12 March 2012

This edition applies to Version 1 Release 1 of Transaction Analysis Workbench for z/OS® with the PTF for APAR PM26786 (“SPE”).
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Introduction

This lab is based on the tutorials in the *Transaction Analysis Workbench User’s Guide*. The tutorials have been altered for this lab to take advantage of predefined sessions (and other definitions) available to IMPOT\(mn\) (\(mn\): 01 to 50) user IDs on the Fundi Software demonstration system (FTSD).

**Note:** The CICS® DBCTL scenario requires IMS™ V11 with the PTF for APAR PM24076 (to enable IMS Performance Analyzer reports to show CICS transaction names and task numbers.)
Tutorial: Creating a session and browsing a log

This tutorial shows you how to create a session for a problem, manually specify a log file for the problem, and then browse the log file.

About this task

This tutorial is intended for first-time users.

Procedure

1. Start the Transaction Analysis Workbench dialog:
   a. On the ISPF primary option menu, select option 6 **Command**.
   b. Enter the following command:
      
      ```
      EX 'PRODUCTS.FUW.SFUWEXEC(FUWOREXX)' 'PRODUCTS.FUW'
      ```
      
      The following steps register (create) a session.

2. On the Transaction Analysis Workbench primary option menu, select option 1 **Sessions**.

   ![Panel: Transaction Analysis Workbench primary option menu](image)

   **Figure 1. Panel: Transaction Analysis Workbench primary option menu**

   The Session Manager panel is displayed. This panel shows the list of existing sessions. To scroll the list horizontally and see more columns, press the Right function key (F11).

3. Enter **NEW** on the command line.
The Problem Details panel for the new session is displayed.

4. Specify a summary such as Getting started. Leave the other problem details blank or accept their default values.

The session manager assigns a numeric key to your new session. The assigned value depends on how many sessions are already in your repository. The example key used in the figures shown here is 00000099.

5. Press the Exit function key (F3) to save the session.

The menu for the new session is displayed. The menu title shows the session key.

The following steps select a log file for the new session.

6. On the session menu, select option 2 Files.
The Locate and Manage Log Files panel is displayed.

7. Manually specify your SMF file:
   a. Select option 1 **Manually specify...** The Specify File Details pop-up window opens.
   b. Specify the following file details:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Name</strong></td>
<td>The SYSID of the MVS™ system that created the SMF file: MVSA</td>
<td>The system name does not have to match an MVS system definition. That is, you do not need to have previously defined this MVS system to Transaction Analysis Workbench under primary menu option 3 <strong>Systems</strong>. If you do want to select from the list of systems defined to Transaction Analysis Workbench, tab to the <strong>System Name</strong> field, and then press the Prompt function key (F4).</td>
</tr>
<tr>
<td><strong>IMS Release</strong></td>
<td>Blank</td>
<td>Required only for IMS log files.</td>
</tr>
<tr>
<td><strong>System Type</strong></td>
<td>IMAGE</td>
<td>IMAGE is an abbreviation of &quot;MVS image&quot;.</td>
</tr>
<tr>
<td><strong>File Type</strong></td>
<td>SMF</td>
<td></td>
</tr>
<tr>
<td><strong>File is a log stream</strong></td>
<td>Unselected</td>
<td>In this example, we are using a data set, not a log stream.</td>
</tr>
<tr>
<td><strong>Data Set Name</strong></td>
<td>The fully qualified data set name of the SMF file, enclosed in single quotes: 'IMPOT01.FTS1.SMF'</td>
<td>If you omit the enclosing single quotes and your TSO user profile specifies a prefix to be used as the first qualifier of all non-fully-qualified data set names, that prefix is added to the data set name.</td>
</tr>
</tbody>
</table>

**Tip:** A plus sign (+) next to a field indicates that you can press the Prompt function key (F4) to select from a pop-up window that lists values for that field.
c. Press the Exit function key (F3). The pop-up window closes. The list at the bottom of the Locate and Manage Log Files panel shows the details of the file that you have just specified.

8. Press the Exit function key (F3) to return to the session menu.

9. On the session menu, select option 4 Investigate. The Investigate panel is displayed. Use this panel to select which log files you want to browse, and whether you want to browse entire files starting at their first record or a time slice (a specific time period across one or more log files). Time slicing improves performance when browsing large log files.
The **Time Slice** heading shows the start and duration of the time slice, and whether time slicing is on or off.

For a new session, the time slice start time and date is set to the start time and date of the log file with the latest (most recent) start, and the time slice duration is set to five minutes.

The **Coverage** column indicates how much of the time slice each file covers. The following figure illustrates the concept of time slice coverage.

**Figure 7. Time slice coverage provided by log files**

For this tutorial, we will use the default time slice.

10. If the **Time Slice** heading shows **(OFF)**, enter **SLICE** on the command line to switch time slicing on.

11. Enter **S** on the first line under the **/** heading.

   Entering **S** in this top line shows a merged view of all log files for the session. In this example, we have only one file, so there is no difference between entering **S** on this line, or the line next to our single file.

   **Tip:** To set the time slice to the start and duration of a particular log file, enter **T** next to the file.

**Figure 8. Panel: Investigate (Time Slicing)**
The log records are displayed in the log browser. Your screen should look similar to the following figure, although the details will depend on your particular log file.

<table>
<thead>
<tr>
<th>File</th>
<th>Menu</th>
<th>Mode</th>
<th>Filter</th>
<th>Time</th>
<th>Labels</th>
<th>Options</th>
<th>Help</th>
</tr>
</thead>
<tbody>
<tr>
<td>BROWSE IMPOT01.FTS1.SMF</td>
<td>Record 000000001 More: &lt; &gt;</td>
<td>Scroll ====&gt; CSR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slice . . Duration 00.05.00 Date 2005-01-15 Time 13.10.07.840000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 9. Panel: Browsing an SMF file

12. Browse the log.
   - To scroll forward or backward through the records, press the Forward function key (F8) or the Backward function key (F7).
   - To cycle through the four views on this log browser panel, press the Left function key (F10) or the Right function key (F11). The different views show or hide global fields, and show either the **Time** column or the **LSN** (log record sequence number) column.
   - To view all the fields of a particular record, enter **S** next to the record.

