



Introducing IBM Transaction Analysis Workbench for z/OS

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Agenda

Introduction

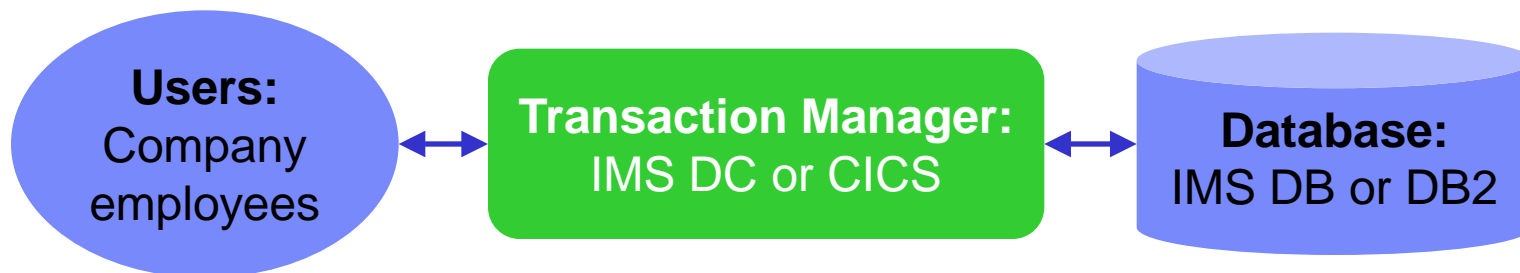
Overview of the ISPF dialog

Scenario: CICS DB2 problem

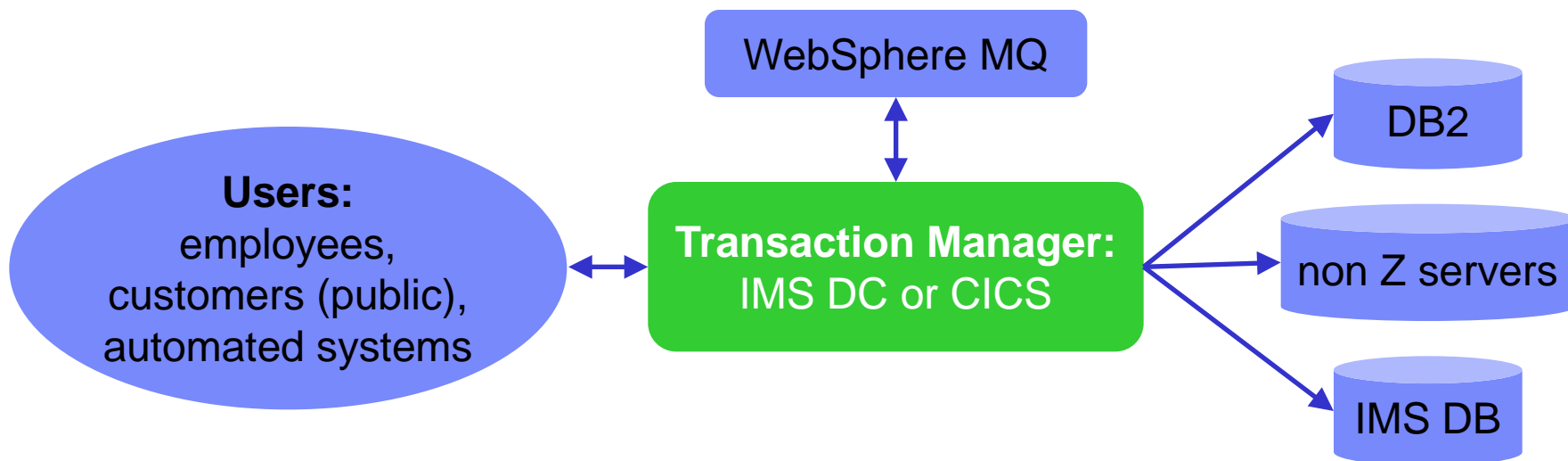
Batch SMF and OPERLOG reports

It's all about evolution

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

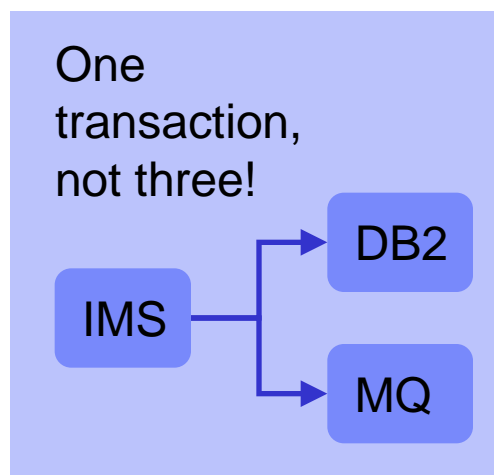
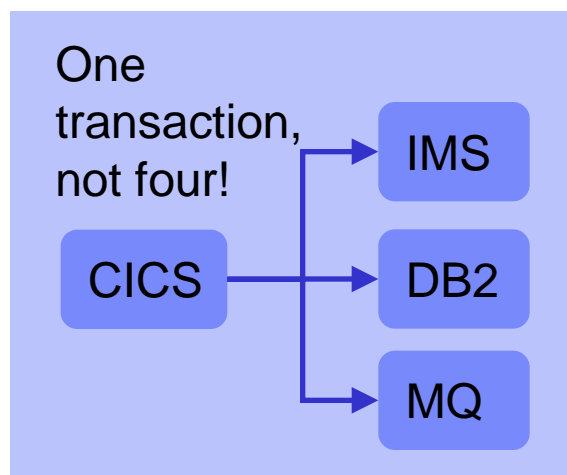
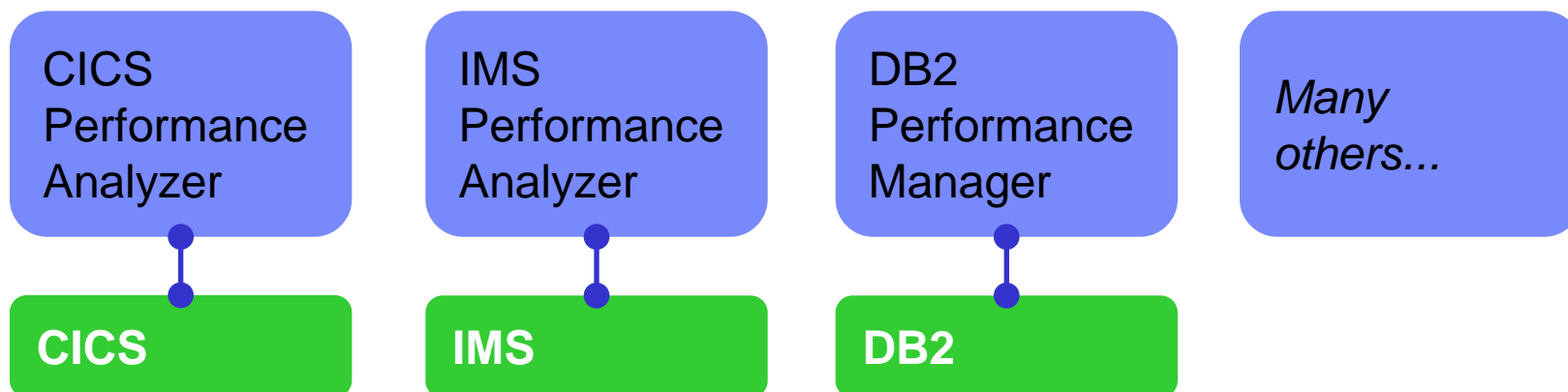


2011: users are customers; data is complex, often distributed



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 overview

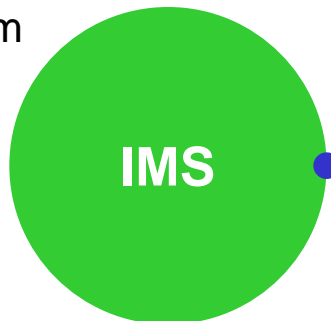
- A transaction analysis framework for System z
 - Not transaction manager specific
 - Leverages current IBM tools for transaction analysis
- Not IMS or CICS specific, but first release provides more synergy with the existing tools for those transaction managers
- Automates collection of data needed for problem analysis
