CIBC

Investigate DB2 deadlock using SMF 102 (IFCID 172)

xiaodong.ma@cibc.com

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Agenda

1 Typical DB2 deadlock scenario

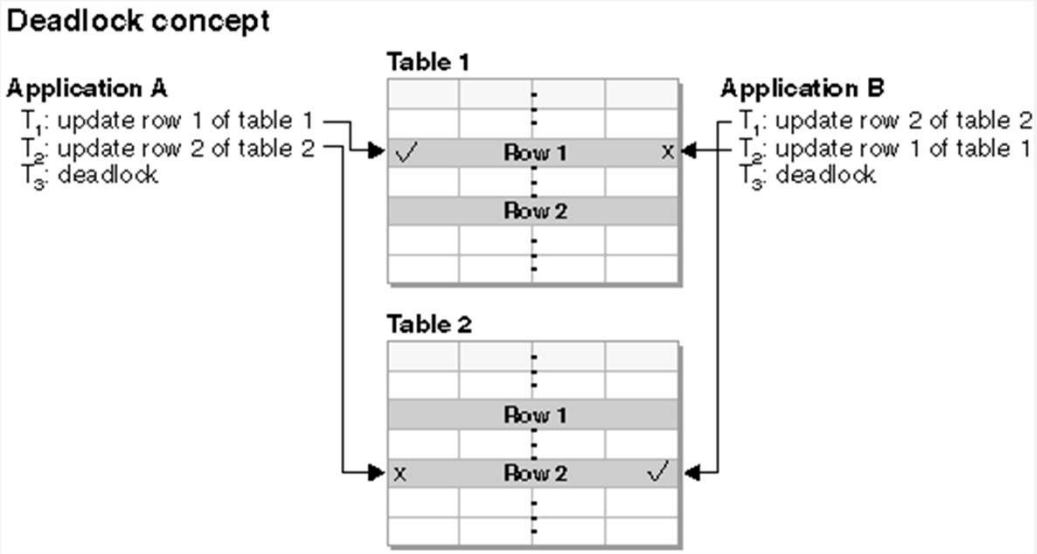
2 DSNT375I deadlock message

3 IFCID 172 data in SMF 102

- DB2 trace
- Decompress IFCID 172 data
- IFCID 172 data layout

4 Tools can parse SMF 102 (IFCID 172) data

1 Typical DB2 deadlock scenario



Holder	Waiter	Resource
Plan A (package A1)	Plan B (package B1)	Row 1 in Table 1
Plan B (package B2)	Plan A (package A2)	Row 2 in Table 2

2 DSNT375I deadlock message

```
In DB2 master log:

10.26.43 STC11680  DSNT375I  -SYXX PLAN=MPPA WITH  152
   152                    CORRELATION-ID=0176MPPA
   152                    CONNECTION-ID=IXXA
   152                    LUW-ID=CAxxxxxx.APxxDDF.DD7DD11D2EAD=29679
   152                    THREAD-INFO=IMSREGS:*:*:MPPA:STATIC:9188693:*:*
   152                    IS DEADLOCKED WITH PLAN=MPPB WITH
   152                    CORRELATION-ID=0008MPPB
   152                    CONNECTION-ID=IXXA
   152                    LUW-ID=CAxxxxxx.APxxDDF.DD7DD1214E01=29684
   152                    THREAD-INFO=IMSREGS:*:*:MPPB:STATIC:9202138:*:*
   152                    ON MEMBER DBXX
10.26.43 STC11680  DSNT501I  -SYXX DSNILMCL RESOURCE UNAVAILABLE  153
   153                       CORRELATION-ID=0176MPPA
   153                       CONNECTION-ID=IXXA
   153                       LUW-ID=CAxxxxxx.APxxDDF.DD7DD11D2EAD=29679
   153                       REASON 00C90088
   153                       TYPE 00000302
   153                       NAME XXXDBD1 .SXXXTSTB.X'00000022'
10.26.44 STC11680  DSN3201I  -SYXX ABNORMAL EOT IN PROGRESS FOR  167
   167            USER=IMSREGS CONNECTION-ID=IXXA CORRELATION-ID=0176MPPA
   167            JOBNAME=IXXABZQT ASID=0158 TCB=00ABB500
```

https://www.ibm.com/docs/en/db2-for-zos/12?topic=messages-dsnt375i

There is only ‘half’ deadlock information in DSNT375I (1 waiter, 1 holder and 1 locked resource).

3 IFCID 172 data in SMF 102

IFCID (Instrumentation Facility Component Identifier) 172 is in Db2 statistics trace Class 3

https://www.ibm.com/docs/en/db2-for-zos/12?topic=commands-start-trace-db2

Class	Description of class	Activated IFCIDs
3	**Deadlock**, lock escalation, group buffer pool, data set extension information, and indications of long-running uncommitted reads, and active log space shortages.	**172**, 196, 250, 258, 261, 262, 313, 330, 335, 337

```
 -DISPLAY TRACE
DSNW127I  -SYXX CURRENT TRACE ACTIVITY IS -
TNO TYPE   CLASS        DEST QUAL IFCID
01  STAT   01,03,04,05, SMF  NO
01         06
02  AUDIT  01,02,08     SMF  NO
03  ACCTG  01,02,03     SMF  NO

*********END OF DISPLAY TRACE SUMMARY DATA*********
DSN9022I  -SYXX DSNWVCM1 '-DIS TRACE' NORMAL COMPLETION
```

