

VM04 – Neues von DB2/LUW



GUIDE SHARE EUROPE

D E U T S C H E R E G I O N

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DB2 Version 10.1 Announcement from April 3, 2012

http://www-01.ibm.com/common/ssi/rep_ca/4/897/ENUS212-074/ENUS212-074.PDF

April 30, 2012: Electronic availability

June 11, 2012: Media availability



Building On the Pillars of DB2



Low Operational Costs

- Adaptive compression
- Multi-Temperature Data Management
- Faster query response
- Improved index mgmt
- Real-time data warehousing

Ease of Development

- Temporal capabilities
- Row and Column Access Control
- SQL compatibility enhancements
- NoSQL graph store

Reliability

- DB2 pureScale enhancements
- Workload management enhancements
- HADR support extended to multiple standby servers

DB2 V10.1 - New Feature Highlights

- **Adaptive Compression**
- **Multi-Temperature Data Management / WLM**
- **Time Travel Query**
- **Row and Column Access Control**
- **Improved HADR functionality**
- **Improved Oracle Compatibility**

DB2 10.1 Adaptive Compression

- Adaptive compression is an **advanced row compression** technique that uses two levels of compression dictionaries (table-level and page-level) to **improve compression ratios**, particularly as data changes

- **How it will help you**
 - **Lower costs**
 - Postpone upcoming storage purchases
 - Lower ongoing storage needs
 - **Better compression rates = increased storage savings**
 - Easier administration with reduced need for table reorganization
 - Compression rates remain very high, **even as data grows and changes**
 - Table reorganization not required to maintain high compression rates
 - **Higher performance**
 - Faster queries for I/O-bound environments
 - Faster backups

DB2 10.1 Adaptive Compression (cont.)

DB2 9.7

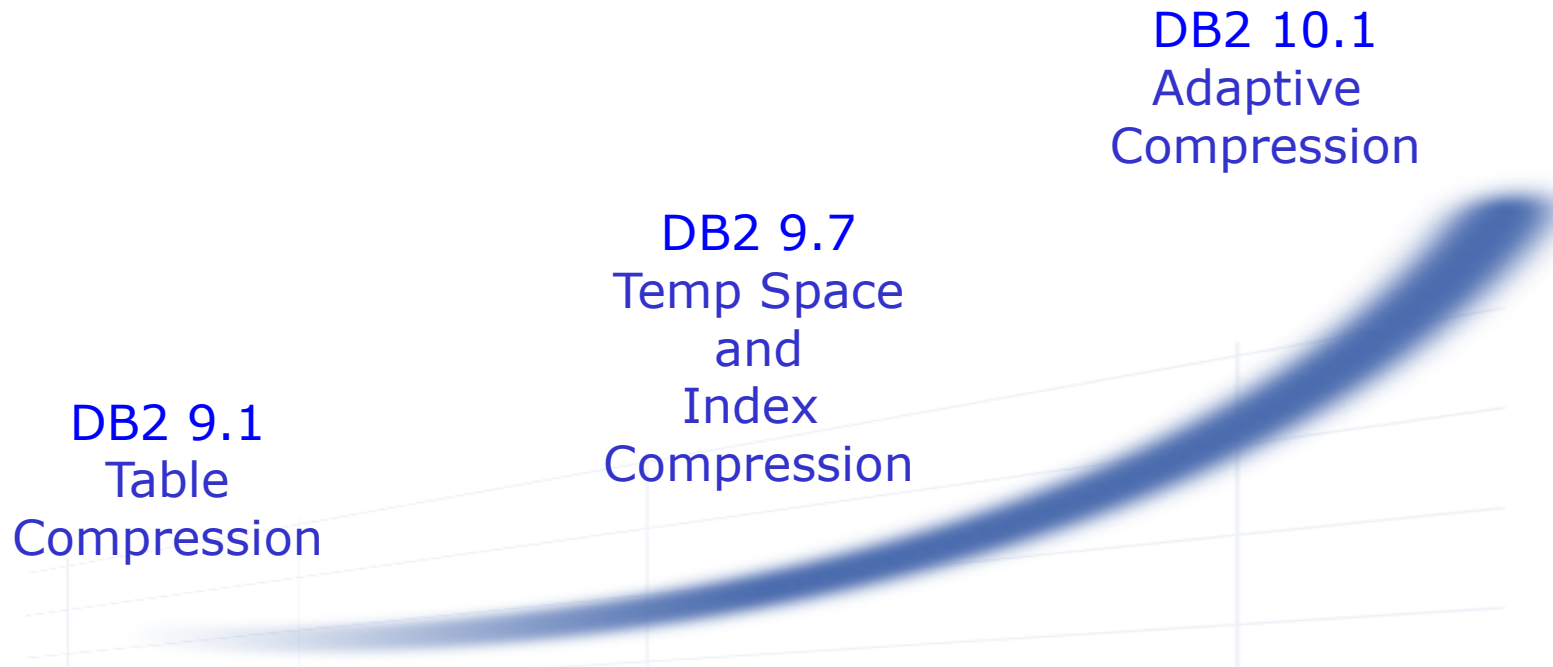
- Uses a single, static compression dictionary
- Compresses data based on recurring patterns that appear in the table
- A classic table reorganization is necessary to improve compression ratios if a significant number of records in a table have been updated, or if a large amount of new data has been inserted