- 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

Product goals

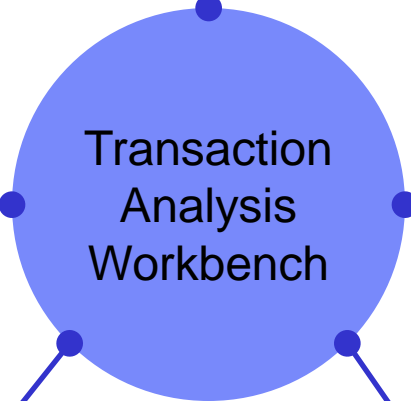
- Enable higher productivity by lower skilled staff, reduce problem analysis time, and serve as a training tool for new support staff
- Allow the “first responder” to determine the most likely source of the problem so that the right subject matter expert can work on the problem
- Allow for “deep dive” problem determination via synergy with other IBM tools
 - Create a ‘common’ approach to transaction problem resolution
 - Increase the degree and ease of collaboration in problem resolution

Supported logs

IMS log
 IMS transaction index
 IMS monitor and DB monitor
 IMS Connect event data
 CQS log stream



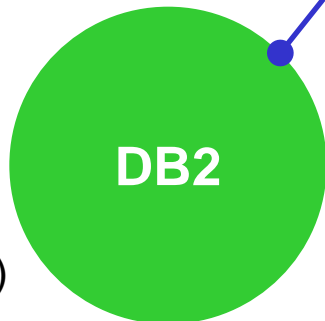
Selected SMF record types (in either log streams or data sets)
 OPERLOG (log stream)



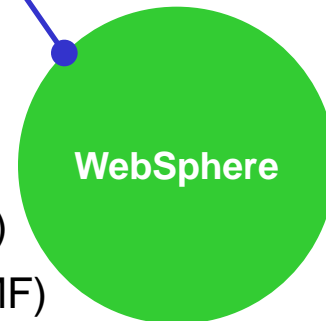
CMF performance (SMF)



DB2 log
 Accounting (SMF)
 Performance (SMF)



