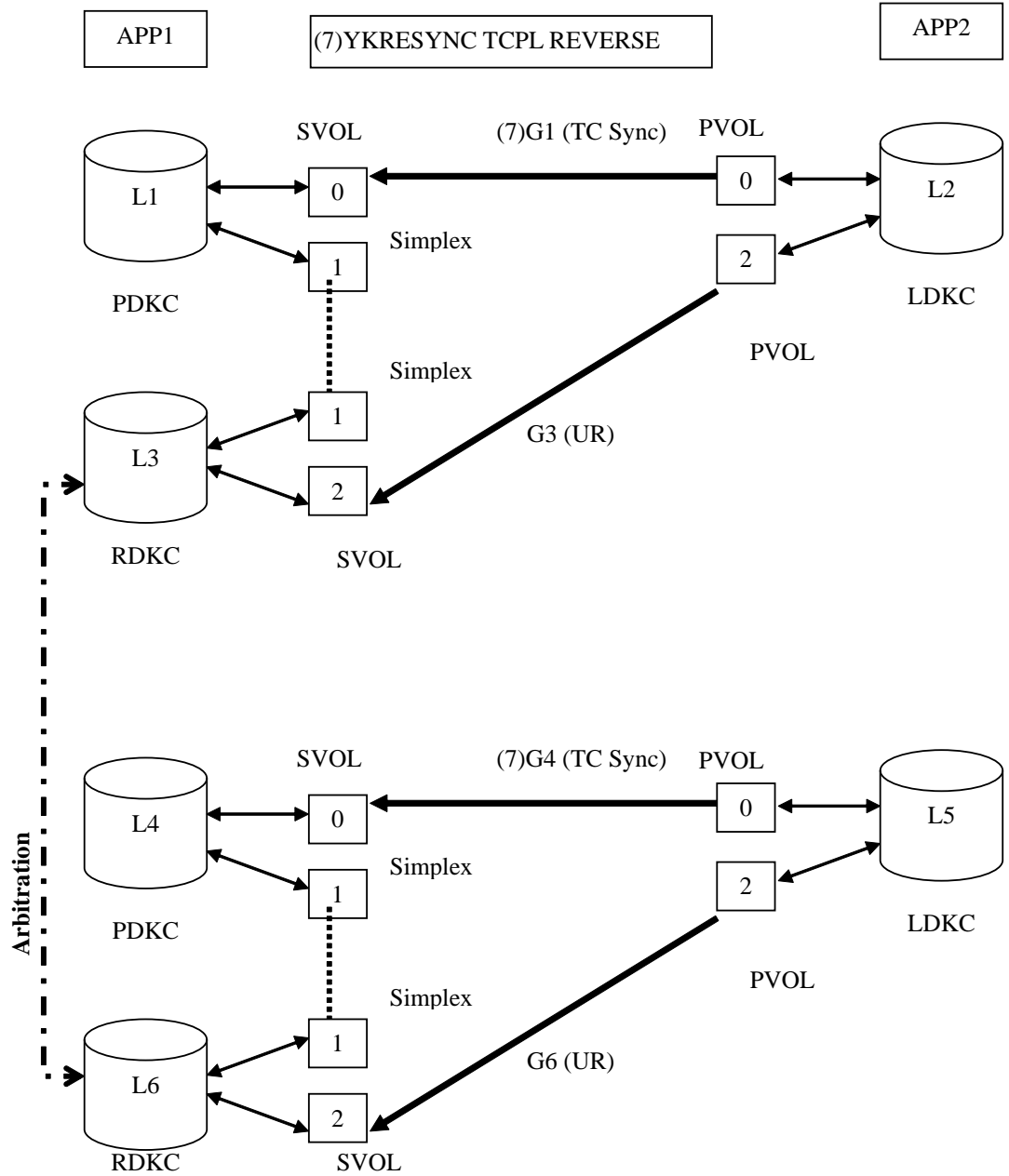
➤ P-site maintenance started.



(6) Stop I/O from APP2.

(7) Perform Reverse Resync on TC Sync copy pairs from APP2. (YKRESYNC TCPL REVERSE)

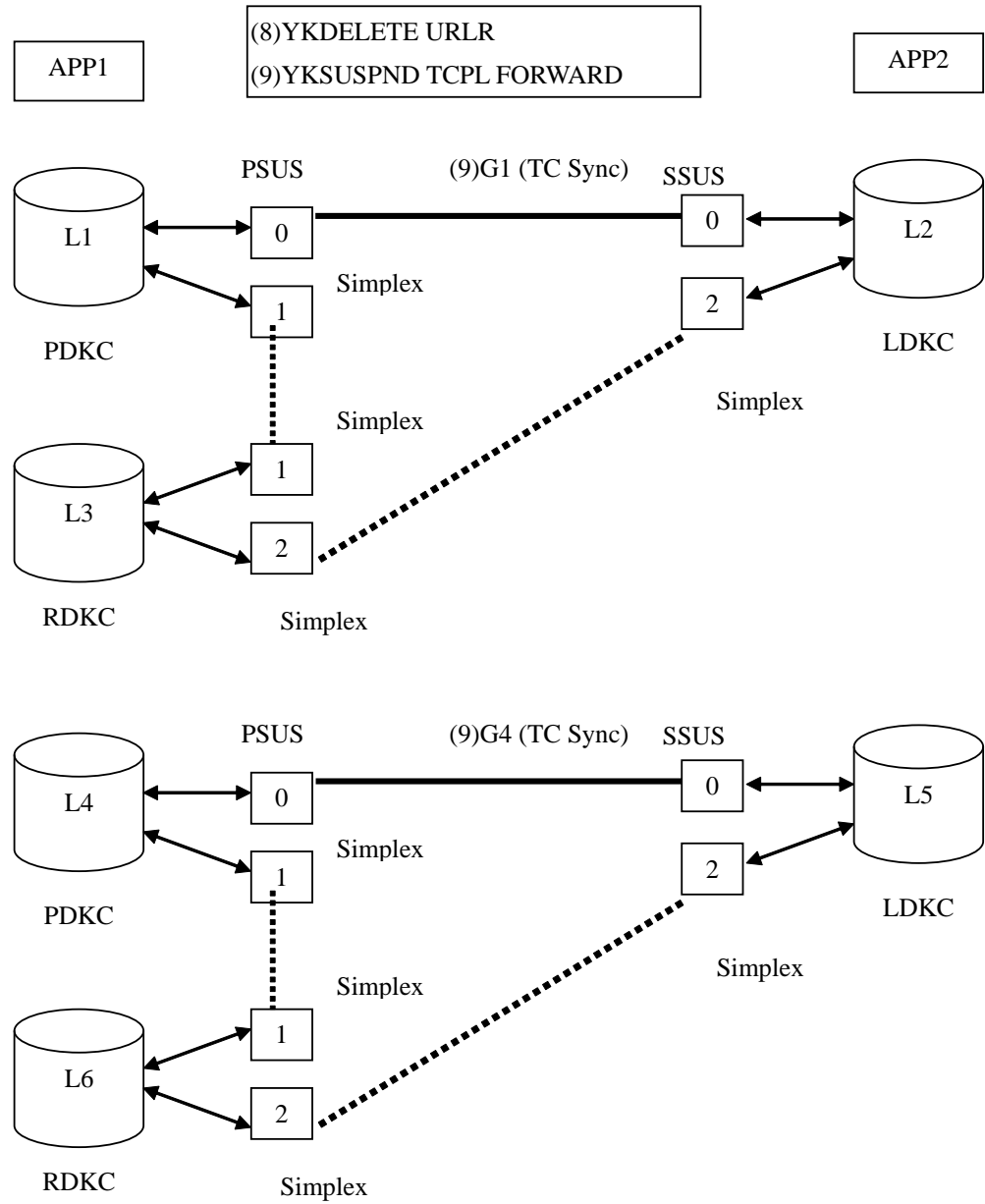




(8) Dissolve on UR copy pairs from APP2. (YKDELETE URLR)

Note: After (8) is executed, EXCTG is dissolved.

(9) Perform Reverse Suspend on TC Sync copy pairs from APP1. (YKSUSPND TCPL FORWARD)

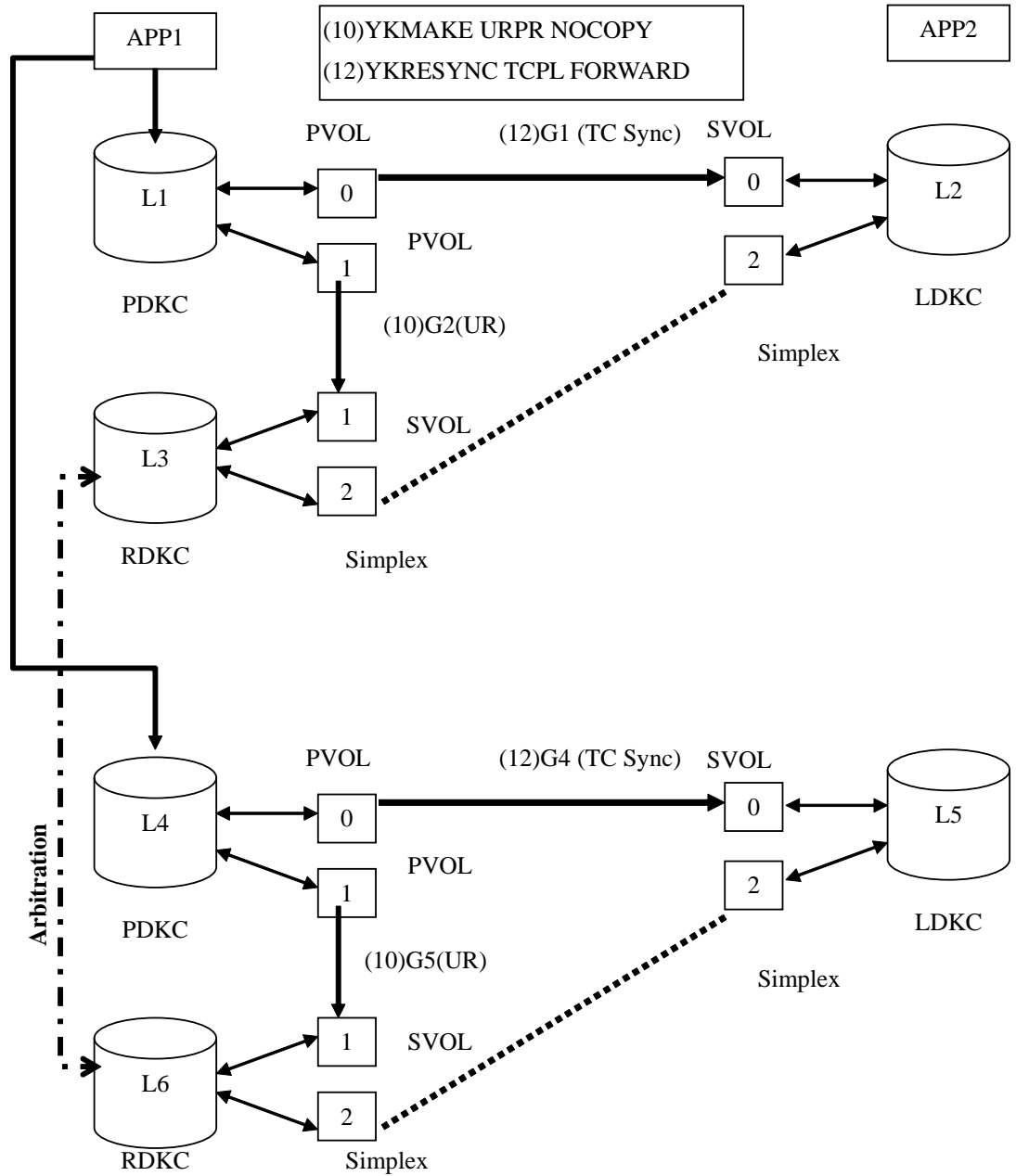


(10) Establish UR copy pairs with NOCOPY parameter from APP1. (YKMAKE URPR NOCOPY)

Note: After (10) is executed, EXCTG is registered.

