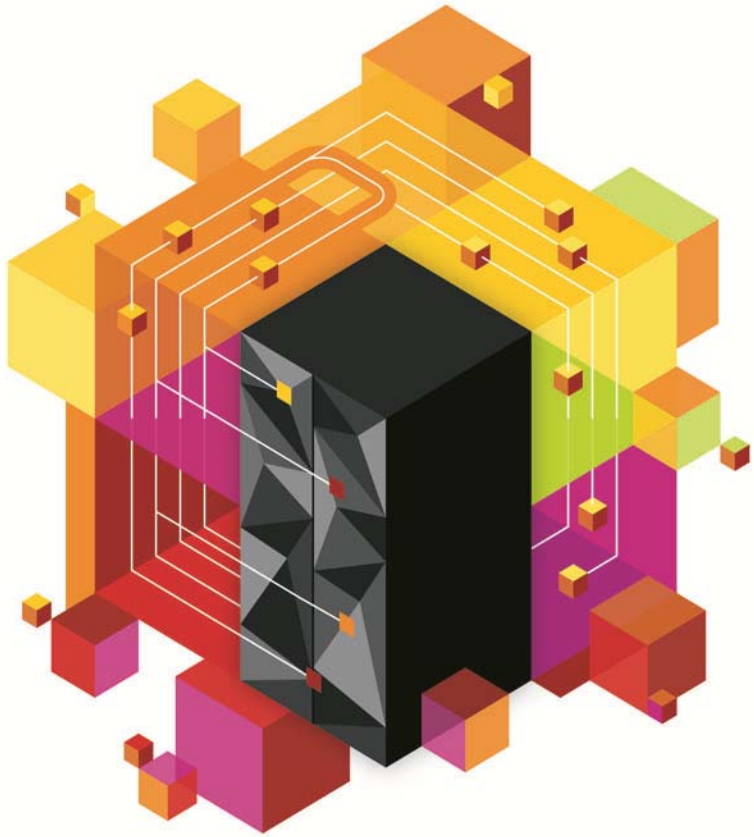
Finding Problems in a Mixed Environment: Transaction Analysis Workbench



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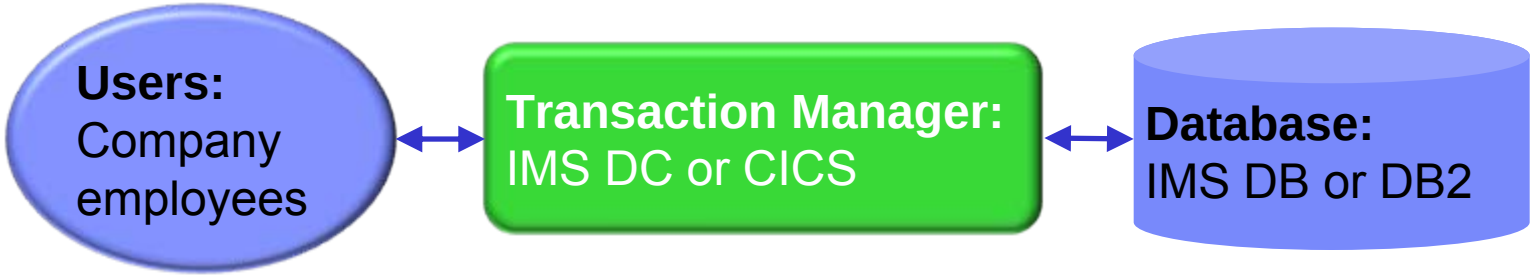
Agenda

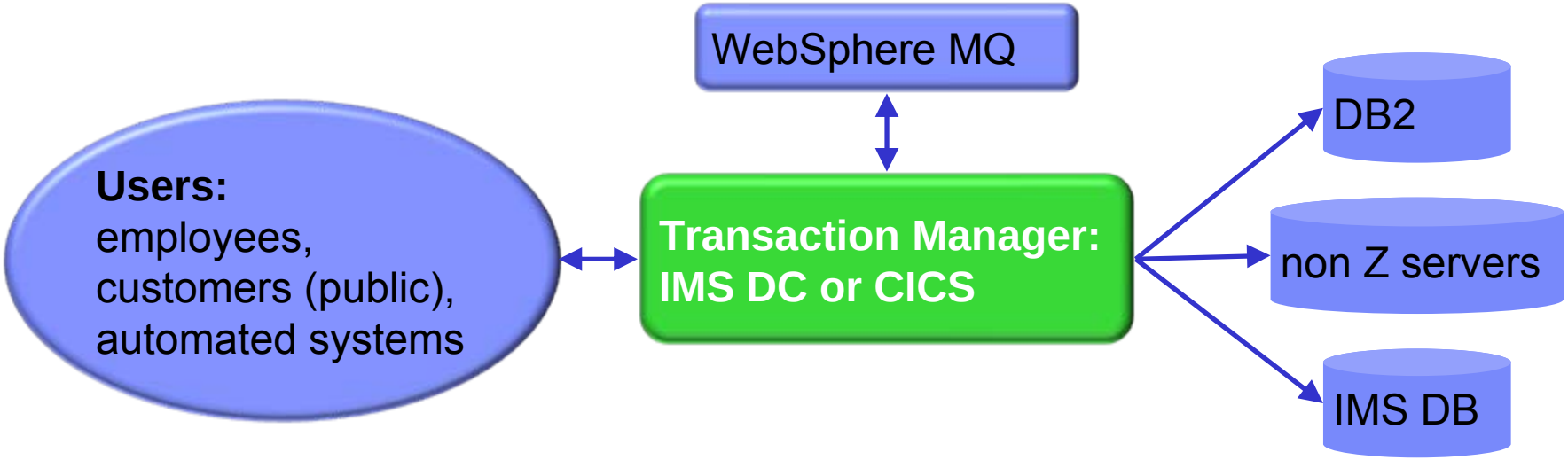
- **It's all about evolution:**
  - Transaction systems have evolved from *simple* to *complex and heterogeneous*.
  - Analysis tools have not kept pace.
- **IBM Transaction Analysis Workbench for z/OS:**
  - Provides a view of transaction activity across subsystems.
  - Enables a collaborative workflow:
    - Between "first responders" (help desk; level 1 support) and subject-matter experts
    - Between experts in different areas
- **Example scenario: IMS DB2 transaction analysis**