Extract/Filter SMF data

```
//SMF       EXEC  PGM=IFASMFDP
//DUMPIN    DD DISP=SHR,DSN=prefix.MANDUMP
//DUMPOUT   DD DSN=prefix.SMF.T102,
//             DISP=(,CATLG,CATLG),
//             SPACE=(CYL,(10,10),RLSE),
//             DCB=(RECFM=VBS,LRECL=32760,BLKSIZE=27998)
//SYSPRINT  DD    SYSOUT=A
//SYSIN     DD    *
   INDD(DUMPIN,OPTIONS(DUMP))
   OUTDD(DUMPOUT,TYPE(102))
   DATE(YYYYDDD,YYYYDDD)
   START(HHMM),END(HHMM)
/*
```

IFASMFDP can extract SMF records according to Type/Date/Time

DFSERA10 utility

DFSERA10 is IMS utility to copy/print IMS log, it can also copy/print any QSAM including SMF data

https://www.ibm.com/docs/en/ims/13.1.0?topic=SSEPH2_13.1.0/com.ibm.ims13.doc.sur/ims_dfsera10.html

```
//STEP1   EXEC PGM=DFSERA10
//STEPLIB   DD DISP=SHR,DSN=prefix.RESLIB
//SYSUT1    DD DISP=SHR,DSN=prefix.SMF.T102
//SYSPRINT  DD SYSOUT=A
//SYSIN     DD *
OPTION   PRINT
END
/*
```

Decompress SMF data

```
Offset    Hex                                                                    Characters

000000   00DE0000 1E660003  34750123 095FE2E8   FFFFC4FF FF400000  800000F0 80830005  *.............¬SY??D?? .....0.C..*
000020   84008800 01830005  2C005800 01830001   0D85000F 94EF6600  05A7A504 EAFA210D  *D.H..C.......C...E..M....XV.....*
000040   ABF24084 0004074F  9BF18C00 04048DF8   A0840014 05BE8D36  0001D575 0000B857  *.2 D...|.1.....8.D........N.....*
000060   000007DC 074F9BF1  85002B01 D5750000   B8570000 07DC0074  010A00FE 02C13345  *.....|.1E...N................A..*
```

If it’s x’80’ at offset x’18’, it’s compressed record (SMFCOMP subsystem parameter is ON), need to decompress using DSNTSMFD, Source code is in *prefix*.SDSNSAMP(DSNTSMFD) , JCL is in *prefix*.SDSNSAMP(DSNTEJDS)

https://www.ibm.com/docs/en/db2-for-zos/12?topic=utilities-dsntsmfd

SMF 102 layout

In SMF, writer headers for statistics records are mapped by macro DSNDQWST, for accounting records by DSNDQWAS, and for performance, audit, and monitor records by DSNDQWSP. Macros are in *prefix*.SDSNMACS

https://www.ibm.com/docs/en/db2-for-zos/12?topic=records-trace-data-record-format

```
//SMF      EXEC PGM=ASMA90
//SYSPRINT DD SYSOUT=*
//SYSLIB   DD DISP=SHR,DSN=prefix.SDSNMACS
//SYSLIN   DD  DSN=&&OBJ,SPACE=(3040,(40,40),,,ROUND),UNIT=VIO,
//             DISP=(MOD,PASS),
//             DCB=(BLKSIZE=3040,LRECL=80,RECFM=FBS,BUFNO=1)
//SYSIN    DD *
 DSNDQWSP DSECT=YES,SUBTYPE=ALL
 END
/*
```

This is Assembler job which can generate the listing of DSNDQWSP (SMF102 definition)

DSNDQWSP listing

```
 Active Usings: None
0  Loc  Object Code    Addr1 Addr2  Stmt   Source Statement                                HLASM R6.0  2023/04/03 21.47
0                                     7+*
                                      8+*********************************************************************
                                      9+* SMF  102 DB2 PERFORMANCE/SERVICEABILITY RECORD SECTION MAPPING
                                     10+*(SEE SYSTEM PLANNING AND ADMINISTRATION GUIDE FOR ADDITIONAL DETAIL)*
                                     11+*********************************************************************
                                     12+*   DSECT   MACRO      *  DESCRIPTION OF SECTIONS IN RECORD          *
                                     13+*                                                                  *
                                     14+*  NOTE: FIELDS DEFINED AS CHARACTER MAY CONTAIN HEX DATA            *
                                     15+*-------------------------------------------------------------------*
                                     16+*   SM102   DSNDQWSP   *  SMF HEADER SECTION                         *
                                     17+*-------------------------------------------------------------------*
                                     18+*                      * INDIVIDUAL IFCID FOLLOWS
                                     19+*                      *
                                     20+*   QWT0    DSNDQWT0   *  SELF DEFINING SECTION - NOTE: USE OFFSETS
                                     21+*                      *   IN QWT0 TO GET TO THE FOLLOWING SECTIONS
                                     22+*                      *   BECAUSE THEIR EXACT POSITION VARIES
                                     23+*-------------------------------------------------------------------
                                     24+*                      * FOLLOWING SECTIONS BEGIN ON A WORD BOUNDARY
                                     25+*                      * PRODUCT SECTION. THIS SECTION NORMALLY
                                     26+*                      * APPEARS AT THE END OF RECORD.
                                     27+*   QWHS    DSNDQWHS   *   STANDARD HEADER ALWAYS APPEARS
                                     28+*    QWHC   DSNDQWHC   *    CORRELATION HEADER MAY APPEAR
                                     29+*    QWHT   DSNDQWHT   *    TRACE HEADER MAY APPEAR
                                     30+*    QWHU   DSNDQWHU   *    CPU  HEADER MAY APPEAR
                                     31+*    QWHD   DSNDQWHD   *    DISTRIBUTED HEADER MAY APPEAR
                                     32+*    QWHA   DSNDQWHA   *    DATA SHARING HEADER MAY APPEAR
                                     33+*                      *
                                     34+*                      *NOTE: THIS MACRO MAPS MANY IFCIDS.
                                     35+*                      *      ONLY DATA FOR ONE IFCID IS CONTAINED
                                     36+*                      *      IN THE RECORD.
                                     37+*   QW00    DSNDQW00   *   IFC ID  0004 - 0057
                                     38+*   QW01    DSNDQW01   *   IFC ID  0058 - 0139
                                     39+*    QWPZ    DSNDQWPZ  *    IFC ID  0106
                                     40+*   QW02    DSNDQW02   *   IFC ID  0140 - 200
                                     41+*   QW03    DSNDQW03   *   IFC ID  0201 - 0249   (EXCEPT 202, 239)
                                     42+*   QW04    DSNDQW04   *   IFC ID  0250 - 0360
                                     43+*   QW05    DSNDQW05   *   IFC ID  0361 - 0512
                                     44+*********************************************************************
```

