



zSeries AD TOOLS

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

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	Interest 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 AD TOOLS

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:

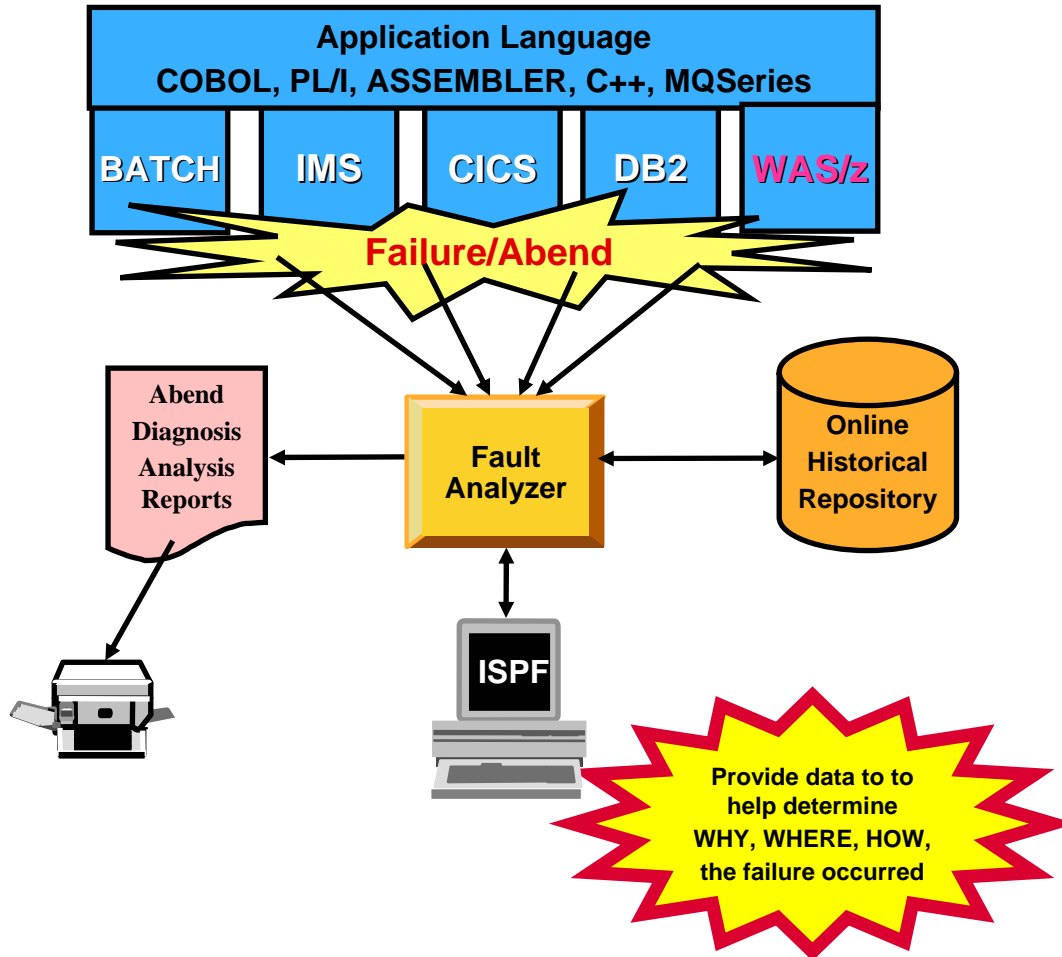
- Understand why an application abended
- Get information you need to diagnose and fix a problem

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 DSD 2 LINE 0 COLUMNS 02 01
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-
11.32.14 JOB06769 $HASP395 DNET074R ENDED                TOTAL CPU TIME=

----- 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

```

File Options View Services Help
-----
IBM Fault Analyzer - Fault Entry List                               Line 1 Col 1 80
Command ==> _____ Scroll ==> CSR

Fault History File or View : 'FAULTANL.V5R1.HIST'

{The following line commands are available: ? (Query), V (View real-time
report), I (Interactive reanalysis), B (Batch reanalysis), D (Delete).}

  Fault_ID Job/Tran User_ID Module Sys/Job Abend Date Tran_ID Tim
  ___ F00054 WEBSRV7 WEBSRV /usr/lpp DEMOMVS SOC4 2005/04/30 n/a 19:
  i F00053 DNET074R DNET074 SAM2 DEMOMVS SOC7 2005/04/30 n/a 11:
  ___ F00047 DNET152 DNET152 STARTAPP DEMOMVS U4038 2005/04/29 n/a 13:
  ___ F00045 DNET311C DNET311 SAM2 DEMOMVS SOC7 2005/04/28 n/a 11:
  ___ F00044 DNET3111 DNET311 SAM1 DEMOMVS SOCB 2005/04/28 n/a 06:
  ___ F00043 GEN001 ETPOT51 REGIONA DEMOMVS SOCB 2005/04/27 n/a 21:
  ___ F00042 GEN001 ETPOT51 REGIONA DEMOMVS SOCB 2005/04/27 n/a 21:
  ___ F00041 GEN001 ETPOT51 REGIONA DEMOMVS SOCB 2005/04/27 n/a 21:
  ___ F00040 WEBSRV7 /usr/lpp DEMOMVS SOC4 2005/04/27 n/a 19:
  ___ F00039 DNET152 DNET152 STARTAPP DEMOMVS U4038 2005/04/27 n/a 09:
  ___ F00038 GEN001 ETPOT59 REGIONA DEMOMVS SOCB 2005/04/27 n/a 04:
  ___ F00037 GEN51 ETPOT51 REGIONA DEMOMVS SOCB 2005/04/27 n/a 04:
  ___ F00036 GEN001 ETPOT62 REGIONA DEMOMVS SOCB 2005/04/27 n/a 04:
  
```

I for interactive reanalysis.
Or **V** to view the real-time report.

Enter

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.

The app abended in **THIS** program...

...on **THIS** statement.

Use Point-and-Shoot navigation in Interactive Reanalysis. Just TAB to any yellow-highlighted field and Enter.

Enter

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

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
000158
COMPUTE CUST-ACCT-BALANCE =
      CUST-ACCT-BALANCE + WS-UPDATE-NUM

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

Source
    
```

The diagram consists of three blue rounded rectangular callout boxes with arrows pointing to specific text elements:

- A box labeled "reason" points to the text "A decimal digit or sign was invalid."
- A box labeled "abending program" points to the text "The cause of the failure was program SAM2 in module SAM2."
- A box labeled "abending statement" points to the COBOL code line "COMPUTE CUST-ACCT-BALANCE = CUST-ACCT-BALANCE + WS-UPDATE-NUM".



Fault Analyzer Interactive Reanalysis - Synopsis

```

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

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

File View Services Help

SAM1 was the main program.
SAM2 was a subroutine.

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 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
000158
                                COMPUTE CUST-ACCT-BALANCE =
                                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.



Fault Analyzer Interactive Reanalysis – program detail

```

File View Services Help
-----
Event 3 of 3: Abend SOC7 *** 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.

PF3

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      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  SOC7   ***** 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 (DSN 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 S

```


 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.



