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

- Specific links from DB2’s home page
  - DB2 for z/OS Version 8 Product Reference Manuals
    - Warning: Documentation is written for V8 NFM
  - DB2 Information Center
  - DB2 Support web page
  - DB2 Version 8 Migration Roadmap

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

Getting the Latest Information

- SG24-6079 - DB2 UDB for z/OS Version 8: Everything You Ever Wanted to Know, ... and More

- SG24-6465 - DB2 UDB for z/OS Version 8 Performance Topics

- SG24-6763 - The Business Value of DB2 UDB for z/OS

- SG24-6480 - Multilevel Security and DB2 Row-Level Security Revealed
Getting the Latest Information

- **SG24-6489** - Best Practices for SAP Business Information Warehouse on DB2 for z/OS V8

- **SG24-6319** - DB2 for z/OS and WebSphere: The Perfect Couple

- **SG24-6370** - Disaster Recovery with DB2 UDB for z/OS

- **SG24-7088** - DB2 UDB for z/OS V8: Through the Looking Glass and What SAP Found There

Getting Off to the Right Start

- Planning for Migration to DB2 for z/OS Version 8
  - by Roger Miller (IBM SVL)

- Health Check Your DB2 System Part 1
  - by John J. Campbell (IBM SVL)

- Health Check Your DB2 System Part 2
  - by John J. Campbell (IBM SVL)
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)
      – 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 UQ5439)
      – 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 DSNTIJP8 but would not be available until after V8 install complete
What about Service?

- Migration/Fallback Info APAR
  - APAR II13695

- Unicode Support
  - APAR II13048 (Part I)
  - APAR II13049 (Part II)

### DB2 Service

<table>
<thead>
<tr>
<th>Version</th>
<th>PID</th>
<th>GA</th>
<th>Marketing Withdrawal</th>
<th>End of service</th>
</tr>
</thead>
<tbody>
<tr>
<td>V3</td>
<td>5685-DB2</td>
<td>Dec 1993</td>
<td>Feb 2000</td>
<td>Mar 2001</td>
</tr>
<tr>
<td>V7</td>
<td>5675-DB2</td>
<td>Mar 2001</td>
<td></td>
<td>Mar 2008 ??</td>
</tr>
<tr>
<td>V8</td>
<td>5625-DB2</td>
<td>Mar 2004</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Web reference for most current information:
**Operating System Service**

<table>
<thead>
<tr>
<th>Version</th>
<th>PID</th>
<th>GA</th>
<th>Marketing Withdrawal</th>
<th>End of service</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1.3</td>
<td>5694-A01</td>
<td>Mar 2002</td>
<td>Sep 12, 2002</td>
<td>Mar 31, 2005</td>
</tr>
<tr>
<td>V1.5</td>
<td>5694-A01</td>
<td>Mar 2004</td>
<td>Sep 9, 2004</td>
<td>Mar 31, 2007*</td>
</tr>
<tr>
<td>V1.6</td>
<td>5694-A01</td>
<td>Sep 2004</td>
<td>Oct 24, 2005</td>
<td>Sep 2007*</td>
</tr>
<tr>
<td>V1.7</td>
<td>5694-A01</td>
<td>Sep 2005</td>
<td>Sep 2006*</td>
<td>Sep 2008*</td>
</tr>
</tbody>
</table>

- Web reference for most current information:

---

**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 functionally 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

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

*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

DSNZPARMS Removed in Version 8...

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPAT</td>
<td>DSNHDECP</td>
<td>Serviceability option</td>
</tr>
<tr>
<td>EDMSPAC</td>
<td>DSN6SPRM</td>
<td>EDM Pool Data Space Size</td>
</tr>
<tr>
<td>EDMDSMAX</td>
<td>DSN6SPRM</td>
<td>EDM Pool Data Space Maximum</td>
</tr>
<tr>
<td>PKGLDTOL</td>
<td>DSN6SPRM</td>
<td>Turn off package requirement for certain SQL statements</td>
</tr>
<tr>
<td>SARGSWRP</td>
<td>DSN6SPRM</td>
<td>Allow index access for certain nested correlated table access</td>
</tr>
<tr>
<td>OPTSUBQ1</td>
<td>DSN6SPRM</td>
<td>Non-correlated subquery costs</td>
</tr>
<tr>
<td>OPTCCOS1</td>
<td>DSN6SPRM</td>
<td>List prefetch picked as the access path while regular index access could perform better</td>
</tr>
<tr>
<td>OPTCCOS2</td>
<td>DSN6SPRM</td>
<td>Inefficient access path or inefficient index is picked for correlated subquery</td>
</tr>
</tbody>
</table>

