



# Analyzing CICS function shipping applications using Transaction Analysis Workbench

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# Agenda

**Introduction**

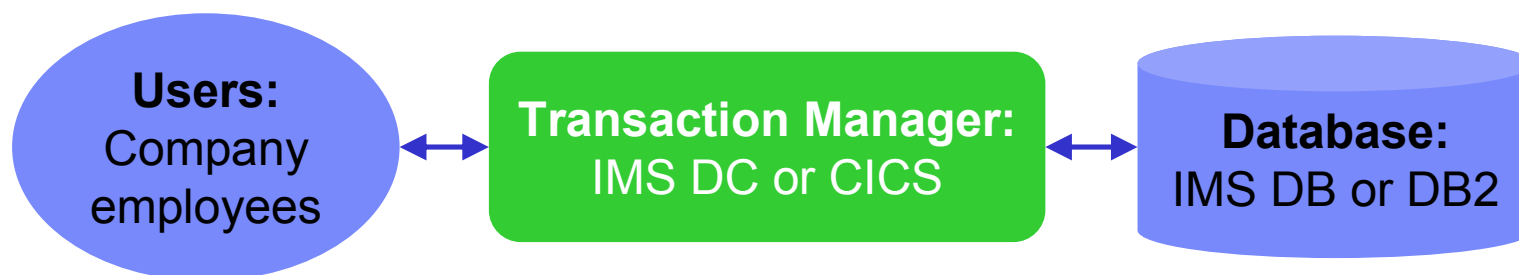
**Overview of the ISPF dialog**

**Scenario: CICS MRO problem**

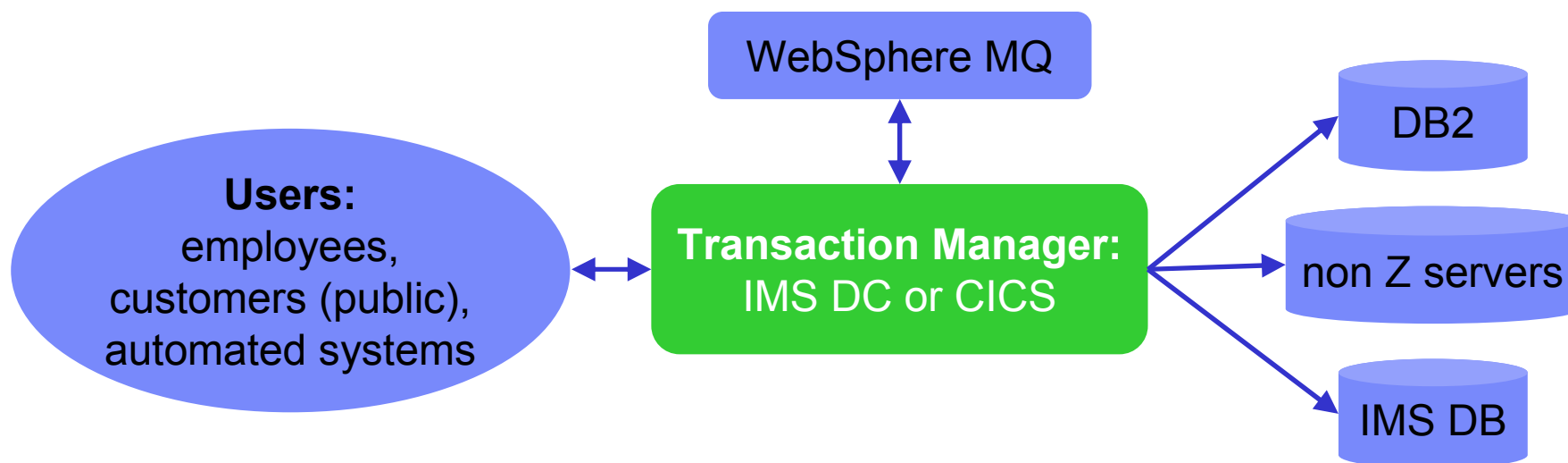
**Batch SMF and OPERLOG reports**

## It's all about evolution

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

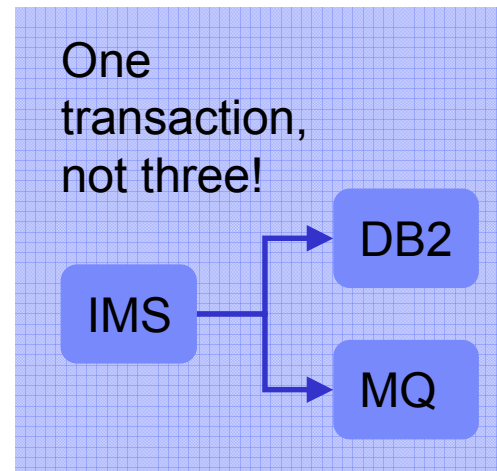
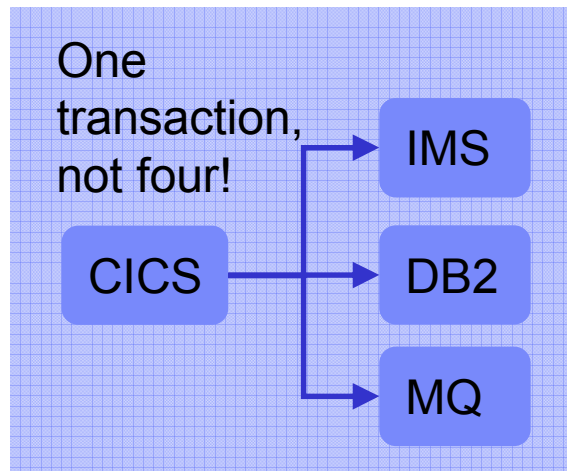
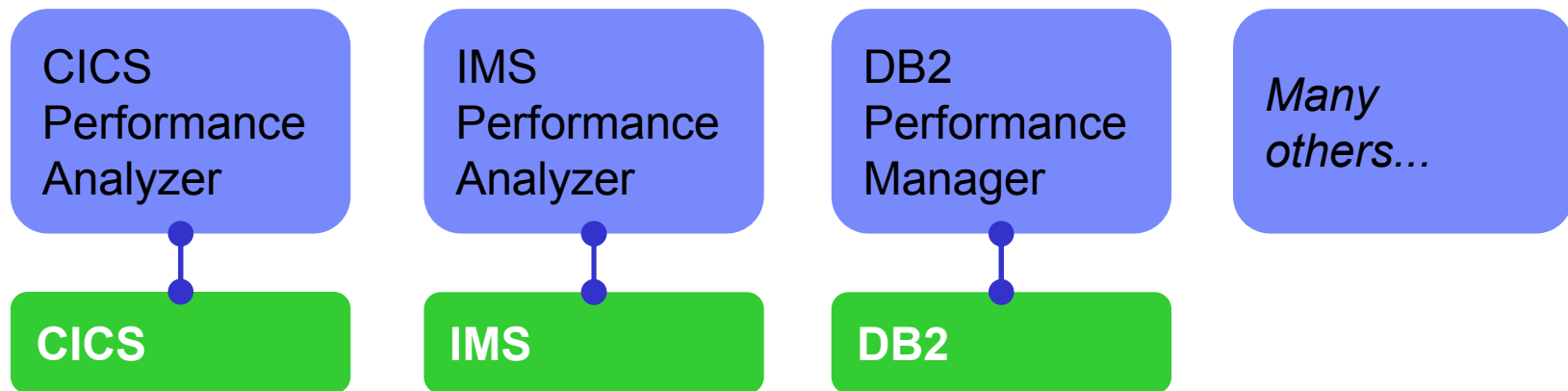


**2011:** users are customers; data is complex, often distributed



## 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

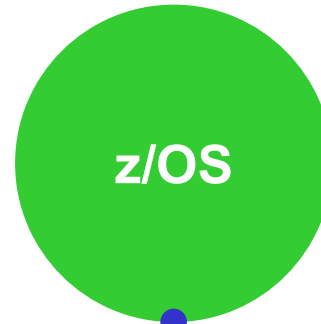
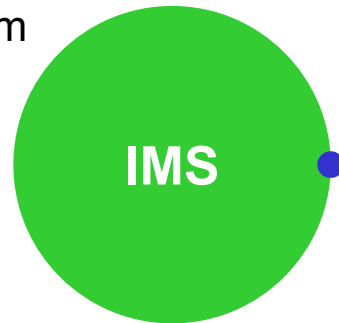
- A transaction analysis framework for System z
  - Not transaction manager specific
  - Leverages current IBM tools for transaction analysis
- Not IMS or CICS specific, but first release provides more synergy with the existing tools for those transaction managers
