

# The Challenge



How to handle large objects ?

LET'S MAKE SURE

# Background

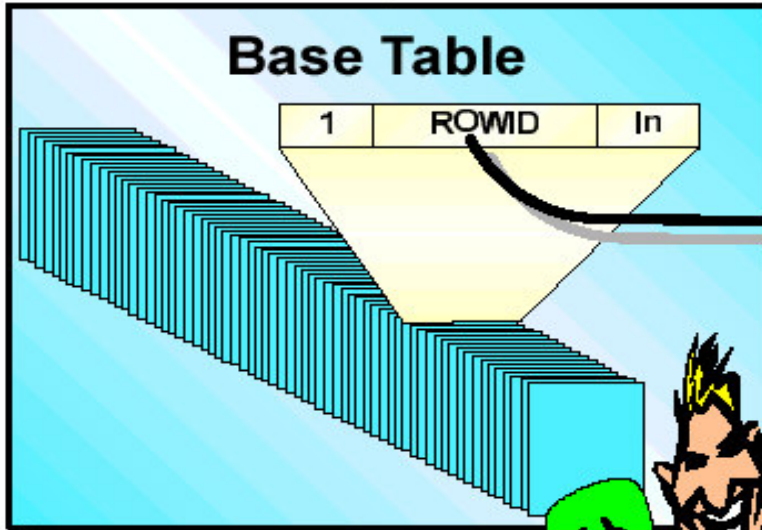
- In DB2 v6 support for large objects upto 2 GB
  - CLOB character data and BLOB for binary data
  - Since DB2 V7 CLOB's can also be stored in **UNICODE** format
- Very low usage of LOBs at Volvo sofar
- Now it's time to start in production
- Some issues still outstanding
  - How to handle changes that need unload/load of data ?
  - Guidelines for maintenance of large objects
  - What tools are available to make life easier when dealing with large objects ?

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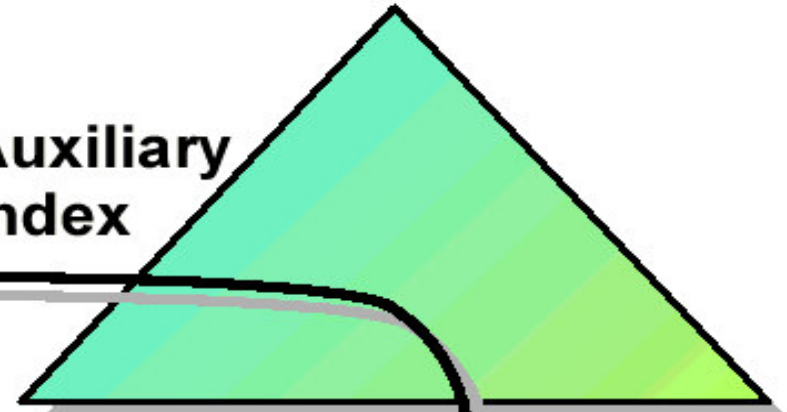
# LOB Support in DB2 z/OS