It's all about application evolution

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



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



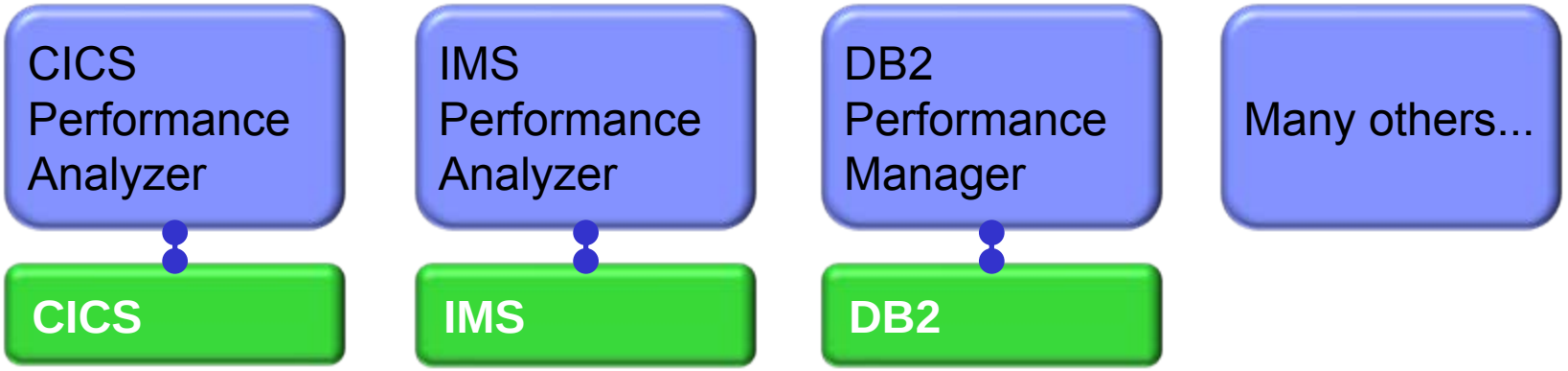
Expert collaboration must be improved

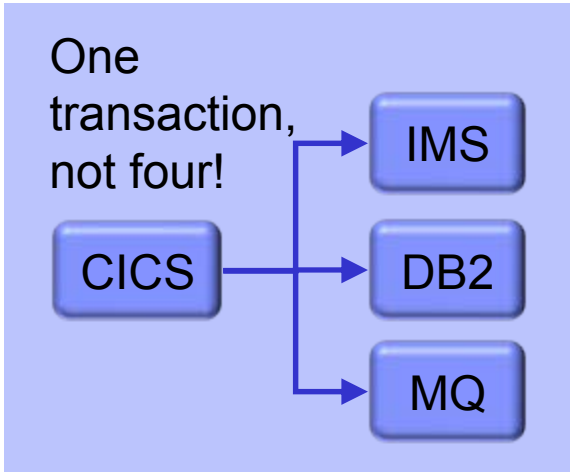
- **Today, the process of problem diagnosis is often “silo-oriented”. For example:**

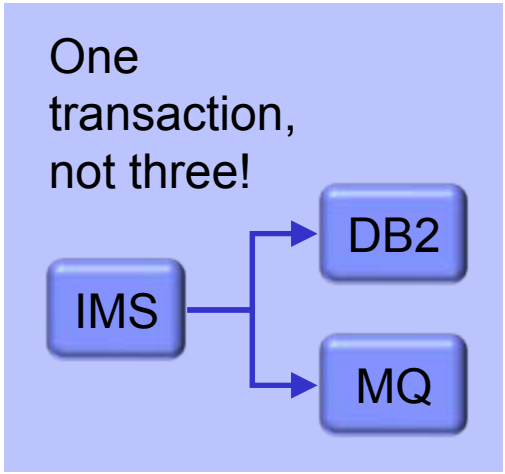
- **Typically, each silo has its own set of subject-matter experts.**
- **Analysis between silos involves experts starting all over again. This slows problem resolution.**
- **Workbench offers a framework that spans the silos; effectively, *dissolving* barriers between silos.**
- **Experts from different areas can collaborate on the same problem without collecting log data all over again.**

