Introducing
IBM Transaction Analysis Workbench for z/OS

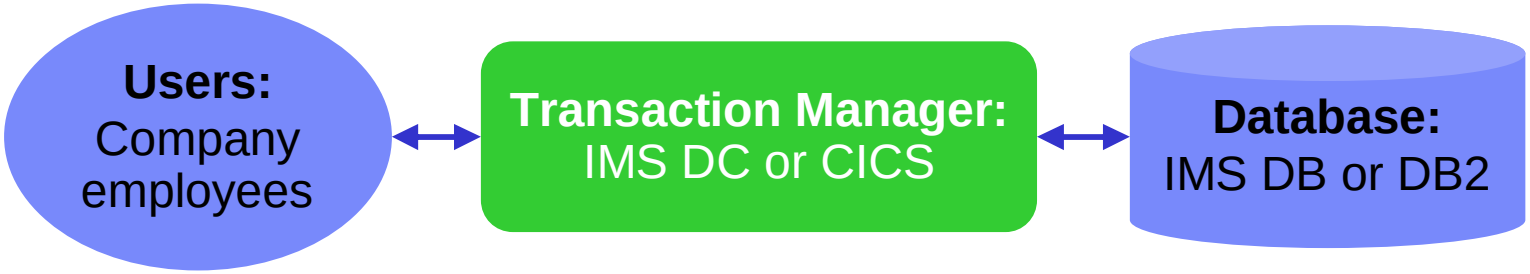
Jim Martin
US Representative, Fundi Software

Agenda

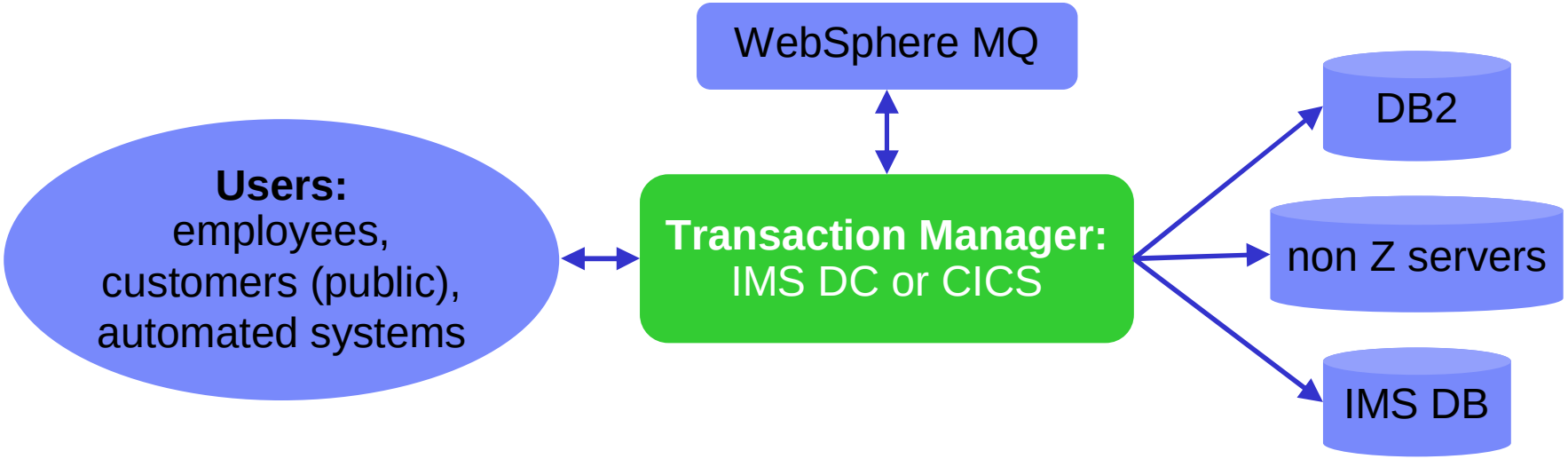
- Introduction
- Overview of the ISPF dialog
- Scenario 1: CICS DBCTL problem
- Batch SMF and OPERLOG reports

It's all about evolution

1980: in-house users only; simple data, single data store

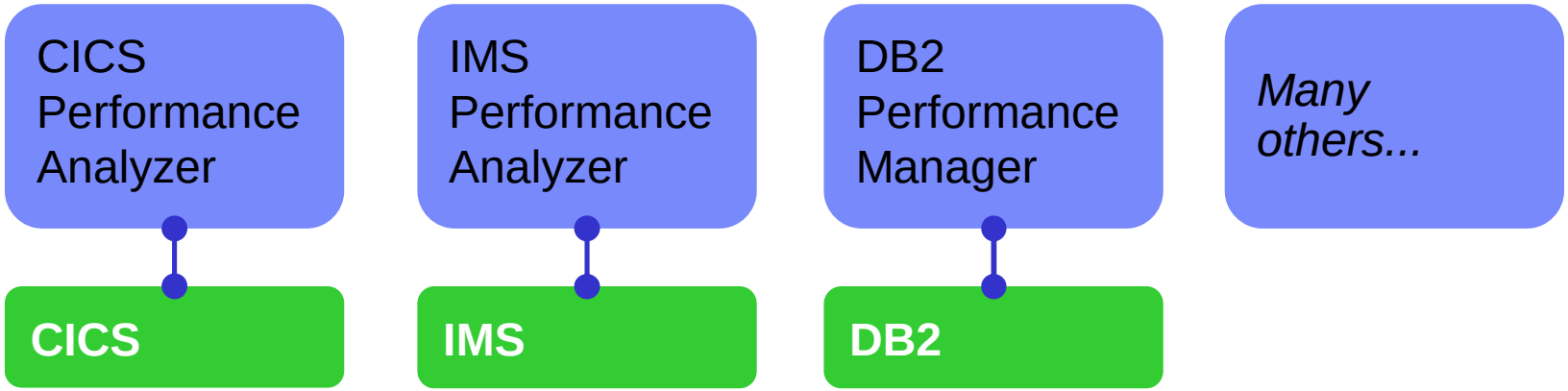


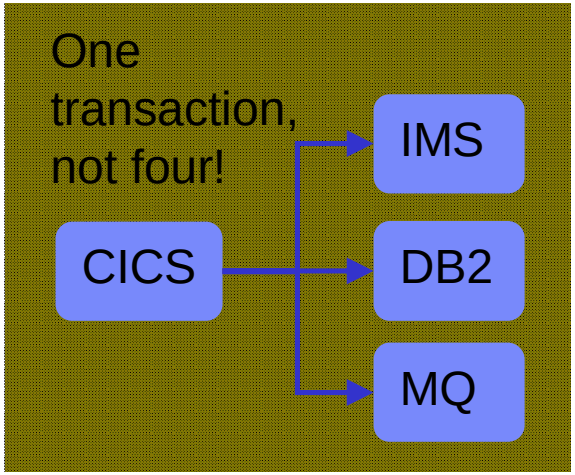
2011: users are customers; data is complex, often distributed