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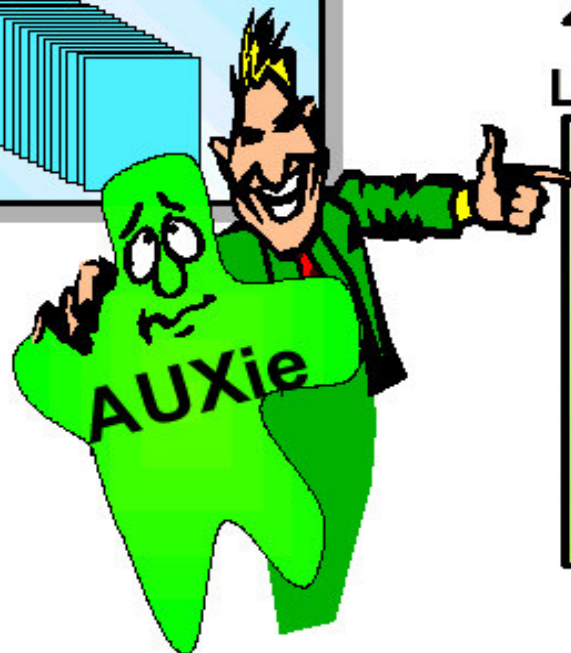
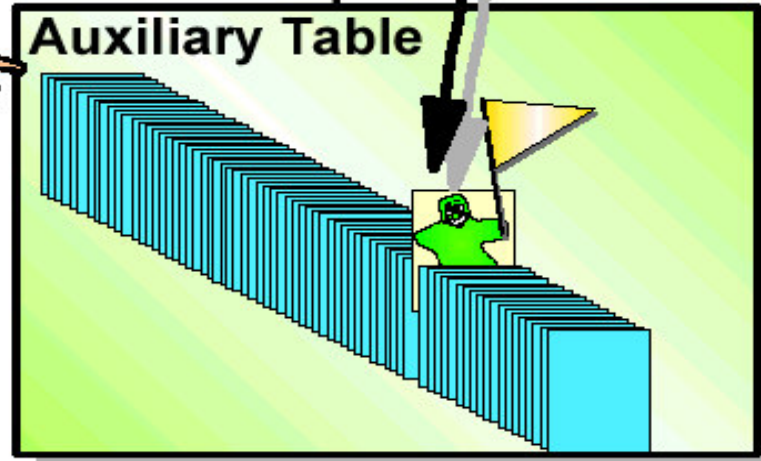
## Base Table Space



## Auxiliary Index



## LOB Table Space



# Hidden Rowid in DB2 v8

- An implicitly generated ROWID column is called *a hidden ROWID column*.
- DB2\_GENERATED\_ROWID\_FOR\_LOBS $nn$
- GENERATED ALWAYS
- SYSIBM.SYSCOLUMNS – HIDDEN
  - P Partially hidden. The column is hidden from SELECT \*.
  - N Not hidden. The column is visible to all SQL statements.
  - blank Not hidden. The column is visible to all SQL statements.

## LOB Support in DB2 cont.

- 1 LOB Tablespace per LOB column (and partition)
  - 4096 partions (v8) \* 254 datasets \* 64Gb = 65536 TB
- No compress
- Bufferpool 4,8,16,32K → 4K recommended
  - Max 1 LOB per datapage
  - No DSSIZE > 4GB if bufferpool > 4K ?
  - Use separate bufferpool for LOBs – VPSEQT=100
- LOG YES or NO (Always NO if LOBsize > 1 GB)
  - The use of LOG YES is recommended for LOB TS
- GBPCACHE SYSTEM (Default)
  - Only Space Map pages are written to Group Buffer Pool

# LOB support in DB2 utilities (on auxiliary objects)

- UNLOAD and LOAD : only if < 32K
  - Support to come in v8 hopefully 1H2005
  - Support to come in Crossloader, PQ90263 - Target Date: 05/01/31
  - Use shadow tables to temporarily store data
- RUNSTATS – no affect on accesspath
  - Used to monitor space usage and orgratio (if reorg needed)
  - SYSIBM.SYSLOBSTATS – Avgsize, Freespace, Orgratio
- REORG : only SHRLEVEL NONE
  - Improve prefetch performance
  - No reclaim of physical space – use RECOVER instead

## Options to move LOB

- IBM Utilities - Support to come in v8 hopefully 1H2005
- IBM Crossload - PQ90263 - Target Date: 05/01/31
- Shadow table – Only within same DB2
- CA Tool R11 – Available since Dec 2004
- BMC – not at Volvo
- Client application ex. Advanced Query Tool
- Home written program

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# Unicenter from CA - R11

Fast Unload r11 DB2 V8. Got a loop and finally abends with B37 because SYSREC is filled up.

The screenshot shows a mainframe terminal window titled "Volvo - RUMBA Mainframe Display". The window displays the "Unicenter DB2 Products Main Menu" for user "r11" on "05/01/17" at "15:08". The menu includes options for Database Administration, Utilities, General Facilities, and Performance Management. A red starburst graphic is overlaid on the screen with the text "Fast Unload Fails !! RC/Merger".

RMA493W LOB TS DMIARL2.SMIARLB2 IS NOT SUPPORTED BY RC/MERGER.  
ANALYSIS OUTPUT CANNOT BE EXECUTED SUCCESSFULLY.