(11) Start I/O from APP1.

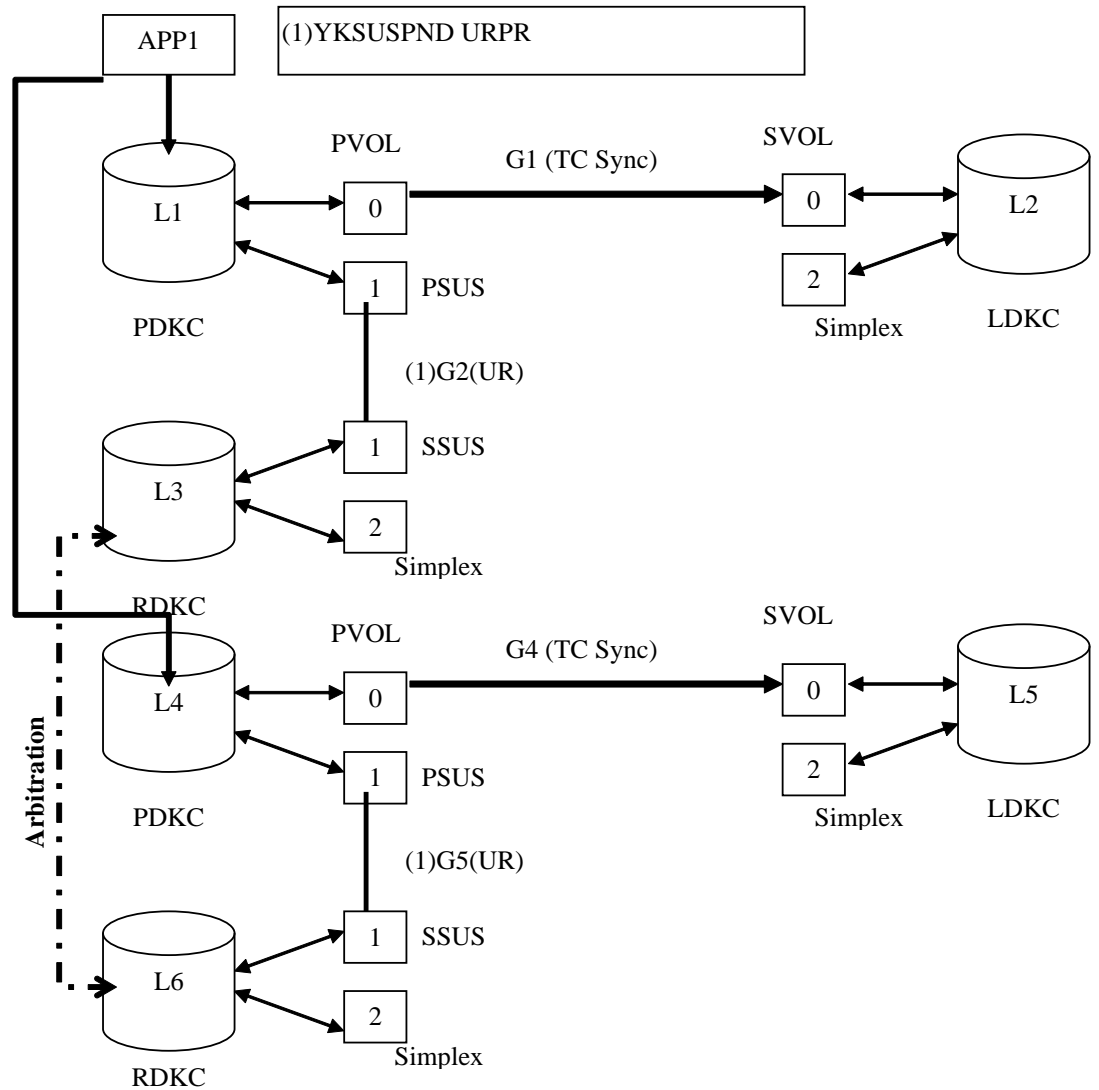
(12) Perform Reverse Resync on TC Sync copy pairs from APP1. (YKRESYNC TCPL FORWARD)



**Procedure 4: R-site maintenance (DKC maintenance)**

(1) Suspend UR copy pairs from APP1 when R-site maintenance needs to be performed. (YKSUSPND URPR)

➤ R-site maintenance started.



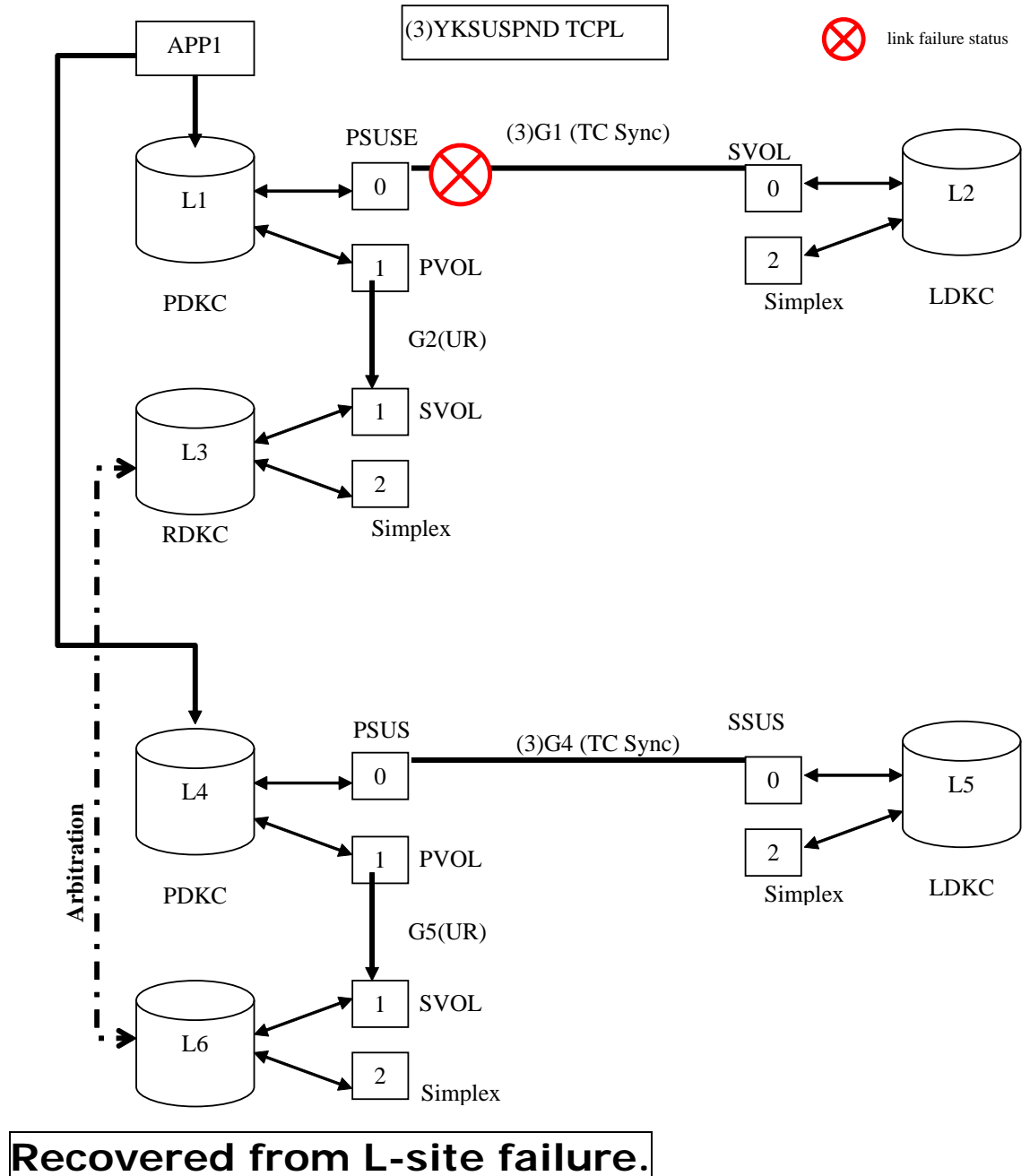
**R-site maintenance completed**

(2) After R-site maintenance has completed, resynchronize UR copy pairs from APP1. (YKRESYNC URPR)

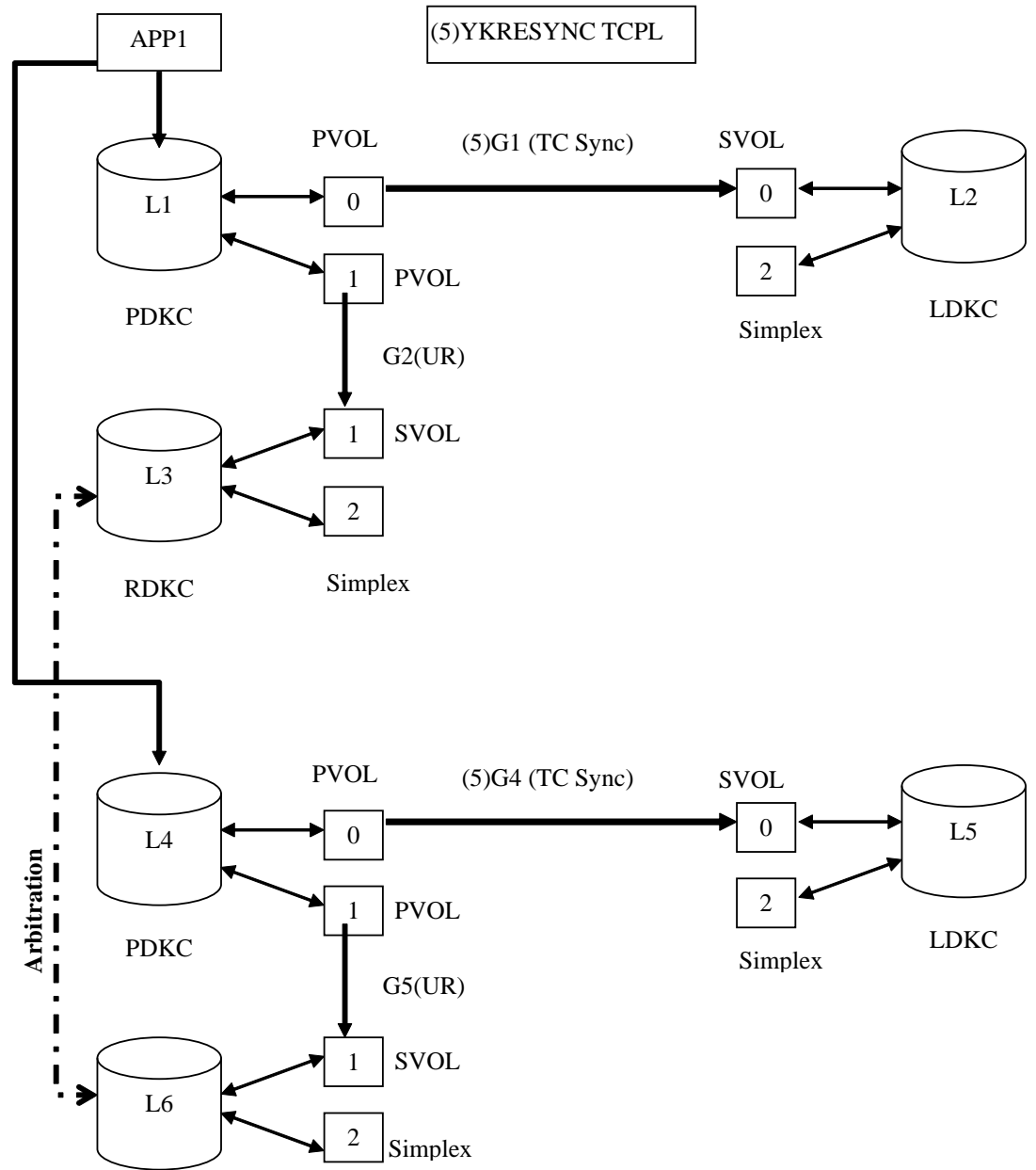
**Procedure 5: L-site failure (G1 link failure)**

- (1) Trap IEA494I message with YKCONMSG from APP1.
- (2) YKFREEZE TCPL from APP1. (YKFREEZE TCPL)
- (3) Suspend TC Sync copy pairs from APP1. (YKSUSPND TCPL)
- (4) YKRUN TCPL from APP1. (YKRUN in this case can be issued without waiting for all pairs to become suspended. Any write I/O after YKRUN is kept as differential data at the MCU of TC Sync. YKRUN TCPL)

Note: You can perform (1) to (4) steps at once by scripting at APP1 site.