Analysis tools targeted at “silo” model

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



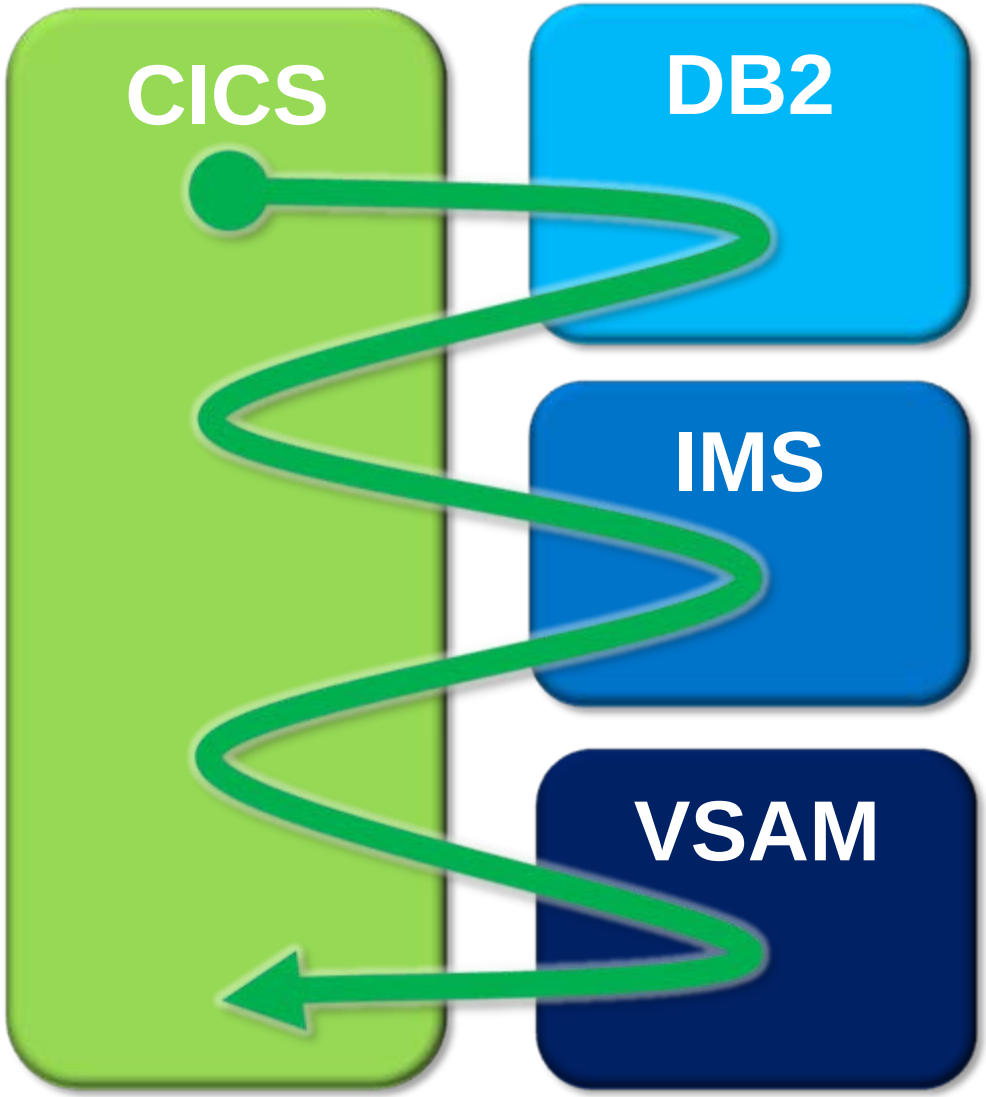




Each tool is well-suited to its environment, but you often need a subject-matter expert to use each tool

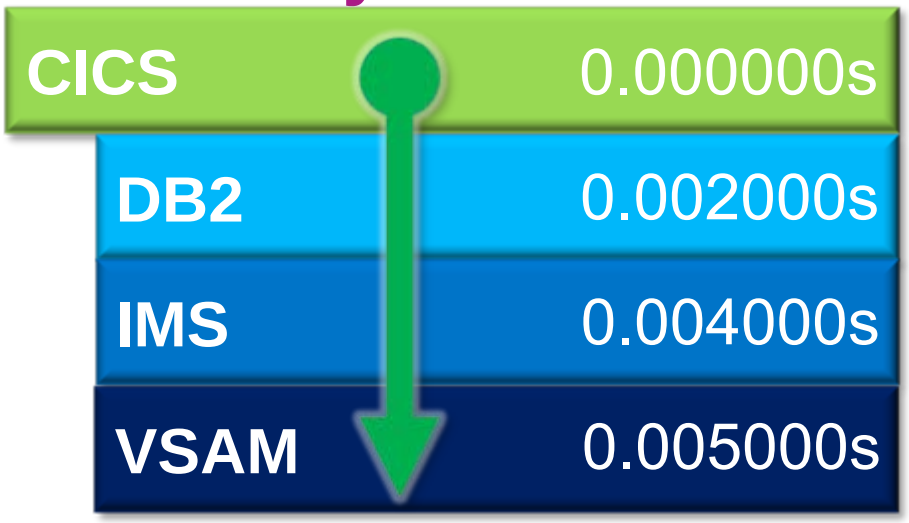
Step 1: where did the delay occur?

- A single transaction can involve activity across many subsystems
- Subsystem-specific tools offer a limited perspective
- To quickly identify performance issues, you need to track activity across subsystems
- Each subsystem has its own activity log



Step 2: deal with transaction lifecycle

- Automatically locates the log files for the problem time range (for some subsystems)
- Combines logs from many subsystems to provide a single, consolidated timeline of transaction activity
- Generates Exception reports and files of likely candidates for evaluation
- Shows events that are related to the same transaction lifecycle