- Automates collection of data needed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

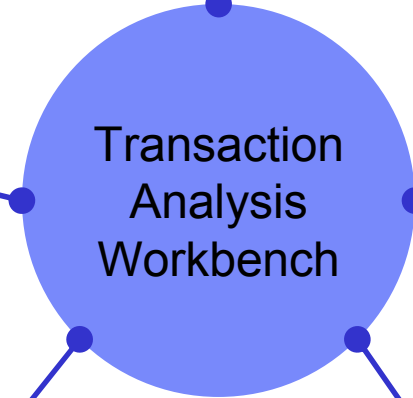
- Enable higher productivity by lower skilled staff.
- Automate trivial tasks commonly needed for problem determination.
  - Data acquisition – get the data needed for problem analysis
  - Reporting – basic reporting without tool specific knowledge
  - Autonomics - automated transaction analysis
- Allow the “first responder” to determine the most likely source of the problem.
  - Give the receiving expert confidence in the assignment
- 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

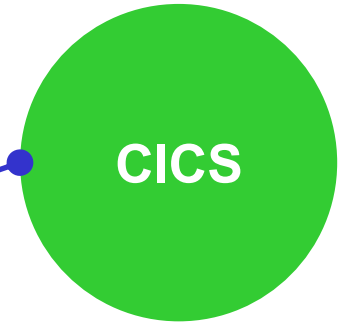
IMS log  
 IMS transaction index  
 IMS monitor and DB monitor  
 IMS Connect event data  
 CQS log stream



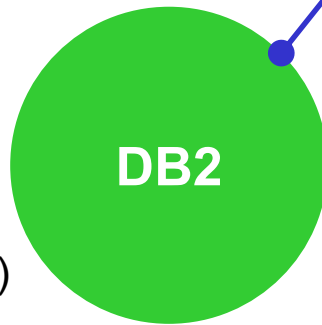
Selected SMF record types (in either log streams or data sets)  
 OPERLOG (log stream)



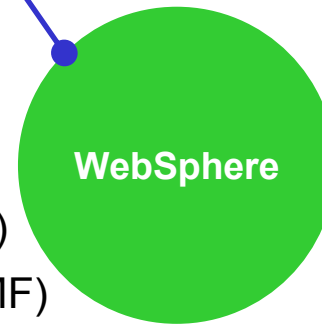
CMF performance (SMF)