(5) After L-site has recovered from failure, resynchronize TC Sync copy pairs from APP1. (YKRESYNC TCPL)



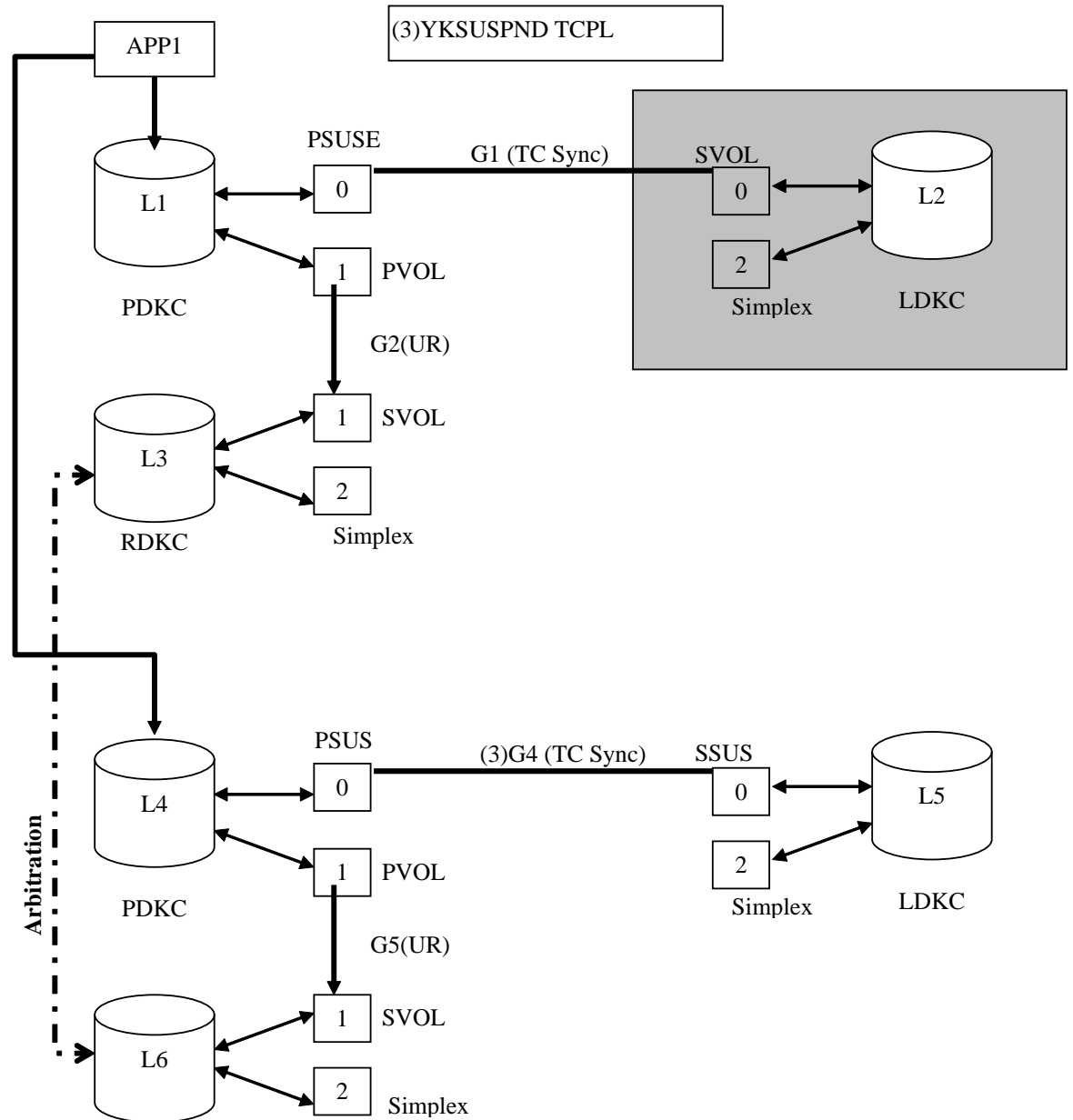
**Procedure 6: L-site failure (L-DKC failure (in case that Shared Memory is not volatilized))**

Perform process as shown in "Procedure 5: L-site failure (G1 link failure)".

**Procedure 7: L-site failure (L-DKC failure (in case that Shared Memory is volatilized))**

- (1) Trap IEA494I message with YKCONMSG from APP1.
- (2) YKFREEZE TCPL from APP1. (YKFREEZE TCPL)
- (3) Suspend TC Sync copy pairs from APP1. (YKSUSPND TCPL)
- (4) YKRUN TCPL from APP1. (YKRUN in this case can be issued without waiting for all pairs to become suspended. Any write I/O after YKRUN is kept as differential data at the MCU of TC Sync. YKRUN TCPL)

Note: You can perform (1) to (4) steps at once by scripting at APP1 site.



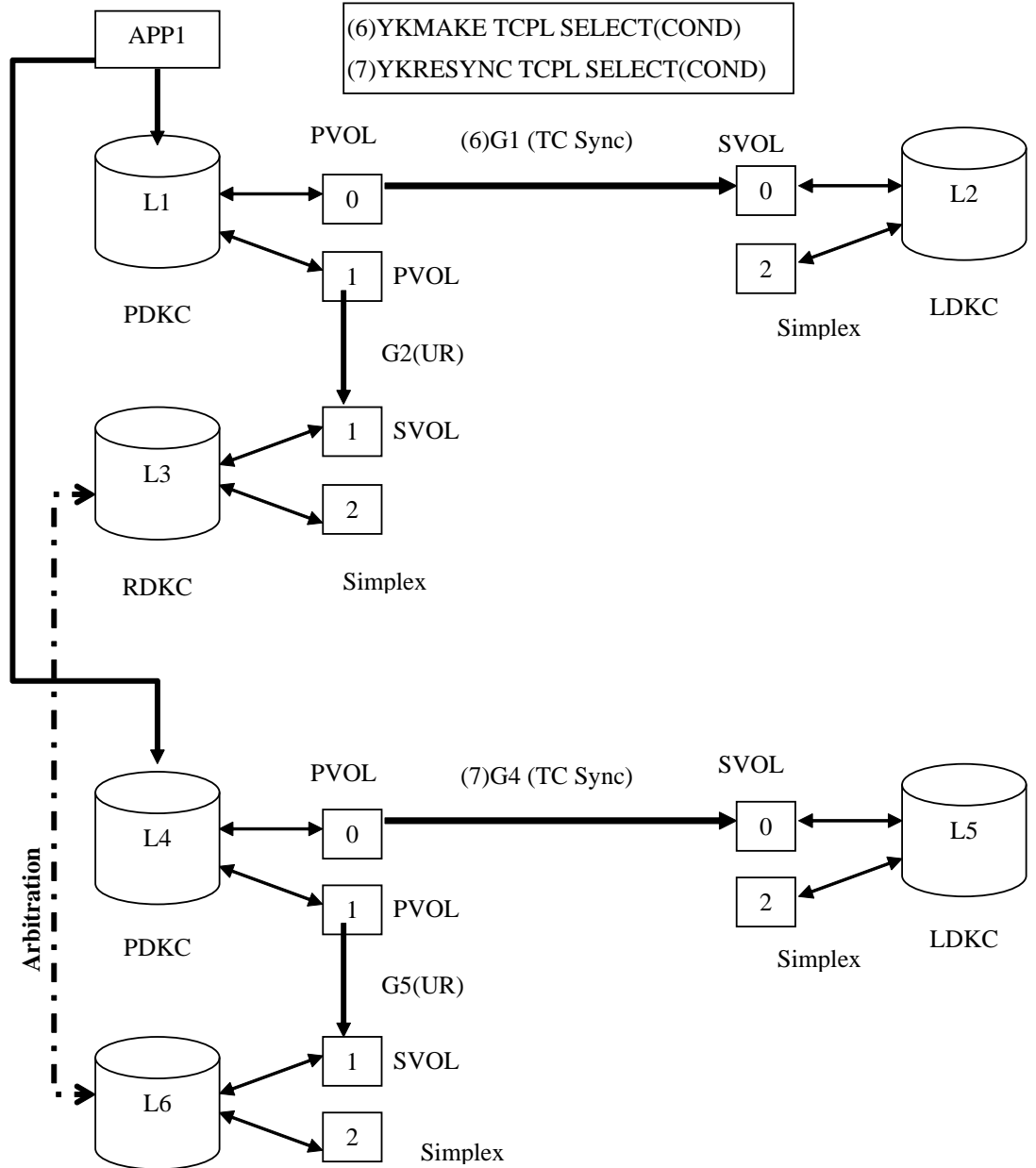
**Recovered from L-site failure.**



(5) After L-site has recovered from failure, dissolve TC Sync copy pairs from APP1 which were in failure. (YKDELETE G1)

(6) Create TC Sync copy pairs which were in failure. (YKMAKE TCPL SELECT(COND))

(7) Resynchronize TC Sync copy pairs from APP1. (YKRESYNC TCPL SELECT(COND))



