High Availability of Your Multi-User

CTC 03 – DBA – Wednesday, April 27 2016

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Abstract

What is the best practice for picking up maintenance? This session reviews CA Datacom/DB's Shadow MUF technology as the basis for both implementing maintenance and for the Active MUF Upgrade process for Version 15.0

Shadow Technology

- Shadow technology is what is recommended to help with the automation of rolling in maintenance into a MUF instance

- How to implement a Shadow MUF
    - DBSIDPR   TARGET_MUF_LIST= (PRODMUF1, PRODMUF2)
    - PXX dataset has to be unique to each MUF stance or be dummy
    - MUF startup option MUF *,99,YES -- * is required
    - MUF startup option MUFPLEX QAPLEX1,*,8192,2000,S,4M
        - QAPLEX1 in this case does not have to exist for this case, you make that label be anything you like – BUBBA will work

Important Labels to Remember

- Primary MUF – is the MUF instance up and enabled at that moment of time

- Shadow MUF – is the second instance of the MUF that is considered not enabled but running on same LPAR or a different LPAR on the same SYSPLEX

Communication Vehicle

- XCF is used as the message service between the shadow and the primary MUF

- If XCF service is stopped or abends, then no communication between the Primary and Shadow MUF is possible. Shadow MUF cannot take over. This is very rare in today's world

- Primary MUF DSNZMFM1
  - DSNZMFM1:MUFM1:DB02330W - SHADOW START, JOB=DSNZMFM2 SYSTEM=CA31

- Shadow MUF DSNZMFM2
  - DSNZMFM2:*:DB02301I - XES GROUP JOINED (QAPLEX1,SHADOW$$071)
  - DSNZMFM2:*:DB02325I - SHADOW MUF NOW WAITING

Shadow MUF When Picking Up Maintenance

- **Shadow MUF**
  - Library chain needs to pick up the maintenance you are wanting to pick up just for the shadow MUF
  - Start the shadow MUF
  - When you have a planned or unplanned outage of the primary MUF, the Shadow will enable with the maintenance on
  - The shadow now becomes the Primary MUF instance
  - Restart the Shadow MUF but without maintenance in the library chain
  - Once you feel that the current Primary MUF has run long enough to feel comfortable with maintenance, bring down the current Shadow MUF
  - Restart the Shadow MUF with maintenance on that matches the Primary MUF

Important Consideration

- STC/JOB for MUF must be able to have different library contents at different times
  - This can be the same library chain or a different library chain. Depends on your site standards

- Methods (there are more methods)
  - Standard library chain CUSLIB, CABDLOAD, CAVQLOAD in the MUF/CICS/Server/Batch
  - Add a new library to the library chain to allow maintenance to be copied but this library has to be in front of the base libraries
  - USE the CUSLIB to copy and delete maintenance
    - This last option carries more risk than the first option
      - can delete to many modules
      - may not delete enough modules
      - recommend adding a second link step to all the customizations assemblies to the CUSLIB.BACKUP
   - (BDNEWCUS or BDUPGCUS)

Steps For This Process

- EOJ the current Shadow MUF

- Start the Shadow MUF with maintenance

- Allow the Shadow MUF to enable to become the Primary MUF at some normal time for that to occur

- Start the another Shadow with no maintenance

- Let the Primary MUF run for some period of time to 'cook' the new code just rolled in

- Once the time box for the Primary MUF has elapsed so no concern for rollback of maintenance, then cycle the Shadow MUF with the maintenance on

- If there is cleanup after you cycle the shadow MUF, this is the time to do that process

