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Profiling a CICS Transaction Using Trace

Ezriel Gross
Circle Software

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Agenda

Dump domain

- SIT parameters
- Dump tables

Trace domain

- Trace Table
- SIT parameters
- Type of trace
- Trace points and destination
- Abbreviated, full and short
- Trace components
- CETR overview
- Printing trace
- Profiling a transaction
- Determining EXEC CICS command offsets using trace

Liberty Java application trace

Dump domain - overview

The Dump domain is responsible for taking system and transaction dumps for CICS

Principal Functions

- System dumps written to MVS dump datasets
- Transaction dumps written to CICS dump datasets

Initial Dumping status

- In pre-initialization processing, the dump domain establishes the initial dumping status: For a cold start, the information comes from the system initialization parameters
- For any other type of start, the information comes from the local catalog

Dump domain SIT parameters

Dump Analysis and Elimination

DAE=NO|YES

System dump master flag

DUMP=YES|NO

Transaction dump data set

DUMPDS=AUTO|A|B

Transaction dump switch

DUMPSW=NO|NEXT

Dump retry time

DURETRY=30|number of seconds

Dump table entry defaults

SYDUMAX=999|number
TRDUMAX=999|number

Transaction dump trace

TRTRANTY=TRAN|ALL

Dump domain SIT parameters

DAE=NO|YES

YES means that the system dump is eligible for suppression by the MVS DAE component

DUMP=YES|NO

NO SDUMPs are suppressed (this does not prevent the CICS kernel from taking SDUMPs)

DUMPDS=AUTO|A|B

When set to AUTO, during initialization the dump domain will open the transaction dump data set that was not in use at the last shut-down

DUMPSW=NO|NEXT

When set to NEXT, the dump domain will switch the transaction dump data set from A to B or vice-versa as appropriate. This is effective only for a single switch unless reset on-line

DURETRY=30|number of seconds

If the SDUMP macro fails because another system is creating a dump, it will try every 5 seconds until successful or DURETRY is exceeded, in which case the dump request is abandoned

SYDUMAX=999|number and TRDUMAX=999|number

If this number is exceeded, subsequent dumps for that particular entry are suppressed

TRTRANTY=TRAN|ALL

TRAN Only the trace entries associated with the transaction that is abending are copied to the transaction dump trace table

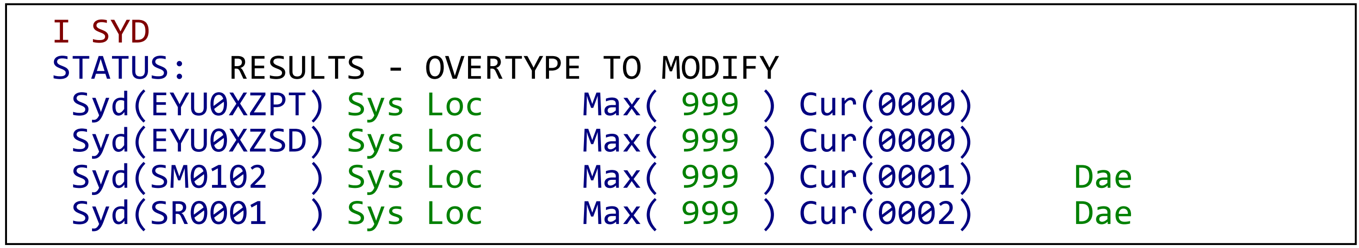
System dump table entries

Dump Tables

- Codes are entered via CEMT or EXEC CICS commands to specify the desired options whenever a dump is requested or a "new style" message is issued.

- The codes are recorded on the Global Catalog. Therefore a WARM start of CICS will rebuild the tables, but all entries are lost on a COLD start.

- Dynamic entries (i.e. ones caused by an ABEND) are added to the table but not to the catalog



```
I SYD
STATUS:  RESULTS - OVERTYPE TO MODIFY
 Syd(EYU0XZPT) Sys Loc     Max( 999 ) Cur(0000)
 Syd(EYU0XZSD) Sys Loc     Max( 999 ) Cur(0000)
 Syd(SM0102   ) Sys Loc     Max( 999 ) Cur(0001)     Dae
 Syd(SR0001   ) Sys Loc     Max( 999 ) Cur(0002)     Dae
```

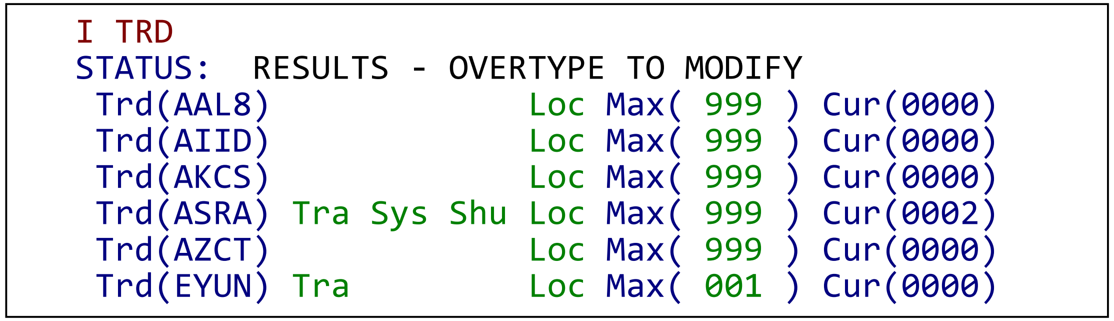
System defaults

- Take a system dump
- Do not terminate CICS
- Take an unlimited number of dumps

Transaction dump table entries

Transaction defaults

- Take a transaction dump
- Do not take a system dump
- Do not terminate CICS
- Take an unlimited number of dumps



```
I TRD
STATUS:  RESULTS - OVERTYPE TO MODIFY
 Trd(AAL8)                Loc Max( 999 ) Cur(0000)
 Trd(AIID)                Loc Max( 999 ) Cur(0000)
 Trd(AKCS)                Loc Max( 999 ) Cur(0000)
 Trd(ASRA) Tra Sys Shu Loc Max( 999 ) Cur(0002)
 Trd(AZCT)                Loc Max( 999 ) Cur(0000)
 Trd(EYUN) Tra            Loc Max( 001 ) Cur(0000)
```

Dump identifier

- When a dump is produced, a dump code identifies the type, and a dump id distinguishes it from other dumps of the same type
- The dump id takes the form rrrr/ssss where:
  - rrrr is the run number since the last cold start and
  - ssss is the sequence number of the dump within this execution

- To suppress dumps, use Dump Table entries or set the appropriate return code in the XDUREQ exit.
- You can also suppress individual transaction dump records by setting the appropriate return code in the XDUOUT exit
  - When CICS creates a dump, you can find the dump name here for later use in IPCS option 0

```
+DFHDU0201 CCVT53I  ABOUT TO TAKE SDUMP. DUMPCODE: SM0102   , DUMPID:
1/0005
IEA045I AN SVC DUMP HAS STARTED AT TIME=07.35.11 DATE=06/29/2016 865
FOR ASID (09BC)
QUIESCE = NO
IEA794I SVC DUMP HAS CAPTURED: 866
DUMPID=380 REQUESTED BY JOB (CCVT53I )
DUMP TITLE=CICS DUMP: SYSTEM=CCVT53I  CODE=SM0102   ID=1/0005
+DFHDU0202 CCVT53I  SDUMPX COMPLETE. SDUMPX RETURN CODE X'00'
IEF196I IGD101I SMS ALLOCATED TO DDNAME (SYS00382)
IEF196I         DSN (FUNDIP.DUMP.D0629.H07.FTS1.CCVT53I.S00380   )
IEF196I         STORCLAS (WORK) MGMTCLAS (PRODDEV) DATACLAS (PRODDEV)
IEF196I         VOL SER NOS= WORK28
IEF196I IGD104I FUNDIP.DUMP.D0629.H07.FTS1.CCVT53I.S00380    RETAINED,
IEF196I DDNAME=SYS00382
IEA611I COMPLETE DUMP ON FUNDIP.DUMP.D0629.H07.FTS1.CCVT53I.S00380 874
DUMPID=380 REQUESTED BY JOB (CCVT53I )
FOR ASID (09BC)
```

Dump example from the system log

Trace table

- The trace table contains footprints of system activity
- A collection of entries represents the start and end of events
- Events are in time sequence
- Trace table entries show the entire execution of a task
- Tracing a task eliminates guesswork about the task’s flow of execution and what went wrong

Principal functions

Support First Failure Data Capture (FFDC)

Record variable-length trace records containing relevant data to function

Extract – Trace domain's *specific* gates

Gate	Trace	Function
TRPT	None	TRACE_PUT
TRSR	TR 0201	SET_INTERNAL_TABLE_SIZE
	TR 0202	START_INTERNAL_TRACE
		STOP_INTERNAL_TRACE

Extract – Trace domain's *generic* gates

Gate	Trace	Function
DMDM	TR 0001	PRE_INITIALIZE
	TR 0002	INITIALIZE_DOMAIN
KETI	TR 0201	NOTIFY_RESET

Trace SIT parameters

AUXTR auxiliary trace option

Controls whether any of the three types of CICS trace entry are written to the auxiliary trace data set

INTTR internal trace option

Controls whether any of the three types of CICS trace entry are written to the internal trace. Shown in both system and transaction dumps

GTFTR generalized trace facility (GTF)

To use the GTF data sets for CICS trace data, the GTF task must be started and running. Same GTF destinations can be shared between programs (VTAM, CICS)

SYSTR CICS system trace records

Note: Setting the master trace lag OFF affects only standard tracing and has no effect on special tracing, which is controlled separately by SPCTR or SPCTRxx trace levels and the CETR transaction

SIT parameters

AUXTR auxiliary trace option

AUXTR=OFF|ON

INTTR internal trace option

INTTR=ON|OFF

GTFTR generalized trace facility (GTF)

GTFTR=OFF|ON

SYSTR CICS system trace records

SYSTR=ON|OFF

Trace SIT parameters

USERTR USER trace records

If the user trace lag is off, the user trace facility is disabled, and EXEC CICS ENTER TRACENUM commands receive an INVREQ condition if EXCEPTION is not specified

AUXTRSW auxiliary trace autoswitch facility

ALL permits continuous switching between the DFHAUXT and DFHBUXT datasets

TRTABSZ specifies the size, in kilobytes, of the internal trace table

Minimum of 12 MB, extendable in 4 KB increments

CICS can obtain 64-bit (above-the-bar) storage, rather than 31-bit (above-the-line) storage for the internal trace table, depending on the version of the z/OS operating system, and whether the CICS region operates with transaction isolation

SIT parameters

USERTR USER trace records

USERTR=ON|OFF

AUXTRSW auxiliary trace autoswitch facility

AUXTRSW=NO|ALL|NEXT

TRTABSZ size of the internal trace table

TRTABSZ=12MB| up to 1Gbyte

Trace SIT parameters

TRTRANSZ specifies the size of the transaction dump trace table

TRTRANSZ=1024 | number-of-kilobytes

When a transaction dump is taken, CICS obtains MVS storage in 64-bit storage for the transaction dump trace table

Exception trace records

Are always made and are not controlled by a system initialization parameter

SIT parameters

TRTRANSZ transaction dump trace table

TRTRANSZ=1024 | number-of-kilobytes

Types of trace

- User-controlled
  - Normal tracing
    - Trace points and levels
    - Standard, special, and suppressed tracing
    - Specified by terminal and transaction
  - VTAM exit tracing
    - Requires GTF trace to be active
  - User-exception tracing

- Automatic
  - Exception tracing
  - Program check and abend tracing
  - XRF tracing

User-controlled tracing

- Normal tracing
  - is done by the trace domain
  - each component has various levels of tracing which can be active, and which you can set or suppress individually
  - also, trace can be activated for individual transactions or terminals
- GTF tracing
  - can be used for CICS trace data
  - must be used with the VTAM exit trace
- User-exception tracing
  - To make a user program create exception trace entries, add the EXCEPTION option to an EXEC CICS ENTER TRACENUM command
  - These entries (identified by character string *EXCU) are written to the internal trace table even if internal tracing is turned off
  - Exception tracing cannot be disabled, even if normal tracing is off

Trace points and levels

- Trace points are predefined points in CICS code
- Trace point levels
  - Level 1
  - Level 2
  - Level 3 and 4
- Mainline trace entry points – have a level attribute
- Exception trace entry points
  - have no level specification
  - cannot be disabled or suppressed

Trace points and levels

- The level attribute specifies the level of details to be provided by the trace program. Higher number = more info
  - 1. enough diagnostic info to resolve user errors
  - 2. provide info to resolve errors in CICS code and application code
  - 3 and 4. For special cases, usually to provide information to the support centre. 3 and 4 can be used for very few components.
- Trace point levels can vary. Most mainline trace points have a level of 1 or 2. Only a few have level 3 or 4

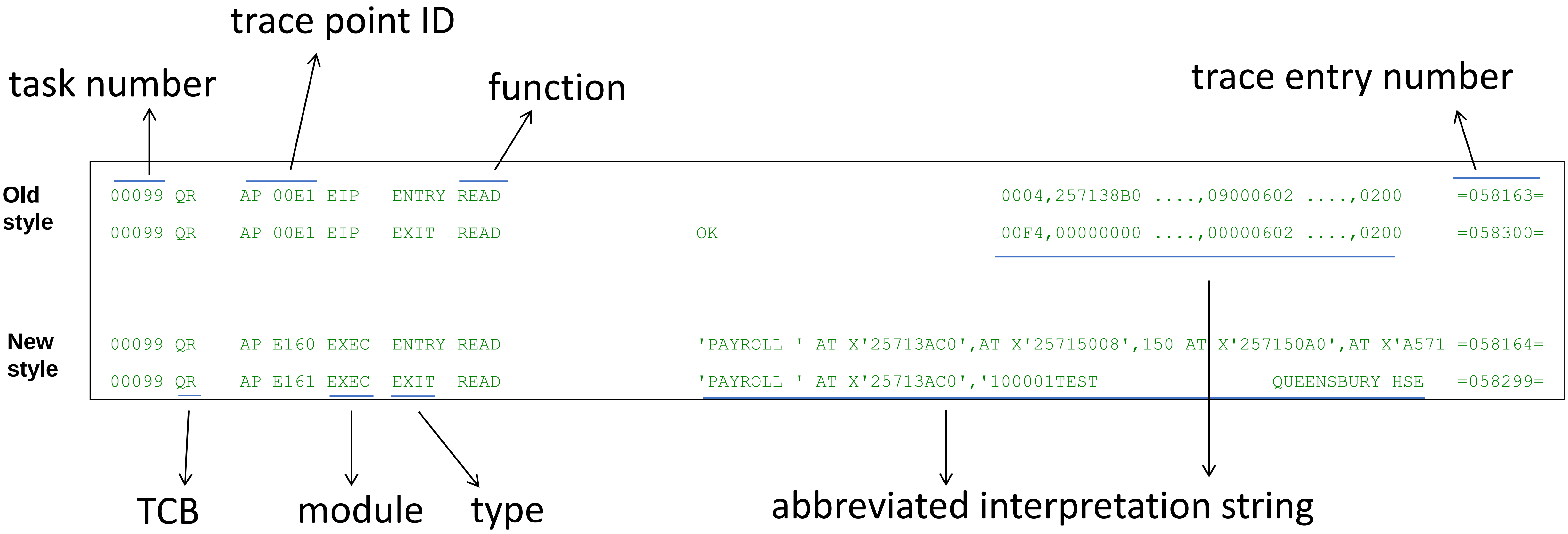
Trace destination

- Internal
  - Wrap-around table in main storage (above the line)
  - Shown in both system and transaction dumps
  - Minimum of 16 KB, extendable in 4KB increments
  - Always allocated
- Auxiliary
  - One or two CICS-owned BSAM data sets
  - May be auto-switched
  - Can be set so entries do not wrap
- GTF
  - Written to MVS-defined destination
  - Same GTF destination may be shared between programs (VTAM, CICS)
  - Entries may wrap

Format of trace entries

- Abbreviated (ABBREV)
  - Prints one line per entry
- Short
  - Prints one or multiple lines
- Extended
  - Prints up to 4 KB per entry
  - The terms ‘extended’ and ‘full’ mean the same thing in this context

Abbreviated trace entries example



Old style

```
00099 QR    AP 00E1 EIP   ENTRY READ                                                  0004,257138B0 ....,09000602 ....,0200     =058163=
00099 QR    AP 00E1 EIP   EXIT  READ                      OK                          00F4,00000000 ....,00000602 ....,0200     =058300=
```

New style

```
00099 QR    AP E160 EXEC  ENTRY READ                      'PAYROLL ' AT X'25713AC0',AT X'25715008',150 AT X'257150A0',AT X'A571 =058164=
00099 QR    AP E161 EXEC  EXIT  READ                      'PAYROLL ' AT X'25713AC0','100001TEST                QUEENSBURY HSE   =058299=
```

Abbreviated trace entries example

- Task number uniquely identifies a task for as long as it is in the system. It can be:
  - a 5 digit decimal number
  - a 3 character non-numeric value
  - a 2 character domain index
- TCB has the name of the TCB that the trace entry was made from
- Trace point indicates where the trace point is in CICS code. AP 00E1 is an exec interface request in the Application domain The Trace Entries topic in IBM Knowledge Center documents the trace point IDs

Abbreviated trace entries example

- Abbreviated interpretation string shows:
  - the module from which the trace point was made
  - the function being performed
  - any parameters passed on a call, and any responses from a called routine
- Trace entry number is the number of the entry on the trace data set. You can match the abbreviated and the extended trace entries with this number
- The types ENTRY and EXIT are paired. The EXIT reveals if the command was successful
- Event, *EXC* (exception), and *EXCU* (user exception) traces are non-paired types

Full trace – old style and new style

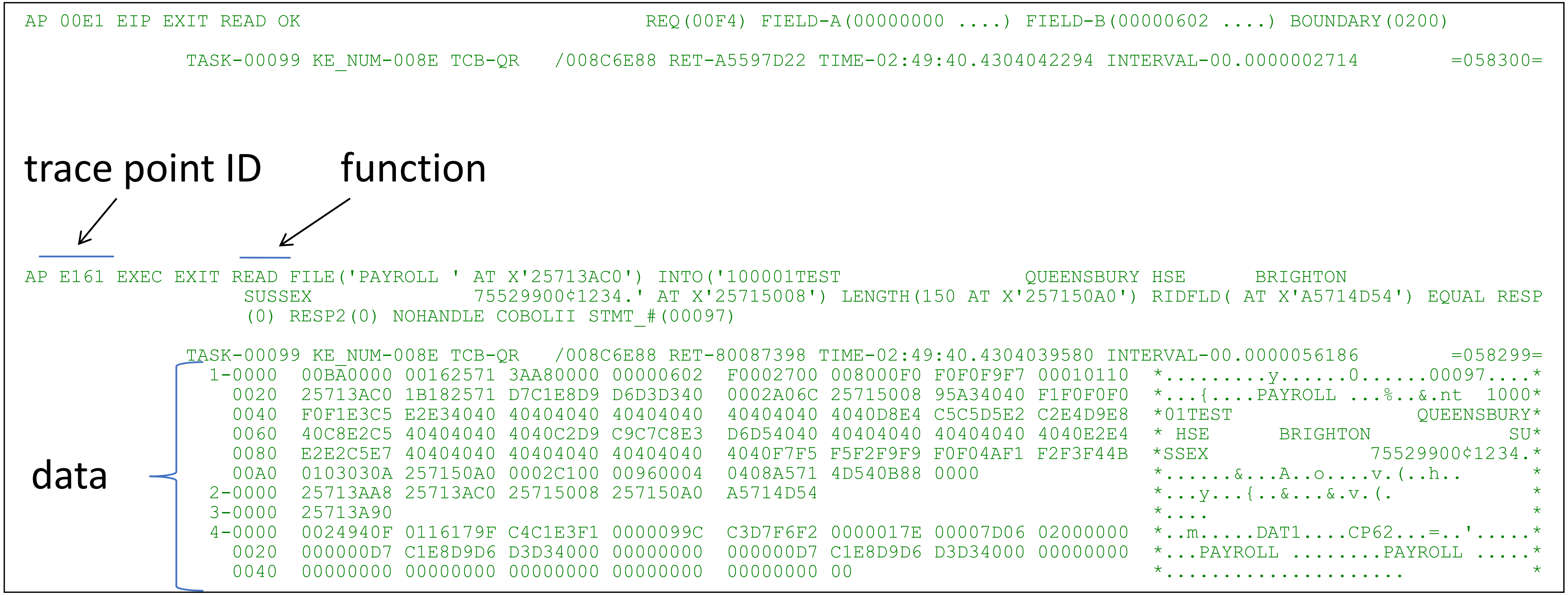
Old style

```
AP 00E1 EIP ENTRY READ                                REQ(0004) FIELD-A(257138B0 ....) FIELD-B(09000602 ....) BOUNDARY(0200)

              TASK-00099 KE_NUM-008E TCB-QR   /008C6E88 RET-A5597D22 TIME-02:49:40.3761297734 INTERVAL-00.0000061040        =058163=

AP 00E1 EIP EXIT READ OK                              REQ(00F4) FIELD-A(00000000 ....) FIELD-B(00000602 ....) BOUNDARY(0200)

              TASK-00099 KE_NUM-008E TCB-QR   /008C6E88 RET-A5597D22 TIME-02:49:40.4304042294 INTERVAL-00.0000002714        =058300=
```

