It's time to switch to IBM Problem Determination Tools Version 6 Technical overview for end users

zSeries: Abend/Edit/Debug/Application Tune/Load, Regression Testing

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WebSphere. software

Rational. software

Agenda

- **Why Problem Determination Tools Now**
- **What are the tools**
- **What can they do now**
- **Summary**
- **Polling Questions**
- **Open Q & A Session**

Problem Determination (PD) Tools

Increases application programmer productivity during development and critical production availability outages.

Cost Components of Availability

- Tangible costs (well understood by finance dept.)
  - Lost
    - User productivity
    - IT staff productivity
    - Revenue
  - Overtime payments
  - Wasted goods & material
  - Imposed fines or penalties

Industry Outage Impact

Type of Business	Average Hourly Impact
Retail brokerage	$6,450,000
Credit card sales authorization	$2,600,000
Home shopping channel	$113,750
Catalog sales centers	$90,000
Airline reservation centers	$89,500
Cellular service activation	$41,000
Package shipping services	$28,250
Online network connect fees	$25,250
ATM service fees	$14,500

A pragmatic and evolutionary approach leads to success — avoid the all-or-nothing scenario

1

Problem Determination Tools

There are many tools in this solution set. We will focus on four key PD Tools today.

- **Fault Analyzer**
  - **determine cause of application failure and offers assistance (replace dumps)**
- **Debug Tool Utilities**
  - **display source level view of point of failure with diagnostics**
- **File Manager**
  - **manipulate data, edit, browse, print, data creation and copy**
- **Application Performance Analyzer**
  - **analyze applications in production for bottlenecks real-time or historically.**

- **Why it broke, how to fix, fix it, tweak it…**

Partial Competitive Landscape

IBM	Computer Associates	Compuware
Fault Analyzer	Symdump	Abend-AID Suite
File Manager	File Master	File-AID Suite
File Export	" ? "	File-AID/RDX
Debug Tool Utilities & Advanced Functions	Intertest Suite	XPEDITER Suite
Application Time Facility (aka TicToc)	" ? "	Xpediter Xchange
Workload Simulator Rational Performance Tester Rational Functional Tester Ext	Verify, Transcentury Enterprise Tester	QAHiperstation / QAPlayback
Application Performance Analyzer	" ? "	Strobe Suite

Other vendors may offer similar competitive tools. Information presented about vendor products is based on public information of which IBM is currently aware. For more information about any vendor products or product lines, check with the vendors themselves.

Why IBM PD Tools?

Why now?

Golden Nuggets

Of

Value

V1 – V6…Reasons to Go with IBM's PD Tools?

1. Price & Flexible Licensing= *Savings*
2. Features/Functions
3. IBM = Reliability = Stability
4. Single product vs. cost options
5. SMPE install, No passwords
6. Strategic Directions:
   - Compliments WebSphere, MQ, Delivery with 64-bit z/Arch., new DB2, CICS,IMS, etc.
7. Partnership/Responsibility

WHY IS V6 Different ?

- Function rich
- Performance ready for heavy workloads
- Immediately tolerates new platforms DB2 V8, IMS V9, CICS TS V3.1, z/OS, MQ, etc
- Within 90 days or less typically Exploits new platforms
- Continued expansion of investment in tools:
  - Lab, sales, technical support, trainers
- Tools integrate with other PD tools and expanding to other IBM zTools
  - ie: APA and Omegamon CICS
- Fortune 500 references
- Training options
  - Lecture, lab based hands on live, webcast, self-based CD

zSeries

IBM Problem Determination Tools:

Fault, Edit, Debug, Test, and Tuning

Dan Brown

File Manager for z/OS

- Data management tool supporting key file structures like VSAM, DB2, and IMS

Fault Analyzer for z/OS

- Helps you rapidly pinpoint cause of failed application (abends)

Debug Tool Utilities & Advanced Functions for z/OS and WDDz

- Source code debugging to improve development productivity

Application Performance Analyzer

- Monitor performance at the application level

Other PD Tools for Application Developers

Workload Simulator for z/OS and OS/390

- Regression and Load testing of interactive z/OS applications

File Export for z/OS

- Export and import related sets of DB2, IMS, VSAM and sequential data

IBM Application Time Facility aka TicToc

- Enables date/time simulation in the mainframe environment

IBM ISPF Productivity Tool Version 5.8 aka Spiffy

- Turbo charge ISPF

Rational Function Tester Extension for z

- Workstation-based regression testing of interactive z/OS applications

Rational Performance Tester

- Harnesses the power of z/OS to validate web application scalability *before* deployment

IBM Fault Analyzer
Version 6.1

What's New With Fault Analyzer V6.1?

PERFORMANCE AND RESOURCE UTILIZATION
- CICS Deferred Report Option for transaction abend processing performance improvement

CURRENCY
- Updates to maintain Java currency
- Adds CICS 3.1 support, including normal V-to-V support and new feature support excluding functions requiring XPLINK support

USABILITY
- Adds the ability to share common source files between Debug Tool and Fault Analyzer without redundancy

NEW FUNCTION
- Provides a DISASSEMBLE display of a failing instruction group when the compile listing view is not available
- Enables exclusion of CICS transaction abend analysis based on the CICS transaction dump code table via CICSDumpTableExclude
- Allows users to nominate compiler error messages that should be ignored via the PermitLangx parameter
- Allows the user to specify names of common error handler routines that should not be made points of failure
- Allows NoDup to permit a JOBNAME subparameter for extended duplicate criteria
- Adds additional domains and abend analysis for CICS system dumps
- Improves CICS storage violation analysis
- Adds lock fault entry from Auto deletion
- Reports Linkedit map AMODE conflict warnings for customer abend programs
- Allocates the IDIREPRT report to the SYSUDUMP class, not sysout=*
- Adds EXCLUDE option via EXEC=program_name
- Allows DATASETS option extension to permit use of variables in DSN (e.g. &USERID &SYSNAME)
- Provides fault history log capability for duplicate entries
- Allows storage range to be specified for IDISNAP print
- Keeps more detailed information like date/time and user IDs for duplicate dumps
- Adds the ability to generate DUMP in SYSOUT OR HISTFILE
- Adds a scalability improvement to reduce the contention on the fault history file

MIXED WORKLOAD
- Provides the ability to view Fault History files over TCP/IP via a Web browser
- Adds internal support for fault analysis across multiple address spaces
- Adds basic WebSphere Developer for zSeries integration - a WebSphere Developer for zSeries plug-in utilizing the browser access

What is Fault Analyzer ?

- **A tool that helps you determine the cause of an application abend**
  - so you can more quickly identify and resolve the problem

- **It provides information about an application when it has abended, to help you assess:**
  - What happened, and why?
  - What program?
  - What line of source code?
  - What source variables were involved?

IBM Fault Analyzer for z/OS

Use it to:

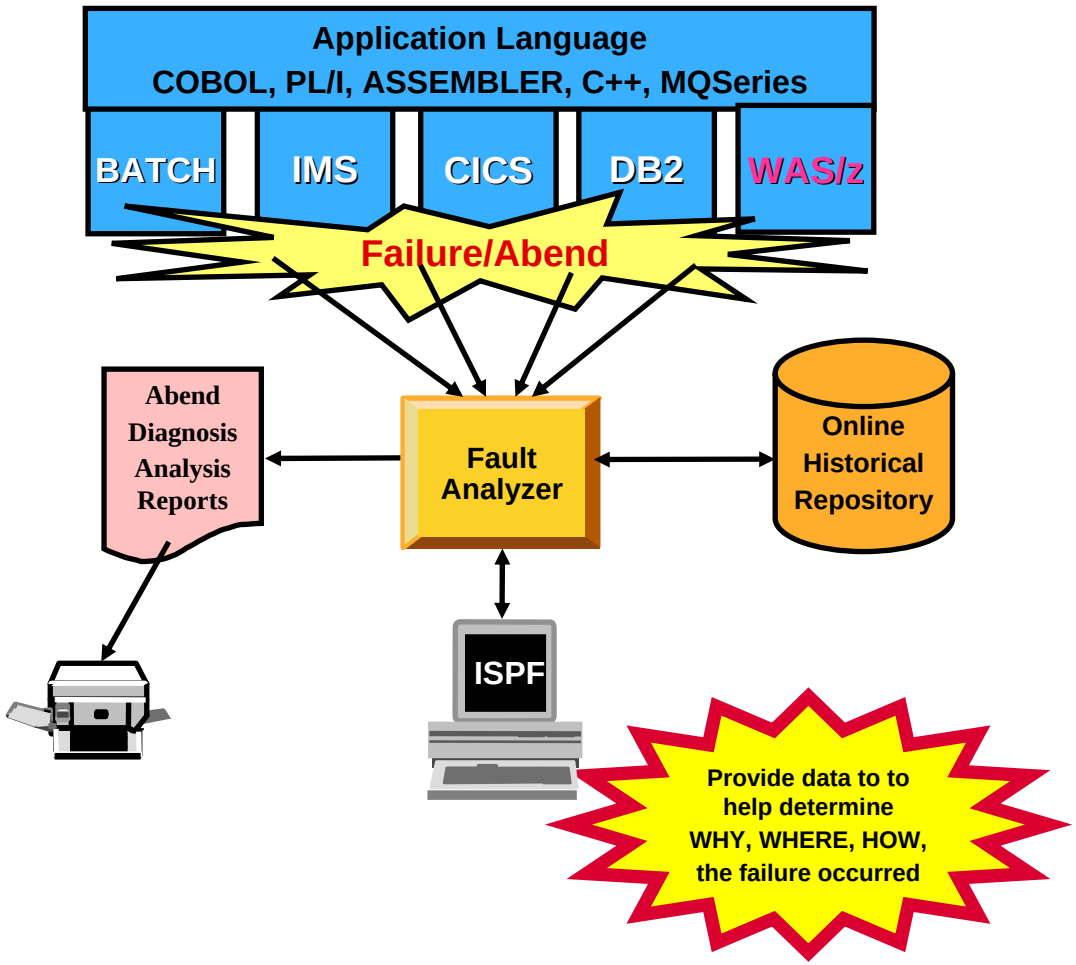
- Understand why an application abended
- Get information you need to diagnose and fix a problem

Key Features:

- Automatic real-time capture of diagnostic information
- Automatic analysis and reporting of application abends
  - FA can pinpoint an abend to the program and source statement
- Interactive, point-and-shoot navigation of abend information
  - Quickly navigate to information you need, even in large, complex applications

Fault Analyzer Functional Overview

Helps you rapidly pinpoint why and where an enterprise application abended and offers suggestions on how to resolve



- **Single Fault Analysis Product For All Environments**
  - Analysis At Application Level
  - Information Gathered At Time Of Abend
  - Translates Low-level "Dump" Information Into Application-level Information
  - Expands Abend Code And Message Descriptions
  - No Recompile Of Applications
  - No JCL Changes
  - No Performance Overhead
  - ISPF Fault History Log Facility
  - Integrated 64-bit DB2 version 8 support
- **Consistent Across Languages**
  - COBOL, C, C++, PL/I, Assembler, LE
- **Environments Supported**
  - CICS, TSO, JES/Batch, IMS, DB2, Unix System Services, MQSeries, WASz
- **Order Fault Analyzer V6 PID 5655-P16**

What Functions does Fault Analyzer have ?

- **Real-Time Analysis**
  - Automatic analysis and report generation
  - Automatic captures of detailed application data for later interactive analysis
- **Reanalysis**
  - Point-and-shoot navigation of an abend
  - Apply program source data after an abend *without re-creating the abend*

A familiar occurrence…

Oooops! The application abended.

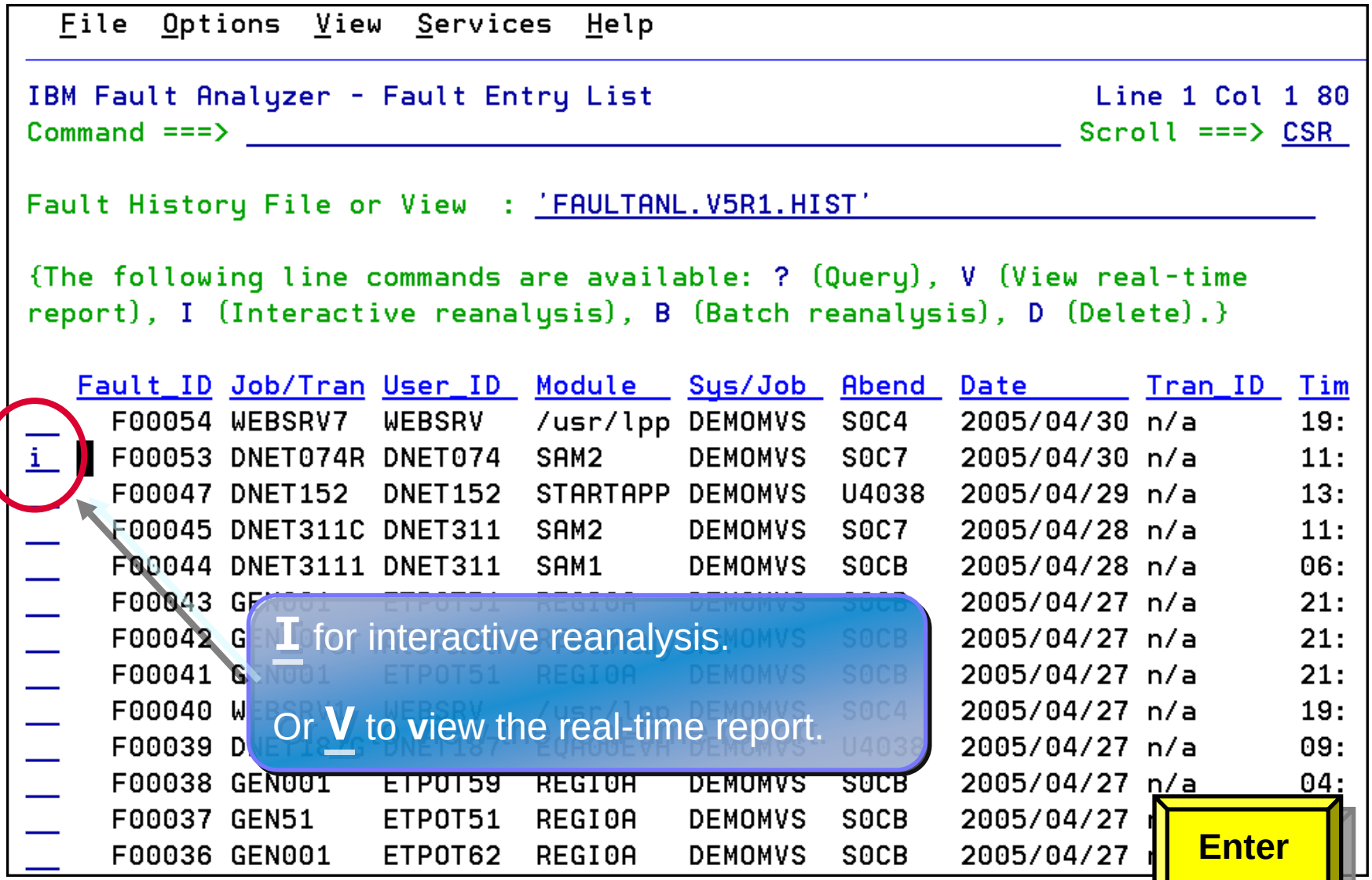
```
 Display  Filter  View  Print  Options
 SDSF OUTPUT DISPLAY DNET074R JOB06769  DSID         2 LINE 0          COLUMNS 02- 81
 COMMAND INPUT ===>                                              SCROLL ===> CSR
******************************** TOP OF DATA ***********************************
                    J E S 2  J O B  L O G  --  S Y S T E M  M V S A  --  N O D E

11.32.09 JOB06769 ---- SATURDAY,  30 APR 2005 ----
11.32.09 JOB06769  IRR010I  USERID DNET074  IS ASSIGNED TO THIS JOB.
11.32.09 JOB06769  ICH70001I DNET074  LAST ACCESS AT 11:31:57 ON SATURDAY, APRIL
11.32.09 JOB06769  $HASP373 DNET074R STARTED - INIT 2    - CLASS A - SYS MVSA
11.32.09 JOB06769  IEF403I DNET074R - STARTED - TIME=11.32.09
11.32.11 JOB06769  +IDI0001I Fault Analyzer V5R1M0 (UK00798 2005/02/23) invoked
11.32.13 JOB06769  +IDI0002I Module SAM2, program SAM2, source line # 157: Abend
11.32.14 JOB06769  +IDI0003I Fault ID F00053 assigned in history file FAULTANL.V
11.32.14 JOB06769  IEF450I DNET074R RUNSAM1 - ABEND=S0C7 U0000 REASON=00000007
   638                     TIME=11.32.14
11.32.14 JOB06769  -                                          --TIMINGS (MINS.)--
11.32.14 JOB06769  -JOBNAME  STEPNAME PROCSTEP    RC     EXCP     CPU     SRB  CLOCK
11.32.14 JOB06769  -DNET074R           RUNSAM1  *S0C7    1666     .01     .00     .08
11.32.14 JOB06769  IEF404I DNET074R - ENDED - TIME=11.32.14
11.32.14 JOB06769  -DNET074R ENDED.  NAME-                 TOTAL CPU TIME=
11.32.14 JOB06769  $HASP395 DNET074R ENDED
------ JES2 JOB STATISTICS ------
  30 APR 2005 JOB EXECUTION DATE
           26 CARDS READ
        2,100 SYSOUT PRINT RECORDS
            0 SYSOUT PUNCH RECORDS
          138 SYSOUT SPOOL KBYTES
         0.08 MINUTES EXECUTION TIME
        1 //DNET074R JOB REGION=4M,
          // TIME=(1),MSGCLASS=H,NOTIFY=DNET074,MSGLEVEL=(1,1)
```

Fault Analyzer captured information and produced a Real-Time Analysis report.

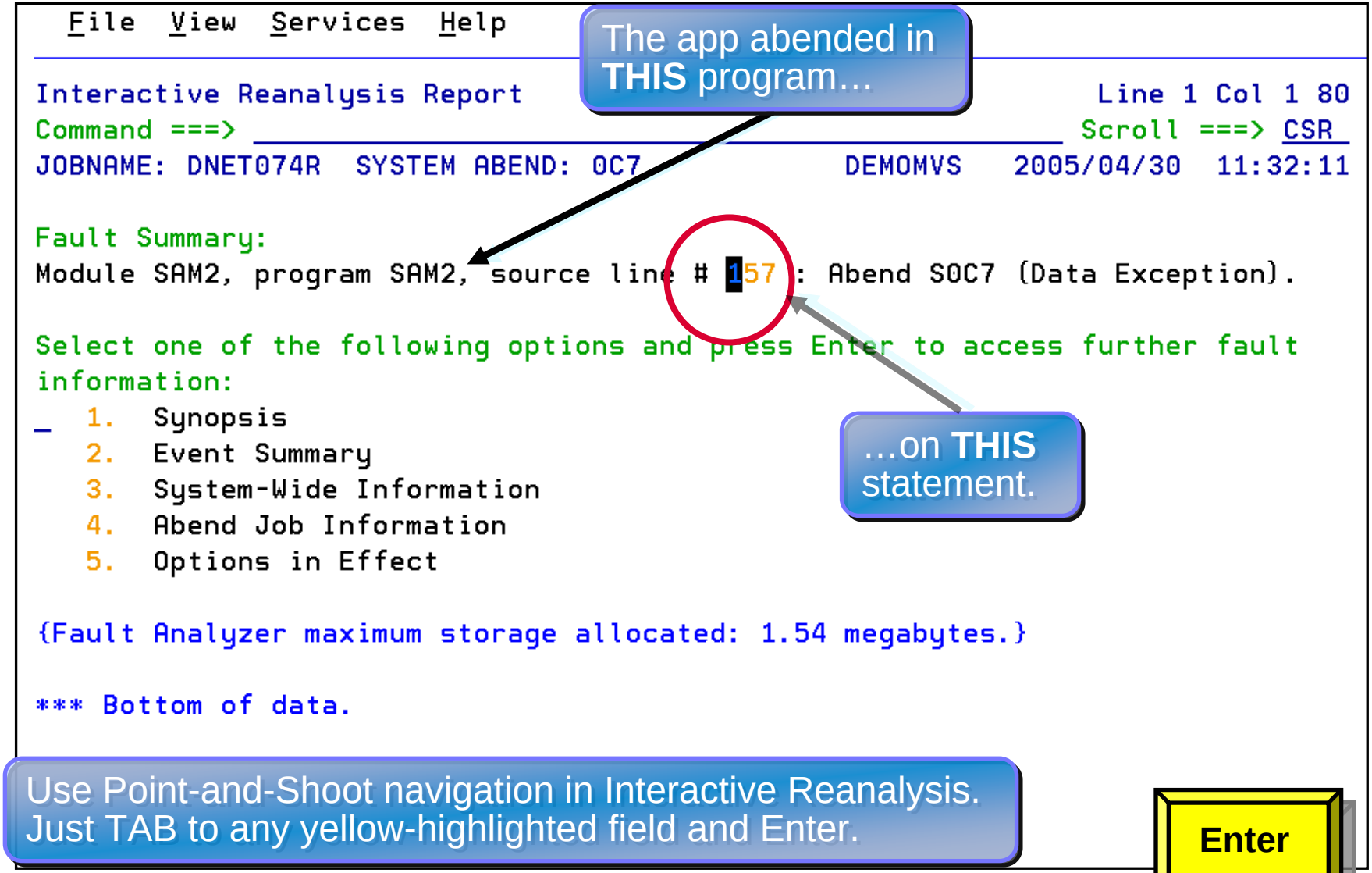
How do I view the Real-Time Analysis report?

- The real time report can be viewed from SYSOUT (for a batch job)
- Or, for any abend, the report can be viewed from the Online Interface

The Fault Analyzer Online Interface



Fault Analyzer Interactive Reanalysis



Fault Analyzer Interactive Reanalysis

```
  File  View  Services  Help
Program SAM2 Compiler Listing                          Line 154 Col 1 80
Command ===>                                           Scroll ===> CSR
JOBNAME: DNET074R  SYSTEM ABEND: 0C7          DEMOMVS   2005/04/30  11:32:11
000148                  WHEN 'NAME    '
000149                      MOVE TRAN-UPDATE-DATA TO CUST-NAME
000150                      COMPUTE TRAN-COUNT = TRAN-COUNT + 1
000151                  WHEN 'BALANCE '
000152                      EVALUATE TRAN-ACTION
000153                          WHEN 'REPLACE'
000154                              MOVE WS-UPDATE-NUM TO CUST-ACCT-BALANCE
000155                              COMPUTE TRAN-COUNT = TRAN-COUNT + 1
000156                          WHEN 'ADD     '
000157                              COMPUTE CUST-ACCT-BALANCE =
000158                                CUST-ACCT-BALANCE + WS-UPDATE-NUM
000159                              COMPUTE TRAN-COUNT = TRAN-COUNT + 1
000160                      END-EVALUATE
000161                  WHEN 'ORDERS  '
000162                      EVALUATE TRAN-ACTION
000163                          WHEN 'REPLACE'
000164                              MOVE WS-UPDATE-NUM TO CUST-ORDERS-YTD
000165                              COMPUTE TRAN-COUNT = TRAN-COUNT
000166                          WHEN 'ADD     '
```

Browse the program listing for reference

abending statement

PF3

Fault Analyzer Interactive Reanalysis

```
  File  View  Services  Help
──────────────────────────────────────────────────────────────────────────────
Interactive Reanalysis Report                                  Line 1 Col 1 80
Command ===> ____________________________________________ Scroll ===> CSR
JOBNAME: DNET074R  SYSTEM ABEND: 0C7          DEMOMVS   2005/04/30  11:32:11

Fault Summary:
Module SAM2, program SAM2, source line # 157 : Abend S0C7 (Data Exception).

Select one of the following options and press Enter to access further fault
information:
_  1.  Synopsis
   2.  Event Summary
   3.  System-Wide Information
   4.  Abend Job Information
   5.  Options in Effect

{Fault Analyzer maximum storage allocated: 1.54 megabytes.}

*** Bottom of data.
```

Synopsis will show high-level information the abend.

Enter

Fault Analyzer Interactive Reanalysis - Synopsis

```
  File  View  Services  Help
 ──────────────────────────────────────────────────────────────────────────
Synopsis                                                  Line 1 Col 1 80
Command ===>                                            Scroll ===> CSR
JOBNAME: DNET074R  SYSTEM ABEND: 0C7          DEMOMVS   2005/04/30  11:32:11

A system abend 0C7 occurred in module SAM2 program SAM2 at offset X'640'.

A program interruption code 0007 (Data Exception) is associated with this
abend and indicates that:

  A decimal digit or sign was invalid.

The cause of the failure was program SAM2 in module SAM2.  The COBOL source
code that immediately preceded the failure was:

  Source
  Line #
  000157          COMPUTE CUST-ACCT-BALANCE =
  000158            CUST-ACCT-BALANCE + WS-UPDATE-NUM

The COBOL source code for data fields involved in the failure:

  Source
```

reason

abending program

abending statement

PF8

Fault Analyzer Interactive Reanalysis - Synopsis

```
  File  View  Services  Help
 ──────────────────────────────────────────────────────────────────────────
Synopsis                                                    Line 11 Col 1 80
Command ===> _____________________________________________  Scroll ===> CSR
JOBNAME: DNET074R  SYSTEM ABEND: 0C7          DEMOMVS   2005/04/30  11:32:11

  Source
  Line #
  000157                              COMPUTE CUST-ACCT-BALANCE =
  000158                                CUST-ACCT-BALANCE + WS-UPDATE-NUM

The COBOL source code for data fields involved in the failure:

  Source
  Line #
  000031            05  WS-UPDATE-NUM        PIC S9(9)V99  COMP-3  VALUE +0.
  000050            05  CUST-ACCT-BALANCE    PIC S9(7)V99  COMP-3.

Data field values at time of abend:

  CUST-ACCT-BALANCE    = X'7B7C5C505A'   *** Cause of error ***
  WS-UPDATE-NUM        = 1.23

*** Bottom of data.
```

Variable that had the bad data

PF3

Fault Analyzer Interactive Reanalysis

```
  File  View  Services  Help
 ──────────────────────────────────────────────────────────────────────
Interactive Reanalysis Report                                Line 1 Col 1 80
Command ===> ____________________________________________ Scroll ===> CSR
JOBNAME: DNET074R  SYSTEM ABEND: 0C7          DEMOMVS   2005/04/30  11:32:11

Fault Summary:
Module SAM2, program SAM2, source line # 157 : Abend S0C7 (Data Exception).

Select one of the following options and press Enter to access further fault
information:
_   1.  Synopsis
    2.  Event Summary
    3.  System-Wide Information
    4.  Abend Job Information
    5.  Options in Effect

{Fault Analyzer maximum storage allocated: 1.54 megabytes.}

*** Bottom of data.
```

Event Summary will show the call chain and program events

Enter

Fault Analyzer Interactive Reanalysis – Event Summary

SAM1 was the main program.
SAM2 was a subroutine.

```
  File  View  Services  Help
Event Summary                                              Line 1 Col 1 80
Command ===> _____________________________________________ Scroll ===> CSR
JOBNAME: DNET074R  SYSTEM ABEND: 0C7          DEMOMVS   2005/04/30  11:32:11

{The following events are presented in chronological order.}

Event                Fail  Module   Program  EP
#  Type              Point Name     Name     Name     Event Location (*)     Loaded
 1 Call                    SAM1     SAM1     SAM1     L#311 P+AD4            DNET07
 2 Call                    IGZCPAC  n/a      IGZCFCC  E+2CA                  CEE.SC
 3 Abend S0C7        ***** SAM2     SAM2     SAM2     L#157 P+640            DNET07
```

Get details about program SAM2

```
(*) One or more of the following abbreviations might appear in the "Event
    Location" column:

    F#n  Source file number (refer to detailed event information for file
         identification)
    L#n  Source file line number
    S#n  Listing file statement number (refer to detailed event information
         for file identification)
    M+x  Offset from start of load module
```

Enter

Fault Analyzer Interactive Reanalysis – program detail

```
  File  View  Services  Help
-------------------------------------------------------------------------------
Event 3 of 3: Abend S0C7 *** Point of Failure ***              Line 1 Col 1 80
Command ===> bottom                                          Scroll ===> CSR
JOBNAME: DNET074R  SYSTEM ABEND: 0C7          DEMOMVS   2005/04/30  11:32:11

Previous Event Details


Abend Code. . . . . . . . . . : S0C7
Program Interruption Code . . : 0007 (Data Exception)
  A decimal digit or sign was invalid.

COBOL Source Code:
  Source
  Line #
  000157                          COMPUTE CUST-ACCT-BALANCE =
  000158                            CUST-ACCT-BALANCE + WS-UPDATE-NUM

Data Field Declarations:
  Source
  Line #
  000031              05  WS-UPDATE-NUM        PIC S9(9)V99  COMP-3
  000050              05  CUST-ACCT-BALANCE    PIC S9(7)V99  COMP-3
```

Detailed info about program SAM2 is shown here.