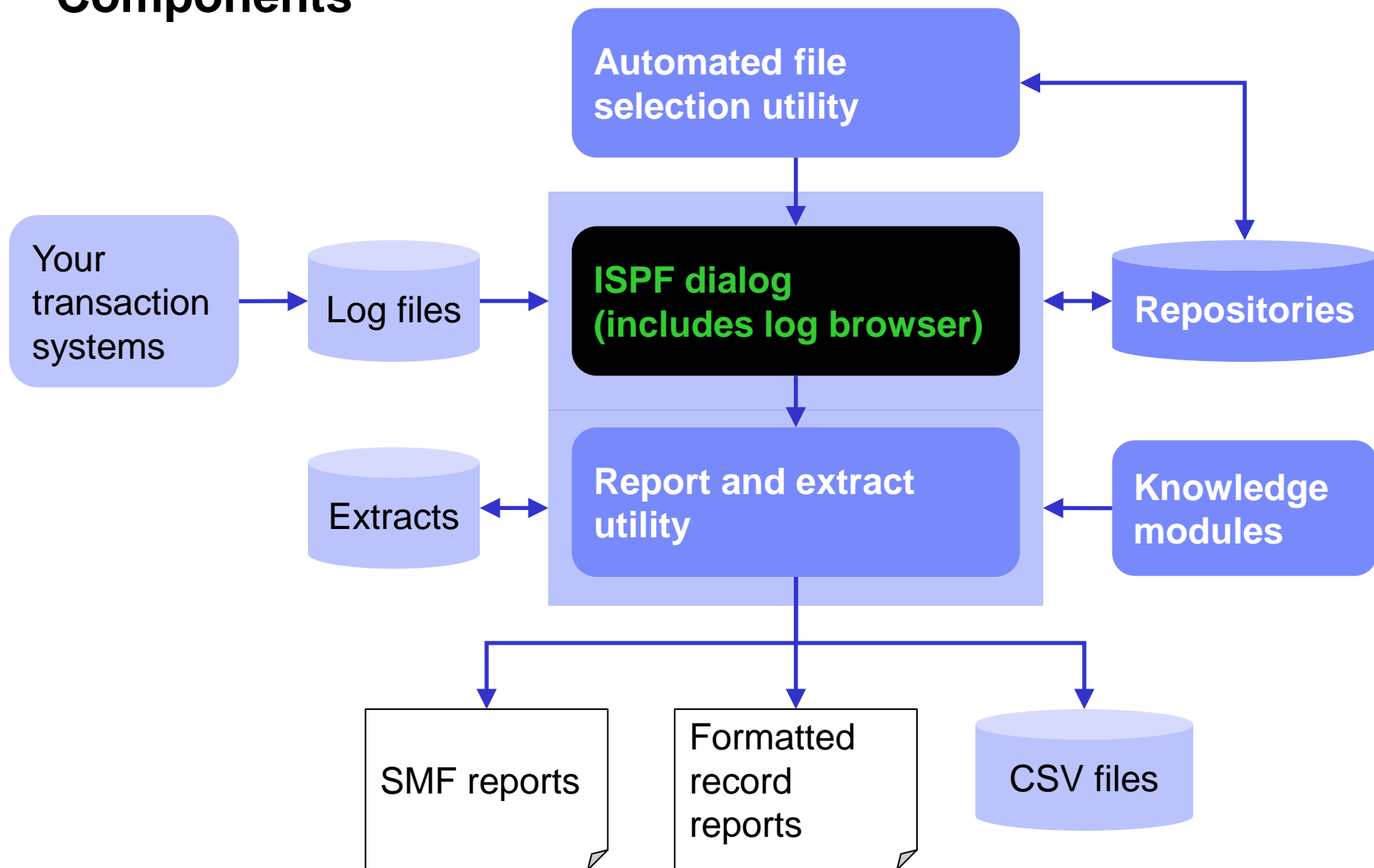
WebSphere log extract
 Statistics (SMF)
 Accounting (SMF)



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

Components



Overview of the ISPF dialog: main menu

File Help

V1R1M0 Transaction Analysis Workbench - Primary Option Menu

Option ===> 0

- 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 +

Option 0 **Profile** contains settings for the current user.

Scenario: CICS DB2 problem

- On the following slides, we present another example scenario: a user has reported an abend in a CICS transaction

CICS DB2 problem: creating a session

```

File  Help
-----
                                Problem Details                                Row 1 to 2 of 2
Command ==> _____ Scroll ==> PAGE

Key . . . . . : 00000045
Summary . . . . : CICS transaction abend DB40      Description...
Severity . . . . : 1
Reference . . . . : CICS-16272      — When problem occurred —
Reported by . . . : John              YYYY-MM-DD  HH.MM.SS.TH
Assigned to . . . : Jim                From 2011-04-29 15.40.00.00
Status . . . . . : OPEN                To    2011-04-29 15.45.00.00  Zone . . LOCAL

Systems where problem occurred (maximum of 32):

/  System +  Type +
___ FUWTCIC  CICS
___ DBA3     DB2
***** Bottom of data *****

```

Create a session (main menu ► option 1 **Sessions** ► **NEW**).

CICS DB2 problem: adding log files

File Help

Session 00000045

Option ==>

Summary . . : CICS transaction abend DB40

- | | | |
|---|-------------|--|
| 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 2 **Files**.