SMF 102 (IFCID 172 data) printed by DFSERA10

```
Offset   Hex                                                                    Characters

000000  058A0000 1E660039  60BA0123 174FE2E8   FFFFC4C2 FFFF0000  00000000 0000043C  *........-....|SYXXDBXX..........*
000020  014E0001 00000034  00100001 00000044   01FC0002 0020AF12  00000002 DD7DD12F  *.+.........................'J.*
000040  68DCBD96 00047422  0D000000 03A50023   00000022 00000000  00000000 00000000  *...O.........V..................*
000060  00000000 00000000  D4D7D7C1 40404040   F0F1F7F6 D4D7D7C1  40404040 C9FFFFFF  *........MPPA    0176MPPA    IXXX*
000080  40404040 C3C1FFFF  FFFFFFFF C1D7FFFF   C4C4C640 DD7DD11D  2EAD0001 000073EF  *    CA??????AP??DDF .'J.........*
0000A0  00000000 004E00BC  1B63BC20 C4C2F0F7   40404040 08401200  D4D7D7C2 40404040  *.....+......DBXX    . ..MPPB    *
0000C0  F0F0F0F8 D4D7D7C2  40404040 C9F0F7C1   40404040 C3C1FFFF  FFFFFFFF C1D7FFFF  *0008MPPB    IXXA    CA??????AP??*
0000E0  C4C4C640 DD7DD121  4E010001 000073F4   00000000 004E008F  1B639008 004E008F  *DDF .'J.+......4.....+.......+..*
000100  1B638F20 02052030  12000000 C4C2FFFF   40404040 C9D4E2D9  C5C7E240 40404040  *............DBXX    IMSREGS     *
000120  40404040 40404040  40404040 D4D7D7C1   40404040 40404040  40404040 40404040  *            MPPA                *
000140  40404040 40404040  40404040 40404040   40404040 40404040  40404040 40400000  *                              ..*
000160  0000C4C2 F2D7C7C1  F2C1C1D7 D3C4C2F2   40404040 40404040  40404040 40404040  *..DB2PGA2AAPLDB2                *
000180  40404040 40404040  40404040 1BAF2317   0BF5A698 00000000  008C69D2 40000000  *            .....5WQ.......K ...*
0001A0  00000000 C9D4E2D9  C5C7E240 40404040   40404040 40404040  40404040 D4D7D7C2  *....IMSREGS                 MPPB*
0001C0  40404040 40404040  40404040 40404040   40404040 40404040  40404040 40404040  *                                *
0001E0  40404040 40404040  40404040 40400000   0000C4C2 F2D7C7C2  F1C1C1D7 D3C4C2F2  *              ....DB2PGB1AAPLDB2*
000200  40404040 40404040  40404040 40404040   40404040 40404040  40404040 1BAF97D5  *                            ..PN*
000220  0148BD78 00000000  008C2AB1 40000000   00000000 00000000  00000000 00000000  *............ ................*
000240  00053422 0D000000  03A50026 00000022   00000000 00000000  00000000 00000000  *.........V......................*
000260  00000000 D4D7D7C2  40404040 F0F0F0F8   D4D7D7C2 40404040  C9FFFFC1 40404040  *....MPPB    0008MPPB    IXXA    *
000280  C3C1FFFF FFFFFFFF  C1D7FFFF C4C4C640   DD7DD121 4E010001  000073F4 00000000  *CA??????AP??DDF .'J.+......4....*
0002A0  004E008F 1B638F20  C4C2FFFF 40404040   08401200 D4D7D7C1  40404040 F0F1F7F6  *.+......DBXX    . ..MPPA    0176*
0002C0  D4D7D7C1 40404040  C9F0F7C1 40404040   C3C1FFFF FFFFFFFF  C1D7FFFF C4C4C640  *MPPA    IXXA    CA??????AP??DDF *
0002E0  DD7DD11D 2EAD0001  000073EF 00000000   004E00BC 1B63BD08  004E00BC 1B63BC20  *.'J..............+.......+......*
000300  02052030 11000000  C4C2FFFF 40404040   C9D4E2D9 C5C7E240  40404040 40404040  *........DBXX    IMSREGS         *
000320  40404040 40404040  D4D7D7C2 40404040   40404040 40404040  40404040 40404040  *        MPPB                    *
000340  40404040 40404040  40404040 40404040   40404040 40404040  40400000 0000C4C2  *                          ....DB*
000360  F2D7C7C2 F1C1C1D7  D3C4C2F2 40404040   40404040 40404040  40404040 40404040  *2PGB1AAPLDB2                    *
000380  40404040 40404040  1BAF97D5 0148BD78   00000000 008C3555  40000000 00000000  *        ..PN............ .......*
0003A0  C9D4E2D9 C5C7E240  40404040 40404040   40404040 40404040  D4D7D7C1 40404040  *IMSREGS                 MPPA    *
0003C0  40404040 40404040  40404040 40404040   40404040 40404040  40404040 40404040  *                                *
0003E0  40404040 40404040  40400000 0000C4C2   F2D7C7C1 F2C1C1D7  D3C4C2F2 40404040  *          ....DB2PGA2AAPLDB2    *
000400  40404040 40404040  40404040 40404040   40404040 40404040  1BAF2317 0BF5A698  *                        .....5WQ*
000420  00000000 008C69DA  40000000 00000000   00000000 00000000  00000000 00740114  *........ .......................*
000440  00AC03C1 1B63BC20  C4C2FFFF DD7DD12F   6B2C6112 00000005  01BCEC66 00000011  *...A....DBXX.'J.,./............*
000460  E2E8FFFF 40404040  40404040 40404040   C3C1FFFF FFFFFFFF  C1D7FFFF C4C4C640  *SYXX            CA??????AP??DDF *
000480  DD7DD11D 2EAD0001  00000000 0000E2E8   FFFFE5FF FFD9FFD4  FFFFFF40 00000000  *.'J...........SYXXV??R?M??? ....*
0004A0  00000000 00000000  00000000 00000000   00B00200 C9D4E2D9  C5C7E240 F0F1F7F6  *....................IMSREGS 0176*
0004C0  D4D7D7C1 40404040  C9FFFFC1 40404040   D4D7D7C1 40404040  C9D4E2D9 C5C7E240  *MPPA    IXXA    MPPA    IMSREGS *
0004E0  00000006 00000000  00D40001 00000000   C4C5C1D3 C3D6D4D4  C1C20000 00000000  *.........M......DEALCOMMAB......*
000500  00000000 00000000  00000000 D4D7D7C1   40404040 40404040  40404040 40404040  *............MPPA                *
000520  40404040 40404040  40404040 00000000   00000000 00000000  00000000 00000000  *                ................*
000540  00000000 00000000  00000000 00000000   1B63BC20 00000000  C9FFFFC1 C2E9D8E3  *........................IXXABZQT*
000560  00160800 00000000  0ACD6D80 00140000   00000000 00000014  2000C4C2 FFFF4040  *..........._...............DBXX  *
000580  4040D4D7 FFC4E2D5  FF40                                                     *  MP?DSN?                       *
```

