



CA Database management for Db2 for z/OS support for Db2 12 Continuous Delivery

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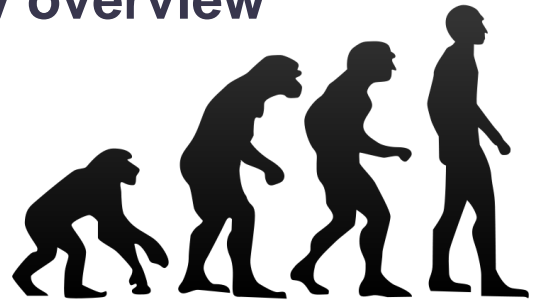
Terms used throughout the document

- **CA Db2 Tools** – CA Database Management Solutions for Db2 for z/OS
- **Product** – any product from CA Database Management Solutions for Db2 for z/OS release 20
- **Db2 CD** – IBM Db2 Continuous Delivery mechanism introduced in Db2 12
- **CD level** – Db2 12 Continuous Delivery function level or catalog level

Agenda

- Db2 12 Continuous Delivery
 - A bit of history
 - Code level, Function level, Catalog level
 - Application considerations
 - Existing levels
- Support in Db2 tools post-install
- A bit of future ideas

Db2 12 Continuous Delivery overview



Short Pre-Db2 12 history

- Traditionally, there was a new Db2 version approximately every 3 years
- IBM used releases until Db2 2.3, since then only versions were introduced
- There were skip release versions
 - Db2 7 – from Db2 5 or 6 to 7
 - Db2 10 – from Db2 8 or 9 to 10
- Db2 8 introduced new modes – CM, NFM, ENFM, and *
- Db2 12 introduced Continuous Delivery

A Brief History of SQL in Db2 for z/OS

- Since the dawn of man... (DB2 for MVS Version 1 Release 1 in 1985)
 - INSERT, UPDATE, DELETE, SELECT, COMMIT, ROLLBACK, ...
- DB2 1.2 (1986)
 - EXPLAIN
 - Explainable statement - SELECT, MERGE, INSERT statement, or the searched form of an UPDATE or DELETE statement
- DB2 1.3 (1987)
 - DATE, TIME, TIMESTAMP data types support, date time arithmetic
 - check your PLAN_TABLE - column TIMESTAMP vs EXPLAIN_TIME (DB2 10)
 - UNION ALL

A Brief History of SQL in Db2 for z/OS

- DB2 2.1 (1988)
 - Referential integrity - DB2 managed RI vs application managed RI?
 - what about other constraints? (check, unique)
- DB2 2.3 (1990)
 - Packages
 - DBRMs cannot be bound into plans since DB2 10
 - OPTIMIZE FOR n ROWS

A Brief History of SQL in Db2 for z/OS

- DB2 3 (1993)
 - 60 Bufferpools
 - Data Compression
- DB2 4 (1995)
 - Data Sharing (almost transparent to application developers)
 - External Stored Procedures
 - Outer joins
 - WITH UR clause

A Brief History of SQL in Db2 for z/OS

- DB2 5 (1997)
 - Result sets from stored procedures
 - Conformance to the SQL-92 standard
 - Do you remember Sysplex query parallelism? (Deprecated in DB2 10)
- DB2 6 and DB2 6 refresh (1998)
 - Triggers
 - Large Objects (LOBs)
 - SQL Stored Procedures - converted to C
 - User Defined Functions
 - Distinct types - object relational extensions
 - SAVEPOINTS
 - Identity columns
 - Declared Temporary Tables

A Brief History of SQL in Db2 for z/OS

- DB2 7 (2001)
 - Unicode support
 - Scrollable cursors
 - Limited fetch - FETCH FIRST n ROWS
 - Row expressions
 - Unions in Views
 - Compliance with SQL 99
 - ORDER BY expression
 - SQL Scalar functions (inline)
 - Stored procedures in Java

