# Planning Your Migration to DB2 9 for z/OS

*The future runs on System z*

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# Migration Staging

- Planning:
  - Education for planning, Plan to educate
  - Detailed project plan and communications
  - Install prerequisites
  - Find and fix incompatibilities
  - Plan virtual and real storage
  - Plan performance
- Migration: monitoring and tuning
- Implementation
  - Using new improvements to deliver value
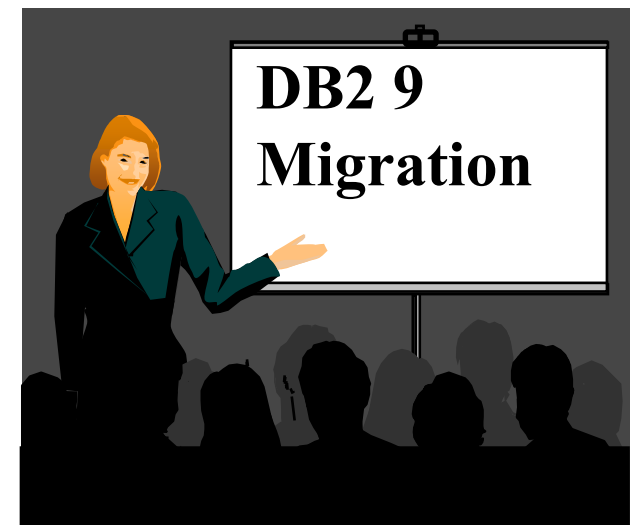
DB2 9
Migration

# Why Migrate to DB2 9 for z/OS?

- Business needs to save money
  - Reduce CPU time & disk space
  - Improve business agility
  - Service Oriented Architecture
- Application developers need
  - PureXML for a powerful SQL and XML interface to XML data
  - Powerful new SQL enhancements
  - Portability with SQL and data definition compatibility

- Database Administrators need
  - Improve availability and performance
  - More flexible security and easier regulatory compliance
  - Better web application & data warehouse function and performance
  - LOB function, performance, usability
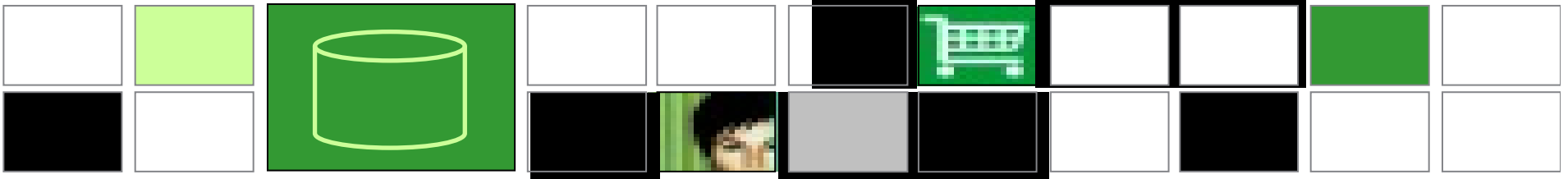
# Common Challenges: DB2 for z/OS Migration

❑ Code page check and correction (V8)

❑ Current product and tool support

  ❑ Old COBOL or PL/I or tools

❑ Cleaning up incompatible change

❑ Real and virtual storage

  ❑ Commit intervals, Calls, …

❑ Plan, monitor and manage performance

# Migration to DB2 9 is easier than V7 to V8

- Migration process enhancements:  ENFM shorter, CM*
- Much less performance regression:
  - Earlier improvements
  - Bind stability & tools for avoiding access path issues
- CCSIDs and old product issues resolved in V8
- Simpler virtual storage considerations
- Less impact from incompatible changes
- Earlier deliveries from vendors
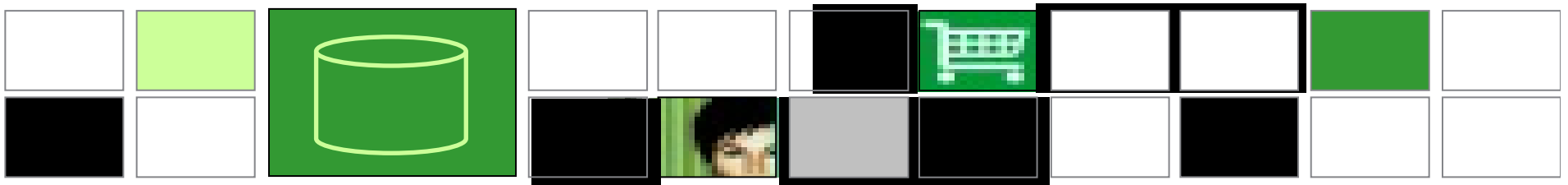
# Best Practices/Recommendations

- **Start with latest RSU + Identified Hipers**
- **Leverage CST/RSU process**
  - Apply 2 to 3 preventative service drops annually
  - Exploit Enhanced HOLDDATA to be vigilant on HIPERs and PEs
- **Use the DB2 9 'Package Stability' function for static SQL**
  - Offers access path preserving option. Recovers to prior access path if regression is encountered
    - PK52523 - DB2 Access Path Stability
- **Minimize potential query performance issues**
  - Use Optimization Service Center to capture SQL statements
  - Run Stats Advisor to generate the recommendation for stats collection
  - Run RUNSTATS to ensure critical stats are collected as recommended by the advisor
- **Ensure a PMR is opened prior to migration start**

# DB2 9 – So where do I go from here?

- **No need to fear DB2 9 migration; but be cautious & thoughtful**
  - Ensure good planning, staying reasonably current on preventative service and application regression testing
  - Follow best practices/recommendations
  - PMR opened
  - Trends are improving!
- **Procedural upgrade easier**
- **Every customer experience is different**
- **Compared to V8?**
  - Lower overall PMR volume
  - Less Severity 1 APARs
  - Lower PE rate
  - Lower HIPER rate

# Quick Hits

- No need to fear migration with proper planning and testing
  - Follow step by step approach adopted by other successful customers
- Migrate only from DB2 V8 (NFM) with fallback SPE (PK11129)
  - See DB2 9 migration info APAR (II12423) for list of prereq APARs and PTFs
  - Make sure that the pre-conditioning APAR for Plan Stability (PK52522) is applied on all V8 (NFM) systems
- z/OS 1.8 required for
  - Full RACF support of trusted context and roles
  - Volume-level utilities enhancements
- Minimum required for DB2 Connect:
  - V9.1 <u>FP1</u>, V8.2 FP6, V8.1 FP13, V9.5
  - V9.5 FP3 introduces Sysplex Failover/Workload balancing and XA support for DB2 Connect Client
- No plan to allow V7 Precompiler function under DB2 9

# Quick Hits …

- Expand BSDS using V8 stand-alone utility DSNJCNVB

  - Or let DSNTIJUZ run the DSNJCNVB module during migration to DB2 9 (CM)

- Need to configure HVSHARE (64-bit shared private storage) in IEASYSxx parmlib at a minimum of 128GB per DB2 subsystem running on LPAR

  - Even if DDF is not used

  - Use DISPLAY VIRTSTOR,HVSHARE or D VS,HVSHARE to check

# Quick Hits …

- Need to reset advisory REORG-pending (AREO*) status on all table spaces and indexes before migrating to DB2 9 (CM)
- Rebind all packages containing SQL LOCK TABLE statements in DB2 9 CM
  - Proactive rebinds under V8 with the PTF UK14099 for APAR PK21103 will avoid the problem
- Rebind all plans and packages that have not been rebound since DB2 V3
- No need for data sharing group-wide shutdown after entry to DB2 9 (NFM) to switch to Locking Protocol 3 (LP3)
  - Apply APAR PK62027 PTF UK38906
  - Will automatically get the LOB locking improvements on entry to NFM
  - With this fix on there is no LP3 any more

# Quick Hits …

- DB2 9 did not eliminate DDF Private Protocol

  - ## Plan is to eliminate in DB2 9+1 release

  - ## If do not convert from Private to DRDA protocol, will not be able to migrate to DB2 9+1 release

  - ## DSNTP2DP (Private to DRDA Protocol Catalog Analysis Tool) introduced with APAR PK27413 to assist the conversion

    - REXX program which looks at the DB2 Catalog
    - Generates CREATE ALIAS statements for remote locations that will probably need 2-part aliases
    - Generates the commands to convert packages and plans which have a remote location dependency (or can be detected to have))

# Quick Hits …

- Removed functions and incompatibilities
  - ## All stored procedures must be modified to become WLM enabled
  - ## The legacy JDBC driver will not work
    - In DB2 9, existing WLM environments configured to use the legacy driver will encounter a failure on address space initialization. This will happen in CM as well as NFM.
      - Data sharing groups with V8 in coexistence with DB2 9 (CM) will experience failure if a Java routine is invoked on any DB2 9 members where the WLM-SPAS JCL does not reference the Universal JDBC driver
    - Recommendation: Modify your WLM-SPAS JCL to use the Universal JDBC Driver while still on V8, prior to migration to DB2 9

# Quick Hits …

- Removed functions and incompatibilities …

  - Simple table space creation support removed in DB2 9
    - New defaults:
      - Implicitly created TS: Segmented (CM) or UTS - Partition by Growth (NFM)
      - Explicitly created TS: Segmented
    - Aim at converting existing simple table spaces to segmented or UTS or partitioned

  - The DBPROTCL ZPARM is removed
    - The default distributed protocol for BIND will always be DRDA

  - The RELCURHL=NO ZPARM option is removed
    - Incompatibility for applications dependent on retaining page or row locks across commits for a WITH HOLD cursor

# Quick Hits …

- Deprecated functions
  - Plans containing DBRMs, ACQUIRE(ALLOCATE)
    - Consider switching to packages
  - Simple table spaces
    - Simple table space creation support removed in DB2 9
- Changes to defaults
  - Default setting for MGEXTSZ (secondary extent allocation) is YES
    - Changed by the installation CLIST from NO to YES
  - BIND options: ISOLATION defaults to CS, CURRENDATA defaults to NO
    - Not changed for REBIND, i.e. use the existing value

# Most consumable DB2 9 improvements

CM very little to no action:
- Utility CPU reductions
- Logging improvements
- Improved index page split
- Larger prefetch, write & preformat quantities
- LOB performance
- DDF VSCR
- Optimization Service Center, Opt. Expert, & Data Studio

- Changed online REORG
- Improved RUNSTATS
- Optimization improvements, EDMPOOL VSCR

