



# DB2 10 for z/OS Technical Overview

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*DB2 for z/OS Development*

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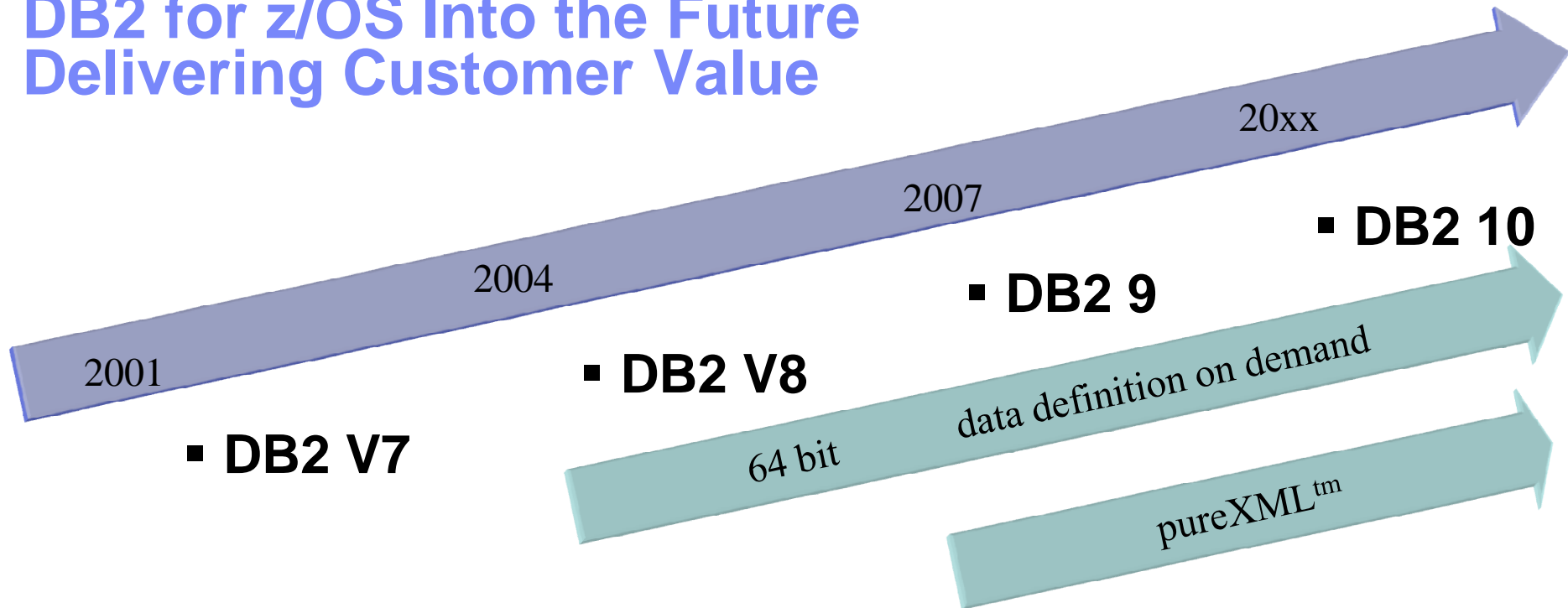


## Business Value Pain Points

- **I am under constant cost pressures**
  - Performance improvements in key workloads: transactions, batch, ...
  - Synergy with System z to help reduce costs
  
- **I need DB2 to be able to scale with my business**
  - Many more concurrent users, simpler growth
  - Reduce DBA workload, eliminate time-consuming tasks
  
- **I need to improve the resilience of my data**
  - More online, more secure
  - Easier privileges with finer granularity authority
  - Ability to have administrators without data access, better auditing



# DB2 for z/OS Into the Future Delivering Customer Value



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



## DB2 for z/OS Technical Strategy

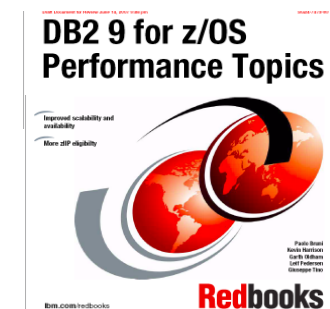
- **RAS (reliability, availability, serviceability), scalability and performance.**
  - Extend the lead in this technology
  - Parallel Sysplex: the best scale-out solution in the industry
  - Tight integration between DB2 and the System z hardware and z/OS operating system
  - Advanced solutions for compliance with data security and privacy regulations
  - Workload consolidation: System z is the ultimate consolidation platform
  - Eliminate all causes of outages
  - Storage and CPU optimization, including specialty engines
  
- **Application enablement**
  - Apps can easily connect to DB2 from anywhere
  - Application portability and DB2 family compatibility
  - Advanced SQL, XML capability.
  - Advanced data warehousing and analytics capabilities
  
- **User Productivity**
  - DB technology that can handle larger workloads without requiring more people
  - Easy to use interfaces that are clear and intuitive
  - Advanced autonomies to make the system more self-managing and self-tuning



## DB2 Deep Synergy With System z

### ➤ Key integration points include:

- Data sharing (availability and scale out)
- zIIP and other specialty engines
- Unicode conversion
- Encrypted communication & data
- Hardware data compression & encryption
- Cross-memory, memory protection keys
- Sorting
- Multi-core, large N-way
- 64-bit addressing and large memory
- z/OS Workload Manager
- z/OS Security Server (RACF)
- z/OS RRS integrated commit coordinator
- System z10 1 MB page size, decimal float
- Solid state disks
- zEnterprise ...





## System zEnterprise Benefits for DB2

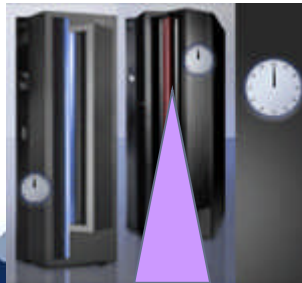
### *Taking System z to the next level*

- 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 cost reduction and scalability increase
  - CPU reductions
  - Remove key single system scaling inhibitors: virtual storage, latching
  - Translation Lookaside Buffer changes expected to improve performance for 1MB page sizes
  - Buffer pool management





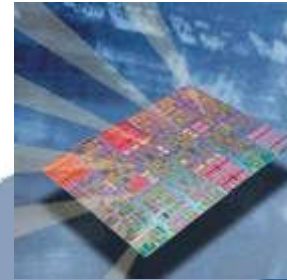
# Mainframe Innovation: Specialty Engines



Internal Coupling Facility (ICF) 1997



Integrated Facility for Linux® (IFL) 2000



System z Application Assist Processor (zAAP) 2004



IBM System z Integrated Information Processor and (2006)

## Eligible for zAAP:

- Java execution environment
- z/OS XML System Services

## Eligible for zIIP:

- DB2 remote access, XML, parallel query, utilities (index & sort)
- ISVs
- IPsec encryption
- XML System Services
- Global Mirror (XRC)
- HyperSockets for large messages (e.g. DRDA)
- IBM GBS Scalable Architecture for Financial Reporting
- z/OS CIM Server
- zAAP on zIIP

\* Statements represent the current intention of IBM. IBM development plans are subject to change or withdrawal without further notice.





## DB2 & IBM zIIP Add Value to Database Work

Portions of the following DB2 for z/OS V8, DB2 9 and 10 workloads may benefit from zIIP (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 via DRDA to fully utilize zIIP
- Increased portion of DRDA redirected to zIIPs to 60%

Improved performance via reduced processor switching

### 2 - Requests that use parallel queries

DB2 9 higher percentage of parallel queries zIIP eligible

DB2 10 still more queries eligible for parallelism

### 3 - DB2 Utilities LOAD, REORG & REBUILD

- DB2 utility functions used to maintain index structure and sort
- DB2 10 RUNSTATS

### 4 - DB2 10 Buffer Pool Prefetch



# IBM Smart Analytics Optimizer

## What is it?

- A special purpose, network-attached appliance that is an add-on to a DB2 for z/OS system
- Offloads typical DW/BI queries resulting in predictable and orders-of-magnitude faster query response times while reducing overall TCO

## Business Value

- Dramatically lowers the cost for query and reporting on System z
- Advanced in-memory scale-out cluster technologies that keep the complete system centrally managed without having to change any requirements for BI applications
- Complements the many new Data Warehousing features in DB2 9 for z/OS
- Leverages the many new warehousing and business intelligence solutions now available on System z

## Targeted Uses for DB2 for z/OS customers:

- Requirements to accelerate a subset of their warehouse or reporting queries
- Looking for more insight and business intelligence from operational data
- Needs to consolidate datamarts or data stores into one enterprise warehouse





# The most robust and cost effective data server

## DB2

## DB2 9

## DB2 10



- Deep synergy with System z
- HW Compression
- Mixed workloads at high utilization

- 20%-30% Utility CPU savings
- Compress indexes, save 50% disk
- More CPU on specialty engines

- Save up to 20% CPU batch & transactions
- Query performance
- Hashed data access
- Skip-level migration



- Unmatched availability
- Unparalleled security
- Industry leading reliability

- Flexible context and role security
- Expanded online schema changes
- Volume level backup & recovery improvements

- 10x more concurrent users
- More online schema changes
- More granular access control
- Access path stability



- Near-linear scalability
- Flexible development
- Warehousing capabilities

- Seamless integration of XML and relational
- Improved SQL
- Partition by growth
- OLAP expressions

- Temporal data
- More SQL features
- Improved pureXML and SQL PL

**DB2 10 Beta Started:  
March 12, 2010**



# DB2 10 for z/OS At a Glance

## Addressing Corporate Data Goals

### RAS, Performance, Scalability, Security

- Wide range of performance improvements
- More online schema changes
- Catalog restructure for improved concurrency
- Fine grained access control
- Hash access to data
- New DBA privileges with finer granularity
- Query parallelism advancements

### Simplification, Reduced TCO

- Full 64-bit SQL runtime
- Auto stats
- Data compression on the fly
- Query stability and management enhancements
- Reduced need for REORG
- Utilities enhancements
- More granular DDF thread management
- Statement level diagnostics

### Application Enablement

- pureXML enhancements
- SQLPL enhancements
- Temporal data
- Last Committed reads
- Timestamp with timezone
- Many new SQL features
- Moving sum, moving average



## DB2 10: Savings Out-of-the-Box

### Up to 20% CPU reductions for transactions, queries, and batch

- Out-of-the-box CPU reductions of 5-10% for traditional workloads
- Out-of-the-box CPU reductions of up to 20% for new workloads
- Up to additional 10% CPU savings using new functions



### Scales with less complexity and cost

- 5-10x more concurrent users – up to 20,000 per subsystem
- Significant scale-up capabilities in addition to existing scale-out support
- Consolidate to fewer LPARs and subsystems

### Improved operational efficiencies and lower administration cost

- Automatic diagnostics, tuning, and compression

### Even better performance

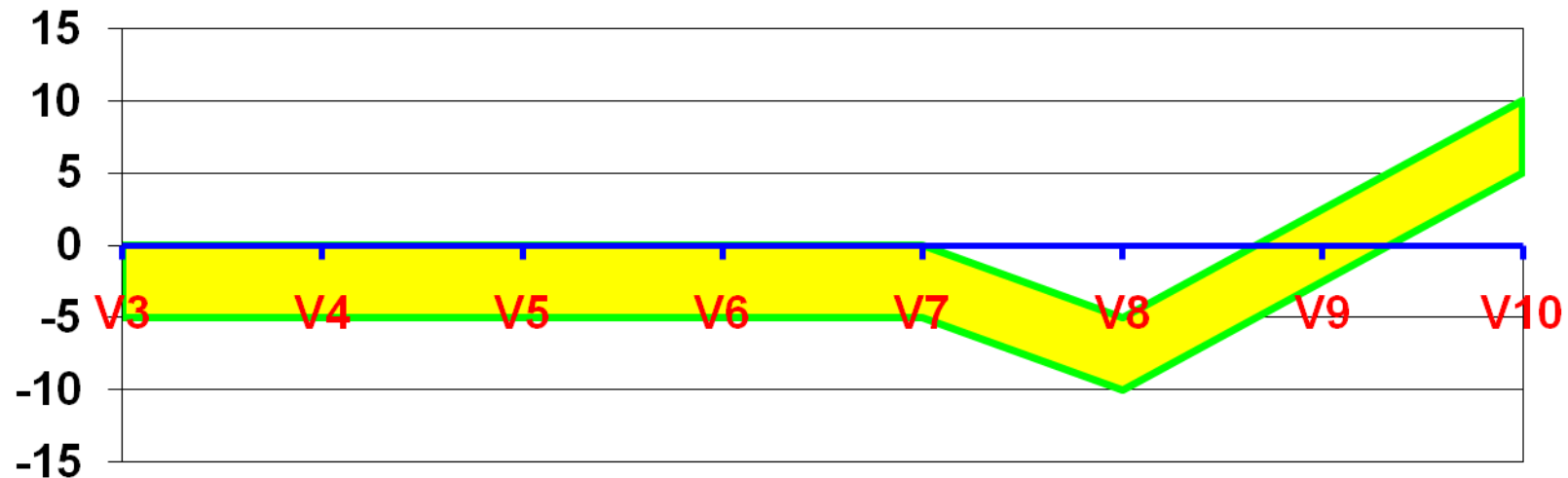
- Elapsed time improvement for small LOBS and Complex Queries



## DB2 10 Performance Objectives

- Historical goal under 5% performance regression
- DB2 10 Goal: 5% -10% initial performance improvement
- Many customers reduce CPU time 10% - 20%

Average %CPU improvements  
version to version





## Performance Enhancements w/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**
  - **RELEASE(DEALLOCATE)** can be more aggressively used with V10 vstor relief
    - IBM measurements show up to 10-20% CPU savings
  - **DDF enforcement of RELEASE(COMMIT)** is removed
    - **KEEPDYNAMIC=YES** will not get benefit from this enhancement
- **DB2 9 utility enhancements in CM8**
- **Parallel index update at insert**
- **Workfile in-memory enhancements**
- **Index list prefetch**
- **Solid State Disk use**
- **Buffer pool enhancements**
  - Utilize z10 1MB page size
  - “Fully in memory” option (**ALTER BUFFERPOOL**)



## Parallel Index Update for INSERT

- **Beta Customer Test Results for 2M+ INSERTs into table with 9 indexes**
  - All jobs in DB2 10 CM9 have less CPU and less ELAPSED Time!
    - Would expect same results for CM8
  - The CPU improvement is between 15-30 percent
  - The Elapsed Time improvement is between 30-43 percent.
  - Depending on the size of the Bufferpool
    - Larger savings observed with smaller BPs
  - Some increase in DBM1 SRB time, but this is zIIP eligible





## Performance Enhancements requiring REBIND (CM)

- **Most access path enhancements**
- **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
- **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
- **REBIND enables further SQL runtime improvements**
- **If migrate from V8, get new RUNSTATS before mass rebind**



## Performance Enhancements requiring NFM

- **Efficient caching of dynamic SQL statements with literals**
- **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, PBG**
- **Insert improvement for UTS**
- **Local JDBC (Type 2) and ODBC application performance**
  - Limited block fetch, LOB progressive streaming, progressive CLOSE now available for JCC Type2 and ODBC z/OS drivers
- **Solid State Disk monitoring and exploitation**

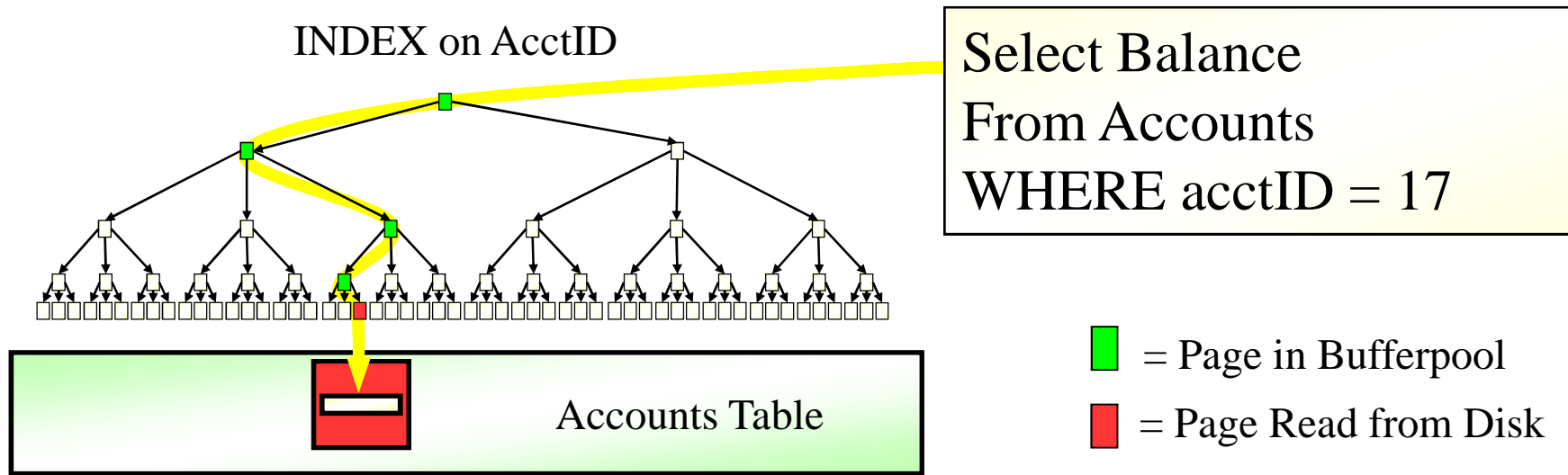


## Performance Enhancements requiring NFM + DBA work

- **Hash access path**                    **Alter + Reorg + rebind to activate**
- **Index include columns**   **Alter + Rebuild + rebind to activate**
- **Inline LOBs**                        **Alter (need UTS and RRF)**
  - Index on expression now possible for LOB columns
  - Important for spatial performance
  - LOAD/UNLOAD performance improvements
  - LOB compression for inline portion
- **MEMBER CLUSTER for UTS**
- **DEFINE NO for LOB and XML columns**



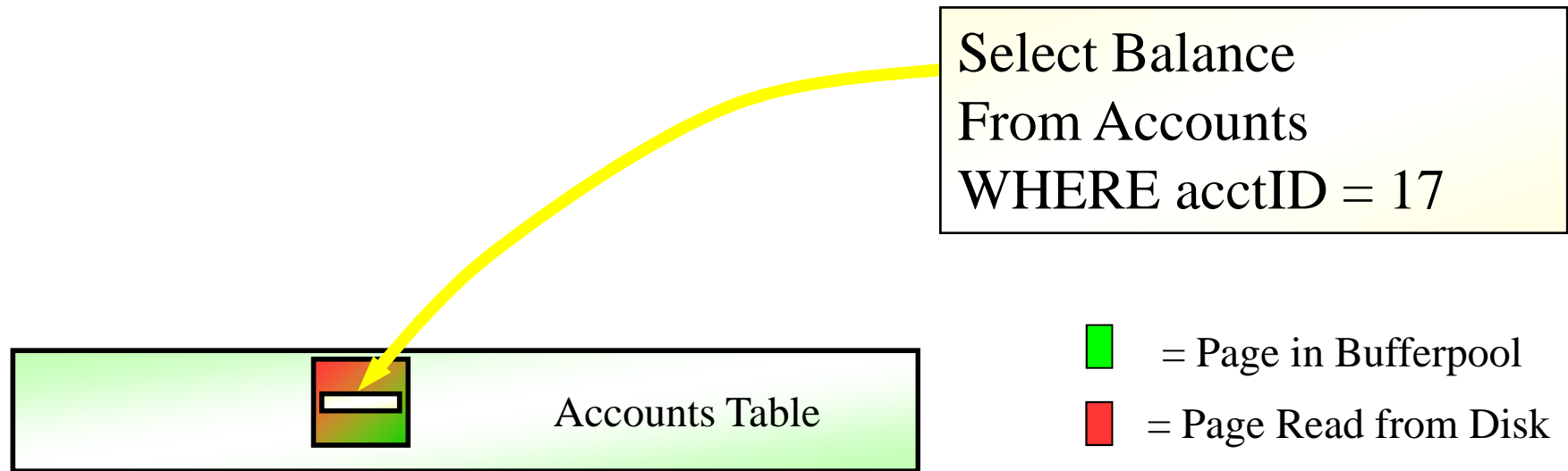
# Index to Data Access Path



- **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



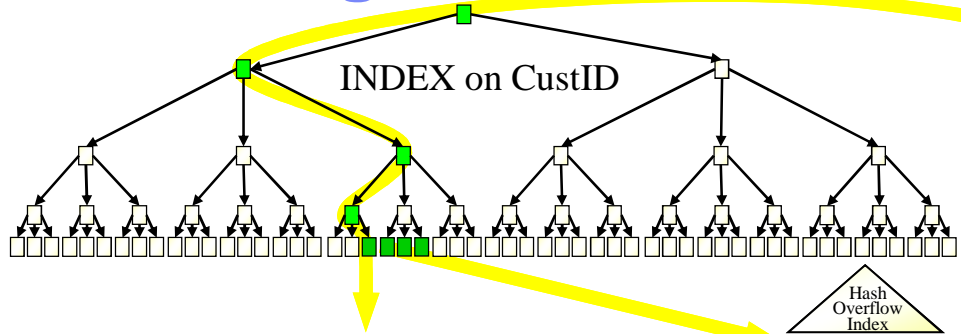
## Hash Access



- **Hash Access provides the ability to directly locate a row in a table without having to use 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**



# Queries against Hashed Tables



Index Lookup/Scan

Select Balance  
 From Accounts  
 WHERE CustID = 1717

Hash Access

Select Balance  
 From Accounts  
 WHERE AcctID = 17

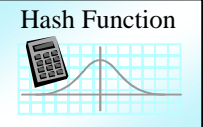


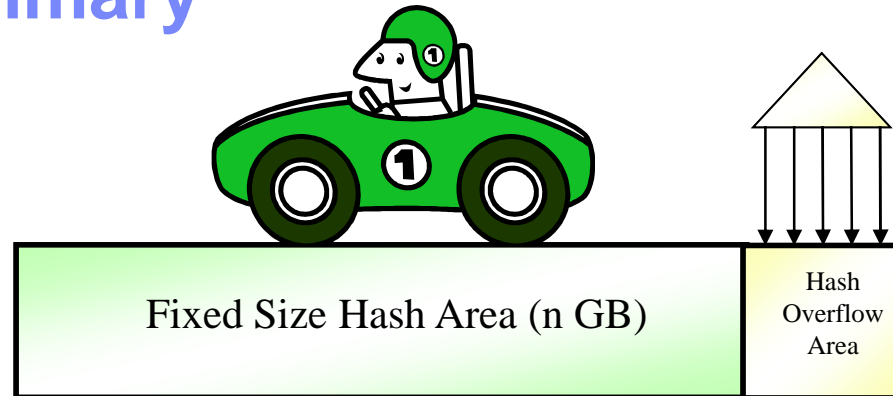
Table Space Scan

Select CustID  
 From Accounts  
 WHERE Balance > 100000

- **Hash Access Path**
  - Great for Equality and IN predicates
  - **Can't do range scans**
- **Secondary indexes can be defined for Range Scans**
- **Table Space Scans still supported**
- **Hash Access can be used to enforce Primary Key and Unique constraints**



## Hashing Summary



- **Provides fast, direct location of most rows**
  - Reduces I/O and CPU in most cases
  - Can replace an existing Primary or Unique Key Index
    - Faster Insertion/Deletion
- **Size of Fixed Size Hash Area is important**
  - Too small and performance degrades
  - Too large and space is wasted
- **DB2 helps you manage the size**
  - REORG AUTOESTSPACE YES
  - RTS tracks the number of overflowed entries

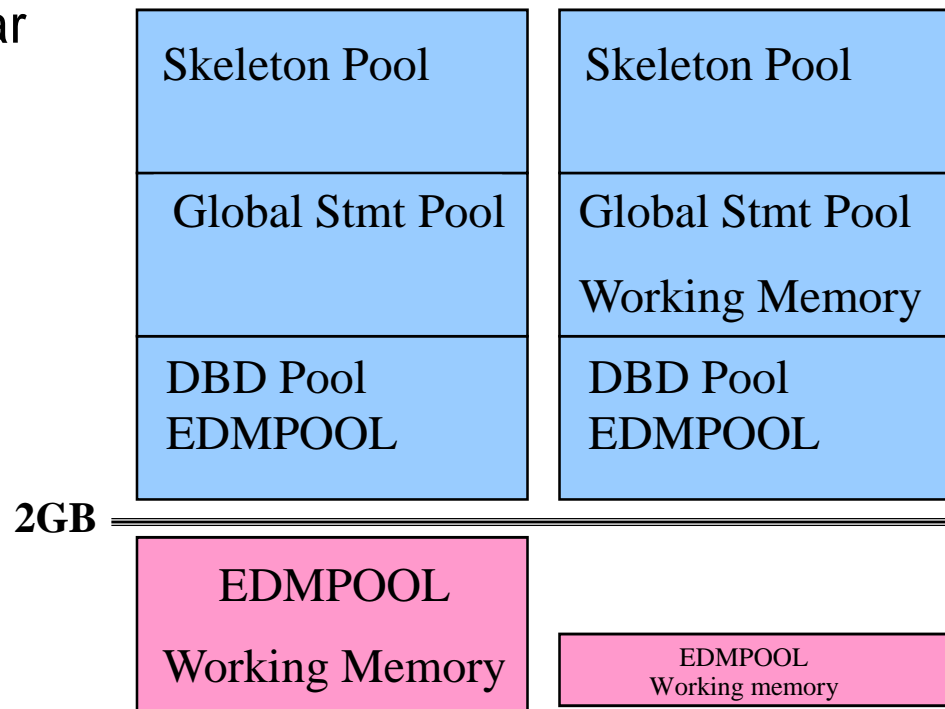


# DB2 10: 64 bit Evolution Virtual Storage Relief

**Scalability:** *Virtual storage constraint is still an important issue for many DB2 customers, until DB2 10*

**DB2 10: 5 to 10 times more threads, up to 20,000**

- Move 80% - 90% above bar
- More concurrent work
- Reduce need to monitor
- Able to consolidate LPARs
- Reduced cost
- Easier to manage
- Easier to grow



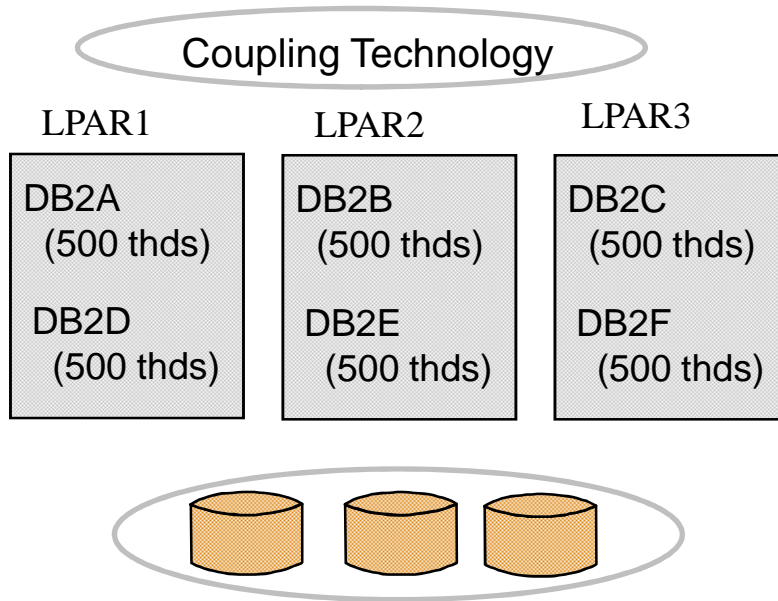
**REBIND is needed for much of the savings.**





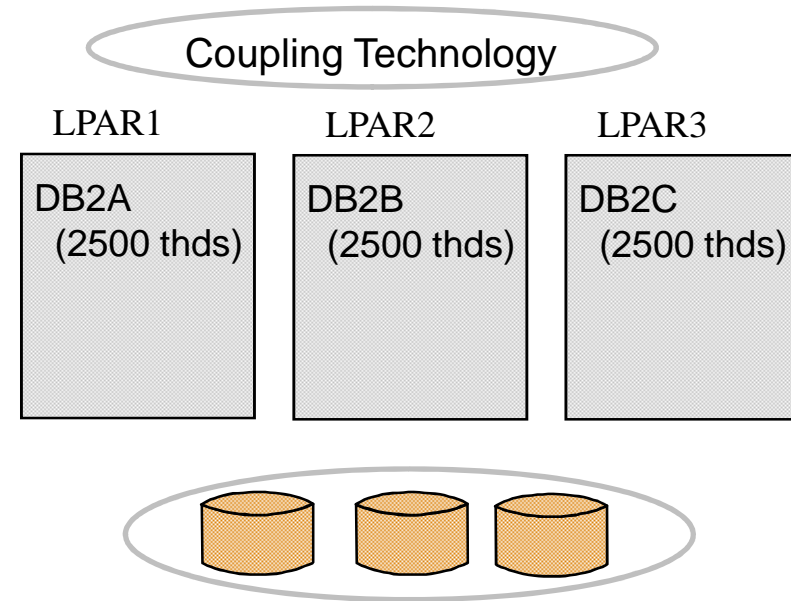
# Running a Large Number of Threads

Today



- Data sharing and sysplex allows for efficient scale-out of DB2 images
- Sometimes multiple DB2s / LPAR

DB2 10



- Easier growth, lower costs, easier management
- More threads per DB2 image
- More efficient use of large n-ways
- Potential for fewer members / LPARs
- Rule of thumb: save ½% CPU for each member reduced, more on memory
- Data sharing and Parallel Sysplex still required for very high availability and scale



## DB2 10: Other System Scaling Improvements

- **Other bottlenecks can emerge in extremely heavy workloads**
  - Several improvements planned to reduce latching and other system serialization contention
  - New option to for readers to avoid waiting for inserters
  - Eliminate UTSERIAL lock contention for utilities
  - Use 64-bit common storage to avoid ECSA constraints
- **Concurrent DDL/BIND/Prepare processes can contend with one another**
  - Restructure parts of DB2 catalog to avoid the contention
- **SPT01 64GB limit can be a constraint, especially if package stability is enabled**
  - Allow many more packages by using LOBs
- **Improved accounting rollup, compress SMF option**
  - Reduced SMF data volume

- 26 ■ **Lower overhead for very large buffer pools**



## DB2 10: Catalog and Directory Improvements

- **Remove links and enable row level locking on key catalog tables**
  - Improved concurrency for BIND, PREPARE, and DDL
  - DSN1CHKR no longer needed in DB2 10 NFM
- **Move long strings such as SQL statements and package binaries to LOBs**
  - Removes max size constraint for SPT01 and others
  - Easier to query SQL statements from catalog
- **Online REORG for all catalog and directory table spaces**
- **Allow SELECT from SYSLGRNX**
- **Easier management: DB2 managed and SMS controlled**



## DB2 10: Data Sharing Improvements

- **ACCESS DATABASE command wildcarding support - V9 PK80925**
- **Sub-group attach (V9 usermod)**
- **BP scan avoidance**
- **Delete data sharing member**
  - Offline utility for “deactivate”, “reactivate”, “destroy”
- **MEMBER CLUSTER support for UTS**
- **DDF Restart Light enhancements: Handle DDF in-doubt URs**
- **Online DDF changes**
- **Auto rebuild CF lock structure on long IRLM waits during restart**
  - Can avoid group-wide shutdowns
- **LRSN spin avoidance for inserts to the same page (e.g. Multi Row Insert)**
- **IFCID 359 for index split**
- **New zparm to force deletion of CF structures on group start (e.g. DR testing)**

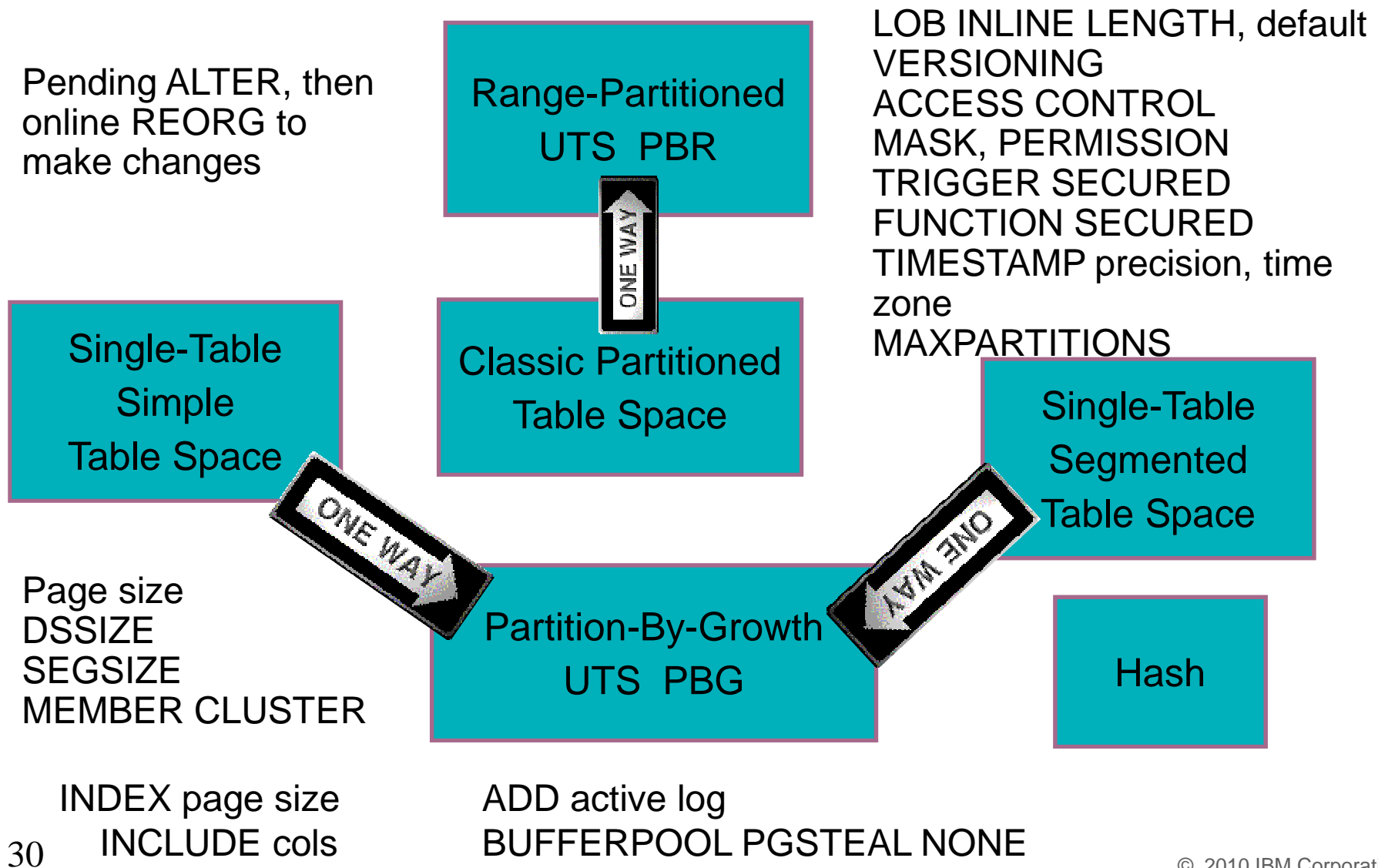


## DB2 10: Availability – Online Schema Changes

- **Online schema changes for table spaces, tables and indexes**
  - **PENDING with ALTER and Online REORG instead of DROP/CREATE or REBUILD INDEX**
    - Page size for table spaces and indexes
    - DSSIZE for table spaces
    - SEGSIZE
    - Convert single table segmented into UTS PBG
    - Convert single table simple into UTS PBG
    - Convert classic partitioned table space into UTS PBR
    - Convert UTS PBR to UTS PBG
    - Convert PBG to hash (immediate, but RBDP index)
    - MEMBER CLUSTER
    - Ability to drop pending changes