13. Press the Exit function key (F3) until you return to the Transaction Analysis Workbench primary option menu.

You have completed this tutorial. Please proceed to the next tutorial.
Tutorial: Submitting a batch report

This tutorial shows you how to create a batch report for a session.

**Procedure**

1. On the Transaction Analysis Workbench primary option menu, select option 1 **Sessions**.
2. Select the session that you created previously.

![Session Manager panel](image1)

**Figure 10. Panel: Session Manager: selecting an existing session**

3. On the session menu, select option 3 **Reporting**.
   
   The Reporting menu is displayed.

4. Select option 3 **SMF**. This option uses SMF files for input.

![Reporting menu](image2)

**Figure 11. Panel: Reporting menu**

5. On the Reporting - z/OS and Subsystem Analysis panel, select the **Address space accounting** report by entering a forward slash (/) next to it. Do not press Enter yet. For this tutorial, we will leave the **Report Interval** blank to process all of the records in the file that we are about to select, regardless of date.

6. Select the SMF file:
   
   a. Select option 2 **SMF File**.
   
   b. Tab to the **SMF File** field.
   
   c. Press the Prompt function key (F4). A pop-up window opens, which lists the SMF files that are associated with the session.
d. Tab to the SMF file that you specified in the previous tutorial, and then press Enter. The pop-up window closes. The name of the SMF file that you selected is displayed in the SMF File field.

7. Press Enter twice to generate the JCL for the report. The JCL is displayed in the ISPF editor.

   Tip: Look at the REPORT command in the in-stream SYSIN data set. The OUTPUT parameter specifies the ddname of the data set in the job output that will contain the report.

8. On the ISPF editor command line, enter **SUB** to submit the job.
9. Press the Exit function key (F3) to exit the ISPF editor. A pop-up window opens, which offers you the option to create a note, which will save the JCL to the session history.

10. Press Enter to save the JCL for later reuse. **Note:** To view any saved JCL for a session, select option 5 History on the session menu.

11. Split your screen, start SDSF, view the job output, and then exit the split screen.

The following figure shows an example report.

Figure 13. Panel: Submitting generated JCL from the ISPF editor

9. Press the Exit function key (F3) to exit the ISPF editor.
   A pop-up window opens, which offers you the option to create a note, which will save the JCL to the session history.

10. Press Enter to save the JCL for later reuse.

**Note:** To view any saved JCL for a session, select option 5 History on the session menu.

11. Split your screen, start SDSF, view the job output, and then exit the split screen.

The following figure shows an example report.

Figure 13. Panel: Submitting generated JCL from the ISPF editor

9. Press the Exit function key (F3) to exit the ISPF editor.
   A pop-up window opens, which offers you the option to create a note, which will save the JCL to the session history.

10. Press Enter to save the JCL for later reuse.

**Note:** To view any saved JCL for a session, select option 5 History on the session menu.

11. Split your screen, start SDSF, view the job output, and then exit the split screen.

The following figure shows an example report.

Figure 14. Example Address Space Activity report

12. Press the Exit function key (F3) until you return to the Transaction Analysis Workbench primary option menu.

You have completed this tutorial. Please proceed to the next tutorial.
Tutorial: Automating selection of IMS logs

This tutorial shows you how to define an IMS system to Transaction Analysis Workbench, and then use that system definition to locate the related IMS log files (SLDS or OLDS) for a particular time interval.

Before you begin

The following prerequisite steps have already been performed for this lab environment. In a different system environment, you would need to perform these steps before you begin the tutorial.

- Ensure that IMS is installed. The Transaction Analysis Workbench automated file selection utility uses the IMS database recovery (DBRC) API to read RECON data sets.
- Determine the time interval (the “from” and “to” dates and times) of the IMS logs that you want to analyze.
- Obtain the following details about the IMS system that created the logs.
  - IMS subsystem identifier (IMSID)
  - IMS version
  - RESLIB data set name
  - Either of the following details:
    - Two or three IMS RECON data set names
    - MVS dynamic allocation (MDA) data set name

If you do not know these details, contact your IMS system administrator.

Procedure

1. On the Transaction Analysis Workbench primary option menu, select option 3 Systems. The System Definitions Menu is displayed.
2. Select option 1 IMS.

The System Definitions panel is displayed. This panel lists any existing IMS and IMS Connect system definitions in the repository.
For this tutorial, we have predefined an IMS system, IADJ.

3. Enter **S** next to IADJ and review the DBRC settings for the definition. Skip to step 7 on page 15 bypassing the steps that you would follow to create a definition.

   Steps 4 to 6 describe how to create an IMS system definition. These steps are included here for illustration purposes only; for this tutorial, use the predefined system.

4. Enter **NEW** on the command line.

   ![System Definitions Panel]

   **Figure 16. Panel: System Definitions (IMS and IMS Connect)**

   The IMS Subsystem panel is displayed.

5. Enter the details that you have obtained for the IMS system:

   a. In the fields at the top of the panel, specify the following details:
      - IMS subsystem ID
      - IMS version
      - A description of the IMS subsystem (this description is used only for selection lists in the dialog; it does not appear in reports)
      - RESLIB data set name

   b. Select the **DBRC Settings** view.

   c. Specify either of the following details:
      - Two or three IMS RECON data set names
      - MVS dynamic allocation (MDA) data set name

6. Select the **Log Data Sets are Cataloged** option by entering a forward slash (/) next to it.

   This step assumes that you want to use cataloged, primary system log data sets (SLDS). If the SLDS are uncataloged, if you want to use secondary SLDS, or if you want to use online log data sets (OLDS) instead of SLDS, see the online help by pressing the Help function key (F1) on the related options.
7. Press the Exit function key (F3) to exit the IMS Subsystem panel. Press the Exit function key (F3) repeatedly until you return to the Transaction Analysis Workbench primary option menu.