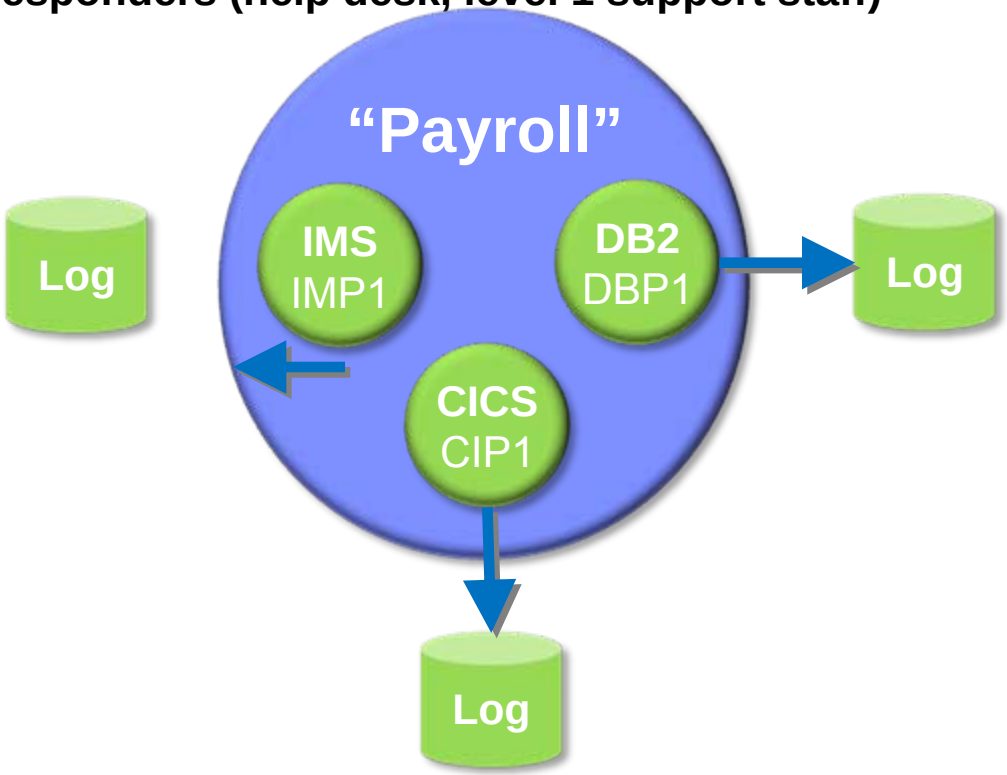


Enabling collaborative transaction analysis

- **Automate trivial tasks commonly needed for problem determination.**
  - Data acquisition – get the data needed for problem analysis
  - Autonomics – automated transaction analysis
    - Reporting – basic reporting without tool specific knowledge
- **Enable the "first responder" to determine the most likely source of the problem.**
  - Process flow approach to assignment
    - 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 between experts

Collaborative workflow: setup

- **Subject-matter experts use Workbench to define:**
  - **Groups** of subsystems involved in applications
  - **Exceptions** (log data values that indicate a problem, such as long response times or abend codes)
- **SMEs also help define scripts (step-by-step procedures) to be followed by first responders (help desk, level 1 support staff)**



Help desk script

1.If user reports long response time in Payroll application, then…

Collaborative analysis workflow

First responder

1.Accepts an incoming support request and selects the appropriate group in Workbench. Workbench locates the log files for each subsystem.
2.Performs ***preliminary analysis*** according to predefined script.
3.Assigns problem to appropriate subject-matter expert.

Subject-matter expert

1.Picks up analysis from where the first responder left off (no need to locate log files again).
2.Performs ***"deep dive" analysis***: for example, using Workbench to interactively browse formatted details of log records.

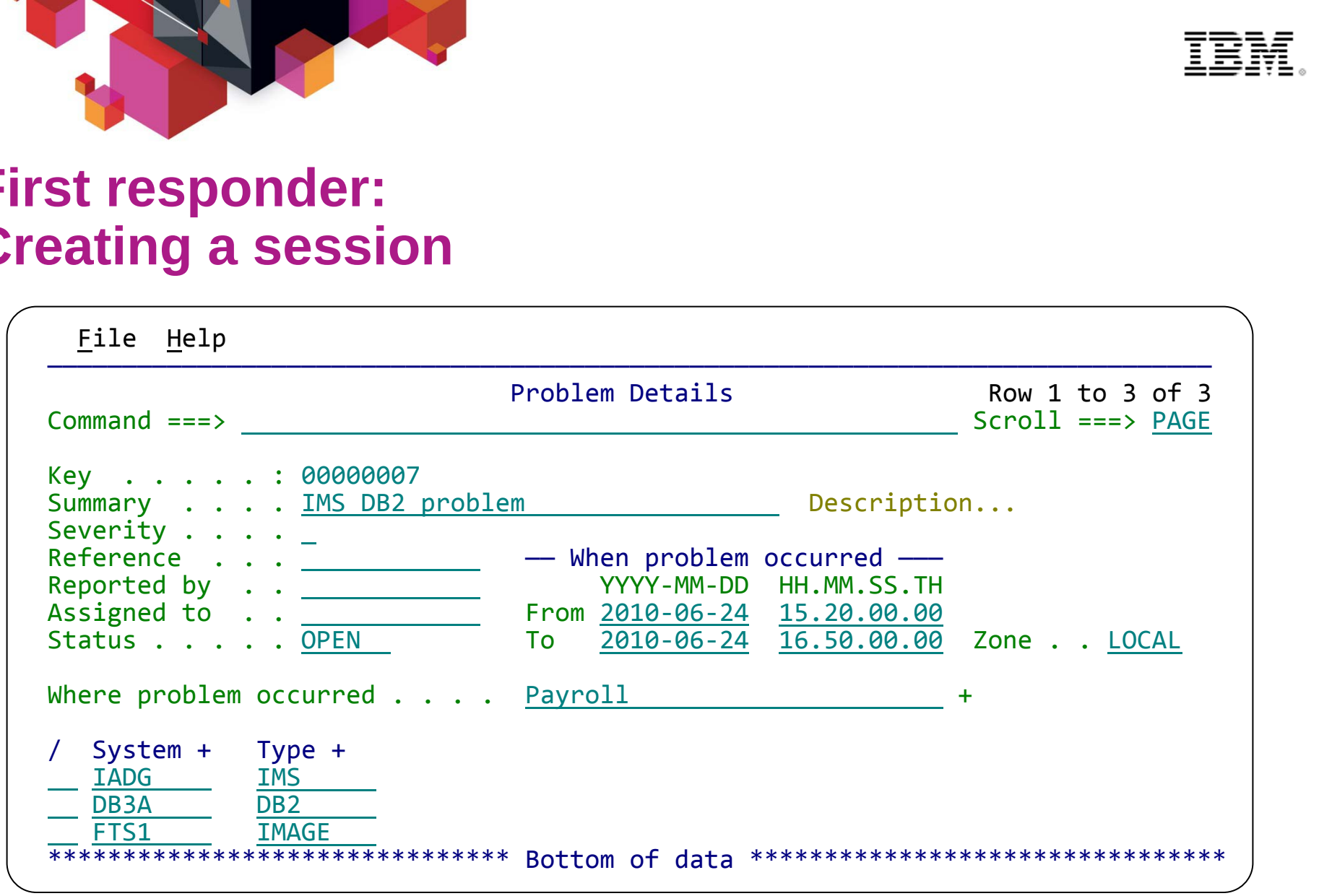
Session manager (ISPF dialog)

- **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
  - Review identified transaction exceptions

Scenario: IMS DB2 problem

- **On the following slides, we present an example scenario: a user has reported a long transaction response time for an IMS transaction performing DB2 updates**
- **The analysis is divided into two parts:**
  - The **first responder**:
    1. Registers the problem in the Workbench session manager and collects the log files
    2. Follows a process orientated script to assign problem to initial expert
  - The **subject-matter expert** 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

First responder: Creating a session



Create a session (main menu ► option 1 **Sessions** ► **NEW**).
Select the environment where the problem occurred. This populates the system list.

First responder: CICS-DBCTL exception analysis reports

- **Example of a Workbench report: combines data from CICS (CMF records, from SMF files) and IMS (IMS log records) to show details of IMS events in a CICS DBCTL transaction**

2012-03-28 Wednesday **CICS-DBCTL Summary** Page 1

CICS

Tran	APPLID	CMF Count	Response	CPU Time	IMS Reqs	IMS Wait	ABEND	Rate/Sec
BANK	CICSP1	60	11.12982	0.008967	35	4.256977	10	0

IMS

08 Count	Elapsed	CPU Time	StaDelay	Schedule	IC Wait	PS Wait
42	10.94999	0.004092	0.011668	0.000183	0	0

07 Count	DB call	DB Gets	DB Upds	IO Count	IO Time	LockWait
41	33	13	19	4	0.003438	3.980170

FP Count	FP call	FP Gets	FP Upds	FP Wait	FP Fail
41	19	7	11	0	7

Synctime	Phase 1	Phase 2	FP PH2	OTHREAD
0.011938	0.006555	0.005383	0.002232	0.017659

Subject-matter expert: Exception candidate investigation

```
  File  Mode  Filter  Time  Labels  Options  Help
BROWSE    IMPOT01.SESSION7.TRANIX +                    Record 00004609 More: < >
Command ===> _____________________________________________ Scroll ===> CSR
   Slice . . Duration  00.03.00     Date  2010-06-24     Time  16.31.00.000000
   Code Description  < 00.05.00.000000 > 2010-06-24 Thursday  Time (LOCAL)
/  ---- ------------------------------------------------- ----------------
TX CA01 Transaction                                          16.33.33.575325
       UTC=16.33.33.575316 TranCode=MQATREQ1 Program=MQATPGM Userid=FUNTRM15
       LTerm=FUNTRM15 Terminal=SC0TCP15 Region=0004
       OrgUOWID=IADG/C62D2CB467860940 IMSID=IADG IMSRel=101
       RecToken=IADG/0000003600000000
       CPU=0.041999 InputQ=0.000562 Process=0.497229
       TotalTm=0.497791 RegTyp=MPP DBCalls=5
   ------------------------------------------------------------------------
__ CA01 Transaction                                          16.33.59.157812
       UTC=16.33.59.157802 TranCode=MQATREQ1 Program=MQATPGM Userid=FUNTRM15
       LTerm=FUNTRM15 Terminal=SC0TCP15 Region=0004
       OrgUOWID=IADG/C62D2CCCCD3E6F81 IMSID=IADG IMSRel=101
       RecToken=IADG/0000003A00000000
       CPU=0.013980 InputQ=0.000543 Process=0.424378
       TotalTm=0.424921 RegTyp=MPP
   ------------------------------------------------------------------------
__ CA01 Transaction                                          16.34.30.389305
```

This display has been filtered to show IMS transaction index (CA01) records with a process time of greater than 0.4 seconds. Enter TX to show records related to a transaction.

Life cycle evaluation using relative time

```
  File  Mode  Filter  Time  Labels  Options  Help
BROWSE    IMPOT01.SESSION7.TRANIX +                    Record 00004609 More: < >
Command ===> _____________________________________________ Scroll ===> CSR
   Slice . . Duration  00.00.00     Date  2010-06-24     Time  16.31.00.000000
   Code Description  < 00.05.00.000000 >  2010-06-24 Thursday  Time (Relative)
/  ---- ------------------------------------------------------ ----------------
 R CA01 Transaction TranCode=MQATREQ1 Region=0004                16.33.33.575325
__ 01   Input Message TranCode=MQATREQ1                               +0.000000
__ 35   Input Message Enqueue TranCode=MQATREQ1                       +0.000025
__ 08   Application Start TranCode=MQATREQ1 Region=0004               +0.000521
__ 5607 Start of UOR Program=MQATPGM Region=0004                      +0.000522
__ 31   DLI GU TranCode=MQATREQ1 Region=0004                         +0.000557
__ 5616 Start of protected UOW Region=0004                           +0.000965
__ 5E   SB Handler requests Image Capture Region=0004                +0.009128
__ 5E   SB Handler requests Image Capture Region=0004                +0.009131
__ 50   Database Update Database=DI21PART Region=0004                +0.009395
__ 50   Database Update Database=DI21PART Region=0004                +0.009517
__ 50   Database Update Database=DI21PART Region=0004                +0.009551
__ 50   Database Update Database=DI21PART Region=0004                +0.009634
__ 50   Database Update Database=DI21PART Region=0004                +0.009678
__ 5600 Sign-on to ESAF Region=0004 SSID=DB3A                        +0.011431
__ 5600 Thread created for ESAF SSID=DB3A                            +0.011460
__ 66   DB2 Performance 072 Create thread entry                      +0.011480
```

The Time column now shows relative times. Scroll forward through the related records. (Here, we have collapsed each record onto a single line by scrolling right.)