CICS DB2 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 2011-04-29 15.40.00.00
                                       To   2011-04-29 15.45.00.00

Log Files:

/      Data Set Name                                     Name      System      File
_____ FUNDIR.SMF.D110429.CICSDB2.FULL                FTS3       IMAGE       SMF
_____ DSNDB2A.DBA3.ARCLG1.A0000034                   DB3A       DB2         LOG
***** Bottom of data *****

```

We've manually added the associated SMF file to the session; we've used automated file selection to add the DB2 log.

CICS DB2 problem: CICS PA reporting

```

File  Help
-----
                                Reporting - CICS Transaction Analysis
Command ==> _____

Type of analysis:
/ Individual transaction detail
/ Transaction statistical summary
/ 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.D110429.CICSDB2.FULL' _____ +

                                Report Interval
                                YYYY-MM-DD  HH.MM.SS.TH
From _____
To   _____

```

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

CICS DB2 problem: CICS PA reporting

V3R2M0

CICS Performance Analyzer
Performance List

LIST0001 Printed at 14:40:40 5/03/2011 Data from 15:29:50 4/29/2011

Transaction details: Response time and CPU

Start Time	APPLID	Tran	SC	Term	Userid	RSID	Program	TaskNo	Response Time	Dispatch Time
15:42:23.3905	FUWTCIC	TWMU	TO	CP13	TWM1		TWM\$UPD	164	.0394	.0353
15:42:24.9909	FUWTCIC	DB2U	TO	CP14	TWM		TWM\$UPD	165	.0545	.0500
15:42:30.6702	FUWTCIC	TWMU	TO	CP13	TWM1		TWM\$UPD	166	.1280	.1182
15:43:14.3336	FUWTCIC	TWMU	TO	CP13	TWM1		TWM\$UPD	168	3.4167	3.3130
15:43:13.9496	FUWTCIC	DB2U	TO	CP14	TWM		TWM\$UPD	167	9.8728	1.3573

User	CPU Time	Suspend Time	Dispwait Time	FC Wait Time	ABcu
	.0214	.0041	.0035	.0000	
	.0236	.0046	.0046	.0000	
	.0822	.0098	.0105	.0000	
	.0413	.1037	.0024	.0000	DB40
	.0391	8.5155	.0028	.0000	

CICS DB2 problem: CICS PA reporting

V3R2M0 CICS Performance Analyzer
Performance List

LIST0004 Printed at 14:40:40 5/03/2011 Data from 15:29:50 4/29/2011

Transaction details: DB2

Start Time	APPLID	Tran	Program	TaskNo	Response Time	Dispatch Time	User CPU Time	DB2 Reqs
15:42:23.3905	FUWTCIC	TWMU	TWM\$UPD	164	.0394	.0353	.0214	27
15:42:24.9909	FUWTCIC	DB2U	TWM\$UPD	165	.0545	.0500	.0236	27
15:42:30.6702	FUWTCIC	TWMU	TWM\$UPD	166	.1280	.1182	.0822	133
15:43:14.3336	FUWTCIC	TWMU	TWM\$UPD	168	3.4167	3.3130	.0413	17
15:43:13.9496	FUWTCIC	DB2U	TWM\$UPD	167	9.8728	1.3573	.0391	52

RMI Time	Elap Time	RMI Susp Time	Suspend Time	ABcu
.0316	.0439	.0000	.0041	
.1016	.0000	.0000	.0098	
3.2237	.0393	.0000	.1037	DB40
1.3498	.0001	.0000	8.5155	

CICS DB2 problem: interactive investigation

```

File  Menu  Time Slicing  Help
-----
Investigate                                     Row 1 of 2 More: < >
Command ==> _____ Scroll ==> PAGE

Time Slice (ON)
Time      Date      Duration  Zone  Filter +
HH.MM.SS.thmiju  YYYY-MM-DD  HH.MM.SS  LOCAL
15.43.14.000000  2011-04-29  00.10.00

/s
Type  Start Time      Date      Duration  Coverage
SMF   15.30.00.390000  2011-04-29 Fri  00.44.59  COMPLETE
DB2   15.15.15.477696  2011-04-29 Fri  01.02.53  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 DB2 problem: interactive investigation

```

File  Mode  Filter  Time  Labels  Options  Help
-----
BROWSE    FUNDID.SMF.D110429.CICSDB2.FULL +      Record 00000462 More: < >
Command ==> filter                        Scroll ==> CSR
Slice . . Duration 00.10.00 Date 2011-04-29 Time 15.43.14.000000
Code Description < 00.05.00.000000 > 2011-04-29 Friday Time (LOCAL)
/ -----
___ 66  DB2 Performance 086 Signon entry SSID=DBA3 SYSID=FTS3 15.43.14.335003
___ 66  DB2 Performance 072 Create thread entry 15.43.14.335150
___ 66  DB2 Performance 021 Lock detail SSID=DBA3 SYSID=FTS3 15.43.14.335687
___ 66  DB2 Performance 112 Successful plan allocation(allied) 15.43.14.336112
___ 66  DB2 Performance 073 Create thread exit 15.43.14.336211
___ 66  DB2 Performance 122 Thread level exit from DB2 15.43.14.336269
___ 66  DB2 Performance 121 Thread level entry into DB2 15.43.14.336329
___ 66  DB2 Performance 044 IRLM suspend entry 15.43.14.336566
___ 66  DB2 Performance 093 Suspend SSID=DBA3 SYSID=FTS3 15.43.14.336629
___ 66  DB2 Performance 094 Resume SSID=DBA3 SYSID=FTS3 15.43.14.337778
___ 66  DB2 Performance 045 IRLM suspend exit 15.43.14.337837
___ 66  DB2 Performance 021 Lock detail SSID=DBA3 SYSID=FTS3 15.43.14.337887
___ 66  DB2 Performance 177 Successful package allocation 15.43.14.338027
___ 66  DB2 Performance 065 SQL open cursor 15.43.14.338354
___ 66  DB2 Performance 058 SQL call completion 15.43.14.338543
___ 66  DB2 Performance 122 Thread level exit from DB2 15.43.14.338598
___ 66  DB2 Performance 121 Thread level entry into DB2 15.43.14.338939

```

Let's use a filter to locate the CMF record for the abending CICS transaction.