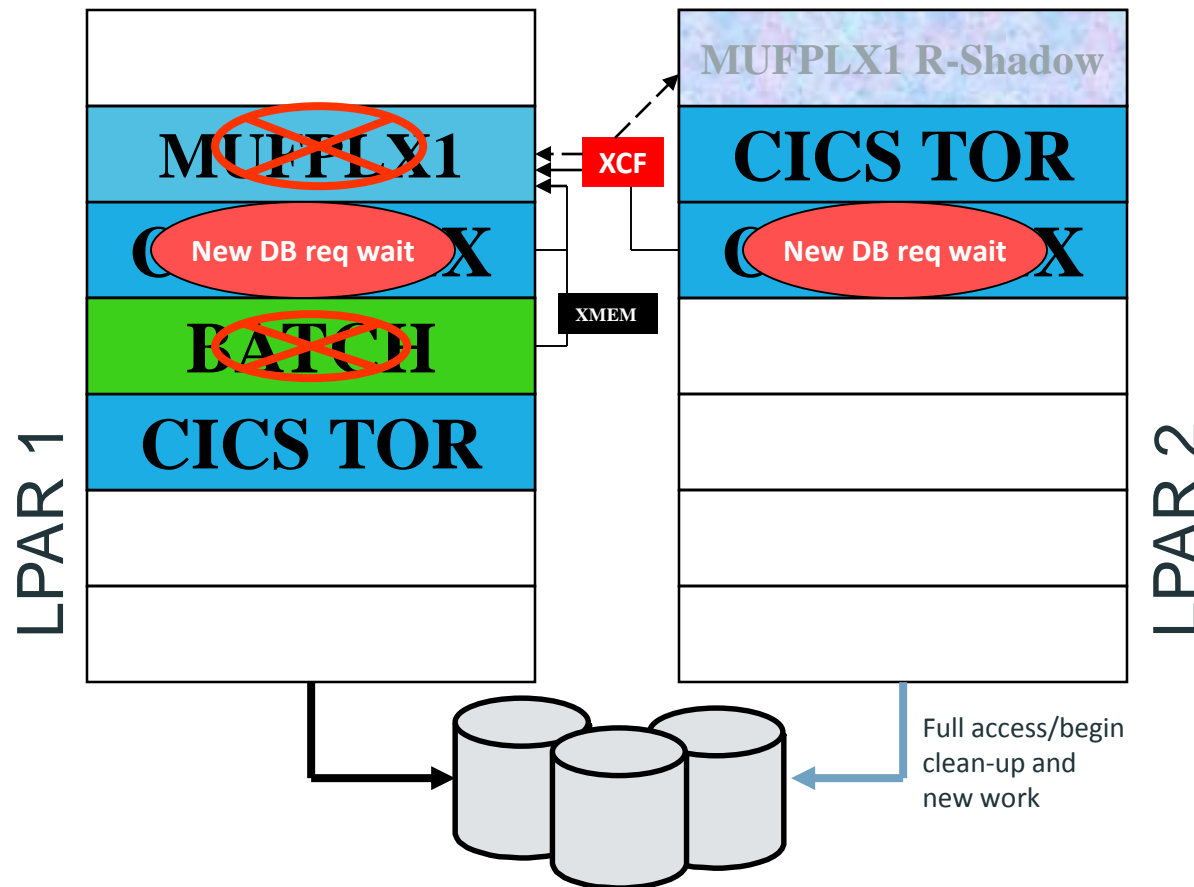# CA Datacom MUF Unplanned Outage Overview

