

Db2 for z/OS Utilities Update

Haakon Roberts
Db2 for z/OS Development



Z

Agenda

- REORG
- LOAD & UNLOAD
- REBUILD INDEX
- Backup and Recovery
- RUNSTATS & Inline Statistics
- General
- Summary

REORG

- REORG performance by driving PI build parallelism
 - Skip PI sort, build parts in parallel during RELOAD phase
 - Only when no NPSIs exist on table
 - PH28092
- REORG DISCARD NOCHECKPEND
 - Availability option to avoid setting CHKP after discard processing
 - Avoids need for separate REPAIR statement
 - PH13527

REORG

- REORG sort performance with z15
 - Support new z15 DFSORT performance improvement
 - REORG data sort only (variable length records)
 - New zparm UTILS_USE_ZSORT
 - PH28183
- Always sort NPSI index keys when SORTNPSI is YES
 - Or zparm REORG_PART_SORT_NPSI = YES
 - Guarantee gathering of NPSI statistics for part-level REORGs
 - PH34403

REORG

- Better handling of REORG inline copies
 - PI75518
 - Remove restriction for PBR RPN that part-level inline copies are required
 - ICLIMIT DASD n
 - Zparm REORG_ICLIMIT_DASD
 - ICLIMIT TAPE n
 - Zparm REORG_ICLIMIT_TAPE
 - Minimum number will be required to handle inline copies for associated LOB tablespaces that must remain separate

REORG

- Better handling of REORG inline copies contd.
- New messages:

DSNU2937I csect-name - SEQUENTIAL INLINE IMAGE COPY PROCESSING
SUMMARY

MAXIMUM NUMBER OF DASD IMAGE COPIES REQUIRED IS a
MINIMUM NUMBER OF DASD IMAGE COPIES REQUIRED IS b
ACTUAL NUMBER OF DASD IMAGE COPIES ALLOCATED IS c
MAXIMUM NUMBER OF TAPE IMAGE COPIES REQUIRED IS d
MINIMUM NUMBER OF TAPE IMAGE COPIES REQUIRED IS e
ACTUAL NUMBER OF TAPE IMAGE COPIES ALLOCATED IS f

DSNU2938I csect-name - UTILITY CANNOT ALLOCATE THE MINIMUM
NUMBER OF REQUIRED IMAGE COPY DATA SETS DUE TO KEYWORD OR
SUBSYSTEM PARAMETER SPECIFICATION

REORG

- REORG INDEX performance
 - REORG INDEX NOSYSUT1 option delivered in 12 via PH25217
 - Up to 86% ET and 61% CPU savings for REORG INDEX
 - Disabled by default in 12
 - Enabled via NOSYSUT1 REORG parm or REORG_INDEX_NOSYSUT1 zparm
 - In Vnext the NOSYSUT1 option will be ignored and always take effect (M500 onwards)

REORG

- Minimise application impact from REORG drain attempt
 - Prevent drain attempt on first log iteration when REORG doesn't have an accurate estimate of time it will take to process
 - PH19594
- Reduce memory consumption for REORG inline copy processing
 - PH19725
- Avoid pulling in LOB tablespaces when using REORG to convert to PBG if MAXPARTITIONS 1
 - PH18057

REORG

- Change in NOBASIC zparm behaviour
 - Before PH30652
 - If zparm is NOBASIC is set then REORG would fail if cannot convert to extended
 - Causes problem for pagesets that cannot be converted (e.g. clones)
 - If zparm is EXTENDED then REORG would succeed
 - After PH30652
 - REORG will succeed even if conversion cannot be done

LOAD & UNLOAD

- LOAD RESUME SHRLEVEL CHANGE compatibility with online REORG
 - PH11255
- UNLOAD SHRLEVEL CHANGE compatibility with online REORG
 - PH27915
- LOAD PRESORT option
 - Supports both DFSORT and Db2 Sort
 - PH23105
 - PH34323 delivers up to 24% ET performance improvement for PRESORT

LOAD & UNLOAD

- Ignore invalid PARALLEL option on LOAD
 - Succeed RC0 instead of fail RC8
 - PARALLEL option not valid with SPANNED YES, FORMAT INTERNAL, INCURSOR, PRESORTED or FORMAT SQL/DS options
 - PH19073
- OVERRIDE(ROWCHANGE) option on LOAD
 - Override row change timestamp column values
 - PH25572