3 portions in IFCID 172 data

SMF102 common header (SMF102 DSECT)

```
Offset   Hex                                                                    Characters

000000   058A0000 1E660039  60BA0123 174FE2E8   FFFFC4C2 FFFF0000  00000000

                                                                   0000043C  *........-....|SYXXDBXX..........*
000020   014F0001 00000034  00100001 00000044   01FC0002
```

Trace Self defining section (QWT0 DSEC)

```
                                                 0020AF12  00000002 DD7DD12F  *.+.............................'J.*
000040   68DCBB96 00047422  0D000000 03A50023   00000022  00000000 00000000  *...O.........V...............*
000060   00000000 00000000  D4D7D7C1 40404040   F0F1F7F6  D4D7D7C1 40404040  C9FFFFFF  *.......MPPA    0176MPPA    IXXX
000080   40404040 C3C1FFFF  FFFFFFFF C1D7FFFF   C4C4C640  DD7DD11D 2EAD0001  000073EF  *    CA??????AP??DDF .'J.........*
0000A0   00000000 004E00BC  1B63BC20 C4C2F0F7   40404040  08401200 D4D7D7C2  40404040  *.....+......DBXX    . ..MPPB    *
0000C0   F0F0F0F8 D4D7D7C2  40404040 C9F0F7C1   40404040  C3C1FFFF FFFFFFFF  C1D7FFFF  *0008MPPB    IXXA    CA??????AP??*
0000E0   C4C4C640 DD7DD121  4E010001 000073F4   00000000  004E008F 1B639008  004E008F  *DDF .'J.+......4.....+.......+..*
000100   1B638F20 02052030  12000000 C4C2FFFF   40404040  C9D4E2D9 C5C7E240  40404040  *............DBXX    IMSREGS     *
000120   40404040 40404040  40404040 D4D7D7C1   40404040  40404040 40404040  40404040  *            MPPA                *
```

Product section (Standard header QWHS + QWHC + QWHU + QWHA)
+
Data section (QW0172HE + QW0172)