The following steps use the IMS system definition that you have just created to automate selection of the related log files for a particular time interval, and then add those selected files to a problem session.

8. On the primary option menu, select option 1 Sessions.

9. On the command line of the Session Manager panel, enter NEW to create a new session.

10. On the Problem Details panel for the new session, specify the following details (use the values highlighted in the following figure):

   - A summary (for example, IMS log selection).
   - The from and to dates and times of the period when the problem occurred.

   **Tip:** When specifying times, you can omit trailing parts that are all zeros. For example, to specify 5 a.m., instead of entering 05.00.00.00, you can enter just the hour part, 05.
   - The IMS system.
11. Press the Exit function key (F3) to save the new session. The session menu is displayed.

12. Select option 2 Files.

13. On the Locate and Manage Log Files panel, run automated file selection:
   a. Select option 2 Run automated file selection... Do not press Enter yet.
   b. Under the heading Automated file selection, specify the system that you defined previously. By default, automated file selection spans the same date and time interval as the problem session; however, you can override these default values.

14. On the ISPF editor command line, enter SUB to submit the job.
15. Press the Exit function key (F3) to exit the ISPF editor and return to the Locate and Manage Log Files panel.

16. When the job is complete, enter `REFRESH` on the command line to refresh the list of log files and to see any files added by the job.

   **Note:** If the job completed with return code 4, it might mean that the log files did not completely cover the specified time range. For details, see the FUWPRINT job output data set.

   You can now browse these log files, or use them to generate batch reports or extracts.

17. To browse one of these log files, enter `S` next to the file.
The log file opens in the log browser.

The log file opens in the log browser.

Figure 21. Panel: IMS log files located by automated file selection

Figure 21. Panel: IMS log files located by automated file selection

The log file opens in the log browser.

Figure 22. Panel: Browsing an IMS log

Figure 22. Panel: Browsing an IMS log
18. Press the Exit function key (F3) until you return to the Transaction Analysis Workbench primary option menu.
   You have completed this tutorial. Please proceed to the next tutorial.
Tutorial: Automating selection of DB2 logs

This tutorial shows you how to define a DB2® system to Transaction Analysis Workbench, and then use that system definition to locate the related DB2 log files for a particular time interval.

Before you begin

The following prerequisite steps have already been performed for this lab environment. In a different system environment, you would need to perform these steps before you begin the tutorial.

- Ensure that DB2 is installed. To locate DB2 log files, the Transaction Analysis Workbench automated file selection utility uses output from the DB2-supplied print log map utility, DSNJU004.
- Determine the time interval (the “from” and “to” dates and times) of the DB2 logs that you want to analyze.
- Obtain the following details about the DB2 system that created the logs. If you already have a DB2 system definition that specifies these details (for example, your DB2 system definition repository is an existing CICS Performance Analyzer HDB register that contains shared system definitions), skip to step 10 on page 24.
  - DB2 subsystem identifier (SSID)
  - Optionally, the SYSID of the MVS image on which the DB2 system runs
  - DB2 version
  - Whether the DB2 system is in a data sharing group (yes or no)
  - DSNLOAD library data set name
  - DB2 bootstrap data set (BSDS) name

If you do not know these details, contact your DB2 system administrator.

Procedure

1. On the Transaction Analysis Workbench primary option menu, select option 3 Systems. The System Definitions Menu is displayed.
2. Select option 3 DB2.
The System Definitions panel is displayed. This panel lists any existing system definitions in the repository.

For this tutorial, we have predefined a DB2 system, DB2P.

3. Enter S next to DB2P, review the definition details. Skip to step 9 on page 24, bypassing the steps that you would follow to create a new definition.
   Steps 4 to 8 on page 24 describe how to create a DB2 system definition. These steps are included here for illustration purposes only; for this tutorial, use the predefined system.

4. Enter NEW on the command line. A pop-up window opens.

5. Specify the DB2 system name and, optionally, the MVS image (SYSID). Specify the system type as DB2.
6. Press Enter. The pop-up window closes.
   The DB2 Subsystem panel is displayed. This panel contains the details that you have just entered.

7. Specify the remaining details that you have obtained for the DB2 system:
   a. Select the **Definition** view.
   b. Specify the following details:
      - **DB2 version**
      - Whether the DB2 system is in a data sharing group (yes or no)
      - **DSNLOAD library data set name**
      - **DB2 bootstrap data set (BSDS) name**

---

**Figure 24. Panel: System Definitions (CICS, DB2, more)**

6. Press Enter. The pop-up window closes.
   The DB2 Subsystem panel is displayed. This panel contains the details that you have just entered.

7. Specify the remaining details that you have obtained for the DB2 system:
   a. Select the **Definition** view.
   b. Specify the following details:
      - **DB2 version**
      - Whether the DB2 system is in a data sharing group (yes or no)
      - **DSNLOAD library data set name**
      - **DB2 bootstrap data set (BSDS) name**
8. Press the Exit function key (F3) to save the DB2 system definition.

9. Press the Exit function key (F3) repeatedly until you return to the Transaction Analysis Workbench primary option menu.

The following steps use the DB2 system definition that you have just created to automate selection of the related log files for a particular time interval, and then add those selected files to a problem session.

10. On the primary option menu, select option 1 Sessions.

11. On the command line of the Session Manager panel, enter NEW to create a new session.

12. On the Problem Details panel for the new session, specify the following details (use the values highlighted in the following figure):
   - A summary (for example, DB2 log selection)
   - The from and to dates and times of the log records that you want to analyze
   - The DB2 system

---

**Figure 25. Panel: DB2 Subsystem definition**

**Figure 26. Panel: Problem Details: session that refers to a DB2 system**
13. Press the Exit function key (F3) to save the new session. The session menu is displayed.

14. Select option 2 Files.

15. On the Locate and Manage Log Files panel, run automated file selection:
   a. Select option 2 Run automated file selection...
   b. Under the heading Automated file selection, specify the system that you defined previously. By default, automated file selection spans the same date and time interval as the problem session; however, you can override these default values.

   ![Figure 27. Panel: Running automated file selection for a DB2 system](image)

   c. Press Enter to generate the JCL for the automated file selection. The JCL is displayed in the ISPF editor.

16. On the ISPF editor command line, enter **SUB** to submit the job.
17. Press the Exit function key (F3) to exit the ISPF editor and return to the Locate and Manage Log Files panel.

18. When the job is complete, enter **REFRESH** on the command line to refresh the list of log files and to see any files added by the job.
   
   You can now browse these log files, or use them to generate batch reports or extracts.

19. To browse one of these log files, enter **S** next to the file.
20. Press the Exit function key (F3) until you return to the Transaction Analysis Workbench primary option menu.

You have completed this tutorial. Please proceed to the next tutorial.
Tutorial: Analyzing an IMS DB2 transaction problem

This tutorial shows you how to analyze a problem with an IMS DB2 transaction.

Before you begin

The following prerequisite steps have already been performed for this lab environment. In a different system environment, you would need to perform these steps before you begin the tutorial.
- Determine the location of the IMS log file (SLDS) and DB2 log file for the time when the problem occurred.
- Create an IMS transaction index from the IMS log file (see the description later in this tutorial).

About this task

The problem has been reported as a long transaction response time for an IMS transaction performing DB2 updates.

Procedure

1. On the Transaction Analysis Workbench primary option menu, select option 1 Sessions. The Session Manager panel is displayed.
2. Select session 00000007, “Tutorial: IMS DB2”. The session menu is displayed.
3. Select option 1 Register. The Problem Details panel for the session is displayed.
4. Press the Exit function key (F3) to return to the session menu.
5. Select option 2 Files. The Locate and Manage Log Files panel for the session is displayed.
The session refers to the following three log files:

a. An IMS transaction index (a special type of extract created from an IMS log, described below)
b. An IMS SLDS
c. A DB2 log file

An IMS transaction index is a specialized extract file that IMS Performance Analyzer creates from an IMS log (such as an SLDS). Each record in the index represents an IMS transaction and contains cumulative information from the IMS log about that transaction.

IMS transaction indexes are especially useful in Transaction Analysis Workbench for identifying problematic IMS transactions, because they contain fields that offer cumulative information about an IMS transaction that are not available in any single IMS log record. For example, the Process field in an IMS transaction index record contains the total processing time for an IMS transaction.

In this tutorial, we will use the Process field to create a filter that identifies IMS transaction index records with long process times. Then we will use transaction tracking (by entering TX next to an IMS transaction index record) to show all of the individual records for that transaction from the original IMS log and the DB2 log. The relative elapsed times of these individual log records enable us to identify particular events that might be responsible for the long overall process time.

The order of the log files in this list is significant: the IMS transaction index appears first, so that, when we browse the files, each IMS transaction index is displayed before its corresponding IMS log records. (To reorder log files in the list, enter M next to the log file that you want to move, and then enter A next to the file that you want to move the selected file after, or enter B next to the file that you want to move the selected file before.)

For this tutorial, we have already created an IMS transaction index, and moved it to the top of the list.

**Note:** To create an IMS transaction index, enter X next to an IMS log file on the Locate and Manage Log Files panel for a session.
6. Press the Exit function key (F3) to return to the session menu.
7. Select option 4 **Investigate**. The Investigate panel is displayed.
8. If the **Time Slice** heading shows (OFF), enter SLICE on the command line to switch time slicing on.
   For our time slice, we are going to use the full duration of the transaction index (which is the same as the duration of the IMS log from the index was created).
9. Enter T next to the transaction index.

   **Tip:** To help identify the transaction index in the list of files, scroll the **Data Set Name** column into view: press the Right function key (F11).

   The time slice duration is now the duration of the log file, rather than the default time slice of five minutes.
10. Enter S on the first line under the / heading, to browse a merged view of all three files.

    ![Panel: Investigate: IMS DB2 transaction analysis](image)

    The log files are displayed in the log browser. IMS transaction index records have the log code CA01.
11. Define a filter that limits the display to IMS transaction index records with a Process time greater than 0.4 seconds.
   a. Enter **FILTER** on the command line.
      The Filter panel is displayed.
   b. Specify **IMS** under the Log column heading, and **CA01** under the Code column heading.
   c. Enter **S** next to IMS CA01.
The Conditions panel is displayed.

d. Specify the following condition:
   PROCESS GT 0.4

---

The Conditions panel is displayed.

e. Press the Exit function key (F3) to return to the Filter panel, and then press
   the Exit function key (F3) again to return to the log browser.

   The log browser now shows only the records that match the filter.

12. Enter TX next to the first record.
The TX line action activates tracking, which displays the records that belong to the same transaction as the selected record.

The log browser displays the related IMS log records and DB2 log records under the IMS transaction index record.

**Note:** Tracking ignores any active filter, with the following exception: if the filter unconditionally excludes a log code, tracking excludes that log code.

13. Press the Right function key (F11) to switch to a log browser view that collapses each record onto single line, with the Time column on the right-hand side of the panel.

14. Enter R next to the CA01 record.

The R line action displays the time of each visible log record relative to the selected record.

Notice the jump in elapsed times following the ESAF (External Subsystem Attach Facility) record (log code 5600) for the connection to subsystem ID CSQ6. The CSQ prefix indicates that this is a WebSphere® MQ subsystem. So, the problem is not in IMS or in DB2, but in WebSphere MQ.

If we had a WebSphere MQ log extract, we could further investigate the specific cause of the problem.
This is as far as we will take this analysis. Before finishing, it is worth noting that the DB2 log records show the LUWID that you can use in products such as DB2 Log Analysis Tool to identify the specific table, row, and column of the data relating to the DB2 activity:

15. Press the Left function key (F10) to switch to a log browser view that expands each record onto multiple lines.

16. Enter **FIND LUWID** (or **F LUWID**) on the command line. The panel scrolls to a DB2 log record (log code 0020) showing the corresponding LUWID.

Figure 38. Panel: Tracking an IMS transaction using a transaction index record
17. Press the Exit function key (F3) until you return to the Transaction Analysis Workbench primary option menu.

You have completed this tutorial. Please proceed to the next tutorial.
Tutorial: Analyzing a CICS DBCTL transaction problem

This tutorial shows you how to analyze a problem with a CICS DBCTL transaction.

Before you begin

The following prerequisite steps have already been performed for this lab environment. In a different system environment, you would need to perform these steps before you begin the tutorial.

- Determine the location of the dumped SMF file that contains the records written by the CICS system for the time when the problem occurred.
- Define a system definition for the associated IMS system, so that you can use automated file selection to locate the IMS log for the time when the problem occurred.
- Create an extract of the OPERLOG.

We are running this tutorial on a different system, and in a different sysplex, than the system that created the OPERLOG we want to analyze. If you want to analyze the records of a log stream (such as OPERLOG) on a system that cannot directly access that log stream, you can use Transaction Analysis Workbench to create an extract of the log stream.

We used the Transaction Analysis Workbench ISPF dialog on the original system (where the problem occurred) to generate the following JCL. This JCL creates an extract of the OPERLOG records for a specific time period, filtered to contain messages that begin with the prefix “DFS” (that is, messages from IMS).

```
//FUWXTRAC JOB ,CLASS=W,NOTIFY=&SYSUID
//FUWBATCH EXEC PGM=FUBATCH,PARM='V111'
//STEPLIB DD DISP=SHR,DSN=FUW110.MAINT.SFUWLINK
//SYSPRINT DD SYSOUT=* 
//FUWPRINT DD SYSOUT=* 
//EXTRACT DD DSN=IMPOT01.OPERLOG.EXTRACT, 
// DISP=(NEW,CATLG), 
// UNIT=SYSDA,SPACE=(CYL,(1,1)) 
//LOGRPT DD SYSOUT=* 
//LOGSTREAM OPERLOG:SYSPLEX.OPERLOG 
//START 2011-04-06-08.40.00.00 
//STOP 2011-04-06-09.00.00.00 
//EXTRACT 
//CODE(OPERLOG) 
//COND TEXT(2) EQ 'DFS' 
/*
```

Figure 40. JCL to create a filtered extract of an OPERLOG

About this task

A user has reported that a CICS transaction abended with code ADCD (DLI deadlock detected) in a known time period. We will use batch reports from CICS Performance Analyzer and IMS Performance Analyzer to get details of the abending transaction, and then use tracking in the interactive log browser to investigate the associated IMS log records, CMF records, and OPERLOG records.
**Procedure**

1. On the Transaction Analysis Workbench primary option menu, select option 1 **Sessions**. The Session Manager panel is displayed.

2. Select session 00000006, “Tutorial: CICS DBCTL”. The session menu is displayed. Let's review the files that have been added to this session.

3. On the session menu, select option 2 **Files**. The session has three associated log files: an SMF file, an IMS log file, and an extract file (created from an OPERLOG log stream).

4. Press the Exit function key (F3) to return to the session menu.

5. Select option 3 **Reporting**. The Reporting menu is displayed.

6. Select option 2 **CICS**.

7. Select all types of analysis.

8. Select all focus options.

9. Select the SMF file.

---

**Figure 41. Panel: Analyzing a CICS DBCTL transaction: associated log files**

<table>
<thead>
<tr>
<th>Data Set Name</th>
<th>Name</th>
<th>Type</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMPOT01.SMF.D110406.DEADLOK.FULL</td>
<td>FTS1</td>
<td>IMAGE</td>
<td>SMF</td>
</tr>
<tr>
<td>IMPOT01.SLDSP.IBB1.D11096.T0841415.V15</td>
<td>IBB1</td>
<td>IMS</td>
<td>LOG</td>
</tr>
<tr>
<td>IMPOT01.OPERLOG.EXTRACT</td>
<td>FTS1</td>
<td>IMAGE</td>
<td>EXTRACT</td>
</tr>
</tbody>
</table>

---
10. Press Enter twice to generate the JCL for the report.

The JCL is displayed in the ISPF editor. This JCL uses CICS Performance Analyzer to create several reports.

11. On the ISPF editor command line, enter SUB to submit the job.

12. View the job output: split your screen and use SDSF, or use your site-specific procedures.

The following figures show two of the reports. For other reports, see the job output.

Note that CICS task number 170 is the abending transaction: it occurs in the time period reported by the user.

---

**Figure 42. Panel: CICS Performance Analyzer reporting to analyze a CICS DBCTL transaction**

```
File Help

Command ===>

Reporting - CICS Transaction Analysis

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

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

Select the CICS system to report against, or specify an SMF file:
  1. System . . .
  2. SMF File . . (TEMP001.SMF.D110406.DEADL0K.FULL) +

**Figure 43. Example CICS Performance Analyzer Transaction details: Response time and CPU report**

---

VJR9M0  CICS Performance Analyzer
Performance List

Transaction details: Response time and CPU

```

**Figure 42. Panel: CICS Performance Analyzer reporting to analyze a CICS DBCTL transaction**

```

---

**Figure 43. Example CICS Performance Analyzer Transaction details: Response time and CPU report**

---

Tutorial: Analyzing a CICS DBCTL transaction problem  39
13. Press the Exit function key (F3) to return to the Reporting menu.
14. Select option 1 IMS.
15. Select all types of analysis.
16. Select all focus options except for “Subsystem usage”.
17. Select the IMS log file.

18. Press Enter twice to generate the JCL for the report.
    The JCL is displayed in the ISPF editor. This JCL uses IMS Performance Analyzer to create several reports.
19. On the ISPF editor command line, enter SUB to submit the job.
20. View the job output: split your screen and use SDSF, or use your site-specific procedures.
    The following figures show two of the reports. For other reports, see the job output.

We know from the earlier CICS Performance Analyzer reports that CICS task number 170 is the abending transaction that we want to analyze.
Note: IMS V11 has the improved instrumentation required to connect CICS and IMS events, and IMS Performance Analyzer now supports this (see APAR PM24076): the IMS Performance Analyzer reports show the CICS transaction name and task number.

IMS Performance Analyzer
Tran detail: Response & CPU

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

CICS Tran CICS IMS Tran DB Call FP Call CPU Process Total IO DB IO ABEND
APPLID Trancode TaskNo Program Start PST Count Count Time Time Count Time Code
FUNTCIC OBEX 150 DFHTWM04 08.43.19.317952 2 35 20 0.004429 7.340751 4 0.002947
FUNTCIC OBEX 152 DFHTWM04 08.43.36.015461 2 35 20 0.004786 7.308276 5 0.004377
FUNTCIC TMUW 170 DFHTWM04 08.47.22.064699 2 27 21 0.003550 13.98985 5 0.004129 U0777
FUNTCIC OBEX 168 DFHTWM04 08.47.14.741096 1 35 20 0.004993 22.51250 4 0.003052
FUNTCIC TMUW 171 DFHTWM04 08.47.36.105442 2 31 11 0.004515 14.97664 5 0.004957
FUNTCIC TMUW 173 DFHTWM04 08.47.51.144257 2 31 11 0.003983 14.97902 5 0.003837
FUNTCIC TMUW 174 DFHTWM04 08.48.06.141930 2 16 1 0.002785 9.973308 4 0.003998
FUNTCIC TMUW 177 DFHTWM04 08.48.23.680926 2 35 15 0.005241 12.29449 6 0.004988
FUNTCIC TMUW 180 DFHTWM04 08.48.35.900428 2 35 15 0.005737 11.54835 6 0.006388
FUNTCIC OBEX 181 DFHTWM04 08.48.42.299975 1 22 15 0.002559 13.77870 1 0.000796 U0777

Figure 46. Example IMS Performance Analyzer Transaction details: Response time and CPU report

Start 06Apr2011 08.47.36.01 IMS Performance Analyzer End 06Apr2011 08.56.26.27

IMS Deadlock Summary

**************** Losing Program **************** *************** Winning Program ****************
DMB-name IMS-name Tran/Job PSB-name PCB--DBD Deadlocks DMB-name IMS-name Tran/Job PSB-name PCB--DBD # Waits
-------- -------- -------- -------- -------- --------- -------- -------- -------- -------- -------- --------
DFSIVD3A IBB1 FUWTCIC DFHTWM04 IVPDB3 2 DFSIVD3B IBB1 FUWTCIC DFHTWM04 IVPDB3 1
DI2IPART IBB1 FUWTCIC DFHTWM04 IVPDB3 1 DI2IPART IBB1 FUWTCIC DFHTWM04 IVPDB3 1
DI2IPART IBB1 FUWTCIC DFHTWM04 IVPDB3 3 DI2IPART IBB1 FUWTCIC DFHTWM04 IVPDB3 3
DI2IPART IBB1 FUWTCIC DFHTWM04 IVPDB3 6 DI2IPART IBB1 FUWTCIC DFHTWM04 IVPDB3 6

Total number of Deadlocks = 14

Figure 47. Example IMS Performance Analyzer Deadlock Summary report

Now that we have run some batch reports, let's use the interactive log browser to further investigate the details of the problem.

21. Press the Exit function key (F3) until you return to the session menu.

22. On the session menu, select option 4 Investigate. The Investigate panel is displayed.

For our time slice, we are going to use the duration of the IMS log.

23. If the Time Slice heading shows (OFF), enter SLICE on the command line to switch time slicing on.

24. Enter T next to the IMS log file.

The time slice is now set to the start and duration of the IMS log file.

25. Enter S on the first line under the / heading, to begin browsing a merged view of the time slice across all of the files.
The log browser displays the log records.

To locate the CMF record for the abending transaction, we will define a filter that selects only CMF records for transactions that abended (that is, with non-blank abend codes).

26. Enter **FILTER** on the command line.

The Filter panel is displayed.

27. Specify CMF under the Log column heading, and 6E13 under the Code column heading.

28. Enter $ next to CMF 6E13.
The Conditions panel is displayed.

29. Specify the following condition:
   ABEND NE ' '  
   This condition uses the global field ABEND: we could have used the equivalent CMF-specific field names ABCU or ABOR.

30. Press the Exit function key (F3) to return to the Filter panel, and then press the Exit function key (F3) again to return to the log browser.
   The log browser now shows only the records that match the filter.

31. Enter TX next to the CMF record (code 6E13) for task 170.
The log browser shows just the selected CMF record, because the CMF record has the latest time stamp of all related records, and so it appears at the bottom of the list of related records. We want to scroll to the top of the related records.

32. Scroll to the top of data. Either:
   - Type `M` on the command line, and then press the Backward function key (F7).
   - Type `TOP` on the command line, and then press Enter.

The log browser scrolls the display to the top of the records from the selected SMF file and IMS log that are related to the CMF record, and all records from the OPERLOG extract that are in the corresponding time period. The first of these records is an IMS 08 log record, marking the start of the IMS unit of work for CICS task number 170.

For the following screen, we have pressed the Right function key (F11) to switch to a log browser view that expands each record onto multiple lines, to show details such as the task number.
Press the Forward function key (F8) to scroll down until you see a 67FF (Exception Condition SNAP - DEADLOCK) IMS log record. This record contains details of the deadlock.

Enter S next to the Exception Condition SNAP record.
The details of the deadlock are displayed, including the key of the affected segment. Press the Forward function key (F8) to scroll the key into view.

35. Press the Exit function key (F3) to return to the list panel of log records. We want to bookmark this record to help other users, such as an IMS subject-matter expert, to find this record later. (To list the tags for a session, select History from the session menu.)

36. Enter G next to the Exception Condition SNAP record. An empty ISPF Edit panel (with the title Notepad) is displayed. Enter details about the record to help other users understand why the tagged record is significant. For example, “Cause of abend in CICS DBCTL transaction”.

37. Press the Exit function key (F3) to return to the list panel of log records. The tag appears directly above its associated log record, and with the same time stamp. Finally, if you scroll down further, you can see IMS message DFS968I (“...SUCCESSFULLY BACKED OUT...”) in the OPERLOG.
38. Press the Exit function key (F3) until you return to the Transaction Analysis Workbench primary option menu.

You have completed this tutorial.

This is the end of the lab. The next tutorial is optional.
Tutorial: Analyzing a CICS DB2 transaction problem

This tutorial shows you how to analyze a problem with a CICS DB2 transaction.

Before you begin

The following prerequisite steps have already been performed for this lab environment. In a different system environment, you would need to perform these steps before you begin the tutorial.

- Determine the location of the dumped SMF file that contains the records written by the related CICS and DB2 systems for the time when the problem occurred.
  
  To analyze the problem using the procedure described here, the SMF file must contain at least the following types of record:
  - CICS monitoring facility (CMF) performance class (SMF type 110, subtype 1, class 3) records
  - DB2 performance (SMF type 102) records
- Determine the location of the DB2 log file for the time when the problem occurred. (Either manually, or using Transaction Analysis Workbench automated file selection to select the appropriate DB2 log file.)
- Create a session that refers to the SMF file and the DB2 log file.

About this task

A user has reported an abend in CICS transaction. We know that this transaction, TWMU, is a CICS DB2 transaction (that is, a CICS transaction that accesses DB2 data).

Procedure

1. On the Transaction Analysis Workbench primary option menu, select option 1 Sessions. The Session Manager panel is displayed.
2. Select session 00000005, “Tutorial: CICS DB2”. The session menu is displayed.
   Let's review the files that have been added to this session.
3. On the session menu, select option 2 Files.
   The session has two associated log files: an SMF file and a DB2 log file.
4. Press the Exit function key (F3) to return to the session menu.
5. Select option 3 **Reporting**.
The Reporting menu is displayed.
6. Select option 2 **CICS**.
7. Select the reporting options and the SMF file as shown in the following figure.

8. Press Enter twice to generate the JCL for the report.
The JCL is displayed in the ISPF editor. This JCL uses CICS Performance Analyzer to create several reports.
9. On the ISPF editor command line, enter **SUB** to submit the job.
10. Use SDSF to view the job output (enter **SDSF** on the command line).
The following figures show extracts from two of the reports (job output data sets LIST0001 and LIST0004). For other reports, see the job output.

Note that CICS task number 168 (labelled [1] in the following figures) is the abending transaction: it occurs in the time period reported by the user, and has the abend code reported by the user.

Figure 60. Example CICS Performance Analyzer Transaction details: Response time and CPU report

Figure 61. Example CICS Performance Analyzer Transaction details: DB2 report

Note the long RMI elapsed time of 3.2 seconds for this CICS task compared to the response time of 3.4 seconds. This indicates that the problem is not in CICS, but in DB2.

Now that we have run some batch reports, let's use the interactive log browser to further investigate the details of the problem.

11. Press the Exit function key (F3) until you return to the session menu.

12. On the session menu, select option 4 Investigate. The Investigate panel is displayed.

For our time slice, we are going to use the 1-minute period within which the problem occurred.

13. If the Time Slice heading shows (OFF), enter SLICE on the command line to switch time slicing on.

14. Enter the time slice time, date, and duration shown in the following figure.

15. Enter S on the first line under the / heading, to begin browsing a merged view of the time slice across both files.
The files are displayed in the log browser.

Let's use a filter to locate the CICS monitoring facility (CMF) performance class record (in the SMF file) for the abending task.

16. Enter **FILTER** on the command line.

The Filter panel is displayed.

17. Specify **CMF** under the Log column heading, and **6E13** under the Code column heading.

In Transaction Analysis Workbench, 6E13 is the log code that identifies CICS monitoring facility (CMF) performance class records:

- The first two digits, 6E, are the hexadecimal representation of the decimal SMF record type, 110
- The third digit represents the record subtype, 1 (CICS monitoring)
- The fourth digit represents the class of data, 3 (performance)
18. Enter S next to CMF 6E13.

The Conditions panel is displayed.

19. Specify the condition ABEND EQ DB40 as shown in the following figure.

![Figure 64. Panel: Specifying a filter to show only CMF records with a specific abend code (part 1 of 2)](image1.png)

The Conditions panel is displayed.

20. Press the Exit function key (F3) to return to the Filter panel, and then press the Exit function key (F3) again to return to the log browser.

The log browser now shows only the records that match the filter. In this instance, there is only one such record, for CICS task 168.

**Note:** In addition to the CMF record that matches the filter, if other users have previously performed this tutorial with the same user ID, you might also see one or more records with the log code TAG. We will explain these records soon.

21. Press the Left function key (F10) to switch to a log browser view that expands the log record onto multiple lines, as shown in the following figure. (The single-line view showed enough details to confirm that this was the record that we want; this expanded view shows a few more details.)

Imagine that you work at a technical support help desk, and that you have taken the problem analysis to this stage (identifying the relevant CICS task and its corresponding log record). Now you want to hand the problem over to a CICS subject matter expert.
To help that next person to pick up the problem analysis from where you left it, we are going to “tag” (bookmark) the CMF record, to make it easy for that person to return to this record in the log browser.

Note: If you can already see tags when browsing this session, that’s okay: continue with this procedure. A record can have multiple tags.

22. Enter G next to the CMF record.

An ISPF edit panel is displayed.

23. Enter a note describing the tag. For example, “CICS Transaction Abend=DB40”. (If a tag with this description already exists, you might like to use a slightly different description. Different tags can have the same description.)

Tip: The note can contain multiple lines. The log browser displays the start of the first line of the note as the tag description.
24. Press the Exit function key (F3) to return to the log browser. The new tag is displayed above the CMF record, as shown in the following figure.

You have found and tagged the CMF record for the abending CICS transaction. You are ready to hand over the problem to a CICS subject matter expert.

25. Press the Exit function key (F3) until you return to the Transaction Analysis Workbench primary option menu.

Now “swap hats”: imagine that you are the CICS subject matter expert who has been handed this problem for further analysis. You have received an email from the technical support help desk containing the relevant session number and tag description, and you have just started the Transaction Analysis Workbench ISPF dialog.

26. On the Transaction Analysis Workbench primary option menu, select option 1 Sessions.