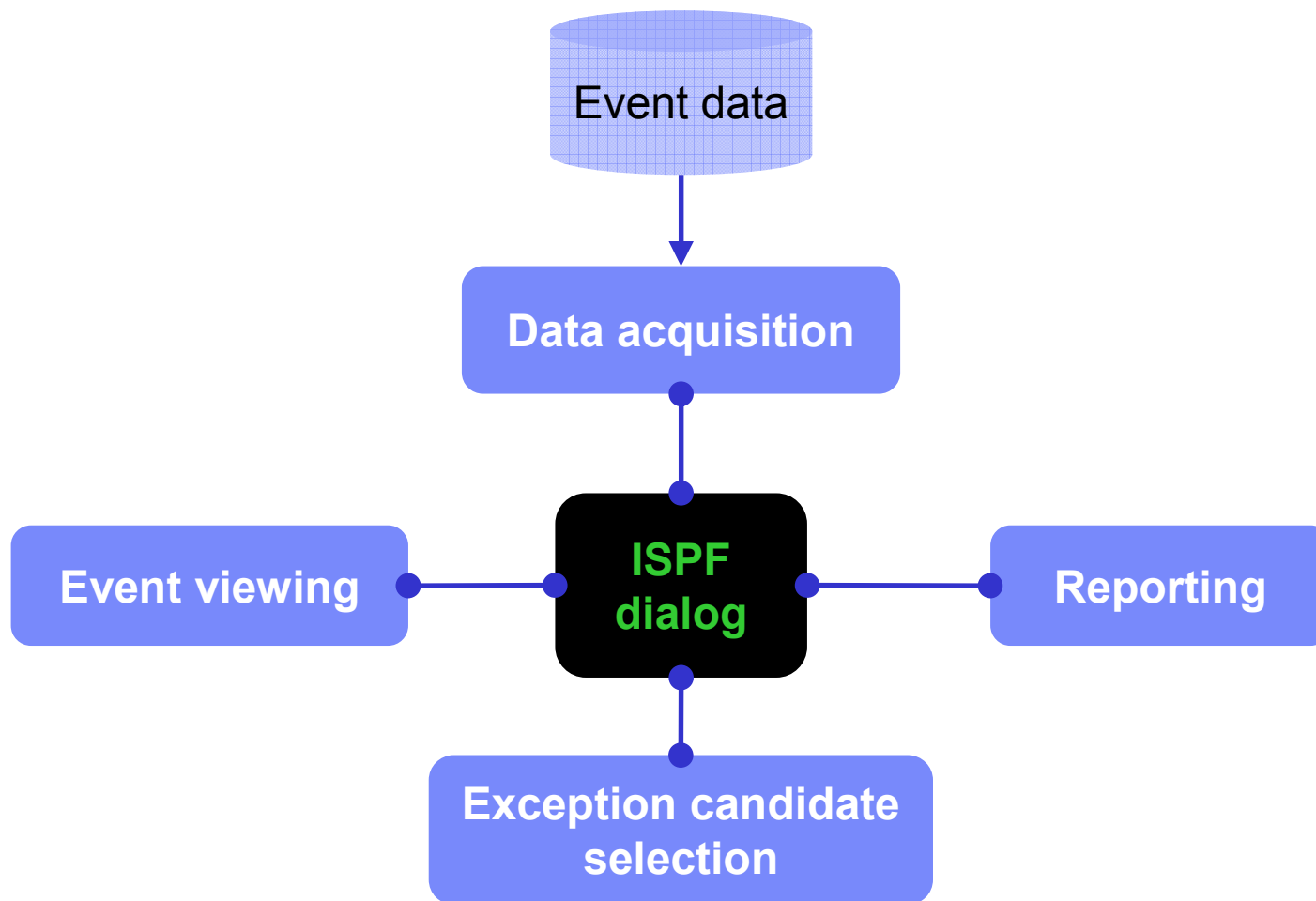
DB2 log  
 Accounting (SMF)  
 Performance (SMF)



WebSphere  
 MQ log extract  
 Statistics (SMF)  
 Accounting (SMF)



# Functions





## 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: CICS MRO problem

- On the following slides, we present an example scenario: a user has reported a long response time in a CICS transaction
- The analysis is divided into two parts:
  1. The **first responder** registers the problem in the Workbench session manager, collects the log files, and then 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

# Register the problem details

```

File  Help
-----
                                Problem Details                                Row 1 to 7 of 7
Command ==> _____ Scroll ==> PAGE

Key . . . . . : 00000030
Summary . . . . : CICS MRO w/ VSAM, DB2 and IMS Description...
Severity . . . . : 2
Reference . . . . : TICKET-9102      — When problem occurred —
Reported by . . . : John              YYYY-MM-DD  HH.MM.SS.TH
Assigned to . . . : Jim                From 2012-02-24 20.40.00.00
Status . . . . . : OPEN                To 2012-02-24 21.00.00.00 Zone . . LOCAL

Systems where problem occurred (maximum of 32):

/ System + Type +
___ FTS1   IMAGE
___ CICSPLEX CICS
___ CICSTOR CICS
___ CICSAOR CICS
___ CICS DOR CICS
___ IMSP   IMS
___ DB2P   DB2
***** Bottom of data *****
    
```

# Session Manager

File Help

Session 00000030

Option ==>

Summary . . : CICS MRO w/ VSAM, DB2 and IMS

- |   |             |  |
|---|-------------|--|
| 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                             |

# 1. Locate the files required for problem analysis

```

Locate and Manage Log Files
Row 1 to 5 of 5
Command ==> _____ Scroll ==> CSR

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

Automated File Selection:
System . . . _____ +
Type . . . . _____ +

— Locate Files Interval —
From 2012-02-24 20.40.00.00
To 2012-02-24 21.00.00.00

Log Files:
/ Data Set Name
X _____ FTS1.WEEKLY.SMF.G0456V00
_____ JIM.CICS.DBCTL.INDEX
_____ IMSP.SLDS.D12055.T2049325.V16
_____ DB2P.ARCLOG1.A0000083
***** Bottom of data *****

Name Type File
FTS1 IMAGE SMF
IMSP IMS IDX
IMSP IMS LOG
DB2P DB2 LOG
    
```



