

Preparing for DB2 UDB for z/OS Version 8

Tom Moulder and John F. Bohn
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Agenda

- Pre-requisites
- Unicode
- Access Path Review
- Schema Evolution
- Catalog Changes
- V7 to V8 Migration




Introductory Comments

- DB2 V6 is scheduled for end of service on June 30, 2005
- There are more new lines of code in DB2 V8 than there were lines of code in V1
- Planning is more important for this version than any previous version



Pre-requisites

- DB2 V7 with Fallback SPE (UQ81009)
- No Type 1 Indexes
- zSeries, z/Architecture Processor
- Running in 64-bit mode
- z/OS V1R3 or later
 - Requires WLM goal mode
 - Some functions require z/OS 1.4 , 1.5



Pre-requisites

- Migrate to IBM COBOL V2.2 or V3.2
 - No OS/VS COBOL or VS COBOL II compiles
 - Run “Old” COBOL Modules
- Unicode Conversion Services
- Run DSNTIJPM or DSNTIJP8 (PQ84421)
 - Identifies CCSIDs and incompatibilities

Pre-requisites

- WLM Goal Mode Requirements
 - Stored Procedures require it
 - DB2 exploits Enclave SRBs
 - Better control of priorities by workload
 - More definitions and policies to maintain
 - Naming Standards are important
 - Better performance control
 - When policies are well defined
 - When workloads are easily identifiable

Pre-requisites Summary

Hardware and OS	
OS	z/OS V1R3 Base Services (5694-A01), or later, executing in 64-bit addressing mode
Hardware	Any processor that supports z/Architecture™
Optional Program Requirements	
Transaction Management	
IMS	Version 7 or Higher
CICS TS	Version 1.3 or Higher
MQSeries	WebSphere MQSeries for OS/390 V5.2
Programming Languages	
PL/1	Version 3.2 or Higher
COBOL	IBM COBOL for OS/390 and VM V2.2 or Enterprise Cobol V3.2
Java	Applications or stored procedures written in Java require IBM Developer Kit for OS/390, Java 2 Technology Edition

Unicode

- DB2 UDB for z/OS Version 8:
 - Most Catalog Tables
 - DBRM
 - All Parsing
 - Pre-compiler (new parm CCSID)

OK, so what's Unicode?



Unicode

- New concept for many z/OS centric personnel
- Unicode is a single character set that encodes all of the world's scripts (Latin, Chinese, mathematics, etc.)
- The Unicode standard provides a cross platform, cross vendor method of encoding data that enables representation and manipulation without loss

Unicode

- The Unicode Consortium publishes the Unicode standard www.unicode.org
- New characters constantly being added
- Before Unicode: Many Standards, Many Owners
- CCSID: (Coded Character Set Identifier)
 - Used by DB2 to tag string data
 - Precisely defines the decoding of that data
 - ASCII: CCSIDs: 850, 819, 437, ...
 - EBCDIC: CCSIDs: 500, 37,

Unicode

– UNICODE UTF-8 CCSID 1208

- Uses 1 byte (8 bits) for common characters
- Code points 0 – 127 each occupy 1 byte
- These code points are compatible with ASCII
- Contain upper & lower A-Z, digits 0-9, common punctuation, blank, etc.
- Code points 128+ each occupy 2, 3 or 4 bytes

– UNICODE UTF-16 CCSID 1200

- Uses 2 bytes (16 bits) for common characters
- Uses 2 two-byte sets for other characters

Unicode Character Conversion

German EBCDIC Code Page 273

	4	5	6	7	8	9	A	B	C	D	E	F
0									0	1	2	3
1									A	J		1
2									B	K	S	2
3									C	L	T	3
4									D	M	U	4
5									E	N	V	5
6									F	O	W	6
7									G	P	X	7
8									H	Q	Y	8
9									I	R	Z	9
A												
B												
C												
D												
E												
F												

US Code Page 37

	4	5	6	7	8	9	A	B	C	D	E	F
0									0	1	2	3
1									A	J		1
2									B	K	S	2
3									C	L	T	3
4									D	M	U	4
5									E	N	V	5
6									F	O	W	6
7									G	P	X	7
8									H	Q	Y	8
9									I	R	Z	9
A												
B												
C												
D												
E												
F												

Unicode

- Unicode Conversion Services on z/OS:
 - Central repository for conversions
 - Callable z/OS Service to convert a character string from 1 CCSID to another CCSID
 - High Performance
 - Conversion image built by off-line utility
 - Each desired translation must be explicitly defined
 - CONVERSION 37, 1208, ER;
 - Constructs the CCSID 37 to 1208 translation table
 - ER ensures data integrity
 - Does not construct the 1208 to 37 translation table

Unicode – Watch out for:

Collating Sequence

Different between Unicode and EBCDIC

- UTF-8 Numeric then Alphabetic
- EBCDIC Alphabetic then Numeric

Similar to what we encounter today

- z/OS vs. Unix
- z/OS vs. PC

Character Length

A, a, 9, Å, ¬ (A with a ring accent and logical not)

- ASCII '41'x, '61'x, '39'x, 'C5'x, n/a
- UTF-8 '41'x, '61'x, '39'x, 'C385'x, 'CA2C'x
- EBCDIC 'C1'x, '81'x, 'F9'x, n/a, '5F'x



Access Path Review

- DB2 Optimizer
 - Cost Based
 - CPU and I/O Estimates
 - Always lowest ESTIMATED cost
 - Getting the desired Access Path from Optimizer
 - Manipulate Statistics
 - Using SQL Clauses
 - Using a Hint

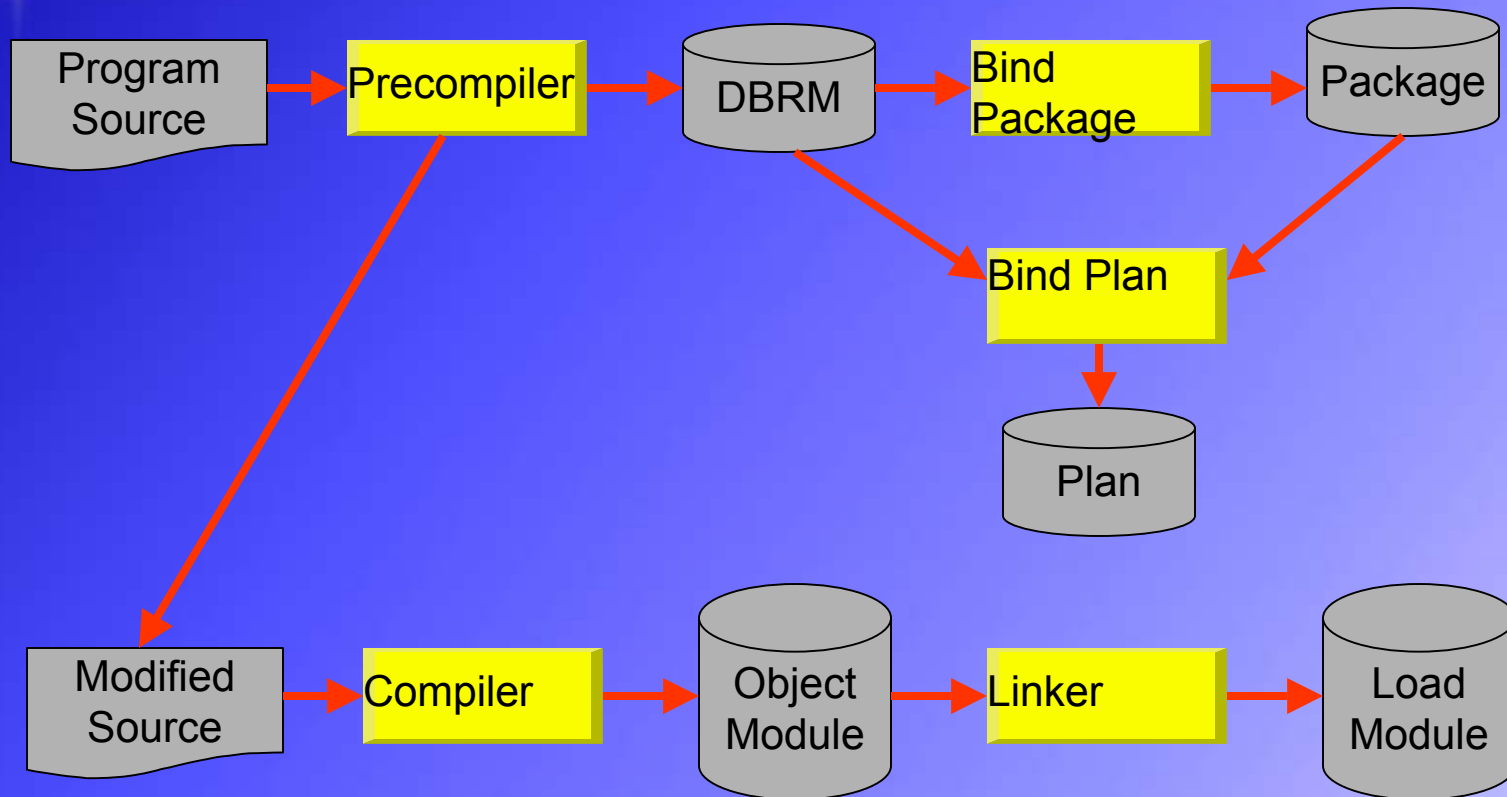


Access Path Review

- When is an Access Path Selected?
 - Bind/Rebind time for Static SQL
 - Mini-bind at execution time for Dynamic SQL
- Any output from this process?
 - Access Path in the directory
 - Tables containing optimizer data
 - V8 will really hide some of these tables

Review Access Path Selection

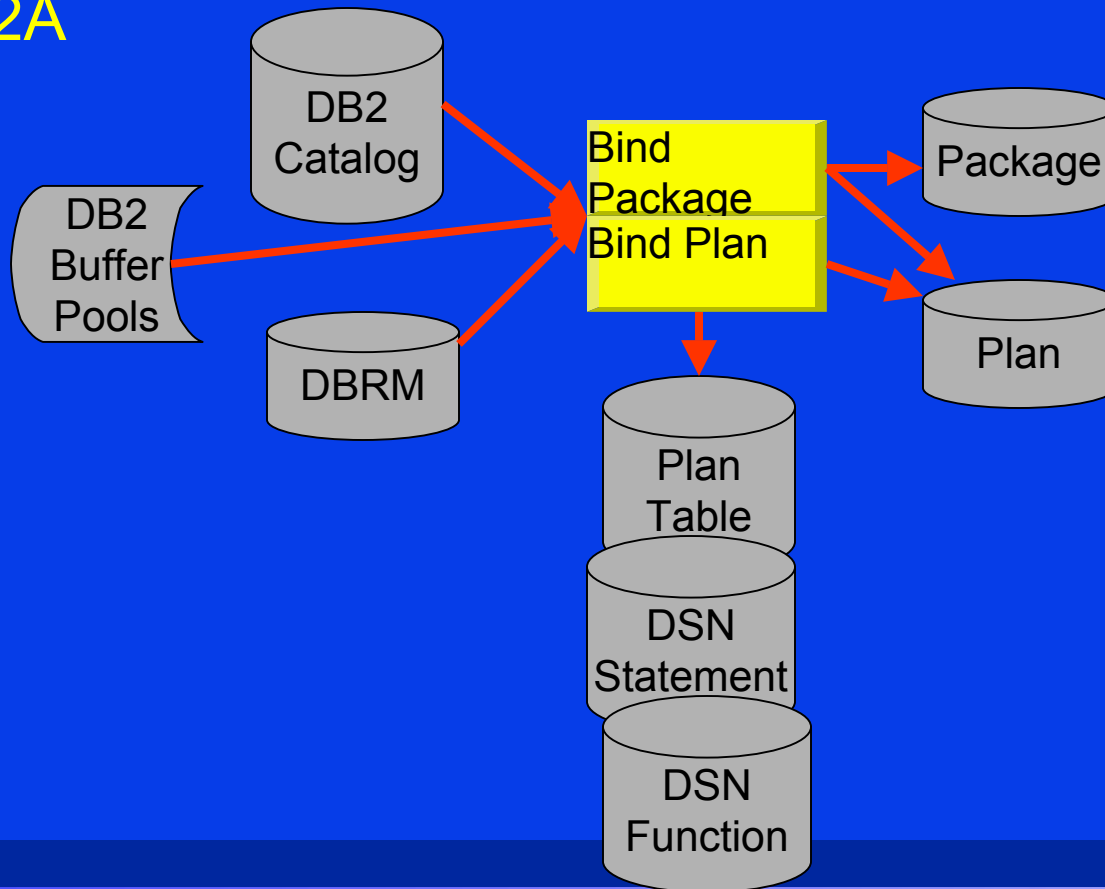
The Big Picture



Review Access Path Selection

The DB2 Picture

DB2A



External Optimizer Influences

- CPU Processor Speeds
- Buffer Pool Differences
 - Assignment of objects
 - Size
 - Thresholds
- Available Processors Online

Impact of Externals

- SQL remains unchanged
- Access Path Changes
 - On a different CPU
 - On a different DB2 Subsystem
 - With different Buffer Pool Configuration
 - On a different Version of DB2



Impact of Externals

- Migrate without Bind
 - Ensured Access Path did not change
 - Propagated old DB2 control blocks
 - Will cause problems in Version 8



Schema Evolution

- Significant enhancements to Alter
 - Character columns
 - increase length
 - change data type
 - Change type for numeric data columns
 - Add column to an index
 - Change the clustering index
 - Add a partition
 - Rotate partitions
 - Alter an index to have true varying length character data



Catalog Changes

- Alter the length of many columns
 - Removes the current 8 or 18 byte limit
 - Dependent for Long Names/Identifiers support
- Alter indexes to be true varying length
 - Dependent upon support for Long Index Keys
 - Dependent upon Varying Length Index Keys support
- Convert most catalog tablespaces to Unicode (UTF-8)
 - Dependent upon Unicode Conversion Services

V7 to V8 Migration

- Pre-Migration Activities
 - DB2 V7
 - No Type 1 Indexes
 - Install fallback SPE (UQ81009)
 - zSeries, z/Architecture in 64-bit mode
 - z/OS V1R3 or later
 - Other products at required levels
 - Unicode Conversion Services
 - Run DSNTIJPM

V7 to V8 Migration

- Migration to Compatibility Mode
 - Install the base DB2 V8 product
 - Invoke the catalog maintenance process
 - Normal DSNTIJTC job
 - Performs some “minor” changes to the catalog [normal catmaint]
 - “Minor” compared to what’s coming
 - Transitions the catalog for major changes

V7 to V8 Migration

- Compatibility Mode (CM)
 - EBCDIC Catalog
 - Data Sharing Coexistence with DB2 V7
 - Can fall back to V7
 - V8 new function forbidden
 - Suggest to run at least one “business cycle” in this mode; an extended period is possible.
 - Might consider migrating all DB2s to CM before migrating any to the next mode

V7 to V8 Migration

- Enabling New Function Mode (ENFM)
 - DSNTIJNE job
 - 1st step places subsystem in ENFM
 - Group wide event; cannot coexist with DB2 V7.
 - Will not start with a V7 running in the group
 - V7 will not start once group in ENFM
 - No returning to CM
 - Cannot fall back to V7
 - Most V8 new function forbidden

V7 to V8 Migration

- Enabling New Function Mode (ENFM)
 - A period of conversions
 - One Catalog Tablespace converted at a time in a multi-step process:
 - Test tablespace status
 - Alter TABLE statements
 - Define new data sets
 - Reorg tablespace SHRLEVEL(REFERENCE)
 - Delete old data sets
 - Catalog from EBCDIC to Unicode (UTF-8)
 - Many catalog columns increasing in length
 - At any point in time during this mode
 - a catalog might be EBCDIC or Unicode
 - a catalog column might be old or new length

V7 to V8 Migration

- Enabling New Function Mode (ENFM)
 - DSNTIJNE job
 - Do not cancel this job
 - Do not modify this job
 - DSNTIJNH job will stop DSNTIJNE
 - after the reorg of current tablespace completes
 - could run a bit before it gets there
 - Restarting the DSNTIJNE job
 - Resubmit the DSNTIJNE job
 - Skips already processed tablespaces
 - Resumes at first tablespace not successfully converted

V7 to V8 Migration

- New Function Mode (NFM)
 - DSNTIJNF job
 - The conversions are complete
 - Catalog is Unicode
 - No fallback with or to V7
 - No coexistence with V7
 - All V8 new functionality is allowed (based on z/OS level)

V7 to V8 Migration

- A new DB2 V8 subsystem starts in NFM
- DRDA communication possible from all modes to all releases

Converting Tablespaces

SYSVIEWS	SYSDBASE	SYSDBAUT
SYSDDDF	SYSGPAUT	SYSGROUP
SYSGRTNS	SYSHIST	SYSJAVA
SYSOBJ	SYSPKAGE	SYSPLAN
SYSSEQ	SYSSEQ2	SYSSTATS
SYSSTR	SYSUSER	SPT01


Summary

- DB2 UDB for z/OS Version 8
 - Became GA on March 26, 2004
 - Healthy amount of pre-requisites
 - Large and complex release
 - Lots of new functions and features
 - Significant migration process
 - Requires planning and training

Next Steps with DB2 V8 and Lightyear


- Our series of detailed presentations on various DB2 V8 topics:

Pre-requisites	V7 to V8 Migration
Unicode	Utilities
Access Path Review	Highlights of New Functionality
Schema Evolution	In Depth Review of the "Top" 5 New Functions
Catalog Changes	Enhancements to SQL



Next Steps with DB2 V8 and Lightyear

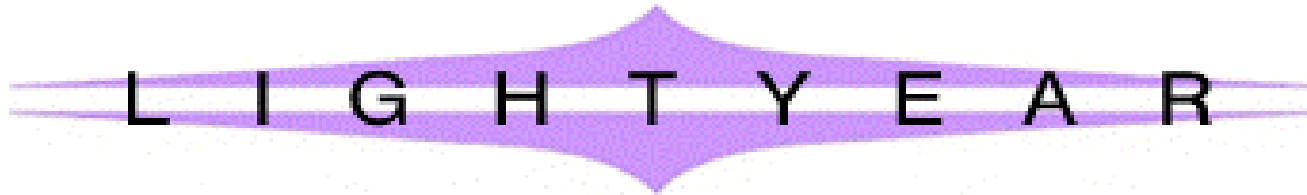
- We will start these FREE presentations in the late September time frame.
- These presentations will be given to just one customer at a time and will be tailored to that customer.
- Presentations will vary in length, dependent upon topic and tailoring.
- A 15 minute “prep” call will be required.



Next Steps with DB2 V8 and Lightyear

- Access Path Review is a performance factor
- We offer a free on-site two-day review
 - Your systems
 - Your SQL
 - Predictive Report of potential problem SQL
- Watch our website for details on both of these exciting and FREE offers and register your interest.

Services available from:



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- *CICS* & *IMS* Web enabling design and implementation
- Database and online system performance analysis and tuning



Questions ...

