



# IBM System z Technology Summit

## *Administering and Optimizing Your DB2 9 & DB2 10 for z/OS Environment with Tools*

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## IBM DB2 Tools: *Are you ready for DB2 10?*

- Exploit DB2 10 performance savings out-of-the-box
- Optimize Performance Across Multi-Platform Applications
- Lower CPU costs while reducing batch windows
- Higher data availability through simplified recovery operations



### All New with DB2 10!

**DB2 Utilities Suite 10** drives down costs with *autonomics*, page sampling and further offloads processing to zIIPs and FlashCopy. Developed in conjunction with DB2 10 to provide maximum data integrity and exploit all new functions out of the box.

**Tivoli OMEGAMON XE for DB2 Performance Expert 5.1** extends its insight into distributed workloads and offers a robust infrastructure to support DB2 10 subsystem consolidation, with lower monitoring overhead. The recommended performance monitor of DB2 10!

**DB2 Administration Tool/Object Compare 10.1** extends the value of DB2 10 with new capabilities that allow DBAs to quickly exploit DB2 10 features like schema evolution. Reduces the overhead of many routine tasks.

**QMF 10** delivers built-in visualizations and reports that dramatically extend the value to end users. A new metadata layer simplifies the process to understand and create reports.

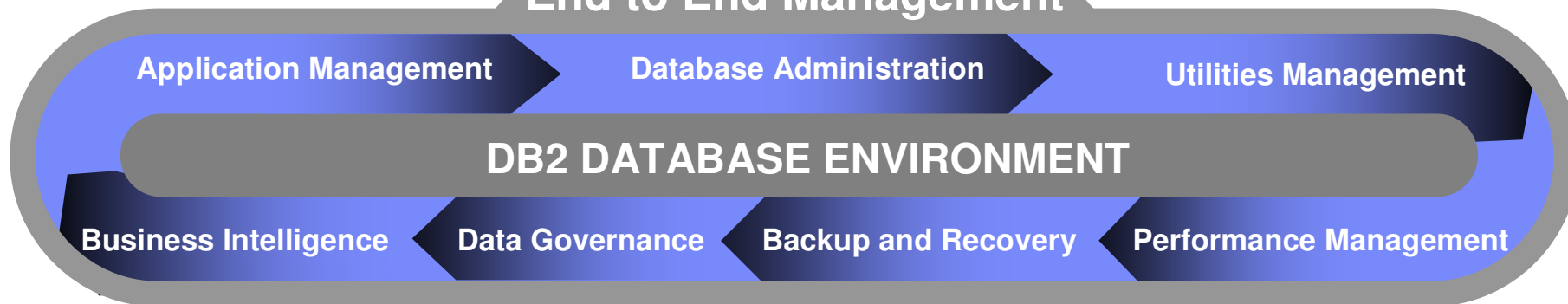
**DB2 Sort 1.1** lowers the cost of DB2 Utility sort processing by exploiting advanced features of System z and z/OS while optimizing overall system efficiency. Significantly reduces batch windows.

**DB2 High Performance Unload 4.1** reduces the cost of extracting DB2 10 data with support for TCP/IP Pipes and the new internal format as well as a new native XML data unload capability.