1 - APAR PQ59207
2 - APAR PQ61024 & PQ66365
3 - APAR PQ60462 & PQ81790
4 - APAR PQ84158
5 - APAR PQ03849 & PQ66335
### DSNZPARMs Added in Version 8 (1 of 2)

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

### DSNZPARMs Added in Version 8 (2 of 2)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Module</th>
<th>Routine</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX_ST_PROC</td>
<td>DSN6SPRM</td>
<td>DSNTIPX</td>
<td>Maximum number of stored procedures per thread</td>
</tr>
<tr>
<td>MGEXTZS</td>
<td>DSN6SYSP</td>
<td>DSNTIP7</td>
<td>OPTIMIZE EXTENT SIZING</td>
</tr>
<tr>
<td>PADIX</td>
<td>DSN6SPRM</td>
<td>DSNTIPE</td>
<td>Pad new indexes by default</td>
</tr>
<tr>
<td>REFSHAGE</td>
<td>DSN6SPRM</td>
<td>DSNTIP8</td>
<td>Default value for the CURRENT REFRESH AGE special register</td>
</tr>
<tr>
<td>SJMXPOOL</td>
<td>DSN6SPRM</td>
<td>DSNTIP8</td>
<td>Maximum size of the virtual memory pool for star join queries in MB</td>
</tr>
<tr>
<td>SMF89</td>
<td>DSN6SYSP</td>
<td>---------</td>
<td>USAGE PRICING</td>
</tr>
<tr>
<td>UIFCIDS</td>
<td>DSN6SYSP</td>
<td>DSNTIPN</td>
<td>Output from IFC records should include Unicode information</td>
</tr>
<tr>
<td>VOLTDEVT</td>
<td>DSN6SPRM</td>
<td>DSNTIPA2</td>
<td>Device type or unit name for allocating temporary data sets</td>
</tr>
</tbody>
</table>
Defaults Changed by Version 8

<table>
<thead>
<tr>
<th>Variable</th>
<th>Old Value</th>
<th>New Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOBVALA</td>
<td>2048</td>
<td>10240</td>
</tr>
<tr>
<td>CTHREAD</td>
<td>70</td>
<td>200</td>
</tr>
<tr>
<td>MAXDBAT</td>
<td>64</td>
<td>200</td>
</tr>
<tr>
<td>CONDBAT</td>
<td>64</td>
<td>10000</td>
</tr>
<tr>
<td>IDFORE</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>IDBACK</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>ACCUMACC</td>
<td>NO</td>
<td>10</td>
</tr>
<tr>
<td>CACHEDYN</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>AUTHCACH</td>
<td>1024</td>
<td>3072</td>
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<tr>
<td>LOGAPSTG</td>
<td>0</td>
<td>100</td>
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<tr>
<td>CHKFREQ</td>
<td>50000</td>
<td>500000</td>
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<tr>
<td>BLKSIZE</td>
<td>28672</td>
<td>24576</td>
</tr>
<tr>
<td>CMTSTAT</td>
<td>ACTIVE</td>
<td>INACTIVE</td>
</tr>
<tr>
<td>IDTHTOIN</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>EXTSEC</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>TCPKPALV</td>
<td>ENABLE</td>
<td>120</td>
</tr>
<tr>
<td>DSMAX</td>
<td>3000</td>
<td>10000</td>
</tr>
<tr>
<td>EDMPOOL</td>
<td>7312</td>
<td>327681</td>
</tr>
</tbody>
</table>

Those DFSORT Rumors

- The DB2 for z/OS Version 8 utilities require DFSORT
- Refer to APARs:
  - PQ68263 (PTF UQ90054)
  - PK04076 (PTF UK03983)
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 tsname – 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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