Enter

Fault Analyzer Interactive Reanalysis – program detail

```
  File  View  Services  Help
─────────────────────────────────────────────────────────────────────
Event 3 of 3: Abend S0C7 *** Point of Failure ***          Line 68 Col 1 80
Command ===> _____________________________________________ Scroll ===> CSR
JOBNAME: DNET074R  SYSTEM ABEND: 0C7          DEMOMVS   2005/04/30  11:32:11
  R7:  000203A0 (Module SAM2 program SAM2 WORKING-STORAGE SECTION BLW=0000 +
                X'0', symbol WS-FIELDS, source line # 30 )
  R8:  00016060 (Module SAM2 program SAM2 LINKAGE SECTION BLL=0002 + X'0',
                symbol TRANSACTION-RECORD, source line # 63 )
  R9:  000201A0 (Module SAM2 program SAM2 + X'7F0', source line # 173 )
  R10: 0001FAE0 (Module SAM2 program SAM2 + X'130')
  R11: 0001FDBC (Module SAM2 program SAM2 + X'40C')
  R12: 0001FAAC (Module SAM2 program SAM2 + X'FC')
  R13: 19087478 (592776 bytes of storage addressable)
  R14: 0001FD14 (Module SAM2 program SAM2 + X'364')
  R15: 8001FD20 (Module SAM2 program SAM2 + X'370')

Associated Messages

CEE3207S The system detected a data exception (System Completion Code=0C7).

Associated Storage Areas

*** Bottom of data.
```

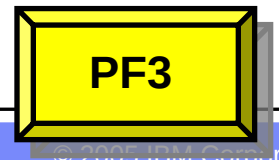
Point-and-shoot lookup of error messages.

Enter

Fault Analyzer Interactive Reanalysis – message lookup

```
  File  View  Services  Help
─────────────────────────────────────────────────────────────────────
Message CEE3207S Explanation                          Line 1 Col 1 80
Command ===> ____________________________________ Scroll ===> CSR
JOBNAME: DNET074R  SYSTEM ABEND: 0C7          DEMOMVS   2005/04/30  11:32:11

  CEE3207S The system detected a data exception (System Completion
         Code=0C7).

  Explanation:  Your program attempted to use a decimal instruction
  incorrectly. See a Principles of Operation manual for a full list of data
  exceptions.

  Programmer Response:  Check the variables associated with the failing
  statement to make sure that they have been initialized correctly.

  System Action:  The thread is terminated.

  Symbolic Feedback Code:  CEE347

*** Bottom of data.
```

Error message look-up.



Fault Analyzer Interactive Reanalysis – Event Summary

File View Services Help

Event Summary Line 1 Col 1 80
Command ===> Scroll ===> CSR
JOBNAME: DNET074R SYSTEM ABEND: 0C7 DEMOMVS 2005/04/30 11:32:11

{The following events are presented in chronological order.}

Event #	Type	Fail Point	Module Name	Program Name	EP Name	Event Location (*)	Loaded
1	Call		SAM1	SAM1	SAM1	L#311 P+AD4	DNET07
2	Call		IGZCPAC	n/a	IGZCFCC	E+2CA	CEE.SC
3	Abend S0C7	*****	SAM2	SAM2	SAM2	L#157 P+640	DNET07

Get details about SAM1 (the main program)

(*) One or more of the following abbreviations might appear in the "Event Location" column:

F#n Source file number (refer to detailed event information for file identification)
L#n Source file line number
S#n Listing file statement number (refer to detailed event information for file identification)
M+x Offset from start of load module

Enter

Fault Analyzer Interactive Reanalysis – program detail

```
  File  View  Services  Help
─────────────────────────────────────────────────────────────────────
Event 1 of 3: Call (DSA Address 19087030)                Line 1 Col 1 80
Command ===> bottom                                      Scroll ===> CSR
JOBNAME: DNET074R  SYSTEM ABEND: 0C7          DEMOMVS   2005/04/30  11:32:11


COBOL Source Code:
  Source
  Line #
  000308          *
  000309          *         Subroutine SAM2 will apply an update to a customer re
  000310          *
  000311                    CALL 'SAM2' USING CUSTOMER-REC, TRANSACTION-RECORD,
  000312                                      WS-TRAN-OK, WS-TRAN-MSG

Data Field Declarations:
  Source
  Line #
  000060           01  CUSTOMER-REC.
  000082           01  TRANSACTION-RECORD.
  000137               05  WS-TRAN-OK              PIC X      VALUE 'N'.
  000139               05  WS-TRAN-MSG             PIC X(50)  VALUE SP
```

Enter

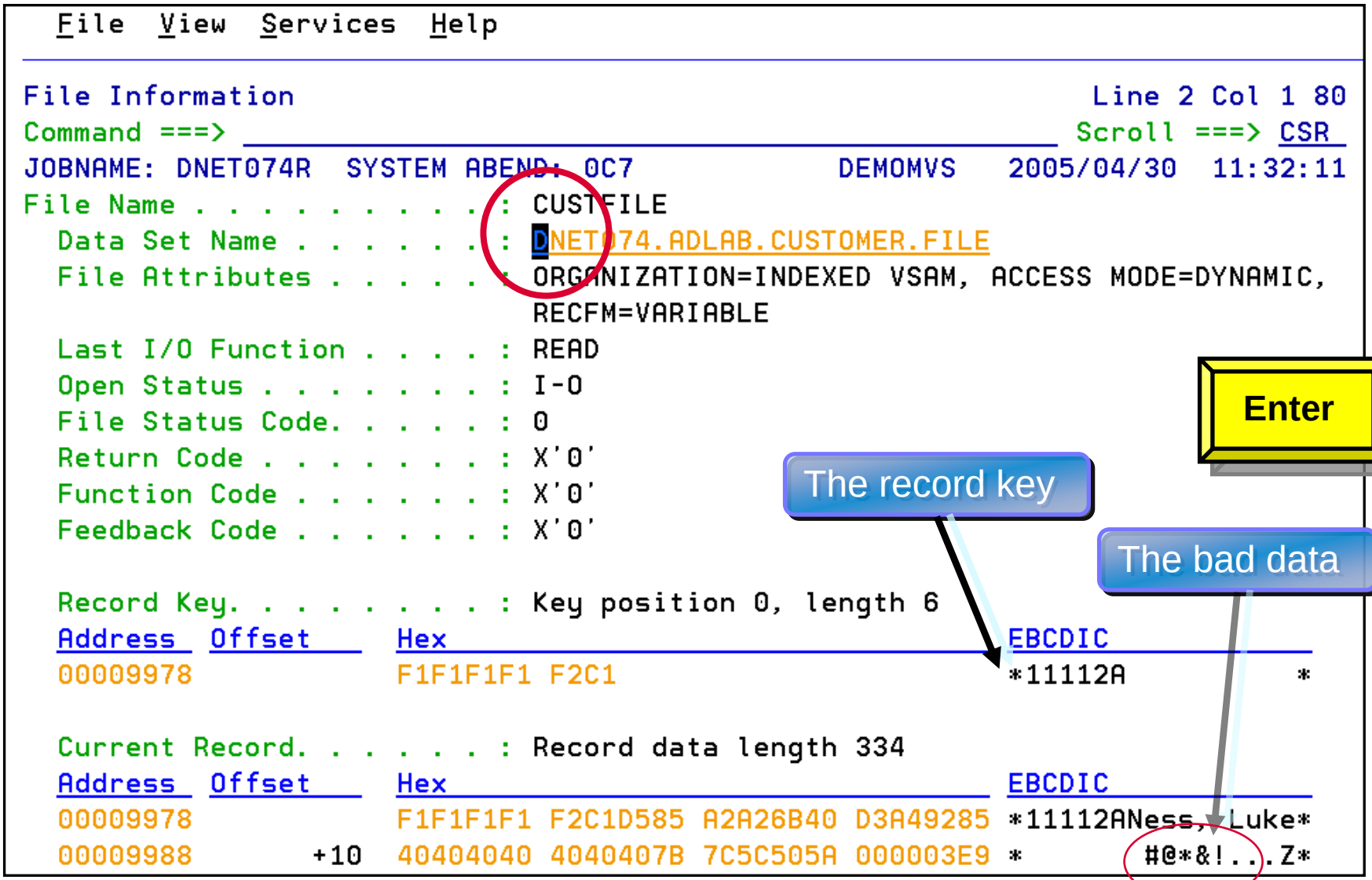
Fault Analyzer Interactive Reanalysis – program detail

```
  File  View  Services  Help
─────────────────────────────────────────────────────────────────────
Event 1 of 3: Call (DSA Address 19087030)                Line 62 Col 1 80
Command ===> _____________________________________________ Scroll ===> CSR
JOBNAME: DNET074R  SYSTEM ABEND: 0C7            DEMOMVS   2005/04/30  11:32:11
  R10: 00007EFC (Module SAM1 program SAM1 + X'12C')
  R11: 00008588 (Module SAM1 program SAM1 + X'7B8')
  R12: 00007ECC (Module SAM1 program SAM1 + X'FC')
  R13: 19087030 (593872 bytes of storage addressable)
  R14: 800088A6 (Module SAM1 program SAM1 + X'AD6', source line # 311 )
  R15: 99051CC0 (Module IGZCPAC + X'406E8')

Associated Open Files

File Name . . . . . : CUSTFILE
File Name . . . . . : CUSTRPT
File Name . . . . . : TRANFILE

Associated Storage Areas


Next Event Details

*** Bottom of data.
```

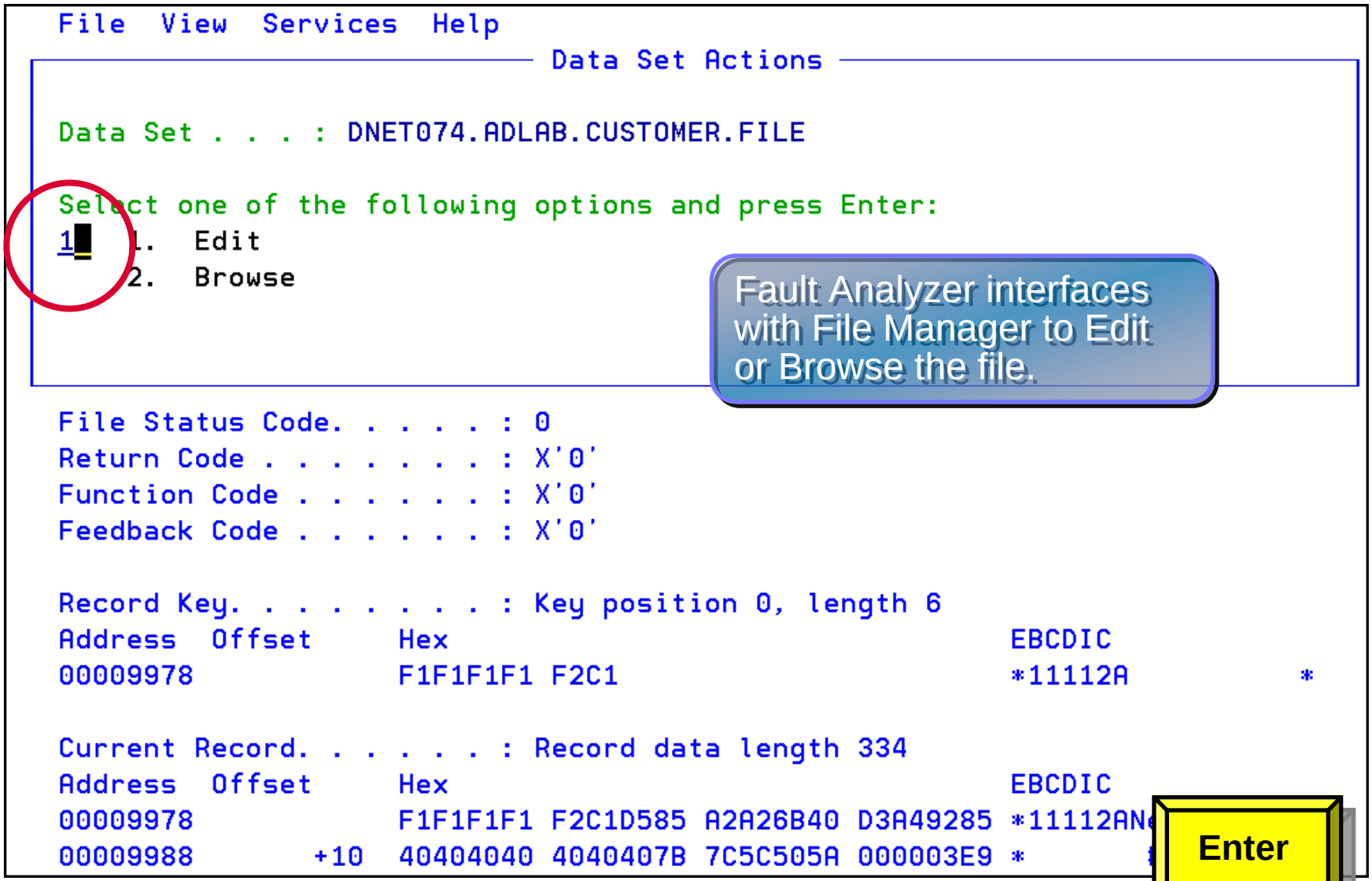
You can get information about files that were open when the program abended.

Enter

Fault Analyzer Interactive Reanalysis – file detail



Fault Analyzer Interactive Reanalysis – link to File Manager



Fault Analyzer Interactive Reanalysis – link to File Manager

```
 Process    Options    Help
 ------------------------------------------------------------------------------
File Manager Edit DNET074.ADLAB.CUSTOMER.FILE
Command ===>                                                  Scroll CSR
       Type KSDS     Refresh on save N                        Format TABL
       CUST-ID REC-TYPE NAME              ACCT-BALANCE  ORDERS-YTD ADDR
       #3      #4       #5                        #6           #7 #8        +
       AN 1:5  AN 6:1   AN 7:17                PD 24:5     BI 29:4 AN 33:20
       <--->   -        <---+----1----+->  <---+----1> <---+----1> <---+----1-
000000 ****  Top of data  ****
000001 03115   A          Graham, Holly          254.53           1 3100 Oaktre
- - -  - - - - - - CONTACT-REC - - - - - - - - - - 2 Line(s) suppressed
000004 05580   A          Moore, Adeline         498.95           3 4700 S. Syr
- - -  - - - - - - CONTACT-REC - - - - - - - - - - 3 Line(s) suppressed
000008 06075   A          Dubree, Dustin         192.98           1 9229 Delega
000009 06927   A          Buchs, Jillian          99.99           0 41 Avendale
000010 07025   A          Marx, Audrey           100.08           1 90 South Ca
- - -  - - - - - - CONTACT-REC - - - - - - - - - - 3 Line(s) suppressed
000014 11112   A          Ness, Luke          **********        1001 5166 Oak Gr
- - -  - - - - - - CONTACT-REC - - - - - - - - - - 2 Line(s) suppressed
00001                                         244.42           1 1551 S. Was
- - -                                  - - - - - - - - - - 2 Line(s) suppressed
00002                                  A.      86.88           0 221 Yale Rd
- - -  - - - - - - CONTACT-REC - - - - - - - - - - 1 Line(s) suppressed
```

The bad data in the file…
(the cause of this abend).

Fault Analyzer Interactive Reanalysis – link to File Manager

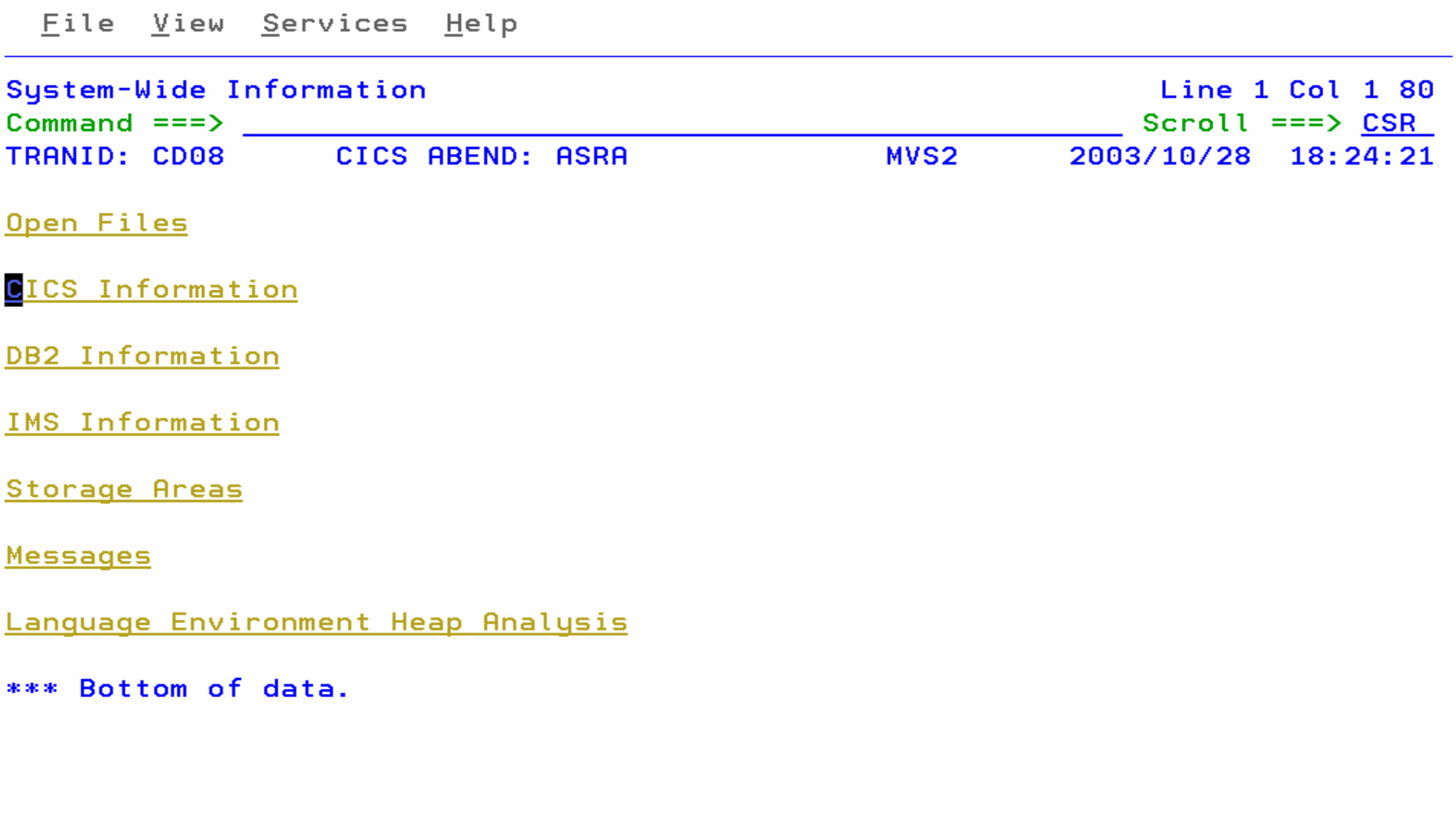
```
 Process   Options   Help
 ------------------------------------------------------------------------------
File Manager Edit DNET074.ADLAB.CUSTOMER.FILE
Command ===> ____________________________________________________ Scroll CSR
       Type KSDS     Refresh on save N                           Format TABL
       CUST-ID REC-TYPE NAME              ACCT-BALANCE  ORDERS-YTD ADDR
       #3      #4       #5                        #6           #7 #8        +
       AN 1:5  AN 6:1   AN 7:17                PD 24:5     BI 29:4 AN 33:20
       <--->   -        <---+----1----+->  <---+----1> <---+----1> <---+----1-
000000 ****  Top of data  ****
000001 03115   A        Graham, Holly          254.53           1 3100 Oaktre
- - -  - - - - - - - CONTACT-REC - - - - - - - - - - 2 Line(s) suppressed
000004 05580   A        Moore, Adeline         498.95           3 4700 S. Syr
- - -  - - - - - - - CONTACT-REC - - - - - - - - - - 3 Line(s) suppressed
000008 06075   A        Dubree, Dustin         192.98           1 9229 Delega
000009 06927   A        Buchs, Jillian          99.99           0 41 Avendale
000010 07025   A        Marx, Audrey           100.08           1 90 South Ca
- - -  - - - - - - - CONTACT-REC - - - - - - - - - - 3 Line(s) suppressed
000014 11112   A        Ness, Luke            543.21*****        1001 5166 Oak Gr
- - -  - - - - - - - CONTACT-REC - - - - - - - - - - 2 Line(s) suppressed
000017 11344   A        Graf, Polly            244.42           1 1551 S. Was
- - -  - - - - - - - CONTACT-REC - - - - - - - - - - 2 Line(s) suppressed
000020 12689   A        Boyd, Luke A.           86.88           0 221 Yale Rd
- - -  - - - - - - - CONTACT-REC - - - - - - - - - - 1 Line(s) suppressed
```

Repairing the data in the file.

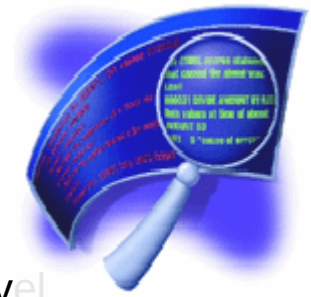
Fault Analyzer Interactive Reanalysis – System Wide Information

```
  File  View  Services  Help
 ──────────────────────────────────────────────────────────────────────
Interactive Reanalysis Report                                Line 1 Col 1 80
Command ===> ____________________________________________ Scroll ===> CSR
TRANID: CD08      CICS ABEND: ASRA              MVS2      2003/10/28  18:24:21

Fault Summary:
Module CDCB0080, program CDCB0080, source line # 677 : CICS abend ASRA.

Select one of the following options and press Enter to access further fault
information:
_   1.  Synopsis
    2.  Event Summary
    3.  System-Wide Information
    4.  Abend Job Information
    5.  Options in Effect

{Fault Analyzer maximum storage allocated: 2.48 megabytes.}

*** Bottom of data.
```

Fault Analyzer Interactive Reanalysis – System Wide Information



Fault Analyzer Summary



- One product, all environments
- **Consistent Across Languages**
  - COBOL, C, C++, PL/I, Assembler
- **Environments Supported**
  - CICS, TSO, JES/Batch, IMS, DB2, Unix System Services, MQSeries, WAS/z and Java
- **Modes Of Operation**
  - Real Time Analysis
  - Batch Dump Re-analysis
  - Interactive Dump Re-analysis

- **Fault Analyzer Features:**
  - Analysis At Application Level, translation of low-level "Dump" information
  - Interactive Point-and-Shoot Navigation
  - Real-Time Information Capture
  - Expands Abend Code And Message Descriptions
  - No Recompile Of Applications
  - No JCL Changes
  - ISPF Interface for all applications
  - Integrated 64-bit DB2 version 8 support

WAS/z support

IBM File Manager
Version 6.1

What's New With File Manager V6.1?

PERFORMANCE ENHANCEMENTS

- The performance of the File Manager Editor and Browser has been enhanced in a number of ways. Areas include the FIND command, the
- CHANGE command, and the processing of excluded records.
- The performance of FASTREXX procs has been enhanced for many usage scenarios.
- More File Manager REXX FASTREXX functions are added, reducing CPU requirements for those tasks. See the "New function" section below for details.
- The performance of the File Manager Display VTOC (DVT) and Find/CHange (FCH) utilities is enhanced.
- Performance is enhanced for the Data Set Copy (DSC), Data Set Update (DSU), and FCH utilities when operating on PDS members. An option to prevent update of member ISPF statistics, and so reduce IO and CPU, is added to the DSC and DSU utilities.
- File Manager / IMS support for IMS V8 and V9 RLSE (Release locking) SPE has been added. This provides improved File Manager editor function while continuing to maintain concurrent access to IMS databases, in cases where previously File Manager / IMS was forced to automatically commit IMS edit changes every time the user pressed ENTER.
- File Manager / IMS is able to translate more template criteria to IMS Segment Search Arguments (SSAs), resulting in faster finding of selected segments.

CURRENCY

- Adds IMS V9 support
- Enhances DB2 V8 support
  - Support for DB2 V8 SQL syntax in File Manager advanced SQL pro totyping
  - Enhancements to File Manager DB2 object utilities panels
  - Toleration of DB2 V7 and V8 default Unicode installations

NEW FUNCTION

Enhancements across all File Manager components

- File Manager REXX enhancements
  - -- A text-sensitive FASTREXX CHANGE function which tries to minimize changes to a record's length by adding or deleting extra blanks during a change
  - -- Unsigned binary support in the TALLY function
  - -- FASTREXX functions to save and restore the output buffer across invocations of the File Manager REXX proc
  - -- A new FASTREXX function to search the output buffer, and new relative positioning capabilities
- More COBOL copybooks or PL/I include files can be used by File Manager without modification. For example:
  - -- Storage redefinitions at a given level (e.g. 05) can be con sidered root level layouts.
  - -- A portion of the copybook or include file can be used.
- A new keyword, ABENDCC, allows for the abending of an File Manager batch job if the condition code reaches or exceeds a user - specified value.

What's New With File Manager V6.1 (con't) ?

USABILITY

- The simple copy of a given data set, both interactively and in batch, is greatly simplified.
- File Manager member selection lists (MSLs) have improved consistency with ISPF, including:
  - The user can sort File Manager MSLs on any column.
  - File Manager MSLs show the total number of members and the number of the top member on the screen.
- File Manager allows a member name to be specified in many Data Set Name fields.
- The File Manager Base Editor and Browser maintain lists of recently edited or browsed files as reference lists similar to those of ISPF. File Manager reference lists also contain associated template or copybook information. Users can create and manage their own File Manager reference lists.
- The user can choose whether to display the RBA and length of VSAM file records during File Manager browse.
- The user can specify the default view mode (e.g.TABL, CHAR, or "Previous") on entry to File Manager Edit or Browse.
- The File Manager Editor and Browser have improved processing of a subset of the data file, including:
  - New options to sample records from the data file
  - A new option to drop unselected records from memory
  - Faster editor / browser startup near the end of the data file
- File Manager Base Display VTOC utility enhancements:
  - New statistics, including count of number of volumes selected
  - The ability to view data set info
  - A new report format ordered by data set name, summarizing for each data set
  - More sort options
  - Display of the full length of data set names
- File Manager Base Catalog Services utility (3.4) shows space used as a percent.
- File Manager Base support of Generation Data Groups is enhanced to allow next generation data sets to be specified in the Data Set Copy (DSC) and Data Set Generate (DSG) utilities.
- The FCH and DSC interactive utilities have a progress indicator.
- The interactive FCH utility has a modified interface which allows the display of more qualifying members on a single screen.
- File Manager / DB2 allows attention interrupts to stop the processing of long running SQL queries.
- File Manager / DB2 Copy Utility adds options controlling the handling of duplicate rows.
- File Manager View / Print Copybook Utility enhancements:
  - Added an option to show the position of individual array elements
  - Added an option to show the position of a field as a hex offset instead of as a decimal index
- File Manager / IMS allows two concatenated DBD libraries to be specfied instead of one.
- File Manager / IMS provides a customization option to limit acces to specified IMS subsystems to read-only.
- The File Manager / IMS print audit log facility is enhanced to allow printing of only changed fields.
- File Manager Customization and installation is enhanced by allowing new options for naming conventions for File Manager temporary data sets.
- File Manager / IMS customization is enhanced to provide an option for the automatic deletion of dynamic DBDs.

What's New With File Manager V6.1 (con't)?

Z/OS component enhancements

- Segmented records are supported by File Manager Editor and Browser and some utilities.
- The File Manager Base Editor and Browser can show the total number of records in a file, and the number of records currently selected.
- The File Manager Base Editor can edit load modules with in-place edit.
- The File Manager Base can generate IDCAMS cards for batch file creation.
- The File Manager Base can display data set information for IAM data sets.
- The Data Set Copy (DSC) has an option for copying of JCL record format data sets. This option allows the processing of multiple lines of continued JCL as a single logical JCL record.
- Process members based on tests of ISPF statistics, for File Manager utilities DSP, DSU, DSEB, and FCH (Print, Update, Edit in Batch, and Find/CHange, respectively.)
- The Data Set Compare (DSM) utility is enhanced to allow optional printing of template, template criteria, and template mapping information, to enable auditing of the effect of templates on the compare operation.
- The FCH utility is enhanced to find members which do not contain a given string.
- The View/Print Template and Copybook (PBK) utility is enhanced to optionally display record identification and record selection criteria in a template.
- Concatenated partitioned data sets are supported in DSC, DSP, and FCH utilities. File Manager output reports are enhanced so it is clear which library a member comes from when there are concatenated libraries.

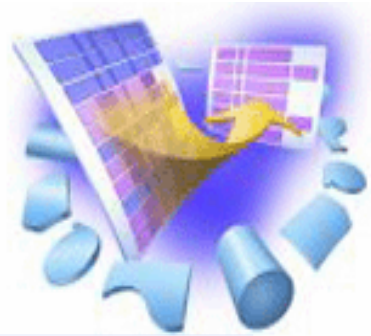
IMS feature enhancements

- File Manager / IMS Editor and Browser has the ability to show the total number of segments in a database, and the number of segments currently selected.
- Templates allow multiple layout members to be used to map a seg ment.
- File Manager / IMS allows the control of the processing options (PROCOPTs) to be used for Browse, Extract, and Batch Print.

MIXED WORKLOAD

- Adds the ability to invoke Unix Systems Services (USS) Hierarchical File System (HFS) utilities from an File Manager Base panel.
- Adds the ability to use File Manager Base Edit, Browse, and certain File Manager utilities on HFS files.

What is File Manager?



- **A comprehensive set of tools for working with z/OS data**
- **These tools allow you to:**
  - Manage QSAM, VSAM, IAM, OAM, DB2 and IMS data
  - Display and report data using Copybooks
  - Create, Copy, Modify, and Reformat data
  - Find and fix data in a file or database

IBM File Manager for z/OS

Use it to:

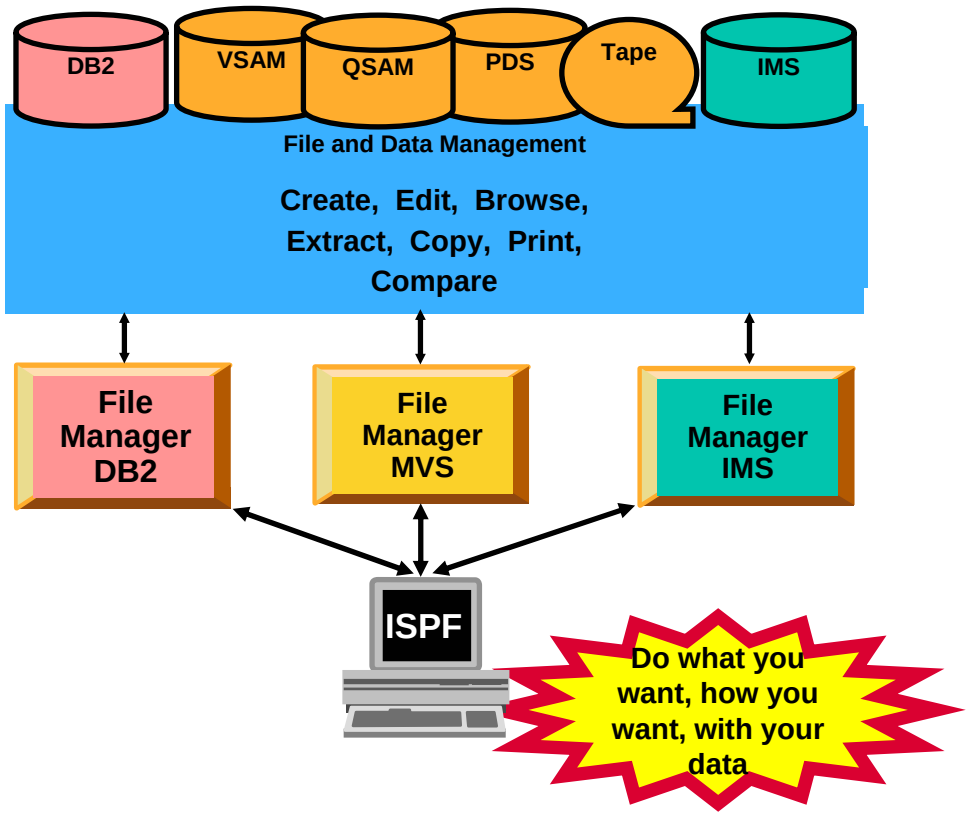
- Work with data in files, DB2 tables, and IMS databases
- Browse and edit data directly
- Easily copy, modify, reformat, and compare data

Key Features:

No limit to file size!

- Advanced data Edit and Browse
  - Uses familiar ISPF edit commands
  - Powerful data formatting and selection capabilities
- A robust set of utilities to create, copy, find, compare, and modify data
- Work with data in friendly formats
  - Use a copybook or user-defined “template” to format records

File Manager Functional Overview
File Manager is delivered as one product with three components ---- z/OS, DB2 and IMS



- **File Manager Features:**
  - Work with data in files, DB2 tables and IMS databases
  - ISPF-like Panels
  - Full Function Browse And Edit
  - Multiple Modes Of Edit And Browse
    - Table
    - Single
  - Flexible Selection Criteria
  - Copy
  - File Reformatting
  - Global Search And Updated Capability
  - Print
  - Compare
  - No file limit size!

The most-used functions in File Manager

- **EDIT and BROWSE**
  - Directly and interactively work with data in a file or database
  - Exploit DB2 Version 8 (Long Column Names)
- **COPY**
  - Easily select records / rows to be copied
  - *Automatically* reformat record layouts during copy
  - Powerful capabilities to modify data during copy
- **COPYBOOK MAP**
- **Create Test Data**

The most-used functions

- **Global FIND / CHANGE**
  - Search for / change data across members in a PDS(E) or in a file
- **COMPARE**
  - Compare records/fields between files
  - Select fields to be compared
  - Map fields between files with different layouts

The most-used functions

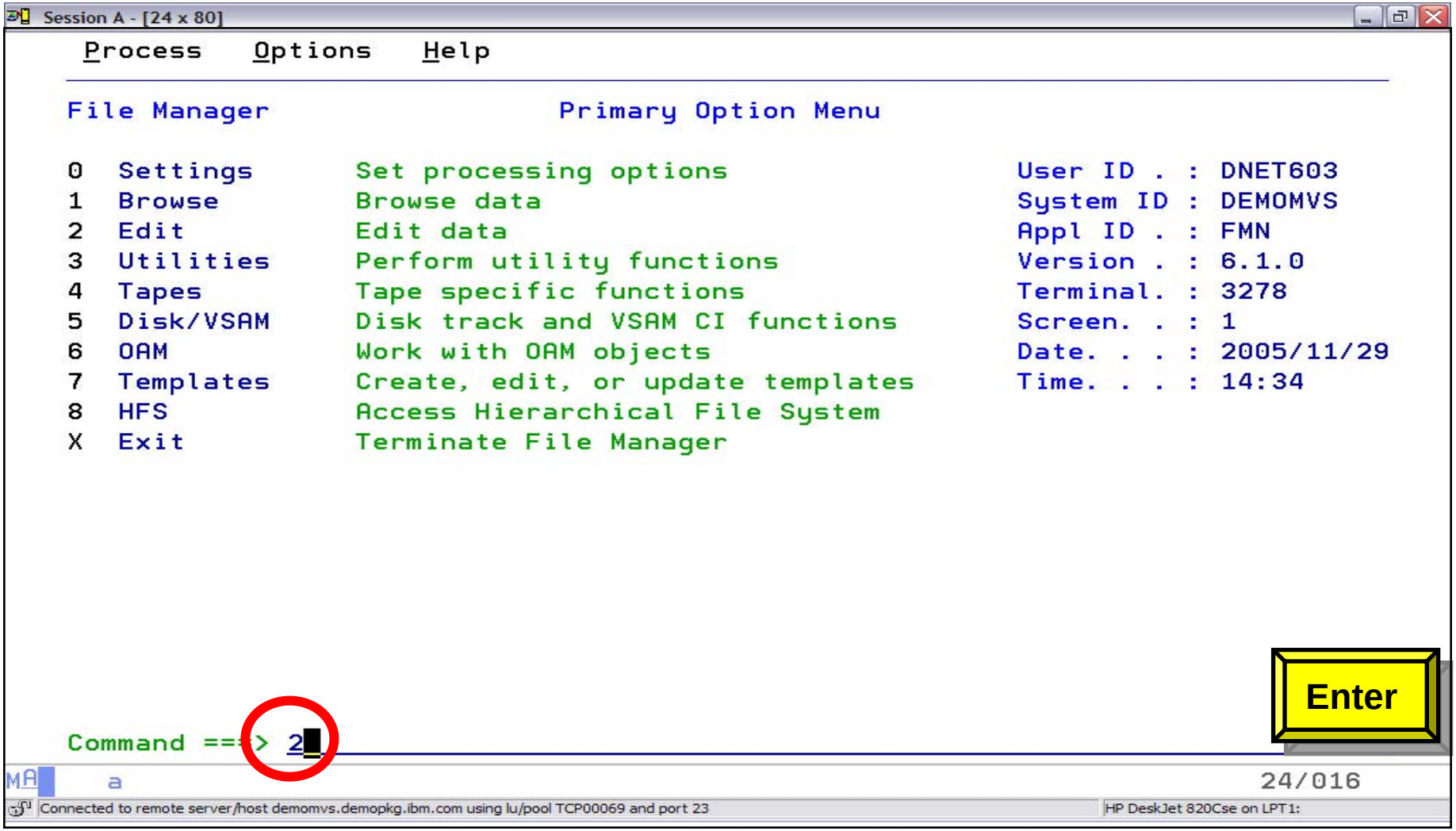
- **PRINT**
  - Select records and fields
  - format a report
- **SQL Prototyping (DB2)**
  - Powerful facilities to help code and test SQL statements
- **EXPORT / IMPORT (DB2)**
- **UNLOAD / LOAD (IMS)**

File Manager EDIT and BROWSE:

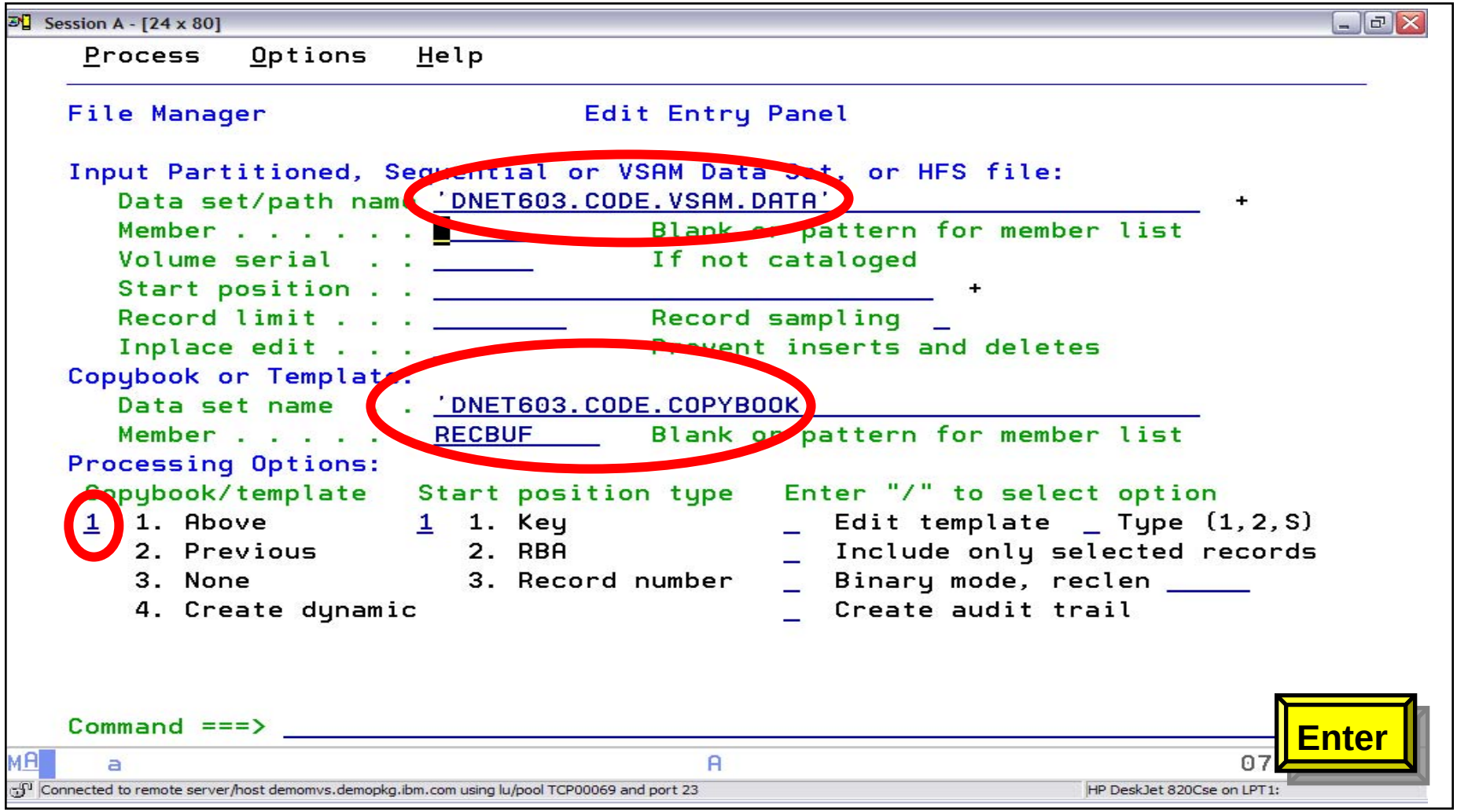
- **Uses familiar ISPF-edit commands**
  - If you know how to use ISPF Edit, then FM Edit will be familiar

- **Edit a single record to an entire file/database**
  - Edit files or IMS databases of unlimited size
  - Customers tell us that FM lets them edit larger files than competing software!

File Manager MVS Primary Options Menu



Edit – with a copybook



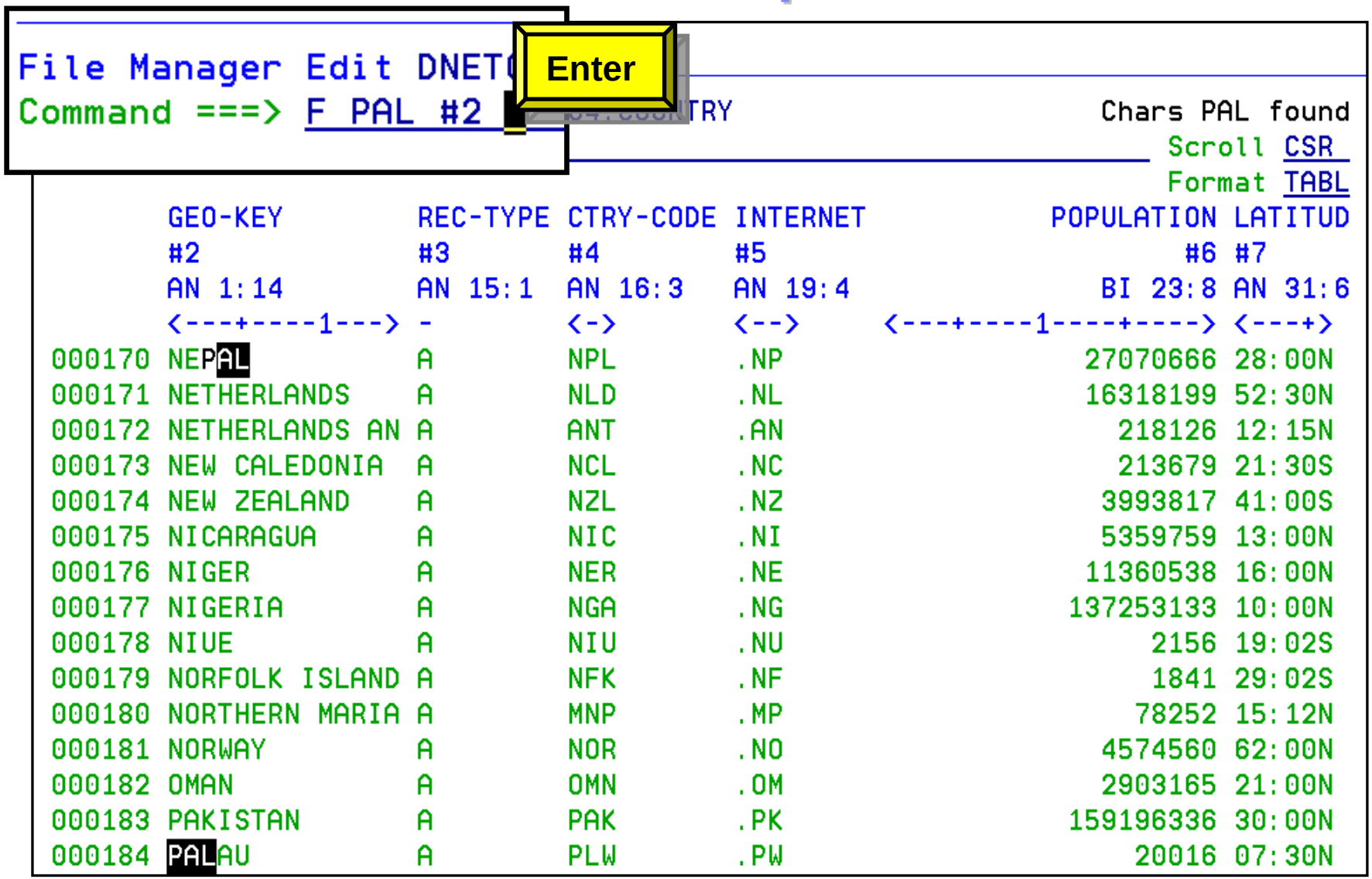
Edit – with a copybook

```
 Process    Options    Help
------------------------------------------------------------------------------
File Manager Edit DNET074.GEO2004.COUNTRY
Command ===> _____________________________________________ Scroll CSR
                                                          Format TABL
       GEO-KEY          REC-TYPE CTRY-CODE INTERNET              POPULATION LATITUD
       #2               #3       #4        #5                         #6 #7
       AN 1:14          AN 15:1  AN 16:3   AN 19:4                 BI 23:8 AN 31:6
       <---+----1---> -          <->       <-->     <---+----1----+----> <---+>
000000 ****  Top of data  ****
000001 AFGHANISTAN      A        AFG       .AF                   28513677 33:00N
000002 ALBANIA          A        ALB       .AL                    3544808 41:00N
000003 ALGERIA          A        DZA       .DZ                   32129324 28:00N
000004 AMERICAN SAMOA   A        ASM       .AS                      57902 14:20S
000005 ANDORRA          A        AND       .AD                      69865 42:30N
000006 ANGOLA           A        AGO       .AO                   10978552 12:30S
000007 ANGUILLA         A        AIA       .AI                      13008 18:15N
000008 ANTARCTICA       A        ATA       .AQ                          0 90:00S
000009 ANTIGUA AND BA   A        ATG       .AG                      68320 17:03N
000010 ARGENTINA        A
000011 ARMENIA          A
000012 ARUBA            A
000013 ASHMORE AND CA   A                                               0 12:14S
000014 AUSTRALIA        A        AUS       .AU                   19913144 27:00S
```

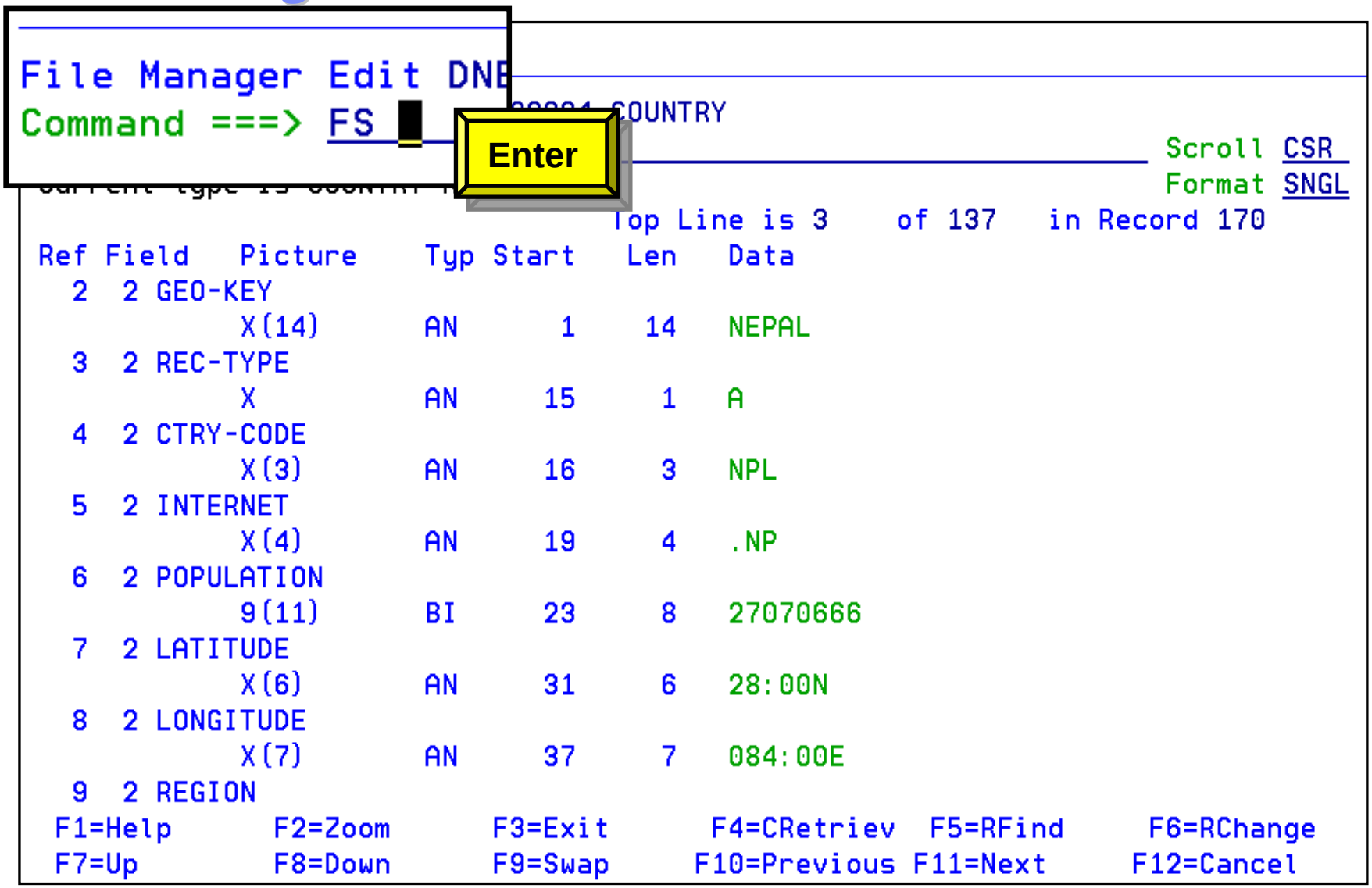
Use familiar ISPF editor commands

And FM provides powerful new commands to work with and format data

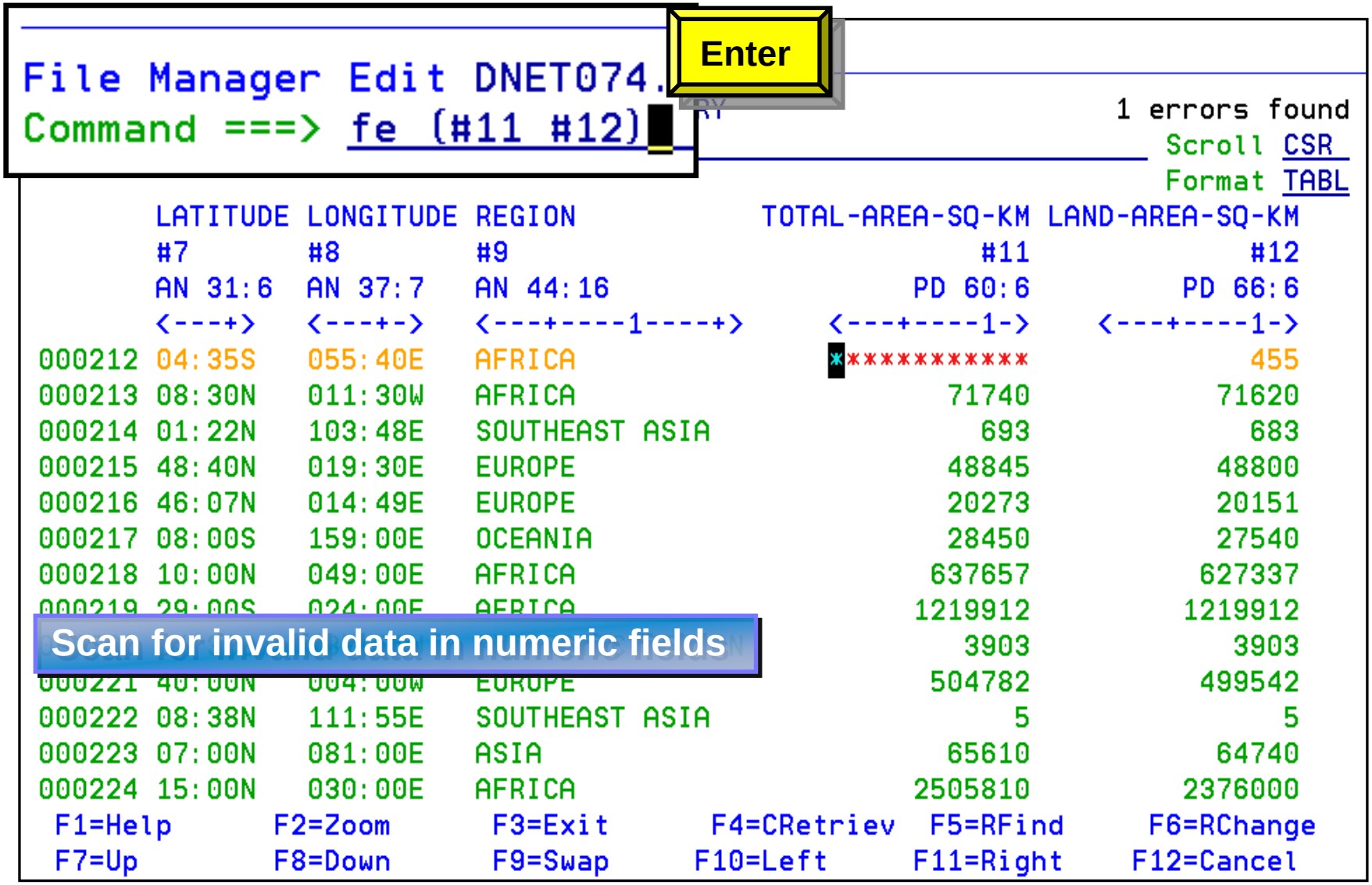
Edit – Find command example



Edit – Single Record Format



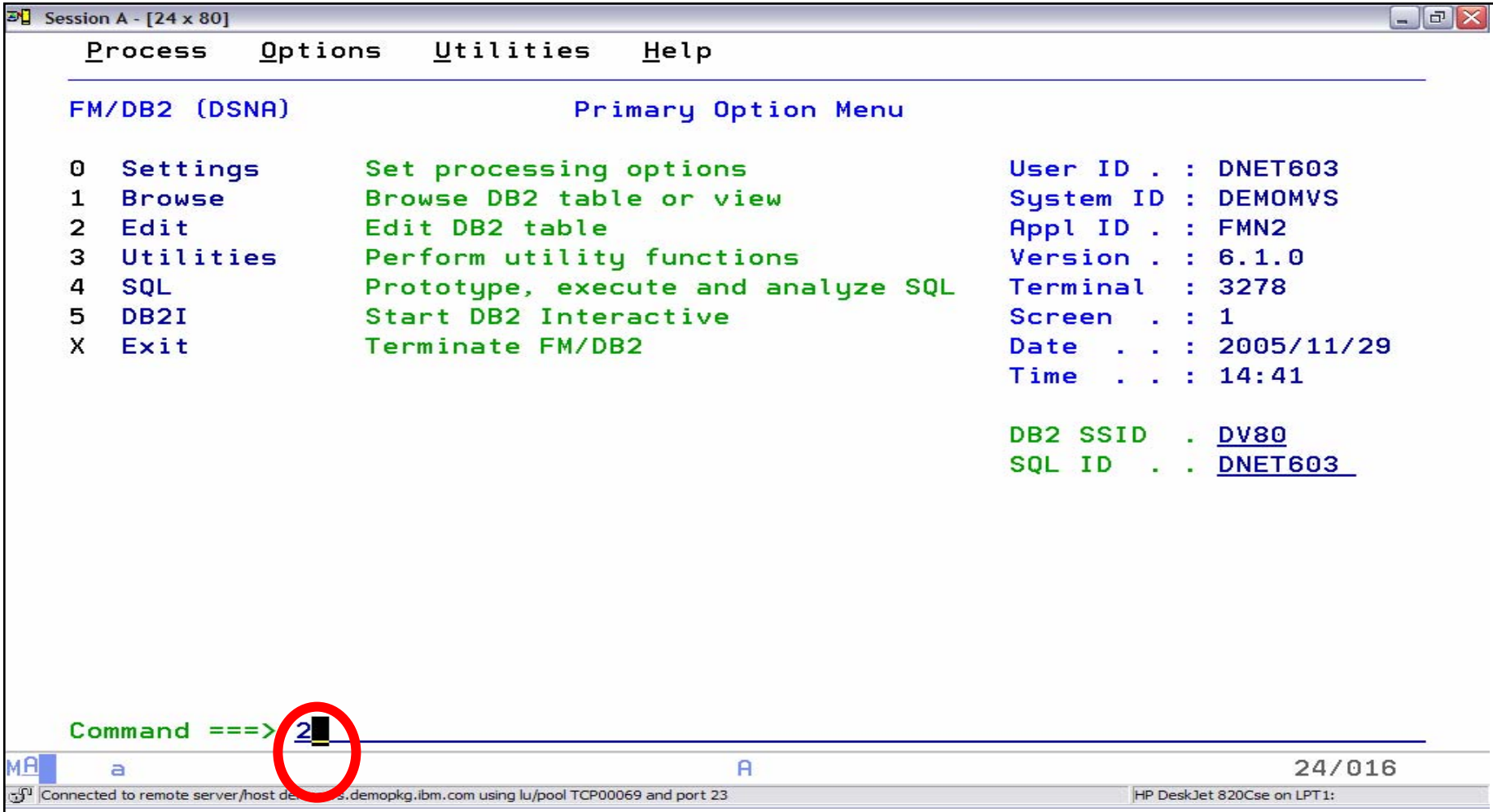
Edit – Find Fields in Error Command



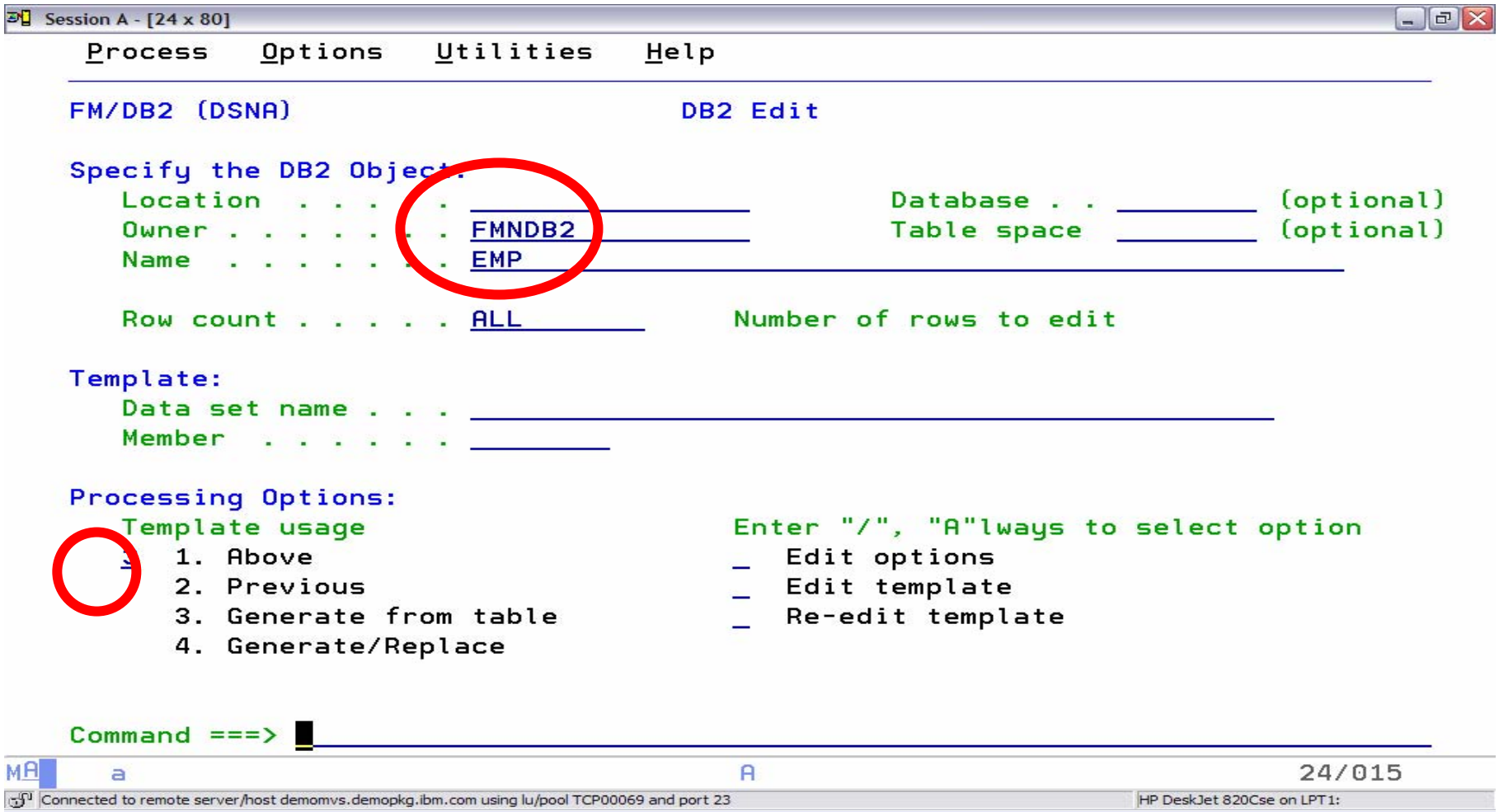
File Manager MVS Utilities

```
 Process    Options    Help
-------------------------------------------------------------------------------
File Manager                        Utility Functions
Command ===> 11_

0  DBCS           Set DBCS data format for print
1  Create         Create data
2  Print          Print data
3  Copy           Copy data
4  Dslist         Catalog services
5  VTOC           Work with VTOC
6  Find/Change    Search for and change data
7  AFP            Browse AFP data
8  Storage        Browse user storage
9  Printdsn       Browse File Manager print data set
10 Loadlib        View load module information
11 Compare        Compare data
12 Audit trail    Print audit trail report
13 Copybook       View and Print



 F1=Help      F2=Split     F3=Exit      F4=CRetriev  F7=Backward  F8=Forward
 F9=Swap     F10=Actions  F12=Cancel
```

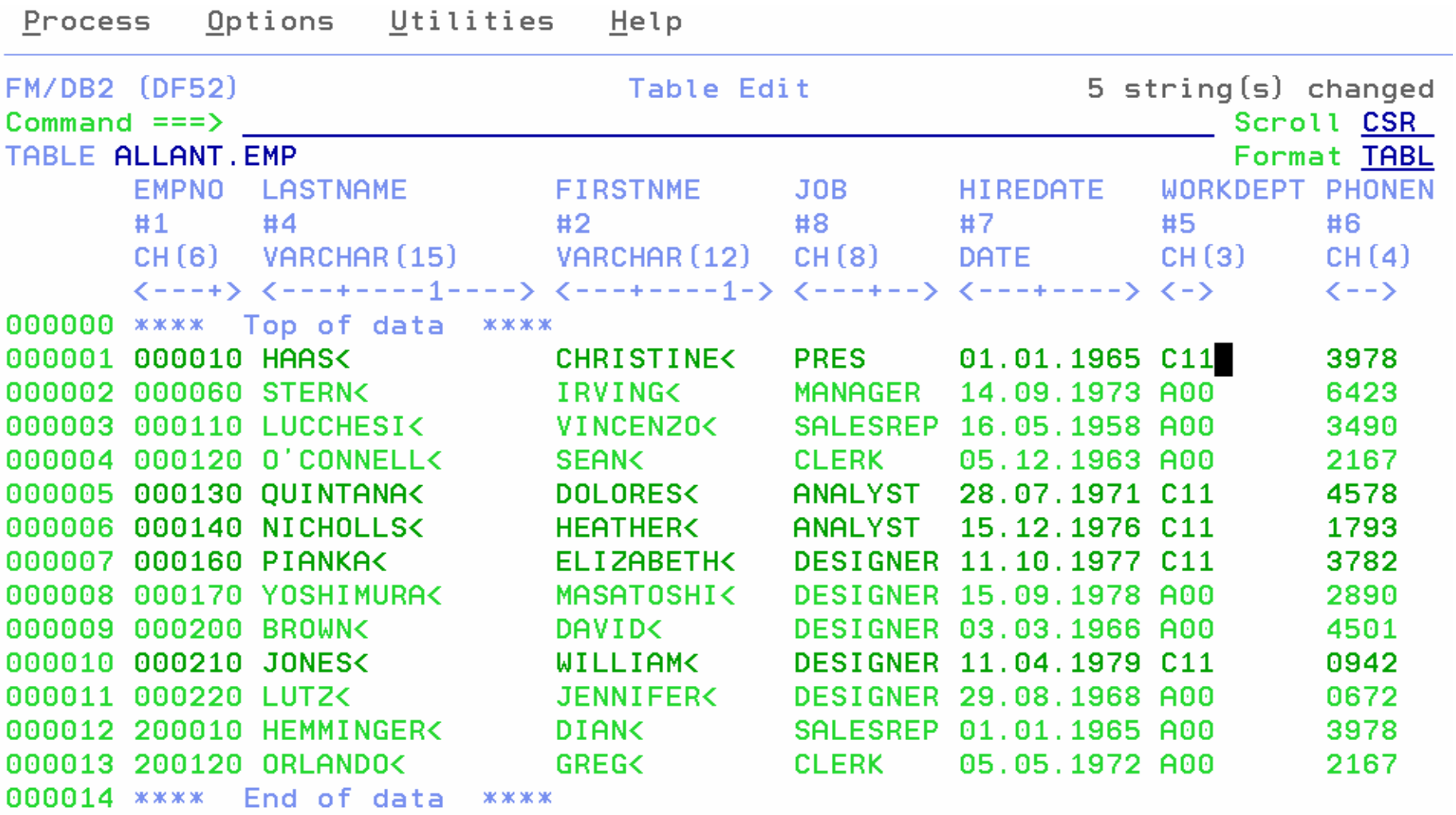
File Manager for DB2 Primary Options Menu



File Manager for DB2 Edit/Browse



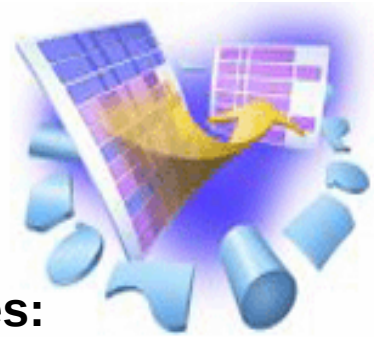
File Manager for DB2 Edit/Browse



File Manager for DB2 Utilities

```
 Process    Options    Utilities    Help
-------------------------------------------------------------------------------
FM/DB2 (DF52)                    Utility Functions
Command ===> 3

1  Print          Print DB2 table or view
2  Objects        Create and drop DB2 objects
3  Copy           Copy data within DB2
4  Object List    Display and process DB2 object lists
5  Privileges     Manage DB2 privileges
6  Import         Import sequential or VSAM data into DB2
7  Export         Export DB2 data to sequential or VSAM data set
8  Create         Create DB2 test data
9  Utilities      DB2 utility job generation
10 Audit trail    Print audit trail report
11 Print browse   Browse FM/DB2 print data set
```

File Manager Summary



- **One product, 3 environments: MVS, DB2, IMS**
- **Modes Of Operation**
  - Interactive
  - Batch
- **Supported Data Types**
  - QSAM / PDS(E)
  - VSAM / IAM
  - DB2
  - IMS
  - Physical Disk / Tape Records

- **File Manager Features:**
  - Familiar ISPF-like Panels
  - Powerful Browse And Edit
  - Customizable Data Display and Formatting
  - Flexible Record and Field Selection Criteria
  - Copy
  - File / Database Update
  - File / Database Reformatting
  - Global Search And Updated Capability
  - Print
  - Compare
  - Export / Import

IBM Debug Tool Utilities and Advanced Functions V6

and WDDz

What's New With Debug Tool And Debug Tool Utilities V6?

New in Debug Tool V6.1

USABILITY

- Breakpoints, monitors, and settings can now be saved and restored across debug sessions independent of the environment in which Debug Tool is running.
- A set of prefix commands has been added so that you can interact with the Monitor window. The prefix commands that are available in the Monitor window will generate the corresponding Debug Tool command line command. These new prefix commands provide a better wayinteract with the Monitor window.
- You can now set an AT ENTRY breakpoint without Debug Tool knowing about the program ahead of time. This enhancement makes it easier to specify breakpoints. The SET LONGCUNAME has been updated to support the AT ENTRY break point.
- New suboptions have been added to the FIND command to enable you to navigate through searches more effectively. Changes have also been made to make the FIND command more like ISPF's FIND command.
- The command LIST FREQUENCY * has been enhanced so that it optionally displays the source statement along with the source statement number and the number of times the statement was run.
- The full-screen mode through a VTAM terminal facility, which is used to debug non-TSO and non-CICS programs in full-screen mode, is enhanced so that you do not need to know the terminal LU of the VTAM terminal that will be used by Debug Tool. A new session manager will provide a method to attach to the program being debugged via an abitrary unused VTAM terminal.
- A CICS Installation Verification Program (IVP) has been added to help you ensure that Debug Tool has been properly installed and customized for the CICS debugging environment.

NEW FUNCTION

- Debug Tool can now debug C and C++ programs compiled with the new DEBUG compile option. The DEBUG compile option was available with C/C++ for z/OS V1.5.
- The NAMES command has been added to allow you to have some control over the load modules and compile units that Debug Tool allows you to see and debug. The NAMES EXCLUDE function allows you to inform Debug Tool that certain load modules and/or compile units are not to be debugged (for example, data modules). The NAMES INCLUDE function allows you to inform Debug Tool that certain load modules and/or compile units that would normally be considered non-debuggable are to be debugged as user programs. The AT CHANGE command has been enhanced to support level 88 data items.
- Support has been added to debug PL/I applications where the programs in the application are compiled with a mixture of new and old IBM PL/I compilers such as IBM Enterprise PL/I for z/OS V3, IBM VisualAge PL/I for z/OS V2, IBM PL/I for MVS and VM V1, and IBM OS PL/I V2.
- Debug Tool now supports PL/I production load modules compiled with the SEPARATE suboption of TEST. This suboption causes the compiler to create the debug information in a separate file. The SEPARATE suboption permits debugging of a load module that does not have debug information embedded in the load module. The combination of this new compile option and the existing dynamic debug support allows you to generate load modules which are smaller in size and do not have compiled-in hooks, while retaining the ability to use all of the features of Debug Tool without compromising the performance of the application when deployed in a production environment.

- If your users use DTCN to specify debugging profiles, you can customize Debug Tool to require that your users specify some or all resource types. For example, if your users are debugging a heavily used CICS program, you can require that they specify a Terminal ID and a Transaction ID to avoid having Debug Tool started every time that a CICS program is run.
- Remote debug support is enhanced to:
  - Allow you to specify the code page for proper rendering of national language characters on the remote debugger window.
  - Allow you to edit attributes of existing breakpoints.
  - Delay conditional expression evaulation until the potential breakpoint execution. This allows expressions which may be out of scope when the breakpoint is set.

What's New With Debug Tool And Debug Tool Utilities V6?

DEBUG TOOL UTILITIES AND ADVANCED FUNCTIONS V6.1

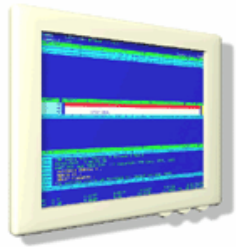
USABILITY

- The JUMPTO command has been added. JUMPTO is similar to the GOTO command except that JUMPTO stops at the target statement or label without having to previously set a breakpoint.
- The LIST TITLED command has been enhanced to list the variables in the COBOL File Section, Working-Storage Section, or Linkage Section.
- In addition to the current STANDARD Assembler view, a NOMACGEN view has been added that will suppress all lines generated by expansion of assembler macros in the source listing view.

NEW FUNCTION

- The non-Language Environment Assembler support has been extended to support non-Language Environment Assembler IMS Message Processing Programs (MPPs).
- The LOAD command has been added to enable you to load a module so that you can debug it. The CLEAR LOAD command has been added to enable you to unload a module. A typical use of this would be to debug a module loaded prior to Debug Tool's initialization.
- The AT CHANGE command has been enhanced to support simple boolean expressions in the command.
- A load module analyzer has been added to help you identify the programs or csects contained in a load module including OS/VS COBOL programs that might be converted to Enterprise COBOL programs.
- Support has been added to share common side files between Debug Tool Utilities and Advanced Functions V6 and Fault Analyzer V6.

What is Debug Tool Utilities and Advanced Functions ?



- **A tool that helps you test programs, and monitor and control the execution of programs**
- **An interactive, source level debugger**
- **A set of utilities:**

  - Modernize (convert) older COBOL programs (i.e. OS/VS COBOL)
  - Perform coverage testing
  - Automate regression testing

IBM Debug Tool and Advanced Functions for z/OS

Use it to:

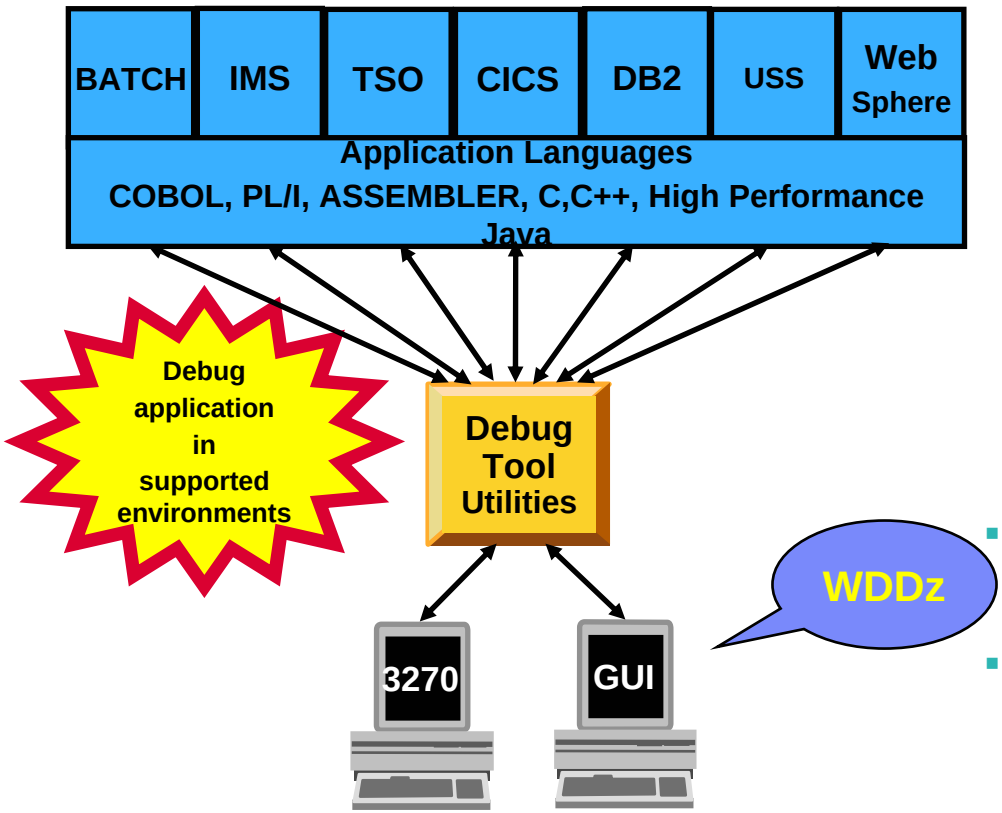
- Interactively debug an application program while it runs
  - Step through source statements, set “breakpoints” and run, monitor and change program variables
- Modernize COBOL programs written for older compilers

Key Features:

- Debug COBOL, PLI, HP Java, C, C++, and Assembler programs
- Support for batch, CICS, IMS, DB2, MQSeries, and DB2 stored procedure programs
- Set simple or conditional breakpoints; or run a script at a breakpoint
- Gives you the ability to trap and repair abends
- Intuitive GUI interface when used with products such as WDDz or WDz
- COBOL Conversion Utility

Debug Tool Suite Functional Overview

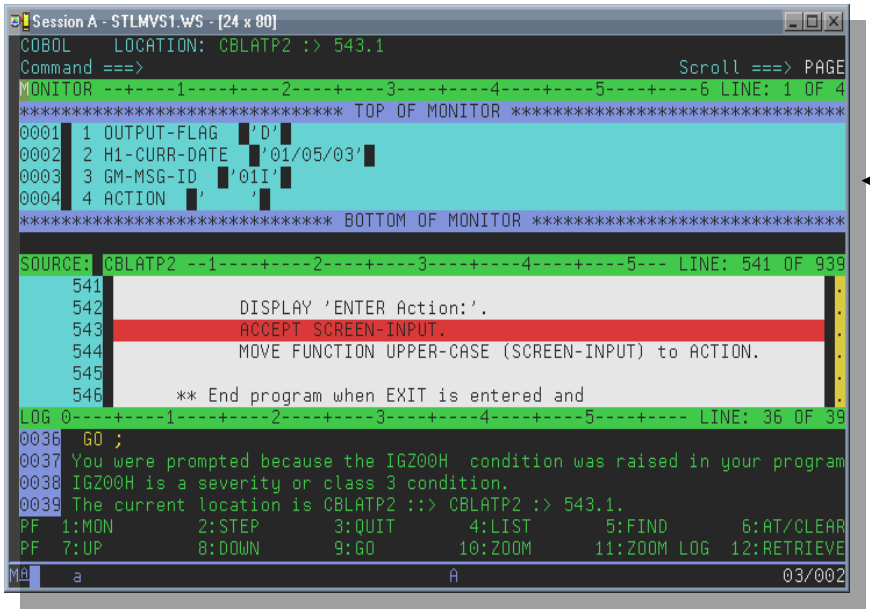
Provides debugging of enterprise applications

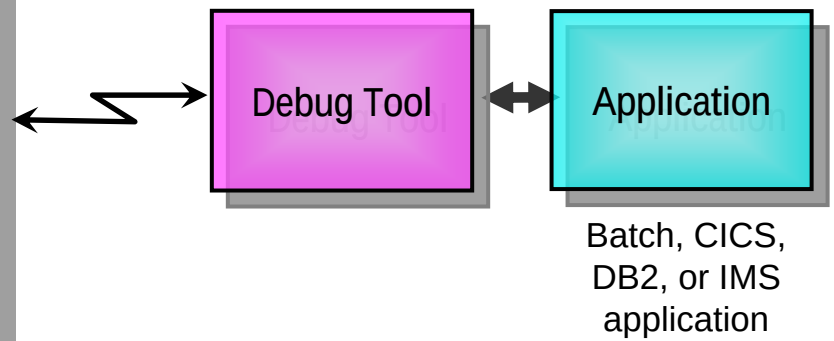


Order: Debug Tool Utilities and Advanced Functions PID 5655-P15

- **Features:**
  - Playback support
  - Automonitor support for COBOL and PL/I programs
  - An interface to the Fault Analyzer tool
  - A code coverage tool
  - Support for identifying and converting OS/VS COBOL source programs to ANSI 85 standard COBOL
  - Preparation and compile facilities for programs
  - Commands to query, allocate, and free files
- **Consistent Across Languages**
  - COBOL, C, C++, PL/I, Assembler, HP Java
- **Environments Supported**
  - CICS, TSO, JES/Batch, IMS Including IMS/TM, DB2 Including Stored Procedures
- **WebSphere Developer Debugger for zSeries** provides a common GUI interface for for developing and debugging z/OS applications (WDDz)

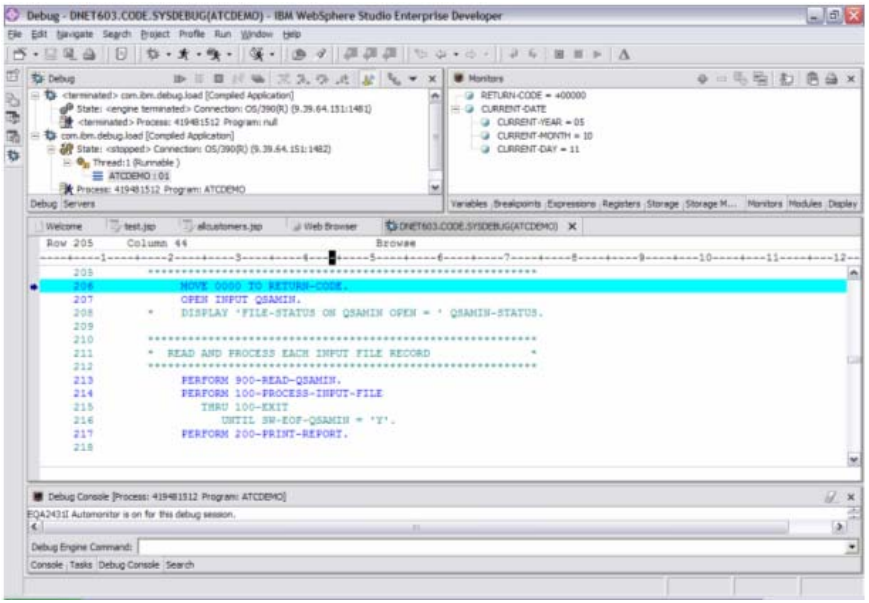
How do I interface with Debug Tool Utilities and Advanced Functions ?

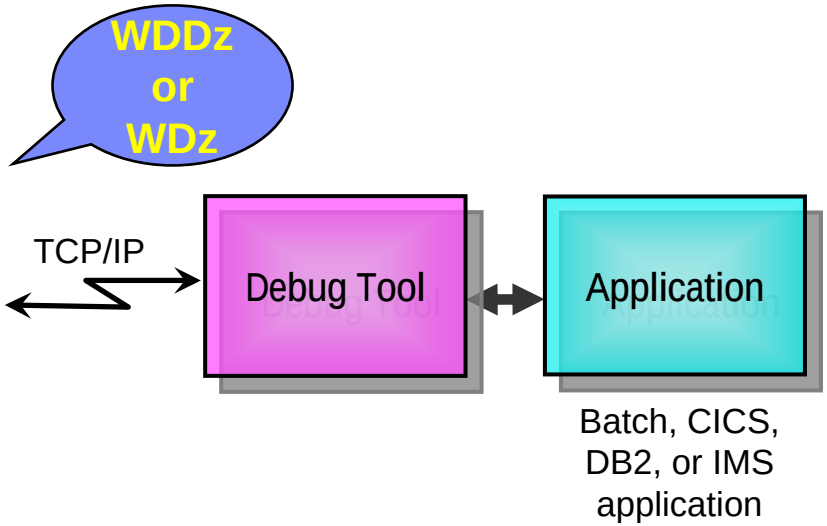




- **Full-screen mode**
  - 3270 interface
  - Common interface for all z/OS runtimes, CICS, JES, IMS TM, DB2 Stored Procedures, etc.

How do I interface with Debug Tool Utilities and Advanced Functions ?





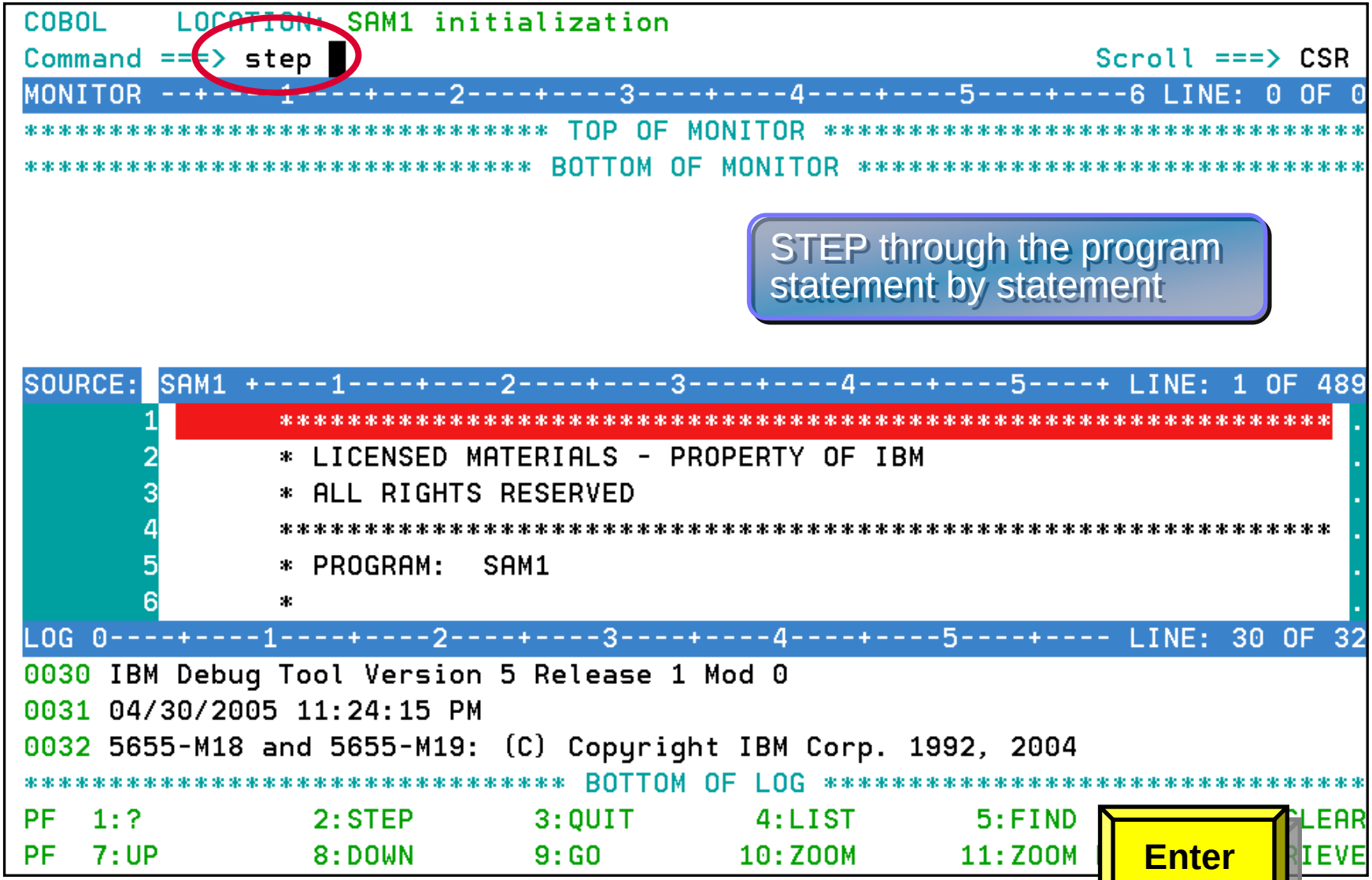
- **Remote debug mode**
  - the host application starts Debug Tool, which connects to a remote debugger on your workstation
  - Uses the GUI debuggers built into products such as:
    - WDDz or WDz
    - C/C++ Productivity Tools for OS/390
    - VisualAge COBOL for Windows
    - VisualAge for Java, Enterprise Edition for OS/390
    - VisualAge PL/I for Windows

Starting a Debug Tool session

```
 File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
EDIT       DNET074.ADWORK.DATA(SAMRUN) - 01.17            Columns 00001 00072
Command ===> sub                                          Scroll ===> CSR
****** ******************************** Top of Data ********************************
000001 //DNET074R JOB REGION=4M,
000002 // TIME=(1),MSGCLASS=H,NOTIFY=DNET074,MSGLEVEL=(1,1)
000003 //*******************************************************************************
000004 //*************************************************
000005 //*   RUN SAMPLE PROGRAM SAM1
000006 //*
000007 //*   CAUSES ABEND IN SUBPROGRAM SAM2
000008 //*************************************************
000009 //RUNSAM1 EXEC PGM=SAM1,REGION=4M,
000010 //    PARM='/TEST(,,,MFI%TRMLU016:)'
000011 //STEPLIB  DD DSN=DNET074.ADWORK.LOAD,DISP=SHR
000012 //         DD DSN=DEBUG.V5R1.SEQAMOD,DISP=SHR
000013 //SYSPRINT DD SYSOUT=*
000014 //CUSTRPT  DD SYSOUT=*
000015 //CUSTFILE DD DSN=DNET074.ADLAB.CUSTOMER.FILE,DISP=SHR
000016 //TRANFILE DD *
000017 *TRAN  KEY        ACTION   FIELD NAME    VALUE
000018 *----- ---------- -------- ------------ +999999..
000019 *PDATE 07025A     ADD      BALANCE      +00000001
```

To start Debug Tool in a batch job, just add a PARM to the EXEC statement

Debug Tool Utilities and Advanced Functions



Debug Tool Utilities and Advanced Functions

```
COBOL     LOCATION: SAM1 ENTRY
Command ===>                                              Scroll ===> CSR
MONITOR --+----1----+----2----+----3----+----4----+----5----+----6 LINE: 1 OF 2
********************************* TOP OF MONITOR ********************************
0001   1 ********** AUTOMONITOR **********
0002     There are no variables in the state
******************************** BOTTOM OF MO
SOURCE: SAM1 +----1----+----2----+----3----+----4----+----5---- LINE: 29 OF 489
      29          PROGRAM-ID. SAM1.
      30          ENVIRONMENT DIVISION.
      31          INPUT-OUTPUT SECTION.
      32          FILE-CONTROL.
      33
      34              SELECT CUSTOMER-FILE ASSIGN TO CUSTFILE
LOG 0----+----1----+----2----+----3----+----4----+----5----+---- LINE: 30 OF 33
0030 IBM Debug Tool Version 5 Release 1 Mod 0
0031 04/30/2005 11:24:15 PM
0032 5655-M18 and 5655-M19: (C) Copyright IBM Corp. 1992, 2004
0033  STEP ;
PF  1:?         2:STEP       3:QUIT       4:LIST       5:FIND
PF  7:UP        8:DOWN       9:GO        10:ZOOM      11:ZOOM
```

PF2 will STEP by default.

You can customize your PF key settings.

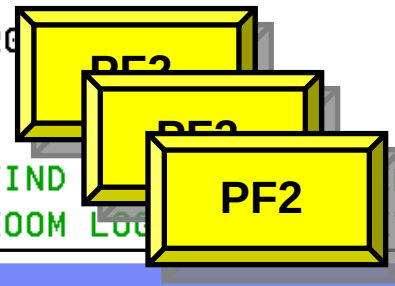
PF2

Debug Tool Utilities and Advanced Functions

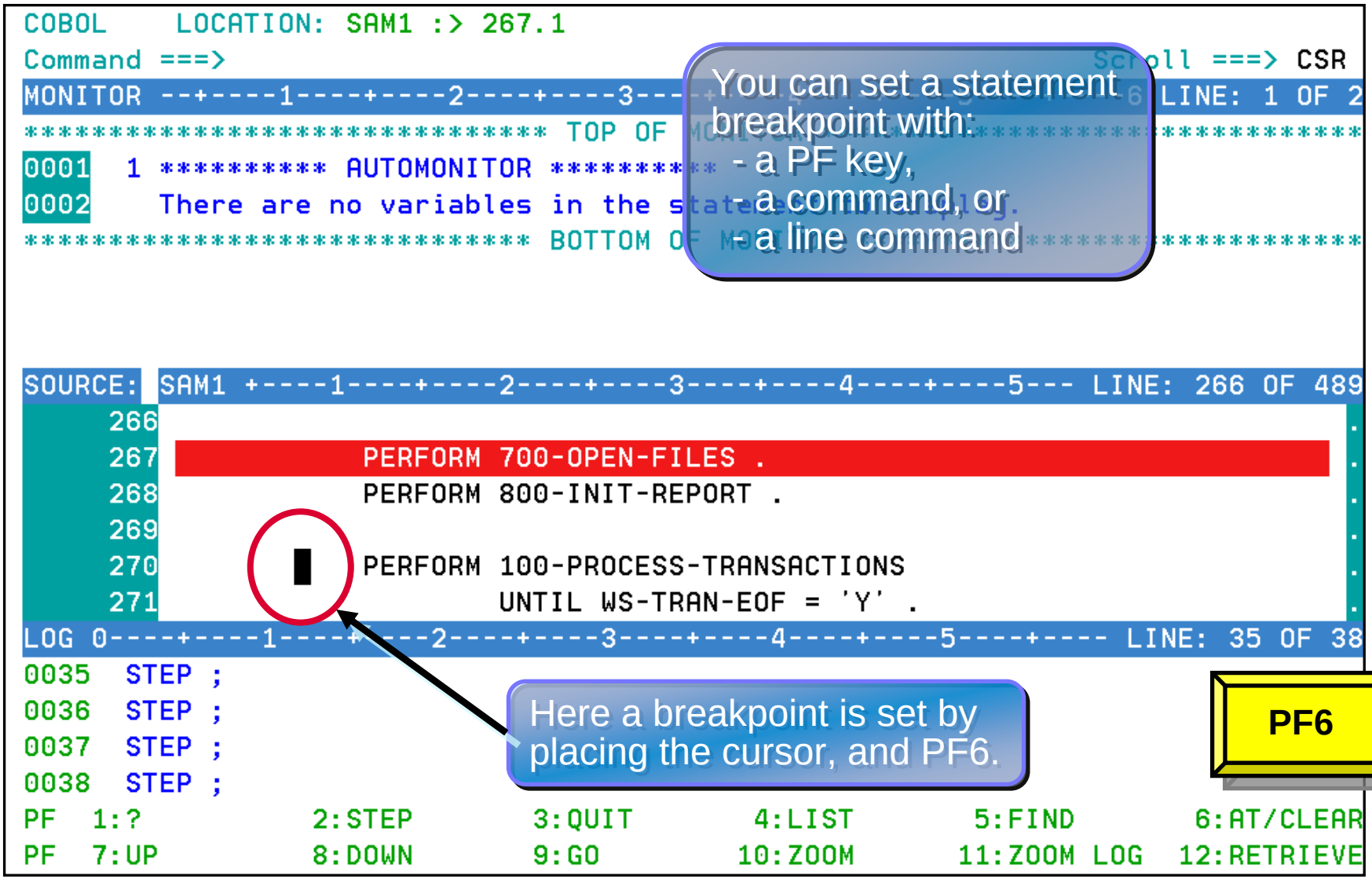
```
COBOL     LOCATION: SAM1 :> 260.1
Command ===>                                              Scroll ===> CSR
MONITOR --+----1----+----2----+----3----+----4----+----5----+----6 LINE: 1 OF 5
********************************* TOP OF MONITOR ********************************
0001   1 ********** AUTOMONITOR **********
0002     02 SAM1:>CURRENT-DATE
0003        03 SAM1:>CURRENT-YEAR     X'0000'
0004        03 SAM1:>CURRENT-MONTH    X'0000'
0005        03 SAM1:>CURRENT-DAY      X'0000'
******************************** BOTTOM OF MONITOR ******************************
SOURCE: SAM1 +----1----+----2----+----3----+----4----+----5--- LINE: 258 OF 489
      258
      259          000-MAIN.
      260              ACCEPT CURRENT-DATE FROM DATE.
      261              ACCEPT CURRENT-TIME FROM TIME.
      262              DISPLAY 'SAM1 STARTED DATE = ' CURRENT-MONTH '/'
      263                      CURRENT-DAY '/' CURRENT-YEAR '   (mm/dd/yy)'.
LOG 0----+----1----+----2----+----3----+----4----+----5----+---- LINE: 31 OF 34
0031 04/30/2005 11:24:15 PM
0032 5655-M18 and 5655-M19: (C) Copyright IBM Corp. 1992, 20
0033  STEP ;
0034  STEP ;
PF  1:?          2:STEP       3:QUIT       4:LIST       5:FIND
PF  7:UP         8:DOWN       9:GO         10:ZOOM      11:ZOOM
```

The Red Line is the current statement.

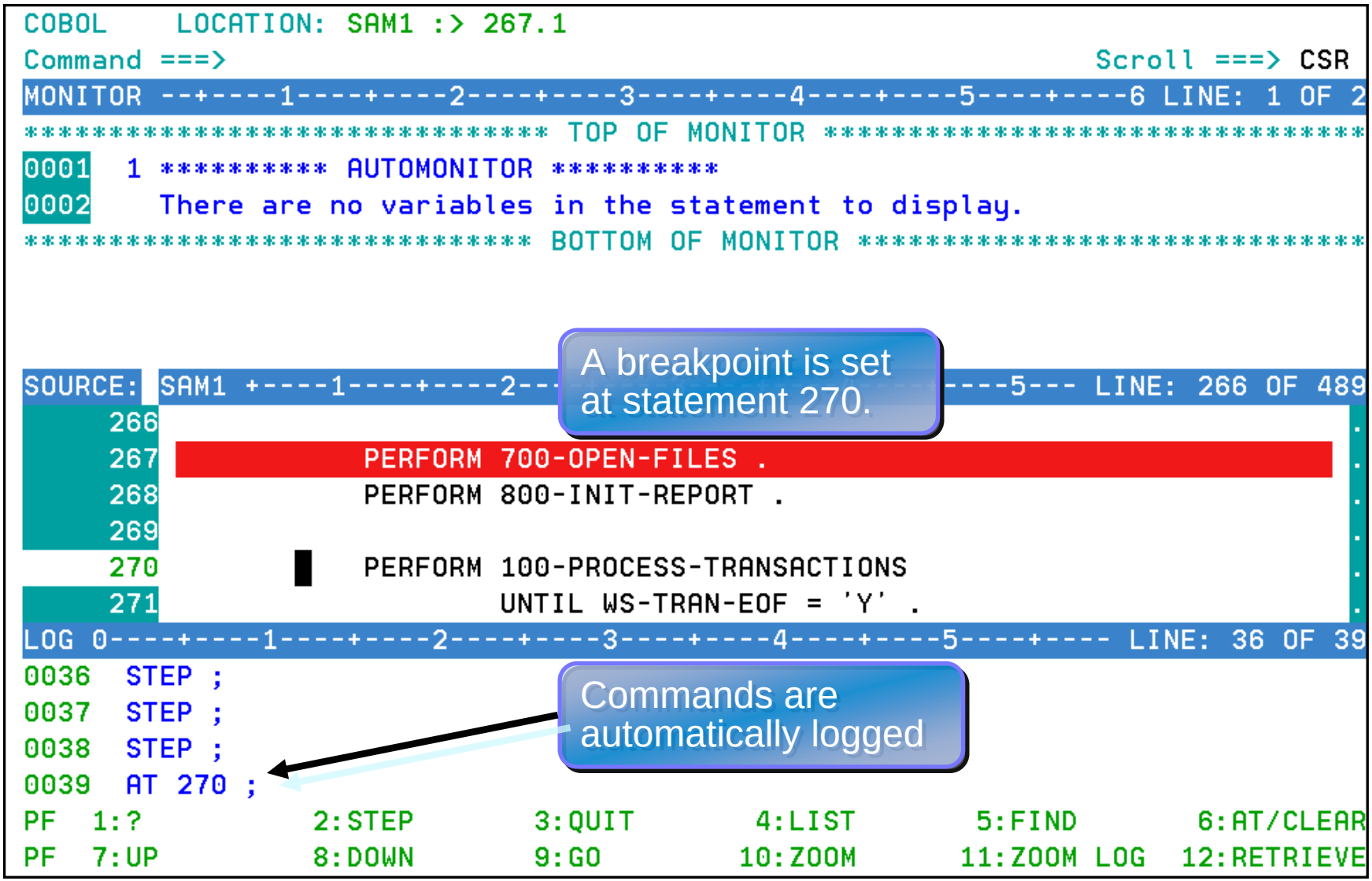
STEP a few times…



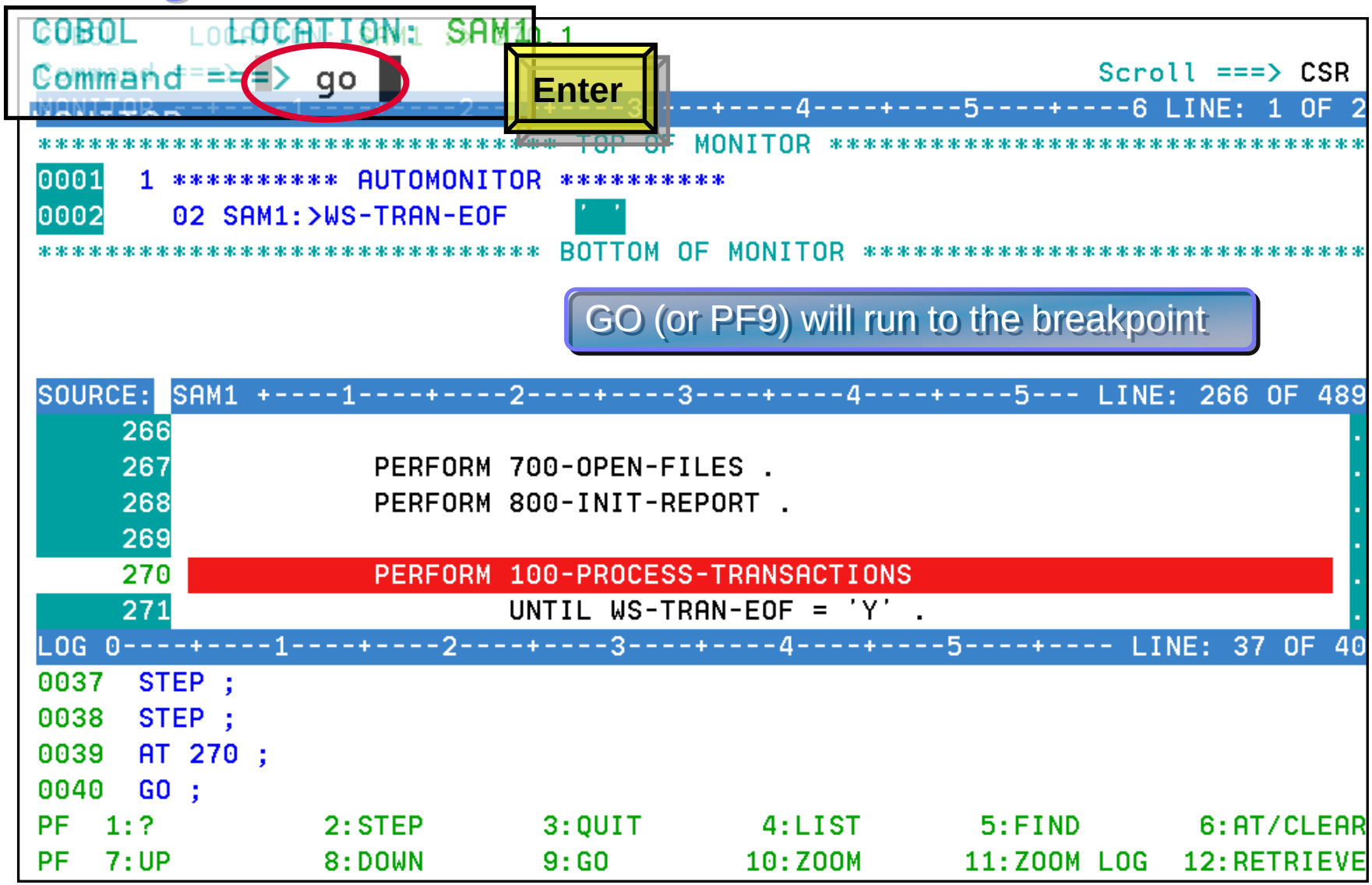
Debug Tool Utilities and Advanced Functions



Debug Tool Utilities and Advanced Functions



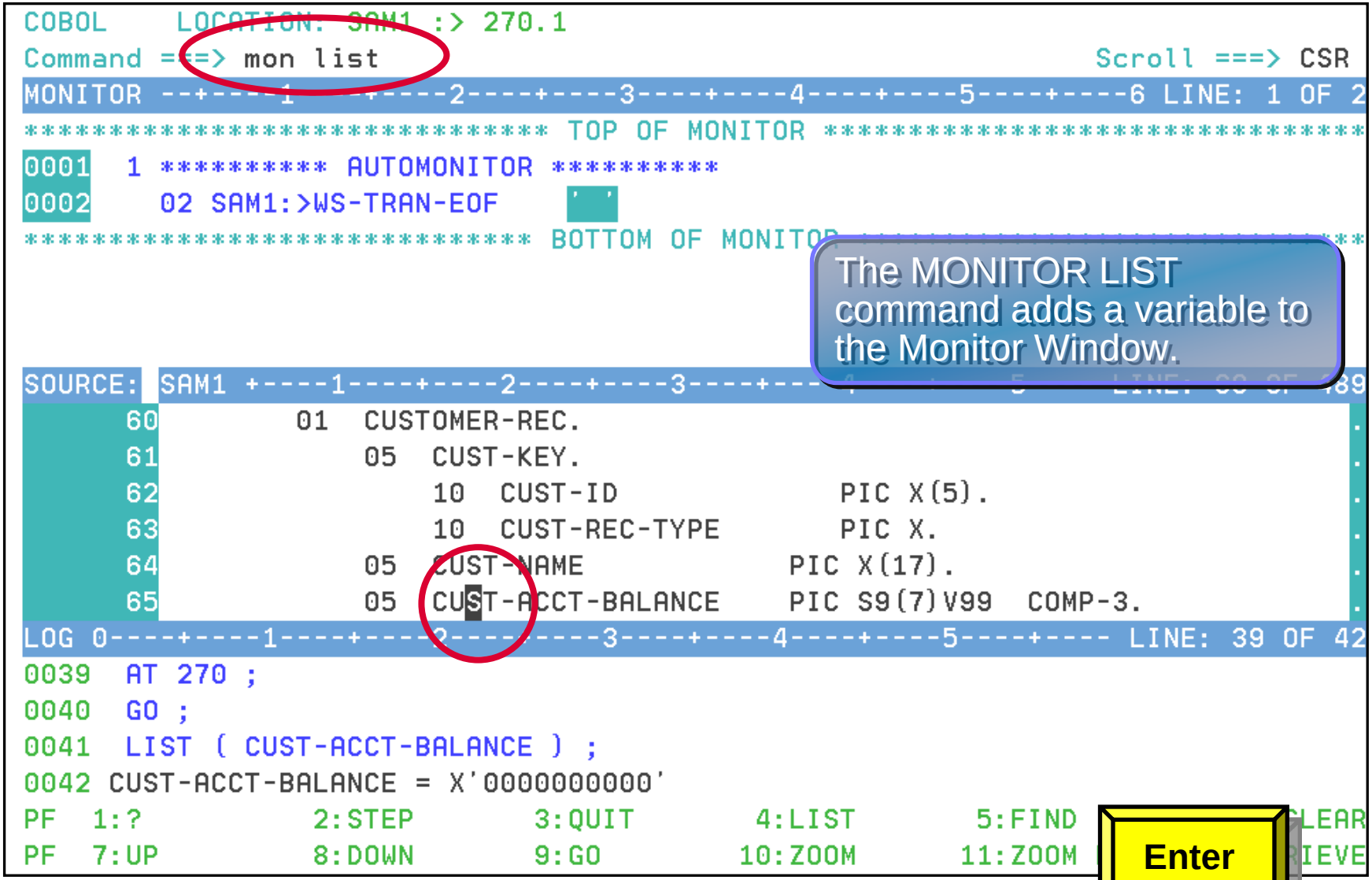
Debug Tool Utilities and Advanced Functions



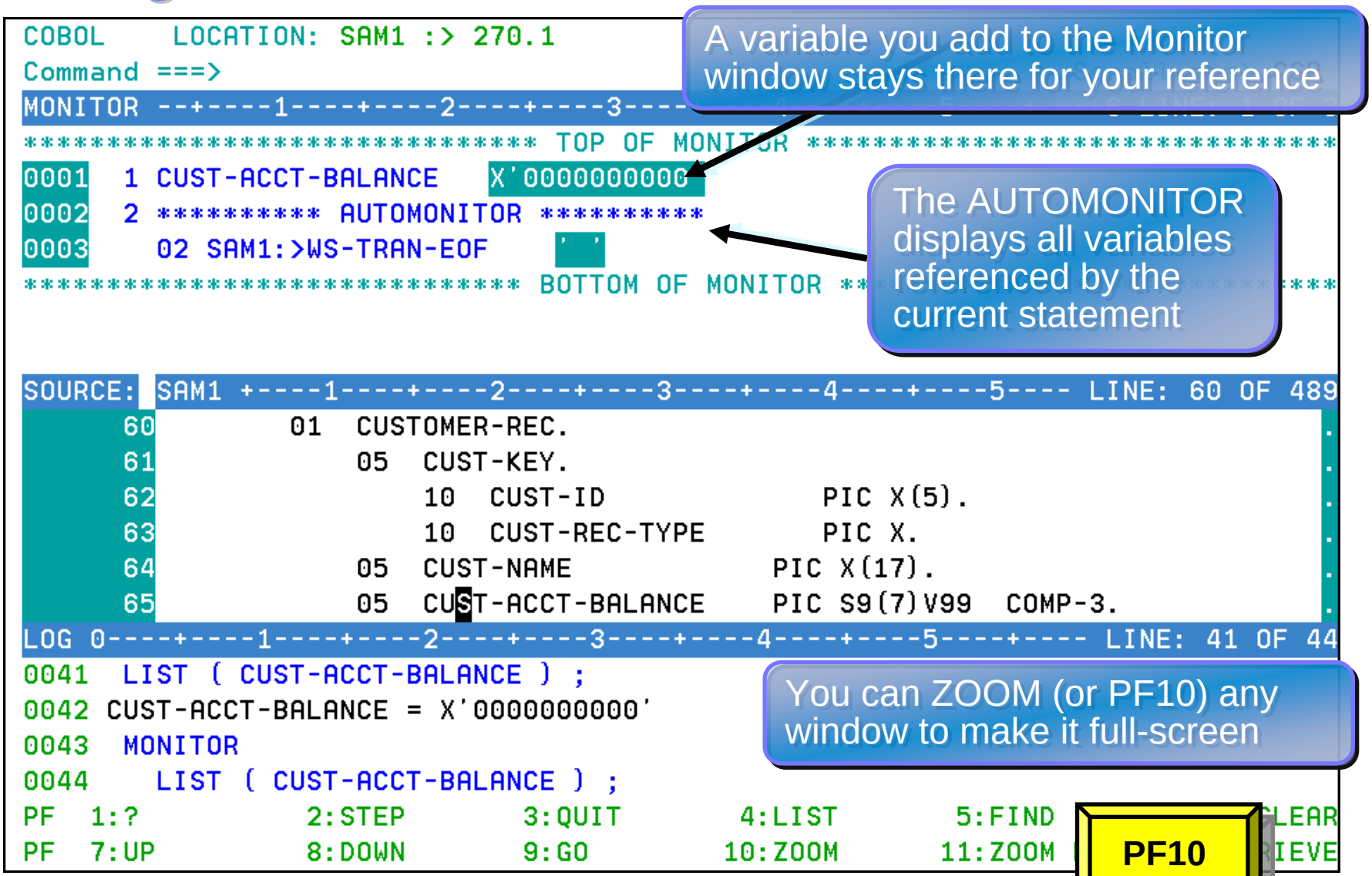
Debug Tool Utilities and Advanced Functions - Breakpoints

- **Debug Tool provides many types of breakpoints.**
- **For example:**
  - At any statement
  - At the change of any variable or storage area
  - When variable(s) reach a value or range
  - When a specific subroutine is called

Debug Tool Utilities and Advanced Functions



Debug Tool Utilities and Advanced Functions



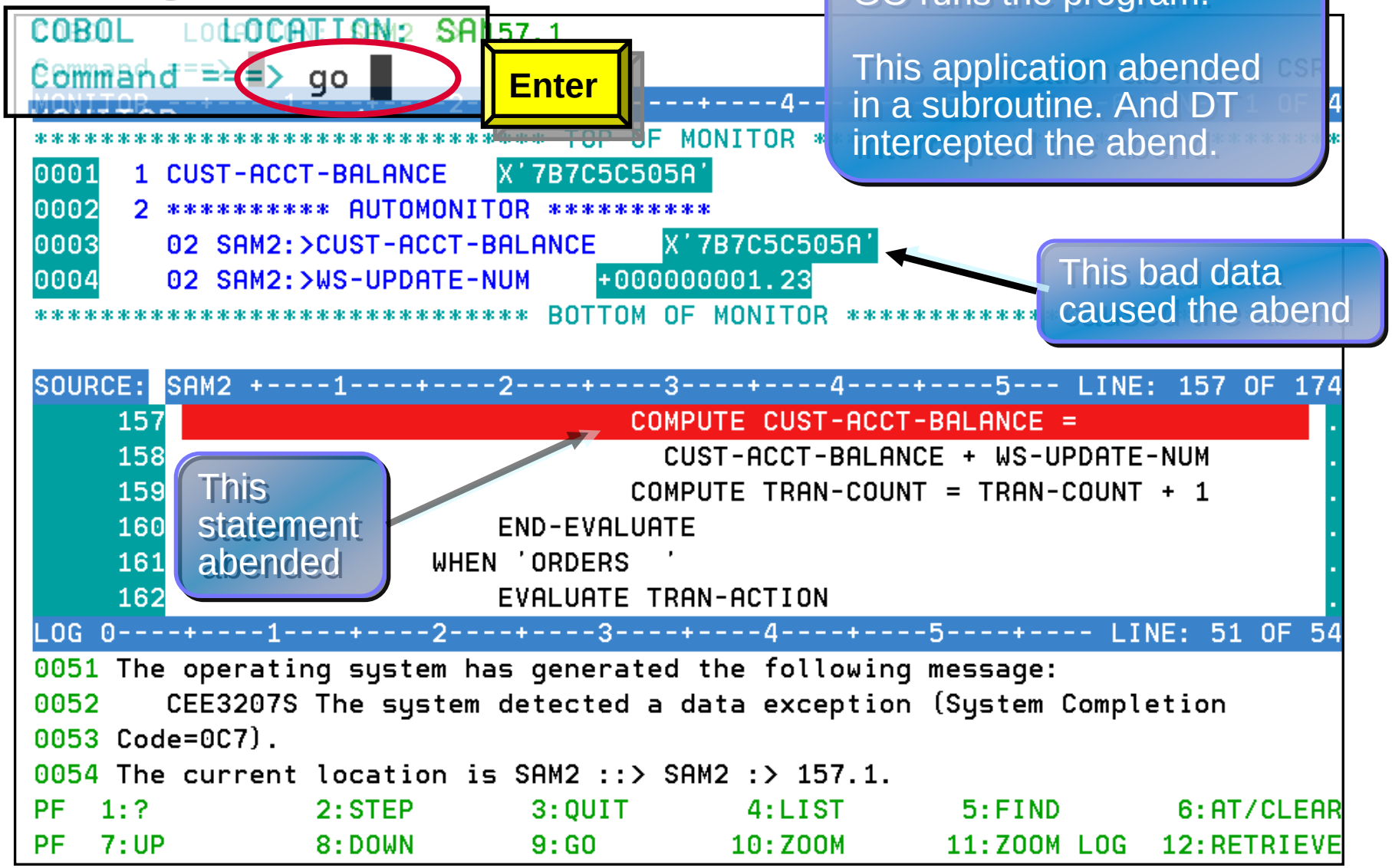
Debug Tool Utilities and Advanced Functions

```
COBOL     LOCATION: SAM1 :> 270.1
Command ===>                                                Scroll ===> CSR
SOURCE:  SAM1 +----1----+----2----+----3-                   - LINE: 60 OF 489
      60          01  CUSTOMER-REC.                                        .
      61              05  CUST-KEY.                                        .
      62                  10  CUST-ID                PIC X(5).            .
      63                  10  CUST-REC-TYPE          PIC X.               .
      64              05  CUST-NAME              PIC X(17).               .
      65              05  CUST-ACCT-BALANCE      PIC S9(7)V99  COMP-3.    .
      66              05  CUST-ORDERS-YTD        PIC S9(5)     COMP.      .
      67              05  CUST-ADDR              PIC X(20).               .
      68              05  CUST-CITY              PIC X(14).               .
      69              05  CUST-STATE             PIC X(02).               .
      70              05  CUST-COUNTRY           PIC X(11).               .
      71              05  CUST-MONTH             PIC S9(7)V99   COMP-3  OCCURS 12 .
      72              05  CUST-OCCUPATION        PIC X(30).               .
      73              05  CUST-NOTES             PIC X(120).              .
      74              05  CUST-LAB-DATA-1        PIC X(05).               .
      75              05  CUST-LAB-DATA-2        PIC X(40).               .
      76                                                                   .
      77          FD  TRANSACTION-FILE                                     .
      78              RECORDING MODE IS F                                  .
PF  1:?       2:STEP       3:QUIT       4:LIST       5:FIND          LEAR
PF  7:UP      8:DOWN       9:GO        10:ZOOM      11:ZOOM          IEVE
```

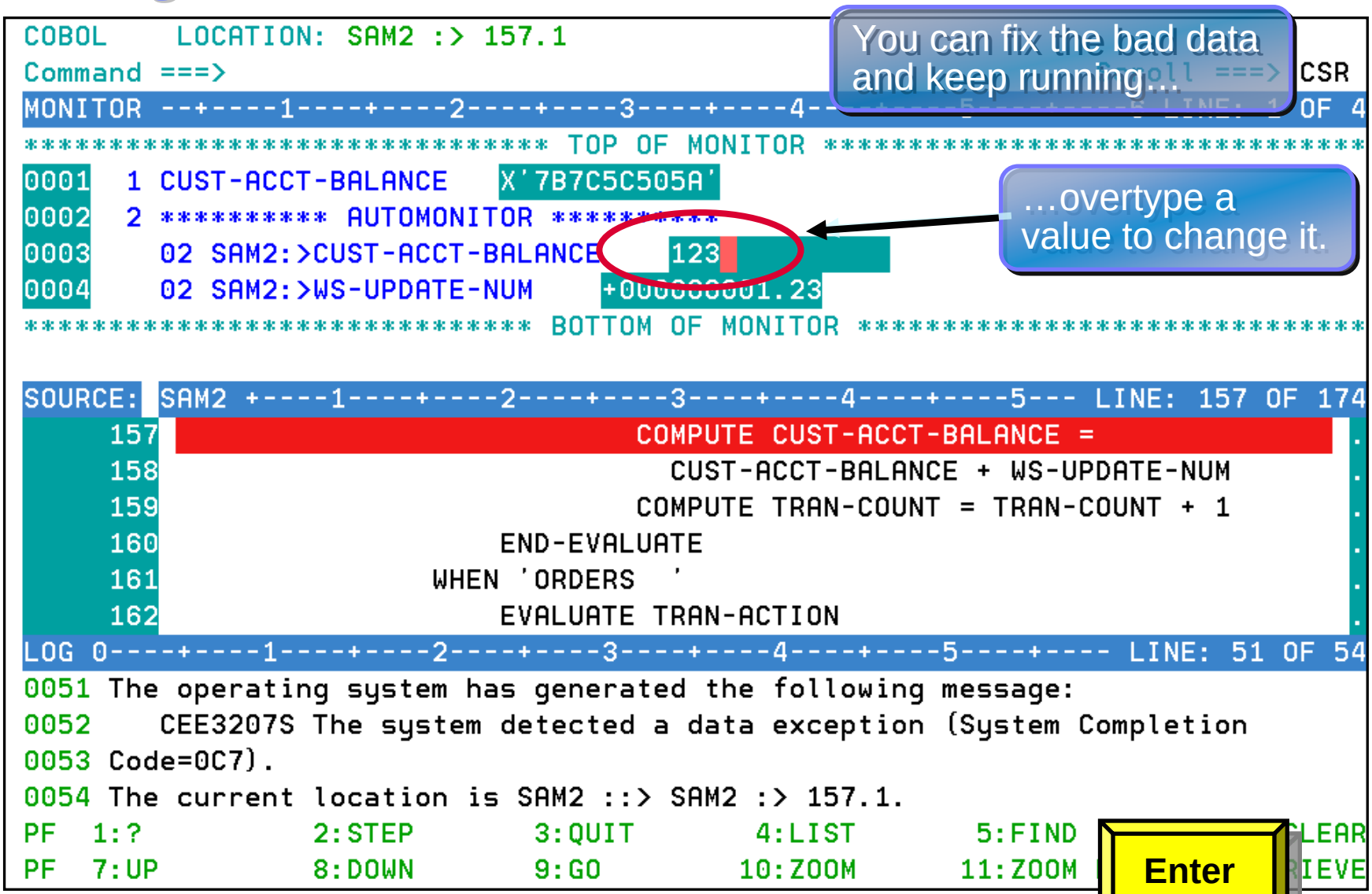
ZOOMed in on the Source Window.

PF10

Debug Tool Utilities and Advanced Functions



Debug Tool Utilities and Advanced Functions



Debug Tool Utilities and Advanced Functions

```
COBOL     LOCATION: SAM2 :> 157.1
Command ===> go bypass
MONITOR --+----1----+----2----+----3----+----4----+----5----+----6 LINE:  1 OF  4
********************************* TOP OF MONITOR ********************************
0001   1 CUST-ACCT-BALANCE    +0000123.00
0002   2 ********** AUTOMONITOR **********
0003     02 SAM2:>CUST-ACCT-BALANCE     +0000123.00
0004     02 SAM2:>WS-UPDATE-NUM     +000000001.23
******************************** BOTTOM OF MONITOR ******************************

SOURCE: SAM2 +----1----+----2----+----3----+----4----+----5--- LINE: 157 OF 174
     157                              COMPUTE CUST-ACCT-BALANCE =
     158                                CUST-ACCT-BALANCE + WS-UPDATE-NUM
     159                              COMPUTE TRAN-COUNT = TRAN-COUNT + 1
     160                         END-EVALUATE
     161                    WHEN 'ORDERS   '
     162                         EVALUATE TRAN-ACTION
LOG 0----+----1----+----2----+----3----+----4----+----5----+---- LINE: 52 OF 55
0052     CEE3207S The system detected a data exception (System Completion
0053  Code=0C7).
0054  The current location is SAM2 ::> SAM2 :> 157.1.
0055   MOVE 123 TO SAM2:>CUST-ACCT-BALANCE ;
PF  1:?          2:STEP       3:QUIT       4:LIST       5:FIND
PF  7:UP         8:DOWN       9:GO        10:ZOOM      11:ZOOM
```

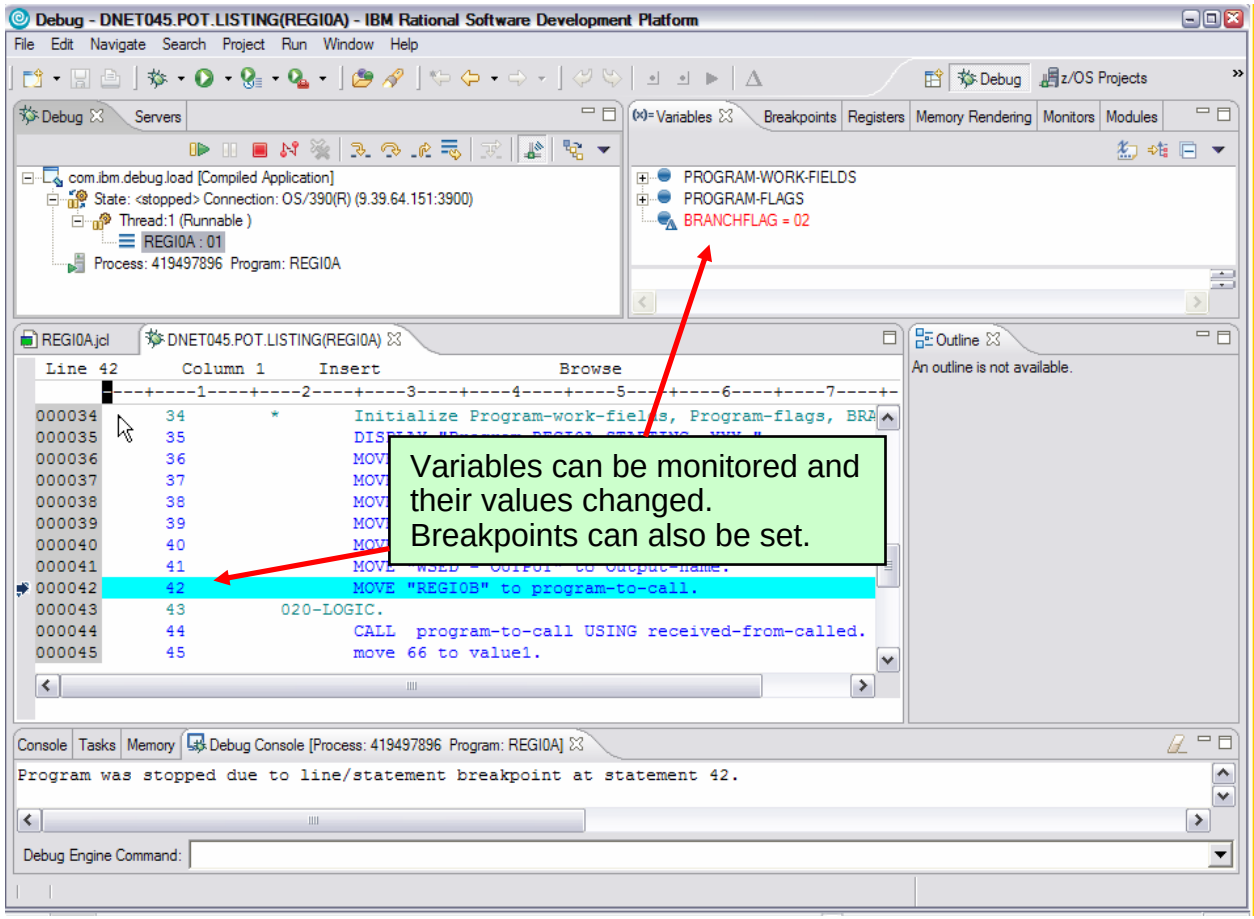
GO BYPASS skips the abending statement and the program keeps running !

Enter

Debug Tool Utilities and Advanced Functions provides powerful debugging features

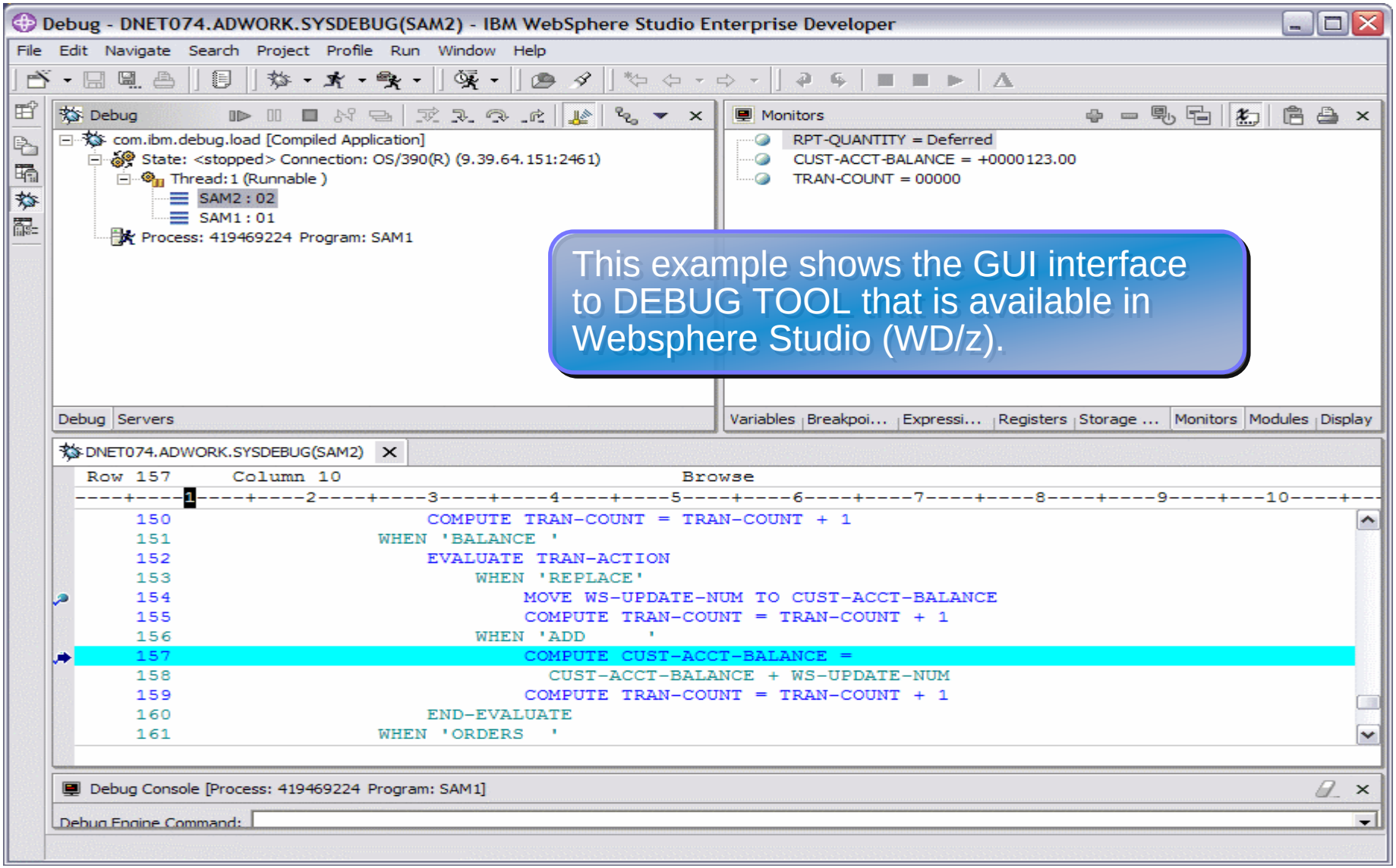
- **Step and run BACKWARD through recorded program statements**
  - See how a program executed
  - View variable values AS THEY WERE during execution
- **Make any breakpoint CONDITIONAL**
  - use COBOL, PLI, or C “IF” statements
- **Run a SCRIPT at any breakpoint**
  - Put programs statements and Debug Tool commands in the script
- **“Patch” your program – effectively add and remove statements on the fly**
- **Customize the user interface**
  - Define your own PF keys, window layouts, and commands

Using Debug Tool and Debug Tool Utilities/Advanced Functions with WebSphere Developer Debugger for zSeries (WDDz)



- **The WebSphere Developer Debugger for zSeries interface to Debug Tool Utilities is used to unit test and debug COBOL, PL/I, etc. code**
- **Provides the ability to set breakpoints and view the value of various variables, while stepping through the executing code**

Optionally, use one of the GUI Debugging Interfaces



DTUAF provides powerful Utilities

- **Load Module Analysis Utility**
  - Discover Load Modules that are OS/VS Cobol (and other lang.)

    Analyze MVS load modules or program objects to determine the language translator (compiler or assembler) used to generate the object for each CSECT in the load module. For Language Environment programs, it can also display information about the Language Environment entry point name, linkage type, source language, and translation date and time. This is for COBOL, PL/I, Fortran, assembler, etc.
- ***Debug Tool COBOL Modernization Utility***
  - Analyze, Report, and Convert COBOL source to be compliant with supported versions of COBOL
    - Assess the current COBOL source inventory and report the “size” of the conversion effort
    - Convert COBOL source to be compliant with supported LE COBOL compilers
    - Facilitate the project management of the conversion effort
- ***Debug Tool Code Coverage Utility***
  - Application runtime tool that will collect and report called and executed COBOL programs at a source statement level
    - Identify the call sequence of programs invoked by a CICS transactions, IMS TM transactions, and batch jobs to define groups of COBOL programs for conversion
    - After COBOL conversion, validate the testing of converted COBOL programs

DTUAF Load Module Analysis Utility Report:

Report Output

- List of load modules names
- List of CSECTs that make up the load module
- List of the compile dates for each CSECT
- List of the compiler version for each CSECT
  (in this report only showing OS/VS V1.2 however can select all compiler versions)

```
5655-M19   Debug Tool Version 5 Release 1 Load Module Analyzer   2005/09/23  13:02  Page     4
      Load Module  DNET603.CODE.LOAD(COB01)

CSECT     Length  Program-ID  Trn-Date    Program-Description
COB01A      5F8  5740CB103   1989/03/01  OS/VS COBOL Version 1 Release 2, PARM=NORES
COB01B      53C  5740CB103   1989/03/01  OS/VS COBOL Version 1 Release 2, PARM=NORES
COB01C      5DA  5740CB103   1989/03/01  OS/VS COBOL Version 1 Release 2, PARM=NORES
COB01D      4CC  5740CB103   1989/03/01  OS/VS COBOL Version 1 Release 2, PARM=NORES

1 5655-M19   Debug Tool Version 5 Release 1 Load Module Analyzer   2005/09/23  13:02  Page     5
      Load Module  DNET603.CODE.LOAD(TDM01)

CSECT     Length  Program-ID  Trn-Date    Program-Description
TDM01A      B60  5740CB103   1992/11/22  OS/VS COBOL Version 1 Release 2, PARM=RES
TDM01B      560  5740CB103   1992/11/22  OS/VS COBOL Version 1 Release 2, PARM=RES
TDM01C      606  5740CB103   1992/11/22  OS/VS COBOL Version 1 Release 2, PARM=RES
TDM01D      4F8  5740CB103   1992/11/22  OS/VS COBOL Version 1 Release 2, PARM=RES

1 5655-M19   Debug Tool Version 5 Release 1 Load Module Analyzer   2005/09/23  13:02  Page     6
      Load Module  DNET603.CODE.LOAD(PROG01)

CSECT     Length  Program-ID  Trn-Date    Program-Description
PROG01      5FC  5740CB103   1999/07/18  OS/VS COBOL Version 1 Release 2, PARM=NORES

1 5655-M19   Debug Tool Version 5 Release 1 Load Module Analyzer   2005/09/23  13:02  Page     7
      Load Module  DNET603.CODE.LOAD(PROG02)

CSECT     Length  Program-ID  Trn-Date    Program-Description
PROG02      6A8  5740CB103   2005/07/18  OS/VS COBOL Version 1 Release 2, PARM=RES

1 5655-M19   Debug Tool Version 5 Release 1 Load Module Analyzer   2005/09/23  13:02  Page     8
      Load Module  DNET603.CODE.LOAD(PROG03)

CSECT     Length  Program-ID  Trn-Date    Program-Description
PROG03      576  5740CB103   1996/02/18  OS/VS COBOL Version 1 Release 2, PARM=NORES
```

Debug Tool Utilities and Advanced Functions Summary:

- **Common User Interface Across Systems And Subsystems**
- **Consistent Across Languages**
  - COBOL, C,C++, PL/I, Assembler, HP Java
- **Environments Supported**
  - CICS
  - TSO
  - JES/Batch
  - IMS Including IMS/TM
  - DB2 Including Stored Procedures
  - Unix System Services (USS)
  - MQSeries
- **Order**

  Debug Tool Utilities and Advanced Functions PID 5655-M19

- **Debug Tool Utilities and Advanced Functions Features:**:
  - **Source-level Debugging**
  - **Step mode debugging**
  - **Multiple Breakpoints**
    - **at program statements**
    - **at change of storage / variable**
    - **at subroutine call / entry**
  - **Recovery of program ABENDS**
  - **Step Mode Debugging**
  - **Dynamic Program Patching**
  - **Statement Frequency Counter**
  - **Enhancements for Interactive Debugging**
  - **“disassembly” interactive debug support**
  - **An interface to the Fault Analyzer tool**
  - **Code coverage tool for unit and regression testing**
  - **COBOL modernization utilities**
  - **Support for OS/VS COBOL source programs**
- **For More Information:**

  http://www-306.ibm.com/software/awdtools/debugtool/

IBM Application Performance Analyzer V1.1

What is Application Performance Analyzer ?

- A performance analyzer for application programs
  - **A tool that shows resources used by an application**
  - **so you can identify the cause of performance problems**
- Delivers information about an application, to help answer:
  - **What programs are running?**
  - **What percentage of time is spent in each program?**
  - **Which lines of code are using the most time?**
  - **What files and databases are being used?**
  - **Why is the application waiting?**

What's new with Application Performance Analyzer

- Loading Debug Tool SYSDEBUG source from a sequential file
- New Feature: Dynamic DB2 EXPLAIN.
- With customer input, increase the IMS reporting from 3 reports to 21
- Use the SYSDEBUG file support for COBOL source mapping.
- New Feature: Provide RACF support for external security.
- New Feature: Provide Disassembled Object Code of load modules when source not available
- Source mapping available from all CICS reports.
- Improve handing at end of sampling for started tasks.
- Enhance Sysplex startup validation.
- Additional support for Third Party formatted listing files. (Serena Changeman, CA-Endevor, CA-Panvalet, CA-Librarian, others)
- Support for datasets using the IAM 8.0 release (Innovation Access Method)

- New Report: C09 - CPU Usage by PSW/Object Code.
- New Import/Export functions for sample files to allow customer easier interaction with IBM Customer Support.
- New Feature: DB2+ trace facility for accurate reporting to compare to other utilities
- Allow use of S as a line command on R02 to open an observation.
- New Feature: Add SSA (Segment Search Argument) detail to CICS report popups for IMS.
- New Feature: IMS+ Engine & Installation changes. (IMS trace)
- Support SQL statements with text > 4095
- New Feature: Support for PL/1 source mapping.
- Include DB2 V8 module descriptions in the module description table (CAZDPA01).
- Add PREFIX option to suppress +/- character for Margin of Error in reports
- New Parameter: DeleteOnJCLError=Y|N added to member CAZCNFG0 in hlq.SCAZSAMP to handle multi-step jobs that hav[illegible] during sampling.

Application Performance Analyzer

Use it to:

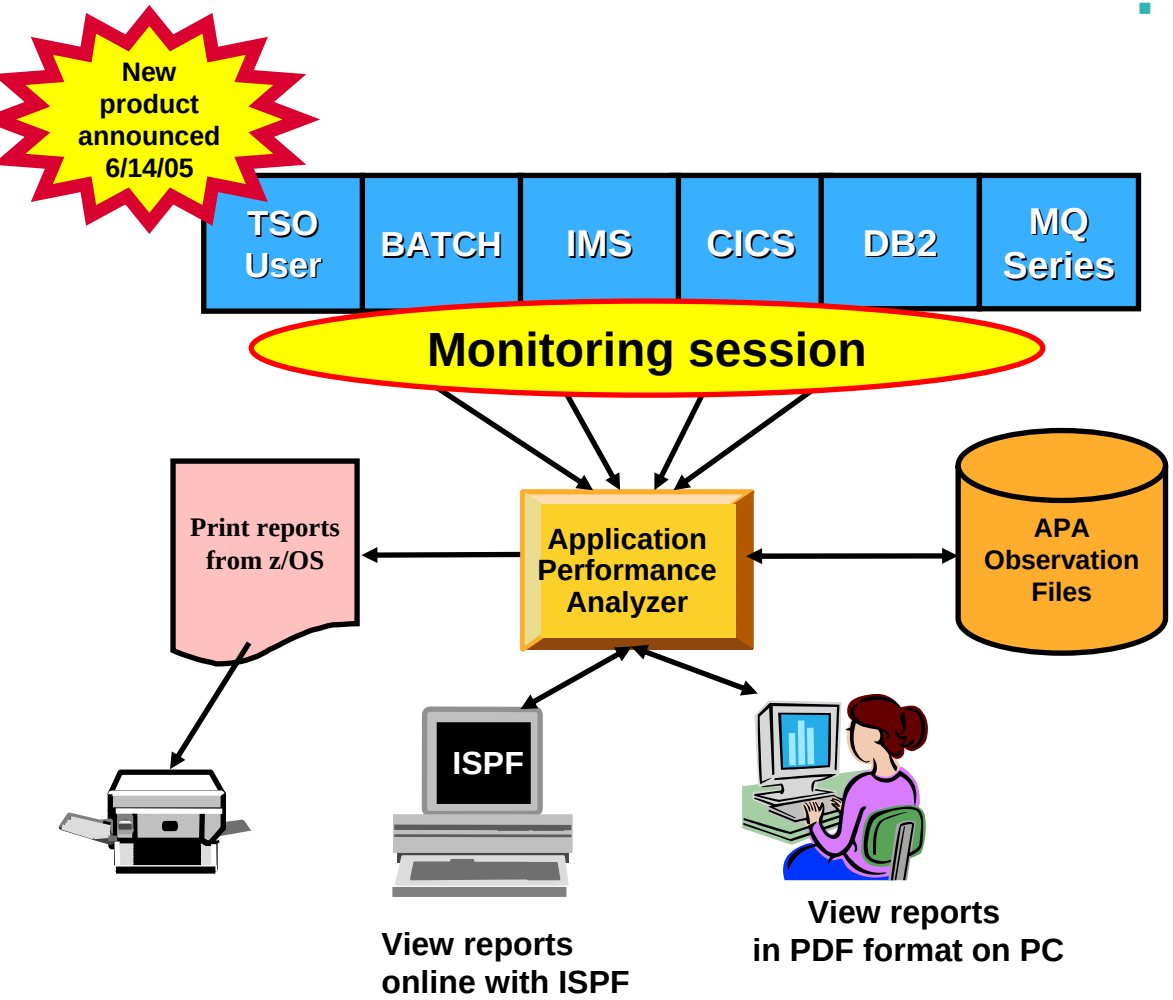
- Monitor an application while it is running
- Pinpoint the cause(s) of bad application performance, right down to the line of source code
- Capture and report application system resource consumption, (ie. file access, DB2 SQL, CPU cycles, etc.)

