



IBM Problem Determination Tools: New Versions Promise Productivity Increases

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Agenda

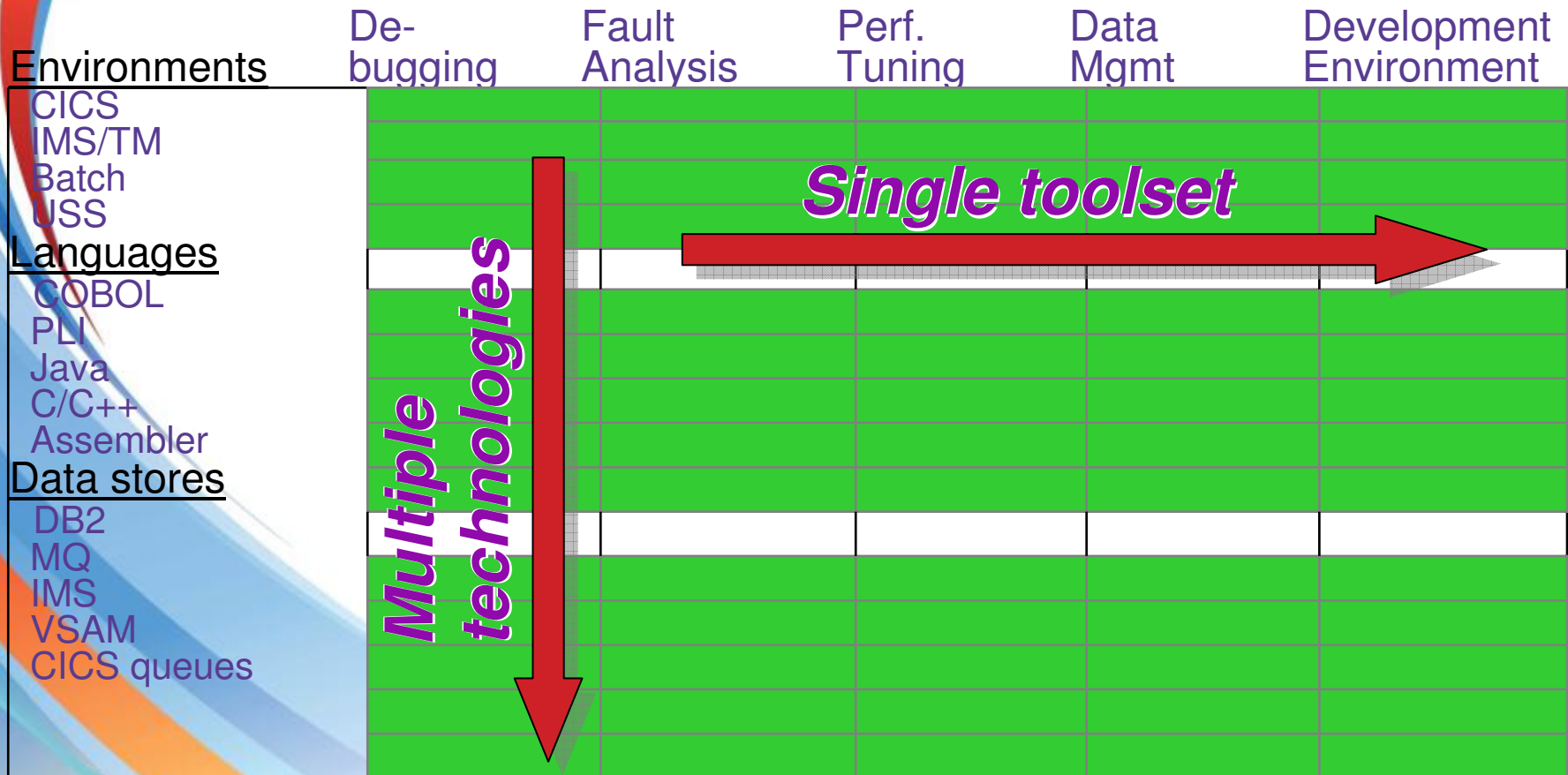
- Introduction to IBM Problem Determination (PD) Tools
- IBM PD Tools Integration
 - Eclipse plug-ins in CICS Explorer, IMS Explorer
 - Rational Developer for System z
 - IMS Explorer, IMS BTS plug-in
 - PD Tools Studio
 - Single sign-on for PD Tools
- PD Tools – Host interface & GUI
- PD Tools Studio Demo

IBM PD Tools for z/OS

- **Reduces** the time programmers need to perform common development tasks such as debugging, test data creation/management, testing, and performance analysis
- **Shortens** application development cycles
- Provides **diagnostic tools** that provide detailed information about **production problems**, and tools for rapidly correcting **data problems**
- Results in **reduced** production down time, **shortened** problem resolution time, and fewer problem re-works
- Provides an extensive collection of **features** and **utilities** to **automate** file and data management, copying and reformatting, data scrambling, comparison, etc.
- **Reduces** loss of time and productivity spent writing in-house utilities
- **Simplifies** programming tasks during the entire development process
- Lets you spend more development time **creating value**, instead of struggling through mundane tasks without the right tools
- **Increases productivity**

The IBM zOS development toolset approach

- A single integrated toolset with support across a broad zOS technology spectrum



The IBM Problem Determination Tools Suite for z/OS

IBM Problem Determination Tools

IBM 2012 Offerings

Debug Tool
for z/OS

File Manager
for z/OS

Fault Analyzer
for z/OS

Application
Performance
Analyzer for
z/OS

Workload Simulator
for z/OS & OS/390

Rational Functional Tester Ext
Rational Performance Tester z/OS

ISPF
Productivity Tool

Hourglass

www.ibm.com/software/awdtools/deployment

Debug Tool for zOS

- Interactive program debugging
- Multiple languages and zOS environments
- Code coverage reporting
- COBOL modernization

Fault Analyzer for zOS

- Automatic program abend capture and reporting
- Program source-level reporting
- Multiple languages and zOS environments

The IBM Problem Determination Tools Suite for z/OS

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Performance
Analyzer for
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Rational Functional Tester Ext
Rational Performance Tester z/OS

ISPF
Productivity Tool

Hourglass

www.ibm.com/software/awdtools/deployment

File Manager for zOS

- Edit and view files and databases of any size
- VSAM, sequential, and PDS(e) files, DB2 and IMS databases
- Extensive file and data utilities

Application Performance Analyzer for zOS

- Monitor and report application performance
- Source level reporting
- Multiple languages and zOS environments

The IBM Problem Determination Tools Suite for z/OS

IBM Problem Determination Tools

IBM 2012 Offerings

Debug Tool
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File Manager
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Performance
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[Rational Functional Tester Ext](#)
[Rational Performance Tester z/OS](#)

ISPF
Productivity Tool

Hourglass

www.ibm.com/software/awdtools/deployment

Workload Simulator for z/OS and OS/390

- Drive regression, performance, stress, function, and capacity testing
- Simulate on-line users with smart scripts

Hourglass

- Alter the date and time returned to an application when a time request is made

The IBM Problem Determination Tools Suite for z/OS

IBM Problem Determination Tools

IBM 2012 Offerings

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Rational Functional Tester Ext
Rational Performance Tester z/OS

ISPF
Productivity Tool

Hourglass

www.ibm.com/software/awdtools/deployment

ISPF Productivity Tool

- Turbo-charge the productivity of your ISPF users
- Turn IBM ISPF into a centralized, object-oriented development center

Support a variety of application developer skills

- Reusing mainframe application assets requires expertise in both traditional and new zOS technologies
- To maximize productivity:
 - Some developers may do best with traditional interfaces
 - Others may be more productive with GUI interfaces
- IBM Problem Determination Tools provide the **best of both worlds**:
 - Proven traditional 3270-based interfaces
 - Eclipse-based GUI interfaces for many products



Positioned to take advantage of the latest technologies

- The changing z development landscape requires modern, more productive and more affordable development tools
- The IBM approach to zSeries tools is an up-to-date toolset that provides:
 - a single set of tools across a broad spectrum of zSeries technologies to support the new generation of complex, composite applications
 - new GUIs and conventional 3270 interfaces
 - immediate support for new versions of critical software such as DB2, CICS, MQ Series, and IMS

Excellent, traditional 3270-based interfaces

The screenshot displays a 3270-based interface with several overlapping windows:

- MONITOR**: Shows COBOL program execution details including line numbers (0001-0005), source code, and job information (JOBNAME: S01: Mea...).
- Debug Tool**: A window titled 'Debug Tool' with a menu (File, View, Services, Help) and a 'Process Options Help' section.
- Fault Analyzer**: A window titled 'Fault Analyzer' with a menu (File, View, Navigate, Help) and a 'Process Options Help' section.
- Application Performance Analyzer**: A window titled 'Application Performance Analyzer' showing a table of data fields and their values.
- File Manager**: A window titled 'File Manager' with a menu (File, View, Navigate, Help) and a 'Process Options Help' section.

The **Application Performance Analyzer** window displays the following data table:

Ref	Field	Picture	Typ	Start	Len	Data
2	2	CUSTOMER-KEY				
3	3	CUST-ID	AN	1	5	
4	2	NAME X(17)	AN	1	5	02202
5	2	ACCT-BALANCE		6	17	Major, Art
6	2	ORDERS-YTD		5	5	1234.56
7	2	ADDR X(20)	AN	23	2	5
8	2	CITY X(14)	AN	28	20	1512 Pine Bluff
9	2	STATE	AN	50	14	Harmon
12	2	OCCUPATION	AN	64	2	MN
		X(30)	AN	137	30	College student

All tools provide GUI interfaces



The screenshot shows the IBM Rational Developer for System z interface. Several tool windows are open and highlighted with callouts:

- Debug Tool:** Points to the main IDE window showing source code and a console.
- Fault Analyzer:** Points to the 'Fault Summary' window.
- Application Performance Analyzer:** Points to the 'TSS09.ADLAB.CUST1' window displaying a table of customer data.
- File Manager:** Points to the 'Remote System Details' window.

CUST-ID	NAME	ACCT-BALANCE	ORDERS-YTD	ADDR
01001	Lynn, Amanda	67.68	9	119 North Lake Road
02200	Graham, Anna	610.05	10	89 Clay Springs Rd
02202	Major, Art	1234.56	5	1512 Pine Bluff
03003	Prentice, Anna	0.00	7	33 Renshaw
03390	Deeds, Darren	74.00	3	649 Brown Street
05570	Parker, Ford	233.27	12	3039 Manning St.
06101	Early, Brighton	311.08	10	9662 Summit Road
06106	Lander, Annette	489.84	7	6127 Cedar Street
06711	Dubree, Dustin	192.98	11	9229 Delegate's Row

Field	Picture	Type	Start	Length	Data
CUST-ID	X (5)	AN	1	5	01001
NAME	X (17)	AN	6	17	Lynn, Amanda
ACCT-BALANCE	S9 (7) V99	PD	23	5	67.68
ORDERS-YTD	S9 (4)	BI	28	2	9
ADDR	X (20)	AN	30	20	119 North Lake Road

IBM Problem Determination Tools Version 12.1



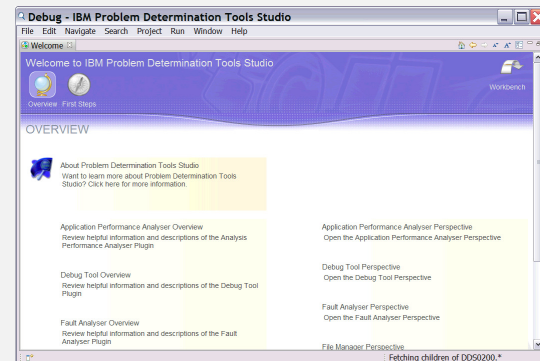
Tools to address and modernize your z/OS Development or System Programming needs

What's new in PD Tools V12.1

- File Manager DB2 and CICS plug-in
- Initial Workload Simulator plug-in
- Enhanced integration and synergy amongst PD Tools, CICS Explorer and/or IMS Explorer taking advantage of newly announce common z/OS Explorer capabilities
- CICS TS 4.2, IMS V12, MQ 8.1 updates to ensure synchronization with latest subsystems
- Improved Java support in APA and FA
- Support for CICS 5.1

PD Tools provides ...

- Five tools addressing z/OS problem resolution needs - Debug Tool, Fault Analyzer, File Manager, Application Performance Analyzer and Workload Simulator
- Subsystem and language support traversing z/OS provided in a timely manner when subsystems and languages are updated
- Improved TCO with full function tools at competitive price



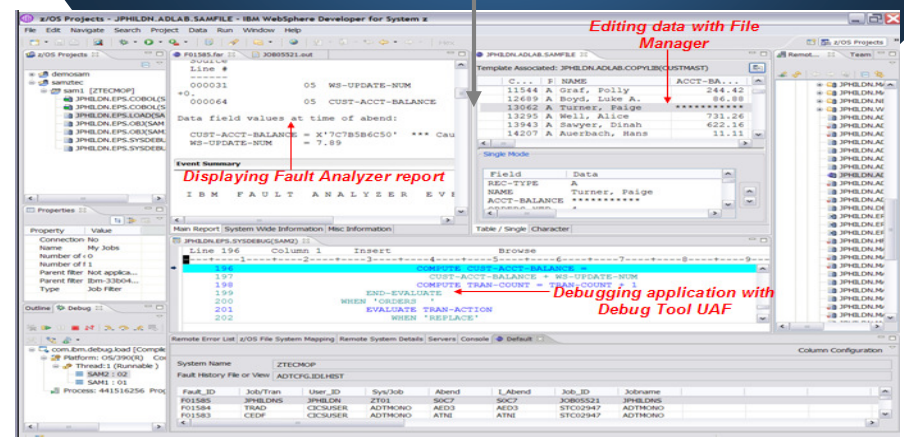
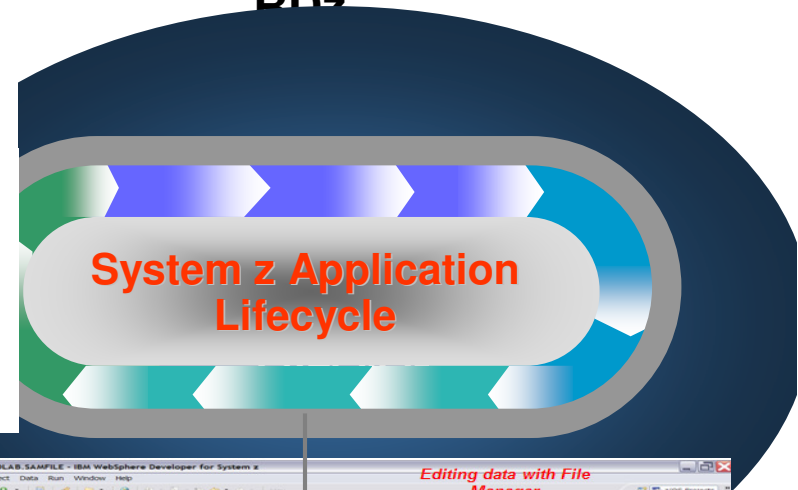
Where do PD Tools Eclipse GUIs fit?

- Graphical interfaces are provided as plug-ins for Eclipse platforms, such as Rational Developer for System z, CICS Explorer, and IMS Explorer

CICS Explorer



RDz



Debug Tool, Fault Analyzer, Application Performance Analyzer, and File Manager plug-ins

Rational Developer for System z (RDz)

- **An eclipse-based Integrated Development Environment (IDE) for System z applications**
 - Common IDE for COBOL, PL/I, C, C++, HLASM, Java, EGL and web services
- **Supports Enterprise Modernization and SOA**
 - Interactive access to z/OS for development, job generation, submission, monitoring, debugging
 - Enables CICS and IMS applications for web services and SOA
 - Support for J2EE, JCA, XML, web services

- Early versions of RD/z included plug-ins for DT, FA, and FM
- Latest versions still includes Debug Tool
- You can install/update PD Tools into RD/z using Installation Manager.



RDz-based development

- Simplified development with more information at your fingertips

Submit jobs, view output, open source members

Source and JCL are selectable tabs

The screenshot shows the IBM Rational Software Development Platform interface. The main editor displays a COBOL program with the following code:

```
Line 35      Column 1      Insert
-----*A-1-B-----2-----3-----4-----5-----
000035      DISPLAY "Program REGIOA STARTING "
000036      MOVE 2 TO BRANCHFLAG.
000037      MOVE 'AAAAAA' TO FIELD-A.
000038      MOVE 'BBBBBB' TO FIELD-B.
000039      MOVE 'CCCCCC' TO FIELD-C.
```

The Properties view on the left shows the program structure:

- DEMOCOBOL
 - RBAROSA.IDE.JCL
 - RBAROSA.IDE.LOAD
 - RBAROSA.SP.COBOLO
 - REGIOA.cbl
 - REGIOB.CBI

The Outline view at the bottom left shows the procedure structure:

- PROCEDURE DIVISION.
 - 010-INITIALIZATION.
 - 020-LOGIC.
 - 030-SEEYA.
 - 040-GOODBYE.

The Problems view at the bottom right shows an error:

Description	Resource	In Folder
IGYPS2072-S "DISPLAI" was invalid. Skipped to the next verb, period or procedure-name d		

Syntax Check

Outline view

Error description

Problem Determination Tools plug-ins in CICS Explorer

The screenshot displays the IBM CICS Explorer interface with several tool views open:

- Debug Tool Views:** Shows the SAM1 [Remote Compiled Application] tree with Thread:1 (Runnable) and Process: 328254224 Program: SAM1. The Variables window shows BALANCE-TOTAL (+0000000.00) and CUST-ACCT-BALANCE (+0000067.68).
- Fault Analyzer Analysis:** Shows a fault summary for Module SAM2, program SAM2, source line # 89: Abend SOC7 (Data Exception). The synopsis states: "A system abend 0C7 occurred in module SAM2 program SAM2 at offset X'39A. A program-interruption code 0007 (Data Exception) is associated with the and indicates that: A decimal digit or sign was invalid."
- APA Reports:** Shows a list of reports including S01 - Measurement Profile (5193/SAM1RUN), S02 - Load Module Attributes, S03 - Load Module Summary, S04 - TCB Summary, and S05 - Memory Usage Timeline. The S01 report is expanded, showing overall CPU activity: Samples 778 (100.0%), CPU Active 728 (93.5%), WAIT 40 (5.1%), and Queued 10 (1.2%).

Problem Determination Tools plug-ins in CICS Explorer



- You have to install PD Tools plug-ins yourself
- Directed to System Programmers
- Originally you needed to authenticate your credentials

IBM CICS Explorer® V5.1



Enhanced!

Session and user views, Configuration, Broadcast, User and Admin commands

ISM

New!

Migrated file view

VT

IMS DB mgt

IMS Explorer

Configuration Status Control, Test

MQ

Status Situations Topology

XE

Threadsafe, File, CPU, Response & Wait analysis, Statistics, Alerts, Graphical and Sheet views

PA

Daemon & Connection Status & Test

TG

Develop Test

RDz

Manipulate, browse z/OS data sets, z/FS, VSAM, MQ, CICS, DB2

FM

CICS, IMS, DB2, & z/OS Abend Reporting & Diagnosis

FA

Deployment, Discovery, Visualization, Cloning, Automation & Control

DA



CICS, IMS, DB2, & z/OS Application Debugging

DT

CICS, IMS, DB2, & z/OS Observation Requests & Reporting

APA

Enhanced!

Execution Tree Dependencies Queries Command Flow

IA

CRUD, Install, History, Backout, Audit, Search, Compare, Packaging

CM

CRUD, Install, Control, Filter, Sort, Topology, Events, ATOM, Java, WLM, Txn Tracking, Copy/Paste, Cloud, Web apps

SM

Enhanced!

3270 application performance testing

WSIM

Complete PD Tools workbench

New!

PDT Studio

SM	CICS Transaction Server
IA	CICS Interdependency Analyzer
PA	CICS Performance Analyzer
CM	CICS Configuration Manager
DA	CICS Deployment Assistant
TG	CICS Transaction Gateway
ISM	IBM Session Manager
VT	CICS VAM Transparency

z/OS Connections, z/OS Datasets, z/FS Files, JES

z/OS Explorer

CICS TS, IMS, DB2, MQ, z/OS

APA	Application Performance Analyzer
FA	Fault Analyzer
DT	Debug Tool
FM	File Manager
WSIM	Workload Simulator
MQ	WebSphere MQ
XE	OMEGAMON XE for CICS
RDz	Rational Developer for System z

IBM Problem Determination Tools Version 12.1



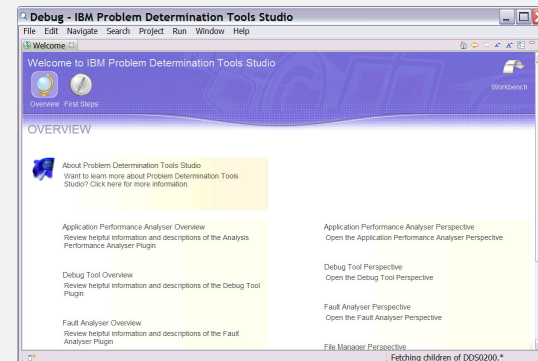
Tools to address and modernize your z/OS Development or System Programming needs

What's new in PD Tools V12.1

- **New IBM Problem Determination Tools Studio** pre-packaged with plug-ins

PD Tools provides ...

- Five tools addressing z/OS problem resolution needs - Debug Tool, Fault Analyzer, File Manager, Application Performance Analyzer and Workload Simulator
- Subsystem and language support traversing z/OS provided in a timely manner when subsystems and languages are updated
- Improved TCO with full function tools at competitive price





PD Tools Studio: **NEW!!**



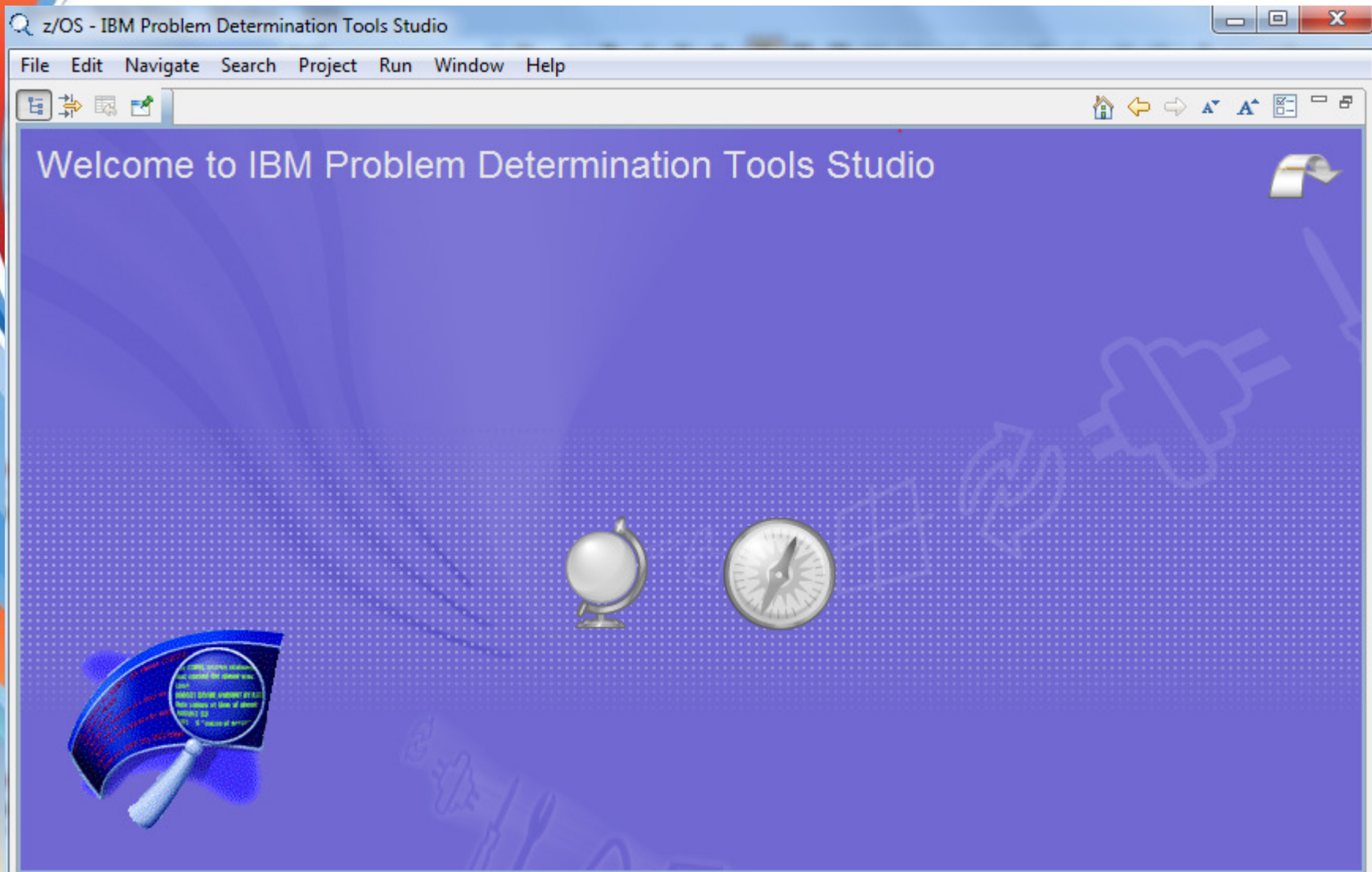
IBM Problem Determination Tools Studio

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12.1.0.0



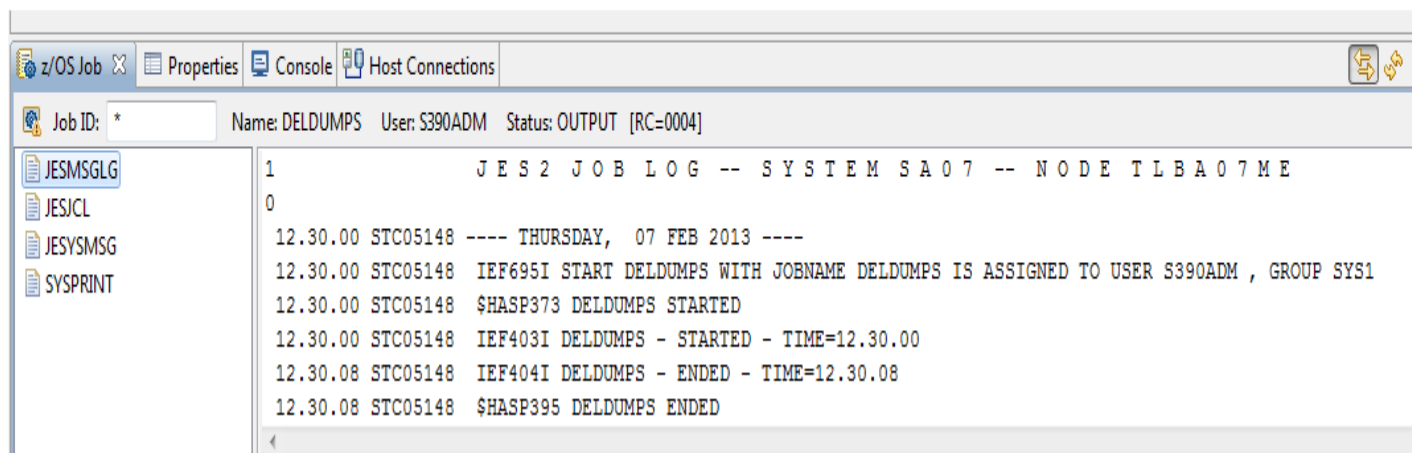
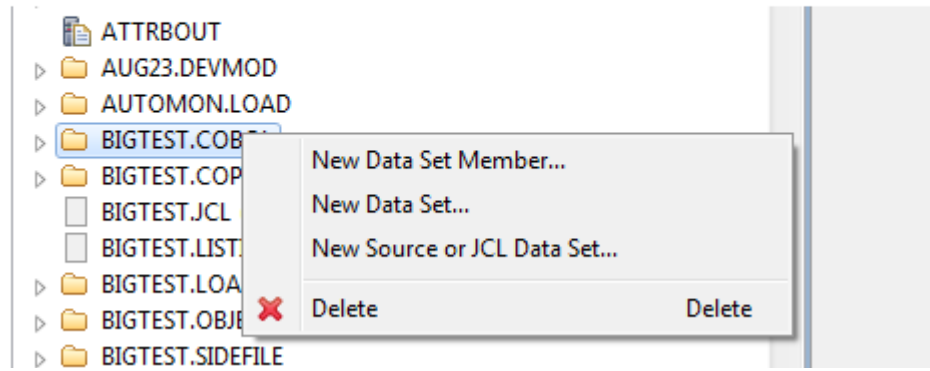
PD Tools Studio



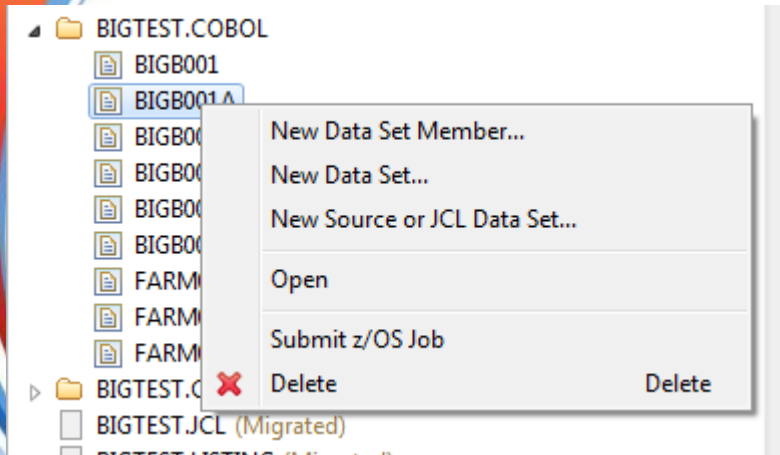
PD Tools Studio

- All PD Tools plug-ins package into one single solution
- Helpful Tutorial and Overview
- No additional charge with your PD Tools Product License.
Free download
- A z/OS Explorer provide access to your dataset and HFS Files.
 - You can edit your datasets
 - Create new datasets
 - Submit jobs
- Provide Update site to download CICS Explorer

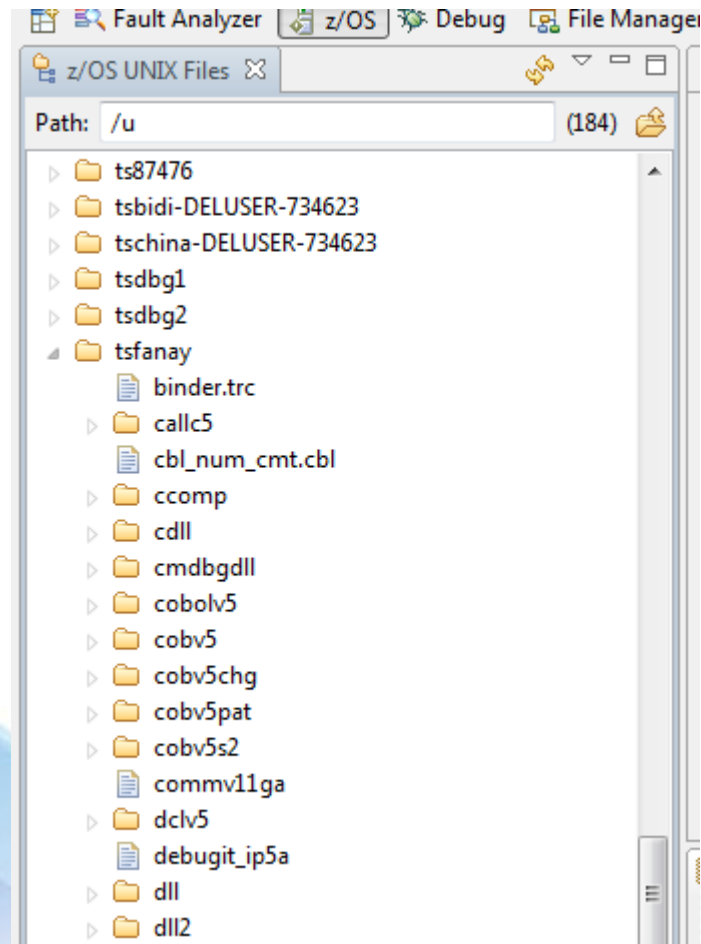
Create New Dataset. or browse your iobs



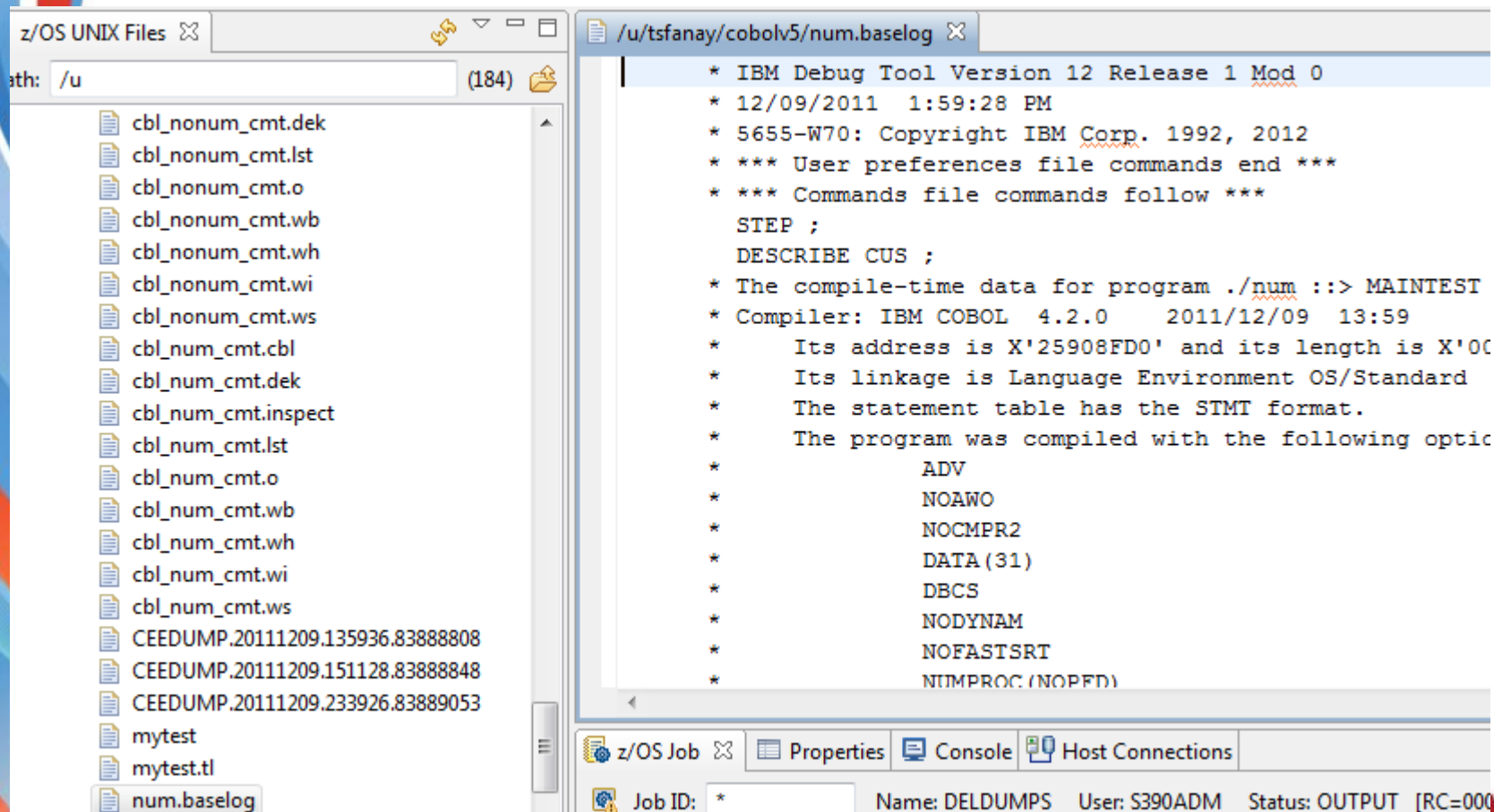
Create, Open or Delete Datasets, Submit Jobs



Access to z/OS Unix Files.



You can also edit your z/OS Unix Files



The screenshot shows a z/OS Unix file editor interface. The left pane displays a file list for the path `/u` containing 184 files, including `cbl_nonum_cmt.dek`, `cbl_nonum_cmt.lst`, `cbl_nonum_cmt.o`, `cbl_nonum_cmt.wb`, `cbl_nonum_cmt.wh`, `cbl_nonum_cmt.wi`, `cbl_nonum_cmt.ws`, `cbl_num_cmt.cbl`, `cbl_num_cmt.dek`, `cbl_num_cmt.inspect`, `cbl_num_cmt.lst`, `cbl_num_cmt.o`, `cbl_num_cmt.wb`, `cbl_num_cmt.wh`, `cbl_num_cmt.wi`, `cbl_num_cmt.ws`, `CEEDUMP.20111209.135936.83888808`, `CEEDUMP.20111209.151128.83888848`, `CEEDUMP.20111209.233926.83889053`, `mytest`, `mytest.tl`, and `num.basealog`. The right pane shows the contents of `num.basealog`, which is a compilation log for the program `./num`. The log includes the following text:

```
* IBM Debug Tool Version 12 Release 1 Mod 0
* 12/09/2011 1:59:28 PM
* 5655-W70: Copyright IBM Corp. 1992, 2012
* *** User preferences file commands end ***
* *** Commands file commands follow ***
STEP ;
DESCRIBE CUS ;
* The compile-time data for program ./num ::> MAINTEST
* Compiler: IBM COBOL 4.2.0 2011/12/09 13:59
* Its address is X'25908FD0' and its length is X'00
* Its linkage is Language Environment OS/Standard
* The statement table has the STMT format.
* The program was compiled with the following options:
*     ADV
*     NOAWO
*     NOCMR2
*     DATA (31)
*     DBCS
*     NODYNAM
*     NOFASTSRT
*     NITMPROC (NOPFD)
```

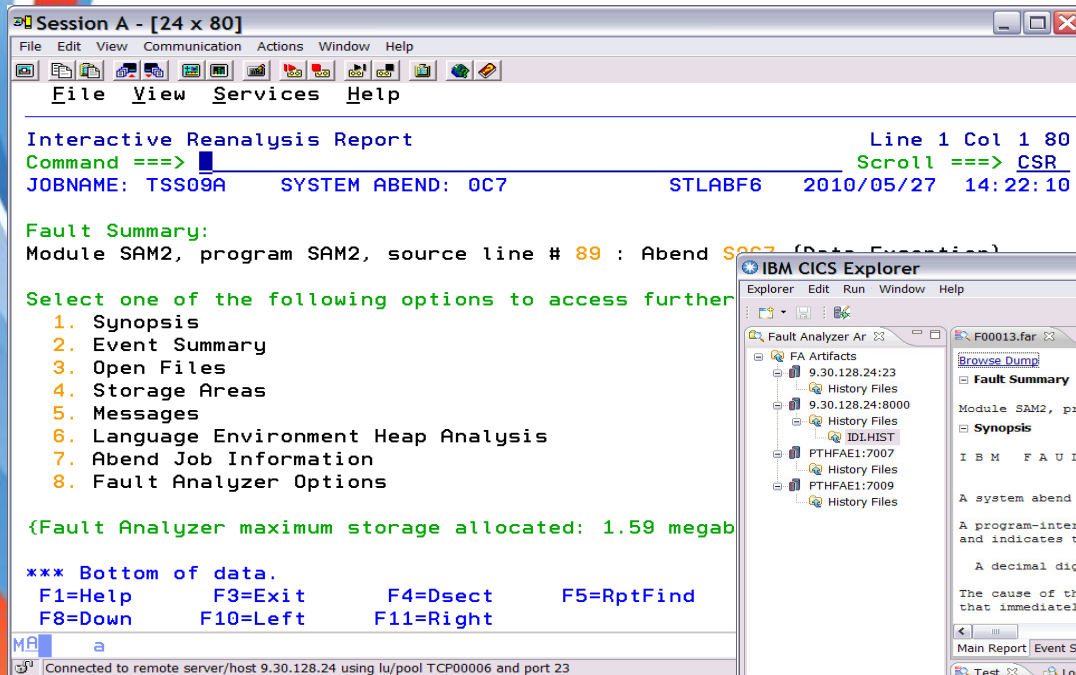
The bottom of the interface shows a status bar with the following information: `z/OS Job`, `Properties`, `Console`, `Host Connections`, `Job ID: *`, `Name: DELDUMPS`, `User: S390ADM`, `Status: OUTPUT [RC=000]`.

PD Tools – Host interface & GUI

- Fault Analyzer
- Debug Tool
- Application Performance Analyzer
- File Manager

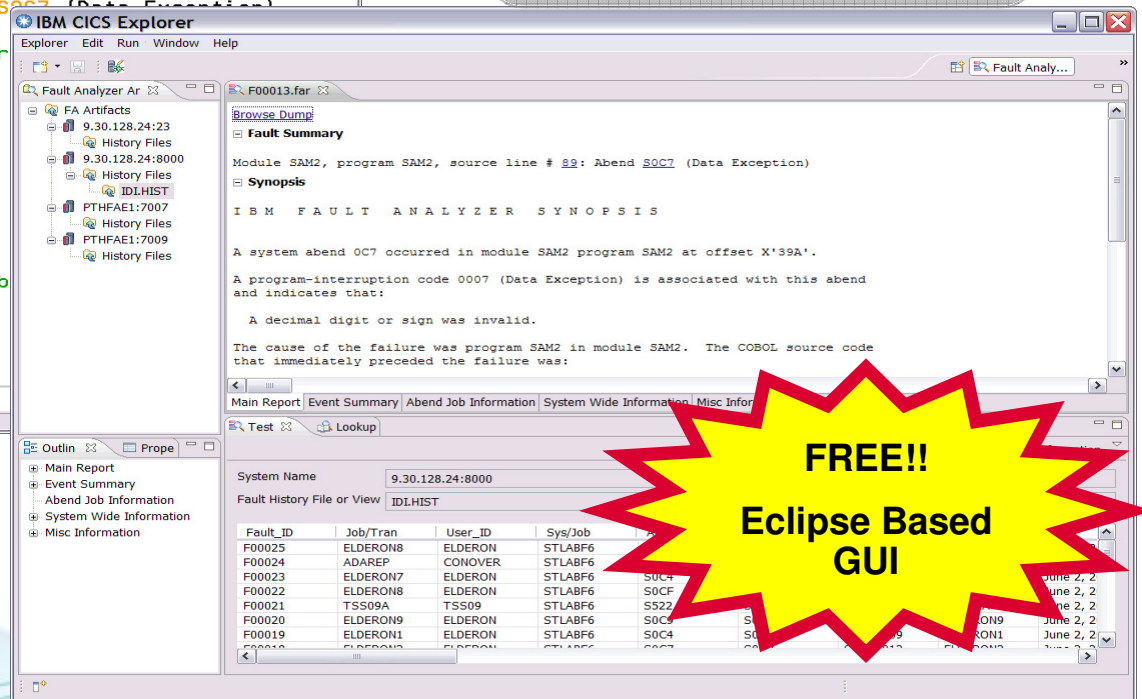
IBM Fault Analyzer

Multiple interfaces and modes of operation



Interfaces

- ISPF
- RDz
- GUI
- CICS
- Web



FREE!!
Eclipse Based GUI

Modes Of Operation

- Real-time analysis
- Batch dump re-analysis
- Interactive dump re-analysis

Fault Analyzer Interface inside CICS Explorer

IBM CICS Explorer

Explorer Edit Window Help

Fault Analyz

- FA Artifacts
 - 9.30.128.24:23
 - History Files
 - 9.30.128.24:8000
 - History Files
 - IDLHIST
 - PTHFAE1:7007
 - History Files
 - PTHFAE1:7009
 - History Files

F05303.far

Browse Dump

Fault Summary

Module SAM2, program SAM2, source line # 89: Abend S0C7 (Data

Synopsis

I B M F A U L T A N A L Y Z E R S Y N O P S I S

A system abend 0C7 occurred in module SAM2 program SAM2 at of

exception) is

that immediately preceded the failure was:

Main Report | Event Summary | Abend Job Informa... | System Wide Infor... »1

SAM2.cob

```
Line 89      Column 1      Insert
-----*A-1-B-----2-----3-----4-----5-----6
      COMPUTE BALANCE-TOTAL =
          BALANCE-TOTAL + CUST-ACCT-BALANCE
      *   *** Calculate Average ***
      COMPUTE BALANCE-AVERAGE =
          BALANCE-TOTAL / BALANCE-COUNT
      *   *** Calculate Minimum ***
      IF WS-FIRST-TIME-SW = 'Y'
          MOVE CUST-ACCT-BALANCE TO BALANCE-MIN.
      IF CUST-ACCT-BALANCE < BALANCE-MIN
          MOVE CUST-ACCT-BALANCE TO BALANCE-MIN.
```

Outl Pro

- Main Report
- Event Summary
- Abend Job Information
- System Wide Information
- Misc Information

Default Lookup

Search *S0C7* Go

- Abend Codes
- Messages
- Miscellaneous Information

Explanation Results

0C7

Explanation: A program interruption occurred, but no routine had been specified to handle this type of interruption. Refer to the instruction description in Principles of Operation to find out how the instruction stops processing for the error condition.

The last digit of this completion code is a hexadecimal number that indicates the cause of the program interruption. Each 'X'0C' system completion code has

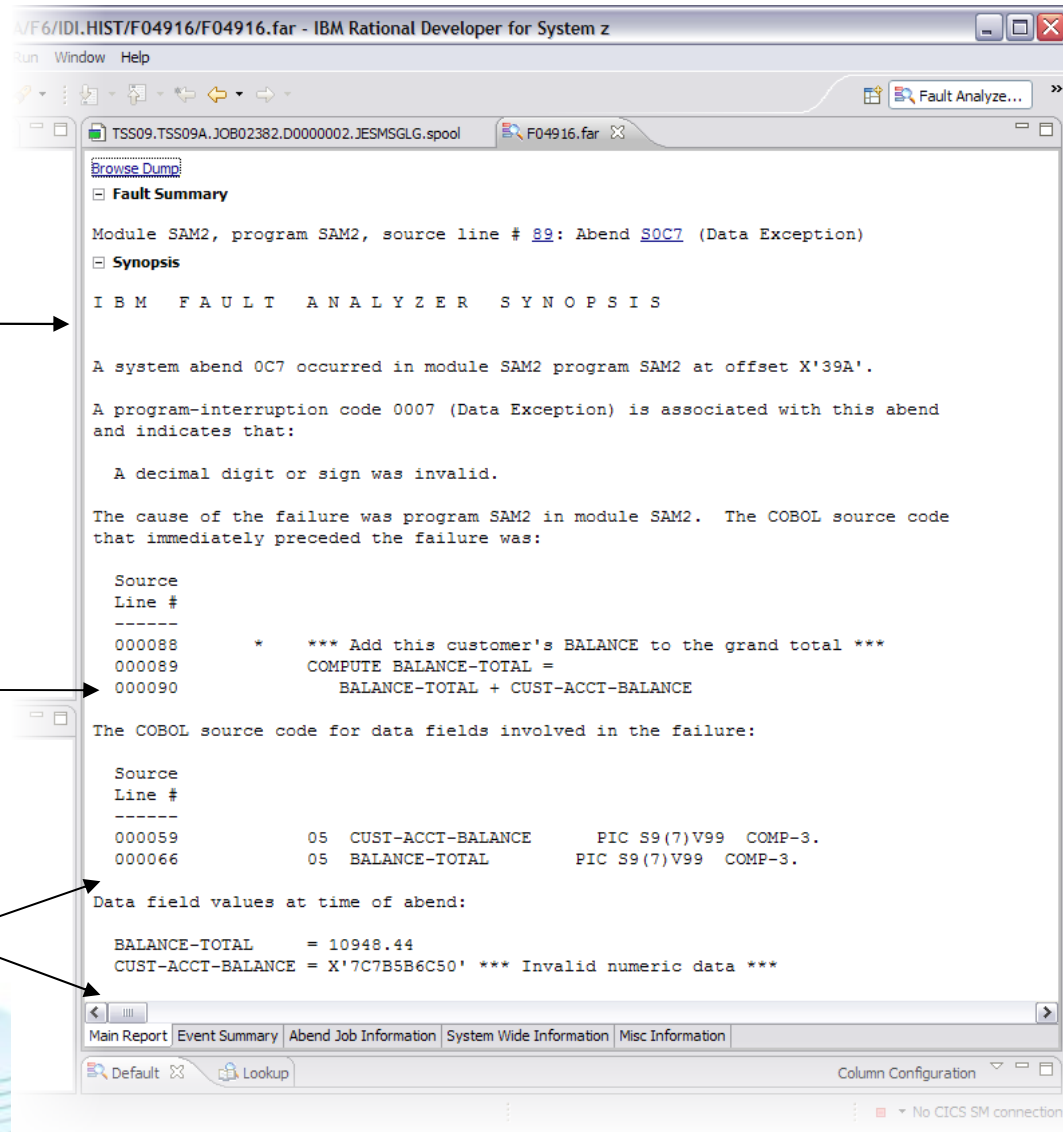
Refresh and update ...HIST(F05303)

Fault Analyzer Main Report

Fault Analyzer
Synopsis

Source code that
preceded the ABEND

Data Field Information



VF6/IDI.HIST/F04916/F04916.far - IBM Rational Developer for System z

Run Window Help

TSS09.TSS09A.JOB02382.D0000002.JESMSG.LG.spool F04916.far

[Browse Dump](#)

Fault Summary

Module SAM2, program SAM2, source line # 89: Abend [SOC7](#) (Data Exception)

Synopsis

IBM FAULT ANALYZER SYNOPSIS

A system abend 0C7 occurred in module SAM2 program SAM2 at offset X'39A'.

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 #
-----
000088      *   *** Add this customer's BALANCE to the grand total ***
000089      COMPUTE BALANCE-TOTAL =
000090          BALANCE-TOTAL + CUST-ACCT-BALANCE
```

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

```
Source
Line #
-----
000059      05 CUST-ACCT-BALANCE      PIC S9(7)V99  COMP-3.
000066      05 BALANCE-TOTAL          PIC S9(7)V99  COMP-3.
```

Data field values at time of abend:

```
BALANCE-TOTAL      = 10948.44
CUST-ACCT-BALANCE  = X'7C7B5B6C50' *** Invalid numeric data ***
```

Main Report | Event Summary | Abend Job Information | System Wide Information | Misc Information

Default | Lookup | Column Configuration

No CICS SM connection

Results of clicking Hotkeys

The screenshot displays the IBM z/OS dump browser interface. On the left, a fault report shows a program interruption (Event 1) for program SAM1 GPR 0. The main area shows a list of captured mini-dump data with hexadecimal addresses and values. A 'Lookup' window is open, showing the explanation for abend code 0C7: 'A program interruption specified to handle this type of interruption. Each 'X'0Cx' system completion code has a hexadecimal number that indicates the type of interruption.' A 'Fault' window is also open, showing the source code for SAM2.cob, with line 89 highlighted: 'ADD +1 TO BALANCE-COUNT'. Three callout boxes provide instructions on how to use these features.

00000000 +0 00
- Event 1 Program SAM1 GPR 0 [(
00000001 +1 0A0000 0001
00000020 +20 7FFFFFF0 7FFF
00000040 +40 00000000 0000
00000060 +60 000A0000 0001
00000080 +80 00040000 0000
000000A0 +A0 0D000001 0145
000000C0 +C0 28000000 0000
000000E0 +E0 00000000 0000
00000100 +100 00000000 0000
00000120 +120 00000000 00000000 00000000 07543000 80000000 00000000 03F29BD0 *
00000140 +140 07850000 00000000
00000160 +160 00000000 00000000
00000180 +180 00000000 00000000
000001A0 +1A0 04040000 00000000
000001C0 +1C0 04040000 80000000
000001E0 +1E0 00000000 80000000
00000200 +200 D7E2C140 00000000
00000220 +220 00FDB600 00000000

Search: *SOC7*
Abend Codes
Messages
Miscellaneous Information
COBOL File Status
DB2
IMS
MQ Series
Program Interruption

Explanation Results
0C7
Explanation: A program interruption specified to handle this type of interruption. Each 'X'0Cx' system completion code has a hexadecimal number that indicates the type of interruption.

IST(F04916) No CICS SM connection

System z

Fault Navig F04916.far SAM2.cob
FA Artifacts
Line 89 Column 1 Insert
*** Increment Record Count ***
ADD +1 TO BALANCE-COUNT
*** Add this customer's BALANCE to the grand total ***
COMPUTE BALANCE-TOTAL =
BALANCE-TOTAL + CUST-ACCT-BALANCE
*** Calculate Average ***
COMPUTE BALANCE-AVERAGE =
BALANCE-TOTAL / BALANCE-COUNT
*** Calculate Minimum ***
IF WS-FIRST-TIME-SW = 'Y'
MOVE CUST-ACCT-BALANCE TO BALANCE-MIN.
IF CUST-ACCT-BALANCE < BALANCE-MIN

Command FIND
Dump Browser User Note Dictionary Data

Clicking Abend code invokes the "lookup" view

Use "Lookup" to research ABEND codes, Messages and other code definitions

Browse the captured mini-dump data stored in the fault entry report in the Dump browser view

Clicking the source line number opens the sidefile copy of the source

Event Summary View



Chronological order of events

Expandable event details

Highlighted "POINT OF FAILURE" event details

```
IBM FAULT ANALYZER EVENT SUMMARY

The following events are presented in chronological order.

Event # Type Fail Point Module Name Program Name EP Name Event Location (*) Loaded From
-----
1 Call SAM1 SAM1 SAM1 L#312 P+D30 E+D30 TSS09.ADLAB.LOAD
2 Call IGZCPAC n/a IGZCFCC E+2BE CEE.SCEERUN
3 Abend SOC7 ***** SAM2 SAM2 SAM2 L#89 P+39A E+39A TSS09.ADLAB.LOAD

(*) 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
P+x Offset from start of program
E+x Offset from start of entry point

+ Event 1
+ Event 2
+ Event 3
EVENT 3 OF 3: ABEND SOC7
*****
***** POINT OF FAILURE *****
*****
Abend Code. . . . . : SOC7
Program-Interruption Code . : 0007 (Data Exception)
A decimal digit or sign was invalid.
```

System Wide Information View



Open Files

LE Heap Analysis

Perspective - FA/F6/IDI.HIST/F04916/F04916.far - IBM Rational Developer for System z

Search Project Run Window Help

F04916.far

Browse Dump

Open Files

OPEN FILES

Non-Event-Related Open Files

File Name : CEEDUMP
Data Set Name : TSS09.TSS09A.JOB02382.D0000113.?
File Attributes : ORGANIZATION=SEQUENTIAL, ACCESS MODE=n/a,
RECFM=FIXED BLOCKED ASA
Last I/O Function : WRITE
Open Status : OUTPUT

Current Record. : Record data length 133

Address	Offset	Hex	EBCDIC
13B8BC08		40404040 40404040 40404040 40404040	*
Lines 13B8BC18-13B8BC78 same as above			
13B8BC88	+80	40404040 40	*

File Name : SYSOUT
Data Set Name : TSS09.TSS09A.JOB02382.D0000109.?
File Attributes : ORGANIZATION=SEQUENTIAL, ACCESS MODE=n/a,
RECFM=FIXED BLOCKED ASA
Last I/O Function : WRITE
Open Status : OUTPUT

Current Record. : Record data length 121

Address	Offset	Hex	EBCDIC
13C480B8		40404040 40404040 40404040 40404040	*
Lines 13C480C8-13C48118 same as above			
13C48128	+70	40404040 40404040 40	*

Language Environment Heap Analysis

Main Report | Event Summary | Abend Job Information | System Wide Information | Misc Information

Default | Lookup





The Fault Analyzer TSO Interface



Using Interactive reanalysis to analyze an abend

```
File Options View Services Help
IBM Fault Analyzer - Fault Entry List
Command ==>
Fault History File or View : 'FAULTANL.V10R1.HIST'

{The following line commands are available: ? (Query), V or S (View saved
report), I (Interactive reanalysis), B (Batch reanalysis), D (Delete), H
(Duplicate history), C (Copy fault entry), M (Move fault entry), X (XMIT fault
entry).}
```

	Fault_ID	Job/Tran	Job_ID	Program	Offset	Dups	User_ID	Sys/Job	Abend
<u>i</u>	F00905	DNET845X	JOB15885	SAM2	39A		DNET845	DEMOMVS	S0C7
—	F00882	DNET845X	JOB15573	SAM2	39A	4	DNET845	DEMOMVS	S0C7
—	F00881	DNET845X	JOB15572	SAM2	39A		DNET845	DEMOMVS	S0C7
—	F00880	DNET845X	JOB15571	SAM2	39A		DNET845	DEMOMVS	S0C7
—	F00878	DNET845X	JOB15535	SAM2	39A		DNET845	DEMOMVS	S0C7
—	F00872	DNET845Y	JOB15410	PSAM2	3DA		DNET845	DEMOMVS	S0C7
—	F00871	DNET845P	JOB15408	PSAMM2	27A		DNET845	DEMOMVS	S0C7
—	F00869	DNET845X	JOB15387	SAM2	39A		DNET845	DEMOMVS	S0C7

** Bottom of data.

The I line command starts an interactive reanalysis session



Analyze an abend

```

File View Services Help
Interactive Reanalysis Report
Command ==>
JOBNAME: DNET845X  SYSTEM ABEND:

Fault Summary:
Module SAM2, program SAM2, source line # 89 : Abend S0C7 (Data Ex

Select one of the following options to access further fault information:
  1. Synopsis
  2. Event Summary
  3. Open Files
  4. Storage Areas
  5. Messages
  6. Language Environment Heap Analysis
  7. Abend Job Information
  8. Fault Analyzer Options

{Fault Analyzer maximum storage allocated: 1.68 megabytes.}

*** Bottom of data.

```

“Point and shoot” fields are highlighted.

Use **tab** and **Enter** to navigate.

Debug Clues:
✓ Abended in program SAM2 because of a data exception

select Synopsis

What is information is in the Synopsis?

Enter

Analyze an abend

```

File Options View Services Help
IBM Fault Analyzer - Fault Entry List                               Line 1 Col 1 80
Command ==> _____ ==> PAGE
Fault History File or View : 'FAULTANL.'
{The following line commands are available: ? (Query), V or S (View saved
report), I (Interactive reanalysis), B (Batch reanalysis), D (Delete), H
(Duplicate history), C (Copy fault entry), M (Move fault entry), X (XMIT fault
entry).}

```

	Fault_ID	Job/Tran	Job_ID	Program	Offset	Dups	User_ID	Sys/Job	Abend
<u>i</u>	F00905	DNET845X	JOB15885	SAM2	39A		DNET845	DEMOMVS	S0C7
---	F00882	DNET845X	JOB15573	SAM2	39A	4	DNET845	DEMOMVS	S0C7
---	F00881	DNET845X	JOB15572	SAM2	39A		DNET845	DEMOMVS	S0C7
---	F00880	DNET845X	JOB15571	SAM2	39A		DNET845	DEMOMVS	S0C7
---	F00878	DNET845X	JOB15535	SAM2	39A		DNET845	DEMOMVS	S0C7
---	F00872	DNET845Y	JOB15410	PSAM2	3DA		DNET845	DEMOMVS	S0C7
---	F00871	DNET845P	JOB15408	PSAMM2	27A		DNET845	DEMOMVS	S0C7
---	F00869	DNET845X	JOB15387	SAM2	39A		DNET845	DEMOMVS	S0C7

** Bottom of data.

The I line command starts an interactive reanalysis session



Analyze an abend

```

File View Services Help
Synopsis
Command ==>
JOBNAME: DNET845X SYSTEM ABEND: 0C7 DEMOMVS 2010/02/23 15:45:0
A system abend 0C7 occurred in module SAM2 program SAM2 at offset X'39A'.
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 #
000088 * *** Add this customer's BALANCE to the grand total ***
000089 COMPUTE BALANCE-TOTAL =
000090 BALANCE-TOTAL + CUST-ACCT-BALANCE
The COBOL source code for data fields involved in the failure:

```

Debug Clues:
 ✓ Abended in program SAM2 while running a COMPUTE statement because of a data exception

Here is a clue. What can cause a data exception?

Page forward to see active variables



Analyze an abend

What variable contained the bad data?

Debug Clues:
✓ Abended in program SAM2 while running a COMPUTE statement because of a data exception

Go look at the bad variable

Return to menu

F3

```

File View Services Help
Synopsis
Command ==>
JOBNAME: DNET845X  SYSTEM ABEND: 0C7          DEMOMVS  2010/02/23  15:45:0
Source
Line #
000088      *      *** Add this customer's BALANCE to the grand total ***
000089      COMPUTE BALANCE-TOTAL =
000090      BALANCE-TOTAL + CUST-ACCT-BALANCE

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

Source
Line #
000059      05  CUST-ACCT-BALANCE      PIC S9(7)V99  COMP-3.
000066      05  BALANCE-TOTAL            PIC S9(7)V99  COMP-3.

Data field values at time of abend:

BALANCE-TOTAL      = 10948.44
CUST-ACCT-BALANCE = X'7C7B5B6C50' *** Invalid numeric data ***

*** Bottom of data.

```


Analyze an abend

```

File View Services Help
-----
Event Summary                                     Line 1 Col 1 8
Command ==>                                     Scroll ==> PAG
JOBNAME: DNET845X  SYSTEM ABEND: 0C7             DEMOMVS   2010/02/23  15:45:0

{The following events are presented in chronological order.}

Event      Fail  Module  Program  EP
#  Type    Point  Name     Name     Name     Event Location (*)  Load
1  Call    SAM1   SAM1     SAM1     L#312 P+D30 E+D30  DNET8
2  Call    IGZCPAC n/a      IGZCFCC  E+2BE      CEE.S
3  Abend  SOC7   ***** SAM2     SAM2     SAM2     L#89 P+39A E+39A  DNET8

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

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

Debug Clues:

- ✓ Abended in program SAM2 because:
- ✓ CUST-ACCT-BALANCE had bad numeric data

Go look at the bad variable, CUST-ACCT-BALANCE

Select detail for program SAM2

What is the relationship between programs SAM1 and SAM2?

Enter

Analyze an abend

```

File View Services Help
-----
Event 3 of 3: Abend S0C7 *** Point of Failure ***           Line 1 Col 1 8
Command ==> bottom                                         Scroll ==> HAL
JOBNAME: DNET845X  SYSTEM ABEND: 0C7                      DEMOMVS  2010/02/23  15:45:0

Previous Event Details

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

The source code below was executed via the following sequence of PERFORM
statements:
  Source
  Line #
  000079          PERFORM 100-CALC-BALANCE-STATISTICS.

COBOL Source Code:
  Source
  Line #
  000088          *   *** Add this customer's BALANCE to the grand total
  000089          COMPUTE BALANCE-TOTAL =

```

Debug Clues:

- ✓ Abended in program SAM2 because:
- ✓ CUST-ACCT-BALANCE had bad numeric data

Go look at the bad variable, CUST-ACCT-BALANCE

Go to the bottom of the program detail display



Analyze an abend

```

File View Services Help
Event 3 of 3: Abend S0C7 *** Point of Failure *** Line 83 Col 1 8
Command ==> _____ Scroll ==> PAC
JOBNAME: DNET845X SYSTEM ABEND: 0C7 DEMOMVS 2010/02/23 15:45:0
R6: 205910C0 (606016 bytes of storage addressable)
R7: 2050DA20 (1144288 bytes of storage addressable)
R8: 0003F7C8 (Module SAM2 program SAM2 WORKING-STORAGE SECTION BLW=0000 +
X'0', symbol WS-FIELDS, source line # 36 )
R9: 0003F5D0 (Module SAM2 program SAM2 + X'5D0', source line # 116 )
R10: 0003F11C (Module SAM2 program SAM2 + X'11C')
R11: 0003F29C (Module SAM2 program SAM2 + X'29C')
R12: 0003F0FC (Module SAM2 program SAM2 + X'FC')
R13: 20594458 (592808 bytes of storage addressable)
R14: 8003F392 (Module SAM2 program SAM2 + X'392', source line # 89 )
R15: 8003F224 (Module SAM2 program SAM2 + X'224')

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

Associated Storage Areas
*** Bottom of data.

```

What is shown here?



Debug Clues:

- ✓ Abended in program SAM2 because:
- ✓ CUST-ACCT-BALANCE had bad numeric data

Go look at the bad variable, CUST-ACCT-BALANCE

Analyze an abend

```

File View Services Help
Associated Storage Areas Line 1 Col 1 8
Command ==> f cust-acct-balance Scroll ==> PAG
JOBNAME: DNET845X SYSTEM ABEND: 0C7 DEMOMVS 2010/02/23 15:45:0

Task Global Table (TGT) at address 0003F5D0 for length 376

WORKING-STORAGE SECTION
- Collapse hex
Off Hex Value Data Value Source (Starting
BLW=0000 at address 0003F7C8

0 C3C1D3C3 E4D3C1E3 C9D5C740 C2C1D3C1 *CALCULATING BALA* 01 WS-FIELDS.
10 D5C3C540 E2E3C1E3 E2404040 4040 *NCE STATS * 05 WS-PROGR
1E D5 *N * 05 WS-FIRST
1F 0000000C 0 05 WS-WORK-
23 0000000C 0 05 WS-WORK-
27 0000000C 0 05 WS-WORK-
2B 0000000C 0 05 WS-WORK-
2F 0000000C 0 05 WS-WORK-

LINKAGE SECTION

```

Debug Clues:

- ✓ Abended in program SAM2 because:
- ✓ CUST-ACCT-BALANCE had bad numeric data

Go look at the bad variable, CUST-ACCT-BALANCE



Analyze an abend

```

File View Services Help
Associated Storage Areas Line 18 Col 40 11
Command ==> Scroll ==> HAL
JOBNAME: DNET845X SYSTEM ABEND: 0C7 DEMOMVS 2010/02/23 15:45:0

ss
Data Value Source (Starting at Line # 000053 )
01 CUST-REC.
05 CUST-KEY.
10 CUST-ID PIC X(5).
10 CUST-RECORD-TYPE PIC X.
10 FILLER PIC X(7).
05 CUST-NAME PIC X(17).
05 CUST-ACCT-BALANCE PIC S9(7)V99 COMP-3.
05 CUST-ORDERS-YTD PIC S9(4) COMP.
05 CUST-CITY PIC X(15).
05 CUST-OCCUPATION PIC X(28).

```

Here is CUST-ACCT-BALANCE, it is a packed decimal field (COMP-3).

Debug Clues:

- ✓ Abended in program SAM2 because:
- ✓ CUST-ACCT-BALANCE had bad numeric data (it is part of CUST-REC)

Here is the bad variable, CUST-ACCT-BALANCE

Scroll right



Analyze an abend

File View Services Help

It is in Linkage Section.
What does that indicate?

Associated Storage Areas

Command ==>

JOBNAME: DNET845X SYSTEM ABEND: 0C7

DEMOMVS 2010/02/23 15:45:02

Line 18 Col 1 80

Scroll ==> HALF

LINKAGE SECTION

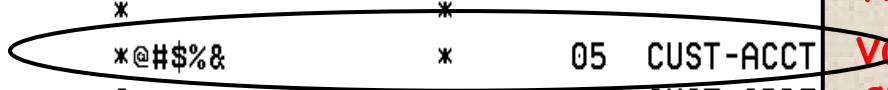
BLL=0000 has not been assigned an address

Off Hex Value Data Value Source (Starting a

BLL=0001 at address 00023F88

01	CUST-REC.
05	CUST-KEY.
10	CUST-
10	CUST-
10	FILLE
05	CUST-NAME
05	CUST-ACCT
05	CUST-ORDE
05	CUST-CITY
05	CUST-OCCU

0	F5F4F3F2	F1	*54321	*		
5	C3		*C	*		
6	40404040	404040	*	*		
D	C1A2A385	996B40C4	85A94040	40404040	*Aster, Dez	*
1D	40		*	*		
1E	7C7B5B6C	50	*@#\$\$%&	*		
23	0002		2	*		
25	E2A39699	94A840C6	819393A2	404040	*Stormy Falls	*
34	C481A381	40C595A3	99A840D6	97859981	*Data Entry Opera*	*
44	A3969940	40404040	40404040		*tor	*



F3

Debug Clues:

- ✓ Abended in program SAM2 because:
- ✓ CUST-ACCT-BALANCE had bad numeric data (it is part of CUST-REC)

Here is the the bad variable, CUST-ACCT-BALANCE

Return to program detail

Analyze an abend (15 of 20)

```
File View Services Help
Event 1 of 3: Call (DSA Address 20594) Command ==> bottom
JOBNAME: DNET845X SYSTEM ABEND: 0C7
```

What passed variable contained the bad data?

The source code below was executed via the following sequence of PERFORM statements:

```
Source
Line #
000261 PERFORM 100-PROCESS-TRANSACTIONS
000278 PERFORM 200-PROCESS-PRINT-TRAN
000299 PERFORM 210-PROCESS-CUSTFILE-RECORD
```

COBOL Source Code:

```
Source
Line #
000311 * SUBROUTINE SAM2 WILL COLLECT CUSTOMER STATISTICS
000312 CALL 'SAM2' USING CUST-REC,
000313 CUSTOMER-BALANCE-STATS
```

This is the CALL statement

Data Field Declarations:

Source

Enter

Debug Clues:

- ✓ Abended in program SAM2 because:
- ✓ CUST-ACCT-BALANCE has bad numeric data (it is part of CUST-REC), which was passed from a calling program
- ✓ SAM1 called SAM2

Go look at the passed data

Analyze an abend

```

File View Services Help
Associated Storage Areas
Command ==>
JOBNAME: DNET845X SYSTEM ABEND: 0C7

Task Global Table (TGT) at address 000088

FILE SECTION (File CUSTFILE)
- Collapse hex

Off Hex Value          Data Value          Source (Starting
BLF=0000 at address 00023F88

0 F5F4F3F2 F1          *54321              *
5 C3                   *C                  *
6 40404040 404040      *                   *
D C1A2A385 996B40C4 85A94040 40404040 *Aster, Dez        *
1D 40                  *                   *
1E 7C7B5B6C 50        *@#$$%&            *
23 0002                2                   *
25 E2A39699 94A840C6 819393A2 404040 *Stormy Falls      *
34 C481A381 40C595A3 99A840D6 97859981 *Data Entry Opera*
44 A3969940 40404040 40404040 *tor                *

```

It is in File Section. What does that indicate?
 What is the file DD name?

FILE SECTION (File CUSTFILE)

The bad data

*@#\$\$%&

F3

Debug Clues:

- ✓ Abended in program SAM2 because:
- ✓ CUST-ACCT-BALANCE has bad numeric data, which was passed from a calling program
- ✓ SAM1 called SAM2
- ✓ SAM1 passed bad data in CUST-REC

Here is CUST-REC

Analyze an abend

```

File View Services Help
File Information
Command ==>
JOBNAME: DNET845X  SYSTEM ABEND: 0C7  DEMOMVS  2010/02/23  15:45:0
Line 1 Col 1 8
Scroll ==> PAG

File Name . . . . . : CUSTFILE
Data Set Name . . . . . : DNET845.ADLAB.FILES(CUST2FA)
File Attributes . . . . . : ORGANIZATION=SEQUENTIAL, ACCESS MODE=SEQUENTIAL
                           RECFM=FIXED
Last I/O Function . . . . . : READ
Open Status . . . . . : INPUT
File Status Code. . . . . : 0

Previous Record . . . . . : Record data length 80
Address  Offset      Hex                               EBCDIC
00023F38          F2F4F0F9 F0D7D7D6 F0F0F9F4 F5D78981 *24090PP000945Pia*
00023F48      +10  95964040 40404040 40404040 40404040 *no *
00023F58      +20  40404040 4040F2F0 F0F560F0 F760F0F5 * 2005-07-05*
00023F68      +30  0001F2F0 F0F660F1 F260F2F7 40404040 *..2006-12-27 *
00023F78      +40  40404040 40404040 40404040 40404040 * *

Current Record. . . . . : Record data length 80
Address  Offset      Hex                               EBCDIC

```

What is the full name of the CUSTFILE file?

DNET845.ADLAB.FILES(CUST2FA)

INPUT

CUSTFILE is an input file

F8

- Debug Clues:
- ✓ Abended in program SAM2 because:
 - ✓ CUST-ACCT-BALANCE has bad numeric data, which was passed from a calling program
 - ✓ SAM1 called SAM2
 - ✓ SAM1 passed bad data in CUST-REC
 - ✓ The bad data was read from file CUSTFILE

Analyze an abend

```

File View Services Help
File Information
Command ==>
JOBNAME: DNET845X SYSTEM ABEND: 0C7 DEMOMVS 2010/02/23 15:45:
Current Record . . . . . : Record data length 80
Address Offset Hex EBCDIC
00023F88 F5F4F3F2 F1C34040 40404040 40C1A2A3 *54321C Ast*
00023F98 +10 85996B40 C485A940 40404040 40407C7B *er, Dez @#*
00023FA8 +20 5B6C5000 02E2A396 9994A840 C6819393 *$%&.Stormy Fall*
00023FB8 +30 A2404040 C481A381 40C595A3 99A840D6 *s Data Entry 0*
00023FC8 +40 97859981 A3969940 40404040 40404040 *perator *

Next Record . . . . . : Record data length 80
Address Offset Hex EBCDIC
00023FD8 F5F5F5F5 F5C34040 40404040 40C485D4 *55555C DeM*
00023FE8 +10 8195956B 40C8A487 88404040 40400001 *ann, Hugh ..*
00023FF8 +20 23400C00 03C68189 99A58985 A6404040 *. ...Fairview *
00024008 +30 40404040 D496A389 A581A389 96958193 * Motivational*
00024018 +40 40E29785 81928599 40404040 40404040 * Speaker *

Associated File Control Blocks

*** Bottom of data.
    
```

Here is the bad data in the record

- Debug Clues:
- ✓ Abended in program SAM2 because:
 - ✓ CUST-ACCT-BALANCE has bad numeric data, which was passed from a calling program
 - ✓ SAM1 called SAM2
 - ✓ SAM1 passed bad data in CUST-REC
 - ✓ The bad data was read from file CUSTFILE

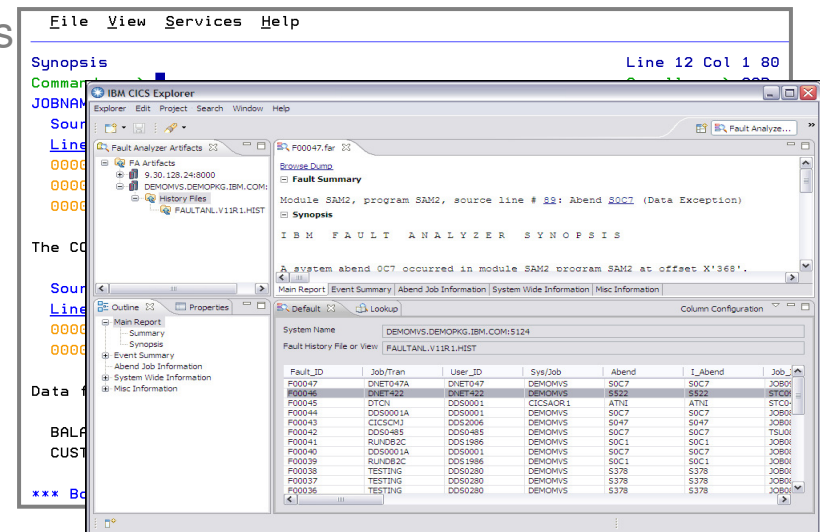
Fault Analyzer: What's new in version 12?

- **IBM Fault Analyzer** improves developer productivity and decreases deployment costs by helping to analyze and correct application failures quickly (CICS/DB2/IMS/MQ/COBOL/PLI/ASM/C/C++/ASM/JAVA).
- Develop and test new and existing applications more productively, helping to reduce costs along the way.
- Proven 3270-based interface and free graphical user interface.

What was released on May 11th?:

- Enhanced Java support
- Support for CICS TS V4.2
- Functional, usability, and security enhancements to the GUI plug-in that include improved integration with CICS Explorer, IMS Explorer, and the other Problem Determination Tools family of plug-ins
- A range of other enhancements to address key customer requirements

Announcement: April 24,12 GA: May 11, 12



The screenshot displays the IBM Fault Analyzer GUI. The main window shows a fault report for a system abend. The report includes a synopsis and a table of fault history.

Fault_ID	Job/Tran	User_ID	Sys/Job	Abend	I_Abend	Job
F00047	DNET047A	DNET047	DEMOHVS	S0C7	S0C7	JOBO1
F00046	DNERS02	DNERS02	DEMOHVS	S0C2	S0C2	91008
F00045	DTCN	DS0001	CICSACR1	ATN1	ATN1	STCO1
F00044	DS0001A	DS0001	DEMOHVS	S0C7	S0C7	JOBO1
F00043	CIC0001	DS0006	DEMOHVS	S047	S047	JOBO1
F00042	DS00485	DS00485	DEMOHVS	S0C7	S0C7	TSLO1
F00041	RUNDB2C	DS01966	DEMOHVS	S0C1	S0C1	JOBO1
F00040	DS0001A	DS0001	DEMOHVS	S0C7	S0C7	JOBO1
F00039	RUNDB2C	DS01966	DEMOHVS	S0C1	S0C1	JOBO1
F00038	TESTING	DS00280	DEMOHVS	S378	S378	JOBO1
F00037	TESTING	DS00280	DEMOHVS	S378	S378	JOBO1
F00036	TESTING	DS00280	DEMOHVS	S378	S378	JOBO1

Helps to identify the cause, analyze the failure, and fix the problem

Fault Analyzer for z/OS V12.1

- **Improvements to Eclipse plug-in:**
 - Subsystem \$\$INDEX cache access
 - RACF® passphrase support added
- **Java enhancements:**
 - Java information displays instance variable data.
 - Java information is displayed from SVC or SDUMP analysis.
- **Usability enhancements:**
 - Point-and-shoot-enabled abend codes are added to Fault Entry list display.
 - Improved options display from Fault Analyzer-supplied CICS transaction.
 - Consistency changes are made to UFM data structure.
 - Expand/collapse function is added to COBOL level 88 items.
- **General enhancements:**
 - Display of C variables is added when using DWARF files.
 - GenerateSavedReport option is added, enabling the creation and saving of a saved report in a fault entry.
 - IDIRLOAD DDname support is added, allowing for extended CSECT mapping.
 - Options specification is added to the environment variables _IDI_OPTS and _IDI_OPTSFIL.
 - 64-bit registers and machine instruction operands are shown with report event details.

Agenda

- Fault Analyzer
- Debug Tool
- Application Performance Analyzer
- File Manager

IBM Debug Tool 3270 and GUI based interfaces

Interfaces

- ISPF
- RDz
- CICS
- GUI

```

Session B - [24 x 80]
File Edit View Communication Actions Window Help
COBOL LOCATION: SAM1 initialization
Command ==>
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-----
1 *****
2 * PROGRAM: SAM1
3 * Sample program for the ENT
4 *
5 * AUTHOR : Doug Stout
6 * IBM PD TOOLS

LOG 0 +-----1-----2-----3-----4-----
0009
0010 EQA1872E An error occurred while opening file: I
0011 exist, or is not accessible.
***** BOTTOM OF LOG *****
PF 1: ? 2: STEP 3: QUIT 4: LIST
PF 7: UP 8: DOWN 9: GO 10: ZOOM

```

Name	Value
CURRENT-TIME	
CURRENT-HOUR	rr
CURRENT-MINUTE	rr
CURRENT-SECOND	rr
CURRENT-HNDSEC	rr

```

Line 252 Column 1 Insert Browse
251 ACCEPT CURRENT-DATE FROM DATE.
252 ACCEPT CURRENT-TIME FROM TIME.
253 DISPLAY 'SAM1 STARTED DATE = ' CURRENT-MONTH '/'
254 CURRENT-DAY '/' CURRENT-YEAR ' (mm/dd/yy) '.
255 DISPLAY ' TIME = ' CURRENT-HOUR ':'
256 CURRENT-MINUTE ':' CURRENT-SECOND.
257
258 PERFORM 900-OPEN-TRAN-AND-RPT-FILES.
259 PERFORM 800-INIT-REPORT .
260

```

Debug Console: EQA2458I SVC Screening is disabled by EQAOPTS. Handling of non-LE event... EQA2383I The environment is not yet fully initialized. Use Step or Run.

Sample Features

- 64-bit register support Assembler
- Dynamic patching
- Save and restore sessions settings
- Object level disassembly debugging



The Debug Tool Perspective

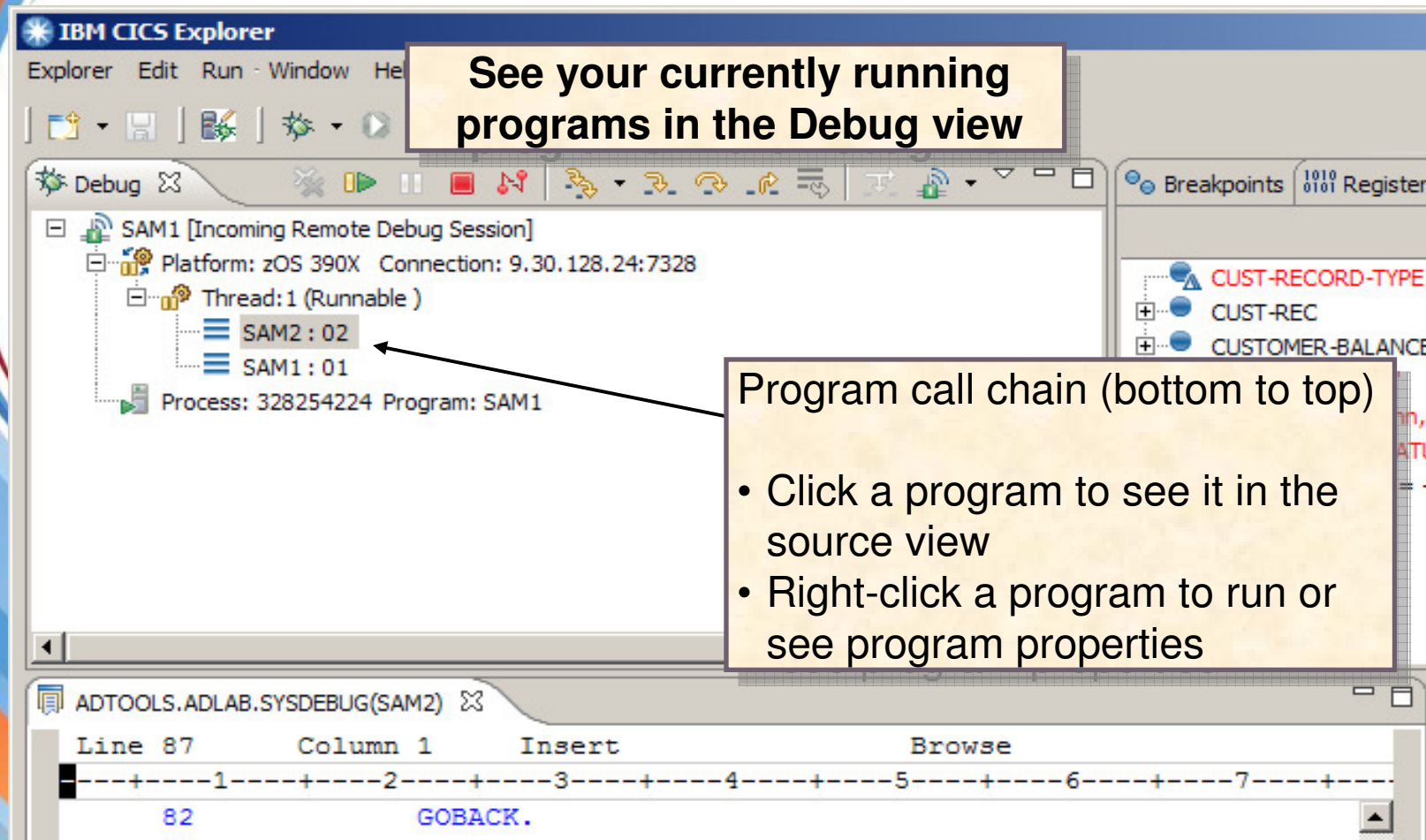
The screenshot displays the IBM CICS Explorer interface during a debug session. The main window is titled "IBM CICS Explorer" and shows a "Debug Demo" session. The interface is divided into several panes:

- Program Stack:** Located in the top-left pane, it shows the current thread and process information. A callout box labeled "Program Stack" points to this area.
- Monitors and Listings:** Located in the top-right pane, it displays a list of active monitors and their values. A callout box labeled "Monitors and Listings" points to this area.
- Active Source Code:** Located in the middle-left pane, it shows the source code of the program being debugged. A callout box labeled "Active Source Code" points to this area.
- Variables Display:** Located in the middle-right pane, it shows a table of variables and their values. A callout box labeled "Variables Display" points to this area.
- The Debug perspective when a program is being debugged:** Located in the bottom-left pane, it shows the debug console with various messages. A callout box labeled "The Debug perspective when a program is being debugged" points to this area.

Name	Value
BALANCE-COUNT	+00000000.00
WS-FIELDS	
WS-PROGRAM-STATUS	'CALCULATING BALANCE STATS'
WS-FIRST-TIME-SW	'Y'
WS-WORK-NUM-1	+00000000

```
EQA2268I *** User preferences file commands end ***
EQA2458I SVC Screening is disabled by EQAOPTS. Handling of non-LE events is not available. Debuggi
EQA2383I The environment is not yet fully initialized. Use Step or Run.
Program was stopped due to line/statement breakpoint at statement 312.
Program was stopped due to entry
```

The Debug view



See your currently running programs in the Debug view

Program call chain (bottom to top)

- Click a program to see it in the source view
- Right-click a program to run or see program properties



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ERROR: stackunderflow
OFFENDING COMMAND: ~

STACK: