Transaction Analysis Workbench for System z Version 1.2

See the big picture from end-to-end

James Martin

Tuesday, 9 September 2014

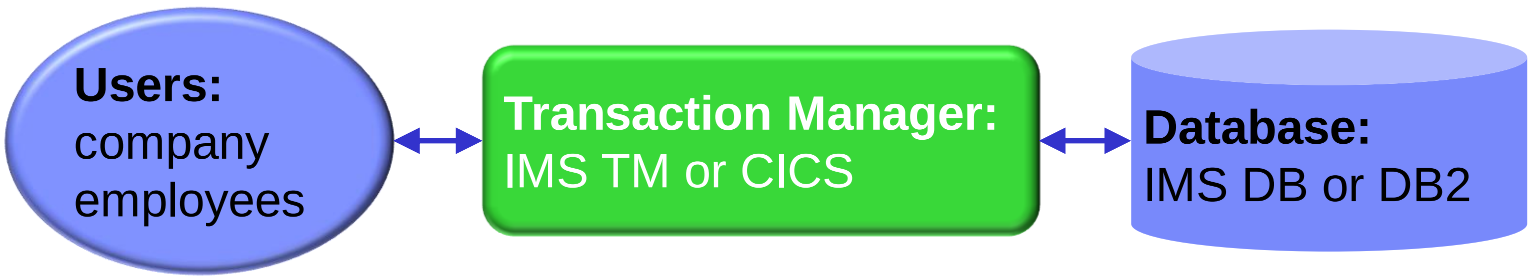
Agenda

- The big picture of modern z/OS transactions
- Common questions asked when analyzing transactions
- IBM Transaction Analysis Workbench for z – Version 1.2
- Exception processing: Workbench and BigData
- How Workbench can help application teams
- CICS/DB2 scenario
- CICS/DBCTL scenario (for reference; not presented)
- IMS/DB2 scenario (for reference; not presented)
- SMF Reports (for reference; not presented)

The big picture of modern z/OS transactions

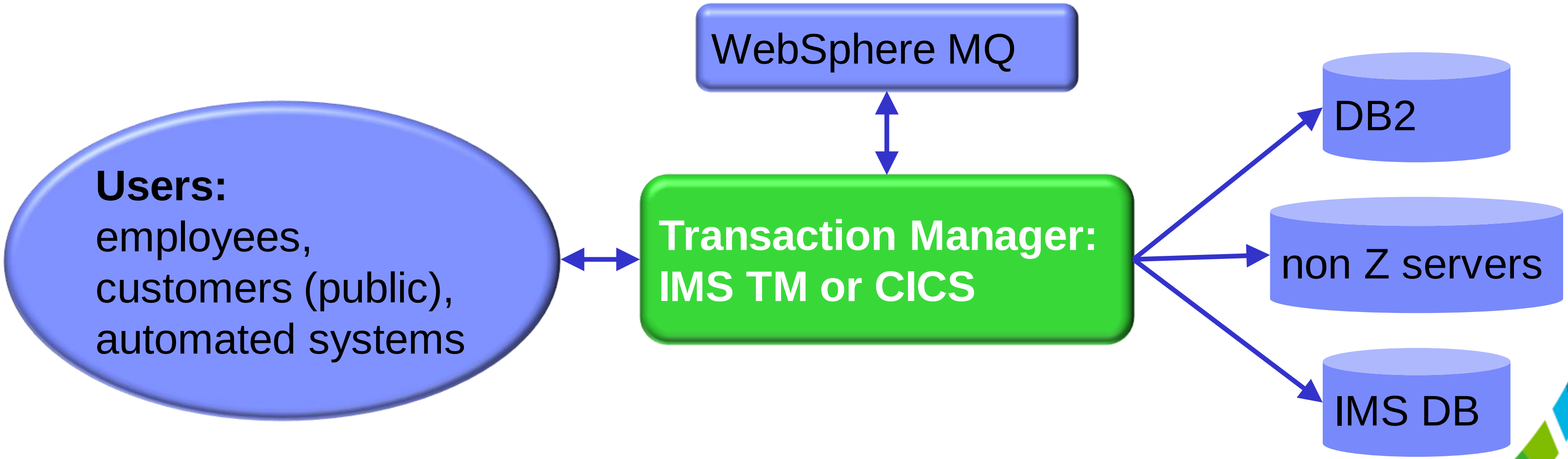
1980s application:

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



Today:

users are customers; data is **complex, heterogeneous**, often distributed

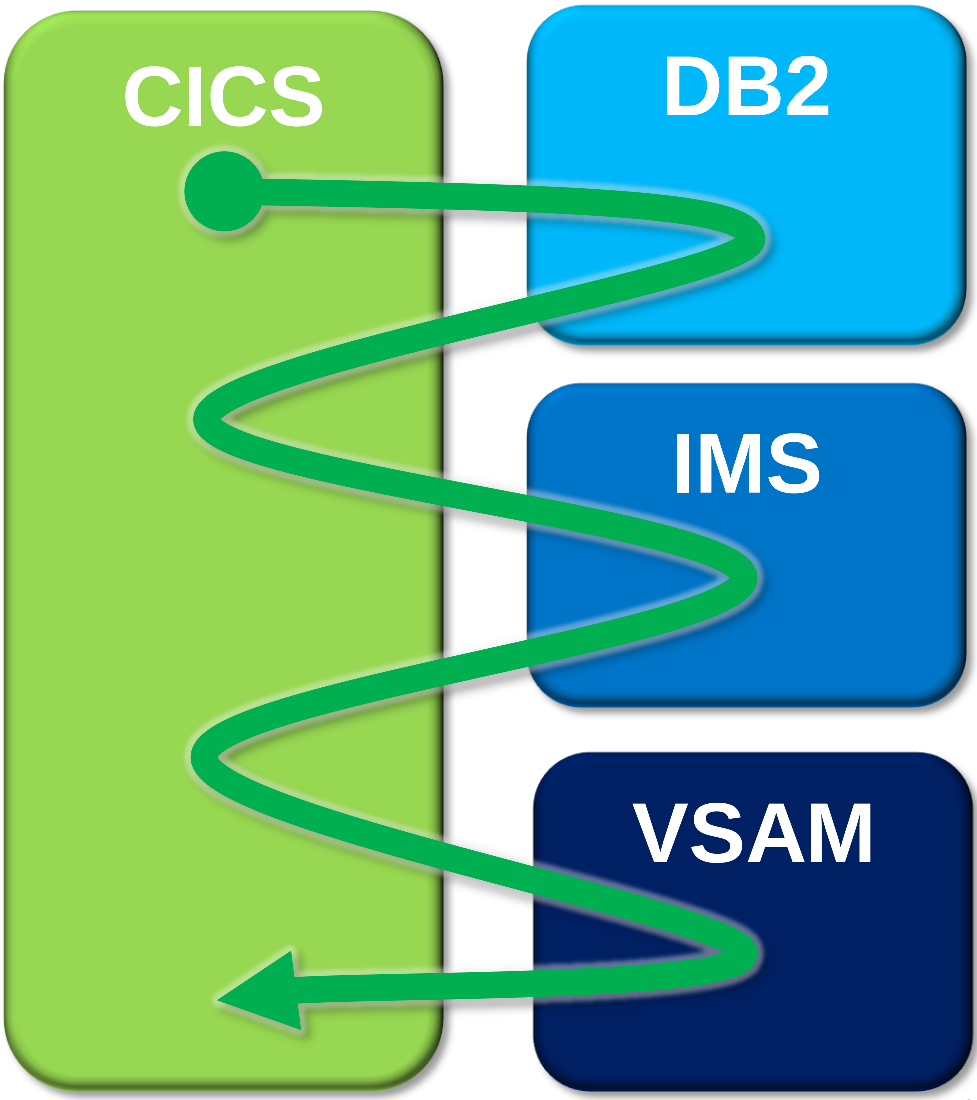


Where is the problem in my z/OS transaction?

- **Common questions asked:**
  - Who’s fault is it anyway?
    - Is a subsystem responsible?
      - IMS, DB2, CICS, WebSphere MQ, etc.
    - Is z/OS the culprit?
  - What instrumentation data is required for problem determination?
    - What is available?
    - Where/how is it collected?
    - Is it accessible?
  - Who is the best person to work on this problem?
    - How is this determined today?

What makes performance issues difficult to identify?

- **Today's complex transaction workloads may span multiple subsystems**
- **Each subsystem has its own instrumentation data; data collection can be difficult**
- **Complex environments increase number of possible points of failure**



What may help ease problem determination issues?

- Develop a common approach to transaction problem resolution
- Automate basic tasks to allow SMEs to focus on problem identification and resolution
  – Locate and extract instrumentation data from multiple subsystem sources
  – Improve the assignment of problems to the correct group
- Provide ability to identify transaction exceptions across multiple subsystems
  – User specified thresholds that identify transactions with poor performance
- Provide Deep-Dive capabilities that span multiple subsytems
  – Provide an end-to-end transaction activity life cycle view
  – Ability for SMEs to work with and understand instrumentations data sources
  – Ability for SMEs to see the big picture on z
  – Reduce time to resolution for transaction performance problems

IBM Transaction Analysis Workbench for z/OS

- **A tool for problems in the big picture:**
  - For "first responders" and subject-matter experts (SMEs)
  - For SMEs in different areas
- **Provides a life cycle view of transaction activity across subsystems**
  - Changes the way problem resolution is performed
  - Ensures everyone is looking at the same transactional data
- **Goes in-depth.**
  - Uses SMF, trace, and log records to follow transaction flow
- **Better assignment of problems to the correct group**
  - Improved confidence in problems assigned to experts

Workbench: What is it?

- A tool for cross-subsystem problem analysis:
- For first responders and SMEs
- Locates and extracts instrumentation data
- Set thresholds and identify exceptions across multiple subsystems
- Provides a life cycle view of end-to-end transaction activity
- Better assignment of problems to the correct group

Workbench is not just for CICS or IMS

IMS	CICS	DB2	WebSphere MQ and WAS	z/OS
IMS log and trace	CMF performance class (SMF 110)	DB2 log	MQ log extract	SMF
IMS monitor	CICS trace	DB2 accounting, statistics and performance trace (IFCIDs)	MQ statistics (SMF 115-1, -2)	OPERLOG / SYSLOG
CQS log stream			MQ accounting (SMF 116)	
IMS Connect event data (collected by IMS Connect Extensions)			WAS request activity performance statistics (SMF 120-9)	
OMEGAMON ATF				
IRLM long lock (RMF 79.15)				

Workbench ISPF dialog

1. **Sessions:** collaborative approach to problem determination
2. **Controls:** common place for shared definitions

```
   File  Help
 ------------------------------------------------------------------------------
 V1R2M0         Transaction Analysis Workbench - Primary Option Menu
 Option ===> ___________________________________________________________________

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

 Session Repository  . . . 'FUW120.SESSIONS'_______________________  +
```

3. **Systems:** define IMS, DB2, CICS and MVS systems – allows workflows to perform automated file selection (locate the required log files)
4. **Process:** ad hoc log file processing

Session Manager

1. **Register problems**
2. **Keep all investigative information in one place**

```
                        Session Manager              Row 1 of 17 More: < >
Command ===> NEW                                         Scroll ===> CSR

NEW Register a new Session

/  Key        Status   Description
_  00000001   OPEN     DB2: CICS read via SP doing table space scan
_  00000002   DONE     DB2: CICS update via SP doing table space scan
_  00000003   DONE     DB2: IMS tran generating cascade deletes
_  00000004   DONE     DB2: IMS tran generating trigger deletes
_  00000005   OPEN     DB2: Java update via SP waiting for WLM
_  00000006   DONE     DB2: IMS tran calling inefficient DB2 SP
_  00000007   OPEN     DB2: Java update via SP waiting for CPU
_  00000008   OPEN     DB2: z/OS WAS Java app gens RI cascade deletes
_  00000009   OPEN     DB2: z/OS WAS Java app gens trigger deletes
_  00000010   OPEN     DB2: z/OS WAS Java app calling inefficient SP
_  00000011   OPEN     CICS-DBCTL
_  00000012   OPEN     CICS-DBCTL deadlock
_  00000014   OPEN     DB2: Contention
******************************* Bottom of data ********************************
```

The session – the place for collaboration

1. **Register** problem details
2. **Workflow** contains all the tasks to be performed
3. **Files** contains the list of log files for this problem

```
  File  Help
──────────────────────────────────────────────────────────────────────────────
                              Session 00000002
Option ===> __________________________________________________________________

Description : DB2: CICS update via SP doing table space scan

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

4. **Investigate** provides interactive problem determination
5. **History** contains written notes and jobs about the problem

Session registration details

1. What is the problem? Including short and long descriptions
2. When and where did the problem occur? Important for log selection!
3. Who is going to fix it?

```
  File  Help
------------------------------------------------------------------------------
                               Session Details                  Row 1 to 3 of 3
Command ===> ________________________________________________  Scroll ===> CSR_

Key . . . . : 00000002
Description . DB2: CICS update via SP doing table space scan________________
Severity  . . _
Reference . . FUW-745________________________     -- When problem occurred ---
Reported by . TONY___________________________          YYYY-MM-DD  HH.MM.SS.TH
Assigned to . GRAHAM_________________________     From 2013-10-08  15.25.00.00
Status  . . . DONE__                              To   2013-10-08  15.30.00.00
Template  . . CICS+DB2   +                        Zone LOCAL

Systems involved:

/  System +   Type +
__ FUWTCIC_   CICS____
__ DBA6____   DB2_____
__ FTS3____   IMAGE___
******************************* Bottom of data ********************************
```

Workflows and session templates

- **SMEs can use session templates to populate new sessions with the tasks needed to prepare the problem for evaluation**
  - Created sessions include: systems involved and a sequence of tasks (workflow) for analyzing the problem

Session template

Systems

Workflow

Task

Task

…

When creating a session, users can select the session template that best matches the type of problem

Each task is either **JCL** for a batch job, or a **note** containing instructions to the user

Session

Systems

Workflow

Task

Task

…

Session: Workflow

1. Contains tasks – batch jobs and instructions
2. Batch jobs can locate log files, create extracts and transaction indexes, run reports
3. Can be predefined with a “template” set up by the expert
4. All jobs run under the session create a new task
5. Batch job output is saved and can be viewed here

```
                                    Tasks                          Row 1 to 7
Command ===> ________________________________________________ Scroll ===> CSR

 NEW   Create a new task
 AUTO  Create file selection and extract tasks
 SCHED Schedule all the tasks (or select required tasks only)

/  Task Status       Description
__    1  DONE        DB2 log file selection for DBA6
__    2  DONE        SMF/CMF file selection for FUWTCIC
__    3  DONE        Create the CICS transaction index
__    4  CC 0000     Create SMF extract for DB2 system DBA6
__    5  CC 0000     Create log extract for DB2 system DBA6
__    6  DONE        Please assign the problem to John, our DB2 expert.
?     7  CC 0000     DB2 performance and accounting analysis for system DBA6
****************************** Bottom of data *******************************
```

```
                           Task Output                            Row 1 to 5

/   DDname     StepName ProcStep     Rec-Cnt  Jobname  JobID     Max-RC
_   JESMSGLG   JES2                       32  DB2X0001 JOB03728  CC 0000
_   JESJCL     JES2                       25
_   JESYSMSG   JES2                       91
_   SYSPRINT   FUWBATCH                   37
S   DB2X       FUWBATCH                  418
************************** Bottom of data ***************************
```

Session: Files

1. All log files and other data sets associated with the problem are registered here
2. Files can be automatically located - IMS, DB2 and SMF
3. Manually enter other types of log files
4. Supports all data set types and log streams

```
  File  Help
------------------------------------------------------------------------------
                         Locate and Manage Log Files     Row 1 of 10 More: < >
Command ===> ________________________________________________ Scroll ===> CSR

NEW  Insert a new log file.
AUTO Run automated file selection to locate log files.

Log Files:
                                                           ---- System ---- File
/   Exc Data Set Name                                      Name     Type    Type
___     TAW.P0000002.CICS.INDEX
___     TAW.P0000002.DB2.ACCT.INDEX
___     TAW.P0000002.DB2.PERF.TRACE                        FUWTCIC  CICS    SMF
___     TAW.P0000002.DB2.ARCLOG.EXTRACT                                     LOG
___     TAW.P0000002.CICS.GTF.TRACE                        FUWTCIC  CICS    GTF
******************************* Bottom of data ********************************
```

CICS and DB2 accounting indexes

CICS and DB2 traces

Session: Reporting

1. **IMS Performance Analyzer** – selected reports only

2. **CICS Performance Analyzer** – selected reports only

```
                              Reporting
Option ===> ____________________________________________________________

Select a reporting option then press Enter.

1  IMS          Transaction and system analysis using IMS PA
2  CICS         Transaction and system analysis using CICS PA
3  CICS-DBCTL   Combined CICS and IMS analysis of transactions
4  SMF          z/OS and subsystem analysis
5  DB2          DB2 accounting exception analysis
6  OPERLOG      Sysplex operations log (SYSLOG)
```

3. **CICS-DBCTL** – end-to-end from CICS into IMS

4. **DB2** – exception reporting and extract

5. **OPERLOG** – MVS operations log (SYSLOG)

Session: Investigate

1. **Session log files are merged in time sequence**

2. **Often log files are very large. Use time slicing to process required time period only – very quick!**

```
                             Investigate                        Row 1 of 4 More: < >
Command ===> ________________________________________________ Scroll ===> CSR

                ______________ Time Slice (ON) ________________
                Time             Date             Duration
                HH.MM.SS.thmiju  YYYY-MM-DD       HH.MM.SS  Zone    Filter +
                16.39.36.351066  2013-07-03       00.00.00  LOCAL   ________
/
________   Type  Start Time       Date             Duration           Coverage
________   CICS  16.39.36.351066  2013-07-03 Wed  00.02.08           PARTIAL
________   SMF   16.35.26.490921  2013-07-03 Wed  00.06.42           PARTIAL
________   DB2   16.33.53.849552  2013-07-03 Wed  00.27.46           COMPLETE
________   DTR   16.39.03.904776  2013-07-03 Wed  00.02.55           PARTIAL
******************************* Bottom of data ********************************
```

3. **Select all or some of the files only**

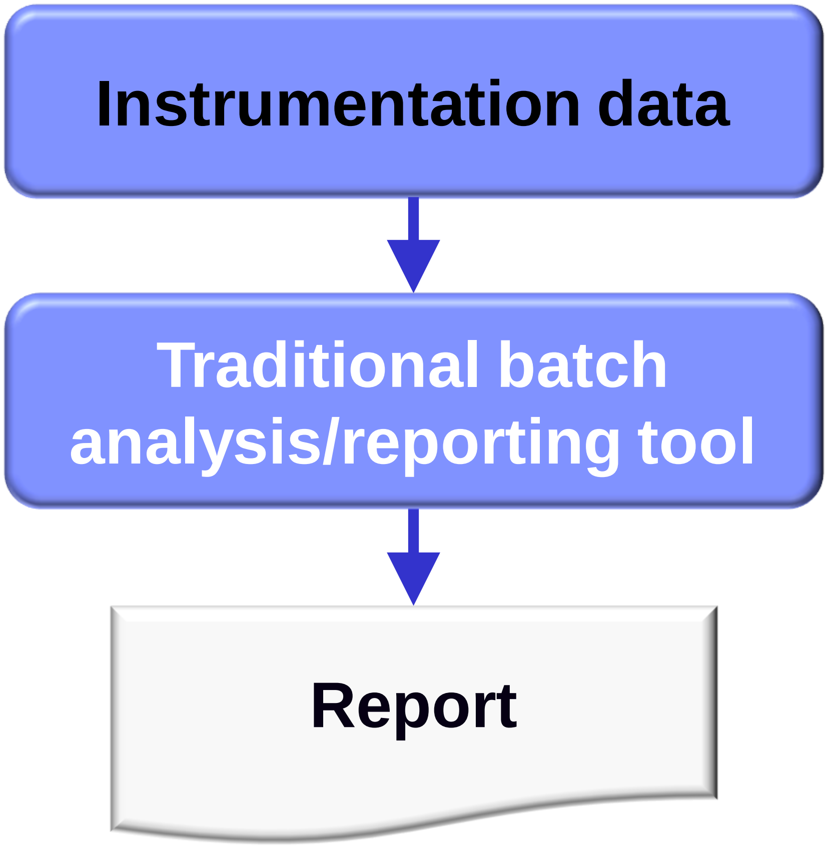
```
________   Type  Data Set Name                                       Coverage
________   CICS  TAW.P0000002.CICS.INDEX                             PARTIAL
________   SMF   TAW.P0000002.DB2.INDEX                              PARTIAL
________   DB2   TAW.P0000002.DB2.ARCLOG.EXTRACT                     COMPLETE
________   DTR   TAW.P0000002.DB2.PERF.TRACE                         PARTIAL
******************************* Bottom of data ********************************
```

Workbench Exception Processing

Problem: today's instrumentation data overwhelms traditional tools

- **Good performance monitoring should identify possible performance issues before they become critical**

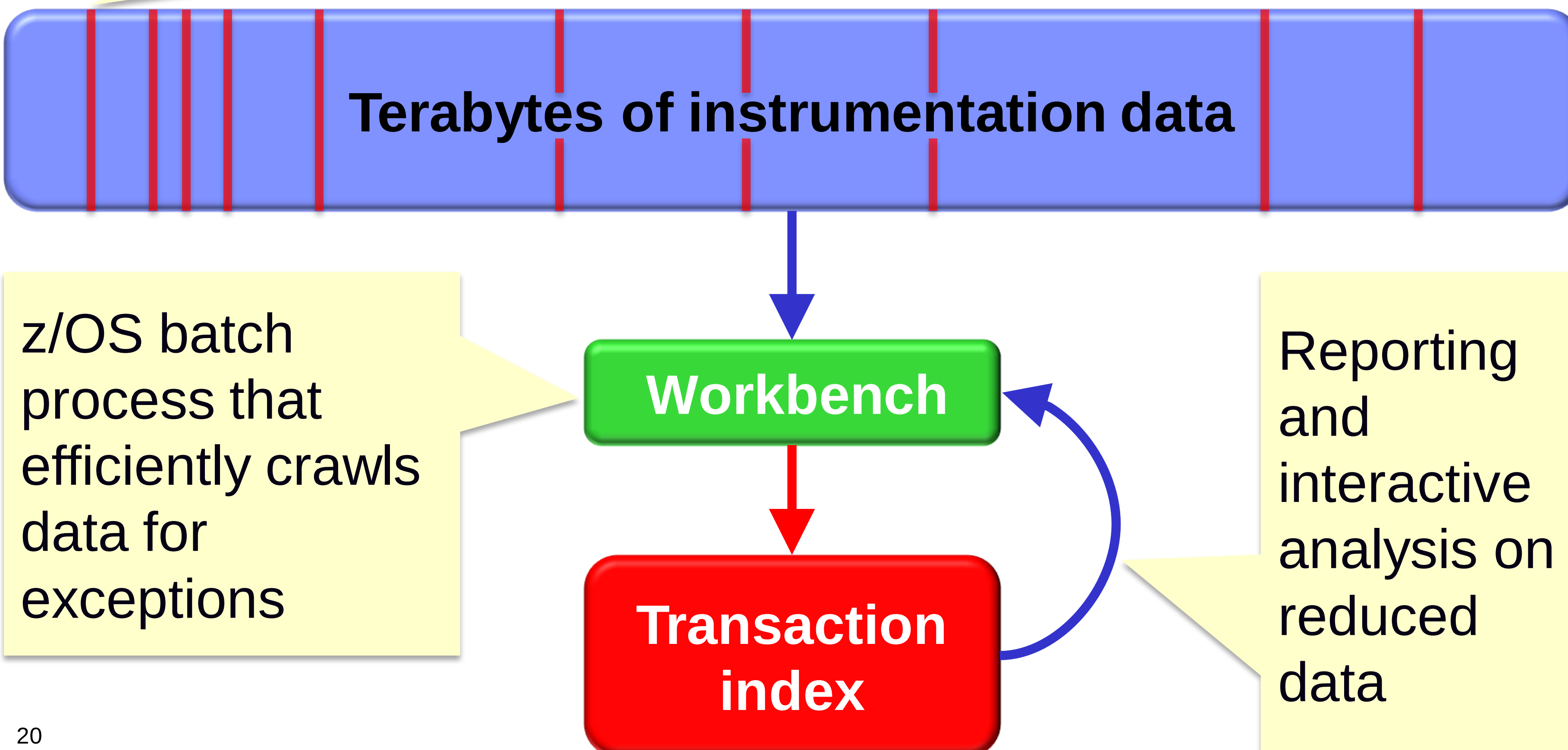
- **Today's systems create so much instrumentation data that existing techniques cannot keep up: takes too long, costs too much!**



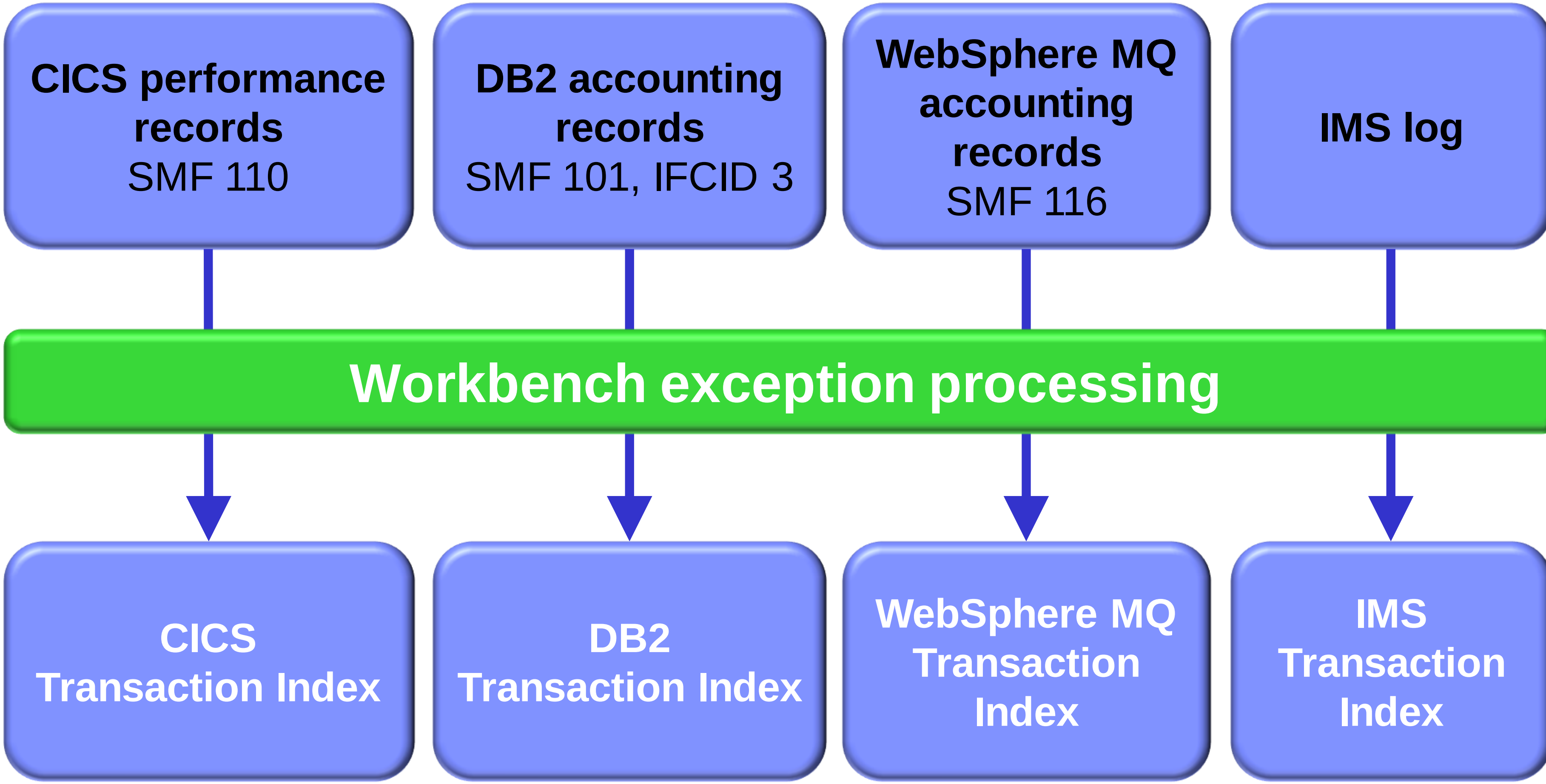
- Processes and reports on all records
- Processing time and cost grows with size of instrumentation data, beyond practical limits
- Reports can grow too long to be useful, and contain unwanted detail

Solution: Exception detection

Exception: a transaction that matches specific *exception criteria*, such as long response time or an abend



Solution: Transaction Index



1. Transaction indexes are created by the workbench (a session workflow will create them)
2. They are used to identify all the transaction and UOR workloads in IMS, DB2 and CICS
3. The transaction index is a special extract - one record per transaction in time sequence
4. Contain summarized performance and resource usage information
5. Can be filtered to include exception transactions only
6. Can be used for reporting and to identify problem transactions

Building the CICS Exception Index

```
.---------------------------- Line Actions ----------------------------.
|   File  Help                                                          |
|  -------------------------------------------------------------------  |
|                      SMF Transaction Index Request                    |
|  Command ===> ____________________________________________________   |
|                                                                       |
|  Original Data Set . : FUW000.QADATA.FBOSP006.SMF.D131008.CICS        |
|  /  CICS index . . . . 'JM3.CICS.INDEX'                              |
|  _  DB2 accounting . . 'JM3.DB2.INDEX'                               |
|  _  MQ accounting  . . 'JM3.MQ.INDEX'                                |
|                                                                       |
|  Exception criteria:                                                  |
|  _  Transaction ABEND (CICS only)                                     |
|  _  Response time threshold . . _______  (0.00001 to 999999 seconds) |
|                                                                       |
|  ---- Extract Interval -----                                          |
|       YYYY-MM-DD  HH.MM.SS.TH                                          |
|  From 2013-10-08  15.25.00.00                                         |
|  To   2013-10-08  15.30.00.00                                         |
|                                                                       |
'-----------------------------------------------------------------------'
```

- User specified Exception criteria narrows investigative process to only “Poorly” performing transactions

CICS exception index

- **CMF/SMF 110 Records**
  - CICS monitoring facility (CMF) performance class data
  - Each original SMF record can be split into one record per transaction using tools

```
S  6E13 CICS Transaction                                        15.28.01.407051
        TranCode=FBOX Program=FBOCCP01 Userid=TWM LTerm=SC0TCP07 Terminal=CP07
        RecToken=FUWTCIC/CC145FE27199CC84 Resp=6.686043 CPU=0.007469 DB2=2
        ACCT=FTS3.SC0TCP07.145FE27199CC Task=249
```

Select (S) to expand record and see more detail

```
+0005   Code... 6E13  CICS Transaction
+00B2   STCK... CC145FE27184B884      LSN.... 0000000000000006
        Date... 2013-10-08 Tuesday    Time... 15.28.01.407051.532

+0000   SMFLEN..... 1058         SMFSEG..... 0000         SMFFLG..... DE
+0005   SMFRTY..... 6E           SMFTME..... 005501FB     SMFDTE..... +113281
+000E   SMFSID..... 'FTS3'       SMFSSI..... 'CICS'       SMFSTY..... 0001
+0018   SMFTRN..... +2           SMFAPS..... 0000002C     SMFLPS..... +114
+0022   SMFNPS..... +1           SMFASS..... 0000009E     SMFASL..... +4026
+002A   SMFASN..... +1           SMFMNRVN... 0670
+002E   APPLID..... 'FUWTCIC '   SMFMNSPN... 'FUWTCIC '   SMFMNCL.... 0003
+0044   SMFMNDCA... 00000D8E     SMFMNDCL... +2           SMFMNDCN... +357
+004C   SMFMNDRA... 0000009E     SMFMNDRL... +3312        SMFMNDRN... +1
+0066   SMFMNCRL... +0           SMFMNTAD... 00006B49
+006C   SMFMNLSO... 0000000000000000
+0074   SMFMNDTO... 00006B49D2000000                      SMFMNOPN... 60
+007E   SMFMNJBN... 'FUWTCIC '   SMFMNRSD... +113280      SMFMNRST... 0043052C
+008E   SMFMNUIF... '        '   SMFMNPDN... 'SP7.1.3 '   SMFMNCON... 00010002

+009E   DFHTASK.... Task Control
+009E   Tran....... 'FBOX'       SC......... 'TP..'
+0856   Dispatch... 1.614352/12
+0862   UserCPU.... 0.007469/12
+086E   Suspend.... 5.071690/12                           TaskNo..... +249
+0672   ICSTART.... +0           ErrFlag.... 00000000     ICSTACCT... +0
+0676   ICTotal.... +0           GroupID.... '..FTS3.SC0TCP07...S...d.....'
+00E2   NETName.... 'FTS3.SC0TCP07'
+00F6   NETUOWID... 145FE27199CC0001
+087A   DispWait... 0.000412/11                           Prty....... +1
```

Expanded records show detailed information, including:
Task Control, CICS Task info, File Control, Data Processing, Program Control, Syncpoint Processing, and much more

CICS Trace: tracking a DLI call

- Can be written to GTF; normally requires batch IPCS to format
- Just another data source for the workbench
- Can be merged and tracked against other data sources including the DB2 Log, DB2 Trace entries, and IMS log

```
    File  Mode  Filter  Time  Labels  Options  Help
 ──────────────────────────────────────────────────────────────────────────────
 BROWSE    FUNDID.TRACE.D120329.T172825.FTS3.S1       Record 00035478 More: < >
 Command ===> ________________________________________________ Scroll ===> CSR
         Navigate < 00.06.00.000000 >      Date/Time 2013-09-12 17.29.49.890485
 / ──── Tracking ────────────────────────  Thursday 2013-09-12 Time (Elapsed)
 E_ AP   0330 DLIDP ENTRY DBCTL                             00579 17.31.51.200624
 __ AP   0302 DLIDP EVENT ABOUT-TO-INVOKE-DFHERM            00579        0.000004
 __ AP   2520 ERM   ENTRY APPLICATION-CALL-TO-TRUE(DBCTL) 00579        0.000006
 __ AP   2522 ERM   EVENT PASSING-CONTROL-TO-QR-TRUE(DBCTL) 579        0.000006
 __ AP   0310 DBAT  ENTRY APPLICATION                       00579        0.000005
 __ AP   0311 DBAT  EVENT ABOUT-TO-INVOKE-DRA               00579        0.000004
 __ AP   0304 DBSPX EVENT ABOUT-TO-ISSUE-WAIT               00579        0.000011
 __ AP   0305 DBSPX EVENT POSTED                            00579        0.014295
 __ AP   0312 DBAT  EVENT RECEIVES-CONTROL-FROM-DRA FOR     00579        0.000012
 __ AP   0313 DBAT  EXIT  DBAT-RESPONSE-CODE                00579        0.000005
 __ AP   2523 ERM   EVENT REGAINING-CONTROL-FROM-QR-TRUE    00579        0.000006
 __ AP   2521 ERM   EXIT  APPLICATION-CALL-TO-TRU(DBCTL)  00579        0.000010
 __ AP   0303 DLIDP EVENT RECEIVES-CONTROL-FROM-DFHERM      00579        0.000007
 __ AP   0331 DLIDP EXIT  DBCTL                             00579        0.000006
```

Workbench and application development teams

Application performance testing

- Can the application team do it?
- What tools are available?
- Is performance a part of validation testing?
- Does the evaluation occur at the transaction level?
- What is the cost of a failed application roll-out due to poor performance?
- Does system programmer or DBA have time to help?

Application team and instrumentation data usage

- **Value of data may not be known**
- **If value is know, how to gain access or collect data is not**
- **Limited or no knowledge of tools that use the data**
  – Not traditional development tools
- **Staffing reductions can limit access to system programmers and DBAs**

How Workbench helps

- **Automated collection of instrumentation data**
- **Automated reporting for validation testing**
- **Exception Analysis to identify performance problems**
- **Transaction life cycle views of transaction exceptions**
- **Save results of each validation testing run for comparison**
- **System programmers and/or DBAs less reluctant to help**

Scenario:
CICS-DB2 problem

Scenario: CICS DB2 problem

1. **On the following slides, we present an example scenario: a user has reported a long transaction response time for an CICS transaction using DB2**

- **The analysis is divided into two parts:**
  1. The **first responder**:
     - Registers the problem in the Workbench session manager and collects the log files
     - Follows a process orientated script to assign problem to initial expert
       - Based on what is found
  2. 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 (***template***) where the problem occurred.

```
  File  Help
 ──────────────────────────────────────────────────────────────────────────────
                              Session Details                    Row 1 to 3 of 3
 Command ===> ________________________________________________ Scroll ===> CSR_

 Key . . . . : 00000002
 Description . DB2: CICS update via SP doing table space scan__________________
 Severity  . . _
 Reference . . FUW-745_____________________________  -- When problem occurred ---
 Reported by . TONY________________________________       YYYY-MM-DD  HH.MM.SS.TH
 Assigned to . GRAHAM______________________________  From 2013-10-08  15.25.00.00
 Status    . . DONE__                                To   2013-10-08  15.30.00.00
 Template  . . CICS+DB2  +                           Zone LOCAL

 Systems involved:

 /  System +   Type +
 __ FUWTCIC_   CICS____
 __ DBA6____   DB2_____
 __ FTS3____   IMAGE___
******************************* Bottom of data ********************************
```

The ***template*** (set up by the expert) populates the system list (where the problem occurred), as well as the workflow task list (preparatory jobs to select log files and create extracts)

Subject-matter expert: Exception candidate investigation

```
BROWSE    FUW000.QADATA.PKGORDER.CICS.D131008.INDEX  Record 00000008 More: < >
Command ===> FILTER                                           Scroll ===> CSR
        Navigate < 00.00.01.000000 >      Date/Time 2013-10-08 14.56.25.116977
/  ____ Filtering ______________________    Tuesday 2013-10-08 Time (LOCAL)
__ 6E13 CICS Transaction                                       15.28.17.693992
        TranCode=FB66 Task=251 Program=FBOCCP66 Userid=TWM Terminal=CP07
        RecToken=FUWTCIC/CC145FF1F9E7C984 Resp=1.516358 CPU=0.006805 DB2=2
        ACCT=FTS3.SC0TCP07.145FF1F9E7C9 Task=251
   ---------------------------------------------------------------------------
__ 6E13 CICS Transaction                                       15.28.26.395768
        TranCode=FB66 Program=FBOCCP66 Userid=TWM LTerm=SC0TCP07 Terminal=CP07
        RecToken=FUWTCIC/CC145FFA465C6704 Resp=1.168714 CPU=0.006750 DB2=2
        ACCT=FTS3.SC0TCP07.145FFA465C67 Task=253
   ---------------------------------------------------------------------------
__ 6E13 CICS Transaction                                       15.28.34.383952
        TranCode=FB66 Program=FBOCCP66 Userid=TWM LTerm=SC0TCP07 Terminal=CP07
        RecToken=FUWTCIC/CC146001E49B4486 Resp=1.590794 CPU=0.006645 DB2=2
        ACCT=FTS3.SC0TCP07.146001E49B44 Task=255
   ---------------------------------------------------------------------------
__ 6E13 CICS Transaction                                       15.30.11.820429
        TranCode=FB66 Program=FBOCCP66 Userid=TWM LTerm=SC0TCP07 Terminal=CP07
        RecToken=FUWTCIC/CC14605ED0D24506 Resp=1.626297 CPU=0.006708 DB2=2
        ACCT=FTS3.SC0TCP07.14605ED0D245 Task=260
   ---------------------------------------------------------------------------
******************************** Bottom of Data ********************************
```

This display has been filtered to show **CICS transaction index (CMF:6E13) records** with a process time of greater than 1.0 second and some DB2 activity (DB2CALLS>0).
A transaction has response time greater than 1.5 seconds but only 2 DB2 calls.
What went wrong? Enter TX to show records related to the transaction.

Transaction lifecycle: CICS and DB2 together

The tracking result set has brought in all the transaction's event records from all the data sources: CICS trace, DB2 log and DB2 trace.

```
BROWSE    FUW000.QADATA.PKGORDER.CICS.D131008.INDEX  Record 00007194 More: < >
Command ===> ____________________________________________ Scroll ===> CSR
        Navigate < 00.00.01.000000 >      Date/Time 2013-10-08 14.56.25.116977
 /  ---- Tracking ----------------------      Tuesday 2013-10-08 Time (LOCAL)
 E   6E13 CICS Transaction TranCode=FB66 Task=251                15.28.17.693992
 __  072  Create thread start                               DBA6 15.28.17.697585
 __  112  Thread allocate PKGCUST1                          DBA6 15.28.17.698036
 __  073  Create thread end                                 DBA6 15.28.17.698088
 __  177  Package allocation PKGCUST1                       DBA6 15.28.17.698276
 __  053  SQL request               SQLCODE=0 STMT=000158 DBA6 15.28.17.698442
 __  380  SP entry PKGORDER                   STMT=000196 DBA6 15.28.17.699529
 __  177  Package allocation PKGORDER                       DBA6 15.28.17.700178
 __  055  SQL set current SQLID                             DBA6 15.28.17.700742
 __  053  SQL request               SQLCODE=0 STMT=000281 DBA6 15.28.17.700783
 __  060  SQL SELECT                          STMT=000344 DBA6 15.28.17.700949
 __  058  SQL SELECT                SQLCODE=0 STMT=000344 DBA6 15.28.19.203303
 __  061  SQL UPDATE                          STMT=000423 DBA6 15.28.19.203690
 __  058  SQL UPDATE                SQLCODE=0 STMT=000423 DBA6 15.28.19.204554
 __  499  SP statement execution detail                     DBA6 15.28.19.204853
 __  380  SP exit  PKGORDER         SQLCODE=0 STMT=000196 DBA6 15.28.19.204891
 __  053  SQL request               SQLCODE=0 STMT=000196 DBA6 15.28.19.204939
 __  088  Sync start                                        DBA6 15.28.19.207223
 __  089  Sync end                                          DBA6 15.28.19.208200
 __  074  Terminate thread start                            DBA6 15.28.19.208290
 __  239  Package accounting-SP                             DBA6 15.28.19.208371
 __  003  Thread accounting                                 DBA6 15.28.19.208399
****************************** Bottom of Data ******************************
```

Transaction life cycle investigation

```
BROWSE    FUW000.QADATA.PKGORDER.CICS.D131008.INDEX  Record 00007194 More: < >
Command ===> ________________________________________________ Scroll ===> CSR
        Navigate < 00.00.01.000000 >        Date/Time 2013-10-08 14.56.25.116977
/  ———— Tracking ————————————————————————    Tuesday 2013-10-08 Time (Elapsed)
TX 6E13 CICS Transaction TranCode=FB66 Task=251                  15.28.17.693992
__ 072  Create thread start                                 DBA6        0.003592
__ 112  Thread allocate PKGCUST1                            DBA6        0.000451
__ 073  Create thread end                                   DBA6        0.000052
__ 177  Package allocation SPORDERS                         DBA6        0.000187
__ 053  SQL request                   SQLCODE=0 STMT=000158 DBA6        0.000165
__ 380  SP entry SPORDERS                       STMT=000196 DBA6        0.001087
__ 177  Package allocation SPORDERS                         DBA6        0.000649
__ 055  SQL set current SQLID                               DBA6        0.000563
__ 053  SQL request                   SQLCODE=0 STMT=000281 DBA6        0.000041
__ 060  SQL SELECT                              STMT=000344 DBA6        0.000166
__ 058  SQL SELECT                    SQLCODE=0 STMT=000344 DBA6        1.502353
__ 061  SQL UPDATE                              STMT=000423 DBA6        0.000387
__ 058  SQL UPDATE                    SQLCODE=0 STMT=000423 DBA6        0.000864
__ 499  SP statement execution detail                       DBA6        0.000299
__ 380  SP exit   SPORDERS            SQLCODE=0 STMT=000196 DBA6        0.000037
__ 053  SQL request                   SQLCODE=0 STMT=000196 DBA6        0.000048
__ 088  Sync start                                          DBA6        0.002284
__ 089  Sync end                                            DBA6        0.000976
__ 074  Terminate thread start                              DBA6        0.000090
__ 239  Package accounting-SP                               DBA6        0.000080
__ 003  Thread accounting                                   DBA6        0.000028
__ 075  Terminate thread end                                DBA6        0.000532
****************************** Bottom of Data ********************************
```

1. Start tracking the problem CICS transaction)
2. See the transaction life-cycle events from the related logs merged together with no preparation required
3. Notice the long SELECT call time
4. In this case, the problem was caused by a table scan in a DB2 stored procedure.

   A drill down of the DB2 trace was able to determine this.

Detail DB2 event data view using forms view

```
******************************** Top of data ********************************
+018C  Code... 058   SQL Call completion          RC=0000 STMT=002896 DBA6
+0198  Date... 2012-11-21 Wednesday  Time... 17.40.04.013647.813

       Package
+0034  Location...... 'DB2ALOC'        Collection ID........ 'CSQ5L710'
+0056  Package name... 'CSQ5L710'      Consistency token.... 193153A81425EA0D

+0072  SQLCA...... SQL communication area (SQLCA)
+0072  SQLCAID.... 'SQLCA   '  SQLCABC.... +136        SQLCODE.... +0
+0082  SQLERRML... +0          SQLERRM.... '        '
+00CA  SQLERRP.... 'DSN     '  SQLERRD1... +0          SQLERRD2... +0
+00DA  SQLERRD3... +0          SQLERRD4... FFFFFFFF    SQLERRD5... +0
+00E6  SQLERRD6... +0          SQLWARN0... ' '         SQLWARN1... 'N'
+00EC  SQLWARN2... ' '         SQLWARN3... ' '         SQLWARN4... ' '
+00EF  SQLWARN5... '1'         SQLWARN6... ' '         SQLWARN7... ' '
+00F2  SQLWARN8... ' '         SQLWARN9... ' '         SQLSTATE... '00000'

+00FC  Statement number... +344
+0106  Query command ID... 00000000     Query instance ID.... 00000000

+0118  QW0058ID... Scantype
+0118  Data type....  'INDX'  Rows processed.. +234     Rows examined.... +12
+012C  Rows qualified... +7   After stage 1... +4       After stage 2.... +3
+0140  Rows inserted.... +17  Rows updated.... +12      Rows deleted..... +24
+0158  Pages scanned.... +76
+015C  Pages scanned (RI)... +0        Rows deleted (RI).... +0
+0160  Pages scanned (LOB).. +0        Pages updated (LOB).. +0

+0188  QWHS....... Product section standard header
+0194  DB2 subsystem.... 'DBA1'

+01BC  QWHSLWID... LUWID
+01BC  Network ID... 'FTS1'            LU name.... 'DBA1LU  '
+01C4  Uniqueness value... CA80E6B51165 Commit count... +1
******************************** Bottom of data ********************************
```

Program statement number 344 caused an index scan that processed 234 rows in the table

Zoom to see more detail about log record fields

```
+002C  QW0065..... IFCID data
       Package
+002C  Location... 'DB2BLOC'   Collection ID.... 'MQATPGM'
+004E  Package name... 'MQATPGM'
+0060  Consistency token.... 189E34F81745545D
       Statement
+006A  Statement type... 91      Cursor name.... 'C1'
+0080  Reoptimization... 0000    Statement number... +835
+0088  Cursor scrollability... 40
+0089  Cursor sensitivity... 40
+008A  Result table type.... 40  Close commit... D5
+0094  Query command ID... 0
```

Isolation.... 'U'

Zoom

```
                               Field Zoom
  File  Menu  Help
------------------------------------------------------------------------------
BROWSE    JCH.FUW.P0000003.D130625.T094351.EXTRACT +          Line 00000000
Command ===> ____________________________________________ Scroll ===> PAGE
******************************* Top of data ******************************
+007F  QW0065I.... 'U'  Isolation level of the SQL statement.

 Off   QW0065RR... 'R'  RR (repeatable read)
 Off   QW0065RS... 'T'  RS (read stability)
 Off   QW0065CS... 'S'  CS (cursor stability)
 On    QW0065UR... 'U'  UR (uncommitted read)
 Off   QW0065XR... 'X'  XR (Repeatable read with X lock)
 Off   QW0065XS... 'L'  XS (Read stability with X lock)
******************************* End of data ******************************
```

Life cycle events: expanded summary view

```
  File  Mode  Filter  Time  Labels  Options  Help
──────────────────────────────────────────────────────────────────────────────
BROWSE    FUW000.QADATA.PKGORDER.CICS.D131008.INDEX  Record 00007206 More: < >
Command ===> _______________________________________________ Scroll ===> CSR
        Navigate < 00.00.01.000000 >     Date/Time 2013-10-08 14.56.25.116977
/  ──── Tracking ────────────────────────   Tuesday 2013-10-08 Time (Elapsed)
__ 380  SP entry PKGORDER                      STMT=000196 DBA6 15.28.17.699529
        TranCode=FB66 Userid=TWM ClientID=FUWTCIC
        ACCT=FTS3.SC0TCP07.145FF1F9E7C9 LUWID=FTS3/DBA6LU/CC145FF1FAB4/0001
   ───────────────────────────────────────────────────────────────────────────
__ 380  SP exit  PKGORDER            SQLCODE=0 STMT=000196 DBA6        1.505361
        TranCode=FB66 Userid=TWM ClientID=FUWTCIC
        ACCT=FTS3.SC0TCP07.145FF1F9E7C9 LUWID=FTS3/DBA6LU/CC145FF1FAB4/0001
   ───────────────────────────────────────────────────────────────────────────
__ 003  Thread accounting                                  DBA6        0.003508
        TranCode=FB66 Userid=TWM ClientID=FUWTCIC
        RESP=1.510268 CPU1=0.001418 CPU2=0.000968 I/O3=0.000328
        ACCT=FTS3.SC0TCP07.145FF1F9E7C9 Source=CICS SEL=1 UPD=1 CAL=1
        LogRecs=6 GetPage=14616 UpdPage=1 MaxLock=2
        LUWID=FTS3/DBA6LU/CC145FF1FAB4/0002
   ───────────────────────────────────────────────────────────────────────────
****************************** Bottom of Data ********************************
```

Scroll right to show the records in expanded view with elapsed or relative times:
Elapsed – time between log record events
Relative – time since start of transaction (or other selected event)

Tag events to review or share with other Teams

```
BROWSE    FUW000.QADATA.PKGORDER.CICS.D131008.INDEX  Record 00000739 More: < >
Command ===> ___________________________________________ Scroll ===> CSR
        Navigate < 00.00.01.000000 >      Date/Time 2013-10-08 14.56.25.116977
/  ---- Tracking ---------------------      Tuesday 2013-10-08 Time (Relative)
__ 6E13 CICS Transaction                                       15.28.34.383952
        TranCode=FB66 Program=FBOCCP66 Userid=TWM LTerm=SC0TCP07 Terminal=CP07
        RecToken=FUWTCIC/CC146001E49B4486 Resp=1.590794 CPU=0.006645 DB2=2
        ACCT=FTS3.SC0TCP07.146001E49B44 Task=251
   ----------------------------------------------------------------------------
__ TAG  CICS DB2 transaction with long response time
   -------------------------------------------------------------
G_ 0020 Begin UR
        Program=PKGCUST1 Userid=TWM URID=00006A942203
        LUWID=FTS3/DBA6LU/CC146001E565/0001
   -------------------------------------------------------------
__ 0600 Update in-place in a data page
        DBID=306 PSID=95 PAGE=66 URID=00006A942203
   -------------------------------------------------------------
__ 0020 Begin commit phase 1
__ 0020 Phase 1 to 2 transition
__ 0020 End commit phase 2
   ----------------------------------------------------------------------------
```

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

Connect the CICS transaction to the DB2 LUWID and URID for further examination.
Enter **G** to "tag" (bookmark) this DB2 record. Next person can go directly here.

Problem resolution: end of scenario

- **The cause of the CICS transaction problem has been narrowed down to a slowdown in DB2**
- **Sufficient information about the DB2 activity has been collected and can be passed on to the DB2 DBA for further investigation**
- **Automatically locates log files for the problem time range for supported subsystems**
  - CICS monitoring facility
  - DB2 accounting
  - DB2 log and trace
- **Enables a collaborative problem analysis:**
  - Between first responders and subject-matter experts
  - Between experts in different areas


Questions?

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/
- **James Martin, US Representative, Fundi Software:**
  james_martin@fundi.com.au
- **Jim Martin, US Representative, Fundi Software:**
  jim_martin@fundi.com.au