DB2 10 for z/OS Overview

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Brief DB2 History

OnGoing themes:
 Performance  Scalability
 Reliability  Availability  Serviceability
 Security  Productivity
 Application Development
 SQL  XML  SOA

Breakthroughs

# DB2 z/OS Availability Summary

<table>
<thead>
<tr>
<th>Version</th>
<th>PID</th>
<th>Generally Available</th>
<th>Marketing Withdrawal</th>
<th>End of Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>V5</td>
<td>5655-DB2</td>
<td>June 1997</td>
<td>December 2001</td>
<td>December 2002</td>
</tr>
<tr>
<td>V6</td>
<td>5645-DB2</td>
<td>June 1999</td>
<td>June 2002</td>
<td>June 2005</td>
</tr>
<tr>
<td>V7</td>
<td>5675-DB2</td>
<td>March 2001</td>
<td>March 2007</td>
<td>June 2008</td>
</tr>
<tr>
<td>V8</td>
<td>5625-DB2</td>
<td>March 2004</td>
<td>September 2009</td>
<td>April 2012</td>
</tr>
<tr>
<td>V9</td>
<td>5635-DB2</td>
<td>March 2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V10</td>
<td>5605-DB2</td>
<td>October 2010</td>
<td></td>
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</tr>
</tbody>
</table>
## DB2 10 for z/OS At a Glance

### Addressing Corporate Data Goals

<table>
<thead>
<tr>
<th>Application Enablement</th>
<th>RAS, Performance, Scalability, Security</th>
<th>Simplification, Reduced TCO</th>
<th>Dynamic Warehousing</th>
</tr>
</thead>
<tbody>
<tr>
<td>• pureXML enhancements</td>
<td>• Wide range of performance improvements</td>
<td>• Full 64-bit SQL runtime (5x – 10x more threads)</td>
<td>• Moving sum, moving average</td>
</tr>
<tr>
<td>• Temporal queries</td>
<td>• More online schema changes</td>
<td>• Auto stats</td>
<td>• Many query optimization improvements</td>
</tr>
<tr>
<td>• Last Committed reads</td>
<td>• Catalog restructure for improved concurrency</td>
<td>• Data compression on the fly</td>
<td>• Query parallelism improvements</td>
</tr>
<tr>
<td>• Timestamp with timezone</td>
<td>• Row and Column access control</td>
<td>• Query stability enhancements</td>
<td>• Advanced query acceleration</td>
</tr>
<tr>
<td>• SQL improvements that simplify porting</td>
<td>• Hash access to data</td>
<td>• Reduced need for REORG</td>
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<td></td>
<td>• New DBA privileges with finer granularity</td>
<td>• Utilities enhancements</td>
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</tbody>
</table>

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Top 10 in DB2 10 for z/OS

1. CPU reductions for transactions, queries, & batch
2. Ten times more users by avoiding memory constraints
3. More concurrency for catalog, utilities, and SQL
4. More online change: data definition, utilities, & subsystem
5. Improved security with more granularity
6. Temporal or versioned data
7. SQL enhancements improve portability
8. pureXML performance and usability
9. Hash, index include columns, skip migration, …
   Pick your favorite!
10. Productivity improved for database & systems administrators, and application programmers
- Base Pre-requisites:
  - zSeries z890, z990, z9, z10, z196 or later
  - z/OS V1.10 or above

- Catalog changes:
  - Additions for new features
  - SMS and DB2 managed
  - Hashes and links removed
  - Many tables changed to:
    - Single table, table spaces (UTS, PBG)
    - Row level locking
    - Using Inline LOBs