Transaction life cycle investigation

```
  File  Mode  Filter  Time  Labels  Options  Help
------------------------------------------------------------------------------
BROWSE    IMPOT01.SESSION7.TRANIX +                  Record 00004707 More: < >
Command ===>                                                 Scroll ===> CSR
   Slice . . Duration  00.00.00     Date  2010-06-24     Time  16.31.00.000000
   Code Description  < 00.05.00.000000 >  2010-06-24 Thursday  Time (Relative)
/  ---- ------------------------------------------------------ ---------------
__ 66   DB2 Performance 058 SQL call completion                      +0.022230
__ 66   DB2 Performance 122 Thread level exit from DB2               +0.022268
__ 66   DB2 Performance 121 Thread level entry into DB2              +0.022412
__ 66   DB2 Performance 061 SQL del/insert/update                    +0.022496
__ 66   DB2 Performance 016 First insert (SRT1) entry                +0.022564
__ 66   DB2 Performance 021 Lock detail                              +0.472641
__ 0020 DB2 Insert into a Data Page                                  +0.472690
__ 66   DB2 Performance 058 SQL call completion                      +0.472731
__ 66   DB2 Performance 122 Thread level exit from DB2               +0.472769
__ 5600 Sign-on to ESAF Region=0004 SSID=CSQ6                        +0.474004
__ 5600 Thread created for ESAF SSID=CSQ6                            +0.474033
__ 74   MQ Accounting Class 1 SSID=CSQ6 CONN=IMS.IADG                +0.474674
__ 5600 Commit Prepare starting Region=0004 SSID=CSQ6                +0.480774
__ 66   DB2 Performance 121 Thread level entry into DB2              +0.482382
__ 66   DB2 Performance 084 Prepare entry                            +0.482475
__ 66   DB2 Performance 018 Exit from OSET, SRT1, or RNXT            +0.482619
__ 0020 DB2 Unit of Recovery Control - End Commit Phase 1            +0.482722
```

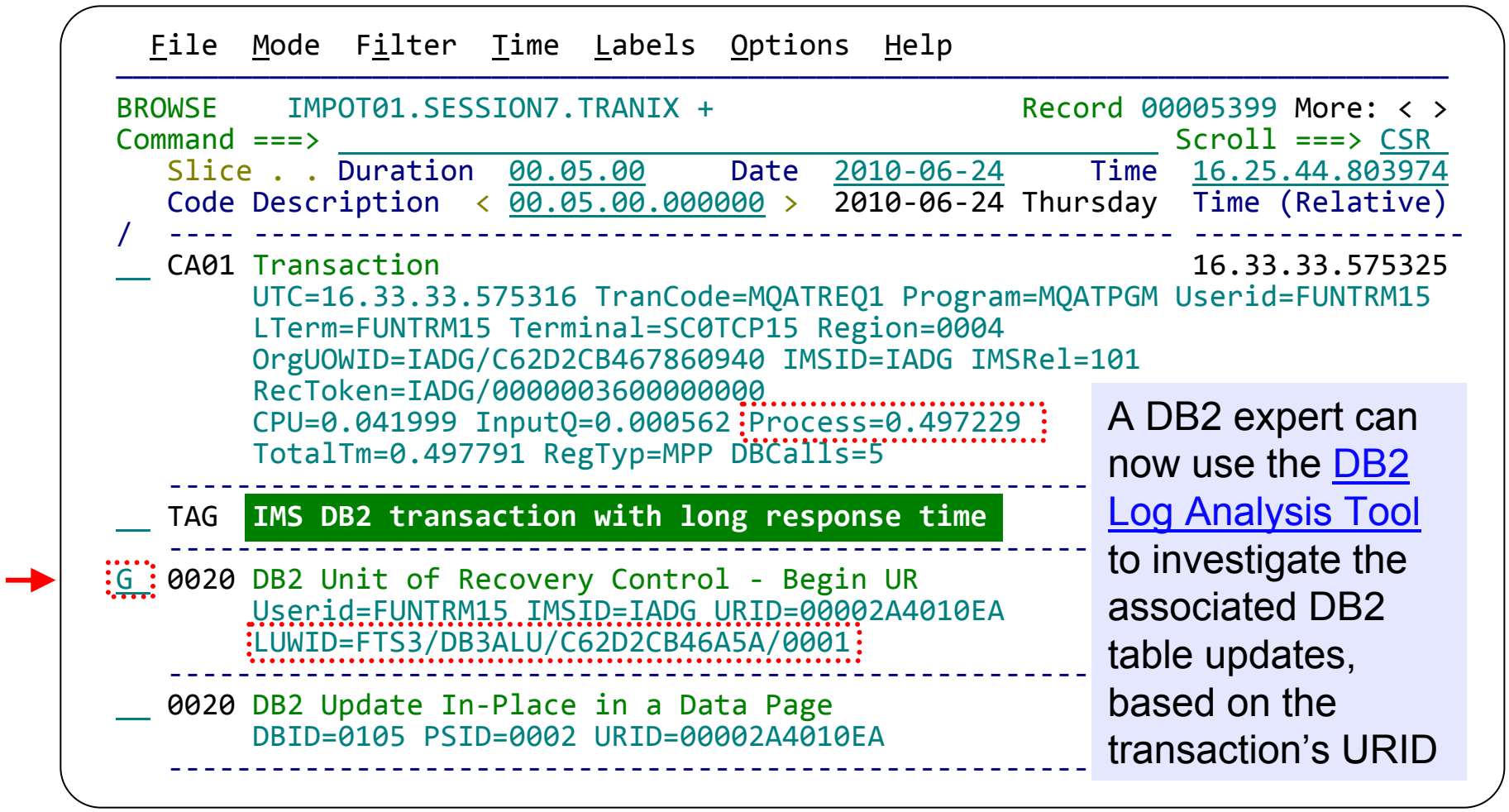
Keep scrolling forward until you see the jump in relative time, then scroll forward again to the 65 record.