Fault Analyzer Interactive Reanalysis – file detail

```

File View Services Help
-----
File Information                                     Line 2 Col 1 80
Command ==> _____ Scroll ==> CSR
JOBNAME: DNET074R  SYSTEM ABEND: 0C7              DEMOMVS   2005/04/30  11:32:11
File Name . . . . . : CUSTFILE
Data Set Name . . . . . : DNET074.ADLAB.CUSTOMER.FILE
File Attributes . . . . . : ORGANIZATION=INDEXED VSAM, ACCESS MODE=DYNAMIC,
                             RECFM=VARIABLE
Last I/O Function . . . . . : READ
Open Status . . . . . : I-0
File Status Code . . . . . : 0
Return Code . . . . . : X'0'
Function Code . . . . . : X'0'
Feedback Code . . . . . : X'0'

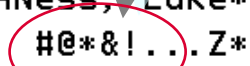
Record Key. . . . . : Key position 0, length 6
Address  Offset      Hex                               EBCDIC
00009978          F1F1F1F1 F2C1          *11112A          *

Current Record. . . . . : Record data length 334
Address  Offset      Hex                               EBCDIC
00009978          F1F1F1F1 F2C1D585 A2A26B40 D3A49285 *11112ANess, Luke*
00009988          +10    40404040 4040407B 7C5C505A 000003E9 *      #@*&!...Z*
    
```



The record key

The bad data



Fault Analyzer Interactive Reanalysis – link to File Manager

```

File  View  Services  Help
----- Data Set Actions -----
Data Set . . . . : DNET074.ADLAB.CUSTOMER.FILE

Select one of the following options and press Enter:
1. Edit
2. Browse

File Status Code. . . . . : 0
Return Code . . . . . : X'0'
Function Code . . . . . : X'0'
Feedback Code . . . . . : X'0'

Record Key. . . . . : Key position 0, length 6
Address  Offset      Hex                                EBCDIC
00009978              F1F1F1F1 F2C1                                *11112A      *

Current Record. . . . . : Record data length 334
Address  Offset      Hex                                EBCDIC
00009978              F1F1F1F1 F2C1D585 A2A26B40 D3A49285 *11112AN
00009988      +10    40404040 4040407B 7C5C505A 000003E9 *
    
```

Fault Analyzer interfaces with File Manager to Edit or Browse the file.



Fault Analyzer Interactive Reanalysis – link to File Manager

```

Process  Options  Help
-----
File Manager Edit DNET074.ADLAB.CUSTOMER.FILE
Command ==> █
Type KSDS      Refresh on save N
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
000015 11112  A          Ness, Luke            244.42          1 1551 S. Was
- - - - - CONTACT-REC - - - - - 2 Line(s) suppressed
000020 11112  A          Ness, Luke            86.88           0 221 Yale Rd
- - - - - CONTACT-REC - - - - - 1 Line(s) suppressed
    
```

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

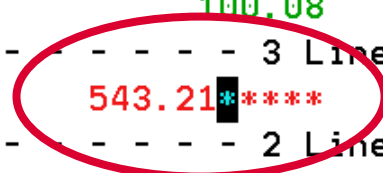


Fault Analyzer Interactive Reanalysis – link to File Manager

```

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 Grai, Pottg 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

File View Services Help

System-Wide Information

Line 1 Col 1 80

Command ==>

Scroll ==> CSR

TRANID: CD08

CICS ABEND: ASRA

MVS2

2003/10/28

18:24:21

Open Files

CICS Information

DB2 Information

IMS Information

Storage Areas

Messages

Language Environment Heap Analysis

*** Bottom of data.

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 considered 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 specified instead of one.
- File Manager / IMS provides a customization option to limit access 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.

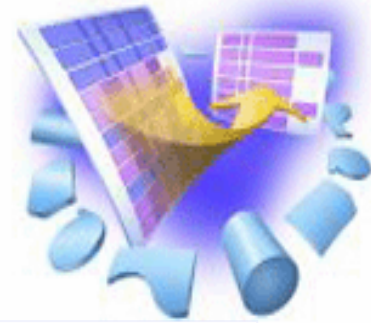
IMS feature enhancements

- 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 segment.
- 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:

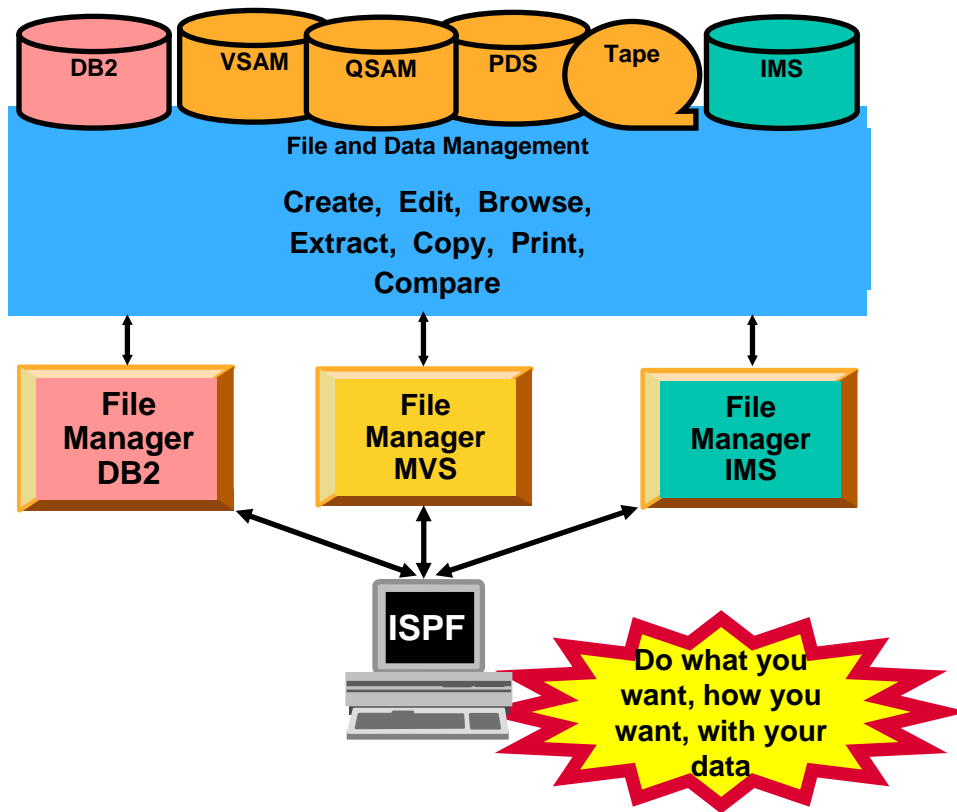
- Advanced data **Edit** and **Browse**
 - Uses familiar ISPF edit commands
 - Powerful data formatting and selection capabilities
- A robust set of **utilities to create, copy, find, compare, and modify data**
- Work with data in friendly formats
 - Use a copybook or user-defined “template” to format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

No limit to file size!



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


```

Session A - [24 x 80]
  Process  Options  Help
-----
File Manager                Primary Option Menu