CICS DB2 problem: defining a filter

```

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 : . . : Find abending transactions _____ _ Activate Tracking

/ Log Code + Exc Description
s CMF 6E13      CICS Transaction
                Level 1 Conditions No Form _____ + REXX _____
-----
***** Bottom of data *****

```

Define a filter for CMF records (log code 6E13)...

CICS DB2 problem: defining a filter

```

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             EQ  DB40
*****
***** Bottom of data *****

```

...with the reported abend code. Then press F3 (Exit) to return to the log browser...

CICS DB2 problem: tagging a record

```

File  Mode  Filter  Time  Labels  Options  Help
-----
BROWSE  FUNDIR.SMF.D110429.CICSDB2.FULL +          Record 00000690 More: < >
Command ==>                               Scroll ==> CSR
Slice . . Duration 00.10.00 Date 2011-04-29 Time 15.43.14.000000
Code Description < 00.05.00.000000 > 2011-04-29 Friday Time (LOCAL)
-----
/
g 6E13 CICS Transaction                               15.43.14.333665
TranCode=TWMU Program=TWM$UPD Userid=TWM1 LTerm=SC0TCP13 Terminal=CP13
RecToken=FUWTCIC/C7B1A1C77C91A063 Resp=3.416706 CPU=0.041252 DB2=17
Task=168 Abend=DB40
-----
***** Bottom of Data *****

```

The log browser displays the CMF record. Enter **G** to tag (“bookmark”) it, and then enter a description for the tag, so that we (or other users) can easily return to it later.

CICS DB2 problem: transaction tracking

```

File  Mode  Filter  Time  Labels  Options  Help
-----
BROWSE    FUNDIR.SMF.D110429.CICSDB2.FULL +          Record 00001017 More: < >
Command ==>                               Scroll ==> PAGE
Slice . . Duration 00.10.00   Date 2011-04-29   Time 15.43.14.390000
Code Description < 00.05.00.000000 > 2011-04-29 Friday   Time (LOCAL)
/
--- TAG  Problem transaction that abended-probable DB2 deadlock 15.43.14.333665
-----
tx 6E13 CICS Transaction                               15.43.14.333665
    TranCode=TWMU Program=TWM$UPD Userid=TWM1 LTerm=SC0TCP13 Terminal=CP13
    RecToken=FUWTCIC/C7B1A1C77C91A063 Resp=3.416706 CPU=0.041252 DB2=17
    Task=168 Abend=DB40
-----
***** Bottom of Data *****

```

Now let's track the related records. Enter **TX** next to the CMF record.

CICS DB2 problem: transaction tracking

```

File  Mode  Filter  Time  Labels  Options  Help
-----
BROWSE      FUNDID.SMF.D110429.CICSDB2.FULL +          Record 00000464 More: < >
Command ==>                               Scroll ==> CSR
  Slice . . Duration 00.10.00   Date 2011-04-29   Time 15.43.14.000000
  Code Description < 00.05.00.000000 > 2011-04-29 Friday   Time (Relative)
/-----
 66 DB2 Performance 021 Lock detail SSID=DBA3 SYSID=FTS3      +0.002021
 66 DB2 Performance 112 Successful plan allocation(allied)  +0.002446
 66 DB2 Performance 073 Create thread exit                  +0.002545
 66 DB2 Performance 122 Thread level exit from DB2         +0.002604
 66 DB2 Performance 121 Thread level entry into DB2        +0.002663
 66 DB2 Performance 044 IRLM suspend entry                  +0.002901
 66 DB2 Performance 093 Suspend SSID=DBA3 SYSID=FTS3       +0.002964
 66 DB2 Performance 094 Resume SSID=DBA3 SYSID=FTS3        +0.004113
 66 DB2 Performance 045 IRLM suspend exit                   +0.004172
 66 DB2 Performance 021 Lock detail SSID=DBA3 SYSID=FTS3   +0.004222
 66 DB2 Performance 177 Successful package allocation       +0.004361
 66 DB2 Performance 065 SQL open cursor                     +0.004689
 66 DB2 Performance 058 SQL call completion                 +0.004877
 66 DB2 Performance 122 Thread level exit from DB2         +0.004932
 66 DB2 Performance 121 Thread level entry into DB2        +0.005273
 66 DB2 Performance 059 SQL fetch SSID=DBA3 SYSID=FTS3     +0.005392
 66 DB2 Performance 061 SQL del/insert/update              +0.012133

```

(We also entered **R** next to the CMF record to show times relative to the start of the CICS transaction.) Log code 66 indicates DB2 performance records (in decimal, SMF 102).

