



# IBM Db2 for z/OS Utilities: The Latest Developments

Haakon Roberts

Db2 for z/OS Development

April 2019



IBM z Analytics

## Disclaimer

- Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision. The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code or functionality. Information about potential future products may not be incorporated into any contract. The development, release, and timing of any future features or functionality described for our products remains at our sole discretion.

## Agenda

- V12 quick review
- Recent Enhancements
- Summary

## Db2 12 Utilities

- REORG
  - Improved Flashcopy management
  - Improved part-level PBG REORGs
  - Up to 50% additional offload to zIIP
  - New mapping table format support
  - Display claimer information on each drain failure, not just last

## Db2 12 Utilities

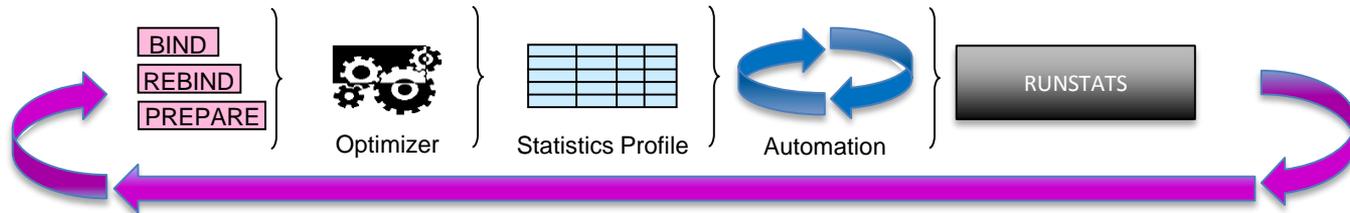
- LOAD
  - Performance improvement for LOAD PART REPLACE with dummy input
    - Against empty PBR partition – 99% CPU, 98% ET reduction
  - LOAD SHRLEVEL CHANGE PARALLEL support for PBG
  - Up to 90% additional zIIP offload
  - Maintain MAXASSIGNEDVAL for identity columns
  - Eliminate datasharing overhead with UNLOAD ISO(UR) REGISTER NO option

## Db2 12 Utilities

- Backup & Recovery
  - PIT recovery support for PBG table spaces
  - SLB and FlashCopy enhancements
    - HSM messages in utility job output
    - Multiple cospool support
  - Option to skip PIT recovery for non-updated pagesets
  - MODIFY RECOVERY delete datasets

## Db2 12 Utilities

- RUNSTATS
  - Optimizer & DDL direct update of stats profiles
  - USE PROFILE support for inline stats in REORG & LOAD
  - Inline stats support for LOAD PARALLEL
  - INVALIDATECACHE option to avoid dynamic cache invalidation
  - COLGROUP performance – 25% CPU, 15% ET reduction



## Recent News

- LOAD RESUME BACKOUT YES
  - Avoid leaving objects in RECP on LOAD failure
  - Objects left in copy-pending
  - PI08421/PI54658
- LOAD RESUME BACKOUT YES at partition-level
  - Avoid need to serialise at tablespace-level
  - PI81204/PI81244

## Recent News

- LOAD utility IGNORE(WHEN) option
  - Ignore records that do not satisfy WHEN clause instead of treating them like discarded records
  - PI44415 & PI44465
- LOAD utility additional IGNORE options
  - CONV, PART, VALPROC, IDERROR, DUPKEY
  - PI77155

## Recent News

- LOAD CONSTANT support
  - Override data in SYSREC, or supply values for fields not in SYSREC
  - PI08421

```
+--CONSTANT(-----+--'string'-----+)->
+--X'hex-string'-----+
+--integer-----+
+--CURRENT DATE-----+
+--CURRENT TIME-----+
+--CURRENT TIMESTAMP--+
+--NULL-----+
```

- LOAD CONSTANTIF support
  - Conditionally replace input data with a constant value
  - Also support for CONSTANT with relative positioning in SYSREC
  - PI69405