A Brief History of SQL in Db2 for z/OS

- DB2 8 (2004)
 - Multi-row inserts and fetches
 - 64-bit support
 - Long names (128 characters instead of 18)
 - Informational referential constraints
 - Materialized Query Tables
 - Online Schema Evolution
 - INSERT within SELECT
 - Sequences
 - GET DIAGNOSTICS – ANSI/ISO 1999
 - Session variables
 - Common Table Expressions

A Brief History of SQL in Db2 for z/OS

- DB2 9 (2007)
 - pureXML
 - New built-in timestamp functions (TIMESTAMPADD, TIMESTAMP_ISO)
 - Native SQL Stored procedures
 - INSTEAD OF Triggers
 - Clone tables
 - SKIP LOCKED DATA
 - Binary data types - are you still using VARCHAR FOR BIT DATA?
 - OLAP functions
 - EXCEPT/INTERSECT
 - Universal Tablespaces – PBR, PBG
 - SELECT FROM UPDATE and SELECT FROM DELETE
 - TRUNCATE, MERGE
 - Optimistic locking – ROW CHANGE TIMESTAMP

A Brief History of SQL in Db2 for z/OS

- DB2 10 (Oct 2010)
 - Temporal tables
 - System, business, bi-temporal
 - Extended timestamp support - new precision, time zones
 - Access to CURRENTLY COMMITTED data
 - SELECT FROM table change reference – MERGE support
 - Non-inline SQL scalar functions
 - SQL table functions
 - Implicit casting – SQL standard compliance
 - BIF compatibility
 - OLAP – moving sums and moving averages. RANK, DENSE_RANK, ROW_NUMBER
 - Column masks and row permissions

A Brief History of SQL in Db2 for z/OS

- DB2 11 (2013)
 - Transparent archiving
 - Expanded support for temporal tables
 - Global variables
 - Support for SQL arrays
 - Improved SQL PL
 - Autonomous procedures
 - Enhancement to LIKE predicate
 - LIKE_BLANK_SIGNIFICANT ZPARM
 - (Expanded RBA/LRSN)

A Brief History of SQL in Db2 for z/OS

- DB2 12 (2016)
 - Enhanced MERGE
 - Advanced Triggers
 - Piece-wise DELETE
 - Temporal enhancements
 - SQL Pagination
 - Continuous Delivery
- V12R1M501 (2017)
 - LISTAGG
- V12R1M502 (2018)
 - KEYLABEL management
 - Explicit casting for GRAPHIC and VARGRAPHIC

What is continuous delivery

- **Continuous delivery:** New functions are delivered together with preventive and prescriptive service in the same stream
- **Traditional model:** New functions (usually) delivered in new versions not through PTFs. However, in practice, IBM released new functions even for pre-Db2 12 versions via PTFs.

Reasons for Continuous Delivery

- IBM lists the following reasons:
 - Customers want new features faster, especially driven by the new types of applications (mobile, cloud, analytics, ...)
 - Industry trends are moving from traditional monolithic code delivery
 - Deployment of a new release may be disruptive
 - Customer adoption of new releases were longer than 3 years
 - Reducing the time to adopt new functions
 - Increasing the time between versions

Db2 12 Continuous Delivery

- New features will be delivered via the **maintenance** stream and **activated** on demand
 - No migration modes that were introduced in Db2 8 (CM, ENFM, NFM, *)
 - **Code level** represents the state of the target libraries
 - **Function level** specifies the level of SQL and other features available for use
 - **Catalog level** represents the state of the DB2 catalog
- Display format of levels is **VvvRrMmmmf** where
 - vv stands for the version (12)
 - r is the release number (1)
 - mmm stands for the level number (100, 500, 501, 502 at this moment)
 - and f is a fallback indicator * if applicable (Function level only)
 - Example: V12R1M501
 - A shortened version **vvrmmm** used for code level