**Procedure 8: P-site failure (host failure)**

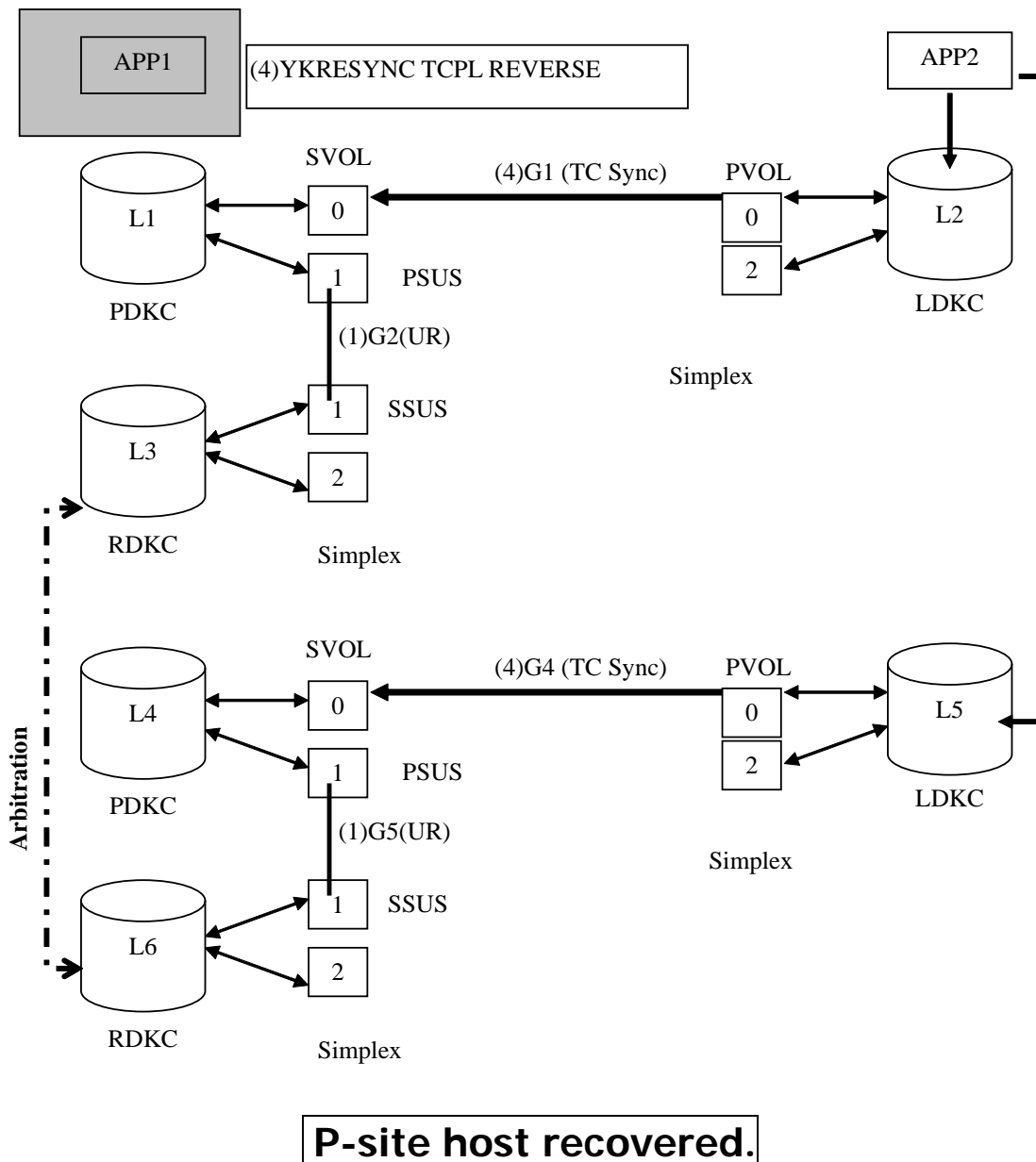
(1) Perform Flush Suspend on UR copy pairs from APP2. (YKSUSPND URPR)

You have to wait copy pair status to be SUSPOP. (YKEWAIT URPR GOTO(SUSPEND))

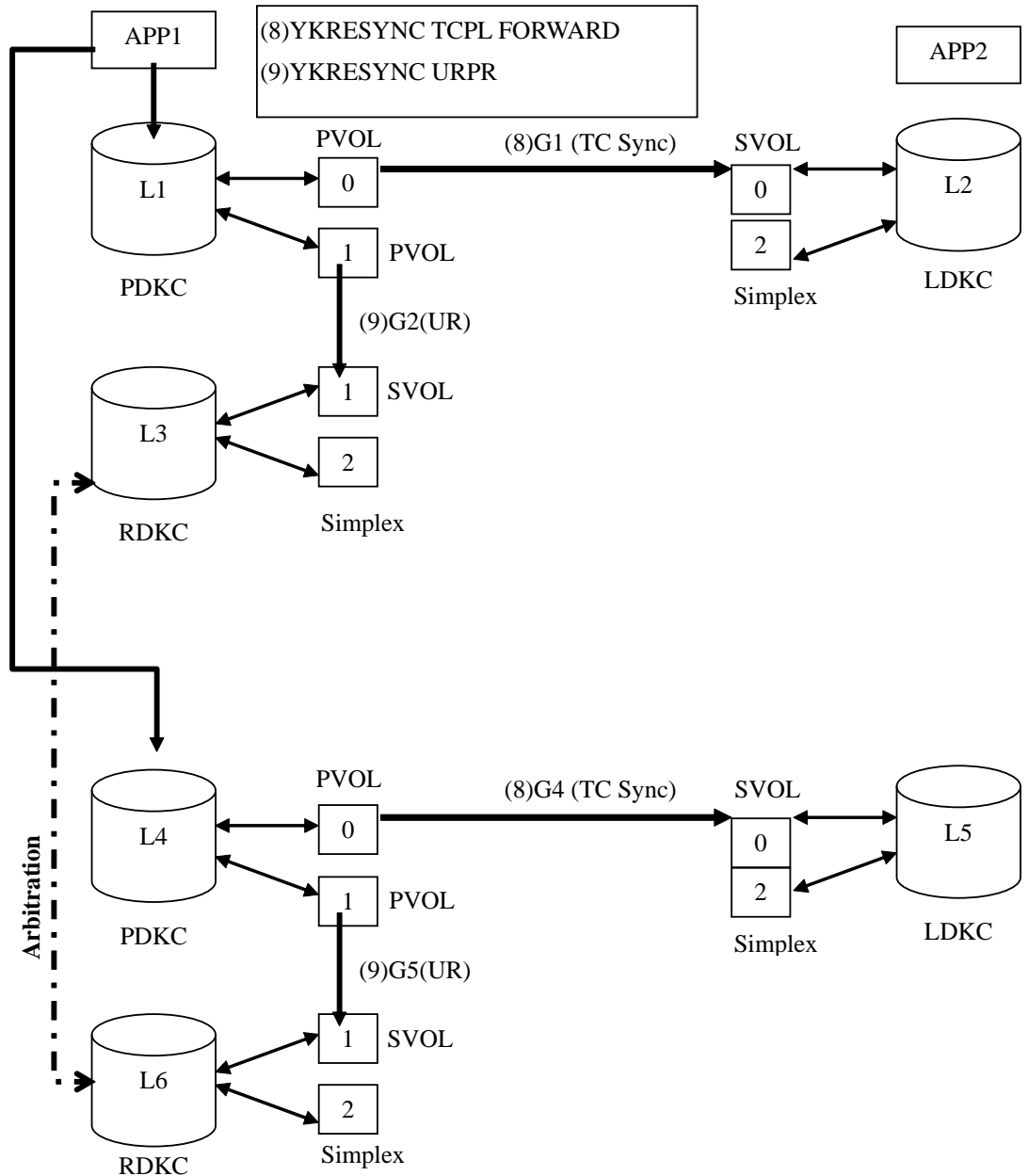
(2) Perform Reverse Suspend on TC Sync copy pairs from APP2. (YKSUSPND TCPL REVERSE)

(3) Start I/O from APP2.

(4) Perform Reverse Resync on TC Sync copy pairs from APP2. (YKRESYNC TCPL REVERSE)



- (5) Stop I/O from APP2.
- (6) Perform Reverse Suspend on TC Sync copy pairs from APP1. (YKSUSPND TCPL FORWARD)
- (7) Start I/O from APP1.
- (8) Perform Reverse Resync on TC Sync copy pairs from APP1. (YKRESYNC TCPL FORWARD)
- (9) Resynchronize UR copy pairs from APP1. (YKRESYNC URPR))

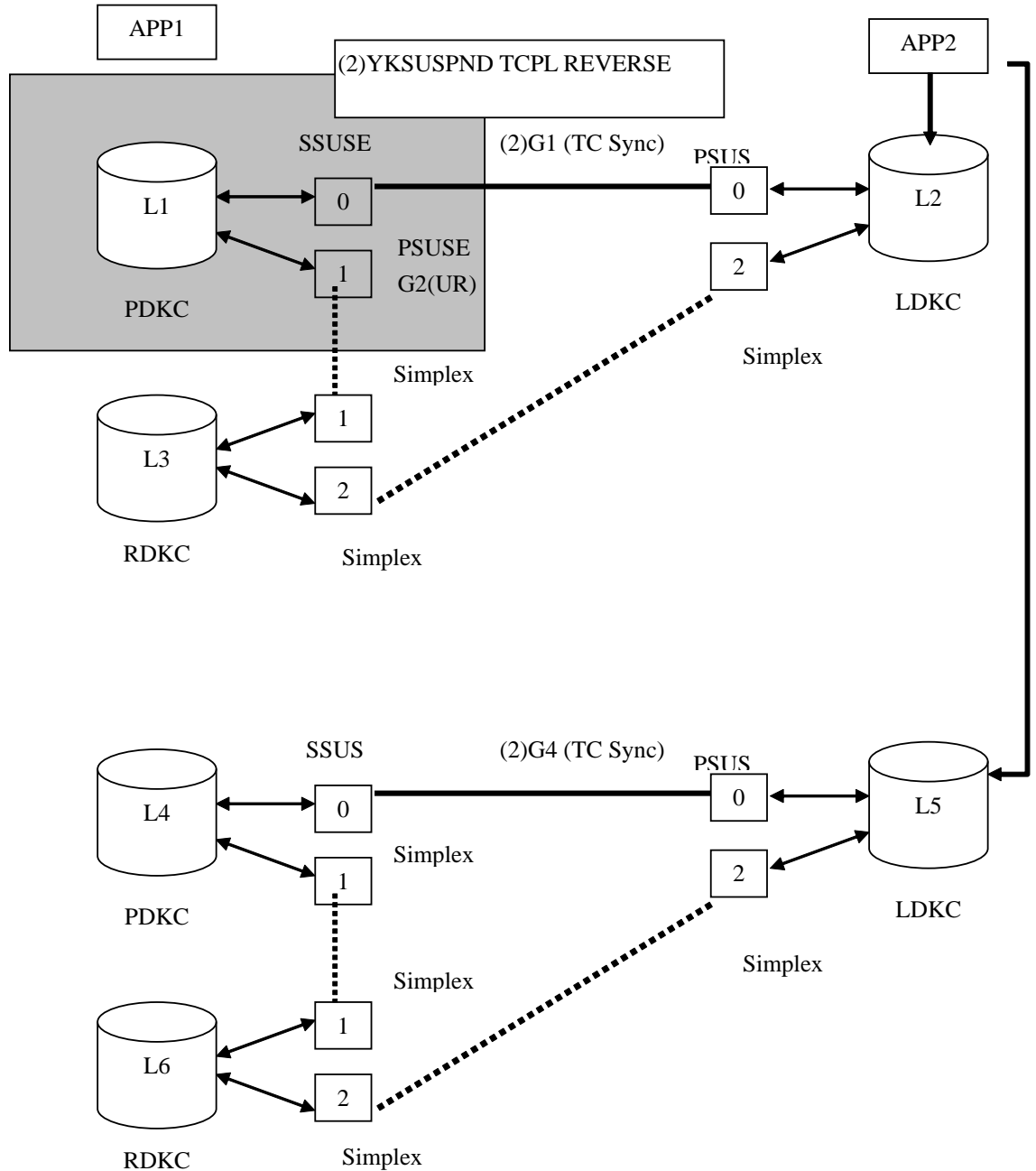


**Procedure 9: P-site failure (DKC failure (in case that Shared Memory is not volatilized))**

(1) Dissolve on UR copy pairs from APP2. (Perform YKRECOVER to the copy group in DKC which were in failure. Perform YKDELETE to a normal copy group. YKRECOVER G2, YKDELETE G5)

Note: After (1) is executed, EXCTG is dissolved.