## Recent News

- Faster UTS PBR conversion: Support REORG partition parallelism and honour KEEPDICTIONARY
  - PI71930
- Utility support for block level variable length key sorting in Db2 Sort
  - PI60788

## Recent News

- NOSYSCOPY option for RECOVER to support recovery to image copy not defined in SYSCOPY
  - PI67547
- Faster point-in-time recovery in RI environments
  - Smarter RI set checking
  - Customer test: RECOVER TOCOPY of single partition reduced from 5:28m to 2s
  - PI62586

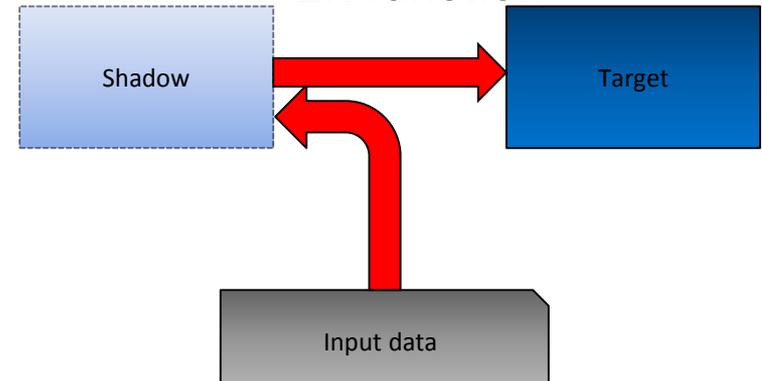
## Recent News

- LOAD support for new DATE, TIME, TIMESTAMP formats
  - PI69064

DATE_A	mm-dd-yyyy	TIME_A	hh.mm.ss	TIMESTAMP_A	yyyy-mm-dd-hh.mm.ss
DATE_B	mm-dd-yy	TIME_B	hh.mm	TIMESTAMP_B	yyyy-mm-dd-hh.mm.ss.nnnnnn
DATE_C	yyyy-mm-dd	TIME_C	hh.mm AM	TIMESTAMP_C	yyyymmddhhmmss
DATE_D	yy-mm-dd		or hh.mm PM	TIMESTAMP_D	yymmddhhmmss
DATE_E	dd-mm-yyyy	TIME_D	hhmmss	TIMESTAMP_E	yyyymmddhhmmssnnnnnn
DATE_F	dd-mm-yy	TIME_E	hhmm	TIMESTAMP_F	yymmddhhmmssnnnnnn
DATE_G	yyyy-ddd				
DATE_H	yy-ddd				
DATE_I	mmddyyyy				
DATE_J	mmddy				
DATE_K	yyyymmdd				
DATE_L	yymmdd				
DATE_M	ddmmyyyy				
DATE_N	ddmmyy				
DATE_O	yyyddd				
DATE_P	yyddd				

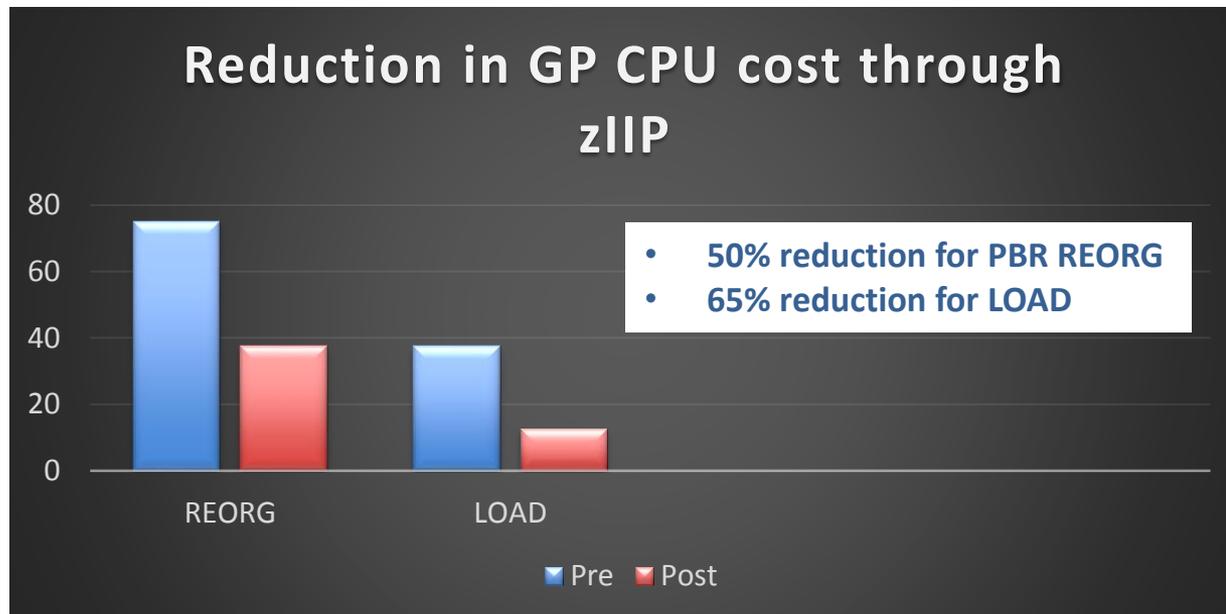
## Recent News

- LOAD REPLACE SHRLEVEL REFERENCE
- LOAD utility pre-validation
  - Including CHECK constraints
- Support usual drain options, including SWITCHTIME
- Works for partition load also
  - Logical NPSI partitions left in RBDP – INDEXDEFER function
- V11: PI67793
- V12: PI69095



## Recent News

- Retrofit zIIP offload from V12 to V11 for LOAD & REORG
  - PI73882
  - PI80243



## Recent News

- CHECK LOB performance
  - 50% CPU reduction, 90% elapsed time reduction
  - PI83928
- Storage reduction for UNLOAD of XML data
  - >4Gb per utility down to 10s of Kb
  - PI84464
- LOAD RESUME LOG NO support for inline image copies
  - PI81723/PI81724

## Recent News

- Statistics COLGROUP performance improvement for single column COLGROUPs
  - New STATCLGSRT zparm
    - Default 10Mb, avoid external sort cost
  - PI74408
  - 100m row table, 20 parts, 6 indexes
    - LOAD STATISTICS TABLE COLGROUP: 39% CPU reduction, 29% ET reduction
    - REORG STATISTICS TABLE COLGROUP: 46% CPU reduction, 37% ET reduction
    - RUNSTATS COLGROUP: 64% CPU reduction, 41% ET reduction
  - PH03678: New STATCLGMEMSRT parameter in RUNSTATS

DSNU1387I DATA SORT FOR SINGLE COLUMN COLGROUPS AVOIDED

DSNU1388I DATA SORT NOT AVOIDED FOR COLGROUPS.

ESTIMATED SPACE REQUIRED = space-value,

SPACE SPECIFIED BY THE STATCLGSRT PARAMETER = storage-limit-value.

## Recent News

- REORG SWITCH phase performance improvement
  - Drive parallel close of part-level inline copy datasets
  - Up to 127-way parallelism
  - Particularly noticeable to tape
  - PI75816
- Reduce application impact from REORG delete of PBG parts
  - Remove need for 2nd drain at end of SWITCH phase
  - Avoid immediate -904 application failures
  - PI86522

## Recent News

- Online REORG last log iteration performance improvement
  - VVDS update before drain, only update VVDS after drain if HURP changes
  - PI83152
- Permit other utilities to run concurrently with REORG of SYSCOPY
  - PI96693
- LOAD SHRLEVEL NONE NOCHECKPEND option
  - Previously only supported for SHRLEVEL REFERENCE
  - PI85722

## Recent News

- LOAD RESUME SHRLEVEL CHANGE PARALLEL resiliency
  - Avoid deadlocks between parallel insert tasks inserting duplicate index keys
  - PI90233
- Avoid long-running UR in LOAD RESUME index build
  - Prevent replication impact
  - PI92244

```
DSNR035I  -D341 DSNRPBCW WARNING - UNCOMMITTED UR   924
AFTER 40 CHECKPOINTS -
          CORRELATION NAME = GPFE113A
          CONNECTION ID   = UTILITY
```

## Recent News

- Acquire BSAM buffers in real both below and above bar
  - PI95858
  - 30 COPY jobs, PARALLEL 3, BUFNO 99, LBI: 30x3x99x256Kb = 2.3Gb
- Improved REORG support for inline copies to tape
  - PI75518
  - V12 new FL only
- REORG to issue –DIS DB LOCKS instead of CLAIMERS if drain failure due to locks
  - E.g. 00C200EB resulting from retained locks
  - PI95911

## Recent News

- Change default for REGISTER parameter from NO to YES for UNLOAD & RUNSTATS
  - PI99075
- Reduce logging volume for REORG
  - Caused by logging of compression dictionaries in SYSUTILX
  - PI92536
- Avoid package invalidation on conversion to PBR or PBR RPN
  - Quiesce of packages still necessary
  - PH01819

## Recent News

- Issue message DSNU2930I and RC4 from REORG if detect rows in wrong partition
  - PI88906

```
DSNU2930I    csect-name - OUT OF PARTITION-SEQUENCE KEYS DETECTED FOR
INDEX creator-name.index-name
```

- Improved cleanup of expired/deleted XML documents by REORG and additional informational messages
  - PH01354

```
DSNU2931I    csect-name - EXPIRED XML RECORDS OLDER THAN discard-threshold WILL BE
DISCARDED FROM XML TABLE SPACE dbname.tsname
```

```
  OLDEST READ CLAIMER RBA/LRSN VALUE IS:  read-lrsn
  LAST SYSTEM COMMIT RBA/LRSN VALUE IS:  commit-lrsn
```

```
DSNU2932I    csect-name - UNLOAD PHASE STATISTICS.  NUMBER OF EXPIRED XML RECORDS
DISCARDED = mmmmmmm for TABLESPACE dbname.tsname
```

## Recent News

- New FLASHCOPY\_XRCP zparm to support RPFC in XRC environments
  - PH01728
  - Supports RPFC delivered in z/OS 2.2 via OA55068
- Allow delete of rows that are discarded by REORG DISCARD
  - Prior to this REORG would fail
  - Updates still not allowed
  - PI98259
- COPY FLASHCOPY CONSISTENT performance improvement
  - PI93390

## Recent News

- RUNSTATS improved sampling
  - New zparm STATPGSAMP
  - Options are SYSTEM, YES, NO - default is SYSTEM
  - YES
    - TABLESAMPLE SYSTEM AUTO will be used by default when gathering stats on UTS objects
    - SAMPLE option is overridden
    - TABLESAMPLE SYSTEM will not be overridden, i.e. we will use page sampling but a sampling rate will not be overridden
  - NO
    - Do not use page sampling by default for UTS tablespaces, keep existing behavior
  - SYSTEM
    - Db2 determines default sampling method
    - Current default is NO
  - New TABLESAMPLE SYSTEM NONE option
    - Overrides STATPGSAMP zparm setting
    - SAMPLE is allowed in this instance, otherwise SAMPLE is not supported with TABLESAMPLE
  - PH07220

## Recent News

- FlashCopy performance improvement
  - Avoid repetitive scans of SYSCOPY for multiple partitions
  - PH05377
- New zparm to control padding on REORG DISCARD
  - REORG\_TS\_NOPAD\_DEFAULT
  - PH00317
- MODIFY RECOVERY FLASHCOPYONLY option
  - PH04023
- LOAD support for multiple SYSREC datasets
  - PI96136

## Summary

- Continued focus on comprehensive, efficient management of Db2 environments
- New solutions in support of ever-greater demands for simplicity, availability, efficiency

A white speech bubble with a tail pointing towards the bottom left is centered in the image. Inside the bubble, the words "Thank You" are written in a white, sans-serif font, with "Thank" on the top line and "You" on the bottom line. The background of the entire image is a dark blue overlay featuring a faint, semi-transparent financial chart with various lines and data points. A hand is visible on the right side, pointing towards the chart.