- DB2 Connect
  - V9 FP1
  - V9.7 FP3a for new features
Key details about DB2 10

- **DB2 10 pre-migration health check job**, DSNTIJPA (PM04968)
  - Private protocol \( \rightarrow \) DRDA (new help in DSNTP2DP)
  - Old plans and packages V5 or before \( \rightarrow \) REBIND
  - Plans containing DBRMs \( \rightarrow \) packages
  - ACQUIRE(ALLOCATE) \( \rightarrow \) ACQUIRE(USE)
  - XML Extender \( \rightarrow \) XML type
  - DB2 MQ XML user-defined functions and stored procedures \( \rightarrow \) XML functions
  - DB2 Management Clients feature (DB2 Administration Server, Control Center, & Development Center) \( \rightarrow \) IBM Data Studio application & administration services
  - msys for Setup DB2 Customization Center \( \rightarrow \) install panels
  - BookManager use for DB2 publications \( \rightarrow \) Info Center, pdf

- **Migration Process**:  
  - CM, ENFM, NFM modes  
  - From Version 8 or 9 NFM  
  - Data sharing coexistence in CM8 or CM9
May move from V8 to DB2 10,
but just because you can, doesn’t mean you always should…. 
Migration, fallback and data sharing coexistence fully supported
Mix of DB2 9 and 10 or DB2 V8 and 10

Key considerations:
• Risk/reward analysis
  • What’s your risk? Tolerance level?
  • How will you do it? What’s your mitigation plan? Are ISVs ready?
  • What workloads do you need to test and can you test them properly?
  • Do you have best practice service and test processes?
• Migration cost savings is not 2X versus two migrations
  • Migration considerations for two versions still apply
  • Larger migration project, longer migration timeline
  • Applications and ISVs need to be ready
• Timing: V8 end of service April 2012, other software, service & test process
Normal Migration Overview DB2 9 -> DB2 10

- **DB2 9 New Function Mode (NFM) With SPE**
  - CATMAINT UPDATE (DSNTIJTC)
- **DB2 10 Conversion Mode (CM9)**
  - CATENFM START (DSNTIJEN)
- **DB2 10 Enabling New Function Mode (ENFM9)**
  - CATENFM COMPLETE (DSNTIJNF)
- **DB2 10 New Function Mode (NFM)**
  - DB2 10 Catalog

**Timeline:**
- 1 - 2 months
- 1 week
- Data Sharing Coexistence
- Minutes

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## Some Beta Customer Performance Feedback

<table>
<thead>
<tr>
<th>Workload</th>
<th>Results</th>
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<tbody>
<tr>
<td>Customer1: Distributed</td>
<td>50% DB2 elapsed time reduction; 15% chargeable CPU reduction after enabling high perf DBAT</td>
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<tr>
<td>Concurrent Insert</td>
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<tr>
<td>Customer2: CICS online</td>
<td>Approx. 7% CPU reduction in DB2 10 CM after REBIND, Another 4% reduction with 1MB page usage</td>
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<tr>
<td>transactions</td>
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<tr>
<td>Customer3: CICS online</td>
<td>Approx 5% CPU reduction</td>
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<tr>
<td>transactions</td>
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<tr>
<td>Customer4: Data sharing</td>
<td>38% CPU reduction</td>
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<tr>
<td>heavy concurrent insert</td>
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<tr>
<td>Customer5: Queries</td>
<td>Average CPU reduction 28% from V8 to DB2 10 NFM</td>
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<td>Customer6: Batch</td>
<td>Overall 28% CPU reduction after rebind packages</td>
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<tr>
<td>Customer7: DDF OLTP</td>
<td>40% CPU reduction for JDBC stored procedures workload</td>
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</table>
## Beta Customer Feedback on Selected New Functions

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<th>Workload</th>
<th>Results</th>
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</thead>
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<tr>
<td>Multi row insert (data sharing)</td>
<td>33% CPU reduction from DB2 9, 4x improvement from V8 due to LRSN spin reduction</td>
</tr>
<tr>
<td>Parallel Index Update</td>
<td>30-40% Elapsed time improvement with class 2 CPU time reduction</td>
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<tr>
<td>Inline LOB</td>
<td>SELECT LOB shows 80% CPU reduction</td>
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<tr>
<td>Include Index</td>
<td>17% CPU reduction in insert after using INCLUDE INDEX</td>
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<tr>
<td>Hash Access</td>
<td>20-30% CPU reduction in random access</td>
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<td>16% CPU reduction comparing Hash Access and Index-data access.</td>
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<td>5% CPU reduction comparing Hash against Index only access</td>
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</tbody>
</table>
Top Items Driving DB2 10 Decisions