DB2 10.1

- Multiple page-level dictionaries in addition to a single table-level dictionary
- Compression dictionary contains locally frequent patterns, with one dictionary stored on every page
- When a page becomes full, page-level compression is applied, immediately freeing up more storage in that page
- Reduced need for table reorganization

Up to 10x Savings with Adaptive Compression

Lower Storage Costs. Lower Administration Costs

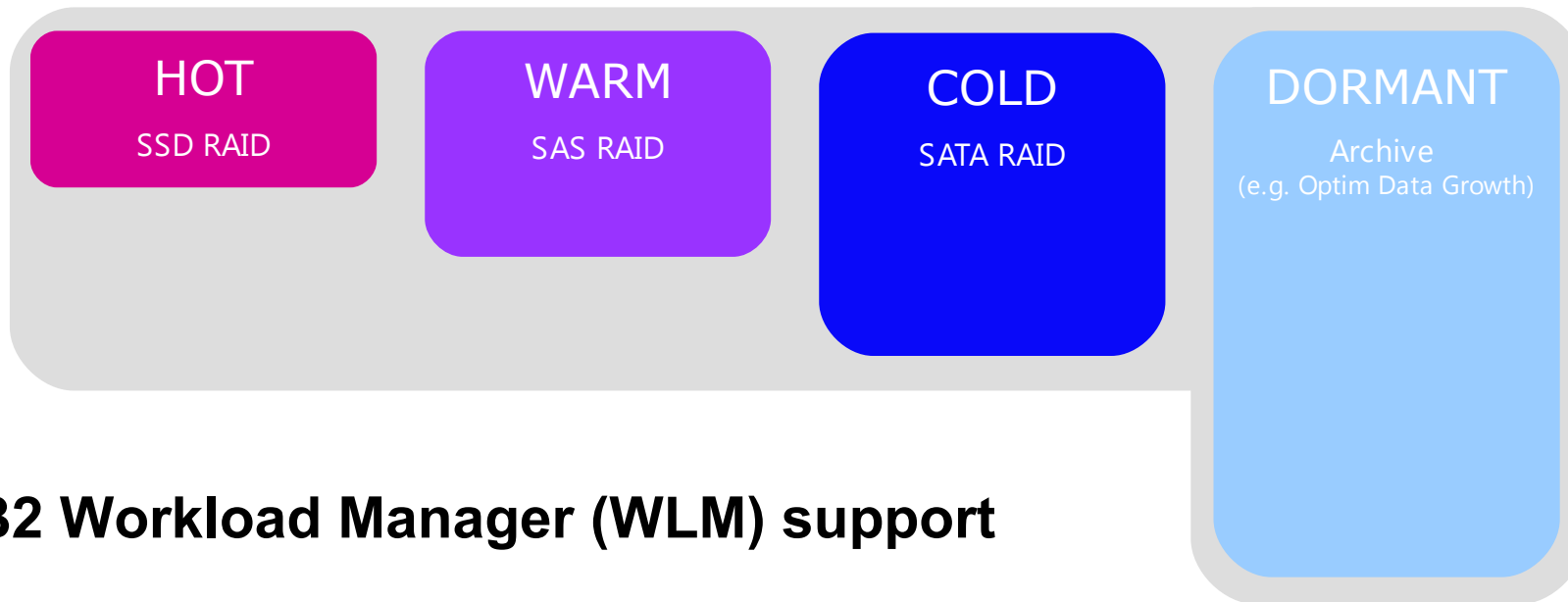


- Adaptively apply both table-level compression and page-level compression
- **Table reorganization not required** to maintain high compression
- Compress archive logs