0  Settings      Set processing options      User ID . : DNET603
1  Browse        Browse data                  System ID : DEMOMVS
2  Edit          Edit data                    Appl ID . : FMN
3  Utilities     Perform utility functions   Version . : 6.1.0
4  Tapes        Tape specific functions     Terminal. : 3278
5  Disk/VSAM    Disk track and VSAM CI functions
6  OAM          Work with OAM objects       Screen. . : 1
7  Templates    Create, edit, or update templates
8  HFS          Access Hierarchical File System
X  Exit         Terminate File Manager      Date. . . : 2005/11/29
                                           Time. . . : 14:34

Command ==> 2

```



Command ==> 2

24/016

Connected to remote server/host demomvs.demopkg.ibm.com using lu/pool TCP00069 and port 23

HP DeskJet 820Cse on LPT1:

Edit – with a copybook

```

Process   Options   Help
-----
File Manager Edit DNET074.GE02004.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 ANGUILLA         A          AGO        .AO              10978552 12:30S
000007 ANTIGUA AND BARBUDA A          AIA        .AI              13008 18:15N
000008 ARGENTINA         A          ATA        .AQ              0 90:00S
000009 ANTIGUA AND BARBUDA A          ATG        .AG              68320 17:03N
000010 ARGENTINA         A          AIA        .AI              38144753 34:00S
000011 ARMENIA          A          AIA        .AI              2991360 41:00N
000012 ARUBA            A          AIA        .AI              11111 17:30N
000013 ASHMORE AND CANTON A          AIA        .AI              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

File Manager Edit DNETC

Enter

Command ==> F PAL #2

Chars PAL found

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-----+----->	<---->
000170 NEPAL	A	NPL	.NP	27070666	28:00N
000171 NETHERLANDS	A	NLD	.NL	16318199	52:30N
000172 NETHERLANDS AN	A	ANT	.AN	218126	12:15N
000173 NEW CALEDONIA	A	NCL	.NC	213679	21:30S
000174 NEW ZEALAND	A	NZL	.NZ	3993817	41:00S
000175 NICARAGUA	A	NIC	.NI	5359759	13:00N
000176 NIGER	A	NER	.NE	11360538	16:00N
000177 NIGERIA	A	NGA	.NG	137253133	10:00N
000178 NIUE	A	NIU	.NU	2156	19:02S
000179 NORFOLK ISLAND	A	NFK	.NF	1841	29:02S
000180 NORTHERN MARIA	A	MNP	.MP	78252	15:12N
000181 NORWAY	A	NOR	.NO	4574560	62:00N
000182 OMAN	A	OMN	.OM	2903165	21:00N
000183 PAKISTAN	A	PAK	.PK	159196336	30:00N
000184 PALAU	A	PLW	.PW	20016	07:30N

Edit – Single Record Format

File Manager Edit DNE
 Command ==> FS **Enter** 00001 COUNTRY

Current type is 00001 in
 Top Line is 3 of 137 in Record 170
 Scroll CSR
 Format SNGL

Ref	Field	Picture	Typ	Start	Len	Data
2	2	GEO-KEY X(14)	AN	1	14	NEPAL
3	2	REC-TYPE X	AN	15	1	A
4	2	CTRY-CODE X(3)	AN	16	3	NPL
5	2	INTERNET X(4)	AN	19	4	.NP
6	2	POPULATION 9(11)	BI	23	8	27070666
7	2	LATITUDE X(6)	AN	31	6	28:00N
8	2	LONGITUDE X(7)	AN	37	7	084:00E
9	2	REGION				

F1=Help F2=Zoom F3=Exit F4=CRetriev F5=RFind F6=RChange
 F7=Up F8=Down F9=Swap F10=Previous F11=Next F12=Cancel

Edit – Find Fields in Error Command

File Manager Edit DNET074.
 Command ==> fe (#11 #12)



1 errors found
 Scroll CSR
 Format TABL

	LATITUDE #7	LONGITUDE #8	REGION #9	TOTAL-AREA-SQ-KM #11	LAND-AREA-SQ-KM #12
	AN 31:6	AN 37:7	AN 44:16	PD 60:6	PD 66:6
	<---->	<---->	<----+-----1----->	<----+-----1-->	<----+-----1-->
000212	04:35S	055:40E	AFRICA	*XXXXXXXXXX	455
000213	08:30N	011:30W	AFRICA	71740	71620
000214	01:22N	103:48E	SOUTHEAST ASIA	693	683
000215	48:40N	019:30E	EUROPE	48845	48800
000216	46:07N	014:49E	EUROPE	20273	20151
000217	08:00S	159:00E	OCEANIA	28450	27540
000218	10:00N	049:00E	AFRICA	637657	627337
000219	29:00S	024:00E	AFRICA	1219912	1219912
				3903	3903
000221	40:00N	004:00W	EUROPE	504782	499542
000222	08:38N	111:55E	SOUTHEAST ASIA	5	5
000223	07:00N	081:00E	ASIA	65610	64740
000224	15:00N	030:00E	AFRICA	2505810	2376000

Scan for invalid data in numeric fields

F1=Help F2=Zoom F3=Exit F4=CRetriev F5=RFind F6=RChange
 F7=Up F8=Down F9=Swap F10=Left F11=Right F12=Cancel

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

```
Session A - [24 x 80]
Process  Options  Utilities  Help
-----
FM/DB2 (DSNA)                Primary Option Menu

0  Settings      Set processing options      User ID . : DNET603
1  Browse       Browse DB2 table or view    System ID : DEMOMVS
2  Edit        Edit DB2 table              Appl ID . : FMN2
3  Utilities    Perform utility functions   Version . : 6.1.0
4  SQL         Prototype, execute and analyze SQL Terminal : 3278
5  DB2I       Start DB2 Interactive       Screen . : 1
X  Exit        Terminate FM/DB2           Date . . : 2005/11/29
                                   Time . . : 14:41

                                   DB2 SSID . DV80
                                   SQL ID . . DNET603

Command ==> 2
```

MA a A 24/016

Connected to remote server/host demopkg.ibm.com using lu/pool TCP00069 and port 23 HP DeskJet 820Cse on LPT1:

File Manager for DB2 Edit/Browse

```

Session A - [24 x 80]
Process  Options  Utilities  Help
-----
FM/DB2 (DSNA)                DB2 Edit

Specify the DB2 Object:
Location . . . . . _____ Database . . _____ (optional)
Owner . . . . . _____ FMNDB2 _____ Table space _____ (optional)
Name . . . . . _____ EMP _____

Row count . . . . . ALL _____ Number of rows to edit

Template:
Data set name . . . _____
Member . . . . . _____

Processing Options:
Template usage          Enter "/", "A"lways to select option
1. Above                _ Edit options
2. Previous              _ Edit template
3. Generate from table  _ Re-edit template
4. Generate/Replace

Command ==> █
    
```

File Manager for DB2 Edit/Browse

Process Options Utilities Help

```

FM/DB2 (DF52)                               Table Edit                               5 string(s) changed
Command ==>                                Scroll CSR
TABLE ALLANT.EMP                            Format TABL
      EMPNO  LASTNAME      FIRSTNME      JOB          HIREDATE      WORKDEPT PHONEN
      #1     #4            #2            #8           #7            #5        #6
      CH(6)  VARCHAR(15)   VARCHAR(12)  CH(8)        DATE          CH(3)     CH(4)
      <----> <----+----1----> <----+----1-> <----+----> <----+----> <->      <-->
000000 **** Top of data ****
000001 000010 HAASK<      CHRISTINE<    PRES         01.01.1965  C11        3978
000002 000060 STERN<      IRVING<      MANAGER      14.09.1973  A00        6423
000003 000110 LUCCHESI<   VINCENZO<    SALESREP     16.05.1958  A00        3490
000004 000120 O'CONNELL<  SEANK<       CLERK        05.12.1963  A00        2167
000005 000130 QUINTANA<   DOLORES<     ANALYST      28.07.1971  C11        4578
000006 000140 NICHOLLS<   HEATHER<     ANALYST      15.12.1976  C11        1793
000007 000160 PIANKA<     ELIZABETH<   DESIGNER     11.10.1977  C11        3782
000008 000170 YOSHIMURA< MASATOSHI<   DESIGNER     15.09.1978  A00        2890
000009 000200 BROWN<      DAVID<       DESIGNER     03.03.1966  A00        4501
000010 000210 JONES<      WILLIAM<     DESIGNER     11.04.1979  C11        0942
000011 000220 LUTZ<       JENNIFER<    DESIGNER     29.08.1968  A00        0672
000012 200010 HEMMINGER<  DIANK<       SALESREP     01.01.1965  A00        3978
000013 200120 ORLANDO<    GREG<        CLERK        05.05.1972  A00        2167
000014 **** End of data ****

```

File Manager for DB2 Utilities

Process Options Utilities Help

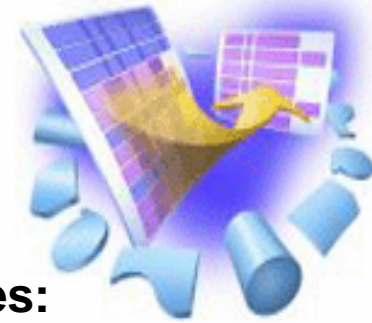
FM/DB2 (DF52)

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 way to interact 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 arbitrary 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 evaluation 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

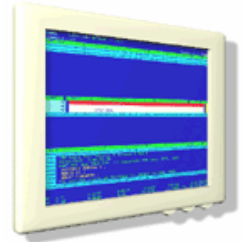
USABILITY

- 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

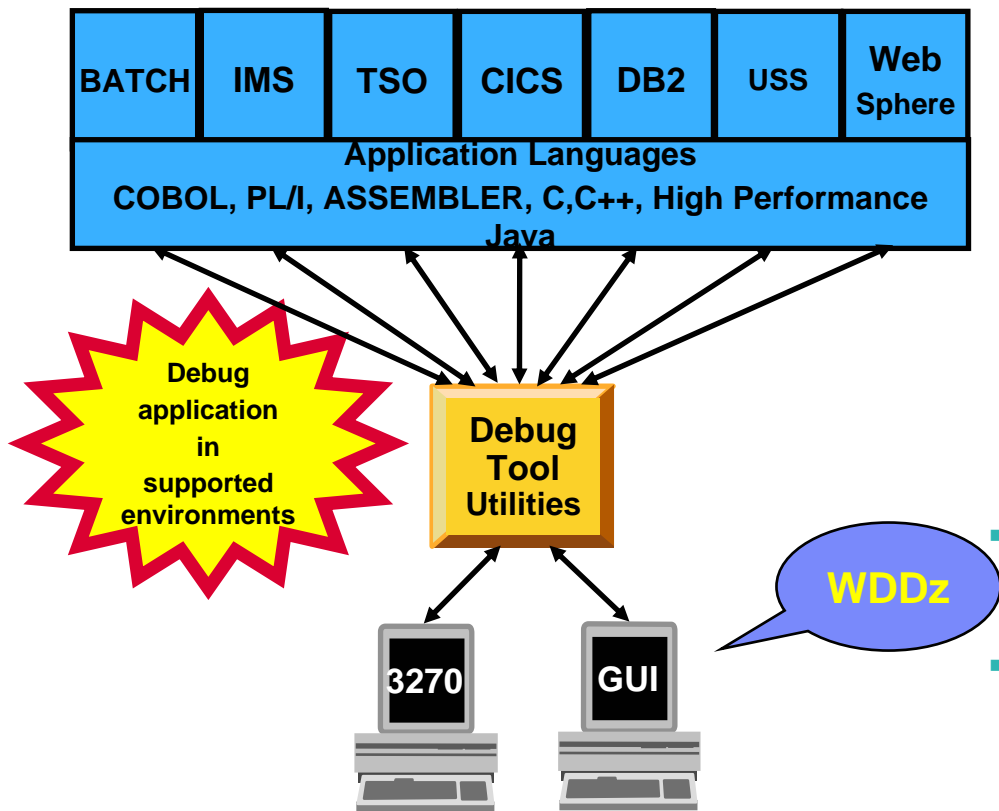


Key Features:

- 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)

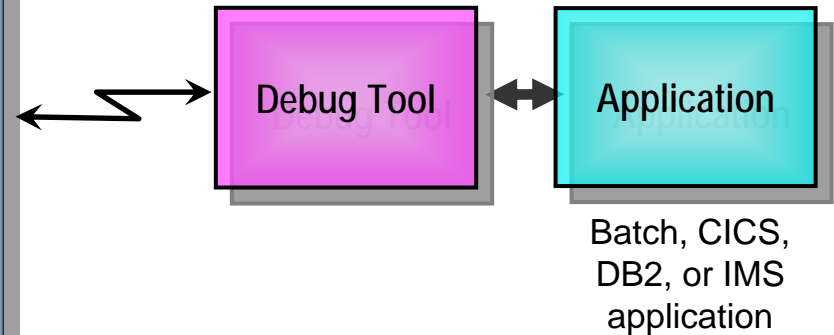
How do I interface with Debug Tool Utilities and Advanced Functions ?

```

Session A - STLMVS1.WS - [24 x 80]
COBOL LOCATION: CBLATP2 :> 543.1
Command ==> Scroll ==> PAGE
MONITOR -----1-----2-----3-----4-----5-----6 LINE: 1 OF 4
***** TOP OF MONITOR *****
0001 1 OUTPUT-FLAG 'D'
0002 2 H1-CURR-DATE '01/05/03'
0003 3 GM-MSG-ID '01I'
0004 4 ACTION
***** BOTTOM OF MONITOR *****

SOURCE: CBLATP2 --1-----2-----3-----4-----5--- LINE: 541 OF 939
541
542 DISPLAY 'ENTER Action:'.
543 ACCEPT SCREEN-INPUT.
544 MOVE FUNCTION UPPER-CASE (SCREEN-INPUT) TO ACTION.
545
546 ** End program when EXIT is entered and

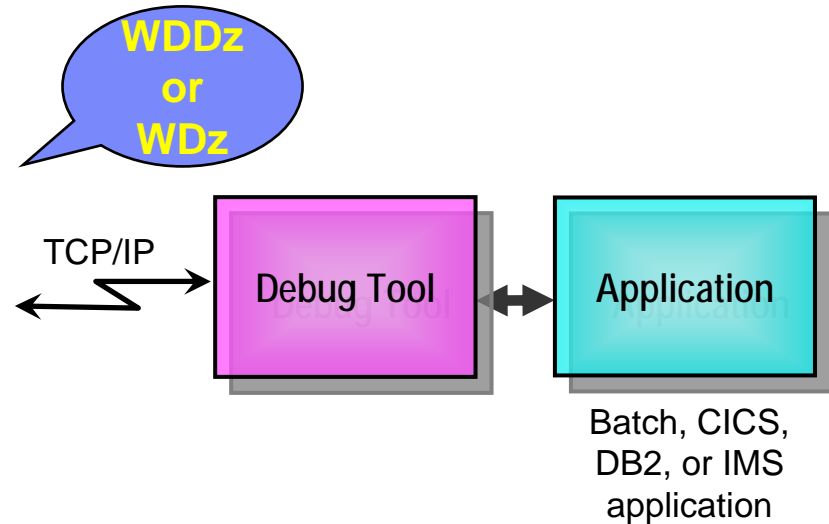
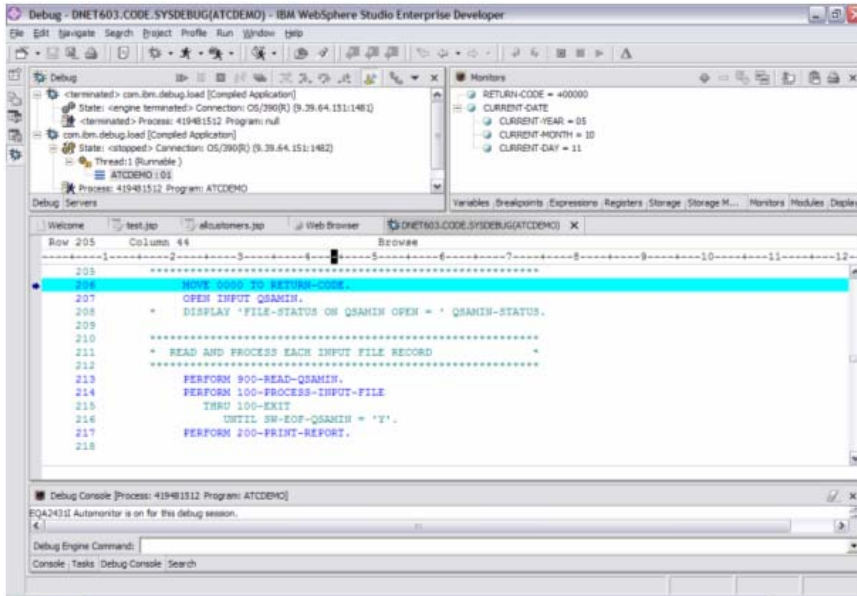
LOG 0-----1-----2-----3-----4-----5----- LINE: 36 OF 39
0036 GO ;
0037 You were prompted because the IGZ00H condition was raised in your program
0038 IGZ00H is a severity or class 3 condition.
0039 The current location is CBLATP2 :> CBLATP2 :> 543.1.
PF 1:MON 2:STEP 3:QUIT 4:LIST 5:FIND 6:AT/CLEAR
PF 7:UP 8:DOWN 9:GO 10:ZOOM 11:ZOOM LOG 12:RETRIEVE
MA a A 03/002
  
```



■ 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
***** ***** 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 *-----
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

```

COBOL      LOCATION: SAM1 initialization
Command ==> step
                                                    Scroll ==> CSR
MONITOR  --+---1---+---2---+---3---+---4---+---5---+---6 LINE: 0 OF 0
***** TOP OF MONITOR *****
***** BOTTOM OF MONITOR *****

SOURCE:  SAM1 +---1---+---2---+---3---+---4---+---5---+ LINE: 1 OF 489
1 *****
2 * LICENSED MATERIALS - PROPERTY OF IBM
3 * ALL RIGHTS RESERVED
4 *****
5 * PROGRAM:  SAM1
6 *

LOG 0---+---1---+---2---+---3---+---4---+---5---+ LINE: 30 OF 32
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
***** BOTTOM OF LOG *****
PF  1:?          2:STEP          3:QUIT          4:LIST          5:FIND          CLEAR
PF  7:UP         8:DOWN          9:GO           10:ZOOM         11:ZOOM        RIEVE
    
```

STEP through the program statement by statement



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 MONITOR *****

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.



Debug Tool Utilities and Advanced Functions

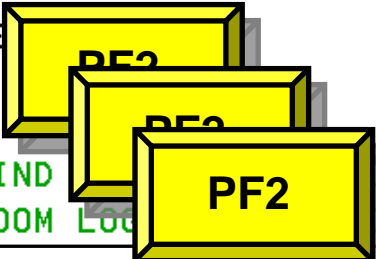
```

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 LOG

```

The Red Line is the current statement.

STEP a few times...



Debug Tool Utilities and Advanced Functions

```

COBOL    LOCATION: SAM1 :> 267.1
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 statement to display.
***** BOTTOM OF MONITOR *****

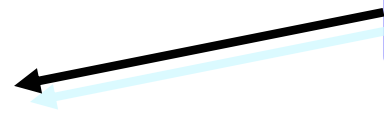
SOURCE: SAM1 +----1----+----2----+----3----+----4----+----5--- LINE: 266 OF 489
266
267  PERFORM 700-OPEN-FILES .
268  PERFORM 800-INIT-REPORT .
269
270  PERFORM 100-PROCESS-TRANSACTIONS
271  UNTIL WS-TRAN-EOF = 'Y' .

LOG 0----+----1----+----2----+----3----+----4----+----5---- LINE: 36 OF 39
0036  STEP ;
0037  STEP ;
0038  STEP ;
0039  AT 270 ;

PF  1: ?      2: STEP      3: QUIT      4: LIST      5: FIND      6: AT/CLEAR
PF  7: UP      8: DOWN      9: GO       10: ZOOM     11: ZOOM LOG  12: RETRIEVE
    
```

A breakpoint is set at statement 270.

Commands are automatically logged



Debug Tool Utilities and Advanced Functions

```

COBOL  LoLOCATION: SAM1.1
Command==> go
MONITOR ~+---1---+---2---+---3---+---4---+---5---+---6 LINE: 1 OF 2
***** TOP OF MONITOR *****
0001 1 ***** AUTOMONITOR *****
0002 02 SAM1:>WS-TRAN-EOF
***** BOTTOM OF MONITOR *****

```

Enter

Scroll ==> CSR

GO (or PF9) will run to the breakpoint

```

SOURCE: SAM1 +---1---+---2---+---3---+---4---+---5--- LINE: 266 OF 489
266
267          PERFORM 700-OPEN-FILES .
268          PERFORM 800-INIT-REPORT .
269
270          PERFORM 100-PROCESS-TRANSACTIONS
271          UNTIL WS-TRAN-EOF = 'Y' .

```

```

LOG 0---+---1---+---2---+---3---+---4---+---5---+--- LINE: 37 OF 40
0037 STEP ;
0038 STEP ;
0039 AT 270 ;
0040 GO ;

```

PF 1:?	2:STEP	3:QUIT	4:LIST	5:FIND	6:AT/CLEAR
PF 7:UP	8:DOWN	9:GO	10:ZOOM	11:ZOOM LOG	12:RETRIEVE

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

```

COBOL   LOCATION: SAM1 :> 270.1
Command ==> mon list                               Scroll ==> CSR
MONITOR ---+---1---+---2---+---3---+---4---+---5---+---6 LINE: 1 OF 2
***** TOP OF MONITOR *****
0001 1 ***** AUTOMONITOR *****
0002 02 SAM1:>WS-TRAN-EOF
***** BOTTOM OF MONITOR *****

SOURCE: SAM1 +---1---+---2---+---3---+---4---+---5---+---6 LINE: 39 OF 42
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.

LOG 0---+---1---+---2---+---3---+---4---+---5---+---6 LINE: 39 OF 42
0039 AT 270 ;
0040 GO ;
0041 LIST ( CUST-ACCT-BALANCE ) ;
0042 CUST-ACCT-BALANCE = X'0000000000'

PF 1:?          2:STEP          3:QUIT          4:LIST          5:FIND          CLEAR
PF 7:UP         8:DOWN          9:GO           10:ZOOM         11:ZOOM        BRIEF
    
```

The MONITOR LIST command adds a variable to the Monitor Window.



Debug Tool Utilities and Advanced Functions

```

COBOL    LOCATION: SAM1 :> 270.1
Command ==>
MONITOR  --+----1----+----2----+----3----
***** TOP OF MONITOR *****
0001  1  CUST-ACCT-BALANCE      X'0000000000
0002  2  ***** AUTOMONITOR *****
0003  02 SAM1:>WS-TRAN-EOF
***** BOTTOM OF MONITOR *****

SOURCE:  SAM1 +----1----+----2----+----3----+----4----+----5---- 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.

LOG 0---+----1----+----2----+----3----+----4----+----5---- LINE: 41 OF 44
0041  LIST ( CUST-ACCT-BALANCE ) ;
0042  CUST-ACCT-BALANCE = X'0000000000'
0043  MONITOR
0044  LIST ( CUST-ACCT-BALANCE ) ;
PF  1:?      2:STEP      3:QUIT      4:LIST      5:FIND      CLEAR
PF  7:UP     8:DOWN     9:GO      10:ZOOM     11:ZOOM     RELIEVE
    
```

A variable you add to the Monitor window stays there for your reference

The AUTOMONITOR displays all variables referenced by the current statement

You can ZOOM (or PF10) any window to make it full-screen



Debug Tool Utilities and Advanced Functions

COBOL LOCATION: SAM1 :> 270.1

Command ==>

ZOOMed in on the Source Window.

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 CLEAR

PF 7:UP 8:DOWN 9:GO 10:ZOOM 11:ZOOM PRIEVE

PF10

Debug Tool Utilities and Advantages

GO runs the program.
This application abended in a subroutine. And DT intercepted the abend.

```

COBOL  Loc:LOCATION:2 SAM 157.1
Command ==> go
***** TOP OF MONITOR *****
0001  1 CUST-ACCT-BALANCE  X'7B7C5C505A'
0002  2 ***** AUTOMONITOR *****
0003  02 SAM2:>CUST-ACCT-BALANCE  X'7B7C5C505A'
0004  02 SAM2:>WS-UPDATE-NUM  +000000001.23
***** BOTTOM OF MONITOR *****

```

go

Enter

This bad data caused the abend

```

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

```

This statement abended

```

LOG 0 +---1---+---2---+---3---+---4---+---5--- LINE: 51 OF 54
0051 The operating system has generated the following message:
0052 CEE3207S The system detected a data exception (System Completion
0053 Code=0C7).
0054 The current location is SAM2 ::> SAM2 :> 157.1.
PF 1:?      2:STEP      3:QUIT      4:LIST      5:FIND      6:AT/CLEAR
PF 7:UP     8:DOWN      9:GO       10:ZOOM     11:ZOOM LOG  12:RETRIEVE

```


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 screenshot displays the IBM Rational Software Development Platform (RSRP) Debug console. The main window shows the source code for the program 'DNET045.POT.LISTING(REGIOA)'. A breakpoint is set at line 42, which is highlighted in blue. The 'Variables' window on the right shows the value of 'BRANCHFLAG' as 02. The console at the bottom shows the message: 'Program was stopped due to line/statement breakpoint at statement 42.' A red arrow points from the 'Variables' window to the source code window, and another red arrow points from the source code window to the console.

Variables can be monitored and their values changed. Breakpoints can also be set.

- 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

The screenshot displays the IBM WebSphere Studio Enterprise Developer interface for debugging. The main window is titled "Debug - DNET074.ADWORX.SYSDEBUG(SAM2) - IBM WebSphere Studio Enterprise Developer". The interface is divided into several panes:

- Debug Console:** Shows the state of the application: "com.ibm.debug.load [Compiled Application]". The state is "<stopped>" with a connection to "OS/390(R) (9.39.64.151:2461)". It lists a thread "Thread:1 (Runnable)" with sub-threads "SAM2:02" and "SAM1:01". The process ID is "419469224" and the program is "SAM1".
- Monitors:** Displays three monitored variables:
 - RPT-QUANTITY = Deferred
 - CUST-ACCT-BALANCE = +0000123.00
 - TRAN-COUNT = 00000
- Code Editor:** Shows COBOL code with line numbers 150 to 161. Line 157 is highlighted in blue. The code includes logic for updating transaction counts and account balances based on the 'TRAN-ACTION'.
- Debug Console (Bottom):** Shows the process "Debug Console [Process: 419469224 Program: SAM1]" and a "Debug.Engine.Command:" field.

A blue callout box with a white border and rounded corners is overlaid on the interface, containing the text: "This example shows the GUI interface to DEBUG TOOL that is available in Websphere Studio (WD/z)."

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:

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

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

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

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

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

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)

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 have JCL errors 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:

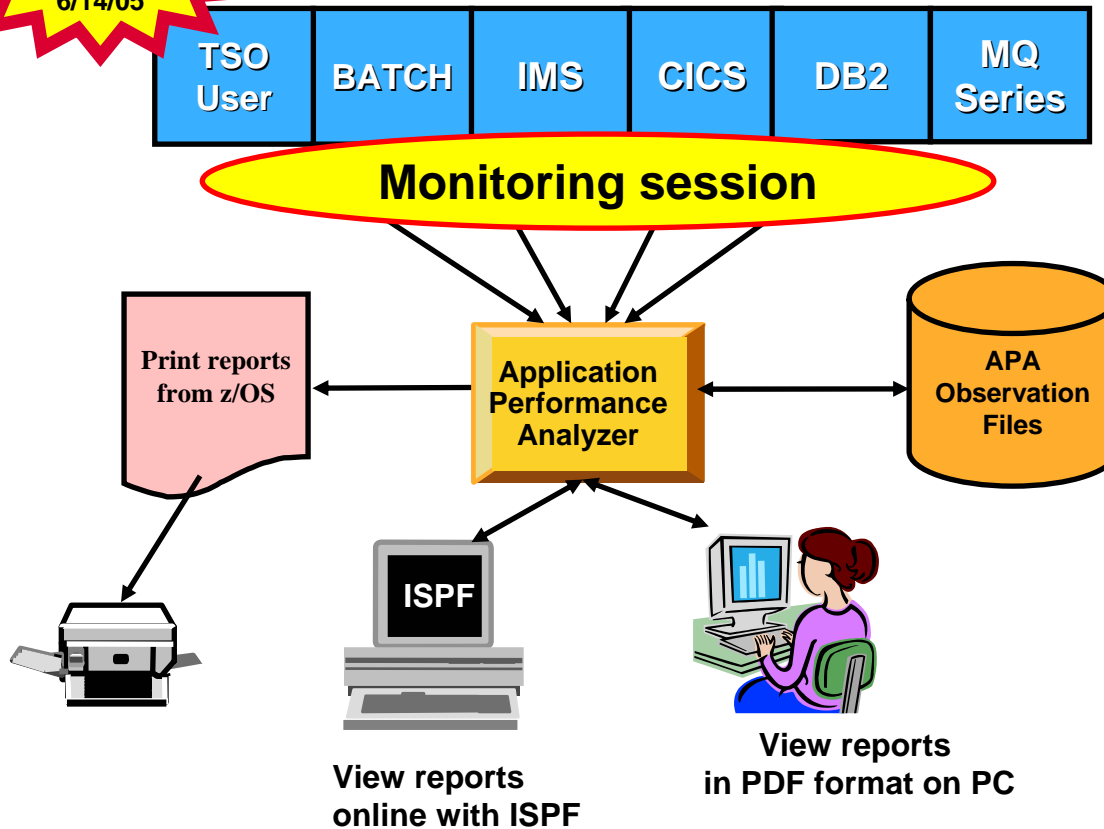
- Intuitive online ISPF interface
- Monitor application programs at the source level
- Support for batch, CICS, DB2, IMS, MQ
- Supports current releases DB2 V8, IMS V9 and CICS TS V3.1



Application Performance Analyzer Functional Overview

Application performance analysis tooling for application developers

New product announced 6/14/05



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

Order: Application Performance Analyzer PID 5697-N37

Measurement Profile - Suggested Start for Navigation

File View Navigate Help

RO1: IBM APA for z/OS Performance Reports (0018) Row 00001 of 00007
 Command ==> _____ Scroll ==> CSR

Select a category from
the list to the right
to view the available
reports in the selection
list below.

_ A Admin/Miscellaneous	_ I IMS Measurement
_ S Statistics/Storage	_ E CICS Measurement
_ C CPU Usage Analysis	_ F DB2 Measurement
_ D DASD I/O Analysis	_ Q MQ Measurement
_ W CPU WAIT Analysis	_ G Coupling Facility

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

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



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C01: CPU Usage by Category



File View Navigate Help

C01: CPU Usage by Category (0018)

Row 00001 of 00002

Command ==>

Scroll ==> CSR

Name	Description	Percent of CPU Time * 10.00%	±1.8%
<u>SYSTEM</u>	System/OS Services	91.06	
<u>APPLCN</u>	Application Code	8.93	

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C01: CPU Usage by Category - Expanded

File View Navigate Help

C01: CPU Usage by Category (0018)

Row 00001 of 00005

Command ==>

Scroll ==> CSR





Name	Description	Percent of CPU Time * 10.00%	±1.8%
		*.....1.....2.....3.....4.....5.....6.....7.....8	
SYSTEM	System/OS Services	91.06	
APPLCN	Application Code	8.93	
+ VSAMWRTE	Application Program	8.93	
+ VSAMWRTE	CSECT in VSAMWRTE	8.76	
+ CEELOCT	LE Runtime Module	0.17	

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09/002

Enter P to view program source

File View Navigate Help			
C01: CPU Usage by Category (0018)			Row 00001 of 00005
Command ==>			Scroll ==> CSR
Name	Description	Percent of CPU Time * 10.00%	±1.8%
		*.....1.....2.....3.....4.....5.....6.....7.....8	
SYSTEM	System/OS Services	91.06	
APPLCN	Application Code	8.93	
+ VSAMWRTE	Application Program	8.93	
+ P VSAMWRTE	CSECT in VSAMWRTE	8.76	
+ CEELOCT	LE Runtime Module	0.17	

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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

```

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PF8

P01: Source Program Attribution

File View Navigate Help

P01: Source Program Attribution (0018)

Row 00018 of 00047

Command ==>

Scroll ==> CSR


















LineNo	Offset	Count	Source Statement
000049	0006D6	17	PERFORM CAL-PARA UNTIL TIME-INTERVAL > TIME-DURA
000050	000710		STOP RUN.
000051			
000052			CAL-PARA.
000053	000730	21	PERFORM STOP-PARA.
000054			
000055			START-PARA.
000056	00074E		ACCEPT TIME-START FROM TIME.
000057			
000058			STOP-PARA.
000059	00078E	47	ACCEPT TIME-STOP FROM TIME.
		2546	<- CPU time attributed to above statement
000060	0007C8	129	COMPUTE TIME-INTERVAL = TIME-START - TIME-STOP.
000061			
000062			INITIALIZE-PARA.
000063			
000064			
000065			TO TABLE-VALUES(1).
000066			TO TABLE-VALUES(2).

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

Referred Attribution

PF3

C03: CPU Usage by Code Slice

File View Navigate Help			
C03: CPU Usage by Code Slice (0018)			Row 00001 of 00052
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	CEEYGMT0+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	CEEYGMT0+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 

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

CICS Measurement

File View Navigate Help

R01: IBM APA for z/OS Performance Reports (0104)

Row 00001 of 00007

Command ==>

Scroll ==> CSR

Select a category from the list to the right to view the available reports in the selection list below.

_ A Admin/Miscellaneous	_ I IMS Measurement
_ S Statistics/Storage	_ E CICS Measurement
_ C CPU Usage Analysis	_ F DB2 Measurement
_ D DASD I/O Analysis	_ Q MQ Measurement
_ W CPU WAIT Analysis	_ G Coupling Facility

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

```

S E01 CICS Session Statistics
█ E03 CICS CPU Usage by Txn
_ E04 CICS Mean Service Time by Txn
_ E05 CICS Total Service Time by Txn
_ E06 CICS Service Time by Task Id
_ E07 CICS Wait by Txn
  
```

CICS CPU Usage by Transaction

File View Navigate Help			
E03: CICS CPU Usage by Transaction (0104)		Row 00001 of 00020	
Command ==> _____		Scroll ==> CSR	
Name	NTxns/Description	Percent of CPU Time * 10.00%	±7.4%
		*.....1.....2.....3.....4.....5.....6.....7	
<u>SSP1</u>	28	38.04	
→ <u>DFHD2EX1</u>	CICS Program	10.86	
→ <u>SSTESTP1</u>	CICS Program	8.15	
→ <u>LGIPOL01</u>	EXEC SQL	7.60	
→ + <u>2102</u>	SELECT	7.60	
→ <u>CICS</u>	System Services	4.34	
→ <u>SSTESTP1</u>	EXEC CICS	3.26	
→ + <u>0892</u>	RECEIVE MAP(SSMAPP1)	1.63	
→ + <u>0EE4</u>	SEND MAP(SSMAPP1)	1.08	
→ + <u>0908</u>	LINK PROGRAM(LGIPOL01)	0.54	
→ <u>LGIPOL01</u>	EXEC CICS	1.08	
→ <u>LGIPOL01</u>	CICS Program	1.08	
→ <u>EQADCXXT</u>	EXEC CICS	1.08	
→ <u>EQADCCXR</u>	EXEC CICS	0.54	
<u>SSC1</u>	22	37.50	



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 the list to the right to view the available reports in the selection list below.

_ A Admin/Miscellaneous	_ I IMS Measurement
_ S Statistics/Storage	_ E CICS Measurement
_ C CPU Usage Analysis	_ F DB2 Measurement
_ D DASD I/O Analysis	_ Q MQ Measurement
_ W CPU WAIT Analysis	_ G Coupling Facility

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

<u>S</u> 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

/004

F01: DB2 Measurement Profile - Summary