## 2. Extract diagnostic data for problem analysis

### Extract Request

Command ==> \_\_\_\_\_

Select an option then press Enter

- 1 1. Extract records from the log file using filtering criteria
2. Create a transaction index (IMS log files only)

Extract records from : FTS1.WEEKLY.SMF.G0456V00  
 Extract Data Set . . . 'JIM.CICS.CMF.MRO.EXTRACT'

Filtering Criteria:

Filter . . . 6E13 +

\_\_\_\_\_ Extract Interval \_\_\_\_\_

	YYYY-MM-DD	HH.MM.SS.TH
From	<u>2012-02-24</u>	<u>22.45.00.00</u>
To	<u>2012-02-24</u>	<u>23.00.00.00</u>

```
//JIMX      JOB ,NOTIFY=&SYSUID,CLASS=A
//EXTRACT   EXEC PGM=FUWBATCH
//SYSPRINT  DD  SYSOUT=*
//SMFIN001  DD  DISP=SHR,DSN=FTS1.WEEKLY.SMF(0)
//EXTRACT   DD  DISP=NEW,DSN=JIM.CICS.CMF.MRO.EXTRACT
//SYSIN     DD  *
FROM(2012-02-24-22.45) TO(2012-02-24-23.00)
EXTRACT CICS-DBCTL OUTPUT(EXTRACT)
CODE(CMF,6E13)
COND RESPONSE GT 2.0
/*
```

### 3. Extracted data now available for diagnosis

```

Locate and Manage Log Files                                     Row 1 to 5 of 5
Command ==> _____ Scroll ==> CSR

Select an option to add log files to the session then press Enter
2 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 2012-02-24 20.40.00.00
                                                    To   2012-02-24 21.00.00.00

Log Files:
/      Data Set Name                                         _____ System _____ File
D      FTS1.WEEKLY.SMF.G0456V00                               FTS1      IMAGE      SMF
S      JIM.CICS.CMF.MRO.EXTRACT                             CICSPLEX  CICS        CMF
      JIM.CICS.DBCTL.INDEX                                   IMSP      IMS         IDX
      IMSP.SLDS.D12055.T2049325.V16                         IMSP      IMS         LOG
      DB2P.ARCLOG1.A0000083                                  DB2P      DB2         LOG
***** Bottom of data *****
    
```

# Reporting using IMS PA and CICS PA

## Reporting - CICS Transaction Analysis

——— Report Interval ———

Type of analysis:  
 Individual transaction detail  
 Transaction statistical summary

From 2012-02-24 20:45  
 To 2012-02-24 21:00

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

SMF File . . 'JIM.CICS.CMF.MRO.EXTRACT' +

### CICS Performance Analyzer

#### Performance Transaction summary: Response time and CPU

Tran	#Tasks	Avg Response Time	Max Response Time	>0.5 Response Time	Avg Dispatch Time	Avg User CPU Time	Avg Suspend Time	Max Suspend Time	Avg Dispwait Time	Avg FC wait Time	Avg DB2SQLwt Time	Avg IMS wait Time
CSMI	55	2.3161	34.3956	21.82%	.0293	.0065	4.2868	34.3071	.0004	.0020	.0180	.0114
PART	25	2.1760	43.5463	20.00%	.0098	.0064	5.1662	43.5337	.0035	.0000	.0000	.0000
Total	236	2.1215	43.5463	31.36%	.0114	.0032	2.1101	43.5337	.0030	.0005	.0042	.0027

### IMS Performance Analyzer

#### Transaction summary: Response & CPU

APPLID	Tran	Tran Count	Avg Process Time	Max Process Time	>1.0 Process Time	Avg CPU Time	Max CPU Time	Avg DB Get Count	Avg DB Updat Count	Avg FP Get Count	Avg FP Updat Count
CICSIMS	CSMI	89129	0.086663	5.065890	23.21%	0.001693	1.278172	4	6	2	3



## Locating the problem transaction

1. Start a filter to look for CICS transactions

```

VIEW                               Filter                               Row 1 of 1 More: < >

Filter  . . BADPARTS  +          Description . . PART trans w/ long response time

/ Log Code + Exc Description
S CMF 6E13          CICS Transaction
***** Bottom of data *****

```

2. Specify filter conditions to narrow down the search

```

                                           Conditions                               Row 1 to 2 of 2

/  Field Name +                               Oper Value +
-  TRAN                               EQ  'PART'
-  RESPONSE                           GT  2.0
***** Bottom of data *****

```

3. Display is reduced to problem candidate list

```

BROWSE      JIM.CICS.CMF.MRO.EXTRACT                               Record 0000020 More: < >
  Slice . . Duration                               Date  2012-02-24      Time  20.40.38.002499
  Code Description < 00.00.00.000000 > 2012-02-24 Friday  Time (LOCAL)
/  -----
-  6E13 CICS Transaction TranCode=PART Task=122 Resp=2.019223 20.44.58.297560
-  6E13 CICS Transaction TranCode=PART Task=274 Abend=AEIV    20.55.24.768251
TX 6E13 CICS Transaction TranCode=PART Task=286 Resp=2.141418 20.57.15.950542
-  6E13 CICS Transaction TranCode=PART Task=288 Resp=2.003727 20.57.34.335989
***** Bottom of Data *****