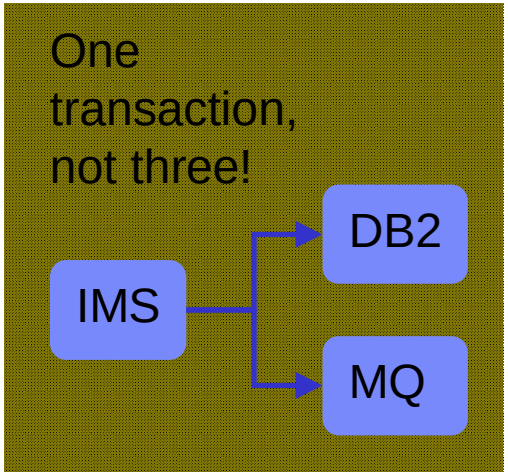


Analysis tools have not kept pace

There are many tools to help analyze *individual* transaction environments on System z:







Each tool is well-suited to its environment, but you often need a subject matter expert to use each tool

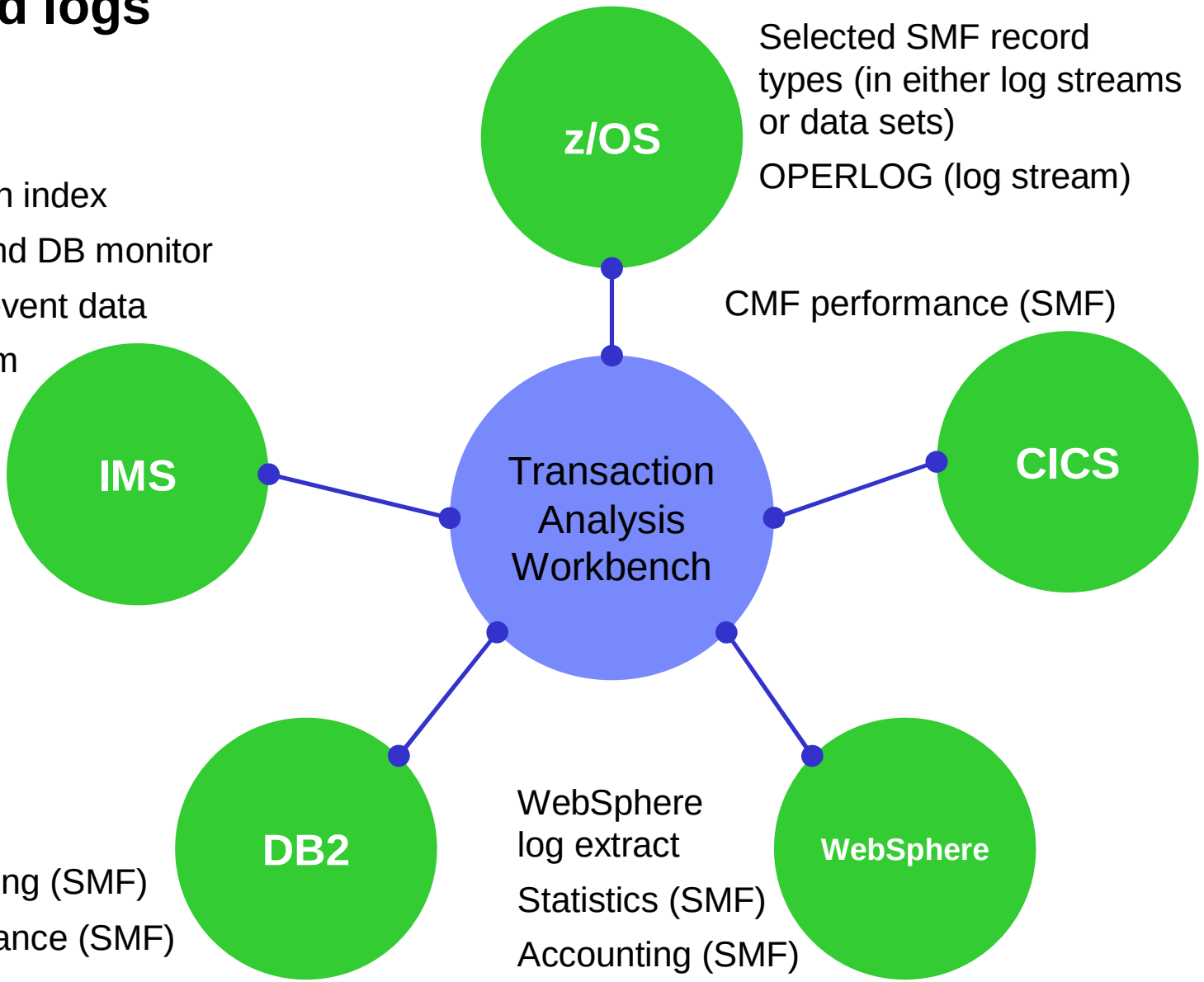
Product goals

- Enable higher productivity by lower skilled staff, reduce problem analysis time, and serve as a training tool for new support staff
- Allow the “first responder” to determine the most likely source of the problem so that the right subject matter expert can work on the problem
- Allow for “deep dive” problem determination via synergy with other IBM tools
  - Subject-matter experts may also use tools not supported by the Workbench

Product overview

- A transaction analysis framework for System z
  - Not transaction manager specific
  - Leverages current IBM tools for transaction analysis
- Not IMS or CICS specific, but first release provides more synergy with the existing tools for those transaction managers
- Automates collection of data needed for problem analysis
  - Big data issue – lots of data relevant to problem
- Provides a session manager to manage problem analysis through its lifecycle
- In this presentation, it might look like the Workbench is IMS or CICS centric but that is not the case
  - The tools for IMS and CICS are the first to be engaged

Supported logs



Session manager (ISPF dialog)

- Session manager approach to problem management:
  - Register the problem
  - Locate the files required to diagnose the problem: IMS, DB2, CICS, SMF, OPERLOG etc.
  - Resume from where you left off, or from a previous save-point
  - Write reminder notes and information as you go
  - Re-assign the problem to the appropriate subject-matter expert
  - Use PI-style interactive analysis to look at related logs and other subsystem events via SMF, OPERLOG etc.
  - Run reports that are specific to the problem

Scenario 1: CICS DBCTL problem

- On the following slides, we present an example scenario: a user has reported an abend in a CICS transaction
- The analysis is divided into two parts:
  1. The **first responder** registers the problem in the Workbench session manager, and runs some preliminary batch reports to attempt to identify the cause of the problem
  2. The **specialist** performs a “deep dive” on the problem: reviewing the reports, and using interactive analysis to identify the specific log records for the cause of the problem

CICS DBCTL problem: creating a session

```
  File  Help
─────────────────────────────────────────────────────────────────────────────
V1R1M0          Transaction Analysis Workbench - Primary Option Menu
Option ===>
─────────────────────────────────────────────────────────────────────────────

0 Profile     Customize your dialog profile
1 Sessions    Analyze problems using the session manager
2 Controls    Define record filtering and formatting controls
3 Systems     Define the systems where transactions are processed
4 Process     Analyze ad-hoc log files
X Exit        Quit the workbench

Session Repository  . . . FUW.SESSIONS                              +
```

Start Workbench, and then select option 1 **Sessions**.

