

IBM System z Technology Summit



IBM Problem Determination Tools Overview of Version 11



Why are Customers Migrating?

Issues with Productivity, Functionality, Cost

Business (Vendor Issues)

- Business Practices
- Pricing Issues
 - Upgrade fees
 - Rising maintenance fees
 - Unplanned budget overages
 - Long term contracts

Technical (Product Issues)

- Ongoing enhancements
 - Integration with other products and hardware
 - Product support
 - Administrative complexity

Application Development Environment

- Unable to deploy new applications on the platform that best meets business needs (z/OS)
- Forced to consider other platforms for application hosting or affordable tools and utilities
- Reuse traditional assets in the Internet world



**Productivity,
Flexibility**

Costs

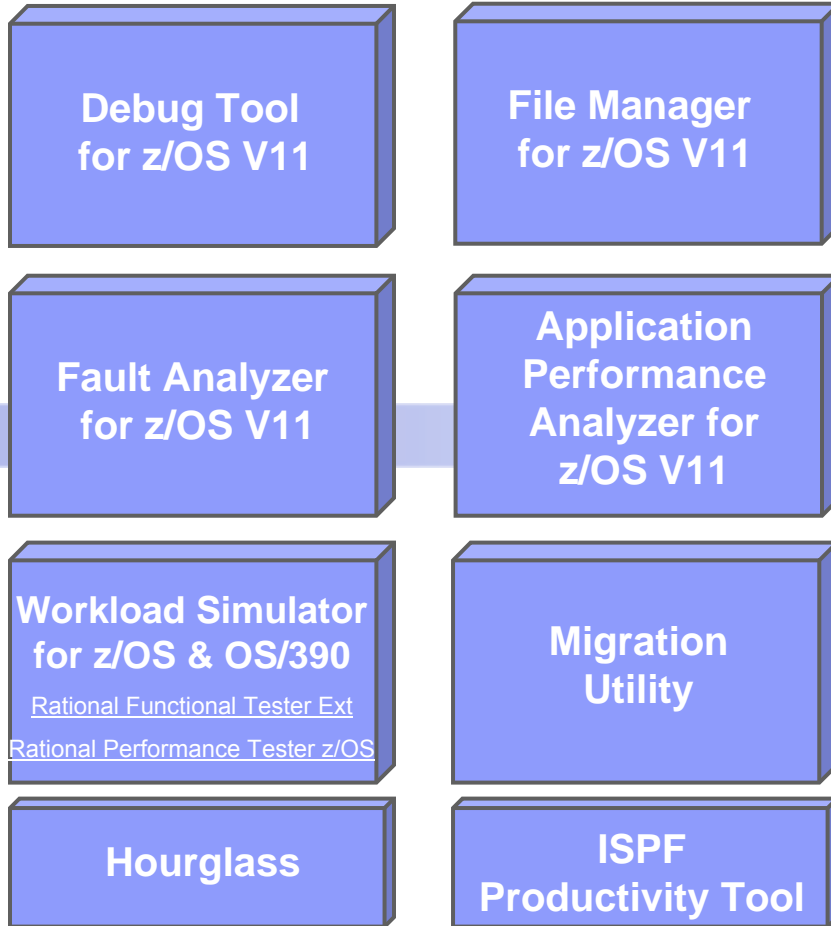
Offer a tool set that:

- Exploits IBM's latest software and processor technology
- Offers wide array of key features and functions
- Enhances the Application Development Lifecycle
- Provides opportunity for increased user productivity
- Is affordably priced
- Has flexible terms and conditions
- Has no license keys

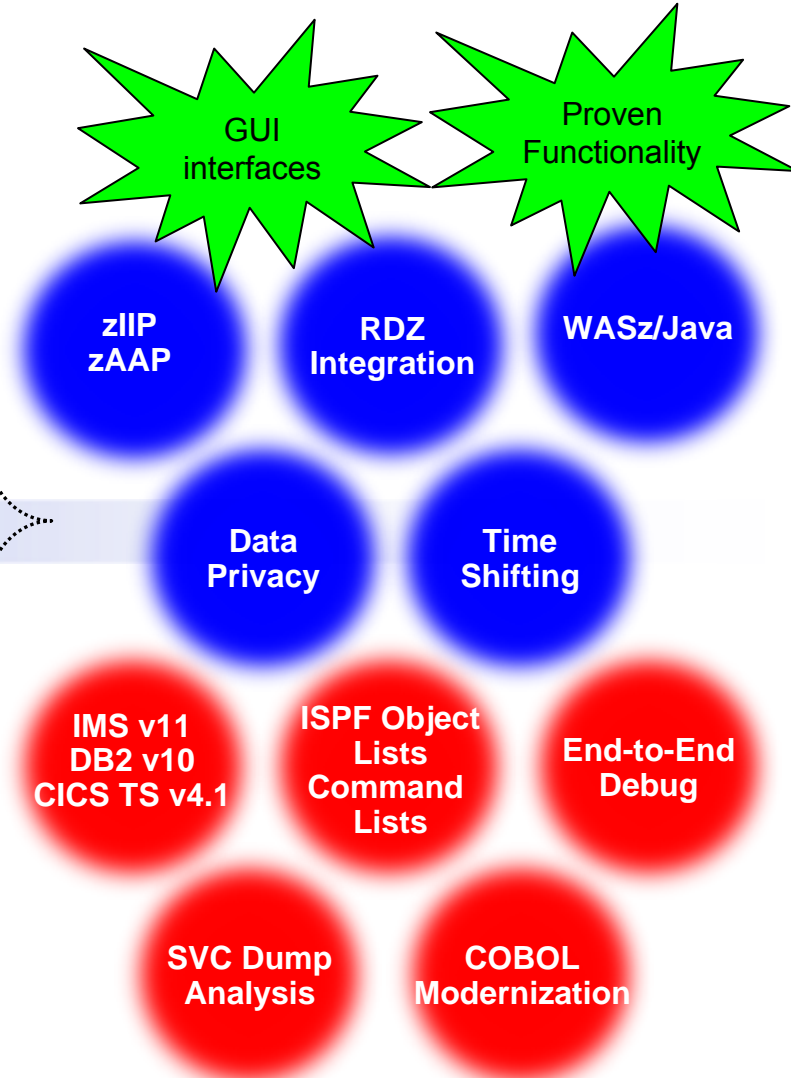
IBM Problem Determination Tools Suite for z/OS

Best of breed application development tooling

IBM 2011 Offerings



www.ibm.com/software/awdtools/deployment



IBM Problem Determination Tools

z/OS Problem Determination Tools

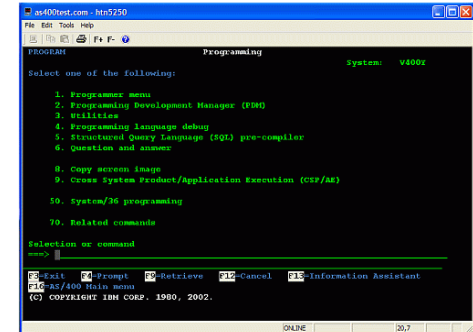
Core Product descriptions

- **Debug Tool z/OS**
 - Interactive source level debugging for multiple languages
- **Fault Analyzer for z/OS**
 - Captures and analyzes abend information about application and environment
- **File Manager for z/OS**
 - Manages production, test, and development data across multiple file formats and storage media
- **Application Performance Analyzer for z/OS**
 - Helps maximize application performance and resource consumption
- **Workload Simulator for z/OS and OS/390**
 - Regression, performance, stress, function, and capacity testing
- **ISPF Productivity Tool**
 - Integrates with ISPF providing improved access to key functionality, reducing time-consuming navigation steps
- **HourGlass**
 - Provides date and time manipulation for time sensitive applications

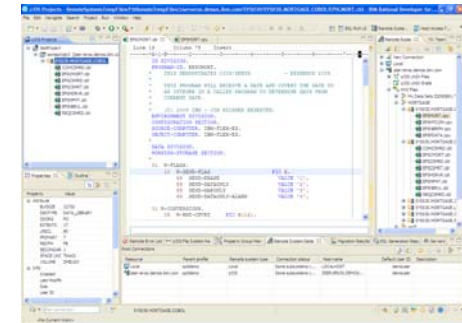
Improve developer productivity with modern interfaces

New Stand-alone GUI interfaces

- A user interface's design affects the amount of **effort** needed to **provide** input and **interpret** output from a system, and the **effort** required to **learn** how.
- Use common Eclipse-based tooling across multiple platforms and languages
 - Achieve ~15% improvement in mainframe developer productivity¹
 - Reduce host CPU usage 50%-80%¹ with workstation syntax checking
 - Reduce training costs, more attractive IDE for younger developers



✓ Produce code faster, save MIPS



- Speed development with specialized editors

1. Aggregation of results from a productivity study conducted by IBM mainframe customers



IBM Debug Tool for z/OS Version 11



IBM Debug Tool for z/OS

Examine, monitor, and control program execution

Program A,
calls B...



Problem

- Need a program testing and analysis aid that helps examine, monitor, and control the execution of application programs on a z/OS system



IBM Debug
tool!

Solution

- **Source level debugging**
 - Conditional and unconditional breakpoints
 - Step mode debugging
 - Variable and storage monitoring and update
- **Single debugging engine for many environments**

– Batch	– IMS	– UNIX System Services
– TSO	– WLM	– DB2 Stored Procedures
– CICS	– WASz	– JZOS
- Ability to run automated command scripts
- Frequency sampler
- Interactive playback support

The IBM Problem Determination Tools Suite for z/OS

IBM Problem Determination Tools

IBM 2011 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

Migration
Utility

Hourglass

ISPF
Productivity Tool

www.ibm.com/software/awdtools/deployment

Debug Tool for zOS

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

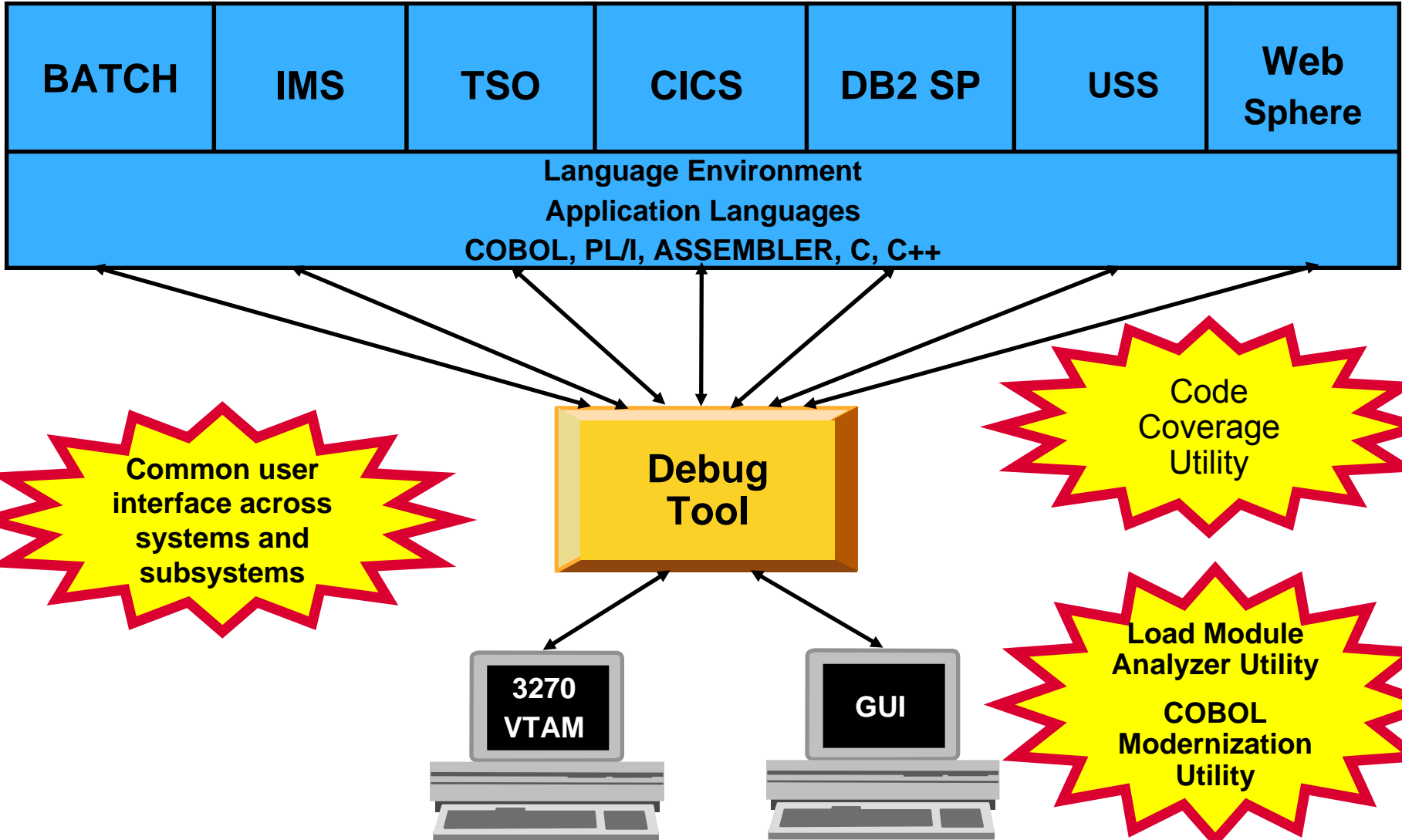
What is IBM Debug Tool for z/OS ?

- An interactive program debugger to control and monitor application programs while they run

The diagram illustrates the interaction between an application and the debug tool. On the left, a box labeled 'z/OS' contains two sub-boxes: 'Application' and 'Debug Tool', connected by a double-headed arrow. An arrow points from the 'Debug Tool' box to a cartoon illustration of a person sitting at a computer terminal. To the right, a screenshot of the debug tool's command-line interface shows COBOL code being executed. The code includes instructions like 'ACCUM-A', 'RESULT-SUM', 'AUTOMONITOR', 'SUB (1)', and 'WORK-MAX'. The interface also displays source code for 'ADSTAT' and a 'LOG' section with control commands like 'GO;', 'SET AUTOMONITOR ON;', 'MONITOR', and 'LIST RESULT-SUM;'. Below the terminal screenshot is a screenshot of the IBM WorkSpace Developer Debugger for Systems z GUI. The GUI shows a 'Debug Console' with a list of instructions being executed, such as 'MOVE CURRENT-REPORT TO SPT-RT;', 'MOVE CURRENT-REPORT TO SPT-HEA;', and 'WRITE REPORT-RECORD FROM SPT-HEADER;'. The right side of the GUI displays a tree view of 'Monitors' and 'Breakpoints' for a program named 'SPT-HEA', and a table of 'SPT-HEA' variables and registers.

- And a set of related online panels and batch utilities

Debug enterprise applications to isolate coding issues



Start CICS Explorer

The screenshot displays the IBM CICS Explorer application window. The main interface includes a menu bar (Explorer, Edit, Run, Window, Help), a toolbar, and several panels: Debug, Breakpoints, Outline, and Variables. A status bar at the bottom left indicates "No CICS SM connection".