Multi-Temperature Data Management

Increase Ability to Meet SLAs. Postpone Hardware Upgrades

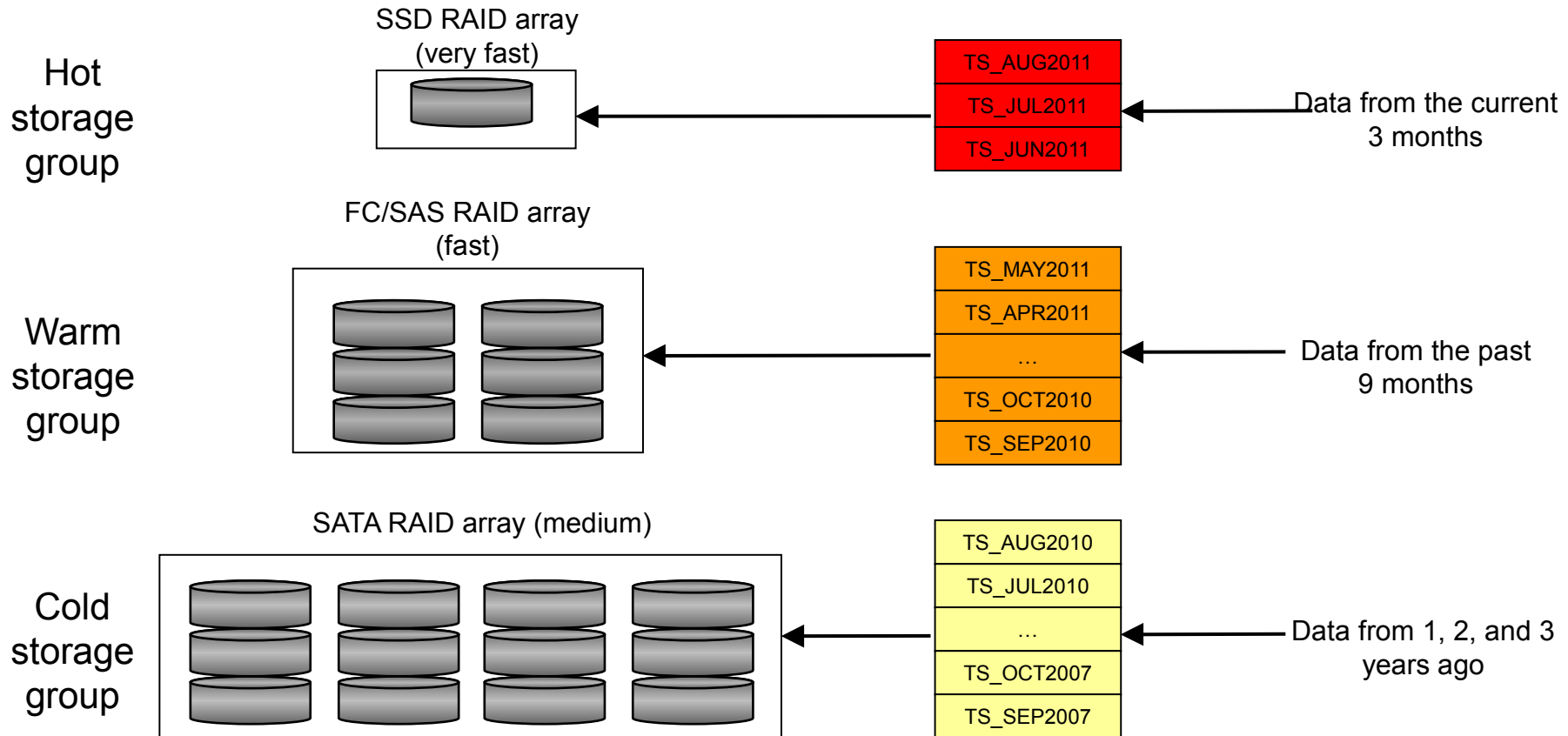
- **Storage pools for different tiers of storage**
 - For range partitions, **policy-based automated movement** of data