CICS DBCTL problem: creating a session

```
  File  Help
──────────────────────────────────────────────────────────────────────────────
                                Session Manager          Row 1 of 3  More: < >
Command ===>                                              Scroll ===> PAGE

Select a session or use the NEW command to register a new session.

/  Key       Status  Description
_  00000001  OPEN    CICS DB2
_  00000002  OPEN    CICS DBCTL
_  00000003  OPEN    IMS DB2
****************************** Bottom of data ********************************
```

Create a new session for the problem.

CICS DBCTL problem: creating a session

```
  File  Help
──────────────────────────────────────────────────────────────────────────────
                                Problem Details                  Row 1 to 3 of 3
Command ===> ____________________________________________________ Scroll ===> PAGE

Key  . . . . . : 00000042
Summary  . . . . CICS DBCTL deadlock_____________  Description...
Severity . . . . _
Reference  . . . _____________   ── When problem occurred ──
Reported by  . . _____________        YYYY-MM-DD  HH.MM.SS.TH
Assigned to  . . _____________   From 2011-04-06  08.40.00.00
Status . . . . . OPEN          To   2011-04-06  09.00.00.00  Zone . . LOCAL

Systems where problem occurred (maximum of 32):

/  System +   Type +
__ FUWTCIC    CICS
__ IBB1       IMS
__ FTS1       IMAGE
******************************** Bottom of data ********************************
```

Enter a problem summary, when the problem occurred, and the names of the systems involved (CICS, IMS, and MVS image).

CICS DBCTL problem: adding log files

```
  File  Help
──────────────────────────────────────────────────────────────────────────────
                                Session 00000042
Option ===> ____________________________________________________________________

Summary . . : CICS DBCTL deadlock

1  Register      Update the problem registration details
2  Files         Locate and manage the log files required for diagnosis
3  Reporting     Run batch reports
4  Investigate   Perform interactive log file analysis
5  History       Review the problem history
```

When you exit the Problem Details panel for a new session, the session menu is displayed. We want to add log files to the session. Select option 3 **Files**.

CICS DBCTL problem: adding log files

```
  File  Help
──────────────────────────────────────────────────────────────────────────────
                          Locate and Manage Log Files          Row 1 to 2 of 2
Command ===> ____________________________________________________ Scroll ===> PAGE

Select an option to add log files to the session then press Enter
   1. Manually specify the log files required for analysis
   2. Run automated file selection to locate the required log files

Automated File Selection:          ── Locate Files Interval ──
  System . . . ____   +                 YYYY-MM-DD  HH.MM.SS.TH
  Type . . . . ____   +           From  2011-04-06  08.40.00.00
                                  To    2011-04-06  09.00.00.00

Log Files:
                                                    ─── System ─── File
/        Data Set Name                              Name     Type    Type
_______  FUNDID.SMF.D110406.DEADLOK.FULL            FTS1     IMAGE   SMF
_______  OPERLOG:SYSPLEX.OPERLOG                    FTS1     IMAGE   OPERLOG
****************************** Bottom of data ********************************
```

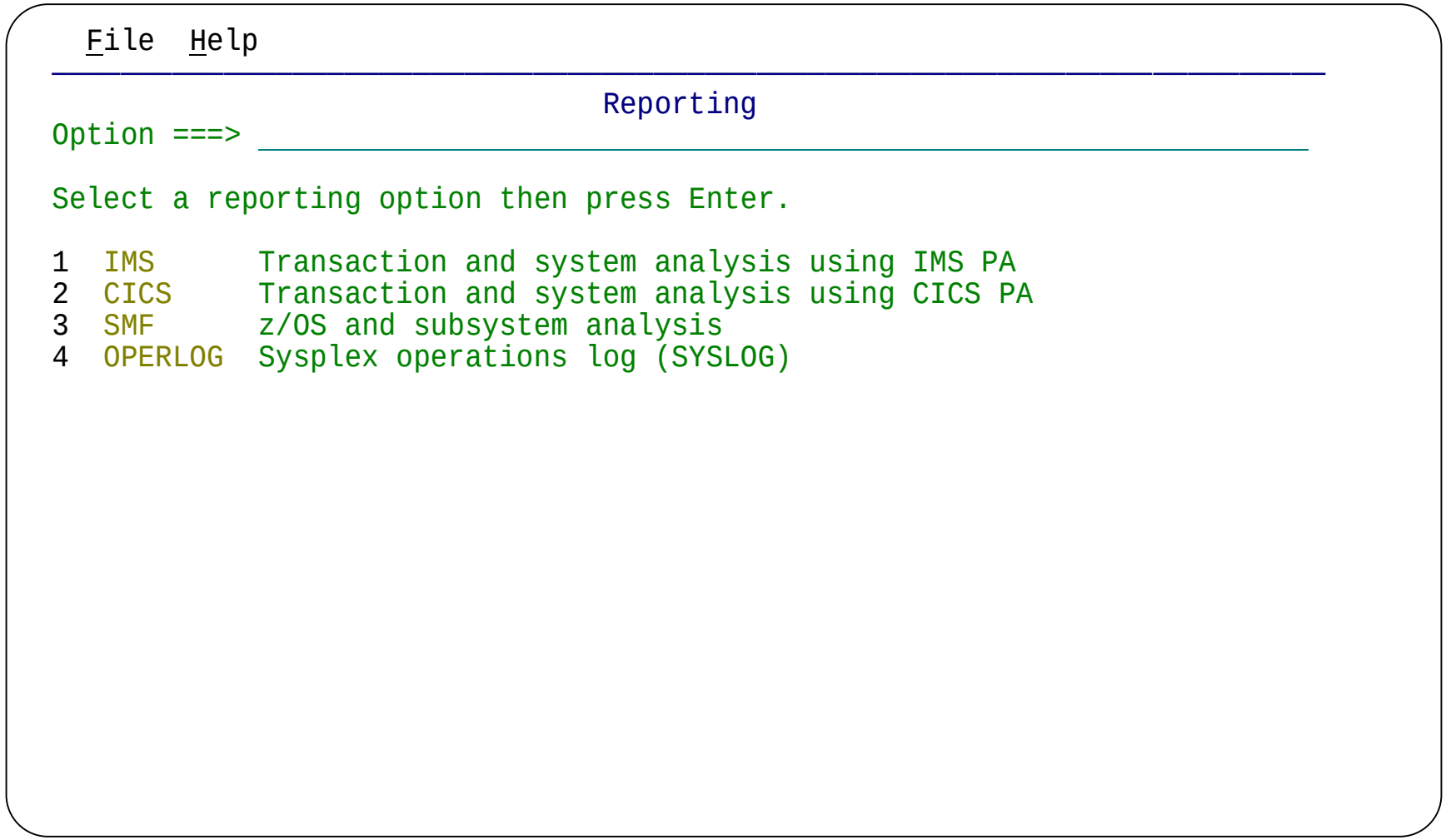
We've manually added the OPERLOG and the associated SMF file to the session, but we will use automated file selection to locate the IMS log file for IBB1.