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The screenshot shows the 'Data Loader' application window. At the top, there is a menu bar with 'Close', 'File', and 'Help'. Below the menu bar, there are two dropdown menus: 'Load data into table' with the value 'V070674.FIKALIST' and 'in database' with the value 'd2z0'. A 'Refresh' button is located to the right of the first dropdown. The main area is divided into three tabs: 'Source', 'Mapping', and 'Options'. The 'Source' tab is active, showing a tree view on the left with 'Load data from' expanded to show 'File', 'Excel Worksheet', 'Table', and 'Query'. The 'Table' option is selected. In the center, there is a 'Load data from Table' section with a 'Table' dropdown set to 'V070674.FIKALIST' and an 'in Database' dropdown set to 'd2y0'. Below this are two unchecked checkboxes: 'Use same schema and table name as target table' and 'Use same table name as target table'. At the bottom of the window, there are four buttons: 'Load Data', 'Preview', 'Exit', and 'Abort'. A status bar at the very bottom displays the text: 'Load completed. Rows read=15 Loaded OK=15. Dups rejected=0. Other error=0. Elapsed=0.47 secs'.

**Advanced Query Tool**

<http://www.querytool.com/>

**\$125 per license – Standard**  
**\$250 per license -- Extended**

**Data Loader**

Close File Help

Load data into table: V070674.FILE\_BLOB\_VERSION ... Refresh

in database: d2y0

Source				Mapping				Options
Columns in Target Table				Columns in Source Table				
	Include	Name	Type		Field Name	Type	Load S	
1	<input checked="" type="checkbox"/>	FK_F_F_NAME	CHAR(170)	1	FK_F_F_NAME	CHAR(170)	<1>	
2	<input checked="" type="checkbox"/>	FK_F_FMT_NUMBER	DECIMAL(4)	2	FK_F_FMT_NUMBER	DECIMAL(4)	<2>	
3	<input checked="" type="checkbox"/>	TIMESTAMP_BLOB	TIMESTAMP	3	TIMESTAMP_BLOB	TIMESTAMP	<3>	
4	<input checked="" type="checkbox"/>	FK_USR_USR_CODE_CR	CHAR(8)	4	FK_USR_USR_CODE_CR	CHAR(8)	<4>	
5	<input checked="" type="checkbox"/>	WS_ACHIEVED	CHAR(15)	5	WS_ACHIEVED	CHAR(15)	<5>	
6	<input checked="" type="checkbox"/>	REST_FR_TIMESTP_BL	TIMESTAMP	6	REST_FR_TIMESTP_BL	TIMESTAMP	<6>	
7	<input type="checkbox"/>	ROWID	ROWID	7	ROWID	VARCHAR (40) FOR BIT DATA	<7>	
8	<input checked="" type="checkbox"/>	BLOBDATA	BLOB(2560000)	8	BLOBDATA	BLOB(2560000)	<8>	

Select All DeSelect All Insert Row Delete Row Default Extra

Load Data Preview Exit Abort

Load completed. Rows read=100 Loaded OK=100. Dups rejected=0. Other error=0. Elapsed=16.84 secs

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# Write your own pgm

- Example from Java

```
// Copy table v070674.fikalist from D2Z0 to D2Y0
while (rs.next()) {
    pstmt.setInt(1,rs.getInt(1));
    pstmt.setString(2,rs.getString(2));
    pstmt.setBlob(3,rs.getBlob(3));
    numUpd = pstmt.executeUpdate();
}
```

# Simple Comparison

Small table 3 columns 15 rows  
 5 Blobs a 2 MB  
 Technical DB2 system with low resources

Date	SQL (within same DB2)	Own written Java In OMVS DB2 in different LPARs	AQT  Windows
Måndag	9-12 sec	21-28 sec	39-114 sec
Tisdag	7-14 sec	24-36 sec	5-12 sec

And CA Fast Unload looped forever until B37

# RC 00C000D1

The amount of space allowed for processing LOB values by a user has been exceeded. The amount of space allowed per user is indicated by panel DSNTIP7.

- Defined in ZPARM

LOBVALA - USER LOB VALUE STG:	10048 KB
LOBVALS - SYS LOB VALUE STG:	2048 MB