```

File View Navigate Help
F01: DB2 Measurement Profile (0087) Row 00001 of 00058
Command ==> Scroll ==> CSR

Most Active DB2 Plans
Samples 7,230 100.0% ' ' ' ' ' ' ' ' ' ' ' ' ' '
DB2JOB3 2,087 28.8% ██████████
Reports: F07

Most Active Package/DBRMs
Samples 7,230 100.0% ' ' ' ' ' ' ' ' ' ' ' ' ' '
DB2JOB3 2,087 28.8% ██████████
Reports: F03

Most Active SQL Statements
Samples 7,230 100.0% ' ' ' ' ' ' ' ' ' ' ' ' ' '
DB2JOB3:00331 FETCH 875 12.1% ██████
DB2JOB3:00377 INSERT 613 8.4% █████
DB2JOB3:00467 FETCH 344 4.7% █████
DB2JOB3:00219 EXECUTE 113 1.5% █████
DB2JOB3:00260 FETCH 106 1.4% █████
Reports: F04
    
```

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



MQ Measurement

File View Navigate Help

RO1: IBM APA for z/OS Performance Reports (0095)

Row 00001 of 00007

Command ==>

Scroll ==> CSR

Select a category from the list to the right to view the available reports in the selection list below.

_ A Admin/Miscellaneous	_ I IMS Measurement
_ S Statistics/Storage	_ E CICS Measurement
_ C CPU Usage Analysis	_ F DB2 Measurement
_ D DASD I/O Analysis	_ Q MQ Measurement
_ W CPU WAIT Analysis	_ G Coupling Facility

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

<u>S</u> 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	

Reports organized by Queue, Request, and Transaction

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

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16/004

IMS Measurement

```

File View Navigate Help
-----
R01: IBM APA for z/OS Performance Reports (2218)          Row 00001 of 00012
Command ==> _____ Scroll ==> CSR

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

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

s I01 IMS Measurement Profile          _ I12 IMS DL/I Activity by Txn
I02 IMS DL/I Call Timeline            _ I13 IMS DL/I Activity by DL/I Call
_ I03 IMS Transaction Timeline         _ I14 IMS PSB/PCB Attributes
_ I04 IMS Txn Activity Timeline        _ I15 IMS DL/I Call Attributes
_ I05 IMS CPU Usage by PSB             _ I16 IMS Transaction Service Times
_ I06 IMS CPU Usage by Transaction     _ I17 IMS Transaction DL/I Counts
_ I07 IMS CPU Usage by DL/I Call       _ I18 IMS CPU/Svc Time by DL/I Call
_ I08 IMS WAIT Time by PSB             _ I19 IMS CPU/Svc Time by PSB
_ I09 IMS WAIT Time by Transaction     _ I20 IMS CPU/Svc Time by Txn
_ I10 IMS WAIT Time by DL/I Call       _ I21 IMS CPU/Svc Time by PCB

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```

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
DFSRR000 parms DLI,DONDRV00,PMAHD#1,7,0000,,0,,N,0,T,,,N,,,N,,DB1E

IMS system id IM8F IMS region name DONDRVN
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
  
```



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

MQSeries

Activity Summary
Serv Time by Txn
CPU Usage by Queue
Wait Time by Queue
CPU Usage by Request
Wait Time by Request
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 Usage
Dataset Attributes
Summary
D06 DASD VSAM Statistics

IMS

DL/I Call CPU Time
DL/I Call Service Time

Coupling Facility

Summary
Mean Times
Facility Total Times

Get more information about these tools at:

www.ibm.com/software/awdtools/deployment

Software > Software Development >

z/OS Problem Determination and Deployment Tools

z/OS® Problem Determination and Deployment Tools have powerful functions and features. Organizations that choose to use them improve the health of their application portfolios.

Select a Product

Products	Solutions
<ul style="list-style-type: none"> • Application Monitor for z/OS A non-intrusive performance analyzer for applications and systems programs that provides resource utilization information for your applications. This resource information can be the current system data (online analysis) or data collected over a certain time period (historical analysis). • Debug Tool for z/OS A program testing and analysis aid that helps you examine, monitor, and control the execution of programs written in C/C++, COBOL, or PL/I on OS/390, MVS™, VM, or VSE™, and compiled Java™ with the 	<ul style="list-style-type: none"> • Problem Determination and Deployment Tools Information Center This information center provides fast, online centralized access to Problem Determination and Deployment Tools product information. • IBM COBOL family IBM COBOL provides a complete offering of compatible, cross-platform, cross-product compilers that support z/OS, OS/390®, VM, VSE/ESA®, AS/400®, AIX®, and Microsoft® Windows NT®. IBM gives you the tools you need to amplify your program development and leverage your existing applications, enabling you

Highlights

- File Manager: Latest PTF information
- Fault Analyzer: Latest PTF information
- Debug Tool: Latest PTF information
- WebSphere and zSeries AD tools help meet on demand

z/OS Problem Determination and Deployment Tools

Library

News

How to buy

Training and certification

Services

Support

Related software

- Application Monitor for z/OS
- DebugTool for z/OS
- Fault Analyzer for z/OS
- File Export for /OS
- File Manager for z/OS
- Workload Simulator for z/OS and OS/390

Related hardware

- zSeries servers
- Warranty info

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



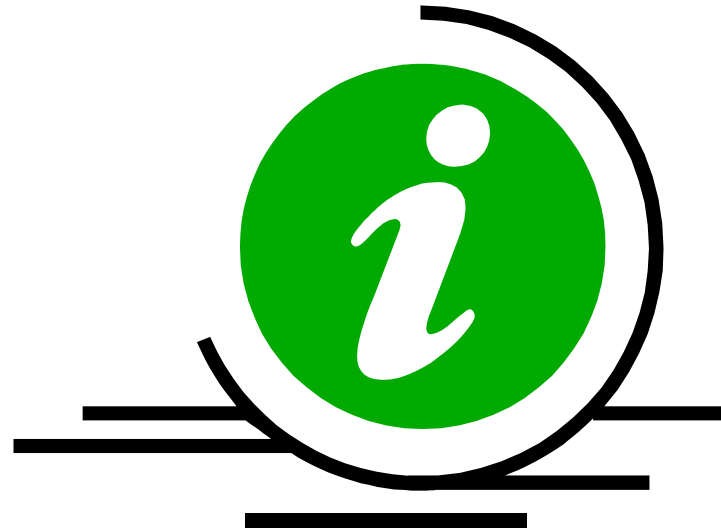
Polling Questions

- **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