New style

```
AP E160 EXEC ENTRY READ FILE('PAYROLL ' AT X'25713AC0') INTO( AT X'25715008') LENGTH(150 AT X'257150A0') RIDFLD( AT X'A5714D54')
                   EQUAL NOHANDLE COBOLII STMT_#(00097)

              TASK-00099 KE_NUM-008E TCB-QR   /008C6E88 RET-800850A2 TIME-02:49:40.3761330527 INTERVAL-00.0000032792        =058164=
                1-0000  00560000 00162571 3AA80000 00000602  F0002700 008000F0 F0F0F9F7 00010110  *.........y......0......00097....*
                  0020  25713AC0 1B182571 D7C1E8D9 D6D3D340  0002A008 25715008 95A34040 0103030A  *...{....PAYROLL ......&.nt  ....*
                  0040  257150A0 4F904040 00960004 0408A571  4D544040 4040                        *..&.|.  .o....v.(.              *
                2-0000  25713AA8 25713AC0 25715008 257150A0  A5714D54                             *...y...{..&...&.v.(.            *
                3-0000  25713A90                                                                  *....                            *
                4-0000  0024940F 0116179F C4C1E3F1 0000099C  C3D7F6F2 0000017E 00007D34 14000000  *..m.....DAT1....CP62...=..'.....*
                  0020  00000000 00000000 00000000 00000000  00000040 40404040 40404000 00000000  *...................        .....*
                  0040  00000000 00000000 00000000 00000000  00000000 00                          *.....................           *
                5-0000  257138B0                                                                  *....                            *
                6-0000  00104001 25713708 40404040 A5597D22  00000000 25714BDC 25713A90 25714D54  *.. .....    v.'...............(.*
                  0020  25597AD0 25597060 40000000 238205EC  00000000 25597160 25714AA0 25714D50  *..:}...- ....b.........-..¢...(&*
                  0040  25597718 257129D8                                                         *.......Q                        *

AP E161 EXEC EXIT READ FILE('PAYROLL ' AT X'25713AC0') INTO('100001TEST                QUEENSBURY HSE      BRIGHTON
                   SUSSEX              75529900¢1234.' AT X'25715008') LENGTH(150 AT X'257150A0') RIDFLD( AT X'A5714D54') EQUAL RESP
                   (0) RESP2(0) NOHANDLE COBOLII STMT_#(00097)

              TASK-00099 KE_NUM-008E TCB-QR   /008C6E88 RET-80087398 TIME-02:49:40.4304039580 INTERVAL-00.0000056186        =058299=
                1-0000  00BA0000 00162571 3AA80000 00000602  F0002700 008000F0 F0F0F9F7 00010110  *.........y......0......00097....*
                  0020  25713AC0 1B182571 D7C1E8D9 D6D3D340  0002A06C 25715008 95A34040 F1F0F0F0  *...{....PAYROLL ...%..&.nt  1000*
                  0040  F0F1E3C5 E2E34040 40404040 40404040  40404040 4040D8E4 C5C5D5E2 C2E4D9E8  *01TEST                QUEENSBURY*
                  0060  40C8E2C5 40404040 4040C2D9 C9C7C8E3  D6D54040 40404040 40404040 4040E2E4  * HSE      BRIGHTON            SU*
                  0080  E2E2C5E7 40404040 40404040 40404040  4040F7F5 F5F2F9F9 F0F04AF1 F2F3F44B  *SSEX              75529900¢1234.*
                  00A0  0103030A 257150A0 0002C100 00960004  0408A571 4D540B88 0000               *......&...A..o....v.(..h..      *
                2-0000  25713AA8 25713AC0 25715008 257150A0  A5714D54                             *...y...{..&...&.v.(.            *
                3-0000  25713A90                                                                  *....                            *
                4-0000  0024940F 0116179F C4C1E3F1 0000099C  C3D7F6F2 0000017E 00007D06 02000000  *..m.....DAT1....CP62...=..'.....*
                  0020  000000D7 C1E8D9D6 D3D34000 00000000  000000D7 C1E8D9D6 D3D34000 00000000  *...PAYROLL ........PAYROLL .....*
                  0040  00000000 00000000 00000000 00000000  00000000 00                          *.....................           *
```

Full trace – old style and new style



Old style

```
AP 00E1 EIP EXIT READ OK                                   REQ(00F4) FIELD-A(00000000 ....) FIELD-B(00000602 ....) BOUNDARY(0200)

              TASK-00099 KE_NUM-008E TCB-QR   /008C6E88 RET-A5597D22 TIME-02:49:40.4304042294 INTERVAL-00.0000002714        =058300=
```

New style

```
AP E161 EXEC EXIT READ FILE('PAYROLL ' AT X'25713AC0') INTO('100001TEST                QUEENSBURY HSE      BRIGHTON
                   SUSSEX              75529900¢1234.' AT X'25715008') LENGTH(150 AT X'257150A0') RIDFLD( AT X'A5714D54') EQUAL RESP
                   (0) RESP2(0) NOHANDLE COBOLII STMT_#(00097)

              TASK-00099 KE_NUM-008E TCB-QR   /008C6E88 RET-80087398 TIME-02:49:40.4304039580 INTERVAL-00.0000056186        =058299=
                1-0000  00BA0000 00162571 3AA80000 00000602  F0002700 008000F0 F0F0F9F7 00010110  *..........y......0......00097....*
                  0020  25713AC0 1B182571 D7C1E8D9 D6D3D340  0002A06C 25715008 95A34040 F1F0F0F0  *...{....PAYROLL ...%..&.nt  1000*
                  0040  F0F1E3C5 E2E34040 40404040 40404040  40404040 4040D8E4 C5C5D5E2 C2E4D9E8  *01TEST                QUEENSBURY*
                  0060  40C8E2C5 40404040 4040C2D9 C9C7C8E3  D6D54040 40404040 40404040 4040E2E4  * HSE      BRIGHTON            SU*
                  0080  E2E2C5E7 40404040 40404040 40404040  4040F7F5 F5F2F9F9 F0F04AF1 F2F3F44B  *SSEX                75529900¢1234.*
                  00A0  0103030A 257150A0 0002C100 00960004  0408A571 4D540B88 0000              *......&...A..o....v.(..h..      *
                2-0000  25713AA8 25713AC0 25715008 257150A0  A5714D54                            *...y...{..&...&.v.(.            *
                3-0000  25713A90                                                                 *....                            *
                4-0000  0024940F 0116179F C4C1E3F1 0000099C  C3D7F6F2 0000017E 00007D06 02000000  *..m.....DAT1....CP62...=..'.....*
                  0020  000000D7 C1E8D9D6 D3D34000 00000000  000000D7 C1E8D9D6 D3D34000 00000000  *...PAYROLL ........PAYROLL .....*
                  0040  00000000 00000000 00000000 00000000  00000000 00                          *.....................           *
```

Full trace entries example

The full trace contains more comprehensive interpretation

The kernel task number (KE_NUM) is the number used by the KE domain to identify the task The TCB field contains the TCB name as well as the address of the MVS TCB in use for this task. The Call return address (RET) is the return address passed in R14 to a called routine

For an EXEC CICS call the RET field becomes invaluable

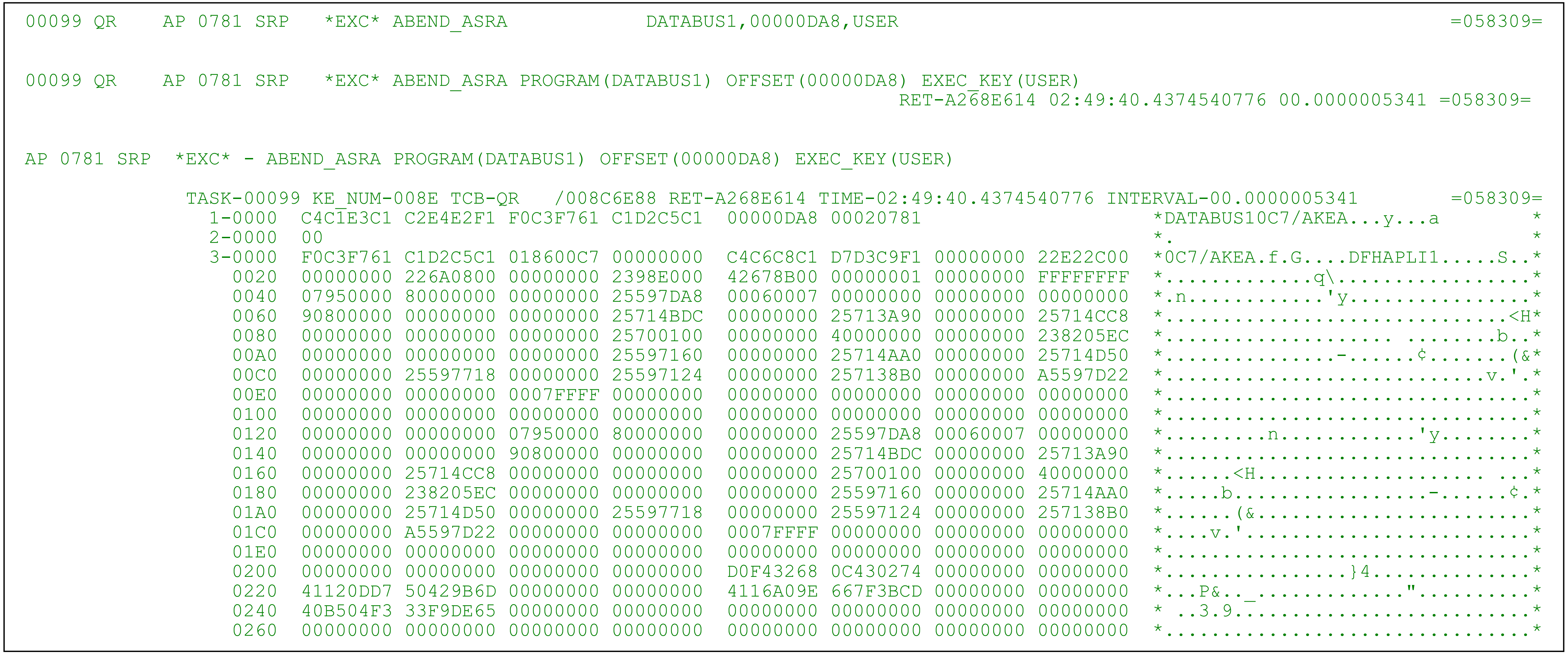
By subtracting the storage address of where the program is loaded from the return value, you can determine the offset in the program of the executed instruction

It is also possible to determine if a handle condition was invoked by looking at this value. If this address is not the same on an entry trace record as the corresponding exit trace record, a handle condition was invoked

Timestamp

Interval is the interval since the last trace entry

Exception trace



abbrev.

```
00099 QR    AP 0781 SRP   *EXC* ABEND_ASRA            DATABUS1,00000DA8,USER                                       =058309=
```

short

```
00099 QR    AP 0781 SRP   *EXC* ABEND_ASRA PROGRAM(DATABUS1) OFFSET(00000DA8) EXEC_KEY(USER)
                                                                     RET-A268E614 02:49:40.4374540776 00.0000005341 =058309=
```

full

```
AP 0781 SRP  *EXC* - ABEND_ASRA PROGRAM(DATABUS1) OFFSET(00000DA8) EXEC_KEY(USER)

             TASK-00099 KE_NUM-008E TCB-QR   /008C6E88 RET-A268E614 TIME-02:49:40.4374540776 INTERVAL-00.0000005341       =058309=
               1-0000  C4C1E3C1 C2E4E2F1 F0C3F761 C1D2C5C1  00000DA8 00020781                     *DATABUS10C7/AKEA...y...a        *
               2-0000  00                                                                         *.                               *
               3-0000  F0C3F761 C1D2C5C1 018600C7 00000000  C4C6C8C1 D7D3C9F1 00000000 22E22C00   *0C7/AKEA.f.G....DFHAPLI1.....S..*
                 0020  00000000 226A0800 00000000 2398E000  42678B00 00000001 00000000 FFFFFFFF   *.............q\.................*
                 0040  07950000 80000000 00000000 25597DA8  00060007 00000000 00000000 00000000   *.n............'y................*
                 0060  90800000 00000000 00000000 25714BDC  00000000 25713A90 00000000 25714CC8   *..............................<H*
                 0080  00000000 00000000 00000000 25700100  00000000 40000000 00000000 238205EC   *.................... ........b..*
                 00A0  00000000 00000000 00000000 25597160  00000000 25714AA0 00000000 25714D50   *...............-......¢.......(&*
                 00C0  00000000 25597718 00000000 25597124  00000000 257138B0 00000000 A5597D22   *............................v.'.*
                 00E0  00000000 00000000 0007FFFF 00000000  00000000 00000000 00000000 00000000   *................................*
                 0100  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000   *................................*
                 0120  00000000 00000000 07950000 80000000  00000000 25597DA8 00060007 00000000   *.........n............'y........*
                 0140  00000000 00000000 90800000 00000000  00000000 25714BDC 00000000 25713A90   *................................*
                 0160  00000000 25714CC8 00000000 00000000  00000000 25700100 00000000 40000000   *......<H.................... ...*
                 0180  00000000 238205EC 00000000 00000000  00000000 25597160 00000000 25714AA0   *.....b.................-......¢.*
                 01A0  00000000 25714D50 00000000 25597718  00000000 25597124 00000000 257138B0   *......(&........................*
                 01C0  00000000 A5597D22 00000000 00000000  0007FFFF 00000000 00000000 00000000   *....v.'.........................*
                 01E0  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000   *................................*
                 0200  00000000 00000000 00000000 00000000  D0F43268 0C430274 00000000 00000000   *................}4..............*
                 0220  41120DD7 50429B6D 00000000 00000000  4116A09E 667F3BCD 00000000 00000000   *...P&.._............."..........*
                 0240  40B504F3 33F9DE65 00000000 00000000  00000000 00000000 00000000 00000000   * ..3.9..........................*
                 0260  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000   *................................*
```

Exception trace entry example

- There is much more detail in the amount of data for full entries compared to abbreviated
- An exception trace entry is a type of extended trace entry. These have EXC in the interpretation string area.
- Exception trace entries are written even if CICS tracing is turned off.
- They occur when an abnormal condition, such as an ASRA abend, occurs

Short trace

A short trace is a full trace without data areas.

Old style

```
00099 QR    AP 00E1 EIP   ENTRY READ                                 REQ(0004) FIELD-A(257138B0 ....) FIELD-B(09000602 ....)
                                BOUNDARY(0200)                              RET-A5597D22 02:49:40.3761297734 00.0000061040 =058163=


00099 QR    AP 00E1 EIP   EXIT  READ OK                              REQ(00F4) FIELD-A(00000000 ....) FIELD-B(00000602 ....)
                                BOUNDARY(0200)                              RET-A5597D22 02:49:40.4304042294 00.0000002714 =058300=
```

New style

```
00099 QR    AP E160 EXEC  ENTRY READ FILE('PAYROLL ' AT X'25713AC0') INTO( AT X'25715008') LENGTH(150 AT X'257150A0') RIDFLD( AT
                                X'A5714D54') EQUAL NOHANDLE COBOLII STMT_#(00097)
                                                                            RET-800850A2 02:49:40.3761330527 00.0000032792 =058164=

00099 QR    AP E161 EXEC  EXIT  READ FILE('PAYROLL ' AT X'25713AC0') INTO('100001TEST                QUEENSBURY HSE      BRIGHTON
                                          SUSSEX              75529900¢1234.' AT X'25715008') LENGTH(150 AT X'257150A0')
                                RIDFLD( AT X'A5714D54') EQUAL RESP(0) RESP2(0) NOHANDLE COBOLII STMT_#(00097)
                                                                            RET-80087398 02:49:40.4304039580 00.0000056186 =058299=
```

Trace selection

- Types of tracing
  - Abbreviated, short, and full trace entries
- Component trace
  - Specify the level of tracing required

- Selection criteria may include
  - –Termid
  - –Tranid
- Additional tracing options
  - VTAM exit tracing
  - User exception tracing

Trace selection

- Standard trace

  Standard tracing is done by the trace domain to record execution flow

- Component trace

  Each component has various levels of tracing which can be set or suppressed individually

- Specified by terminal and transaction

  By default, trace is turned on for a transaction running at any terminal.

  Trace can be activated for individual transactions or terminals.

- Special trace

  Allows recording of alternative trace entries

- VTAM Exit tracing

  GTF trace can be used for CICS trace data

- Exception tracing

  Cannot be suppressed

  CICS records Program check and ABEND information automatically

Trace levels

It is possible to select up to 32 levels of tracing. However, most CICS components only use levels 1, 2 and 3, and some do not have trace points at all these levels.

The exceptions are the SM component (storage manager domain), which also has level 4 tracing; and the SJ component (JVM domain), which also has trace levels 29–32.

SIT parameters

STNTR specifies the level of standard tracing

STNTR=1|(1[,2][,3])|ALL|OFF

STNTRxx standard CICS component tracing

STNTRxx=1|(1[,2][,3][,4][,29][,30][,31][,32])|ALL|OFF

SPCTR specifies the level of special tracing

SPCTR=(1,2)|(1[,2][,3])|ALL|OFF

SPCTRxx special component level tracing

SPCTRxx=(1,2)|(1[,2][,3][,4][,29][,30][,31][,32])|ALL|OFF

Trace levels 1-4 and 29-32

Level 1

Provides documented diagnostic information to resolve user errors Located on entry to, and exit from, every CICS domain or major internal domain function

Level 2

Provides more detailed information

Level 3 and 4

Only use under advice from the Support Center.

Selecting tracing levels 3, 4, or ALL for standard tracing for the storage manager (SM) component, or the temporary storage domain (TS), degrades the performance of your CICS region. This is because options 3 and 4 (and ALL) switch on trace flags that are used by SM domain for field engineering purposes.

Level 29,30,31,32

The SJ component (JVM domain), supports trace levels 29–32, which are reserved to indicate the JVM trace levels 0, 1, and 2, plus a user-definable JVM trace level

Trace component names 1

Code	Component name	Code	Component name
AP	Application domain	DP	Debugging profiles domain
BA	Business application manager	DS	Dispatcher domain
BF*	Built-in function	DU	Dump domain
BM*	Basic mapping support	EC*	Event capture and emission
CP*	Common programming interface	EI*	Exec interface
DC*	Dump compatibility layer	EJ	Enterprise Java domain
DD	Directory manager domain	EM	Event manager domain
DH	Document handling domain	EP	Event processing domain
DI*	Data interchange	FC*	File control
DM	Domain manager domain	GC	Global catalog domain

Trace component names 2

Code	Component name	Code	Component name
IC*	Interval control	ME	Message domain
IE	ECI over TCP/IP domain	ML	Markup language domain
II	IIOP domain	MN	Monitoring domain
IS*	ISC or IRC	MP	Managed platform domain
KC*	Task control	NQ	Enqueue domain
KE	Kernel	OT	Object transaction domain
LC	Local catalog domain	PA	Parameter domain
LD	Loader domain	PC*	Program control
LG	Log manager domain	PG	Program manager domain
LM	Lock domain	PI	Pipeline domain

New

Trace component names 3

Code	Component name	Code	Component name
PT	Partner domain	SJ	JVM domain
RA	Resource manager adapters	SM	Storage manager domain
RI*	Resource manager interface (RMI)	SO	Sockets domain
RL	Resource life-cycle domain	ST	Statistics domain
RM	Recovery manager domain	SZ*	Front End Programming Interface
RS	Region status domain	TC*	Terminal control
RX	RRS-coordinated EXCI domain	TD*	Transient data
RZ	Request streams domain	TI	Timer domain
SC*	Storage control	TR	Trace domain
SH	Scheduler services domain	TS	Temporary storage domain

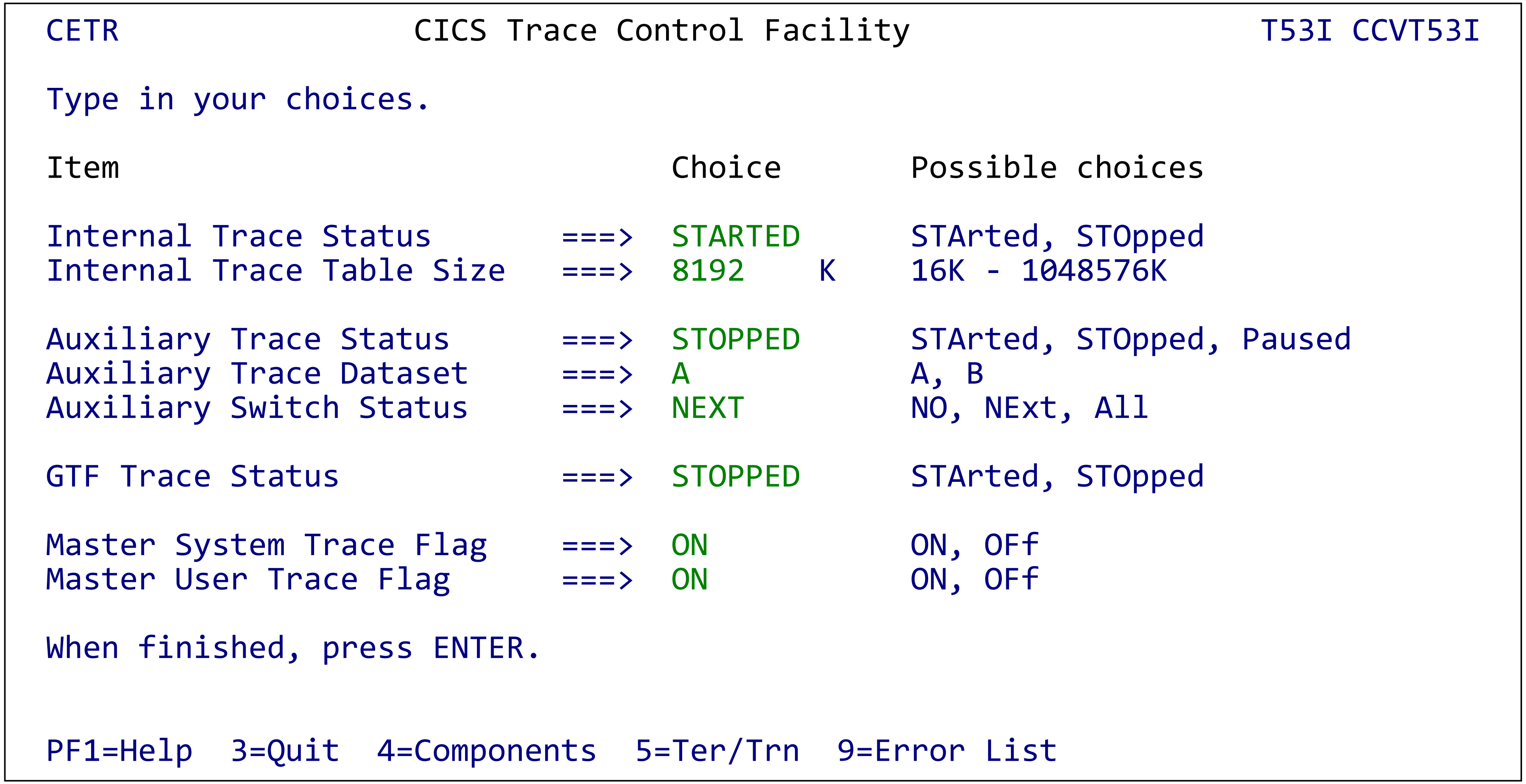
Trace component names 4

Code	Component name
UE*	User exit interface
US	User domain
WB	Web domain
WU	System management RESTful API
W2	Web 2.0 domain
XM	Transaction manager domain
XS	Security manager domain