CICS DB2 problem: transaction tracking

```

File  Mode  Filter  Time  Labels  Options  Help
-----
BROWSE      FUNDID.SMF.D110429.CICSDB2.FULL +          Record 00000488 More: < >
Command ==>                               Scroll ==> CSR
  Slice . . Duration 00.10.00   Date 2011-04-29   Time 15.43.14.000000
  Code Description < 00.05.00.000000 > 2011-04-29 Friday   Time (Relative)
/-----
___ 66   DB2 Performance 211 Make/release/change claim request      +0.012275
___ 66   DB2 Performance 021 Lock detail SSID=DBA3 SYSID=FTS3      +0.012341
___ 0020 DB2 Unit of Recovery Control - Begin UR                    +0.012494
___ 0020 DB2 Update In-Place in a Data Page                       +0.012510
___ 66   DB2 Performance 058 SQL call completion                  +0.012626
___ 66   DB2 Performance 122 Thread level exit from DB2          +0.012679
___ 66   DB2 Performance 121 Thread level entry into DB2         +0.012826
___ 66   DB2 Performance 066 SQL close cursor                     +0.012898
___ 66   DB2 Performance 018 Exit from OSET, SRT1, or RNXT       +0.012953
___ 66   DB2 Performance 058 SQL call completion                  +0.013045
___ 66   DB2 Performance 122 Thread level exit from DB2          +0.013085
___ 66   DB2 Performance 121 Thread level entry into DB2         +0.013249
___ 66   DB2 Performance 061 SQL del/insert/update                +0.013403
___ 0010 DB2 Savepoint                                             +0.013486
___ 66   DB2 Performance 017 Seq/Workfile scan (RNXT) entry      +0.013518
___ 66   DB2 Performance 223 Commit_LSN detail record            +0.013597
___ 66   DB2 Performance 021 Lock detail SSID=DBA3 SYSID=FTS3    +0.014067

```

Scrolling through the records, we see the DB2 log (0010 and 0020) records describing DB2 activity interspersed with the DB2 performance SMF records (66)...

CICS DB2 problem: detailed analysis

```

File  Mode  Filter  Time  Labels  Options  Help
-----
BROWSE      FUNDID.SMF.D110429.CICSDB2.FULL +          Record 00000512 More: < >
Command ==>                               Scroll ==> CSR
Slice . . Duration 00.10.00 Date 2011-04-29 Time 15.43.14.000000
Code Description < 00.05.00.000000 > 2011-04-29 Friday Time (Relative)
/-----
___ 66  DB2 Performance 021 Lock detail SSID=DBA3 SYSID=FTS3          +0.014129
___ 0020 DB2 Delete from a Data Page                                +0.014190
___ 66  DB2 Performance 044 IRLM suspend entry                    +0.014239
___ 66  DB2 Performance 093 Suspend SSID=DBA3 SYSID=FTS3          +0.014285
___ 66  DB2 Performance 094 Resume SSID=DBA3 SYSID=FTS3          +3.018812
___ 66  DB2 Performance 045 IRLM suspend exit                    +3.018924
___ s 66  DB2 Performance 172 Deadlock data SSID=DBA3 SYSID=FTS3  +3.028649
___ 0010 DB2 Diagnostic Record                                     +3.089118
___ 66  DB2 Performance 122 Thread level exit from DB2           +3.172309
___ 66  DB2 Performance 121 Thread level entry into DB2          +3.174172
___ 66  DB2 Performance 068 Abort entry SSID=DBA3 SYSID=FTS3     +3.174277
___ 66  DB2 Performance 046 Synchronous EU switch                +3.174359
___ 66  DB2 Performance 093 Suspend SSID=DBA3 SYSID=FTS3        +3.174413
___ 66  DB2 Performance 047 EU switch SRB entry                  +3.174496
___ 0020 DB2 Unit of Recovery Control - Begin Abort              +3.174670
___ 66  DB2 Performance 032 Begin wait for log manager           +3.174712
___ 0020 DB2 Update In-Place in a Data Page                     +3.179022

```

Notice the sudden jump in the time stamps following the “Delete...” activity (0020 record). Let’s select the subsequent “Deadlock data” performance trace record.

CICS DB2 problem: deadlock details

```

File  Menu  Format  Help
-----
BROWSE      FUNDID.SMF.D110429.CICSDB2.FULL +      Record 00000558 Line 00000032
Command ==> _____ Scroll ==> CSR
Form ==> _____ + Use Form in Filter Format ==> STD

+0114 QW0172HB... Holder
+0114 QW0172HB... 'TWM' ' QW0172HC... ' ' QW0172HJ... ' '
+014C QW0172HK... ' ' QW0172H9... 00000000
+0162 QW0172HQ... Holders package/DBRM name
+0162 QW0172Q1... 'TWM$UPD' ' QW0172Q2... 'TWM$UPD '
+017C QW0172Q3... ' ' QW0172Q4... 18BCFE730734BC9D
+01A4 QW0172WB... Waiter
+01A4 QW0172WB... 'TWM1' ' QW0172WC... ' ' QW0172WJ... ' '
+01DC QW0172WK... ' ' QW0172W9... 00000000
+01F2 QW0172WQ... Waiters package/DBRM name
+01F2 QW0172Q5... 'TWM$UPD' ' QW0172Q6... 'TWM$UPD '
+020C QW0172Q7... ' ' QW0172Q8... 18BCFE730734BC9D

+0424 QWHS..... Product Section
+0424 QWHSLEN.... 0052 QWHSTYP.... 01 QWHSRMID... +20
+0428 QWHSIID.... +172 QWHSNSDA... +3 QWHSRN..... 91
+042C QWHSACE.... 1CB70A48 QWHSSSID... 'DBA3'
+0434 QWHSSTCK... C7B1A1C75968B043 QWHSISEQ... 00000001
+0440 QWHSWSEQ... 0003C4BD QWHSMTN.... 00000005

```

...holder, and various other related information.