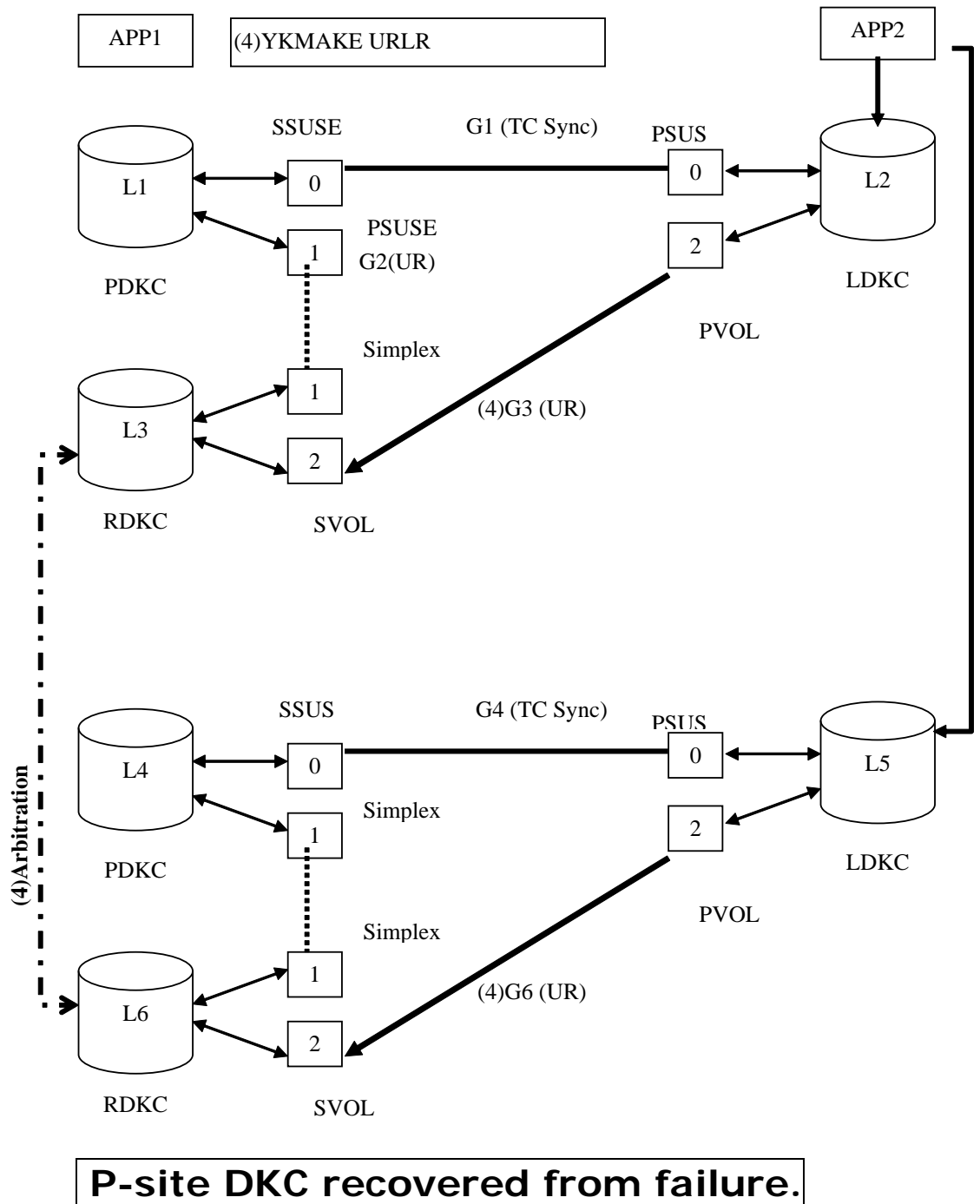
(2) Perform Reverse Suspend on TC Sync copy pairs from APP2. (YKSUSPND TCPL REVERSE)



(3) Start I/O from APP2.

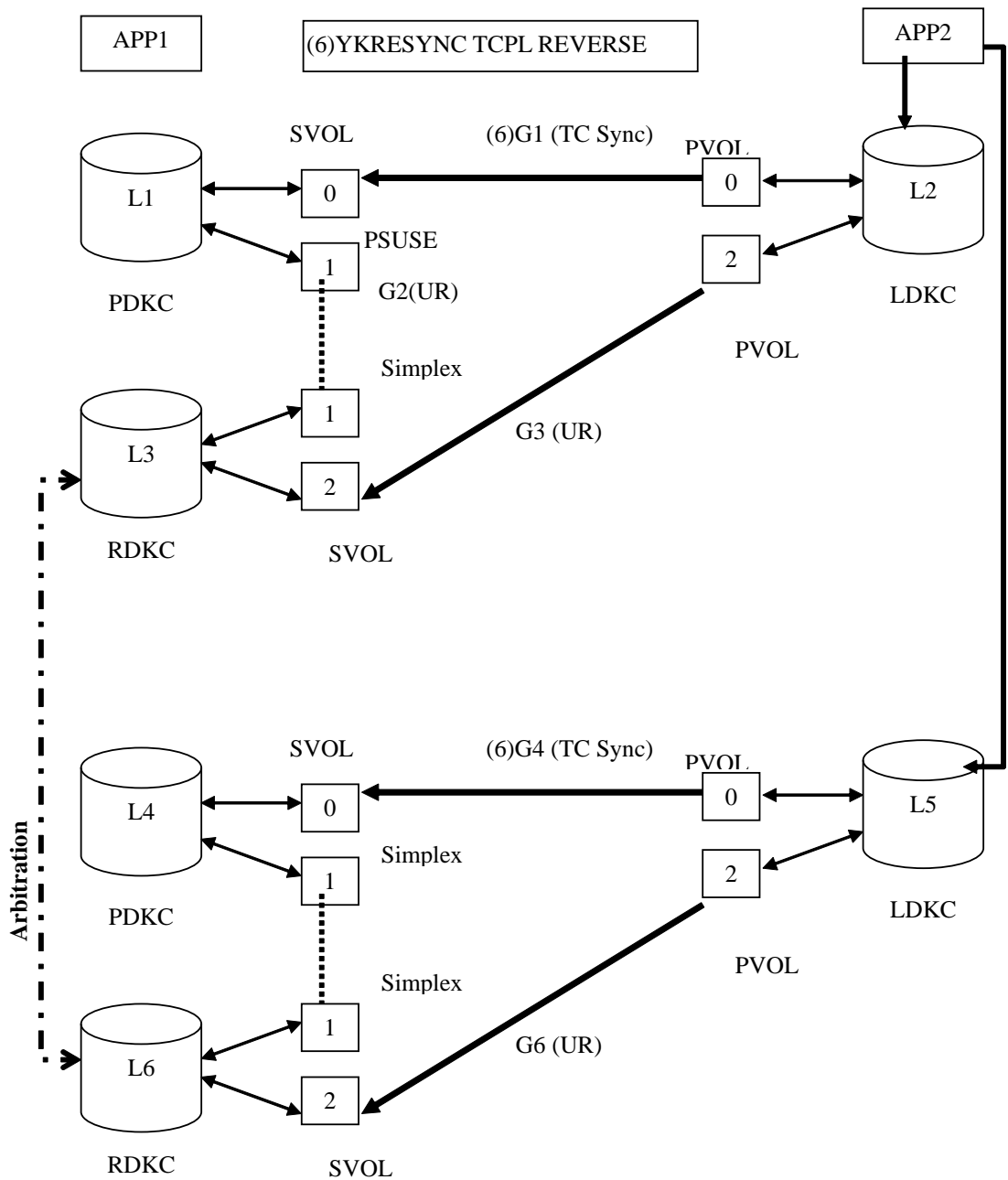
(4) Establish UR copy pairs from APP2. (YKMAKE URLR)

Note: After (4) is executed, EXCTG is registered.



(5) Stop I/O from APP2.

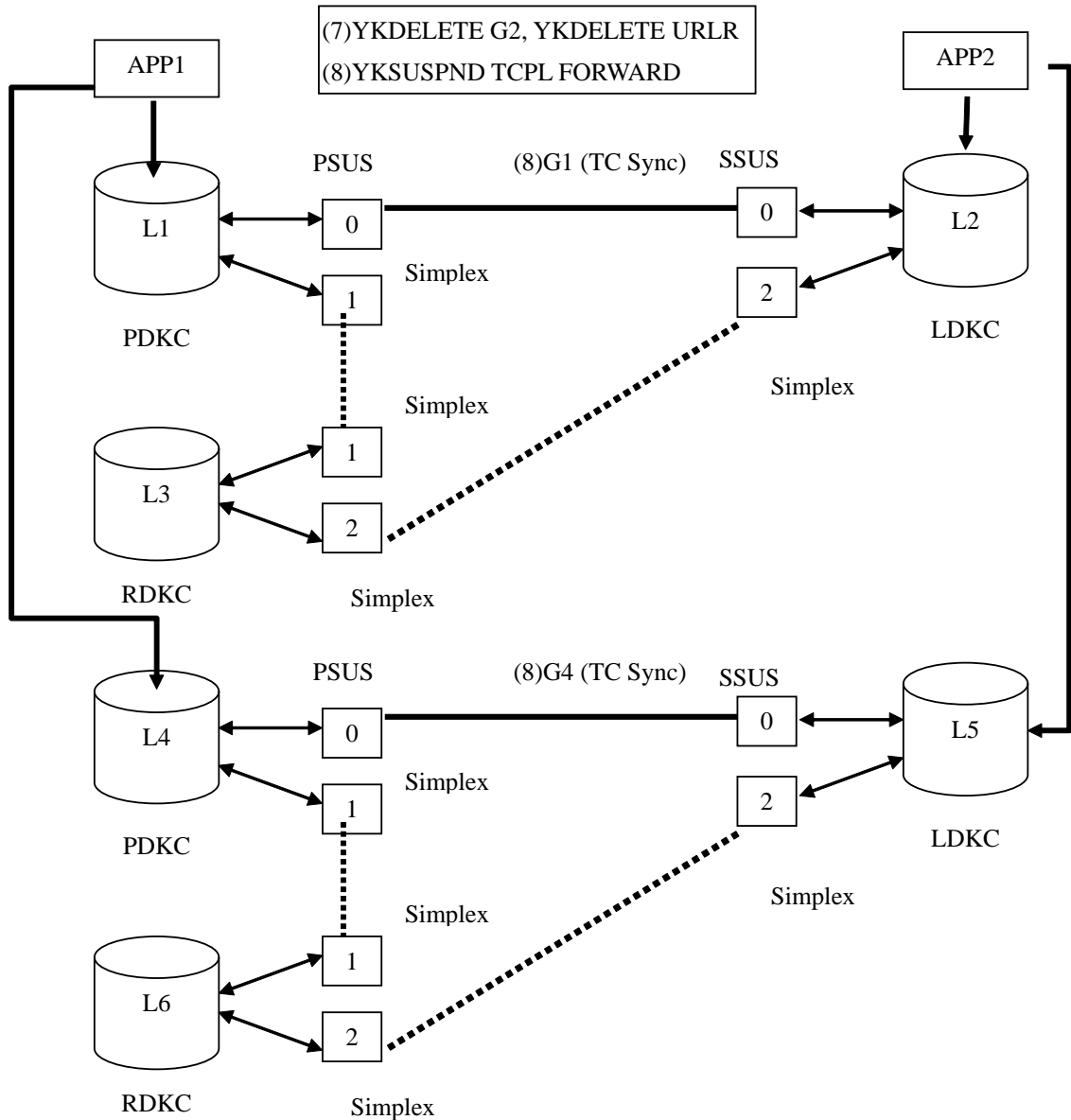
(6) Perform Reverse Resync on TC Sync copy pairs from APP2. (YKRESYNC TCPL REVERSE)



(7) Dissolve on UR copy pairs from APP2. (P-VOL of the copy group which were in failure is failure suspend status, and dissolve the pair. YKDELETE G2, YKDELETE URLR)

Note: After YKDELETE command is executed on URLR, EXCTG is dissolved.