- **DB2 Workload Manager (WLM) support**

Low
Operational
Costs

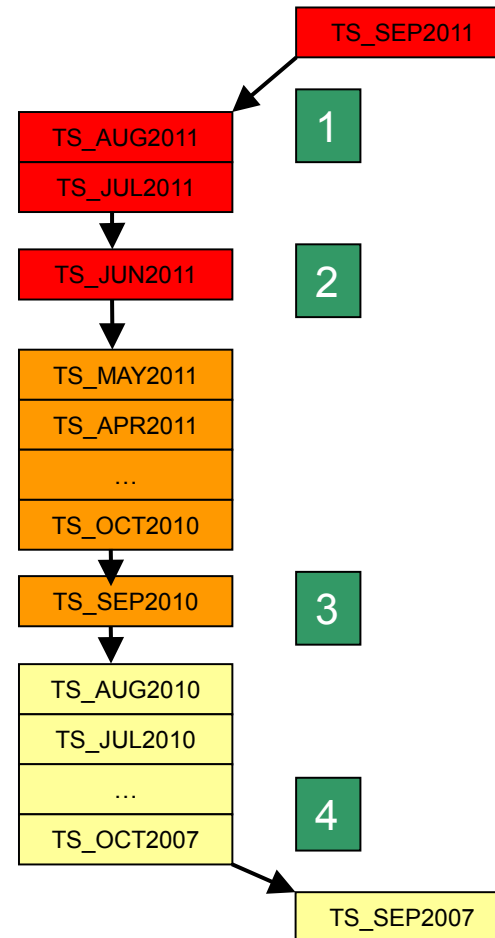
Multi-Temperature Data Management (cont.)



Multi-Temperature Data Management (cont.)

Moving Data Between Storage Tiers

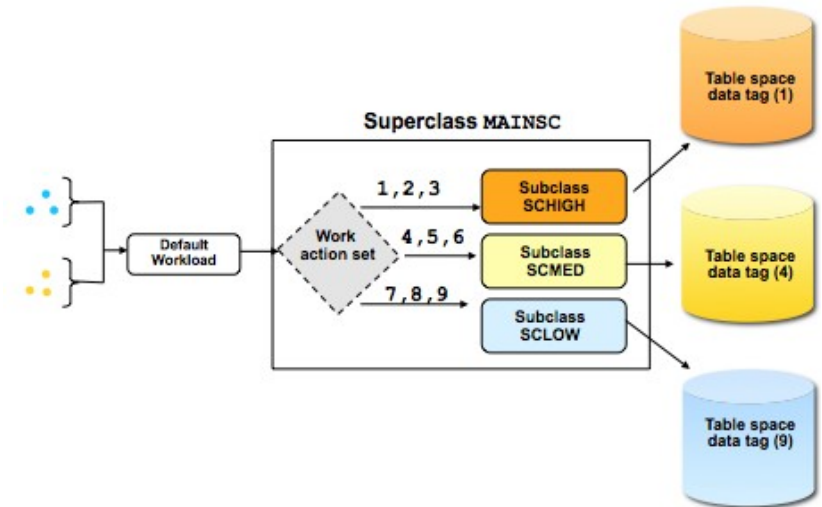
- 1 ALTER TABLE sales
ATTACH PARTITION TS_SEP2011
STARTING FROM ('9/1/2011') ENDING ('9/30/11')
- 2 ALTER TABLESPACE TBSP_JUN2011
USING STOGROUP SG_WARM
- 3 ALTER TABLESPACE TBSP_SEP2010
USING STOGROUP SG_COLD
- 4 ALTER TABLE sales
DETACH PARTITION TS_SEP2007
INTO TS_SEP2007_DETACHED



Workload Management

Managing Service-Level Agreements

- Provides Improved Performance for Data-Centric Workloads
 - Priority can be given to requests based on what data is accessed



Time Travel Query

Easily Analyze Historical Trends and Predict Future Demand

- Query data as it was at any point in the past, or as it will be at some point in the future
- Provide temporal logic and analysis
- Can be based on system time, application-based time and queried using AS OF queries
- **How with it help you?**
 - Higher performance
 - Native support for fast performance
 - Lower costs
 - Up to 45x fewer lines of code than Java
 - Eliminate need to maintain and update custom temporal implementations
 - Easy to administer (simply turn on for any table)



“The use of standardized SQL syntax for temporal operations and the integration deep into the database engine, make DB2 a leader in second generation bitemporal data management - Bitemp 2.0!”

—Craig Baumunk, Principal at BitemporalData.com

Time Travel Query (cont.)

Sample questions

- In what department was Ritu as of 12/01/1997?

Emp	Dept	System_start	System_end
Ritu	K25	11/15/1995	01/31/1998
Ritu	M24	01/31/1998	12/31/9999

These values are automatically maintained by DB2 when Ritu's dept is updated

- What account will Marcelo be assigned to on 9/15/2012?