NFM
- LOB lock avoidance
- Reordered row format
- Index: larger page sizes, compression, index on expression
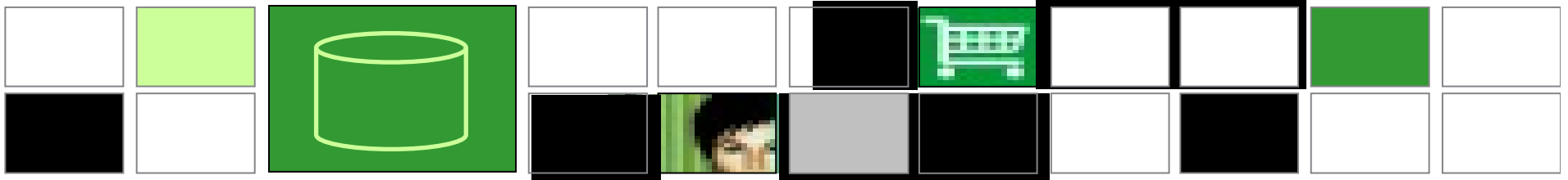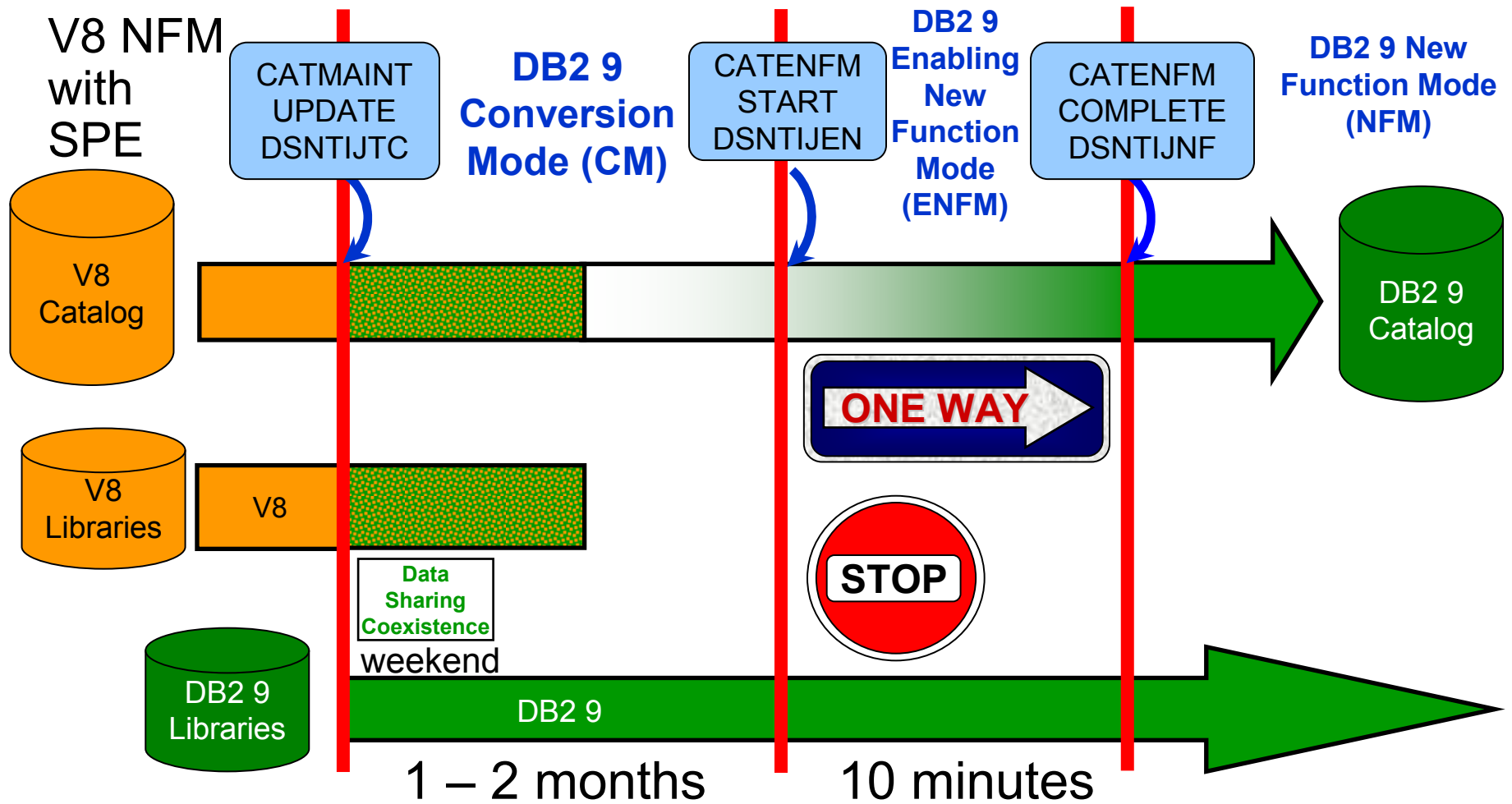
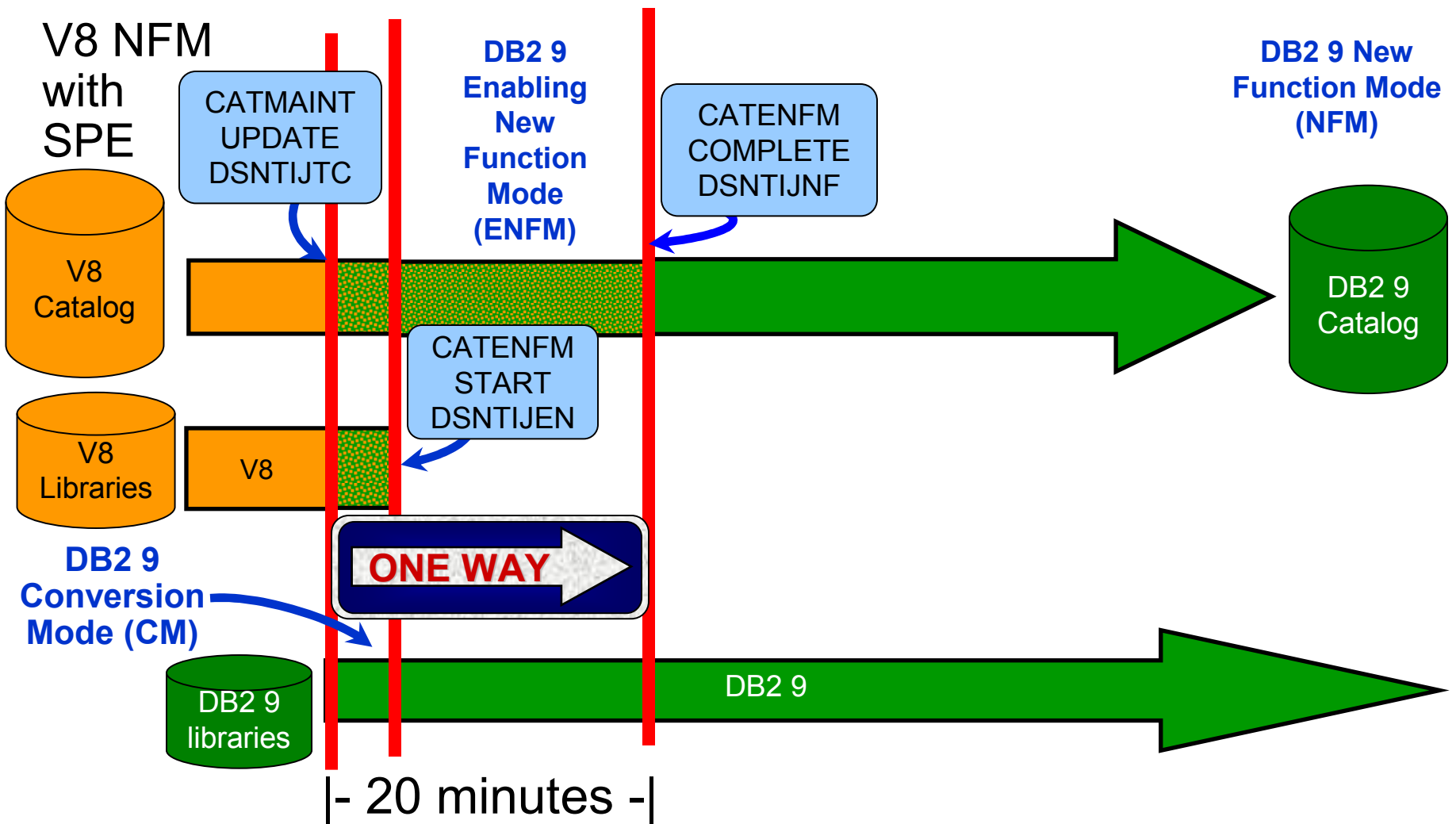# DB2 9 z10, z9, z890 & z990 performance scenario
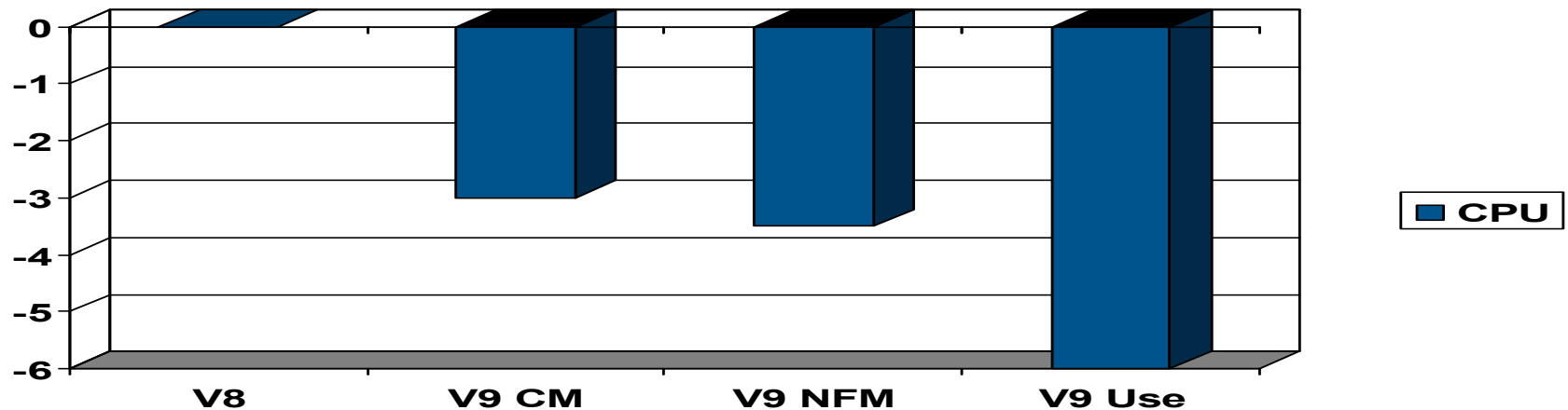


|  | Utilities | DB design adjustments |
|--|-----------|----------------------|
|  | Histogram statistics | Index improvements |
|  | REBIND | application changes |
|  | DSNZPARMS | native SQL procedures |
|  |  | SQL adjustments |

Your situation will vary.  Less CPU is better.

z800 and z900 expect +5% to +10% CPU

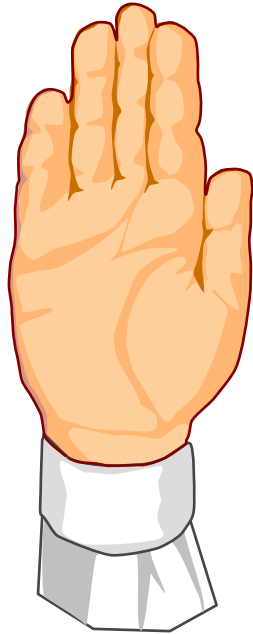# DB2 9 Migration Timeline

V8 NFM with SPE

| CATMAINT UPDATE DSNTIJTC | DB2 9 Conversion Mode (CM) | CATENFM START DSNTIJEN | DB2 9 Enabling New Function Mode (ENFM) | CATENFM COMPLETE DSNTIJNF | DB2 9 New Function Mode (NFM) |

V8 Catalog

V8 Libraries

V8

Data Sharing Coexistence weekend

DB2 9 Libraries

DB2 9

**ONE WAY**

**STOP**

DB2 9 Catalog

1 – 2 months          10 minutes

# DB2 9 Migration Alternative → Straight Through to NFM

V8 NFM with SPE

**DB2 9 Enabling New Function Mode (ENFM)**

**DB2 9 New Function Mode (NFM)**

CATMAINT UPDATE DSNTIJTC

CATENFM COMPLETE DSNTIJNF

V8 Catalog

DB2 9 Catalog

CATENFM START DSNTIJEN

V8 Libraries

V8

**ONE WAY**

**DB2 9 Conversion Mode (CM)**

DB2 9 libraries

DB2 9

|- 20 minutes -|

# ENFM and NFM Considerations

**Attention: You cannot return to the prior version 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 9 ENFM and NFM is the same as for CM.**

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

STOP!

THINK!

# DB2 9 Modes – An Overview

**CM** Conversion Mode (previously called compatibility mode) - This is the DB2 mode DB2 9 migrated from V8 and is started for the first time. It will still be in CM when migration job DSNTIJTC has completed. Very little new function can be executed in CM. Data sharing systems can have V8 and DB2 9 members in this mode, called coexistence. Coexistence should be very short, such as a weekend or a week. DB2 can only migrate to CM from V8 NFM.  This mode is not compatibility, but the ability to fall back.  We try to move most (but not all) problems for migration from NFM to CM, so that fallback can be used, if necessary.

**ENFM** Enabling New Function Mode - This mode is entered when CATENFM START is executed (the first step of job DSNTIJEN). DB2 remains in this mode until all the enabling functions are completed. Data sharing systems can only have DB2 9 members in this mode.

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

**ENFM*** This is the same as ENFM but the * indicates that at one time DB2 was at 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 ENFM* it can not fallback to V8 or coexist with a V8 system.

**CM*** This is the same as CM but the * indicates that at one time DB2 was at ENFM and possibly NFM. Objects that were created in NFM can still be accessed. When DB2 is in CM* it can not fallback to V8 or coexist with a V8 system. Functionally, CM* is very similar to ENFM.

# What works in Conversion Mode?

- Logging improvements
- DSN1COMP index compression estimate
- Larger prefetch, write and preformat quantities
- LOB performance other than LOB lock avoidance
- Command enhancements: REFRESH, DISPLAY, START, STOP, & MODIFY TRACE qualifications and ACCESS DATABASE
- Virtual storage use above the 2 GB bar DDF & EDMPOOL (when bound)
- Package BIND stability (PLANMGMT & EXCHANGE)
- Optimization improvements (when bound)
- Optimization Service Center & Optimization Expert (work with V8 if PTFs are applied)
- Most utility enhancements and CPU reductions (see next slide)

# DB2 9 Utilities: Conversion Mode versus New Function Mode

Utility enhancements available in both CM and NFM are:
- CPU reductions
- Parallel unload, reload and log apply processing by the REORG utility
- Removal of the BUILD2 phase for REORG at the partition level
- Log Phase addition for REORG SHRLEVEL REFERENCE PART
- REORG SHRLEVEL REFERENCE for LOB table spaces
- CHECK INDEX SHRLEVEL REFERENCE with Parallelism
- Histogram Statistics for RUNSTATS
- CHECK LOB SHRLEVEL CHANGE
- CHECK DATA SHRLEVEL CHANGE
- REPAIR LOCATE SHRLEVEL CHANGE
- REBUILD INDEX SHRLEVEL CHANGE
- MODIFY RECOVERY support for the RETAIN option
- Object level recovery from a system-level backup by the RECOVER Utility
- BACKUP SYSTEM & RESTORE SYSTEM system-level backups to tape
- Skipping locked rows for transaction updates by the UNLOAD Utility
- TEMPLATE switching support based on size for image copy datasets

Other utility enhancements are only available for DB2 9 NFM, such as...
- LBI (large Block Interface) support for sequential datasets on tape
- Recover to Point in Time (PIT) with consistency (defaults as new behavior)
- Clones effectively provide LOAD REPLACE SHRLEVEL CHANGE
- Online Load (LOAD RESUME YES SHRLEVEL CHANGE) without logging using NOT LOGGED

# Migration Planning Workshop

- **Understand breadth of features in DB2 for z/OS**
- **Bring together a toolbox of resources for your migration planning**
- **Explain the current migration process**
- **Bring a project focus to migration**
- **Remain relevant through GA life of the product**
  - **Updated with field experiences**

# Migration Strategy: Test and Production

- Short time for data sharing coexistence
- One to two months for conversion mode
  - Not able to use most new performance, function
- Minutes for enabling new function mode
- Move to new function mode
  - Stage in new function
- Test to QA to Production
  - Better controls for not using new function
  - Still don't want long gap test to production
  - Vendor support may affect strategy, e.g. NFM certified
  - Improved granularity, stage by modes
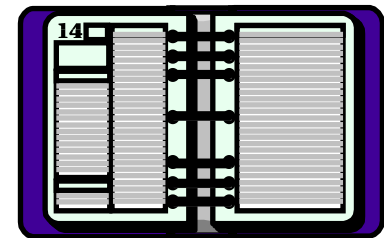
# Premigration Activity *...*
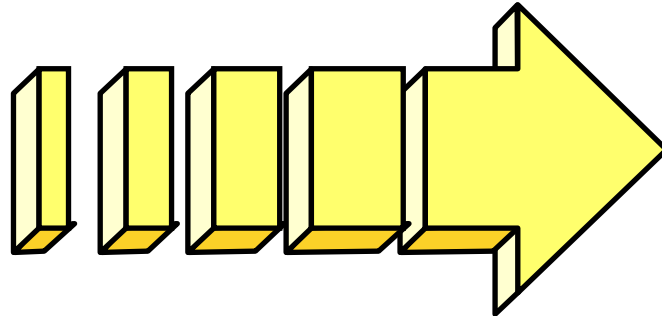


- **Find problems with incompatibilities**
  - It is important to look at these now because many have actions that you must address before migrating.
  - Get the complete list from the Installation Guide (Get the latest from the web).
  - Use V8 job DSNTIJP9     APAR PK31841, PK45981, PK61841, PK65772, PK73081

# Install Prerequisite Software

- Prerequisites and Functional Needs
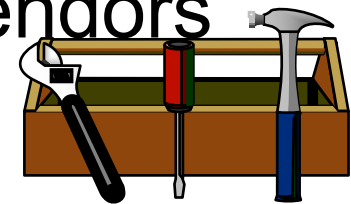    - ✓ All products need to be at proper maintenance level (prior DB2 release too) Migration & Fallback SPE APARs PK11129, PK33664, PK39850, PK38799, PK44884
        - ◆ Ensure that you apply all hiper APARS, PE fixes
        - ◆ Use the DB2 Program Directories, the Installation Guide, PSP (preventative service planning), web & Info APAR **II14401 II14464**
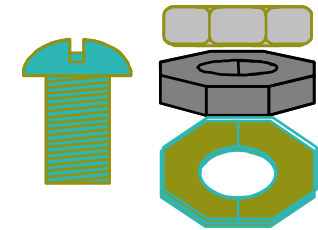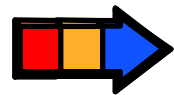
    - ◆Other software ...Talk to your Vendors
    - ◆z/OS R7 R8 R9
        - ◆Job DSNTIJPM or DSNTIJP9
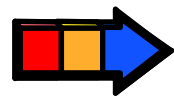
# DSNTIJPM(9)

- **JP9 shipped with V8 APAR PK31841**
- **Checks for:**
  - Check for V8 Sample Database
    - V8 job DSNTEJ1*
  - Report of user-defined indexes on the DB2 Catalog that reside on user-managed storage
    - On table spaces that will be converted during ENFM
    - DSNTIJEN needs modification for their shadow datasets
  - DB2 Managed Stored Procedures (SPAS)
    - Convert to WLM established stored procedures before migrating
  - Plans & Packages bound prior to V4 that need to be rebound
    - They will automatically rebind if ABIND = YES or COEXIST
    - If ABIND = NO, a -908 will be received at execute time
  - Incomplete table space, table, and columns
  - Optimization Service Center table format changes required before migration.

# Migrating to DB2 9

- Complete pre-migration checks against DB2 V8 (DSNTIJP9)
  - This will be the same as DSNTIJPM delivered with DB2 9
- Check / correct incompatibilities
  - The BSDS needs to be expanded to V8 format (DSNJCNVB)
  - If not done before migrating to V9, DSNTIJUZ will convert the BSDS(s)
- Must be on DB2 for z/OS V8 New Function Mode
- Reestablish V8 IVP to test DB2 9 before NFM
- Assess ISV Requirements
  - Tools and applications
  - Some vendors may add instructions for migration and / or require maintenance
- Assess the training requirements for your organization
- Establish a project team and project plan

# DB2 9 incompatibilities

➢**Installation Guide for details**

  ➢ **Chapter 2. Preparing your system to install or migrate DB2**

    ➢**Changes to DB2 that might impact your migration to DB2 9 conversion mode**

      ➢Application and SQL release incompatibilities

      ➢Utility release incompatibilities

      ➢Command release incompatibilities

      ➢Storage release incompatibilities

      ➢Other release incompatibilities

      ➢Functions that are no longer supported

      ➢Functions that are deprecated

      ➢Preparing a data sharing group or distributed environment for migration

  ➢ **Chapter 5. Installing or migrating DB2**

    ➢**Migrating your DB2 subsystem to new-function mode**

      ➢**Implications of converting to DB2 9 new-function mode**

➢**Application Programming and SQL front**

  ➢ **Application and SQL release incompatibilities**

# DB2 9 removed function

- DB2-managed stored procedures → WLM-managed SPs
- Create simple table space → create segmented or partition by growth
- Temp databases & table spaces → work files
- Very old plans and packages (V3 and before) → REBIND
- AIV Extender → Content Management
- Text, Net Search Extenders → new text search
- Net.Data → WebSphere, REXX, command line proc., …
- DB2 Estimator → capacity planning products
- Visual Explain → Optimization Service Center, Data Studio
- Old JDBC / SQLJ driver → Current driver
- Java stored procedures → non-resettable JVMs
- Online help → Information Center
- Parameters removed RELCURHL, DBPROTCL, STORPROC, ...

# DB2 9 deprecated function

➢Private protocol ➔ DRDA   (help in DSNTP2DP, PK64045)

➢Plans containing DBRMs ➔ packages        PK62876

➢ACQUIRE(ALLOCATE) ➔ ACQUIRE(USE)

➢XML Extender  ➔ XML type

➢Old Plan table formats ➔ DB2 V8 or 9 format (59 columns)

➢DB2 MQ XML user-defined functions and stored procedures ➔ XML functions

➢DB2 Management Clients feature (DB2 Administration Server, Control Center, & Development Center) ➔ IBM Data Studio application & administration services

➢msys for Setup DB2 Customization Center ➔ install panels

➢BookManager use for DB2 publications ➔ Info Center, pdf

➢Simple table spaces ➔ segmented or partitioned by growth

# DB2 9 migration process changes, APARs

➢ Enterprise PL/I change JCL error DSNTEP2        PK63659
➢ Rebind required for V3 and earlier plans & packages
➢ Best process is rebind all in CM or NFM, top 10% in CM
   ➢ Highly recommended to rebind all V8 and below
➢ PDSE is required for SDSNLOAD.  PDSE service needed.
➢ Premigration job DSNTIJP9 APAR PK31841 ..PK61841
➢ SPE PK11129, PK33664, PK39850, PK38799, PK44884
➢ Info APARs:  Install **II14401**, **II14464**,  DDF II14203,
   XML **II14426**,  Unicode II13048 & II13049, zIIP II14219,
   DFSORT II14047, II14213 & II13495, Performance II13579,
   Storage II10817,    Parallel II12836, LOBs II14334, DSNUTILS
   sec. id. II13133, Coprocessor II13782, PDSE II14067, II14255,
   II14403 …

# DB2 9 default and process changes

- ➢ BIND ISOLATION defaults to CS.    Query catalog RR
  - ➢ Not changed for distributed, REBIND
- ➢ BIND CURRENTDATA defaults to NO.   Query Yes.
  - ➢ Not changed for REBIND
- ➢ DB2-managed data set secondary extent allocation default YES, even for migration
- ➢ Work files → much more 32K space needed, avoid small files
- ➢ Varying length data change row format PK78958, PK78959
- ➢ DB2 disables DATA CAPTURE CHANGES for SYSROUTINES during migration (DSNTIJTC) and SYSPACKSTMT during ENFM (DSNTIJEN) PK72214
- ➢ Need to find and complete or delete incomplete definitions
- ➢ Online REORG processes change
- ➢ Configure shared virtual storage (128 GB for each DB2)

# Old COBOL?

✓ Understand the options  DB2 CICS V3

  ➔ Compiler and Run-Time Migration Guide

  ➔ No compiles OS/VS COBOL or
    VS COBOL II    CICS V3 also

  ➔ Run Old COBOL modules

✓ Set strategy & plan for Enterprise COBOL V4

  ➔ Use V8 precompiler?, NEWFUN(NO)?

✓ Plan staging and Migrate

## Old PL/I?

✓ Understand the options

➔ Compiler and Run-Time Migration Guide

➔ Run Old PL/I modules

✓ Set strategy & plan for Enterprise PL/I V3.7

✓ Support requires at least V3.4 now

➔ Use V8 precompiler?, NEWFUN(NO)?

✓ Plan staging and Migrate

# DFSort and DB2 for z/OS Utilities Suite

➢V8 removed prerequisite for external sort product

➢V8 only uses DFSort: SORT, MERGE functions only

➢Sort 32K page & improve reliability & performance

➢DFSort is part of standard z/OS install

➢DB2 for z/OS Utilities Suite has license to use DFSort when invoked by Utilities

➢Must have access to DFSort R14 plus APAR PQ68263 applied.  See Info APARs II14047, II14213 & II13495

➢DB2 9 requires APAR PQ92594

➢z/OS 1.10 DFSORT PARMLIB changes requires PK59399

➢Must update DB2 space statistics for sort space

# Install Prerequisite Software

- **Functional Requirements for identified features and functions   e.g. DB2 Connect, clients**
  - ✓ See What's New in DB2?
  - ✓ Program Directories for Details
- **Service Level: IBM Consolidated Service Test**
- **Plan for more frequent service**
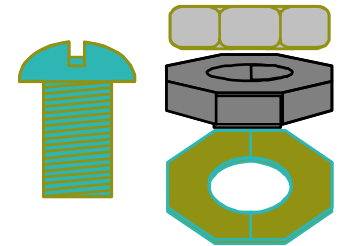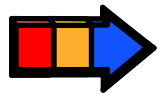
  - ✓ More current releases = more frequent
  - ✓ Refresh service level quarterly
- **Prepare to manage performance**
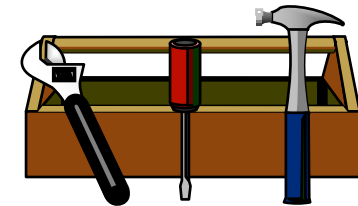
# DB2 9 requires DB2 Connect 9 FP1
# Recommended level is latest 9.7 fixpack

✓Performance & Scalability

✓Improved Application Availability

✓Innovative manageability

✓Programmer productivity

DB2 Connect V8.2 out of service April 30, 2009

**DB2.** Information Management Software

**DB2 Connect**
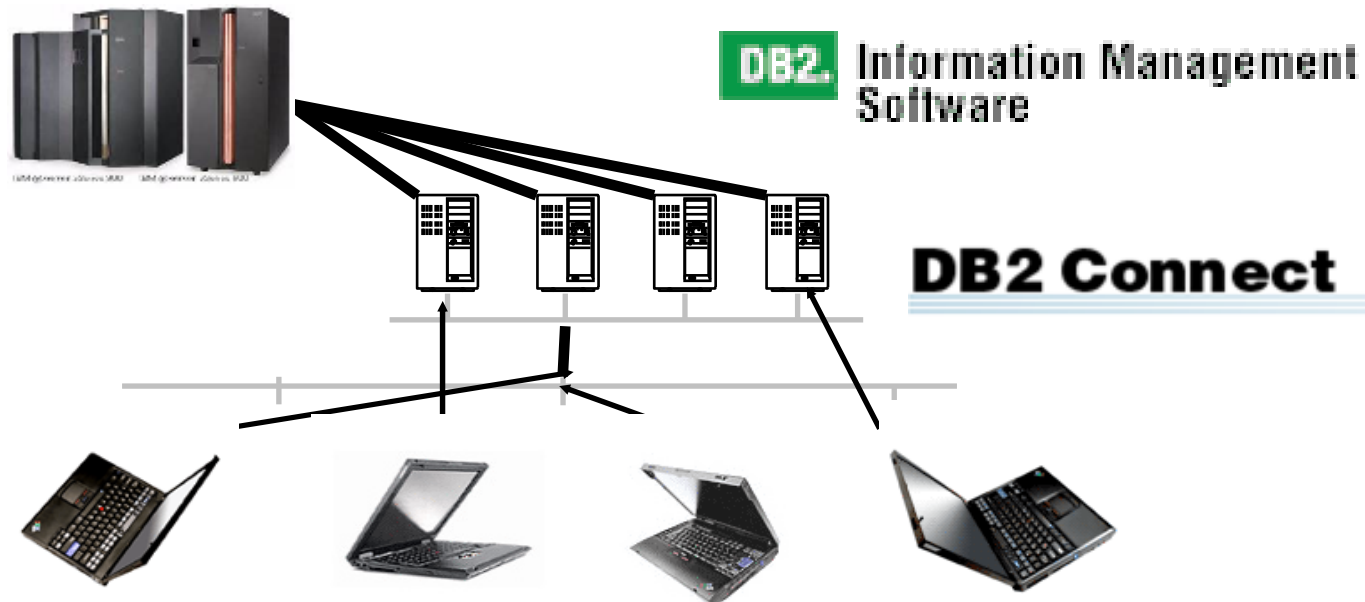
# Plan Stability …

- At REBIND, save old copies of packages
    - Catalog tables
    - Directory

- Two flavors
    - BASIC and EXTENDED
    - Controlled by new ZPARM PLANMGMT
    - Default is OFF
    - Also supported as REBIND options

- REBIND PACKAGE …
    - PLANMGMT(BASIC)
        - 2 copies: Current and Previous
    - PLANMGMT(EXTENDED)
        - 3 copies: Current, Previous, Original

- Most bind options can be changed at REBIND
    - But a few must be the same …

- REBIND PACKAGE …
    - SWITCH(PREVIOUS)
        - Switch between current & previous
    - SWITCH(ORIGINAL)
        - Switch between current & original

- FREE PACKAGE …
    - PLANMGMTSCOPE(ALL) – Free package completely
    - PLANMGMTSCOPE(INACTIVE) – Free all old copies

- Catalog support
    - SYSPACKAGE reflects active copy
    - SYSPACKDEP reflects dependencies of all copies
    - Other catalogs (SYSPKSYSTEM, …) reflect metadata for all copies

- Invalidation and Auto Bind
    - Each copy invalidated separately
    - Auto bind replaces only the current copy – previous and original are not affected

# Sample Strategy for Migration using Plan Stability

- ## Migration strategy with Plan Stability

  - Before migrating to DB2 9 (CM), ensure V8 plan table information is available

  - On migration to DB2 9 (CM), set ZPARM PLANMGNT to EXTENDED

    - Objective: Make sure that the V8 version of package is kept as the original in case a fallback to DB2 V8 is required

    - Restriction: EXTENDED means that DB2 always keeps 3 versions of the package (even if they are the same). Watch out for SPT01 growth (limit is still 64GB with DB2 9)

# Sample Strategy for Migration using Plan Stability

- Migration strategy with Plan Stability …
  - Delay rebind on DB2 9 (CM) until running stable
    - Do not rebind on DB2 9 (CM) until RUNSTATS has been run
    - Collect RUNSTATS with KEYCARD
    - Make sure new ZPARM STATCLUS=ENHANCED (Default)
      - Introduces major change to CLUSTERRATIO calculation in DB2 9 and introduction of new statistic Data Repetition Factor (DRF)
    - Use DB2 supplied RUNSTATS utility if ISV utility does not yet support the enhanced statistics collection
  - Recommended Optimizer ZPARM changes
    - Set OPTIOWGT=ENABLE (APAR PK75643 will reflect this recommendation)
    - Set OPTIXOPREF=ON (APAR PK77426 will reflect this recommendation)
    - Several INCORROUT are related to the new global query block optimisation
      - Set OPTXQB=OFF (temporary) to disable this function

# Sample Strategy for Migration using Plan Stability ...

- Why REBIND plans and packages?
  - As a general rule it is always a good recommendation to rebind on the new release to get the best performance
  - Almost all Optimizer enhancements available in DB2 9 (CM)
  - To avoid special DB2 handling to compensate for the different package structure in DB2 9 to avoid "puffing" of CTs/PTs/SLTEs
  - Re-enable SPROCs
    - Many plans/packages have SPROCs for fast column processing
    - All plans/packages with SPROCs that were bound prior to DB2 9 will be disabled
    - As a result DB2 will build SPROCs dynamically at execution time
    - Typical CPU performance impact in 0 to 10% range
    - Non-zero value for BYPASS COL indicator of problem
    - Performance trace of IFCID 224 identifies plans and packages which need rebinding to re-enable SPROCs
  - Exploit virtual storage constraint relief for static SQL

# Sample Strategy for Migration using Plan Stability ...

- REBIND in DB2 9 (CM)

  - DB2 now stores 3 versions of the package

  - Initial REBIND

    - Current version = DB2 9 version

    - Previous version = Original version = V8 version

    - If needed because of V9 access path regression, use REBIND PACKAGE … SWITCH(PREVIOUS) to fallback to the V8 version

  - Subsequent REBINDs

    - Current version = "New" DB2 9 version

    - Previous version = Latest DB2 9 version

    - Original version = V8 version

    - Use REBIND PACKAGE … SWITCH(PREVIOUS) to fallback to the previous V9 version

# Sample Strategy for Migration using Plan Stability ...

- In case of fallback to DB2 V8, before falling back to V8

  - Use REBIND PACKAGE … SWITCH(ORIGINAL) to fall back to original version of package (V8 version)

- In the future, to establish a new original version e.g to move forward to the version after DB2 9

  - Use FREE PACKAGE … PLANMGMTSCOPE(INACTIVE) to free off the original (will also free off the previous version)

# DB2 9 Post GA Deliveries APAR PKxxxxx

- BIND package stability changes                               PK52522, PK52523
- BIND change to convert plans with DBRMs to packages PK62876
- BIND private protocol help                                          PK64045
- Text search server                                          Accessories Suite 1.2
- New XML function & performance (next pages)                    II14426
- Incremental FlashCopy          PK41001, z/OS 1.8 APAR OA17314
- Trusted context enhancements                          PK44617, PK47579
- New storage class Zparm for online CHECK utilities          PK41711
  (Needed when PPRC is used)
- ALTER TABLE ALTER COLUMN DROP DEFAULT          PK56392
- Allow RESTORE SYSTEM without log truncation          PK51979
- Spatial phase II                                          PK51020, PK54451, …
- LOAD COPYDICTIONARY                          PK63324, PK63325
- Protocol(3) without data sharing group quiesce          PK62027

# DB2 9 Post GA Deliveries APAR PKxxxxx

- PK62161        add rows to accounting & statistics

- PK75643         parameter OPTIOWGT default to enable

- PK62178        default 10,000 maximum implicit DB

- PK70060        work file allocation

- PK70269        USS pipes for LOAD

- PK78958 PK78959 PK87348 RRF & compressed table spaces

- PK80925          -ACCESS command wildcards

- PK79228 PK79327  parameter group attach like V8

- PK72214         install stop change data capture

- PK49348        REOPT(AUTO) change

- PK85068        migrate plan tables to Unicode, current format

- PK80375        compress package directory table space SPT01

# Temporary Space
# The DB2 V8 Picture

**WORKFILE**

Installation support (DSNTIJTM)

CREATE DATABASE xxx as WORKFILE … *

Define VSAM Dataset

CREATE TABLESPACE DSN4K01 IN xxx …

Work files

Created global temporary tables

**TEMP**

No installation support

CREATE DATABASE xxx as TEMP …

Declared temporary tables for SSC

Declared global temporary tables
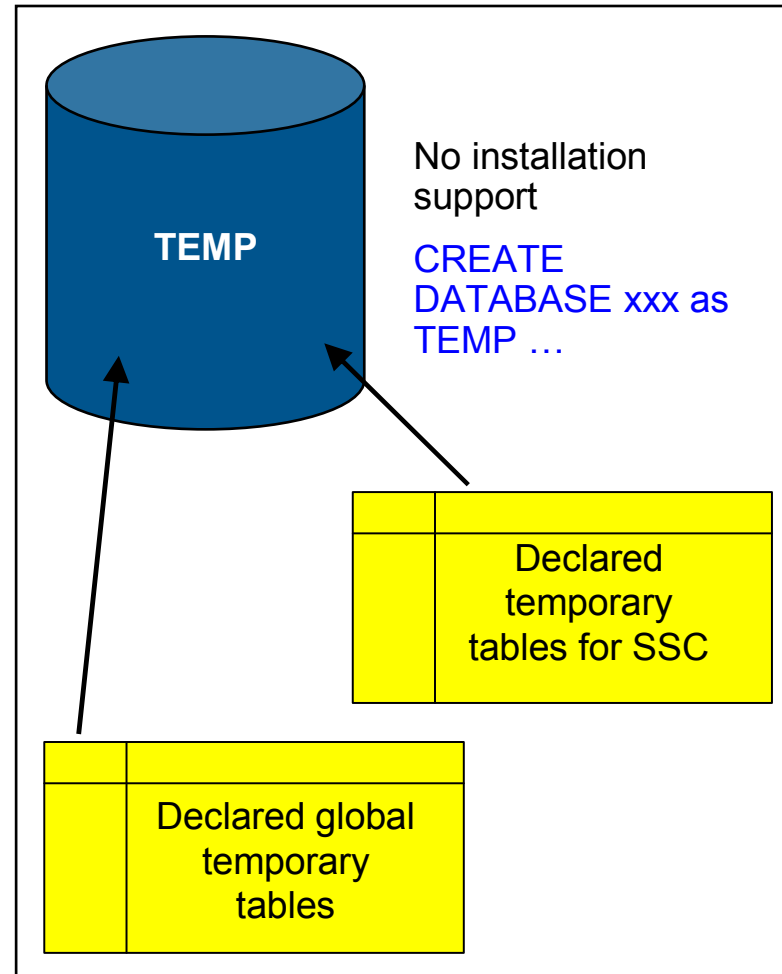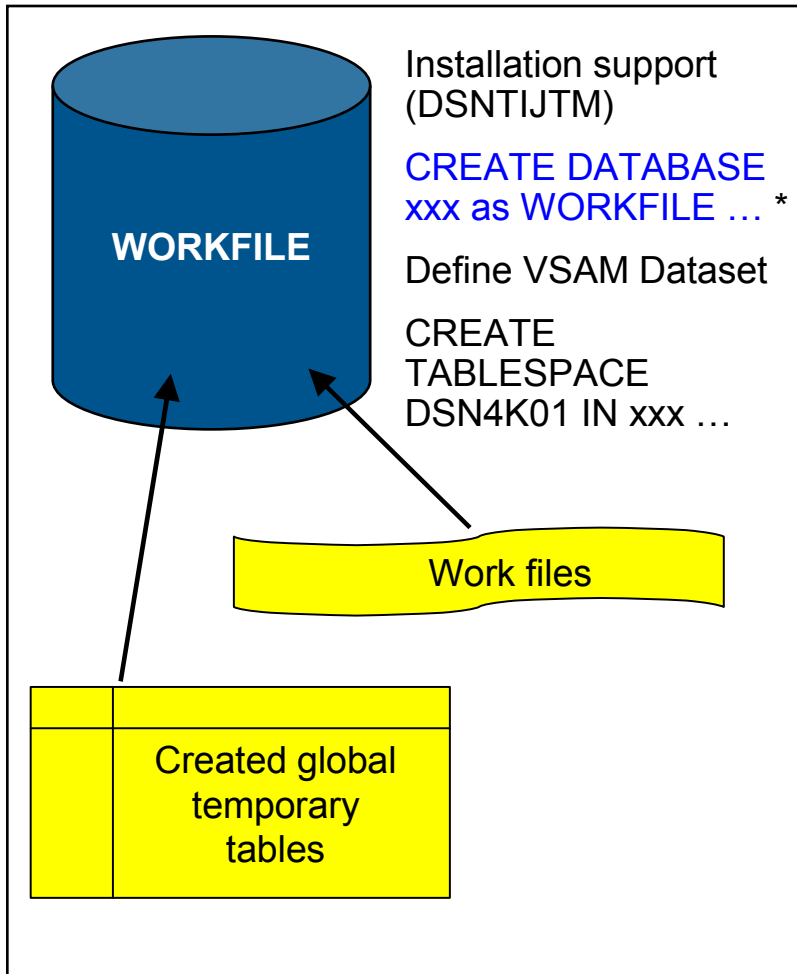
\* Only in a data sharing environment – in non-data sharing syntax is CREATE DATABASE DSNDB07

# Temporary Space
# The DB2 9 Picture

Created global temporary tables

**WORKFILE**

Declared global temporary tables

Work files

Declared temporary tables for SSC
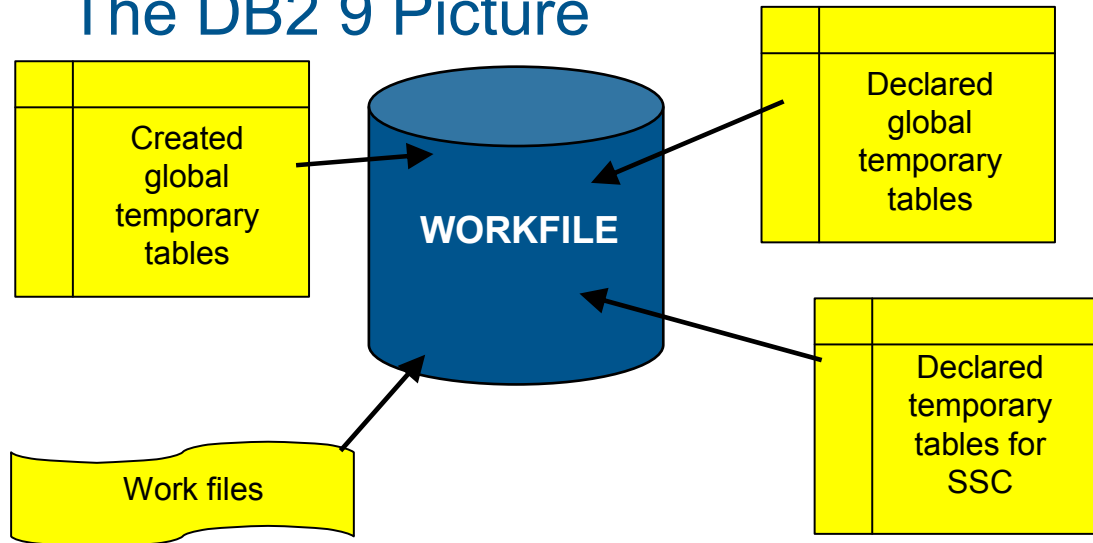
Installation and migration support
(REXX program called by DSNTIJTM)

```
CREATE DATABASE xxx as WORKFILE;

DSNTWFG DB41 DB2ADM xxx +
        3 10 16 BP0 SYSDEFLT +
        1 20 16 BP32K SYSDEFLT
```

- Declared Global Temporary Tables and Static Scrollable Cursors now use the WORKFILE database instead of the TEMP database
- Uses DB2-managed (instead of user-managed) storage in SYSDEFLT storage group
- Segmented table space organisation (user-defined SEGSIZE or default of 16)
- 4KB and 32KB page sizes only – no 8KB or 16KB

# Planning For Converged TEMP Space - more changes coming

- Migration from DB2 V8
  - To reclaim TEMP database storage, You must drop the TEMP database and reallocate the storage
  - Recommendation: Do not drop the TEMP database until you are sure that you will not return be falling back to V8, to avoid having to recreate it after fallback
- New installation panel for work file database definitions (DSNTIP9)
  - In migration mode, if you specify non-zero values
    - Migration job DSNTIJTM will create <u>additional</u> DB2-managed WORKFILE table spaces in the SYSDEFLT storage group → new REXX program DSNTWFG
    - DSNTWFG does not include the existing work file table spaces
- Recommendation: Keep 'DSVCI' default ZPARM YES to allow DB2 to match VSAM CI size to table space page size
- Ensure you have 32KB WORKFILE table spaces for Declared Global Temporary Tables and Static Scrollable Cursors
  - Much more 32KB space is needed in DB2 9

# Controlling Temporary Space Utilization

**WORK FILE DATABASE**
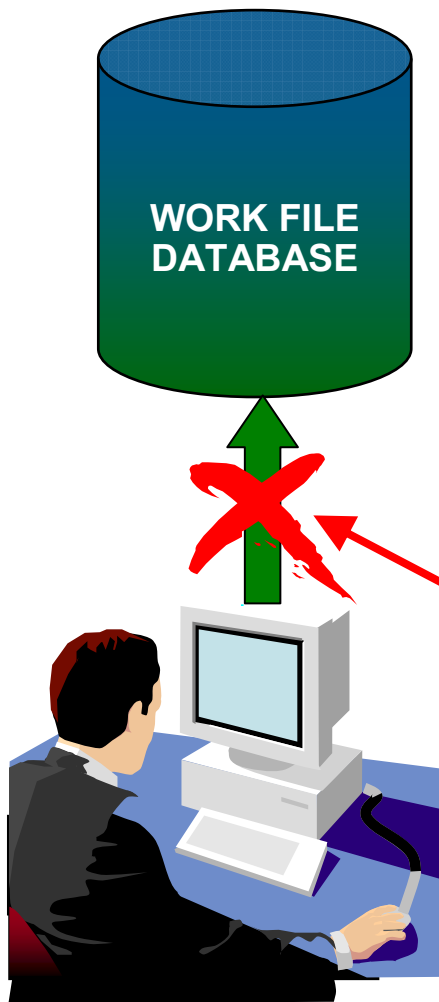
- Control of temporary space utilization at the agent level
- New ZPARM: MAXTEMPS
  - Macro DSN6SYSP, panel DSNTIP9
- If MAXTEMPS is exceeded for any given agent:

```
SQLCODE = -904, ERROR:
UNSUCCESSFUL EXECUTION CAUSED BY AN
UNAVAILABLE RESOURCE.
REASON 00C90305,
TYPE OF RESOURCE 100, AND
RESOURCE NAME = 'WORKFILE DATABASE'
SQLSTATE = 57011
```

# Monitoring Temporary Space Utilization

IFCID 343: User, plan and system information

DB2 TRACE

IFCID 2: Current and HWM storage usage, exception data

**WORKFILE 4KB Page**

**WORKFILE 32KB Page**
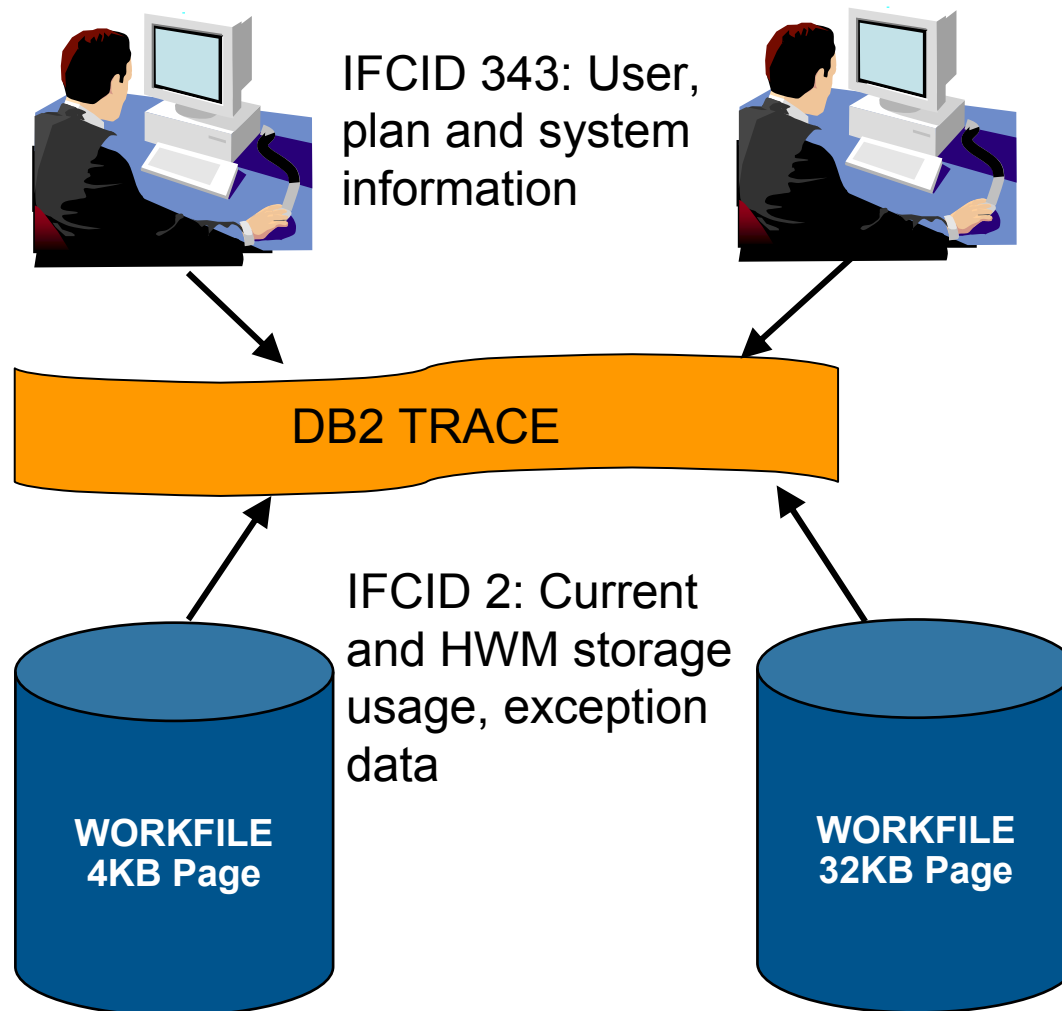
- IFCID 2
  - Updated with new counters
  - Monitoring of temp space usage at the DB2 subsystem level, including the number of times MAXTEMPS has been exceeded

- New IFCID 343 (Performance Trace Class 3)
  - Written when the MAXTEMPS limit for an agent is exceeded

# Service Best Practice

Use Consolidated Service Test

Recommended Service

Cross product tested levels Best

practice for service:      two or

three per year

http://www.ibm.com/servers/eserver/zseries/zos/servicetst/mission.html

II14401 & II14464 install service



**Consolidated Service Test and the RSU**

**The Consolidated Service Test Mission**

Our mission is to provide a consolidated, tested, and recommended set of service for z/OS and key subsystems on a quarterly basis with published results. This means that when you order your current service deliverable (ShopzSeries) you'll receive and install one recommended service package with a tested level of service for all these products.

**How we do our testing**

We test in a customer-like production sysplex environment in an IBM test lab and are continuously improving our CST test environment. We run batch and data-sharing applications that exploit and stress the latest functions with up to two levels of subsystems on three levels of z/OS systems. As we test, we observe how each product runs and how they interact in this environment. We report problems to the IBM Support Center. We have the following FMIDs installed on our systems. For more information about our environment, see our CST Quarterly Report.

We have a quarterly CST test cycle:

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# Migrating to DB2 9

- Develop conversion and coexistence goals
  - How did your V8 test plans work?
  - Reuse and improve upon your experiences
- Establish performance baselines
- Migration occurs in three familiar phases
  - Conversion Mode (CM)
  - Enable New Function Mode (ENFM)
  - New Function Mode (NFM)
  - With more flexibility to move between modes
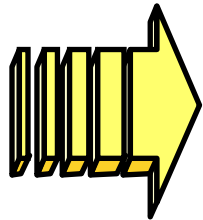
**Prepare to manage performance**

- **Save accounting reports**
- **Save critical access paths**
  - **Be sure you have PLAN_TABLE access paths & DSN_STATEMNT_TABLE & DSN_FUNCTION_TABLE for critical applications (or Visual Explain reports).**
  - **Run EXPLAIN on queries before migrating.**
  - **Add new columns to PLAN_TABLE**
- **Differentiate by plans & packages**

# To REBIND or not to REBIND

- **WHEN? is the question**
  - **When to take the chance of access path regression**
  - **For the potential benefits of improved performance & memory**
- **When migrating?   Test Before**
  - **Parallel individual binds**
  - **More disruptive, longer**
- **Incrementally or later**
  - **More potential for problem calls**
  - **Resolution could be more difficult**

# Package or Bind Stability APAR PK52523

- Old access paths for a package retained at REBIND

  REBIND PACKAGE (HRCOLL.SALPKG)

              PLANMGMT(BASIC | EXTENDED)

  - BASIC retains 2 copies: Current and Previous
  - EXTENDED retains 3 copies: Current, Previous, Original
  - PLANMGMT new subsystem parameter
    - Can provide default for command options

- Fallback to an older access path

  REBIND PACKAGE (HRCOLL.SALPKG)

              SWITCH(PREVIOUS | ORIGINAL)

  - Conceptually, this can do a "ROLLBACK" of a prior REBIND

# Package or BIND Stability PK52523

- At REBIND, save old copies of packages
  - Catalog tables
  - Directory (SPT01 table space)
- Two flavors
  - BASIC and EXTENDED
  - REBIND options
  - Default new DSNZPARM
- REBIND PACKAGE …
  - PLANMGMT (BASIC)  2 copies: Current & Previous
  - PLANMGMT (EXTENDED) 3: Current, Previous, & Original
- Most bind options can be changed at REBIND.

- REBIND PACKAGE …
  - SWITCH(PREVIOUS)
  Switch between current & previous
  - SWITCH(ORIGINAL)
  Switch between current & original
- FREE PACKAGE …
  - SCOPE(ALL) – Free package completely
  - SCOPE(INACTIVE) – Free old copies
- Each copy invalidated separately
- Cost of stability
  - 2-3 X size in SPT01
  - 30% CPU overhead for REBIND
  - No impact on statement runtime processing, fast switch

# Convert plans with DBRMs to packages

- Convert from DBRMs in PLAN to packages
- Specify the collection id for the packages
- REBIND plan option: COLLID
- Default collection id
DSN_DEFAULT_COLLID_planname
- Able to specify plan name, list of plans, *
- APAR PK62876 ptf UK43291 DB2 9
- See new book on packages
SG24-7688 chapter 4

DB2 9 for z/OS:
Packages Revisited

# How much room will you get in DBM1?

It depends.   For DB2 9,

Estimate 10% to 15%

5 EDM pools

REBIND needed for savings

DDF  - shared memory

Above the bar shared virtual storage required

You need to calculate, monitor and manage
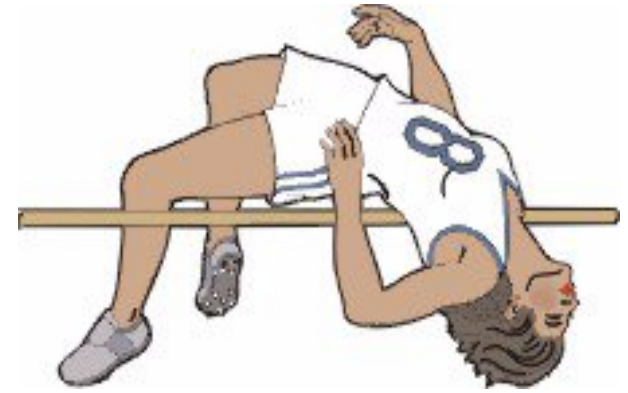
# DB2 9 64 bit Evolution (Virtual Storage Relief)

Virtual Storage Constraint is still an important issue for many DB2 customers.

- EDMPOOL Changes:
  - V8 – DBD storage moved above 2GB bar.
  - DB2 9 – SKCT, SKPT, some CT, PT storage moved above 2 GB bar.
  - DB2 9 approx. 60% reduction in EDMPOOL size observed for lab workloads
- Other changes:
  - Some storage acquired for distributed applications moved above 2GB bar.
  - Control blocks for table spaces and RTS move above the bar.
  - DSC statement text moved above the bar
    - SAP tests have shown almost 300 MB reduction in virtual storage below 2 GB bar

| Skeleton Pool (EDM_SKELETON_POOL) |
| SKCT / SKPT |
| CT / PT |
| Global Stmt Pool (EDMSTMTC) |
| DBD Pool (EDMDBDC) |

2GB

| EDM Pool (EDMPOOL) |
| CT / PT |
| Others |
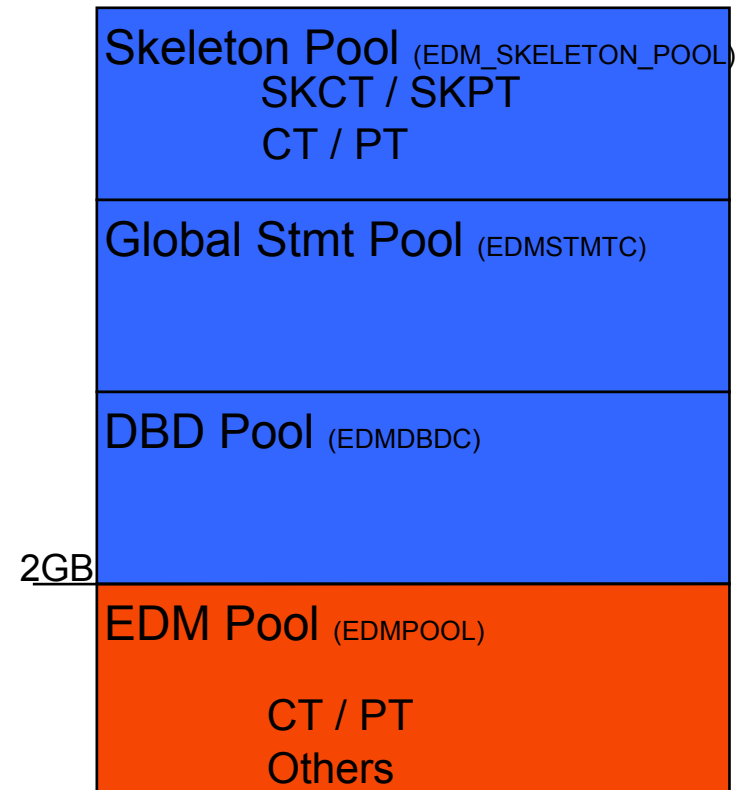
IFCID 217: detailed DBM1 virtual storage health

IFCID 225: consolidated DBM1 virtual storage health

# 64-bit DDF – Shared Private with DBM1

- DDF address space runs in 64-bit addressing mode
  - Shared 64-bit memory object avoids cross memory moves between DBM1 and DDF and improves performance

z/OS Shared Private Storage

2GB
Bar

DBM1

DIST
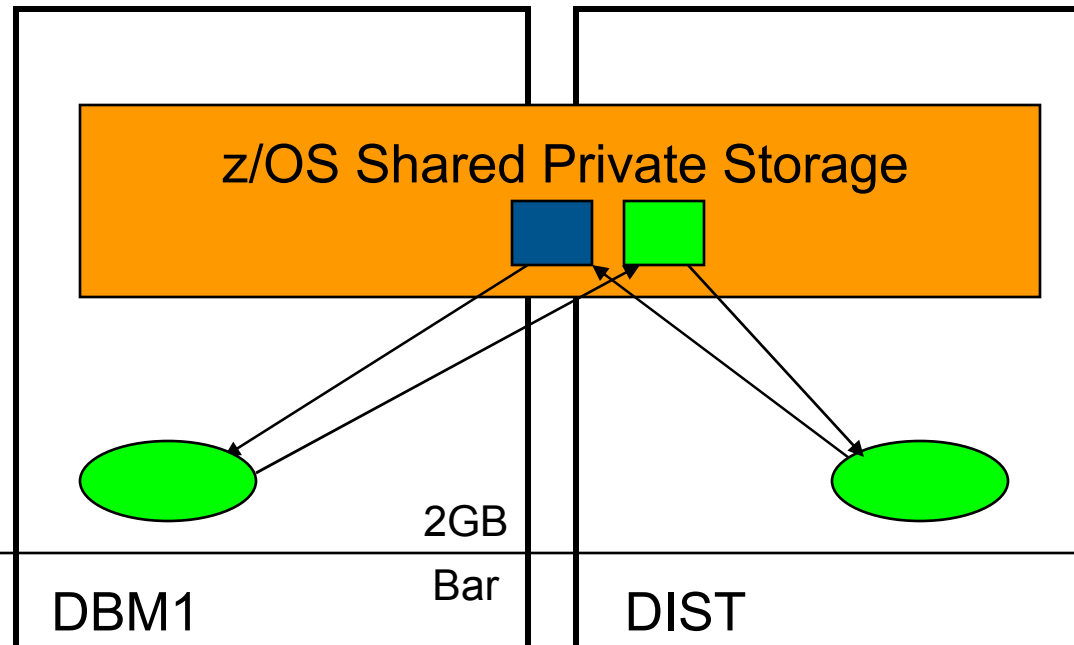
- Shared memory: new virtual storage type allowing multiple address spaces to share storage.
- Similar to ECSA – always addressable, avoids AR and XM moves.
- Different from ECSA – only available to those address spaces registering with z/OS to share this storage.
- Reduces data formatting and data movement
- Reduces virtual storage
  - It exists once, instead of in each address space

# Migration - data sharing group

- **V8 and 9 CM members in group for short time (coexistence)**
- **MUST apply fallback SPE to all members first**
- **First member migrated must be successful before migrating other members**
  - **Run CATMAINT only for the first member**
- **Use Data Sharing book for migration**
- **Migrate all members before using new function**
- **Restrict execution of packages & plans bound on new version to migrated members**
- **CFLEVEL 16, 15, 14, 13, 12 for best performance**

# Next phase: Use the new function

- Reduce CPU time
- Save disk space
- Service Oriented Architecture
- Productivity for applications & administrators
  - PureXML & Data Studio
  - SQL & LOBs
  - Portability via SQL & data definition compatibility

- Improve availability
- More flexible security
- Easier regulatory compliance
- Web applications
- Data warehouse function and performance
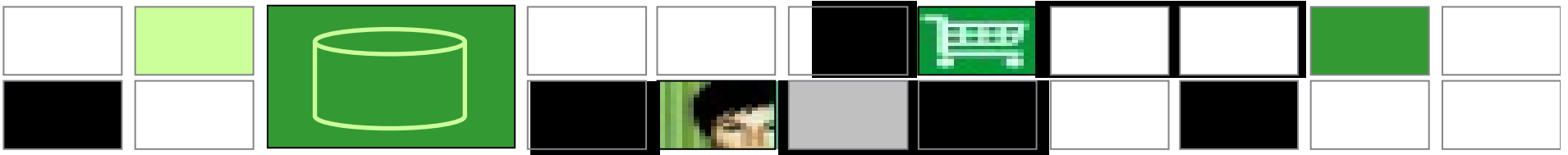
# Common V9 Migration Issues

- Temp Space
  - V9 Performance Redbook Section 4.14.1 IFCID 2 extension
  - You will need more temp
  - MAXTEMPS usage
  - Use of 32k when rowsize > 100
  - APARS
    - UK46839 Preference of workfile with secondary allocation
    - PK81427 MAXTEMPS & Workfile cleanup

- Partitioned versus UTS

- New Function testing…
  - Read the Performance redbook

- Monitor II APARs
  - II14441 INCORROUT
  - II10817 Storage

- Monitor Hiper & ++ HOLD list with appropriate keywords/eyecatchers

# More Quick Hits …

- ## Declared Global Temporary Tables (DGTTs) …
  - APAR PK70060 to
    - For sort workfile, DB2 will first go after tablespaces with zero secondary quantity to find space and if none is available, will try to find space in the first 2GB region of tablespaces with non-zero secondary quantity and even if that is not possible, will use any available tablespace
    - For DGTT, DB2 will first try to find space in table space with non zero secondary quantity and if none is available will use any available table space
  - To achieve separation for DGTT and Sort Workfile use, the recommendation will be to have some table spaces with zero secondary quantity and some with non-zero secondary quantity
  - Maximum primary quantity of workfile tablespace is 2GB. But workfile tablespace can grow up to 64GB like any classic segmented table space if secondary quantity is not zero

# More Quick Hits

- Object level RECOVER from system level backups is available as soon as DB2 9 (CM), whereas object level RECOVER to PIT with consistency is not available until DB2 9 (NFM)

- Nice package of DB2 9 COPY enhancements
  - MRU to avoid throwing away useful random pages
  - Automatic implicit CHECKPAGE on table space pages and no setting of COPYPEND when damage found
  - All with less CPU

- Beware of using a very large index page size
  - Page size greater than 4K is a requirement for index compression
  - Very large page size (16K, 32K) may possibly lead to either
    - Wasted space within page to maintain ability to compress down to 4K CI
    - Aggravated index buffer pool hit ratio for random access

# More Quick Hits …

- ## Reordered Row Format (RRF)
  - Potential for significant reduction in CPU resource consumption when accessing many rows with many varying length columns
    - Implements CPU tuning recommendation to place fixed length columns ahead of varying length columns
    - Provides for direct access to each varying length column
    - In some few cases may lead to increased logging volume
  - On by default in DB2 9 (NFM) and applies to all tablespace types
  - A pageset will be automatically converted from Basic Row Format (BRF) to RRF when pageset is re-allocated  (e.g., REORG, LOAD REPLACE)
  - Application transparent – even for SELECT *
  - REORG and LOAD REPLACE utilities override KEEPDICTIONARY during first time migration where data compression of variable-length rows

# More Quick Hits …

- Reordered Row Format (RRF) …
  - Be careful when using DSN1COPY to export/import data during the transition period when all DB2 systems and data sharing groups have not yet been migrated to DB2 9 (NFM)
    - Should consider disabling RRF on a temporary basis before migrating first system or data sharing group to DB2 9 (NFM), and re-enabling after all the systems and data sharing groups have been migrated to DB2 9 (NFM)
  - How to disable RRF
    - Find &SPRMRRF parameter in the macro DSN6SPRC in SDSNMACS
    - Look for "&SPRMRRF SETC '1' 1=Enable High Perf Row Option"
    - Edit the macro and set &SPRMRRF to '0' and rerun DSNTIJUZ job or similar
    - Disabling RRF with SPRMRRF has the following effect:
      - Any tablespaces created in DB2 9 NFM will be created as BRF
      - When a BRF tablespace is reorganised it will remain in BRF
    - Note carefully pageset/partitions already in RRF will remain in RRF
    - REORG will not convert to BRF

# More Quick Hits …

- ## Universal Table Space (UTS)

  - LOCKSIZE ROW (default) is not a recommendation
  - No MEMBER CLUSTER support
  - Hard prerequisite for CLONE TABLE
  - Migration path: UNLOAD/DROP/CREATE/LOAD

- ## V7/V8 combination of MEMBER CLUSTER+FREEPAGE 0+PCTFREE 0 is still an alternative to DB2 9 APPEND option of CREATE/ALTER TABLE

  - Advantage: Fills in holes left behind by bulk delete - no need for REORG to reclaim space
  - Only applies to partitioned table spaces
    - MEMBER CLUSTER is required
    - PTF PK81470 required to achieve MC00 in V9 CM

# SQL Stored Procedures

- **SQL Stored Procedure terminology change**
  - **"SQL procedures" in Version 8 are called "external SQL procedures" in Version 9.1.**
  - **Version 9.1 also introduces a new type of SQL procedure called native SQL procedures. You cannot create and use native SQL procedures until Version 9.1 new-function mode.**

- **External** SQL procedures:
  - Generated C program which runs in a WLM environment
  - Not zIIP eligible

- **Native** SQL procedures:
  - The SQL procedure logic runs in the DBM1 address space
  - zIIP eligible   ~ 55% redirect

# DB2 for z/OS V9 zIIP Redirect

- **Other V9 zIIP exploitation**
  - Global Query Optimization with parallel query
  - Pair Wise Join
- Native SQL Procedure Benchmark
  - http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/TD104524

# Customer Experiences

- **Customer experiences say pay attention to:**
  - **Read the web, books, Info APARs, PSP**
  - **Have a plan that includes performance**
  - **Run premigration job DSNTIJPM**
    - **Use V8 DSNTIJP9 job**
    - **On every subsystem**
  - **Current maintenance for DB2, z/OS & CF**
  - **Get the latest books: library, red books, ...**
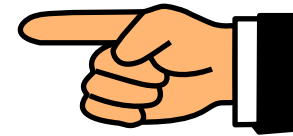
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✓RACF Access Control Module Guide
✓Messages
✓Codes

DB2 Version 9.1 for z/OS
Technical Overview
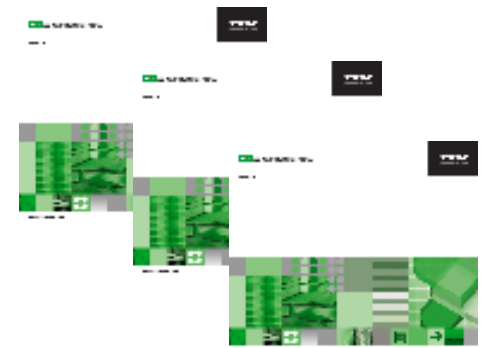
Redbooks

# DB2 9 in **IBM** **Red**books Publications

1. DB2 9 Technical Overview  SG24-7330
2. DB2 9 Performance Topics  SG24-7473
3. DB2 9 Stored Procedures SG24-7604
4. Index Compression with DB2 9 for z/OS redp4345
5. SQL Reference for Cross-Platform Development
6. Enterprise Database Warehouse, SG24-7637
7. 50 TB Data Warehouse on System z, SG24-7674
8. DB2 9 Optimization Service Center SG24-7421
9. LOBs with DB2 for z/OS SG24-7270
10. Deploying SOA Solutions SG24-7663
11. Enhancing SAP - DB2 9  SG24-7239
12. SAP Application on Linux z SG24-6847
13. Best practices SAP BI - DB2 9 SG24-6489-01
14. Data Sharing in a Nutshell, SG24-7322
15. Securing DB2 & MLS z/OS SG24-6480-01
16. Data Sharing: Distributed Load Balancing & Fault Tolerant Configuration redp4449
17. Considerations on Small & Large Packages redp4424
18. Backup and Recovery Considerations redp4452
19. Powering SOA with IBM Data Servers SG24-7259
20. Packages Revisited, SG24-7688
21. Data Studio V2.1 Web Services redp4510
22. Ready to Access Solid-State Drives redp4537
23. Distributed Architecture, SG24-6952
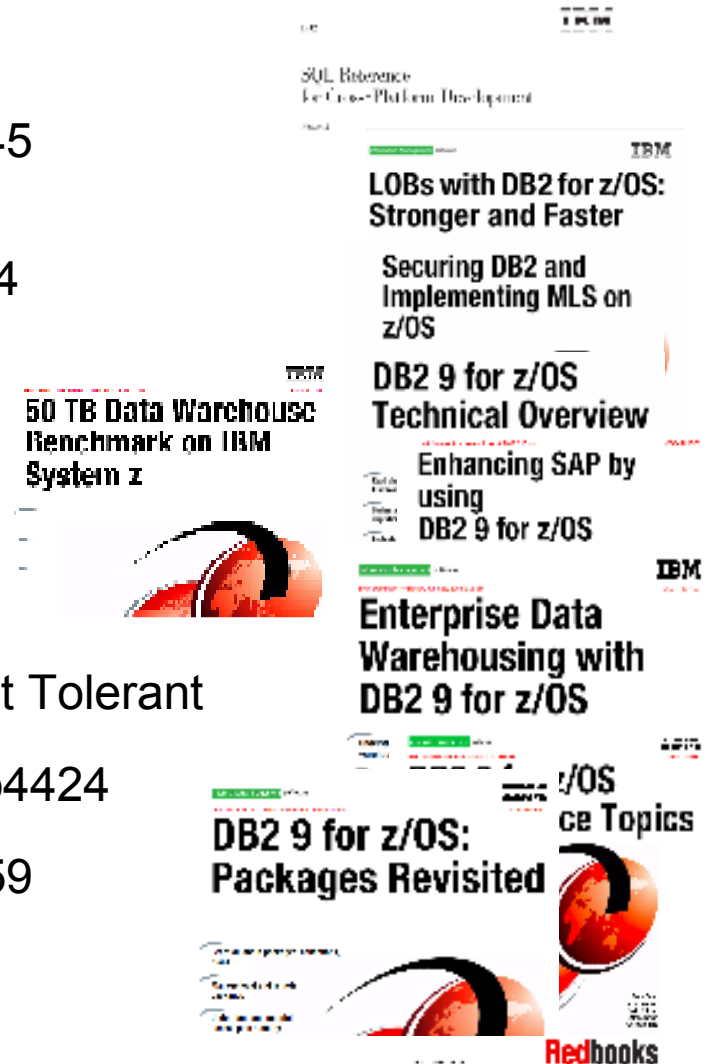
# Main DB2 for z/OS Web Page
## ibm.com/software/db2zos

- **Technical resources**
- **Events**
- **Support**
- **V8, DB2 9**
- **Developer Domain**
- **DB2 Magazine**
- **zIIP**
- **Tools**

# DB2 for z/OS Lifecycle
## http://www.ibm.com/software/data/db2/support/db2zos/



**Click the "Product Support Lifecycle" link**

DB2 for z/OS

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- DB2 Connect z/OS®
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Related solutions
- DB2® and IMS™ z/OS
- DB2 for Linux™

Related hardware
- IBM TotalStorage
- IBM System z
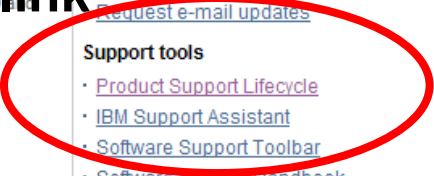
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| Product name/comments | Version/ Rel./Mod. | PID/ License type/ Policy type[1] | General availability[2]/ End of marketing/ End of support | Last updated |
|---|---|---|---|---|
| DB2 for z/OS | 9.1 | 5635-DB2 ICA S | GA: 16-Mar-2007,207-041<br>EOM:<br>EOS: | 06-Mar-2007 |
| DB2 for z/OS | 8.1 | 5625-DB2 ICA S | GA: 26-Mar-2004,204-029<br>EOM: 08-Sep-2009,908-280<br>EOS: | 18-Dec-2008 |
| DB2 for OS/390 | 6.1 | 5645-DB2 ICA S | GA: 30-Jun-1998,299-154<br>EOM: 04-Dec-2001,901-307<br>EOS: 30-Jun-2005,904-021 | 30-Jan-2007 |
| DB2 for OS/390 | 5.1 | 5655-DB2 ICA S | GA: 27-Jun-1997,297-146<br>EOM: 31-Dec-2001,901-184<br>EOS: 31-Dec-2002,901-202 | 30-Jan-2007 |
| DB2 for OS/390 and z/OS<br>Comments: Replacement: DB2 for z/OS V8 (5625-DB2) | 7.1 | 5675-DB2 ICA S | GA: 30-Mar-2001,201-054<br>EOM: 05-Mar-2007,906-254<br>EOS: 30-Jun-2008,907-023 | 07-Feb-2007 |

# DB2 Support Page

ibm.com/software/db2zos/support.html

Technotes
(FAQs)

Presentations

White papers

Redbooks
✓new books

APARs, CST



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## DB2 for z/OS
Product support

**Primary support resources**

**Flash** 2 May, 2007: How can I redeploy an SQL stored procedure without rebuilding it?

**Flash** 1 Nov, 2006: URGENT: Effects of Daylight Saving Time changes on your systems and applications

**Flash** 21 Jul, 2006: IBM Software Support Toolbar

[View all Flashes]

**Solve a problem**
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· Technotes | APARs

**Search Support (this product)**
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# ibm.com/support/docview.wss?rs=64&uid=swg21307783

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**Functions available in conversion mode vs. new-function mode**

Technote (FAQ)

**This document applies only to the following language version(s):**
English

**Question**
Which new functions work only in DB2 9 for z/OS new-function mode (NFM), and which new functions also work in conversion mode (CM, previously called compatibility mode)?

**Answer**
**The short answer**
New functions are available only in new-function mode, unless explicitly stated otherwise in the product documentation. A few general exceptions exist for utilities and for optimization.

**Where is this information documented?**
This general guidance is stated in the information center (http://publib.boulder.ibm.com/infocenter/dzichelp/v2r2/topic/com.ibm.db29.doc.inst/db2z_relincompatassumptions. and in a statement at the beginning of each PDF book, with some specific exceptions. For most information, the guidance is that the function is not supported in conversion mode unless noted. For utilities and optimization, the function is available in conversion mode unless noted. The functions available in conversion mode (CM), conversion mode* (CM*), enabling-new-function mode (ENFM), and enabling-new-function mode* (ENFM*) are

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· CICS
· IMS
· DB2 Connect
· z/OS
· Linux on IBM System z

# Info APARs  II14401 II14464

## II14401: DB2 V8 MIGRATION/FALLBACK INFOAPAR TO/FROM DB2 V9

**APAR status**
INTRAN

**Error description**

```
5740XYR00 R910
DB2 V8 MIGRATION/FALLBACK INFOAPAR TO/FROM DB2 V9

FOLLOWING PTFS ARE FOR DB2 V9 MIGRATION:
(Updated on Oct/4/2008)


PK11129/UK90008(PE)(F610)
   Toleration of fallback from DB2 Version 9 (R910). In a Data
   Sharing environment, required for coexistence of V8R1 and
```

# DB2 9 Technical Resources page

ibm.com/support/docview.wss?rs=64&uid=swg27011656

- •Download 30 PDF books
- •Access html books
- •DB2 new ✓June 2009
- •Program Directories
- •Information Center

# DB2 Connect

## ibm.com/software/data/db2/db2connect/



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### DB2 Connect

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· Warranties and licenses

INTRODUCING
DB2 9.5
→ Learn more
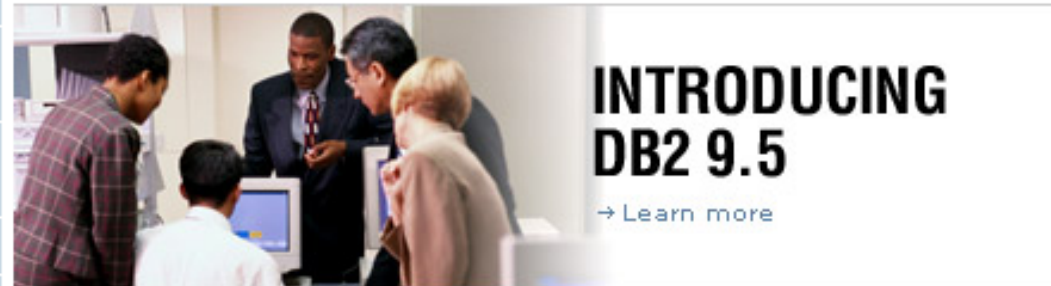
**DB2 Connect** makes your company's host data directly available to your personal computer and LAN-based workstations. It connects desktop and palm-top applications to your company's mainframe and minicomputer host databases for access to your enterprise information no matter where it is. **DB2 Connect** provides the application enablement and robust, highly scalable communication infrastructure for connecting Web, Windows, UNIX, Linux and mobile applications to z/OS and AS/400 data. **DB2 Connect** is included in many of the DB2 products.

**Product Editions**

➔ **Compare editions**

# DB2 Cross-Platform SQL Reference
## updated March 2009

ibm.com/developerworks/db2/library/techarticle/0206sqlref/0206sqlref.html

V3.1 DB2 for LUW 9.5
    DB2 for i V6.1
    DB2 9 for z/OS

## New SQL features now included
• DECFLOAT data type              Additional timestamp format
• ROW CHANGE expressions      New built-in functions
• order-by-clause and fetch-first-clause in a subselect
• SELECT FROM INSERT            Full outer join
• IMPLICITLY HIDDEN columns   row-change-timestamp columns
• RESTRICT on DROP of functions and procedures
• CURRENT DECFLOAT ROUNDING MODE special register & SET
• ALTER FUNCTION                       Other portability enhancements

# ibm.com/software/data/db2imstools/

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For
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bility
Matrix
→ → →
&
V8 or
DB2 9

# ibm.com/support/docview.wss?rs=434&uid=swg21256800

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**Related software**
· DB2
· IMS
· DB2 QMF
· CICS Tools

## DB2 Data Management Tools and DB2 for z/OS V9.1 Compatibility

**Flash (Alert)**

**Abstract**
This table provides the minimum maintenance required for DB2® Tools to support DB2 for z/OS V9.1.

**Content**
Key:
- **NS = Not Supported**
  The product does not function properly on DB2 V9.
- **T = Tolerate**
  Allows the product to execute as it did on a previous release of DB2 but does not utilize any of the new DB2 V9 functions.
- **E = Exploit**
  The product utilizes the new functions and features available in DB2 V9.

**NOTE: If the product is not listed in the matrix, it is not supported on DB2 V9.**
**For new products that have been released after this matrix was published contact your IBM Sales Representative for DB2 V9 compatibility.**

| DB2 Tools | VRM | NS | T | E | Comments |
|---|---|---|---|---|---|
| Application Recovery Tool | 1.2.0 | | | X | PK33728 |
| Data Encryption | 1.1.0 | | | X | No PTF necessary |
| DB2 Administration Tool | 7.2.0 | | | X | No PTF necessary |
| | 7.1.0 | X | | | |
| DB2 Administration Toolkit for z/OS SAP Edition | 2.1.0 | | | X | No PTF necessary |
| | 1.1.0 | X | | | |
| DB2 Archive Log Accelerator | 2.2.0 | | | X | PK38148(See * below) |

**Document information**

Product categories

**Software**

**Data & Information Management**

**Database Tools & Utilities**

**DB2 and IMS Tools**

Operating system (s):
**z/OS**

Software version:
**9.1.0**

Reference #:
**1256800**

IBM Group:
**Software Group**

Modified date:
**2007-03-16**

# Installable option

http://www.ibm.com/support/docview.wss?rs=865&uid=pub1sk5t737700

**http://publib.boulder.ibm.com/infocenter/imzic/**

# DB2 for z/OS Information Center: Cool features

- Optimized for Google search: easily get to DB2 for z/OS information from Google

- Browser search plug-in available: search the information center from your browser's search box, anywhere on the web

- Integrated search for messages, APARs, PTFs, Redbooks

- Filter to see only the products you use

- RSS feeds for automatic notification of updates

- Three new Flash tours with tips for using the information center

- Links to related product information and community resources

# Tips for using the information center



1. You can perform simple and complex searches. You can search for exact words or phrases, and search with wildcards and Boolean operators. Searches are not case sensitive.

2. Narrow a search by clicking **Search scope**. In the Select Search Scope window, you can specify the name of your search list and the topics to search.

3. Synchronize the Topics view and the Contents view so that the displayed topic is highlighted in the Contents view.

4. Turn off and on the highlighting that displays in search results.

5. Bookmark a topic in your browser.

6. Navigate between the topics that you previously viewed.

7. Link to the same content in PDF.

8. Toggle between the Contents view and the Search Results view.

9. Print or search the current topic or its subtopics.

10. Set a filter to limit the topic titles that are displayed in the Contents view.

11. Search within IBM.com.

# Resources:

- DB2 for z/OS information center:
  **http://publib.boulder.ibm.com/infocenter/imzic**

- Launch page for the Flash tours:
  **http://publib.boulder.ibm.com/infocenter/imzic/topic/com.ibm.dzic.doc/dzicviewlet.htm**

- Search for APARs and PTFs from the information center:
  **http://publib.boulder.ibm.com/infocenter/imzic/topic/com.ibm.support.dzic.doc/html/search.html**

- Internal download for the installable information center:
  **http://ibmurl.hursley.ibm.com/9UP**

- Printable flyer (2-sided/color):
  **ftp://ftp.software.ibm.com/software/data/db2/zos/info/DZIC_2009.pdf**

- Browser search plugin for the information center:

  **http://publib.boulder.ibm.com/infocenter/dzichelp/v2r2/topic/com.ibm.dzic.doc/additional_search.html**

# More information: hours of education

COBOL and DB2 V8 multirow fetch, insert
http://www.ibm.com/support/docview.wss?&uid=swg27012149
http://www.ibm.com/support/docview.wss?&uid=swg27012160
DB2 9 education from BetaWorks
XML    http://www.ibm.com/support/docview.wss?&uid=swg27012156
SQL    http://www.ibm.com/support/docview.wss?&uid=swg27012157
Clones http://www.ibm.com/support/docview.wss?&uid=swg27012150
Scalability http://www.ibm.com/support/docview.wss?&uid=swg27012151
Data sharing http://www.ibm.com/support/docview.wss?&uid=swg27012152
Availability http://www.ibm.com/support/docview.wss?&uid=swg27012153
Security    http://www.ibm.com/support/docview.wss?&uid=swg27012155
Data fmt    http://www.ibm.com/support/docview.wss?&uid=swg27012158
Install  http://www.ibm.com/support/docview.wss?&uid=swg27012181
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