CETR overview

- The CICS-supplied CETR transaction can control trace destinations, component tracing, terminal and transaction tracing. It can also activate or deactivate any destination, set master trace flags, or dynamically alter the size of the trace table
- Pressing PF4 from the first CETR screen displays this slide. The list of CICS components, or domains, is shown with the current settings for standard and special (greater detail) trace levels
- Here you can see the options set for standard and special tracing. This allows you to set two different tracing criteria for each component. The Standard and Special columns indicate the trace point levels
- Pressing PF1 on this screen displays the next screen containing the component abbreviations and the associated meaning

CETR: CICS Trace Control Facility

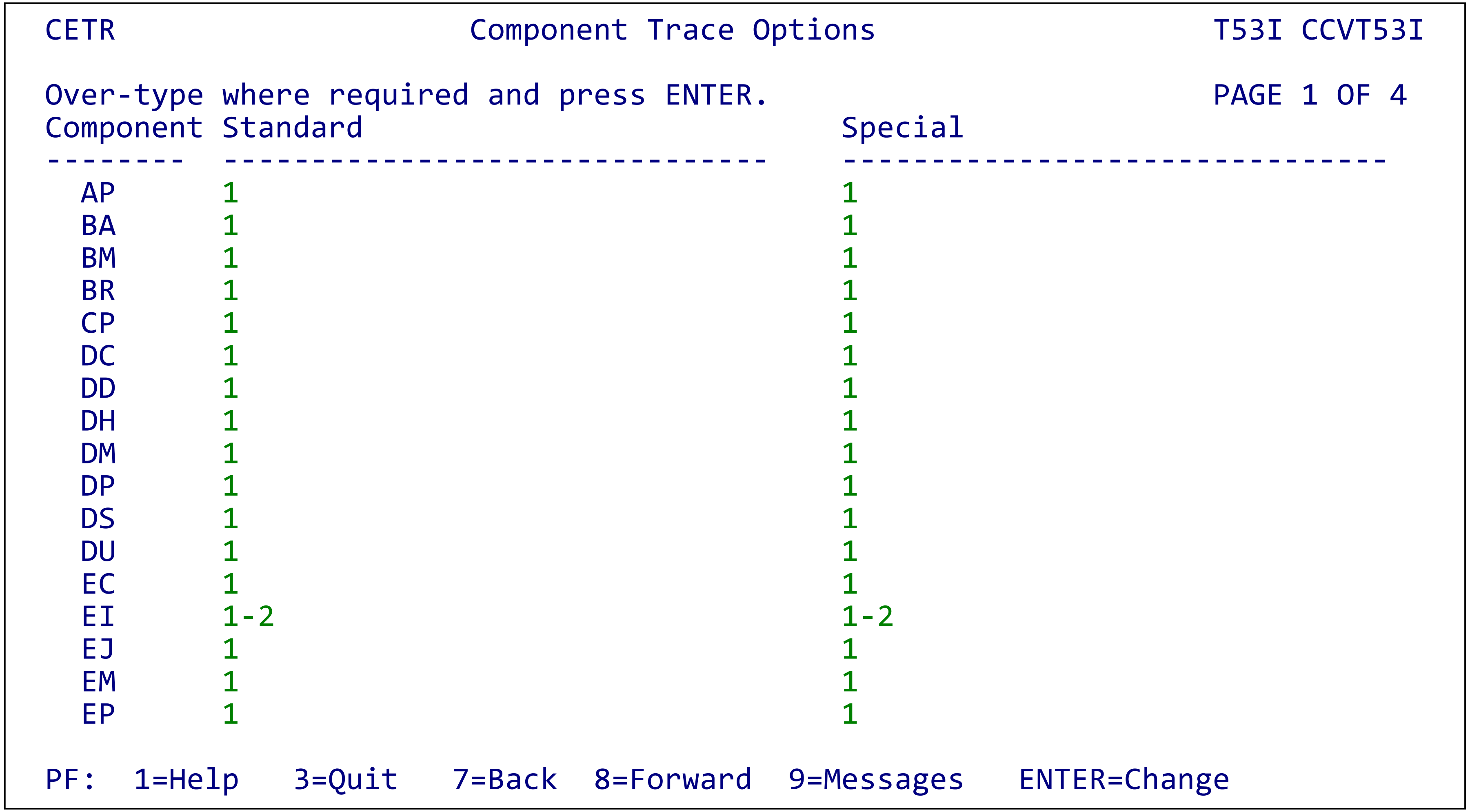


```
CETR                CICS Trace Control Facility                  T53I CCVT53I

Type in your choices.

Item                                  Choice        Possible choices

Internal Trace Status          ===>   STARTED       STArted, STOpped
Internal Trace Table Size      ===>   8192    K     16K - 1048576K

Auxiliary Trace Status         ===>   STOPPED       STArted, STOpped, Paused
Auxiliary Trace Dataset        ===>   A             A, B
Auxiliary Switch Status        ===>   NEXT          NO, NExt, All

GTF Trace Status               ===>   STOPPED       STArted, STOpped

Master System Trace Flag       ===>   ON            ON, OFf
Master User Trace Flag         ===>   ON            ON, OFf

When finished, press ENTER.


PF1=Help  3=Quit  4=Components  5=Ter/Trn  9=Error List
```

CETR: Component Trace Options

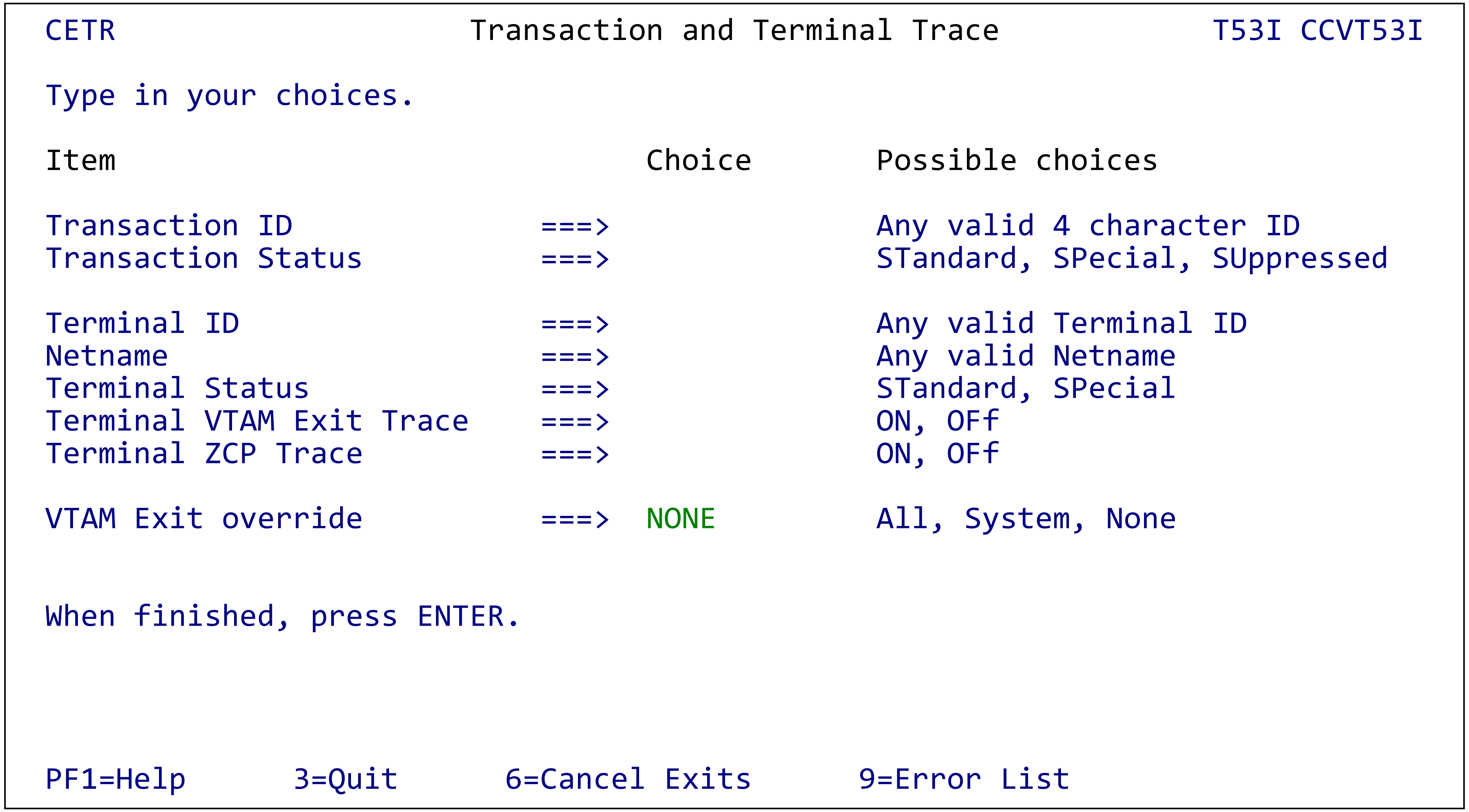
There are 4 pages of component trace options

Use PF8 to page down as normal



```
CETR                         Component Trace Options                       T53I CCVT53I

Over-type where required and press ENTER.                                  PAGE 1 OF 4
Component Standard                            Special
--------  -------------------------------     -------------------------------
   AP     1                                   1
   BA     1                                   1
   BM     1                                   1
   BR     1                                   1
   CP     1                                   1
   DC     1                                   1
   DD     1                                   1
   DH     1                                   1
   DM     1                                   1
   DP     1                                   1
   DS     1                                   1
   DU     1                                   1
   EC     1                                   1
   EI     1-2                                 1-2
   EJ     1                                   1
   EM     1                                   1
   EP     1                                   1

PF:  1=Help   3=Quit   7=Back  8=Forward  9=Messages   ENTER=Change
```

CETR: Transaction and Terminal Trace



```
CETR                    Transaction and Terminal Trace            T53I CCVT53I

Type in your choices.

Item                                  Choice      Possible choices

Transaction ID               ===>                 Any valid 4 character ID
Transaction Status           ===>                 STandard, SPecial, SUppressed

Terminal ID                  ===>                 Any valid Terminal ID
Netname                      ===>                 Any valid Netname
Terminal Status              ===>                 STandard, SPecial
Terminal VTAM Exit Trace     ===>                 ON, OFf
Terminal ZCP Trace           ===>                 ON, OFf

VTAM Exit override           ===>  NONE           All, System, None


When finished, press ENTER.




PF1=Help      3=Quit      6=Cancel Exits      9=Error List
```

CETR: Transaction and Terminal Trace

- Use PF5 to display the Transaction and Terminal Trace screen
- Using this screen of the CETR transaction, you can select standard, special or, suppressed tracing for any terminal or transaction. You can also enable the special GTF traces for VTAM exits
  - Standard tracing – normal transaction tracing
  - Special tracing – invoke when transaction or terminal tracing is required, or when a higher level of tracing is needed
  - Suppressed tracing – suppress tracing for a particular transaction or terminal
- If standard tracing is turned off, special tracing can still occur
- To only trace a single transaction or terminal:
  - Turn the master system trace flag off
  - Identify the transaction or terminal you wish to trace

Printing CICS traces

- Transaction dump
  - Uses DFHDUnnn utility
  - Contains only transaction that failed (default)
  - Can be abbreviated followed by full entries
- System dump
  - Formatted with IPCS
  - Shows all transactions
  - Can be abbreviated, short, and full entries
- Auxiliary trace
  - Uses DFHTU*nnn* utility
  - Can be abbreviated, short, and full entries
  - Can be selective

Auxiliary trace print JCL

```
//**************************************************************
//*                                                            *
//* THIS JOB WILL PRINT THE AUXILIARY TRACE DATASET            *
//* -- OPTIONAL SYSIN PARAMETERS                               *
//*    ABBREV | SHORT | FULL (DEFAULT)                         *
//*    TRANID=(PAY1,DAT1,...)                                  *
//*    TERMID=(TRM1,TRM2,...)                                  *
//*    TASKID=(00099-00112,00115,...)                          *
//*    TIMERG=(HH MM SS-HH MM SS,...)                          *
//*    TYPETR=(AP00E1,APE160-E161,...)                         *
//*    KE_NUM=(0097,0098,...)                                  *
//*    ENTRY_NUM=(005781-006439,...)                           *
//*    INTERVAL=.300                                           *
//*    EXCEPTION                                               *
//*    ...                                                     *
//**************************************************************
//PRTAUXT  EXEC PGM=DFHTU700,REGION=30M
//STEPLIB  DD DISP=SHR,DSN=CICS.V700BASE.CICS.SDFHLOAD
//DFHAUXT  DD DISP=SHR,DSN=CCVCICS.CCVT53I.DFHAUXT
//         DD DISP=SHR,DSN=CCVCICS.CCVT53I.DFHBUXT
//DFHAXPRM DD SYSOUT=*
//DFHAXPRM DD *
  FULL,TASKID=99,TYPETR=(AP00E1,APE160-E161)
/*
```

Auxiliary trace print JCL

- Auxiliary trace is printed using the trace utility program
- Abbreviated, short, or full (extended) format
- You can select trace entries by kernel task number, TRANID, TASKID, CICS TASKID, trace ID types, and any time period
- Some additional parameters:
  - ENTRY_NUM allows printing specific trace entries
  - EXCEPTION prints only exception trace entries
  - INTERVAL prints trace entries that exceed the interval specified
  - TYPETR=(AP00E1) shows all the EXEC CICS commands issued and their response. It provides a quick summary of program flow logic.

Profiling a transaction

- Profiling is a technique for determining the behaviour and performance parameters for an online transaction
- Profiling is started at transaction initiation to obtain some basic information such as transaction ID and the first program to be started
- Every EXEC CICS command can be bracketed and responses received
- Obtain fast overview of transaction flow
- Minimum entries need to be reviewed
- Focus on EXEC CICS commands
  - repetitive commands issued
  - non-normal responses
  - resources accessed
  - intervals longer than expected

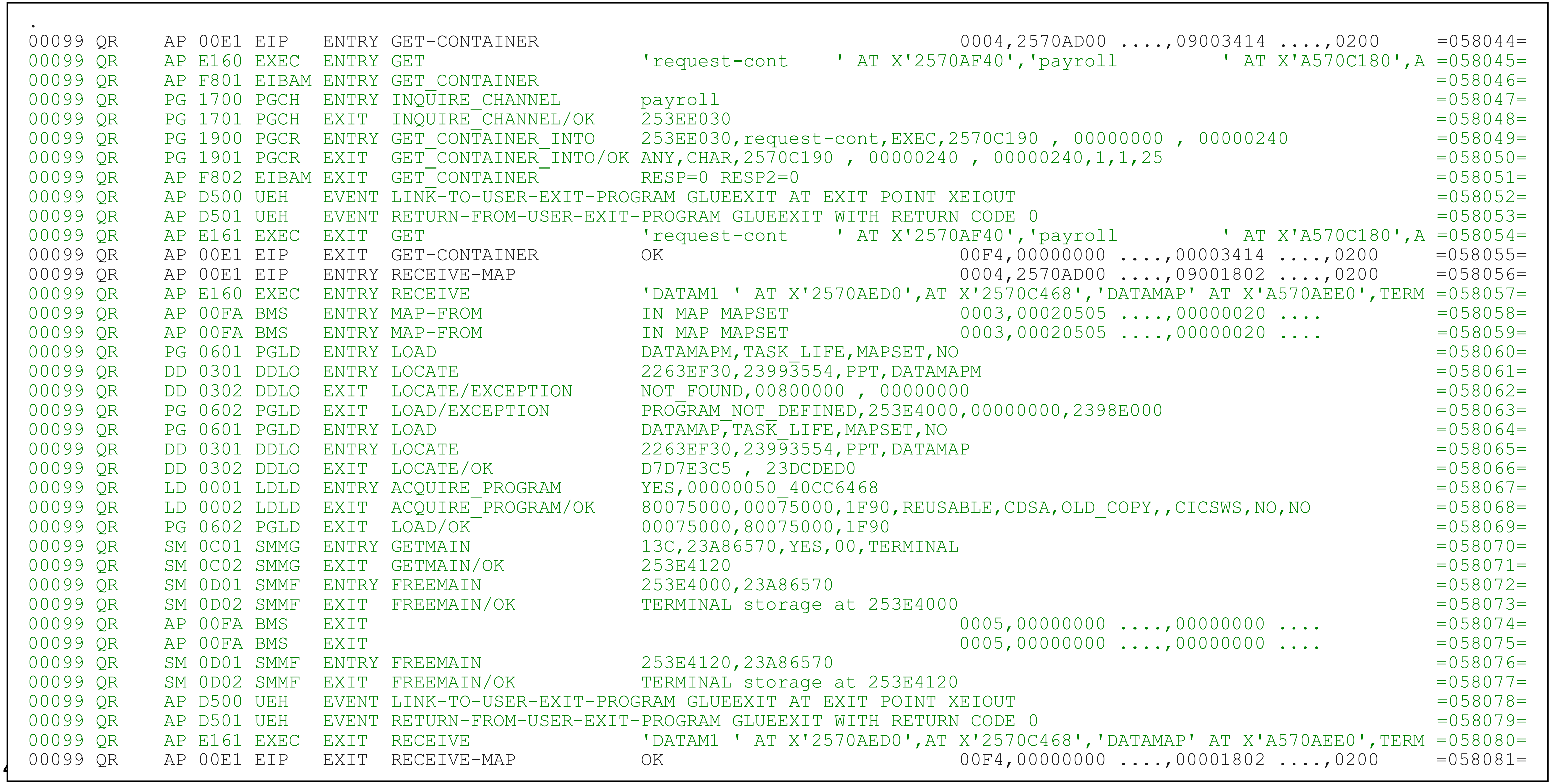
Profile – page 1 of 3

```
00099 QR    AP 0591 APXM  EXIT  INIT_XM_CLIENT/OK                                                                            =057961=
00099 QR    AP 1790 TFXM  ENTRY INIT_XM_CLIENT        23A86570 , 02A00000                                                    =057962=
00099 QR    XM 1001 XMIQ  ENTRY SET_TRANSACTION       TERMINAL,23A86570                                                      =057963=
00099 QR    XM 1002 XMIQ  EXIT  SET_TRANSACTION/OK                                                                           =057964=
00099 QR    AP 1791 TFXM  EXIT  INIT_XM_CLIENT/OK     00000004,00000000,YES,NO,NO                                            =057965=
00099 QR    US 0401 USXM  ENTRY INIT_TRANSACTION_USER 00000004,YES                                                           =057966=
00099 QR    DD 0301 DDLO  ENTRY LOCATE                22616BC0,23990DD4,USD2,00000004                                        =057967=
00099 QR    DD 0302 DDLO  EXIT  LOCATE/OK             22D01400 , 01010101                                                    =057968=
00099 QR    XS 0401 XSXM  ENTRY ADD_TRANSACTION_SECURITY 426005F0 , 00000004                                                 =057969=
00099 QR    XS 0402 XSXM  EXIT  ADD_TRANSACTION_SECURITY/OK                                                                  =057970=
00099 QR    US 0402 USXM  EXIT  INIT_TRANSACTION_USER/OK 22D0141F , 22D03110,0                                               =057971=
00099 QR    DS 0002 DSAT  ENTRY SET_PRIORITY          1                                                                      =057972=
00099 QR    DS 0003 DSAT  EXIT  SET_PRIORITY/OK       1                                                                      =057973=
00099 QR    DP 0900 DPXM  ENTRY INIT_XM_CLIENT                                                                               =057974=
00099 QR    DP 0901 DPXM  EXIT  INIT_XM_CLIENT/OK                                                                            =057975=
00099 QR    RM FA01 RMUC  ENTRY CREATE_UOW            NO,BACKWARD,0                                                          =057976=
00099 QR    RM 0209 RMUC  EVENT Remote_UOW_id_created 160DC6E3E2F14BE2C3F0E3C3D7F6F2F43267FB72EF000100000000                 =057977=
00099 QR    RM FA02 RMUC  EXIT  CREATE_UOW/OK                                                                                =057978=
00099 QR    PI 0B00 PIXM  ENTRY INIT_XM_CLIENT                                                                               =057979=
00099 QR    PI 0B01 PIXM  EXIT  INIT_XM_CLIENT/OK                                                                            =057980=
00099 QR    XS 0701 XSRC  ENTRY CHECK_CICS_RESOURCE   DAT1,TRANSATTACH,EXECUTE                                               =057981=
00099 QR    XS 0709 XSRC  EVENT CHECK                 DAT1 CHECK_RESOURCE_ACCESS,426005F0 , 00000004,TCICSTRN,READ,YES,2399 =057982=
00099 QR    XS 070A XSRC  EVENT CHECK-COMPLETE        DAT1 EJG CHECK_RESOURCE_ACCESS,OK,0,0,0,0                              =057983=
00099 QR    XS 0702 XSRC  EXIT  CHECK_CICS_RESOURCE/OK                                                                       =057984=
00099 QR    AP 0590 APXM  ENTRY BIND_XM_CLIENT                                                                               =057985=
00099 QR    AP 0591 APXM  EXIT  BIND_XM_CLIENT/OK                                                                            =057986=

… cut pages to save trees …
.
.
```