Life cycle events: expanded summary view

```
  File  Mode  Filter  Time  Labels  Options  Help
-------------------------------------------------------------------------------
BROWSE    IMPOT01.SESSION7.TRANIX +                  Record 00004787 More: < >
Command ===>                                                 Scroll ===> CSR
   Slice . . Duration  00.00.00     Date  2010-06-24     Time  16.31.00.000000
   Code Description  < 00.05.00.000000 >  2010-06-24 Thursday  Time (Relative)
/  ---- ------------------------------------------------------ ----------------
__ 65   DB2 Accounting 003                                          +0.497189
        Program=MQATPGM Userid=FUNTRM15 Region=0004
        RecToken=IADG/0000003600000000
        CPU1=00.033593 CPU2=00.005305 I/O3=00.000000 Source=IMS_MPP
        GtPgRq=7 SyPgUp=3 Suspnd=0 DeadLk=0 TimOut=0 MxPgLk=1
        Sel=0 Ins=1 Upd=1 Del=1 LUWID=FTS3/DB3ALU/C62D2CB46A5A/0001
   ---------------------------------------------------------------------------
__ 66   DB2 Performance 046 Synchronous EU switch                   +0.497252
        Program=MQATPGM Userid=FUNTRM15 Region=0004
        SSID=DB3A SYSID=FTS3 ConType=MPP Plan=MQATPGM
        LUWID=FTS3/DB3ALU/C62D2CB46A5A/0001
   ---------------------------------------------------------------------------
__ 66   DB2 Performance 093 Suspend                                 +0.497298
        Program=MQATPGM Userid=FUNTRM15 Region=0004
        SSID=DB3A SYSID=FTS3 ConType=MPP Plan=MQATPGM
        LUWID=FTS3/DB3ALU/C62D2CB46A5A/0001
   ---------------------------------------------------------------------------
```

Scroll right to show the records in expanded view with relative times.

Identifying events for review or collaboration



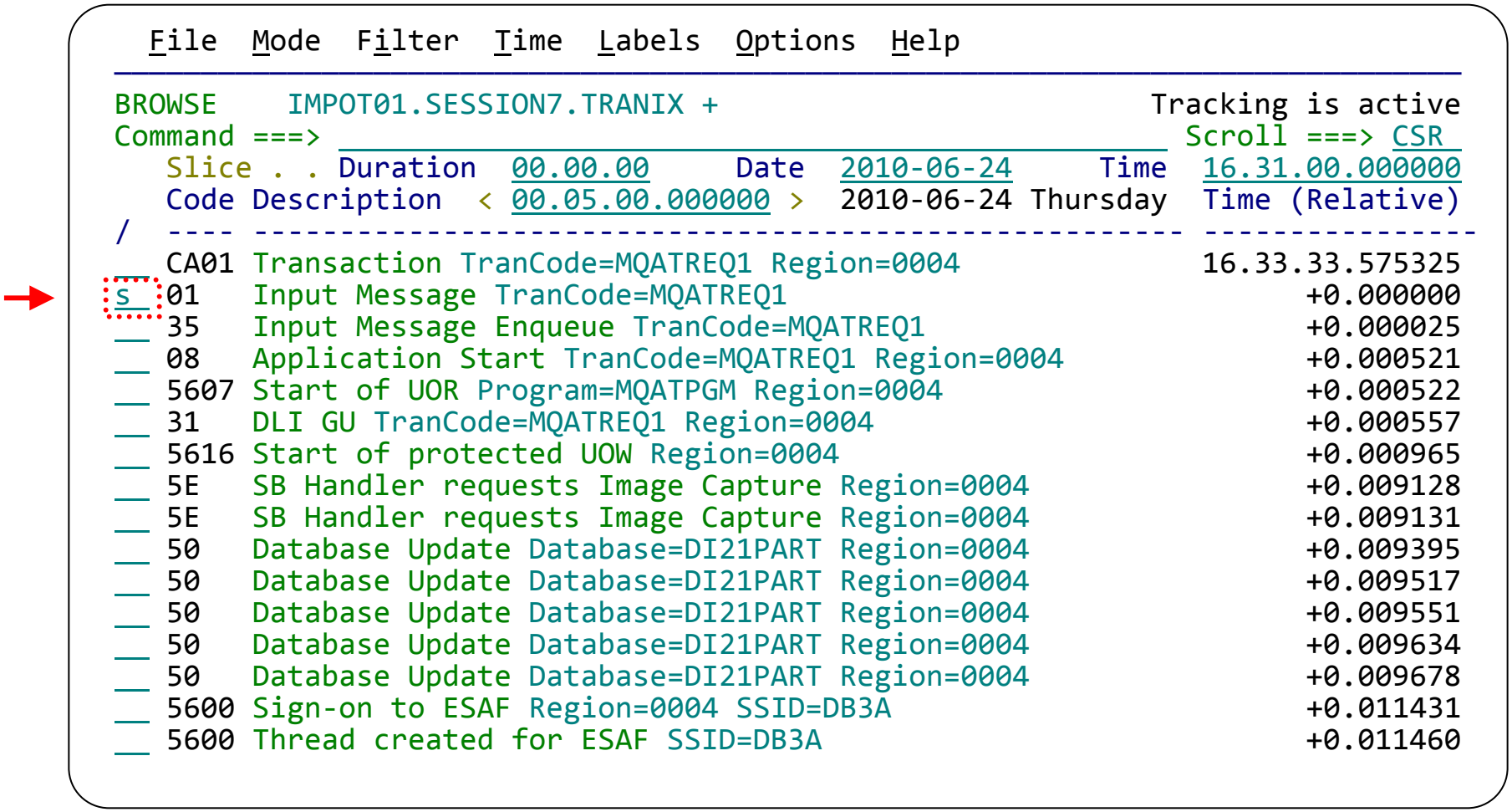
A DB2 expert can now use the DB2 Log Analysis Tool to investigate the associated DB2 table updates, based on the transaction's URID

Enter **FIND LUWID** on the command line.
Enter **G** to "tag" (bookmark) this DB2 record.