# Managing your everyday business

**Boost productivity !!!**

End to End Management



**Empower People !!!**



# Roadmap to Exploit DB2 10 for z/OS

*Accelerate your ability to leverage compelling DB2 10 features*

## ➔ **Administer DB2 Performance Savings**

Optimize Dynamic Infrastructure Performance

Drive DB2 Efficiency and Productivity

Recover DB2 Advanced Technology

*Accelerate Time to Value*

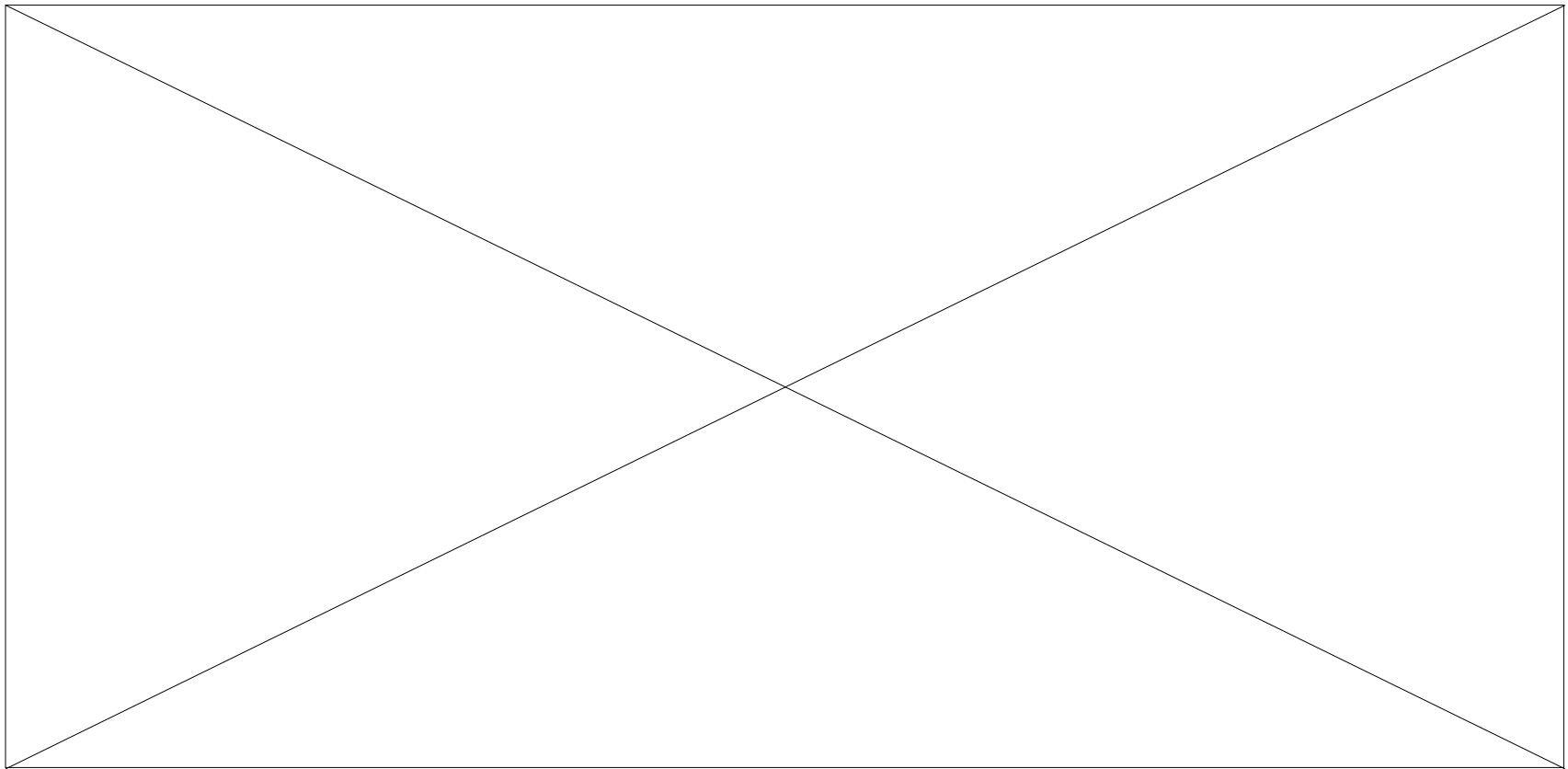


It is very important for my DB2 tools to support the new DB2 10 features since I plan to upgrade to DB2 10 in the near future and take advantage of the new features.

True

False

It is very important for my DB2 tools to support the new DB2 10 features since I plan to upgrade to DB2 10 in the near future and take advantage of the new features.