(8) Perform Reverse Suspend on TC Sync copy pairs from APP1. (YKSUSPND TCPL FORWARD)

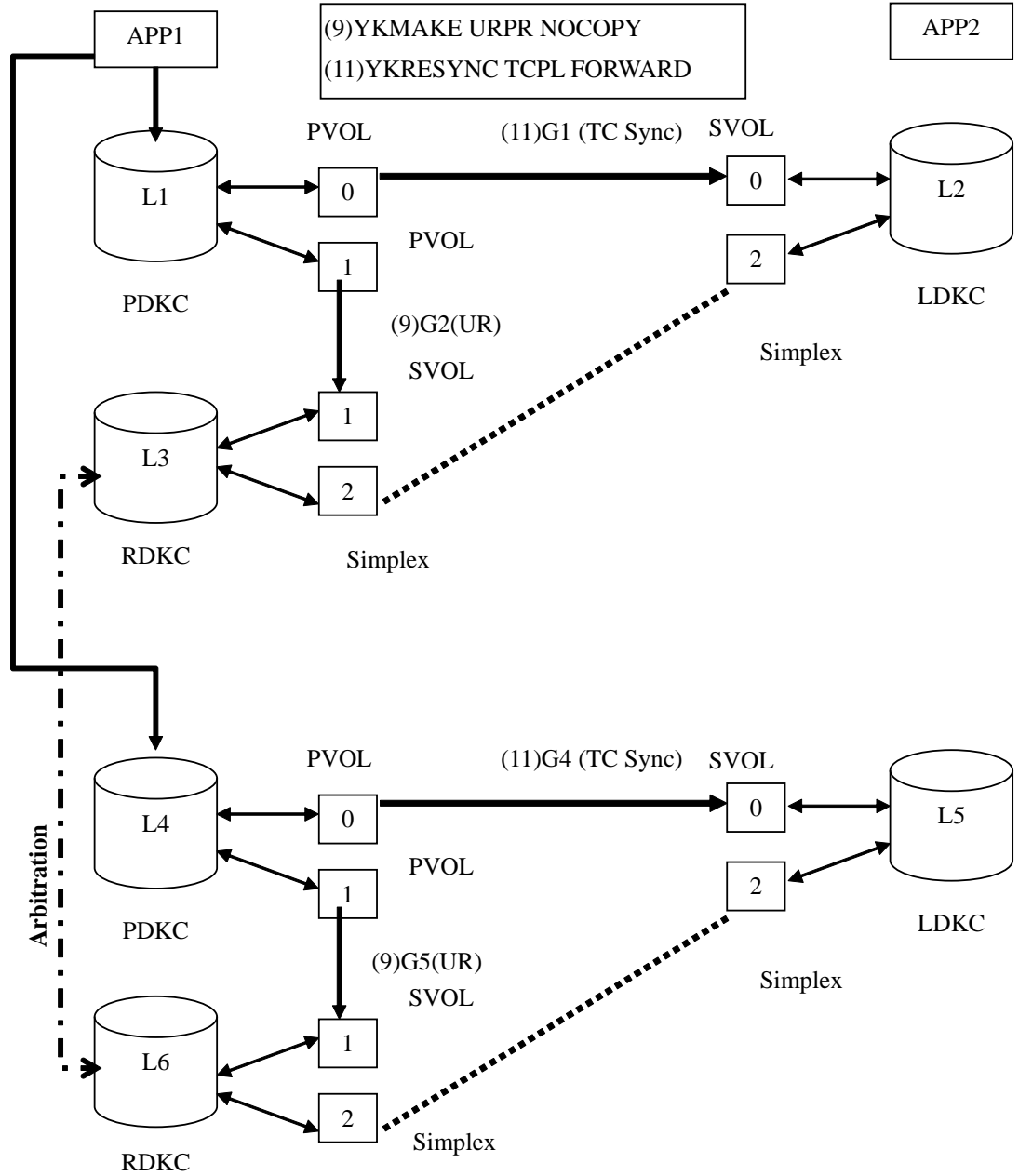


(9) Establish UR copy pairs with NOCOPY parameter from APP1. (YKMAKE URPR NOCOPY)

Note: After (9) is executed, EXCTG is registered

(10) Start I/O from APP1.

(11) Perform Reverse Resync on TC Sync copy pairs from APP1. (YKRESYNC TCPL FORWARD)



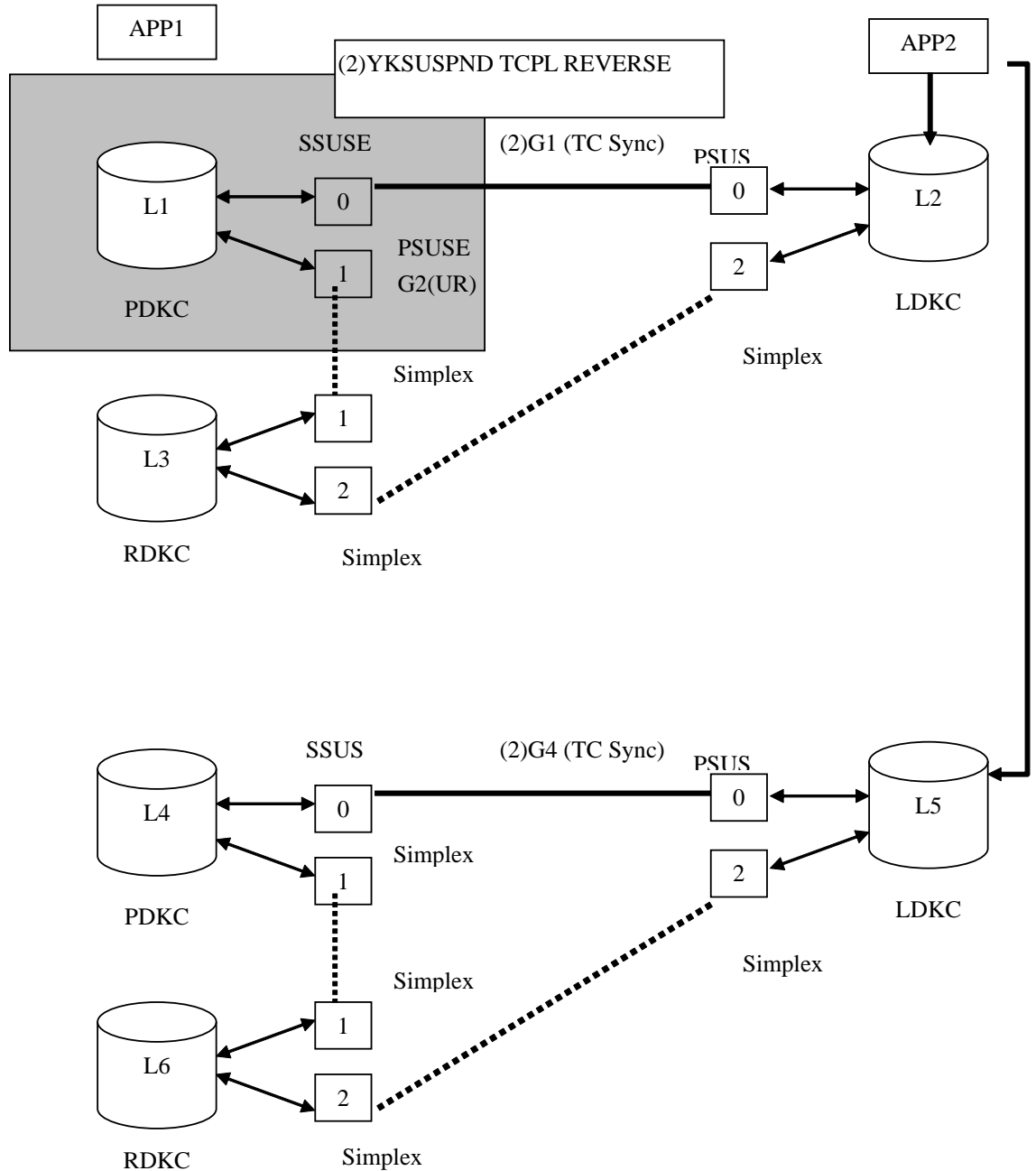


**Procedure 10: P-site failure (DKC failure (in case that Shared Memory is volatilized))**

(1) Dissolve on UR copy pairs from APP2. (Perform YKRECOVER to the copy group in DKC which were in failure. Perform YKDELETE to a normal copy group. YKRECOVER G2, YKDELETE G5)

Note: After (1) is executed, EXCTG is dissolved.

(2) Perform Reverse Suspend on TC Sync copy pairs from APP2. (YKSUSPND TCPL REVERSE)



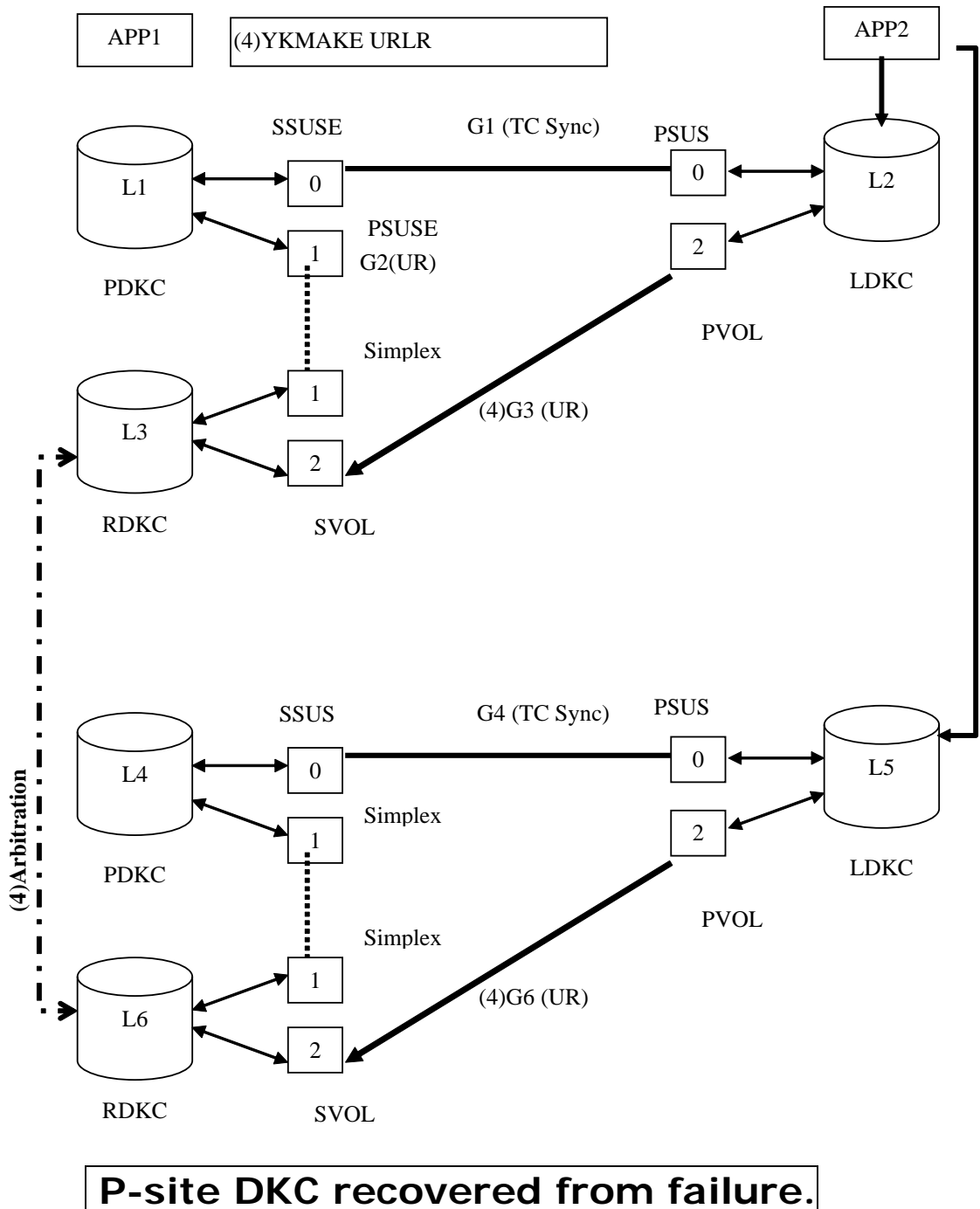
(3) Start I/O from APP2.