- CPU / Performance improvements
- Virtual storage enhancements
  - Reduce number of members, save money
- Stability & regression
- Security enhancements
  - Built-in security, trace & audit features, new roles, end-to-end auditing
  - Cleaner/safer environment; Better audit/compliance
- Temporal
- Skip-level migration DB2 V8 → DB2 10

**Vast majority of beta customers plan production in 2011**
DB2 10 Performance

- Most customers 5% - 10% CPU reduction out of the box after rebind
- Some workloads and customer situations can reduce CPU time up to 20%

![Average %CPU improvements version to version chart]
Preliminary Measurements of IBM Relational Warehouse Workload (IRWW) with data sharing

Base DB2 9 NFM REBIND with PLANMGMT(EXTENDED)

- DB2 9 NFM → DB2 10 CM without REBIND measured 3.7% CPU reduction from DB2 9
- DB2 10 CM REBIND getting same access path measured 7.4% CPU reduction from DB2 9
- DB2 10 NFM measured same 7.4% CPU reduction from DB2 9
- DB2 10 CM or NFM with RELEASE(DEALLOCATE) measured additional 10% CPU reduction from DB2 10 NFM RELEASE(COMMIT)
DB2 and zEnterprise 196 performance

LSPR Measurement data currently available shows

- DB2 OLTP workloads observing 1.3x to 1.6x DB2 CPU reduction compared to z10 processors
- Higher DB2 CPU reduction can be achieved as number of processors per LPAR increases
- With DB2 10 and zEnterprise, CPU reduction can be up to 1.8x compared to DB2 9 and z10 with many processors per LPAR
Taking System z synergy to the next level

- Faster CPUs, more CPUs, more memory → better DB2 performance, scalability
- Compression hardware expected to increase DB2 data compression performance
- Cache optimization, 192M L4 Cache expected to benefit DB2 work
- Hybrid architecture query performance acceleration with IBM Smart Analytics Optimizer
- Excellent synergy with DB2 10 → significant CPU reduction and scalability increase
  - CPU reductions
  - Remove key single system scaling inhibitors: virtual storage, latching, catalog, utilities, …
- Translation Lookaside Buffer changes expected to improve performance for 1MB page sizes
- Buffer pool management
Portions of the following DB2 for z/OS V8, DB2 9 and 10 workloads may benefit from zIIP or zAAP for XML (DB2 9 in blue, DB2 10 in green)*:

1 – DRDA over TCP/IP connections
   • DB2 9 for z/OS Remote native SQL procedures
   • DB2 9 XML parsing XML schema validation
   • Increased portion of DRDA redirected to zIIPs to 60% (PM12256) Improved performance via reduced processor switching

2 - Requests that use parallel queries
   • DB2 9 higher percentage of parallel queries zIIP eligible
   • DB2 10 more queries eligible, more parallelism

3 - DB2 Utilities LOAD, REORG & REBUILD functions used to maintain index structures and sort
   • DB2 10 RUNSTATS – options other than column group

4 - DB2 10 buffer pool prefetch and deferred write
Performance Enhancements Few Changes (CM)

- SQL runtime improved efficiency
- Address space, memory changes to 64 bit, some REBINDs
- Faster single row retrievals via open / fetch / close chaining
- Distributed thread reuse High Performance DBATs
- DB2 9 utility enhancements in CM8
- Parallel index update at insert
- Workfile in-memory enhancements
- Index scans using list prefetch
- Solid State Disk use
- Buffer pool enhancements
  - Utilize 1MB page size on z10
  - “Fully in memory” option (ALTER BUFFERPOOL)
Performance Enhancements need REBIND (CM)

