

COPE for IMS DB2 SQL Trace Feature



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`DB2 SQL Trace Feature

About This Manual

This manual explains how to install and use the COPE for IMS SQL call trace feature.

The feature allows a user to trace DB2 SQL calls in a message processing region and have one or more SQL statements expanded when the trace records are expanded in an edit session under ISPF.

The feature extends the capabilities of the COPE product to extract both DL/1 calls and DB2 SQL calls.

Figure 1: Example of expanded DB2 call

```
COMMAND=>          ----- Columns 001 072
1032 LINES DISPLAYED, 531 LOG RECORDS SEARCHED   SCROLL ==>> CSR
=NOTE= '-----'
000234  SQL call SELECT rc=0 stmt=1209 Pgm=DSN8IP1 Timestamp=1775069
=NOTE= .-----'
=NOTE= |SELECT SELTXT INTO {DEPARTMENT STRUCTURE} FROM VOPTVAL
=NOTE= |WHERE OBJFLD = "DS" AND OBJFLD ^= " " AND SRCHCRIT
=NOTE= |= " "
=NOTE= "'-----'"
000235  SQL call SELECT rc=0 stmt=1417 Pgm=DSN8IP1 Timestamp=1727501
=NOTE= .-----'
=NOTE= |SELECT SELTXT INTO {MANAGER NAME} FROM VOPTVAL WHERE
=NOTE= |ACTION = "D" AND OBJFLD = "DS" AND SRCHCRIT = "MN"
=NOTE= |AND ( SCRTYPE = " " OR SCRTYPE = "S" )
=NOTE= "'-----'"
000236  SQL call SELECT rc=0 stmt=1258 Pgm=DSN8IP2 Timestamp=1727501
=NOTE= .-----'
=NOTE= |SELECT HEADTXT , INFOTXT , PFKTXT , DSPINDEX INTO {DEPARTME
=NOTE= |ADMINISTRATIVE STRUCTURE SELECTION} , {SELECT A DEPARTMENT
=NOTE= |FOLLOWING LIST BY SPECIFYING THE LI} , {PFK: 02=RESEND 03=}
=NOTE= |, {03} FROM VOPTVAL WHERE MAJSYS = "O" AND ACTION = "D"
=NOTE= |AND SRCHCRIT = "MN" AND SCRTYPE = "S"
=NOTE= "'-----'"
000237  SQL call SELECT rc=0 stmt=1289 Pgm=DSN8IP2 Timestamp=1727506
```

The DB2 SQL Feature extracts the SQL call from the DB2 catalog and inserts input and output data together with the host variable indicators into the call. Data that is output from DB2 is surrounded with { } brackets. Where a host variable indicator is specified, the host variable data is shown in hex format with the table data within the brackets. e.g. {DB2-DATA X'FFFF'}.

How to turn on the COPE TRACE from an IMS session

The control of the COPE Trace Feature is performed from an IMS session. From a cleared screen enter **COPE**. COPE is a transaction defined to the IMS system. The following screen will be displayed:-

Figure 2: The COPE Transaction screen

```
COPE IVP8AP390                                00:07 IVP81M11 J1839
=====> trace on

                                     Sun 05/04/03
Enter a command above, or PF1 to access the tutorial.

Lsys          - Logon to, or change to, logical system Lsys
/FOR Format    - Display MFS format
ABS           - Display last ABend Summary screen
SS            - Start/Stop databases or transactions
TRACE ON      - Turn DLI and SQL call trace on

AVAIL> IVP8A      IVP8B      IVP8C

=PFK=>  1=HELP          2=SS          3=          4=
=PFK=>  5=              6=              7=UP        8=DOWN
=PFK=>  9=/DIS Q TRAN  10=LEFT      11=RIGHT   12=
```

The menu has many functions. IMS commands may be issued from it. In addition, it may be used to show the user what Logical System they are connected to. (The 2nd token on the top line). Also, it may be used to turn the trace feature on or off.

There are 3 Trace control commands

- TRACE ON
- TRACE OFF
- TRACE NOTRUNC

When TRACE ON is entered and the ENTER key is pressed, the word TRACE will appear as the 4 token on the top line. When TRACE NOTRUNC is entered and the ENTER key is pressed, the word TRACE*N* will appear as the 4th token on the top line.

TRACE OFF

When the trace is off, some trace records are still generated for every transaction. These records are intended for accounting purposes and to record the transaction usage. They are minimal

TRACE ON

When the trace is on, all DL/1 calls are traced, and a record is written for all SQL calls identifying the timestamp and the type of SQL call. These trace records may be extracted from the OLDS in a ISPF session described below. If a DL/1 call retrieves data in excess of 128 bytes, the trace record is truncated.

TRACE NOTRUNC

When TRACE NOTRUNC is specified, all DL/1 calls are traced as well as SQL calls, but in addition all input and output data to each SQL call is captured and may be extracted in the ISPF session described below. There is no truncation of recorded data from DL/1 calls.

Retrieving the trace from ISPF

From the COPE main panel, enter 7 and then enter Option 2. The following menu will be displayed:-

Figure 3: ISPF TRACE extract menu

```
----- IMS Online Traces - COPE System -----
COMMAND ==>

      Blank - Display Trace      ("COPE TRACE ON" under IMS)
      T   - Transaction Activity  (Picture of transactions by region)
      PO  - Printoff              (Print last trace displayed)
User      ==> *                  * for all, or mask                      Time - 0053
Lines     ==> 100000             (Maximum to display)                Date - 030504
Edit/Browse ==> E                E or B

Optional range restriction:
      From Date ==> YYMMDD      From Time ==> HHMM      (Blank, HHMM, or HHMMSS)
      To Date   ==> 030504      To Time   ==> 0048      (Blank, HHMM, or HHMMSS)

Optional filters:
Trancode  ==> *                  * - for all, or mask
Region    ==> *                  * - for all, region jobname/mask/pst-number
Display   ==> D                  N - no calls, S - summary, D - details

----- IVP8 ----- Compuware -----
```

Fill in the From Date and Time and the trace records generated from the IMS session will be extracted and displayed.

Managing the ISPF trace session

When Edit is entered, each transaction extracted is displayed and the details are excluded. The following figure is an example:-

Figure 4: Initial extracted TRACE display

```
COMMAND=>
15348 LINES      DISPLAYED, 40757 LOG      RECORDS SEARCHEDSCROLL ==> CSR
-----
002703 ****      01:20 COPEP390                IVP81M11 IVP8ACOPEUTP1 COPUTP
-----
002915 ****      01:20 COPEP390                IVP81M11 IVP8ACOPEUTP1 COPEUT
-----
003170 ****      01:20 COPEP390                IVP81M11 IVP8ACOPEUTP1 COPEUT
-----
003441 ****      01:21 COPEP390                IVP81M11 IVP8ACOPEUTP1 COPEUT
-----
003529 ****      01:21 DSN8PSP390              IVP81M11 IVP8ADSN8IP0 C00017
-----
003554 ****      01:21 DSN8PSP390              IVP81M11 IVP8ADSN8IP0 C00017
-----
003579 ****      01:21 DSN8PSP390              IVP81M11 IVP8ADSN8IP0 C00017
-----
003606 ****      01:21 DSN8PSP390              IVP81M11 IVP8ADSN8IP0 C00017
-----
003631 ****      01:22 DSN8PSP390              IVP81M11 IVP8ADSN8IP0 C00017
-----
003655 ****      01:22 DSN8PSP390              IVP81M11 IVP8ADSN8IP0 C00017
-----
```

The user should scroll through the display until they identify the transaction of interest and then enter a "Fnnn" command on the excluded row below the transaction row. For instance if 24 lines are excluded, the user should enter F24 on the excluded information line. A typical result is shown in the next figure:-

Figure 5: Typical Display After a 'F' Row Command

```
COMMAND=>----- Columns 001072
15348 LINES DISPLAYED, 40757 LOG RECORDS SEARCHED SCROLL ==> CSR

-----178 Line(s) not Displayed
002703 **** 01:20 COPE      P390      IVP81M11  IVP8A  COPEUTP1 COPEU
-----211 Line(s) not Displayed
002915 **** 01:20 COPE      P390      IVP81M11  IVP8A  COPEUTP1 COPEU
-----254 Line(s) not Displayed
003170 **** 01:20 COPE      P390      IVP81M11  IVP8A  COPEUTP1 COPEU
-----270 Line(s) not Displayed
003441 **** 01:21 COPE      P390      IVP81M11  IVP8A  COPEUTP1 COPEU
-----87 Line(s) not Displayed
003529 **** 01:21 DSN8PS   P390      IVP81M11  IVP8A  DSN8IP0 C0001

003530 GU-- P390      loal: 10  Pcb:1  Pgm: .0mS  Dli: .0mS  Pcbmodn:C
003531          DSN8PS
003532 =MSG=> DB2 Plan set to Z0001715
003533 SQL call SELECT rc=0      stmt=660  Pgm=DSN8IP1 Timestamp=17275069
003534 SQL call SELECT rc=100 stmt=1001  Pgm=DSN8IP1 Timestamp=172750
003535 SQL call OPEN   rc=0      stmt=1026 Pgm=DSN8IP1 Timestamp=172750690
003536 SQL call FETCH rc=0      stmt=1030 Pgm=DSN8IP1 Timestamp=17275069
003537 SQL call FETCH rc=0      stmt=1030 Pgm=DSN8IP1 Timestamp=17275069
003538 SQL call FETCH rc=0      stmt=1030 Pgm=DSN8IP1 Timestamp=17275069
003539 SQL call FETCH rc=0      stmt=1030 Pgm=DSN8IP1 Timestamp=17275069
003540 SQL call FETCH rc=100 stmt=1030  Pgm=DSN8IP1 Timestamp=17275069
```

