



The Best Defense Is a Good Offense

DB2 for z/OS Version 8 Migration Planning

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- a new release of DB2, or
- a Programming Temporary Fix (PTF)

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A Quick Overview

- Planning
 - This presentation
- Compatibility Mode (CM)
 - Limited V8 function available
 - Essentially CATMAINT
- Enable New Function Mode (ENFM)
 - Catalog conversion to Unicode
- New Function Mode (NFM)
 - All new functionality

Planning

Getting the Right Answers

- Your primary bookmark
 - DB2 Universal Database for z/OS home page
 - <http://www.ibm.com/software/data/db2/zos/>
- Specific links from DB2's home page
 - DB2 for z/OS Version 8 Product Reference Manuals
 - <http://www.ibm.com/software/data/db2/zos/v8books.html>
 - **Warning:** Documentation is written for V8 NFM
 - DB2 Information Center
 - <http://publib.boulder.ibm.com/infocenter/dzichelp/v2r2/index.jsp>
 - DB2 Support web page
 - <http://www.ibm.com/software/data/db2/zos/support.html>
 - DB2 Version 8 Migration Roadmap
 - <http://www.ibm.com/software/data/db2/zos/roadmap.html>

Examples of Necessary Documents

- DB2 V8 Program Directory - GI10-8566 (May also need: Utility Suite, Application Connectivity, Management Clients Package)
- Installation Guide - GC18-7418
- Release Guide - SC18-7425
- Data Sharing: Planning and Administration (data sharing install) - SC18-7417
- Application Programming & Reference for JAVA™ (Java install) - SC18-7414
- Messages (New) - GC18-9602
- Codes (New) - GC18-9603
- Internationalization Guide (Unicode)
- Administration Guide - SC18-7413
- Utility Guide and Reference - SC18-7427
- RACF Access Control Module Guide (if using RACF)
- z/OS Managed System Infrastructure for Setup (msys for Setup) DB2 Customization Center User's Guide (available from web)

Make Sure...

- Always check the web for the latest version of the product documentation
- Documentation on the web does change
- Web reference (**once again**)
 - DB2 for z/OS Version 8 Product Reference Manuals
 - <http://www.ibm.com/software/data/db2/zos/v8books.html>

Getting the Latest Information

- **SG24-6079** - *DB2 UDB for z/OS Version 8: Everything You Ever Wanted to Know, ... and More*
 - <http://publib-b.boulder.ibm.com/abstracts/sg246079.html?Open>
- **SG24-6465** - *DB2 UDB for z/OS Version 8 Performance Topics*
 - <http://publib-b.boulder.ibm.com/abstracts/sg246465.html?Open>
- **SG24-6763** - *The Business Value of DB2 UDB for z/OS*
 - <http://publib-b.boulder.ibm.com/abstracts/sg246763.html?Open>
- **SG24-6480** - *Multilevel Security and DB2 Row-Level Security Revealed*
 - <http://publib-b.boulder.ibm.com/abstracts/sg246480.html?Open>

Getting the Latest Information

- **SG24-6489** - *Best Practices for SAP Business Information Warehouse on DB2 for z/OS V8*
 - <http://publib-b.boulder.ibm.com/abstracts/sg246489.html?Open>
- **SG24-6319** - *DB2 for z/OS and WebSphere: The Perfect Couple*
 - <http://publib-b.boulder.ibm.com/abstracts/sg246319.html?Open>
- **SG24-6370** - *Disaster Recovery with DB2 UDB for z/OS*
 - <http://publib-b.boulder.ibm.com/abstracts/sg246370.html?Open>
- **SG24-7088** - *DB2 UDB for z/OS V8: Through the Looking Glass and What SAP Found There*
 - <http://publib-b.boulder.ibm.com/abstracts/sg247088.html?Open>

Getting Off to the Right Start

- Planning for Migration to DB2 for z/OS Version 8
 - by Roger Miller (IBM SVL)
 - <ftp://ftp.software.ibm.com/software/data/db2zos/S1322rma.pdf>
- Health Check Your DB2 System Part 1
 - by John J. Campbell (IBM SVL)
 - <ftp://ftp.software.ibm.com/software/data/db2zos/G11jc.pdf>
- Health Check Your DB2 System Part 2
 - by John J. Campbell (IBM SVL)
 - <ftp://ftp.software.ibm.com/software/data/db2zos/G12jc.pdf>

Getting Off to the Right Start

- Migration Planning Workshop
 - Free
 - Contact your IBM Rep

Were Must You Be?