```

## CICS transaction with 4 MRO subtasks

```

BROWSE      JIM.CICS.CMF.MRO.EXTRACT                      Record 00000216 More: < >
Command ==> _____ Scroll ==> CSR
Slice . . Duration 15.00.00 Date 2012-02-24 Time 20.46.04.986507
Code Description < _____ > 2012-02-24 Friday Time (Relative)
/-----/-----
G TAG CICS Tran=PART Task=286 has the long response time 20.57.15.950542
TX 6E13 CICS Transaction 20.57.15.950542
      TranCode=PART Program=PARTMENU Userid=JIM Terminal=NY Task=286
      ACCT=FTS3.SC0TCP22.2C5958F82B96 Resp=2.251886 CPU=0.002323
-----
  6E13 CICS Transaction +0.001969
      TranCode=CSMI Program=PARTEEXEC Task=72
      ACCT=FTS3.SC0TCP22.2C5958F82B96 Resp=2.241418 CPU=0.002990
-----
  6E13 CICS Transaction +0.003165
      TranCode=CSMI Program=PARTFILE Task=82
      ACCT=FTS3.SC0TCP22.2C5958F82B96 Resp=2.236072 CPU=0.003273 FC=4
-----
  6E13 CICS Transaction +0.018608
      TranCode=CSMI Program=PARTIMS Task=60
      ACCT=FTS3.SC0TCP22.2C5958F82B96 Resp=2.225775 CPU=0.004406
      RecToken=CICSDIMS/C92C5958FCB44261 PSB=PARTSDB IMS=12
-----
  6E13 CICS Transaction +1.262832
      TranCode=CSMI Program=PARTDB2 Task=57
      ACCT=FTS3.SC0TCP22.2C5958F82B96 Resp=0.988344 CPU=0.014637 DB2=12
-----
***** Bottom of Data *****

```

Tracking displays all the events associated with the transaction – noise is removed

## CICS transaction details

```

BROWSE      JIM.CICS.CMF.MRO.EXTRACT      Record 00000216 Line 00000000
Command ==> _____ Scroll ==> CSR
Form ==> MY6E13 + Use Form in Filter      Format ==> STD
***** Top of data *****
+0005 Code... 6E13 CICS Transaction
+00B2 STCK... C92C5958F81CE043 LSN.... 00000000000000D8
      Date... 2012-02-24 Friday Time... 20.57.15.950542.016

+009E DFHTASK.... Task Control
+009E Tran..... 'PART' SC..... 'TO..'
+0856 Dispatch... 0.004109/6 UserCPU... 0.002323/6
+086E Suspend... 2.117776/26 TaskNo.... +286
+00E2 NETName.... 'FTS3.SC0TCP22' NETUOWID... 2C5958F82B960001
+087A DispWait... 0.000051/5 Prty..... +1
+0132 Brdg..... 00000000 Disp1Dly... 0.000062
+0A7E RMIelap... 0.000018/3 RMISusp... 0
+0B92 QRModDly... 0.000051/5 QRDisp.... 0.004109/6 QRCPU.... 0.002323/6

      DFHCICS.... CICS task information
+00B2 Start.. 20.57.15.950542 Stop.. 20.57.18.202428 Response... 2.251886

      DFHRMI..... Resource Manager (RMI)
+0B06 RMITotal... 2.104618/26
+0B12 RMIDB2.... 1.062417/14 RMIDBCTL... 1.041290/12 RMIMQ..... 0

```

Select any record (CICS, IMS, DB2, MQ, and others) to see it neatly formatted

# Overall perspective

```

BROWSE      JCH.SMF.EXTRACT +                               Record 00028179 More: < >
Command ===>                                               Scroll ===> CSR
Slice . . Duration _____ Date 2012-02-24           Time 20.40.38.002499
Code Description < 00.00.00.000000 > 2012-02-24 Friday   Time (Relative)
/ -----
TX 6E13 CICS Transaction TranCode=MROU Task=286 TOR      20.57.15.950542
__ 6E13 CICS Transaction TranCode=CSMI Task=72  AOR      +0.001969
__ 6E13 CICS Transaction TranCode=CSMI Task=82  FC=4      +0.018608
__ 6E13 CICS Transaction TranCode=CSMI Task=60  IMS=12      +0.018608
__ CA01 Transaction Program=DFHTWM04 LTerm=FUWFWIR      +0.019642
__ 08  Application Start TranCode=CSMI Program=DFHTWM04 +0.019642
__ 50  Database Update Database=DI21PART Region=0001    +0.034078
__ 50  Database Update Database=DI21PART Region=0001    +1.265202
__ 6E13 CICS Transaction TranCode=CSMI Task=57  DB2=14      +1.262832
__ 66  DB2 Performance 072 Create thread entry          +1.264293
. . .
__ 66  DB2 Performance 061 SQL update                  +1.272195
__ 0020 DB2 Unit of Recovery Control - Begin UR          +1.272609
__ 0020 DB2 Update In-Place in a Data Page              +1.272625
__ 66  DB2 Performance 058 SQL call completion          +1.272673
__ 0010 DB2 Savepoint                                  +1.273665
__ 66  DB2 Performance 021 Lock detail                  +1.274140
__ 0020 DB2 Delete from a Data Page                    +1.274209
. . .
__ 0020 DB2 Insert into a Data Page                    +2.175537
__ 66  DB2 Performance 058 SQL call completion          +2.175602
__ 5610 Syncpoint Start of Phase 1 Region=0001          +2.178900
__ 5950 FP Database Update Database=IVPDB3 Region=0001 +2.178921
__ 5611 Syncpoint End of Phase 1 Region=0001            +2.226836
__ 0020 DB2 Unit of Recovery Control - End Commit Phase 1 +2.232817
__ 3730 Syncpoint End of Phase 1 Region=0001            +2.242026
__ 5937 FP Syncpoint Program=DFHTWM04 Region=0001      +2.242924
__ 56FA Transaction Statistics Region=0001              +2.242963
__ 07  Application Terminate Region=0001                +2.243907
__ 66  DB2 Performance 070 Begin commit phase 2         +2.244799
__ 0020 DB2 Unit of Recovery Control - Begin Commit Phase 2 +2.245105
__ 5612 Syncpoint End of Phase 2 Program=DFHTWM04 Region=0001 +2.245664
. . .
__ 0020 DB2 Unit of Recovery Control - End Commit Phase 2 +2.248257
__ 65  DB2 Accounting 003 Source=CICS                   +2.249216
__ 66  DB2 Performance 075 Terminate thread exit       +2.250783
***** Bottom of Data *****
    
```