Key Features:

- Intuitive online ISPF interface
- Monitor application programs at the source level
- Support for batch, CICS, DB2, IMS, MQ
- Supports current releases DB2 V8, IMS V9 and CICS TS V3.1

Application Performance Analyzer Functional Overview

Application performance analysis tooling for application developers



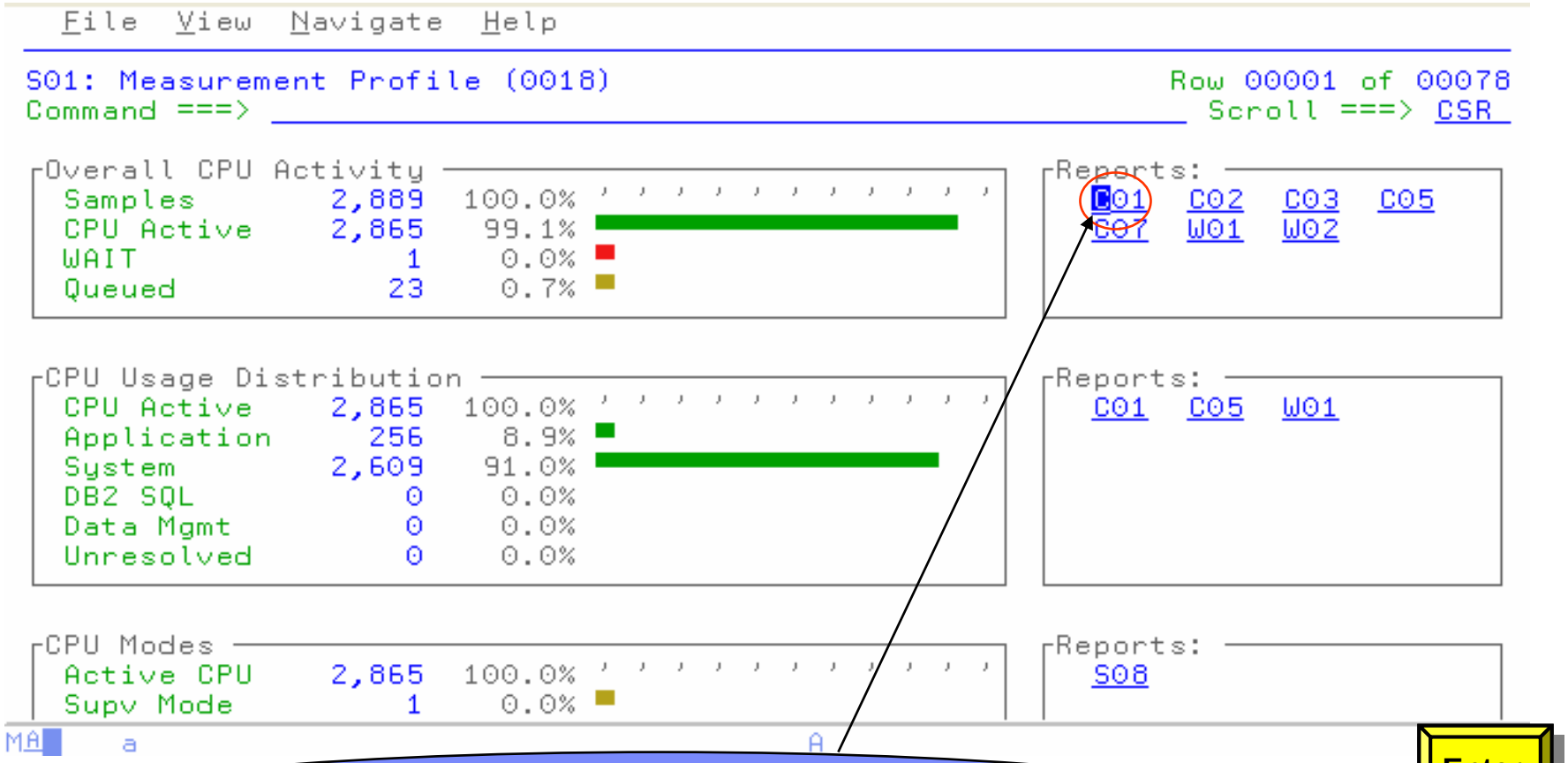
Order: Application Performance Analyzer PID 5697-N37

- **Features:**
  - Summary/Profile Reports with drill down into detailed levels via an ISPF interface or PDF hardcopy
  - CPU, Load Module, and CSECT Analysis of all modules in the address space
  - Source Statement (COBOL or PL1) or Instruction utilization in each CSECT
  - Supports Fault Analyzer / Debug Tool Sidefiles
  - Wait Time Analysis by Category, Task/Module, or Attribution
  - DASD I/O Analysis by Device, DD Name, Dataset and Dataset Attributes, EXCP's, VSAM with Buffer Pool, I/O Wait, Over Time
  - Sysplex Coupling Facility Reports
  - DB2 SQL Analysis – Static and Dynamic – Service Times
  - DB2 Analysis by DBRM, Statement, and Plan
  - CICS Session Statistics, Transaction Analysis by CPU Usage, Mean and Total Service Time, and Waits by Transaction
  - IMS CPU and Service Time Analysis
  - MQ Series Analysis by Queue, Request, and Transaction
  - Interval Reporting
  - Adjustable Sampling Rate
  - Repeated Observation Sessions
  - Internal (APA) and External (RACF, etc) Security

Measurement Profile - Suggested Start for Navigation

```
  File  View  Navigate  Help
R01: IBM APA for z/OS Performance Reports (0018)          Row 00001 of 00007
Command ===> _____________________________________________ Scroll ===> CSR

  Select a category from     _ A Admin/Miscellaneous   _ I IMS Measurement
  the list to the right      _ S Statistics/Storage    _ E CICS Measurement
  to view the available      _ C CPU Usage Analysis    _ F DB2 Measurement
  reports in the selection   _ D DASD I/O Analysis      _ Q MQ Measurement
  list below.                _ W CPU WAIT Analysis      _ G Coupling Facility

Enter S to make a selection or enter the report code on the command line

  S S01 Measurement Profile                 _ S07 TCB Execution Summary
  S S02 Load Module Attributes              _ S08 Processor Utilization Summary
  _ S03 Load Module Summary
  _ S04 TCB Summary
  _ S05 Memory Usage Timeline
  _ S06 Data Space Usage Timeline

MA    b
```

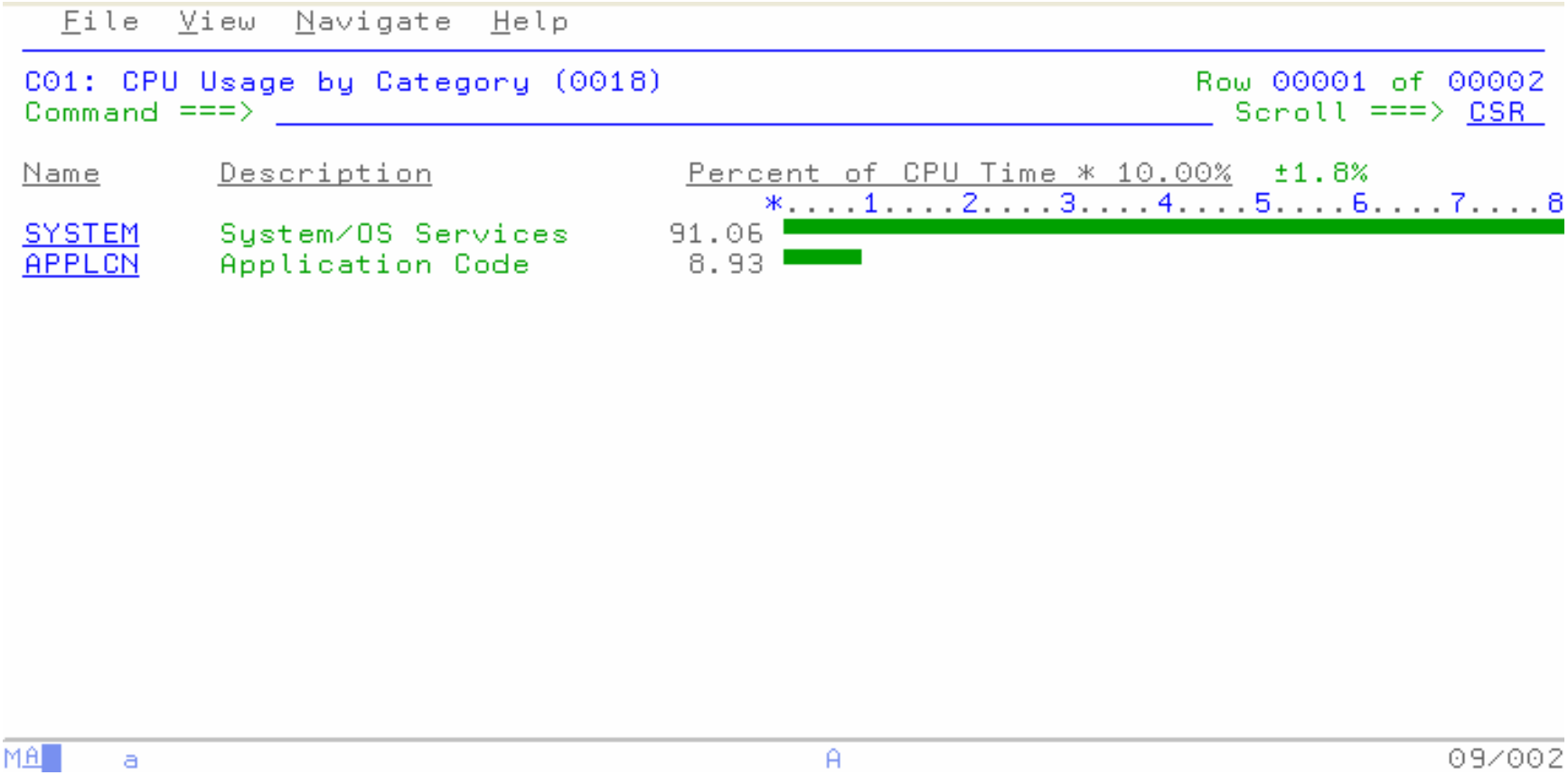
Measurement Profile - Summary



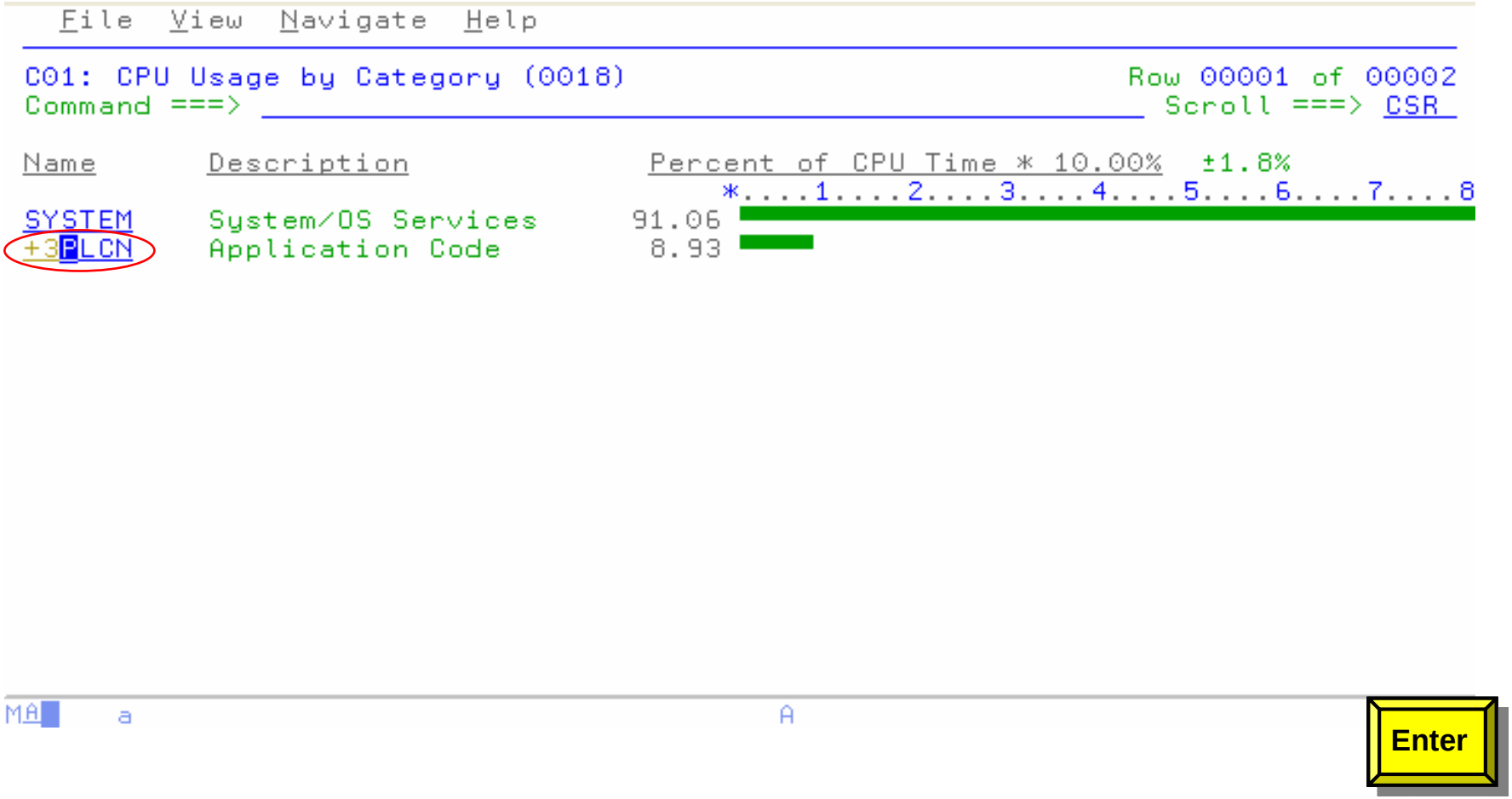
Navigate to more detailed information by selecting the desired report with the cursor

Enter

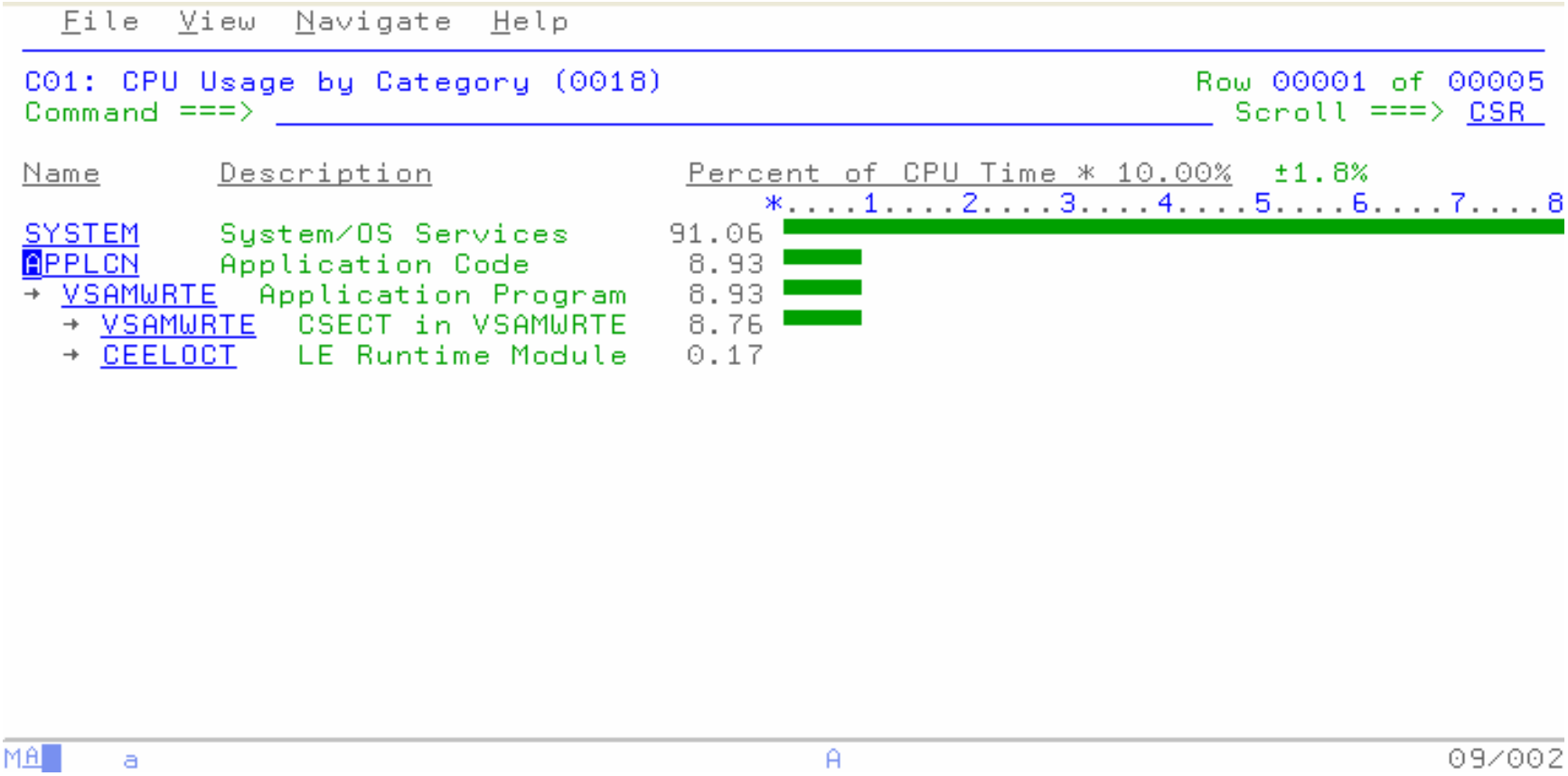
C01: CPU Usage by Category



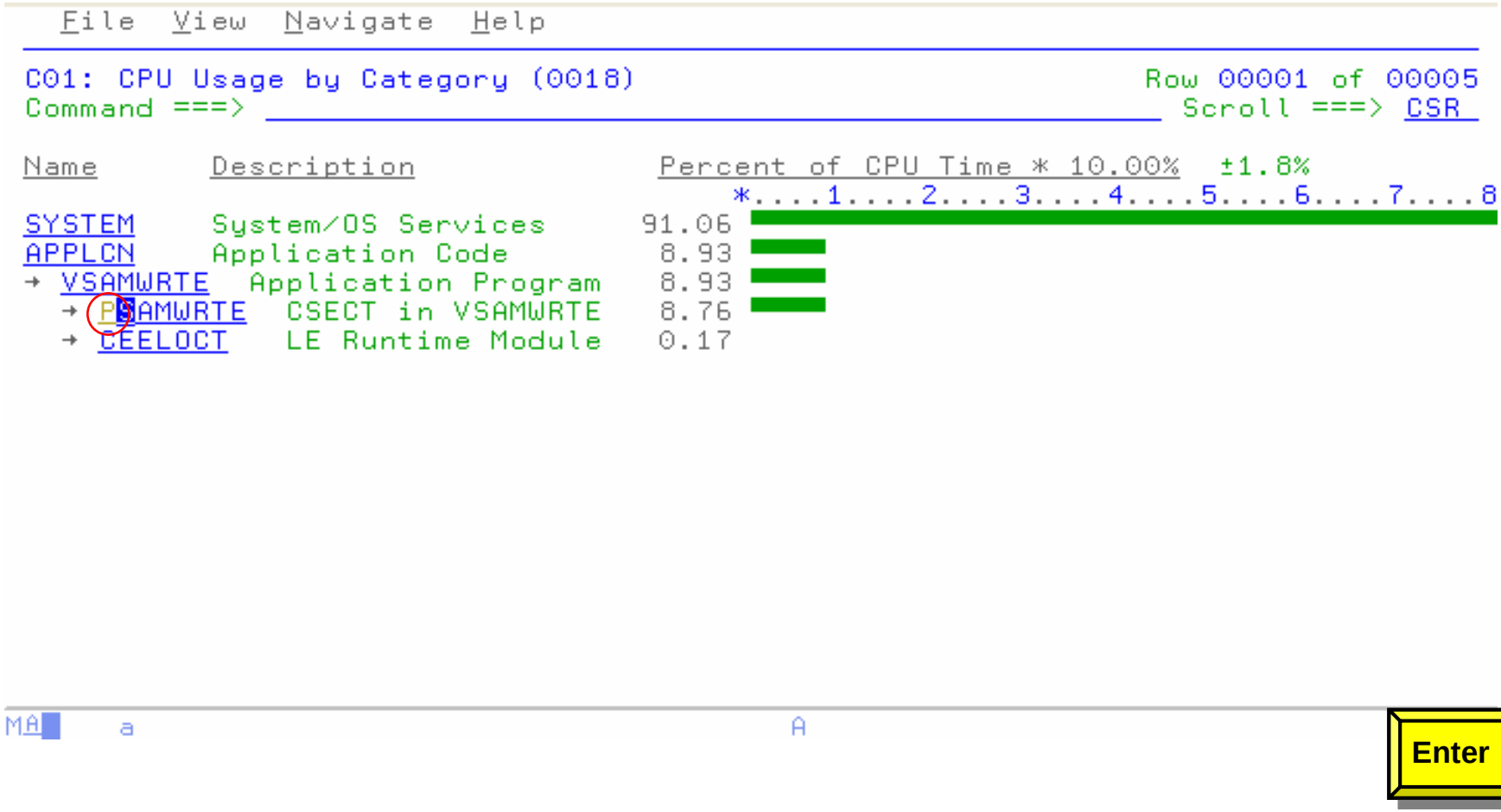
Shortcut - Expand 3 levels



C01: CPU Usage by Category - Expanded



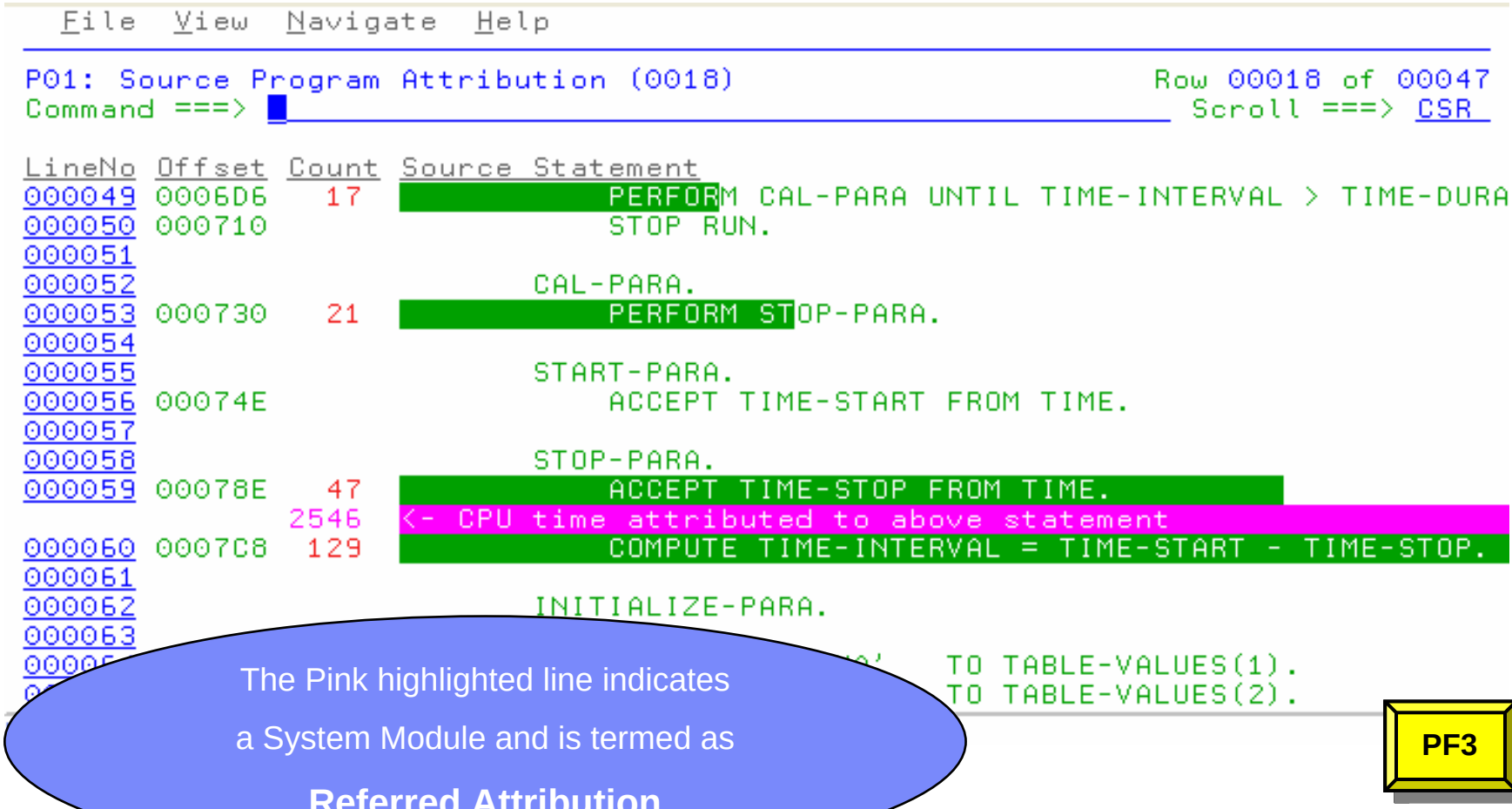
Enter P to view program source



P01 Source Program Attribution

```
  File  View  Navigate  Help
P01: Source Program Attribution (0018)                    Row 00001 of 00047
Command ===>                                              Scroll ===> CSR

LineNo Offset Count Source Statement

000033
000034                      PROCEDURE DIVISION.
000035                      MAIN-PARA.
000036 000536                   DISPLAY 'START PARA'.
000037 000544                   PERFORM START-PARA.
000038 00055C    17             PERFORM CAL-PARA UNTIL TIME-INTERVAL > TIME-DURA
000039 000596                   PERFORM OPEN-PARA.
000040 0005AE                   INITIALIZE TIME-START , TIME-STOP , TIME-INTERVA
000041 0005C0                   PERFORM START-PARA.
000042 0005DC    20             PERFORM CAL-PARA UNTIL TIME-INTERVAL > TIME-DURA
000043 000616                   DISPLAY 'WRITE PARA'.
000044 000624                   PERFORM INITIALIZE-PARA.
000045 00063C                   PERFORM WRITE-PARA VARYING I FROM 1 BY 1 UNTIL I
000046 000690                   INITIALIZE TIME-START , TIME-STOP , TIME-INTERVA
000047 0006A2                   PERFORM CLOSE-PARA.
000048 0006BA                   PERFORM START-PARA.
000049 0006D6    17             PERFORM CAL-PARA UNTIL TIME-INTERVAL > TIME-DURA
MA    a                                   A
```

P01: Source Program Attribution



The Pink highlighted line indicates a System Module and is termed as **Referred Attribution**

C03: CPU Usage by Code Slice

File View Navigate Help

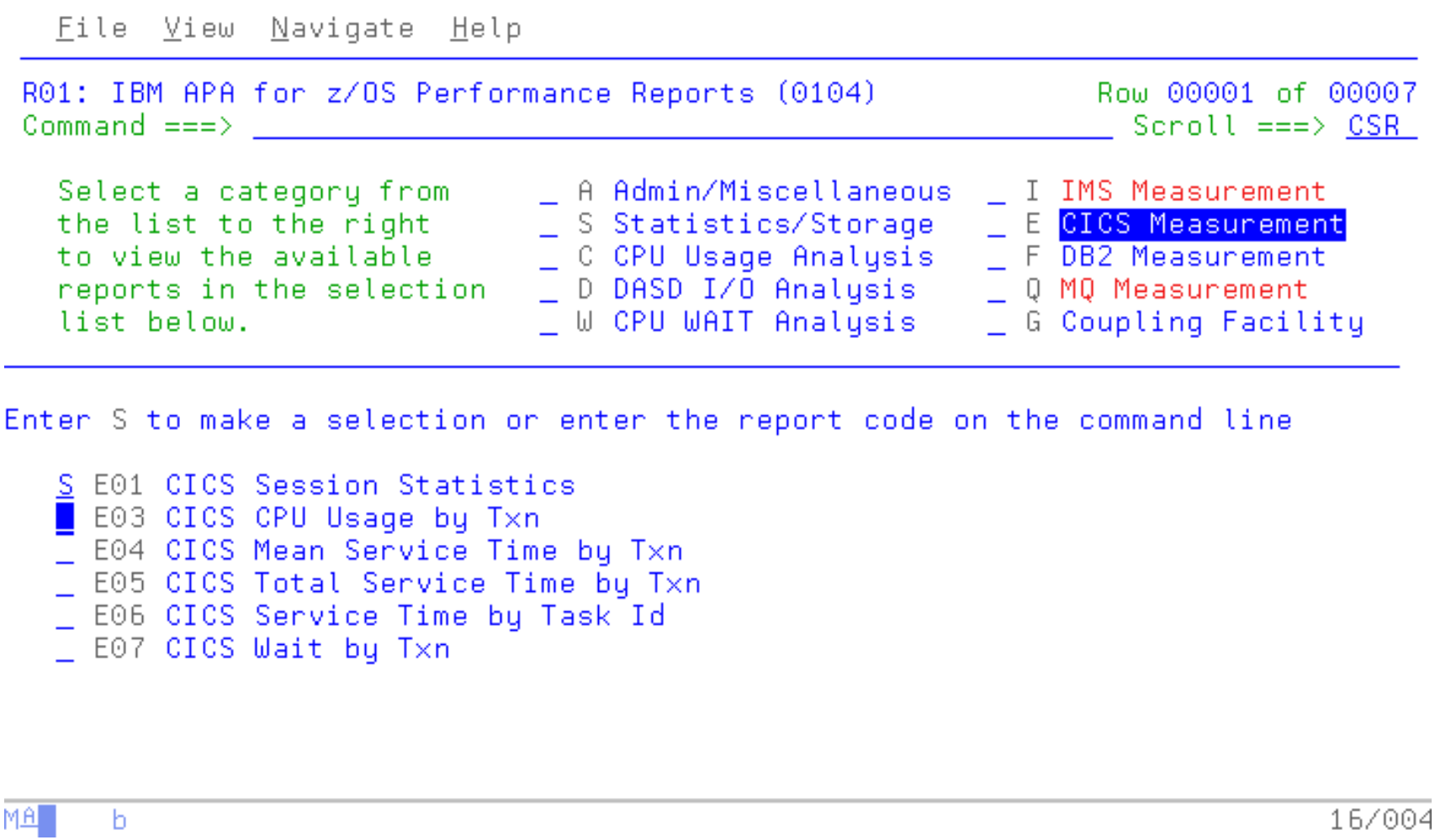
C03: CPU Usage by Code Slice (0018) Row 00001 of 00062
Command ===> Scroll ===> CSR

Address	Size	Location	Percent of CPU Time * 10.00% ±1.8%
			*....1....2....3....4....5....6....7....8
050827E0	64	CEEYLHMS+0180	6.94
05080F38	64	CEEYGMTO+01C0	6.14
050823D8	64	CEEYJLIL+0080	5.68
00007C28	64	VSAMWRTE+07C0	4.53
05082820	64	CEEYLHMS+01C0	4.18
05080AF0	64	CEEYGMT+00C0	3.94
05080B30	64	CEEYGMT+0100	3.90
05080EB8	64	CEEYGMTO+0140	3.63
05082C48	64	CEEYLOCT+0180	3.35
05082530	64	CEEYLEAP+0040	2.93
050808E8	64	CEEYGJUL+00C0	2.86
05082398	64	CEEYJLIL+0040	2.82
05082C88	64	CEEYLOCT+01C0	2.72
05082760	64	CEEYLHMS+0100	2.58
05082CC8	64	CEEYLOCT+0200	2.51
05082B08	64	CEEYLOCT+0040	2.37
05080868	64	CEEYGJUL+0040	2.19

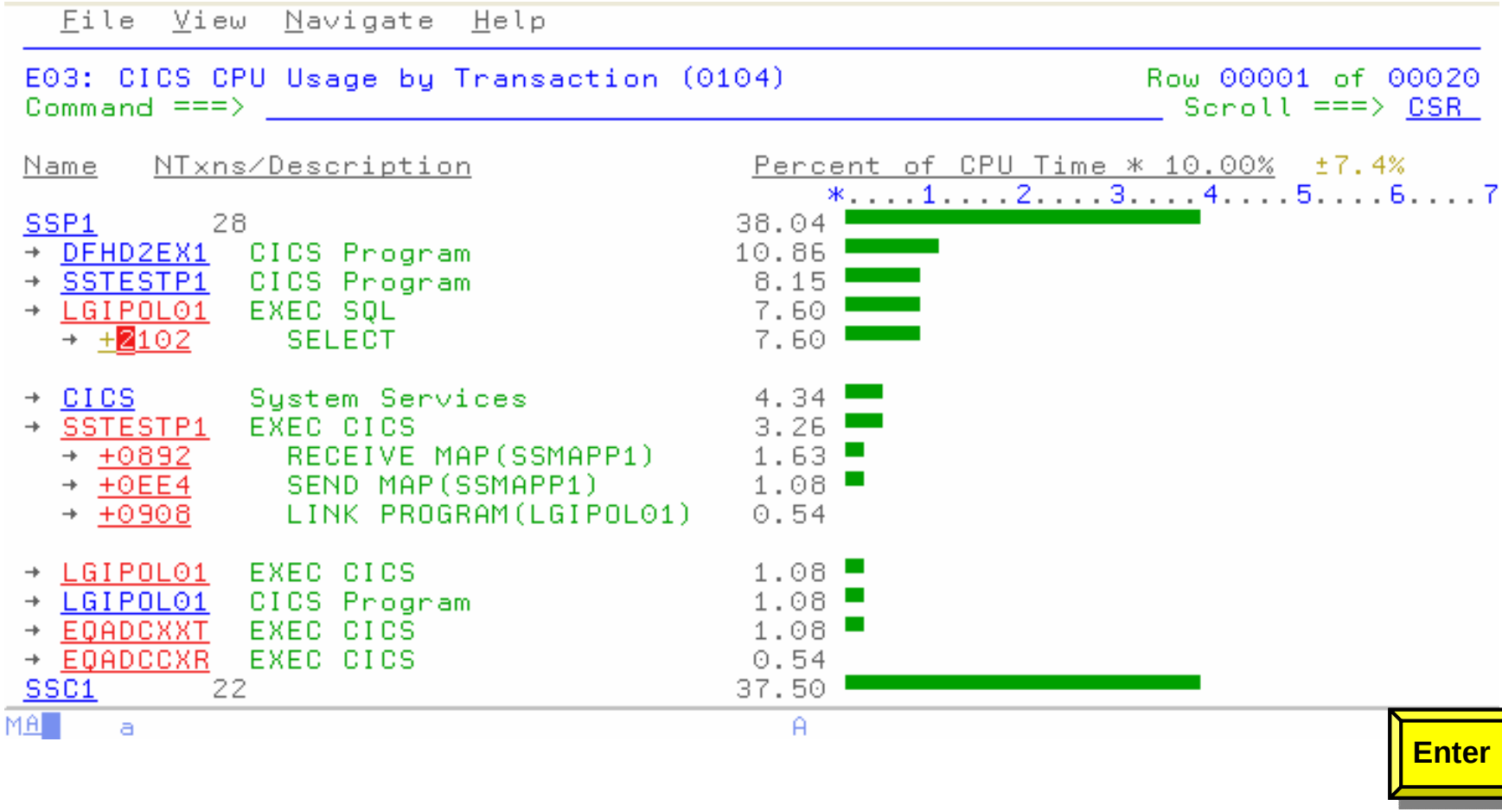
MA a A

Identifies areas of a program which are consuming CPU resource. Adjust the size of the Code Slice with the SETUP Command

CICS Measurement



CICS CPU Usage by Transaction



DB2 Measurement

```
  File  View  Navigate  Help
R01: IBM APA for z/OS Performance Reports (0103)          Row 00001 of 00008
Command ===> _____________________________________________ Scroll ===> CSR

  Select a category from      _ A Admin/Miscellaneous    _ I IMS Measurement
  the list to the right       _ S Statistics/Storage     _ E CICS Measurement
  to view the available       _ C CPU Usage Analysis     _ F DB2 Measurement
  reports in the selection    _ D DASD I/O Analysis      _ Q MQ Measurement
  list below.                 _ W CPU WAIT Analysis      _ G Coupling Facility

Enter S to make a selection or enter the report code on the command line

  S F01 DB2 Measurement Profile          _ F08 DB2 SQL Wait Time by Statement
  _ F02 DB2 SQL Activity Timeline        _ F09 DB2 SQL Wait Time by Plan
  _ F03 DB2 SQL Activity by DBRM         _ F10 DB2 SQL CPU/Svc Time by DBRM
  _ F04 DB2 SQL Activity by Statement    _ F11 DB2 SQL CPU/Svc Time by Stmt
  _ F05 DB2 SQL Activity by Plan         _ F12 DB2 SQL CPU/Svc Time by Plan
  _ F06 DB2 SQL Statement Attributes     _ F13 DB2 SQL Threads Analysis
  _ F07 DB2 SQL Wait Time by DBRM        _ F14 DB2 CPU by Plan/Stored Proc
```

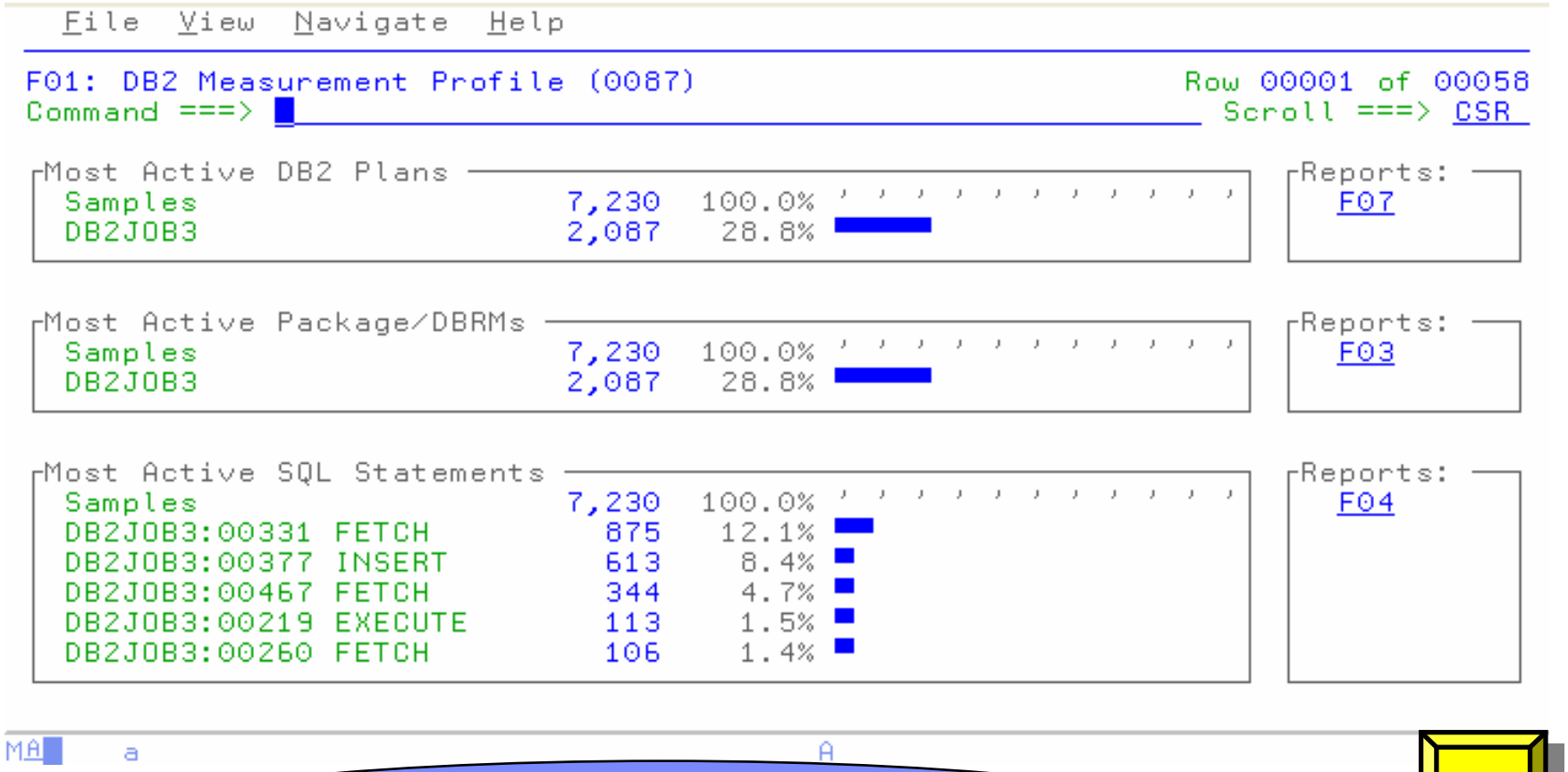
Reports organized by DBRM, Statement, and Plan

F02 – F04 SQL Activity

F07 – F09 Wait Time

F10 – F2 CPU/SVC Time

F01: DB2 Measurement Profile - Summary



Shows Most Active DB2 Plans, DBRM/Packages, and Statements

PF8

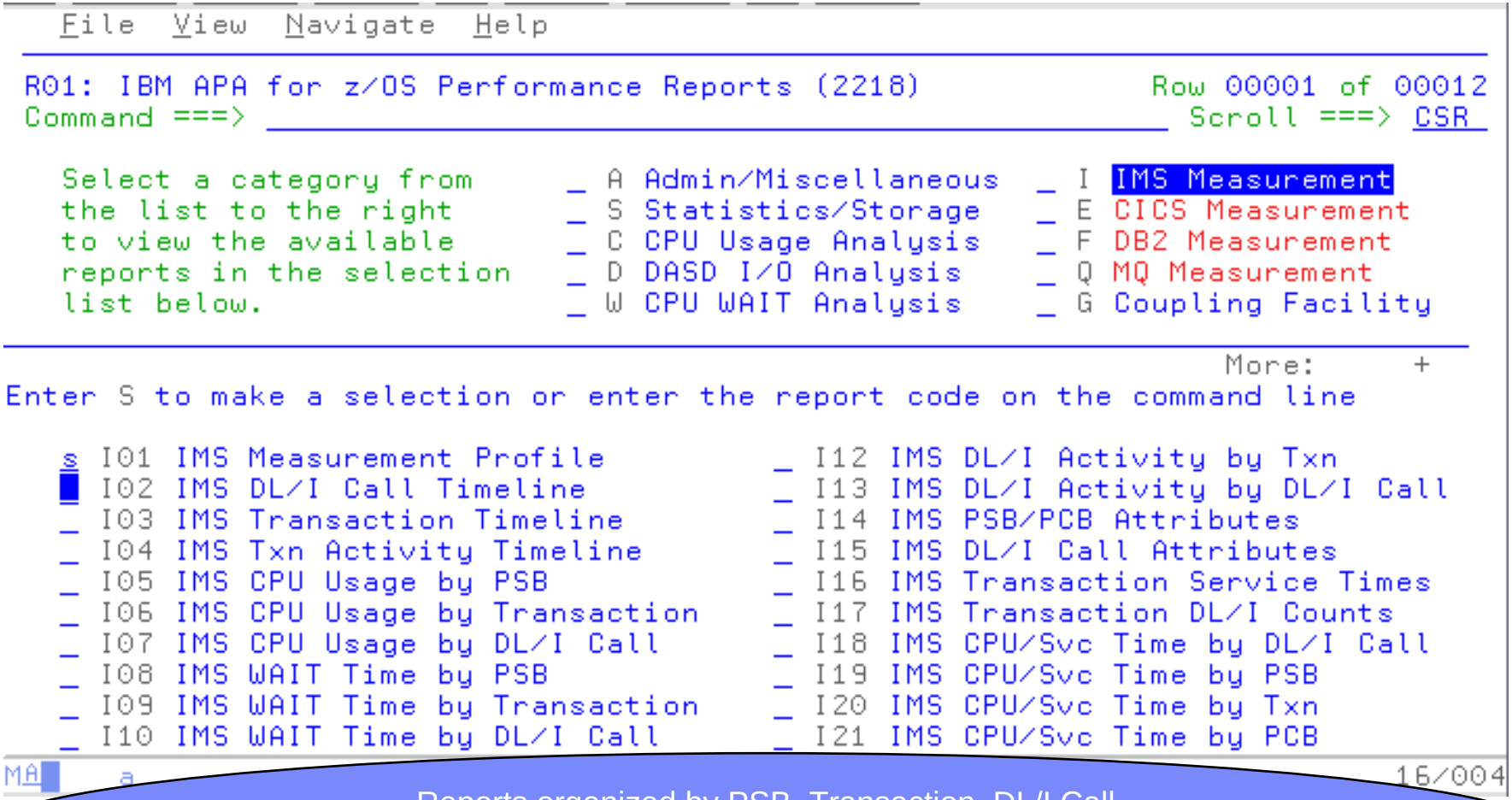
MQ Measurement

```
  File  View  Navigate  Help
R01: IBM APA for z/OS Performance Reports (0095)          Row 00001 of 00007
Command ===> _____________________________________________ Scroll ===> CSR

  Select a category from     _ A Admin/Miscellaneous   _ I IMS Measurement
  the list to the right      _ S Statistics/Storage    _ E CICS Measurement
  to view the available      _ C CPU Usage Analysis    _ F DB2 Measurement
  reports in the selection   _ D DASD I/O Analysis      _ Q MQ Measurement
  list below.                _ W CPU WAIT Analysis      _ G Coupling Facility

Enter S to make a selection or enter the report code on the command line

   S Q01 MQSeries Activity Summary       _ Q07 MQSeries Serv Time by Txn
   _ Q02 MQSeries CPU Usage by Queue     _ Q08 MQSeries Wait Time by Queue
   _ Q03 MQSeries CPU Usage by Request   _ Q09 MQSeries Wait Time by Request
   _ Q04 MQSeries CPU Usage by Txn       _ Q10 MQSeries Wait Time by Txn
   _ Q05 MQSeries Serv Time by Queue
   _ Q06 MQSeries Serv Time by Request
MA  b                                                          16/004
```

Reports organized by Queue, Request, and Transaction

Q02 – Q04 CPU Usage | Q05 – Q07 Service Time | Q08 – Q10 Wait Time

IMS Measurement



Reports organized by PSB, Transaction, DL/I Call

I05 – I07 CPU Usage | I08 – I10 Wait Time | I19 – I21 CPU/Service Time

IMS Measurement Profile

File View Navigate Help

I01: IMS Measurement Profile (2218) Row 00001 of 00031
Command ===> Scroll ===> CSR

IMS Environment
DFSRRC00 parms DLI,DONDRV00,PMAHD#1,7,0000,,0,,N,0,T,,,N,,,N,,DB1E

IMS system id	IM8F	IMS region name	DONDRVRN
IMS version	8.1.0	IMS region type	DL/I Batch

Most Active IMS PSBs

Samples	24,552	100.0%	
PMAHD#1	23,242	94.6%	

Reports: I05 I08 I11

Most Active IMS DLI Calls

Samples	24,552	100.0%	
00001 GU MAHD#1	23,242	94.6%	

Reports: I07 I10 I13

Most CPU consumptive DLI

Total DLI CPU time	30.07	100.0%	

Report I18

MA a

PF8

IBM Application Performance Analyzer - Summary

- **Multiple Types of Observation Sessions**
  - Real-Time
  - Scheduled
  - Via Batch Submission
- **Multiple Environments Supported**
  - CICS, DB2, IMS, JES/Batch, Sysplex, MQ Series
  - All supported Environments Included
- **Security**
  - External – RACF, other security products
  - Internal – control activity/viewing by user
- **Multiple Languages Supported**
  - COBOL Source Level
  - PL1 Source Level
  - Assembler Statement Level
  - Supports IDILANGX Source Files, PDS, Sequential
  - All Supported Languages Included
- **Observation Sessions**
  - Adjustable Sampling Rate
  - Observe Single or Mutli-Step Jobs
  - Observe Step, Proc-Step, Program, or Step Number
  - Repeatable Measurements
  - Simple “HotSpot” Navigation of Reports
- **Information Available At:** **www.ibm.com/software/awdtools/deployment**

Application Performance Analyzer Report Summary

CICS
- Session Statistics
- CPU Usage by Txn
- Mean Service Time by Txn
- Total Service Time by Txn
- Service Time by Task Id
- Wait Time by Txn

Storage & Statistics
- Measurement Profile
- Load Module Attributes
- Load Module Summary
- TCB Summary
- Memory Usage Timeline
- Data Space Usage Timeline
- TCB Execution Summary
- Processor Utilization Summary

DB2
- Measurement Profile
- SQL Wait Time by Statement
- SQL Activity Timeline
- SQL Wait Time by Plan
- SQL Activity by DBRM
- SQL CPU/Svc Time by DBRM
- SQL Activity by Statement
- SQL CPU/Svc Time by Stmt
- SQL Activity by Plan
- SQL CPU/Svc Time by Plan
- SQL Statement Attributes
- SQL Threads Analysis
- SQL Wait Time by DBRM
- CPU by Plan/Stored Proc

Wait
- Time by Task/Category
- Time by Task/Module
- Time Referred Attribution

CPU
- Usage by Category
- Usage by Procedure
- Usage by Module
- Referred Attribution
- Usage by Code Slice
- Usage Timeline
- Usage Task/Category
- Usage Task/Module

IMS
- DL/I Call CPU Time
- DL/I Call Service Time

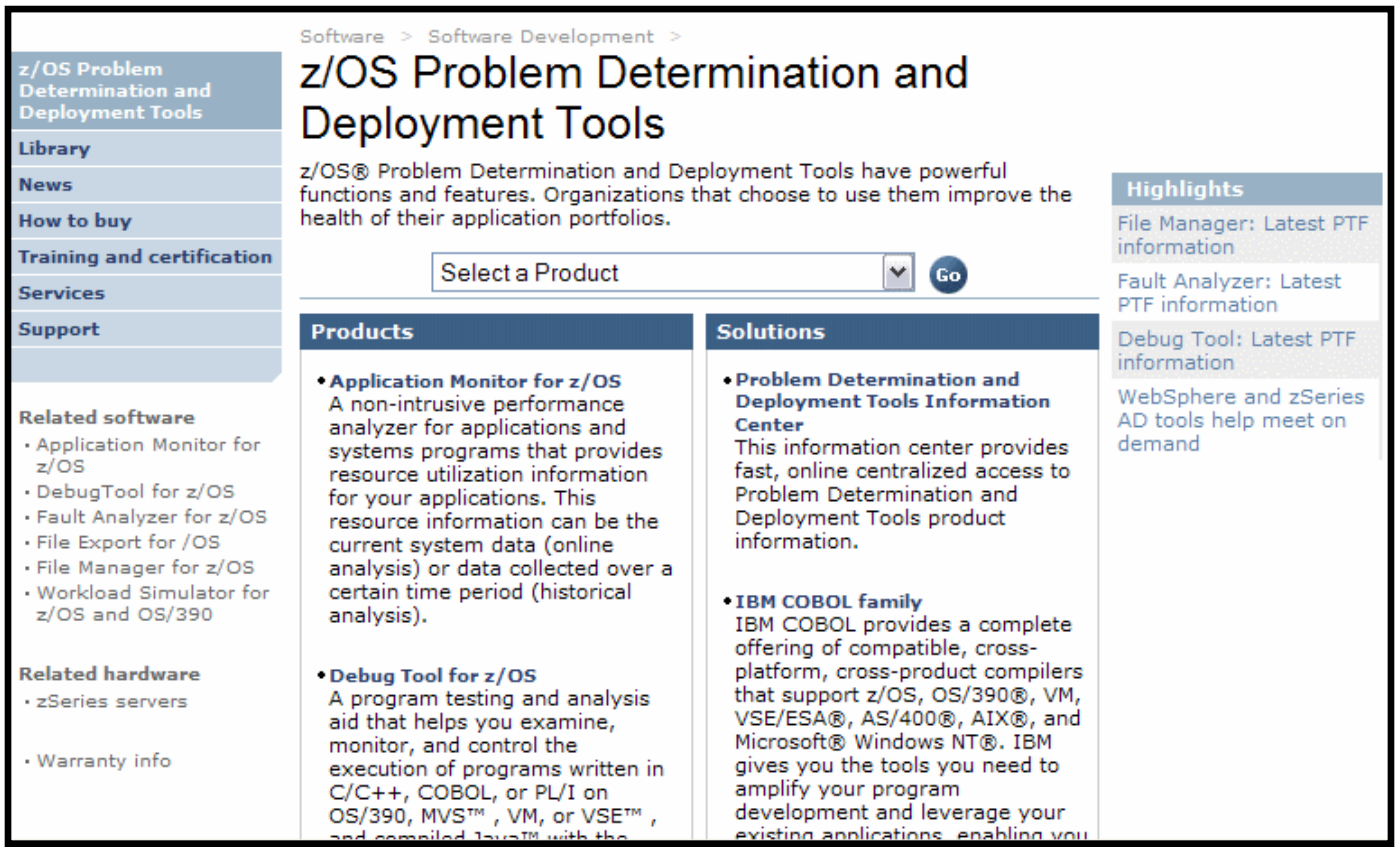
MQSeries
- Activity Summary
- Serv Time by Txn
- CPU Usage by Queue
- Wait Time by Queue
- CPU Usage by Request
- Wait Time by Reque
- CPU Usage by Txn
- Wait Time by Txn
- Serv Time by Queue
- Serv Time by Request

DASD
- Usage by Device
- Activity Timeline
- Usage by DDNAME
- I/O Wait Time
- Usage by Dataset
- VSAM Buffer Pool Usag
- Dataset Attributes Summary
- D06 DASD VSAM Statistics

Coupling Facility
- Summary
- Mean Times
- Facility Total Times

Get more information about these tools at:

www.ibm.com/software/awdtools/deployment



Summary

- IBM's Problem Determination Tools are Prime Time
- Now is the time to look at alternatives to your ISV tools before going to CICS TS V3.1, DB2 V8, IMS V9
- IBM is investing in PD tools and zSeries software

Polling Questions

- **Would you like more information on the PD Tools**

  * 1 – Yes

  * 2 – No

- **Would you like a FREE Cost Benefit Analysis (CBA) / Return On Investment (ROI) calculation ?**

  * 1 – Yes

  * 2 – No

- **What is your time frame for looking at this type of functionality?**

  * 1 – within three months

  * 2 – three to six months

  * 3 – six to twelve months

  * 4 – more than 12 months

Question and Answer

Live on call or email pbaron@us.ibm.com