CICS DBCTL problem: automated file selection

```
  File  Help
──────────────────────────────────────────────────────────────────────────────
                          Locate and Manage Log Files          Row 1 to 3 of 3
Command ===> ____________________________________________________ Scroll ===> PAGE

Select an option to add log files to the session then press Enter
_   1. Manually specify the log files required for analysis
    2. Run automated file selection to locate the required log files

Automated File Selection:          ── Locate Files Interval ──
  System . . . ________  +               YYYY-MM-DD  HH.MM.SS.TH
  Type . . . . ________  +         From  2011-04-06  08.40.00.00
                                   To    2011-04-06  09.00.00.00

Log Files:
                                                    ─── System ─── File
/        Data Set Name                              Name     Type    Type
________ FUNDID.SMF.D110406.DEADLOK.FULL            FTS1     IMAGE   SMF
________ OPERLOG:SYSPLEX.OPERLOG                    FTS1     IMAGE   OPERLOG
________ [redacted]                                 IBB1     IMS     LOG
********** Bottom of data **********************************
```

When the automated file selection batch job ends, enter REFRESH on the command line of this panel to see the IMS log file that the job has added to this session.

CICS DBCTL problem: batch reporting



On the session menu, select option 3 **Reporting**. Then, on the reporting menu, Select option 2 **CICS**.

CICS DBCTL problem: CICS PA reporting

```
  File  Help
──────────────────────────────────────────────────────────────────────────────
                    Reporting - CICS Transaction Analysis
Command ===> ____________________________________________________________

                                          ──── Report Interval ────
Type of analysis:                              YYYY-MM-DD  HH.MM.SS.TH
/  Individual transaction detail          From 2011-04-06  08.40.00.00
/  Transaction statistical summary        To   2011-04-06  09.00.00.00
/  Transaction suspend time breakdown

Focus of transaction analysis:
/  Response time and CPU usage
/  VSAM files
/  Virtual storage
/  DB2
/  IMS DBCTL

Select the CICS system to report against, or specify an SMF file:
2  1. System . . . ________  +
   2. SMF File . . 'FUNDID.SMF.D110406.DEADLOK.FULL'              +
```

Select reports for the SMF file.

CICS DBCTL problem: CICS PA reporting

```
                                                        CICS Performance Analyzer
                                                  Transaction details: Response time and
LIST0001 Printed at 16:55:17  4/11/2011    Data from 08:39:21  4/06/2011

Start          APPLID   Tran SC Term Userid   RSID Program    TaskNo Response Dispatch
Time                                                                Time     Time
08:43:19.3169 FUWTCIC  DBEU TO UW2B FUW2          TWM$UPD        150   7.3433    .0066
08:43:34.0141 FUWTCIC  DBEU TO UW2B FUW2          TWM$UPD        152   7.3112    .0065
08:47:22.0636 FUWTCIC  TWMU TO UW1B FUW1          TWM$UPD        [redacted] 14.0675    .0368
08:47:14.7397 FUWTCIC  DBEU TO UW2B FUW2          TWM$UPD        168   22.5172    .0082
08:47:36.1434 FUWTCIC  TWMU TO UW1B FUW1          TWM$UPD        171   14.9865    .0360
```

```
 CPU


User CPU  Suspend DispWait  FC Wait ABcu
    Time     Time     Time     Time
   .0053   7.3367    .0006    .0000
   .0055   7.3047    .0008    .0000
   .0265  14.0308    .0031    .0000 [redacted]
   .0061  22.5090    .0293    .0000
   .0271  14.9505    .0036    .0000 DE40
```

CICS DBCTL problem: IMS PA reporting

```
  File  Help
──────────────────────────────────────────────────────────────────────────────
                Reporting - IMS Transaction and System Analysis
Command ===> ____________________________________________________________

Type of analysis:                              ──── Report Interval ────
/  Individual transaction detail                    YYYY-MM-DD  HH.MM.SS.TH
/  Transaction statistical summary           From 2011-04-06  08.40.00.00
/  IMS system resources                      To   2011-04-06  09.00.00.00
/  Deadlock analysis

Focus of transaction analysis:
/  Response time breakdown and CPU usage
/  DLI calls
/  Fast Path database and buffers
   Subsystem usage
/  CICS DBCTL

Select the IMS system to report against, or specify an IMS log file:
2  1. System . . .  ____  +
   2. Log File . .  'IBB1.SLDSP.IBB1.D11096.T0841415.V15'        +
```

Return to the Reporting menu, select IMS, and then select reports for the IMS log file.

CICS DBCTL problem: IMS PA reporting

IMS Performance Analyzer
Tran detail: Response & CPU

LIST0001 Printed at 11:41:35 12Apr2011 Data from 08.41.45 06Apr2011

CICS APPLID	Trancode	CICS TaskNo	IMS Tran Program	IMS Tran Start	PST	DB Call Count	FP Call Count	CPU Time
FUWTCIC	DBEU	150	DFHTWM04	08.43.19.317952	2	35	20	0.004429
FUWTCIC	DBEU	152	DFHTWM04	08.43.34.015461	2	35	20	0.004786
FUWTCIC	[redacted]	[redacted]	DFHTWM04	08.47.22.064699	2	27	10	0.003550
FUWTCIC	DBEU	168	DFHTWM04	08.47.14.741096	1	35	20	0.004993
FUWTCIC	TWMU	171	DFHTWM04	08.47.36.145544	2	31	11	0.004575

IMS V11 has the improved instrumentation required to connect CICS and IMS events, and IMS PA now supports this (see APAR PM24076): the IMS PA reports show the CICS transaction name and task number.

Process Time	Total IO Count	DB IO Time	ABEND Code
7.340751	4	0.002947	
7.308276	5	0.004377	
13.98985	5	0.004129	U0777
22.51250	4	0.003052	
14.97864	5	0.004057	

CICS DBCTL problem: interactive investigation

```
  File  Menu  Time Slicing  Help
 ──────────────────────────────────────────────────────────────────────────────
                                 Investigate                 Row 1 of 3 More: < >
Command ===> ____________________________________________________ Scroll ===> PAGE

                 ──────────────── Time Slice (ON) ─────────────────
                 Time              Date              Duration
                 HH.MM.SS.thmiju   YYYY-MM-DD       HH.MM.SS  Zone   Filter +
                 08.41.41.519325   2011-04-06        00.14.19  LOCAL  ________

 ____   Type  Data Set Name                                    Coverage
 ____   SMF   FUNDID.SMF.D110406.DEADLOK.FULL                  COMPLETE
 ____   IMS   IBB1.SLDSP.IBB1.D11096.T0841415.V15              COMPLETE
 ____   MVS   OPERLOG:SYSPLEX.OPERLOG                         COMPLETE
****************************** Bottom of data ********************************
```

Now let's use the interactive log browser to view the log records. On the session menu, select option 4 **Investigate**. Enter **S** to browse a merged view of all log files.

CICS DBCTL problem: interactive investigation

```
  File  Mode  Filter  Time  Labels  Options  Help
──────────────────────────────────────────────────────────────────────────────
BROWSE    FUNDID.SMF.D110406.DEADLOK.FULL +          Record 00000059 More: < >
Command ===> [redacted]                                  Scroll ===> PAGE
   Slice . . Duration  00.14.19     Date  2011-04-06     Time  08.41.41.519325
   Code Description  < 00.05.00.000000 >  2011-04-06 Wednesday Time (LOCAL)
/  ---- ------------------------------------------------- ----------------
__ 50   Database Update Database=DI21PART Region=0002          08.41.41.519325
__ 50   Database Update Database=DI21PART Region=0002          08.41.41.519601
__ 50   Database Update Database=DI21PART Region=0002          08.41.41.519659
__ 43   Log Data Set Control                                   08.41.41.567359
__ 42   Log Buffer Control                                    08.41.41.567362
__ CA52 DFS3257I ONLINE LOG NOW SWITCHED - FROM DFSOLP00 TO DF 08.41.41.567883
__ CA52 DFS3257I ONLINE LOG NOW SWITCHED - FROM DFSOLS00 TO DF 08.41.41.569543
__ CA52 HTRT03I JCP1FUW  VERIFY0              00     69        08.41.41.649266
__ CA52 HTRT03I JCP1FUW  DELC0                00     30        08.41.41.802076
__ CA52 $HASP100 JCP1FUW  ON INTRDR      FUW Testing           08.41.41.997997
__ CA52 HTRT03I JCP1FUW  VERIFYS              00     53        08.41.42.040191
__ CA52 IRR010I  USERID JCP1     IS ASSIGNED TO THIS JOB.      08.41.42.139646
__ CA52 HTRT03I JCP1FUW  DELCS                00     36        08.41.42.203048
__ 5C   File System Activity                                   08.41.42.250000
__ CA52 HTRT03I JCP1FUW  DELETES              00     34        08.41.42.356674
__ CA52 $HASP100 IBB1#ARC ON INTRDR      IMSDBC                08.41.42.552139
__ CA52 IRR010I  USERID STC@IMS  IS ASSIGNED TO THIS JOB.      08.41.42.569636
```

The log browser is displayed, showing a merged view of the IMS log, SMF file, and OPERLOG. Let's use a filter to help locate the CMF record for the abending transaction.

CICS DBCTL problem: filtering records

```
  File  Menu  View  Help
_____________________________________________________________________________
VIEW                              Filter                    Row 1 of 1 More: < >
Command ===> _____________________________________________  Scroll ===> PAGE

Specify filtering criteria then press EXIT (F3) to apply the filter.

Filter  . . . . . ________  +
Description . . . New Log Record Filter                 _  Activate Tracking

/ Log Code + Exc Description
           ____  CICS Transaction
           Level ___  Conditions ___  Form ________ + REXX ________
------------------------------------------------------------------------------
******************************* Bottom of data ********************************
```

We want to specify a filter for CMF records, log code 6E13. x'6E' represents the decimal SMF type 110; 1 is for CMF; 3 is for performance class records.

CICS DBCTL problem: filtering records

```
  File  Menu  Edit  Object Lists  Help
──────────────────────────────────────────────────────────────────────────────
                                  Conditions                    Row 1 to 1 of 1
Command ===> ____________________________________________________ Scroll ===> PAGE

Code: 6E13 CICS Transaction

/  Field Name +                      Oper Value +
_  ABEND                             NE   ' '
****************************** Bottom of data ********************************
```

This filter condition selects CMF records for transactions that abended.

CICS DBCTL problem: viewing a CMF record

```
  File  Mode  Filter  Time  Labels  Options  Help
──────────────────────────────────────────────────────────────────────────────
BROWSE    FUNDID.SMF.D110406.DEADLOK.FULL +          Record 00008199 More: < >
Command ===>                                                 Scroll ===> PAGE
   Slice . . Duration  00.14.19     Date  2011-04-06     Time  08.41.41.519325
   Code Description  < 00.05.00.000000 >  2011-04-06 Wednesday Time (LOCAL)
 / ---- ------------------------------------------------------ ---------------
   6E13 CICS Transaction TranCode=TWMU Task=170 Abend=ADCD     08.47.22.063694
   6E13 CICS Transaction TranCode=TWMU Task=171 Abend=DE40     08.47.36.143484
   6E13 CICS Transaction TranCode=TWMU Task=173 Abend=DE40     08.47.51.142989
   6E13 CICS Transaction TranCode=TWMU Task=174 Abend=DE40     08.48.06.140979
   6E13 CICS Transaction TranCode=DBEU Task=181 Abend=ADCD     08.48.42.298937
   6E13 CICS Transaction TranCode=DBEU Task=183 Abend=ADCD     08.48.56.165539
   6E13 CICS Transaction TranCode=TWMU Task=185 Abend=DE40     08.49.10.328848
   6E13 CICS Transaction TranCode=DBEU Task=188 Abend=ADCD     08.49.29.735139
   6E13 CICS Transaction TranCode=DBEU Task=189 Abend=ADCD     08.49.41.183492
   6E13 CICS Transaction TranCode=DBEU Task=193 Abend=ADCD     08.50.03.586072
   6E13 CICS Transaction TranCode=TWMU Task=201 Abend=DE40     08.50.56.233561
   6E13 CICS Transaction TranCode=DBEU Task=200 Abend=ADCD     08.50.50.772178
   6E13 CICS Transaction TranCode=TWMU Task=223 Abend=ADCD     08.55.31.495953
******************************** Bottom of Data ********************************
```

The log browser displays CMF records for transactions that abended. Let's view the details of the CMF record that we're interested in (for task 170). Enter **S** next to the record.