Emp	Account	Bus_start	Bus_end
Marcelo	1	03/01/2011	06/30/2011
Marcelo	2	06/30/2011	12/10/2011
Marcelo	3	03/01/2012	12/31/2012

These values are maintained by the user or application

Time Travel Query – Temporal Tables

■ System-period temporal table

- DB2 tracks the period when a row is valid (beginning when it is inserted, and ending when it is either updated or deleted)
- All currently valid rows are stored in one table
- When a row is no longer currently valid, it is automatically moved to an associated history table that is transparent to users and applications
- DB2 will automatically query the history table and return applicable rows based on the SQL executed against the base table

■ Application-period temporal table

- The user or application updates the beginning and end of the period in which the information is valid
- All data is kept in a single table and DB2 will automatically split rows based on SQL activity against the existing rows

■ Bi-temporal table

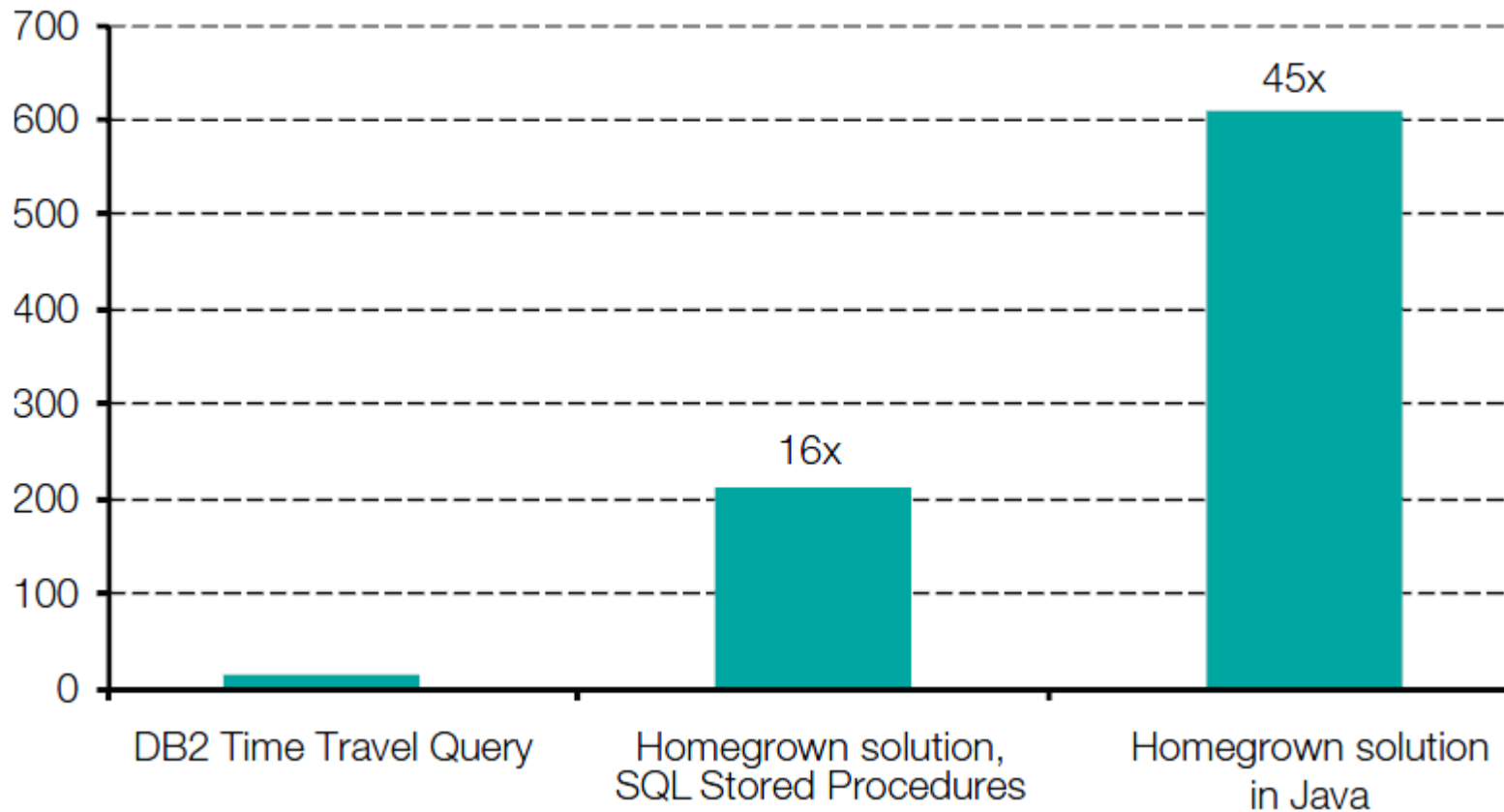
- Combines characteristics of both types of temporal tables

Time Travel Query

Reduces Code by up to 45x

Ease of Development

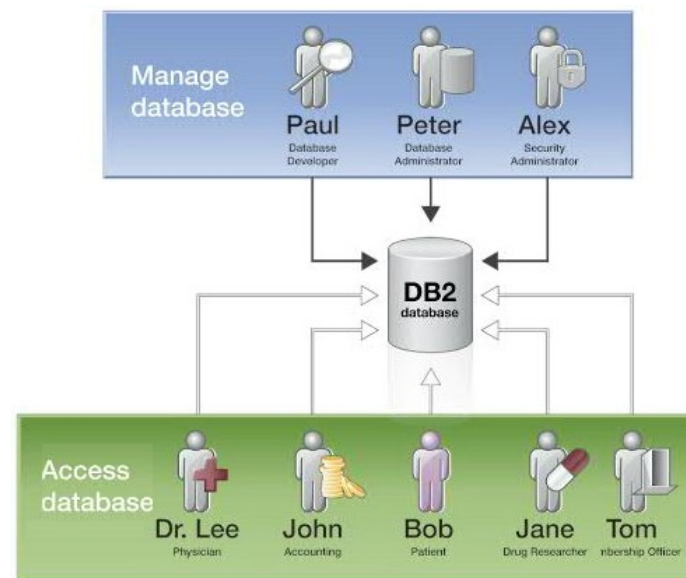
Lines of code required to implement business time



Row and Column Access Control (RCAC)

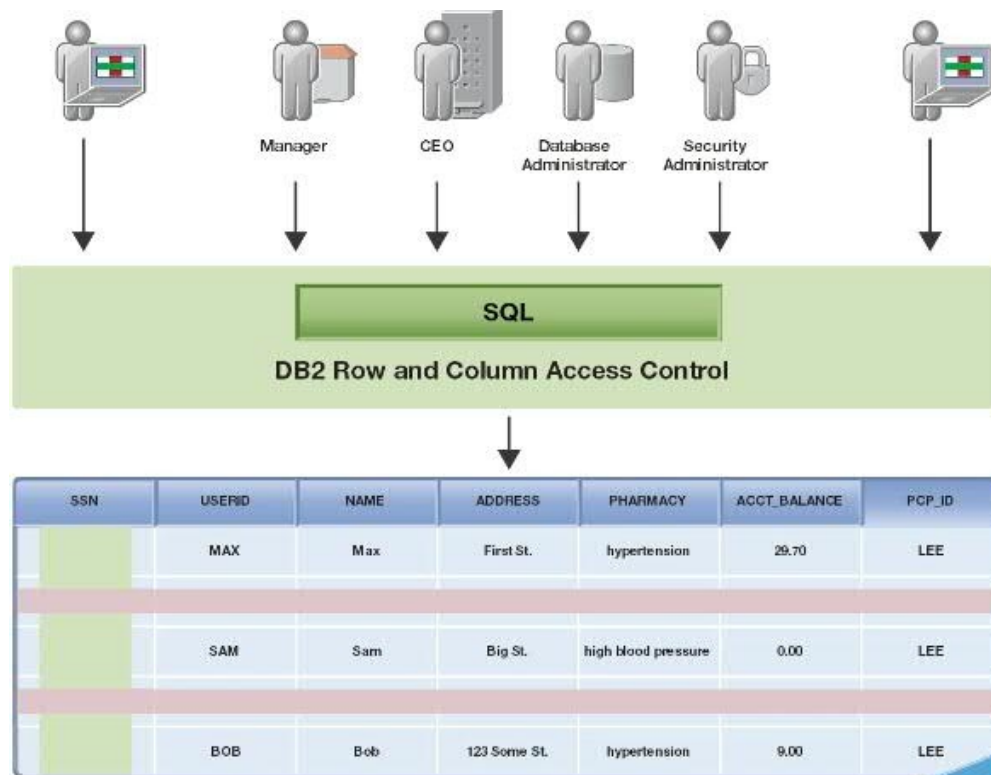
Protect Privacy with Less Effort

- **Row and Column Access Control offers greater flexibility for security control across industries**
- **Separation of duties between Security Officer and DBA**
 - Easy compliance with legal requirements regarding privacy and security
 - Cost savings with reduced development time - No need to create separate views for differing access rights
 - Example: Allowing Health-care works to view their Patients



What is Row and Column Access Control?

- **Additional layer of data security** introduced in DB2 10.1 for LUW
- **Complementary** to table level authorization
- **Allows access only to subset of data** useful for job task
- **Controls access to a table at the row, column, or both**
- **Two sets of rules**
 - Permissions for rows
 - Masks for columns



Create Permission

- **To create a permission governing access to rows**
 - 1) CREATE the permission with access rule defined by search condition
 - Choose to enforce for all DML or simply select
 - 2) ENABLE or DISABLE the permission
 - If enabled, this access rule will be implemented when row access control is ACTIVATED for the affected table
 - 3) ALTER table to activate row access control

```
CREATE PERMISSION p_name ON table/view FOR ROWS
WHERE search condition ENFORCED FOR ALL ACCESS {disable/enable};

ALTER TABLE/VIEW table/view ACTIVATE ROW ACCESS CONTROL;
```

WHERE clause

ACTIVATE the row
access control

Determines if permission
will be ENABLED when
access control is
ACTIVATED for table

Create Column Mask

- **To create a mask for a column**
 - 1) CREATE the mask with visibility of column value determined by case expression
 - 2) ENABLE or DISABLE the permission, determining if this access rule will be implemented when column access control is enabled for the affected table
 - 3) ALTER table to ACTIVATE column access control

```
CREATE MASK m_name on t_name FOR COLUMN c_name RETURN  
case-expression {disable/enable}
```

```
ALTER TABLE/VIEW table/view ACTIVATE COLUMN ACCESS CONTROL;
```

Result of case expression is returned in substitute of column value

Determines if mask will be enabled when access control is ACTIVATED for table

ACTIVATE column access control

Scenario: Create Column Mask (cont.)

1

```
CREATE MASK acct_balance_mask ON patient FOR
COLUMN acct_balance RETURN
CASE
  WHEN verify_role_for_user(SESSION_USER,
    'ACCOUNTING') = 1
  THEN acct_balance
  ELSE 0.00
END
ENABLE;
```

2

```
CREATE MASK sin_mask ON patient FOR
COLUMN sin RETURN
CASE
  WHEN verify_role_for_user(SESSION_USER,
    'PATIENT') = 1
  THEN sin
  ELSE
    'XXX XXX ' || SUBSTR(sin,8,3)
END
ENABLE;

ALTER TABLE patient ACTIVATE COLUMN ACCESS CONTROL;
```



Scenario: Select from Table with Mask



```
SELECT * FROM patient
```

SIN	USERID	NAME	ADDRESS	PHARMACY	ACCT_BALANCE	PCP_ID
XXX XXX 234	MAX	Max	First St.	hypertension	89.70	LEE
XXX XXX 812	MIKE	Mike	Long St.	diabetics	8.30	JAMES
XXX XXX 856	SAM	Sam	Big St.	codeine	12.50	LEE
XXX XXX 454	DOUG	Doug	Good St.	influenza	7.68	JAMES
XXX XXX 789	BOB	Bob	123 Some St.	hypertension	9.00	LEE

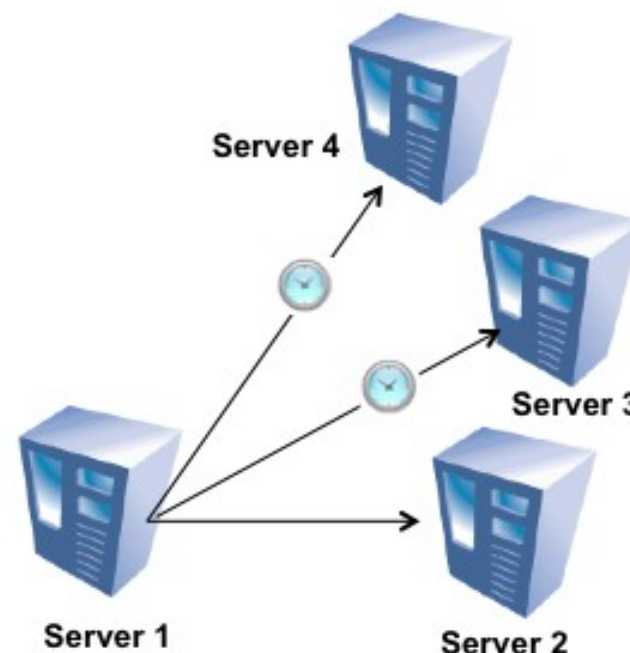
- **Column Access Control**
 - Accountants can see account balances
 - Accountants cannot see SIN numbers

- **Row Access Control**
 - Accountants can see all rows

HADR Supports Multiple Standby Servers

Increase Ability to Meet SLAs. Disaster Recovery

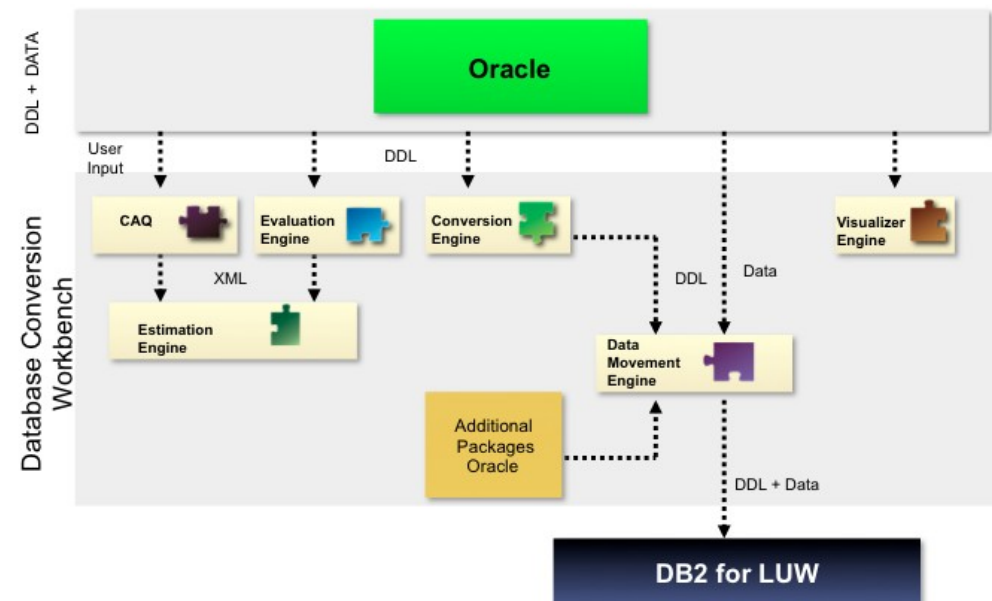
- **HADR now supports more than one stand-by server**
 - If primary server fails, principle standby takes over
 - If principle standby then fails, can switch to auxiliary standby
 - Auxiliary standby can provide complete offsite availability, while maintaining speed of local standby
- **Time delay apply available for the standby**



Oracle Compatibility Features

Simplifying Migration to DB2

- Trigger Improvements
- PL SQL Performance Improvements
- Local Object Declarations
- Nested Routines
- Improved Migration Workbench



Ease of Development

DB2 10 PL/SQL Compatibility

Average PL/SQL Compatibility Moves Above 98%

“The total cost of ownership with DB2 running on IBM systems is almost half the cost of Oracle Database on Sun systems.”
 --- Reliance Life Insurance

“We switched from Oracle Database to IBM DB2 and cut our costs in half, while improving performance and reliability of business applications.”
 Sandro Reátegui Banco de Crédito del Peru

- Moved from Oracle Database to IBM DB2
 - Used “compatibility features”
 - 3-30x faster query performance
 - 200% improvement in data availability
- JSC Rietumu Banka

9.7.1	SUB STRB	Increase compatibility
9.7.1	UDF Parameters: INOUT	Increase compatibility
9.7.1	FORALL/BULK COLLECT	Increase compatibility
9.7.1	Improve BOOLEAN	Increase compatibility
9.7.1	Conditional Compilation	Enhancement
9.7.1	Basic DPF Support	Broaden coverage
9.7.1	OCI Support	Broaden coverage
9.7.2	UDF Parameters: DEFAULT	Increase compatibility
9.7.2	Obfuscation	Enhancement
9.7.2	NCHAR, NVARCHAR, NCLOB	Increase compatibility
9.7.3	NUMBER Performance	Performance
9.7.3	Runtime “purity level” Enforcement	Increase compatibility
9.7.3	RATIO_TO_REPORT Function	Increase compatibility
9.7.3	RAISE_APPLICATION_ERROR	Increase compatibility
9.7.3	Small LOB Compare	Increase compatibility
9.7.4	Multi-action Trigger & Update Before Trigger	Increase compatibility
9.7.4	Autonomous Tx Improvements	Increase compatibility
9.7.4	LIKE Improvements, LISTAGG	Increase compatibility
9.7.4	ROW & ARRAY of ROW JDBC Support	Increase compatibility
9.7.5	Pro*C Support	Increase compatibility
9.7.5	Nested Complex Objects	Increase compatibility
10	Local Procedure Definitions	Increase compatibility
10	Local Type Definitions	Increase compatibility
10	PL/SQL Performance	Performance

Links

<http://www.ibm.com/developerworks/data/library/techarticle/dm-1204whatsnewdb210/index.html?ca=drs->

<http://www.channeldb2.com/video/db2-v10-1-adaptive-compression>

Questions ?