LOAD & UNLOAD

- LOAD support for 3 byte packed decimal julian date
 - New DATE_P option on LOAD to support x'YYDDDs' format
 - PH22944

LOAD

C1 POSITION(1:3) DATE DATE_P

C2 POSITION(4:8) DATE EXTERNAL (DATE_P)

input for C1: '20086C'X

input for C2: 'F2F0F0F8F6'X

LOAD & UNLOAD

- New LOAD_RO_OBJECTS zparm
 - Permit LOAD utility to load into pagesets started RO
 - Default is NO
 - PH26131
- LOAD FORCE NONE|READERS|ALL option
 - PH24369
 - LOAD REPLACE SHRLEVEL REFERENCE behaviour:
 - FORCE READERS forces all claimers at SWITCH time
 - FORCE ALL forces writers at UTILINIT, all at SWITCH time

LOAD & UNLOAD

- LOAD DEFAULTIF improvements
 - Support not equals in addition to equals
 - E.g. COL2 POSITION(5:10) CHAR(6) DEFAULTIF(COL1<>'ABC')
 - Support substitution with default value in case of conversion error
 - E.g. COL2 POSITION(5:14) DATE DEFAULTIF(CONV_ERROR)
 - PH30610
- Improve AUTH_COMPATIBILITY zparm for UNLOAD process
 - AUTH_COMPATIBILITY=SELECT_FOR_UNLOAD changed to permit UNLOAD when either SELECT or UNLOAD privilege exists
 - PH20168

LOAD & UNLOAD

- LOAD FORMAT DELIMITED correction for DECIMAL data
 - Inconsistent behaviour for LOAD FORMAT EXTERNAL of DECIMAL EXTERNAL data
 - LOAD FORMAT DELIMITED ... (DEC1 POSITION(*) DECIMAL EXTERNAL(10,2))
 - Input: 123456
 - LOAD without FORMAT DELIMITED loads 1234.56 (right)
 - LOAD with FORMAT DELIMITED loads 123456.00 (wrong)
 - Fixed by PH36908 in 12 with new zparm LOAD_DELIM_IMPLICIT_DEC
 - Default is N (keep existing behaviour)
 - IFCID 25 enhanced to identify this situation
 - Run it over time and correct jobs because expect that in future FL Db2 will remove the zparm

LOAD & UNLOAD

- Consistent copy for LOAD
 - LOAD REPLACE will now fix up inline copy in INDEXVAL and ENFORCE phases so can now be used for recovery purposes
 - PH39300
- LOAD better handling of part level inline copies
 - Before: 2 options:
 1. COPYDDN at ts level serialises at ts level
 2. COPYDDN at part level, which means separate IC for each part, also problems for IC to tape
 - With PH40709:
 - Single COPYDDN at ts level will only serialise and copy parts processed

REBUILD INDEX

- Change REBUILD INDEX on an empty table to end RC0, not RC4
 - Messages DSNU550I, DSNU551I changed from warning to informational
 - PH20379

COPY and RECOVER

- Redirected recovery
 - PH27043 – tablespace support
 - PH35266 – index support
 - Ability to use RECOVER utility to recover object to a different target with zero source impact
 - Recovery testing, RTE, forensic business analysis, data movement
 - PIT recovery or to current
 - Current meaning current as of time of RECOVER
 - Target will be made consistent, just as in a normal PIT recovery
 - UTS base, LOB, XML, indexes supported and can be recovered separately

COPY and RECOVER

- Redirected recovery contd.
 - RECOVER TABLESPACE testdb.testts FROM proddb.prodts
 - New messages:
 - DSNU1569I RECOVERY LOGPOINT IS X'rsa-or-lrsn'
 - DSNU1568I log-phase – n LOG RECORDS READ, m LOG RECORDS APPLIED
 - New TRANSLAT phase to translate OBIDs at target
 - Target placed in copy-pending after RECOVER
 - Recommended actions on target after RECOVER completion
 - REPAIR CATALOG; Run COPY to create new recovery base; REBUILD any indexes; CHECK DATA if in CHKP

Statistics

- Simplify sampling for RUNSTATS
 - PH07220
 - Promote use of page sampling and auto sampling rate
 - New zparm STATPGSAMP
 - Options are NO, YES, SYSTEM
 - NO
 - Keep existing behaviour
 - ...