- Most access path enhancements
- Further SQL runtime improvements
- Use of RELEASE(DEALLOCATE)
- SQL paging performance enhancements
  - Single index access for complex OR predicates:
- IN list performance
  - Optimized Stage1 processing (single or multiple IN lists)
  - Matching index scan on multiple IN lists
- Safe query optimization
- Query parallelism improvements
- More stage 2 predicates can be pushed down to stage 1
- More aggressive merge of views and table expressions
  - Avoid materialization of views
- If migrating from V8, get new RUNSTATS before mass rebind
Performance Enhancements requiring NFM

- DB2 catalog concurrency and productivity
- Compress on insert
- Most utility enhancements
- LOB streaming between DDF and rest of DB2
- Faster fetch and insert, lower virtual storage consumption
- SQL Procedure Language performance improvements
- Workfile spanned records, partition by growth
- Access to currently committed data
- Insert improvement for universal table spaces
- Locking improvement for multirow insert
- Efficient caching of dynamic SQL statements with literals
Performance Enhancements need NFM + DBA

- Hash access path Create + Reorg + rebind to activate
- Index include columns Alter + Rebuild + rebind to activate
- Inline LOBs Alter (need universal table space and reordered row format)
- DEFINE NO for LOB and XML columns
- MEMBER CLUSTER for universal table space Alter + Reorg
- Alter to universal table space, page size, data set size, segment size Alter + Reorg
- Online reorg for all catalog and directory table spaces
Best practice for hash

Index to Data Access Path

Select Balance
From Accounts
WHERE acctID = 17

Hash Access

Select Balance
From Accounts
WHERE acctID = 17

CREATE TABLE.....
........
ORGANIZE BY HASH UNIQUE
(ACCTID, ....)
HASH SPACE 4G

• Traverse down Index Tree
  • Typically non-leaf portion of tree in the bufferpool
  • Leaf Portion of the tree requires I/O
  • Requires searching pages at each level of the index
• Access the Data Page
  • Typically requires another I/O
• For a 5 Level Index
  • 6 GETP/RELPs, 2 I/O’s, and 5 index page searches

Accounts Table

INDEX on AcctID

Accounts Table

• Directly locate a row in a table
  • without using an index
  • Single GETP/RELP in most cases
  • 1 Synch I/Os in common case
  • 0 If In Memory Table
  • Greatly reduced Search CPU expense
Scalability: Virtual storage constraint is still an important issue for many DB2 customers, until DB2 10

- DB2 10 supports 5-10x more active threads, up to 20,000 per member
  - 80-90% of thread storage moved above the bar
  - More concurrent work
  - Reduce need to monitor
  - Consolidate members and LPARs
  - Reduced cost,
    - easier to manage,
    - easier to grow
  - REBIND required to get most of the savings
Major changes in DB2 10 catalog & directory

- Improve availability and productivity
- Increase maximum size substantially
- Reduce contention: BIND, DDL, utilities
- Catalog changes: Remove links
  - Many more table spaces, partition by growth
  - Row level locking, reordered row format
  - CLOB and BLOB columns for long strings
    - Inline for performance
  - Online reorganization and check
  - More automatic: DB2-managed SMS-controlled
Improved availability ALTER REORG ...

- Classic Partitioned Table Space
- Range-Partitioned Table Space: UTS, PBR
- Single-Table Segmented Table Space
- Single-Table Simple Table Space
- Partition-By-Growth Table Space: UTS, PBG
- Hash

Page size
Data set size
Segment size
Member cluster
INDEX page size
INCLUDE cols

MODIFY DDF ALIAS
ADD active log
BUFFERPOOL PGSTEAL NONE
LOB INLINE LENGTH, VERSIONING
ACCESS CONTROL
MASK, PERMISSION
TRIGGER SECURED
FUNCTION SECURED
SECURED
TIMESTAMP precision, tz
MAXPARTITIONS
Business Security & Compliance