# Availability – More Online Schema Changes...





## Other Availability Improvements

- **Access currently committed data**
- **Change DDF location alias names online**
  - New MODIFY DDF ALIAS command
- **Online DDF CDB changes**
  - LOCATIONS, IPNAMES, IPLIST
- **Online add active log**



## DB2 10: Utilities Enhancements – Online REORG

- REORG SHRLEVEL(CHANGE) for LOBs
  
- Online REORG enhancements
  - SHRLEVEL(CHANGE) support for all catalog/directory objects
  - Option to cancel blocking threads
  - Improved availability
    - Update stats after de-drain in UTILTERM phase
  
  - Allow disjoint partition ranges
  - Permit movement of rows between partitions when LOB columns exist
    - Allows REBALANCE and ALTER LIMITKEY even when LOB columns exist
    - Allows DISCARD to delete associated LOB values
  
  - Messages to estimate length of REORG phases and time to completion





## DB2 10: More Utility Improvements

- Support of spanned records for UNLOAD of LOB data
- Autonomic RUNSTATS & table profile
- Improved COPY CHANGELIMIT performance
  - Use RTS instead of SM page scans
- Data set level FlashCopy option
- FlashCopy backups with consistency and no application outage
- FlashCopy backups as input to:
  - RECOVER (fast restore phase)
  - COPYTOCOPY, DSN1COPY
- RECOVER “back to” log point
- REPORT RECOVERY support for system level backups



## DB2 10: Productivity – Doing More With Less!

- **Auto statistics collection**
- **Easier scaling, simpler memory management**
- **Reduce contention, more online processing**
- **Access path stability**
- **Reduced need for REORG**
  - Build compression dictionary on the fly
  - Index list prefetch enhancements
- **Configure IBM UDFs and stored procedures**
- **Allow one SDSNEXIT data set for many subsystems**
- **Monitoring enhanced**
  - Timeout / deadlock diagnostics
  - Identify SQL statements

Name	Monitoring Status	Data Server Status	Critical	Warning	CPU Usage	Disk Space	Memory Usage	Locking	SQL Performance	Connections	Transactions	Logging	Maintenance
Production	3	8											
Web	1	1											
eCommerce	0	0											
Support	1	1											
Retail	0	0											
New York	0	0											
Los Angeles	0	0											
Accounts	2	3											
Marketing	0	4											
Test	0	0											
Development	0	0											

Manual invocation of

- RUNSTATS
- COPY/BACKUP SYSTEM
- QUIESCE
- MODIFY RECOVERY
- REORG



## DB2 10: Autonomics and DBA Productivity...

- **Checkpoint intervals based on both time and # log records**
- **Run 'must complete' backout under pre-emptable SRB**
- **Identify unused packages**
- **SQL Statement level monitoring**
  - Statement ID introduced
  - Trace records & messages extended to include statement ID
  - New trace class for statement detail
    - GetPages, Locks, I/Os, cpu/elapsed time, etc. at statement level
    - Available via IFI for online monitors or via SMF/GTF
- **Exploit z/OS 1.10 WLM service to temporarily boost priority of blocking lock holders**
  - Complements V9 health monitor task which handles latches
- **Manage max threads, connections, idle thread timeout on an application basis**
  - Warning or exceptions issued when threshold is hit
  - Profiles can be set based on userids, packages, IP addresses, member names, ...



## DB2 10: Optimization Stability and Control

**Provide unprecedented level of stability for query performance by stabilizing access paths for**

- Static SQL - Relief from REBIND regressions
- Dynamic SQL
  - Remove the unpredictability of PREPARE
  - Extend Static SQL benefits to Dynamic SQL

### **Support:**

- Versioning
  - “Fallback”
  - “Lockdown”
  - Manual overrides. Hints: easily influence access paths without changing apps
  - Per-statement BIND options
- 
- **Safe query optimization: assess “reliability” of access path choices**
  - **Adaptive algorithms, e.g. RID pool overflow to workfiles**



## DB2 10: Business Security and 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
- Audit privileged users
- Row and column access control
  - Allow masking of value
  - Restrict user access to individual cells



Use disk encryption



## DB2 10: Security Benefits

- More flexible authorization
  - Separation of duties
  - Do job without access to data
  - Policies for audit
  - Simpler control
  - Tighter security
  - Avoid cascade delete
  - Avoid views and application security logic
  - Allow more tools
  - Evolve security policies
  - Easier to manage security policy
- Improved productivity & tighter security



Use disk encryption



## DB2 10: New Application Features

- **Data versioning, temporal data**
- **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
- **Currently committed locking semantics**
- **Implicit casting or loose typing**
- **Timestamp with timezone**
- **Greater timestamp precision – to picoseconds**
- **Moving Sum, Moving Average**



## Versioned Data or Temporal Data

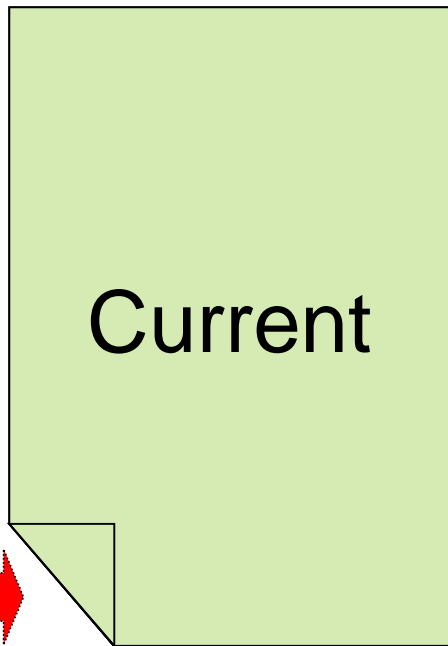
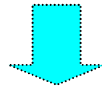
- **Table-level specification to control data management based upon time**
- **Two notions of time:**
  - System time: notes the occurrence of a data base change
    - “row xyz was deleted at 10:05 pm”
    - Query at current or any prior period of time
    - Useful for auditing, compliance
  - Business time: notes the occurrence of a business event
    - “customer xyz’s service contract was modified on March 23”
    - Query at current or any prior/future period of time
    - Useful for tracking of business events over time, application logic greatly simplified
- **New syntax in FROM clause to specify a time criteria for selecting historical data**





# Current and History

Current SQL Application



Auditing SQL Application  
Using ASOF

History  
Generation



Transparent/automatic  
Access to satisfy ASOF  
Queries





## Temporal UPDATE example (business time)

Simple table definition (Policy#, start, end, coverage)

Table has 1 row of (123,'01/01/2001', '12/31/2001', 1000)

```
UPDATE policy p
  FOR BUSINESS_TIME FROM DATE('03/01/2001') TO DATE('03/31/2001')
  SET coverage = 2000;
```

Result of the update statement is 3 rows:

```
(123,'01/01/2001','03/01/2001',1000)
(123,'03/01/2001','03/31/2001',2000)
(123,'03/31/2001','12/31/2001',1000)
```



## DB2 10: More New Application Features

- **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**
- **Data-dependent paging**
  - When only a specific part of the result set is needed
  - Efficient access to desired portions of result set, based upon current position



## DB2 10: Query Enhancements

- **CPU time reductions for queries, batch, & transactions**
- **SQL enhancements: Moving Sum, Moving Average, temporal, timestamp, implicit cast, SQL PL, ...**
- **pureXML improvements**
- **Access improvements: Index include columns, hash, index list prefetch, workfile spanned records, ...**
- **Optimization techniques**
  - Remove parallelism restrictions and more even parallel distribution
    - increased zIIP use
  - In-memory techniques for faster query performance
  - Access path stability and control
- **Analysis: instrumentation, Data Studio & Optim Query Tuner**
- **Advanced query acceleration techniques**
  - IBM Smart Analytics Optimizer



## pureXML Performance and Usability Improvements

- XML schema validation in the engine for improved usability and performance
- Binary XML exchange format improves performance
- XML multi-versioning for more robust XML queries
- Allow easy update of sub-parts of XML document
- Stored proc, UDF, Trigger enhanced support
- XML index matching with date/timestamp
- CHECK utility checks XML



# *DB2 10 for z/OS Migration paths available*





## DB2 10 for z/OS: Skip-Level Migration

You may move from V8 to DB2 10,  
**but** just because you can, doesn't mean you always should...

Key considerations:

- Risk/reward analysis

- What's the 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?
- Am I missing out on DB2 9 value in the meantime?

- Migration cost savings is not 2x versus two migrations

- Migration considerations for two releases still apply
- Larger migration project, longer migration timeline
- Applications and ISVs may not be ready

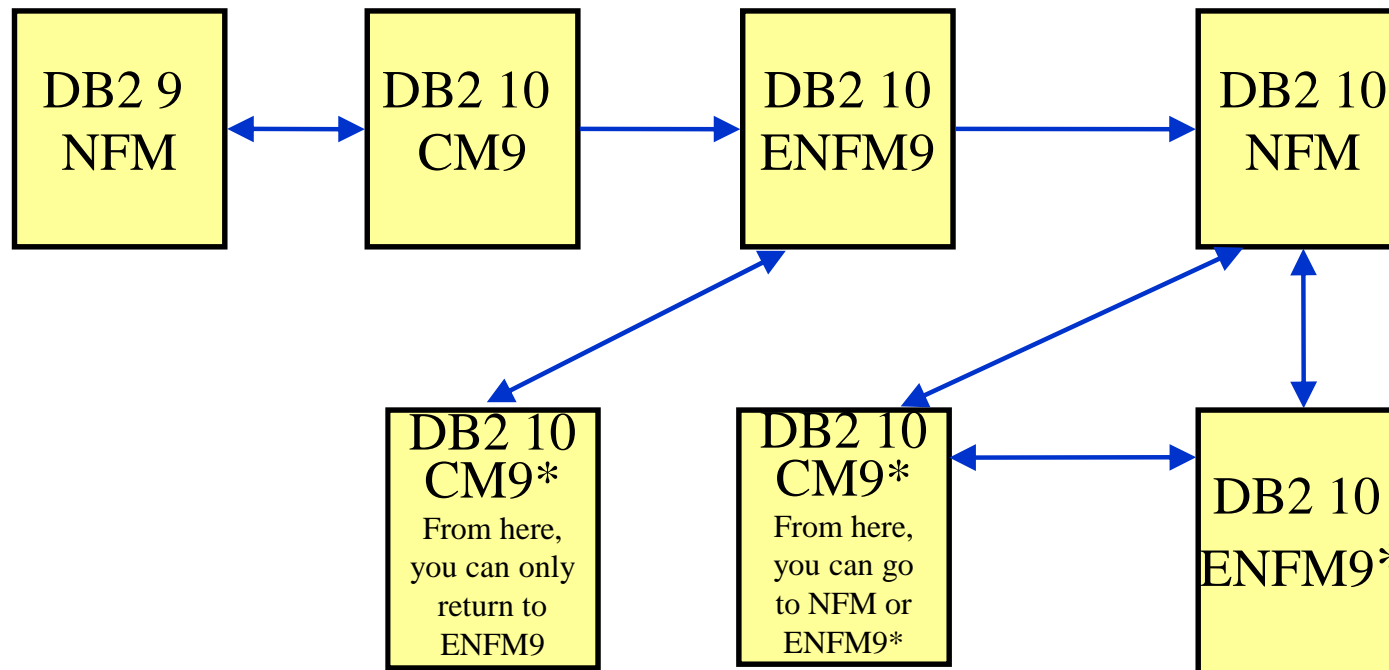


Data sharing mixed release coexistence fully supported  
V8/10 or V9/10



## Migration and Fallback Paths when migrating (V9 ==> V10)

- With DB2 10, you can always drop back to the previous stage
- Cannot fallback to DB2 9 after entry to DB2 10 (ENFM9), but can return to DB2 10 (CM9\*)

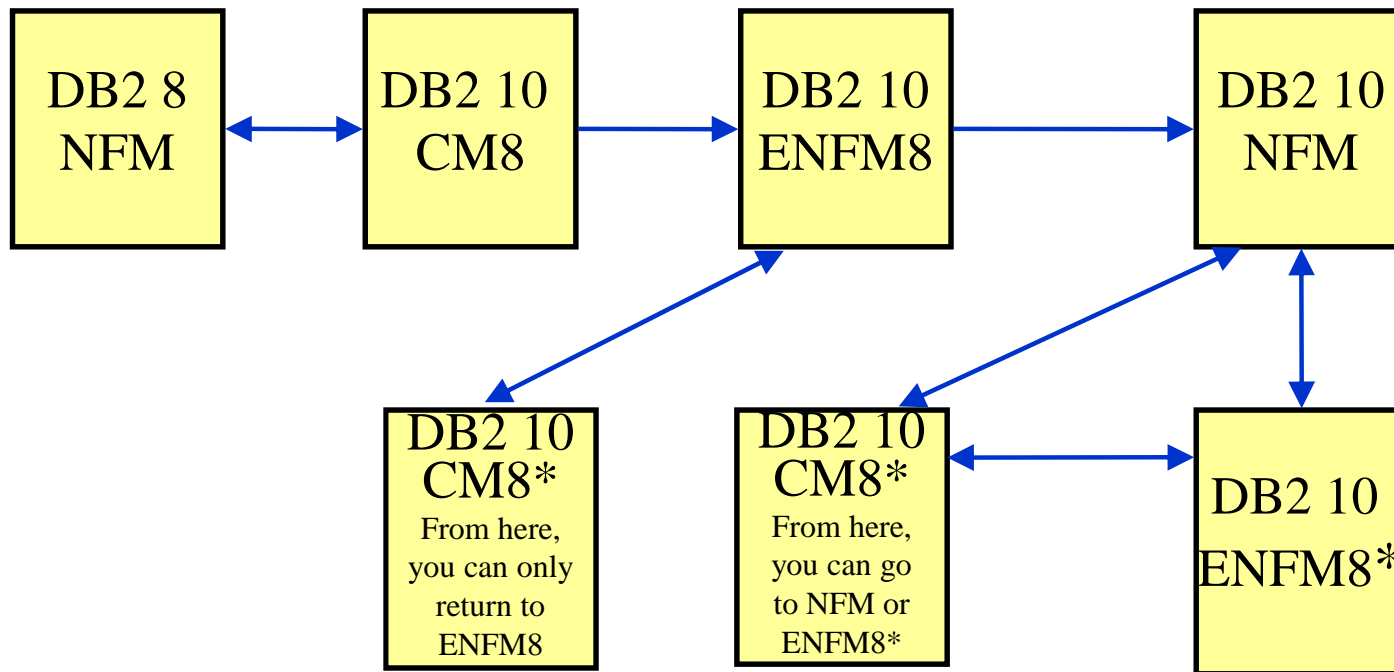






## Migration and Fallback Paths when migrating (V8 ==> V10)

- With DB2 10, you can always drop back to the previous stage
- Cannot fallback to DB2 V8 after entry to DB2 10 (ENFM8), but can return to DB2 10 (CM8\*)