CICS DB2 problem: delete details

```

File  Menu  Format  Help
-----
BROWSE      FUNDIR.SMF.D110429.CICSDB2.FULL +      Record 00000471 Line 00000000
Command ==> _____ Scroll ==> CSR
Form ==> _____ + Use Form in Filter      Format ==> STD
***** Top of data *****
+0004 Code... 0020 DB2 Delete from a Data Page
+001E STCK... C7B1A1C479750000 LSN... 00000000419DAB10
      Date... 2011-04-29 Friday      Time... 15.43.14.347856.000

...
+000A LRHURID.... 0000419DA9FF

...
+0026 LRHDBHDR... Database identification
+0027 LRHDBID.... 0110          LRHPSID.... 0002          LRHDFLAG... 40

+0038 LRHUPDTH... Update information
      LRHACTN.... 'Delete'
      LRHDDESC... 'Full user row delete (UNDO)

+0040 LRHUPDTE... Update data
+0040 LRHRHDR.... Row Header
      +0000 02003600 000D          *.....*

+0046 LRHRDATA... Row Data
      +0000 C9F2F200 F0F0F0F1 F0F0C5F0 F100E3E6 *I22.000100E01.TW*
      +0010 D45BE4D7 C440F140 4D404040 5D400020 *M$UPD 1 ( ) ..*
      +0020 C2D9C1D5 C3C840D6 C6C6C9C3 C540C9F2 *BRANCH OFFICE I2*

```

Similarly, we can select the 0020 “Delete...” record to view its details...

CICS DB2 problem: Unit of Recovery Backout

```

File  Mode  Filter  Time  Labels  Options  Help
-----
BROWSE    FUNDIR.SMF.D110429.CICSDB2.FULL +          Record 00000512 More: < >
Command ==>                               Scroll ==> PAGE
Slice . . Duration 00.10.00 Date 2011-04-29 Time 15.43.14.390000
Code Description < 00.05.00.000000 > 2011-04-29 Friday Time (Relative)
/ -----
...

0020 DB2 Delete from a Data Page                +0.014190
      DBID=0110 PSID=0002 URID=0000419DA9FF
-----
...

0020 DB2 Unit of Recovery Control - Begin Abort  +3.174670
      URID=0000419DA9FF
-----
...

```

Press F11 (Right) to expand the records over multiple lines. We can see that the “Delete...” URID matches the “Abort”.

CICS DB2 problem: interactive investigation

```

File  Mode  Filter  Time  Labels  Options  Help
-----
BROWSE      FUNDID.SMF.D110429.CICSDB2.FULL +          Record 00000526 More: < >
Command ==>                               Scroll ==> CSR
Slice . . Duration 00.10.00 Date 2011-04-29 Time 15.43.14.000000
Code Description < 00.05.00.000000 > 2011-04-29 Friday Time (Relative)
/ -----
___ 66 DB2 Performance 211 Make/release/change claim request +3.179175
___ 66 DB2 Performance 020 Lock summary SSID=DBA3 SYSID=FTS3 +3.179436
___ 66 DB2 Performance 218 Commit_LSN summary record +3.179475
___ 0020 DB2 Unit of Recovery Control - End Abort +3.179518
___ 66 DB2 Performance 032 Begin wait for log manager +3.179550
___ 66 DB2 Performance 093 Suspend SSID=DBA3 SYSID=FTS3 +3.179600
___ 66 DB2 Performance 094 Resume SSID=DBA3 SYSID=FTS3 +3.182640
___ 66 DB2 Performance 033 End wait for log manager +3.182683
___ 66 DB2 Performance 074 Terminate thread entry +3.183267
___ 66 DB2 Performance 067 Accounting collection beginning +3.184071
___ 65 DB2 Accounting 003 +3.184348
Userid=TWM1 CPU1=00.013704 CPU2=00.011367 I/O3=00.000000 Source=CICS
GtPgRq=6 SyPgUp=4 Suspnd=1 DeadLk=1 TimOut=0 MxPgLk=1
Sel=0 Ins=0 Upd=1 Del=1 LUWID=FTS3/DBA3LU/C7B1A1C4765D/0001

___ 66 DB2 Performance 046 Synchronous EU switch +3.184441
___ 66 DB2 Performance 093 Suspend SSID=DBA3 SYSID=FTS3 +3.184513

```

Finally, the DB2 accounting record shows a deadlock count of 1.

Related possible future feature: DB2 PE integration

- You can currently use Workbench to generate CICS Performance Analyzer or IMS Performance Analyzer reports
- Future updates to Workbench might include a similar ability to generate reports from other tools, such as DB2 Performance Expert...

Sample report: DB2 Performance Expert

---	L O C K	R E S O U R C E	---	TOTAL	LOCAL	GLOB.	S.NFY
TYPE	NAME			SUSPENDS	LATCH	IRLMQ	OTHER
PART SPL	DB =272			4	0	4	0
	OB =2				0	0	0
ROW	DB =SANDBOX			1	1	0	0
	OB =FUNDEPT				0	0	0
	PAGE=X'00000002' ROW =X'0E'						
ROW	DB =SANDBOX			4	0	0	0
	OB =FUNDEPT				4	0	0
	PAGE=X'00000002' ROW =X'01'						

----	NORMAL	----	TIMEOUT/CANCEL	----	DEADLOCK	----
NMBR	AET	NMBR	AET	NMBR	AET	
4	0.001873	0	N/C	0	N/C	
0	N/C	0	N/C	1	3.004685	
4	0.000459	0	N/C	0	N/C	