- Protect sensitive data from privileged users & improve productivity
  - SECADM & DBADM without data access
  - Usability: DBADM for all DB
  - Revoke without cascade
- Separate authorities to perform security related tasks, e.g. security administrator, EXPLAIN, performance monitoring and management (SQLADM)
- Audit privileged users
- Row and column access control
  - Allow masking of value (CREATE MASK)
  - Restrict user access to individual cells (CREATE PERMISSION)
Autonomics and DBA Productivity

- Auto statistics collection
- Compress ‘on the fly’
  - Avoid need to run utility
- Timeout / deadlock diagnostics:
  - Identify SQL statements
- Automatic config of IBM supplied UDFs and SPs
- Access path stability
- Reduced need for REORG
  - Build compression dictionary on the fly
  - Index list prefetch enhancements
- Allow tailored names for DSNHDECP
- Static SQL caching

Manual invocation of
- RUNSTATS
- COPY/BACKUP SYSTEM
- QUIESCE
- MODIFY RECOVERY
- REORG
Utilities Enhancements – Online REORG

• REORG SHRLEVEL(CHANGE) for LOBs

• Online REORG enhancements
  – SHRLEVEL(CHANGE) for all catalog & directory
  – Option to cancel blocking threads
  – Faster SWITCH phase
  – Allow disjoint partition ranges
  – Permit movement of rows between partitions when LOB columns exist
    – Allow REBALANCE and ALTER LIMITKEY even when LOB columns exist
    – Allow DISCARD to delete associated LOB values
  – Messages to estimate length of REORG phases and time to completion
Utilities Enhancements …

- Improved COPY CHANGELIMIT performance
  - Use RTS instead of SM page scans
- Dataset level FlashCopy option
  - FlashCopy backups with consistency and no application outage
  - FlashCopy backups as input to:
    - RECOVER (fast restore phase)
    - UNLOAD
    - COPYTOCOPY, DSN1COPY
- RECOVER “back to” log point
- REPORT RECOVERY support for system level backups
- MODIFY RECOVERY improved performance
- RUNSTATS enhancements to support auto stats
Query Processing Enhancements

- **Performance Improvements**
  - Improved caching of dynamic SQL with literals
  - Safe Query Optimization
  - Workfile spanned records, PBG support, and in-memory enhancements
  - IN List performance
    - Predicate transitive closure on IN-lists.
    - Matching index scan on multiple IN-lists.
    - Enable list prefetch in conjunction with IN-lists.
  - SQL Pagination - Single index access for complex OR predicates*
    - Commonly used for cursor scrolling
  - Parallelism Enhancements

- **Access Path Stability**
  - Relief from package REBIND regression
Query Enhancements

- CPU time reductions for queries, batch, & transactions
  - Complex predicate processing improvements
- SQL enhancements: Moving Sum, Moving Average, temporal, timestamp, implicit cast, SQL PL, …
- pureXML improvements
- Access improvements:
  - Index include columns, Hash
  - Index list prefetch -> better performance using a disorganized index
  - RID pool overflow to workfiles, in memory workfiles …..
- Optimization techniques
  - Remove parallelism restrictions; more even parallel distribution
  - Scalability: memory and latching relief allow more parallel
  - Increased zIIP use – parallel, prefetch, RUNSTATS
  - In-memory techniques for faster query performance
- Analysis: instrumentation, Data Studio & Optim Query Tuner
Multi-row INSERT, FETCH & multi-row cursor UPDATE, Dynamic Scrollable Cursors, GET DIAGNOSTICS, Enhanced UNICODE SQL, join across encoding schemes, IS NOT DISTINCT FROM, VARBINARY, FETCH CONTINUE, MERGE, SELECT from MERGE, data versioning, access controls

