# Migrating to Db2 13 (1|7)

First: activate function level 510 on the Db2 12 system

To successfully activate function level 510:

- Code level (**DB2 LVL** in -DISPLAY GROUP output) must be 121510
- Catalog level (in -DISPLAY GROUP output) must be V12R1M509
- *Must not be any packages, used within last 18 months, that were last bound or rebound prior to Db2 11*
  - To check on old packages, issue this query before issuing -ACTIVATE FUNCTION LEVEL (V12R1M510):

```
SELECT * FROM SYSIBM.SYSPACKAGE
  WHERE LASTUSED >= DATE(DAYS(CURRENT DATE) - 548)
  AND RELBOUND NOT IN ('P','Q','R')
  AND VALID <> 'N'
  AND OPERATIVE <> 'N';
```

*Note: this query also documented on Db2 12 documentation page about function level 510*

  - If > 0 rows returned, rebind pre-Db2 11 packages and issue query again

# Migrating to Db2 13 (2|7)

Why must pre-Db2 11 packages (that are still in use) be rebound prior to migrating to Db2 13?

- Packages are executable code, and a package generated by Db2 10 (or an earlier version) cannot execute in a Db2 13 system
- Db2 12 function level 510 can be activated if there are pre-Db2 11 packages that have not been used in the past 18 months – what if there is a request to execute such a package after migration to Db2 13?
  - Package would be auto-rebound by Db2 13
  - If auto-rebind causes access path change that negatively impacts performance, reverting to previous instance of package via REBIND PACKAGE with SWITCH(PREVIOUS) not possible – *previous instance of package was generated prior to Db2 11 and cannot execute in Db2 13 system*
  - With that in mind, may consider rebinding <u>any and all</u> pre-Db2 11 packages prior to migrating to Db2 13 – not just those that have not been used in the past 18 months
- Especially if migration to Db2 13 will occur several months after activation of Db2 12 function level 510, use pre-migration preparation job DSNTIJPM to identify pre-Db2 11 packages that have been used within the past 18 months, and rebind those packages prior to migrating to Db2 13

# Migrating to Db2 13 (3|7)

In addition to activation of Db2 12 function level 510, migration to Db2 13 requires application of fallback SPE to Db2 12 system

- Fallback SPE allows fallback to Db2 12 following a migration to Db2 13
- In Db2 data sharing environment, fallback SPE also allows Db2 12 and Db2 13 members to coexist in a data sharing group
  - Fallback SPE must be applied to all members of data sharing group before one of the members can be started with Db2 13 to migrate catalog for new Db2 version
- APAR for fallback SPE is PH37108 (see https://www.ibm.com/support/pages/apar/PH37108)
  - Associated PTF is UI79956 (March 2022)
- To identify all maintenance required for migration to Db2 13, use these fix categories (FIXCATs):
  - IBM.Migrate-Fallback.DB2.V13
  - IBM.Coexistence.DB2.SYSPLEXDataSharing

# Migrating to Db2 13 (4|7)

After activation of function level 510 and application of fallback SPE, Db2 12 subsystem can be stopped and restarted with Db2 13 to execute CATMAINT and make Db2 13 available for use

After execution of CATMAINT, Db2 13 catalog level is V13R1M100

- Initial Db2 13 CATMAINT job *does not change structure of catalog* – benefits:
  - Greatly simplifies fallback SPE
  - Minimizes contention between CATMAINT and concurrently executing application and utility processes
  - Avoids invalidation of packages dependent on catalog tables
- Catalog not structurally changed until Db2 13 system is at function level 500 and CATMAINT is executed again to take catalog level to V13R1M501
- **Note:** in a Db2 data sharing environment, when first member is started with Db2 13, application/user/utility processes will be effectively blocked on that member until CATMAINT has taken catalog to V13R1M100 level – this Db2 13 member will be available for applications after successful execution of CATMAINT

# Migrating to Db2 13 (5|7)

Initial function level for a Db2 13 system migrated from Db2 12 is V13R1M100

- Initial function level for newly installed Db2 13 system is V13R1M501
- Primary new features available at Db2 13 function level 100 are optimizer-related

When ability to fallback to Db2 12 is not needed (and, in a data sharing group, when release coexistence is not needed), can activate function level V13R1M500

- No CATMAINT job required for this activation: function level V13R1M500 has no catalog dependencies
- More new features (those that do not require catalog changes) available with Db2 13 function level 500

At the appropriate time, execute CATMAINT to take catalog level to V13R1M501, then activate function level V13R1M501

- Still more new features available at this function level
- Note that GA level of Db2 13 code includes level 501 functionality – no need to apply the fix for an APAR to get code to that level

# Migrating to Db2 13 (6|7)

In a Db2 13 migration context, two important things to keep in mind regarding the APPLCOMPAT package bind option:

1. *APPLCOMPAT affects DDL as well as DML statements (same as in Db2 12 environment)*

   - If new DDL (CREATE/ALTER/DROP) syntax or behavior is introduced by Db2 13 function level V13R1M501, availability of new syntax or behavior requires package used to issue DDL statement (e.g., DSNTEP2 or SPUFI package) to be bound with APPLCOMPAT(V13R1M501) or higher

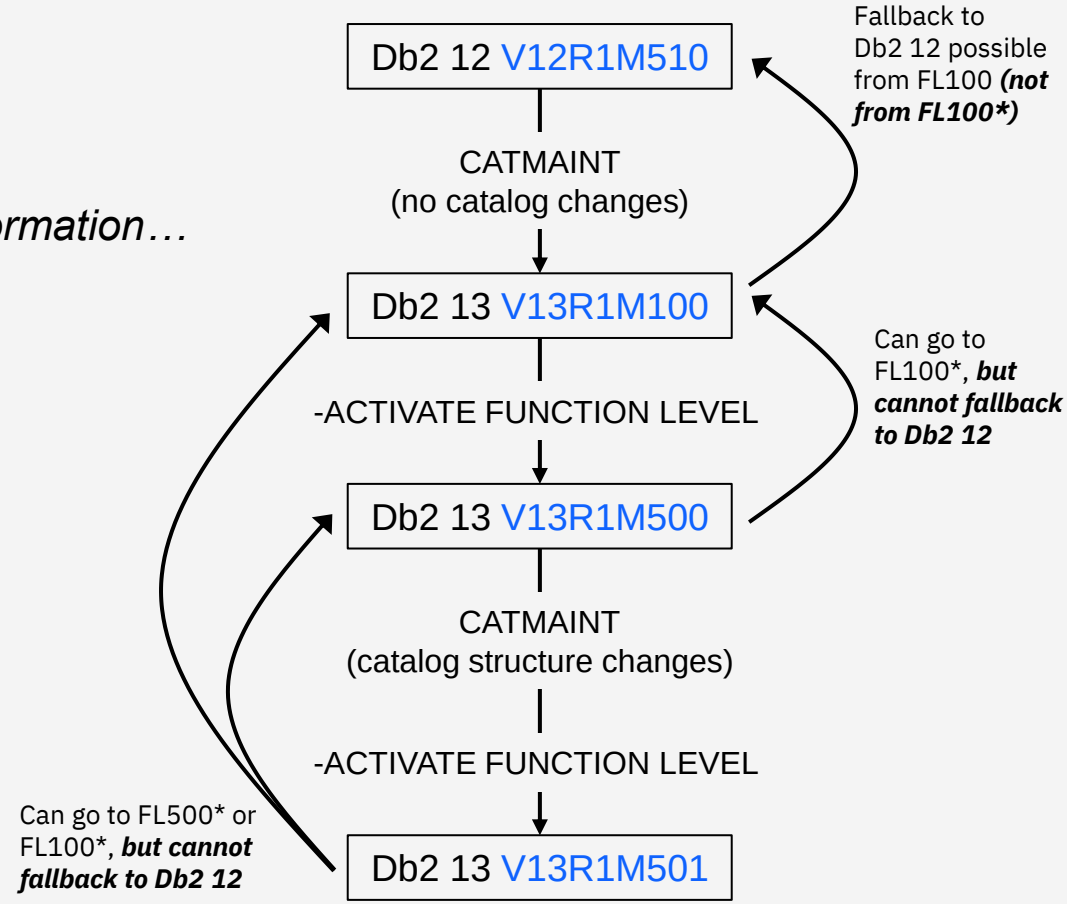
2. *APPLCOMPAT value for the packages in the NULLID collection (i.e., the IBM Data Server Driver / Db2 Connect packages) provide the default level of SQL syntax and behavior for DDF-using applications*

   - A Db2 13 subsystem could be running with function level V13R1M500 activated, but if NULLID packages are bound with APPLCOMPAT(V11R1) then by default DDF-using applications cannot use SQL syntax or get SQL behavior introduced after Db2 11

# Migrating to Db2 13 (7|7)

*Visual summary of Db2 13 migration information…*

*Note: if function level 500 or 501 is activated for a Db2 13 system, and the system's function level is later changed to 100*, packages bound with APPLCOMPAT value of V13R1M500 and/or V13R1M501 will continue to execute as they did when the system's function level was 500 or 501*



# Memory limit (MLMT) parameter on IRLMPROC; Db2 install panel DSNTIPJ

FL 100

Install panel DSNTIPJ is input to IRLMPROC

- Old process: IRLMPROC passed MAX STORAGE FOR LOCKS field via JOB statement parameter MEMLIMIT
  - Problem: MEMLIMIT could be overwritten
  - PH18291 and PH27450 allow IRLM to accept storage limit as EXEC statement parameter
    - Install panels not updated; MEMLIMIT still used to generate IRLMPROC
- New process
  - Install panels updates allow wider range of inputs to MAX STORAGE FOR LOCKS
    - Input to EXEC statement parameter, instead of JOB statement parameter, to prevent overwrite

```
DSNTIPJ          INSTALL DB2 - IRLM PANEL 2
===>

Enter data below:
   1 PAGE PROTECT           ===> YES       Page protect common modules (YES,NO)
   2 MAX LOCK STORAGE UNIT  ===> M         Cntl blk storage unit (M,G,T,P)
   3 MAX STORAGE FOR LOCKS  ===> 2160      Cntl blk storage (UNIT M:2048-99999,
                                           G:2-99999, T:1-99999, P:1-16384)
   4 LOCKS PER TABLE(SPACE) ===> 5000      Max before lock escalation (0-100M)
   5 LOCKS PER USER         ===> 20000     Max before resource unavail (0-100M)
   6 DEADLOCK TIME          ===> 1         Detection interval (1-5 seconds or
                                           100-5000 milliseconds)
For Db2 data sharing ONLY enter data below:
   7 DEADLOCK CYCLE         ===> 1        Number of LOCAL cycles before GLOBAL
   8 MEMBER IDENTIFIER      ===> 1        Member ID for this IRLM (1-255)
   9 IRLM XCF GROUP NAME    ===> DXRGROUP Name of IRLM XCF group
  10 LOCK ENTRY SIZE        ===> 2        Initial allocation in bytes (2,4,8)
  11 NUMBER OF LOCK ENTRIES ===> 0        Lock table entries (0-2048)
  12 DISCONNECT IRLM        ===> YES      Disconnect automatically  (YES, NO)

PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

# IRLMPROC MLMT example

FL 100

DSNTIJMA modified

- JOB statement parm MEMLIMIT removed
- EXEC statement parm added, &MLMT

Fallback considerations:

- If PH18291 and PH27450 applied to Db2 12 environment, no changes required
  - If not applied to Db2 12 environment, MEMLIMIT JOB statement parm will be required

```
//IRLMPROC PROC RGN=5000K,
//             LIB='DSN!!0.SDXRRESL',
//             IRLMNM=IRLM,
//             IRLMID=1,
//             SCOPE=LOCAL,
//             DEADLOK='1,1',
//             MAXCSA=0,
//             PC=YES,
//             MAXUSRS=7,
//             IRLMGRP=,
//             LOCKTAB=,
//             TRACE=NO,
//             PGPROT=YES,
//             LTE=0,
//             MLMT=2160M
//          EXEC PGM=DXRRLM00,DPRTY=(15,15),
//          PARM=(&IRLMNM,&IRLMID,&SCOPE,&DEADLOK,&MAXCSA,&PC,
//               &MAXUSRS,&IRLMGRP,&LOCKTAB,&TRACE,&PGPROT,&LTE,&MLMT),
//          REGION=&RGN
//          MEMLIMIT=&MLMT
//STEPLIB   DD DSN=&LIB,DISP=SHR
```

# What is your Db2 13 for z/OS migration plan?

Db2 13 for z/OS was generally available (GA) in October of 2022

You should be planning to migrate

End of support for Db2 12 for zOS –

31 December, 2025

Make sure you have a workable plan