
DB2 10 for z/OS

Migration Considerations



Information Management

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Migration Agenda

- Why Migrate
- Hardware & Software Prerequisites
- Pre-migration planning
- Incompatibilities after migrating to V10
- Migration paths available
 - V9 to V10 "Standard release" Migration Process Overview
 - V8 to V10 "Skip release" Migration Process Overview
- The Migration Process
 - New Release Migration Planning
 - Migration to Conversion Mode (Running DSNTIJTC)
 - Enable New-Function-Mode
 - Catalog Restructure
- Fallback - Returning to a prior release
- Migration Considerations For Specific Features
 - EXPLAIN tables
 - Elimination DDF Private Protocol





DB2 V8

DB2 9

DB2 10

The key questions are WHEN? And HOW?

DB2 10 for z/OS: Skip-Level Migration

- May move from V8 to DB2 10,

but just because you can, doesn't always mean you should....

Estimation is 25% customers migrating from V8 to 10, based on what happened V5-V7

- Migration, fallback and data sharing coexistence fully supported

Mix of DB2 9 and 10 or DB2 V8 and 10

- Key considerations:

- Risk/reward analysis: What's your risk? Tolerance level?
 - While DB2 10 is expected to be better than prior versions, it will have maturity and service delivery like other software, with more defects at first fewer as the software matures
- How will you do it? What's your mitigation plan? Are ISVs ready?
- What workloads do you need to test and can you test them properly?
- Are you missing out on DB2 9 value in the meantime?

- Migration cost savings is not 2X versus two migrations

- Migration considerations for two versions still apply
 - Most project plans estimate 150% cost of one version migration
- Applications and ISVs may not be ready

- Timing: V8 end of service, other software, ability to test early software

DB2 for z/OS Lowering TCO

Maximum value for dollar investment

- Hardware pricing
 - CPU saving specialty engines (zIIP, zAAP..)
 - Compression of disk space (data, index)
- Software pricing
 - Software costs are higher (typically 3 to 10 times) than hardware costs for most customers
 - Larger amounts of processing power reduce the unit cost by more than 90%.
 - The z990, z9 and z10 generations have each reduced the charging units by 10% over the prior generation
 - Changing from z900 to z10 processors would reduce the software charge units by about 28% for the same processing power
 - zNALC, Value Unit Edition, Subcapacity pricing, Solution Editions



CPU + Memory + I/O and disk + Software + Energy and floor space + People = Improved Total Cost of Ownership (TCO)

DB2 10 for z/OS - (1Q 2011)

- GA'ed October 2010
- Completed Largest Beta Ever
 - 23 WW customers
 - +10 Extended Beta
 - Over 80 vendors
- Fastest uptake out of the gate
 - As of May 2011, over 150 customer orders
 - More than 2x the number of licenses
 - About 25% are migrating from V8
 - Every core beta customer is continuing with migration plans
 - Licensing rate almost double 6 months after GA compared to V9

The screenshot shows the IBM website for DB2 10 for z/OS. The top navigation bar includes links for Home, Solutions, Services, Products, Support & downloads, and My IBM. The main content area features a banner for "Announcing DB2 10 for z/OS" with the tagline "Savings ... right out of the box" and a "Learn more" link. Below the banner is an "Overview" section with a "Find products" search bar and a "Search" button. The main text highlights that DB2 10 for z/OS delivers innovations in operational efficiency, out-of-the-box savings, business resiliency, warehouse deployment, and enhanced business analytics. A "Learn more" link is provided. The "Learn more" section lists various resources: Features & benefits, System requirements, Edition comparison, Product library, Announcement letter, IOD Global 2011, IDUG EMEA 2011, Downloads (DB2 10 Demo, DB2 10 Brochure), and Use and maintain (Product support, Product documentation, Support downloads, Training and certification, Developer resources, IDUG link, The World of DB2 for z/OS). A "View features and benefits" link is at the bottom.

DB2 10 for z/OS

Hardware & Software Prerequisites



Prerequisites – Hardware & Operating System

➤ Processor requirements:

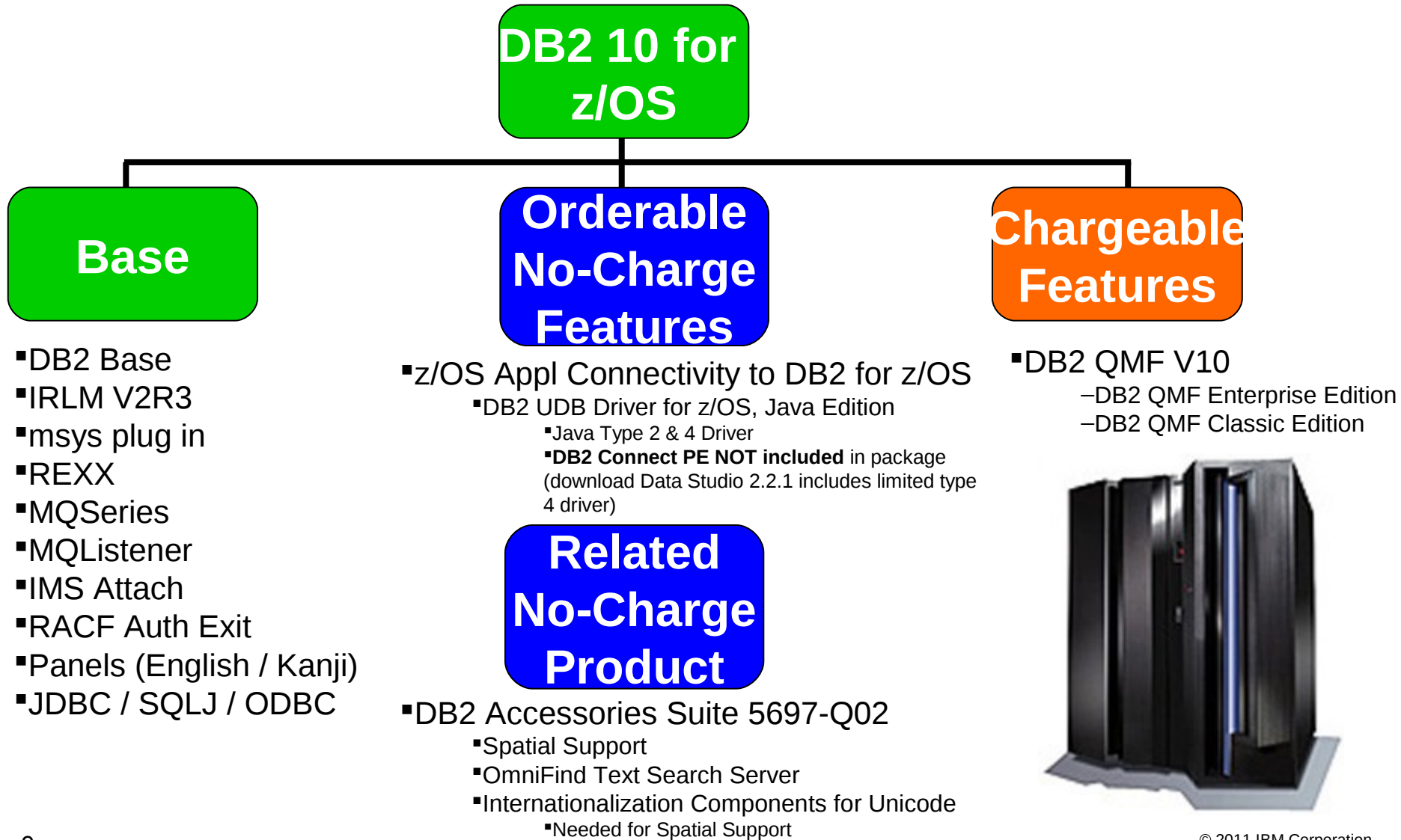
- z196, z10, z9, z990 and z890 processors
 - z800 or z900 processors NOT supported
- DB2 10 for z/OS will probably require increased real storage for a workload compared to DB2 9 for z/OS

➤ Software Requirements:

- z/OS V1.10 Base Services (5694-A01) at minimum
- DFSMS V1 R10 – DB2 Catalog becomes SMS managed
- Language Environment Base Services
- z/OS Version 1 Release 10 Security Server (RACF)
- IRLM Version 2 Release 3 (Shipped with DB2 10 for z/OS)
- z/OS Unicode Services
- DB2 Connect 9 Fixpack 1 is required; 9.7 Fixpack 3a recommended



DB2 10 packaging



IBM DB2 Tools: Are you ready for DB2 10?

- ✓ Exploit DB2 10 performance savings out-of-the-box
- ✓ Optimize Performance Across Multi-Platform Applications
- ✓ Lower CPU costs while reducing batch windows
- ✓ Higher data availability through simplified recovery operations



All New with DB2 10!

DB2 Utilities Suite 10 drives down costs with autonomies, page sampling and further offloads processing to zIIPs and FlashCopy. Developed in conjunction with DB2 10 to provide maximum data integrity and exploit all new functions out of the box.

DB2 Administration Tool/Object Compare 10.1 extends the value of DB2 10 with new capabilities that allow DBAs to quickly exploit DB2 10 features like schema evolution. Reduces the overhead of many routine tasks.

DB2 Sort 1.2 lowers the cost of DB2 Utility sort processing by exploiting advanced features of System z and z/OS while optimizing overall system efficiency. Significantly reduces batch windows.

Tivoli OMEGAMON XE for DB2 Performance Expert 5.1 extended insight into distributed workloads and offers a robust infrastructure to support DB2 10 subsystem consolidation, with lower monitoring overhead.

The recommended performance monitor of DB2 10!

QMF 10 delivers built-in visualizations and reports that dramatically extend the value to end users.

A new metadata layer simplifies the process to understand and create reports.

DB2 High Performance Unload 4.1 reduces the cost of extracting DB2 10 data with support for TCP/IP Pipes and the new internal format as well as a new native XML data unload capability.

DB2 10 for z/OS

Pre-migration planning



Run DSNTIJPM (DSNTIJPA) pre-migration job

➤ Check for incomplete object definitions in the catalog?

- Complete or drop all such objects **before** beginning migration
 - Avoids possible behaviour differences in DB2 10.

➤ Run DSNTIJPM or DSNTIJPA, to identify them:

- DSNTIJPM ships with DB2 10 and should be run on previous releases to identify pre-migration catalog cleanup requirements.
 - DSNTIJPM may provide DDL or utility statements for the cleanup.
- DSNTIJPA is the same job and is shipped for both DB2 V8 & DB2 V9, to maximize prepare time.

```
READY
DSNTPMQ DB1S DBA015
DSNTPMQ entry:
Subsystem ID ..... DB1S
Authorization ID ..... DBA015

Report 1 completed
Report 2 completed
Report 3 completed
Report 4 completed
Report 4 completed
Report 6 completed
Report 7 completed
Report 8 completed
Report 9 completed
Report 10 completed
Report 11 completed
Report 12 completed
Report 13 completed
Report 14 completed
Report 15 completed
Report 16 completed
Report 17 completed
Report 18 completed
Report 19 completed
Report 20 completed
Report 21 completed
Report 22 completed
Report 23 completed
Report 24 completed
Report 25 completed
```

DSNTIJPM(A): See PM33991

➤ Checks for:

1. Check for previous-release sample tablespaces
2. User-defined indexes that reside on user-managed storage and are defined on DB2 catalog tables that are processed during enabling-new-function mode
3. User-defined indexes that reside on DB2-managed storage and are defined on DB2 catalog tables that are processed during enabling-new-function mode
4. Stored procedures that use the DB2 SPAS (from V8)
5. Plans that are autobind candidates in V10
6. Packages that are autobind candidates in V10
7. Use of external module DSNWZPR-Alias removed in DB2 9 -Alter SP external name DSNWZP)
8. **Incomplete table definitions**
9. **Incomplete column definitions**
10. Occurrences of the DSN_PTASK_TABLE explain table with one or more column names that contain a hash mark character
11. **Plans that contain DBRMs**
12. Plans bound with ACQUIRE(ALLOCATE)
13. Static queries bound with query parallelism
14. EBCDIC explain tables
15. **Explain tables that are not in current-release format**
16. MQTs on the DB2 catalog that are affected by CATMAINT
17. MQTs on the DB2 catalog that are affected by CATENFM
18. **Plans bound with DBPROTOCOL(PRIVATE) that can be converted to DRDA via REBIND PLAN**
19. **Plans bound with DBPROTOCOL(PRIVATE) that can be converted to DRDA via DSNTIJPD**
20. **Packages bound with DBPROTOCOL(PRIVATE) that can be converted to DRDA via REBIND PLAN**
21. **Packages bound with DBPROTOCOL(PRIVATE) that can be converted to DRDA via DSNTIJPD**
22. Authorization IDs and roles that use EBCDIC-encoded SP routines for DBMetaData
23. Obsolete DB2-supplied objects
24. Packages that use UDF SYSFUN.DSN_XMLVALIDATE now a BIF
25. Existence of inconsistent UTF-8 encoding of the collection IDs and the package names that were bound by a remote client system.
26. Reports those with EXECUTE authority on SYSPROC.DSNLEUSR. This is dropped / recreated during NFM migration
27. Reports on DATACAPTURE that will be disabled during migration to CM8.
28. Reports on DATACAPTURE that will be disabled during migration to ENFM

Important preparation

- PDSE requirement for SDSNLOAD and SDSNLOD2

Enter "/" to select action	Dsorg	Recfm	Lrecl	Blksz
SYS2.DB2.V10.SDSNLINK	PO	U	0	32760
SYS2.DB2.V10.SDSNLOAD	PO-E	U	0	32760
SYS2.DB2.V10.SDSNLOD2	PO-E	U	0	32760
SYS2.DB2.V10.SDSNMACS	PO	FB	80	3120

- Migrate only from a system with an expanded BSDS (DSNJCNVB)
 - V8 DSNVCNVB provides the opportunity to resize & convert the BSDS, V10 would only convert it
- Old plans and packages V5 or before → REBIND
- Plans containing DBRMs → packages
(PK62876 (V9), PK85833 (V9), PK79925 (V8), PM01821 (All))
- ACQUIRE(ALLOCATE) only applies to DBRMs in plan → packages, ACQUIRE(USE)
 - Once everything is packages, this will just happen automatically. Hence, no need to do anything to make this happen
- Old Plan table formats → DB2 V8 or 9 format (59 columns) PK85068

Items deprecated in earlier versions - NOW eliminated

- Private protocol → DRDA
 - New help in DSNTDP2DP, PK92339, PK64045

- XML Extender → XML type

- DB2 MQ XML UDFs and stored procedures → XML functions

- DB2 Management Clients feature → IBM Data Studio application & administration services

- BookManager use for DB2 publications → Info Center, pdf

- The DB2 Customization Center, DB2's plugin for the z/OS msys for setup installation initiative, is discontinued in DB2 Version 10 → install panels

No longer supported in DB2 10 from V8: ...

- Net.Data: WebSphere is the strategic IBM solution for delivering DB2 data to Web applications
- DB2-established stored procedures -> WLM SPs
- JDBC/SQLJ Driver for OS/390 and z/OS is replaced by IBM DB2 Driver for JDBC and SQLJ (formerly known as the DB2 Universal JDBC Driver)
- Pascal L string data type from VAX
- Creating simple table spaces
- QMF Visionary Studio is removed from DB2 QMF Enterprise Edition
- DB2 Estimator
- BookManager help
- DB2 Extenders: AIV, text, Net Search
- Java stored procedures in resettable JVMs
- ...

DB2 10 for z/OS Migration paths available



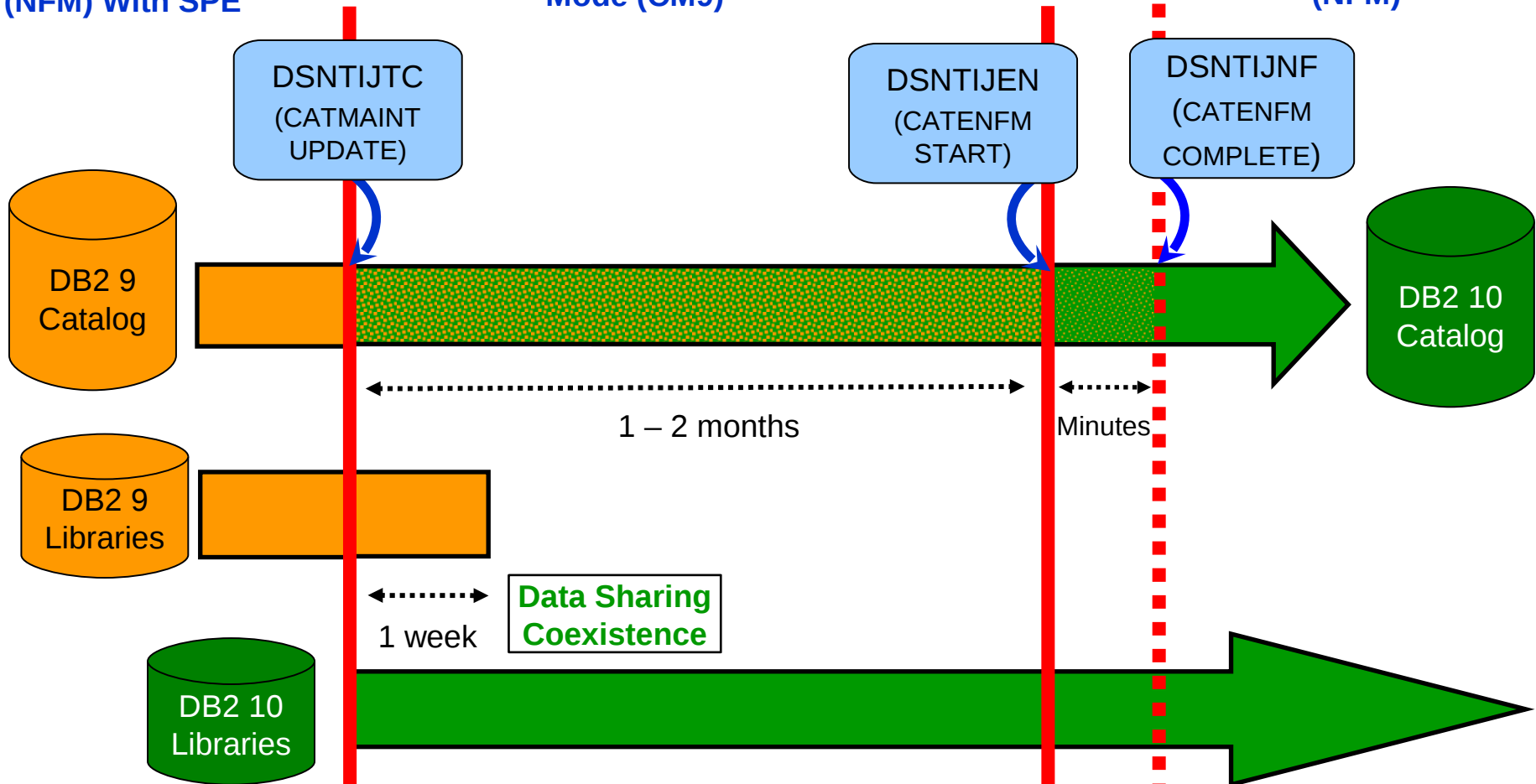
Migration Overview DB2 9 → DB2 10

DB2 9 New Function Mode (NFM) With SPE

DB2 10 Conversion Mode (CM9)

DB2 10 Enabling New Function Mode (ENFM9)

DB2 10 New Function Mode (NFM)



Overview of Modes when migrating 9 → 10

CM9 Conversion Mode – The mode DB2 is in when DB2 10 is started for the first time after migrating direct from DB2 9. It will still be in CM9 when migration job DSNTIJTC has completed. Very little new function can be executed in CM9 Data sharing systems can have DB2 9 and DB2 10 members in this mode. DB2 can only migrate to CM9 from DB2 9 NFM.

ENFM9 Enabling New Function Mode - This mode is entered when job DSNTIJEN is first executed (CATENFM START). DB2 remains in this mode until all the enabling functions are completed. Data sharing systems can only have DB2 10 members in this mode.

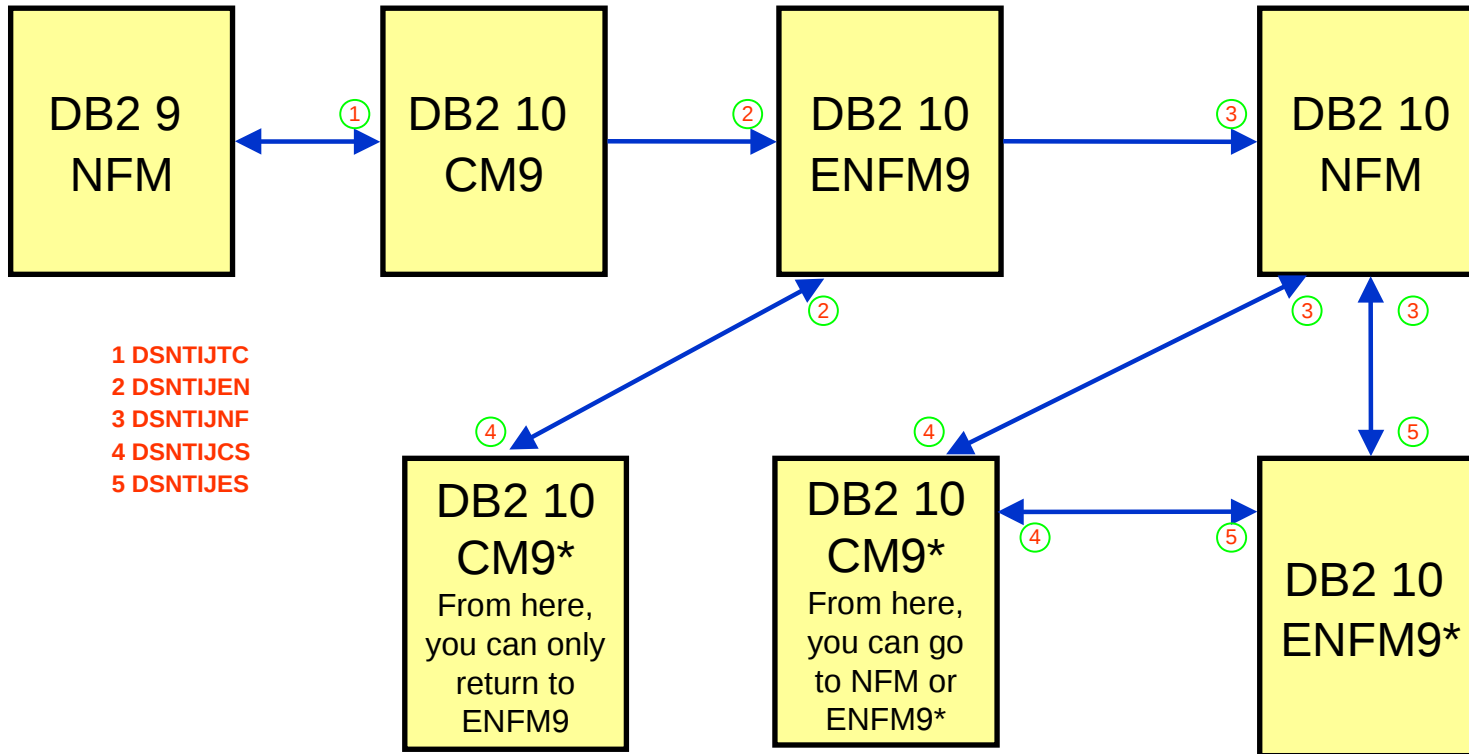
NFM New Function Mode - This mode is entered when job DSNTIJNF executed (CATENFM COMPLETE). This mode indicates that all catalog changes are complete and new function can be used.

ENFM9* This is the same as ENFM9 but the * indicates that at one time DB2 was at DB2 10 NFM. Objects that were created when the system was at NFM can still be accessed but no new objects can be created. When the system is in ENFM9* it can not fallback to DB2 9 or coexist with a DB2 9 system.

CM9* This is the same as CM9 but the * indicates that at one time DB2 was at a higher level. Objects that were created at the higher level can still be accessed. When DB2 is in CM9* it can not fallback to DB2 9 or coexist with a DB2 9 system.

Migration and Fallback Paths when migrating (V9 ==> V10)

- With DB2 10, you can always drop back to the previous stage
- Cannot fallback to DB2 9 after entry to DB2 10 (ENFM9), but can return to DB2 10 (CM9*)



- A DB2 9 system that has started the migration to DB2 10 can only fallback to V9
- A data sharing group that migrated from DB2 V9 to 10 can not have any V8 members.
- A data sharing group with CM9 members can have V9 and 10 members
- A data sharing group with ENF9 members can only have DB2 10 members

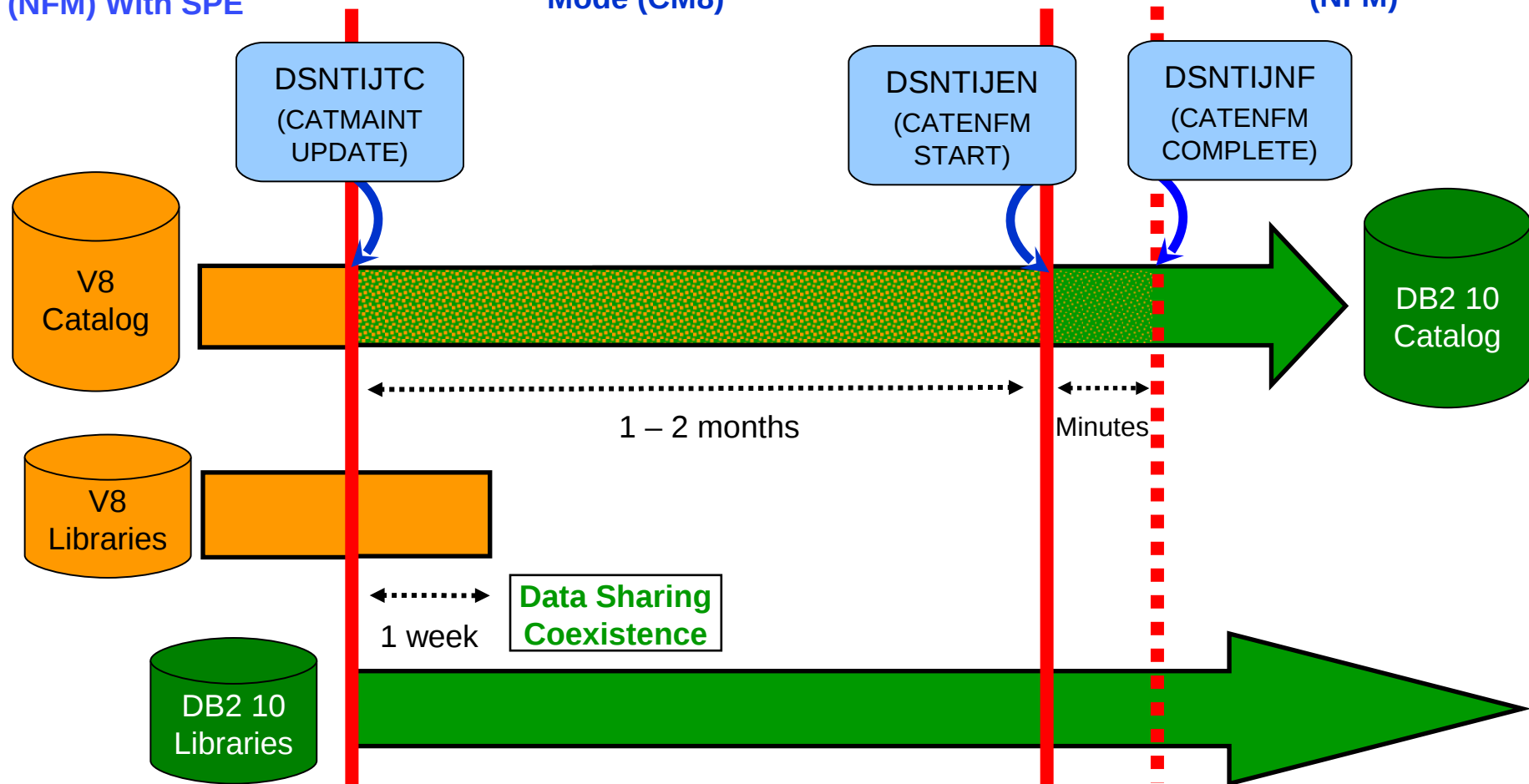
Skip Migration Overview V8 → 10

DB2 8 New Function Mode (NFM) With SPE

DB2 10 Conversion Mode (CM8)

DB2 10 Enabling New Function Mode (ENFM8)

DB2 10 New Function Mode (NFM)



Overview of Modes when migrating V8 → 10

CM8 Conversion Mode - This is the mode DB2 is in when DB2 10 is started for the first time after migrating direct from DB2 V8. It will still be in CM8 when migration job DSNTIJTC has completed. Very little new function can be executed in CM8. Data sharing systems can have DB2 V8 and DB2 10 members in this mode. DB2 can only migrate to CM8 from DB2 V8 NFM.

ENFM8 Enabling New Function Mode - This mode is entered when job DSNTIJEN is first executed (CATENFM START). DB2 remains in this mode until all the enabling functions are completed. Data sharing systems can only have DB2 10 members in this mode.

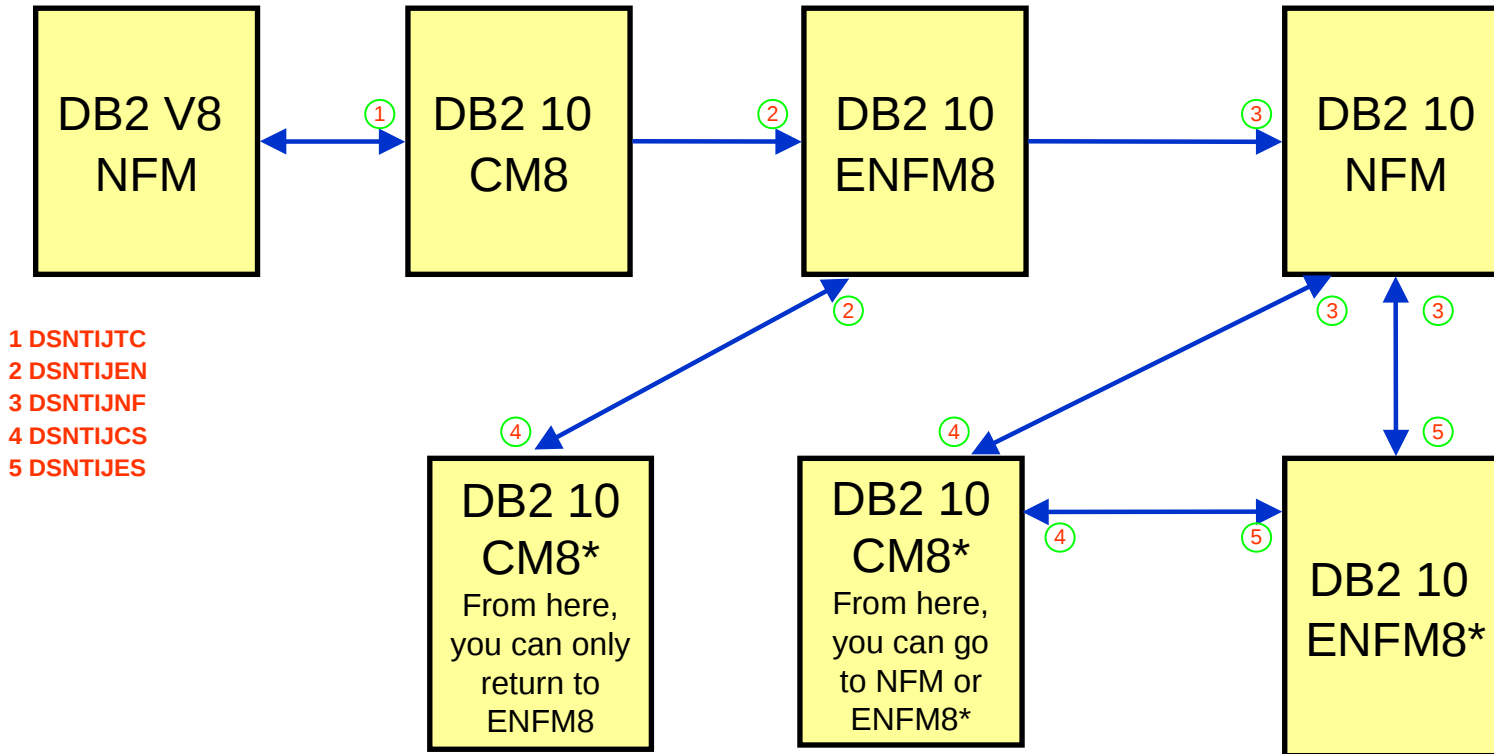
NFM New Function Mode - This mode is entered when job DSNTIJNF is executed (CATENFM COMPLETE). This mode indicates that all catalog changes are complete and new function can be used.

ENFM8* This is the same as ENFM8 but the * indicates that at one time DB2 was at DB2 10 NFM. Objects that were created when the system was at NFM can still be accessed but no new objects can be created. When the system is in ENFM8* it can not fallback to DB2 V8 or coexist with a DB2 V8 system.

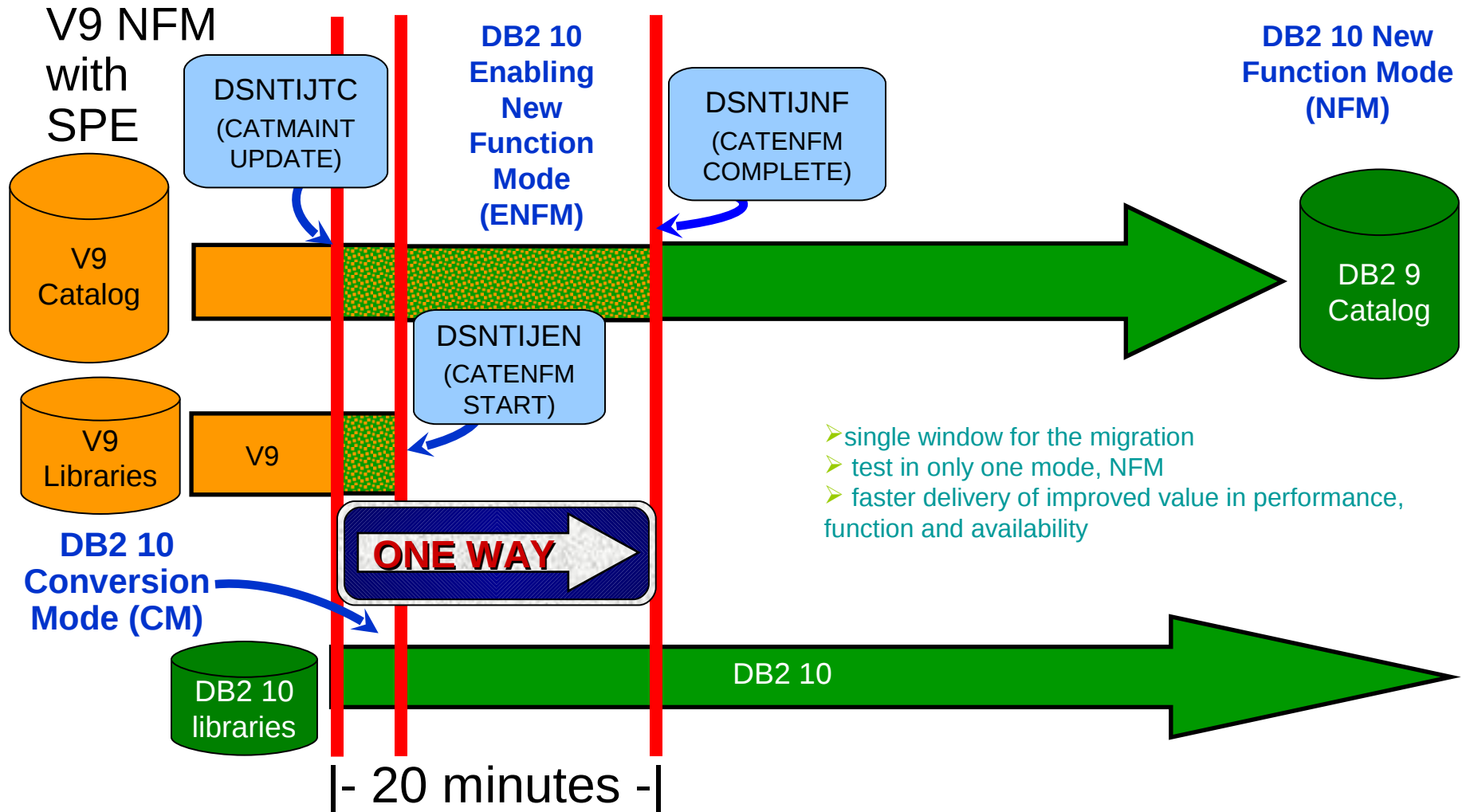
CM8* This is the same as CM8 but the * indicates that at one time DB2 was at a higher level. Objects that were created at the higher level can still be accessed. When DB2 is in CM8* it can not fallback to DB2 V8 or coexist with a DB2 V8 system.

Migration and Fallback Paths when migrating (V8 ==> V10)

- With DB2 10, you can always drop back to the previous stage
- Cannot fallback to DB2 V8 after entry to DB2 10 (ENFM8), but can return to DB2 10 (CM8*)



DB2 9 Migration to V10 Alternative → SAP Straight Through to NFM, No fallback



Performance Enhancements Requiring Few Changes (CM)

- 64 bits SQL runtime: improved efficiency
- Address space, memory changes to 64 bit, some REBINDs needed
- Faster single row retrievals via open / fetch / close chaining
- Distributed thread reuse High Performance DBATs: + thread reuse
- DB2 9 utility enhancements in CM8
- Parallel index update at insert
- Workfile in-memory enhancements & RID pool overflow enhancements
- Index list prefetch
- Solid State Disk use
- Buffer pool enhancements
 - Utilize 1MB page size on z10
 - “Fully in memory” option (ALTER BUFFERPOOL)

Performance Enhancements requiring REBIND (CM)

- Most access path enhancements
- SQL paging performance enhancements
 - Single index access for complex OR predicates
- IN list performance
 - Optimized Stage1 processing (single or multiple IN lists)
 - Matching index scan on multiple IN lists
- Safe query optimization
- Query parallelism improvements
- More stage 2 predicates can be pushed down to stage 1
- More aggressive merge of views and table expressions
 - Avoid materialization of views
- REBIND enables further SQL runtime improvements
 - If migrate from V8, get new RUNSTATS before mass rebind (cluster ratio, data repeat factor and high cardinality non-uniform distribution of data)

Performance Enhancements requiring NFM

➤ Efficient caching of dynamic SQL statements with literals

- SQL stmt consolidation for ones that are the same but have different literals.
 - ✓ SQL stmt space reduction in the DSC
 - ✓ Security, object verification and access path reusage
 - ✓ DSC cache hits improvement
 - Duplicate SQL stmt reduction
 - More room for more SQL
 - Overall workload performance improvement
 - ✓ Requires REBIND in NFM

➤ Most utility enhancements

➤ LOB streaming between DDF and rest of DB2

➤ Faster fetch and insert, lower virtual storage consumption

➤ SQL Procedure Language performance improvements

➤ Workfile spanned records, partition by growth

- WORKFILE can have expanded records up to 65K so larger joins and answers set can be generated from DB2.
- Simple predicate evaluation for work files that reduces the CPU time for workloads that execute queries that require the use of small work files.

➤ Insert improvement for universal table spaces

Things to be considered when “skipping” past V9?

- DB2 9 for z/OS education
 - Migration Planning workshop materials
 - Redbooks
 - Transition class
- Check for DB2 9 release incompatibilities
 - DB2-managed stored procedures -> WLM-managed SPs
- Familiarity with the new modes
 - CM*, ENFM* introduced in V9
- Deprecated items
 - Create simple table space -> segmented or partition by growth
- Performance benefits
- Storage changes
 - Temp databases & table spaces -> work files (favor 32K)
- Utilities updates
- Key enhancements e.g. pureXML, Native SQLPL
- Comprehensive regression test plan
- Plan for more frequent maintenance



Migration considerations to REMEMBER

- A V8 system started migration to V10, can only fallback to V8.
- A V8 system started the migration to V10, then performed fallback to V8, can not then migrate to V9.
- A V8 system started the migration to V9, then performed fallback to V8, can not then migrate to V10.
- A V8 system migrating to V10, can not use V9 new functions until V10 NFM is reached.
- A data sharing group that started migrating from V8 to V10 can not have any V9 members.
- A V9 system that has started the migration to V10 can only fallback to V9.
- A data sharing group that started migration from V9 NFM to V10 can not have any V8 members.

DB2 10 for z/OS

The Migration Process



Preparing your current DB2 for Migration to V10 CM

- Apply the Fallback SPE APAR, **PK56922** and any prerequisite fixes
 - **Your DB2 (V8 or V9) systems *MUST* be at the proper service level**
 - **See Info APARs II14477 (9) or II14474 (8)**
- Non-Data Sharing
 - Current DB2 (V8 or V9) must be started with the SPE applied, or migration to DB2 10 will terminate.
- Data Sharing
 - Before migrating a member to DB2 10, all other started DB2 (V8 or V9) members must have the fallback SPE applied.
 - The fallback SPE must be on all active DB2 (V8 or V9) group members for DB2 10 to start.



Important – Apply SPE to ALL Data Sharing Members Before Starting Migration!

Migration to Conversion Mode

- Run the **DSNTIJTC** job to migrate:
 - From DB2 for z/OS Version 8 to DB2 10 for z/OS Conversion Mode (**CM8**)
 - From DB2 9 for z/OS to DB2 10 for z/OS Conversion Mode (**CM9**)
 - Authorization check (INSTALL SYSADM)
 - Verify Catalog is at correct level for migration
 - Adds entries in the catalog and directory for new catalog objects & additional Cat updates
 - Update Directory header page and BSDS/SCA with new release information
 - **Restriction: there must be no outstanding utilities started from prior releases when running CATMAINT UPDATE on a non data-sharing system**

```
DSNU000I 194 14:58:16.06 DSNUGUTC - OUTPUT START FOR UTILITY, UTILID = RELODCAT
DSNU1044I 194 14:58:16.08 DSNUGTIS - PROCESSING SYSIN AS EBCDIC
DSNU050I 194 14:58:16.49 DSNUGUTC - CATMAINT UPDATE
DSNU750I 194 14:58:16.59 DSNUECM0 - CATMAINT UPDATE PHASE 1 STARTED
DSNU777I 194 14:58:16.59 DSNUECM0 - CATMAINT UPDATE STATUS - VERIFYING CATALOG IS AT CORRECT LEVEL FOR MIGRATION.
DSNU777I 194 14:58:17.29 DSNUECM0 - CATMAINT UPDATE STATUS - BEGINNING MIGRATION SQL PROCESSING PHASE.
DSNU777I 194 14:58:43.15 DSNUEXUP - CATMAINT UPDATE STATUS - BEGINNING ADDITIONAL CATALOG UPDATES PROCESSING.
DSNU777I 194 14:58:43.16 DSNUEXUP - CATMAINT UPDATE2 STATUS - BEGINNING SYSCOPY TABLE SPACE MIGRATION PROCESSING.
DSNU777I 194 14:58:43.16 DSNUECM0 - CATMAINT UPDATE STATUS - UPDATING DIRECTORY WITH NEW RELEASE MARKER.
DSNU752I 194 14:58:43.18 DSNUECM0 - CATMAINT UPDATE PHASE 1 COMPLETED.
DSNU010I 194 14:58:43.23 DSNUGBAC - UTILITY EXECUTION COMPLETE, HIGHEST RETURN CODE=0
```

SMS now a prerequisite



Important – All new indexes and new table space data sets WILL be SMS controlled.

“SMS now a prerequisite of DB2 10”.

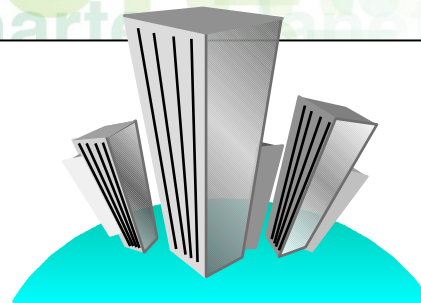
So be prepared!

During migration from (V8 or V9) to V10 conversion mode, all the new indexes and new table spaces in the catalog and directory will be created as SMS-controlled with the extended addressability (EA) attributes.

- DSNTIJSS job provides SMS classes for customers without SMS in use.
 - The environment created by DSNTIJSS is ONLY for DB2 Catalog and Directory data sets.
 - Other DB2 data sets such as logs and BSDS not covered.
- Useful SMS reference material includes:
 - z/OS DFSMS Introduction.
 - z/OS DFSMS Implementing System Managed Storage.
 - z/OS DFSMS Storage Administration Reference.
 - The Redbook: Maintaining your SMS environment



DB2 Catalog Evolution

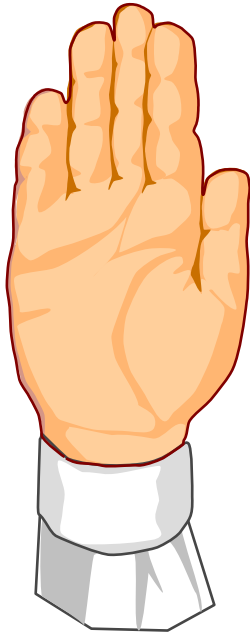


The DB2 catalog continues to grow with every DB2 release.

DB2 Version	Table Spaces	Tables	Indexes	Columns	LOB Columns	Table Check Constraints
V1	11	25	27	269	0	N/A
V3	11	43	44	584	0	N/A
V5	12	54	62	731	0	46
V6	15	65	93	967	0	59
V7	20	84	118	1212	2	105
V8	22	85	132	1265	2	105
V9	28	104	165	1643	3	119
DB2 10	95 (104-9)	134	233	1922	18	119

Does not include objects for XML Schema Repository

ENFM and NFM Considerations



Attention: You cannot return to the previous release (DB2 V8 or DB2 9) once you enter ENFM.

Do NOT move to ENFM until you are certain that you will not need to return.

HOWEVER

The code base for DB2 10 ENFM and NFM is the same as for CM.

You can return to CM* from ENFM or NFM if necessary.

Moving to Enabling New Function Mode

➤ DSNTIJEN job:

- CATENFM START places DB2 in Enabling New Function Mode.
- Data sharing groups must only have DB2 10 CM members.

➤ ENFM will handle the “Catalog Restructure” changes

- Invokes the CATENFM and REORG (with SHRLEVEL REFERENCE) utilities in order to convert a V10 CM catalog to ENFM level
 - Move the existing catalog tables to the new PBG table spaces using row-level locking and reordered-row format.
 - Convert SCTR, SYSLGRNX, SYSUTIL and SYSUTILX from EBCDIC to UNICODE.
 - Merge SYSUTIL and SYSUTILX tables.

➤ Existing catalog and directory table spaces will be dropped and the tables will be moved to the new SMS-controlled table spaces.

- DB2-defined indexes on these tables in the cat+dir will be SMS-controlled
- User-defined catalog indexes continue as before.

➤ New columns will be added.

➤ A number of new Indexes will also be created

➤ Advantages:

- New CLOB/BLOB columns to the catalog
 - Merge records that store SQL statements' text
- Reduce catalog contention
 - Removal of links
 - Change to row-level locking

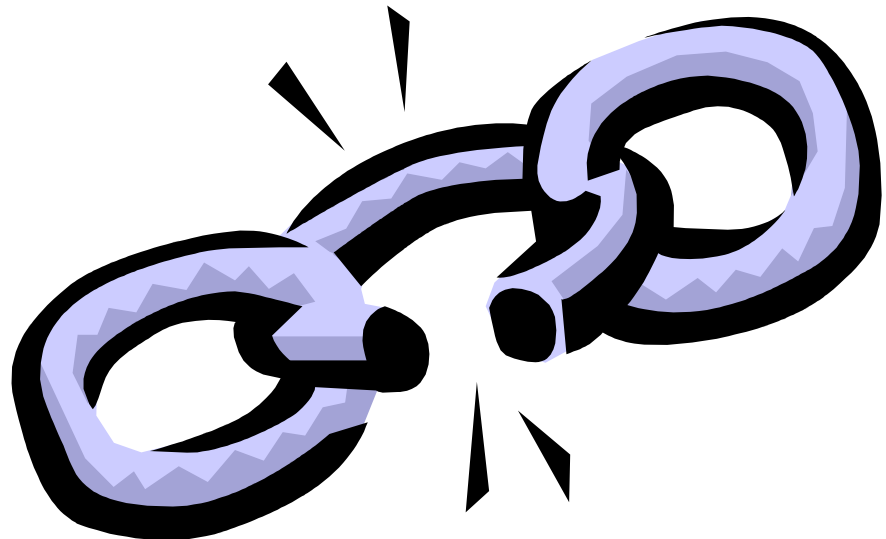
DB2 Catalog restructure: Managed data sets - Benefits

- Minimize user's effort to maintain data sets.
 - No need to allocate data sets and extended pieces (A002, A003 etc...)
 - No need to allocate data sets as part of the migration (next release)
 - We still have DSNTIJIN for new installs to define data sets for the catalog and directory.
 - No need to allocate data sets for the shadow for online REORG.
 - No need to estimate the size for the data sets (had to provide space allocations in the DEFINES)
 - DB2 will use a default for the primary and a sliding scale for secondary.
 - Minimize the chance of running out of extends before reaching the maximum data set size.
 - SMS will determine which data set goes to which volume.
 - Minimize outage due to improper data set allocations.

- New fields in installation/migration panels (CLIST)
 - SMS information (data class, storage class, management class) stored in ZPARM.

Row level locking and removing links

- SYSDBASE, SYSPLAN, SYSDBAUT, SYSVIEW, SYSGROUP and DBD01 had links
 - These table spaces used page level locking because of the links.
- SPT01, SYSOBJ, and SYSPKAGE are also processed in ENFM.
- All of these table spaces will be removed and the tables within each will be moved to new PBG table spaces
 - Row level locking
 - New row format RRF
 - Partition-by-growth
 - One table per table space
 - Referential Integrity in place of links
 - DSSIZE 64G
 - MAXPARTS 1
 - PLAN MANAGEMENT = EXTENDED



Row level locking+removing links & SPT01 - Benefits

- Row level locking minimizes timeout/deadlock for concurrent catalog access:
 - DDL
 - DML
 - Grant/revoke
 - Commands (DISPLAY, BIND/REBIND/FREE etc)
 - Utilities (e.g. RUNSTATS)
- Less or no SQL timeout when running BIND at the same time therefore increased availability for your applications.
- Reduced catalog contention:
 - Multiple binds in parallel
 - More concurrent Binding and running of DDL
- Eliminate 64Gb limit on Catalog & Directory – e.g. SPT01
 - V10 will relieve SPT01 space problems
 - SPT01 can grow beyond 64G, when system in DB2 10 NFM.



Binds and rebinds don't fail for lack of SPT01 space.

DB2 10 for z/OS

Fallback

Returning to a prior release or mode



Returning to a previous release from DB2 10

- **Fallback is only supported from DB2 10 CM.**
- Migrate to DB2 10 CM9 then you can ONLY fallback to DB2 9 NFM
- Migrate to DB2 10 CM8 then you can ONLY fallback to DB2 8 NFM
- Fallback SPE (PK56922) **must** be applied beforehand.
- Packages bound (or rebound) in DB2 10 CM are automatically rebound in DB2 V8 NFM or DB2 9 NFM.
- DBRMs created by the V10 Precompiler cannot be bound on V8 or V9
- Objects with functional dependencies are indicated by an 'O' in the IBMREQD catalog columns. None should exist.
 - Frozen on return to DB2 V8 or DB2 9.

Fallback Considerations

➤ **Buffer pool enhancements**

- Fall back process unchanged
- Any BPs changed to PGSTEAL=NONE will revert to their previous values
 - i.e. LRU if PGSTEAL was never altered
 - Otherwise the value from the last alter (under either release)
- On remigration, any BP which was set to PGSTEAL=NONE before fallback will revert to PGSTEAL=NONE.

➤ **Autonomic diagnosis & tuning for query performance issues**

- Fall back process unchanged.
- No special procedure for the explain tables.
 - These tables in V10 explain schema and UNICODE would simply work with the fallback subsystem as it was before after applying the SPE fallback APAR and completing the preparatory steps.

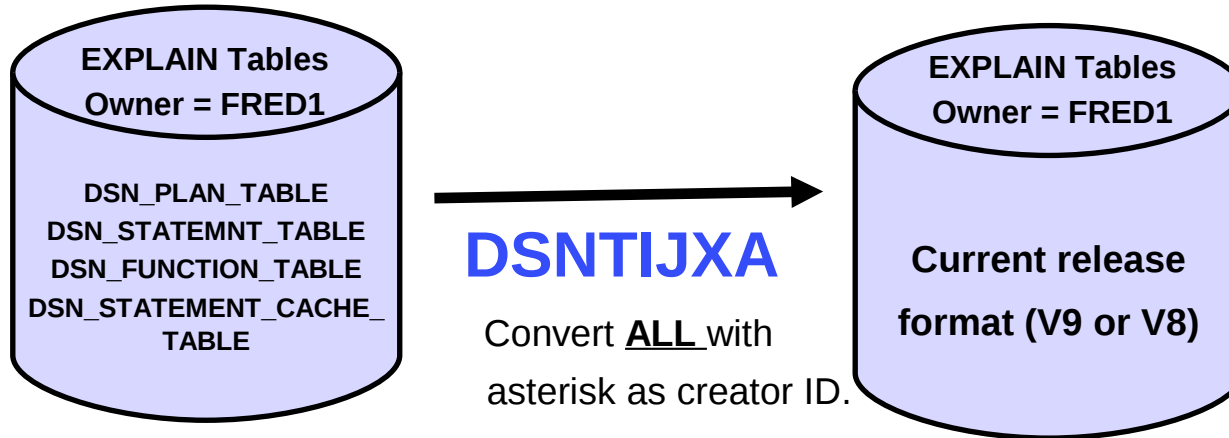
DB2 10 for z/OS

Migration Considerations For Specific Features



Migrate EXPLAIN tables to V10 schema encoded in UNICODE - Prepare

DB2 10 EXPLAIN tables must be in latest schema format and in UNICODE.



➤ Important - migrating V8 to V10, you will not be able to convert DSN_STATEMENT_CACHE_TABLE to V10 format until DB2 enters V10 new-function mode. (BIGINT not supported in V8).

- However, DB2 V10 will tolerate DSN_STATEMENT_CACHE_TABLE in V8 format.
- Once DB2 is in V10 new-function mode, rerun job DSNTIJXA to convert DSN_STATEMENT_CACHE_TABLE to V10 format.



Elimination of Private Protocol

- DB2 Private Protocol has not been enhanced since V5
- DB2 9 for z/OS delivered the following functionality
 - Warning when PRIVATE protocol used at BIND time
 - Prevent PRIVATE being the default option
 - IFCID records to determine applications using PRIVATE
 - Analysis Tool to identify and convert plans and packages
 - Additionally identify Aliases required at remote sites
- DB2 10 will no longer support **ANY** Private Protocol
 - Customers should convert to DRDA prior to V10
 - Enhancements to V8 and V9 DRDA support to aid conversion

Eliminate DDF Private Protocol: Enhancements to V8 & V9

- The following is delivered to facilitate conversion
 - Ability to Enable or Disable Private protocol (PK92339)
 - Via ZPARM PRIVATE_PROTOCOL
 - Enables testing to ensure private is eliminated
 - Allow Private protocol to access V8/V9 data sharing members
 - Until all members are at V10 CM
 - DRDA alias resolution processing to be enabled or disabled (PK64045)
 - Provide Enhanced Tools to identify plans and packages requiring conversion (PK64045)
 - DSN1PPTP analyses IFCID157 trace records for input into DSNTTP2DP
 - DSNTTP2DP reports on applications using private protocol
 - Program to scan SYSSTMT and SYSPACKSTMT for invalid syntax (PK64045)
 - DSNTPPCK

Eliminate DDF Private Protocol: V10 Enhancements

➤ Enhancements to V10 are

- Remove PRIVATE PROTOCOL from DB2
- Attempt to load/execute object with DBPROTOCOL column = 'P' will be tolerated, but any reference to non-local data will fail with SQLCODE -904, reason code 00E3001E
- REBIND will always use DBPROTOCOL(DRDA) regardless of object's current DBPROTOCOL value
- BIND PACKAGE COPY will create DBPROTOCOL(DRDA) object regardless of source object of copy
- DRDA alias resolution will always be performed
 - SQL statement text sent to remote system will contain object names substituted for 3-part name alias references.
 - Aliases will not be needed at remote locations
 - Occurs during dynamic PREPARE and EXECUTE IMMEDIATE and remote package bind

Eliminate DDF Private Protocol: Migration Steps

- Activate trace while running Private protocol applications
 - Identify embedded dynamic SQL and remote sites referenced
- Enable Alias Resolution (zParm DRDA_RESOLVE_ALIAS=YES)
 - To properly convert applications
- Build Private Protocol Information Table
 - Output from DSN1PPTP (DSNTIJPT installation job)
- Run Protocol REXX Catalog Analysis Program (DSNTP2PD)
 - Generates the commands to convert any plan/package to DRDA if they were last bound using DBPROTOCOL(PRIVATE)
- Test the application
 - Check for errors from DRDA conversion
 - SQLCODE -805 suggests embedded dynamic SQL
 - Fix using BIND PACKAGE COPY of indicated package

धन्यवाद

Hindi

多謝

Traditional Chinese

ขอบคุณ

Thai

Спасибо

Russian

Thank

English

Gracias!

Spanish

شكراً

Arabic

Merci

French

Obrigado

Brazilian Portuguese

Bedankt

Nederlands

多谢

Simplified Chinese

Danke

German

நன்றி

Tamil

ありがとうございました

Japanese

감사합니다

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