IBM Db2 for z/OS Utilities: The Latest Developments

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Db2 for z/OS Development

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Agenda

- Utilities Strategy
- V12 quick review
- Recent Enhancements
- Summary

Strategy

- Support core function
- Reduce CPU, ET & resource consumption
- Maximize availability
- Remove constraints & limitations
- Simplify data management

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

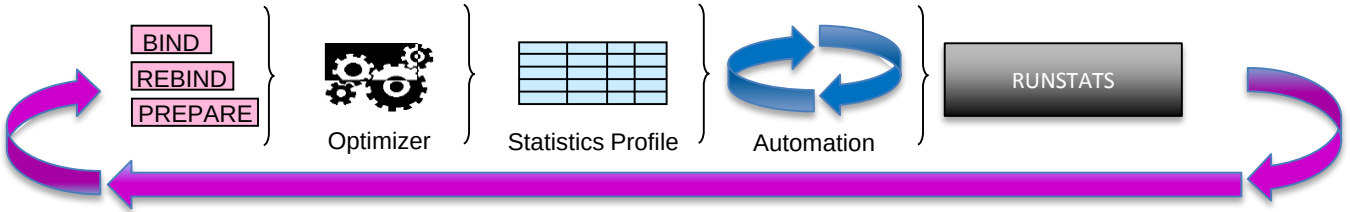
- LOAD
  - Performance improvement for LOAD PART REPLACE with dummy input
    - Against empty PBR partition – 99% CPU, 98% ET reduction
  - LOAD SHRLEVEL CHANGE PARALLEL support for PBG
  - Up to 90% additional zIIP offload
  - Maintain MAXASSIGNEDVAL for identity columns
  - Eliminate datasharing overhead 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 copypool 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

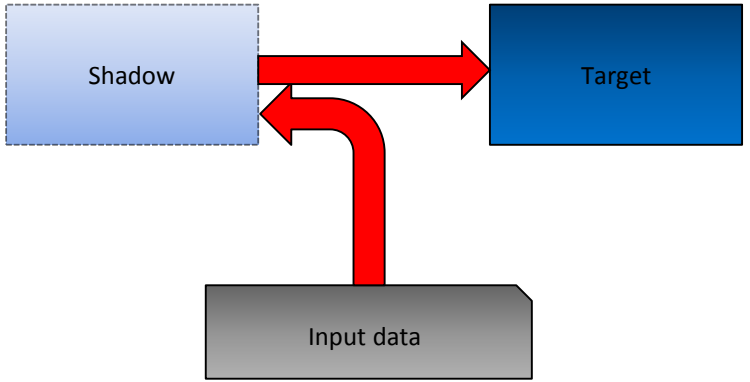
DATE_A	mm-dd-yyyy
DATE_B	mm-dd-yy
DATE_C	yyyy-mm-dd
DATE_D	yy-mm-dd
DATE_E	dd-mm-yyyy
DATE_F	dd-mm-yy
DATE_G	yyyy-ddd
DATE_H	yy-ddd
DATE_I	mmddyyyy
DATE_J	mmddyy
DATE_K	yyyymmdd
DATE_L	yymmdd
DATE_M	ddmmyyyy
DATE_N	ddmmyy
DATE_O	yyyyddd
DATE_P	yyddd

TIME_A	hh.mm.ss
TIME_B	hh.mm
TIME_C	hh.mm AM or hh.mm PM
TIME_D	hhmmss
TIME_E	hhmm

TIMESTAMP_A	yyyy-mm-dd-hh.mm.ss
TIMESTAMP_B	yyyy-mm-dd-hh.mm.ss.nnnnnn
TIMESTAMP_C	yyyymmddhhmmss
TIMESTAMP_D	yymmddhhmmss
TIMESTAMP_E	yyyymmddhhmmssnnnnnn
TIMESTAMP_F	yymmddhhmmssnnnnnn

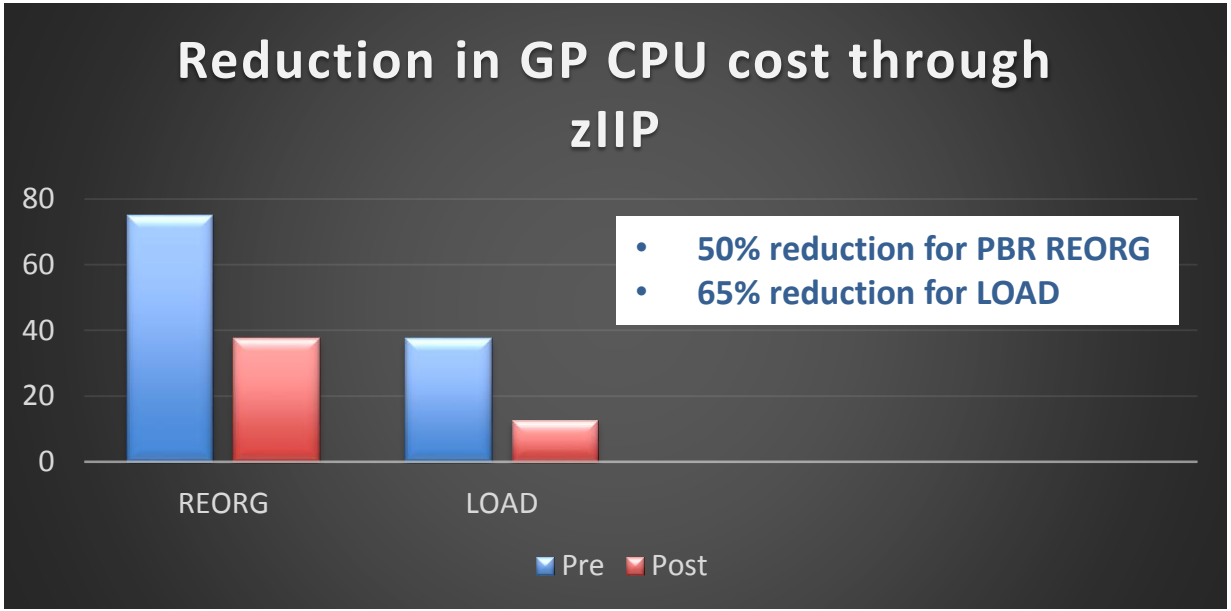
Recent News

- 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

```
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
- Allow delete of rows that are discarded by REORG DISCARD
  - Prior to this REORG would fail
  - Updates still not allowed
  - PI98259
- COPY FLASHCOPY CONSISTENT consistency processing performance improvement
  - PI93390

Summary

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


Thank
You