- Easy answer
 - DB2 Version 7
 - No out of service announced (Yet)
 - However...
 - No other supported migration path available
 - If you are Version 7
 - » Version 7 to Version 8
 - If you are Version 6
 - » Version 6 to Version 7 to Version 8
 - If you are Version 5
 - » Version 5 to Version 7 to Version 8

What about Service?

- Service

- Fallback toleration PTF

- APAR PQ48486 (PTF UQ81009)

- http://www.ibm.com/support/docview.wss?rs=64&context=SSEPEK&q1=PQ48486&uid=swg1PQ48486&loc=en_US&cs=utf-8&lang=en
 - RSU 0403
 - APAR must be applied to V7
 - V7 subsystem must be started before any attempt to start V8
 - APAR must be applied to all members of a data sharing group before DB2 V8 is started on any one member

- Catalog Migration Pre-Check APAR

- APAR PQ84421 (PTF UQ85439)

- http://www.ibm.com/support/docview.wss?rs=64&context=SSEPEK&q1=PQ84421&uid=swg1PQ84421&loc=en_US&cs=utf-8&lang=en
 - RSU 0406
 - Provides job DSNTIJP8
 - » Contains set of catalog queries to assist identifying catalog "situations"
 - » Addressed before migrating to Version 8
 - » Actually delivered with DB2 V8 in job DSNTIJPM but would not be available until after V8 install complete

What about Service?

- Migration/Fallback InfoAPAR
 - APAR II13695
 - http://www.ibm.com/support/docview.wss?rs=64&context=SSEPEK&q1=II13695&uid=isg1II13695&loc=en_US&cs=utf-8&lang=en
- Unicode Support
 - APAR II13048 (Part I)
 - http://www.ibm.com/support/docview.wss?rs=64&context=SSEPEK&q1=II13048&uid=isg1II13048&loc=en_US&cs=utf-8&lang=en
 - APAR II13049 (Part II)
 - http://www.ibm.com/support/docview.wss?rs=64&context=SSEPEK&q1=II13048&uid=isg1II13049&loc=en_US&cs=utf-8&lang=en

DB2 Service

| Version | PID | GA | Marketing Withdrawal | End of service |
|-----------|-----------------|-----------------|---------------------------|---------------------|
| V3 | 5685-DB2 | Dec 1993 | Feb 2000 | Mar 2001 |
| V4 | 5695-DB2 | Nov 1995 | Dec 1, 2000 | Dec 2001 |
| V5 | 5655-DB2 | Jun 1997 | Dec 31, 2001 | Dec 31, 2002 |
| V6 | 5645-DB2 | Jun 1999 | Jun 30, 2002 | Jun 30, 2005 |
| V7 | 5675-DB2 | Mar 2001 | <u>Mar 5, 2007</u> | Mar 2008* |
| V8 | 5625-DB2 | Mar 2004 | | |

* Indicates projected date. Actual end of service date has not been announced yet.

- Web reference for most current information:
 - <http://www.ibm.com/software/data/db2/zos/support/plc/>

Operating System Service

| Version | PID | GA | Marketing Withdrawal | End of service |
|---------|----------|----------|----------------------|----------------|
| V1.3 | 5694-A01 | Mar 2002 | Sep 12, 2002 | Mar 31, 2005 |
| V1.4 | 5694-A01 | Sep 2002 | Sep 9, 2004 | Mar 31, 2007 |
| V1.5 | 5694-A01 | Mar 2004 | Sep 9, 2004 | Mar 31, 2007 |
| V1.6 | 5694-A01 | Sep 2004 | Oct 24, 2005 | Sep 30, 2007 |
| V1.7 | 5694-A01 | Sep 2005 | Oct 23, 2006 | Sep 2008* |
| V1.8 | 5694-A01 | Sep 2006 | Sep 2007* | Sep 2009* |

* Indicates projected date. Actual end of service date has not been announced yet.