SMF102 common header

```
Offset   Hex                                                                  Characters

000000  058A0000 1E660039  60BA0123 174FE2E8   FFFFC4C2 FFFF0000  00000000          *........-....|SYXXDBXX..........*
```

```
000000                 00000 0001C    46+SM102    DSECT                                                        01-DSNDQ
000000                                47+QWSP     DS    0F                                                     01-DSNDQ
                                      48+*/*************************************************************/
                                      49+*/*       SMF COMMON HEADER MAPPING MACRO FOR PERFORMANCE SMF 102 */
                                      50+*/*************************************************************/
000000                                51+SM102BKE DS    0XL4      /*END OF BLOCK ADDRESS WHEN COLLECTING         01-DSNDQ
                                      52+*                                DATA                              */
000000                                53+SM102LEN DS    XL2       /*SM102 TOTAL LENGTH                        */ 01-DSNDQ
000002                                54+SM102SGD DS    XL2       /* ZZ BYTES                                 */ 01-DSNDQ
000004                                55+SM102FLG DS    XL1       /*SYSTEM INDICATOR                          */ 01-DSNDQ
000005                                56+SM102RTY DS    XL1       /*RECORD TYPE X'66'                         */ 01-DSNDQ
000006                                57+SM102TME DS    XL4       /*TIME SMF MOVED RECORD                     */ 01-DSNDQ
00000A                                58+SM102DTE DS    XL4       /*DATE SMF MOVED RECORD                     */ 01-DSNDQ
00000E                                59+SM102SID DS    CL4       /*SYSTEM ID (SID)                           */ 01-DSNDQ
000012                                60+SM102SSI DS    CL4       /*SUBSYSTEM ID                              */ 01-DSNDQ
000016                                61+SM102STF DS    XL2       /* SMF RECORD SUBTYPE                       */ 01-DSNDQ
0000018                               62+SM102SEQ DS    0XL4                                                   01-DSNDQ
                       00080          63+SM102CMP EQU   X'80'     /* THIS RECORD IS COMPRESSED BY CSRCESRV    */ 01-DSNDQ
000018                                64+SM102BUF DS    F         /* UNCOMPRESSED DATA LENGTH. THIS WILL BE   */ 01-DSNDQ
                                      65+*                        /* 0 FOR UNCOMPRESSED RECORDS.              */
00001C                                66+SM102END DS    0C        /* START OF THE SELF DEFINING SECTION       */ 01-DSNDQ
```

Product section (Standard header)

```
Offset   Hex                                                                    Characters

                                                                                0000043C  *........-....|SYXXDBXX..........*
000020  014E0001 00000034  00100001 00000044   01FC0002
... lines deleted ...
000420                                                                          00740114  *........ ......................*
000440  00AC03C1 1B63BC20  C4C2FFFF DD7DD12F   6B2C6112 00000005  01BCEC66 00000011  *...A....DBXX.'J.,./.............*
000460  E2E8FFFF 40404040  40404040 40404040   C3C1FFFF FFFFFFFF  C1D7FFFF C4C4C640  *SYXX            CA??????AP??DDF *
000480  DD7DD11D 2EAD0001  00000000 0000E2E8   FFFFE5FF FFD9FFD4  FFFFFF40 00000000  *.'J...........SYXXV??R?M??? ....*
0004A0  00000000 00000000  00000000 00000000   00B00200 C9D4E2D9  C5C7E240 F0F1F7F6  *....................IMSREGS 0176*
0004C0  D4D7D7C1 40404040  C9FFFFC1 40404040   D4D7D7C1 40404040  C9D4E2D9 C5C7E240  *MPPA    IXXA    MPPA    IMSREGS *
0004E0  00000006 00000000  00D40001 00000000   C4C5C1D3 C3D6D4D4  C1C20000 00000000  *.........M......DEALCOMMAB......*
000500  00000000 00000000  00000000 D4D7D7C1   40404040 40404040  40404040 40404040  *............MPPA               *
000520  40404040 40404040  40404040 00000000   00000000 00000000  00000000 00000000  *            ....................*
000540  00000000 00000000  00000000 00000000   1B63BC20 00000000  C9FFFFC1 C2E9D8E3  *........................IXXABZQT*
000560  00160800 00000000  0ACD6D80 00140000   00000000 00000014  2000C4C2 FFFF4040  *..........._...............DBXX  *
000580  4040D4D7 FFC4E2D5  FF40                                                     *  MP?DSN?                      *
```

Product section is at offset x’43C’, it contains QWHS/QWHC/QWHU/QWHA, total length is x’14E’

x’14E’ = x’74’ (QWHS DSECT) + x’B0’ (QWHC DSECT) + x’16’ (QWHU DSECT) + x’14’ (QWHA DSECT)

IFCID 172 header

```
Offset      Hex                                                                  Characters

000020          00000034  00100001                    0020AF12  00000002 DD7DD12F  *.+.........................'J.*
000040  68DCBD96                                                                 *...O.........V..................*
```

```
                                 10596+*********************************************************************
                                 10597+*   HEADER FOR IFC ID 0172 FOR RMID 20 RECORDS
                                 10598+*********************************************************************
                                 10599+*
000000                 00000 00010 10600+QW0172HE DSECT                                                    02-DSNDQ
000000                             10601+         DS    0F         INSURE BOUNDARY                          02-DSNDQ
000000                             10602+QW0172IT DS    FL4        DEADLOCK INTERVAL COUNTER                02-DSNDQ
000004                             10603+QW0172NR DS    FL4        NUMBER OF RESOURCES INVOLVED IN          02-DSNDQ
                                   10604+*                          DEADLOCK
000008                             10605+QW0172TD DS    CL8        TIME (STCK) DEADLOCK WAS DETECTED        02-DSNDQ
                                   10606+*
```

First QW0172 data

```
Offset              Hex                                                          Characters

000020                                00000044   01FC0002                         *.+.........................'J.*

000040            00047422  0D000000 03A50023   00000022 00000000  00000000 00000000  *...O.........V..................*
            ... Lines deleted ...
000160  0000C4C2 F2D7C7C1  F2C1C1D7 D3C4C2F2   40404040 40404040  40404040 40404040  *..DB2PGA2AAPLDB2                *
000180  40404040 40404040  40404040 1BAF2317   0BF5A698 00000000  008C69D2 40000000  *            .....5WQ.......K ...*
0001A0  00000000 C9D4E2D9  C5C7E240 40404040   40404040 40404040  40404040 D4D7D7C2  *....IMSREGS                MPPB*
0001C0  40404040 40404040  40404040 40404040   40404040 40404040  40404040 40404040  *                                *
0001E0  40404040 40404040  40404040 40400000   0000C4C2 F2D7C7C2  F1C1C1D7 D3C4C2F2  *              ....DB2PGB1AAPLDB2*
000200  40404040 40404040  40404040 40404040   40404040 40404040  40404040 1BAF97D5  *                            ..PN*
000220  0148BD78 00000000  008C2AB1 40000000   00000000 00000000  00000000 00000000  *............ ..................*
```