## Things to be considered when “skipping” past V9?

- **DB2 9 for z/OS education**
  - Migration Planning workshop materials
  - Redbooks
  - Transition class
- **Check for DB2 9 release incompatibilities**
- **Familiarity with the new modes**
  - CM\*, ENFM\* introduced in V9
- **Deprecated items**
- **Performance benefits**
- **Storage changes**
- **Utilities updates**
- **Key enhancements e.g. pureXML**





## Migration considerations to **REMEMBER**

- A V8 system started migration to V10, can only fallback to V8.
- A V8 system started the migration to V10, then performed fallback to V8, can not then migrate to V9.
- A V8 system migrating to V10, can not use V9 new functions until V10 NFM is reached.
- A data sharing group that started migrating from V8 to V10 can not have any V9 members.
- A V9 system that has started the migration to V10 can only fallback to V9.
- A data sharing group that started migration from V9 NFM to V10 can not have any V8 members.



# *DB2 10 for z/OS*

## *Hardware & Software Prerequisites*



## Prerequisites – Hardware & Operating System

- **Processor requirements:**

- zEnterprise, z10, z9, z990 and z890 processors supporting z/Architecture
  - **z800 or z900 processors NOT supported**
- DB2 10 for z/OS will probably require increased real storage for a workload compared to DB2 9 for z/OS

- **Software Requirements:**

- z/OS V1.10 Base Services (5694-A01) at minimum
- DFSMS V1 R10 – DB2 Catalog now SMS managed
- Language Environment Base Services
- z/OS Version 1 Release 10 Security Server (RACF)
- IRLM Version 2 Release 3 (Shipped with DB2 10 for z/OS)
- z/OS Unicode Services and appropriate conversion definitions are required.





# *DB2 10 for z/OS*

## *Pre-migration planning*



## Important preparation

- **PDSE requirement**

```
Enter "/" to select action
```

	Dsorg	Recfm	Lrecl	Blksz
SYS2.DB2.V10.SDSNLINK	PO	U	0	32760
SYS2.DB2.V10.SDSNLOAD	PO-E	U	0	32760
SYS2.DB2.V10.SDSNLOD2	PO-E	U	0	32760
SYS2.DB2.V10.SDSNMACS	PO	FB	80	3120

- **Migrate only from a system with an expanded BSDS (DSNJCNVB)**
- **and packages V5 or before → REBIND**
- **Old plans Plans containing DBRMs → packages (PK62876 (V9), PK85833 (V9), PK79925 (V8), PM01821 (All))**
- **ACQUIRE(ALLOCATE) → ACQUIRE(USE)**
- **Old Plan table formats → DB2 V8 or 9 format (59 columns)**



## Items deprecated in earlier versions – NOW eliminated

- Private protocol → DRDA (new help in DSNTDP2DP, PK64045)
- XML Extender → XML type
- DB2 MQ XML UDFs and stored procedures → XML functions
- DB2 Management Clients feature → IBM Data Studio application & administration services
- BookManager use for DB2 publications → Info Center, pdf
- The DB2 Customization Center, DB2's plugin for the z/OS msys for setup installation initiative, is discontinued in DB2 Version 10 → install panels





## Requirements for Dependent Functions

- **System level Point-in-Time (PIT) Backup and Recovery**
  - DFSMShsm, DFSMSdss
  - FlashCopy Version 1
  - FlashCopy Version 2 (required for object-level recovery from system-level backup and FlashCopy backups)
  - Remove restriction for object recovery from a System-Level Backup requires z/OS Version 1 Release 11
- **Extended Address Volumes (EAV)**
  - Large sequential datasets require z/OS Version 1 Release 11
- **Encryption and decryption**
  - Built-in functions require z/OS Integrated Cryptographic Service Facility (ICSF).
  - **DRDA Data Stream Encryption** can optionally use ICSF.
- **Group Bufferpool (GBP) Batching**
  - See the latest Coupling Facility (CF) level recommended for your processor at: <http://www.ibm.com/systems/z/advantages/ps0/cftable.html>



## Overview of the information center (IC)

- **BookManager format is not supported for the DB2 V10 for z/OS library.**
  - We offer an on-line information center that contains the information for supported versions.
  - As always, we support and provide PDF versions of our information.
  - We also offer an installable IC that you can run on your local system or intranet server. For ordering information, see:  
<http://publib.boulder.ibm.com/infocenter/dzichelp/v2r2/topic/com.ibm.dzic.doc/installabledzic.htm>
- **The IC is the IBM strategic direction for delivering information.**
- **The IC is a browser-based information portal—an industry-wide trend.**
- **The DB2 for z/OS IC has been available since V8 GA. Our IC is one of IBM's top visited ICs based on total number of hits!**
- **Current information for V8 and V9 is available at:**  
<http://publib.boulder.ibm.com/infocenter/imzic/>



## For more information on DB2 10

<http://www.ibm.com/software/data/db2/zos/db2-10/>

<ftp://public.dhe.ibm.com/software/data/db2/zos/presentations/v10-new-function/>

Name	Size	Type	Modified
availability-idug-na-2010-roberts.pdf	700 KB	Adobe Acrobat Doc...	5/28/2010 1:02 PM
db2-10-questions-answered.pdf	37.1 KB	Adobe Acrobat Doc...	5/28/2010 3:02 PM
db2-10-webcast-2010-miller.pdf	1.35 MB	Adobe Acrobat Doc...	5/28/2010 3:02 PM
dba-idug-na-2010-miller.pdf	934 KB	Adobe Acrobat Doc...	5/28/2010 1:02 PM
optimizer-idug-na-2010-purcell.pdf	253 KB	Adobe Acrobat Doc...	5/28/2010 1:02 PM
optimizer-iod-2010-purcell.pdf	643 KB	Adobe Acrobat Doc...	5/28/2010 1:02 PM
performance-preview-idug-na-2010-hoshikawa.pdf	413 KB	Adobe Acrobat Doc...	5/28/2010 1:02 PM
SAP-iod-2010-schuetzner.pdf	303 KB	Adobe Acrobat Doc...	5/28/2010 1:02 PM
security-iod-2010-pickel.pdf	845 KB	Adobe Acrobat Doc...	5/28/2010 1:02 PM
xml-iod-2010-zhang.pdf	736 KB	Adobe Acrobat Doc...	5/28/2010 1:02 PM

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Questions?





# DB2 10 for z/OS Technical Overview

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