Profile – page 2 of 3

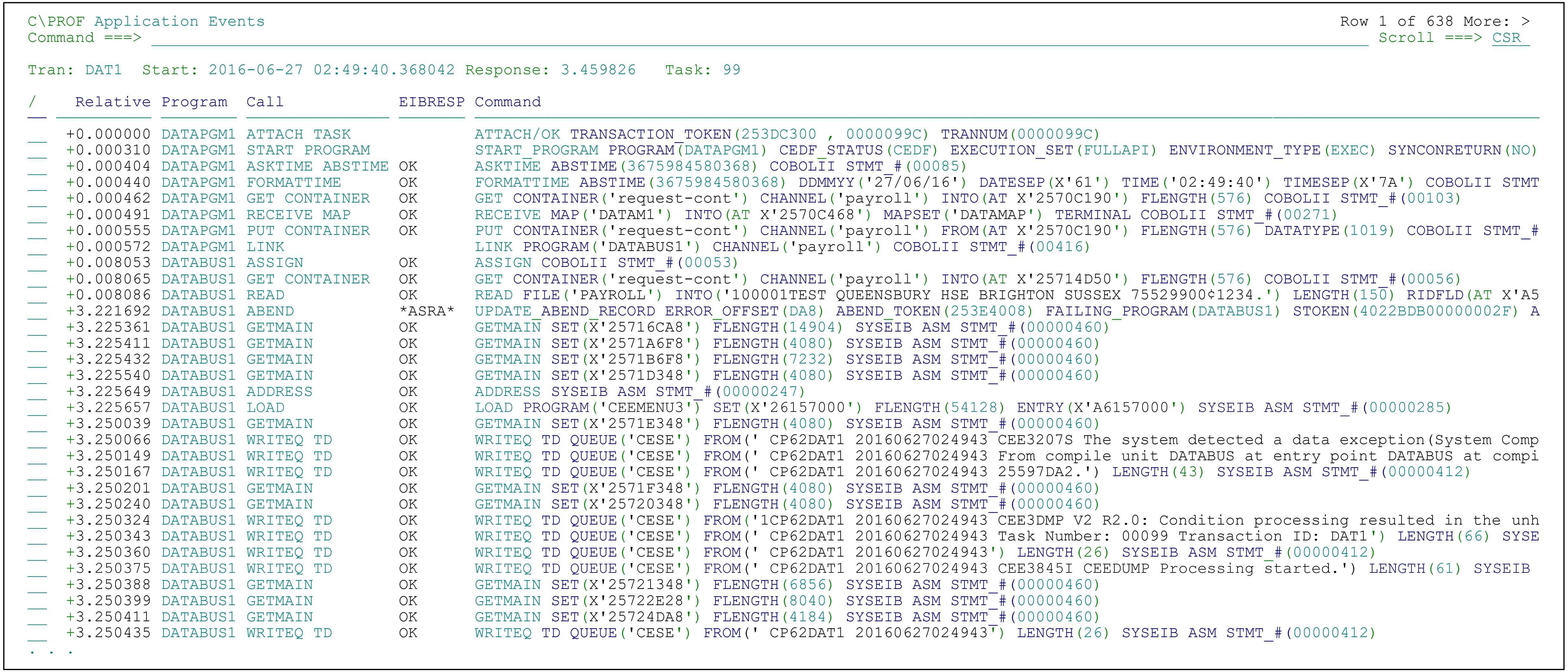
```
.
.
00099 QR    PG 0901 PGPG  ENTRY INITIAL_LINK          DATAPGM1                                                              =058017=
00099 QR    LD 0001 LDLD  ENTRY ACQUIRE_PROGRAM       00000050_40CC6990                                                     =058018=
00099 QR    LD 0002 LDLD  EXIT  ACQUIRE_PROGRAM/OK    A5511028,25511000,3A78,REUSABLE,ESDSA,OLD_COPY,,CICSWS,NO,NO          =058019=
00099 QR    PG 1700 PGCH  ENTRY SET_CURRENT_CHANNEL   253EA030,YES                                                          =058020=
00099 QR    PG 1701 PGCH  EXIT  SET_CURRENT_CHANNEL/OK                                                                      =058021=
00099 QR    AP 1940 APLI  ENTRY START_PROGRAM         DATAPGM1,CEDF,FULLAPI,EXEC,NO,253B579C,00000000 , 00000000,1,NO       =058022=
00099 QR    AP 1948 APLI  EVENT CALL-TO-LE/370        Thread_Initialization DATAPGM1                                        =058023=
00099 QR    AP 1949 APLI  EVENT RETURN-FROM-LE/370    Thread_Initialization OK DATAPGM1                                     =058024=
00099 QR    SM 0301 SMGF  ENTRY GETMAIN               8BA0,YES,LE_RUWA,TASK31                                               =058025=
00099 QR    SM 0302 SMGF  EXIT  GETMAIN/OK            25705528                                                              =058026=
00099 QR    AP 1948 APLI  EVENT CALL-TO-LE/370        Rununit_Init_&_Begin_Invo DATAPGM1                                    =058027=
00099 QR    AP 00E1 EIP   ENTRY ASKTIME-ABSTIME                                   0004,2570AD00 ....,09004A02 ..¢.,0200    =058028=
00099 QR    AP E160 EXEC  ENTRY ASKTIME               AT X'A570C448',COBOLII,00085                                          =058029=
00099 QR    TI 0200 TIMF  ENTRY INQUIRE_TIME          LOCAL,YES                                                             =058030=
00099 QR    TI 0201 TIMF  EXIT  INQUIRE_TIME/OK       2E9A1E,003675984580368C,02,49,40,368                                  =058031=
00099 QR    AP D500 UEH   EVENT LINK-TO-USER-EXIT-PROGRAM GLUEEXIT AT EXIT POINT XEIOUT                                     =058032=
00099 QR    AP D501 UEH   EVENT RETURN-FROM-USER-EXIT-PROGRAM GLUEEXIT WITH RETURN CODE 0                                   =058033=
00099 QR    AP E161 EXEC  EXIT  ASKTIME               3675984580368 AT X'A570C448',0,0,COBOLII,00085                        =058034=
00099 QR    AP 00E1 EIP   EXIT  ASKTIME-ABSTIME       OK                          00F4,00000000 ....,00004A02 ..¢.,0200    =058035=
00099 QR    AP 00E1 EIP   ENTRY FORMATTIME                                        0004,2570AD00 ....,09004A04 ..¢.,0200    =058036=
00099 QR    AP E160 EXEC  ENTRY FORMATTIME            3675984580368 AT X'2570C448',AT X'2570C42B',X'61' AT X'2570AF30',AT X =058037=
00099 QR    TI 0200 TIMF  ENTRY FORMAT_TIME           003675984580368C                                                      =058038=
00099 QR    TI 0201 TIMF  EXIT  FORMAT_TIME/OK        7E0,6,1B,170,B3,1,Sun, 26 Jun 2016 18:49:40 +0000,2016-06-26T18:49:40 =058039=
00099 QR    AP D500 UEH   EVENT LINK-TO-USER-EXIT-PROGRAM GLUEEXIT AT EXIT POINT XEIOUT                                     =058040=
00099 QR    AP D501 UEH   EVENT RETURN-FROM-USER-EXIT-PROGRAM GLUEEXIT WITH RETURN CODE 0                                   =058041=
00099 QR    AP E161 EXEC  EXIT  FORMATTIME            3675984580368 AT X'2570C448','27/06/16' AT X'2570C42B',X'61' AT X'257 =058042=
00099 QR    AP 00E1 EIP   EXIT  FORMATTIME            OK                          00F4,00000000 ....,00004A04 ..¢.,0200    =058043=
.
.
```

Profile – page 3 of 3



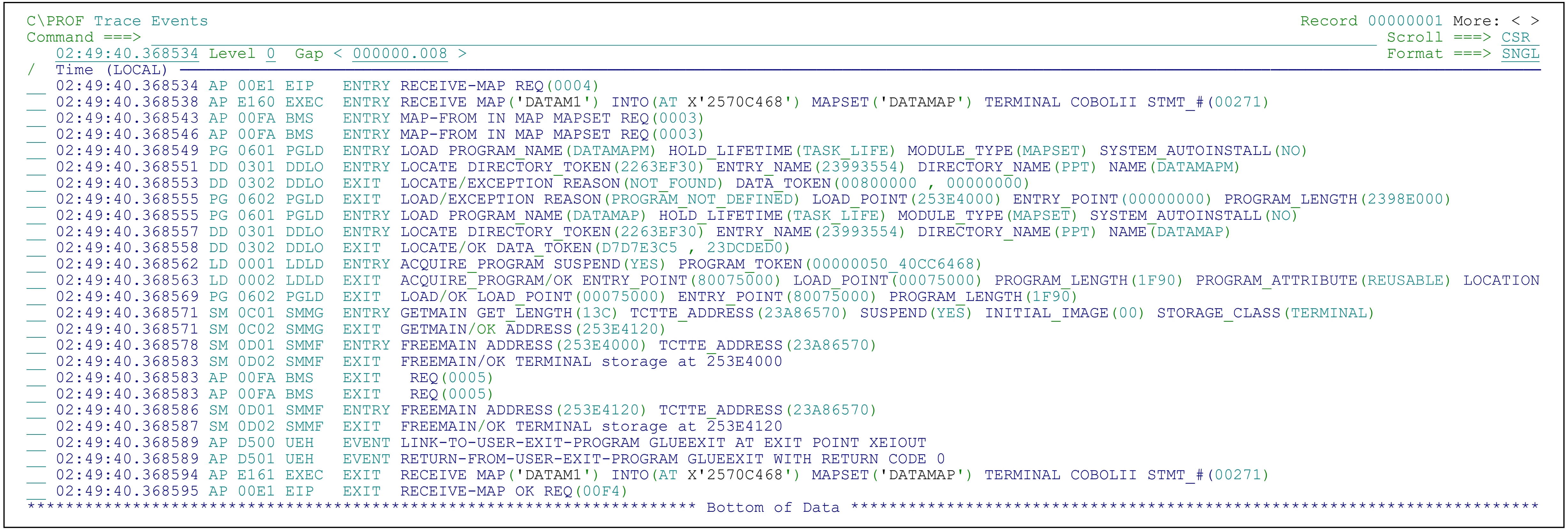
```
.
00099 QR    AP 00E1 EIP   ENTRY GET-CONTAINER                                      0004,2570AD00 ....,09003414 ....,0200     =058044=
00099 QR    AP E160 EXEC  ENTRY GET                   'request-cont     ' AT X'2570AF40','payroll         ' AT X'A570C180',A =058045=
00099 QR    AP F801 EIBAM ENTRY GET_CONTAINER                                                                                =058046=
00099 QR    PG 1700 PGCH  ENTRY INQUIRE_CHANNEL       payroll                                                                =058047=
00099 QR    PG 1701 PGCH  EXIT  INQUIRE_CHANNEL/OK    253EE030                                                               =058048=
00099 QR    PG 1900 PGCR  ENTRY GET_CONTAINER_INTO    253EE030,request-cont,EXEC,2570C190 , 00000000 , 00000240              =058049=
00099 QR    PG 1901 PGCR  EXIT  GET_CONTAINER_INTO/OK ANY,CHAR,2570C190 , 00000240 , 00000240,1,1,25                         =058050=
00099 QR    AP F802 EIBAM EXIT  GET_CONTAINER         RESP=0 RESP2=0                                                         =058051=
00099 QR    AP D500 UEH   EVENT LINK-TO-USER-EXIT-PROGRAM GLUEEXIT AT EXIT POINT XEIOUT                                      =058052=
00099 QR    AP D501 UEH   EVENT RETURN-FROM-USER-EXIT-PROGRAM GLUEEXIT WITH RETURN CODE 0                                    =058053=
00099 QR    AP E161 EXEC  EXIT  GET                   'request-cont     ' AT X'2570AF40','payroll         ' AT X'A570C180',A =058054=
00099 QR    AP 00E1 EIP   EXIT  GET-CONTAINER         OK                           00F4,00000000 ....,00003414 ....,0200     =058055=
00099 QR    AP 00E1 EIP   ENTRY RECEIVE-MAP                                        0004,2570AD00 ....,09001802 ....,0200     =058056=
00099 QR    AP E160 EXEC  ENTRY RECEIVE               'DATAM1  ' AT X'2570AED0',AT X'2570C468','DATAMAP' AT X'A570AEE0',TERM =058057=
00099 QR    AP 00FA BMS   ENTRY MAP-FROM              IN MAP MAPSET                0003,00020505 ....,00000020 ....          =058058=
00099 QR    AP 00FA BMS   ENTRY MAP-FROM              IN MAP MAPSET                0003,00020505 ....,00000020 ....          =058059=
00099 QR    PG 0601 PGLD  ENTRY LOAD                  DATAMAPM,TASK_LIFE,MAPSET,NO                                           =058060=
00099 QR    DD 0301 DDLO  ENTRY LOCATE                2263EF30,23993554,PPT,DATAMAPM                                         =058061=
00099 QR    DD 0302 DDLO  EXIT  LOCATE/EXCEPTION      NOT_FOUND,00800000 , 00000000                                          =058062=
00099 QR    PG 0602 PGLD  EXIT  LOAD/EXCEPTION        PROGRAM_NOT_DEFINED,253E4000,00000000,2398E000                         =058063=
00099 QR    PG 0601 PGLD  ENTRY LOAD                  DATAMAP,TASK_LIFE,MAPSET,NO                                            =058064=
00099 QR    DD 0301 DDLO  ENTRY LOCATE                2263EF30,23993554,PPT,DATAMAP                                          =058065=
00099 QR    DD 0302 DDLO  EXIT  LOCATE/OK             D7D7E3C5 , 23DCDED0                                                    =058066=
00099 QR    LD 0001 LDLD  ENTRY ACQUIRE_PROGRAM       YES,00000050_40CC6468                                                  =058067=
00099 QR    LD 0002 LDLD  EXIT  ACQUIRE_PROGRAM/OK    80075000,00075000,1F90,REUSABLE,CDSA,OLD_COPY,,CICSWS,NO,NO            =058068=
00099 QR    PG 0602 PGLD  EXIT  LOAD/OK               00075000,80075000,1F90                                                 =058069=
00099 QR    SM 0C01 SMMG  ENTRY GETMAIN               13C,23A86570,YES,00,TERMINAL                                           =058070=
00099 QR    SM 0C02 SMMG  EXIT  GETMAIN/OK            253E4120                                                               =058071=
00099 QR    SM 0D01 SMMF  ENTRY FREEMAIN              253E4000,23A86570                                                      =058072=
00099 QR    SM 0D02 SMMF  EXIT  FREEMAIN/OK           TERMINAL storage at 253E4000                                           =058073=
00099 QR    AP 00FA BMS   EXIT                                                     0005,00000000 ....,00000000 ....          =058074=
00099 QR    AP 00FA BMS   EXIT                                                     0005,00000000 ....,00000000 ....          =058075=
00099 QR    SM 0D01 SMMF  ENTRY FREEMAIN              253E4120,23A86570                                                      =058076=
00099 QR    SM 0D02 SMMF  EXIT  FREEMAIN/OK           TERMINAL storage at 253E4120                                           =058077=
00099 QR    AP D500 UEH   EVENT LINK-TO-USER-EXIT-PROGRAM GLUEEXIT AT EXIT POINT XEIOUT                                      =058078=
00099 QR    AP D501 UEH   EVENT RETURN-FROM-USER-EXIT-PROGRAM GLUEEXIT WITH RETURN CODE 0                                    =058079=
00099 QR    AP E161 EXEC  EXIT  RECEIVE               'DATAM1  ' AT X'2570AED0',AT X'2570C468','DATAMAP' AT X'A570AEE0',TERM =058080=
00099 QR    AP 00E1 EIP   EXIT  RECEIVE-MAP           OK                           00F4,00000000 ....,00001802 ....,0200     =058081=
```

Alternate profile – application events



```
C\PROF Application Events                                                                                     Row 1 of 638 More: >
Command ===> ______________________________________________________________________________________________________ Scroll ===> CSR_

Tran: DAT1  Start: 2016-06-27 02:49:40.368042 Response: 3.459826   Task: 99

/     Relative Program  Call            EIBRESP Command
__  _________ ________ _______________ _______ ____________________________________________________________________________________

__   +0.000000 DATAPGM1 ATTACH TASK             ATTACH/OK TRANSACTION_TOKEN(253DC300 , 0000099C) TRANNUM(0000099C)
__   +0.000310 DATAPGM1 START PROGRAM           START_PROGRAM PROGRAM(DATAPGM1) CEDF_STATUS(CEDF) EXECUTION_SET(FULLAPI) ENVIRONMENT_TYPE(EXEC) SYNCONRETURN(NO)
__   +0.000404 DATAPGM1 ASKTIME ABSTIME OK      ASKTIME ABSTIME(3675984580368) COBOLII STMT_#(00085)
__   +0.000440 DATAPGM1 FORMATTIME      OK      FORMATTIME ABSTIME(3675984580368) DDMMYY('27/06/16') DATESEP(X'61') TIME('02:49:40') TIMESEP(X'7A') COBOLII STMT
__   +0.000462 DATAPGM1 GET CONTAINER   OK      GET CONTAINER('request-cont') CHANNEL('payroll') INTO(AT X'2570C190') FLENGTH(576) COBOLII STMT_#(00103)
__   +0.000491 DATAPGM1 RECEIVE MAP     OK      RECEIVE MAP('DATAM1') INTO(AT X'2570C468') MAPSET('DATAMAP') TERMINAL COBOLII STMT_#(00271)
__   +0.000555 DATAPGM1 PUT CONTAINER   OK      PUT CONTAINER('request-cont') CHANNEL('payroll') FROM(AT X'2570C190') FLENGTH(576) DATATYPE(1019) COBOLII STMT_#
__   +0.000572 DATAPGM1 LINK                    LINK PROGRAM('DATABUS1') CHANNEL('payroll') COBOLII STMT_#(00416)
__   +0.008053 DATABUS1 ASSIGN          OK      ASSIGN COBOLII STMT_#(00053)
__   +0.008065 DATABUS1 GET CONTAINER   OK      GET CONTAINER('request-cont') CHANNEL('payroll') INTO(AT X'25714D50') FLENGTH(576) COBOLII STMT_#(00056)
__   +0.008086 DATABUS1 READ            OK      READ FILE('PAYROLL') INTO('100001TEST QUEENSBURY HSE BRIGHTON SUSSEX 75529900¢1234.') LENGTH(150) RIDFLD(AT X'A5
__   +3.221692 DATABUS1 ABEND           *ASRA*  UPDATE_ABEND_RECORD ERROR_OFFSET(DA8) ABEND_TOKEN(253E4008) FAILING_PROGRAM(DATABUS1) STOKEN(4022BDB00000002F) A
__   +3.225361 DATABUS1 GETMAIN         OK      GETMAIN SET(X'25716CA8') FLENGTH(14904) SYSEIB ASM STMT_#(00000460)
__   +3.225411 DATABUS1 GETMAIN         OK      GETMAIN SET(X'2571A6F8') FLENGTH(4080) SYSEIB ASM STMT_#(00000460)
__   +3.225432 DATABUS1 GETMAIN         OK      GETMAIN SET(X'2571B6F8') FLENGTH(7232) SYSEIB ASM STMT_#(00000460)
__   +3.225540 DATABUS1 GETMAIN         OK      GETMAIN SET(X'2571D348') FLENGTH(4080) SYSEIB ASM STMT_#(00000460)
__   +3.225649 DATABUS1 ADDRESS         OK      ADDRESS SYSEIB ASM STMT_#(00000247)
__   +3.225657 DATABUS1 LOAD            OK      LOAD PROGRAM('CEEMENU3') SET(X'26157000') FLENGTH(54128) ENTRY(X'A6157000') SYSEIB ASM STMT_#(00000285)
__   +3.250039 DATABUS1 GETMAIN         OK      GETMAIN SET(X'2571E348') FLENGTH(4080) SYSEIB ASM STMT_#(00000460)
__   +3.250066 DATABUS1 WRITEQ TD       OK      WRITEQ TD QUEUE('CESE') FROM(' CP62DAT1 20160627024943 CEE3207S The system detected a data exception(System Comp
__   +3.250149 DATABUS1 WRITEQ TD       OK      WRITEQ TD QUEUE('CESE') FROM(' CP62DAT1 20160627024943 From compile unit DATABUS at entry point DATABUS at compi
__   +3.250167 DATABUS1 WRITEQ TD       OK      WRITEQ TD QUEUE('CESE') FROM(' CP62DAT1 20160627024943 25597DA2.') LENGTH(43) SYSEIB ASM STMT_#(00000412)
__   +3.250201 DATABUS1 GETMAIN         OK      GETMAIN SET(X'2571F348') FLENGTH(4080) SYSEIB ASM STMT_#(00000460)
__   +3.250240 DATABUS1 GETMAIN         OK      GETMAIN SET(X'25720348') FLENGTH(4080) SYSEIB ASM STMT_#(00000460)
__   +3.250324 DATABUS1 WRITEQ TD       OK      WRITEQ TD QUEUE('CESE') FROM('1CP62DAT1 20160627024943 CEE3DMP V2 R2.0: Condition processing resulted in the unh
__   +3.250343 DATABUS1 WRITEQ TD       OK      WRITEQ TD QUEUE('CESE') FROM(' CP62DAT1 20160627024943 Task Number: 00099 Transaction ID: DAT1') LENGTH(66) SYSE
__   +3.250360 DATABUS1 WRITEQ TD       OK      WRITEQ TD QUEUE('CESE') FROM(' CP62DAT1 20160627024943') LENGTH(26) SYSEIB ASM STMT_#(00000412)
__   +3.250375 DATABUS1 WRITEQ TD       OK      WRITEQ TD QUEUE('CESE') FROM(' CP62DAT1 20160627024943 CEE3845I CEEDUMP Processing started.') LENGTH(61) SYSEIB
__   +3.250388 DATABUS1 GETMAIN         OK      GETMAIN SET(X'25721348') FLENGTH(6856) SYSEIB ASM STMT_#(00000460)
__   +3.250399 DATABUS1 GETMAIN         OK      GETMAIN SET(X'25722E28') FLENGTH(8040) SYSEIB ASM STMT_#(00000460)
__   +3.250411 DATABUS1 GETMAIN         OK      GETMAIN SET(X'25724DA8') FLENGTH(4184) SYSEIB ASM STMT_#(00000460)
__   +3.250435 DATABUS1 WRITEQ TD       OK      WRITEQ TD QUEUE('CESE') FROM(' CP62DAT1 20160627024943') LENGTH(26) SYSEIB ASM STMT_#(00000412)
. . .
```