Shadow MUFPLEX
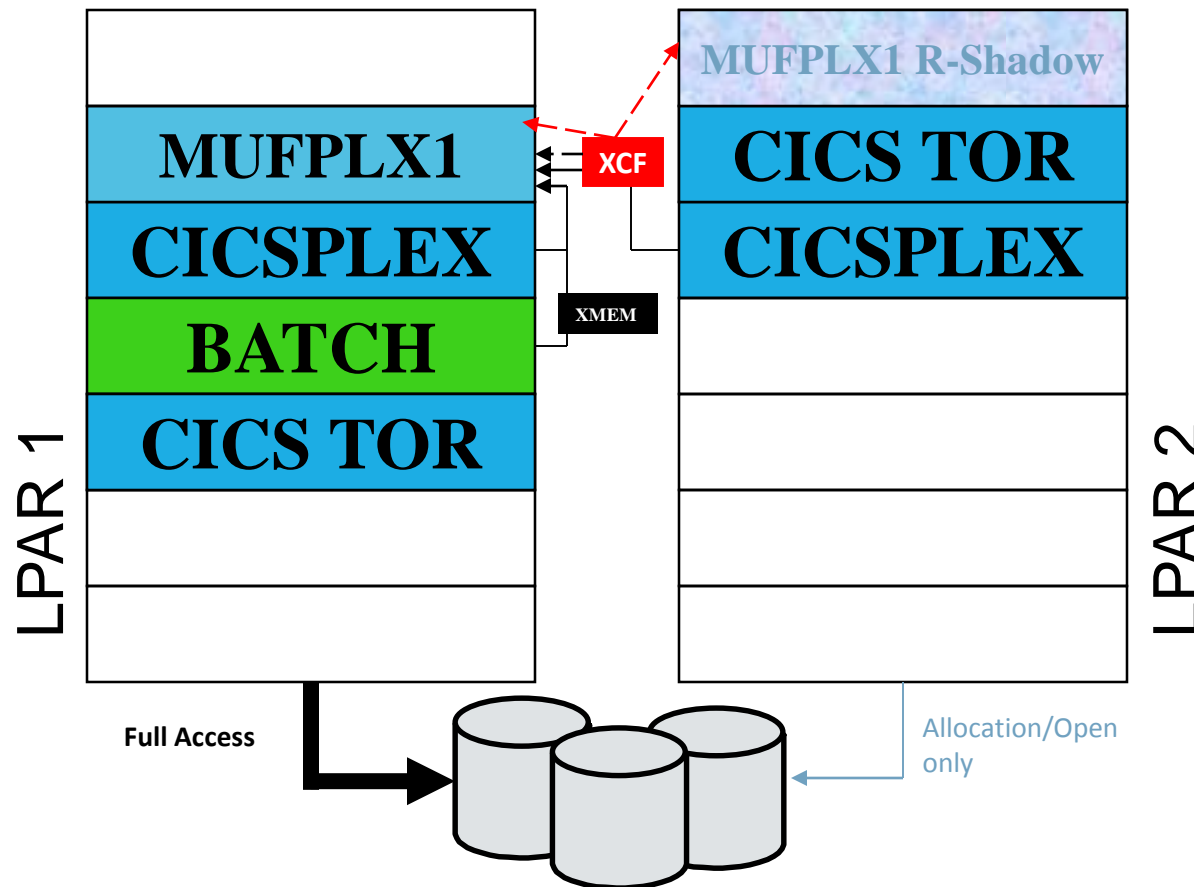
- Application regions use "access anywhere" to connect to primary MUF

- Shadow MUF is started (same or different LPAR)