Statistics

- Simplify sampling for RUNSTATS contd.
- STATPGSAMP behavior contd.
 - YES
 - TABLESAMPLE SYSTEM AUTO will be used by default on UTS objects
 - SAMPLE option is overridden to use TABLESAMPLE SYSTEM AUTO, i.e. override row sampling to page
 - TABLESAMPLE SYSTEM will not be overridden, i.e. we will use page sampling but the specified sampling rate will not be overridden
 - SYSTEM
 - Before V12R1M505: Equals NO
 - After V12R1M505: Equals YES

Statistics

- Report profile options in job output
- PH11423

```
DSNU050I      268 11:45:54.15 DSNUGUTC -  RUNSTATS TABLESPACE L611DB.L611TS
TABLE(ADMF001.L611TABLE) USE PROFILE SHRLEVEL CHANGE REPORT YES
DSNU1361I -DB2A 268 11:45:54.15 DSNUGPRF -  THE STATS PROFILE WITH STATSTIME
= 2019-09-25-11.45.49.973036  FOR TABLE L611TABLE HAS BEEN USED
DSNU1376I -DB2A 268 11:45:54.15 DSNUGPR1 -  PROFILE_TEXT IN
SYSTABLES_PROFILES ROW
FOR TABLE ADMF001.L611TABLE IS
COLUMN (ALL) INDEX (*) HISTOGRAM NUMCOLS 1 NUMQUANTILES 3
DSNU1368I      268 11:45:54.15 DSNUGPRB -  PARSING STATS PROFILE FOR TABLE
L611TABLE
DSNU1369I      268 11:45:54.15 DSNUGPRB -  PARSING STATS PROFILE FOR TABLE
L611TABLE COMPLETED
```

Statistics

- Improve RUNSTATS performance and limit memory consumption for FREQVAL and COLGROUP processing many parts
 - If BOTH or HISTOGRAM is specified then cap COUNT at 100 partitions
 - If sampling <50% and FREQVAL COUNT BOTH or LEAST then change to MOST
 - PH25277

DSNU1393I csect-name VALUE SPECIFIED FOR COUNT IS OVERRIDDEN BY DB2

DSNU1394I csect-name KEYWORD keyword IS OVERRIDDEN WITH MOST

Statistics

- Dynamic profile support
 - FL507
 - Delete from the catalog statistics which are not part of the profile being used
 - REORG USE PROFILE support added with PH16345, also enabled at FL507

DSNU1390I csect-name THE UTILITY DELETED ALL EXISTING STATISTICS FOR THE TARGET OBJECT AND COLLECTED NEW STATISTICS WITH THE SPECIFIED PROFILE

General

- New zparm UTILS_BLOCK_FOR_CDC
 - Give greater control to prevent disruptive replication refreshes
 - Prevent utilities from performing any action that triggers a replication target refresh
 - CHECK DATA DELETE YES
 - LOAD LOG NO
 - PIT recovery
 - REORG DISCARD
 - REPAIR LOCATE DELETE
- PH14363 `DSNU187I csect-name utility-name UTILITY IS NOT ALLOWED ON TABLE SPACE database-name.table-space-name BECAUSE IT CONTAINS A TABLE WITH THE DATA CAPTURE CHANGES ATTRIBUTE`

General

- CHECK SHRLEVEL CHANGE resets CHKP/ACHKP
 - PH25593
- Do not register DSN1COPY with SCRT
 - VUE customers will no longer see Db2 in SCRT MLC reports.
 - PH15766
- New REPAIR WRITELOG option
 - PH11871
 - Allow vendors to write LGOPALT diagnostic log record to trigger replication target refresh

General

- DSNACCOX performance and scalability improvement
 - If many objects in restricted state then DSNACCOX with CRITERIA DBNAME=dbname may not find all objects since internal –DIS DB command can exceed available space
 - DSNACCOX changed to use a targeted –DIS DB command when dbname specified in CRITERIA parameter
 - PH25108
- TEMPLATE support for large block interface
 - New BLKSZLIM parameter
 - PH30093

Summary

- Major enhancements delivered through maintenance stream in 2020/21
 - Not including utility support for key engine items such as multi-table table space conversion to UTS
- Further significant usability, availability, performance improvements planned for utilities going forward
- Reference:
 - Recent enhancements to Db2 12 in Knowledge Center
 - Db2 for z/OS lab blog

Feedback & Questions