



IBM Software Group

# Migration to DB2 for z/OS Version 8

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**DB2** Information Management Software



@.business on demand software

## Changes to the Catalog in Version 8

- **Long Names ==> Varchar 128**



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- Long Names ==> Varchar(128)

*f* **Table, View, Alias, ...**

*f* **Column (Varchar(30)), Data Type**

*f* **Schema, Authorization ID (8)**

*f* **Routine: UDF, Stored  
Procedure, ...**

*f* **Trigger, Package**

*f* **...**



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  - f* Trigger, Package
  - f* ...
- **Immediate Effects**
  - f* **Keys > 255**
  - f* **Rows > 4056**
    - BP8K0 and BP16K0 (and BP32K)
  - f* **18 Table Spaces**

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  - f* 18 Table Spaces
- **UNICODE**
  - f* **Ordering**

## Related Functional Enhancements

- **Long Keys (255 => 2,000)**
- **Variable Length Keys (NOT PADDED)**
  - f* Index-only access
- **Long comparisons (255 => 32,704)**
  - f* Sorting (4,000 => 16,000)
- **Long SQL statements (32K => 2 Meg)**
  - f* (Parse Tree Restructure)
- **Multiple Encodings per SQL statement**
- **Online Reorg of all Catalog and Directory table spaces**
- **Unicode Parsing**

## Customary Migration Procedure

### ■ Customary Migration Procedure

- f* Test Install and Migration on Test System
- f* Migrate Production to the new release
- f* Use no new function
- f* Verify compatibility of old function on new release
- f* When satisfied with new release, begin to use new function

### ■ Problems for Fallback

- f* No control over use of new function when verifying compatibility of old function on new release
- f* New function use usually not discovered until Fallback
- f* Use of new function sometimes precludes Fallback
- f* Fallback requires application of Fallback SPE
  - Usually overlooked during migration



## Formalize Customary Procedure

- **Run DSNTIJPM or in V7, DSNTIJP8**
  - Identifies CCSIDs and incompatibilities
- **Test Install and Migration on Test System**
- **Install Fallback SPE on all members (required)**
  - UQ81009
- **Migrate to V8 - Compatibility Mode**
  - f* Normal CATMAINT - no long names
  - f* No new external functions available (almost)
- **When satisfied with V8 supporting production,**
- **Run job to Enable New Function**
  - f* Fallback and Coexistence with V7 no longer possible
  - f* A series of ALTERs and Online Reorgs (RO) of Catalog and Directory table spaces
- **New Function Mode**
  - f* All new functions available



## Tighter Migration Customer Value

- **More robust migration process**
  - f* Fewer migration & fallback errors
  - f* All customers apply the Fallback SPE
- **Customer control for migration process & timing for using new function**
- **Reduced risk of problems in Fallback SPE**
  - f* Reduced number of modules, fewer changes
- **Improved ability to deliver new function, while still having fallback & coexistence**



## Migration

- **Can only migrate to V8 from V7**
  - f* No Skip-Release Migration
  - f* Normal DSNTIJTC job
    - f* Establishes Compatibility Mode
- **Data Sharing Coexistence only between V7 and V8 Compatibility Mode**
- **DRDA communication possible from all modes to all releases**
- **Enabling New Function Mode is a Group-Wide event**
  - f* Will not start with a V7 running anywhere in the group
  - f* V7 will not start after Enabling process has begun
    - Regardless of whether or not Enabling process is running
    - Now in Enabling New Function Mode (ENFM)

## 18 Table Spaces

<b>SYSVIEWS</b>	<b>SYSOBJ</b>
<b>SYSDBASE</b>	<b>SYSPKAGE</b>
<b>SYSDBAUT</b>	<b>SYSPLAN</b>
<b>SYSDDF</b>	<b>SYSSEQ</b>
<b>SYSGPAUT</b>	<b>SYSSEQ2</b>
<b>SYSGROUP</b>	<b>SYSSTATS</b>
<b>SYSGRTNS</b>	<b>SYSSTR</b>
<b>SYSHIST</b>	<b>SYSUSER</b>
<b>SYSJAVA</b>	<b>SPT01</b>

## Enabling New Function Mode

- **Job named DSNTIJNE**
- **First step enters Enabling New Function Mode (ENFM)**
  - f* **No Fallback or Coexistence with V7**
  - f* **No returning to Compatibility Mode**
- **Several steps for each table space to be processed**
  - f* **Test for table space already converted**
  - f* **ALTER TABLE statements**
  - f* **(Delete) Define new data sets**
  - f* **Reorg the table space SHRLEVEL(REFERENCE)**
    - Record Formats - Page Sizes - Unicode - Not Padded Indexes
    - Inline Image Copy
  - f* **Delete old data sets**

## Enabling New Function Mode (cont.)

- **Can be stopped after the reorg of any table space**
  - f* DSNTIJNH
- **Can be restarted without modification**
  - f* Skips already processed table spaces
  - f* Resumes processing at first table space not successfully converted
- **Insufficient space**
  - f* Succeeding steps are skipped
  - f* -TERM UTIL issued to make table space available
  - f* Can change space parameters and restart
    - Skips already processed table spaces
    - Resumes processing at first table space not successfully converted

## New Function Mode

- **Job named DSNTIJNF enters New Function Mode (NFM)**
- **No Fallback or Coexistence with V7**
  - f* Fallback would involve
    - Changing the code base - eg. from V8 to V7
    - No change to the catalog data or structure
- **No returning to Compatibility Mode**
  - f* Returning would involve process outside of usual customer experience
    - No change to the code base
      - Identical code in all modes - CM, ENFM, and NFM
    - Change to the catalog data and structure
      - Recover to Point In Time prior to Enabling
        - **Recover Catalog and Directory to PIT**
        - **Recover Customer data to PIT**
- **Job named DSNTIJEN to return to ENFM**
  - f* No change to the catalog data or structure
- **New Installs go directly to New Function Mode**

# Unicode Catalog

## ▪ Automatic Conversion

*f* Application Encoding Scheme

*f* Host Variable Declaration

## ▪ Equal Predicates

*f* = '5'

## ▪ Joins to EBCDIC tables

*f* Unicode Intermediate and Final Answer Sets



## ▪ Ordering

*f* ORDER BY

*f* GROUP BY

*f* Range Predicates

• >, <, BETWEEN

– > '5'

## Unicode Catalog

- **In Compatibility Mode, all table spaces are EBCDIC**
- **In Enabling New Function Mode, some are EBCDIC, some are Unicode**
  - f* **-DISPLAY GROUP DETAIL**
  - f* **SYSTABLES - ENCODING\_SCHEME**
  - f* **SYSTABLESPACE - ENCODING\_SCHEME**
- **In New Function Mode, all 18 are Unicode, others are EBCDIC**





## Unicode Catalog

- **Due to "National Characters" - \$, @, and #**
  - **z/OS names in Unicode tables become Varchar(n\*3)**
    - Database Name ==> Varchar(24)
    - Table Space Name => Varchar(24)
    - DBRM Library Name => Varchar(132)
    - etc.

## Migration Summary

- **Migrate to V8 requires normal CATMAINT**
- **Enters Compatibility Mode**
  - f* No new function (almost)
- **Changes to the Catalog are not optional**
  - f* Everyone must run the Enabling New Function Mode process
- **Enabling New Function Mode Process is a single job**
  - f* Several steps for each table space to be processed
  - f* Online, SHRLEVEL(REFERENCE) Reorg of each table space
  - f* Can be stopped after any table space
  - f* Can be restarted without modification
    - Skips already processed table spaces
  - f* No Fallback to V7
  - f* No returning to Compatibility Mode
- **Upon completion, job to enter New Function Mode**
  - f* All new function available