Inner and Outer Joins, Table Expressions, Subqueries, GROUP BY, Complex Correlation, Global Temporary Tables, CASE, 100+ Built-in Functions including SQL/XML, Limited Fetch, Insensitive Scroll Cursors, UNION Everywhere, MIN/MAX Single Index, Self Referencing Updates with Subqueries, Sort Avoidance for ORDER BY, and Row Expressions, 2M Statement Length, GROUP BY Expression, Sequences, Scalar Fullselect, Materialized Query Tables, Common Table Expressions, Recursive SQL, CURRENT PACKAGE PATH, VOLATILE Tables, Star Join Sparse Index, Qualified Column names, Multiple DISTINCT clauses, ON COMMIT DROP, Transparent ROWID Column, Call from trigger, statement isolation, FOR READ ONLY KEEP UPDATE LOCKS, SET CURRENT SCHEMA, Client special registers, long SQL object names, SELECT from INSERT, UPDATE or DELETE, INSTEAD OF TRIGGER, Native SQL Procedure Language, BIGINT, file reference variables, XML, FETCH FIRST & ORDER BY in subselect & fullselect, caseless comparisons, INTERSECT, EXCEPT, not logged tables, OmniFind, spatial, range partitions, data compression, session variables, DECIMAL FLOAT, optimistic locking, ROLE, TRUNCATE, index & XML compression, created temps, inline LOB, administrative privileges, implicit cast, date/time changes, currently committed, moving sum & average, index include columns, PureScale

Updateable UNION in Views, GROUPING SETS, ROLLUP, CUBE, more Built-in Functions, SET CURRENT ISOLATION, multi-site join, MERGE, MDC, XQuery, XML enhancements, array data type, global variables, even more vendor syntax, temp table compression
Many improvements for SAP & web applications

<table>
<thead>
<tr>
<th>Autonomics</th>
<th>Performance</th>
<th>Availability</th>
<th>Portability</th>
<th>Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compress on the fly on INSERT</td>
<td>CPU reductions</td>
<td>More online schema changes for table spaces, tables and indexes via online REORG</td>
<td>Allow non-NULL default values for inline LOBs</td>
<td>More granular DBA privileges</td>
</tr>
<tr>
<td>Auto-statistics</td>
<td>Hash access path</td>
<td>Online REORG for LOBs</td>
<td>Loading and unloading tables with LOBs in stream</td>
<td></td>
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<tr>
<td>Hints enhancements</td>
<td></td>
<td>Online add log</td>
<td>Currently committed locking semantics</td>
<td></td>
</tr>
<tr>
<td>Access path lock-in and fallback for dynamic SQL</td>
<td></td>
<td>Automatically delete CF structures before/during first DB2 restart</td>
<td>Default SAP settings for DB2</td>
<td></td>
</tr>
<tr>
<td>Automatic checkpoint interval</td>
<td></td>
<td></td>
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<tr>
<td>Automated installation, configuration &amp; activation of DB2 supplied stored procedures &amp; UDFs</td>
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<tr>
<td>Data set FlashCopy in COPY &amp; inline copy</td>
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<tr>
<td>Inline image copies for COPY YES indexes</td>
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<tr>
<td>UNLOAD from FlashCopy backup</td>
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<td>REORG enhancements</td>
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<tr>
<td>Reduce need for reorganizations for indices</td>
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<tr>
<td>Numerous optimizer enhancements, paging through result sets</td>
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<td>Parallel index update at insert</td>
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<td>Faster single row retrievals</td>
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<td>LOB streaming between DDF and rest of DB2</td>
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<td>Faster fetch and insert, lower virtual storage consumption</td>
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<tr>
<td>DEFINE NO for LOBs and XML</td>
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<td>MEMBER CLUSTER for UTS</td>
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<td>Query parallelism enhancements: lifting restrictions</td>
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<td>Dynamic Index ANDing Enhancements</td>
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<td>Option to avoid index entry creation for NULL value</td>
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<td>Index include columns</td>
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<td>Buffer pool enhancements</td>
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<td>Scalability</td>
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<td>Many more threads</td>
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<td>Reducing latch contention</td>
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<td>Workfile spanned records, PBG support, and in-memory enhancements</td>
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<td>Availability</td>
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Data versioning by date
pureXML enhancements
Large object improvements
- Allow non-NULL default values for inline LOBs
- Loading and unloading tables with LOBs
  - LOBs in input/output files with other non-LOB data
Improved portability and SQL consistency
- Currently committed locking semantics
- Implicit Casting of string and numeric data
- Timestamp with time zone
- Greater timestamp precision – seconds to picoseconds
- Moving Sum, Moving Average
SQL stored procedure enhancements
  - SQL PL in Scalar UDFs & XML support