Locked resource:

```
QW0172KD is at x'44'+x'8'=x'4C' value x'03A5'(933)
QW0172KB is at x'44'+x'A'=x'4E' value x'23'  (35)
QW0172K4 is at x'44'+x'C'=x'50' value x'22'
```

Waiter:

```
QW0172WZ is at x'194' value x'8C69D2'(9202130)
```

Holder:

```
QW0172HZ is at x'224' value x'8C2AB1'(9185969)
```

First QW0172 information (tablespace name/database name/packages name)

```
SELECT NAME,DBNAME,DBID,HEX(DBID),PSID,HEX(PSID)

FROM SYSIBM.SYSTABLESPACE

WHERE DBID = 933 AND PSID = 35;

+-----------------------------------------------------------------------------------------------+
|           NAME           |          DBNAME          |   DBID    |      |   PSID    |      |
+-----------------------------------------------------------------------------------------------+
| SXXXTSTA                 | XXXDBD1                  |       933 | 03A5 |        35 | 0023 |
+-----------------------------------------------------------------------------------------------+


SELECT NAME, STMT_ID, CAST(STATEMENT AS VARCHAR(320)) AS STATMENT

FROM SYSIBM.SYSPACKSTMT

WHERE STMT_ID = 9202130 OR STMT_ID = 9185969;

+-------------------------------------------------------------------------------------------------------------------------------------------------------------+
|  NAME    | STMT_ID  |   STATEMENT                                                                                                                                                |
+-------------------------------------------------------------------------------------------------------------------------------------------------------------+
| DB2PGA1A | 9185969  | DECLARE TABLE1_CURSOR CURSOR FOR SELECT RECORD_NUMBER FROM TABLE1 WHERE RECORD_ID = : H FOR UPDATE OF RECORD_NUMBER |
| DB2PGB1A | 9202130  | DECLARE TABLE1_CURSOR CURSOR FOR SELECT RECORD_NUMBER FROM TABLE1 WHERE RECORD_ID = : H FOR UPDATE OF RECORD_NUMBER |
+-------------------------------------------------------------------------------------------------------------------------------------------------------------+
```

Second QW0172 data

```
Offset   Hex                                                                Characters
000020                                00000044   01FC0002                          *.+.........................'J.*

000240   00053422 0D000000  03A500 26 00000022   00000000 00000000  00000000 00000000  *.........V......................*
         ...lines deleted ...
000360   F2D7C7C2 F1C1C1D7  D3C4C2F2 40404040   40404040 40404040  40404040 40404040  *2PGB1AAPLDB2                   *
000380   40404040 40404040  1BAF97D5 0148BD78   00000000 008C3555  40000000 00000000  *        ..PN........... .......*
0003A0   C9D4E2D9 C5C7E240  40404040 40404040   40404040 40404040  D4D7D7C1 40404040  *IMSREGS                MPPA    *
0003C0   40404040 40404040  40404040 40404040   40404040 40404040  40404040 40404040  *                               *
0003E0   40404040 40404040  40400000 0000C4C2   F2D7C7C1 F2C1C1D7  D3C4C2F2 40404040  *          ....DB2PGA2AAPLDB2    *
000400   40404040 40404040  40404040 40404040   40404040 40404040  1BAF2317 0BF5A698  *                      .....5WQ*
000420   00000000 008C69DA  40000000 00000000   00000000 00000000  00000000           *........ ......................*
```

x’44’ + x’1FC’ = x’240’

Locked resource:

```
QW0172KD is at x’248’ value x’3A5’(933)
QW0172KB is at x’24A’ value x’26’ (38)
QW0172K4 is at x’24C’ value x’22’
```

Waiter:

```
QW0172WZ is at x’390’ value x’8C3555’(9188693)
```

Holder:

```
QW0172HZ is at x’420’ value x’8C69DA’(9202138)
```

Second QW0172 information (tablespace name/database name/packages name)

```
SELECT NAME,DBNAME,DBID,HEX(DBID),PSID,HEX(PSID)
FROM SYSIBM.SYSTABLESPACE
WHERE DBID = 933 AND PSID = 38;
+-----------------------------------------------------------------------------------------------+
|           NAME           |          DBNAME          |   DBID    |      |   PSID    |      |
+-----------------------------------------------------------------------------------------------+
| SXXXTSTB                 | XXXDBD1                  |       933 | 03A5 |        38 | 0026 |
+-----------------------------------------------------------------------------------------------+

SELECT NAME, STMT_ID, CAST(STATEMENT AS VARCHAR(320)) AS STATMENT
FROM SYSIBM.SYSPACKSTMT
WHERE STMT_ID = 9188693 OR STMT_ID = 9202138;
+-----------------------------------------------------------------------------------------------------------------------------------------------------------+
|  NAME    | STMT_ID  |   STATEMENT                                                                                                                                                |
+-----------------------------------------------------------------------------------------------------------------------------------------------------------+
| DB2PGA2A | 9188693  | DECLARE TABLE2_CURSOR CURSOR FOR SELECT RECORD_NUMBER FROM TABLE2 WHERE RECORD_ID = : H FOR UPDATE OF RECORD_NUMBER |
| DB2PGB2A | 9202138  | DECLARE TABLE2_CURSOR CURSOR FOR SELECT RECORD_NUMBER FROM TABLE2 WHERE RECORD_ID = : H FOR UPDATE OF RECORD_NUMBER |
+-----------------------------------------------------------------------------------------------------------------------------------------------------------+
```

Second QW0172 information matches DSNT375I deadlock message

Two QW0172 explain the reason of deadlock

Holder	Waiter	Resource
Plan MPPA (package DB2PGA1A STMT_ID 9185969)	Plan MPPB (package DB2PGB1A STMT_ID 9202130)	Page x'22' in Table1
Plan MPPB (package DB2PGB2A STMT_ID 9202138)	Plan MPPA (package DB2PGA2A STMT_ID 9188693)	Page x'22 in Table2

Complete IFCID 172 with comments

```
Offset   Hex                                                                    Characters

000000  058A0000 1E660039 60BA0123 174FE2E8 FFFFC4C2 FFFF0000 00000000 0000043C *........-....|SYXXDBXX..........* SMF102 common header:  x'00' to x'1C'
000020  014E0001 00000034 00100001 00000044 01FC0002 0020AF12 00000002 DD7DD12F *.+.........................'J.* QWT0 is at x'1C'
000040  68DCBD96 00047422 0D000000 03A50023 00000022 00000000 00000000 00000000 *...O.........V.................* QWT02PSO = x'0000043C' QWHS + QWHC + QWHU
000060  00000000 00000000 D4D7D7C1 40404040 F0F1F7F6 D4D7D7C1 40404040 C9FFFFFF *........MPPA    0176MPPA    IXXX*                                + QWHA
000080  40404040 C3C1FFFF FFFFFFFF C1D7FFFF C4C4C640 DD7DD11D 2EAD0001 000073EF *    CA??????AP??DDF .'J.........* QWT02R1O = x'00000034' QW0172HE
0000A0  00000000 004E00BC 1B63BC20 C4C2F0F7 40404040 08401200 D4D7D7C2 40404040 *.....+......DBXX    . ..MPPB    * QWT02R2O = x'00000044' QW0172 * 2
0000C0  F0F0F0F8 D4D7D7C2 40404040 C9F0F7C1 40404040 C3C1FFFF FFFFFFFF C1D7FFFF *0008MPPB    IXXA    CA??????AP??*
0000E0  C4C4C640 DD7DD121 4E010001 000073F4 00000000 004E008F 1B639008 004E008F *DDF .'J.+......4.....+.......+..* first QW0172 is at x'44'
000100  1B638F20 02052030 12000000 C4C2FFFF 40404040 C9D4E2D9 C5C7E240 40404040 *............DBXX    IMSREGS     * QW0172KD is at x'44'+x'8'=x'4C' value x'03A5'
000120  40404040 40404040 40404040 D4D7D7C1 40404040 40404040 40404040 40404040 *            MPPA                * QW0172KB is at x'44'+x'A'=x'4E' value x'23'
000140  40404040 40404040 40404040 40404040 40404040 40404040 40404040 40000000 *                              ..* QW0172K4 is at x'44'+x'C'=x'50' value x'22'
000160  0000C4C2 F2D7C7C1 F2C1C1D7 D3C4C2F2 40404040 40404040 40404040 40404040 *..DB2PGA2AAPLDB2               *
000180  40404040 40404040 40404040 1BAF2317 0BF5A698 00000000 008C69D2 40000000 *            .....5WQ.......K ...*
0001A0  00000000 C9D4E2D9 C5C7E240 40404040 40404040 40404040 40404040 D4D7D7C2 *....IMSREGS                 MPPB* QW0172WZ is at x'194' value x'8C69D2'(9202130)
0001C0  40404040 40404040 40404040 40404040 40404040 40404040 40404040 40404040 *                              *
0001E0  40404040 40404040 40404040 40000000 0000C4C2 F2D7C7C2 F1C1C1D7 D3C4C2F2 *              ....DB2PGB1AAPLDB2* QW0172HZ is at x'224' value x'8C2AB1'(9185969)
000200  40404040 40404040 40404040 40404040 40404040 40404040 40404040 1BAF97D5 *                          ..PN*
000220  0148BD78 00000000 008C2AB1 40000000 00000000 00000000 00000000 00000000 *........... ................*
000240  00053422 0D000000 03A50026 00000022 00000000 00000000 00000000 00000000 *.........V.....................* second QW0712 is at x'240'
000260  00000000 D4D7D7C2 40404040 F0F0F0F8 D4D7D7C2 40404040 C9FFFFC1 40404040 *....MPPB    0008MPPB    IXXA    *   QW0172KD is at x'248' value x'3A5'
000280  C3C1FFFF FFFFFFFF C1D7FFFF C4C4C640 DD7DD121 4E010001 000073F4 00000000 *CA??????AP??DDF .'J.+......4....*   QW0172KB is at x'24A' value x'26'
0002A0  004E008F 1B638F20 C4C2FFFF 40404040 08401200 D4D7D7C1 40404040 F0F1F7F6 *.+......DBXX    . ..MPPA    0176*   QW0172K4 is at x'24C' value x'22'
0002C0  D4D7D7C1 40404040 C9F0F7C1 40404040 C3C1FFFF FFFFFFFF C1D7FFFF C4C4C640 *MPPA    IXXA    CA??????AP??DDF *
0002E0  DD7DD11D 2EAD0001 000073EF 00000000 004E00BC 1B63BD08 004E00BC 1B63BC20 *.'J..............+.......+......*
000300  02052030 11000000 C4C2FFFF 40404040 C9D4E2D9 C5C7E240 40404040 40404040 *........DBXX    IMSREGS         *
000320  40404040 40404040 D4D7D7C2 40404040 40404040 40404040 40404040 40404040 *        MPPB                  *
000340  40404040 40404040 40404040 40404040 40404040 40404040 40000000 0000C4C2 *                          ....DB*
000360  F2D7C7C2 F1C1C1D7 D3C4C2F2 40404040 40404040 40404040 40404040 40404040 *2PGB1AAPLDB2                 *
000380  40404040 40404040 1BAF97D5 0148BD78 00000000 008C3555 40000000 00000000 *        ..PN............ .......* QW0172WZ is at x'390' value x'8C3555'(9188693)
0003A0  C9D4E2D9 C5C7E240 40404040 40404040 40404040 40404040 D4D7D7C1 40404040 *IMSREGS                 MPPA    *
0003C0  40404040 40404040 40404040 40404040 40404040 40404040 40404040 40404040 *                              * QW0172HZ is at x'420' value x'8C69DA'(9202138)
0003E0  40404040 40404040 40400000 0000C4C2 F2D7C7C1 F2C1C1D7 D3C4C2F2 40404040 *          ....DB2PGA2AAPLDB2    *
000400  40404040 40404040 40404040 40404040 40404040 40404040 1BAF2317 0BF5A698 *                        .....5WQ*
000420  00000000 008C69DA 40000000 00000000 00000000 00000000 00740114 *........ .......................*   QWHS is at x'43C' length x'0074'
000440  00AC03C1 1B63BC20 C4C2FFFF DD7DD12F 6B2C6112 00000005 01BCEC66 00000011 *...A....DBXX.'J.,./............*
000460  E2E8FFFF 40404040 40404040 40404040 C3C1FFFF FFFFFFFF C1D7FFFF C4C4C640 *SYXX            CA??????AP??DDF *
000480  DD7DD11D 2EAD0001 00000000 0000E2E8 FFFFE5FF FFD9FFD4 FFFFFF40 00000000 *.'J...........SYXXV??R?M??? ....*
0004A0  00000000 00000000 00000000 00000000 00B00200 C9D4E2D9 C5C7E240 F0F1F7F6 *....................IMSREGS 0176*   QWHC is at x'4B0' length x'00B0'
0004C0  D4D7D7C1 40404040 C9FFFFC1 40404040 D4D7D7C1 40404040 C9D4E2D9 C5C7E240 *MPPA    IXXA    MPPA    IMSREGS *
0004E0  00000006 00000000 00D40001 00000000 C4C5C1D3 C3D6D4D4 C1C20000 00000000 *.........M......DEALCOMMAB......*
000500  00000000 00000000 00000000 D4D7D7C1 40404040 40404040 40404040 40404040 *............MPPA            *
000520  40404040 40404040 40404040 00000000 00000000 00000000 00000000 00000000 *                              *
000540  00000000 00000000 00000000 00000000 1B63BC20 00000000 C9FFFFC1 C2E9D8E3 *                        .....IXXABZQT*
000560  00160800 00000000 0ACD6D80 00140000 00000000 00000014 2000C4C2 FFFF4040 *..........._..............DBXX  *
```