CICS  
CMF

IMS  
log

DB2  
Log &  
Trace

Coordinated  
Syncpoint

# IMS perspective

```

BROWSE      FTS1.WEEKLY.SMF.G0456V00 +                      Record 00028179 More: < >
Command ==> _____ Scroll ==> CSR
Slice . . Duration 00.15.00      Date 2012-02-24      Time 20.45.00.000000
Code Description < 00.00.00.000000 > 2012-02-24 Friday Time (Relative)
/ -----
___ 6E13 CICS Transaction TranCode=PART Task=286 TOR      20.57.15.950542
___ 6E13 CICS Transaction TranCode=CSMI Task=72  AOR      +0.001969
___ 6E13 CICS Transaction TranCode=CSMI Task=82  FC=4     +0.003165
___ 6E13 CICS Transaction TranCode=CSMI Task=60  IMS=12   +0.018608
-----
___ CA01 Transaction                                     +0.019642
      TranCode=CSMI Program=PARTIMS LTerm=CICSDIMS
      IMSID=IMSP RecToken=CICSDIMS/C92C5958FCB44261
      RegTyp=DBC DBCalls=10 FPCalls=5 CPU=0.002172 Process=0.123315
-----
___ 08 Application Start TranCode=CSMI Program=PARTIMS +0.019642
___ 5607 Start of UOR Program=PARTIMS +0.019643
___ 50 Database Update Database=PARTSDB +0.034078
___ 50 Database Update Database=PARTSDB +1.265202
___ 6E13 CICS Transaction TranCode=CSMI Task=57 +1.272832
___ 5610 Syncpoint Start of Phase 1 +2.178900
___ 5950 FP Database Update Database=PARTSDBF +2.188921
___ 5611 Syncpoint End of Phase 1 +2.216836
___ 3730 Syncpoint End of Phase 1 +2.242026
___ 5937 FP Syncpoint Program=PARTIMS +2.242924
___ 56FA Transaction Statistics +2.242963
___ 07 Application Terminate +2.243907
___ 5612 Syncpoint End of Phase 2 Program=PARTIMS +2.245664
***** Bottom of Data *****

```

## DB2 perspective 1 – DB2 log and accounting

```

BROWSE      FTS1.WEEKLY.SMF.G0456V00 +                      Record 00028179 More: < >
Command ==> _____ Scroll ==> CSR
  Slice . . Duration 00.15.00      Date 2012-02-24      Time 20.45.00.000000
  Code Description < 00.00.00.000000 > 2012-02-24 Friday Time (Relative)
/ -----
--- 6E13 CICS Transaction TranCode=PART Task=286                20.57.15.950542
--- 6E13 CICS Transaction TranCode=CSMI Task=72                  +0.001969
--- 6E13 CICS Transaction TranCode=CSMI Task=82                  +0.003165
--- 6E13 CICS Transaction TranCode=CSMI Task=60                  +0.018608
--- 6E13 CICS Transaction TranCode=CSMI Task=57 DB2=14          +1.262832
--- 0020 DB2 Unit of Recovery Control - Begin UR                 +1.272609
--- 0020 DB2 Update In-Place in a Data Page                     +1.272625
--- 0010 DB2 Savepoint                                          +1.273665
--- 0020 DB2 Delete from a Data Page                            +1.274209
--- 0020 DB2 Insert into a Data Page                            +2.175537
--- 0020 DB2 Unit of Recovery Control - End Commit Phase 1      +2.242817
--- 0020 DB2 Unit of Recovery Control - Begin Commit Phase 2   +2.245105
--- 0020 DB2 Unit of Recovery Control - End Commit Phase 2     +2.248257
      URID=0000A54E30DA
-----
--- 65  DB2 Accounting 239 CLASS 7,8                            +2.349146
      ACCT=FTS3.SC0TCP22.2C5958F82B96 Source=CICS
      LUWID=FTS3/DB2PLU/C92C59590561/0001
-----
--- 65  DB2 Accounting 003 CLASS 1,2,3                          +2.349216
      CPU1=00.010299 CPU2=00.007918 I/O3=00.000000
      ACCT=FTS3.SC0TCP22.2C5958F82B96 Source=CICS
      GtPgRq=8 SyPgUp=3 Suspnd=0 DeadLk=0 TimOut=0 MxPgLk=1
      Sel=0 Ins=1 Upd=1 Del=1 LUWID=FTS3/DB2PLU/C92C59590561/0001
-----
***** Bottom of Data *****

```

## DB2 table update from DB2 log

```

BROWSE      DSNDB2A.DBA3.ARCLG1.A0000083      Record 00000794 Line 00000000
Command ==> _____ Scroll ==> CSR
Form ==>      + Use Form in Filter      Format ==> STD
***** Top of data *****
+0004 Code... 0020 DB2 Update In-Place in a Data Page
+001E STCK... C92C59AD95F5000      LSN... 0000000A54E78F3
      Date... 2012-02-24 Friday      Time... 20.58.44.677456.000

+0000 LRHLL..... 0058      LRHRTYPE... 0600      LRHSTYPE... 0001
+0008 LRHRMID.... 0E      LRHFLAGS... 80
+000A LRHURID.... 0000A54E7863      LRHUNLSN... 0000A54E7863
+001E LRHLRSN.... C92C59AD95F5      LRHMEMID... 0003

+0026 LRHDBHDR... Database identification
+0027 LRHDBID.... 0110      LRHPSID.... 0002      LRHDFLAG... 41

+0038 LRHUPDTH... Update information
      LRHDESC... 'Partial user row update'
      LRHVARNO... +9      LRHUFLAG... C0

+0042 LRHREDOD... Redo Data
      +0000 F2404D40 40405D40      *BALANCE=$200      *
+004A LRHUNDOD... Undo Data
      +0000 F1404D40 40405D40      *BALANCE=$100      *
***** End of data *****

```

## DB2 perspective 2 – DB2 performance trace

```

BROWSE      FTS1.WEEKLY.SMF.G0456V00 +                      Record 00027543 More: < >
Command ==> _____ Scroll ==> CSR
Slice . . Duration _____ Date 2012-02-24      Time 20.40.38.002499
Code Description < 00.00.00.000000 > 2012-02-24 Friday Time (Relative)
/ -----
___ 6E13 CICS Transaction                                     +1.262832
      TranCode=CSMI Program=PARTDB2 LTerm=FUWFWAR
      Terminal=AR1 RecToken=FUWFWDR/C92C595905174403 Task=57
      ACCT=FTS3.SC0TCP22.2C5958F82B96 Resp=0.988344 CPU=0.014637 DB2=14
-----
___ 66  DB2 Performance 072 Create thread entry SSID=DB2P          +1.264293
___ 66  DB2 Performance 021 Lock detail                            +1.264857
___ 66  DB2 Performance 112 Successful plan allocation(allied)    +1.265228
___ 66  DB2 Performance 177 Successful package allocation         +1.255701
___ 66  DB2 Performance 065 SQL open cursor                       +1.266018
___ 66  DB2 Performance 058 SQL call completion                  +1.266129
___ 66  DB2 Performance 059 SQL fetch                            +1.266705
___ 66  DB2 Performance 044 IRLM suspend entry                   +1.267471
___ 66  DB2 Performance 093 Suspend                              +1.267525
___ 66  DB2 Performance 094 Resume                               +2.177735 ←
___ 66  DB2 Performance 045 IRLM suspend exit                    +2.177790
___ 66  DB2 Performance 021 Lock detail                          +2.177836
___ 66  DB2 Performance 021 Lock detail                          +2.177907
___ 66  DB2 Performance 058 SQL call completion                  +2.177996
. . .
___ 66  DB2 Performance 075 Terminate thread exit                +2.250783
***** Bottom of Data *****

```



# Complete problem history including personal notes

```

                                History                                Row 1 to 4 of 4
Command ==> _____ Scroll ==> CSR

Select a history item or use the NEW command to create a new note.

/  Type      Description                               Changed                               ID
-  TAG       Personal savepoint for JIM                 2012-02-29 11.19.03                 JIM
-  SMF       SMF report                                     2012-02-29 08.37.46                 LEVEL1
-  CICS      CICS SPA report                               2012-02-28 16.57.18                 LEVEL1
S TAG       CICS TRAN=PART long response time           2012-02-28 16.13.33                 JIM
***** Bottom of data *****
    
```

```

                                Notepad                                Columns 00001 00072
Command ==> _____ Scroll ==> CSR
***** Top of Data *****
000001 CICS TOR TRAN=PART TASK=286 has the long response time
000002
000003 I have had a look at the problem, observations are:
000004 1. MRO to AOR CSMI TASK=72 - called FOR, IMS and DB2 - problem below
000005 2. MRO to FOR CSMI TASK=82 - VSAM file requests are OK, no delay
000006 3. DPL to IMS CSMI TASK=60 - 12 DLI calls, application delay - problem
000007 4. DPL to DB2 CSMI TASK=47 - 14 SQL calls , long delay - problem
000008
' ' ' ' ' Please investigate the problem using your IMS and DB2 tool kits :- )
***** Bottom of Data *****
    
```

## Overview of the ISPF dialog: ad-hoc log files

```

File  Menu  Edit  Help
-----
                                Process Log Files                Row 1 of 14 More: < >
Command ===> _____ Scroll ===> PAGE
Select a Log File to browse.                IMS Release 111 +      Zone LOCAL

/      Log File                Rel + Filter + Zone
-----
* CICS DBCTL DEADLOCK PROBLEM 12 APRIL 2011
'FUNDID.SMF.D110328.TESTING.FULL'
'IBB1.SLDSP.IBB1.D11087.T1557493.V21'      111  08
'DSNDB2A.DBA3.ARCLG1.A0000022'
-----
* SUPPORTED LOG STREAMS
CQS:IBDE.CQS.EMHL.LOGOFFLD
SMF:IFASMF.FTS1.SMF.MAN1                  1E
OPERLOG:SYSPLEX.OPERLOG
-----
* OTHER LOG STREAMS INC. RRS AND CICS JOURNAL
OTHER:ATR.FTS1PLEX.RM.DATA
OTHER:STC@CICS.CCVQ41D2.DFHLOG
'IBDH.VB10.OLP00'
***** Bottom of data *****

```

Option 4 **Process** offers an IMS PI-like list of ad-hoc files, enabling you to simply enter a data set or log stream name, and then browse its records...