(4) Establish UR copy pairs from APP2. (YKMAKE URLR)

Note: After (4) is executed, EXCTG is registered.

➤ P-site DKC recovery started.

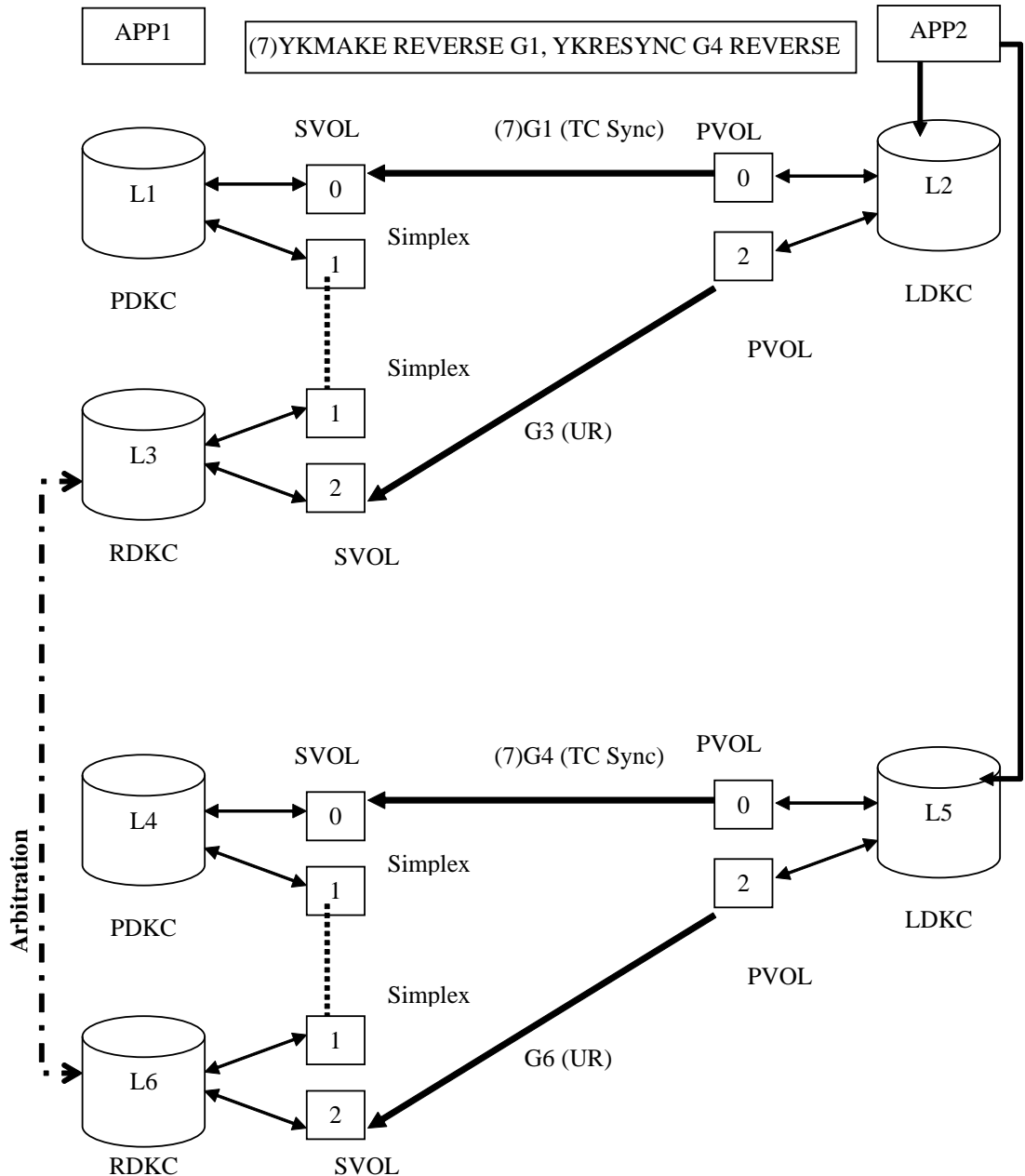
After P-site DKC has recovered from failure, establish logical path of G1 and G2. (L1 to L3 and L1 to L2)



(5) Stop I/O from APP2.

(6) Perform YKRECOVER to the copy group in DKC which were in failure from APP2.  
(YKRECOVER G1)

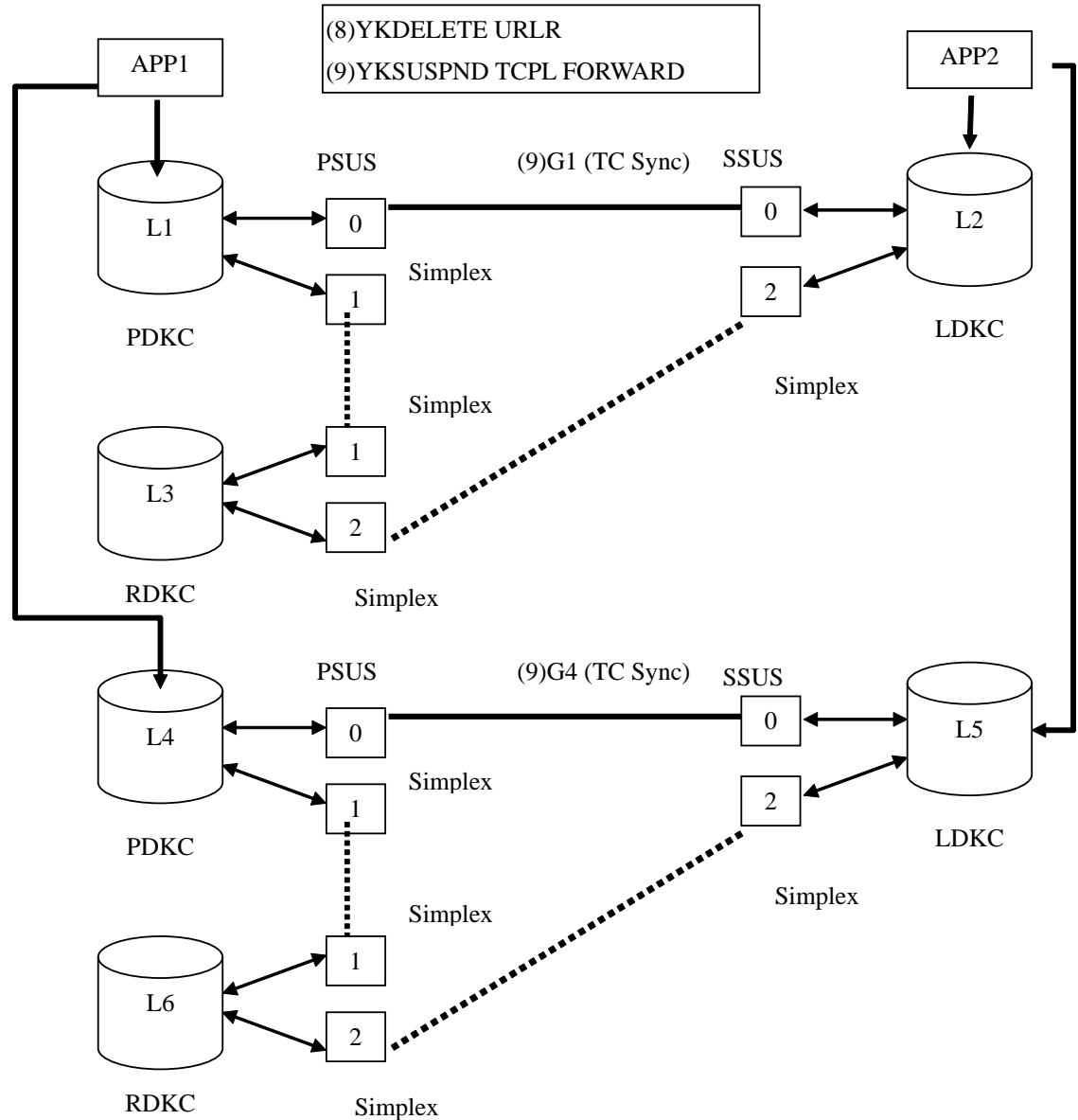
(7) Establish TC Sync copy pairs in reverse direction and perform Reverse Resync on TC Sync copy pairs from APP2. (YKMAKE REVERSE G1, YKRESYNC G4 REVERSE)



(8) Dissolve on UR copy pairs from APP2. (YKDELETE URLR)

Note: After (8) is executed, EXCTG is dissolved.