□ Web reference for most current information:

➤ http://www.ibm.com/servers/eserver/zseries/zos/support/zos_eos_dates.html/

Basic Hardware Prereqs

- DB2 for z/OS Version 8 exploits 64 bit architecture
 - zArchitecture supported processor required including IBM's:
 - z800
 - z890
 - z900 (with the proper microcode),
 - z990
 - z9 EC
 - z9 BC
 - Needs adequate real storage to support z/OS, DB2, and any other applications required to run in the same environment.

Basic Hardware/Software Prereqs

Operating system requirements:

- Minimum - z/OS 1.3 or above
 - However, z/OS 1.3 is out of service
- z/OS 1.4 end of service extended to March 2007
- Give a serious look at z/OS 1.5 as a minimum
 - additional functionality over 1.4
 - features in DB2 V8 are enabled by running z/OS 1.5 or above
 - z/OS 1.7 is even better (*and wait till you see z/OS 1.8*)
- Other Software
 - IRLM V2.2
 - CFLEVEL=7 (service level 1.06) or CFLEVEL=8 (service level 1.03)

Tools (Ours, Theirs, etc...)

- Check all software
 - IBM
 - Non-IBM
 - Have to make sure it will work with V8
- Remember
 - 64 bit
 - Unicode
 - Long names
- And don't forget development software

Get to the New Stuff

- ✓ Get ready for DB2 for z/OS V8 by upgrading
- ✓ Migrate to DB2 for z/OS V7
- ✓ Migrate to z/OS 1.4 or later
- ✓ Get to WLM goal mode, it's required
- ✓ DB2 requires z/OS Unicode services
- ✓ Some V8 functions need z/OS V1R5, R6, or R7
- ✓ zSeries, z/Architecture 64 bit mode
- ✓ Migrate to IBM COBOL V3.4
- ✓ Migrate to PL/I V3.4
- ✓ IMS V9, V8, V7,
- ✓ CICS TS V3, V2.3
- ✓ All of the details are in Program Directory

Outdated Compilers

| COBOL Compiler | PID | Withdrawn from Service | Run-Time Supported |
|--|----------|------------------------|---------------------------------|
| OS/VS COBOL | 5740-CB1 | Jun 1994 | Language Environment (LE) Only* |
| COBOL/370 | 5688-197 | Sep 1997 | Language Environment (LE) Only* |
| VS COBOL II | 5668-958 | Mar 2001 | Language Environment (LE) Only* |
| COBOL for MVS & VM Ver 1 Rel 2 | 5688-197 | Dec 2001 | Language Environment (LE) Only* |
| COBOL for OS/390 & VM Ver 2 | 5648-A25 | Dec 2004 (MVS only) | Yes |
| Enterprise COBOL for z/OS V3R1 | 5655-G53 | Apr 2004 | Yes |
| Enterprise COBOL for z/OS V3R2 | 5655-G53 | >>>> Oct 2005 <<<< | Yes |
| Enterprise COBOL for z/OS V3R3 | 5655-G53 | Not yet announced | Yes |
| Enterprise COBOL for z/OS V3R4 | 5655-G53 | Most current version | Yes |
| *Language Environment for z/OS V1R2 - V1R5 | | | |

Some Deprecated Function

- LANGUAGE COMPJAVA stored procedures removed
- DB2 managed stored procedures
- DB2-established data space for cached dynamic statements removed
- Migration failure if type 1 indexes found
- Type 2 keyword removed
- Selective partition locking on partitioned table spaces is deprecated

Clean & Reorganize Catalog

- Good time to start to clean up catalog
 - Removed unused objects
- Start running REORG against catalog
 - Good practice
 - Could make ENFM run faster





Rebind Plans

- Plans bound prior to V2.3 will not run
- May have to rebind plans without PKLIST
- Consider rebinding high performance packages
- Make sure you are saving EXPLAIN data
- Do you have accounting information

Planning on Testing Migration?

- DB2 V8 IVP contains functions only available in NFM
- DB2 V7 IVP must be available to test the successful migration to CM

What about DSNZPARMs

- Lots of new parameters
 - But we will leave those for another time
- What about defaults changed in V8?
 - See next slide 
- What about ZPARMs removed in V8?
 - Two slides from now   

DSNZPARAMs Removed in Version 8...

| | | |
|------------------------------------|----------|---|
| COMPAT | DSNHDECP | Serviceability option |
| EDMDSPAC | DSN6SPRM | EDM Pool Data Space Size |
| EDMDSMAX | DSN6SPRM | EDM Pool Data Space Maximum |
| <u>PKGLDTOL</u>¹ | DSN6SPRM | Turn off package requirement for certain SQL statements |
| SARGSWRP² | DSN6SPRM | Allow index access for certain nested correlated table access |
| <u>OPTSUBQ1</u>³ | DSN6SPRM | Non-correlated subquery costs |
| <u>OPTCCOS1</u>⁴ | DSN6SPRM | List prefetch picked as the access path while regular index access could perform better |
| <u>OPTCCOS2</u>⁵ | DSN6SPRM | Inefficient access path or inefficient index is picked for correlated subquery |

1 - APAR PQ59207

2 - APAR PQ61024 & PQ66365

3 - APAR PQ50462 & PQ81790

4 - APAR PQ84158

5 - APAR PQ03849 & PQ66335

DSNZPARAMs Added in Version 8 (1 of 2)

| | | | |
|--------------------|----------|---------|---|
| ACCUMACC | DSN6SYSP | DSNTIPN | Specifies whether DB2 accounting data should be accumulated by the user for DDF and RRSF threads. |
| ACCUMUID | DSN6SYSP | DSNTIPN | Aggregation fields to be used for DDF and RRSF accounting rollup |
| AEXITLIM | DSN6SPRM | DSNTIPP | AUTH EXIT LIMIT |
| DSVCI | DSN6SYSP | DSNTIP7 | VARY DS CONTROL INTEVAL |
| EDMDBDC | DSN6SPRM | DSNTIPC | EDM DBD cache size |
| EDMSTMTC | DSN6SPRM | DSNTIPC | EDM Statement Cache size |
| LRDRTHLD | DSN6SPRM | DSNTIPE | LONG-RUNNING READER |
| MAINTYPE | DSN6SPRM | DSNTIP8 | Default value for CURRENT MAINTAINED TABLE TYPES FOR OPTIMIZATION special register |
| MAX_NUM_CUR | DSN6SPRM | DSNTIPX | Maximum number of open cursors |

DSNZPARAMs Added in Version 8 (2 of 2)

| | | | |
|--------------------|----------|----------|---|
| MAX_ST_PROC | DSN6SPRM | DSNTIPX | Maximum number of stored procedures per thread |
| MGEXTSZ | DSN6SYSP | DSNTIP7 | OPTIMIZE EXTENT SIZING |
| PADIX | DSN6SPRM | DSNTIPE | Pad new indexes by default |
| REFSHAGE | DSN6SPRM | DSNTIP8 | Default value for the CURRENT REFRESH AGE special register |
| SJMXPOOL | DSN6SPRM | DSNTIP8 | Maximum size of the virtual memory pool for star join queries in MB |
| SMF89 | DSN6SYSP | ----- | USAGE PRICING |
| UIFCIDS | DSN6SYSP | DSNTIPN | Output from IFC records should include Unicode information |
| VOLTDEVT | DSN6SPRM | DSNTIPA2 | Device type or unit name for allocating temporary data sets |

Defaults Changed by Version 8

| | | | |
|------------|------------------------|--------|-----------------|
| LOBVALA | USER LOB VALUE STORAGE | 2048 | 10240 |
| → CTHREAD | MAX USERS | 70 | 200 |
| → MAXDBAT | MAX REMOTE ACTIVE | 64 | 200 |
| → CONDBAT | MAX REMOTE CONNECTED | 64 | 10000 |
| IDFORE | MAX TSO CONNECT | 40 | 50 |
| IDBACK | MAX BATCH CONNECT | 20 | 50 |
| ACCUMACC | DDF/RRSAF ACCUM | NO | 10 |
| → CACHEDYN | CACHE DYNAMIC SQL | NO | YES |
| AUTHCACH | PLAN AUTH CACHE | 1024 | 3072 |
| → LOGAPSTG | LOG APPLY STORAGE | 0 | 100 |
| → CHKFREQ | CHECKPOINT FREQ | 50000 | 500000 |
| BLKSIZE | BLOCK SIZE | 28672 | 24576 |
| → CMTSTAT | DDF THREADS | ACTIVE | INACTIVE |
| IDTHTOIN | IDLE THREAD TIMEOUT | 0 | 120 |
| EXTSEC | EXTENDED SECURITY | NO | YES |
| TCPKPALV | TCP/IP KEEPALIVE | ENABLE | 120 |
| → DSMAX | MAXIMUM OPEN DATA SETS | 3000 | 10000 |
| EDMPOOL | EDMPOOL STORAGE SIZE | 7312 | 327681 |

Those DFSORT Rumors

- The DB2 for z/OS Version 8 utilities require DFSORT
- Refer to APARs:
 - PQ68263 (PTF UQ90054)
 - <http://www.ibm.com/support/docview.wss?uid=isg1PQ68263>
 - PK04076 (PTF UK03983)
 - http://www.ibm.com/support/docview.wss?rs=64&context=SWB30&q1=PQ68263&uid=swg1PK04076&loc=en_US&cs=utf-8&lang=en

Those DFSORT Rumors


- DFSORT is already installed
 - Even if you are using some other sort product
- The V8 DB2 utilities are licensed for to use DFSORT
- DFSORT's two libraries have to be in the search list AFTER the OEM sort products libraries
- DFSORT's libraries must be authorized
 - LNKAUTH=LNKLST or
 - LNKAUTH=APFTAB and in APF list
- DFSORT module aliases called by the DB2 utilities are ICEDFSRT and ICEDFSRB

Those DFSORT Rumors

- If DFSORT NOT installed as primary sort package
 - DFSORT R14 plus APAR PQ68263 must be accessible via
 - DFSORT SORTLPA library added to LPALST and SICELINK library added to LNKLST
 - DFSORT libraries SICELINK and SORTLPA added to LNKLST
 - DFSORT libraries SICELINK and SORTLPA added to STEPLIB DD
 - DFSORT modules in private library equivalent to one of the above

Planning's Done. What's Next?

Compatibility Mode

- CATMAINT
 - Catalog changes: table spaces, tables, columns, indexes, etc...
- Limited functionality
 - Next slide 
- Limit time spent
 - Through a major event
 - Maybe a few months
- Minimal time in data sharing coexistence

CM Limited Functionality

- Database Services Address Space runs in 64 bit mode. There will be no dual path code available. This is why there is a z/OS 1.3 requirement.
- Required release level for zIIP specialty engine
- IRLM runs in 64 bit mode
- Buffer pools are moved above the bar and dataspaces and hiperpools are eliminated
- EDM Pool is moved above the bar
- Dynamic statement cache is moved above the bar
- Sort pools are moved above the bar
- Castout buffers are moved above bar

CM Limited Functionality

- RID Pool is moved above the bar
- Compression dictionaries are moved above the bar
- DBDs are moved above the bar
- Most optimization changes are in affect and can be taken advantage of if plans and packages are rebound. New access paths in plans and packages may take **more space** so the size of the SPT01 and SCT01 might need to be increased.
- New catalog and directory objects and new columns to existing catalog are added.
- DB2 parses all SQL in UNICODE
- String constants may be longer when represented in UNICODE which can result in some string constants exceeding the maximum length for a string constant

CM Limited Functionality

- Buffer pools may (probably will) require more central storage when hiperpools are converted to virtual pool allocations
- PGFIX(YES) option on the ALTER BUFFERPOOL command is available
- IRLM PC=YES enforced
- z/OS Conversion Services used for CCSID conversion to UNICODE
- Stored procedures can no longer be defined or run with COMPJAVA
- Online REORG of entire DB2 catalog is available (and used during ENFM migration)
- Larger buffer pools are immediately available (provided that you have enough real storage)
- The changes to the behavior of the IMMEDWRI are available in Compatibility Mode (CM) when migrating to V8.