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 64: VSAM Data Set report

Close Date	Time	Data set name	--Splits--		
			CA	CI	Ext
2011-02-02	16:00:01	FUNDIP.OME.FTS1MVS.RKM2EDS3.DATA	5	17	1
2011-02-02	16:00:01	FUNDIP.OME.FTS1MVS.RKM2EDS3.INDEX	0	5	1
2011-02-02	16:00:01	FUNDIP.OME.FTS1MVS.RKM2EDS3.DATA	5	18	1
2011-02-02	16:00:01	FUNDIP.OME.FTS1MVS.RKM2EDS3.INDEX	0	5	1
2011-02-02	16:00:32	FUNDIP.OME.FTS1MVS.RKM2EDS3.DATA	5	19	1
2011-02-02	16:00:32	FUNDIP.OME.FTS1MVS.RKM2EDS3.INDEX	0	5	1
2011-02-02	16:00:55	FUNDIP.ANF.QUEUE.DATA	0	0	1
2011-02-02	16:00:55	FUNDIP.ANF.QUEUE.INDEX	0	0	1

VSAM data sets are commonly used as databases in IMS and CICS.

As these data sets are re-opened (or extend), information about their I/O activity and general health (splits) is available.

EXCPs	-----Calls-----				-RLS Activity-		
	Get	Upd	Del	Ins	LSR	CF	DASD
3322	13	1	0	1314	0	0	0
1796	0	259	0	0	0	0	0
3378	13	1	0	1340	0	0	0
1850	0	261	0	0	0	0	0
3436	13	1	0	1353	0	0	0
1902	0	275	0	0	0	0	0
3754685	23K	8658	4353	1602	0	0	0
3739616	13	0	0	0	0	0	0

SMF 70-1: RMF Processor Activity report

- Interval Start --	System	- %CPU Busy -	IO	
Date Time	Name	LPAR MVS	Rate	
2010-08-17 23:45:00	FTS1	68.75	87.42	2282.4
	FTS2	4.07	4.50	9.4
	FTS3	4.03	4.39	12.6
2010-08-18 00:00:00	FTS1	61.15	72.16	1934.8
	FTS2	4.15	4.72	8.4
	FTS3	3.88	4.41	11.7

CPU constraints are one of the most common causes of a slowdown in performance, and often has flow-on effects including contention.

CPU Busy and **IO Rate** are the classical system performance indicators.

Look for spikes that might indicate a slowdown.

Number of Address Spaces								
In		-In Ready-		-Out Ready-		-Out Wait-		
Avg	Max	Avg	Max	Avg	Max	Avg	Max	
151	156	7	86	0	1	0	0	
77	80	1	15	0	0	0	0	
69	72	1	9	0	0	0	0	

Out Ready identifies the number of address spaces waiting for dispatching on the CPU

SMF 79-15: IRLM Long Lock Detection report

Time	Cycle Number	Entry Type	IMS ID	Trancode	PSBname	PST	Reg Typ	Duration	Max Locks
08:51:47.440	25853771	Wait	ISA2	CI1CSAC3	PCM0F0	49		11.534336	0
08:51:47.440	25853771	Block	ISA3	CI1ESAE1	PCM0F0	127		111.149056	44
08:54:36.250	25854107	Wait	ISA3	CI1ESAE5	PCM0F0	102		11.534336	0
08:54:36.250	25854107	Block	ISA4	CI1FSAF3	PCM0F0	40		98.566144	44
15:25:31.580	25900783	Wait	ISA1	CI1ASAA2	PRE0F0	90		11.534336	26
15:25:31.580	25900783	Block	ISA1	CI1ASAA1	PSA0F0	60		11.534336	2

IMS database locks that are held by transactions for an extended period (several seconds) are logged to SMF; and can be analyzed to determine if there is an application problem.

Recovery Token	Resource	CICS Task
CI1CSAC3/C5BF632F08B62783	HNMTRM01	00088603
CI1ESAE1/C5BF62D0456F8085		00036462
CI1ESAE5/C5BF63D077B36503	HNMTRM01	00088040
CI1FSAF3/C5BF637DEF1A2001		00032398
CI1ASAA2/C5BFBB316C472003	SHSECN08	00013029
CI1ASAA1/C5BFBB3166E1F584		00048273

SMF 88-1: System Logger Log Stream Summary report

Logstream name	MVSID	Structure name	Group
STC@CICS.CICSPR1.DFHLOG	FTS1	*DASDONLY*	
----- IXGWrites -----			
	Count	Total Bytes	Average Bytes
	-----	-----	-----
Total	29862	19177K	642
Rate(/Sec)	0	5	35
Minimum	0	0	0
Maximum	1322	862741	5480448

CICS and IMS both rely on log streams for critical services; including message handling and journaling.

Problems can be avoided by monitoring their I/O and offload activity.

First interval start	Last interval stop	Total Interval
14:30:00.00 3/04/2011	16:00:00.00 4/14/2011	0985:30:00

----- DELETIONS -----			
Count	Count	Bytes	Bytes
With	Without	After	Int Stor
DASD	DASD	Offload	w/o DASD
Write	Write	w. DASD	Write
-----	-----	-----	-----
24950	4075	102547K	16691K
0	0	29	5
0	0	0	0
1685	839	7032832	3436544

SMF 101: DB2 Thread Accounting Summary report

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

DB2 SSID	Plan Name	----- Connection Name	----- Type	Thread Count
DB3A	CEXTPGM	IADG	IMS MPP	68

										Start: 2010-06-24 15:27:39
										End: 2010-06-24 16:44:00
										Interval: 01:16:20
										Rate/sec: < 1
Class1: Thread Time	Avg: Elapsed=70.43305	CPU= .011006								
	Max: Elapsed=2045.732	CPU= .013724								
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/>
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