- XCF is used to SYNC MUFs

- Shadow "watches" primary

- Shadow opens all MUF datasets, but **does not** do request processing
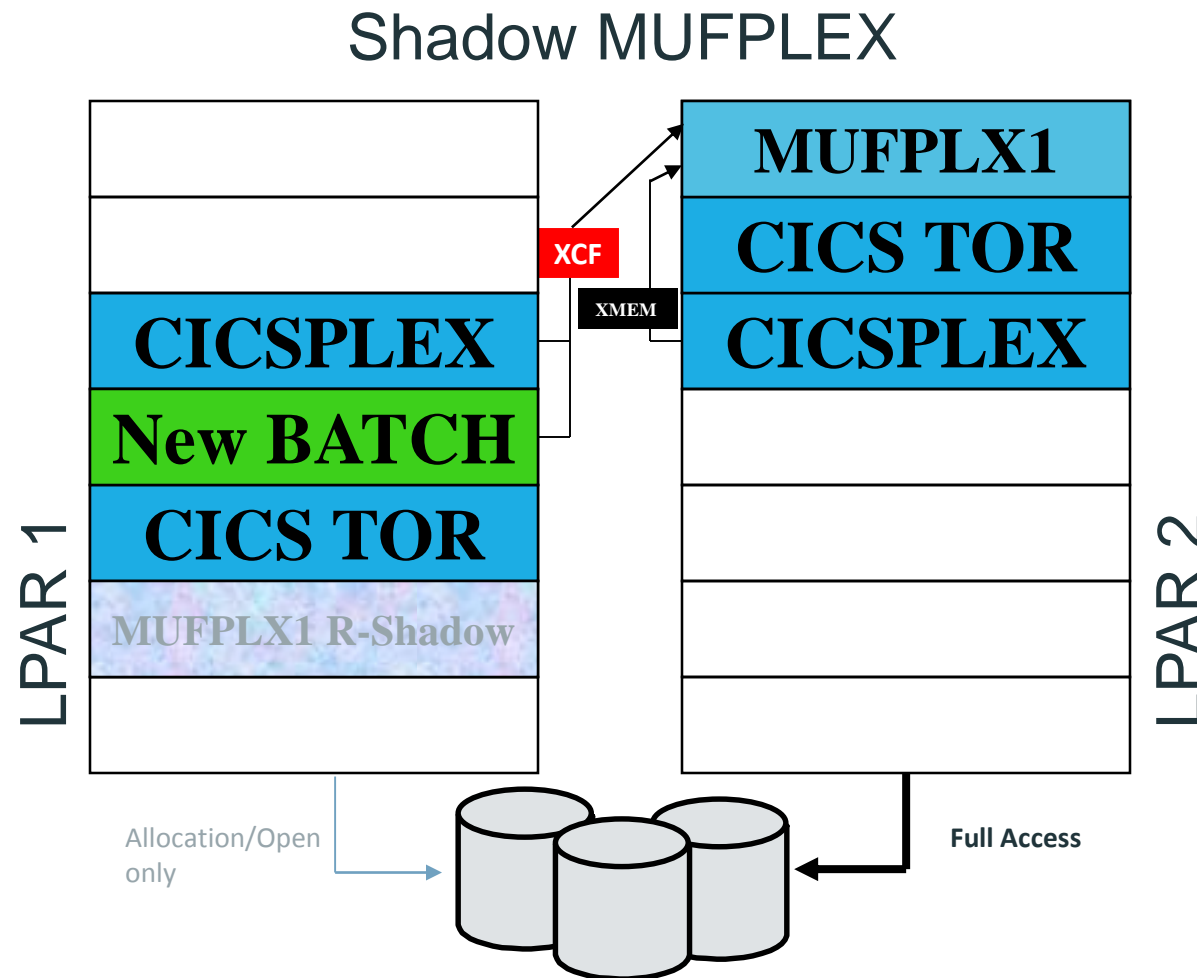
CA Datacom MUF Unplanned Outage Overview (cont'd)

Shadow MUFPLEX

LPAR 1

LPAR 2

MUFPLX1

New DB req wait

~~BATCH~~

CICS TOR

XCF

XMEM

MUFPLX1 R-Shadow

CICS TOR

New DB req wait

Full access/begin clean-up and new work

- Primary MUF (MUFPLX1) fails
- Existing transactions notified of MUF failure
- Remote Shadow automatically detects failure
- Remote Shadow begins clean-up of failed MUF
- New requests can be told to "wait"
- **Remote Shadow becomes MUFPLX1**

CA Datacom MUF Unplanned Outage Overview (cont'd)

Shadow MUFPLEX

LPAR 1

CICSPLEX
New BATCH
CICS TOR
MUFPLX1 R-Shadow

XCF
XMEM

MUFPLX1
CICS TOR
CICSPLEX

LPAR 2

Allocation/Open only

Full Access

- Applications with reconnect capabilities re-establish connections and continue processing

- Brief pause in service, but not an outage

- Site restarts failed MUF region and it automatically detects that it is now the Shadow

Planned Outage Shadow

- Another method for Shadow MUF

- Requires a true Coupler Facility structure and the MUFPLEX MUF option must use that name

- This method allows you to actually allow the Shadow MUF to be become enabled before the Primary MUF ends so two MUFs are up at the same time.
  - Items that can not be shared
    - COVERED/Virtual
    - CBS
    - PXX
    - Use of the migrate command -- MIGRATE_TO_SHADOW

MIGRATE_TO_SHADOW

- This is issued to the Shadow MUF via console or DBUTLTY CONSOLE API or DBSQLPR using SQL CONSOLE

- This issues EOJ to the Primary MUF so no new work can start in the old Primary MUF

- Once the EOJ is posted to the Primary MUF all new work will come the old Shadow MUF that is now enabled
  - CICS Service Facility Disconnect Immediate
  - Server/batch jobs have to end in the old Primary MUF before they can attach to the new MUF that was the Shadow MUF
  - EOJ process in the MUF takes as long as it takes for all the jobs to end in the MUF, but that they can end sooner if the URT option EOJ_OK= is used in the URTs for the attached JOB.   If this URT option is not used, then the app or Server has to end gracefully or be cancelled before the close process can start

MIGRATE_TO_SHADOW (cont'd)

- Once all the jobs have ended in the old Primary MUF, close can start. It is not unusual for close to take up to 30 minutes or longer to get all the datasets closed in MUF.

- Remember, once the EOJ is posted to the MUF, no new work can start in that MUF instance. EOJOFF is still eligible to run until the EOJ is committed to that MUF instance. This can be more than one second or occur in the same second as the EOJ was posted. Duration of time can be very short.

- DB00243I - EOJ COMMITTED, EOJOFF DISABLED

Shadow MUF Review

- **Unplanned Shadow MUF**
  - No CF Structures
  - PXX can not be shared
  - Only one MUF up at a time, no intersection of two MUF instances can occur
  - No worries about MRDF, CBS and PXX being shared

- **Planned Shadow MUF**
  - CF structure required
  - Two MUFs can be up so the rules for full data sharing are now enforced
  - Can use the Migrate command or do the process manually
  - If either MUF instance fails during this process, must restart the MUF instance that failed ASAP
  - EOJ of either MUF instance removes the aspects of full data sharing
  - Time line for two MUF instances being up at the same time should be considered to be brief
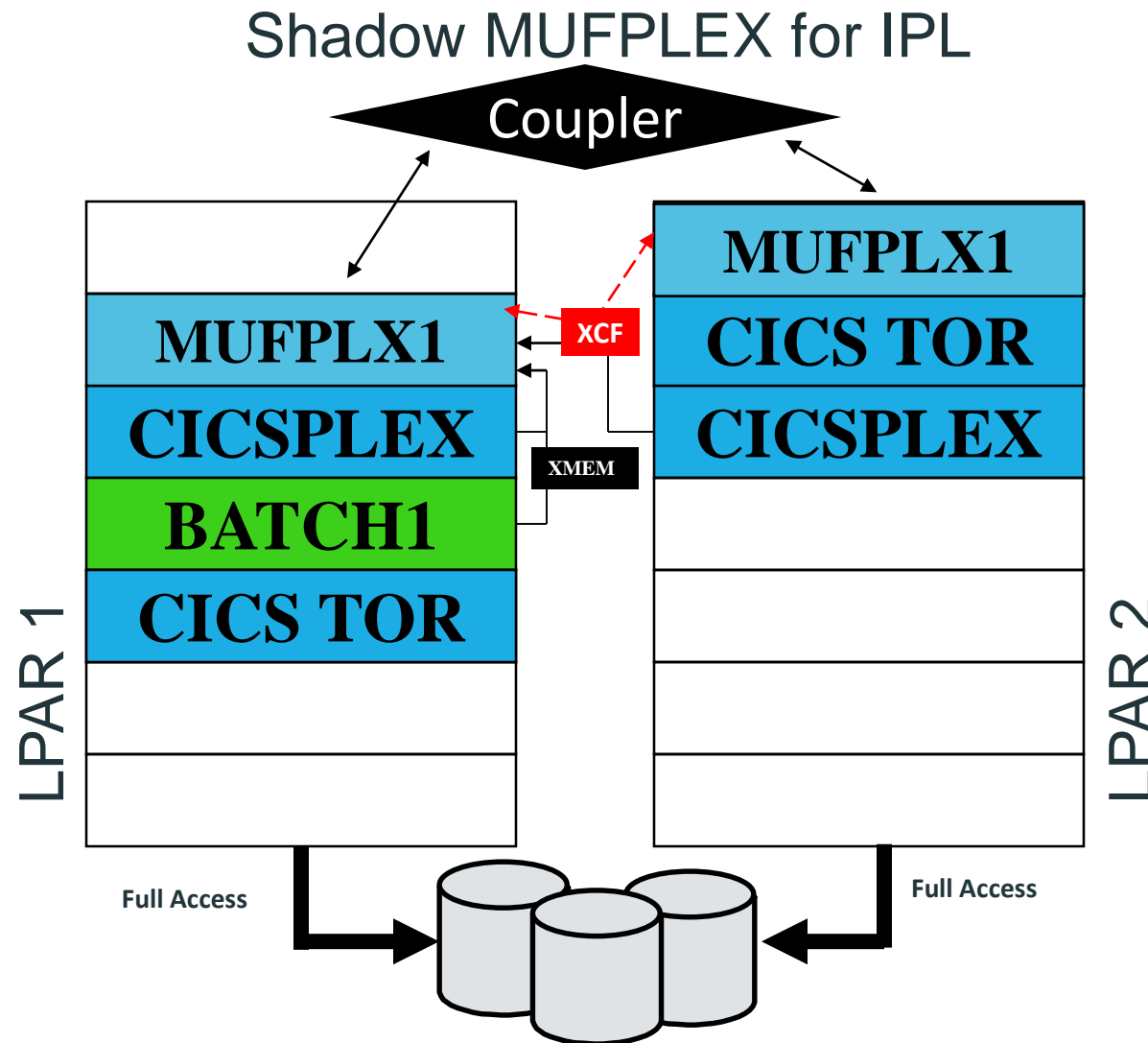
Planned Shadow

- If you want to upgrade from 14.0 to 15.0, this is permitted, but we recommend the code only be done at this time. One MUF instance can be 14.0 and the other MUF instance can be 15.0.   Recommend not leaving both MUF instances up very long.
  - DBID Format 3 and DBID Format 2 messages will be occurring in both MUFs, so this is additional overhead if you attempt this
  - I would recommend you bring down the 14.0 MUF instance as soon as you can. I would then restart the Shadow MUF as 14.0 for fallback

- This upgrade process is supported, but it is not the path we expect the clients to take.   We expect the upgrade path will not be done with two MUFs up.

CA Datacom MUF Planned Outage Overview (cont'd)

Shadow MUFPLEX for IPL

Coupler

LPAR 1

MUFPLX1
CICSPLEX
BATCH1
CICS TOR

XCF

XMEM

LPAR 2

MUFPLX1
CICS TOR
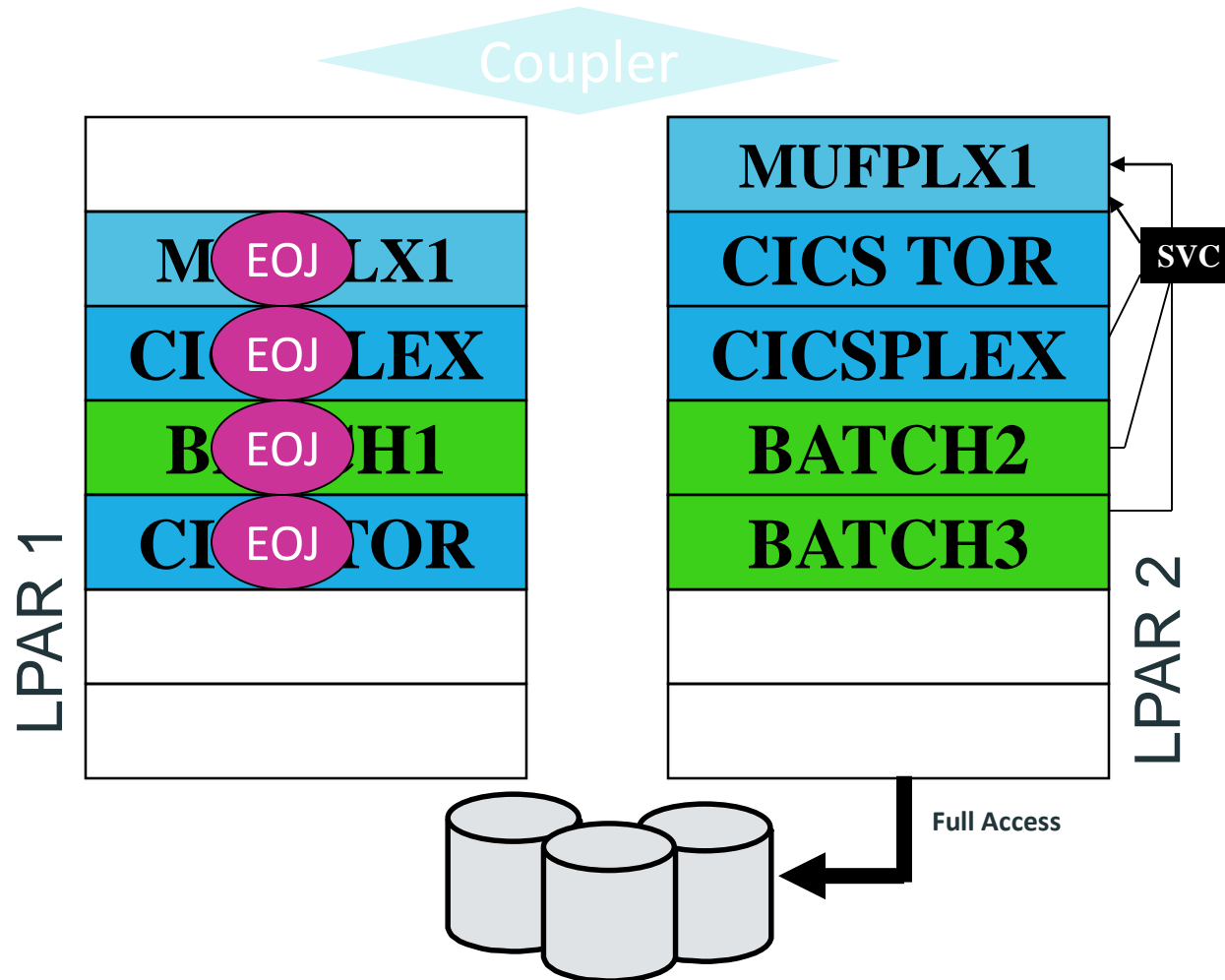CICSPLEX

Full Access

Full Access

- Issue MIGRATE command to convert Remote Shadow into a full data sharing MUF

- Coupler Facility used to synchronize two member MUFs

- Both MUFs now full participants

CA Datacom MUF Planned Outage Overview (cont'd)

Shadow MUFPLEX for IPL

Coupler

LPAR 1

| MUFPLX1 (EOJ) |
| CICSPLEX (EOJ) |
| BATCH1 (EOJ) |
| CICS TOR (EOJ) |

LPAR 2

| MUFPLX1 |
| CICS TOR |
| CICSPLEX |
| BATCH2 |
| BATCH3 |

SVC

Full Access

- All applications now running on LPAR2
- Stop MUF on LPAR1
- Use of coupler stops
- IPL LPAR1
- Once complete restart Shadow on LPAR1
- Could issue MIGRATE to revert to original state
- Could use a Shadow on LPAR3 while LPAR1 is being IPL'd

How Are Clients Using Shadow?

- Large number of sites have not implemented this

- For the ones who have, probably over 90% use the unplanned version of Shadow (no CF structure)

- The remaining 5-10% use the planned outage of the Shadow MUF (requires CF structure)

Other Considerations

- Products such as CA 7 and CA 11 have the built-in logic to recognize a MUF failure and automatically reconnect to the Shadow without loss of information

- CA Datacom provides a suite of "online" utilities so that items like data reorganization are supported while the data is in use except when running data sharing mode for two or more MUF instances at the same time.

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