Problem Determination for z Workloads

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Agenda

Problem Determination Tools Overview

The new GUI face of the IBM PD Tools

Fault Analyzer Interfaces

Debug Tool Interfaces

Application Performance Analyzer Interfaces

File Manager Interfaces

Summary

Q&A

Source: If applicable, describe source origin.

IBM Problem Determination Tools Suite for z/OS

Best of breed application development tooling

IBM Problem Determination Tools

IBM 2010 Offerings

- Debug Tool for z/OS V11
- File Manager for z/OS V11
- Fault Analyzer for z/OS V11
- Application Performance Analyzer for z/OS V11
- Workload Simulator for z/OS & OS/390
  - Rational Functional Tester Ext
  - Rational Performance Tester z/OS
- Optim Move for DB2
- Hourglass
- ISPF Productivity Tool

GUI interfaces

Proven Functionality

zIIP zAAP

RDZ Integration

WASz/Java

Data Privacy

Time Shifting

IMS v11 DB2 v9 CICS TS v4.1

ISPF Object Lists Command Lists

End-to-End Debug

SVC Dump Analysis

COBOL Modernization

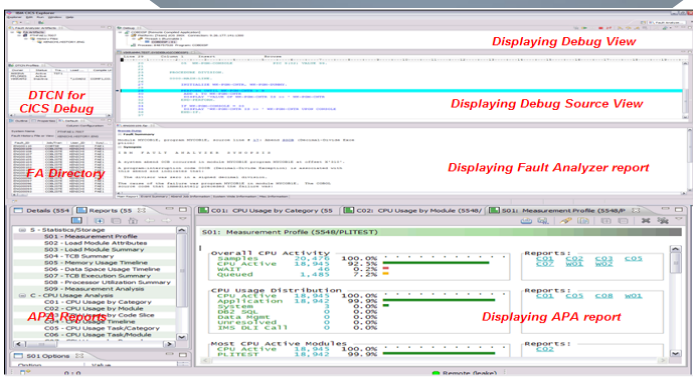
www.ibm.com/software/awdtools/deployment

The new GUI face of the IBM PD Tools

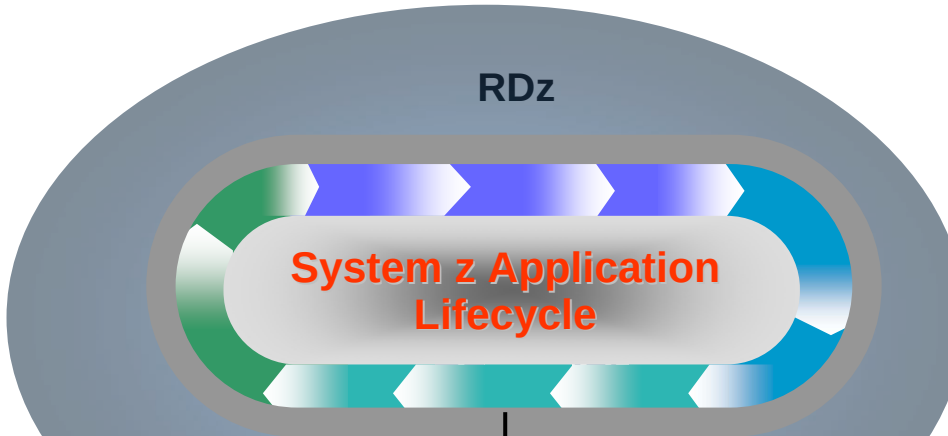
IBM Problem Determination Tools V11 GUIs

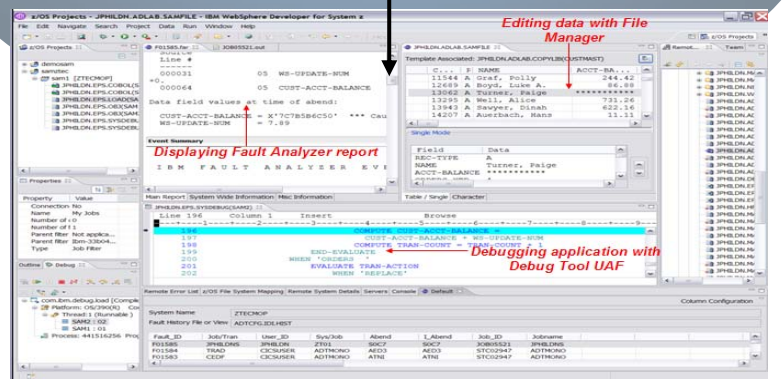
- The GUIs are available as plug-ins to CICS Explorer, or integrated with Rational Developer for System z

PD V10 GUI plug-ins in CICS Explorer

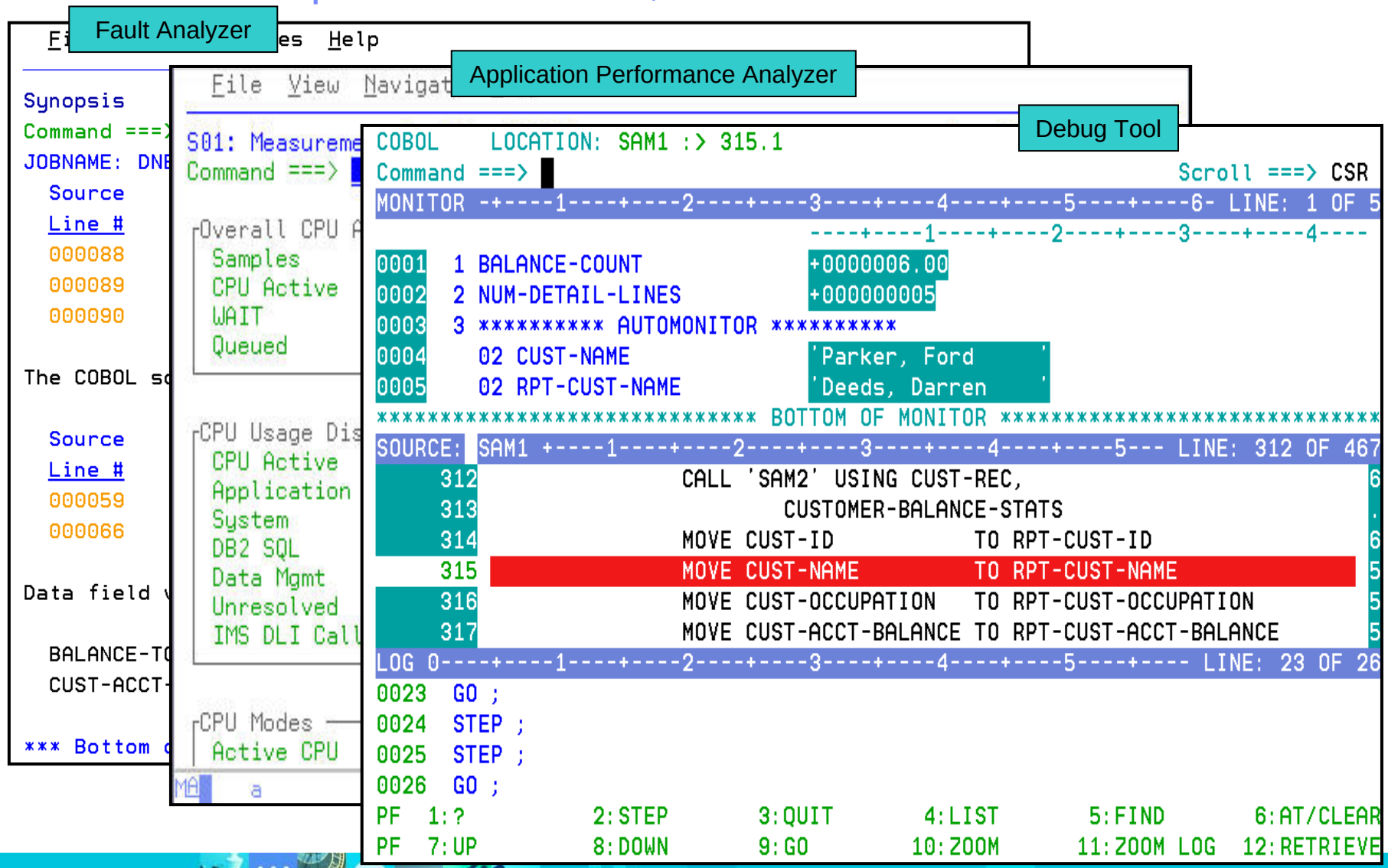


RDz

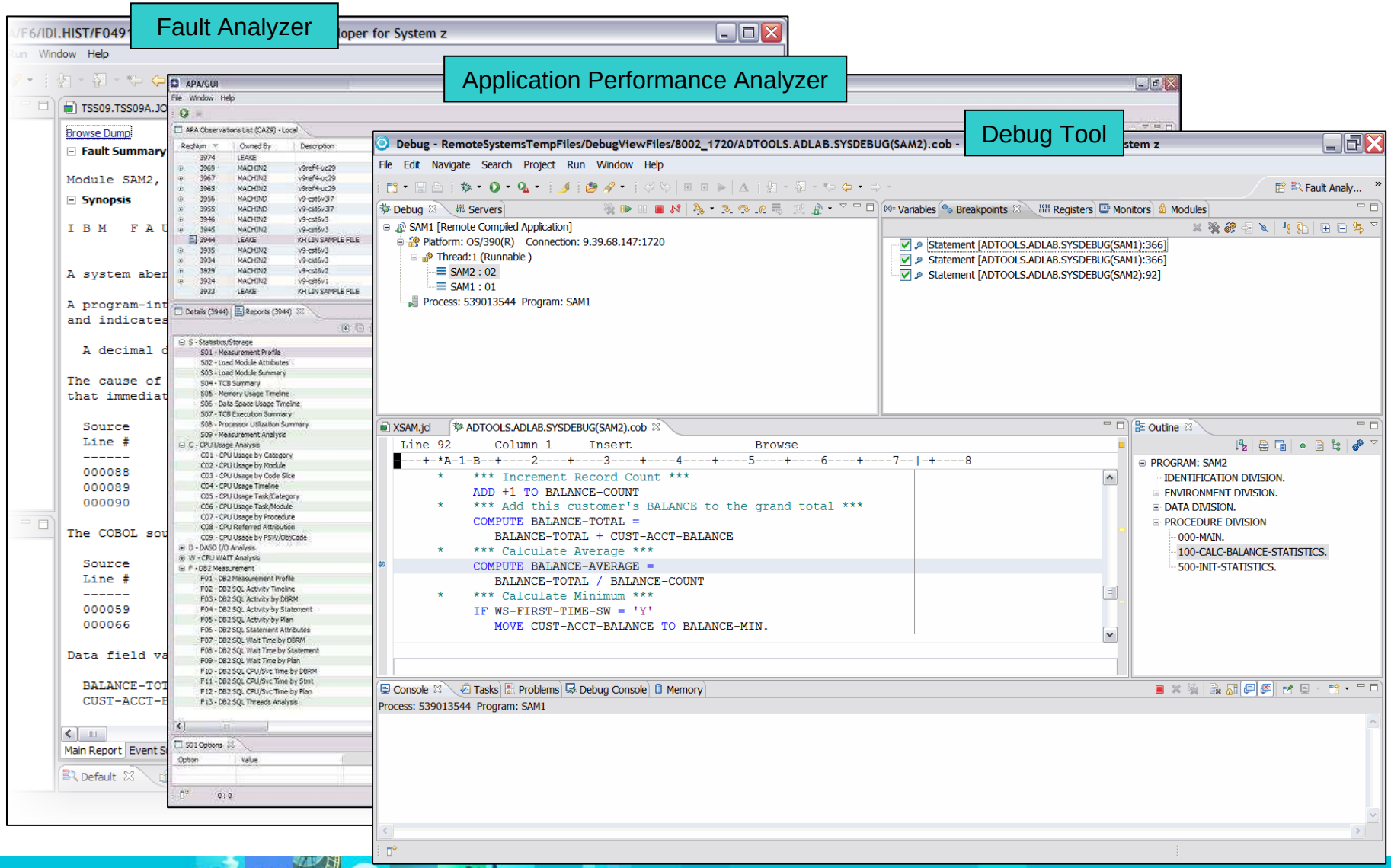




The tools also provide excellent, traditional 3270-based interfaces



Many of the tools have graphical user interfaces



IBM CICS Explorer™

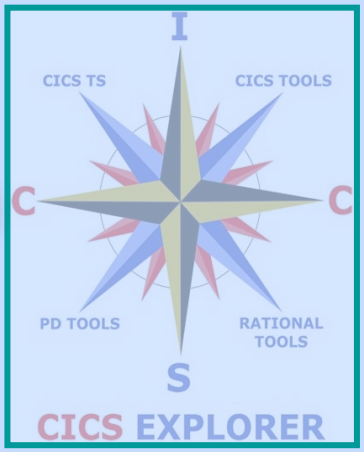
Threadsafe, File, CPU, Response Time analysis Graphical and Sheet views
PA

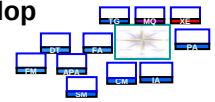
Daemon & Connection Status & Test
TG

Configuration Status Control, Test
MQ

Status Situations Topology
XE

New!



Develop Test Etc

RDz

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

Execution Tree Dependencies Queries Command Flow
IA

Deployment Discovery, Visualization, Automation & Control
DA

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

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

CRUD/Install History, Audit Backout Search, Compare
CM

CRUD/Install Control, Filter Topology Events, ATOM
SM

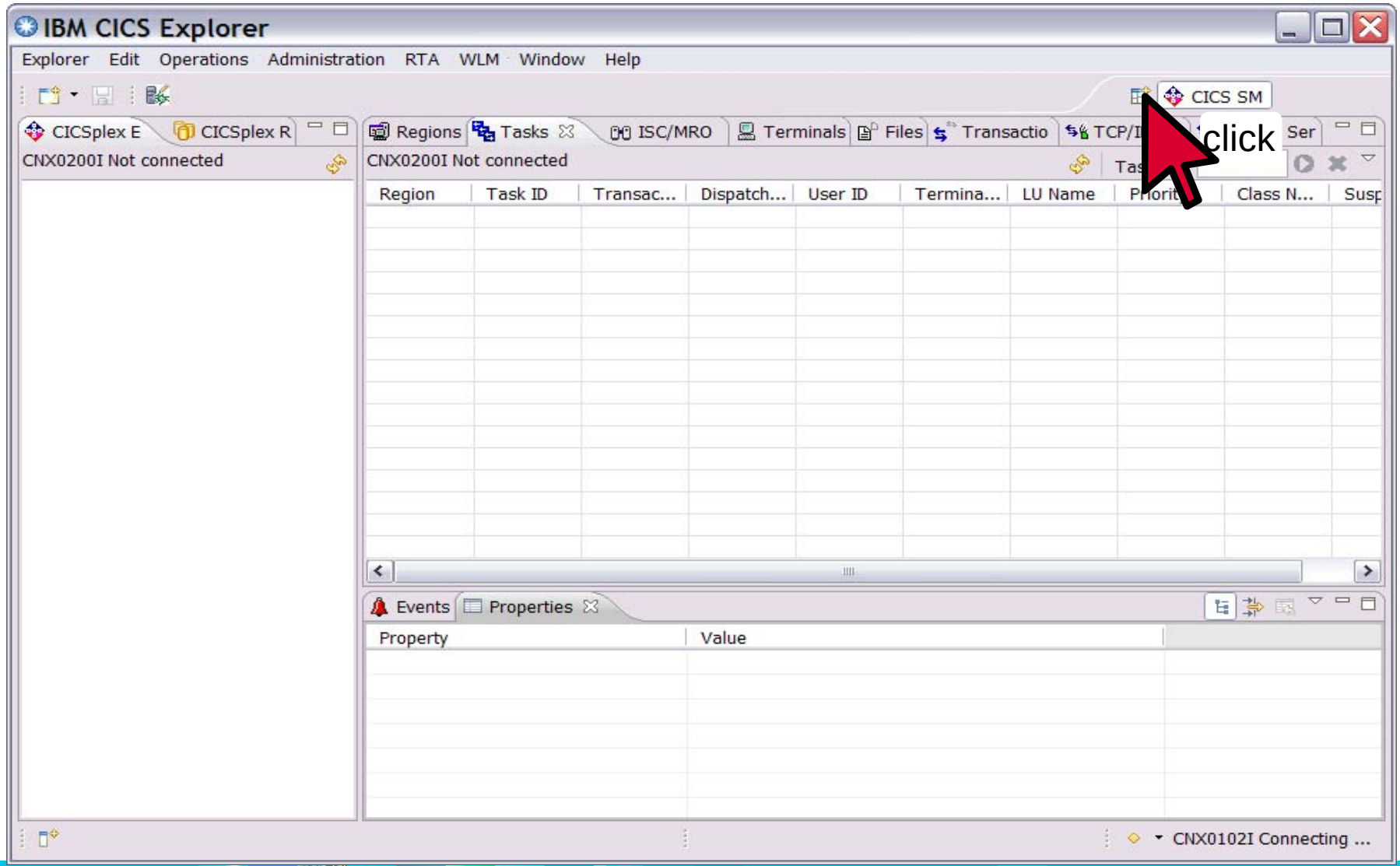
ibm.com/cics/tools
ibm.com/cics/explorer
ibm.com/cics/explorer/download

SM	CICS Transaction Server
IA	CICS Interdependency Analyzer
PA	CICS Performance Analyzer
CM	CICS Configuration Manager
DA	CICS Deployment Assistant
TG	CICS Transaction Gateway

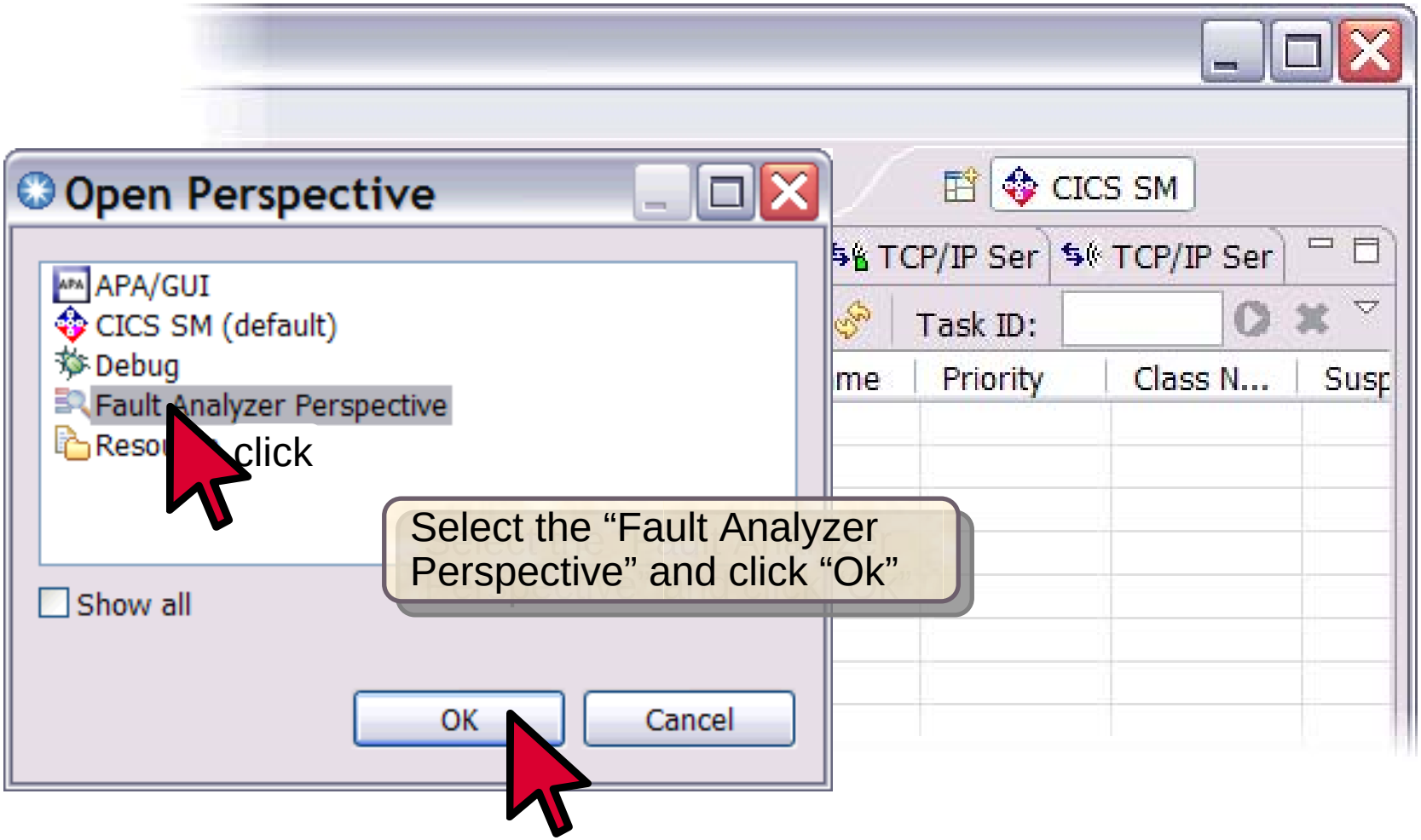
CICS TS

APA FA DT	Application Performance Analyzer Fault Analyzer Debug Tool
MQ	WebSphere MQ
XE	OMEGAMON XE for CICS
RDz	Rational Developer for System z

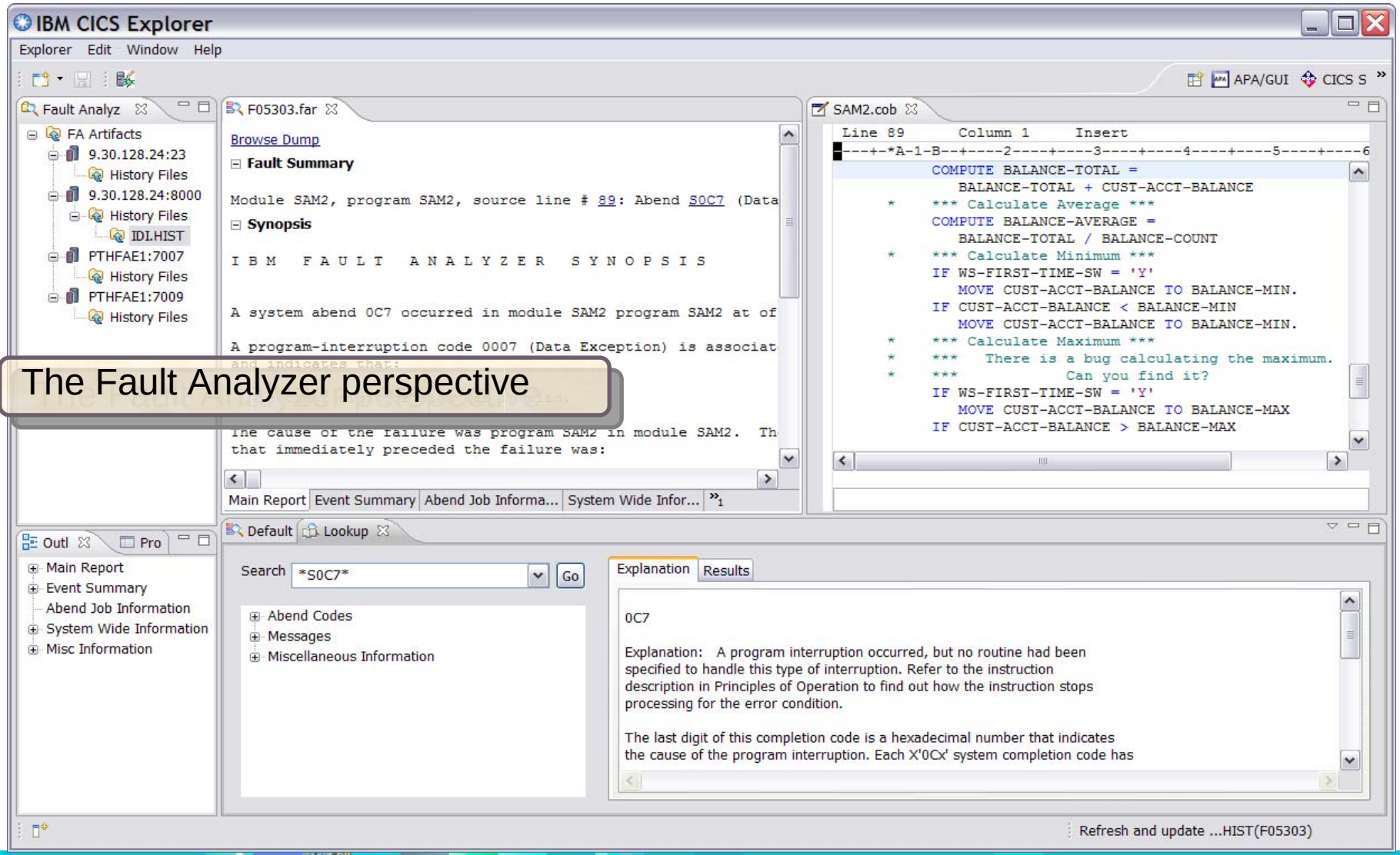
Open a "perspective" in CICS Explorer



Select a PD Tools perspective



An example of a PD Tools GUI in CICS Explorer



The Fault Analyzer perspective

The Fault Analyzer Interfaces

Fault Analyzer - Helps you rapidly pinpoint why and where an application failed

IBM Problem Determination Tools

IBM 2010 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
- Optim Move for DB2
- Hourglass
- ISPF Productivity Tool

www.ibm.com/software/awdtools/deployment

Fault Analyzer for zOS Highlights

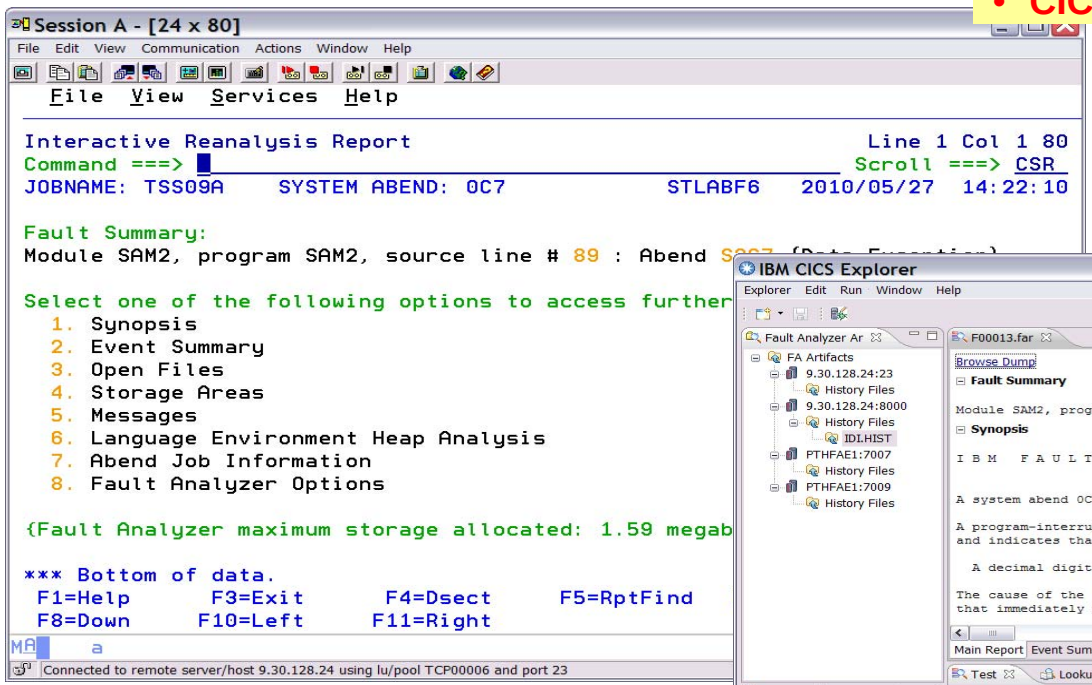
- Automatic program abend capture and reporting
- Program source-level reporting
- Multiple languages and zOS environments including CICS, DB2, IMS, Enterprise PL/I, Enterprise COBOL, C/C++, HLASM, JAVA and WebSphere Application Server for z/OS systems
- Provides a detailed report about program failures to help resolve them quickly
- Enables you to track and manage application failures and fault reports
- Offers a view of storage contents, trace tables and terminal screen images at the time of failure to help speed corrective action
- Provides the ability to customize message descriptions to be used in failure reports
- Interface to File Manager
- Eclipsed-based GUI plug-in available for download

IBM Fault Analyzer

Multiple interfaces and modes of operation

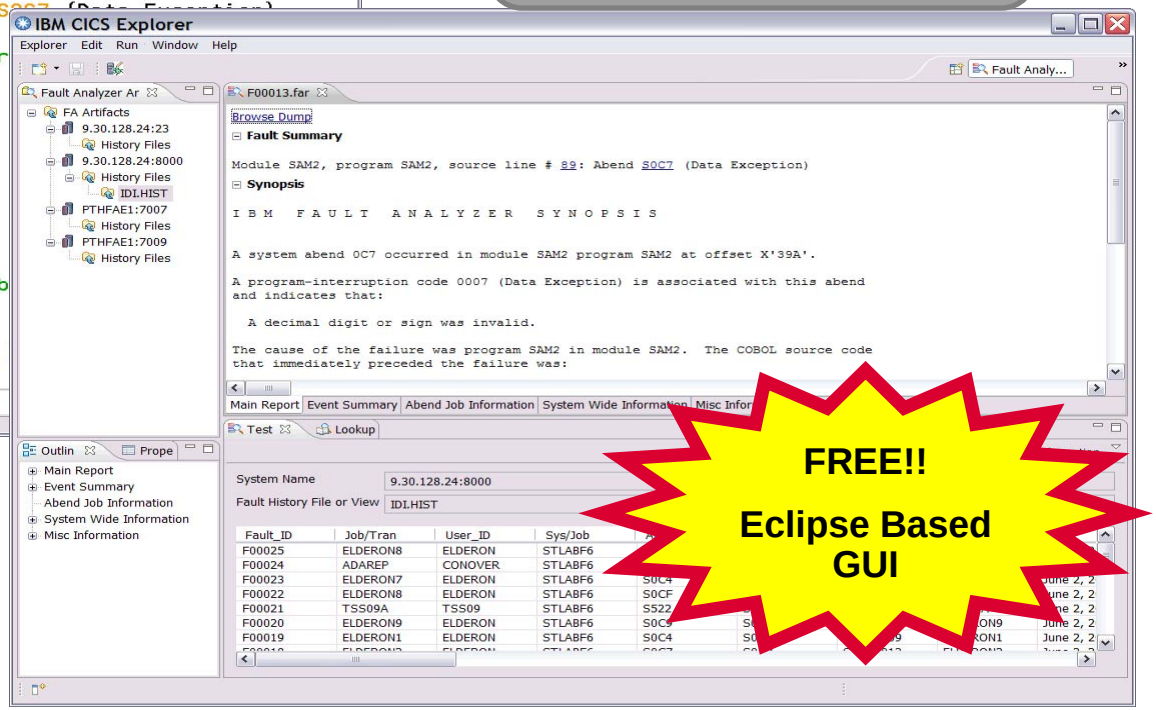
New in FA 11.1

- **Plug-in for CICS Explorer**
- **Java, C/C++, and Enterprise PL/I enhancements**
- **CICS support improvements**



Interfaces

- ISPF
- RDz
- GUI
- CICS
- Web



FREE!!

Eclipse Based GUI

Modes Of Operation

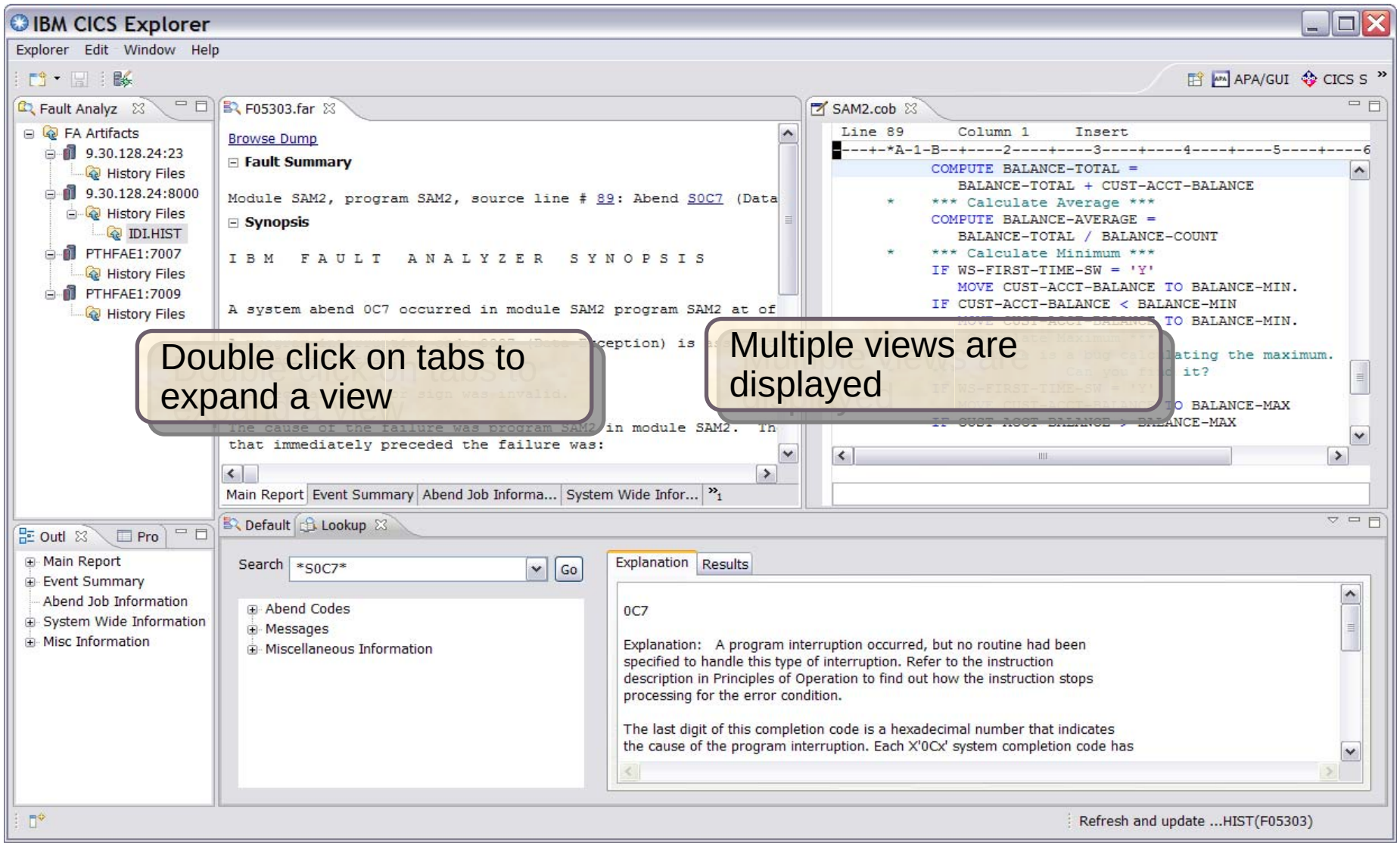
- Real-time analysis
- Batch dump re-analysis
- Interactive dump re-analysis

The Fault Analyzer GUI Interface

Fault Analyzer: What's new in version 11?

- The IBM Fault Analyzer Plug-in for Eclipse, when integrated with Fault Analyzer for z/OS and CICS Explorer, provides access to problem reports for diagnosing mainframe application errors and abends. Key features include:
  - An interface to manage views and multiple fault history files
  - The ability to browse fault entries that were created during real-time analysisof abending programs
  - A browser for browsing the dump storage associated with a fault entry
  - A source listing of abending programs using side files
- Java support enhancements:
  - Integration of Java stack trace information into the Fault Analyzer event list
  - Java source support where Java source is included in the abending jar file
- C/C++ Dwarf file support.
- Latest Enterprise PL/I sysdebug file support.
- Fault Entry size management improvements:
  - Fault Analyzer will no longer include un-referenced storage pages in the minidump portion of a Fault Entry.
  - An option to control the size of the CICS trace table included from SDUMP analysis.
  - Support for CICS EXCI calls made from the Fault Analyzer listing exit.
  - CICS Auxiliary trace data set interpretation and viewing.
  - Enhancements to ISPF history file management operations to be similar to IDIUTIL.

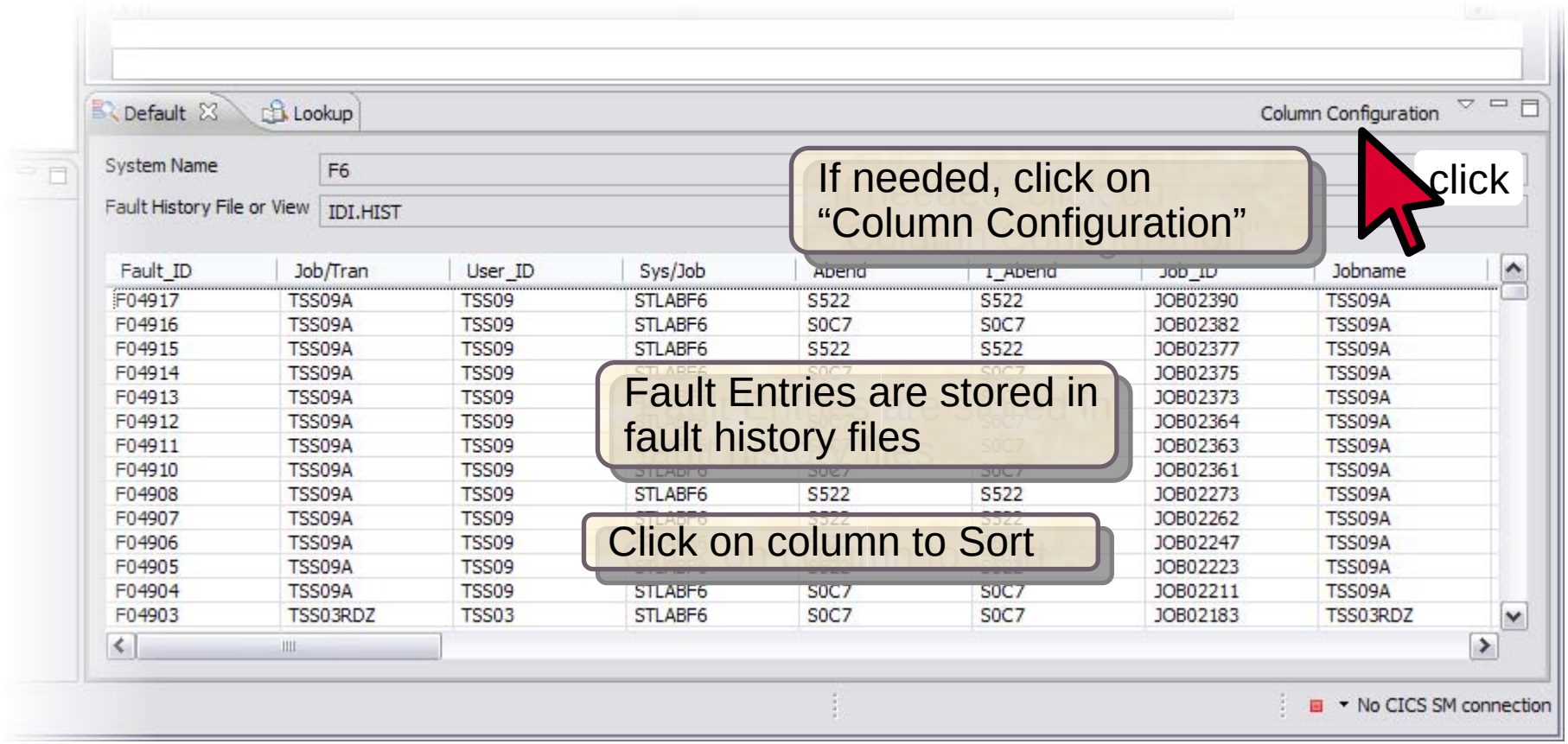
Fault Analyzer Interface inside CICS Explorer



Double click on tabs to expand a view

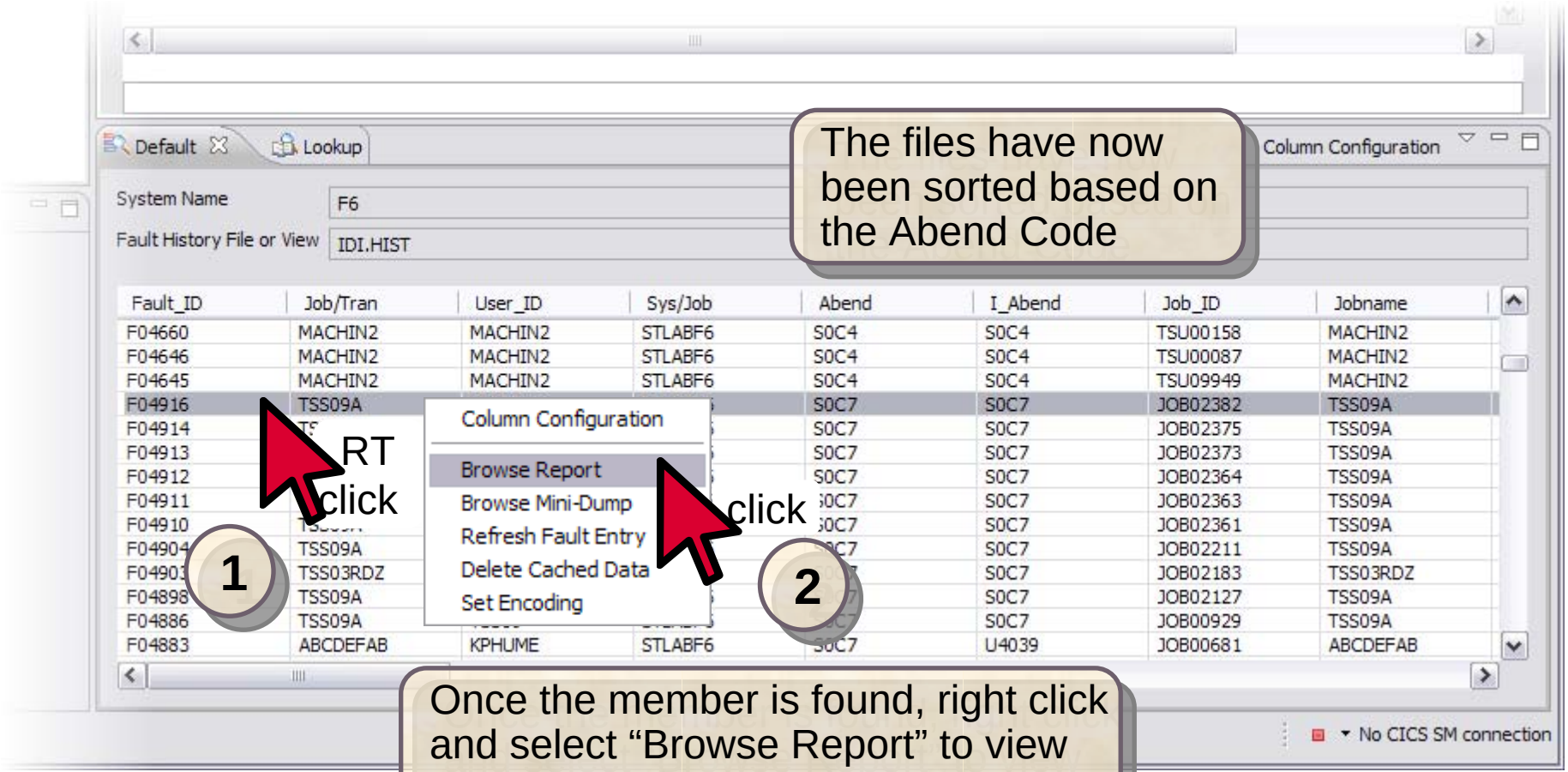
Multiple views are displayed

Default Fault History File View



Fault_ID	Job/Tran	User_ID	Sys/Job	Abend	I_Abend	Job_ID	Jobname
F04917	TSS09A	TSS09	STLABF6	S522	S522	JOB02390	TSS09A
F04916	TSS09A	TSS09	STLABF6	S0C7	S0C7	JOB02382	TSS09A
F04915	TSS09A	TSS09	STLABF6	S522	S522	JOB02377	TSS09A
F04914	TSS09A	TSS09				JOB02375	TSS09A
F04913	TSS09A	TSS09				JOB02373	TSS09A
F04912	TSS09A	TSS09				JOB02364	TSS09A
F04911	TSS09A	TSS09				JOB02363	TSS09A
F04910	TSS09A	TSS09				JOB02361	TSS09A
F04908	TSS09A	TSS09	STLABF6	S522	S522	JOB02273	TSS09A
F04907	TSS09A	TSS09				JOB02262	TSS09A
F04906	TSS09A	TSS09				JOB02247	TSS09A
F04905	TSS09A	TSS09				JOB02223	TSS09A
F04904	TSS09A	TSS09	STLABF6	S0C7	S0C7	JOB02211	TSS09A
F04903	TSS03RDZ	TSS03	STLABF6	S0C7	S0C7	JOB02183	TSS03RDZ

Opening a Fault Entry



The files have now been sorted based on the Abend Code

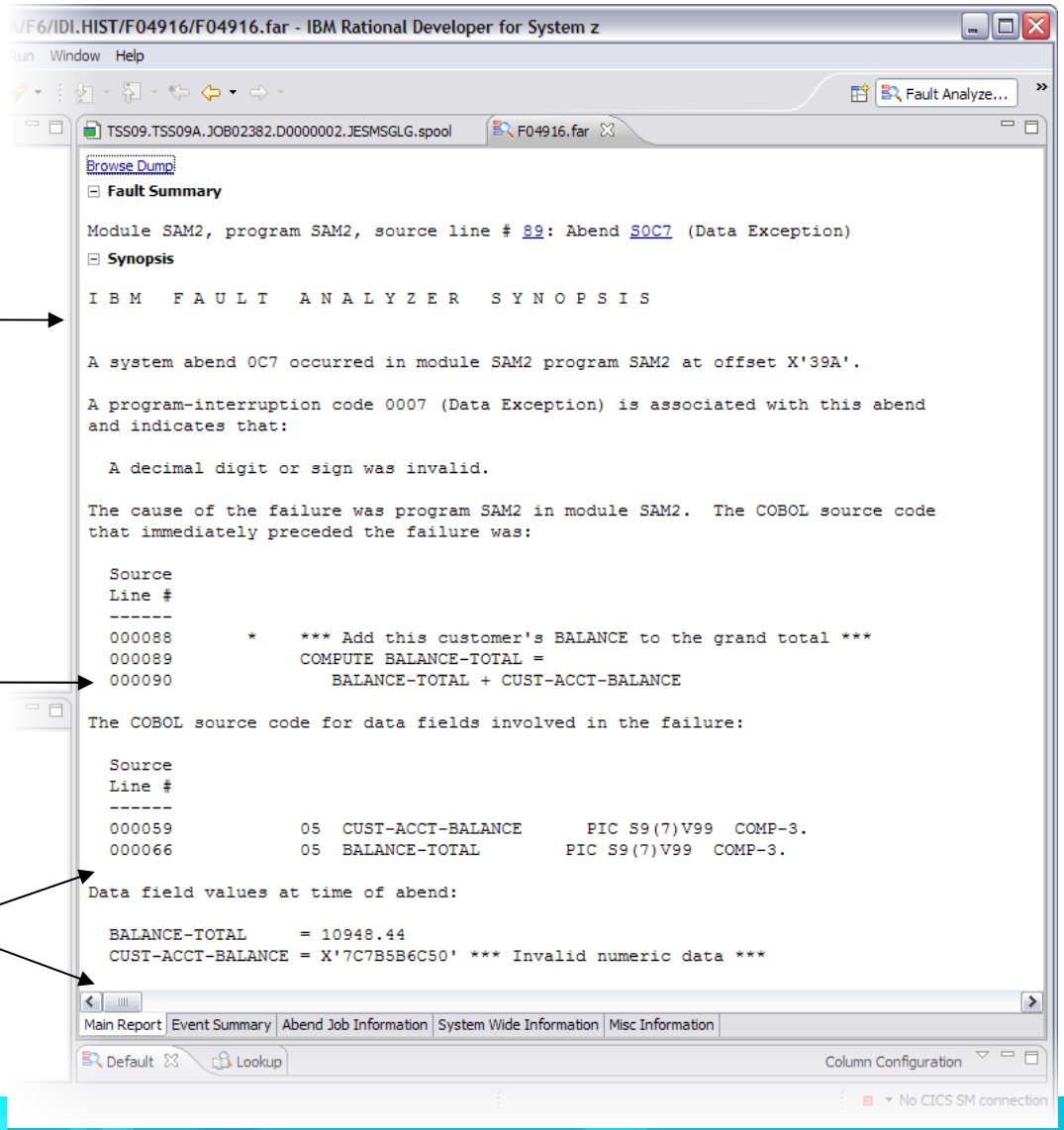
Once the member is found, right click and select “Browse Report” to view the Fault Analyzer Report

Fault Analyzer Main Report

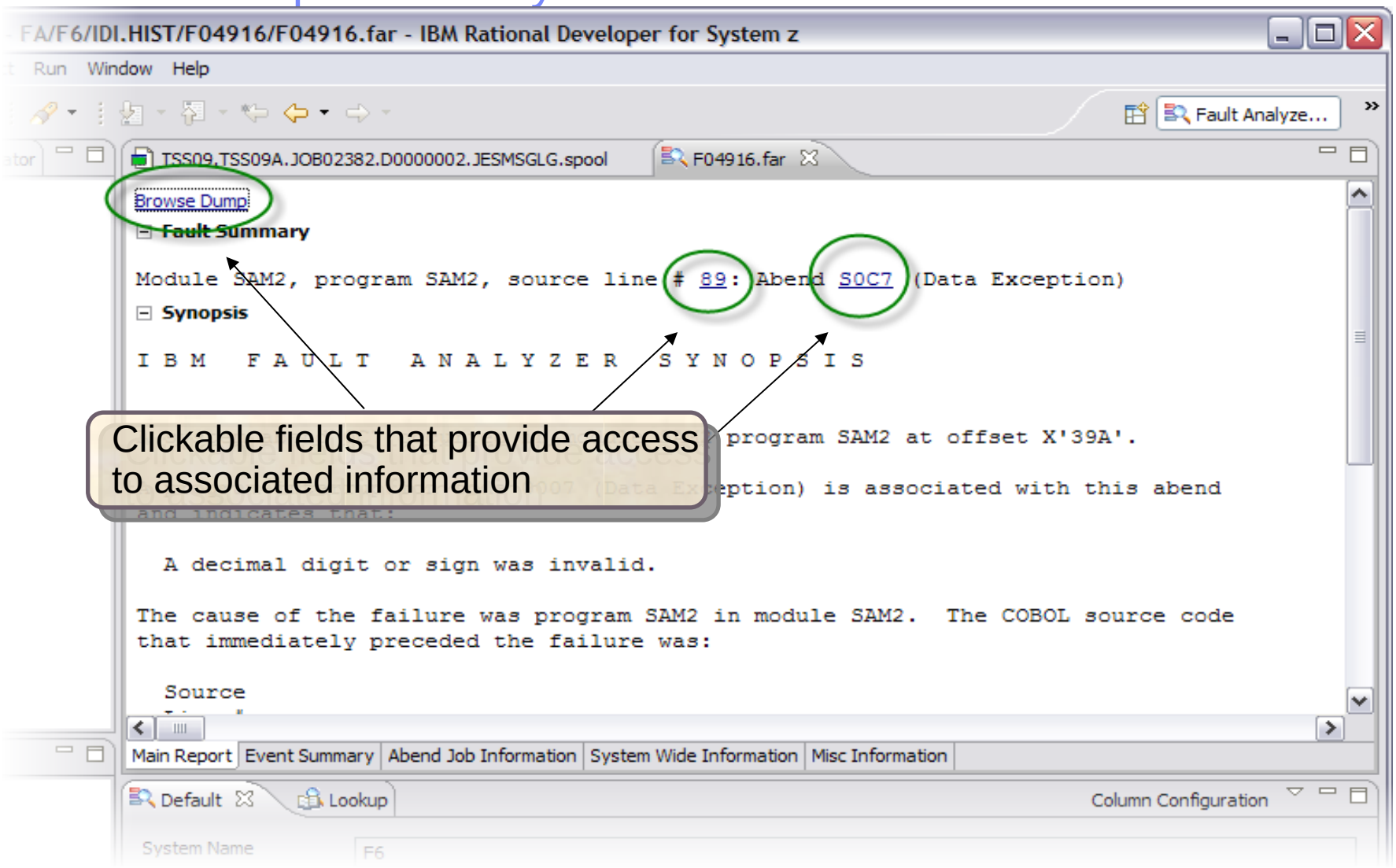
Fault Analyzer Synopsis

Source code that preceded the ABEND

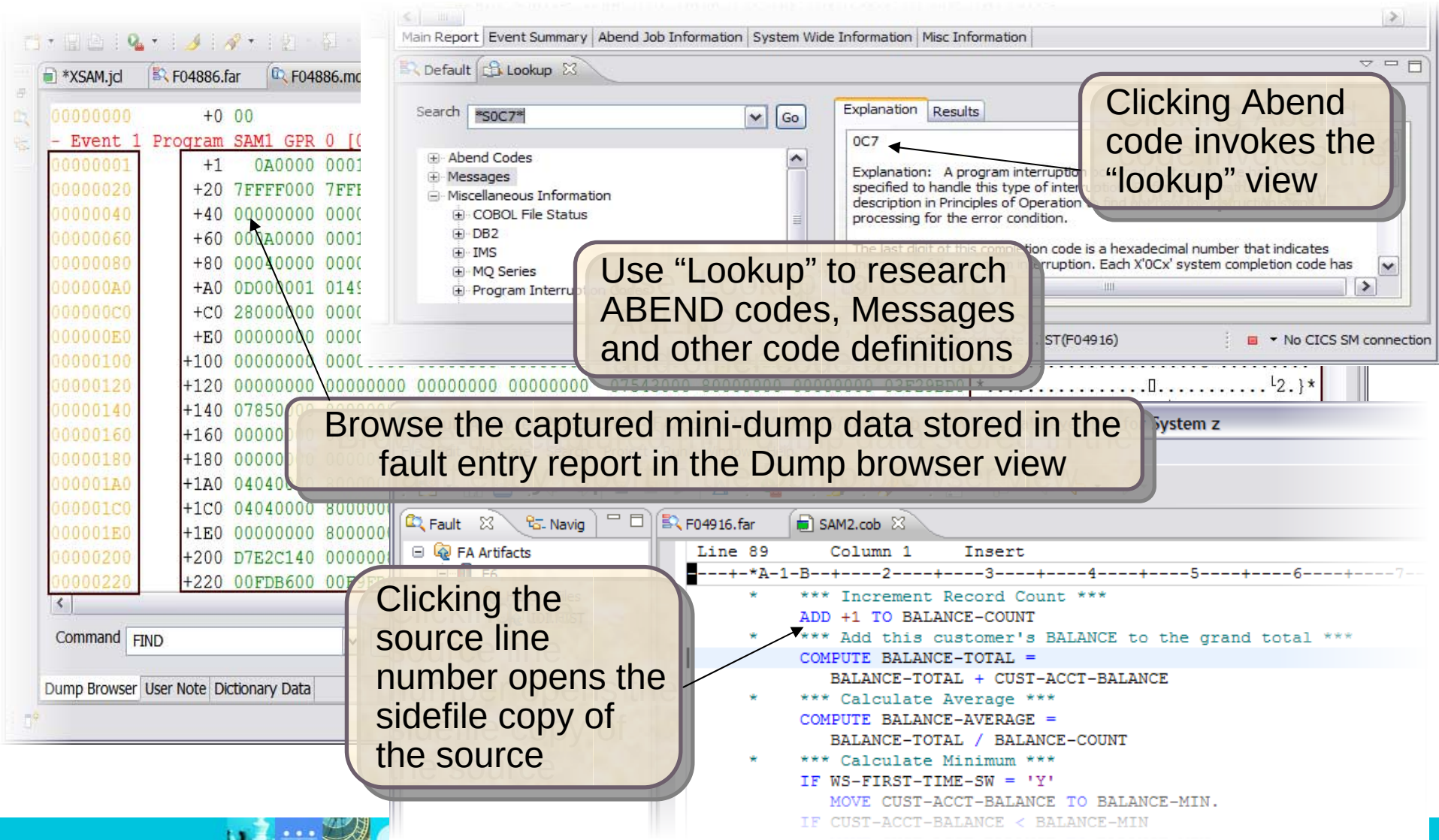
Data Field Information



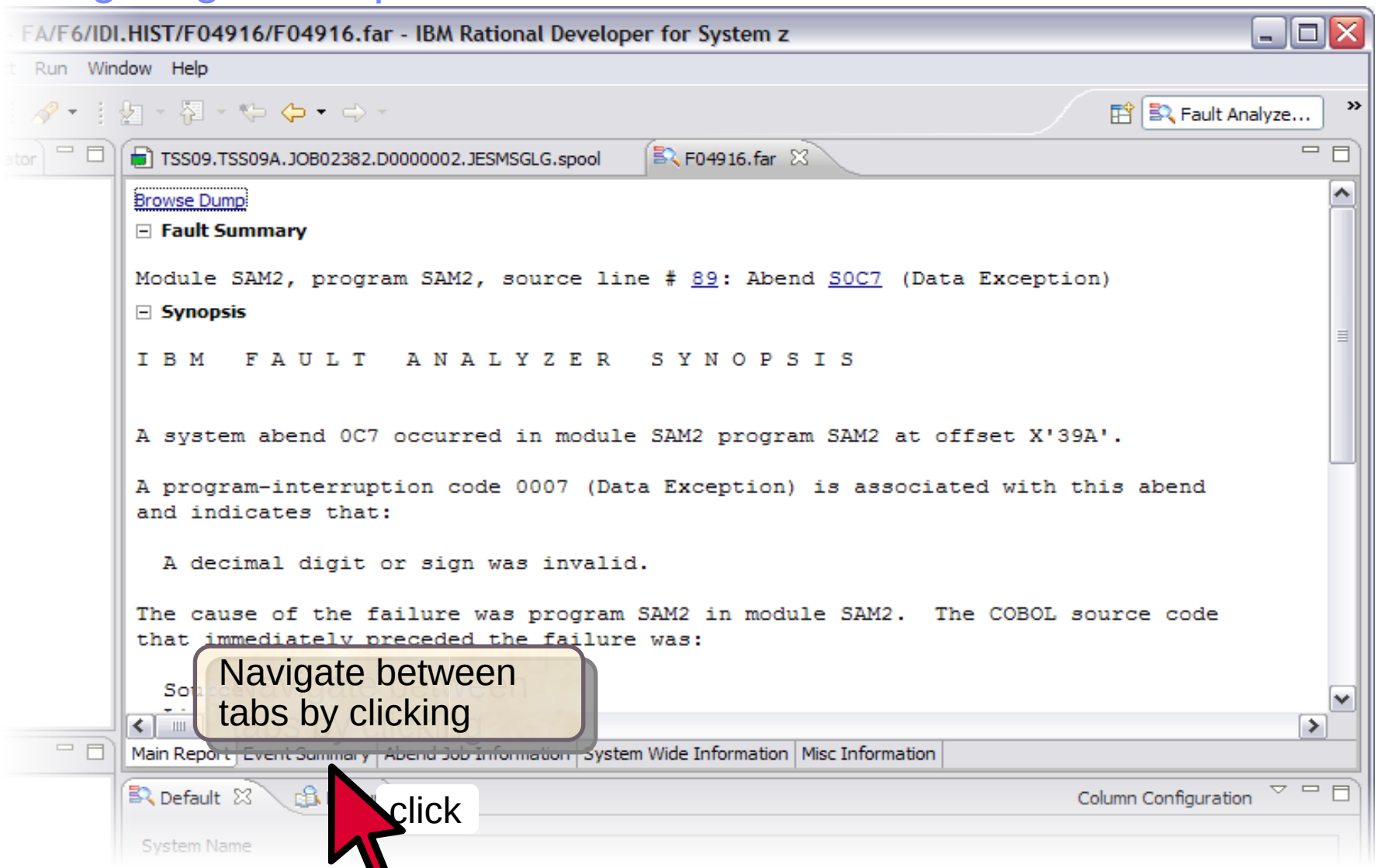
The Main Report "Hotkeys"



Results of clicking Hotkeys



Navigating the Report

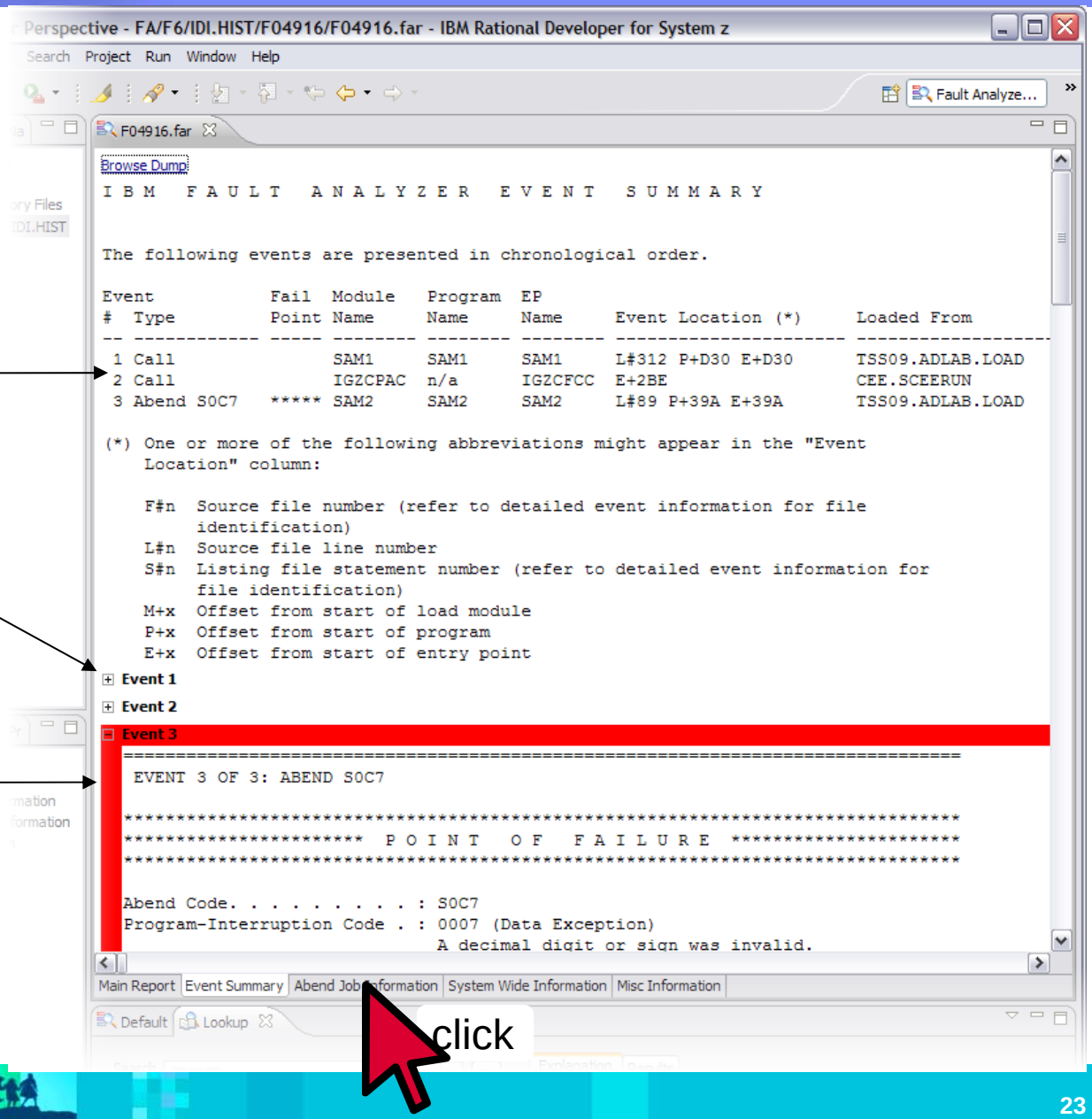


Event Summary View

Chronological order of events

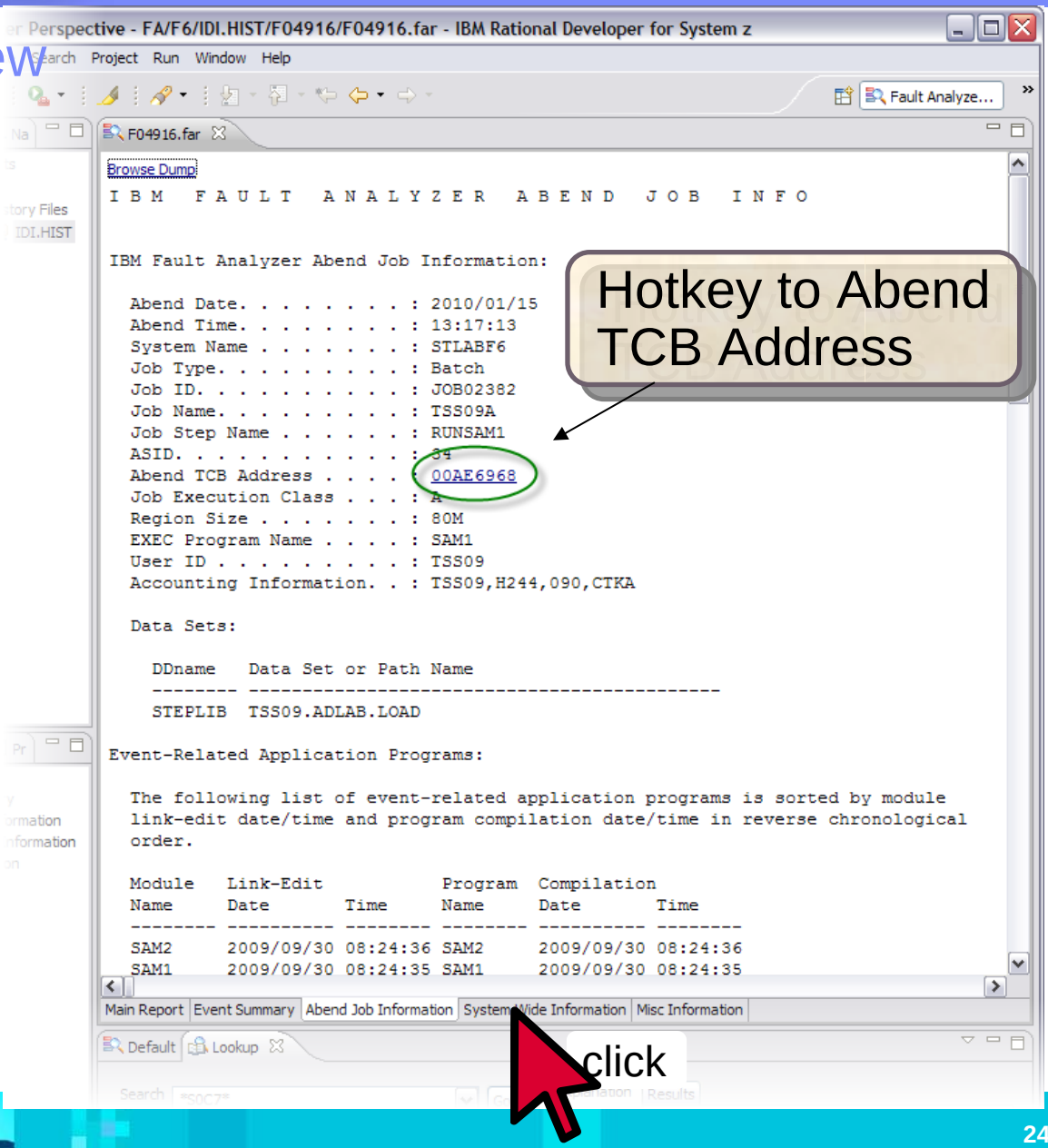
Expandable event details

Highlighted “POINT OF FAILURE” event details



Abend Job Information View

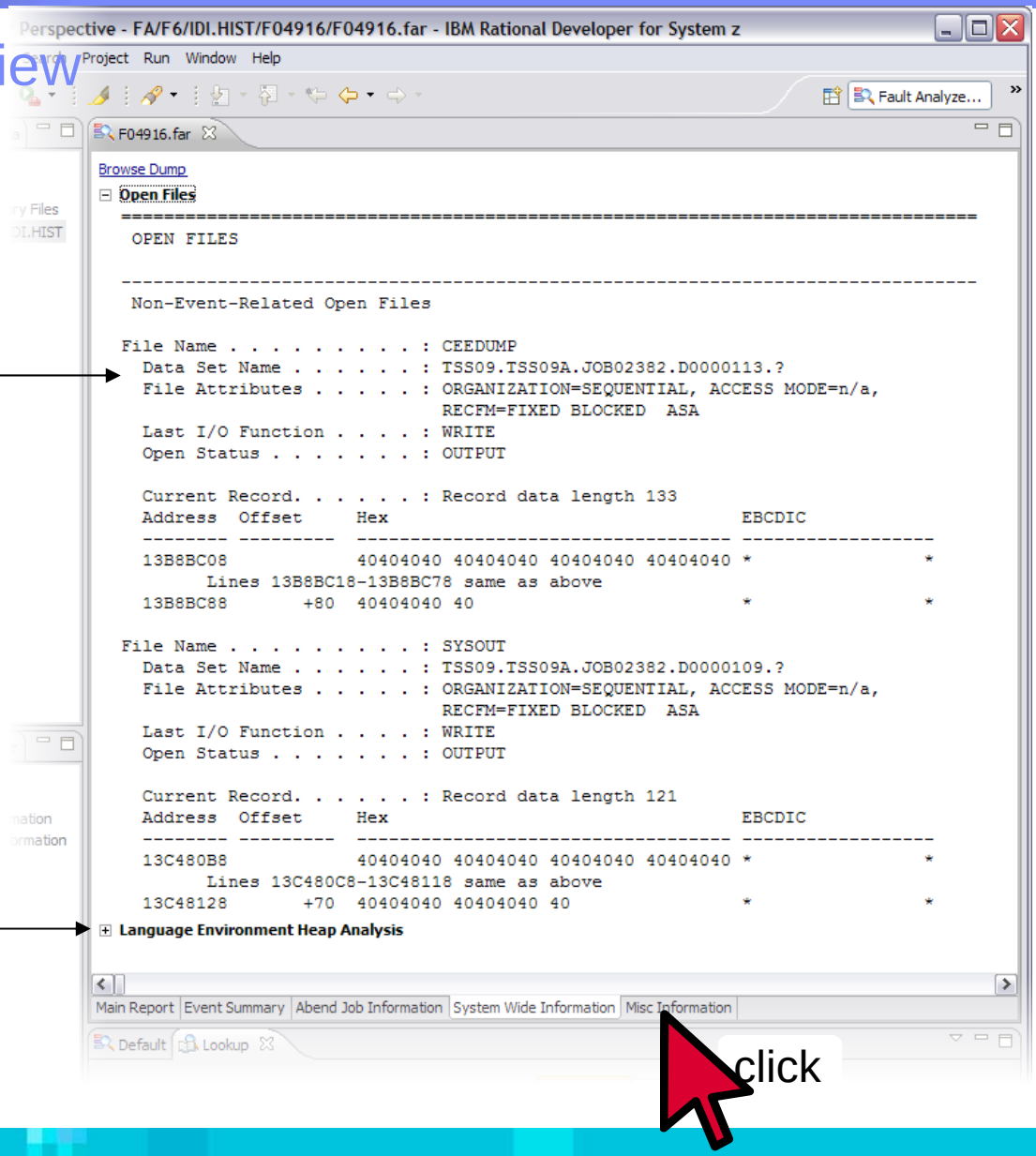
ABEND Job details



System Wide Information View

Open Files

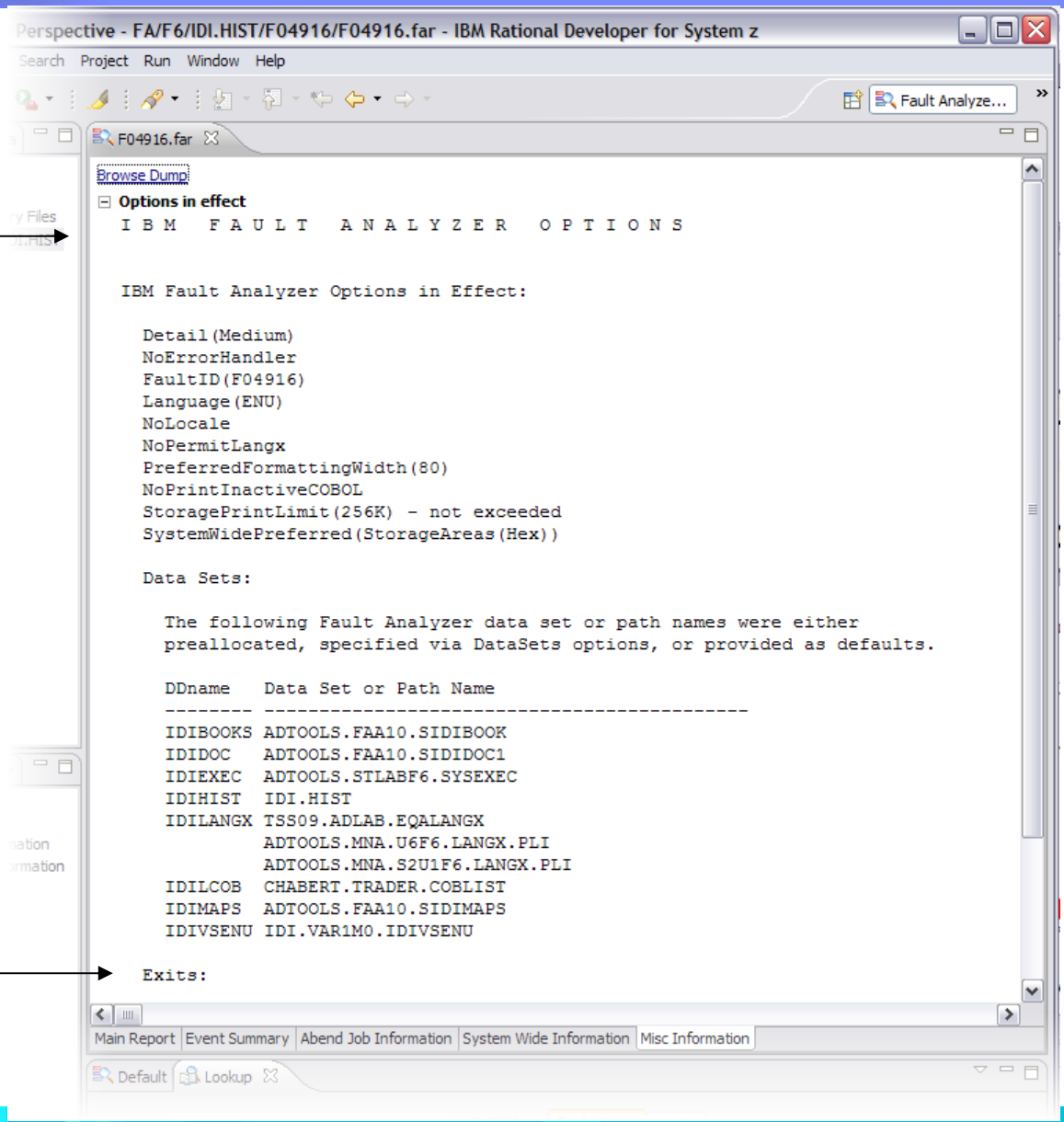
LE Heap Analysis



Misc Information View

Options in effect

Exits



The Fault Analyzer TSO Interface

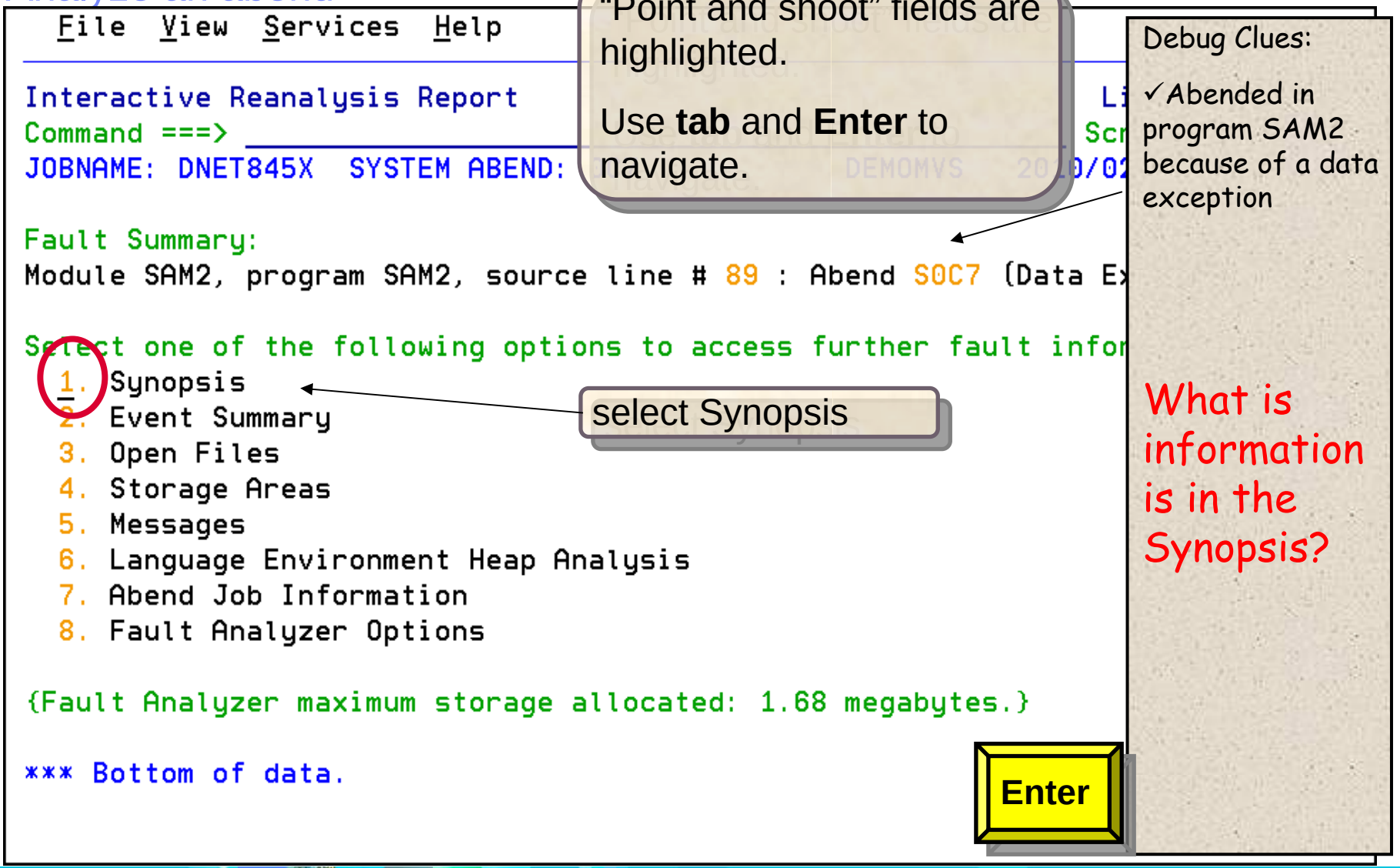
Using **Interactive reanalysis** to analyze an abend

```
  File  Options  View  Services  Help
IBM Fault Analyzer - Fault Entry List                          Col 1 80
Command ===>                                                ===> PAGE

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
i_  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

Enter

Analyze an abend



"Point and shoot" fields are highlighted.

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

select Synopsis

Enter

Debug Clues:

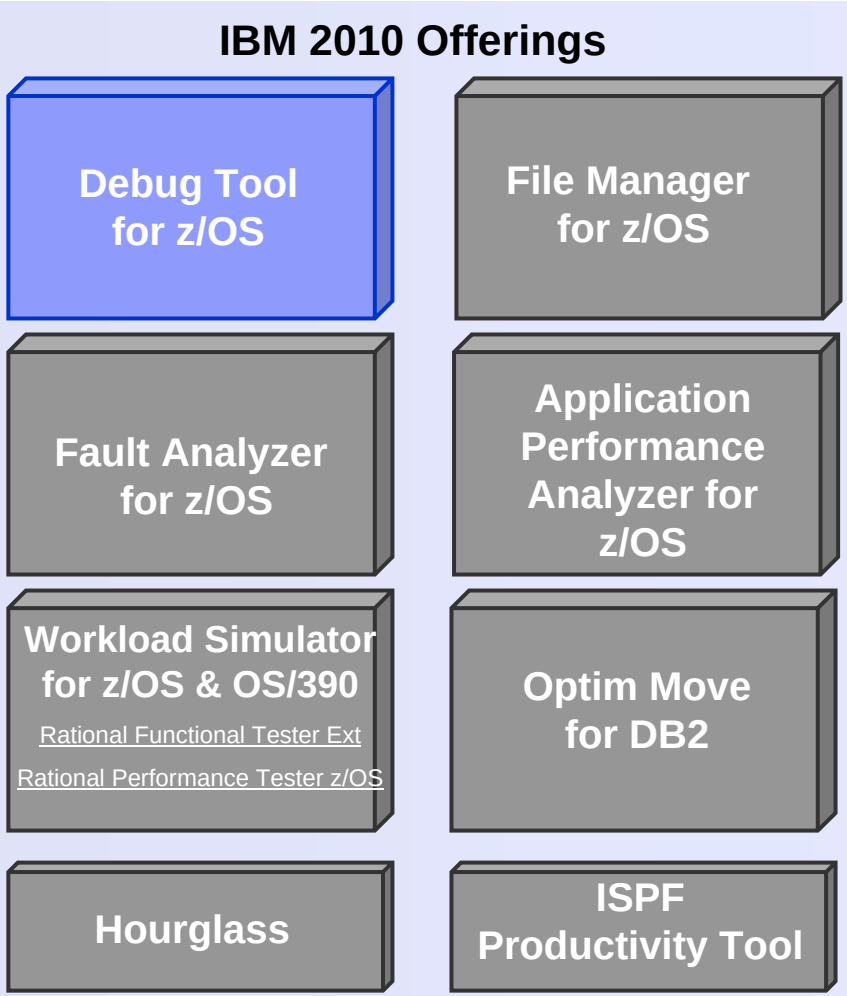
✓Abended in program SAM2 because of a data exception

What is information is in the Synopsis?

The Debug Tool Interface

Debug Tool – Debugging enterprise applications to isolate code problems

IBM Problem Determination Tools



www.ibm.com/software/awdtools/deployment

Debug Tool for zOS Highlights

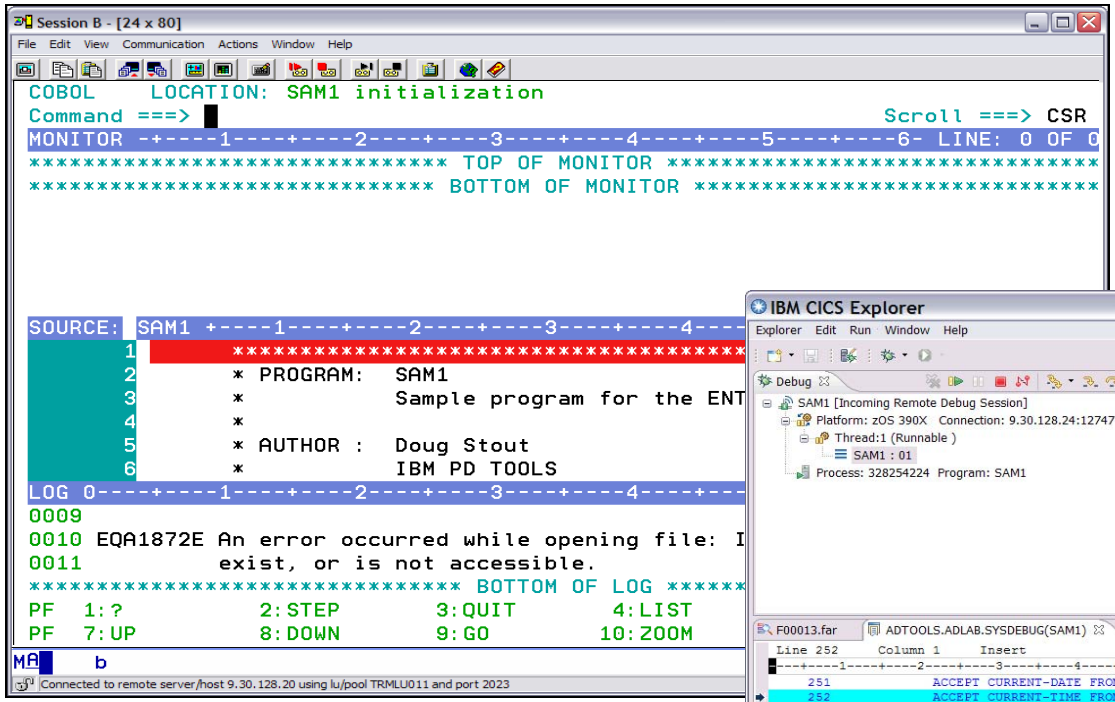
- Interactive program debugging
- Easy setup – debug your program quickly
- Multiple languages:
  - COBOL
  - PL/I
  - C/C++
  - Assembler
- Multiple z/OS environments
  - TSO
  - CICS
  - IMS/TM
  - DB2 stored procedures
  - Batch
  - Websphere application server
  - Unix system services
- Interactive statement playback feature
- Statement frequency counter
- Customizable displays and commands
- Code coverage reporting
- COBOL modernization
- GUI Eclipse plug-in for CICS Explorer **at no additional cost!**

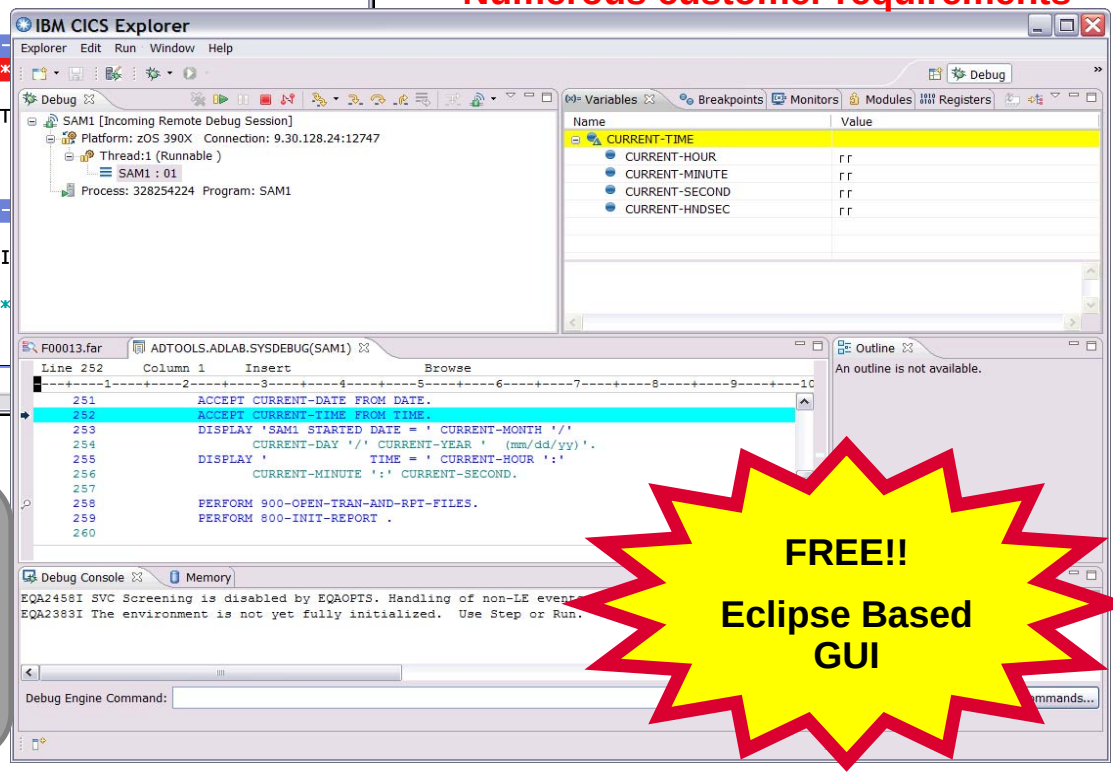
IBM Debug Tool

3270 and GUI based interfaces

New in DT V11.1

- **Plug-in for CICS Explorer**
- **Explicit debug mode**
- **New UI for Terminal Interface Manager**
- **IBM zEnterprise 196 support**
- **Numerous customer requirements**





FREE!!

Eclipse Based GUI

Sample Features

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

Debug Tool: What's new in version 11?

- A new mode of operation, explicit debug mode, is now supported. In this mode, the user identifies the compile units to debug, then Debug Tool loads debug data only for those compile units. This mode can significantly improve debugger performance when it is debugging very large and complex programs. This new mode is an alternative to the standard Debug Tool mode of operation where debug data is automatically loaded for all compile units. It is intended to be used only when debugging large, complex applications that don't perform as well in the standard Debug Tool mode.
- A new user interface is added to the Terminal Interface Manager (TIM) that helps you create and manage the TEST runtime options data set.
- The TIM has been enhanced to remove the need for a site to set up a separate TN3270E port or to customize a set of terminal LUs.
- A GUI interface is added that helps you create and manage the TEST runtime options data set from the workstation.
- The Debug Tool Language Environment user exit for DB2 (EQADDCXT) now supports debugging of DB2 stored procedures of type SUB invoked using the call_sub function.
- EQAOPTS commands can now be specified at runtime in addition to the use of a user-generated EQAOPTS load module. This allows individual users to enter EQAOPTS commands at runtime by supplying a data set containing EQAOPTS commands.
- Support is added for debugging of assembler programs that exploit the latest IBM zEnterprise 196 architecture.
- Enhanced performance while debugging C and C++ applications.

Debug Tool: What's new in version 11?

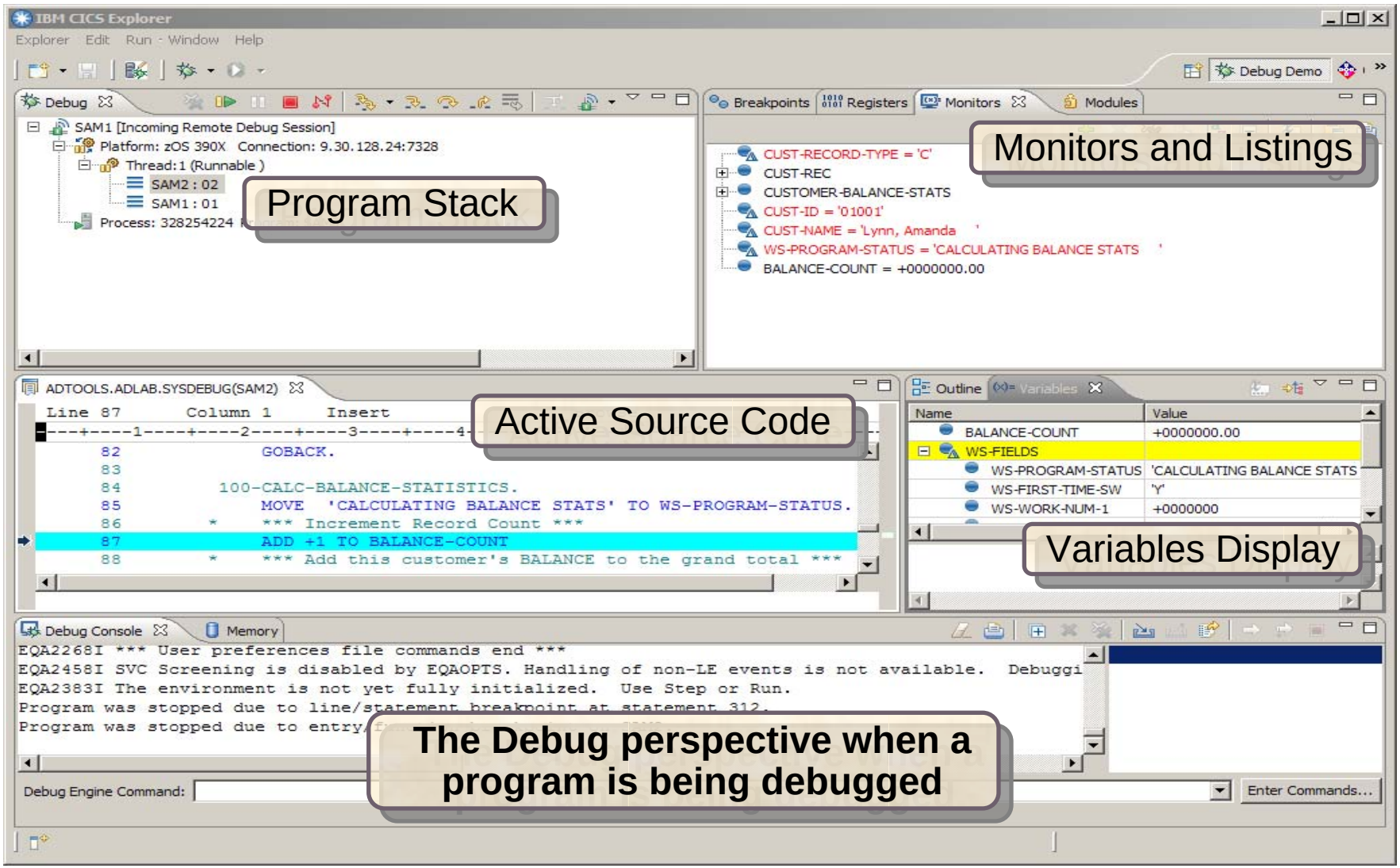
- A Popup window, which displays the result of the LIST expression command when the Log window, is not visible.
- Support for the Enterprise PL/I ADDRDATA built-in function.
- Support for the Enterprise PL/I V4.1 compiler and its new GONUMBER(SEPARATE) option.
- For programs compiled with any level of Enterprise PL/I, you can now list a single element of an array of structures. For programs compiled with Enterprise PL/I V4.1, you can list a single element of an array of structures in automonitor or use the L prefix command in the Source window to list a single element of an array of structures.
- For programs compiled with any level of Enterprise PL/I, you can now change the format in which Debug Tool displays an array. By using the SET LIST BY SUBSCRIPT ON command, you can have Debug Tool display the array as it is stored in memory.
- A new keyword LABELS is added to the LIST NAMES command where you can list the names of all section and paragraph names in a COBOL program, and the names of all instruction labels in an assembler program.

Debug Tool: What's new in version 11?

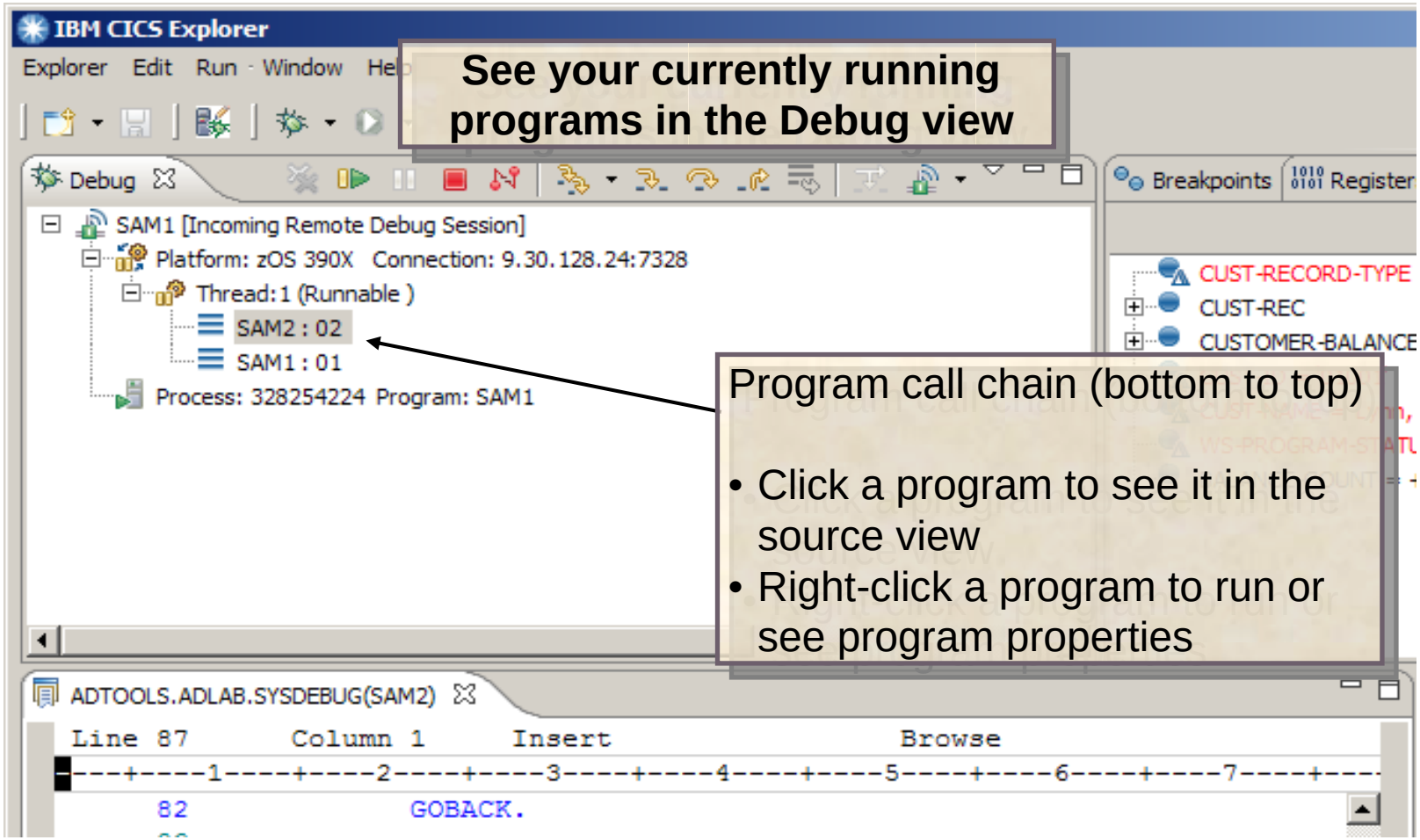
- The following breakpoints are enhanced:
  - AT CHANGE and AT LABEL breakpoints are enhanced to allow a user to limit the scope of the breakpoint to a specific compile unit.
  - AT GLOBAL is enhanced to provide an OCCURRENCE option or wild card (*) to stop for any condition raised in the application.
  - The QUERY LOCATION command is enhanced to provide more information when Debug Tool stops for an AT CHANGE breakpoint.
- Automonitor enhancements:
  - You can change the subscripts of an array directly in the Monitor window.
  - You can delete multiple items from Monitor window at one time.
  - You can use the cursor (in combination with the CLEAR MONITOR command) to indicate which variable to remove from the Monitor window.
- Automated allocation of the commands, log, preferences, save settings and save breakpoints and monitor specifications files.
- New functions are included in Debug Tool Utilities to help an application programmer more easily start debugging IMS applications running in BTS.
- A CICS transaction, DTNP, is provided which issues NEWCOPY or PHASEIN of application programs.
- Documentation is provided to assist debugging of Language Environment C/C++, COBOL, and PLI programs in the Java JNI environment in z/OS.

The Debug Tool GUI Interface

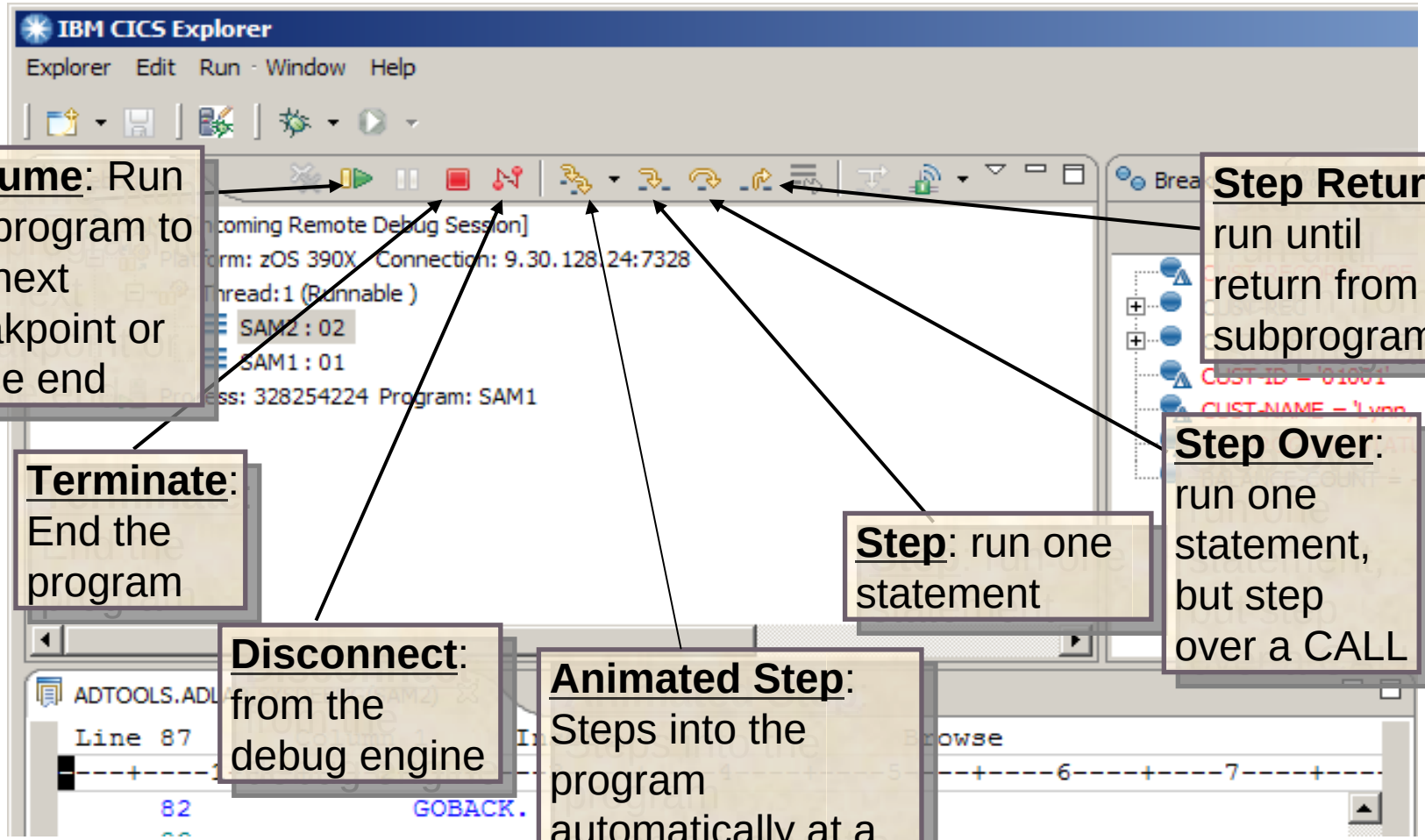
The Debug Tool Perspective



The Debug view



Action bar buttons perform program actions….



Resume: Run the program to the next breakpoint or to the end

Terminate: End the program

Disconnect: from the debug engine

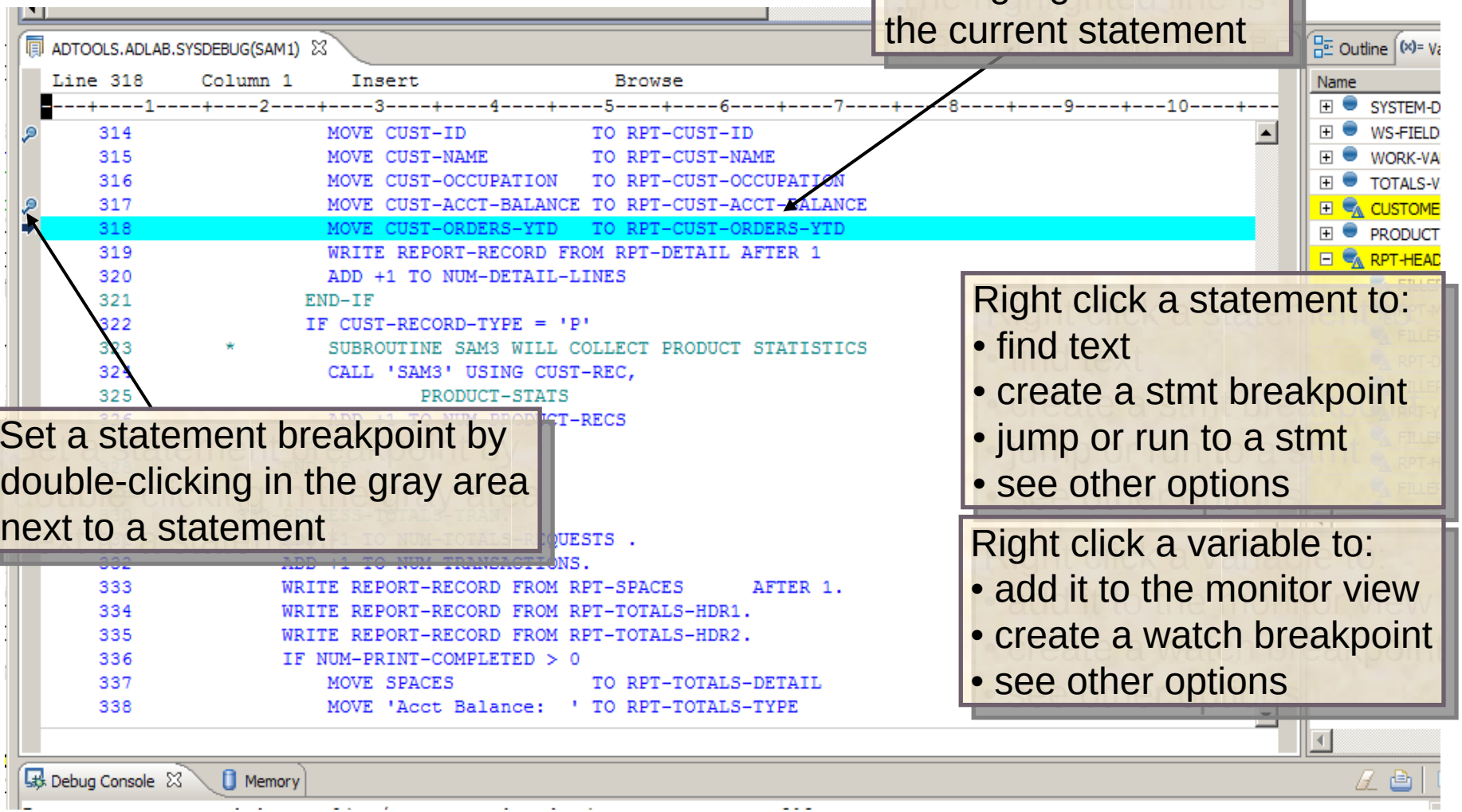
Animated Step: Steps into the program automatically at a rate you specify

Step: run one statement

Step Over: run one statement, but step over a CALL

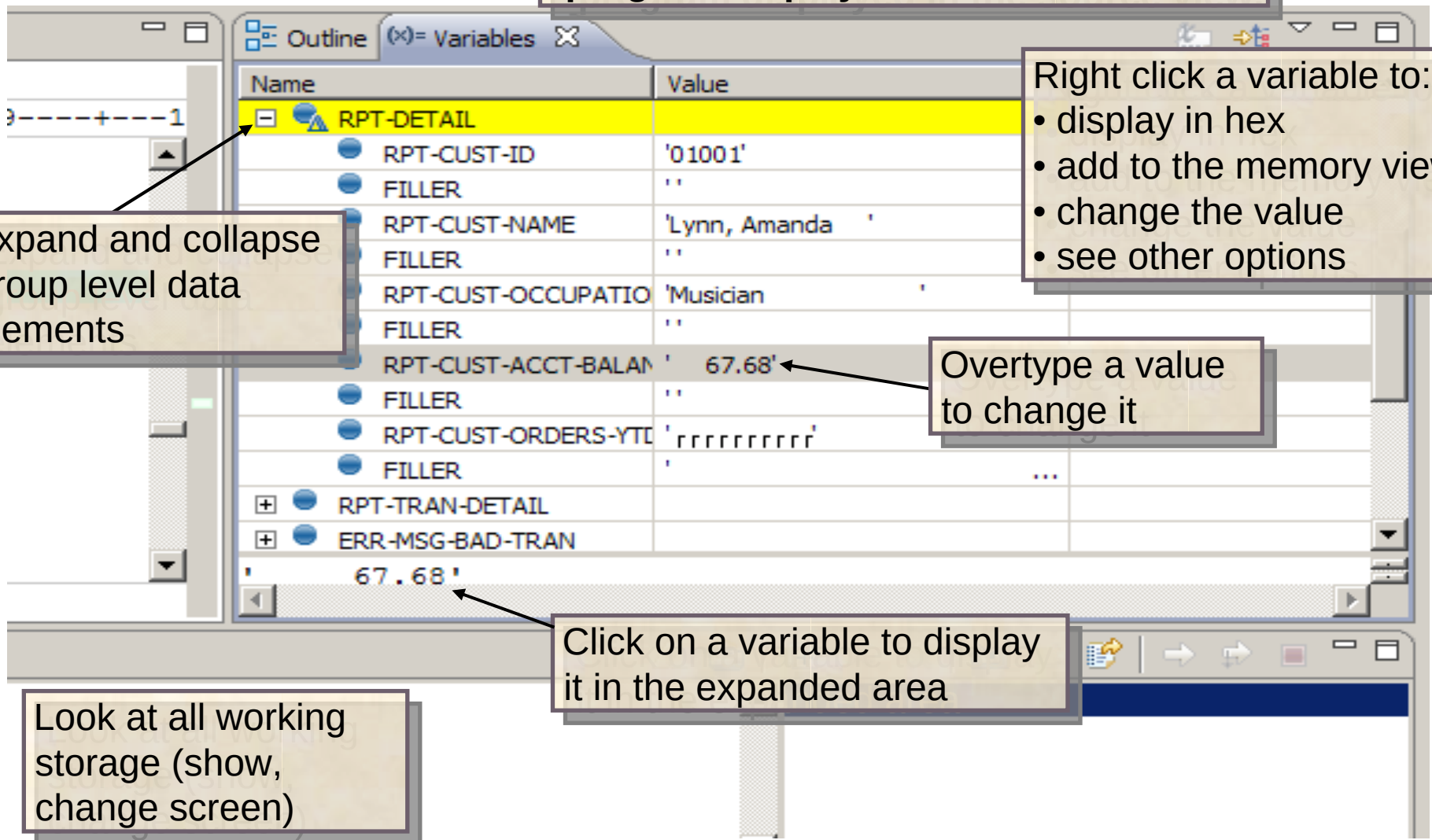
Step Return: run until return from subprogram

The Program Source view



The Variables View

View and change variables for the program displayed in the source view.



Expand and collapse group level data elements

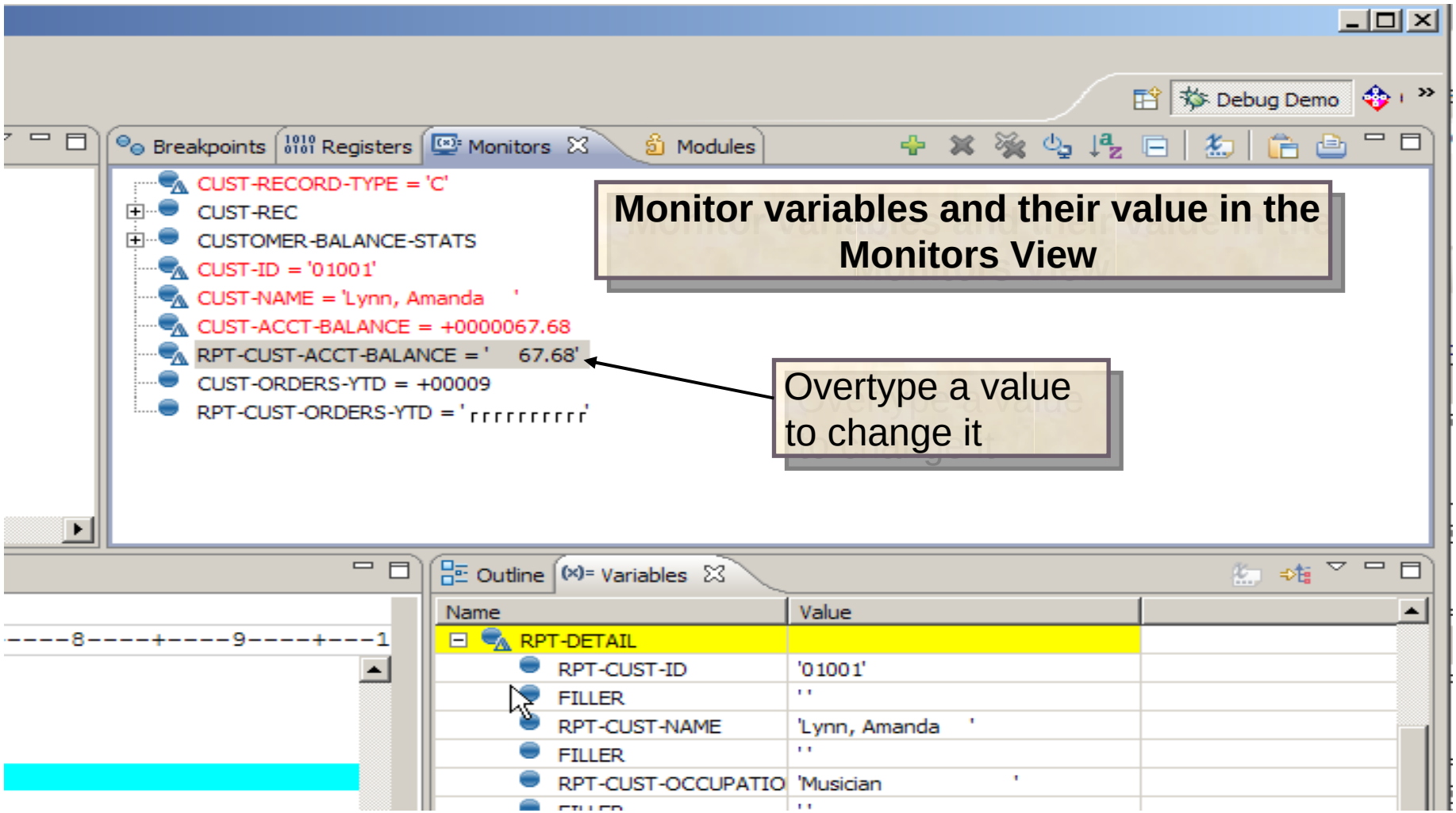
Right click a variable to:
- display in hex
- add to the memory view
- change the value
- see other options

Overtype a value to change it

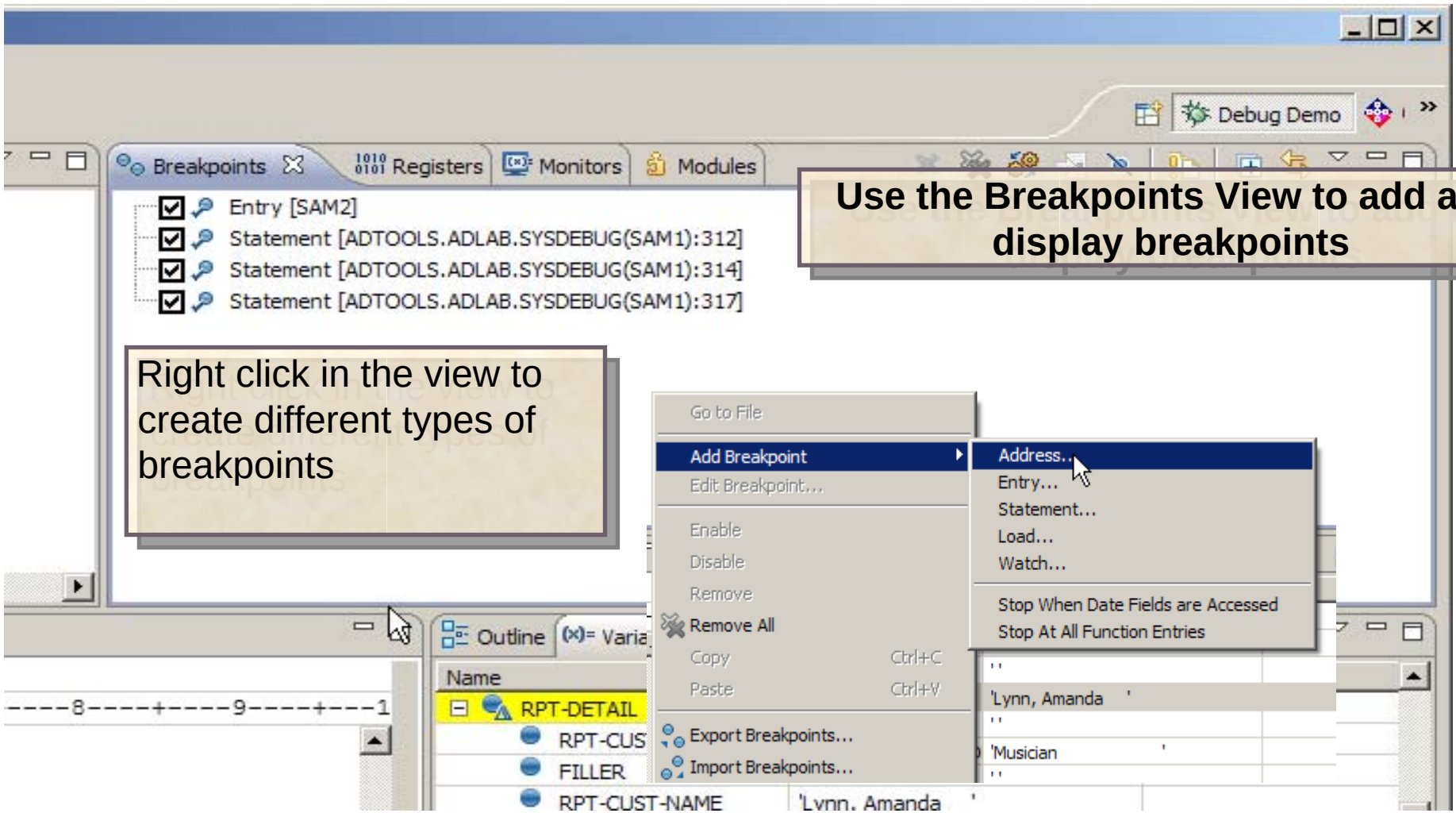
Click on a variable to display it in the expanded area

Look at all working storage (show, change screen)

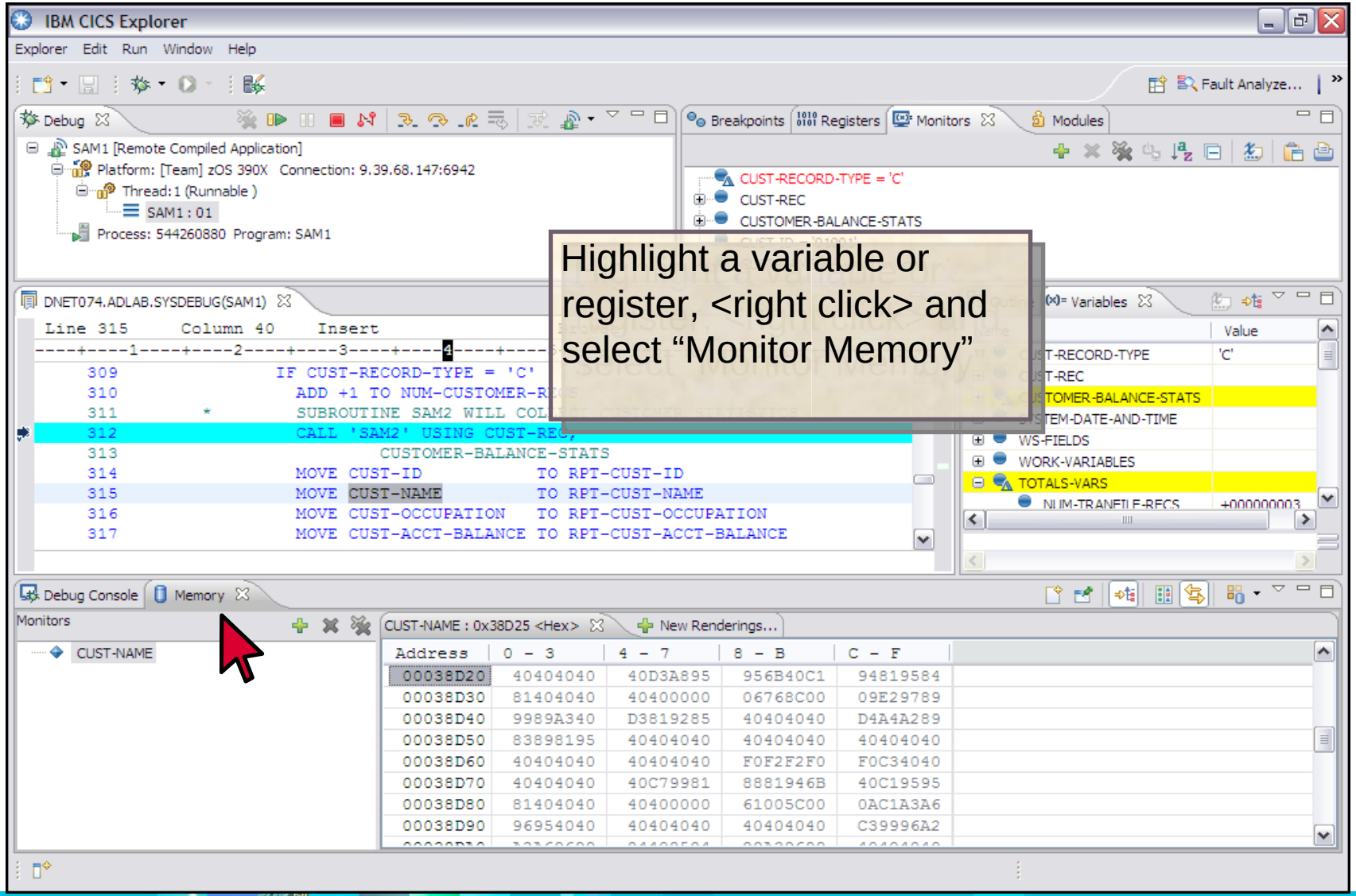
The Monitors View



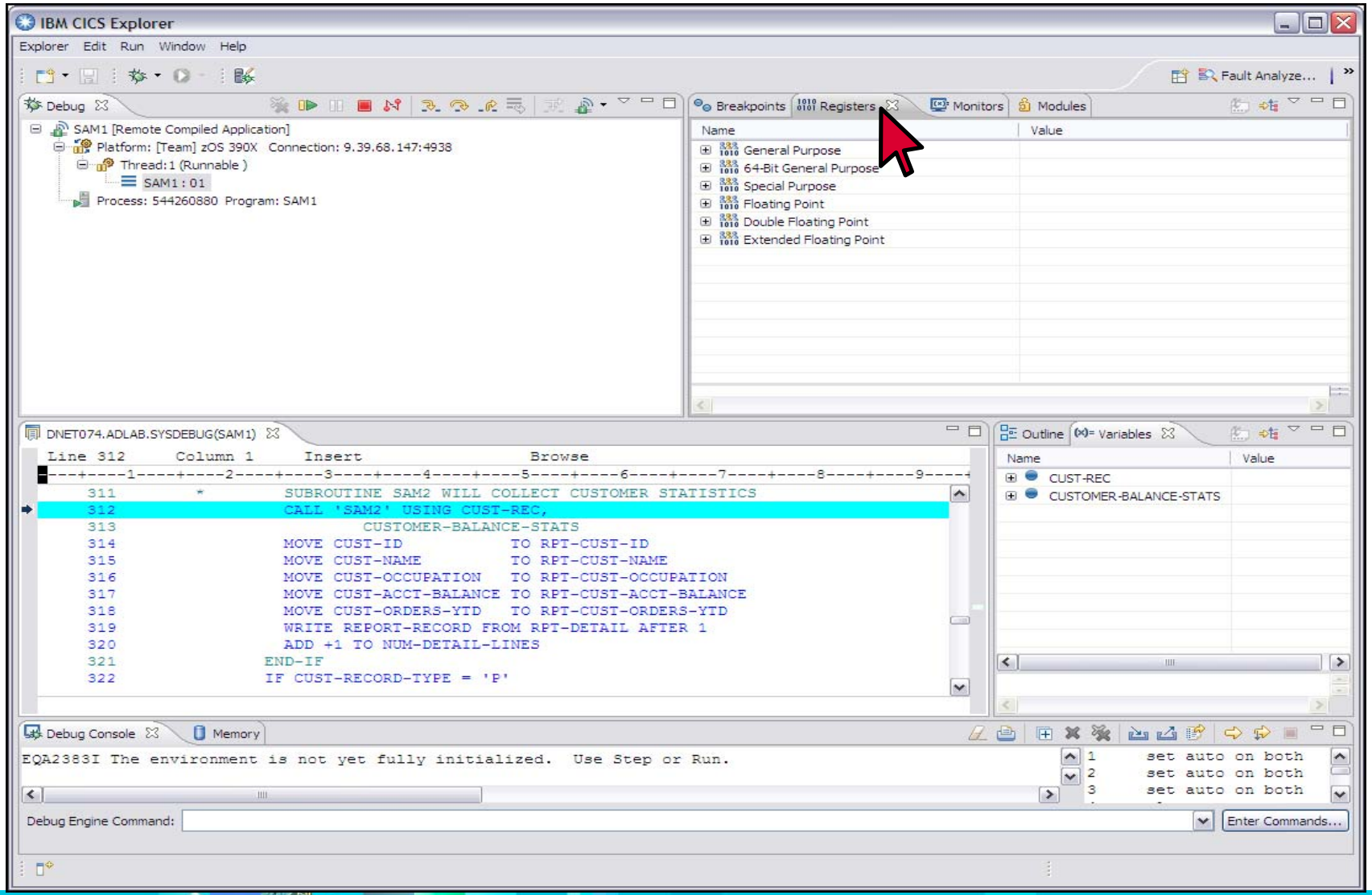
The Breakpoints View



The memory view

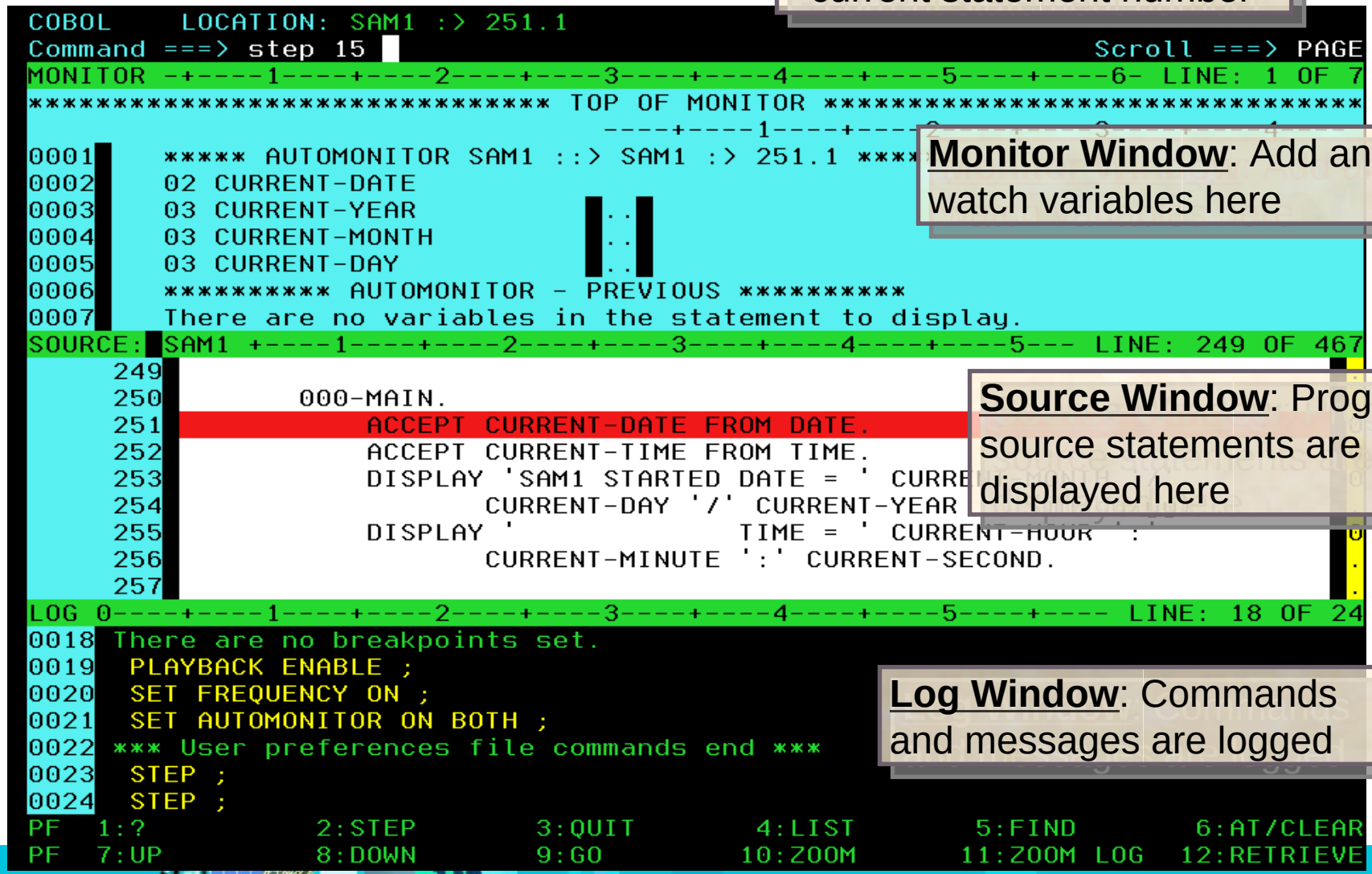


The registers view



The Debug Tool 3270 Interface

Three windows in initial display



Header: Shows:
- the name of program
- current statement number

Monitor Window: Add and watch variables here

Source Window: Program source statements are displayed here

Log Window: Commands and messages are logged

The Application Performance Analyzer Interfaces

Application Performance Analyzer – Find the performance bottlenecks in source code

IBM Problem Determination Tools

IBM 2010 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
- Optim Move for DB2
- Hourglass
- ISPF Productivity Tool

www.ibm.com/software/awdtools/deployment

Application Performance Analyzer for z/OS Higlights

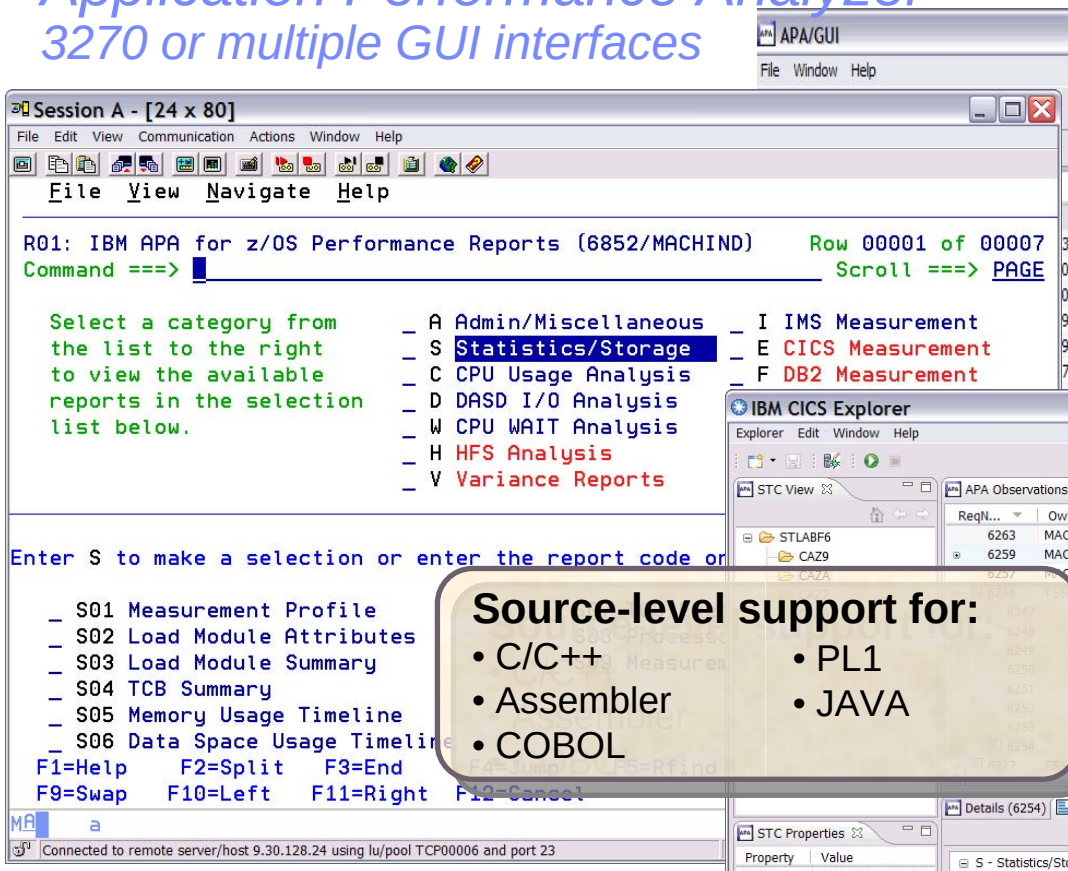
- Identify performance and response time problems in production
- Reduce batch application turnaround time
- Multiple languages:
  - COBOL
  - PL/I
  - C/C++
  - Assembler
  - JAVA
- Multiple z/OS environments
  - Batch
  - CICS
  - IMS
  - DB2
  - Websphere MQ
  - Websphere application server
- Performance Reports for analysis
- Can be integrated with Fault Analyzer with source mapping side files
- Workstation GUI, available as standalone or plug-in

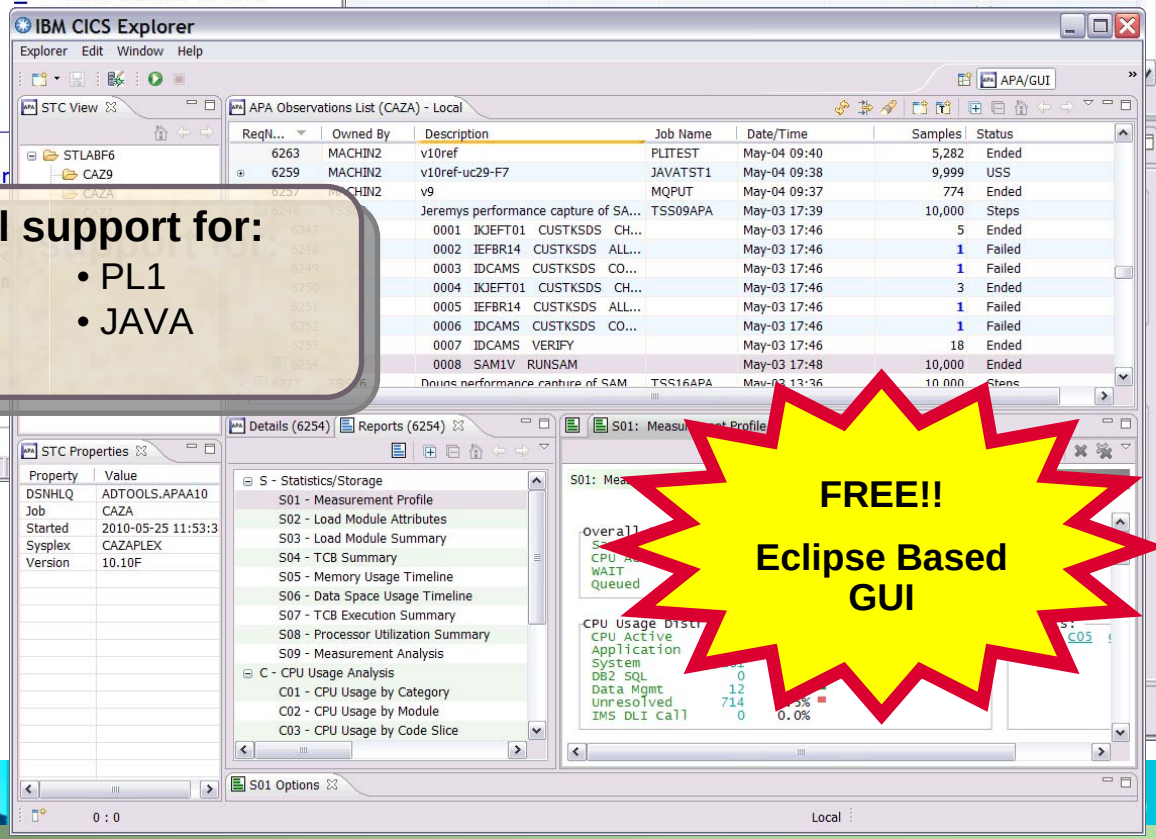
Application Performance Analyzer

3270 or multiple GUI interfaces

New in APA V11.1

- Plug-in for CICS Explorer
  - Source code drill down
- JAVA/WAS Enhancements
- 64-bit Java support
- Enhanced CICS, DB2, and IMS support
- NATURAL and ADABAS support





Source-level support for:

- C/C++
- Assembler
- COBOL
- PL1
- JAVA

Types of Observation Sessions

- Real-Time
- Scheduled
- Via batch submission

FREE!!

Eclipse Based GUI

Application Performance Analyzer: What's new in version 11?

- The IBM Application Performance Analyzer Plug-in for Eclipse, when integrated with Application Performance Analyzer for z/OS and CICS Explorer, encompasses both the Observation Request and Reporting functions, including the R02 screens list, detail views, edit functions, and reports for the observation. The plug-in GUI can be used for submitting new observation requests and for navigating the performance analysis reports generated from observation requests. The plugin GUI can display and provide functions to multiple components of Application Performance Analyzer at the same time. The major views include:
  - STC View, which lists all active started tasks
  - Observations List View, which lists all observations
  - Observation Detail View, which provides details of an observation
  - Reports List View, which lists all reports for an observation
  - Report View, which displays an individual report
- The Application Performance Analyzer Plug-in is enhanced to support IMS Multiple Address Space measurements, source program mapping, and to display windows for details of the sample file and the module information, to make it consistent with the ISPF panels.
- 64-bit support for xplink.
- 64-bit Java support

Application Performance Analyzer: What's new in version 11?

- CICS+ new CICS intercept extractor.
- New CICS reports are added to report mean and total service times by user, and to report CPU/service time by CICS transaction.
- New Java reports are added to report the Java heap usage timeline and Java CPU usage by thread.
- The "Variance Report" feature is improved by providing three new variance reports highlighting the main difference between the CICS, DB2, and IMS "summary reports." Up to 20 measurements can be selected for variance reporting, providing the ability to evaluate the performance of specific jobs over an extended time period.
- The DB2 CPU/service time reports are enhanced to allow the developer to display the percentage used in place of the mean fields.
- Support for the natural language and ADABASE from Software AG.
- Recommendation to the developer that a VSAM reorganization be done when CI and CA splits are present. This is shown in the Application Performance Analyzer S09 report.
- Support for large block size (greater than 262K).

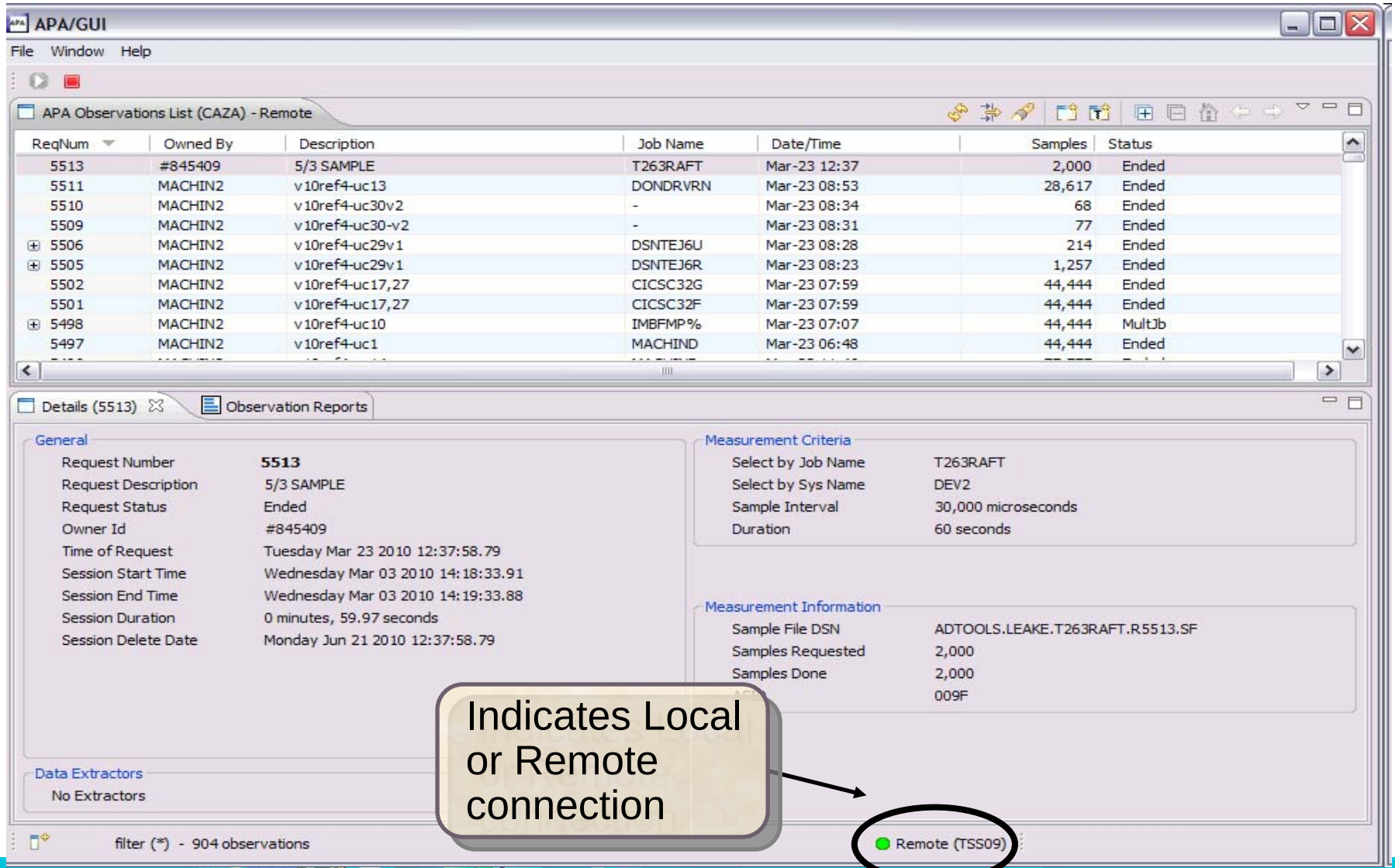
Application Performance Analyzer: What's new in version 11?

- A memory tracking exit that can include data about modules managed via directed load.
- Permit use of system symbols in SampleHLQ, and allow complete control of sample file naming convention via SampleDSN and DuplicateDSN configuration settings.
- C/C++ mapping time stamp interval is reduced.
- An option to load source and then map it to the module (the inverse of usual C/C ++).
- IMS Multiple Address Space Support that groups all IMS MPP region observations under a single parent observation in R02.
- IMS Multiple Address Space Support for IMSPlex.
- Support a shared source program mapping dataset list, called the Common Data Store.
- Support measuring Java jobs running in WebSphere V7.
- Currency support for DB2 V10.

The Application Performance Analyzer

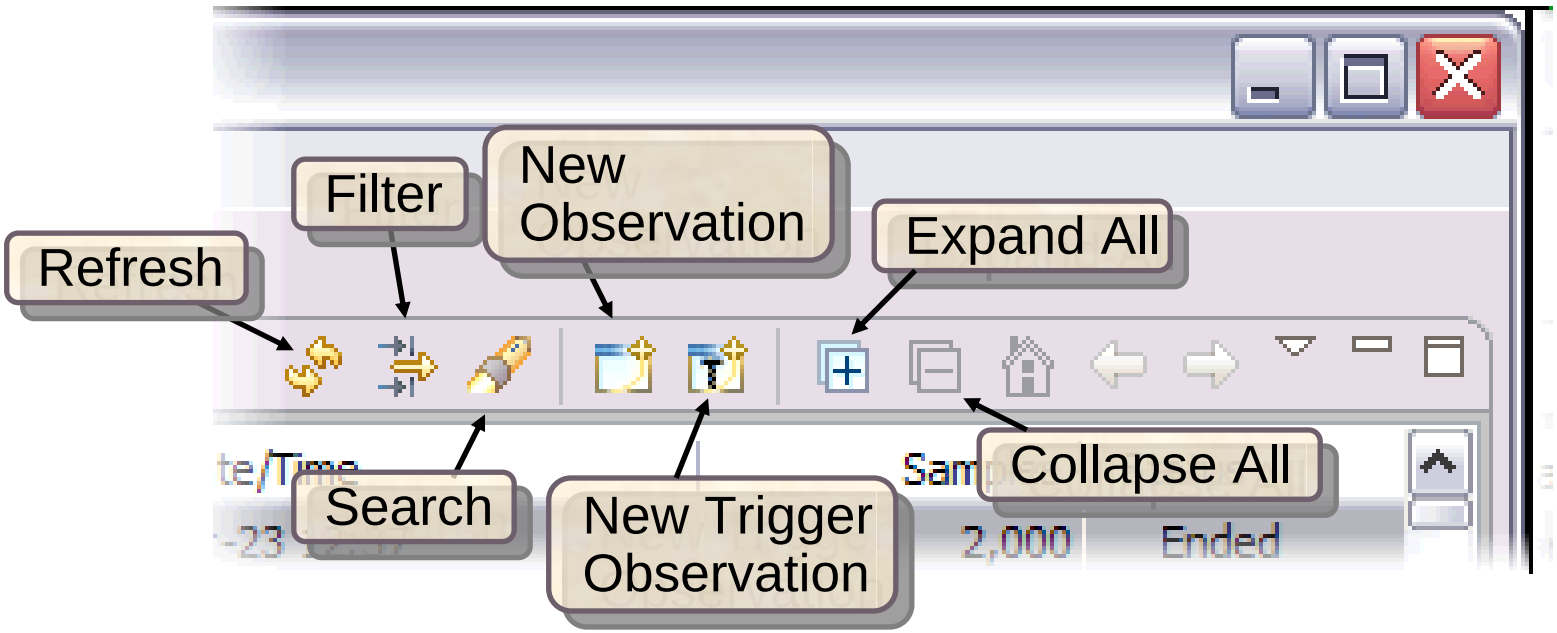
GUI Interface

The Observations List View

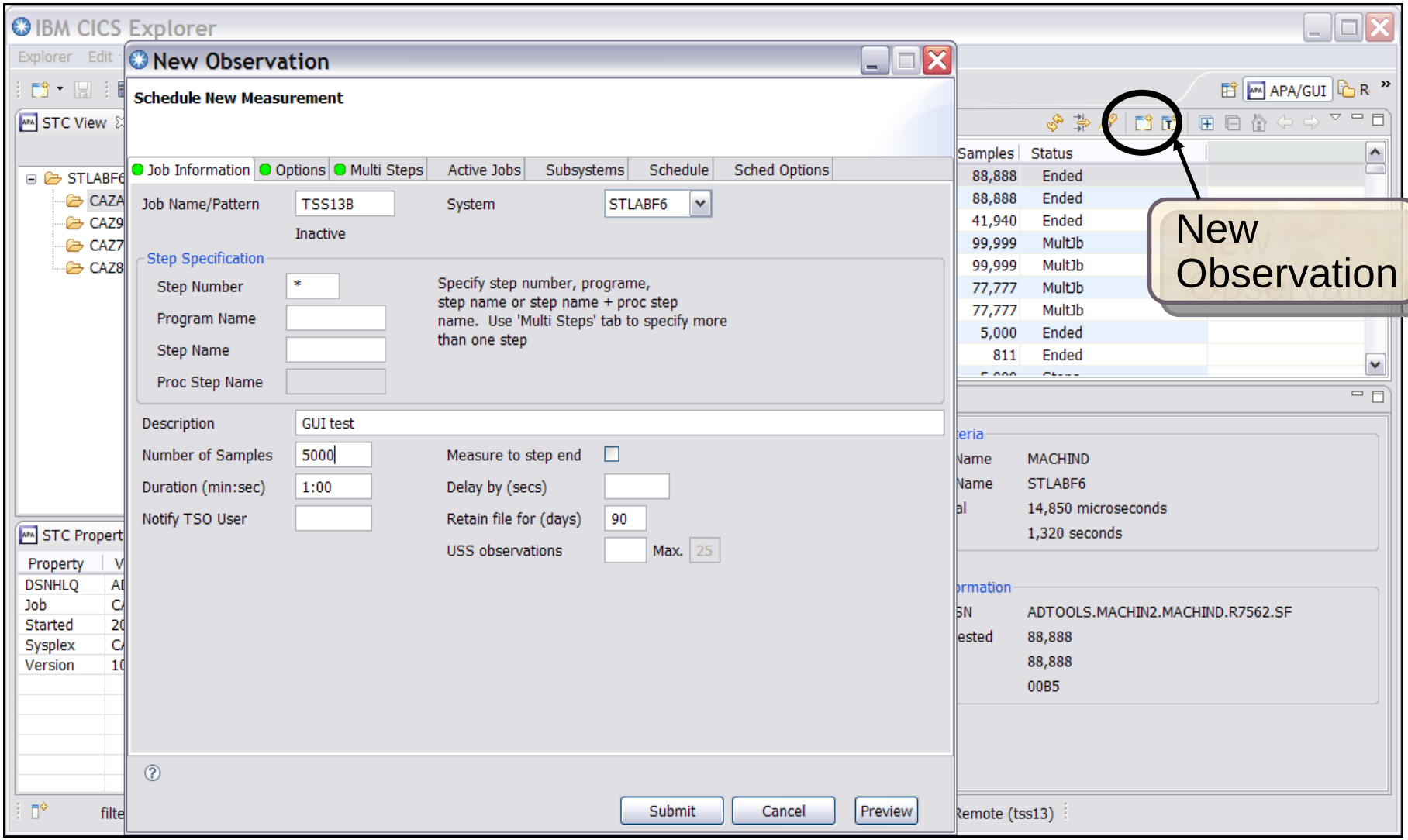


Observations List View Toolbar

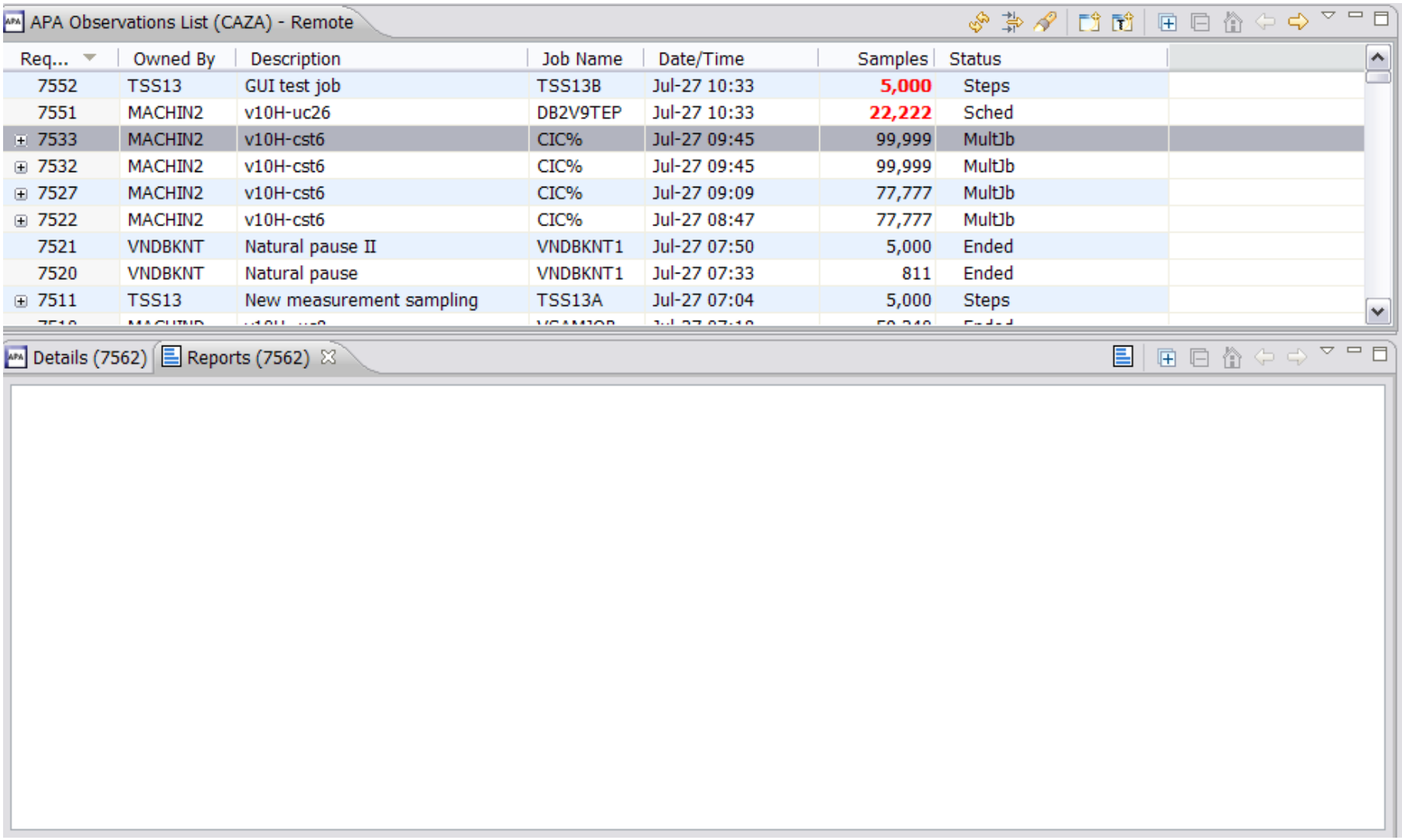
- **Observations List toolbar**
  - **Refresh Observations List**
  - **Filter Observations List**
  - **Search Observations**
  - **New Observation**
  - **New Trigger Observation**
  - **Expand All (expand all observations)**
  - **Collapse All (collapse all observations)**



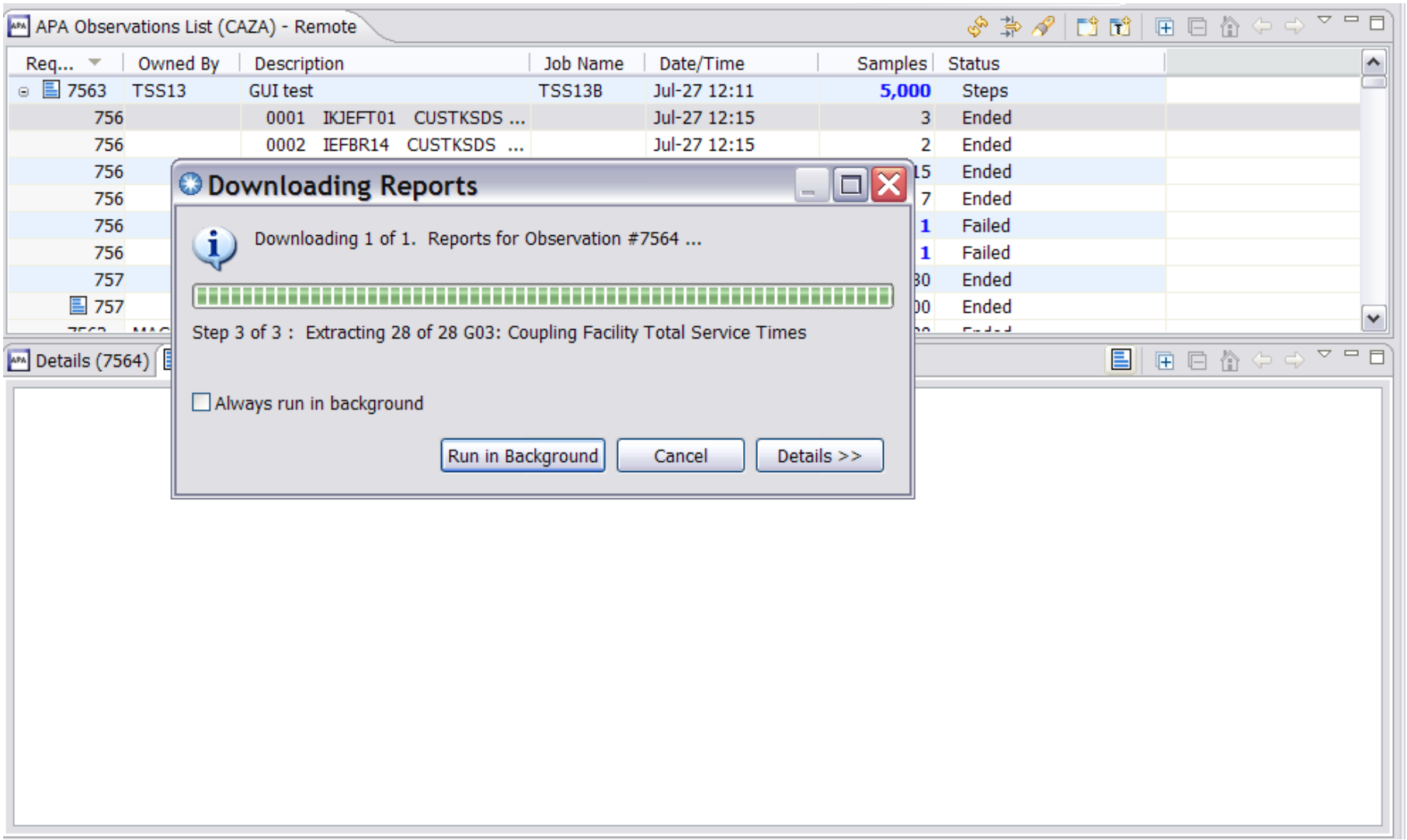
Click on new observation button
Create a new observation



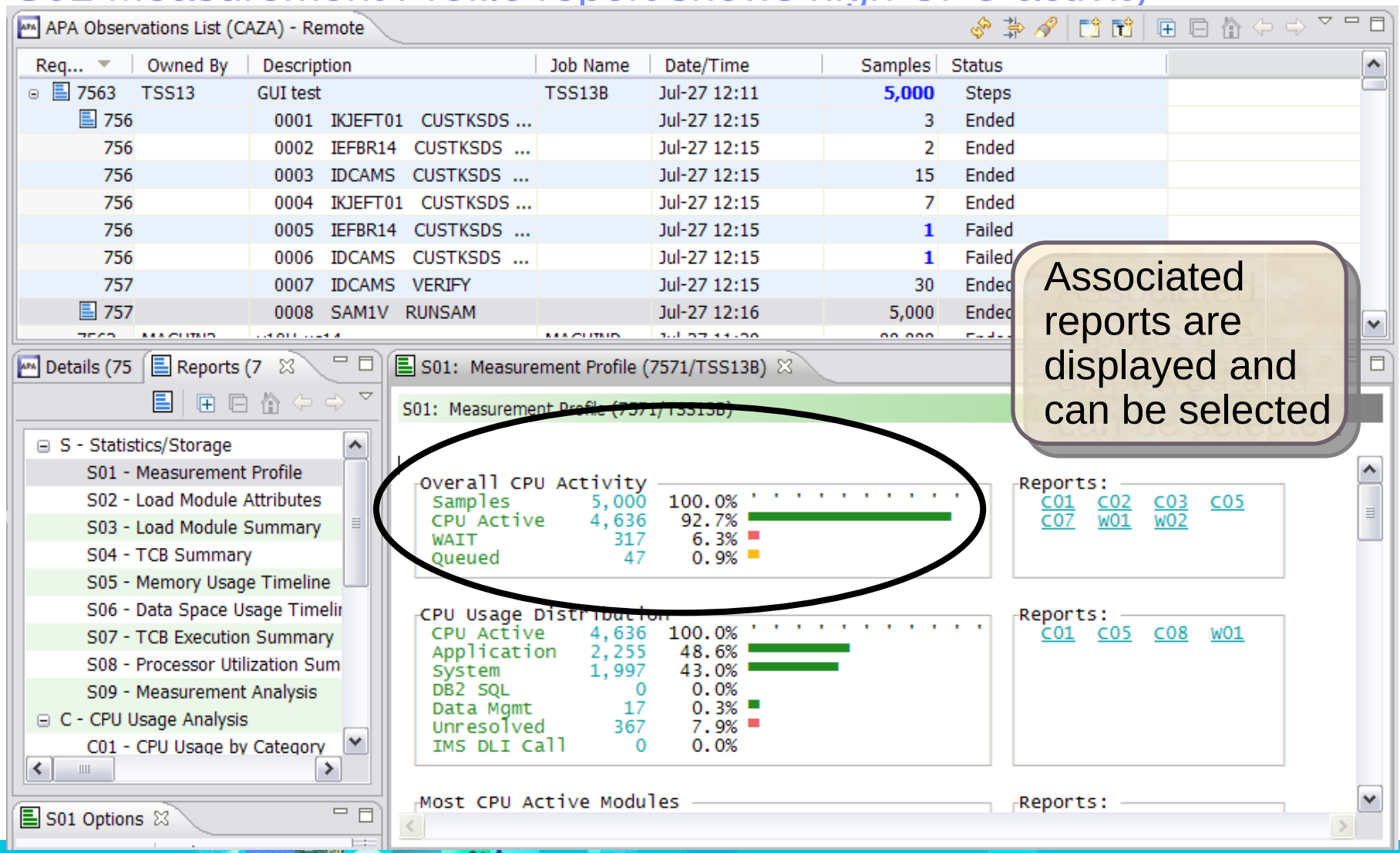
Observation is scheduled



Right click on report and select Download Reports

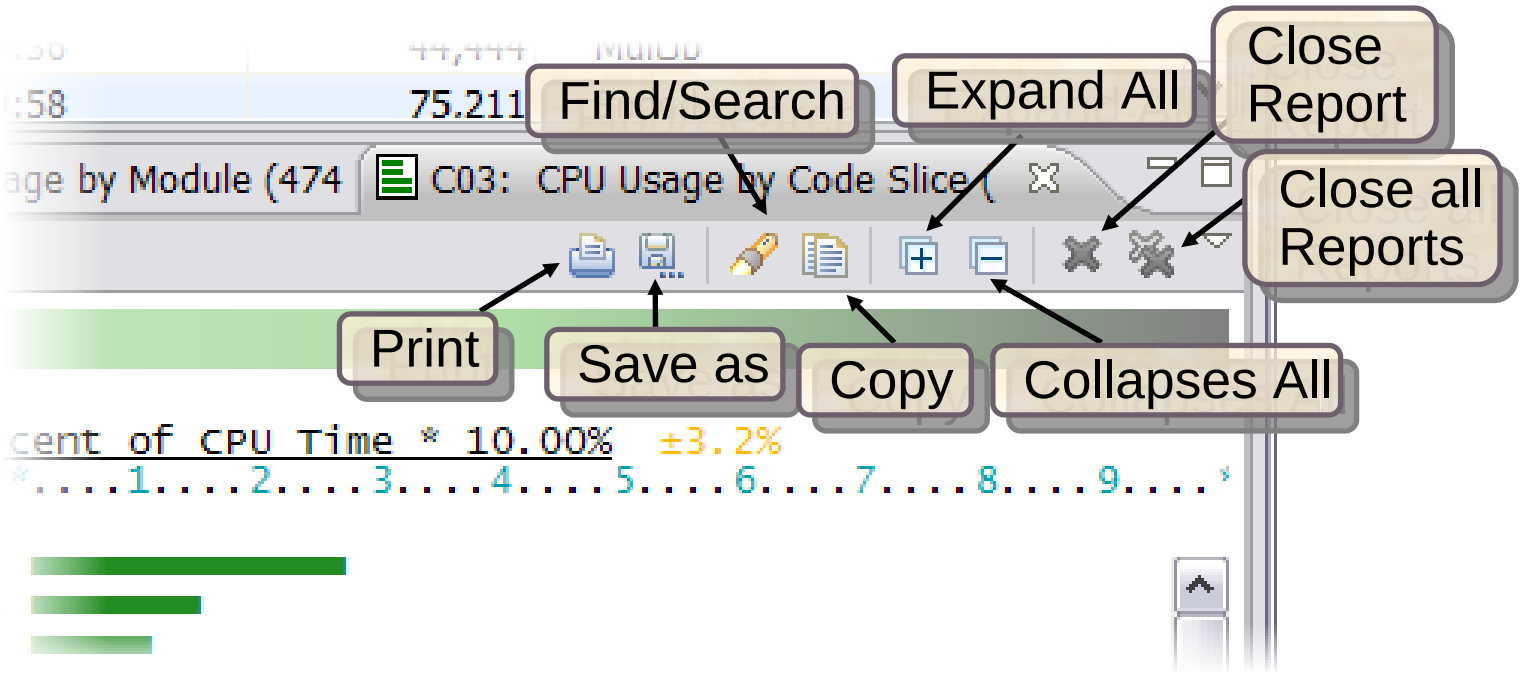


Report list is displayed
S01 Measurement Profile report shows high CPU activity

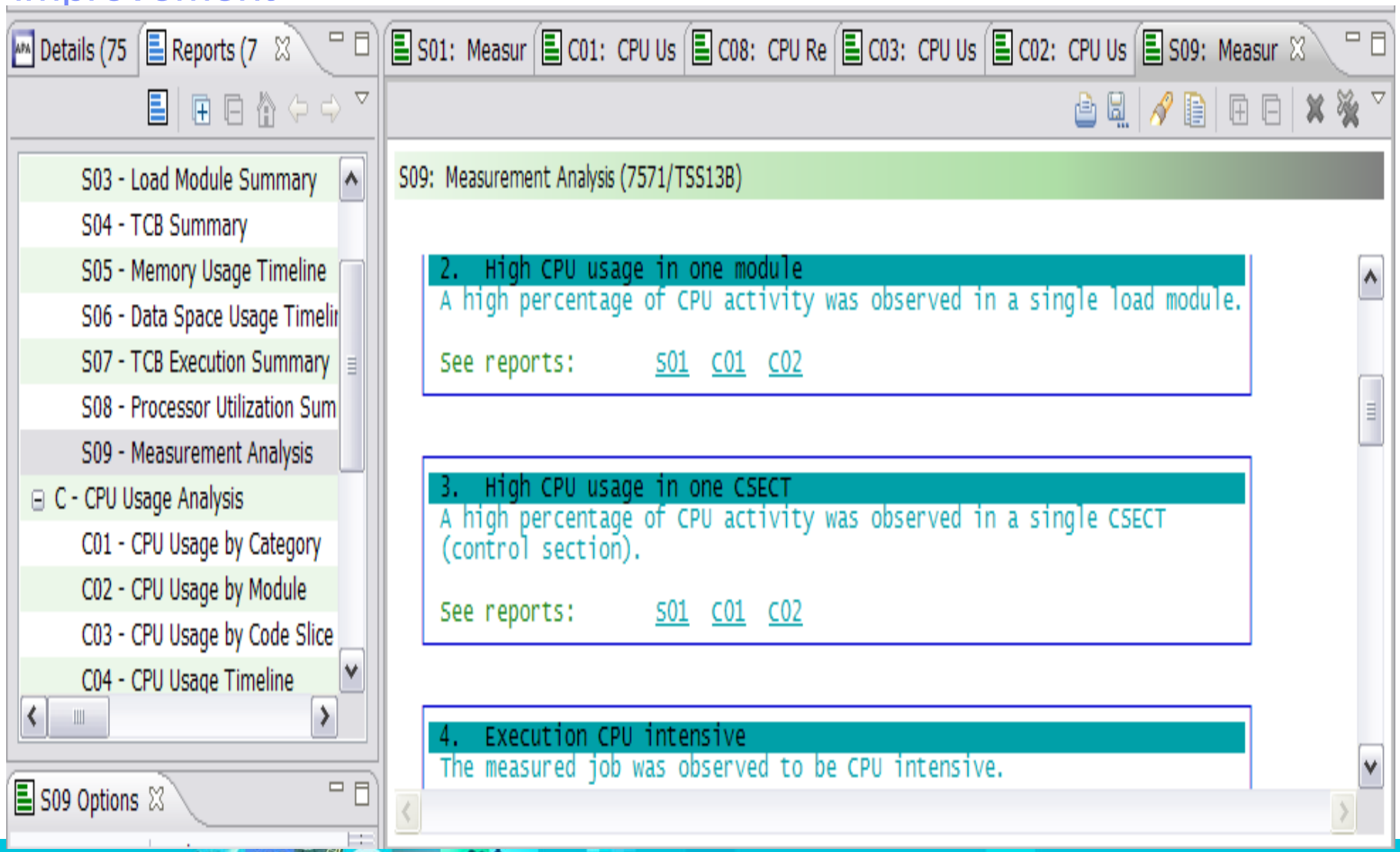


Report View

- **Toolbar**
  - **Provides buttons for report-level actions which include:**
    - **Print**
    - **Save As**
    - **Find**
    - **Copy**
    - **Close Report**
    - **Close All Reports**
    - **Expand All**
    - **Collapse All**



S09 Measurement Analysis report displays possible performance improvement



The Application Performance Analyzer

3270 Interface

Each step generates reports, select the appropriate report

```
  File  View  Navigate  Help

R02: IBM APA for z/OS Observation List (CAZA)          Row 00001 of 00177
Command ===> _____________________________________  Scroll ===> PAGE

ReqNum  Owned By  Description      Job Name  Date/Time      Samples  Status

 7511 + TSS13     New measurement TSS13A     Jul-27  7:04     5,000  STEPS
 → 7512  0001 IKJEFT01 CUSTKSDS CHECKV      Jul-27  7:06        63  Ended
 → 7513  0002 IEFBR14  CUSTKSDS ALLOCV      Jul-27  7:06         2  Ended
 → 7514  0003 IDCAMS   CUSTKSDS COPYV       Jul-27  7:06        50  Ended
 → 7515  0004 IKJEFT01 CUSTKSDS CHECKV      Jul-27  7:06         4  Ended
 → 7516  0005 IEFBR14  CUSTKSDS ALLOCV      Jul-27  7:06         2  Ended
 → 7517  0006 IDCAMS   CUSTKSDS COPYV       Jul-27  7:06        51  Ended
 → 7518  0007 IDCAMS   VERIFY               Jul-27  7:06        13  Ended
 → r519  0008 SAM1V    RUNSAM               Jul-27  7:07     5,000  Ended

 7510     MACHIND  v10H- uc8       VSAMJOB   Jul-27  6:37    78,787  Sched
 7509     MACHIND  v10H-uc20       CICSC31G  Jul-27  6:36        11  Active
 7508     MACHIND  v10H- uc5       VSAMREAD  Jul-27  6:25    59,218  En
 7498     MACHIN2  v10H-uc10       PLITEST   Jul-26 16:58     2,088  En
 7496 +   MACHIN2  v10H-uc23v2     COBOLPLI  Jul-26 16:14    34,567  Th
```

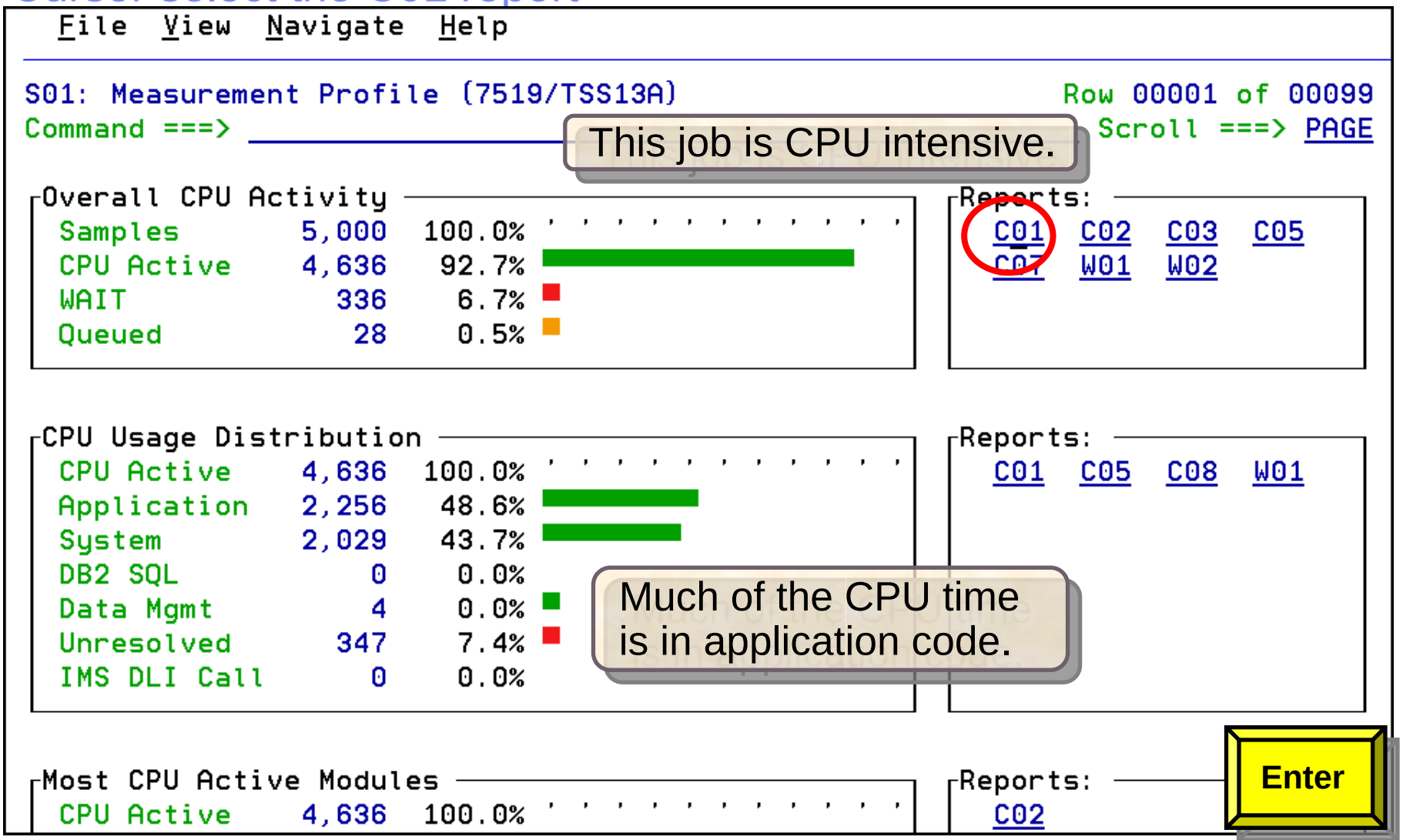
Enter

R01 Performance Report index is displayed
Select S01 Measurement Report

```
  File  View  Navigate  Help

R01: IBM APA for z/OS Performance Reports (7519/TSS13A)      Row 00001 of 00007
Command ===> _____________________________________________  Scroll ===> PAGE

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

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

  s S01 Measurement Profile                 _ S07 TCB Execution Summary
  _ S02 Load Module Attributes              _ S08 Processor Utilization Summary
  _ S03 Load Module Summary                 _ S09 Measurement Analysis
  _ S04 TCB Summary
  _ S05 Memory Usage Timeline
  _ S06 Data Space Usage Timeline
```

Enter

Measurement Profile report
Cursor select the C01 report



Use the ‘p’ line command to display program source for the SAM2V csect

```
  File  View  Navigate  Help
C01: CPU Usage by Category (7519/TSS13A)                Row 00001 of 00081
Command ===> _____________________________________________ Scroll ===> PAGE

Name      Description              Percent of CPU Time * 10.00%  →1.4%
                                       *....1....2....3....4....5....6....7....8
APPLCN    Application Code         48.66
→ SAM2V     Application Program    48.66
  → pAM2V     CSECT in SAM2V       48.66

SYSTEM    System/OS Services       43.76
→ LERUNLIB  Language               43.29
            Environment Runtime
  → IGZCPAC   COBPACK              43.24
    → IGZCXDI   Double             43.24
                precision
                division
  → IGZEINI   Environment           0.02
              initialization
    → IGZEINI   CSECT in IGZEINI    0.02
  → IGZCPCO   COBPACK               0.02
    → IGZEVIO   VSAM                0.02
                input/output
```

The program statements that used the most CPU time are displayed
Bar charts indicate statements using the most resources

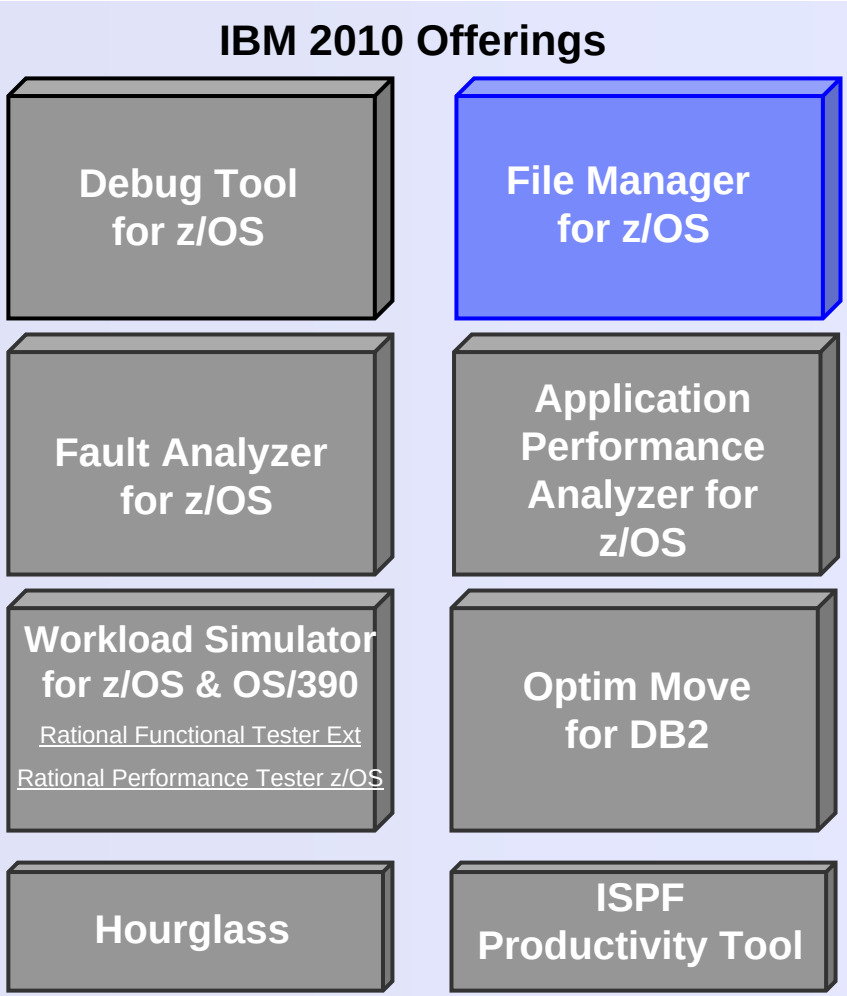
```
  File  View  Navigate  Help

P01: Source Program Attribution (7519/TSS13A)                Row 00010 of 00039
Command ===> _                                                Scroll ===> HALF

LineNo Offset Prcnt Source Statement
000097
000098                          100-CRUNCH-LOOP.
000099 0003C2   .90 ▌               MOVE  'CALCULATING BALANCE STATS' TO WS-PROGRAM-
000100                        *     *** Increment Record Count ***
000101 0003D2  5.24 ▌▌              ADD +1 TO BALANCE-COUNT
000102                        *     *** Add this customer's BALANCE to the grand tot
000103 0003EA 11.32 ▌▌▌▌▌           COMPUTE BALANCE-TOTAL =
000104                                 BALANCE-TOTAL + CUST-ACCT-BALANCE
000105                        *     *** Calculate Average ***
000106 000412 13.97 ▌▌▌▌▌▌          COMPUTE BALANCE-AVERAGE =
               46.09 <- CPU time attributed to above statement
000107                                 BALANCE-TOTAL / BALANCE-COUNT
000108                        *     *** Calculate Minimum ***
000109 00045A  2.41 ▌               IF WS-FIRST-TIME-SW = 'Y'
000110 00046A                          MOVE CUST-ACCT-BALANCE TO BALANCE-MIN.
000111 000474  1.61 ▌               IF CUST-ACCT-BALANCE < BALANCE-MIN
000112 000486                          MOVE CUST-ACCT-BALANCE TO BALANCE-MI
000113                        *     *** Calculate Maximum ***
```

PF3

The File Manager Interface

File Manager - Manage a variety of enterprise data

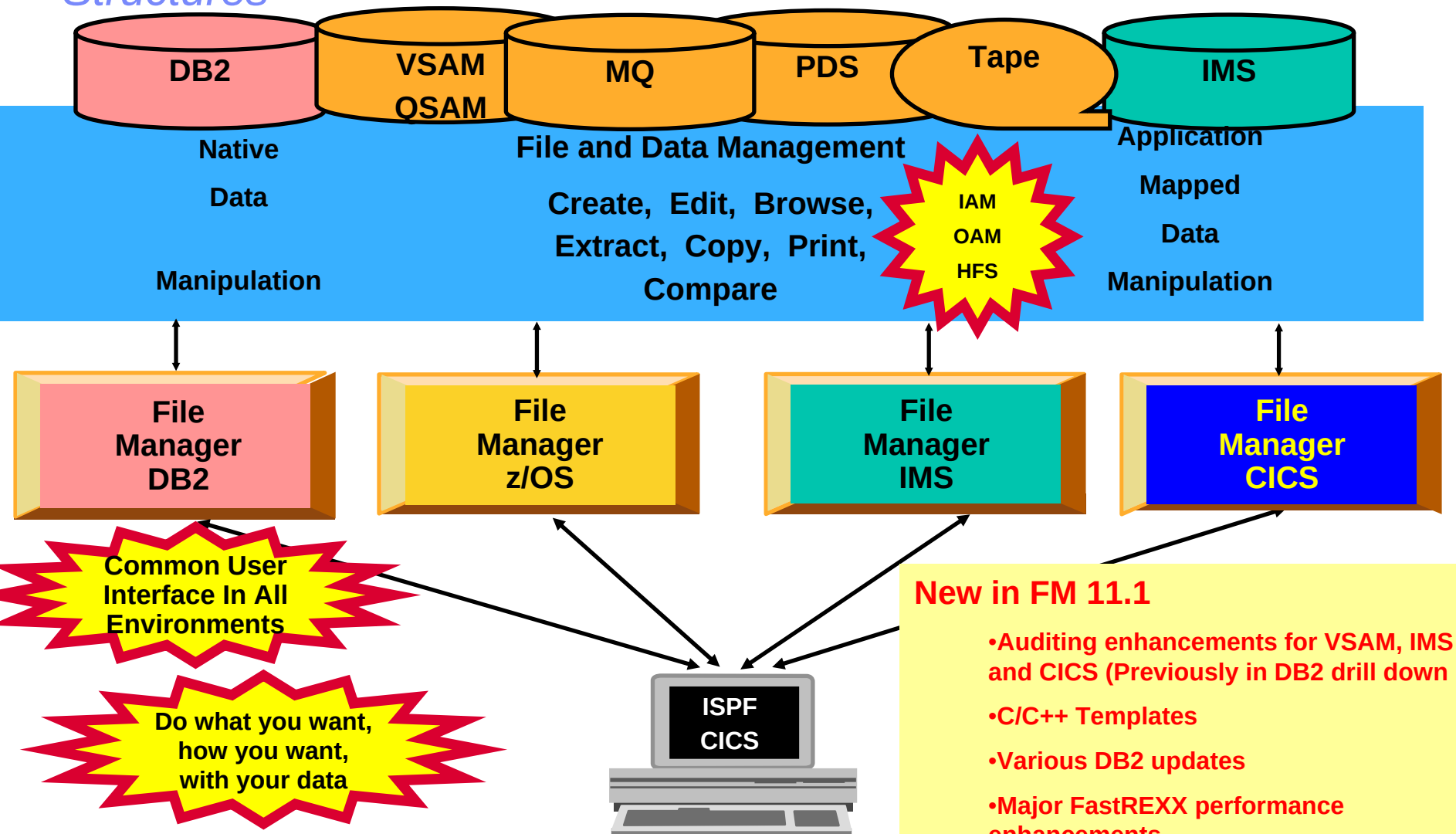
IBM Problem Determination Tools



File Manager for zOS Highlights

- Edit entire files regardless of size
- Manipulate data using COBOL, Assembler and PL/I record layouts interactively or in batch
- Comprehensive, user-friendly, batch and interactive utilities extends standard ISPF
- Scrambling sensitive data to ensure data privacy across all environments
- Identify fields that contain invalid values
- Find and change data within specific fields
- Websphere MQ support
- Test data generation based on record layouts
- Compare data/load modules between datasets using field level mapping
- Date aging capability is included to help with date-sensitive testing
- Enhanced audit capabilities to assist with governance compliance
- And much more…

File Manager for z/OS (FM) – Manage a variety of Enterprise Data Structures



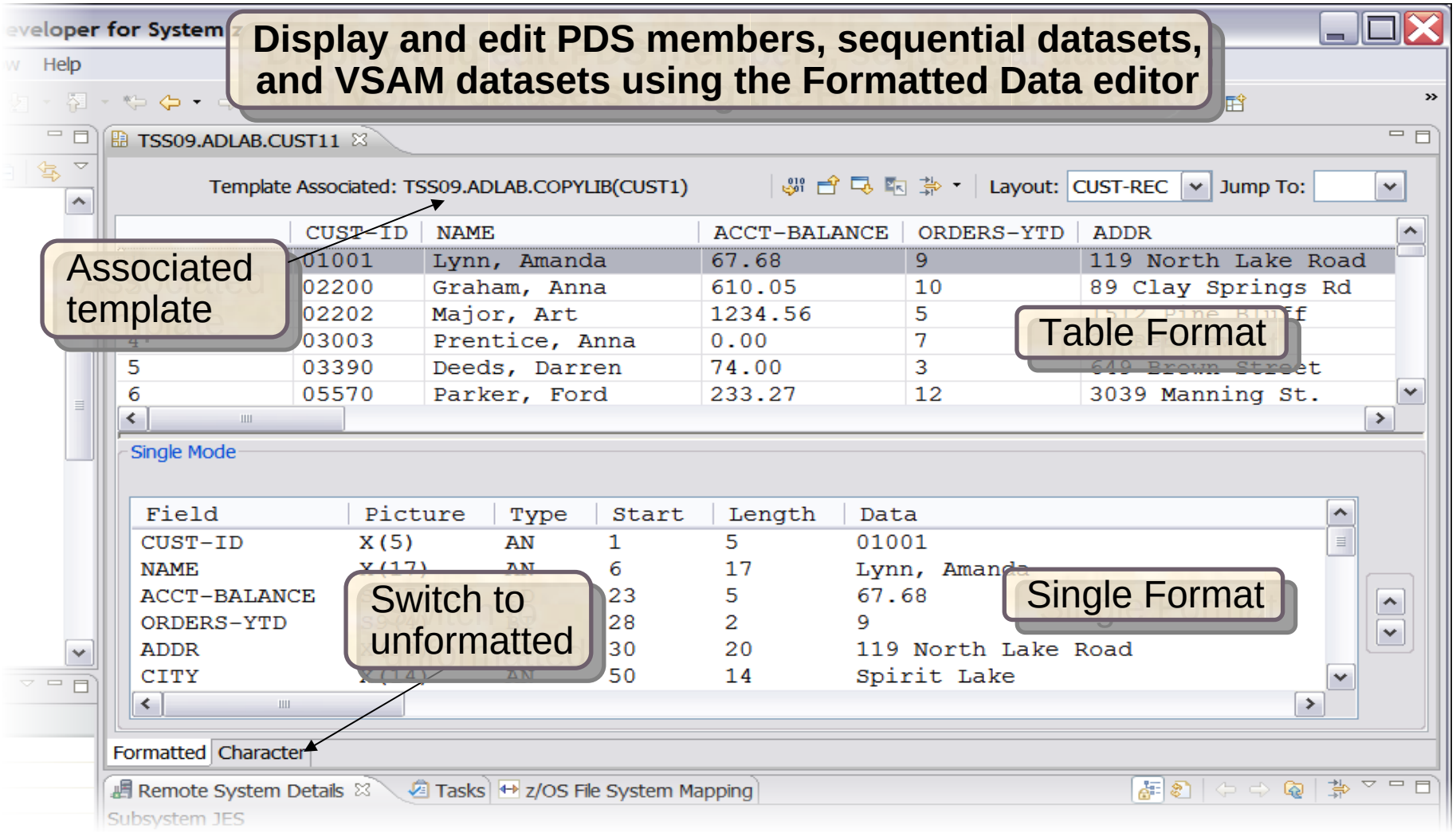
New in FM 11.1

- Auditing enhancements for VSAM, IMS and CICS (Previously in DB2 drill down
- C/C++ Templates
- Various DB2 updates
- Major FastREXX performance enhancements

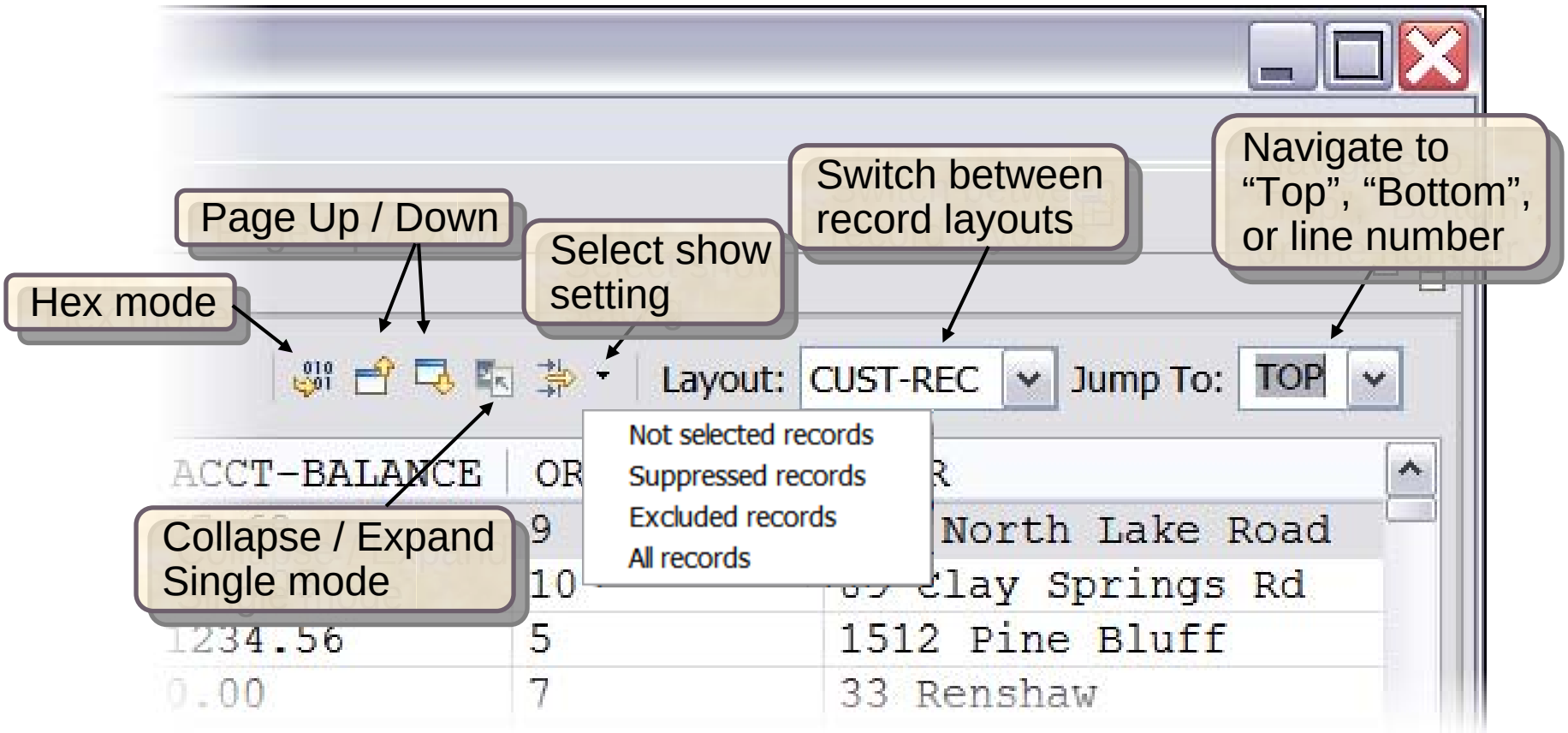
File Manager: What's new in version 11?

- File Manager Editor and Batch performance is improved with enhanced expression processing which includes:
  - Improved performance for the File Manager Base Editor with REXXTM template expressions
  - Improved performance for the File Manager Base Utility functions with REXX procedures
  - Additional programming constructs supported in FASTREXX
  - Ability to access files in read only mode for Data Set Edit Batch (DSEB) and to run DSEB procedures using FASTREXX
  - IImproved expression capability for segmented data
- The File Manager Base is enhanced to work with Rational® Developer for System z V7.6.2 to enable compiler option processing.
- Auditing enhancements for the File Manager Base, CICS, and IMS components. The enhancements are built on the facility provided in the File Manager DB2 V10 component.
- Support for DB2 export to produce column names in CSV format as well as supporting DBCS characters.
- Support for creating and updating the DB2 template in batch.
- Support for setting commit conditions for FM DB2 edit and import.
- Usability enhancements:
  - Member list panel enhancements to support COPY, DELETE, MOVE, PRINT, RESET, and SUBMIT commands
  - Allocation of template data sets when the specified data set does not exist

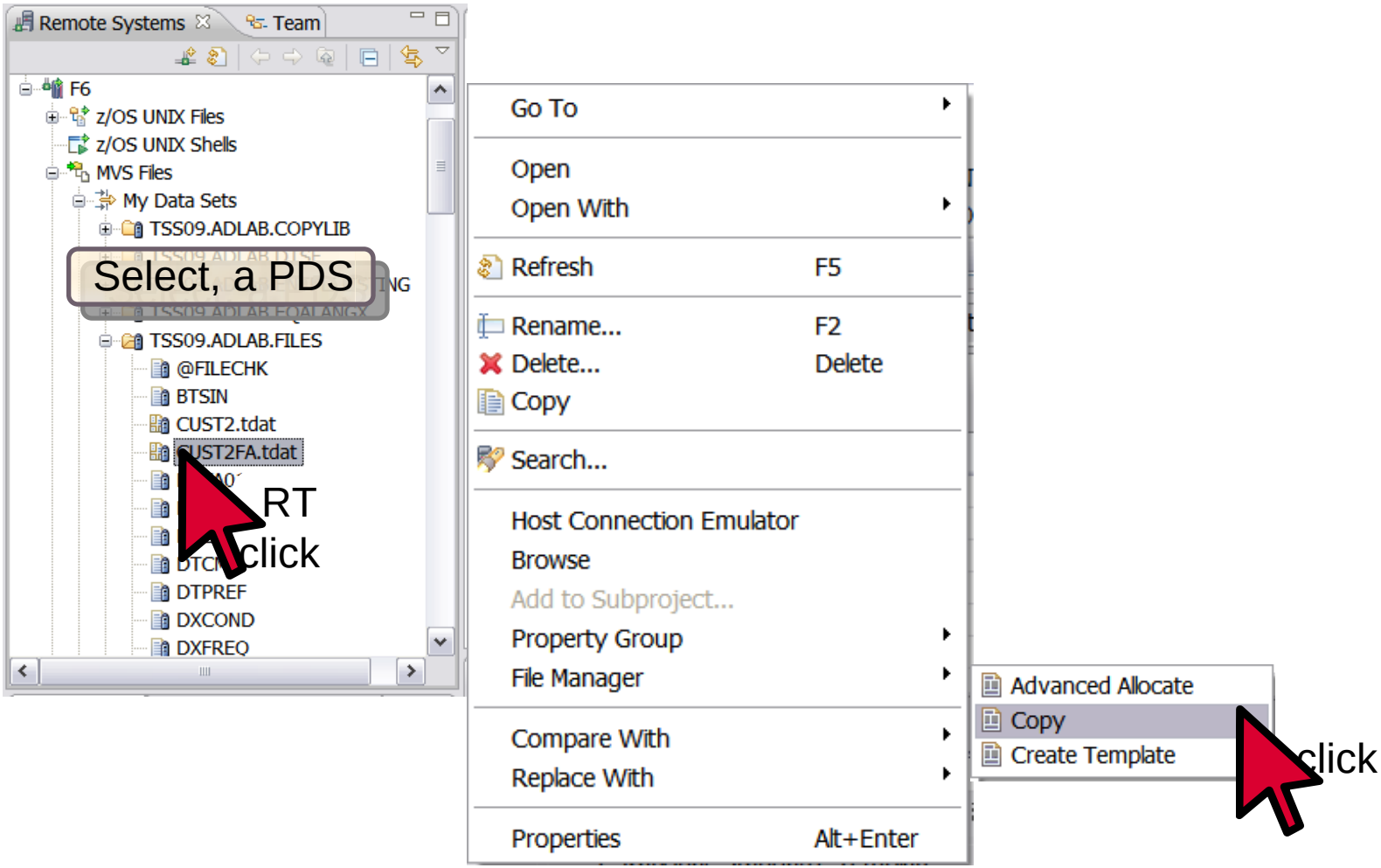
Formatted Data Editor



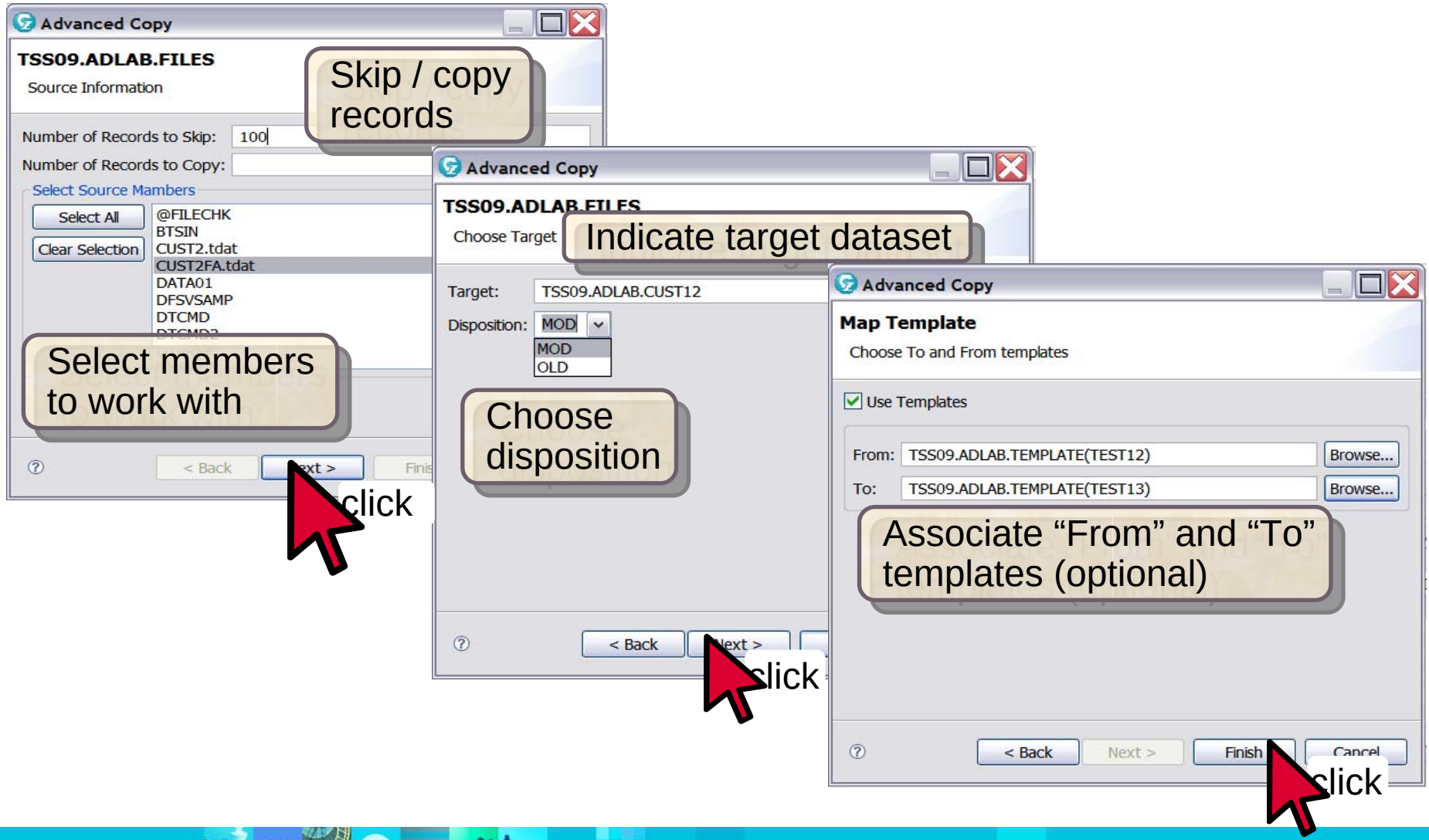
Formatted Data Editor Actions



Copy Utility



Copy Utility (continued)



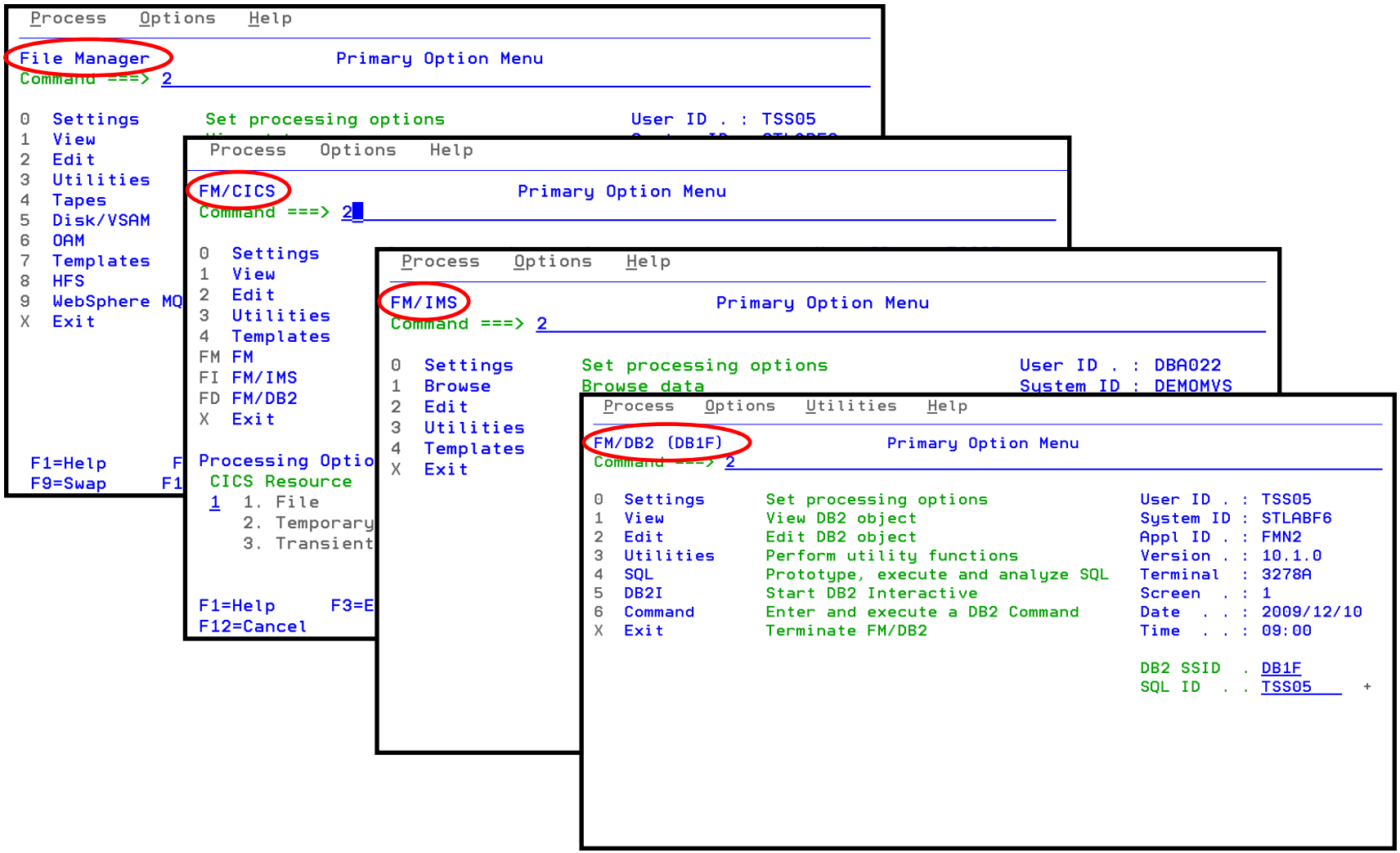
File Manager for z/OS (FM)

IBM File Manager for z/OS

Base Feature

File Manager

Inclusive of all environments



- Use a copybook or template to format the display
- A COBOL or PL/I copybook, or an assembler DSECT can be used

```
EDIT       TSS12.ADLAB.COPYLIB(CUST1) - 01.00
Command ===>
=COLS> ---1----+----2----+----3----+----4----+----5----+---
****** ***************************** Top of Data **********
000100 *   ---------------------------------------------
000200 *   Sample COBOL Copybook for IBM PD Tools Workshops
000300 *   Describes file <userid>.ADLAB.CUST1
000400 *   ---------------------------------------------
000500  01  CUST-REC.
000600      05  CUSTOMER-KEY.
000700          10  CUST-ID              PIC X(5).
000800      05  NAME                  PIC X(17).
000900      05  ACCT-BALANCE          PIC S9(7)V99  COMP-3.
001000      05  ORDERS-YTD            PIC S9(4)     COMP.
```

```
EDIT       TSS12.ADLAB.COPYLIB(PLCU1) - 01.00              Columns 000
Command ===>                                                Scroll =
=COLS> ----+----1----+----2----+----3----+----4----+----5----+----6---
****** ***************************** Top of Data ***********************
000001  /*   ------------------------------------------------   */
000002  /*   SAMPLE PLI COPYBOOK FOR IBM PD TOOLS WORKSHOPS     */
000003  /*   DESCRIBES FILE <USERID>.ADLAB.CUST1                */
000004  /*   ------------------------------------------------   */
000005  DCL 1 CUST_REC,
000006        2 CUSTOMER_KEY,
000007          3 CUST_ID         CHAR(5),
000008        2 NAME              CHAR(17),
000009        2 ACCT_BALANCE      FIXED DEC (9,2) UNALIGNED,
000010        2 ORDERS_YTD        FIXED BINARY(15,0) SIGNED UNALIGNED,
```

```
EDIT       TSS12.ADLAB.COPYLIB(ASCU1)
Command ===>
=COLS> ----+----1----+----2----+----3
****** ******************************
000001 *---------------------------
000002 *   SAMPLE ASSEMBLER DSECT FOR
000003 *   DESCRIBES FILE <USERID>.AD
000004 *---------------------------
000005 CUST_REC    DSECT
000006 CUST_ID     DS CL5
000007 NAME        DS CL17
000008 ACCT_BAL    DS 5D
000009 ORDS_YTD    DS 4H
```

Option 1 displays the view entry panel

```
 Process   Options   Help
-------------------------------------------------------------------------------
File Manager                    Primary Option Menu
Command ===> 1
-------------------------------------------------------------------------------

0  Settings      Set processing options                 User ID . : TSS12
1  View          View data                              System ID : STLABF6
2  Edit          Edit data                              Appl ID . : FMN
3  Utilities     Perform utility functions              Version . : 10.1.0
4  Tapes         Tape specific functions                Terminal. : 3278A
5  Disk/VSAM     Disk track and VSAM CI functions       Screen. . : 1
6  OAM           Work with OAM objects                  Date. . . : 2010/05/19
7  Templates     Template and copybook utilities        Time. . . : 03:15
8  HFS           Access Hierarchical File System
9  WebSphere MQ  List, view and edit MQ data
X  Exit          Terminate File Manager

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

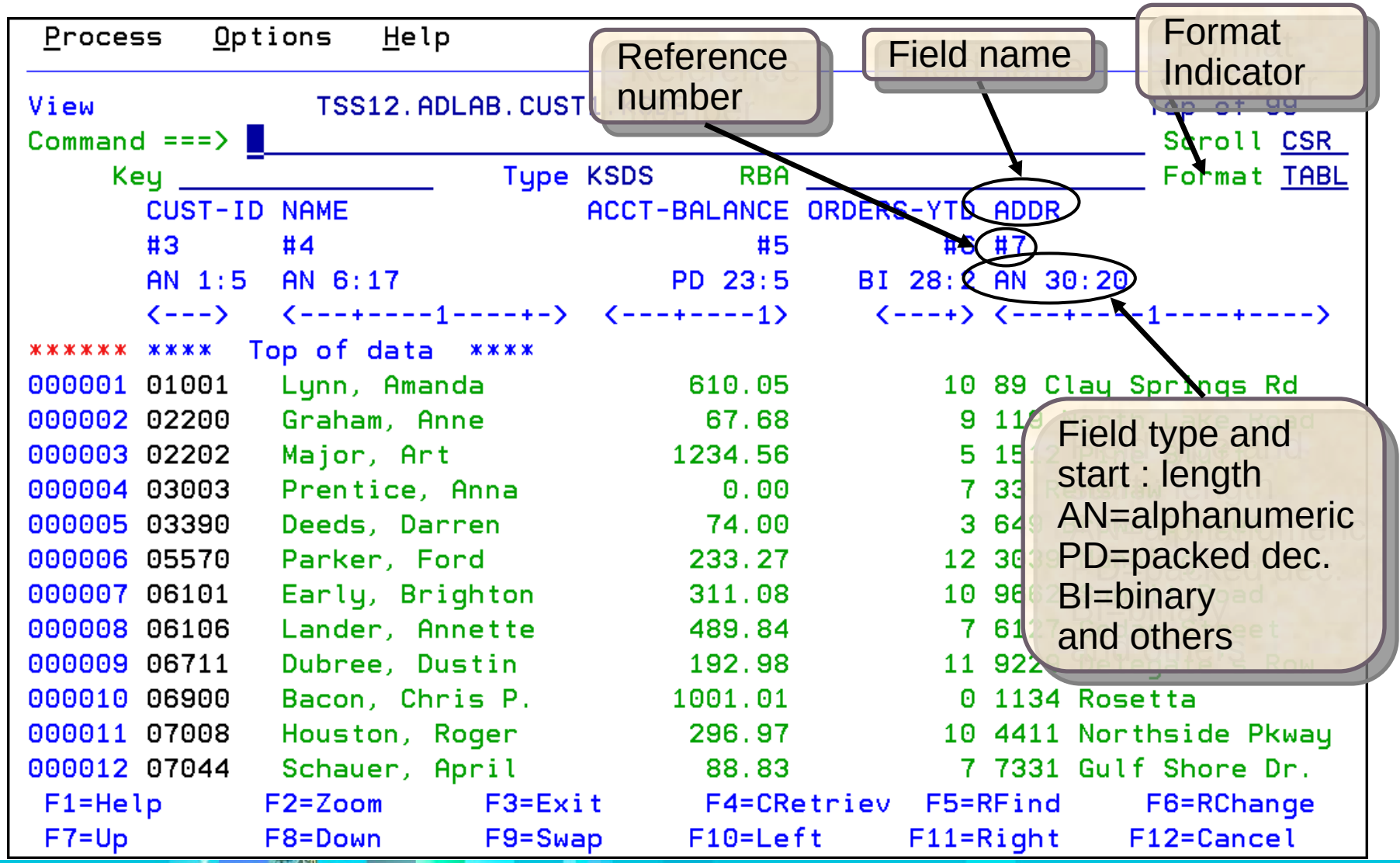
Enter

Enter the name of the copybook, and specify the 1 (above) option

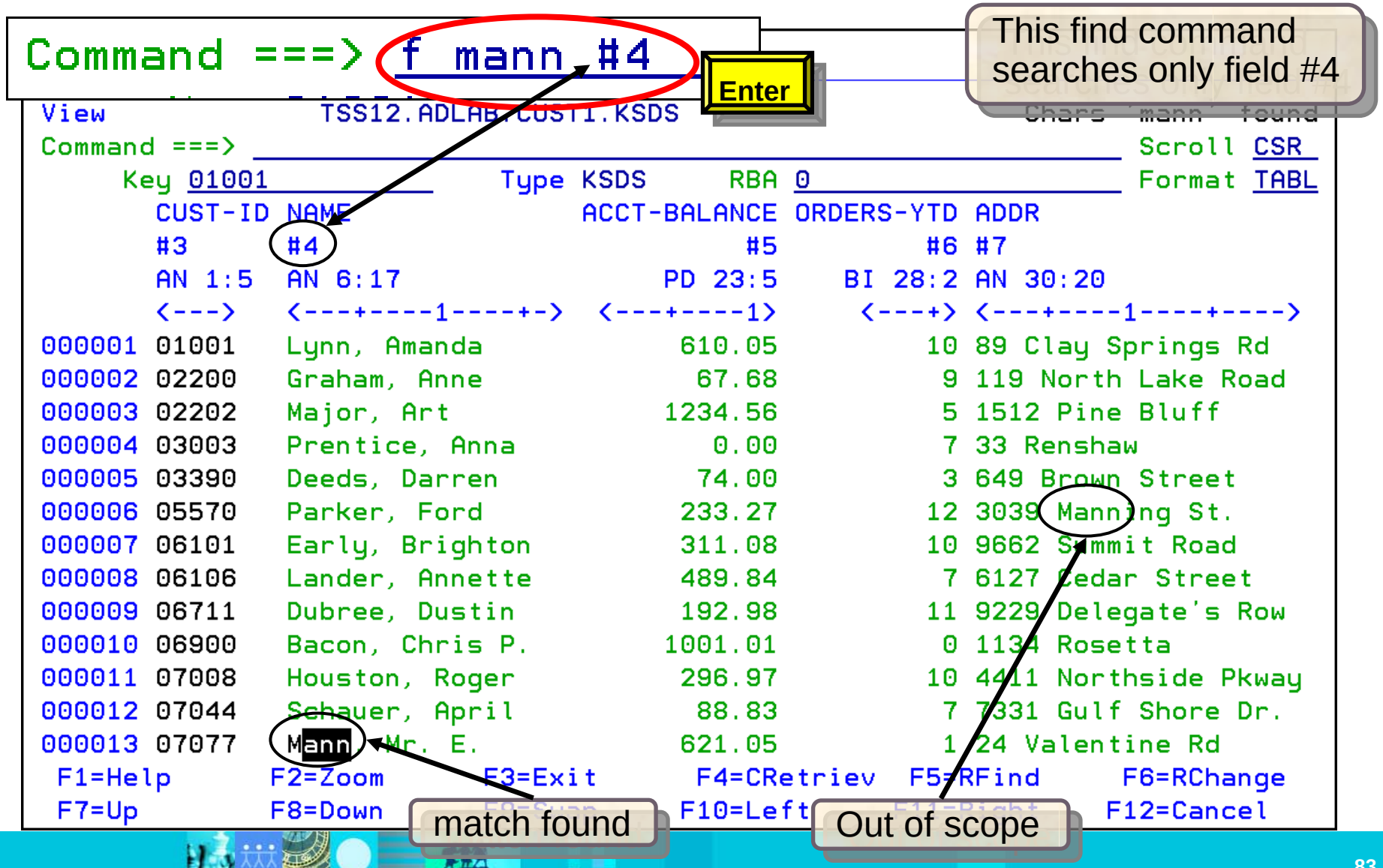
```
 Process   Options   Help
 ------------------------------------------------------------------------------
 File Manager                    View Entry Panel
 Command ===> ____________________________________________________________

 Input Partitioned, Sequential or VSAM Data Set, or HFS file:
    Data set/path name ADLAB.CUST1.KSDS                                  +
    Member . . . . . . _________      (Blank or pattern for member list)
    Volume serial  . . ______         (If not cataloged)
    Start position . . ____________________________________  +
    Record limit . . . _________      Record sampling  _

 Copybook or Template:
    Data set name  . . ADLAB.COPYLIB ____________________________________
    Member . . . . . . CUST1_____     (Blank or pattern for member list)
 Processing Options:
  Copybook/template   Start position type   Enter "/" to select option
  1  1. Above         _  1. Key             _  Edit template   _ Type (1,2,S)
     2. Previous         2. RBA             _  Include only selected records
     3. None             3. Record number   _  Binary mode, reclen 80___
     4. Create dynamic

  F1=Help      F2=Split     F3=Exit      F4=Expand    F7=Backward  F8
  F9=Swap      F10=Left     F11=Right    F12=Cancel
```

Enter

Records are formatted showing fields defined in the copybook



Some commands can use the field reference number



Utilities

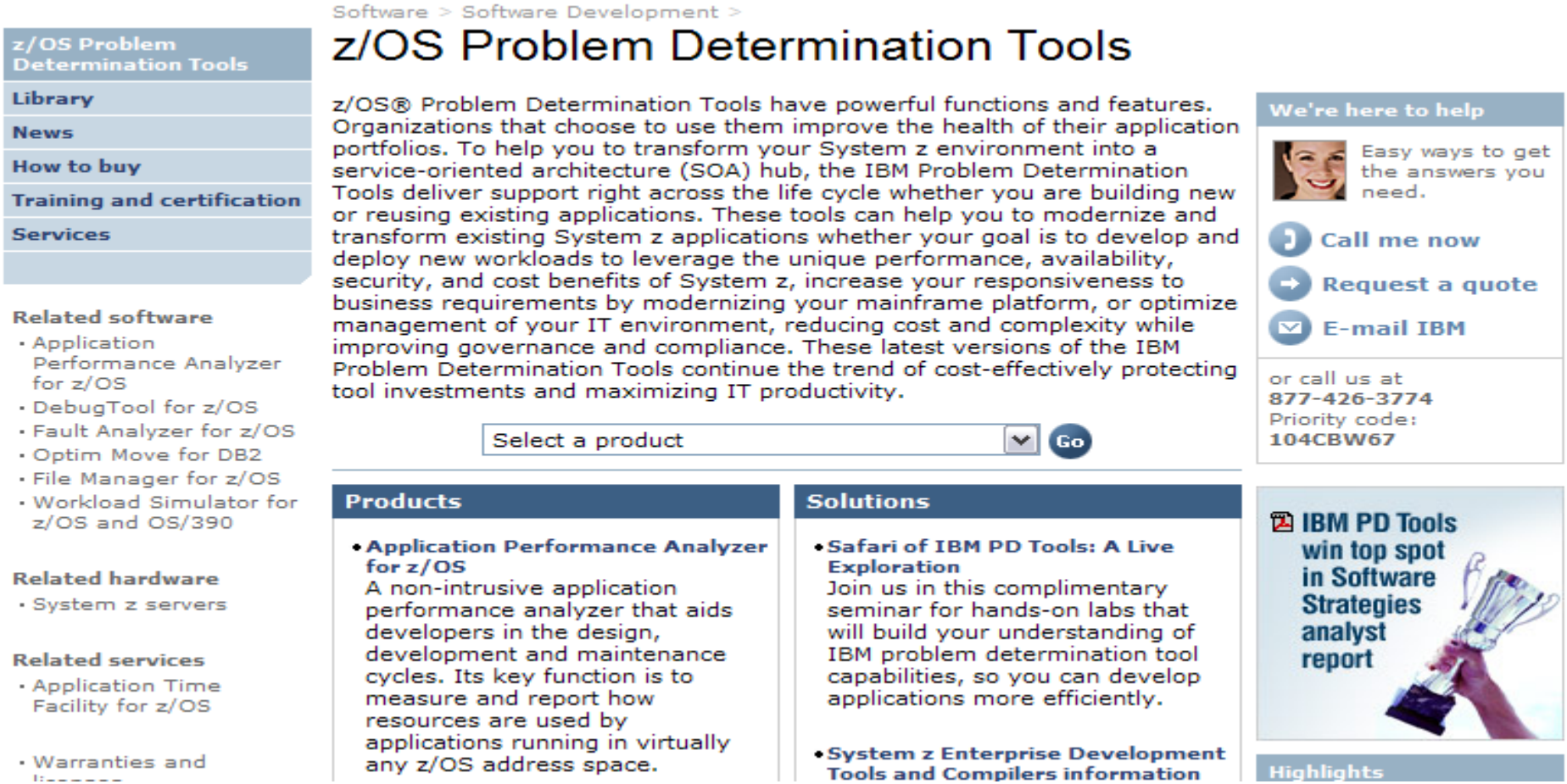
- Test data generation
  - Generate new data based on existing copybooks
- Copy data
  - Reformat and generate data while copying
  - Field values can be "**scrambled**" to protect sensitive data
  - Copy data into XML format
- Global Find/Change
  - Search for/change data across members in a PDS(E)
  - Perform a new search based on the results of a previous search
- Compare
  - Compare records/fields between files
  - Use field level mapping for comparison criteria
  - Special options for load module comparisons
- Websphere MQ support

Summary

- The PD Tools GUIs reduce the effort needed to learn and perform tasks
  - Interfaces for Fault Analyzer, Debug Tool and Application Performance Analyzer
  - Add flexibility, while retaining the proven functionality of the PD Tools
  - Navigate quickly between multiple product's functionality
  - Perform complex tasks with the aid of menus and toolbars
  - Reduce the learning curve - gain maximum leverage of IT staff with minimal training expense
- z/OS Problem Determination and Deployment Tools that:
  - Exploits IBM's latest software and processor technology
  - Offer wide array of key features and functions
  - Provide opportunity for increased user productivity
  - Are affordably priced
  - Have flexible terms and conditions
  - Various training options (Class, Web/online - free, etc…)
- PD Tools interfaces are available no charge with CICS Explorer, or integrated with RDz
- The traditional 3270 interfaces are also available to leverage traditional application development and maintenance skills
- Integrated Application Development, System/Sub System Environments

Get more information about these tools at:

www.ibm.com/software/awdtools/deployment



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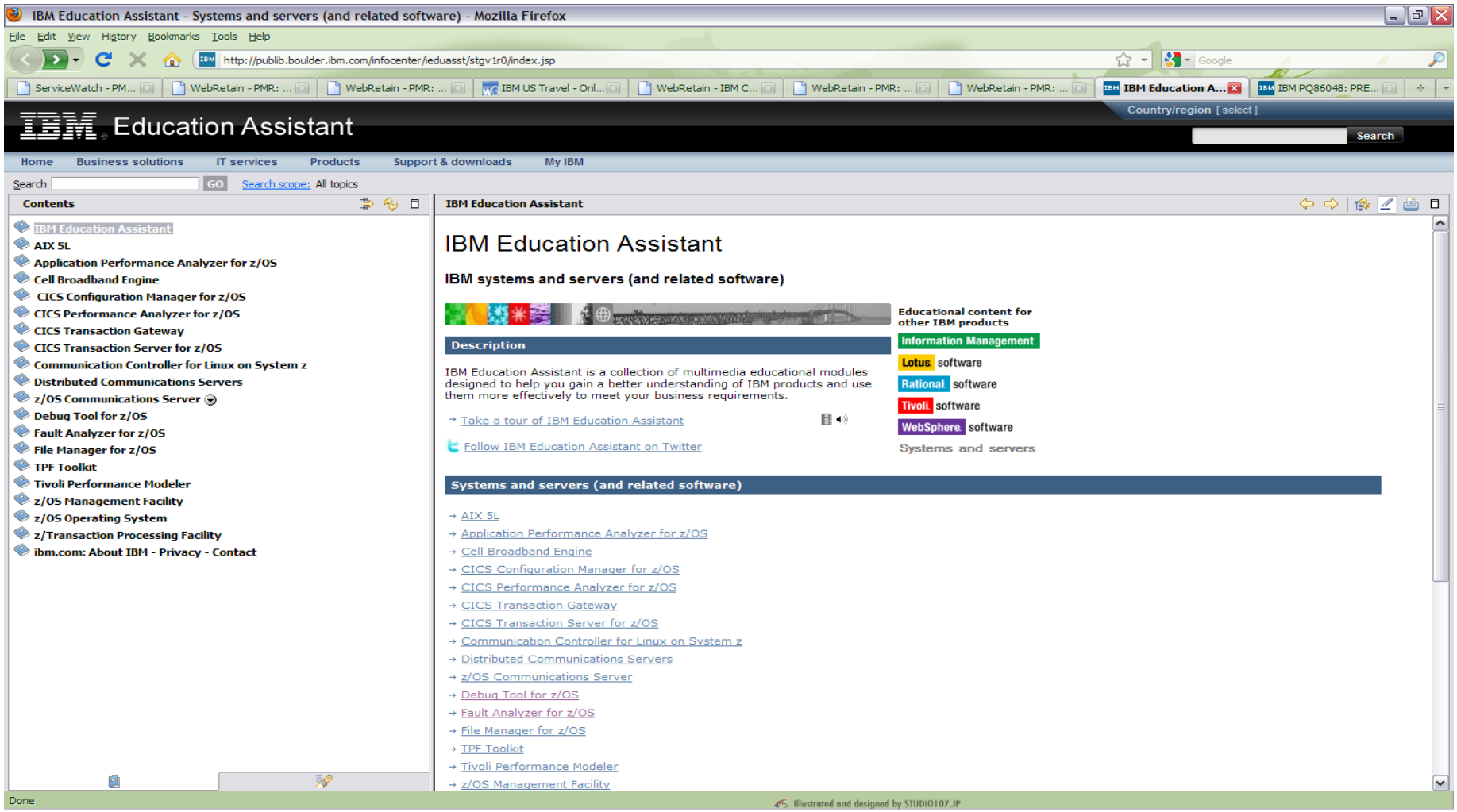
http://publib.boulder.ibm.com/infocenter/ieduasst/stgv1r0/index.jsp



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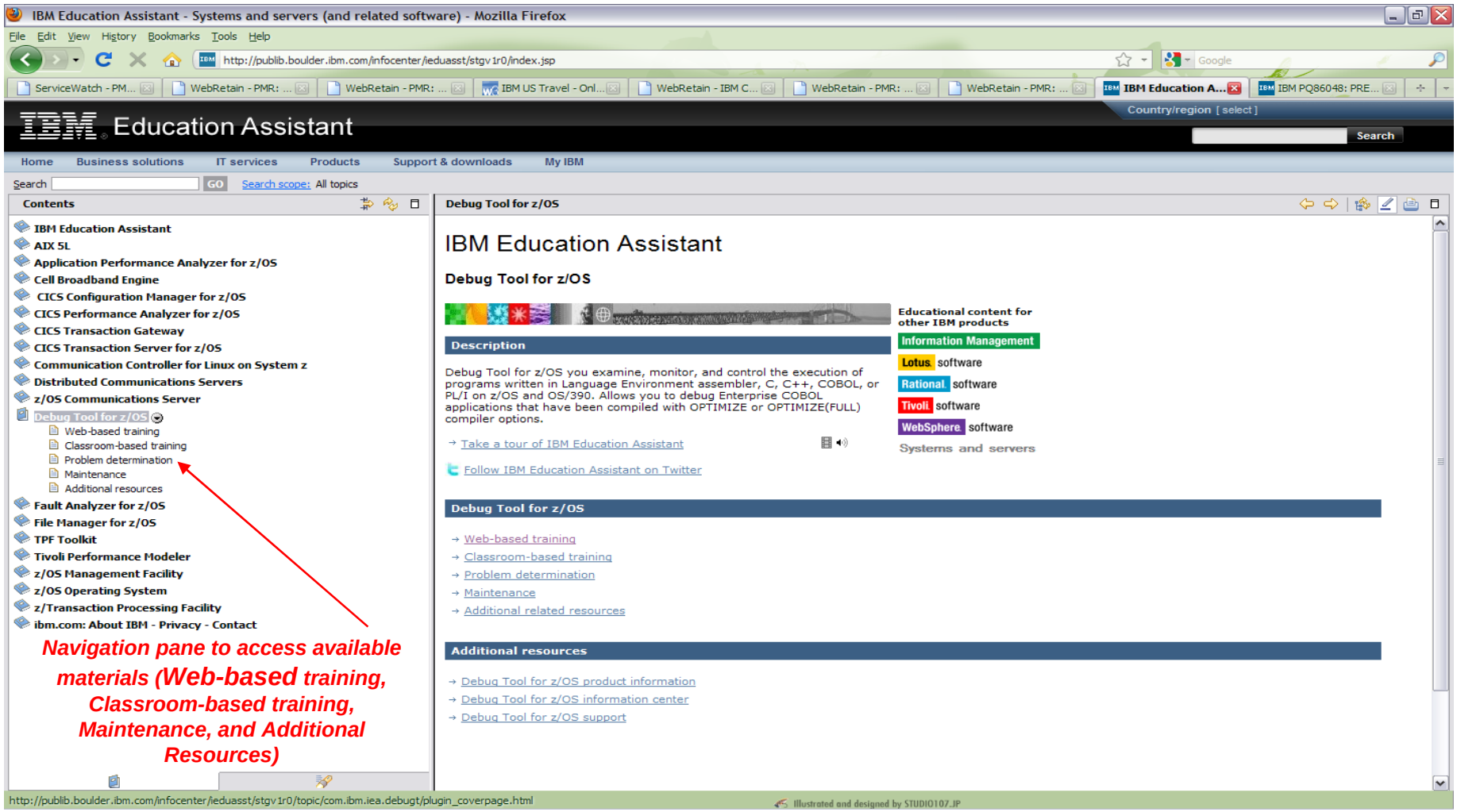
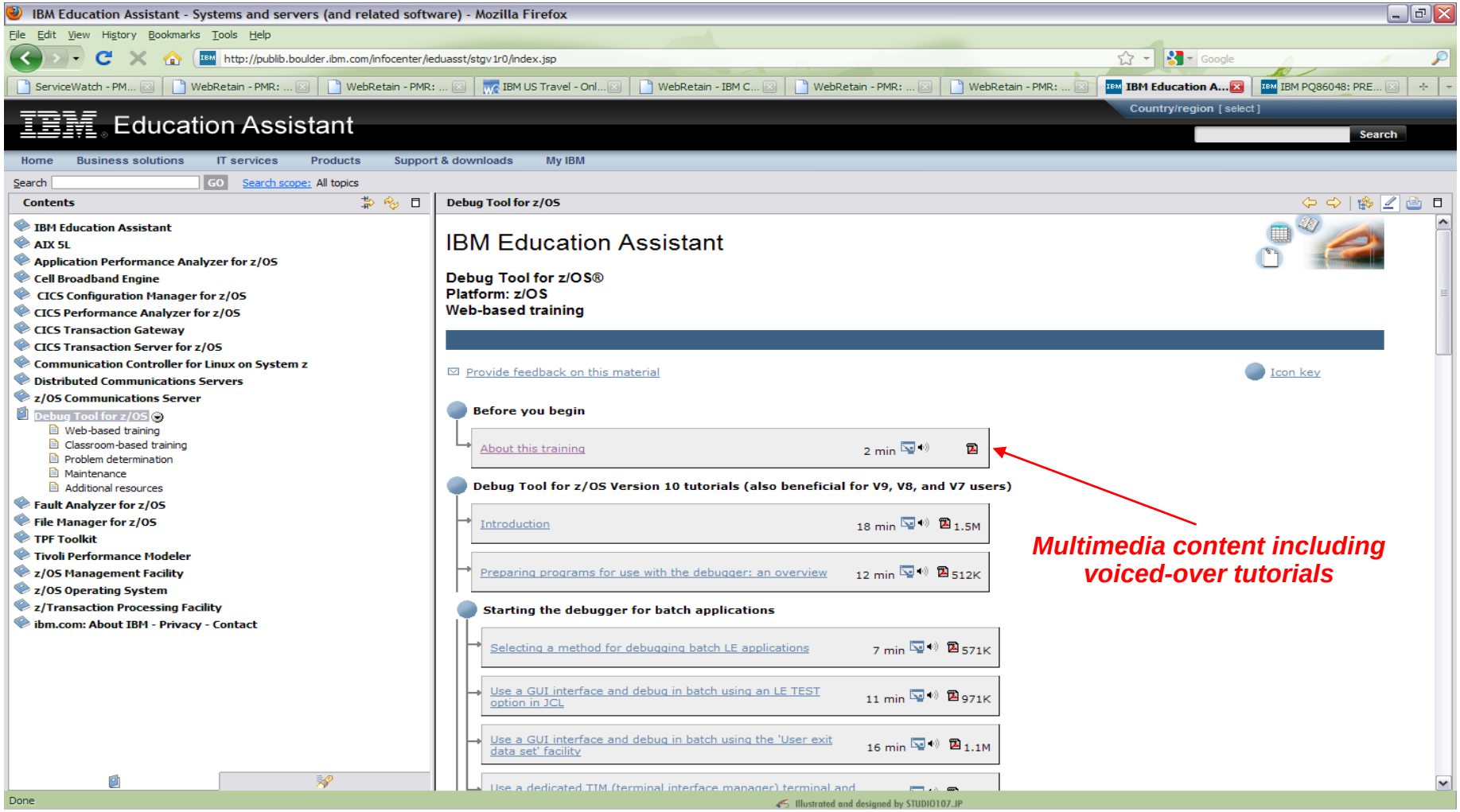
A Drill Down



The Education Assistant
More Information



CICS Explorer

- An Eclipse rich-client platform
- An integration point for CICS Transaction Server, CICS Tools, CICS Transaction Gateway, **Problem Determination Tools plug-ins**, and Rational Tools
- Provides extensive GUI CICS capabilities, for example:
  - See a list of CICS regions, transactions, resources, and resource definitions
  - Manage CICS resource, regions, and plexes
- With the PD Tools plug-ins, CICS Explorer is not only for CICS applications

- **CICS Explorer is free to download and run**
- **The PD Tools plug-ins are free to download and run in CICS Explorer**
  - they access PD Tools products running on z/OS systems

For More Information

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Q&A


Thank
You

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