A combination of row commands and panel commands may now be entered.

The panel commands are:-

- DB2**
- DB2NEW**
- SQL**
- DB2IN**
- DB2OUT**

The row commands are :-

- Q** or **QQ**

The panel commands have a range that is controlled by the Q or QQ row commands. If the Q option is not used, and the cursor is positioned on a SQL statement, **ALL** SQL statements in the transaction are operated on.

The DB2NEW command

The SQL statements are expanded using information from the DB2 catalog. In order to specify the table name, the package collection name, and the DB2 subsystem, the DB2NEW command must be used. This command may be used together with the Q or QQ row commands, or may be used with cursor positioning. An example of the DB2NEW panel follows :-

Figure 6: The DB2NEW panel

```

----- IMS SQL Trace extract - COPE System -----
COMMAND ==>

The SQL call is extracted from the SYSPACKSTMT catalog table
Specify the following parameters for inclusion in the SQL call that
extracts the data

                                Logical System ==>
DB2 Subsystem                    ==> DSN1      (e.g. DSN1)
SYSPACKSTMT Table Owner          ==> SYSIBM   (e.g. SYSIBM)
Package collection name in SYSPACKSTMT table (PACKAGE (name))
=> 'DSN8IC71'

Suppress redisplay of this panel    ==>          (Y or N)

Display SQL call for extracting DBRMs ==> N      (Y or N)

```

If the package collection name is not variable for all SQL statements, the „Suppress Redisplay of this Panel“ field may be set to Y to avoid unnecessary redisplay of the panel. In this case, the DB2 command expands the SQL statements without an unnecessary intervening panel.

How to determine the Package Collection name

The Package Collection name is the name of the package that the DBRM is bound into. The following shows a typical set of bind statements.

```

//P390J4I JOB CLASS=A,MSGCLASS=A,NOTIFY=P390,REGION=0M
/*JOBPARM PROCLIB=PROC00
//PH04PS09 EXEC PGM=IKJEFT01,DYNAMNBR=20,COND=(4,LT)
//DBRMLIB DD DSN=DSN710.DBRMLIB.DATA,DISP=SHR
//SYSUDUMP DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
  GRANT BIND, EXECUTE ON PLAN Z0001715, Z0001723 TO PUBLIC;
//SYSTSIN DD *
DSN SYSTEM(DSN1)
BIND PACKAGE (DSN8IC71) MEMBER(DSN8IP1) -
  ACT(REP) ISO(CS) ENCODING(EBCDIC)

```

```

BIND PACKAGE (DSN8IC71) MEMBER(DSN8IP2) -
  ACT(REP) ISO(CS) ENCODING(EBCDIC)
BIND PACKAGE (DSN8IC71) MEMBER(DSN8IP3) -
  ACT(REP) ISO(CS) ENCODING(EBCDIC)
BIND PACKAGE (DSN8IC71) MEMBER(DSN8IP7) -
  ACT(REP) ISO(CS) ENCODING(EBCDIC)
BIND PACKAGE (DSN8IC71) MEMBER(DSN8IP8) -
  ACT(REP) ISO(CS) ENCODING(EBCDIC)
BIND PLAN(Z0001715) PKLIST(DSN8IC71.*) -
  QUALIFIER(DSN8710) -
  ACT(REP) ISO(CS) ENCODING(EBCDIC)
BIND PLAN(Z0001723) PKLIST(DSN8IC71.*) -
  QUALIFIER(DSN8710) -
  ACT(REP) ISO(CS) ENCODING(EBCDIC)
RUN PROGRAM(DSNTIAD) PLAN(DSNTIA71) -
  LIB(DSN710.RUNLIB.LOAD)

```

In this example DSN8IC71 is the package name that should be specified on the DB2NEW panel.

The DB2 Command

The DB2 command performs the same as the DB2NEW command except that it does not display the selection criteria panel if the „Suppress Redisplay of this Panel“ field has been set to Y. Position the cursor on a set of SQL statements or use the Q or QQ row command and enter DB2 in the command field to view the expanded SQL statements.

The SQL command

The SQL command extracts the SQL statement from the DB2 catalog and displays it without inserting input or output data. Position the cursor on a set of SQL statements or use the Q or QQ row command and enter SQL in the command field to view the unexploded SQL statements.

The DB2OUT command

The DB2OUT command lists the data and host indicator **OUTPUT** from the DB2 subsystem. Position the cursor on a set of SQL statements or use the Q or QQ row command and enter DB2OUT in the command field to view the data in list form. An example follows:-

Figure 7: Results of a DB2OUT command

```

COMMAND=>                                ----- Columns 001 072
15348 LINES DISPLAYED, 40757 LOG RECORDS SEARCHED SCROLL ==> CSR
=NOTE= .....
=NOTE= |OPEN DEA                          |
=NOTE= "....."
003666 SQL call FETCH rc=100 stmt=1415 Pgm=DSN8IP2 Timestamp=1727506
=NOTE= .....
=NOTE= |FETCH DEA INTO {N8I X"01C4"}, {u}, {X"0002"},
=NOTE= |X"08C2"}, {X"8283"}, {DSN8IP1&&
=NOTE= |X"FF00"}
=NOTE= "....."
=NOTE= Host VarOutput Data from DB2
=NOTE= X"01C4" N8I
=NOTE= - NONEu
=NOTE= X"0002"
=NOTE= X"08C2"
=NOTE= X"8283"
=NOTE= X"FF00" DSN8IP1&&P
003667 SQL call CLOSE rc=0 stmt=1493 Pgm=DSN8IP2 Timestamp=1727506B
=NOTE= .....
=NOTE= |CLOSE DEA                          |
=NOTE= "....."
003668 SQL call UPDATE rc=0 stmt=794 Pgm=DSN8IP1 Timestamp=17275069

```

DB2IN command

The DB2IN command is identical to the DB2OUT command except it displays data **INPUT** to the DB2 subsystem from the application program SQL call. Position the cursor on a set of SQL statements or use the Q or QQ row command and enter DB2IN in the command field to view the expanded SQL statements.

LABEL Command

If the user wishes to delete lines from the data in the edit session, they should first enter **LABEL** in the command field. This command will add labels to all SQL statements so that they will be located by label and not depend on their relative line number. No row commands are valid with this panel command.

Installation Instructions

The feature is supplied on a COPE installation tape and is integrated with the other features the customer has purchased.

Installation of the DB2 trace feature can only be done after the COPE installation tape has been installed.

Installation consists of the following 4 steps

- Bind of the COPEDYNS plan
- Tailoring of the COPESQL1 ISPF menu
- Set ZDEFAULT parameters
- Generate COPEXRF5 member

Bind of the COPEDYNS plan

A member named "BIND" is supplied in the JCL COPE distribution library. This member should be tailored and the COPEDYNS DBRM should be bound and execute access granted to public for the DB2 subsystem in which the application DBRMs are stored.

Tailor the COPESQL1 ISPF menu

The DB2NEW panel command displays the COPESQL1 menu. As an aid to users, the menu may be altered to provide automatic defaults.

The COPESQL1 menu should be copied into the UMOD.MENUS library so that it will be insulated from changes when a new release is introduced.

The COPE ISPF menu "COPESQL1" member should be edited and the instructions in the)INIT section followed to supply default values for the DB2 system, the high level qualifier of the SYSPACKSTMT table and the collection ids that the application packages are bound to.

Set ZDEFAULT parameters

The following ZDEFAULT variables affect the operation of the SQL trace feature:-

- **XSQLEDIT** Must be set to YES. If set to NO the feature will not operate.
- **XCOPDB2N** Must be set to the name of the DB2 subsystem that contains the catalog in which the DB2 DBRM packages are stored.
- **XCOPESQL** Is the SQLID that matches the 2nd parameter in the IMS SSM member. e.g. "SYS1" in "DSN1,SYS1,DSNMIN10.."

The ZDEFAULT member copy may be accessed by entering ISPF COPE and entering EVARS on the prime menu. For example, find the statement)SET XSQLEDIT = and change it to)SET XSQLEDIT = YES.

Generate COPEXRF5 member

The updated value of the XSQLEDIT parameter must be changed in the COPEXRF5 load module. This module contains values of certain ZDEFAULT parameters required by the batch and on-line systems. To update COPEXRF5, enter 4.11 on the prime ISPF COPE menu and when the list of message region datasets appears, press PFKey 3 and submit the resulting job. If IMS is running, the message regions should be recycled as soon as the COPEXRF5 generate job has completed.

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