## Overview of the ISPF dialog: ad-hoc log files

```

File  Mode  Filter  Time  Labels  Options  Help
-----
BROWSE      SMF:IFASMF.FTS1.SMF.MAN1      Record 00000001 More: < >
Command ==> _____ Scroll ==> PAGE
  Slice . . Duration _____ Date 2011-03-04 Time 13.38.47.760000
  Code Description < 00.05.00.000000 > 2011-03-04 Friday Time (LOCAL)
/-----
__ 1E Job Step Total TranCode=RXRR2IX5 13.38.47.760000
__ 1E Job Step Termination Delta TranCode=RXRR2IX5 13.38.47.920000
__ 1E Job Step Total TranCode=RXRR2IX5 13.38.47.920000
__ 1E Job Step Termination Delta TranCode=RX00301 13.38.48.290000
__ 1E Job Step Total TranCode=RX00301 13.38.48.300000
__ 1E Job Step Termination Delta TranCode=RXRR2IX4 13.38.48.550000
__ 1E Job Step Total TranCode=RXRR2IX4 13.38.48.550000
__ 1E Job Step Termination Delta TranCode=DVP5IPI 13.38.48.600000
__ 1E Job Step Total TranCode=DVP5IPI 13.38.48.610000
__ 1E Job Step Termination Delta TranCode=RXRR2IX4 13.38.48.910000
__ 1E Job Step Total TranCode=RXRR2IX4 13.38.48.910000
__ 1E Job Step Termination Delta TranCode=DVP5IPI 13.38.49.040000
__ 1E Job Step Total TranCode=DVP5IPI 13.38.49.040000
__ 1E Job Step Termination Delta TranCode=RXRR2IX4 13.38.49.080000
__ 1E Job Step Total TranCode=RXRR2IX4 13.38.49.090000
__ 1E Job Step Termination Delta TranCode=RX00301 13.38.49.150000
__ 1E Job Step Total TranCode=RX00301 13.38.49.160000

```

...for example, these are SMF 30 (x1E) address space accounting records in an SMF log stream. However, for a more structured approach, Workbench introduces sessions.

## OPERLOG report: JCL

```

File Edit Edit_Settings Menu Utilities Compilers Test Help
VIEW      FUW110.WTWM.REPORTS(OPERLOG) - 01.03      Columns 00001 00072
Command ==> _____ Scroll ==> CSR
***** ***** Top of Data *****
000001 //OPERLOG JOB ,CLASS=A,NOTIFY=&SYSUID
000002 /*JOBPARM SYSAFF=FTS1
000003 //FUWBATCH EXEC PGM=FUWBATCH
000004 //STEPLIB DD DISP=SHR,DSN=FUW.SFUWLINK
000005 //SYSPRINT DD SYSOUT=*
000006 //SYSIN DD *
000007 LOGSTREAM OPERLOG:SYSPLEX.OPERLOG
000008 START 2011-04-06-08.40.00.00 STOP 2011-04-06-09.00.00.00
000009 REPORT OPERLOG
000010 CODE(OPERLOG)
000011 COND TEXT(2) EQ 'DFS'
000012 COND TEXT(*) EQ 'BACKOUT'
000013 /*
***** ***** Bottom of Data *****

```

Note the LOGSTREAM command in the SYSIN data set, identifying the input log stream. The COND statements filter the reported OPERLOG records.

## 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.

## 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

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.



## SMF 33-2: APPC/MVS Conversation List report

Start Time	Local LU Name	Direction	Partner UserId	Job Name	SyncLvl
18:16:47.624543	MVSLU02	Outbound		TWM#RBAT	Syncpt
	** Partner	**	TPname=IADGEXP_PROFILE		
18:16:47.796620	IADGAPPC	Inbound		IADGMPPA	Syncpt
	*** Local	***	TPname=IADGEXP_PROFILE		

APPC requests processed on z/OS are logged to SMF. These requests may end up being processed by an IMS or CICS transaction.

A breakdown of processing inside MVS can identify bottlenecks and other performance related issues.

InputQ	Time Process	Total	Bytes Received	Bytes Sent
	.324737	.324737	68	83
.166232	.154551	.320783	83	68

## 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 70-1: RMF Processor Activity report

- Interval Start -- Date Time	System Name	- %CPU Busy - LPAR MVS	I/O 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 30: Address Space Activity report

-----Interval-----			System				----- CPU -----		
Start Date/Time	Duration	Type	Name	Jobname	Comp	TCB	SRB	%CPU	
2011-03-04 15:37:01	00:01	STE	MVS1	IMSCTL1	0004	0.445357	0.023205	15.1	
2011-03-04 15:37:01	00:01	STT	MVS1	IMSCTL2	0004	0.445357	0.023205	15.0	
2011-03-04 15:37:06	00:01	STE	MVS1	IMSCTL3	0004	0.404175	0.011985	19.3	
2011-03-04 15:37:06	00:01	STT	MVS1	IMSCTL4	0004	0.404175	0.011985	19.2	
2011-03-04 15:43:24	00:01	STE	MVS1	IMSCTL5	0004	0.904357	0.046920	18.9	
2011-03-04 15:43:24	00:01	STT	MVS1	IMSVTL6	0004	0.904357	0.046920	18.9	
2011-03-04 15:44:05	00:01	INT	MVS2	CICSPR1	0000	7.966200	0.241357	15.2	
2011-03-04 15:44:58	00:01	INT	MVS2	CICSPR2	0000	0.141780	0.004335	11.2	

At regular intervals, every address space can be monitored for unusual spikes (or lulls) in system-related resource consumption including CPU and I/O.

EXCPs /Sec	----Storage-----			-Paging/Sec-		
	<16M	>16M	64bit	In	Out	Swap
477	1M	11M	0M	0	0	0
476	1M	11M	0M	0	0	0
309	1M	11M	0M	0	0	0
309	1M	11M	0M	0	0	0
590	1M	11M	0M	0	0	0
589	1M	11M	0M	0	0	0
140	4M	1366M	0M	0	0	0
100	0M	12M	0M	0	0	0

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

## 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:  
[www.ibm.com/software/data/db2imstools/](http://www.ibm.com/software/data/db2imstools/)
- IBM Transaction Analysis Workbench for z/OS:  
[www.ibm.com/software/data/db2imstools/imstools/transaction-analysis/](http://www.ibm.com/software/data/db2imstools/imstools/transaction-analysis/)
- Jim Martin, US Representative, Fundi Software:  
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