DB2 expert help using DB2 Log Analysis Tool

```
RECORD IDENTIFIER: 1

ACTION DATE       TIME     TABLE OWNER  TABLE NAME                 URID
------ ---------- -------- ------------ ------------------------- ------------
INSERT 2011-06-24 16.33.34 JOHN         HR                        00002A4010EA

DATABASE TABLESPACE DBID  PSID  OBID  AUTHID   PLAN     CONNTYPE LRSN
-------- ---------- ----- ----- ----- -------- -------- -------- ------------
HR_DB    HR_SPACE   00456 00002 00003 FUNTRM15 HR_PLAN  IMS      C62D2CB46CB3

MEMID CORRID       CONNID   LUW=NETID/LUNAME/UNIQUE/COMMIT      PAGE/RID
----- ------------ -------- ----------------------------------- -----------
00000 0004MQATPGM  IMS      FTS3    /DB3ALU  /C62D2CB46A5A/0001 00000002/02

ROW STATUS   EMP_ID EMP_NAME   EMP_PHONE       EMP_YEAR   EMP_SALARY
---------- ------ ---------- --------------- ---------- -----------
CURRENT     +330   JIM MARTIN 475-712-9508    2009-06-24 +0041000.00
POST-CHANGE +330   JIM MARTIN 475-712-9508    2009-06-24 +0042000.00
```

Viewing the details of transaction event data



Scroll back to the top of the tracked transaction (type M, then press F7). Select the 01 record.

Detail event data view using forms view

```
  File  Menu  Format  Help
 ──────────────────────────────────────────────────────────────────────────
BROWSE     IMPOT01.SESSION7.TRANIX +              Record 00004610 Line 00000000
Command ===>                                                  Scroll ===> CSR
Form    ===> MSC02    +    _   Use Form in Filter             Format ===> FORM
********************************* Top of data ********************************
+0004  Code... 01    Input Message
+0195  STCK... C62D2CB46789D940      LSN.... 000000000000177D
       Date... 2010-06-24 Thursday   Time... 16.33.33.575325.578

+0004  MSGLCODE... 01          MSGFLAGS... C1          MSGDFLG2... 81
+0014  MSGUOW..... Unit of Work (UOW) - Tracking
+0014  MSGORGID... 'IADG    '  MSGORGTK... C62D2CB467860940
+0024  MSGPROID... 'IADG    '  MSGPROTK... C62D2CB467860940

+00BE  MSGMSE..... Message System Extension; Item ID = 8A
+00C2  MSGUTC..... Coordinated Universal Time (UTC)
+00C2  MSGUDATE... 2010175F    MSGUTIME... 083333575316
+00CC  MSGUZONE... 032C

+00D6  MSGMSC..... TMR System Segment; Item ID = 8C
+00F6  MSGMSOID... 00          MSGMSIID... 00          MSGMSFL1... 01
+00F9  MSGMSFL2... 48          MSGMSFL3... 40          MSGMSFL4... 00
+00FC  MSGMSUID... 0000000000000000
```

To reduce “noise”, and show only the fields that are of interest to you, use a form.
To “zoom” on a field, move your cursor to the field, and then press Enter.

Demystifying field data in the event

```
  File  Menu  Help
 ──────────────────────────────────────────────────────────────────────────────
BROWSE    IMPOT01.SESSION7.TRANIX +                          Line 00000000
Command ===> _____________________________________________ Scroll ===> PAGE
****************************** Top of data ******************************
+0006  MSGDFLG2... 81   Flags from QDFLG2 of QDEST

 On    QDF2PRM.... 80   This Destination is permanent and implies that
                        fields exist for
                        1. Average Msg length
                        2. Enqueue and Dequeue counts
                        3. Name field If the above  bit is off, the
                        fields  are assumed to be absent
 Off   QDF2BKR.... 40   Backup queue is required, either for Resend or
                        Conversational process
 Off   QDF2QMOV... 20   QMOVE in Process : XRF
 Off   QDF2LQUE... 10   Local QPOOL in Use : XRF
 Off   QDF2CLNR... 08   Cleanup Check Request Flag : XRF
 Off   QDF2MDEL... 04   Message Deletion in Progress Flag : XRF
 Off   QDF2BTYP... 03   Destination Type bits
 On    QDF2SMB.... 81   Generated SMB - Transaction
 Off   QDF2CNT.... 82   Generated CNT - Logical Terminal
****************************** End of data ******************************
```

End of scenario

- **The cause of the IMS transaction problem has been narrowed down to a slowdown in DB2**
- **Sufficient information about the DB2 update activity has been collected and can be passed on to the DB2 DBA for further investigation.**

Summary: Transaction Analysis Workbench

- **Enables a change in the way problem resolution is performed within an organization**
- **Automatically locates log files for the problem time range for supported subsystems.**
  - Manual addition of files also provided
- **Identifies exceptions (using criteria defined by your subject-matter experts)**
- **Better assignment of problems to the correct group**
  - Improved confidence in problem assigned by experts
- **Enables a collaborative workflow:**
  - Between first responders and subject-matter experts
  - Between experts in different areas

More information

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

RFE Now Live for DB2 and IMS Tools

- We recently announced the launch of the DB2 and IMS Tools Request for Enhancements (RFE) Community that enables customers to directly submit, manage and track their requirements through this online community.
- The DB2 and IMS Tools RFE provides customers with greater accessibility to the requirements that are of interest to them. DB2 for z/OS, Rational, Tivoli and WebSphere have already adopted RFE with positive customer feedback. All you need to get started is an IBM developerWorks IBM ID. Please use the DB2 and IMS Tools RFE to submit customer requirements going forward.

DB2 Tools RFE Submission

- Brand = Information Management
- Product Family = “DB2 for z/OS”
- Product = Your DB2 Tool

IMS Tools RFE Submission

- Brand = Information Management
- Product Family = “IMS”
- Product = Your IMS Tool

Thank You!

Your Feedback is Important !