IMS Managed ACB at TD

CCDUG Toronto May13-14

Luxmi Gnanamuttu – IMS System Programmer

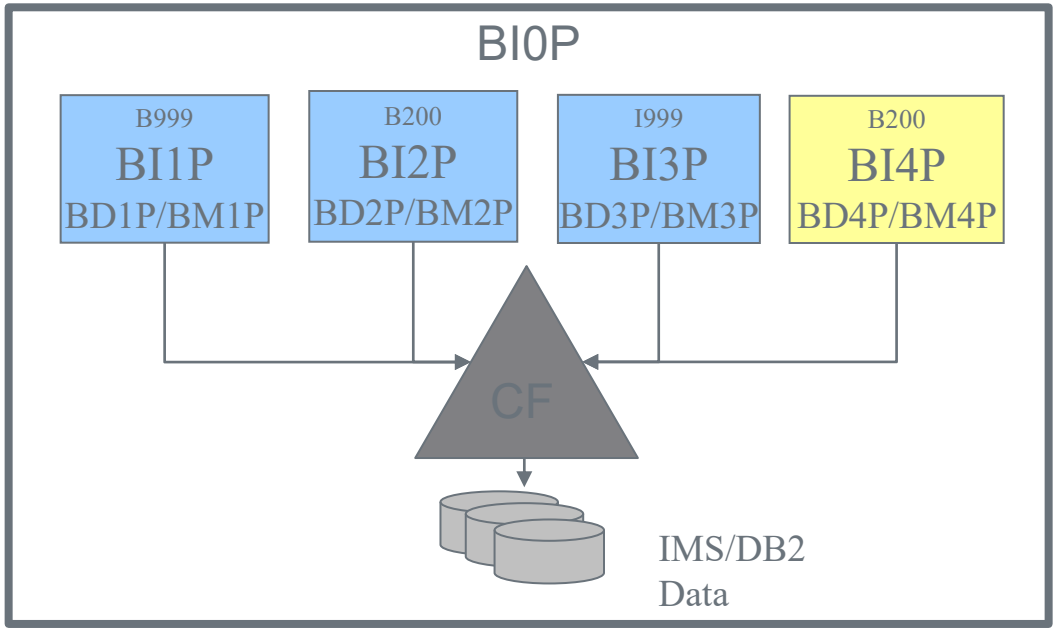
TD Bank Group

- One of the top 10 North American bank
- TD Bank offers full range of financial products and services
- Headquartered in Toronto, with ~95,000 employees around the world
- 27.5 million customers worldwide
- More than 16 million active online and mobile customers.

Production IMS Environment

- IMS V15.3 as 4-way data sharing on 3 LPARs with MQ, Db2, z/connect, IMS connect
- DRD with repository server, SPOC
- Databases
  - DEDB -145 DEDB DBs with 1,689 areas and 43% of DEDB setup with SDEP
  - Full function - 136 FF DB; HISAM (3%), SHISAM (26%), HDAM (42%), HIDAM (9%), INDEX(20%)
- Online - Dependent regions in each IMS
  - 206 MPP (majority as PWFI), 18 to 24 permanent running BMPs
- Batch - BMPs, handful DL/I batch
  - Around 10,000 BMPs during batch window (9 PM to 7 AM weekdays night)
- IMS Workload
  - 3,747 transactions per second
  - 193.6 million transactions per day

Production Configuration



BI1P/BI2P/BI3P Applications:
- ATM
- Point of Sale
- Branch systems
- Online banking
- Mobile banking
- International payments
- BMPs

BI4P Applications:
- BMPs
- Ad-hoc pilot applications

mACB Timeline

- 2014 – Enabled IMS catalog in development IMS (IMS V14)
- 2021 (Aug to Oct) – enabled mACB in development IMS systems
- 2022 (Aug) – enabled mACB in small stand-alone production system
- 2023/2024 (Nov to Feb) – enabled mACB in major pre-production
- 2024 (August) – mACB to be enabled in major production