4 Tools can parse SMF 102 (IFCID 172) data

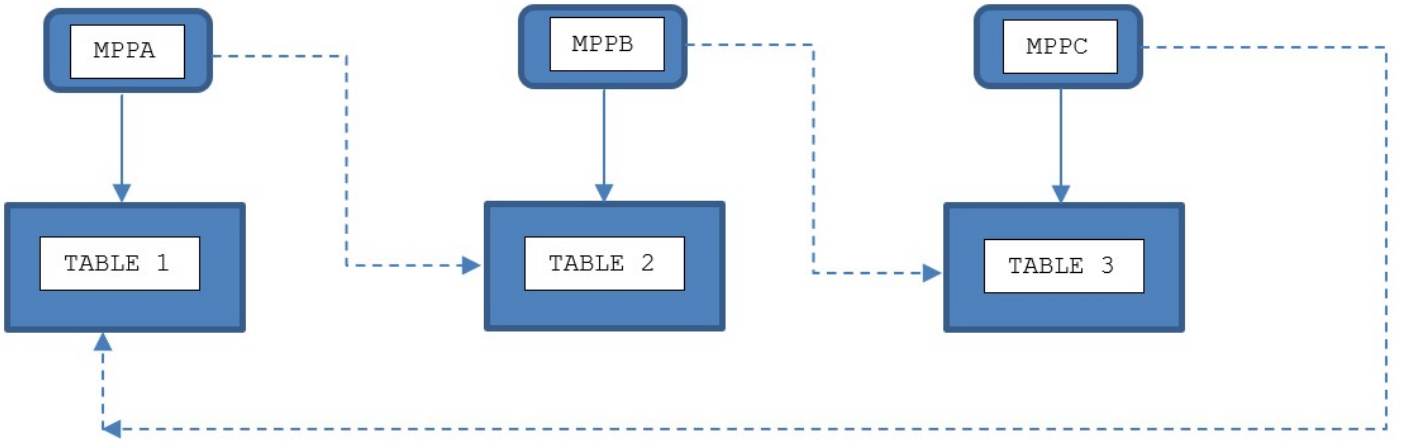
1 IBM OMEGAMON for Db2 Performance Expert on z/OS

https://www.ibm.com/docs/en/om-db2-pe/5.4.0?topic=blocks-ifcid-172-deadlock-data

2 Broadcom SYSVIEW® Performance Management Option For Db2

https://techdocs.broadcom.com/us/en/ca-mainframe-software/database-management/ca-sysview-performance-management-option-for-db2/20-0/reference/ifcid-records/records-and-fields/172-deadlock.html

3 Pacific Systems Group
http://www.pacsys.com/smf/smf102B_DB2v11.htm

5 Questions

What will happen