Enable New Function Mode



- What is it?
 - The process to move from CM to NFM
 - A fully restartable job DSNTIJNE which converts catalog & directory to long names and Unicode
 - Reorganizes 18 table spaces (read only)
 - Marks its current progress in the catalog.
 - CATENFM START – On the initial run.
 - CATENFM CONVERT INPUT tname – To mark the currently converting tablespace.
 - Can be stopped
 - Does not allow new function

Enable New Function Mode

- Convert catalog to Unicode
 - REORG utility
 - 18 Catalog & Directory table spaces
 - Support for long names added
 - Conversion performed by DSNTIJNE
- DBRMs are still in EBCDIC
- ENFM is group wide in data sharing
- Move through ENFM quickly

- No fallback to CM once ENFM is started

New Function Mode

- Signifies completion of V8 migration
 - All new function is available
 - Appropriate catalog tables are in Unicode
 - Catalog columns expanded for long names
- Final step performed by DSNTIJNF
- Set NEWFUN=YES for precompiler
- DBRMs are now in Unicode
- Can stage in NFM

Secrets to a successful migration

- **Spend time and effort in testing to keep fire away from production**
- **Clean up code page issues, analyzing all inputs and outputs, and systematically test to avoid data corruption**
- **Perform Pre-migration catalog migration testing on clone image**
- **Perform systematic testing of release fallback toleration**
- **Perform Batch regression testing**
- **Monitor and control CPU, virtual and real storage usage**
 - Before, during, after
 - Build V7 performance baseline prior to V8 COMPAT mode
 - After migrating to V8 COMPAT
- **Use RMF and DB2 PE to build performance baseline and monitor**
- **Consider using DB2 Path Checker in migration process**

Inhibitors and Problems

- Lack of planning and preparation for introduction of significant new release
- Not properly cleaning up code page issues
- Use of obsolete language compilers
- Support for and quality of vendor code
- Concerns about availability of tools that support V8
- Not cleaning up V8 incompatible changes
- Executing crash project
- Lack of CPU, real storage, virtual storage and time to manage them
- Lack of regression testing of customer applications in their unique environment
- Not running for reasonable period in Compatibility Mode
- Shortage of change windows

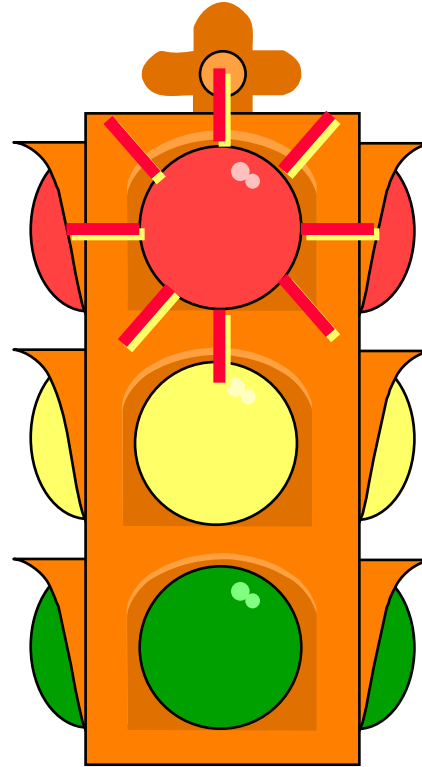
Shameless Self-promotion

- DB2 blog

<http://blogs.ittoolbox.com/database/db2zos/>

**Thank You
for Attending!
Willie**

*The
End*



The Best Defense Is a Good Offense

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