(9) Perform Reverse Suspend on TC Sync copy pairs from APP1. (YKSUSPND TCPL FORWARD)



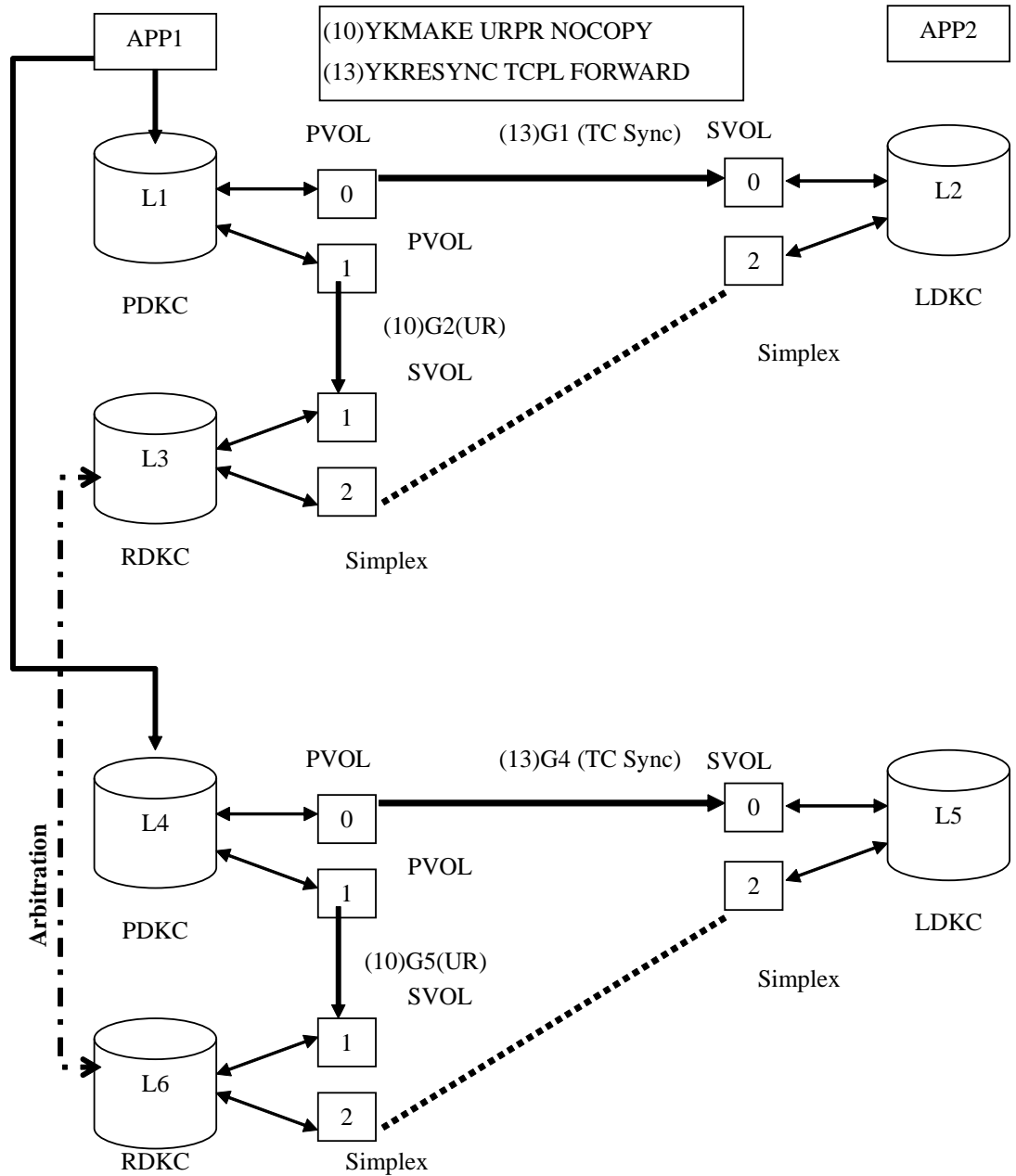
(10) Establish UR copy pairs with NOCOPY parameter from APP1. (YKMAKE URPR NOCOPY)

Note: After (10) is executed, EXCTG is registered.

(11) Create the JNL-Group for P-site (L1) again by Storage Navigator.

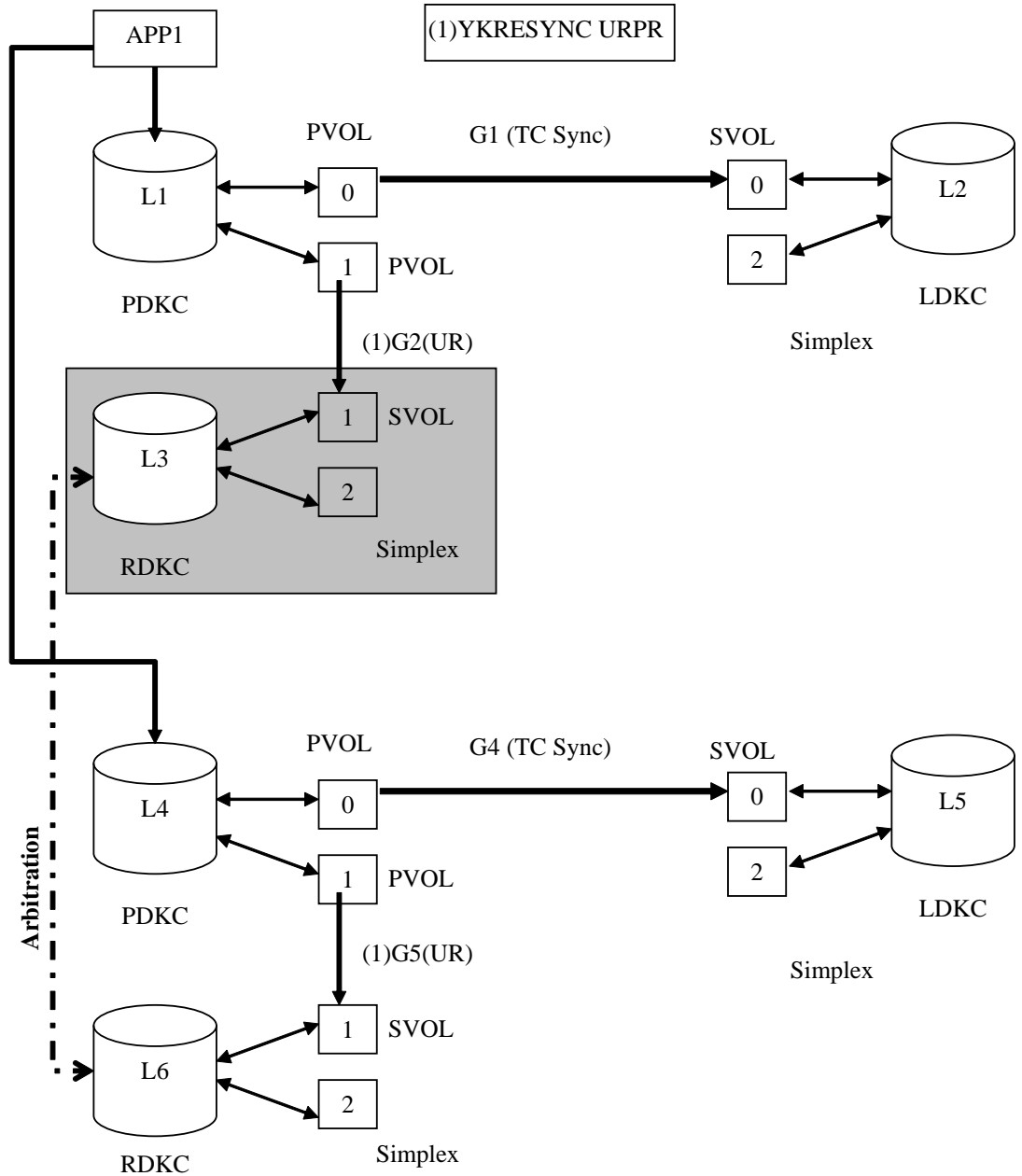
(12) Start I/O from APP1.

(13) Perform Reverse Resync on TC Sync copy pairs from APP1. (YKRESYNC TCPL FORWARD)



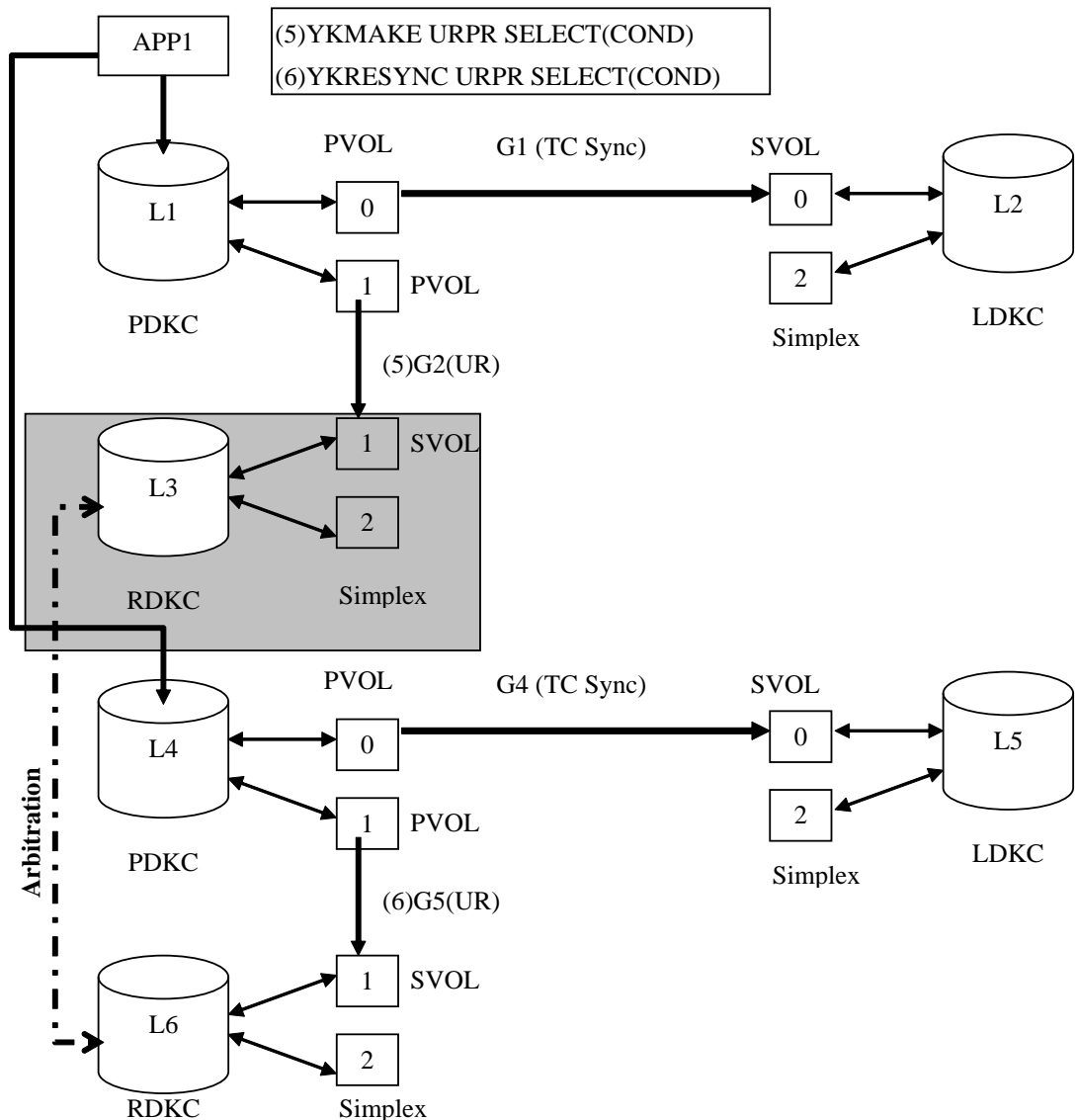
**Procedure 11: R-site failure (in case that Shared Memory is not volatilized)**

(1) After R-site DKC has recovered from failure, resynchronize UR copy pairs from APP1. (YKRESYNC URPR)



**Procedure 12: R-site failure (in case that Shared Memory is volatilized)**

- (1) After R-site DKC has recovered from failure, dissolve UR copy pairs from APP1 which were in failure. (YKDELETE G2)
- (2) Create the JNL-Group for R-site (L3) again by Storage Navigator.
- (3) Delete EXCTG related information from JNL in force by Storage Navigator.
- (4) Establish logical path of G2. (L3 to L1)
- (5) Create UR copy pairs which were in failure and register all UR JNLG to EXCTG again from APP1. (YKMAKE URPR SELECT(COND))
- (6) Resynchronize UR copy pairs from APP1. (YKRESYNC URPR SELECT(COND))



- End of document -