27. Select session 0000005, “Tutorial: CICS DB2”.

28. On the session menu, select option 5 History.

Notice that, in addition to the tag we explicitly created with the description “CICS Transaction Abend=DB40” (or similar), the history contains a “personal savepoint” tag. Each time a user exits the log browser for a session, the log browser automatically saves this tag in the session history, bookmarking the current position (the record at the top of the panel), and enabling the user to resume browsing at that position later.
(If other users have previously performed this tutorial with the same user ID, the session history might contain more tags than shown in the previous figure.)

Tip: The Resume Investigate option (under dialog option 0.1 Workbench Personal Settings) controls whether or not the log browser automatically resumes from your personal savepoint when you select option 4 Investigate on the session menu, or displays the Investigate panel.

29. Enter R (resume) next to the tag that you created previously (in your role as technical support help desk operator) for “CICS Transaction Abend=DB40”. The log browser resumes at the tagged position.

30. Enter TX next to the CMF record. The message “Tracking is active” is displayed at the top right of the panel, but otherwise, the TX line action appears to have had little effect. This is because we are using a CMF record for tracking. CICS writes CMF records at the end of a CICS transaction, after all other log records related to the transaction (such as related records in the DB2 log) have been written. To see the related records, all we need to do is scroll backwards.

However, before we scroll backwards, there is one more issue to consider that is specific to CMF records. The log browser displays CMF records in the position they were written to SMF (that is, according to the SMF time stamp). However, the log browser Time column displays the CICS transaction start time, not the SMF time stamp. This behavior is useful because it means that we can display records that are related to the CICS transaction with elapsed times relative to the transaction start time. The following steps demonstrate this technique.

31. Enter R (display relative times) next to the CMF record.

Figure 70. Panel: Tracking a CICS DB2 transaction: scroll backward to see more records

As the CICS subject matter expert, we want to delve into the detail of the CICS transaction activity. We will use transaction tracking to display the log records related to this transaction, from all selected log files (in this case, the SMF file and the DB2 log).

30. Enter TX next to the CMF record.

The message “Tracking is active” is displayed at the top right of the panel, but otherwise, the TX line action appears to have had little effect. This is because we are using a CMF record for tracking. CICS writes CMF records at the end of a CICS transaction, after all other log records related to the transaction (such as related records in the DB2 log) have been written. To see the related records, all we need to do is scroll backwards.

However, before we scroll backwards, there is one more issue to consider that is specific to CMF records. The log browser displays CMF records in the position they were written to SMF (that is, according to the SMF time stamp). However, the log browser Time column displays the CICS transaction start time, not the SMF time stamp. This behavior is useful because it means that we can display records that are related to the CICS transaction with elapsed times relative to the transaction start time. The following steps demonstrate this technique.
Again, not much appears to have changed. Now let's scroll backwards to view the related records.

32. Scroll to the top of data. Either:
   - Type `M` on the command line, and then press the Backward function key (F7).
   - Type `TOP` on the command line, and then press Enter.

We now see the related records for this transaction, showing elapsed times relative to the start of the transaction.

33. Press the Right function key (F11) to compress each record onto a single line.

34. Press the Forward function key (F8) several times to scroll forward until you see the elapsed time jump from less than 1 second to greater than 3 seconds.
The jump in elapsed time occurs because the lock manager (IRLM) has suspended the transaction due to a lock (and has probably timed out waiting, hence the transaction abend). Looking at the surrounding log records, we see the probable cause: the previous DB2 activity, a delete (log record shown before the IRLM suspend) has resulted in a deadlock (log record shown after the IRLM resume).

35. Enter S next to the “DB2 Performance 172 Deadlock data” record to view its details.

The full details of the deadlock record are displayed.

36. Press the Forward function key (F8) to scroll past the header fields to the Blocker section.

Here, TWMU, the CICS transaction that abended, is the waiter. DB2U is the CICS transaction that is the blocker in this deadlock.
37. Press the Exit function key (F3) to return to the list panel of log records.

38. Enter S next to the “DB2 Delete from a Data Page” record to view its details. Here we can see the details of the activity that the transaction was attempting to perform before it abended, including the actual data that the transaction was attempting to delete.

Figure 74. Panel: Browsing the details of a DB2 performance “deadlock” record (from an SMF file)

Figure 75. Panel: Browsing the details of a DB2 delete record (from a DB2 log)
39. Press the Exit function key (F3) to return to the list panel of log records.
Finally, if we scroll forward a little further, we can see the “DB2 Unit of Recovery Control - Begin Abort” record that corresponds to the DB2 “Delete...” record (matching URIDs; for clarity, we have omitted from the following figure all but these two log records.). Any other activity in this unit of recovery will also be rolled back.

![File Mode Filter Time Labels Options Help]

<table>
<thead>
<tr>
<th>BROWSE</th>
<th>IMPOT01.SMF.D110429.CICSD82.FULL</th>
<th>Record 00000603</th>
<th>More: &lt; &gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command</td>
<td>Scroll ====&gt; CSR</td>
<td>Slice . . Duration 00.01.00</td>
<td>Date 2011-04-29</td>
</tr>
<tr>
<td>Code Description</td>
<td>&lt; &gt;</td>
<td>Time 15.43.14.33665</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>0020 DB2 Delete from a Data Page</td>
<td>2011-04-29 Friday</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td>0020 DB2 Unit of Recovery Control - Begin Abort</td>
<td>+3.174670</td>
<td></td>
</tr>
<tr>
<td></td>
<td>URID=0000419DA9FF</td>
<td>+0.014190</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 76. Panel: Tracking a CICS DB2 transaction (matching the delete and abort URID)**

At this point, you would probably hand over the problem to a DB2 subject matter expert, perhaps after tagging one or more of the relevant log records discussed in this tutorial.

You have completed the last tutorial. Your sessions repository includes additional predefined sessions that are not specifically covered by these tutorials. Please feel free to explore those other sessions now.