Alternate profile – trace events



```
C\PROF Trace Events                                                                                                                  Record 00000001 More: < >
Command ===>                                                                                                                                  Scroll ===> CSR
   02:49:40.368534 Level 0  Gap < 000000.008 >                                                                                                Format ===> SNGL
/  Time (LOCAL)
__ 02:49:40.368534 AP 00E1 EIP   ENTRY RECEIVE-MAP REQ(0004)
__ 02:49:40.368538 AP E160 EXEC  ENTRY RECEIVE MAP('DATAM1') INTO(AT X'2570C468') MAPSET('DATAMAP') TERMINAL COBOLII STMT_#(00271)
__ 02:49:40.368543 AP 00FA BMS   ENTRY MAP-FROM IN MAP MAPSET REQ(0003)
__ 02:49:40.368546 AP 00FA BMS   ENTRY MAP-FROM IN MAP MAPSET REQ(0003)
__ 02:49:40.368549 PG 0601 PGLD  ENTRY LOAD PROGRAM_NAME(DATAMAPM) HOLD_LIFETIME(TASK_LIFE) MODULE_TYPE(MAPSET) SYSTEM_AUTOINSTALL(NO)
__ 02:49:40.368551 DD 0301 DDLO  ENTRY LOCATE DIRECTORY_TOKEN(2263EF30) ENTRY_NAME(23993554) DIRECTORY_NAME(PPT) NAME(DATAMAPM)
__ 02:49:40.368553 DD 0302 DDLO  EXIT  LOCATE/EXCEPTION REASON(NOT_FOUND) DATA_TOKEN(00800000 , 00000000)
__ 02:49:40.368555 PG 0602 PGLD  EXIT  LOAD/EXCEPTION REASON(PROGRAM_NOT_DEFINED) LOAD_POINT(253E4000) ENTRY_POINT(00000000) PROGRAM_LENGTH(2398E000)
__ 02:49:40.368555 PG 0601 PGLD  ENTRY LOAD PROGRAM_NAME(DATAMAP) HOLD_LIFETIME(TASK_LIFE) MODULE_TYPE(MAPSET) SYSTEM_AUTOINSTALL(NO)
__ 02:49:40.368557 DD 0301 DDLO  ENTRY LOCATE DIRECTORY_TOKEN(2263EF30) ENTRY_NAME(23993554) DIRECTORY_NAME(PPT) NAME(DATAMAP)
__ 02:49:40.368558 DD 0302 DDLO  EXIT  LOCATE/OK DATA_TOKEN(D7D7E3C5 , 23DCDED0)
__ 02:49:40.368562 LD 0001 LDLD  ENTRY ACQUIRE_PROGRAM SUSPEND(YES) PROGRAM_TOKEN(00000050_40CC6468)
__ 02:49:40.368563 LD 0002 LDLD  EXIT  ACQUIRE_PROGRAM/OK ENTRY_POINT(80075000) LOAD_POINT(00075000) PROGRAM_LENGTH(1F90) PROGRAM_ATTRIBUTE(REUSABLE) LOCATION
__ 02:49:40.368569 PG 0602 PGLD  EXIT  LOAD/OK LOAD_POINT(00075000) ENTRY_POINT(80075000) PROGRAM_LENGTH(1F90)
__ 02:49:40.368571 SM 0C01 SMMG  ENTRY GETMAIN GET_LENGTH(13C) TCTTE_ADDRESS(23A86570) SUSPEND(YES) INITIAL_IMAGE(00) STORAGE_CLASS(TERMINAL)
__ 02:49:40.368571 SM 0C02 SMMG  EXIT  GETMAIN/OK ADDRESS(253E4120)
__ 02:49:40.368578 SM 0D01 SMMF  ENTRY FREEMAIN ADDRESS(253E4000) TCTTE_ADDRESS(23A86570)
__ 02:49:40.368583 SM 0D02 SMMF  EXIT  FREEMAIN/OK TERMINAL storage at 253E4000
__ 02:49:40.368583 AP 00FA BMS   EXIT   REQ(0005)
__ 02:49:40.368583 AP 00FA BMS   EXIT   REQ(0005)
__ 02:49:40.368586 SM 0D01 SMMF  ENTRY FREEMAIN ADDRESS(253E4120) TCTTE_ADDRESS(23A86570)
__ 02:49:40.368587 SM 0D02 SMMF  EXIT  FREEMAIN/OK TERMINAL storage at 253E4120
__ 02:49:40.368589 AP D500 UEH   EVENT LINK-TO-USER-EXIT-PROGRAM GLUEEXIT AT EXIT POINT XEIOUT
__ 02:49:40.368589 AP D501 UEH   EVENT RETURN-FROM-USER-EXIT-PROGRAM GLUEEXIT WITH RETURN CODE 0
__ 02:49:40.368594 AP E161 EXEC  EXIT  RECEIVE MAP('DATAM1') INTO(AT X'2570C468') MAPSET('DATAMAP') TERMINAL COBOLII STMT_#(00271)
__ 02:49:40.368595 AP 00E1 EIP   EXIT  RECEIVE-MAP OK REQ(00F4)
********************************************************************** Bottom of Data ************************************************************************
```

Determining EXEC CICS command offsets using trace

- Locate the desired EIP entry (EXEC CICS command)
- Note the RET address located on the full or short trace
- Find an LDLD trace entry before the EIP command
- Subtract the entry point address in the LDLD from the RET address on the EIP command giving an offset in a program
- Program name is found from the PG entry before the LDLD

Determining EXEC CICS command offsets using trace

- When you subtract the entry point address, if the offset you obtained is larger than the program length, the problem could be:
  - the incorrect LDLD trace entry was used
  - a subtraction error occurred
  - the program was statically-called. A statically-called program does not have an LDLD entry. The trace by itself does not help determine the offset in the program where an instruction was executed
- Also the LDLD trace entry might not be the one immediately preceding the EIP. Maps or subroutines might have been loaded in between the program load and the EIP

Determining EXEC CICS command offsets using trace

- Using the next slide as an example, look at the EXEC CICS FORMATTIME command at trace entry =058043=
- The RET address for this command is A5511B68 (25511B68)
- Looking backwards in the trace, the LDLD trace entry shows the ENTRY POINT(A5511028) - (25511028) – trace entry =058018=
  - subtracting 25511B68 from 25511028 gives an offset of X ‛B40 '
  - browsing before the LDLD entry looking for the PG trace entry, the name of the program is identified as **DATAPGM1**
- In summary, the command can be found at offset X‘B40' in program **DATAPGM1**
- Alternatively, if EI trace level 2 is active the APE161 says “**COBOLII STMT_#(00090)**”. Note: its RET address points to a CICS module

Determining offsets example – page 1 of 3

RET on EIP is actual return address into the application program

```
00099 QR    PG 0901 PGPG  ENTRY INITIAL_LINK PROGRAM_NAME(DATAPGM1)         RET-A225A406 02:49:40.3683298852 00.0000030336 =058017=
00099 QR    LD 0001 LDLD  ENTRY ACQUIRE_PROGRAM PROGRAM_TOKEN(00000050_40CC6990)
                                                                            RET-A2921E96 02:49:40.3683356645 00.0000057792 =058018=
00099 QR    LD 0002 LDLD  EXIT  ACQUIRE_PROGRAM/OK ENTRY_POINT(A5511028) LOAD_POINT(25511000) PROGRAM_LENGTH(3A78)
                                PROGRAM_ATTRIBUTE(REUSABLE) LOCATION(ESDSA) COPY_STATUS(OLD_COPY) FETCH_TIME() LIBRARY
                                (CICSWS) BUNDLE_INSTALLED_LIB(NO) PRIVATE_LIBRARY(NO)
                                                                            RET-A2921E96 02:49:40.3683416264 00.0000059619 =058019=
00099 QR    AP 00E1 EIP   ENTRY ASKTIME-ABSTIME                      REQ(0004) FIELD-A(2570AD00 ....) FIELD-B(09004A02 ..¢.)
                                BOUNDARY(0200)                              RET-A5511A6E 02:49:40.3684469809 00.0000714936 =058028=
00099 QR    AP E160 EXEC  ENTRY ASKTIME ABSTIME( AT X'A570C448') COBOLII STMT_#(00085)
                                                                            RET-800850A2 02:49:40.3684546152 00.0000076342 =058029=
00099 QR    AP E161 EXEC  EXIT  ASKTIME ABSTIME(3675984580368 AT X'A570C448') RESP(0) RESP2(0) COBOLII STMT_#(00085)
                                                                            RET-80087398 02:49:40.3684824111 00.0000033413 =058034=
00099 QR    AP 00E1 EIP   EXIT  ASKTIME-ABSTIME OK                   REQ(00F4) FIELD-A(00000000 ....) FIELD-B(00004A02 ..¢.)
                                BOUNDARY(0200)                              RET-A5511A6E 02:49:40.3684826596 00.0000002485 =058035=
00099 QR    AP 00E1 EIP   ENTRY FORMATTIME                           REQ(0004) FIELD-A(2570AD00 ....) FIELD-B(09004A04 ..¢.)
                                BOUNDARY(0200)                              RET-A5511B68 02:49:40.3684832304 00.0000005708 =058036=
00099 QR    AP E160 EXEC  ENTRY FORMATTIME ABSTIME(3675984580368 AT X'2570C448') DDMMYY( AT X'2570C42B') DATESEP(X'61' AT
                                X'2570AF30') TIME( AT X'2570C433') TIMESEP(X'7A' AT X'A570AF60') COBOLII STMT_#(00090)
                                                                            RET-800850A2 02:49:40.3684896074 00.0000063769 =058037=
00099 QR    AP E161 EXEC  EXIT  FORMATTIME ABSTIME(3675984580368 AT X'2570C448') DDMMYY('27/06/16' AT X'2570C42B') DATESEP(X'61' AT
                                 X'2570AF30') TIME('02:49:40' AT X'2570C433') TIMESEP(X'7A' AT X'A570AF60') RESP(0) RESP2(0)
                                 COBOLII STMT_#(00090)                      RET-80087398 02:49:40.3685029902 00.0000042846 =058042=
00099 QR    AP 00E1 EIP   EXIT  FORMATTIME OK                        REQ(00F4) FIELD-A(00000000 ....) FIELD-B(00004A04 ..¢.)
                                BOUNDARY(0200)                              RET-A5511B68 02:49:40.3685033608 00.0000003706 =058043=
00099 QR    AP 00E1 EIP   ENTRY GET-CONTAINER                        REQ(0004) FIELD-A(2570AD00 ....) FIELD-B(09003414 ....)
                                BOUNDARY(0200)                              RET-A5511D46 02:49:40.3685058334 00.0000024726 =058044=
00099 QR    AP E160 EXEC  ENTRY GET CONTAINER('request-cont    ' AT X'2570AF40') CHANNEL('payroll         ' AT X'A570C180') INTO(
                                AT X'2570C190') FLENGTH(576 AT X'2570AF50') NOHANDLE COBOLII STMT_#(00103)
                                                                            RET-800850A2 02:49:40.3685078320 00.0000019985 =058045=
00099 QR    AP E161 EXEC  EXIT  GET CONTAINER('request-cont    ' AT X'2570AF40') CHANNEL('payroll         ' AT X'A570C180') INTO(
                                AT X'2570C190') FLENGTH(576 AT X'2570AF50') RESP(0) RESP2(0) NOHANDLE COBOLII STMT_#(00103)
                                                                            RET-80087398 02:49:40.3685314414 00.0000037109 =058054=
00099 QR    AP 00E1 EIP   EXIT  GET-CONTAINER OK                     REQ(00F4) FIELD-A(00000000 ....) FIELD-B(00003414 ....)
                                BOUNDARY(0200)                              RET-A5511D46 02:49:40.3685318193 00.0000003779 =058055=
```

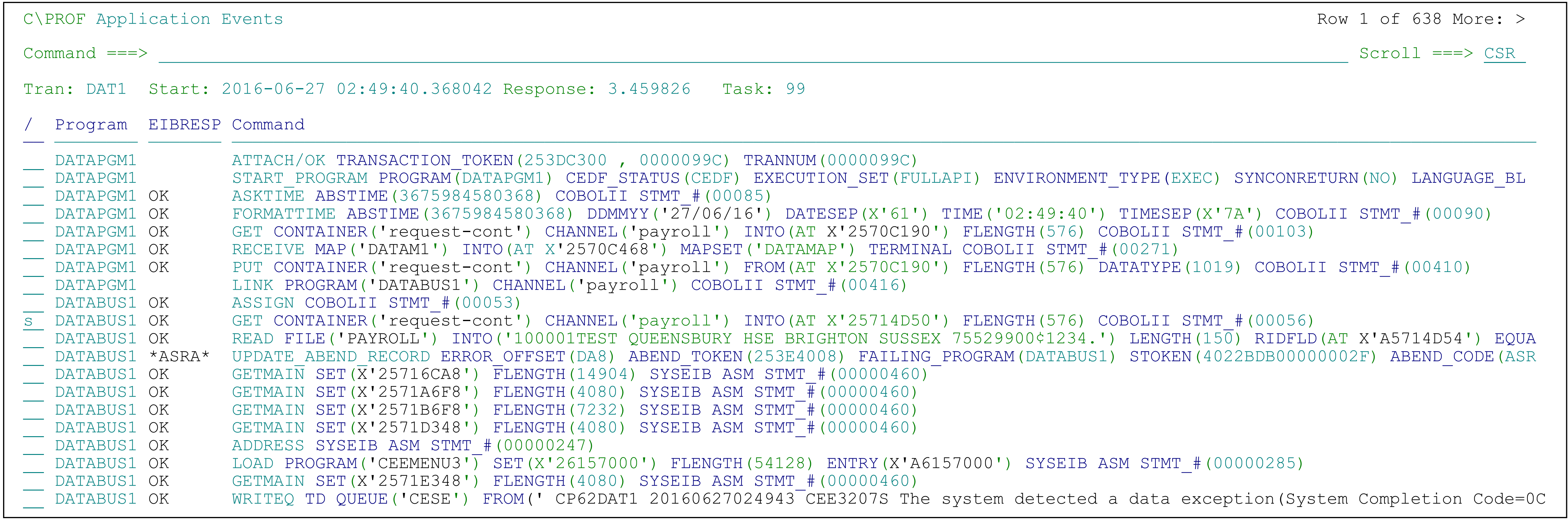
Determining offsets example – page 2 of 3

```
00099 QR    AP 00E1 EIP   ENTRY RECEIVE-MAP                          REQ(0004) FIELD-A(2570AD00 ....) FIELD-B(09001802 ....)
                                BOUNDARY(0200)                              RET-A5512706 02:49:40.3685348906 00.0000030712 =058056=
00099 QR    AP E160 EXEC  ENTRY RECEIVE MAP('DATAM1 ' AT X'2570AED0') INTO( AT X'2570C468') MAPSET('DATAMAP' AT X'A570AEE0')
                                TERMINAL NOHANDLE COBOLII STMT_#(00271)     RET-800850A2 02:49:40.3685384096 00.0000035190 =058057=
00099 QR    LD 0001 LDLD  ENTRY ACQUIRE_PROGRAM SUSPEND(YES) PROGRAM_TOKEN(00000050_40CC6468)
                                                                            RET-A2917204 02:49:40.3685626982 00.0000046245 =058067=
00099 QR    LD 0002 LDLD  EXIT  ACQUIRE_PROGRAM/OK ENTRY_POINT(80075000) LOAD_POINT(00075000) PROGRAM_LENGTH(1F90)
                                PROGRAM_ATTRIBUTE(REUSABLE) LOCATION(CDSA) COPY_STATUS(OLD_COPY) FETCH_TIME() LIBRARY
                                (CICSWS) BUNDLE_INSTALLED_LIB(NO) PRIVATE_LIBRARY(NO)
                                                                            RET-A2917204 02:49:40.3685637968 00.0000010986 =058068=
00099 QR    AP E161 EXEC  EXIT  RECEIVE MAP('DATAM1 ' AT X'2570AED0') INTO( AT X'2570C468') MAPSET('DATAMAP' AT X'A570AEE0')
                                TERMINAL RESP(0) RESP2(0) NOHANDLE COBOLII STMT_#(00271)
                                                                            RET-80087398 02:49:40.3685947929 00.0000049707 =058080=
00099 QR    AP 00E1 EIP   EXIT  RECEIVE-MAP OK                       REQ(00F4) FIELD-A(00000000 ....) FIELD-B(00001802 ....)
                                BOUNDARY(0200)                              RET-A5512706 02:49:40.3685950190 00.0000002260 =058081=
00099 QR    AP 00E1 EIP   ENTRY PUT-CONTAINER                        REQ(0004) FIELD-A(2570AD00 ....) FIELD-B(09003416 ....)
                                BOUNDARY(0200)                              RET-A5512CD0 02:49:40.3685982343 00.0000032153 =058082=
00099 QR    AP E160 EXEC  ENTRY PUT CONTAINER('request-cont    ' AT X'2570AF50') CHANNEL('payroll         ' AT X'2570C180') FROM(
                                AT X'2570C190') FLENGTH(576 AT X'2570AF60') DATATYPE(1019 AT X'A570B048') COBOLII STMT_#
                                (00410)                                     RET-800850A2 02:49:40.3686017451 00.0000035107 =058083=
00099 QR    AP E161 EXEC  EXIT  PUT CONTAINER('request-cont    ' AT X'2570AF50') CHANNEL('payroll         ' AT X'2570C180') FROM(
                                AT X'2570C190') FLENGTH(576 AT X'2570AF60') DATATYPE(1019 AT X'A570B048') RESP(0) RESP2(0)
                                COBOLII STMT_#(00410)                       RET-80087398 02:49:40.3686139736 00.0000037348 =058092=
00099 QR    AP 00E1 EIP   EXIT  PUT-CONTAINER OK                     REQ(00F4) FIELD-A(00000000 ....) FIELD-B(00003416 ....)
                                BOUNDARY(0200)                              RET-A5512CD0 02:49:40.3686145068 00.0000005332 =058093=
00099 QR    AP 00E1 EIP   ENTRY LINK                                 REQ(0004) FIELD-A(2570AD00 ....) FIELD-B(09000E02 ....)
                                BOUNDARY(0200)                              RET-A5512D86 02:49:40.3686150229 00.0000005161 =058094=
00099 QR    AP E160 EXEC  ENTRY LINK PROGRAM('DATABUS1' AT X'2570AEE8') CHANNEL('payroll         ' AT X'A570C180') NOHANDLE COBOLII
                                 STMT_#(00416)                              RET-800850A2 02:49:40.3686179477 00.0000029248 =058095=
00099 QR    LD 0001 LDLD  ENTRY ACQUIRE_PROGRAM PROGRAM_TOKEN(00000050_40CC6780)
                                                                            RET-A290D9BC 02:49:40.3686338466 00.0000069160 =058099=
00099 QR    LD 0002 LDLD  EXIT  ACQUIRE_PROGRAM/OK ENTRY_POINT(A5597028) LOAD_POINT(25597000) PROGRAM_LENGTH(35D8)
                                PROGRAM_ATTRIBUTE(REUSABLE) LOCATION(ESDSA) COPY_STATUS(NEW_COPY) FETCH_TIME() LIBRARY
                                (CICSWS) BUNDLE_INSTALLED_LIB(NO) PRIVATE_LIBRARY(NO)
                                                                            RET-A290D9BC 02:49:40.3760121572 00.0000199750 =058126=
```

Determining offsets example – page 3 of 3

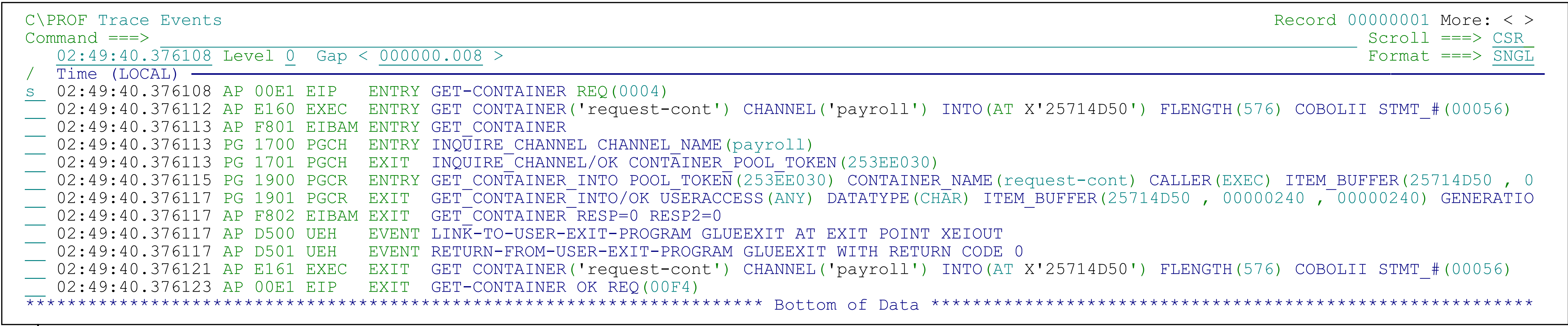
```
00099 QR    AP 00E1 EIP   ENTRY ASSIGN                               REQ(0004) FIELD-A(257138B0 ....) FIELD-B(09000208 ....)
                                BOUNDARY(0200)                              RET-A55978CC 02:49:40.3760966655 00.0000270488 =058143=
00099 QR    AP E160 EXEC  ENTRY ASSIGN COBOLII STMT_#(00053)                RET-800850A2 02:49:40.3760978261 00.0000011606 =058144=
00099 QR    AP E161 EXEC  EXIT  ASSIGN RESP(0) RESP2(0) COBOLII STMT_#(00053)
                                                                            RET-80087398 02:49:40.3761076816 00.0000023188 =058149=
00099 QR    AP 00E1 EIP   EXIT  ASSIGN OK                            REQ(00F4) FIELD-A(00000000 ....) FIELD-B(00000208 ....)
                                BOUNDARY(0200)                              RET-A55978CC 02:49:40.3761079116 00.0000002299 =058150=
00099 QR    AP 00E1 EIP   ENTRY GET-CONTAINER                        REQ(0004) FIELD-A(257138B0 ....) FIELD-B(09003414 ....)
                                BOUNDARY(0200)                              RET-A5597AA2 02:49:40.3761085087 00.0000005971 =058151=
00099 QR    AP E160 EXEC  ENTRY GET CONTAINER('request-cont    ' AT X'25713B30') CHANNEL('payroll         ' AT X'A5714F90') INTO(
                                AT X'25714D50') FLENGTH(576 AT X'25713B40') COBOLII STMT_#(00056)
                                                                            RET-800850A2 02:49:40.3761121704 00.0000036616 =058152=
00099 QR    AP E161 EXEC  EXIT  GET CONTAINER('request-cont    ' AT X'25713B30') CHANNEL('payroll         ' AT X'A5714F90') INTO(
                                AT X'25714D50') FLENGTH(576 AT X'25713B40') RESP(0) RESP2(0) COBOLII STMT_#(00056)
                                                                            RET-80087398 02:49:40.3761217900 00.0000039599 =058161=
00099 QR    AP 00E1 EIP   EXIT  GET-CONTAINER OK                     REQ(00F4) FIELD-A(00000000 ....) FIELD-B(00003414 ....)
                                BOUNDARY(0200)                              RET-A5597AA2 02:49:40.3761236694 00.0000018793 =058162=
00099 QR    AP 00E1 EIP   ENTRY READ                                 REQ(0004) FIELD-A(257138B0 ....) FIELD-B(09000602 ....)
                                BOUNDARY(0200)                              RET-A5597D22 02:49:40.3761297734 00.0000061040 =058163=
00099 QR    AP E160 EXEC  ENTRY READ FILE('PAYROLL ' AT X'25713AC0') INTO( AT X'25715008') LENGTH(150 AT X'257150A0') RIDFLD( AT
                                X'A5714D54') EQUAL NOHANDLE COBOLII STMT_#(00097)
                                                                            RET-800850A2 02:49:40.3761330527 00.0000032792 =058164=
00099 QR    AP E161 EXEC  EXIT  READ FILE('PAYROLL ' AT X'25713AC0') INTO('100001TEST                QUEENSBURY HSE      BRIGHTON
                                          SUSSEX              75529900¢1234.' AT X'25715008') LENGTH(150 AT X'257150A0')
                                RIDFLD( AT X'A5714D54') EQUAL RESP(0) RESP2(0) NOHANDLE COBOLII STMT_#(00097)
                                                                            RET-80087398 02:49:40.4304039580 00.0000056186 =058299=
00099 QR    AP 00E1 EIP   EXIT  READ OK                              REQ(00F4) FIELD-A(00000000 ....) FIELD-B(00000602 ....)
                                BOUNDARY(0200)                              RET-A5597D22 02:49:40.4304042294 00.0000002714 =058300=
```

Alternate example

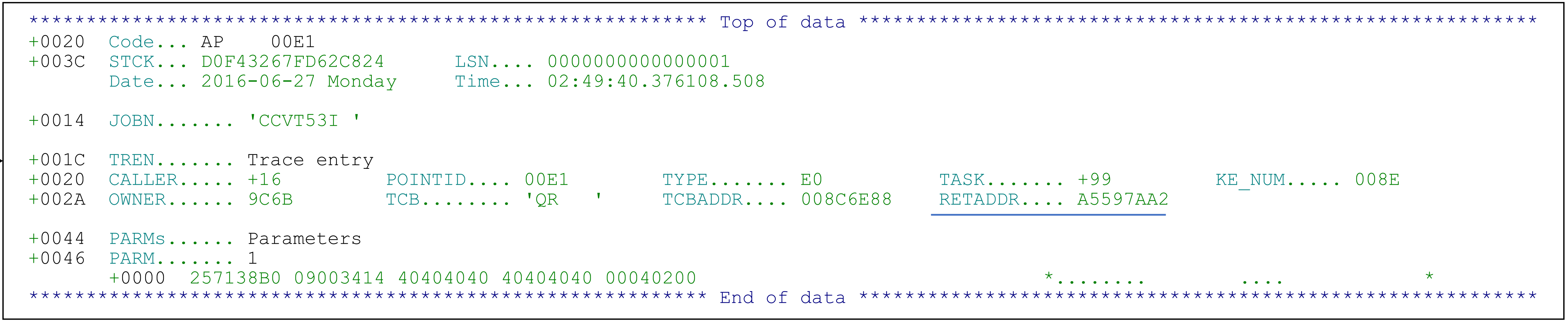


```
C\PROF Application Events                                                                                                         Row 1 of 638 More: >
Command ===> _____________________________________________________________________________________________________________________ Scroll ===> CSR_
Tran: DAT1  Start: 2016-06-27 02:49:40.368042 Response: 3.459826   Task: 99
/  Program  EIBRESP Command
__ DATAPGM1         ATTACH/OK TRANSACTION_TOKEN(253DC300 , 0000099C) TRANNUM(0000099C)
__ DATAPGM1         START_PROGRAM PROGRAM(DATAPGM1) CEDF_STATUS(CEDF) EXECUTION_SET(FULLAPI) ENVIRONMENT_TYPE(EXEC) SYNCONRETURN(NO) LANGUAGE_BL
__ DATAPGM1 OK      ASKTIME ABSTIME(3675984580368) COBOLII STMT_#(00085)
__ DATAPGM1 OK      FORMATTIME ABSTIME(3675984580368) DDMMYY('27/06/16') DATESEP(X'61') TIME('02:49:40') TIMESEP(X'7A') COBOLII STMT_#(00090)
__ DATAPGM1 OK      GET CONTAINER('request-cont') CHANNEL('payroll') INTO(AT X'2570C190') FLENGTH(576) COBOLII STMT_#(00103)
__ DATAPGM1 OK      RECEIVE MAP('DATAM1') INTO(AT X'2570C468') MAPSET('DATAMAP') TERMINAL COBOLII STMT_#(00271)
__ DATAPGM1 OK      PUT CONTAINER('request-cont') CHANNEL('payroll') FROM(AT X'2570C190') FLENGTH(576) DATATYPE(1019) COBOLII STMT_#(00410)
__ DATAPGM1         LINK PROGRAM('DATABUS1') CHANNEL('payroll') COBOLII STMT_#(00416)
__ DATABUS1 OK      ASSIGN COBOLII STMT_#(00053)
s_ DATABUS1 OK      GET CONTAINER('request-cont') CHANNEL('payroll') INTO(AT X'25714D50') FLENGTH(576) COBOLII STMT_#(00056)
__ DATABUS1 OK      READ FILE('PAYROLL') INTO('100001TEST QUEENSBURY HSE BRIGHTON SUSSEX 75529900¢1234.') LENGTH(150) RIDFLD(AT X'A5714D54') EQUA
__ DATABUS1 *ASRA*  UPDATE_ABEND_RECORD ERROR_OFFSET(DA8) ABEND_TOKEN(253E4008) FAILING_PROGRAM(DATABUS1) STOKEN(4022BDB00000002F) ABEND_CODE(ASR
__ DATABUS1 OK      GETMAIN SET(X'25716CA8') FLENGTH(14904) SYSEIB ASM STMT_#(00000460)
__ DATABUS1 OK      GETMAIN SET(X'2571A6F8') FLENGTH(4080) SYSEIB ASM STMT_#(00000460)
__ DATABUS1 OK      GETMAIN SET(X'2571B6F8') FLENGTH(7232) SYSEIB ASM STMT_#(00000460)
__ DATABUS1 OK      GETMAIN SET(X'2571D348') FLENGTH(4080) SYSEIB ASM STMT_#(00000460)
__ DATABUS1 OK      ADDRESS SYSEIB ASM STMT_#(00000247)
__ DATABUS1 OK      LOAD PROGRAM('CEEMENU3') SET(X'26157000') FLENGTH(54128) ENTRY(X'A6157000') SYSEIB ASM STMT_#(00000285)
__ DATABUS1 OK      GETMAIN SET(X'2571E348') FLENGTH(4080) SYSEIB ASM STMT_#(00000460)
__ DATABUS1 OK      WRITEQ TD QUEUE('CESE') FROM(' CP62DAT1 20160627024943 CEE3207S The system detected a data exception(System Completion Code=0C
```

Alternate example - offsets

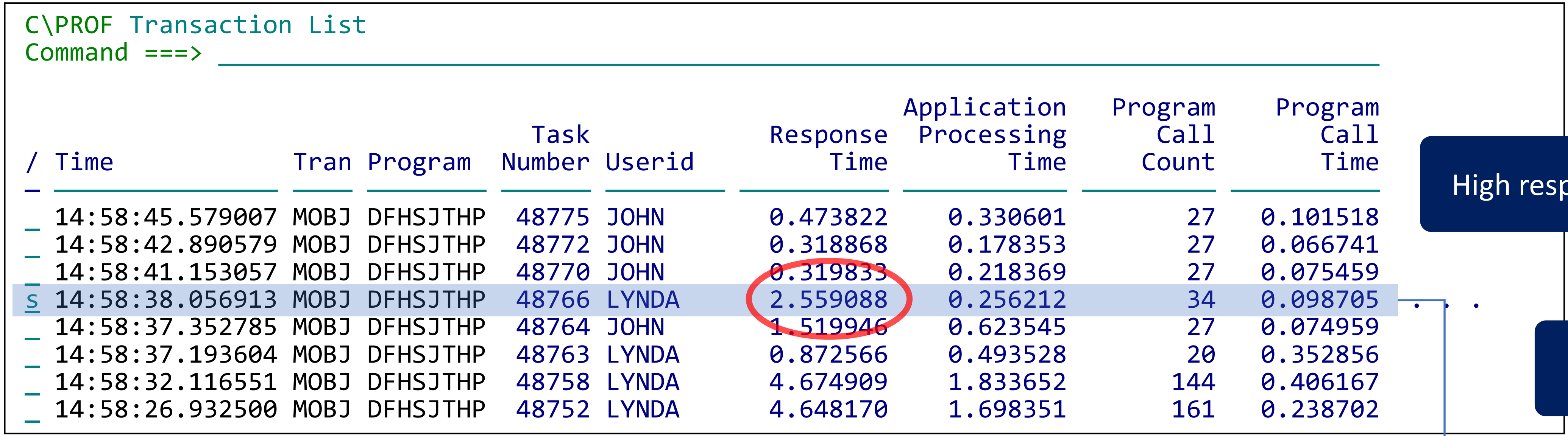


```
C\PROF Trace Events                                                                                 Record 00000001 More: < >
Command ===>                                                                                               Scroll ===> CSR
   02:49:40.376108 Level 0  Gap < 000000.008 >                                                             Format ===> SNGL
/  Time (LOCAL)
s  02:49:40.376108 AP 00E1 EIP   ENTRY GET-CONTAINER REQ(0004)
__ 02:49:40.376112 AP E160 EXEC  ENTRY GET CONTAINER('request-cont') CHANNEL('payroll') INTO(AT X'25714D50') FLENGTH(576) COBOLII STMT_#(00056)
__ 02:49:40.376113 AP F801 EIBAM ENTRY GET_CONTAINER
__ 02:49:40.376113 PG 1700 PGCH  ENTRY INQUIRE_CHANNEL CHANNEL_NAME(payroll)
__ 02:49:40.376113 PG 1701 PGCH  EXIT  INQUIRE_CHANNEL/OK CONTAINER_POOL_TOKEN(253EE030)
__ 02:49:40.376115 PG 1900 PGCR  ENTRY GET_CONTAINER_INTO POOL_TOKEN(253EE030) CONTAINER_NAME(request-cont) CALLER(EXEC) ITEM_BUFFER(25714D50 , 0
__ 02:49:40.376117 PG 1901 PGCR  EXIT  GET_CONTAINER_INTO/OK USERACCESS(ANY) DATATYPE(CHAR) ITEM_BUFFER(25714D50 , 00000240 , 00000240) GENERATIO
__ 02:49:40.376117 AP F802 EIBAM EXIT  GET_CONTAINER RESP=0 RESP2=0
__ 02:49:40.376117 AP D500 UEH   EVENT LINK-TO-USER-EXIT-PROGRAM GLUEEXIT AT EXIT POINT XEIOUT
__ 02:49:40.376117 AP D501 UEH   EVENT RETURN-FROM-USER-EXIT-PROGRAM GLUEEXIT WITH RETURN CODE 0
__ 02:49:40.376121 AP E161 EXEC  EXIT  GET CONTAINER('request-cont') CHANNEL('payroll') INTO(AT X'25714D50') FLENGTH(576) COBOLII STMT_#(00056)
__ 02:49:40.376123 AP 00E1 EIP   EXIT  GET-CONTAINER OK REQ(00F4)
*********************************************************************** Bottom of Data **********************************************************
```



```
********************************************************* Top of data ************************************************************
+0020  Code... AP    00E1
+003C  STCK... D0F43267FD62C824      LSN.... 0000000000000001
       Date... 2016-06-27 Monday     Time... 02:49:40.376108.508

+0014  JOBN....... 'CCVT53I '

+001C  TREN....... Trace entry
+0020  CALLER..... +16          POINTID.... 00E1        TYPE....... E0          TASK....... +99         KE_NUM..... 008E
+002A  OWNER...... 9C6B         TCB........ 'QR    '    TCBADDR.... 008C6E88    RETADDR.... A5597AA2

+0044  PARMs...... Parameters
+0046  PARM....... 1
       +0000  257138B0 09003414 40404040 40404040 00040200                               *........       ....          *
********************************************************* End of data ************************************************************
```

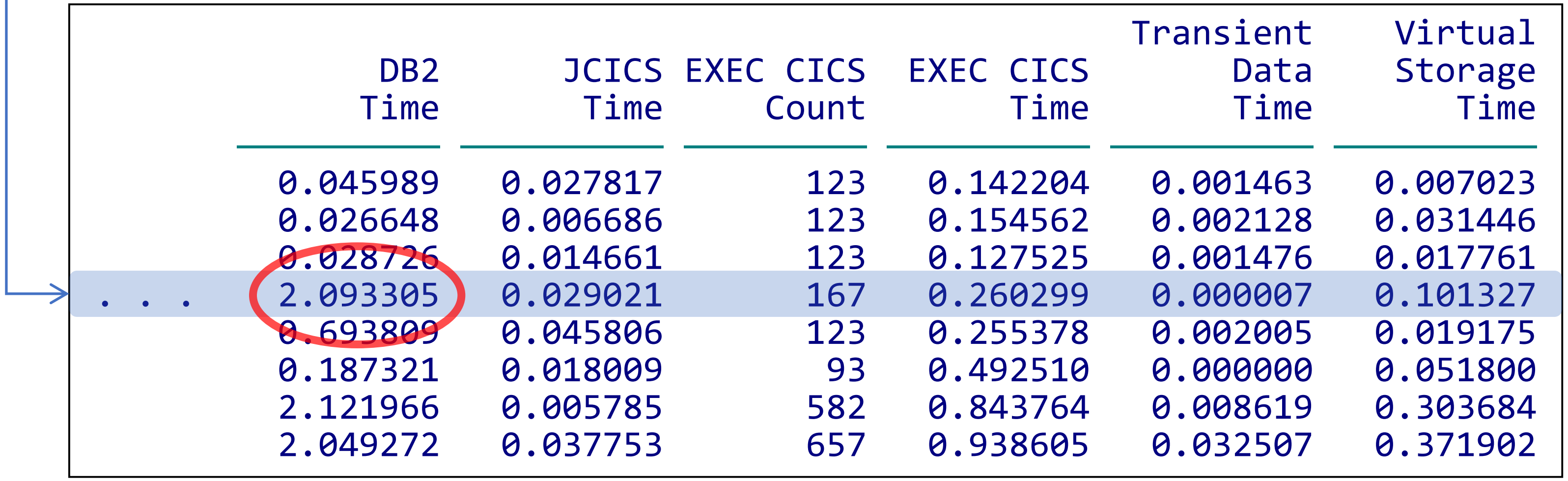
Java profiling: response time



```
C\PROF Transaction List
Command ===> ____________________________________________________________________________

                                                                  Application    Program    Program
                                           Task             Response Processing     Call       Call
/ Time            Tran Program   Number Userid         Time       Time         Count       Time
_ ______________ ____ ________ ______ ______________ ________ ___________ _________ __________
_ 14:58:45.579007 MOBJ DFHSJTHP  48775 JOHN         0.473822   0.330601        27   0.101518
_ 14:58:42.890579 MOBJ DFHSJTHP  48772 JOHN         0.318868   0.178353        27   0.066741
_ 14:58:41.153057 MOBJ DFHSJTHP  48770 JOHN         0.319833   0.218369        27   0.075459
s 14:58:38.056913 MOBJ DFHSJTHP  48766 LYNDA        2.559088   0.256212        34   0.098705 . . .
_ 14:58:37.352785 MOBJ DFHSJTHP  48764 JOHN         1.519946   0.623545        27   0.074959
_ 14:58:37.193604 MOBJ DFHSJTHP  48763 LYNDA        0.872566   0.493528        20   0.352856
_ 14:58:32.116551 MOBJ DFHSJTHP  48758 LYNDA        4.674909   1.833652       144   0.406167
_ 14:58:26.932500 MOBJ DFHSJTHP  48752 LYNDA        4.648170   1.698351       161   0.238702
```

High response time…

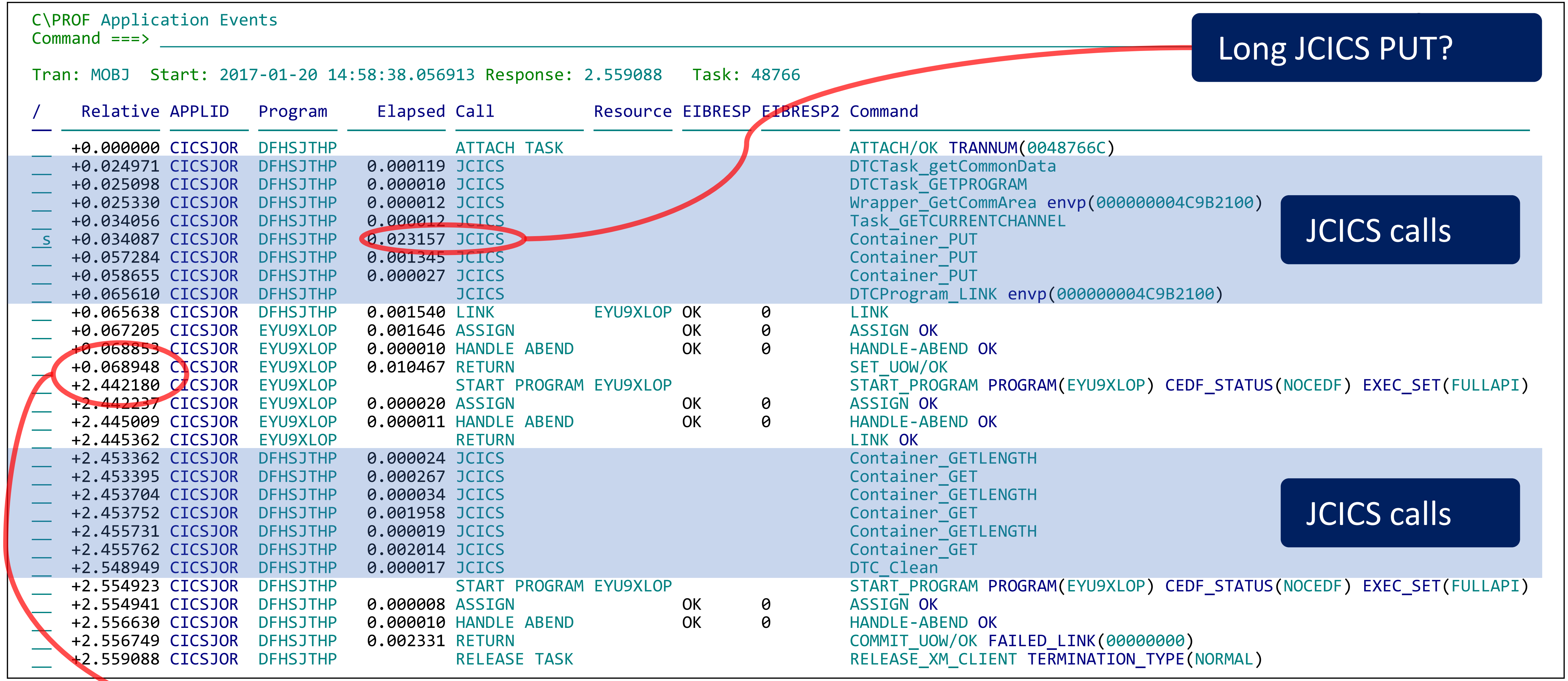
…problem in DB2?



```
                                                          Transient    Virtual
           DB2      JCICS  EXEC CICS  EXEC CICS       Data    Storage
          Time       Time      Count       Time       Time       Time
      ________ __________ __________ __________ __________ __________
      0.045989   0.027817        123   0.142204   0.001463   0.007023
      0.026648   0.006686        123   0.154562   0.002128   0.031446
      0.028726   0.014661        123   0.127525   0.001476   0.017761
. . . 2.093305   0.029021        167   0.260299   0.000007   0.101327
      0.693809   0.045806        123   0.255378   0.002005   0.019175
      0.187321   0.018009         93   0.492510   0.000000   0.051800
      2.121966   0.005785        582   0.843764   0.008619   0.303684
      2.049272   0.037753        657   0.938605   0.032507   0.371902
```

The Java owning region (JOR) runs applications that use JCICS and LINK to a COBOL program in the AOR to perform the business logic

Java profiling: application events



```
C\PROF Application Events
Command ===> ____________________________________________________________________________________________________

Tran: MOBJ  Start: 2017-01-20 14:58:38.056913 Response: 2.559088   Task: 48766

/    Relative APPLID   Program     Elapsed Call          Resource EIBRESP EIBRESP2 Command
__  _________ _______  ________ ________ _____________ ________ _______ ________ _____________________________________
__  +0.000000 CICSJOR  DFHSJTHP          ATTACH TASK                             ATTACH/OK TRANNUM(0048766C)
__  +0.024971 CICSJOR  DFHSJTHP   0.000119 JCICS                                   DTCTask_getCommonData
__  +0.025098 CICSJOR  DFHSJTHP   0.000010 JCICS                                   DTCTask_GETPROGRAM
__  +0.025330 CICSJOR  DFHSJTHP   0.000012 JCICS                                   Wrapper_GetCommArea envp(000000004C9B2100)
__  +0.034056 CICSJOR  DFHSJTHP   0.000012 JCICS                                   Task_GETCURRENTCHANNEL
_s  +0.034087 CICSJOR  DFHSJTHP   0.023157 JCICS                                   Container_PUT
__  +0.057284 CICSJOR  DFHSJTHP   0.001345 JCICS                                   Container_PUT
__  +0.058655 CICSJOR  DFHSJTHP   0.000027 JCICS                                   Container_PUT
__  +0.065610 CICSJOR  DFHSJTHP            JCICS                                   DTCProgram_LINK envp(000000004C9B2100)
__  +0.065638 CICSJOR  DFHSJTHP   0.001540 LINK          EYU9XLOP OK      0        LINK
__  +0.067205 CICSJOR  EYU9XLOP   0.001646 ASSIGN                 OK      0        ASSIGN OK
__  +0.068853 CICSJOR  EYU9XLOP   0.000010 HANDLE ABEND           OK      0        HANDLE-ABEND OK
__  +0.068948 CICSJOR  EYU9XLOP   0.010467 RETURN                                  SET_UOW/OK
__  +2.442180 CICSJOR  EYU9XLOP            START PROGRAM EYU9XLOP                  START_PROGRAM PROGRAM(EYU9XLOP) CEDF_STATUS(NOCEDF) EXEC_SET(FULLAPI)
__  +2.442237 CICSJOR  EYU9XLOP   0.000020 ASSIGN                 OK      0        ASSIGN OK
__  +2.445009 CICSJOR  EYU9XLOP   0.000011 HANDLE ABEND           OK      0        HANDLE-ABEND OK
__  +2.445362 CICSJOR  EYU9XLOP            RETURN                                  LINK OK
__  +2.453362 CICSJOR  DFHSJTHP   0.000024 JCICS                                   Container_GETLENGTH
__  +2.453395 CICSJOR  DFHSJTHP   0.000267 JCICS                                   Container_GET
__  +2.453704 CICSJOR  DFHSJTHP   0.000034 JCICS                                   Container_GETLENGTH
__  +2.453752 CICSJOR  DFHSJTHP   0.001958 JCICS                                   Container_GET
__  +2.455731 CICSJOR  DFHSJTHP   0.000019 JCICS                                   Container_GETLENGTH
__  +2.455762 CICSJOR  DFHSJTHP   0.002014 JCICS                                   Container_GET
__  +2.548949 CICSJOR  DFHSJTHP   0.000017 JCICS                                   DTC_Clean
__  +2.554923 CICSJOR  DFHSJTHP            START PROGRAM EYU9XLOP                  START_PROGRAM PROGRAM(EYU9XLOP) CEDF_STATUS(NOCEDF) EXEC_SET(FULLAPI)
__  +2.554941 CICSJOR  DFHSJTHP   0.000008 ASSIGN                 OK      0        ASSIGN OK
__  +2.556630 CICSJOR  DFHSJTHP   0.000010 HANDLE ABEND           OK      0        HANDLE-ABEND OK
__  +2.556749 CICSJOR  DFHSJTHP   0.002331 RETURN                                  COMMIT_UOW/OK FAILED_LINK(00000000)
__  +2.559088 CICSJOR  DFHSJTHP            RELEASE TASK                            RELEASE_XM_CLIENT TERMINATION_TYPE(NORMAL)
```

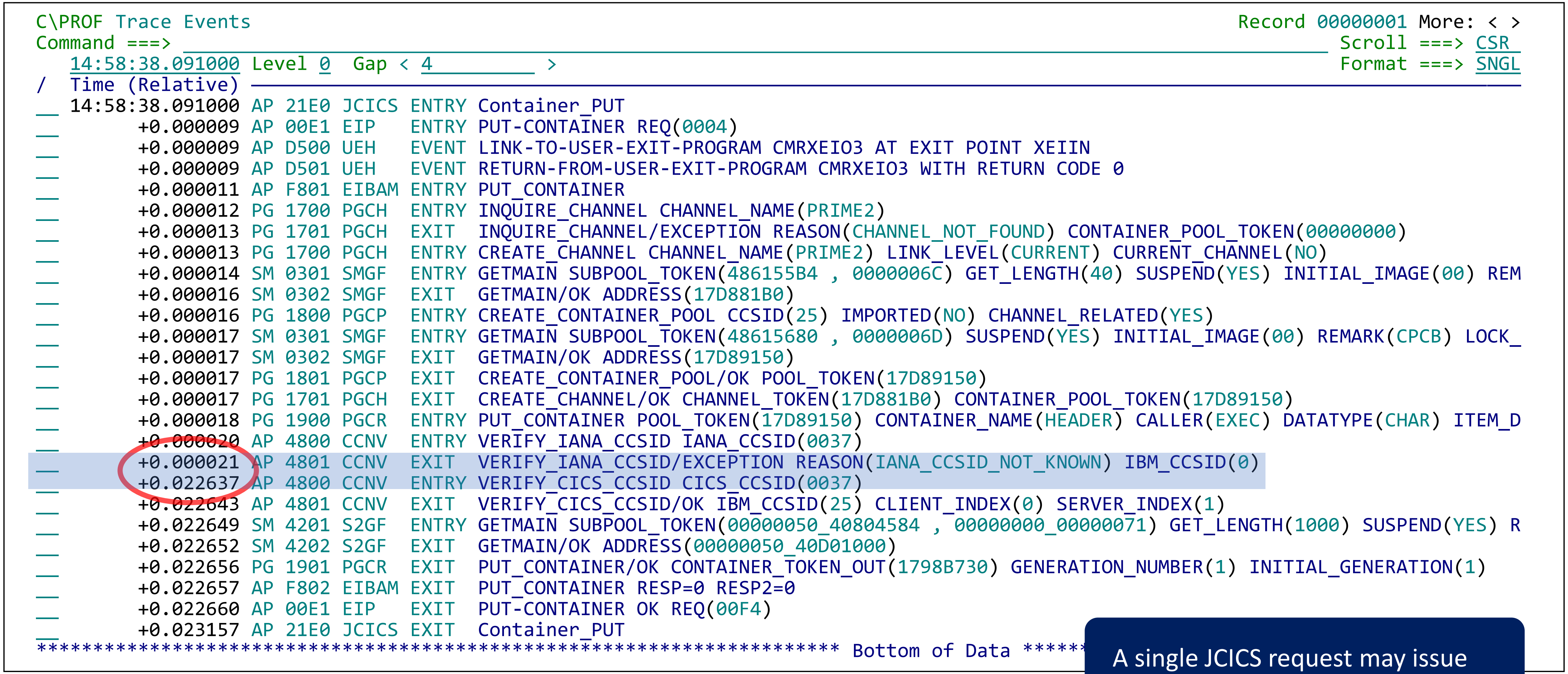
Long JCICS PUT?

JCICS calls

JCICS calls

An unexplained delay of 2.5 seconds, waiting for the LINK to the AOR to respond

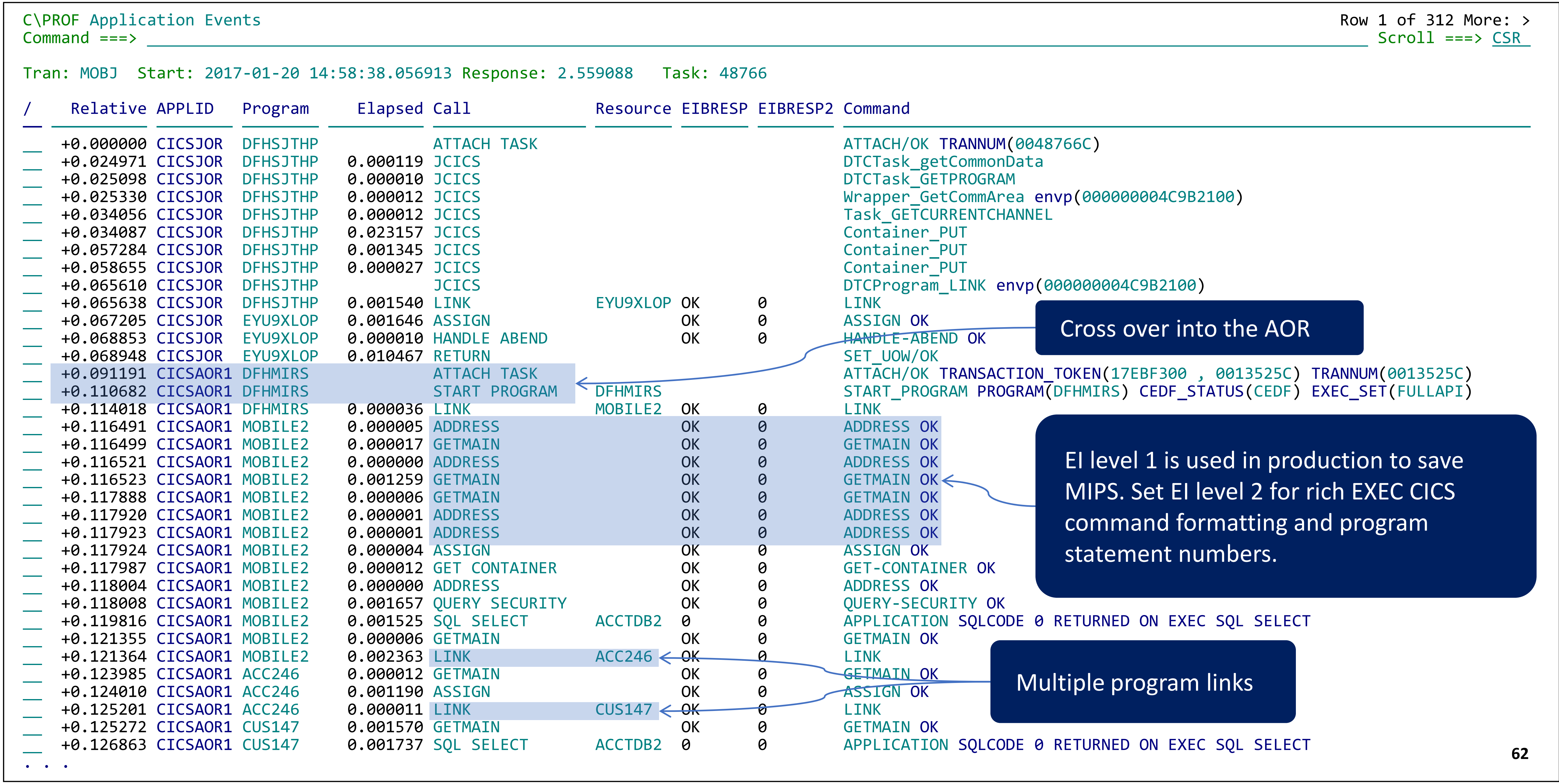
Java profiling: JCICS PUT CONTAINER



```
C\PROF Trace Events                                                                                Record 00000001 More: < >
Command ===> ________________________________________________________________________________________ Scroll ===> CSR_
  14:58:38.091000 Level 0  Gap < 4_________ >                                                           Format ===> SNGL
/  Time (Relative) ____________________________________________________________________________________________________
__ 14:58:38.091000 AP 21E0 JCICS ENTRY Container_PUT
__       +0.000009 AP 00E1 EIP   ENTRY PUT-CONTAINER REQ(0004)
__       +0.000009 AP D500 UEH   EVENT LINK-TO-USER-EXIT-PROGRAM CMRXEIO3 AT EXIT POINT XEIIN
__       +0.000009 AP D501 UEH   EVENT RETURN-FROM-USER-EXIT-PROGRAM CMRXEIO3 WITH RETURN CODE 0
__       +0.000011 AP F801 EIBAM ENTRY PUT_CONTAINER
__       +0.000012 PG 1700 PGCH  ENTRY INQUIRE_CHANNEL CHANNEL_NAME(PRIME2)
__       +0.000013 PG 1701 PGCH  EXIT  INQUIRE_CHANNEL/EXCEPTION REASON(CHANNEL_NOT_FOUND) CONTAINER_POOL_TOKEN(00000000)
__       +0.000013 PG 1700 PGCH  ENTRY CREATE_CHANNEL CHANNEL_NAME(PRIME2) LINK_LEVEL(CURRENT) CURRENT_CHANNEL(NO)
__       +0.000014 SM 0301 SMGF  ENTRY GETMAIN SUBPOOL_TOKEN(486155B4 , 0000006C) GET_LENGTH(40) SUSPEND(YES) INITIAL_IMAGE(00) REM
__       +0.000016 SM 0302 SMGF  EXIT  GETMAIN/OK ADDRESS(17D881B0)
__       +0.000016 PG 1800 PGCP  ENTRY CREATE_CONTAINER_POOL CCSID(25) IMPORTED(NO) CHANNEL_RELATED(YES)
__       +0.000017 SM 0301 SMGF  ENTRY GETMAIN SUBPOOL_TOKEN(48615680 , 0000006D) SUSPEND(YES) INITIAL_IMAGE(00) REMARK(CPCB) LOCK_
__       +0.000017 SM 0302 SMGF  EXIT  GETMAIN/OK ADDRESS(17D89150)
__       +0.000017 PG 1801 PGCP  EXIT  CREATE_CONTAINER_POOL/OK POOL_TOKEN(17D89150)
__       +0.000017 PG 1701 PGCH  EXIT  CREATE_CHANNEL/OK CHANNEL_TOKEN(17D881B0) CONTAINER_POOL_TOKEN(17D89150)
__       +0.000018 PG 1900 PGCR  ENTRY PUT_CONTAINER POOL_TOKEN(17D89150) CONTAINER_NAME(HEADER) CALLER(EXEC) DATATYPE(CHAR) ITEM_D
__       +0.000020 AP 4800 CCNV  ENTRY VERIFY_IANA_CCSID IANA_CCSID(0037)
__       +0.000021 AP 4801 CCNV  EXIT  VERIFY_IANA_CCSID/EXCEPTION REASON(IANA_CCSID_NOT_KNOWN) IBM_CCSID(0)
__       +0.022637 AP 4800 CCNV  ENTRY VERIFY_CICS_CCSID CICS_CCSID(0037)
__       +0.022643 AP 4801 CCNV  EXIT  VERIFY_CICS_CCSID/OK IBM_CCSID(25) CLIENT_INDEX(0) SERVER_INDEX(1)
__       +0.022649 SM 4201 S2GF  ENTRY GETMAIN SUBPOOL_TOKEN(00000050_40804584 , 00000000_00000071) GET_LENGTH(1000) SUSPEND(YES) R
__       +0.022652 SM 4202 S2GF  EXIT  GETMAIN/OK ADDRESS(00000050_40D01000)
__       +0.022656 PG 1901 PGCR  EXIT  PUT_CONTAINER/OK CONTAINER_TOKEN_OUT(1798B730) GENERATION_NUMBER(1) INITIAL_GENERATION(1)
__       +0.022657 AP F802 EIBAM EXIT  PUT_CONTAINER RESP=0 RESP2=0
__       +0.022660 AP 00E1 EIP   EXIT  PUT-CONTAINER OK REQ(00F4)
__       +0.023157 AP 21E0 JCICS EXIT  Container_PUT
*********************************************************************** Bottom of Data ******
```

A single JCICS request may issue multiple EXEC CICS calls

Java profiling: cross into the AOR…



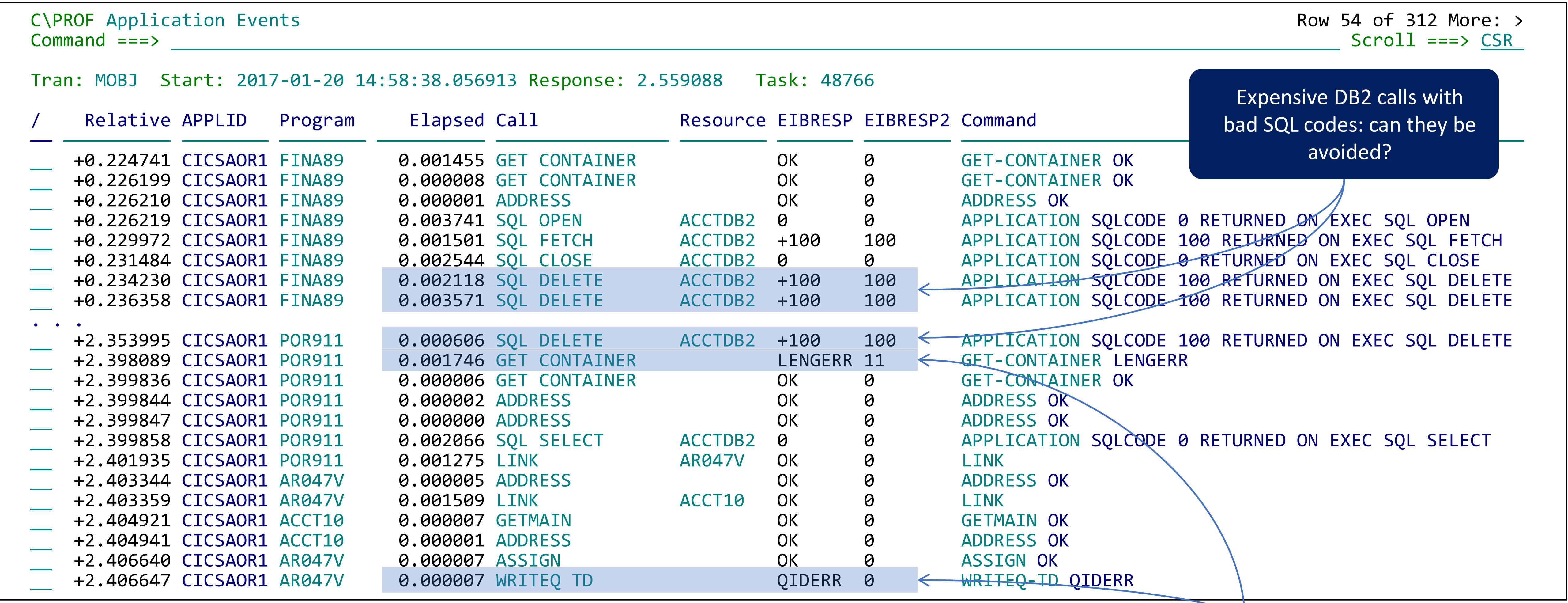
```
C\PROF Application Events                                                                                              Row 1 of 312 More: >
Command ===> ______________________________________________________________________________________________________________ Scroll ===> CSR

Tran: MOBJ  Start: 2017-01-20 14:58:38.056913 Response: 2.559088   Task: 48766

/    Relative APPLID   Program     Elapsed Call             Resource EIBRESP EIBRESP2 Command
_    ________ ________ ________ __________ ________________ ________ _______ ________ ____________________________________________________________
__  +0.000000 CICSJOR  DFHSJTHP            ATTACH TASK                                ATTACH/OK TRANNUM(0048766C)
__  +0.024971 CICSJOR  DFHSJTHP   0.000119 JCICS                                      DTCTask_getCommonData
__  +0.025098 CICSJOR  DFHSJTHP   0.000010 JCICS                                      DTCTask_GETPROGRAM
__  +0.025330 CICSJOR  DFHSJTHP   0.000012 JCICS                                      Wrapper_GetCommArea envp(000000004C9B2100)
__  +0.034056 CICSJOR  DFHSJTHP   0.000012 JCICS                                      Task_GETCURRENTCHANNEL
__  +0.034087 CICSJOR  DFHSJTHP   0.023157 JCICS                                      Container_PUT
__  +0.057284 CICSJOR  DFHSJTHP   0.001345 JCICS                                      Container_PUT
__  +0.058655 CICSJOR  DFHSJTHP   0.000027 JCICS                                      Container_PUT
__  +0.065610 CICSJOR  DFHSJTHP            JCICS                                      DTCProgram_LINK envp(000000004C9B2100)
__  +0.065638 CICSJOR  DFHSJTHP   0.001540 LINK             EYU9XLOP OK      0        LINK
__  +0.067205 CICSJOR  EYU9XLOP   0.001646 ASSIGN                    OK      0        ASSIGN OK
__  +0.068853 CICSJOR  EYU9XLOP   0.000010 HANDLE ABEND              OK      0        HANDLE-ABEND OK
__  +0.068948 CICSJOR  EYU9XLOP   0.010467 RETURN                                     SET_UOW/OK
__  +0.091191 CICSAOR1 DFHMIRS             ATTACH TASK                                ATTACH/OK TRANSACTION_TOKEN(17EBF300 , 0013525C) TRANNUM(0013525C)
__  +0.110682 CICSAOR1 DFHMIRS             START PROGRAM    DFHMIRS                   START_PROGRAM PROGRAM(DFHMIRS) CEDF_STATUS(CEDF) EXEC_SET(FULLAPI)
__  +0.114018 CICSAOR1 DFHMIRS    0.000036 LINK             MOBILE2  OK      0        LINK
__  +0.116491 CICSAOR1 MOBILE2    0.000005 ADDRESS                   OK      0        ADDRESS OK
__  +0.116499 CICSAOR1 MOBILE2    0.000017 GETMAIN                   OK      0        GETMAIN OK
__  +0.116521 CICSAOR1 MOBILE2    0.000000 ADDRESS                   OK      0        ADDRESS OK
__  +0.116523 CICSAOR1 MOBILE2    0.001259 GETMAIN                   OK      0        GETMAIN OK
__  +0.117888 CICSAOR1 MOBILE2    0.000006 GETMAIN                   OK      0        GETMAIN OK
__  +0.117920 CICSAOR1 MOBILE2    0.000001 ADDRESS                   OK      0        ADDRESS OK
__  +0.117923 CICSAOR1 MOBILE2    0.000001 ADDRESS                   OK      0        ADDRESS OK
__  +0.117924 CICSAOR1 MOBILE2    0.000004 ASSIGN                    OK      0        ASSIGN OK
__  +0.117987 CICSAOR1 MOBILE2    0.000012 GET CONTAINER             OK      0        GET-CONTAINER OK
__  +0.118004 CICSAOR1 MOBILE2    0.000000 ADDRESS                   OK      0        ADDRESS OK
__  +0.118008 CICSAOR1 MOBILE2    0.001657 QUERY SECURITY            OK      0        QUERY-SECURITY OK
__  +0.119816 CICSAOR1 MOBILE2    0.001525 SQL SELECT       ACCTDB2  0       0        APPLICATION SQLCODE 0 RETURNED ON EXEC SQL SELECT
__  +0.121355 CICSAOR1 MOBILE2    0.000006 GETMAIN                   OK      0        GETMAIN OK
__  +0.121364 CICSAOR1 MOBILE2    0.002363 LINK             ACC246   OK      0        LINK
__  +0.123985 CICSAOR1 ACC246     0.000012 GETMAIN                   OK      0        GETMAIN OK
__  +0.124010 CICSAOR1 ACC246     0.001190 ASSIGN                    OK      0        ASSIGN OK
__  +0.125201 CICSAOR1 ACC246     0.000011 LINK             CUS147   OK      0        LINK
__  +0.125272 CICSAOR1 CUS147     0.001570 GETMAIN                   OK      0        GETMAIN OK
__  +0.126863 CICSAOR1 CUS147     0.001737 SQL SELECT       ACCTDB2  0       0        APPLICATION SQLCODE 0 RETURNED ON EXEC SQL SELECT
. . .
```

Cross over into the AOR

EI level 1 is used in production to save MIPS. Set EI level 2 for rich EXEC CICS command formatting and program statement numbers.

Multiple program links

Java profiling: delaying programs

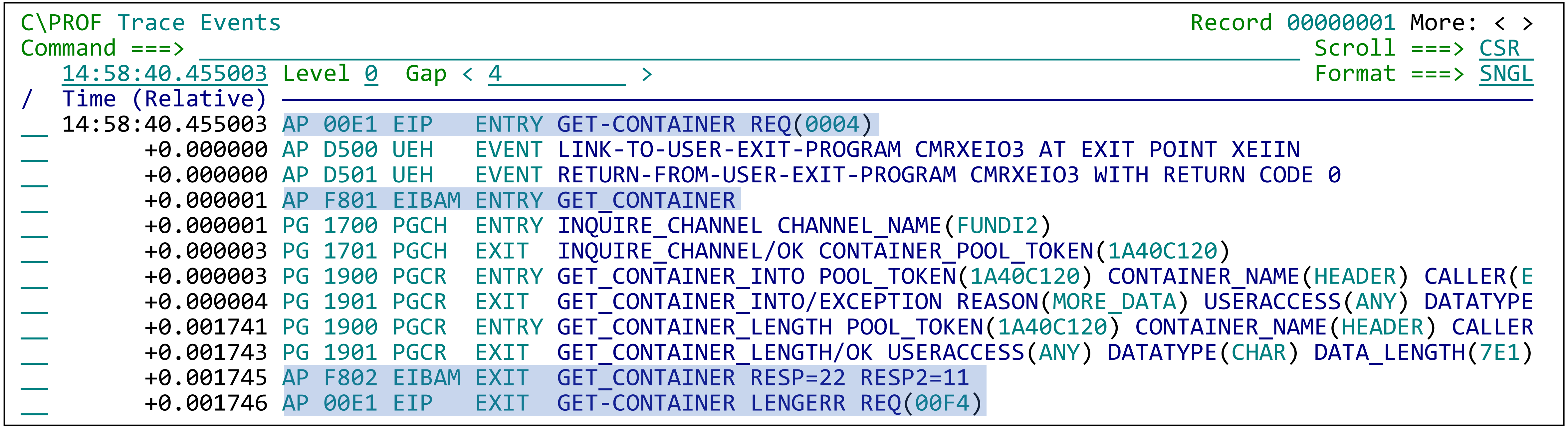


```
C\PROF Application Events                                                            Row 54 of 312 More: >
Command ===> ______________________________________________________________________ Scroll ===> CSR

Tran: MOBJ  Start: 2017-01-20 14:58:38.056913 Response: 2.559088   Task: 48766

/    Relative APPLID   Program      Elapsed Call            Resource EIBRESP EIBRESP2 Command
__ __________ ________ ________ ___________ _______________ ________ _______ ________ ______________________________________
__  +0.224741 CICSAOR1 FINA89      0.001455 GET CONTAINER            OK      0        GET-CONTAINER OK
__  +0.226199 CICSAOR1 FINA89      0.000008 GET CONTAINER            OK      0        GET-CONTAINER OK
__  +0.226210 CICSAOR1 FINA89      0.000001 ADDRESS                  OK      0        ADDRESS OK
__  +0.226219 CICSAOR1 FINA89      0.003741 SQL OPEN        ACCTDB2  0       0        APPLICATION SQLCODE 0 RETURNED ON EXEC SQL OPEN
__  +0.229972 CICSAOR1 FINA89      0.001501 SQL FETCH       ACCTDB2  +100    100      APPLICATION SQLCODE 100 RETURNED ON EXEC SQL FETCH
__  +0.231484 CICSAOR1 FINA89      0.002544 SQL CLOSE       ACCTDB2  0       0        APPLICATION SQLCODE 0 RETURNED ON EXEC SQL CLOSE
__  +0.234230 CICSAOR1 FINA89      0.002118 SQL DELETE      ACCTDB2  +100    100      APPLICATION SQLCODE 100 RETURNED ON EXEC SQL DELETE
__  +0.236358 CICSAOR1 FINA89      0.003571 SQL DELETE      ACCTDB2  +100    100      APPLICATION SQLCODE 100 RETURNED ON EXEC SQL DELETE
. . .
__  +2.353995 CICSAOR1 POR911      0.000606 SQL DELETE      ACCTDB2  +100    100      APPLICATION SQLCODE 100 RETURNED ON EXEC SQL DELETE
__  +2.398089 CICSAOR1 POR911      0.001746 GET CONTAINER            LENGERR 11       GET-CONTAINER LENGERR
__  +2.399836 CICSAOR1 POR911      0.000006 GET CONTAINER            OK      0        GET-CONTAINER OK
__  +2.399844 CICSAOR1 POR911      0.000002 ADDRESS                  OK      0        ADDRESS OK
__  +2.399847 CICSAOR1 POR911      0.000000 ADDRESS                  OK      0        ADDRESS OK
__  +2.399858 CICSAOR1 POR911      0.002066 SQL SELECT      ACCTDB2  0       0        APPLICATION SQLCODE 0 RETURNED ON EXEC SQL SELECT
__  +2.401935 CICSAOR1 POR911      0.001275 LINK            AR047V   OK      0        LINK
__  +2.403344 CICSAOR1 AR047V      0.000005 ADDRESS                  OK      0        ADDRESS OK
__  +2.403359 CICSAOR1 AR047V      0.001509 LINK            ACCT10   OK      0        LINK
__  +2.404921 CICSAOR1 ACCT10      0.000007 GETMAIN                  OK      0        GETMAIN OK
__  +2.404941 CICSAOR1 ACCT10      0.000001 ADDRESS                  OK      0        ADDRESS OK
__  +2.406640 CICSAOR1 AR047V      0.000007 ASSIGN                   OK      0        ASSIGN OK
__  +2.406647 CICSAOR1 AR047V      0.000007 WRITEQ TD                QIDERR  0        WRITEQ-TD QIDERR
```

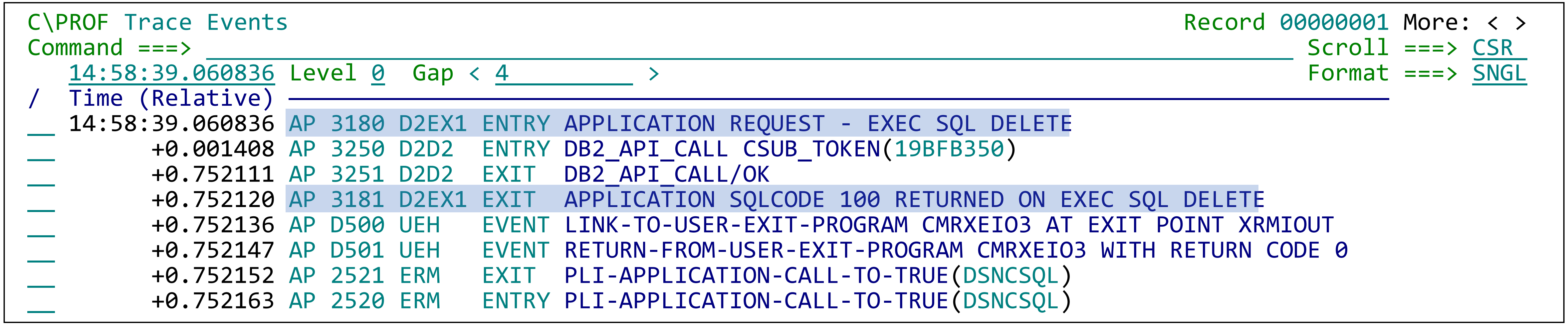
Expensive DB2 calls with bad SQL codes: can they be avoided?

EXEC CICS calls with unexpected response codes…

Java profiling: response codes

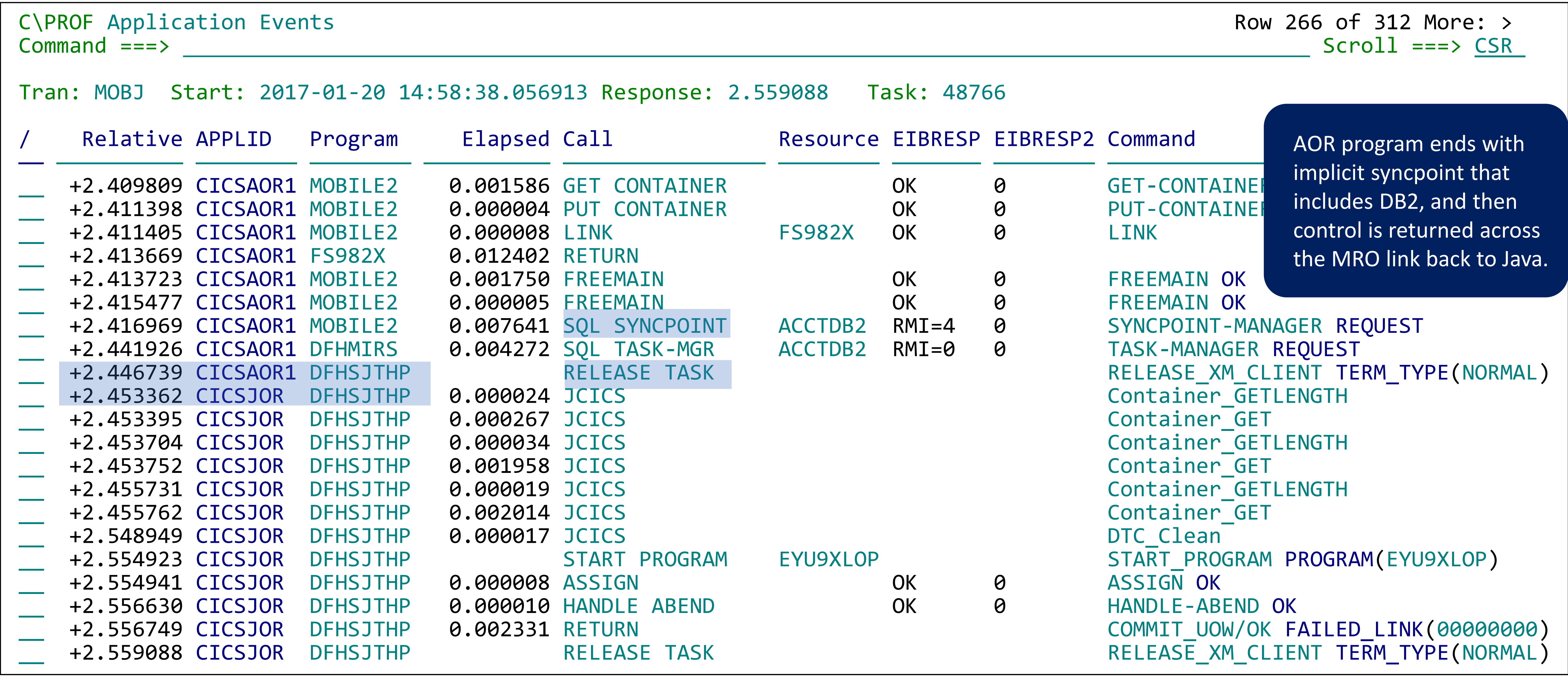


```
 C\PROF Trace Events                                          Record 00000001 More: < >
 Command ===>                                                    Scroll ===> CSR
    14:58:40.455003 Level 0   Gap < 4          >                 Format ===> SNGL
 /  Time (Relative)
 __ 14:58:40.455003 AP 00E1 EIP   ENTRY GET-CONTAINER REQ(0004)
 __       +0.000000 AP D500 UEH   EVENT LINK-TO-USER-EXIT-PROGRAM CMRXEIO3 AT EXIT POINT XEIIN
 __       +0.000000 AP D501 UEH   EVENT RETURN-FROM-USER-EXIT-PROGRAM CMRXEIO3 WITH RETURN CODE 0
 __       +0.000001 AP F801 EIBAM ENTRY GET_CONTAINER
 __       +0.000001 PG 1700 PGCH  ENTRY INQUIRE_CHANNEL CHANNEL_NAME(FUNDI2)
 __       +0.000003 PG 1701 PGCH  EXIT  INQUIRE_CHANNEL/OK CONTAINER_POOL_TOKEN(1A40C120)
 __       +0.000003 PG 1900 PGCR  ENTRY GET_CONTAINER_INTO POOL_TOKEN(1A40C120) CONTAINER_NAME(HEADER) CALLER(E
 __       +0.000004 PG 1901 PGCR  EXIT  GET_CONTAINER_INTO/EXCEPTION REASON(MORE_DATA) USERACCESS(ANY) DATATYPE
 __       +0.001741 PG 1900 PGCR  ENTRY GET_CONTAINER_LENGTH POOL_TOKEN(1A40C120) CONTAINER_NAME(HEADER) CALLER
 __       +0.001743 PG 1901 PGCR  EXIT  GET_CONTAINER_LENGTH/OK USERACCESS(ANY) DATATYPE(CHAR) DATA_LENGTH(7E1)
 __       +0.001745 AP F802 EIBAM EXIT  GET_CONTAINER RESP=22 RESP2=11
 __       +0.001746 AP 00E1 EIP   EXIT  GET-CONTAINER LENGERR REQ(00F4)
```



```
 C\PROF Trace Events                                          Record 00000001 More: < >
 Command ===>                                                    Scroll ===> CSR
    14:58:39.060836 Level 0   Gap < 4          >                 Format ===> SNGL
 /  Time (Relative)
 __ 14:58:39.060836 AP 3180 D2EX1 ENTRY APPLICATION REQUEST - EXEC SQL DELETE
 __       +0.001408 AP 3250 D2D2  ENTRY DB2_API_CALL CSUB_TOKEN(19BFB350)
 __       +0.752111 AP 3251 D2D2  EXIT  DB2_API_CALL/OK
 __       +0.752120 AP 3181 D2EX1 EXIT  APPLICATION SQLCODE 100 RETURNED ON EXEC SQL DELETE
 __       +0.752136 AP D500 UEH   EVENT LINK-TO-USER-EXIT-PROGRAM CMRXEIO3 AT EXIT POINT XRMIOUT
 __       +0.752147 AP D501 UEH   EVENT RETURN-FROM-USER-EXIT-PROGRAM CMRXEIO3 WITH RETURN CODE 0
 __       +0.752152 AP 2521 ERM   EXIT  PLI-APPLICATION-CALL-TO-TRUE(DSNCSQL)
 __       +0.752163 AP 2520 ERM   ENTRY PLI-APPLICATION-CALL-TO-TRUE(DSNCSQL)
```

Java profiling: return to JOR



```
C\PROF Application Events                                                              Row 266 of 312 More: >
Command ===> ____________________________________________________________________________ Scroll ===> CSR

Tran: MOBJ  Start: 2017-01-20 14:58:38.056913 Response: 2.559088   Task: 48766

/    Relative APPLID   Program     Elapsed Call            Resource EIBRESP EIBRESP2 Command
_    ________ _______  _______  __________ _______________ ________ _______ ________ _______
__  +2.409809 CICSAOR1 MOBILE2    0.001586 GET CONTAINER            OK      0        GET-CONTAINER
__  +2.411398 CICSAOR1 MOBILE2    0.000004 PUT CONTAINER            OK      0        PUT-CONTAINER
__  +2.411405 CICSAOR1 MOBILE2    0.000008 LINK            FS982X   OK      0        LINK
__  +2.413669 CICSAOR1 FS982X     0.012402 RETURN
__  +2.413723 CICSAOR1 MOBILE2    0.001750 FREEMAIN                 OK      0        FREEMAIN OK
__  +2.415477 CICSAOR1 MOBILE2    0.000005 FREEMAIN                 OK      0        FREEMAIN OK
__  +2.416969 CICSAOR1 MOBILE2    0.007641 SQL SYNCPOINT   ACCTDB2  RMI=4   0        SYNCPOINT-MANAGER REQUEST
__  +2.441926 CICSAOR1 DFHMIRS    0.004272 SQL TASK-MGR    ACCTDB2  RMI=0   0        TASK-MANAGER REQUEST
__  +2.446739 CICSAOR1 DFHSJTHP            RELEASE TASK                              RELEASE_XM_CLIENT TERM_TYPE(NORMAL)
__  +2.453362 CICSJOR  DFHSJTHP   0.000024 JCICS                                     Container_GETLENGTH
__  +2.453395 CICSJOR  DFHSJTHP   0.000267 JCICS                                     Container_GET
__  +2.453704 CICSJOR  DFHSJTHP   0.000034 JCICS                                     Container_GETLENGTH
__  +2.453752 CICSJOR  DFHSJTHP   0.001958 JCICS                                     Container_GET
__  +2.455731 CICSJOR  DFHSJTHP   0.000019 JCICS                                     Container_GETLENGTH
__  +2.455762 CICSJOR  DFHSJTHP   0.002014 JCICS                                     Container_GET
__  +2.548949 CICSJOR  DFHSJTHP   0.000017 JCICS                                     DTC_Clean
__  +2.554923 CICSJOR  DFHSJTHP            START PROGRAM   EYU9XLOP                  START_PROGRAM PROGRAM(EYU9XLOP)
__  +2.554941 CICSJOR  DFHSJTHP   0.000008 ASSIGN                   OK      0        ASSIGN OK
__  +2.556630 CICSJOR  DFHSJTHP   0.000010 HANDLE ABEND             OK      0        HANDLE-ABEND OK
__  +2.556749 CICSJOR  DFHSJTHP   0.002331 RETURN                                    COMMIT_UOW/OK FAILED_LINK(00000000)
__  +2.559088 CICSJOR  DFHSJTHP            RELEASE TASK                              RELEASE_XM_CLIENT TERM_TYPE(NORMAL)
```

AOR program ends with implicit syncpoint that includes DB2, and then control is returned across the MRO link back to Java.

We want your feedback!

- Please submit your feedback online at ….
  - ➢http://conferences.gse.org.uk/2018/feedback/GD

- Paper feedback forms are also available from the Chair person

- This session is GD