64-bit ODBC – also DB2 9 PK83072

EXTENDED INDICATOR VARIABLES to indicate value not supplied or default

DRDA support of Unicode for system code points

CURRENT EXPLAIN MODE special register

Allow caching of dynamic SQL statements with literals

Static SQL cache
Temporal Data - Summary

- **Business Time** (Effective Dates, Valid Time)
  - Every row has a pair of time stamps set by Application
    - Start time: when the business deems the row valid
    - End Time: when the business deems row validity ends
  - Query over current, any prior, present or future period in business time
  - Useful for tracking of business events over time, app logic greatly simplified

- **System Time** (Assertion Dates, Knowledge Dates, Transaction Time)
  - Every row has another pair of time stamps set by DBMS
    - Start time: when the row was inserted in the DBMS
    - End Time: when the row was modified/deleted
    - Modified rows start time is the modification time
  - Query at current or any prior period in system time
  - Useful for auditing, compliance

- **Bi-temporal**
  - Inclusion of both System Time and Business Time in row
Current SQL Application

Current

Auditing SQL Application
Using “AS OF”

History

History

Transparent/automatic Access to satisfy ASOF Queries

Current and History

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pureXML improved performance & usability

- **XML schema validation** in the engine for improved usability and performance
  - XML Schema versioning using XML schema repository
  - Automatic schema validation using **XML Column Type Modifier**
- **Binary XML exchange** format improves performance
- **XML multi-versioning** for more robust XML queries
- Allow easy **update of XML document nodes**
- SQL Stored procedure, UDF, Trigger **enhanced support**
- **XML XPATH Date & Time Support**
- **CHECK DATA** utility checks XML
Questions?

Thank You
DB2 10 Sample Performance Improvements

- **DB2 10 CMx with REBIND**
  - Run time CPU reductions 5% - 10%
  - 1 MB page size 0% - 4% z10, z196
  - Page fix buffers 0% - 8% since V8
  - Release deallocate 0% - 15% short trans, batch
  - Virtual storage constraints 0% - 5% memory, latches
  - Data sharing fewer members 1% for each 2 members
  - Insert 0% - 40% high volume insert
  - Predicate evaluation 0% - 60% complex predicates
  - Increased use of zIIP 0% - 3% IO, RUNSTATS, parallelism
  - Utilities (from V8) 3% - 20%

- **DB2 10 NFM**
  - Improved dynamic SQL cache 0% - 20% literals
  - Access: hash, index include 0% - 5% access improved
Important features of information center

- Find helpful usage instructions in the “Information center home” section.
- Easily send feedback by clicking the **Feedback** link at the bottom of any topic.
- Conveniently download the PDF version of the information from the link at the bottom of any topic. (*Look for the PDF icon!*)
- Efficiently search for the information you need by using the search features.

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**DB2 10 for z/OS information**

Welcome to the DB2 10 for z/OS (DB2 for z/OS) information, where you can find topics that you need to use DB2 for z/OS. By using this information, you can install or migrate to Version 10 DB2 for z/OS, develop, and run application programs, and administer and operate DB2 databases and subsystems.

These topics can also be found in DB2 for z/OS PDF books. To see the correspondence between the PDF books and the information center topics and to download PDF books, view this table.

**Resources**

- **Getting started**
  - Planning for Version 10
  - DB2 for z/OS information roadmap
  - What’s new in the information center
- **News and events**
  - What’s new in DB2 for z/OS
  - DB2 for z/OS events
- **Programming with DB2**
  - DB2 application programming and SQL
  - Programming for Java
  - Programming for ODBC
  - Programming for XML with DB2
- **DB2 Information Management training**
  - DB2 for z/OS training
  - Professional certification

**Support and assistance**

- **General product information**
  - DB2 for z/OS home page
  - Terminology and citations
  - Accessibility for DB2
- **DB2 administration**
  - Administration
  - Data sharing
  - Managing performance
- **Communities**
  - DB2 for z/OS Exchange
  - DB2 developerWorks
  - DB2 for z/OS downloads
  - Information Management Business Partner Solutions
  - IBM Global Solutions directory
  - User groups
  - Support and assistance

**Using the information center**

- **Navigating**
- **Searching**
- **Setting bookmarks**
- **Printing topics**
- **Displaying information in your preferred language**
- **Accessibility**
1. DB2 10 Technical Overview SG24-7892  new
2. Extremely pureXML DB2 10 & 9 SG24-7915  new
3. DB2 10 Performance Topics  coming soon
4. DB2 9 Technical Overview  SG24-7330
5. DB2 9 Performance Topics  SG24-7473
6. DB2 9 Stored Procedures SG24-7604
7. Serialization and Concurrency SG24-4725-01
8. Distributed Functions SG24-6952
9. Utilities SG24-6289-01
10. DB2 and Storage Management, SG24-7823
11. Index Compression with DB2 9 for z/OS redp4345
12. SQL Reference for Cross-Platform Development
13. Enterprise Database Warehouse, SG24-7637
14. 50 TB Data Warehouse on System z, SG24-7674
15. LOBs with DB2 for z/OS SG24-7270
16. Deploying SOA Solutions SG24-7663
17. Enhancing SAP - DB2 9  SG24-7239
18. Best practices SAP BI - DB2 9 SG24-6489-01
19. Data Sharing in a Nutshell, SG24-7322
20. Securing DB2 & MLS z/OS SG24-6480-01
21. Data Sharing: Dist Load Balancing & config. redp4449
22. Packages Revisited, SG24-7688
23. Ready to Access Solid-State Drives redp4537
24. Buffer Pool Monitoring & Tuning redp4604
25. Securing & Auditing Data SG24-7720
More information and resources

- DB2 main web page
  http://www.ibm.com/software/data/db2/zos/
- DB2 10 web page
  http://www.ibm.com/software/data/db2/zos/db2-10/
- DB2 books, Information Center
  http://www.ibm.com/support/docview.wss?rs=64&uid=swg27011656
  http://publib.boulder.ibm.com/infocenter/imzic
- DB2 best practices web page
  https://www.ibm.com/developerworks/data/bestpractices/db2zos/
- DB2 for z/OS IBM Redbooks publications
  http://www.redbooks.ibm.com/cgi-bin/searchsite.cgi?query=db2&SearchOrder=4&SearchFuzzy=
- DB2 presentations
DB2 10 Resources and Contacts

- **Website** [http://www.ibm.com/software/data/db2/zos/db2-10/](http://www.ibm.com/software/data/db2/zos/db2-10/)
  - Case Studies, Customer statements
  - Demos: DB2 10 for z/OS, QMF 10
  - Brochures: DB2 10 for z/OS Highlights, QMF 10 What’s New

- **Presentations**

- **Books**

- **Whitepapers**
  - zJournal article by Willy Favero [http://www.mainframezone.com/z-journal](http://www.mainframezone.com/z-journal)
(cont) DB2 10 Resources and Contacts

SAP Whitepapers  DB2 10 for z/OS is certified for SAP NetWeaver 7.30 and SAP R/3 4.6

- SAP article on DB2 10 *(published by SAP)* [http://www.sdn.sap.com/irj/sdn/db2](http://www.sdn.sap.com/irj/sdn/db2)
- SAP Best Practice Guide for Migrating to DB2 10 for z/OS *(published by SAP)* [https://websmp207.sap-ag.de/~sapidb/011000358700001414122010E](https://websmp207.sap-ag.de/~sapidb/011000358700001414122010E)