Db2 12 Continuous Delivery - levels

- **Code level** – state of the target libraries
 - Applied maintenance via SMP/E
 - Member specific if different libraries are used
- **Catalog level** – state of the Db2 catalog
 - Activated by the CATMAINT utility
 - Group-wide level
 - Depends on the Code level and possibly on a previous function level
- **Function level** – DML and DDL features available
 - Activated via -ACTIVATE FUNCTION LEVEL Db2 command
 - Depends on the Code level of all members and the Catalog level
 - Group-wide level

Db2 12 Continuous Delivery

- DISPLAY GROUP Example

```
DSN7100I  !DT31 DSN7GCMD
```

```
*** BEGIN DISPLAY OF GROUP(DSNDTGP ) CATALOG LEVEL(V12R1M500)
```

```
    CURRENT FUNCTION LEVEL(V12R1M500)
```

```
    HIGHEST ACTIVATED FUNCTION LEVEL(V12R1M500)
```

```
    HIGHEST POSSIBLE FUNCTION LEVEL(V12R1M501)
```

```
    PROTOCOL LEVEL(2)
```

```
    GROUP ATTACH NAME(DTGP)
```

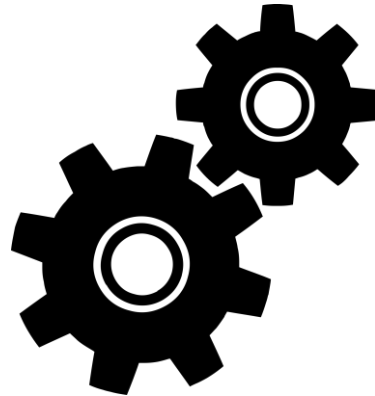
Catalog Level

Function Level

```
-----
DB2          SUB          DB2  SYSTEM  IRLM
MEMBER  ID  SYS  CMDPREF  STATUS  LVL  NAME      SUBSYS  IRLMPROC
-----
DT11      1  DT11 !DT11    ACTIVE  121501 CA11      IT11    DT11IRLM
DT31      2  DT31 !DT31    ACTIVE  121501 CA31      IT31    DT31IRLM
DT32      3  DT32 !DT32    ACTIVE  121501 CA32      IT32    DT32IRLM
-----
```

Code Level

Db2 12 Levels



Code level

- Is also referred as maintenance level
- Is associated with a set of PTFs
- Received and Applied maintenance
- Is member scope, every member can have a different code level

Db2 12 Continuous Delivery levels

- DISPLAY GROUP Example

```
DSN7100I  !DT31 DSN7GCMD
```

```
*** BEGIN DISPLAY OF GROUP(DSNDTGP ) CATALOG LEVEL(V12R1M500)
```

```
        CURRENT FUNCTION LEVEL(V12R1M500)
```

```
        HIGHEST ACTIVATED FUNCTION LEVEL(V12R1M500)
```

```
        HIGHEST POSSIBLE FUNCTION LEVEL(V12R1M501)
```

```
        PROTOCOL LEVEL(2)
```

```
        GROUP ATTACH NAME(DTGP)
```

```
-----
```

DB2	SUB	DB2	SYSTEM	IRLM				
MEMBER	ID	SYS	CMDPREF	STATUS	LVL	NAME	SUBSYS	IRLMPROC
DT11	1	DT11	!DT11	ACTIVE	121501	CA11	IT11	DT11IRLM
DT31	2	DT31	!DT31	ACTIVE	121501	CA31	IT31	DT31IRLM
DT32	3	DT32	!DT32	ACTIVE	121501	CA32	IT32	DT32IRLM

```
-----
```

Code Level

Catalog level

- Represents the state of Db2 catalog
 - Catalog tables
 - Columns in catalog tables
- Is not required until a function level requires it
- Might require a certain lower function level
- Requires all members at certain code level
- Is a group wide level (shared catalog)
- Changed by CATMAINT UPDATE LEVEL utility
 - Prevents backing off any maintenance
 - Is cumulative – changing catalog level applies all previous catalog levels

Db2 12 Continuous Delivery levels

- DISPLAY GROUP Example

```
DSN7100I  !DT31 DSN7GCMD
```

```
*** BEGIN DISPLAY OF GROUP(DSNDTGP ) CATALOG LEVEL(V12R1M500)
```

Catalog Level

```
        CURRENT FUNCTION LEVEL(V12R1M500)
```

```
        HIGHEST ACTIVATED FUNCTION LEVEL(V12R1M500)
```

```
        HIGHEST POSSIBLE FUNCTION LEVEL(V12R1M501)
```

```
        PROTOCOL LEVEL(2)
```

```
        GROUP ATTACH NAME(DTGP)
```

```
-----
```

DB2	SUB				DB2	SYSTEM	IRLM	
MEMBER	ID	SYS	CMDPREF	STATUS	LVL	NAME	SUBSYS	IRLMPROC
DT11	1	DT11	!DT11	ACTIVE	121501	CA11	IT11	DT11IRLM
DT31	2	DT31	!DT31	ACTIVE	121501	CA31	IT31	DT31IRLM
DT32	3	DT32	!DT32	ACTIVE	121501	CA32	IT32	DT32IRLM

```
-----
```

Function Level

- Is a set of enhancements and capabilities delivered via PTFs
 - SQL features
 - New Utility syntax
- Not active until activated explicitly by `–ACTIVATE` command
 - `–ACTIVATE FUNCTION LEVEL (V12R1M500) TEST`
- Applications also must use the corresponding application compatibility level (APPLCOMPAT) in order to use it
- Prerequisites:
 - code level
 - catalog level
- Activating a level also activates all lower levels

Function Level, cont.

- Previous function level
 - So called star level – example: from V12R1M501 to V12R1M500 ends in **V12R1M500***
 - No new application can be bound with V12R1M501, but existing applications will continue to run with the previous level
 - Does not change the code level nor catalog level
- Highest activated level
 - Previously highest activated function level
 - Makes sense only in case of activating a prior function level
- Highest possible function level
 - Shows the highest function level that can be activated in a group
 - Depends on the catalog level and code levels of individual members

Db2 12 Continuous Delivery levels

- DISPLAY GROUP Example

```
DSN7100I  !DT31 DSN7GCMD
```

```
*** BEGIN DISPLAY OF GROUP(DSNDTGP ) CATALOG LEVEL(V12R1M500)
```

```
    CURRENT FUNCTION LEVEL(V12R1M500)
```

```
    HIGHEST ACTIVATED FUNCTION LEVEL(V12R1M500)
```

```
    HIGHEST POSSIBLE FUNCTION LEVEL(V12R1M501)
```

```
    PROTOCOL LEVEL(2)
```

```
    GROUP ATTACH NAME(DTGP)
```

Function
Level

```
-----
```

DB2	SUB	DB2	SYSTEM	IRLM				
MEMBER	ID	SYS	CMDPREF	STATUS	LVL	NAME	SUBSYS	IRLMPROC
DT11	1	DT11	!DT11	ACTIVE	121501	CA11	IT11	DT11IRLM
DT31	2	DT31	!DT31	ACTIVE	121501	CA31	IT31	DT31IRLM
DT32	3	DT32	!DT32	ACTIVE	121501	CA32	IT32	DT32IRLM

```
-----
```

Relationships between levels - summary

- Function level depends on Code Level and a Catalog Level
- Catalog Level depends on Code Level and possibly on a previous function level
- Catalog level is cumulative
 - All prior catalog changes are applied
- Function level is cumulative
 - All prior functions are activated

Level scenarios

- Migration from **Db2 11 NFM** to **V12R1M100**
- Activate new function level without catalog changes
 - Example: **V12R1M501**
- Activate new function level with catalog changes
 - Example: **V12R1M502** from **V12R1M501**
- Activate new function level with catalog change while skipping function levels
 - Example: **V12R1M502** from **V12R1M500**, without **V12R1M501**
- Activate previous function level
 - Example: **V12R1M500*** from **V12R1M501**

Existing levels

- **V12R1M100** – equivalent to CM
- **V12R1M500** – equivalent to NFM
 - New catalog level and function level
- **V12R1M501**
 - new LISTAGG function, SQL 2016
- **V12R1M502**
 - Support for more granular encrypted objects
 - New catalog level and function level
 - Catalog level adds KEYLABEL column to several tables
 - New KEY LABEL option in DDL
 - Explicit casting of numeric data types to fixed or variable graphic strings
 - Changes in migration process

Application considerations



Application Compatibility Considerations

- Application compatibility introduced in Db2 11
 - **APPLCOMPAT** bind option
 - APPLCOMPAT ZPARM
 - CURRENT APPLICATION COMPATIBILITY special register
- Controls behavior of DML, DDL, and DCL
 - In Db2 11 **APPLCOMPAT controlled only DML!** (DDL and DCL were controlled by NFM)
- **REBIND** is needed to allow new features!

Application Compatibility Considerations

- APPLCOMPAT
 - Default value comes from APPLCOMPAT ZPARM
 - APPLCOMPAT syntax applies to
 - packages (BIND and REBIND),
 - triggers (REBIND only),
 - functions and procedures (CREATE and ALTER)
 - Can be **less or equal** to the currently activated function level
 - Otherwise throws an error!
 - Allowed values:
 - V10R1
 - V11R1 = V12R1M100
 - V12R1Mxxx, where xxx can be 500, 501, 502

Application Compatibility Considerations

- CURRENT APPLICATION COMPATIBILITY
 - Controls the function level compatibility in dynamic SQL
 - Initial value set from APPLCOMPAT
 - Value can be **less or equal** to the APPLCOMPAT bind option!
 - Different than in Db2 11 where you could set higher CURRENT APPLICATION COMPATIBILITY than APPLCOMPAT bind
 - The only exception is setting V11R1 in a package bound with V10R1
 - Honors this maximum even if a lower level has been activated
- CURRENT APPLICATION COMPATIBILITY <= APPLCOMPAT <= function level of the system

IBM Data Server Driver

- Returns the APPLCOMPAT value of the driver package (instead of Function Level)
- CURRENT APPLICATION COMPATIBILITY can be set in DSN_PROFILE, but must be less or equal to APPLCOMPAT of the driver package
- ClientApplCompat value must be specified for V12R1M501 or higher!
 - enables or disables new Db2 for z/OS version 12 features
 - Controls the capability of the client
- The needed driver version
 - https://www.ibm.com/support/knowledgecenter/SSEPEK_12.0.0/a-psg/src/tpc/db2z_applcompatclients.html

Global variables, new catalog table

- Built-in variables
 - PRODUCTID_EXT – VARCHAR(30)
 - DSN1201500, DSN1101500
 - CATALOG_EVEL – VARCHAR(30)
 - V12R1M500
 - DEFAULT_SQLLEVEL
 - V12R1M501
- Version strings in client applications
 - SQL_DBMS_FUNCTIONLVL for SQLGetInfo()
 - getDatabaseFunctionalLevel()
- How to check levels programmatically
 - SQLCA - SQLERRP, SQLERRMC (function level)

Global variables, new catalog table

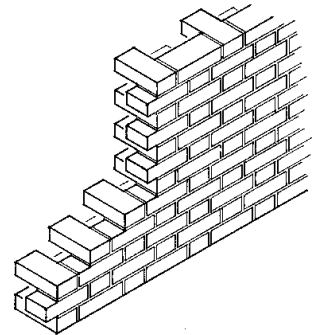
- SYSIBM.SYSLEVELUPDATES catalog table

FUNCTION_LVL	PREV_FUNCTION_LVL	HIGH_FUNCTION_LVL	CATALOG_LVL	OPERATION_TYPE	EFFECTIVE_TIME	OPERATION_TEXT
V12R1M100	V11R1M500	V12R1M100	V12R1M500	C	2016-07-05-15.19.43.896521949218	CATMAINT PROCESSING
V12R1M500	V12R1M100	V12R1M500	V12R1M500	F	2016-07-05-15.20.17.320790054687	-ACTIVATE FUNCTION LEVEL(V12R1M500)
V12R1M500	V12R1M100	V12R1M500	V12R1M500	M	2018-01-05-16.25.03.897987700195	CATMAINT PROCESSING - A5 CLEARED
V12R1M500	V12R1M100	V12R1M500	V12R1M502	C	2018-03-07-15.24.54.672765723632	CATMAINT PROCESSING - V12R1M502
V12R1M502	V12R1M500	V12R1M502	V12R1M502	F	2018-03-15-15.28.50.420473144042	- ACTIVATE FUNCTION LEVEL(V12R1M502)

Function level adoption procedures

- Be current with maintenance
- Execute CATMAINT UPDATE LEVEL if needed
- -ACTIVATE FUNCTION LEVEL TEST
- -ACTIVATE FUNCTION LEVEL
 - BIND/REBIND packages with any APPLCOMPAT to pick access path changes
 - REBIND DBA packages to allow new DDL
 - REBIND static applications with a higher APPLCOMPAT
 - REBIND dynamic packages with a higher APPLCOMPAT
 - REBIND distributed packages, switch applications to use new collections

CA Database Management Solutions for Db2 for z/OS Infrastructure support for Db2 12 Continuous Delivery



Db2 12 Continuous Delivery support in Db2 tools 20.0 post-install

- Updated subsystem definition panel to provide fields for **Catalog** and **Function** levels
- During an upgrade, you will be prompted to enter these fields in the post install panels for Db2 12 subsystems
- New PARMLIB (CDBAPARM) settings for Catalog and Function levels for Db2 12
 - New **SSIDVERC** and **SSIDVERF** replace the SSIDMODE(NFY | NFN)
 - new function yes/no for Db2 12 subsystems
- You must specify these values anytime you change the Db2 function and catalog level and then execute the post-install tasks (**Compare, Create, Bind**)

PARMLIB (CDBAPARM) Changes

- New parameters for Db2 12 subsystem definitions (SSIDs) in SETUPxx parmlib member
 - **SSIDVERF** – for function level
 - **SSIDVERC** – for catalog level
 - Updated post install panel (INSEDSE3)
 - SETUPxx Example:

```
SSID      (Q12B)  
SSIDDESC  (DB2 12)  
SSIDVERF  (V12R1M501)  
SSIDVERC  (V12R1M500)
```

```
----- Edit Parmlib Member SETUP -----  
OPTION ==>  
PF KEYS..... ENTER   to Continue, PF1 for Help           Member..: SETUP00  
              PF3/END to Return to the previous panel  
COMMANDS..... CANCEL  to Exit without Saving Changes  
  
DB2 Subsystem.....> Q12B  
DB2 Subsystem Description.....> DB2 12  
DB2 12: Function Level.....> V12R1M501 Catalog Level...> V12R1M500  
DB2 10/11: Version.....> Mode.....>  
VSAM Catalog Alias.....> Q12B  
DB2 Load Libraries.....> Q12B.PRIVATE.SDSNEXIT  
              > DB2.DB2C10.SDSNLOAD  
              >  
BSDS01 Dataset.....> Q12B.BSDS01  
BSDS02 Dataset.....> Q12B.BSDS02  
              >  
DB2 ZPARM Library.....> Q12B.PRIVATE.SDSNEXIT  
DB2 ZPARM Member.....> Q12BPARM  
              >  
Install SYSADM.....> TERJ003  
Install SYSADM2.....> TERJ003
```

Db2 12 function level string in ISPF panels

- Full 10 bytes format – Example: V12R1M500

```
DB2 SSID ==> D12A LOCATION ==> LOCAL DB2 VERSION: V12R1M500
ACM ==> OFF ACMID ==> KOTEM01 SQLID ==> KOTEM01

<-> Backup and Recovery          <-> Report Facility
  _ LA Log Analyzer              _ R Report Facility Menu
  _ MM Merge/Modify
  _ Z Recovery Analyzer          <-> Utilities
                                _ U DB2 Object Manager

<-> Database Administration      <-> Value Pack
  _ 1 RC/Query
```

- Shortened 8 bytes format – Example: 121M500

```
LAM 20.0 ----- CA Log Analyzer Main Menu ----- 2018/03/29 02:48
OPTION ==>

DB2 SSID ==> D12A Version: 121M500 Userid: KOTEM01
```

- No Changes for Db2 11 – Example: V11NF

```
20.0 CA Database Management Solutions for DB2 for z/OS 2018/03/29 02:47
OPTION ==> SCROLL ==> CSR
PT367I: PLEASE CHOOSE AN OPTION FROM THE LIST SHOWN.
DB2 SSID ==> D11A LOCATION ==> LOCAL DB2 VERSION: V11NF
ACM ==> OFF ACMID ==> KOTEM01 SQLID ==> KOTEM01
```

APPLCOMPAT in products' packages

- All product packages now bound with APPLCOMPAT
 - Applies to both Db2 11 and Db2 12
- This is not a customizable value
- Every product can use its APPLCOMPAT level
- Keep in mind that APPLCOMPAT cannot be higher than activated level
 - Post-install handles this appropriately
- Example:

```
BIND PACKAGE      ( AUTHD200_COM )
  MEMBER          ( PTAACCTL )
  APPLCOMPAT      ( V12R1M500 )
  VALIDATE        ( RUN          )
  ISOLATION        ( CS           )
  ...
```

Db2 12 Support in Db2 Tools 19.0 Post-install

- Db2 tools 19.0 support only two levels of Db2 12:
 - V12R1M100 – similar to CM
 - V12R1M500 – similar to NFM
 - **No higher levels** are supported!
 - PARMLIB option is SSIDMODE:
 - NFN – new function no (V12R1M100)
 - NFY – new function yes (V12R1M500)

```
----- Edit Parmlib Member SETUP -----
OPTION ==>

PF KEYS..... ENTER   to Continue, PF1 for Help           Member..: SETUP00
               PF3/END to Return to the previous panel
COMMANDS..... CANCEL  to Exit without Saving Changes

DB2 Subsystem.....> Q12A
DB2 Subsystem Description.....> DB2 12
DB2 Subsystem Version.....> V12
DB2 Subsystem Mode.....> NE(Y) (Press HELP for valid values)
VSAM Catalog Alias.....> Q12A
DB2 Load Libraries.....> Q12A.PRIVATE.SDSNEXIT
                   > DB2.DB2C10.ESP.BATCH10.SDSNLOAD
                   >
                   >
                   >
BSDS01 Dataset.....> Q12A.BSDS01
BSDS02 Dataset.....> Q12A.BSDS02
DB2 ZPARM Library.....> Q12A.PRIVATE.SDSNEXIT
DB2 ZPARM Member.....> Q12APARM
Install SYSADM.....> TERJ003
Install SYSADM2.....> TERJ003
```

References

- Create a SETUP Global Parmlib Member
 - <https://docops.ca.com/ca-database-management-solutions-for-db2-for-z-os/20/en/installing/complete-product-configuration/create-and-edit-global-and-product-parmlib-members/global-parmlib-members/create-a-setup-global-parmlib-member>
- Upgrade to New DB2 Releases, Modes, and Function Levels
 - <https://docops.ca.com/ca-database-management-solutions-for-db2-for-z-os/20/en/installing/upgrade-to-new-db2-releases-modes-and-function-levels>



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Thank You.