Issues encountered by TD

- More than 70 cases opened against mACB/DDL
  - IMS catalog build ran for 6 days for ACBLIB with 210 k objects. IMS lab provided fix to reduce build time close to BUILD PSB=ALL time.
  - ATM assembler code did not tolerate 3 additional PCBs in PCBLIST in 2014. Updated application code. IBM provided UI94643 recently.
  - Need to start IMS catalog with ACCESS=UP when IMS starts. DFSDFxxx proclib configuration has the option now.
  - INSYNC issues
    - INSYNC did not work with mACB. IBM/TD worked with Macro4 to get support.
    - INSYNC held BSDS with exclusive access and did not release the hold when user exits INSYNC. IBM/TD worked with Macro4 to get support.
    - DOPT PSB was not deleted from catalog directory. IBM/TD worked with Macro4 to get support.
  - DFS3UACB only supported as DL/I batch. Now DFS3UACB can run as BMP
  - GSAM changes was not supported. Now DFS3PU00 can be used for GSAM changes
  - IMPORT issues corrupted IMS storage. All resolved now
  - IMS restart issue after IMPORT failures. All resolved now.
  - Deleting IMS objects was not supported. zDDL now allows IMS object deletion.

Issues encountered by TD cont..

- IMPORT took around 30 minutes for a single PSB change. After performance improvement fix, IMPORT finish in few seconds
- DBD change IMPORT took 2 hours. IBM provided OPTION(NOCHECK) which improved IMPORT time.
- Unable to resize STG dataset when IMS is up. Now STG can be resized while IMS is up.
- Several issues with SQL batch. zDDL created for IMS DDL
- SHISAM reload DFSURGL0 fails with S0C4 with catalog exit. Resolved with IBM fix.
- Incorrect SQL syntax in zDDL caused IMS to abend. Resolved with IBM fix
- Catalog DB stopped after /NRE and /ERE if # of DB definitions exceeds 32k
- Catalog API - missing some of DBDLIB information for full function DB
- SMF29 did not have end user userid
- Temporary objects not cleaned up from catalog directory when IMPORT fails.

Before and After

Before mACB

(PSBLIB/DBDLIB/ACBLIB)

- DBDGEN/PSBGEN – update DBDLIB/PSBLIB
- ACBGEN – update ACBLIB
- DFSUOCU0 - copy changed objects to inactive ACB
- Global Online change – activate changes for online system

After mACB

(PSBLIB/DBDLIB/ACBLIB/IMS catalog databases & catalog directories)

- DBDGEN/PSBGEN – update DBDLIB/PSBLIB
- Catalog ACBGEN (DFS3UACB) with MANAGEDACBS=STAGE – update ACBLIB, IMS catalog databases and STG dataset
- IMPORT – update IMS catalog directories and activate changes for online system

IMS catalog database partition

- Development IMS
  - Large ACBLIB with 210 k and 280 k objects
  - 6 partitions
  - DBDs in partition 1
  - PSBs in partitions 2 to 6
- Preproduction and production IMS
  - 2 partitions
  - DBDs in partition 1
  - PSBs in partition 2

Migration Strategy

- Sandbox, development, preproduction and production
- Staggered conversion in a data sharing system
  - Convert IMS1 to mACB
  - Convert IMS2 to mACB after 2 weeks
  - Convert IMS3 to mACB after 3 weeks
  - Convert IMS4 to mACB after 4 weeks
- Premigration, update all DFSDFxxx to change ACBSHR to N in <SECTION=COMMON_SERVICE_LAYER>
- As part of mACB conversion change ACBSHR=Y
- GOLC use OLCSTAT and IMPORT use ACBSHR parm to co-ordinate IMS object changes among data sharing systems

Migration Steps

- Update DFSVSMxx proclib to add OSAM buffers (for non OSAM customer)
- Copy DFSCD000 & DFSCX000 from RESLIB to DBDLIB, Copy DFSCPL00 & DFSCP00* from RESLIB to PSBLIB, ACBGEN & GOLC
- DBRC registration of DFSCD000, DFSCX000
- Allocate catalog, catalog directory and stage datasets
- Populate catalog and catalog directories using DFS3PU00 with MANAGEDACBS=SETUP as DL/I batch
- Image copy catalog database and index database
- Restart IMS with "/NRE CHECKPOINT 0" after updating DFSDFxxx

```
<SECTION=CATALOG>
 CATALOG=Y
 ALIAS=DFSC
 ACBMGMT=CATALOG,ACCESS=UPDATE
 RETENTION=(INSTANCES=3)
```

- Test object change with updated procedure (catalog ACBGEN and IMPORT)

Post Migration Steps

- Daily image copy for IMS catalog databases
- Regular IMS catalog clean up and catalog REORG
  - DFS3PU10 as BMP for IMS catalog clean up
  - HALDB online REORG after catalog clean up
    - INIT OLREORG NAME(DFSCD01)
    - INIT OLREORG NAME(DFSCD02)
- Monitor IMS catalog directory usage (we kept DI1001 and DI1002 size same size as ACBLIB size so double the capacity compared to ACB)
- Monitor IMS catalog DB usage (we created twice the size of what is needed)
- Remove DBDLIB/PSBLIB from IMS BMP procedure (if your shop use common BMP procedures)
- IMS catalog exit for batch
  - Allocate partition definition dataset, MDA for partition definition dataset, install catalog exit, Change DFSVSMxx to remove NODYNALLOC

Do's and Don'ts after mACB conversion

- DBD IMPORT can run longer if database is used in multiple PSBs. (IMS stops PSB scheduling during IMPORT similar to GOLC)
  - For DEDB, use the following options so that IMPORT time is comparable to GOLC time
    - Use BUILD DBD=XXXXXXX,BLDPSB=NO
    - IMPORT DEFN SOURCE(CATALOG) OPTION(NOCHECK)
- To delete IMS objects, use IMS DDL DROP PROGRAMVIEW or DROP DATABASE
- Do not run IMPORT and IMS DDL (DFS3ID00) DROP at the same time (IMS can abend)
- Do not run IMS DDL (DFS3ID00) DROP in parallel (IMS DDL can hang) – fixed by UI95783
- If you have large number of IMS objects, DROP DATABASE will run for minutes (runs for 10 to 14 min in our development system)

Preparation for IMS DDL

- New user interface/intake tool for IMS DDL
  - Update or create home written tool to support IMS DDL

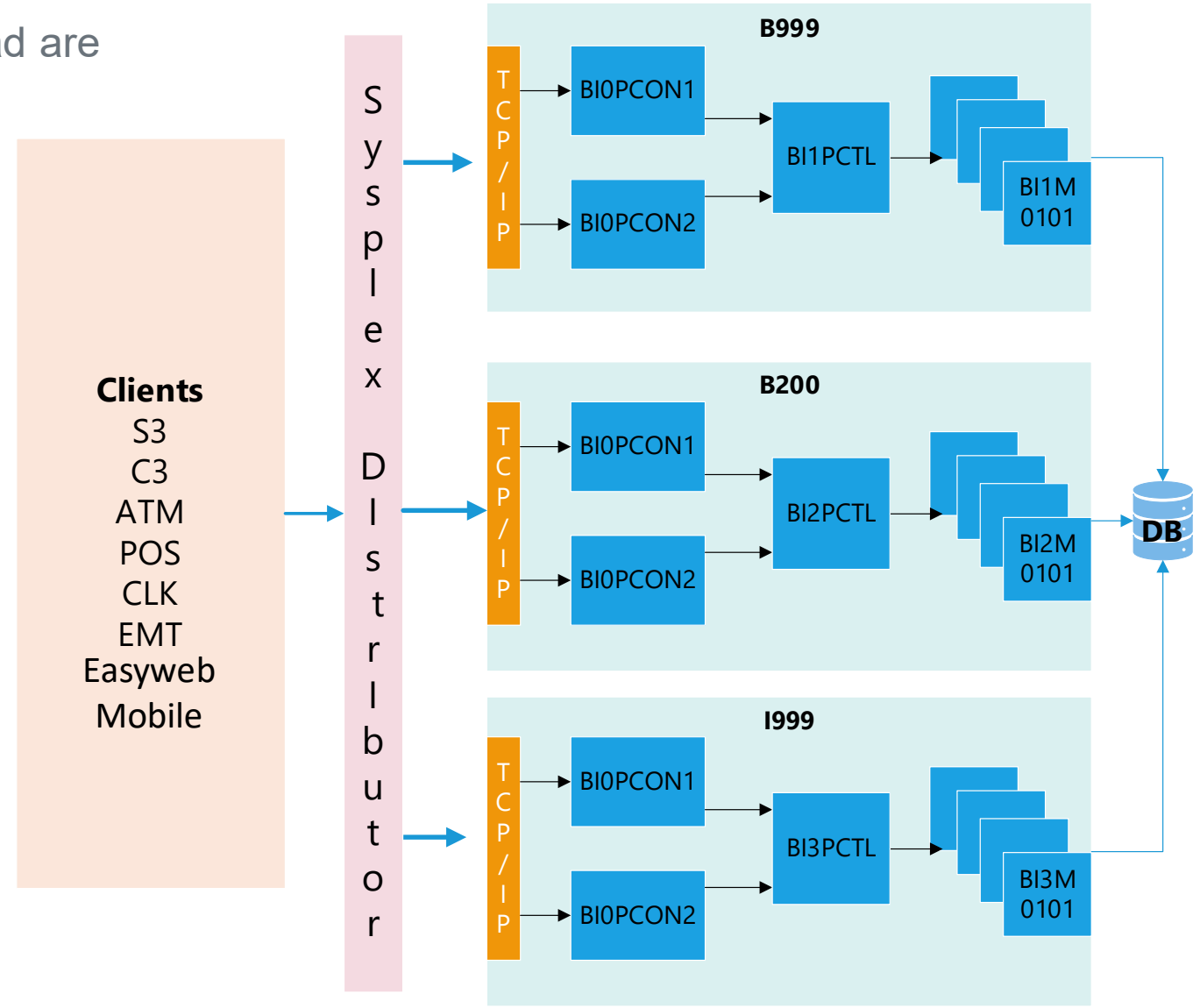
- Huge undertaking to update production batch jobs to remove DBDLIB/PSBLIB/ACBLIB
  - BMP use //IMS DD with PSBLIB/DBDLIB
  - DBRC batch use DBDLIB
  - DEDB unload (FABCUR1) use ACBLIB
  - DEDB init (DBFUMIN0) use ACBLIB
  - DEDB Pointer checker use ACBLIB
  - IMS full function database utilities (IC2, unload, reload…) use DBDLIB
  - Randomizer sort exits (if you have any) use ACBLIB
  - Any other home written tools/utilities

- Possible to convert to DDL without removing PSBLIB/DBDLIB/ACBLIB from production batch
  - Keep DBDLIB/PSBLIB/ACBLIB in sync with IMS catalog directories by using IBM provides utilities
  - Run with empty DBDLIB/PSBLIB/ACBLIB (it will take years to really get rid of DBD/PSB/ACBLIB in production batch jobs)

IMS CONNECT CONFIGURATION & SECURITY

IMS connect configuration at TD

85% of total workload are from IMS connect



IMS Connect configuration at TD

- Majority IMS connect clients use TMRA. RYO and connect API are also used.
- 2 sysplex ports (secure and non-secure)
- Run 2 IMS connect tasks per LPAR for higher availability
- IMS connect exits customization (TMRA and RYO)
  - to route IMS connect messages to local IMS running in same LPAR
  - Enforce standards such as CM0, purge non deliverable, IRM timer for ACK
- Use IMS connect extension
  - Event collection at level 3
  - 6 active Journals

IMS Connect Security

- Use CEX security with RACF=N
- ACEE caching for 8 hours to reduce ACF2 GRS enqueue contention
- IP allow list or userid password checking in IMS connect exits.
- Reload exit with CEX REFRESH command to update IP allow list
- Pass ticket for CEX batch command utility