CICS DBCTL problem: viewing a CMF record

```
BROWSE     FUNDID.SMF.D110406.DEADLOK.FULL       Record 00000006 Line 00000000
Command ===> ____________________________________________________ Scroll ===> PAGE
Form    ===> CMF      +  /  Use Form in Filter                    Format ===> FORM
******************************** Top of data ********************************
+0005  Code... 6E13  CICS Transaction
+0366  STCK... C79458194C1A7D60      LSN.... 0000000000000006
       Date... 2011-04-06 Wednesday  Time... 08.39.14.241959.835

+0005  SMFRTY..... 6E          SMFSID..... 'FTS3'     SMFMNPRN... 'FUWTCIC '

+0352  DFHTASK.... Task Control
+0352  Tran....... 'TWMU'      SC......... 'TO..'
+09E2  Dispatch... 0.006213/55                         UserCPU.... 0.005241/55
+09FA  Suspend.... 7.032136/55                         TaskNo..... +113
+0396  NETName.... 'FTS3.VAPFUW1B.......'   NETUOWID... 9458194C25C60001
+0A06  DispWait... 0.001080/54
+0C0A  RMIElap.... 0.020270/43 RMISusp.... 0.018037/39 ExtWait.... 0
+0C5E  CICSWait... 0           ICDelay.... 7.013661/7  GiveUpWt... 0
+03EA  RRMSURID... 00000000    RRMSWait... 0           DSCHMDLY... 0
+0AEA  QRModDly... 0.001080/54                         MaxOTDly... 0
+0A1E  QRCPU..... 0.005241/55                         MSDisp..... 0

       DFHCICS.... CICS task information
+0366  Start...... C79458194C1A7D60
+036E  Stop....... C794582002735C60                    Response... 7.038349
+035A  Userid..... 'FUW1    '  ExcWait.... 0           RTyp....... '   T'
+03B2  RSID....... 00000000    RecCount... +1
+03C2  SrvClass... 'TRANLO  '  RptClass... 'RCICS   '  EICTotCt... +28
```

The log browser displays the details of the CMF record. Scroll down to view the rest...

CICS DBCTL problem: transaction tracking

```
  File  Mode  Filter  Time  Labels  Options  Help
BROWSE    FUNDID.SMF.D110406.DEADLOK.FULL +          Record 00008199 More: < >
Command ===>                                                Scroll ===> PAGE
   Slice . . Duration  00.14.19     Date  2011-04-06     Time  08.41.41.519325
   Code Description  < 00.05.00.000000 >  2011-04-06 Wednesday Time (LOCAL)
/  ---- ------------------------------------------------- ----------------
   6E13 CICS Transaction TranCode=TWMU Task=170 Abend=ADCD     08.47.22.063694
__ 6E13 CICS Transaction TranCode=TWMU Task=171 Abend=DE40     08.47.36.143484
__ 6E13 CICS Transaction TranCode=TWMU Task=173 Abend=DE40     08.47.51.142989
__ 6E13 CICS Transaction TranCode=TWMU Task=174 Abend=DE40     08.48.06.140979
__ 6E13 CICS Transaction TranCode=DBEU Task=181 Abend=ADCD     08.48.42.298937
__ 6E13 CICS Transaction TranCode=DBEU Task=183 Abend=ADCD     08.48.56.165539
__ 6E13 CICS Transaction TranCode=TWMU Task=185 Abend=DE40     08.49.10.328848
__ 6E13 CICS Transaction TranCode=DBEU Task=188 Abend=ADCD     08.49.29.735139
__ 6E13 CICS Transaction TranCode=DBEU Task=189 Abend=ADCD     08.49.41.183492
__ 6E13 CICS Transaction TranCode=DBEU Task=193 Abend=ADCD     08.50.03.586072
__ 6E13 CICS Transaction TranCode=TWMU Task=201 Abend=DE40     08.50.56.233561
__ 6E13 CICS Transaction TranCode=DBEU Task=200 Abend=ADCD     08.50.50.772178
__ 6E13 CICS Transaction TranCode=TWMU Task=223 Abend=ADCD     08.55.31.495953
******************************** Bottom of Data ********************************
```

Let's track the transaction (hide all log records except those related to the transaction): enter **TX** next to the CMF record.

CICS DBCTL problem: transaction tracking

```
  File  Mode  Filter  Time  Labels  Options  Help
──────────────────────────────────────────────────────────────────────────────
BROWSE    FUNDID.SMF.D110406.DEADLOK.FULL +          Record 00007007 More: < >
Command ===>                                                 Scroll ===> PAGE
   Slice . . Duration  00.14.19     Date  2011-04-06     Time  08.41.41.519325
   Code Description  < 00.05.00.000000 >  2011-04-06 Wednesday Time (LOCAL)
/  ---- ------------------------------------------------- ----------------
__ 08   Application Start TranCode=TWMU Program=DFHTWM04        08.47.22.064705
__ 5607 Start of UOR Program=DFHTWM04 Region=0002               08.47.22.064706
__ 50   Database Update Database=DI21PART Region=0002           08.47.22.066178
__ 50   Database Update Database=DI21PART Region=0002           08.47.22.066466
__ 50   Database Update Database=DI21PART Region=0002           08.47.22.066498
__ 50   Database Update Database=DI21PART Region=0002           08.47.22.066649
__ 50   Database Update Database=DI21PART Region=0002           08.47.22.066690
__ CA52 HTRT03I JCP1FUW  REXEXPF              00    220         08.47.22.231829
__ CA52 HTRT03I JCP1FUW  UPDATE0              00     53         08.47.22.367418
__ CA52 HTRT03I JCP1FUW  DELETE0              00     36         08.47.22.515830
__ CA52 IEF404I JCP1FUW - ENDED - TIME=08.47.22                 08.47.22.519622
__ CA52 *=======================================================08.47.22.522669
__ CA52 |STEP# | STEPNAME | PROCSTEP | CONDCODE | CPUSECS | NU 08.47.22.525021
__ CA52 |=======================================================08.47.22.526151
__ CA52 |00001 | ALCMAST0 |          |   0000   |    0.03 |    08.47.22.527595
__ CA52 |00002 | FUWBAT   |          |   0000   |    0.04 |    08.47.22.528589
__ CA52 |00003 | REXEXM0  |          |   0000   |    0.12 |    08.47.22.530020
```

The log browser displays related records from the IMS log and SMF file, and also all records from the OPERLOG that are in the same time period...

CICS DBCTL problem: identifying the specific problem

```
  File  Mode  Filter  Time  Labels  Options  Help
──────────────────────────────────────────────────────────────────────────────
BROWSE    FUNDID.SMF.D110406.DEADLOK.FULL +          Record 00007297 More: < >
Command ===>                                                 Scroll ===> PAGE
   Slice . . Duration  00.14.19     Date  2011-04-06     Time  08.41.41.519325
   Code Description  < 00.05.00.000000 >  2011-04-06 Wednesday LSN
/  ---- ------------------------------------------------------ ----------------
   5930 Exception Condition SNAP - DEADLOCK                    2-00000000000F0B
__ 5938 Release Input Message after Application ABEND          2-00000000000F2F
__ 5938 FP SYNC Fail-Application Program or Pseudo ABEND       2-00000000000F30
__ 50   Database Update Database=DI21PART Region=0002          2-00000000000F31
__ 50   Database Update Database=DI21PART Region=0002          2-00000000000F32
__ 50   Database Update Database=DI21PART Region=0002          2-00000000000F33
__ 50   Database Update Database=DI21PART Region=0002          2-00000000000F34
__ 50   Database Update Database=DI21PART Region=0002          2-00000000000F35
__ 50   Database Update Database=DI21PART Region=0002          2-00000000000F36
__ 50   Database Update Database=DI21PART Region=0002          2-00000000000F37
__ 50   Database Update Database=DI21PART Region=0002          2-00000000000F38
__ 50   Database Update Database=DI21PART Region=0002          2-00000000000F39
__ 50   Database Update Database=DI21PART Region=0002          2-00000000000F3A
__ 50   Database Update Database=DI21PART Region=0002          2-00000000000F3B
__ 50   Database Update Database=DI21PART Region=0002          2-00000000000F3C
__ 50   Database Update Database=DI21PART Region=0002          2-00000000000F3D
__ 50   Database Update Database=DI21PART Region=0002          2-00000000000F3E
```

...scrolling through these related records, we can see the IMS 67FF record for the deadlock. Enter **S** next to the record to view its details.

CICS DBCTL problem: identifying the affected segment

```
  File  Menu  Format  Help
─────────────────────────────────────────────────────────────────────────────
BROWSE     FUNDID.SMF.D110406.DEADLOK.FULL +     Record 00002368 Line 00000032
Command ===> ____________________________________________ Scroll ===> CSR
Form    ===>          +     Use Form in Filter           Format ===> STD
+0080  DIPWAITR... Waiter Entry
+0080  DIPWOWU.... 00AABBB71BBB7060
+0088  DIPWRWU.... 00AABBB71BBB7060
+0090  DIPWDBMS... 'IBB1    '  DIPWWRTH... 5C          DIPWFUNC... 02
+009A  DIPWSTAT... 06          DIPWFROM... 00          DIPWDURA... 00
+009D  DIPWCLS.... 00          DIPWFLG.... 0B

+00A0  DLKDLD..... IRLM supplied UserData
+00A0  DLKDJOB.... 'FUWTCIC '  DLKDSTEP... 'FUWTCIC '
+00B0  DLKDPSB.... 'DFHTWM04'  DLKDPCBN... 'DI21PART'
+00C0  DLKDBNM.... 'DI21PART'  DLKLRPRM... 30400378    DLKLRIPM... 30400358
+00D0  DLKDCALL... 01          DLKDFLG1... 80          DLKDFLG2... 00
+00D4  DLKDMBTY... 09          DLKDRTYP... 02          DLKDPSTN... 0001
+00D8  DLKDSTCK... 9459EC803E0A41                      DLKDKYLN... +16
+00E0  DLKDKEY.... Key of Data Base record
      +0000  F0F2F9F2 F5F3F6F3 60F1F3F6 40404040   *[redacted]*

+01E0  DIPENTRY... Deadlock Information Parameter List Entry
+01E0  DIPFLAG2... C0
```

The record details show the key of the affected segment. Press F3 (Exit) to return to the list panel of log records.

CICS DBCTL problem: tagging a specific log record

```
  File  Mode  Filter  Time  Labels  Options  Help
──────────────────────────────────────────────────────────────────────────────
BROWSE    FUNDID.SMF.D110406.DEADLOK.FULL +          Record 00007297 More: < >
Command ===>                                                 Scroll ===> PAGE
   Slice . . Duration  00.14.19     Date  2011-04-06     Time  08.41.41.519325
   Code Description  < 00.05.00.000000 >  2011-04-06 Wednesday Time (LOCAL)
 / ---- ------------------------------------------------- ----------------
   67FF Exception Condition SNAP - DEADLOCK                    08.47.36.016740
        UTC=08.47.36.016343 Region=0002
        Winner: IMS=IBB1 Job/Tran=FUWTCIC  PST=0001 PSB=DFHTWM04 DMB=DI21PART
        Victim: IMS=IBB1 Job/Tran=FUWTCIC  PST=0002 PSB=DFHTWM04 DMB=DI21PART
   ------------------------------------------------------------------------
   38   Release Input Message after Application ABEND          08.47.36.019855
        Region=0002 RecToken=FUWTCIC/C79459EA853EFB03
   ------------------------------------------------------------------------
   5938 FP SYNC Fail-Application Program or Pseudo ABEND       08.47.36.030531
        UTC=08.47.36.030522 Program=DFHTWM04 Region=0002
        OrgUOWID=IBB1/C79459F7D7136603 RecToken=FUWTCIC/C79459EA853EFB03
        RegTyp=DBC DBCall=10 DBGet=4 DBUpd=6 DBWait=0
   ------------------------------------------------------------------------
   50   Database Update                                        08.47.36.047752
        UTC=08.33.00.631046 Program=DFHTWM04 Database=DI21PART RBA=00008B5E
        Region=0002 RecToken=FUWTCIC/C79459EA853EFB03
   ------------------------------------------------------------------------
```

Press F11 (Right) to switch to a view that shows more details about each record, such as the winner and loser of the deadlock. Enter **G** next to this record to “tag” (bookmark) it.

CICS DBCTL problem: tagging a specific log record

```
  File  Mode  Filter  Time  Labels  Options  Help
BROWSE    FUNDID.SMF.D110406.DEADLOK.FULL +          Record 00007297 More: < >
Command ===>                                                Scroll ===> CSR
   Slice . . Duration  00.14.19     Date  2011-04-06     Time  08.41.41.519325
   Code Description  < 00.05.00.000000 >  2011-04-06 Wednesday Time (LOCAL)
/  ---- ------------------------------------------------- ----------------
__ TAG                                                    08.47.36.016740
__ 67FF Exception Condition SNAP - DEADLOCK               08.47.36.016740
__ 38   Release Input Message after Application ABEND     08.47.36.019855
__ 5938 FP SYNC Fail-Application Program or Pseudo ABEND  08.47.36.030531
__ 50   Database Update                                   08.47.36.047752

.
.
.

__ CA52          DBD=DI21PART WITHIN PSB=DFHTWM04 SUCCESSFULLY 08.47.51.053525
__ CA52 DFS980I BACKOUT PROCESSING HAS ENDED FOR DFHTWM04 IBB1 08.47.51.056589

.
.
.
```

The tag is displayed in the log browser directly above the tagged record (with an identical time stamp). Scrolling down, you can see message DFS968I from IMS in the OPERLOG.

Scenario 1: The end

- The cause of the CICS transaction problem has been narrowed down to a deadlock in IMS
- Sufficient information about the two applications involved can now be passed on to the application developers

SMF reports

- System events or constraints can affect transaction processing
- Workbench provides reports for selected SMF record types, specifically aimed at identifying performance-related issues

System-related:

- SMF 30: Address Space activity; including CICS, IMS, DB2
- RMF 70-1: CPU usage
- RMF 76: Page data sets
- RMF 78-2: Virtual Storage
- SMF 64: VSAM data set I/O

Subsystem-related:

- SMF 33-2: APPC conversations
- SMF 88-1: System Logger
- SMF 101: DB2 accounting
- SMF 116: WebSphere MQ

SMF 101: DB2 Thread Accounting Summary report

```
DB2    Plan       ---------- Connection -----------   Thread
SSID   Name       Name     Type                        Count

DB3A   CEXTPGM    IADG     IMS MPP                        68
```

All transactions that use DB2 cut accounting records that show how DB2 performed in the application and across into DB2.

```
                                                          Start: 2010-06-24 15:27:39
                                                          End:   2010-06-24 16:44:00
Class1: Thread Time    Avg: Elapsed=70.43305  CPU= .011006          Interval:         01:16:20
                       Max: Elapsed=2045.732  CPU= .013724          Rate/sec:              < 1
Class2: In-DB2 Time    Avg: Elapsed= .015108  CPU= .006035
                       Max: Elapsed= .033537  CPU= .008234
Class3: Suspend Time   Avg: Total  = .008709  I/O= .000000  Lock/Latch= .002404  Other= .006305
                       Max: Total  = .017377  I/O= .000000  Lock/Latch= .007199  Other= .010178
Buffer Manager Summary Avg: GtPgRq=     7.0  SyPgUp=     3.0
                       Max: GtPgRq=       7  SyPgUp=       3
Locking Summary        Avg: Suspnd=      .0  DeadLk=      .0  TmeOut=      .0  MxPgLk=     1.0
                       Max: Suspnd=       0  DeadLk=       0  TmeOut=       0  MxPgLk=       1
SQL DML Query/Update   Avg: Sel=       .0  Ins=     1.0  Upd=     1.0  Del=     1.0
                       Max: Sel=        0  Ins=       1  Upd=       1  Del=       1
SQL DML 'Other'        Avg: Des=       .0  Pre=       .0  Ope=     1.0  Fet=     9.0  Clo=     1.0
                       Max: Des=        0  Pre=        0  Ope=       1  Fet=       9  Clo=       1
```

SMF 116: WebSphere MQ Accounting reports

```
MQACCT4  Printed at 10:50:30  2/03/2011  Data from 09:00:40 03/03/2010 to 09:59:52 03/03/2010


SSID: SYSB  Type: CICS     Name: CICSSYSP  Tran: TRTI      Threads:         2
  Other     Avg Count                6.0   Avg Elapsed    0.000116  Avg CPU      0.000112

  In-MQ Time (Total)      Elapsed:  0.000233   CPU:   0.000224
  In-MQ Time (Average)    Elapsed:  0.000116   CPU:   0.000112

SSID: SYSB  Type: CICS     Name: CICSSYSP  Tran: TRTL      Threads:         4

  In-MQ Time (Total)      Elapsed:         0   CPU:          0
  In-MQ Time (Average)    Elapsed:         0   CPU:          0

  Queue: APPLICATION_A_REQUEST
  QType: LOCAL    IType: NONE       GDisp: Q_MGR    QCount:         4

               Count     Elapsed      CPU      Susp Elp  JnlWrt Elp   PS Req's  PS Rd Elp   Ex
             _________  _________  _________  _________  __________  _________  _________  ___
    OPEN          15.0   0.000019   0.000009
    CLOSE         15.0   0.000002   0.000002
    INQ           15.0   0.000009   0.000008

    In-MQ Time (Total)     Elapsed: 0.001861   CPU: 0.001222
    In-MQ Time (Average)   Elapsed: 0.000465   CPU: 0.000305
```

Detailed MQ accounting can be requested to show the impact of MQ on transaction performance.

OPERLOG report: output

```
FTS3     2011096 08.41.42.57 STC36951  DFS2484I JOBNAME=IBB1#ARC
                                                 GENERATED BY LOG AUTOMATIC ARCHIVING IBB1
FTS2     2011096 08.41.48.71 STC37128  DFS058I 08:41:48 START COMMAND IN PROGRESS   ICDZ
FTS2     2011096 08.41.49.80 STC37128  DFS551I IFP  REGION ICDZIFP1 STARTED
                                                 ID=00001 TIME=0841  ICDZ
FTS2     2011096 08.41.49.89 STC37128  DFS551I MESSAGE REGION ICDZMPP1 STARTED
                                                 ID=00002 TIME=0841 CLASS=001,000,000,000 ICDZ
FTS2     2011096 08.41.52.04 STC37128  DFS551I IFP  REGION ICDZIFP3 STARTED
                                                 ID=00003 TIME=0841  ICDZ
FTS3     2011096 08.47.36.05 STC36951  DFS554A FUWTCIC  00002 FUWTCIC  DFHTWM04(3)
                                                 000,0777   2011/096  8:47:36
                                                 RTKN=FUWTCIC C79459EA853EFB03 IBB1
FTS3     2011096 08.47.51.05 STC36951  DFS968I  DBD=DI21PART WITHIN PSB=DFHTWM04
                                                 SUCCESSFULLY BACKED OUT IBB1
FTS3     2011096 08.47.51.05 STC36951  DFS980I BACKOUT PROCESSING HAS ENDED FOR DFHTWM04 IBB1
```

From the previous JCL request, it is simple to identify the IMS subsystem messages associated with the transaction failure.

Summary: Transaction Analysis Workbench

- Companion to the popular IMS and CICS Performance Analyzer tools, allowing systems programmers to look outside of IMS and CICS for the source of problems
- Exploits the wealth of system performance and activity information available in SMF, OPERLOG, and event traces
- Allows medium-skilled analysts to perform expert analysis of their enterprise

More information

- IBM DB2 and IMS Tools website: http://www.ibm.com/software/data/db2imstools/
- IBM Transaction Analysis Workbench for z/OS: http://www-01.ibm.com/software/data/db2imstools/imstools/trans-analysis/
- Jim Martin, US Representative, Fundi Software: jim_martin@fundi.com.au

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