## DB2 Administration Tool V10.1

- **Drive immediate DB2 10 out-of-the-box Performance Savings**
- **Exploit DBA-managed Performance/Productivity Improvements**
  - INCLUDE additional Columns in Indexes to Exploit Index Only Access
  - Convert LOBs to INLINE to boost performance
- **Extend Administration Capabilities**
  - Manage new Security models
  - Reduce Schema change overhead
  - Recover from Access Path regressions
  - Manage Autonomic Statistics collection
- **Time Travel with Temporal Data – “as of”**
  - Record changes in history – System Time
  - Define, update and query events in past or future – Business Time
  - Browse Temporal Data “as of” a point in time with DB2 Table Editor 4.3

## DB2 Admin Tool V10.1 **INCLUDE** Index non-key Column

- **Purpose**
  - Decrease index maintenance
  - Decrease physical storage
  - Index only access
- **Only supported on UNIQUE indexes**
- **Places the object in RBDP (Rebuild Pending)**
- **INCLUDE COLUMN syntax available**
  - CREATE INDEX
  - ALTER INDEX



# DB2 Admin Tool V10.1 INCLUDE Index non-key Column

```

DB2 Admin ----- DSNT Redefine Index ----- Row 1 to 5 of 5
Command ==>                                           Scroll ==> PAGE

Commands: CONTINUE ORIGINAL
Line commands: nnn A|D - Sequence & order R - Remove the column I - Include
A - Ascending D - Descending RA - Random U - Update expression/XML pattern
B - Business Time without overlaps

CREATE INDEX TEAM76 . TD76XA32_LCN >
      ON TEAM76.TD76TB32_LCN
Unique . . . . . YES      Where Not Null . . . . . YES      Cluster . . . . . YES
Buffer Pool . . . . . BP16  Close Rule . . . . . YES      Copy Allowed . . . NO
Piece Size . . . . . 2097152 Define . . . . . YES      Defer . . . . .
Partitioned . . . . .      Padded . . . . .      Compress . . . . . NO

Select Column Name      Col Type      Length      Scale N      ColSeq Ord  OldSeq Ord
      *              *              *              * *              * *              * *
-----
      LOC_NO           SMALLINT           2           0 N           1 A           1 A
      LOCATION         CHAR              20           0 N
      ADDRESS          VARCHAR           30           0 N
      TOWN             VARCHAR           30           0 N
      POSTCODE         CHAR              10           0 N
I
***** END OF DB2 DATA *****
    
```

# DB2 Admin Tool V10.1 INCLUDE Index non-key Column

```

DB2 Admin ----- DSNT Redefine Index ----- Row 1 to 5 of 5
Command ==> Scroll ==> PAGE

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Select Column Name      Col Type      Length  Scale N  ColSeq  Ord  OldSeq  Ord
      *              *              *      * *      * *      * *
-----
      LOC_NO          SMALLINT          2      0 N      1 A      1 A
*-----
      POSTCODE         CHAR              10      0 N      30 I
      LOCATION         CHAR              20      0 N
      ADDRESS          VARCHAR           30      0 N
      TOWN             VARCHAR           30      0 N
-----
***** END OF DB2 DATA *****

```

# DB2 Admin Tool V10.1 INCLUDE Index non-key Column

```
DB2 Admin ----- Edit Statement ----- Columns 00001 00072
Command ==> _                               Scroll ==> CSR

***** ***** Top of Data *****
000001 -- Created by DBA104 on 2011/01/13 at 10:15
000002 -- Generated by apply exec by DBA104 on 2011/01/13 at 10:15
000003 --#ADMIN PROCESS ALTER
000004 ALTER INDEX TEAM76.TD76XA32_LCN
000005     ADD INCLUDE COLUMN (POSTCODE) ;
000006 COMMIT ;
000007 --#ADMIN PROCESS REBUILD
000008 LISTDEF ADBLD1
000009 INCLUDE INDEXSPACES
000010 INDEX "TEAM76"."TD76XA32_LCN";
000011 REBUILD INDEX LIST ADBLD1;
000012 -- End of Apply statements
***** ***** Bottom of Data *****
```

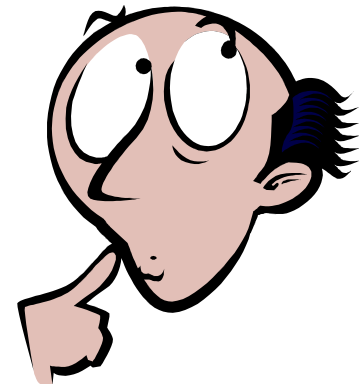
## DB2 Admin Tool V10.1 INLINE LOB

- **INLINE LOB data stored in base table space**
  - Must be a universal table space
- **Purpose – improve application performance**
  - Reduce I/O to read LOB data
  - Saves CPU time to access LOB data
  - Minimize the management of auxiliary table space and index space
- **zPARM – LOB\_INLINE\_LENGTH – defines default max length**
  - Default = 0
- **CREATE TABLE, CREATE TYPE, and ALTER TABLE**
- **Data is moved during the next process that modifies the data or thru a REORG**

## DB2 Admin Tool V10.1 INLINE LOB

### ▪ Operational Considerations

- Base table will be larger
- Potential impact on non-LOB column access
- Tables scans could take longer
- Utility processing could take longer
- Size of image copy increases
- Buffer Pool hit ratio may be impacted



**Redbook: DB2 10 for z/OS Technical Overview (SG24-7892)**

## DB2 Admin Tool V10.1 INLINE LOB

```

DB2 Admin ----- DSNT ALTER Table ----- 12:40
Command ==>

DB2 Admin ALTER                               Schema . : TEAM80   >
                                                Name . . : BOOK_BASE_TABLE   >
Column name . . BOOK_TEXT                     > (column number 3)
Column type . . CLOB                          (CHAR,DECIMAL,INTEGER,SMALLINT,etc.)
Data length . . 38664
Inline length . 200_                          (0-32680 BLOB or CLOB, 0-16340 DBCLOB)
Precision . . .                               (FLOAT and DECIMAL only)
Scale . . . . .                               (DECIMAL and TIMESTAMP only)
Type schema . .                               (User-defined type schema)
Type name . . .                               (User-defined type name)
WITH TIME ZONE .                             (Yes/No - for TIMESTAMP only)

Allow Nulls . . NO   (Yes-Nullable, No-NOT NULL)
FOR ? DATA . . .   (B - Bit, S - SBCS, M - Mixed, or blank)
WITH DEFAULT . . YES (Yes, No, L (SECLABEL) or enter value below)
Default value . . .

GENERATED . . .   (A-ALWAYS, D-DFLT, I-ALWAYS AS IDENT, J-DFLT AS IDENT,
                  E-ALWAYS AS UPD TIMESTAMP, F-DFLT AS UPD TIMESTAMP)
FIELDPROC

```

## DB2 Admin Tool V10.1 INLINE LOB

```
DB2 Admin ----- Edit Statement ----- Columns 00001 00072
Command ==> _                               Scroll ==> CSR

***** ***** Top of Data *****
000001 -- Created by DBA104 on 2011/01/13 at 12:46
000002 -- Generated by apply exec by DBA104 on 2011/01/13 at 12:46
000003 --#ADMIN PROCESS CREATE
000004 ALTER TABLE TEAM80.BOOK_BASE_TABLE
000005     ALTER COLUMN BOOK_TEXT
000006     SET INLINE LENGTH 200 ;
000007 -- End of Apply statements
***** ***** Bottom of Data *****
```

## DB2 Admin Tool V10.1 Temporal Table

- **Temporal Table**

- Records a period of time when a row is valid
- System Time or Business Time

- **Benefits**

- DB2 provides a capability to specify table-level specifications to **control the management of application data based upon time.**
- Application programmers can specify a **search criteria** based upon the time the data existed or was valid. Simplifies DB2 application development requiring **data versioning.**
- Customers can **satisfy new compliance laws** faster and cheaper because DB2 will automatically manage the different versions of data



## DB2 Admin Tool V10.1 Temporal Table

- **Application period (Application Period Temporal Table)**
  - 2 columns maintained by the application (timestamp or date)
  - Indicate a period of time the row is valid (user-specified)
- **System period**
  - Implemented by creating a temporal table, a history table, and enabling versioning.
  - 2 columns maintained by the system (timestamp)
  - Old rows are archived to another table → History table (Versioning)
    - Can delete rows that are no longer needed
  - Table with the active rows → System Period Temporal Table
  - Queries automatically rewritten to include a UNION to access historical data
- **Bi-temporal table – is both a System Period Temporal Table and an Application Temporal Table**



ERROR: stackunderflow  
OFFENDING COMMAND: ~

STACK: