Db2 13 data sharing

IRLM dynamic alter of CF lock structure
GBP group level castout
GBP residency time
Performance for RPN table spaces
Db2 controlled Sysplex workload balancing

Dynamically alter CF lock structure

FL 100

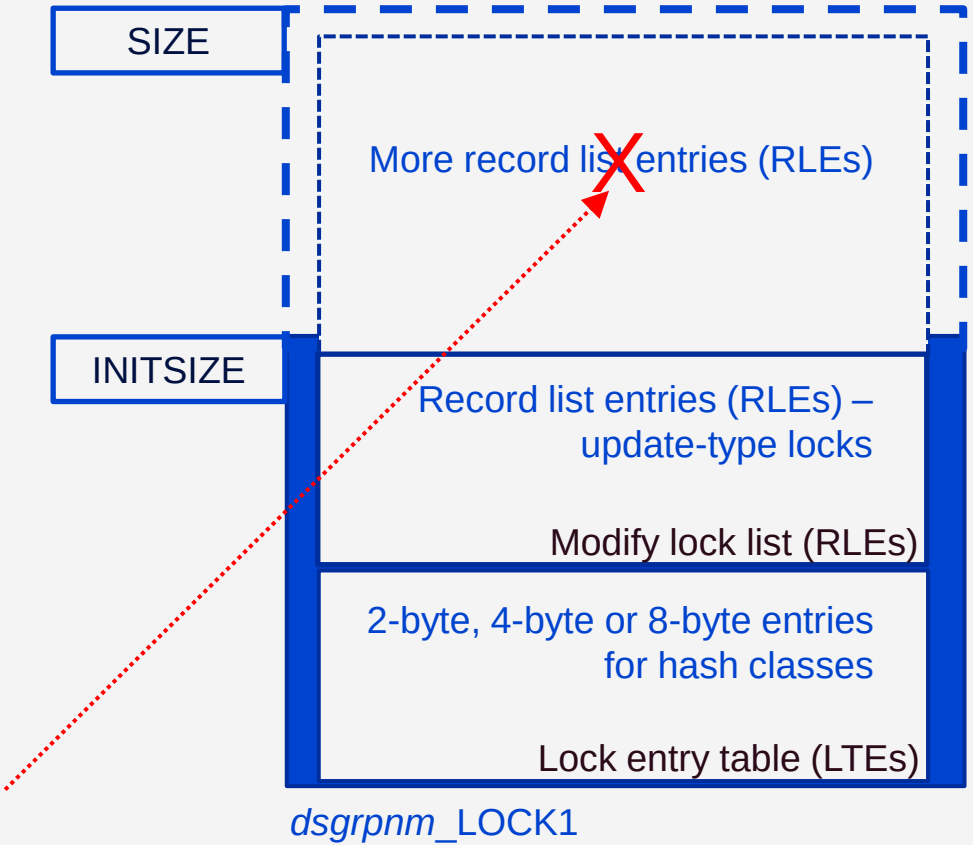
Db2 lock structure (*dsgrpnm*_LOCK1) allocated based upon CFRM policy

- INITSIZE = initial size, SIZE = max size
- Lock entry table = $2^n \leq 0.5$ x INITSIZE

CFRM ALLOWAUTOALT YES

- XES can dynamically adjust structure allocation
  - FULLTHRESHOLD > 0 enables monitoring and dynamic rebuild; ‘full’ applies to modify lock list record list entries (RLEs) only
  - Expansion of LOCK1 results in more RLEs

Under heavy workload IRLM does not request expansion; XES expansion not responsive enough



IRLM requests dynamic lock structure increase

FL 100

Db2 13: IRLM initiates dynamic alter of lock structure to avoid structure full conditions

- More responsive than AUTOALTER in CFRM policy
- New messages:

```
DXR189I  <irlmname> ALTERING LOCK STRUCTURE SIZE
DXR190I  <irlmname> ALTER LOCK STUCTURE COMPLETED

IXC530I START ALTER REQUEST FOR STRUCTURE DSNCAT_LOCK1 ACCEPTED
  TARGET  SIZE:                  8 M
IXC534I REQUEST TO ALTER STRUCTURE DSNCAT_LOCK1
COMPLETED.  TARGET ATTAINED.
CURRENT SIZE:                    8 M  TARGET:          8 M
CURRENT ENTRY COUNT:          4427    TARGET:       4427
CURRENT ELEMENT COUNT:           0    TARGET:          0
CURRENT EMC COUNT:               0    TARGET:          0
```

Trigger GBP group level castout on shorter interval

FL 100

GBP castout is critical for busy data sharing systems

- Castout delays can lead to GBP full, application delays, and coupling facility (CF) message overhead
- GBP full can add pages to the logical page list (LPL)
  - Pages on LPL are not available for any process
- Group buffer pool threshold (GBPOOLT) monitoring drives group level castout
  - Threshold monitoring frequency values are static
- Db2 checks for relief of GBP full condition on behalf of transaction or process
  - “Transaction pacing”: interval between checks

New behavior

- GBPOOLT threshold monitoring
  - Frequency increased dramatically
    - Castout triggered more quickly
- “Transaction pacing”
  - Frequency increased dramatically
    - Faster response to GBP full relief
- Overall reduced likelihood of delays due to GBP full conditions

Group buffer pool (GBP) residency time

FL 100

Challenge:

- More information required to tune GBPs effectively and to balance resources between GBPs

Solution:

- Collect residency time for directory entries and data elements
  - Record average in microseconds of residency time for directory entries and data elements in IFCIDs 230, 254
- New message DSNB820I added to DISPLAY GROUPBUFFER POOL GDETAIL option

```
DSNB820I - AVERAGE RESIDENCY TIME
             FOR DIRECTORY ENTRIES                  = directory-entry-reside-time
             FOR DATA ENTRIES                       = data-area-reside-time
```

- Requires z/OS 2.4 or z/OS 2.5, and GBP in CF on z16+ with CF control code (CFCC) 25 or higher

Performance tip for RPN table spaces

FL 500

Db2 12 introduced relative page numbering (RPN) for universal PBR table spaces

- RPN advantages versus absolute page numbering:
  - Much greater data capacity
  - Maximum number of partitions not affected by choice of page size or DSSIZE
  - DSSIZE can be specified at partition level (and DSSIZE increase is immediate change)

Performance tip for RPN table spaces *defined with LOCKSIZE ROW in a data sharing system*: after activating function level V13R1M500, online REORG those table spaces

- Why?
  - Online REORG will modify header pages of table space's partitions so that Db2 will use a new lock hashing algorithm for the data page P-lock requests associated with row-level L-locks
  - New hashing algorithm will boost CPU efficiency by reducing page P-lock contention
- Note that this online REORG can be done at the partition level – full-table space REORG not required
- For RPN table spaces created after activation of function level V13R1M500, Db2 will use the new hashing algorithm for data page P-locks – no need to REORG those table spaces to get that performance benefit

Db2 controlled Sysplex workload balancing

FL 502

Sysplex workload balancing (transaction-level workload balancing)

- High availability for client applications
- In some situations, Sysplex workload balancing is not being exploited by DDF clients as often as desired
  - Now you can initiate Sysplex workload balancing

- -MODIFY DDF (Db2) command changes (PH48253)
  - RQSTWLB – request client to enable Sysplex workload balancing; Db2 LUW 11.5 or later, JDBC 4.26.14 or later
    - * - enabled for entire data sharing group (default)
    - *location-name*
    - *alias - name*
  - DFLTWLB – honor Sysplex workload balancing option requested by client
    - * - enabled for entire data sharing group (default)
    - *location-name*
    - *alias-name*