Overlaid on the right side is a terminal window titled "Compilers Test Help". The terminal displays the following output:

```

Columns 00001 00072
Scroll ==> CSR
ata *****
SHOP',REGION=4M,CLASS=A,
MSGLEVEL=(1,1)

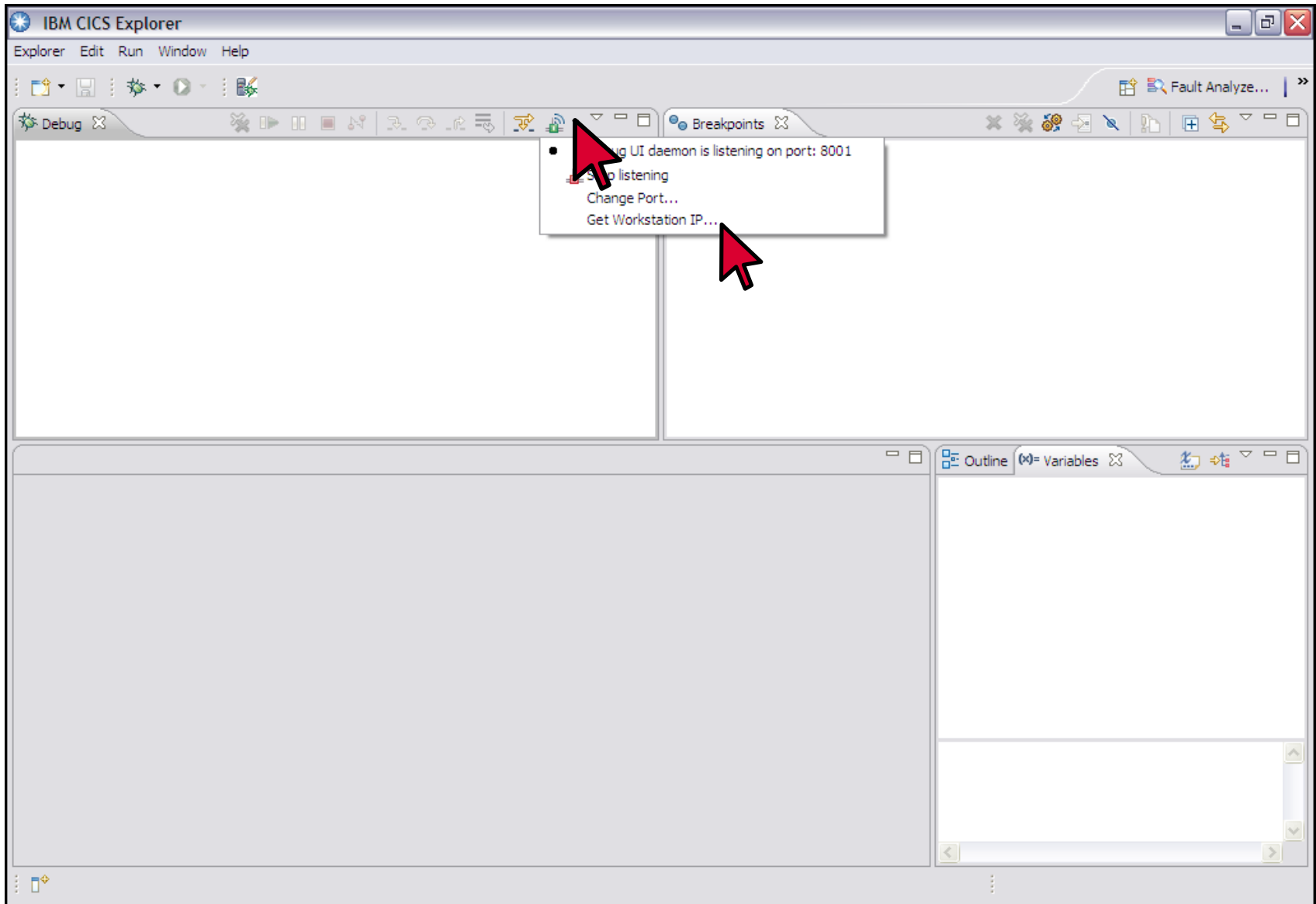
(CUST2FA),DISP=SHR

*****

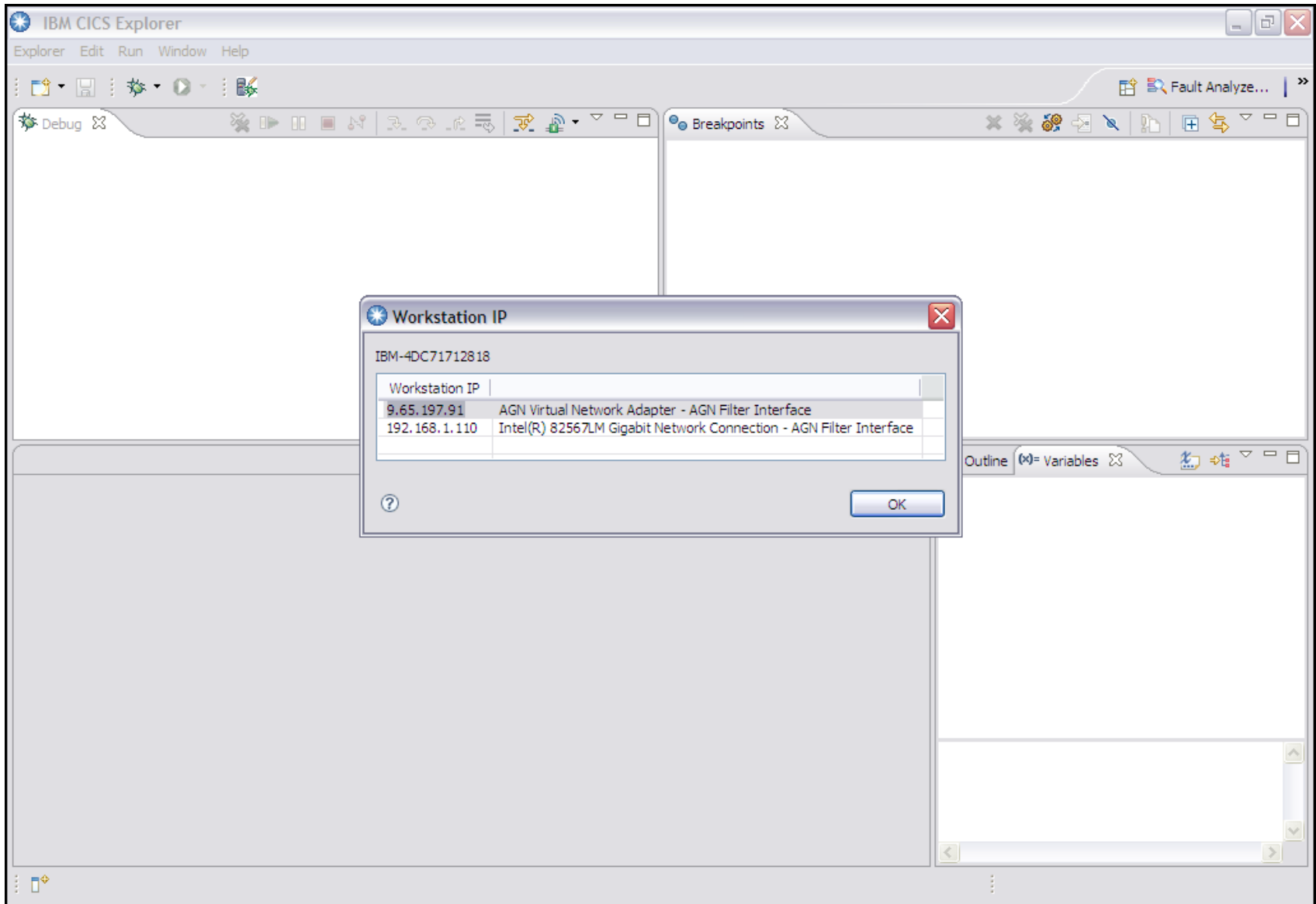
000014 /** //INSPLOG DD SYSOUT=*
000015 /** //EQADEBUG DD DSN=&SYSUID..ADLAB.SYSDEBUG,DISP=SHR
000016 /** // DD DSN=&SYSUID..ADLAB.EQUALANGX,DISP=SHR
000017 /** //INSPREF DD DSN=&SYSUID..ADLAB.DTPREF,DISP=SHR
000018 //*****
000019 //STEPLIB DD DISP=SHR,DSN=&SYSUID..ADLAB.LOAD
  
```

The terminal window also shows a status bar at the bottom with the text "Connected to remote server/host demomvs.demopkg.ibm.com using lu/e" and "Print to Disk - Append".

Select 'Get workstation IP address'



Copy the workstation's IP address



Submit the job that will be debugged

IBM CICS Explorer

Session A - [24 x 80]

File Edit View Communication Actions Window Help

File Edit Edit_Settings Menu Utilities Compilers Test Help

```

-IPT- EDIT DNET074.ADLAB.JCL(XSAM) - 04.20          Columns 00001 00072
Command ===> SUB                                     Scroll ==> CSR
***** ***** Top of Data *****
000001 //DNET074A JOB (ACCTG), 'IBM TOOLS WORKSHOP', REGION=4M, CLASS=A,
000002 //          MSGCLASS=H, NOTIFY=&SYSUID, MSGLEVEL=(1,1)
000003 //*
000004 //PRINT1 EXEC PGM=IDCAMS
000005 //SYSPRINT DD SYSOUT=*
000006 //FILE     DD DSN=&SYSUID..ADLAB.FILES(CUST2FA), DISP=SHR
000007 //SYSIN DD *
000008 PRINT INFILE(FILE) COUNT(1)
000009 //*
000010 //RUNSAM1 EXEC PGM=SAM1, REGION=4M
000011 //***** DD'S FOR DEBUG TOOL *****
000012 //CEEOPST DD *
000013 TEST(,,TCPIP&9.65.197.91%8001:)
000014 //** //INSPLOG DD SYSOUT=*
000015 //** //EQADEBUG DD DSN=&SYSUID..ADLAB.SYSDEBUG, DISP=SHR
000016 //** //          DD DSN=&SYSUID..ADLAB.EQALANGX, DISP=SHR
000017 //** //INSPREF DD DSN=&SYSUID..ADLAB.DTPREF, DISP=SHR
000018 //*****
000019 //STEPLIB DD DISP=SHR, DSN=&SYSUID..ADLAB.LOAD
  
```

MA a 04/019

Connected to remote server/host demomvs.demopkg.ibm.com using lu/pool TCP00055 and port 23

Print to Disk - Append

Enter

The debugger started, step

The screenshot shows the IBM CICS Explorer interface with the following components:

- Tree View:** Shows the application structure for SAM1 [Remote Compiled Application], including Platform: [Team] zOS 390X, Connection: 9.39.68, Thread: 1 (Runnable), and Process: 544260880 Program: SAM1. A red mouse cursor points to the Thread: 1 (Runnable) node.
- Source Code Editor:** Displays the source code for DNET074.ADLAB.SYSDEBUG(SAM1). The code is as follows:


```

Line 1      Column 1      Insert      Browse
-----
1  *****
2  * PROGRAM:  SAM1
3  *           Sample program for the ENTERPRISE COBOL Compiler
4  *
5  * AUTHOR :  Doug Stout
6  *           IBM PD TOOLS
7  *
8  * READS A SEQUENTIAL FILE AND WRITES A REPORT
9  * PROCESSING IS CONTROLLED BY A TRANSACTION FILE
10 *
11 * THIS EXAMPLE APPLICATION IS A TEACHING AID.  INTENDED USES ARE:
12 *   FOR DEBUG TOOL WORKSHOP:
13 *   - DETERMINE WHY MAX VALUE IS INCORRECT IN THE REPORT
14 *   - INTERCEPT THE SOC7 ABEND THAT CAN OCCUR IN PROGRAM SAM2
      
```
- Variable Window:** Shows "no local variables are available".
- Debug Console:** Displays the message: "EQA2383I The environment is not yet fully initialized. Use Step or Run." Below this, a list of commands is shown:


```

1  set auto on both
2  set auto on both
3  set auto on both
4  clear mon
      
```
- Debug Engine Command:** A text input field with a "Enter Commands..." button.

Step

The screenshot shows the IBM CICS Explorer interface during a debug session. A red mouse cursor points to the 'Step' button in the top toolbar. The main window displays the source code for the program SAM1, with line 31 highlighted. The debug console at the bottom shows the message: 'EQA2383I The environment is not yet fully initialized. Use Step or Run.' Below the console, there is a list of commands: '1 set auto on both', '2 set auto on both', '3 set auto on both', and '4 clear mon'. The 'Debug Engine Command' field is empty.

Step

IBM CICS Explorer

Explorer Edit Run Window Help

Debug SAM1 [Remote Compiled Application]
 Platform: [Team] zOS 390X Connection: 9.39.68 65942
 Thread: 1 (Runnable)
 SAM1: 01
 Process: 544260880 Program: SAM1

Breakpoints Registers Monitors Modules

CURRENT-DATE

DNET074.ADLAB.SYSDEBUG(SAM1)

Line	Column	Insert	Browse
251	1	ACCEPT CURRENT-DATE FROM DATE.	
252	1	ACCEPT CURRENT-TIME FROM TIME.	
253	1	DISPLAY 'SAM1 STARTED DATE = ' CURRENT-MONTH '/'	
254	1	CURRENT-DAY '/' CURRENT-YEAR ' (mm/dd/yy)'.	
255	1	DISPLAY ' TIME = ' CURRENT-HOUR ':'	
256	1	CURRENT-MINUTE ':' CURRENT-SECOND.	
257	1		
258	1	PERFORM 900-OPEN-TRAN-AND-RPT-FILES.	
259	1	PERFORM 800-INIT-REPORT .	
260	1		
261	1	PERFORM 100-PROCESS-TRANSACTIONS	
262	1	UNTIL WS-TRAN-FILE-EOF = 'Y' .	
263	1		
264	1	PERFORM 905-CLOSE-TRAN-AND-RPT-FILES.	

Outline Variables

Name	Value
CURRENT-DATE	

Debug Console Memory

EQA2383I The environment is not yet fully initialized. Use Step or Run.

1	set auto on both
2	set auto on both
3	set auto on both
4	clear mon

Debug Engine Command: Enter Commands...

Step

IBM CICS Explorer

Explorer Edit Run Window Help

Debug SAM1 [Remote Compiled Application]
 Platform: [Team] zOS 390X Connection: 9.39.68 65942
 Thread: 1 (Runnable)
 SAM1: 01
 Process: 544260880 Program: SAM1

Breakpoints Registers Monitors Modules

- CURRENT-DATE
- CURRENT-TIME

Outline Variables

Name	Value
CURRENT-DATE	
CURRENT-TIME	

Debug Console Memory

EQA2383I The environment is not yet fully initialized. Use Step or Run.

1	set auto on both
2	set auto on both
3	set auto on both
4	clear mon

Debug Engine Command: Enter Commands...

After stepping

IBM CICS Explorer

Explorer Edit Run Window Help

Debug SAM1 [Remote Compiled Application]

- Platform: [Team] zOS 390X Connection: 9.39.68.147:6942
- Thread: 1 (Runnable)
 - SAM1: 01
- Process: 544260880 Program: SAM1

Breakpoints Registers Monitors Modules

- CURRENT-TIME
- CURRENT-MONTH = 07
- CURRENT-DAY = 27
- CURRENT-YEAR = 10

DNET074.ADLAB.SYSDEBUG(SAM1)

Name	Value
CURRENT-TIME	
CURRENT-MONTH	07
CURRENT-DAY	27
CURRENT-YEAR	10

```

Line 253 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
261 PERFORM 100-PROCESS-TRANSACTIONS
262 UNTIL WS-TRAN-FILE-EOF = 'Y' .
263
264 PERFORM 905-CLOSE-TRAN-AND-RPT-FILES.
    
```

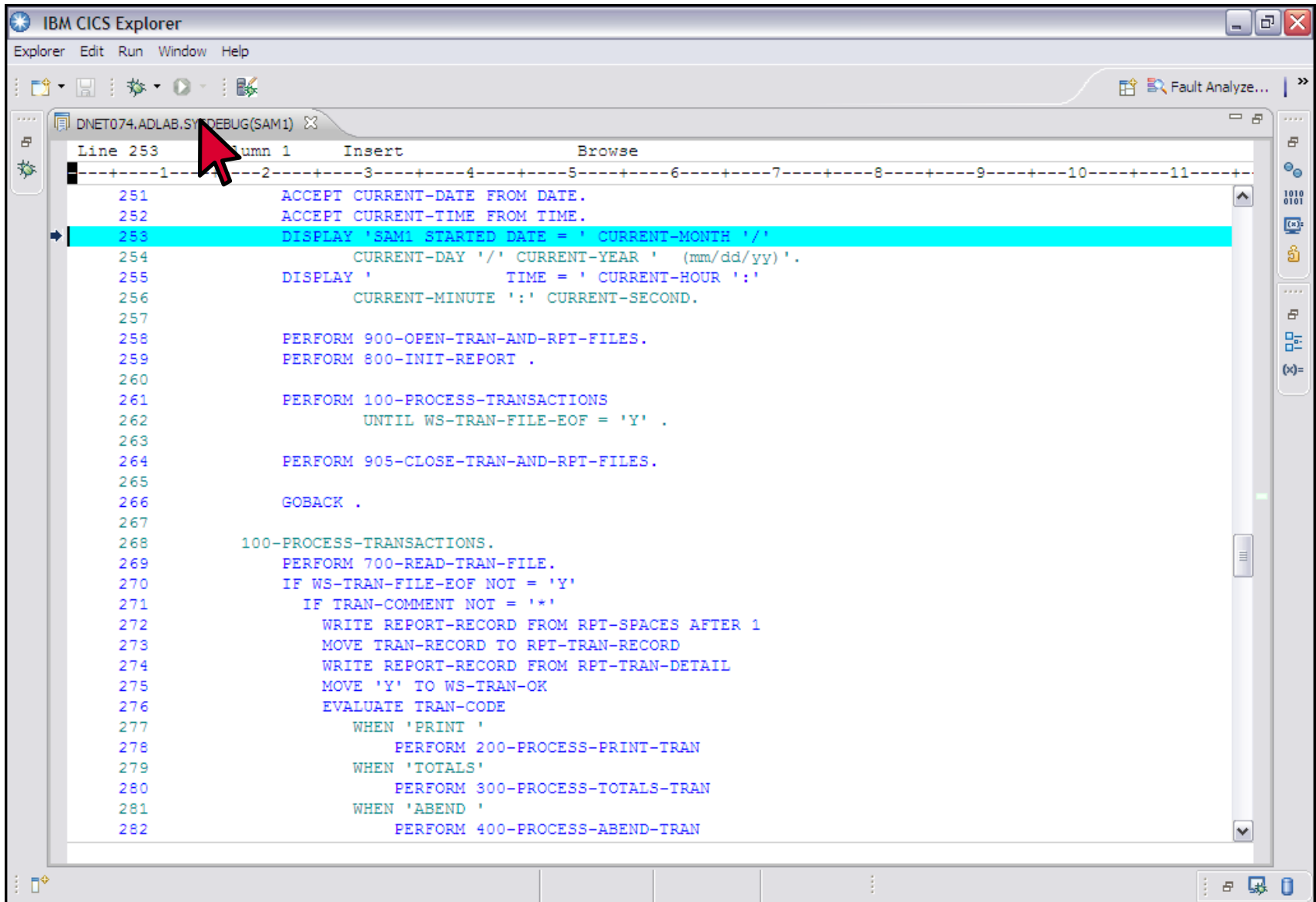
Debug Console Memory

EQA2383I The environment is not yet fully initialized. Use Step or Run.

1	set auto on both
2	set auto on both
3	set auto on both
4	clear mon

Debug Engine Command: Enter Commands...

An expanded view



```
IBM CICS Explorer
Explorer Edit Run Window Help

DNET074.ADLAB.SYNDDEBUG(SAM1)
Line 253 Column 1 Insert Browse
-----1-----2-----3-----4-----5-----6-----7-----8-----9-----10-----11-----
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
261 PERFORM 100-PROCESS-TRANSACTIONS
262 UNTIL WS-TRAN-FILE-EOF = 'Y' .
263
264 PERFORM 905-CLOSE-TRAN-AND-RPT-FILES.
265
266 GOBACK .
267
268 100-PROCESS-TRANSACTIONS.
269 PERFORM 700-READ-TRAN-FILE.
270 IF WS-TRAN-FILE-EOF NOT = 'Y'
271 IF TRAN-COMMENT NOT = '*'
272 WRITE REPORT-RECORD FROM RPT-SPACES AFTER 1
273 MOVE TRAN-RECORD TO RPT-TRAN-RECORD
274 WRITE REPORT-RECORD FROM RPT-TRAN-DETAIL
275 MOVE 'Y' TO WS-TRAN-OK
276 EVALUATE TRAN-CODE
277 WHEN 'PRINT '
278 PERFORM 200-PROCESS-PRINT-TRAN
279 WHEN 'TOTALS'
280 PERFORM 300-PROCESS-TOTALS-TRAN
281 WHEN 'ABEND '
282 PERFORM 400-PROCESS-ABEND-TRAN
```

The view was collapsed

IBM CICS Explorer

Explorer Edit Run Window Help

Debug [Remove All Terminated Launches]

SAM1 [Remote Compiled Ap] Platform: [Team] zOS 390X Connection: 9.39.68.147:6942

Thread: 1 (Runnable)

SAM1: 01

Process: 544260880 Program: SAM1

Breakpoints Registers Monitors Modules

CURRENT-TIME
CURRENT-MONTH = 07
CURRENT-DAY = 27
CURRENT-YEAR = 10

DNET074.ADLAB.SYSDEBUG(SAM1)

Line	Column	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			
261		PERFORM 100-PROCESS-TRANSACTIONS	
262		UNTIL WS-TRAN-FILE-EOF = 'Y' .	
263			
264		PERFORM 905-CLOSE-TRAN-AND-RPT-FILES.	

Name	Value
CURRENT-TIME	
CURRENT-MONTH	07
CURRENT-DAY	27
CURRENT-YEAR	10

Debug Console Memory

EQA2383I The environment is not yet fully initialized. Use Step or Run.
EQA2383I The environment is not yet fully initialized. Use Step or Run.

Debug Engine Command: Enter Commands...

1	set auto on both
2	set auto on both
3	set auto on both
4	clear mon

Run to a statement

The screenshot shows the IBM CICS Explorer interface with the following components:

- Project Tree:** SAM1 [Remote Compiled Application]
 - Platform: [Team] zOS 390X Connection: 9.39.68.147:6942
 - Thread: 1 (Runnable)
 - SAM1: 01
 - Process: 544260880 Program: SAM1
- Breakpoints/Registers/Modules:**
 - CURRENT-TIME
 - CURRENT-MONTH = 07
 - CURRENT-DAY = 27
 - CURRENT-YEAR = 10
- Code Editor:**

```

Line 309      Column 29      Insert      Browse
-----1-----2-----3-----4-----5-----6-----7-----8-----+
305
306          210-PROCESS-CUSTFILE-RECORD.
307          PERFORM 730-READ-CUSTOMER-FILE.
308          IF WS-CUST-FILE-EOF NOT = 'Y'
309          IF CUST-RECORD-TYPE = 'C'
310          ADD +1 TO NUM-CUSTOMER-R
311          * SUBROUTINE SAM2-SELL COL
312          CALL 'SAM2' USING CUST-R
313          CUSTOMER-BALANCE
314          MOVE CUST-ID TO
315          MOVE CUST-NAME TO
316          MOVE CUST-OCCUPATION TO
317          MOVE CUST-ACCT-BALANCE TO
318          MOVE CUST-ORDERS-YTD TO
          
```
- Outline/Variables:**

Name	Value
CURRENT-TIME	
CURRENT-MONTH	07
CURRENT-DAY	27
CURRENT-YEAR	10
- Debug Console:**

```

EQA2383I The environment is not yet fully initializ
EQA2383I The environment is not yet fully initializ
          
```
- Context Menu (over line 309):**
 - Find Text... Ctrl+F
 - Find Next Ctrl+K
 - Find Function or Entry Point... Ctrl+F12
 - Add Breakpoint
 - Add Watch Breakpoint...
 - Jump To Location
 - Run To Location**
 - Monitor Expression
 - Monitor Memory
 - Edit Source Lookup...
 - Change Text File...
 - Switch View
- Bottom Panel:**
 - Debug Engine Command: Enter Commands...
 - Breakpoint list:

1	set auto on both
2	set auto on both
3	set auto on both
4	clear mon

After running to a statement, Set a breakpoint

The screenshot shows the IBM CICS Explorer interface with the following components:

- Explorer Panel:** Shows the application structure for SAM1 [Remote Compiled Application] on a z/OS 390X platform. The current thread is Thread:1 (Runnable) and the process is 544260880.
- Breakpoints Panel:** Lists four active breakpoints:
 - CURRENT-MONTH = 07
 - CURRENT-DAY = 27
 - CURRENT-YEAR = 10
 - CUST-RECORD-TYPE = 'C'
- Code Editor:** Displays the source code for DNET074.ADLAB.SYSDEBUG(SAM1). Line 309, which contains the statement `IF CUST-RECORD-TYPE = 'C'`, is highlighted in blue and has a red mouse cursor pointing to it. The code includes a subroutine call and several data moves.


```

      Line 309      Column 1      Insert      Browse
      -----1-----2-----3-----4-----5-----6-----7-----8-----+
      305
      306          210-PROCESS-CUSTFILE-RECORD.
      307              PERFORM 730-READ-CUSTOMER-FILE.
      308              IF WS-CUST-FILE-EOF NOT = 'Y'
      309          IF CUST-RECORD-TYPE = 'C'
      310              ADD +1 TO NUM-CUSTOMER-RECS
      311          *          SUBROUTINE SAM2 WILL COLLECT CUSTOMER STATISTICS
      312              CALL 'SAM2' USING CUST-REC,
      313                  CUSTOMER-BALANCE-STATS
      314              MOVE CUST-ID          TO RPT-CUST-ID
      315              MOVE CUST-NAME        TO RPT-CUST-NAME
      316              MOVE CUST-OCCUPATION  TO RPT-CUST-OCCUPATION
      317              MOVE CUST-ACCT-BALANCE TO RPT-CUST-ACCT-BALANCE
      318              MOVE CUST-ORDERS-YTD  TO RPT-CUST-ORDERS-YTD
      
```
- Variables Panel:** Shows the current values of the variables used in the breakpoints:

Name	Value
CURRENT-MONTH	07
CURRENT-DAY	27
CURRENT-YEAR	10
CUST-RECORD-TYPE	'C'
- Debug Console:** Shows two messages: `EQA2383I The environment is not yet fully initialized. Use Step or Run.`
- Command Panel:** Contains a list of commands:
 - 1 set auto on both
 - 2 set auto on both
 - 3 set auto on both
 - 4 clear mon

A breakpoint was set, Resume

The screenshot shows the IBM CICS Explorer interface during a debug session. A red arrow points to the 'Resume' button in the Debug toolbar. The Breakpoints pane shows a breakpoint set at line 309 with the condition `IF CUST-RECORD-TYPE = 'C'`. The Variables pane shows the current values of `CURRENT-MONTH` (07), `CURRENT-DAY` (27), `CURRENT-YEAR` (10), and `CUST-RECORD-TYPE` ('C'). The Debug Console shows the message: `EQA2383I The environment is not yet fully initialized. Use Step or Run.`

Breakpoints:

- CURRENT-MONTH = 07
- CURRENT-DAY = 27
- CURRENT-YEAR = 10
- CUST-RECORD-TYPE = 'C'

Code Editor (Line 309):

```

305
306     210-PROCESS-CUSTFILE-RECORD.
307     PERFORM 730-READ-CUSTOMER-FILE.
308     IF WS-CUST-FILE-EOF NOT = 'Y'
309     IF CUST-RECORD-TYPE = 'C'
310     ADD +1 TO NUM-CUSTOMER-RECS
311     * SUBROUTINE SAM2 WILL COLLECT CUSTOMER STATISTICS
312     CALL 'SAM2' USING CUST-REC,
313         CUSTOMER-BALANCE-STATS
314     MOVE CUST-ID TO RPT-CUST-ID
315     MOVE CUST-NAME TO RPT-CUST-NAME
316     MOVE CUST-OCCUPATION TO RPT-CUST-OCCUPATION
317     MOVE CUST-ACCT-BALANCE TO RPT-CUST-ACCT-BALANCE
318     MOVE CUST-ORDERS-YTD TO RPT-CUST-ORDERS-YTD
    
```

Variables:

Name	Value
CURRENT-MONTH	07
CURRENT-DAY	27
CURRENT-YEAR	10
CUST-RECORD-TYPE	'C'

Debug Console:

```

EQA2383I The environment is not yet fully initialized. Use Step or Run.
EQA2383I The environment is not yet fully initialized. Use Step or Run.
    
```


Stopped at a breakpoint

IBM CICS Explorer

Explorer Edit Run Window Help

Debug SAM1 [Remote Compiled Application]
 Platform: [Team] zOS 390X Connection: 9.39.68.147:6942
 Thread: 1 (Runnable)
 SAM1: 01
 Process: 544260880 Program: SAM1

Breakpoints Registers Monitors Modules

- CUST-RECORD-TYPE = 'C'
- CUST-REC
- CUSTOMER-BALANCE-STATS

DNET074.ADLAB.SYSDEBUG(SAM1)

Line	Column	Insert	Browse
305			
306		210-PROCESS-CUSTFILE-RECORD.	
307		PERFORM 730-READ-CUSTOMER-FILE.	
308		IF WS-CUST-FILE-EOF NOT = 'Y'	
309		IF CUST-RECORD-TYPE = 'C'	
310		ADD +1 TO NUM-CUSTOMER-RECS	
311	*	SUBROUTINE SAM2 WILL COLLECT CUSTOMER STATISTICS	
312		CALL 'SAM2' USING CUST-REC,	
313		CUSTOMER-BALANCE-STATS	
314		MOVE CUST-ID TO RPT-CUST-ID	
315		MOVE CUST-NAME TO RPT-CUST-NAME	
316		MOVE CUST-OCCUPATION TO RPT-CUST-OCCUPATION	
317		MOVE CUST-ACCT-BALANCE TO RPT-CUST-ACCT-BALANCE	
318		MOVE CUST-ORDERS-YTD TO RPT-CUST-ORDERS-YTD	

Outline Variables

Name	Value
CUST-RECORD-TYPE	'C'
CUST-REC	
CUSTOMER-BALANCE-STATS	

Debug Console Memory

Program was stopped due to line/statement breakpoint at statement 312.

1 set auto on both
 2 set auto on both
 3 set auto on both
 4 clear mon

Debug Engine Command: Enter Commands...

Hover over a variable to display its value

The screenshot displays the IBM CICS Explorer interface during a debugging session. The main window shows the source code for the program SAM1, with line 312 highlighted. A mouse cursor is hovering over the variable 'Lynn, Amanda' in the code, which has triggered a tooltip showing its value. The 'Variables' panel on the right lists the current state of variables, with 'CUST-RECORD-TYPE' set to 'C'. The 'Debug Console' at the bottom shows the program was stopped at a breakpoint at statement 312.

Code Editor (Line 312):

```

312 CALL 'SAM2' USING CUST-REC,
    CUSTOMER-BALANCE-STATS
  
```

Variables Panel:

Name	Value
CUST-RECORD-TYPE	'C'
CUST-REC	
CUSTOMER-BALANCE-STATS	

Debug Console:

```

Program was stopped due to line/statement breakpoint at statement 312.
  
```

Add a variable to the monitor

The screenshot shows the IBM CICS Explorer interface. The main window displays source code for a program named SAM1. A context menu is open over line 312, which contains the instruction: `CALL 'SAM2' USING CUST-REC,`. The menu options include: Find Text..., Find Next, Find Function or Entry Point..., Add Breakpoint, Add Watch Breakpoint..., Jump To Location, Run To Location, Monitor Expression, Monitor Memory, Edit Source Lookup..., Change Text File..., and Switch View. A 'Variables' window on the right shows the current state of variables, with 'CUST-RECORD-TYPE' set to 'C'. The 'Debug Console' at the bottom shows the message: 'Program was stopped due to line/statement 312.'

Variable was added to the monitor

The screenshot shows the IBM CICS Explorer interface with a debugger. The main window displays the source code for DNET074.ADLAB.SYSDEBUG(SAM1). A breakpoint is set at line 312, which is highlighted in cyan. The code at this line is:

```

312 CALL 'SAM2' USING CUST-REC,
313     CUSTOMER-BALANCE-STATS

```

The right-hand pane shows the 'Monitors' tab with a list of active monitors:

- CUST-RECORD-TYPE = 'C'
- CUST-REC
- CUSTOMER-BALANCE-STATS
- CUST-ID = '01001'

The 'Variables' pane on the right shows the current state of variables:

Name	Value
CUST-RECORD-TYPE	'C'
CUST-REC	
CUSTOMER-BALANCE-STATS	

The bottom pane shows the 'Debug Console' with the message: "Program was stopped due to line/statement breakpoint at statement 312." Below this, there is a list of commands:

- 1 set auto on both
- 2 set auto on both
- 3 set auto on both
- 4 clear mon

The 'Debug Engine Command' field is empty, and there is an 'Enter Commands...' button.

Display all working-storage in the variables view

The screenshot shows the IBM CICS Explorer interface with a COBOL program at a breakpoint. The 'Variables' view is open, displaying a table of variables. A context menu is open over the 'Variables' view, and a sub-menu is open over the 'Filter Locals' option. A red arrow points to the 'Filter Locals' option, and another red arrow points to the '4 COBOL Working-Storage Section' option in the sub-menu.

Name	Value
CUST-RECORD-TYPE	'C'
CUST-REC	
CUSTOMER-BALANCE-STATS	
CUST-ID	'01001'
CUST-NAME	'Lynn, Amanda'

Context Menu Options:

- Monitor Local Variable
- Monitor Memory
- Change representation
- Copy Variables Ctrl+C
- Find... Ctrl+F
- Change Value...
- Filter Locals
 - 0 All
 - 1 Automonitor Current
 - 2 Automonitor Previous
 - 3 COBOL File Section
 - 4 COBOL Working-Storage Section
 - 5 COBOL Linkage Section
 - 6 COBOL Local-Storage Section

Debug Console Output:

```
Program was stopped due to line/statement breakpoint at statement 312.
```

Debug Engine Command: Enter Commands...

Working-storage is displayed in the variables view

The screenshot shows the IBM CICS Explorer interface during a debug session. The main window displays the source code for the program SAM1, with a breakpoint set at line 312. The variables view on the right shows the current state of variables, including CUST-RECORD-TYPE, CUST-REC, and CUSTOMER-BALANCE-STATS.

Source Code (Line 312):

```

312 CALL 'SAM2' USING CUST-REC,
    CUSTOMER-BALANCE-STATS
  
```

Variables View:

Name	Value
CUST-RECORD-TYPE	'C'
CUST-REC	
CUSTOMER-BALANCE-STATS	
SYSTEM-DATE-AND-TIME	
WS-FIELDS	
WORK-VARIABLES	
TOTALS-VARS	
PRODUCT-STATS	
RPT-HEADER1	
RPT-HEADER2	
RPT-HEADER3	
RPT-DETAIL1	

Debug Console:

```

Program was stopped due to line/statement breakpoint at statement 312.
  
```

Command Window:

```

1 set auto on both
2 set auto on both
3 set auto on both
4 clear mon
  
```

A group variable was expanded

The screenshot shows the IBM CICS Explorer interface during a debug session. The main window displays the following COBOL code:

```

Line 315      Column 40      Insert      Browse
-----1-----2-----3-----4-----5-----6-----7-----8-----
305
306          210-PROCESS-CUSTFILE-RECORD.
307          PERFORM 730-READ-CUSTOMER-FILE.
308          IF WS-CUST-FILE-EOF NOT = 'Y'
309          IF CUST-RECORD-TYPE = 'C'
310          ADD +1 TO NUM-CUSTOMER-RECS
311          *          SUBROUTINE SAM2 WILL COLLECT CUSTOMER STATISTICS
312          CALL 'SAM2' USING CUST-REC,
313          CUSTOMER-BALANCE-STATS
314          MOVE CUST-ID          TO RPT-CUST-ID
315          MOVE CUST-NAME        TO RPT-CUST-NAME
316          MOVE CUST-OCCUPATION  TO RPT-CUST-OCCUPATION
317          MOVE CUST-ACCT-BALANCE TO RPT-CUST-ACCT-BALANCE
318          MOVE CUST-ORDERS-YTD  TO RPT-CUST-ORDERS-YTD
  
```

The right-hand pane shows the 'Variables' window with the following data:

Name	Value
CUST-RECORD-TYPE	'C'
CUST-REC	
CUSTOMER-BALANCE-STATS	
SYSTEM-DATE-AND-TIME	
WS-FIELDS	
WORK-VARIABLES	
TOTALS-VARS	
NUM-TRANFILE-RECS	+000000003
NUM-TRAN-ERRORS	+000000000
NUM-TRANSACTIONS	+000000001
NUM-CUSTFILE-RECS	+000000001
NUM-CUSTOMER-RECS	+000000001

The Debug Console at the bottom shows the message: "Program was stopped due to line/statement breakpoint at statement 312." Below this, there is a list of commands:

- 1 set auto on both
- 2 set auto on both
- 3 set auto on both
- 4 clear mon

The Debug Engine Command field is currently empty.

Jump to a statement

The screenshot displays the IBM CICS Explorer interface during a debugging session. The main window shows the source code for the program SAM1, with line 319 highlighted. A context menu is open over this line, with 'Jump To Location' selected. The right-hand pane shows a watch breakpoint on the variable CUST-ID. The bottom pane shows the debug console with the message: "Program was stopped due to watch breakpoint on CUST-ID for".

Source Code Snippet:

```

Line 314      Column 34      Insert      Browse
-----1-----2-----3-----4-----5-----6-----7-----8-----+
306          210-PROCESS-CUSTFILE-RECORD.
307          PERFORM 730-READ-CUSTOMER-FILE.
308          IF WS-CUST-FILE-EOF NOT = 'Y'
309          IF CUST-RECORD-TYPE = 'C'
310          ADD +1 TO NUM-CUSTOMER-RECS
311          * SUBROUTINE SAM2 WILL COLLECT CUSTOMER STATISTICS
312          CALL 'SAM2' USING CUST-REC,
313          CUSTOMER-BALANCE-STATS
314          MOVE CUST-ID          TO RPT-CUST-ID
315          MOVE CUST-NAME        TO RPT-CU
316          MOVE CUST-OCCURANCE  TO RPT-CU
317          MOVE CUST-ACCT-BALANCE TO RPT-CU
318          MOVE CUST-ORDERS-YTD  TO RPT-CU
319          WRITE REPORT-RECORD FROM RPT-DET
  
```

Watch Breakpoint:

```

Watch [CUST-ID] [conditional: cust-id = '10207']
  
```

Debug Console:

```

Program was stopped due to watch breakpoint on CUST-ID for
  
```


Change a value in the monitor

The screenshot shows the IBM CICS Explorer interface. The top toolbar includes 'Breakpoints', 'Registers', 'Monitors', and 'Modules'. The 'Monitors' tab is active, displaying a list of monitors:

- CUST-ID = '10290'
- CUST-NAME = 'Well, Alice'
- RPT-CUST-NAME = 'Well, Alice'
- CUST-ID = '10290'

A red arrow points to the second 'CUST-ID = '10290'' monitor entry. Below the monitor list, the 'Outline' and 'Variables' panels are visible. The 'Variables' panel shows a table of variables:

Name	Value
CUSTOMER-BALANCE-STATS	
SYSTEM-DATE-AND-TIME	
WS-FIELDS	
WORK-VARIABLES	
TOTALS-VARS	
NUM-TRANFILE-RECS	+000000003
NUM-TRAN-ERRORS	+000000000
NUM-TRANSACTIONS	+000000001
NUM-CUSTFILE-RECS	+000000038
NUM-CUSTOMER-RECS	+000000019
NUM-PRODUCT-RECS	+000000019
NUM-DETAIL-LINES	+000000018

The main window displays the program listing for 'DNET074.ADLAB.SYSDEBUG(SAM1)'. The code is as follows:

```

Line 314      Column 1      Insert      Browse
-----1-----2-----3-----4-----5-----6-----7-----8-----
306          210-PROCESS-CUSTFILE-RECORD.
307          PERFORM 730-READ-CUSTOMER-FILE.
308          IF WS-CUST-FILE-EOF NOT = 'Y'
309          IF CUST-RECORD-TYPE = 'C'
310              ADD +1 TO NUM-CUSTOMER-RECS
311          *          SUBROUTINE SAM2 WILL COLLECT CUSTOMER STATISTICS
312          CALL 'SAM2' USING CUST-REC,
313              CUSTOMER-BALANCE-STATS
314          MOVE CUST-ID      TO RPT-CUST-ID
315          MOVE CUST-NAME    TO RPT-CUST-NAME
316          MOVE CUST-OCCUPATION TO RPT-CUST-OCCUPATION
317          MOVE CUST-ACCT-BALANCE TO RPT-CUST-ACCT-BALANCE
318          MOVE CUST-ORDERS-YTD TO RPT-CUST-ORDERS-YTD
319          WRITE REPORT-RECORD FROM RPT-DETAIL AFTER 1
  
```

The Debug Console at the bottom shows the message: "Program was stopped due to watch breakpoint on CUST-ID for 5 byte(s) and the condition cust-id = '10290'".

Change a value in the monitor

The screenshot shows the IBM CICS Explorer interface. The top toolbar includes 'Breakpoints', 'Registers', 'Monitors', and 'Modules'. The 'Monitors' tab is active, showing a list of monitors:

- CUST-ID = '10290'
- CUST-NAME = 'Well, Alice'
- RPT-CUST-NAME = 'Well, Alice'
- CUST-ID = '99999'

The 'CUST-ID = '99999'' monitor is selected and highlighted with a red circle. A yellow box with the text 'Enter' is positioned over the input field of this monitor. Below the monitor list, the source code for the program is displayed:

```

Line 314      Column 1      Insert      Browse
-----1-----2-----3-----4-----5-----6-----7-----8-----+
306          210-PROCESS-CUSTFILE-RECORD.
307          PERFORM 730-READ-CUSTOMER-FILE.
308          IF WS-CUST-FILE-EOF NOT = 'Y'
309          IF CUST-RECORD-TYPE = 'C'
310              ADD +1 TO NUM-CUSTOMER-RECS
311          *      SUBROUTINE SAM2 WILL COLLECT CUSTOMER STATISTICS
312          CALL 'SAM2' USING CUST-REC,
313              CUSTOMER-BALANCE-STATS
314          MOVE CUST-ID      TO RPT-CUST-ID
315          MOVE CUST-NAME    TO RPT-CUST-NAME
316          MOVE CUST-OCCUPATION TO RPT-CUST-OCCUPATION
317          MOVE CUST-ACCT-BALANCE TO RPT-CUST-ACCT-BALANCE
318          MOVE CUST-ORDERS-YTD TO RPT-CUST-ORDERS-YTD
319          WRITE REPORT-RECORD FROM RPT-DETAIL AFTER 1
  
```

At the bottom, the 'Debug Console' shows the program was stopped due to a watch breakpoint on CUST-ID for 5 byte(s) and the condition cust-id = '10290'. The 'Enter Commands...' field is visible at the bottom right.

Step

IBM CICS Explorer

Explorer Edit Run Window Help

Debug SAM1 [Remote Compiled Application]
 Platform: [Team] zOS 390X Connection: 9.39.68...942
 Thread: 1 (Runnable)
 SAM1: 01
 Process: 544260880 Program: SAM1

Breakpoints Registers Monitors Modules

- CUST-ID = '99999'
- CUST-NAME = 'Well, Alice'
- RPT-CUST-NAME = 'Well, Alice'
- CUST-ID = '99999'

DNET074.ADLAB.SYSDEBUG(SAM1)

Line	Column	Insert	Browse
306	210	PROCESS-CUSTFILE-RECORD.	
307		PERFORM 730-READ-CUSTOMER-FILE.	
308		IF WS-CUST-FILE-EOF NOT = 'Y'	
309		IF CUST-RECORD-TYPE = 'C'	
310		ADD +1 TO NUM-CUSTOMER-RECS	
311	*	SUBROUTINE SAM2 WILL COLLECT CUSTOMER STATISTICS	
312		CALL 'SAM2' USING CUST-REC,	
313		CUSTOMER-BALANCE-STATS	
314		MOVE CUST-ID TO RPT-CUST-ID	
315		MOVE CUST-NAME TO RPT-CUST-NAME	
316		MOVE CUST-OCCUPATION TO RPT-CUST-OCCUPATION	
317		MOVE CUST-ACCT-BALANCE TO RPT-CUST-ACCT-BALANCE	
318		MOVE CUST-ORDERS-YTD TO RPT-CUST-ORDERS-YTD	
319		WRITE REPORT-RECORD FROM RPT-DETAIL AFTER 1	

Outline Variables

Name	Value
CUSTOMER-BALANCE-STATS	
SYSTEM-DATE-AND-TIME	
WS-FIELDS	
WORK-VARIABLES	
TOTALS-VARS	
PRODUCT-STATS	
RPT-HEADER1	
RPT-HEADER2	
RPT-HEADER3	
RPT-DETAIL	
RPT-TRAN-DETAIL	
ERR-MSG-BAD-TRAN	

Debug Console Memory

Program was stopped due to watch breakpoint on CUST-ID for 5 byte(s) and the condition cust-id = '1'

1	set auto on both
2	set auto on both
3	set auto on both

Debug Engine Command: Enter Commands...

After stepping

IBM CICS Explorer

Explorer Edit Run Window Help

Debug SAM1 [Remote Compiled Application]

Platform: [Team] zOS 390X Connection: 9.39.68.147:6942

Thread: 1 (Runnable)

SAM1: 01

Process: 544260880 Program: SAM1

Breakpoints Registers Monitors Modules

- CUST-ID = '99999'
- CUST-ID = '99999'
- RPT-CUST-ID = '99999'
- CUST-NAME = 'Well, Alice'

DNET074.ADLAB.SYSDEBUG(SAM1)

Line	Column	Insert	Browse
306	210	PROCESS-CUSTFILE-RECORD.	
307		PERFORM 730-READ-CUSTOMER-FILE.	
308		IF WS-CUST-FILE-EOF NOT = 'Y'	
309		IF CUST-RECORD-TYPE = 'C'	
310		ADD +1 TO NUM-CUSTOMER-RECS	
311	*	SUBROUTINE SAM2 WILL COLLECT CUSTOMER STATISTICS	
312		CALL 'SAM2' USING CUST-REC,	
313		CUSTOMER-BALANCE-STATS	
314		MOVE CUST-ID TO RPT-CUST-ID	
315		MOVE CUST-NAME TO RPT-CUST-NAME	
316		MOVE CUST-OCCUPATION TO RPT-CUST-OCCUPATION	
317		MOVE CUST-ACCT-BALANCE TO RPT-CUST-ACCT-BALANCE	
318		MOVE CUST-ORDERS-YTD TO RPT-CUST-ORDERS-YTD	
319		WRITE REPORT-RECORD FROM RPT-DETAIL AFTER 1	

Outline Variables

Name	Value
CUSTOMER-BALANCE-STATS	
SYSTEM-DATE-AND-TIME	
WS-FIELDS	
WORK-VARIABLES	
TOTALS-VARS	
PRODUCT-STATS	
RPT-HEADER1	
RPT-HEADER2	
RPT-HEADER3	
RPT-DETAIL	
RPT-TRAN-DETAIL	
ERR-MSG-BAD-TRAN	

Debug Console Memory

Program was stopped due to watch breakpoint on CUST-ID for 5 byte(s) and the condition cust-id = '1'

1	set auto on both
2	set auto on both
3	set auto on both

Debug Engine Command: Enter Commands...

Create an Entry breakpoint

The screenshot illustrates the steps to create an entry breakpoint in IBM CICS Explorer:

- Source Code:**

```

Line 315      Column 1      Insert
-----1-----2-----3-----4-----
314          MOVE CUST-ID
315          MOVE CUST-NAME
316          MOVE CUST-OCCUPATION
317          MOVE CUST-ACCT-BALANCE TO RPT-CUST-ACCT-BALANCE
318          MOVE CUST-ORDERS-YTD TO RPT-CUST-ORDERS-YTD
319          WRITE REPORT-RECORD FROM RPT-DETAIL AFTER 1
320          ADD +1 TO NUM-DETAIL-LINES
321          END-IF
322          IF CUST-RECORD-TYPE = 'P'
323              *          SUBROUTINE SAM3 WILL COLLECT PRODUCT STATISTICS
324              CALL 'SAM3' USING CUST-REC,
325                  PRODUCT-STATS
326              ADD +1 TO NUM-PRODUCT-RECS
327          END-IF
            
```
- Breakpoints Window:** Shows a watch on `CUST-ID` with the conditional expression `cust-id = '10207'`.
- Debug Console:**

```

Program was stopped due to watch breakpoint on CUST-ID for 5 byte(s) and the condition cust-id = '10207'
            
```

Create an Entry breakpoint

The screenshot shows the IBM CICS Explorer interface. A dialog box titled "Add an Entry Breakpoint" is the central focus. It contains the following fields and options:

- Required information:** Sets a breakpoint to stop execution at a specific function or entry point.
- Defer breakpoint until executable is loaded
- Show items with debug info only
- Load Module/DLL/Executable:** SAM3
- Object/Program/CSECT:** SAM3
- Function or Entry point:** SAM3
- Case sensitive

Buttons at the bottom of the dialog include: **Back**, **Next >**, **Finish** (highlighted with a red arrow), and **Cancel**.

In the background, the code editor shows the following code snippet:

```

Line 315      Column 1      Insert
-----1-----2-----3-----
314          MOVE CUST
315          MOVE CUST
316          MOVE CUST
317          MOVE CUST
318          MOVE CUST
319          WRITE REP
320          ADD +1 TO
321          END-IF
322          IF CUST-REC
323          SUBROUTIN
324          CALL 'SAM
325          P
326          ADD +1 TO
327          END-IF
    
```

The Debug Console at the bottom displays the following message:

```

Program was stopped due to watch breakpoint on CUST-ID for 5 byte(s) and the condition cust-id = '10207'
    
```

Below the message is a table with 3 rows and 2 columns:

1	set auto on both
2	set auto on both
3	set auto on both

The Debug Engine Command field is empty.

Resume

IBM CICS Explorer

Explorer Edit Run Window Help

Debug SAM1 [Remote Compiled Application] Platform: [Team] zOS 390X Address: 9.39.68.147:6942 Thread: 1 (Runnable) SAM1: 01 Process: 544260880 Program: SAM1

Breakpoints Entry [SAM3] Watch [CUST-ID] [conditional: cust-id = '10207']

DNET074.ADLAB.SYSDEBUG(SAM1)

Line	Column	Insert	Browse
314		MOVE CUST-ID	TO RPT-CUST-ID
315		MOVE CUST-NAME	TO RPT-CUST-NAME
316		MOVE CUST-OCCUPATION	TO RPT-CUST-OCCUPATION
317		MOVE CUST-ACCT-BALANCE	TO RPT-CUST-ACCT-BALANCE
318		MOVE CUST-ORDERS-YTD	TO RPT-CUST-ORDERS-YTD
319		WRITE REPORT-RECORD FROM RPT-DETAIL AFTER 1	
320		ADD +1 TO NUM-DETAIL-LINES	
321		END-IF	
322		IF CUST-RECORD-TYPE = 'P'	
323	*	SUBROUTINE SAM3 WILL COLLECT PRODUCT STATISTICS	
324		CALL 'SAM3' USING CUST-REC,	
325		PRODUCT-STATS	
326		ADD +1 TO NUM-PRODUCT-RECS	
327		END-IF	

Outline Variables

Name	Value
CUSTOMER-BALANCE-STATS	
SYSTEM-DATE-AND-TIME	
WS-FIELDS	
WORK-VARIABLES	
TOTALS-VARS	
PRODUCT-STATS	
RPT-HEADER1	
RPT-HEADER2	
RPT-HEADER3	
RPT-DETAIL	
RPT-TRAN-DETAIL	
ERR-MSG-BAD-TRAN	

Debug Console Memory

Program was stopped due to watch breakpoint on CUST-ID for 5 byte(s) and the condition cust-id = '10207'

Debug Engine Command: Enter Commands...

Stopped at the Entry breakpoint, Step

The screenshot shows the IBM CICS Explorer interface with the following components:

- Project Tree:** Shows the application structure for SAM1, including Platform, Thread, and Program details.
- Breakpoints Window:** Displays an active entry breakpoint for SAM3 and a watch expression for CUST-ID.
- Source Code Editor:** Shows the program code for DNET074.ADLAB.SYSDEBUG(SAM3) with line 21 highlighted.
- Debug Console:** Shows the message: "Program was stopped due to entry/function breakpoint on SAM3."
- Outline/Variables Window:** Shows the current variable WS-FIELDS.

Source Code:

```

Line 21      Column 1      Insert      Browse
-----
21  PROGRAM-ID, SAM3.
22  ENVIRONMENT DIVISION.
23  INPUT-OUTPUT SECTION.
24  *****
25  DATA DIVISION.
26
27  WORKING-STORAGE SECTION.
28  *
29  01  WS-FIELDS.
30     05  WS-PROGRAM-STATUS      PIC X(30)      VALUE SPACES.
31     05  WS-FIRST-TIME-SW       PIC X         VALUE 'Y'.
32     05  WS-WORK-NUM-1          PIC S9(7)     COMP-3 VALUE +0.
33     05  WS-WORK-NUM-2          PIC S9(7)     COMP-3 VALUE +0.
34     05  WS-WORK-NUM-3          PIC S9(7)     COMP-3 VALUE +0.
  
```

Debug Console:

```

Program was stopped due to entry/function breakpoint on SAM3.
  
```

Outline/Variables:

Name	Value
WS-FIELDS	

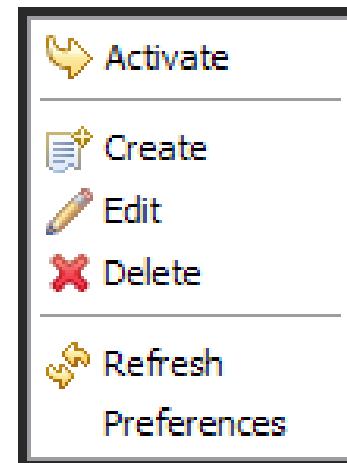
The DTCN Eclipse plug-in

The DTCN profiles view is displayed

Owner	Status	Tra...	Load Module	Compile Unit	Ses...	Session Ad...	Port#	Test...	Level	Command...	Preference...	Other...
JWINCHE	Active	ADC1			TCP	9.65.11.66	8001	TEST	ERR...	*	*	
KPHUME	Active	KPH1			TCP	9.76.135.206	5702	TEST	ALL	*	*	
TSS01	Active	CD*			TCP	9.76.69.145	8002	TEST	ALL	*	*	
TSS03	Active	*	CD*	CD*	TCP	9.65.136.2	8002	TEST	ALL	*	*	
TSS05	Active	PSC1		*	TCP	9.49.191.96	8001	TEST	ALL	*	*	

The “DTCN Profiles” view is displayed near the “Remote Systems Details” view

- “Right click” actions:
 - Activate – activate a profile
 - Create – begin wizard driven profile creation
 - Edit – wizard driven profile editing
 - Delete – remove a profile
 - Refresh – refresh view
 - Preferences – edit the DTCN connection information defined at installation



Create a new DTCN Profile

Debug Console | Memory | DTCN Profiles

Owner	Status	Tra...	Load Module	Compile Unit	Ses...	Session Ad...	Port#	Test...	Level	Command...
JWINCHE	Active	ADC1			TCP	9.65.11.66	8001	TEST	ERR...	*
KPHUME	Active	KPH1				9.76.135.206	5702	TEST	ALL	*
TSS01	Active	CD*				9.76.69.145	8002	TEST	ALL	*
TSS03	Active	*	CD*			9.65.136.2	8002	TEST	ALL	*
TSS05	Active	PSC1				191.96	8001	TEST	ALL	*

Context Menu:

- Activate
- Create
- Edit
- Delete
- Refresh
- Preferences

1: RT click (Right-click on TSS05 row)

2: click (Click on 'Create' option)

In the “DTCN Profiles” view,
right click and select “Create”

Specify your CICS user ID and "create"

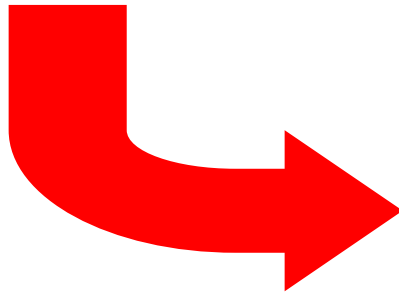
Debug Tool Profiles Management

DTCN profile action choices

Profile Owner User Id:

Choose an action:

[DTCN Preferences](#)



Debug Tool Profiles Management

DTCN pattern matching resources

Resources to debug

Terminal Id:

Transaction Id:

Load Module and Compile Unit (maximum 8 pairs)

Load Module	Compile Unit

User Id:

NetName:

IP Name/Address:

Commarea

Offset:

Data:

Container

Name:

Offset:

Data:

URM Debugging:

Profile Status:

Visit our web site: www.ibm.com/software/awdtools/debugtool

The screenshot shows the IBM website interface for the Debug Tool for z/OS. At the top, there is a navigation bar with the IBM logo, a search box, and a language selector set to 'United States'. Below the navigation bar is a breadcrumb trail: 'Software > Software Development > z/OS Problem Determination Tools >'. The main heading is 'Debug Tool for z/OS'. A left sidebar contains a table of contents with links to 'Features and benefits', 'System requirements', 'Library', 'News', 'Training and certification', 'Services', 'How to buy', and 'Support'. Below this is a 'Find products' section with a search box and a 'Search' button. A 'Related links' section lists various z/OS related products and tools. The main content area includes an 'Overview' section with a description of the tool's capabilities, a list of features, and a 'Learn more' section with links to detailed information. A right sidebar contains a 'We're here to help' section with a contact form and a 'Highlights' section with links to executive briefs and podcasts.

United States [change]

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Debug Tool for z/OS

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Overview

IBM Debug Tool for z/OS enables you to examine, monitor, and control the execution of C, C++, COBOL, and PL/I programs.

Debug Tool is an interactive source-level debugging tool for compiled applications in a variety of environments

- Supports batch, TSO, CICS, DB2, DB2 stored procedures, IMS, and UNIX System Services
- Supports seamless debugging of mixed-language applications in the same session
- Offers a set of interpreted commands that you can use to specify actions to be taken
- Provides the option of setting breakpoints in an application program, monitoring variables for changes and watching for specified exceptions and conditions during program execution
- Counts how many times a statement or verb has been processed in an application program
- Integration with IBM Rational Developer for System z enables developers to debug applications within an integrated application development environment
- IBM Debug Tool for z/OS V11.1 replaces all prior versions of both IBM Debug Tool for z/OS and IBM Debug Tool for z/OS and IBM Debug Tool Utilities and Advanced Functions for z/OS.
- [New features in V11.1 can be found here](#)
- [New!! GUI plug-in download now available !!](#)

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IBM Fault Analyzer for z/OS Version 11



IBM Fault Analyzer for z/OS

Assists in analyzing and fixing application and system failures



SOC7, S522,
SOC1, SCQ4

Problem

- Your new developers don't have the experience to diagnose faults and dumps
- Your experienced developers don't have the time



IBM Fault
Analyzer

Solution

- Analysis at application level
- Information gathered at time of abend
- Translates low-level dump information into application-level information
- Expands abend code and message descriptions
- No recompile of applications or JCL changes
- No performance overhead
- Integrated 64-bit DB2 support
- Interface to File Manager for z/OS

The IBM Problem Determination Tools Suite for z/OS

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

Migration
Utility

Hourglass

ISPF
Productivity Tool

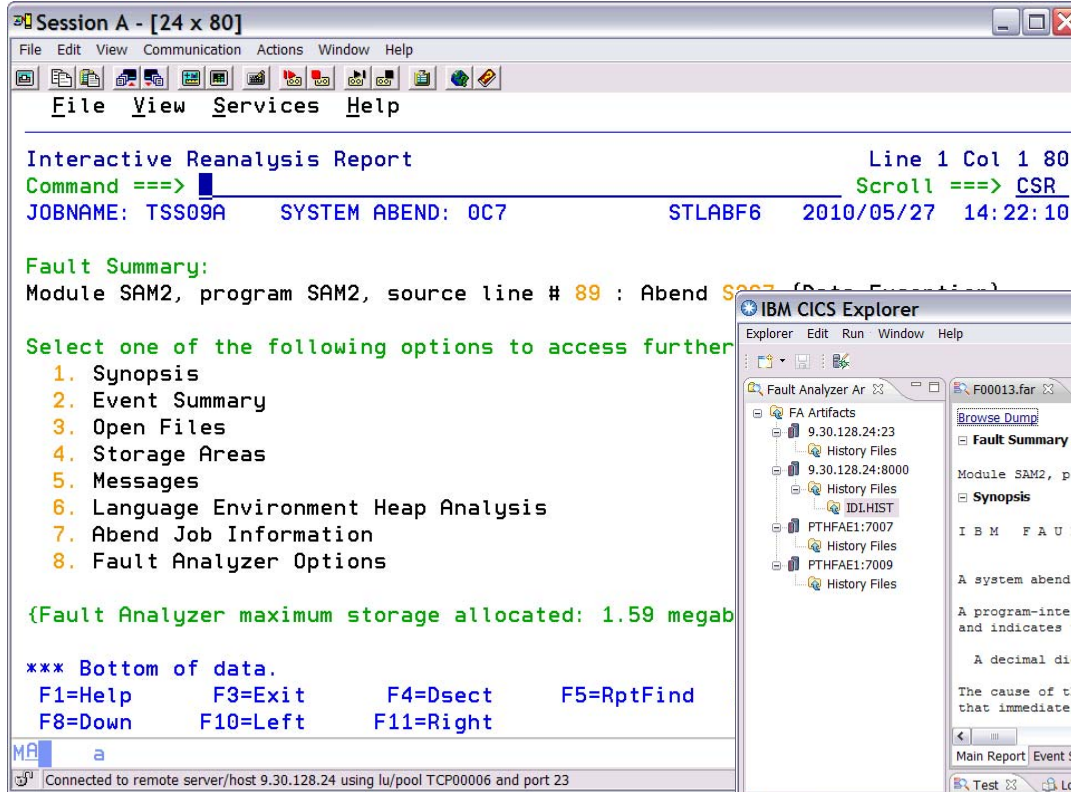
www.ibm.com/software/awdtools/deployment

Fault Analyzer for z/OS Highlights

- Automatic program abend capture and reporting
- Program source-level reporting
- Multiple languages and z/OS environments including CICS, DB2, IMS, Enterprise PL/I, Enterprise COBOL 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 application-failure reports
- Eclipsed-based GUI plug-in available for download

IBM Fault Analyzer for z/OS

Multiple interfaces and modes of operation

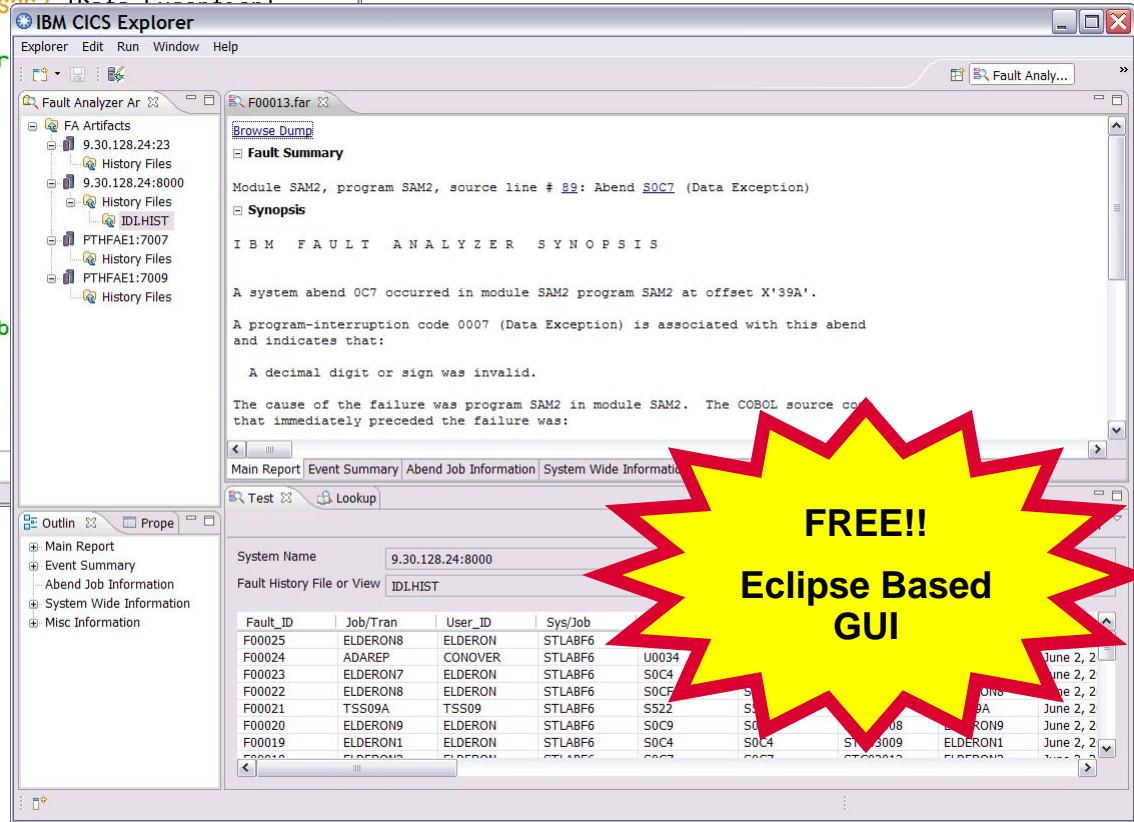


Interfaces

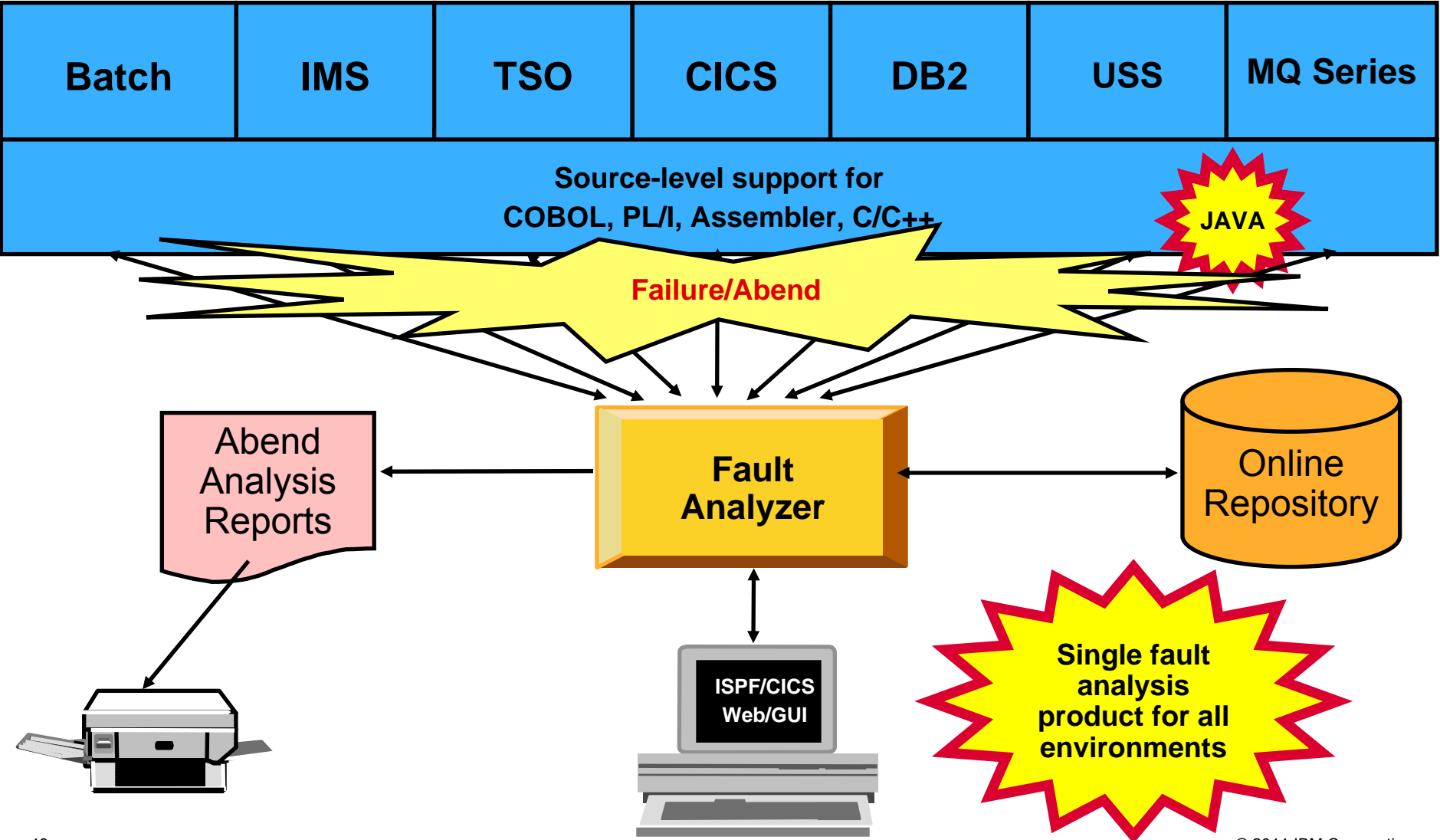
- ISPF
- RDz
- GUI
- CICS
- Web

Modes Of Operation

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



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



Fault Analyzer provides information to determine the cause and resolution of application and system failures

- Analysis at the application level
- Information gathered at time of abend
- Translates low-level dump information into application-level information
- Expands abend code and message descriptions
- No recompile of applications
- No JCL changes
- No performance overhead
- Integrated 64-bit support
- Interface to File Manager for z/OS
- Three Modes Of Operation
 - Real-time analysis
 - Batch dump re-analysis
 - Interactive dump re-analysis
- Interfaces
 - RDz
 - Eclipsed-based GUI
 - ISPF
 - CICS
 - Web
- Support for IBM software
 - CICS TS 4.2
 - **Channels and containers** in 64-bit storage
 - DB2 V10
 - IMS V11

Fault Analyzer Interface inside CICS Explorer

IBM CICS Explorer
Explorer Edit Window Help

Fault Analyz | F05303.far | SAM2.cob

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

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 of

A program-interruption code 0007 (Data Exception) is associated and indicates that:

A decimal digit or sign was invalid.

The cause of the failure was program SAM2 in module SAM2. The last immediately preceded the failure was:

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

Search *SOC7* Go

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'0Cx' system completion code has

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.
*   *** Calculate Maximum ***
*   *** There is a bug calculating the maximum.
*   *** Can you find it?
IF WS-FIRST-TIME-SW = 'Y'
      MOVE CUST-ACCT-BALANCE TO BALANCE-MAX
IF CUST-ACCT-BALANCE > BALANCE-MAX
  
```

Refresh and update ...HIST(F05303)

Populate/Refresh history file

Populate and Refresh History File

RT click

click

Right Click on the Fault History File, and select Populate/Refresh

```

JES2 JOB LOG -- SYSTEM F6 -- NODE S

1 JOB02382 ---- FRIDAY, 15 JAN 2010 ----
1 JOB02382 IRR010I USERID TSS09 IS ASSIGNED TO THIS JOB.
1 JOB02382 ICH70001I TSS09 LAST ACCESS AT 11:04:56 ON FRIDAY, JANUARY 15,
1 JOB02382 $HASP373 TSS09A STARTED - INIT 1 - CLASS A - SYS F6
1 JOB02382 IEF403I TSS09A - STARTED - TIME=11.42.11
11.42.11 SMF000I TSS09A PRINT1 IDCAMS 0000
13.1 +IDI0001I Fault Analyzer V10R1M0 (UK52832 2009/12/15) invoked by
13.1 +IDI0002I Module SAM2, program SAM2, source line # 89: Abend SOC
13.1 +IDI0003I Fault ID F04916 assigned in history file IDI.HIST
13.17.19 JOB02382 IEF450I TSS09A RUNSAM1 - ABEND=SOC7 U0000 REASON=00000007 791
791 TIME=13.17.19
13.17.19 JOB02382 SMF000I TSS09A RUNSAM1 SAM1 00C7
13.17.19 JOB02382 SMF000I TSS09A PRINT2 IDCAMS NOT EXECUTED
13.17.19 JOB02382 IEF404I TSS09A - ENDED - TIME=13.17.19
13.17.19 JOB02382 $HASP395 TSS09A ENDED

----- JES2 JOB STATISTICS -----
15 JAN 2010 JOB EXECUTION DATE
  
```

Contents of the fault history file

```

11.42.11 JOB02382 ---- FRIDAY, 15 JAN 2010 ----
11.42.11 JOB02382 IRR010I USERID TSS09 IS ASSIGNED TO THIS JOB.
11.42.11 JOB02382 ICH70001I TSS09 LAST ACCESS AT 11:04:56 ON FRIDAY, JANUARY 15, 2010
    
```

Fault History file refreshed in the "Default" view

Default Lookup Column Configuration

System Name: F6
 Fault History File or View: IDI.HIST

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	STLABF6	S0C7	S0C7	JOB02375	TSS09A
F04913	TSS09A	TSS09	STLABF6	S0C7	S0C7	JOB02373	TSS09A
F04912	TSS09A	TSS09	STLABF6	S0C7	S0C7	JOB02364	TSS09A
F04911	TSS09A	TSS09	STLABF6	S0C7	S0C7	JOB02363	TSS09A
F04910	TSS09A	TSS09	STLABF6	S0C7	S0C7	JOB02361	TSS09A
F04908	TSS09A	TSS09	STLABF6	S522	S522	JOB02273	TSS09A
F04907	TSS09A	TSS09	STLABF6	S522	S522	JOB02262	TSS09A
F04906	TSS09A	TSS09	STLABF6	S522	S522	JOB02247	TSS09A
F04905	TSS09A	TSS09	STLABF6	S522	S522	JOB02223	TSS09A
F04904	TSS09A	TSS09	STLABF6	S0C7	S0C7	JOB02211	TSS09A
F04903	TSS03RDZ	TSS03	STLABF6	S0C7	S0C7	JOB02183	TSS03RDZ

No CICS SM connection

Default Fault History File View

System Name: F6
 Fault History File or View: IDI.HIST

Fault_ID	Job/Tran	User_ID	Sys/Job	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	STLABF6	S0C7	S0C7	JOB02375	TSS09A
F04913	TSS09A	TSS09	STLABF6	S0C7	S0C7	JOB02373	TSS09A
F04912	TSS09A	TSS09	STLABF6	S0C7	S0C7	JOB02364	TSS09A
F04911	TSS09A	TSS09	STLABF6	S0C7	S0C7	JOB02363	TSS09A
F04910	TSS09A	TSS09	STLABF6	S0C7	S0C7	JOB02361	TSS09A
F04908	TSS09A	TSS09	STLABF6	S522	S522	JOB02273	TSS09A
F04907	TSS09A	TSS09	STLABF6	S522	S522	JOB02262	TSS09A
F04906	TSS09A	TSS09	STLABF6	S522	S522	JOB02247	TSS09A
F04905	TSS09A	TSS09	STLABF6	S522	S522	JOB02223	TSS09A
F04904	TSS09A	TSS09	STLABF6	S0C7	S0C7	JOB02211	TSS09A
F04903	TSS03RDZ	TSS03	STLABF6	S0C7	S0C7	JOB02183	TSS03RDZ

Column Configuration

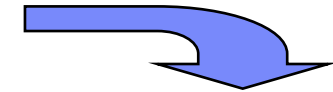
If needed, click on "Column Configuration"

No CICS SM connection

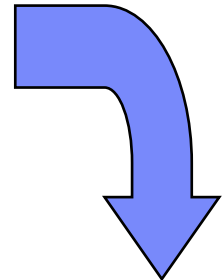
Column Configuration

1 click

Job_ID	Jobname
JOB02364	TSS09A
JOB02373	TSS09A
JOB02375	TSS09A
JOB02382	TSS09A
JOB03218	JWINCHEX
JOB03665	DALLENA
JOB03704	TSS09A
JOB03718	TSS09A

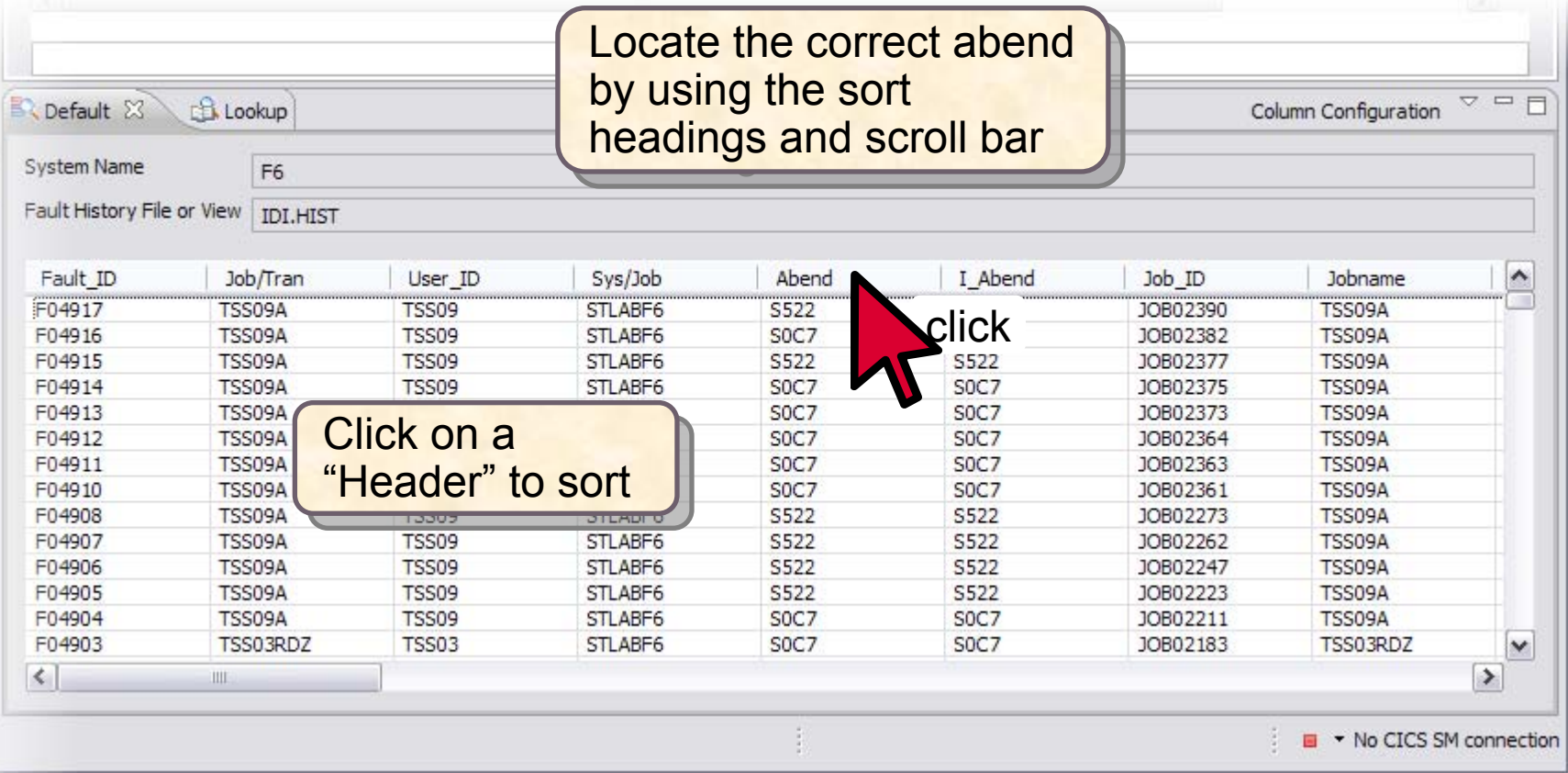


2 click



Select the fields to be shown and their order for your new column configuration

Sort fault history files



Locate the correct abend by using the sort headings and scroll bar

click

Click on a "Header" to sort

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

No CICS SM connection

Opening a Fault Entry

The files have now been sorted based on the Abend Code

Fault_ID	Job/Tran	User_ID	Sys/Job	Abend	I_Abend	Job_ID	Jobname
F04660	MACHIN2	MACHIN2	STLABF6	S0C4	S0C4	TSU00158	MACHIN2
F04646	MACHIN2	MACHIN2	STLABF6	S0C4	S0C4	TSU00087	MACHIN2
F04645	MACHIN2	MACHIN2	STLABF6	S0C4	S0C4	TSU09949	MACHIN2
F04916	TSS09A			S0C7	S0C7	JOB02382	TSS09A
F04914	TSS09A			S0C7	S0C7	JOB02375	TSS09A
F04913	TSS09A			S0C7	S0C7	JOB02373	TSS09A
F04912	TSS09A			S0C7	S0C7	JOB02364	TSS09A
F04911	TSS09A			S0C7	S0C7	JOB02363	TSS09A
F04910	TSS09A			S0C7	S0C7	JOB02361	TSS09A
F04904	TSS09A			S0C7	S0C7	JOB02211	TSS09A
F04903	TSS03RDZ			S0C7	S0C7	JOB02183	TSS03RDZ
F04898	TSS09A			S0C7	S0C7	JOB02127	TSS09A
F04886	TSS09A			S0C7	S0C7	JOB00929	TSS09A
F04883	ABCDEFAB	KPHUME	STLABF6	S0C7	U4039	JOB00681	ABCDEFAB

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

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

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

[Browse Dump](#)

Fault Summary

Module SAM2, program SAM2, source line # [89](#): Abend [S0C7](#) (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

The Main Report “Hotkeys”

The screenshot displays the IBM Rational Developer for System z interface. The main window shows a fault analysis report for a job named TSS09.TSS09A.JOB02382.D0000002.JESMSGLG.spool. The report is titled "Fault Summary" and contains the following text:

```
Module SAM2, program SAM2, source line # 89: Abend SOC7 (Data Exception)
IBM FAULT ANALYZER SYNOPSIS
program SAM2 at offset X'39A'.
(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
```

Key elements are highlighted with green circles and arrows:

- The "Browse Dump" link is circled in green.
- The source line number "89" is circled in green.
- The abend code "SOC7" is circled in green.

A callout box with a yellow background and black border contains the text: "Clickable fields that provide access to associated information". Arrows point from this box to the "Browse Dump" link, the source line number "89", and the abend code "SOC7".

The interface also shows a navigation bar at the bottom with tabs for "Main Report", "Event Summary", "Abend Job Information", "System Wide Information", and "Misc Information". The "Main Report" tab is currently selected. The system name "F6" is visible in the bottom left corner.

Results of clicking Hotkeys

Clicking Abend code invokes the “lookup” view

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

Clicking the source line number opens the side file copy of the source

```

Line 89      Column 1      Insert
-----*A-1-B-----2-----3-----4-----5-----6-----7-----
*      *** 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
  
```

Dump Browser View

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

The screenshot displays the Dump Browser window with a memory dump table. The table has four columns: Address, Hex Values, Hex Values, and Character Values. The first column (Address) is highlighted with a yellow box and labeled 'Address'. The second and third columns (Hex Values) are highlighted with a yellow box and labeled 'Hex Values'. The fourth column (Character Values) is highlighted with a yellow box and labeled 'Character Values'. A search dialog is open in the bottom right corner, with a yellow box around it labeled 'Search for a pattern'. The search dialog contains a search bar with the text 'CUST-REC', a 'Find' button, and a 'Close' button. The search mode is set to 'Hexadecimal'.

Address	Hex Values	Hex Values	Character Values
00000000	+0 00	*	*
00000001	+1 0A0000 000130E1 00000000 00000000 00FDE8A0 00000000 7FFFF000 7FFFF000	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
00000020	+20 7FFFF000 7FFFF000 7FFFF000 7FFFF000 00000000 00000000 7FFFF000 7FFFF000	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
00000040	+40 00000000 00000000 00000000 00000000 00FDE8A0 00000000 00000000 000140E1	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
00000060	+60 000A0000 000150E1 000A0000 000170E1 000A0000 000180E1	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
00000080	+80 00040000 00001004 00020000 00000000 00000000 00000000 00000000 00000000	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
000000A0	+A0 0D000001 01499C08 00000000 00000000 00000000 00012368 00F45E50	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
000000C0	+C0 28000000 00000000 FBF1FFFB F0F80000 58080000 00000000 00000000 00000000	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
000000E0	+E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
00000100	+100 00000000 00000000 00000000 00000000 00000000 06A37FBA 00000000 00000000	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
00000120	+120 00000000 00000000 00000000 00000000 00000000 07543300 80000000 00000000 03F29BD0	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
00000140	+140 07850000 80000000 00000000 06A3801C 04041000 80000000 00000000 016C3B3A	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
00000160	+160 00000000 00000000 00000000 00000000 07060000 00000000 00000000 00000000	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
00000180	+180 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
000001A0	+1A0 04040000 80000000 00000000 0149D598 04040000 80000000 00000000 01122630	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
000001C0	+1C0 04040000 80000000 00000000 016C3A00 00000000 80000000 00000000 7FCA03B0	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
000001E0	+1E0 00000000 80000000 00000000 7FCA1A10 04040000 80000000 00000000 0148B580	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
00000200	+200 D7E2C140 00000080 00F59008 7FC1C008 00F96000 7FC59000 00AE	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*
00000220	+220 00FDB600 00F9FB80 00000000 00000000 00000000 00000000 0000	* ..r.....Y.....".0."0 *	*".0."0."0."0."0.....".0."0.*

Switch between Dump Browser / User Notes / Dictionary Data

Search for a pattern

Navigating the Report

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

File Run Window Help

TSS09.TSS09A.JOB02382.D0000002.JESMSGLG.spool F04916.far

[Browse Dump](#)

Fault Summary

Module SAM2, program SAM2, source line # [89](#): Abend [S0C7](#) (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 program that caused this abend was program SAM2 in module SAM2. The COBOL source code that caused this abend was:

So...

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

Default | Local | Column Configuration

System Name F6

Navigate between tabs by clicking

click

Event Summary Tab

Chronological order of events

Expandable event details

Highlighted "POINT OF FAILURE" event details

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

Search Project Run Window Help

F04916.far

Browse Dump

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.

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

click

Abend Job Information

ABEND Job details

IBM FAULT ANALYZER ABEND JOB INFO

IBM Fault Analyzer Abend Job Information:

```

Abend Date. . . . . : 2010/01/15
Abend Time. . . . . : 13:17:13
System Name . . . . . : STLABF6
Job Type. . . . . : Batch
Job ID. . . . . : JOB02382
Job Name. . . . . : TSS09A
Job Step Name . . . . . : RUNSAM1
ASID. . . . . : 34
Abend TCB Address . . . . . : 00AE6968
Job Execution Class . . . . . : A
Region Size . . . . . : 80M
EXEC Program Name . . . . . : SAM1
User ID . . . . . : TSS09
Accounting Information. . . : TSS09,H244,090,CTKA
    
```

Data Sets:

```

DDname  Data Set or Path Name
-----
STEPLIB TSS09.ADLAB.LOAD
    
```

Event-Related Application Programs:

The following list of event-related application programs is sorted by module link-edit date/time and program compilation date/time in reverse chronological order.

Module Name	Link-Edit Date	Link-Edit Time	Program Name	Compilation Date	Compilation Time
SAM2	2009/09/30	08:24:36	SAM2	2009/09/30	08:24:36
SAM1	2009/09/30	08:24:35	SAM1	2009/09/30	08:24:35

Main Report | Event Summary | **Abend Job Information** | System V... | Information | Misc Information

Search: #007#

Hotkey to Abend TCB Address

click

System Wide Information

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

click

Misc Information

Options in effect

Exits

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

Search Project Run Window Help

F04916.far

Options in effect

IBM FAULT ANALYZER OPTIONS

IBM Fault Analyzer Options in Effect:

Detail (Medium)
 NoErrorHandler
 FaultID (F04916)
 Language (ENU)
 NoLocale
 NoPermitLangx
 PreferredFormattingWidth (80)
 NoPrintInactiveCOBOL
 StoragePrintLimit (256K) - not exceeded
 SystemWidePreferred (StorageAreas (Hex))

Data Sets:

The following Fault Analyzer data set or path names were either preallocated, specified via DataSets options, or provided as defaults.

DDname	Data Set or Path Name
IDIBOOKS	ADTOOLS.FAA10.SIDIBOOK
IDIDOC	ADTOOLS.FAA10.SIDIDOC1
IDIEEXEC	ADTOOLS.STLABF6.SYSEEXEC
IDIHIST	IDI.HIST
IDILANGX	TSS09.ADLAB.EQALANGX ADTOOLS.MNA.U6F6.LANGX.PLI ADTOOLS.MNA.S2U1F6.LANGX.PLI
IDILCOB	CHABERT.TRADER.COBLIST
IDIMAPS	ADTOOLS.FAA10.SIDIMAPS
IDIVSENU	IDI.VAR1M0.IDIVSENU

Exits:

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

Default | Lookup

Exiting Fault Analyzer

Close view by clicking "X"

click

click

Or leave open and navigate to another perspective

The FA Report Browser can be left open in other perspectives for reference if needed

IBM Fault Analyzer for zOS

One tool for all your application abend reporting

- **Identifies the cause of a program abend**
 - Helps you quickly resolve the problem
- **Reports detailed information for:**
 - CICS
 - WAS
 - Batch
- **Source-level support for programs**
 - COBOL, PL/I, C/C++ and assembler
 - Provides detailed program source and variable value information
- **Advanced CICS Transaction Server support**
 - Reports channels and containers in 64-bit storage
 - CICS containers with XML data are formatted to simplify reviewing the XML information
- **Java enhancements**
 - Use of Java-supplied Diagnostic Tooling Framework for Java (DTFJ)
 - Java information is captured and displayed



<http://www.ibm.com/software/awdtools/faultanalyzer/library>

- Fault Analyzer for z/OS
- Features and benefits
- System requirements
- Library
- News
- Training and certification
- Services
- How to buy
- Support

Software > Software Development >

Fault Analyzer for z/OS

Library

Fault Analyzer - English:

- ↓ [Version 11 Release 1](#)
- ↓ [Version 10 Release 1](#)
- ↓ [Version 9 Release 1](#)
- ↓ [Version 8 Release 1](#)
- ↓ [Version 7 Release 1](#)
- ↓ [Version 6 Release 1](#)
- ↓ [Redbooks](#)

We're here to help



- Open
- Open in New Window
- Save Target As...
- Print Target
- Cut
- Copy
- Copy Shortcut
- Paste
- Add to Favorites...
- Convert link target to Adobe PDF
- Convert link target to existing PDF
- Properties

[Search for text](#) in the book in the Fault Analyzer V11 BookShelf.

Right-click to download User's Guide and Reference

1 Publications - English (new)					
	Order number	View Book	Download		
Program Directory (PDF, 130KB)	GI10-8857-00	-	-		
User's Guide and Reference (PDF, 1.0MB)	SC19-3131-00	View	Download (BOO, 1.6MB)	11/2010	
Bookshelf	GC19-3129-00	View	Download (BKS, 1KB)	11/2010	
Bookshelf Index	GC19-3128-00	-	Download (BKI, 390KB)	11/2010	

ways to get the answers
eed.
Request a quote
e-mail IBM
us at:
26-3774
y code:
03W

Manager
t the IBM Softcopy Reader
the PC
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Related resources
→ The IBM Publications Center
→ The z/OS V1R8 Library

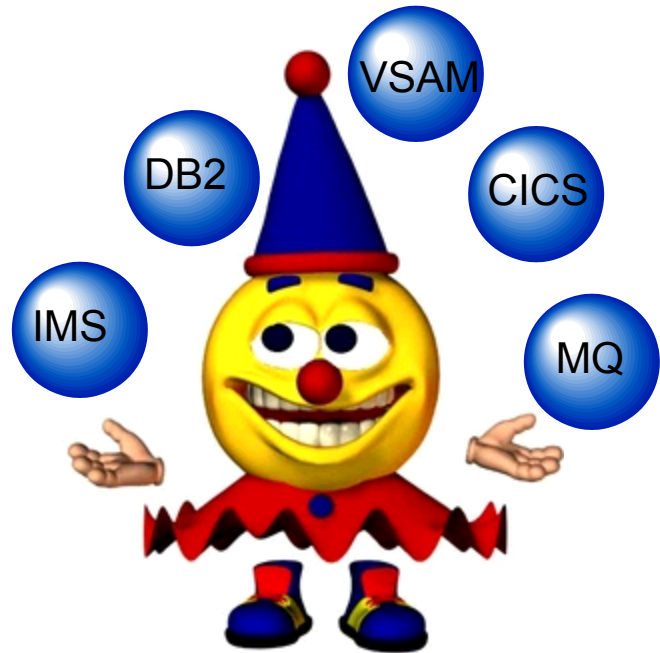


IBM File Manager for z/OS Version 11



IBM File Manager for z/OS

Manage, Edit, View, Browse data stored in various formats



Problem

- Developers need to see data in a formatted mode so they don't see non-display data
- Your developers need to browse, edit and view data in DB2, IMS, VSAM, Sequential datasets, etc

IBM File
Manager



- Edit entire files regardless of size
- Format data with COBOL, PL/I or Assembler record layouts
- Scrambling sensitive data to insure 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

The IBM Problem Determination Tools Suite for z/OS

IBM Problem Determination Tools

IBM 2011 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

Migration
Utility

Hourglass

ISPF
Productivity Tool

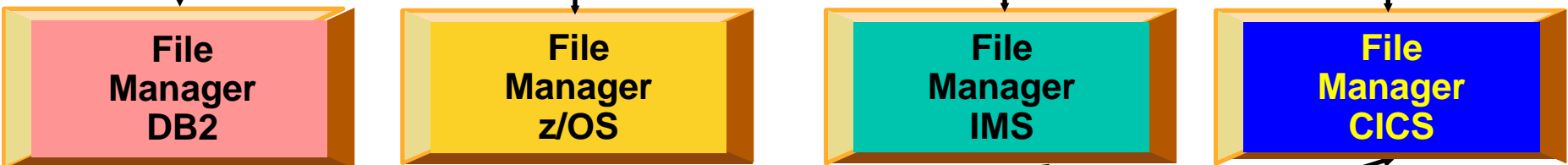
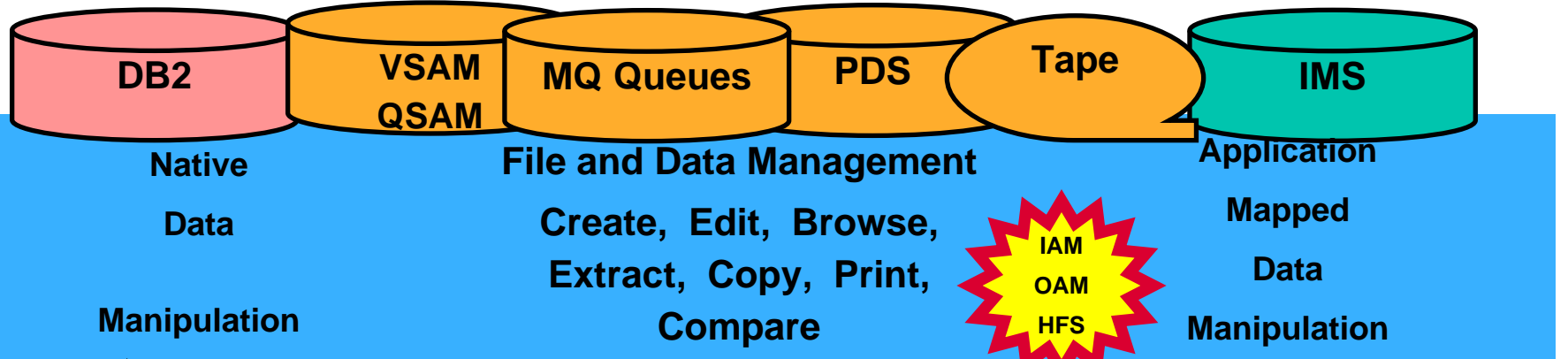
www.ibm.com/software/awdtools/deployment

File Manager for z/OS Highlights

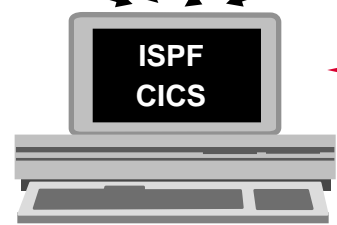
- Select, create, browse, copy, edit, print, and format or reformat data files
- Manipulate data using COBOL, Assembler and PL/I record layouts interactively or in batch
- Scrambling of data for data privacy
- SQL Prototyping and Execution
- Comprehensive, user-friendly, batch and interactive utilities extends standard ISPF
- Multiple z/OS environments
 - Batch
 - TSO/ISPF
 - CICS
 - IMS/TM
 - DB2
 - Websphere MQ

IBM File Manager for z/OS

Manage a variety of enterprise data file structures



Common User Interface In All Environments



Do what you want, how you want, with your data

IBM File Manager for z/OS

Inclusive of all environments

The image displays four overlapping screenshots of the IBM File Manager interface, illustrating the navigation path through different processing options. Each screenshot shows a 'Primary Option Menu' with a 'Command ==>' field and a list of options. Red circles highlight the selected menu item in each step.

Screenshot 1: File Manager
 Menu items: 0 Settings, 1 View, 2 Edit, 3 Utilities, 4 Tapes, 5 Disk/VSAM, 6 OAM, 7 Templates, 8 HFS, 9 WebSphere MQ, X Exit.
 Selected: File Manager (circled in red).
 Command ==> 2

Screenshot 2: FM/CICS
 Menu items: 0 Settings, 1 View, 2 Edit, 3 Utilities, 4 Templates, FM FM, FI FM/IMS, FD FM/DB2, X Exit.
 Selected: FM/CICS (circled in red).
 Command ==> 2

Screenshot 3: FM/IMS
 Menu items: 0 Settings, 1 Browse, 2 Edit, 3 Utilities, 4 Templates, X Exit.
 Selected: FM/IMS (circled in red).
 Command ==> 2

Screenshot 4: FM/DB2 (DB1F)
 Menu items: 0 Settings, 1 View, 2 Edit, 3 Utilities, 4 SQL, 5 DB2I, 6 Command, X Exit.
 Selected: FM/DB2 (DB1F) (circled in red).
 Command ==> 2

Additional Information from Screenshot 4:
 User ID . : TSS05
 System ID : STLABF6
 Appl ID . : FMN2
 Version . : 10.1.0
 Terminal : 3278A
 Screen . : 1
 Date . . : 2009/12/10
 Time . . : 09:00
 DB2 SSID . DB1F
 SQL ID . . TSS05 +

File Manager for z/OS (FM)

IBM File Manager for z/OS

CICS Feature

File Manager / CICS functions

- Edit and Browse data
 - Process CICS file
 - Process CICS temporary queue or transient data queue
 - Select rows / items and columns displayed
- Print
 - Table, Single, Hex or Character format
 - Select rows / items and columns
- Work with a list of CICS resources
 - Use line commands to initiate functions
- No destructive reads when accessing TD queues
- Copy option supports data scrambling
- Link to FM base, FM DB2 and FM IMS

FM / CICS Primary Option Menu

Process Options Help

FM/CICS

Primary Option Menu

Command ==> FM

0	Settings	Set processing options	User ID . . :	DBA022
1	View	View data	CICS User :	DBA022
2	Edit	Edit data	CICS Appl :	CICSACB4
3	Utilities	Perform utility functions	Date. . . :	2011/01/07
4	Templates	Template and copybook utilities	Time. . . :	13:32
5	WebSphere MQ	List, view and edit MQ data		
FM	FM	File Manager z/OS		
FI	FM/IMS	File Manager for IMS z/OS		
X	Exit	Terminate FM/CICS		

Processing Options:

CICS Resource

- 1 1. File
2. Temporary Storage
3. Transient Data

F1=Help F3=Exit F4=CRetriev F7=Backward F8=Forward F10=Actions
 F12=Cancel

File Manager Primary Option Menu

Process Options Help

File Manager

Primary Option Menu

Command ==> 2

0	Settings	Set processing options	User ID . . :	DBA022
1	View	View data	System ID :	DEMOMVS
2	Edit	Edit data	Appl ID . . :	FMN
3	Utilities	Perform utility functions	Version . . :	11.1.0
4	Tapes	Tape specific functions	Terminal. . :	3278
5	Disk/VSAM	Disk track and VSAM CI functions	Screen. . . :	1
6	OAM	Work with OAM objects	Date. . . . :	2011/01/07
7	Templates	Template and copybook utilities	Time. . . . :	13:25
8	HFS	Access Hierarchical File System		
9	WebSphere MQ	List, view and edit MQ data		
X	Exit	Terminate File Manager		

F1=Help
F9=Swap

F2=Split
F10=Actions

F3=Exit
F12=Cancel

F4=CRetriev

F7=Backward

F8=Forward

Edit

Process Options Help

File Manager

Edit Entry Panel

Command ==> █

Input Partitioned, Sequential or VSAM Data Set, or HFS file:

```

Data set/path name 'TSS05.TESTDATA' +
Member . . . . . FMNCDATA      (Blank or pattern for member list)
Volume serial . . .                 (If not cataloged)
Start position . . .                 +
Record limit . . .                 Record sampling   
Inplace edit . . .                 (Prevent inserts and deletes)

```

Copybook or Template:

```

Data set name . . . 'TSS05.BASE.COPYLIB'
Member . . . . . FMNCDATA      (Blank or pattern for member list)

```

Processing Options:

Copybook/template	Start position type	Enter "/" to select option
<u>1</u> 1. Above	<u> </u> 1. Key	<u> </u> Edit template <u> </u> Type (1,2,S)
2. Previous	2. RBA	<u> </u> Include only selected records
3. None	3. Record number	<u> </u> Binary mode, reclen <u>80</u>
4. Create dynamic		<u> </u> Create audit trail

Edit

Process Options Help

```

Edit                               TSS05.TESTDATA (FMNCDATA)                               Top of 40
Command ==> x all
SHAD                                Record AT TOP                                Scroll CSR
                                     Format TABL
REC-TYPE NAME                       EMPLOYEE-NO   AGE   SALARY   MONTH(1)
#2      #3                               #4      #5      #6      #7
AN 1:2  AN 3:20                       BI 23:2 BI 25:2 PD 27:4   BI 31:4
<>      <---+-----1-----+---->   <---+>  <---+>  <---+---> <---+-----1>

***** **** Top of data ****
000003 01      Graham Purdie                5512      94      68000      7
000006 01      Bill Soper                  4412      28      68000      5
000008 01      Tyrone Dalais               3312      21      60000     14
000012 01      Silvano Prez                2312      50      60000      1
000016 01      Don Pharoah                 4412      55      63000     38
000017 01      John Levrington             3412      40      67000     14
000018 01      Liz Rushton                 3412      40      66000     44
000021 01      Keith Stewart               2312      40      70000     26
000022 01      John Nicholls               3412      40      69000     30
000026 01      Bnna Waghorn                7812      33      60000      2
000029 01      Merrill Bani                7712      96      58000     18
***** **** End of data ****

```

Edit

Process Options Help

```

Edit                TSS05.TESTDATA(FMNCDATA)                Top of 40
Command ==> f 40 (#2 #4 #5) all                               Scroll CSR
Some shadows are off, so no records displayable
  REC-TYPE NAME                EMPLOYEE-NO        AGE        SALARY        MONTH(1)
  #2          #3                #4          #5          #6          #7
  AN 1:2     AN 3:20           BI 23:2    BI 25:2    PD 27:4     BI 31:4
  <>         <----+-----1----->      <----+>    <----+>    <----+--->  <----+-----1>
*****  ****  Top of data  ****
*****  ****  End of data  ****
  
```

Edit

Process Options Help

```

Edit                               TSS05.TESTDATA (FMNCDATA)                4 string(s) found
Command ==> res                               Scroll CSR
SHAD                                Record AT TOP           Format TABL
REC-TYPE NAME                        EMPLOYEE-NO      AGE      SALARY      MONTH(1)
#2          #3                        #4          #5          #6          #7
AN 1:2     AN 3:20                    BI 23:2     BI 25:2     PD 27:4     BI 31:4
<>        <----+-----1----->      <----+>    <----+>    <----+-->  <----+-----1>
***** **** Top of data ****
000017 01      John Levrington          3412      40      67000      14
000018 01      Liz Rushton              3412      40      66000      44
000021 01      Keith Stewart            2312      40      70000      26
000022 01      John Nicholls            3412      40      69000      30
***** **** End of data ****
  
```

Edit

Process Options Help

```

Edit                               TSS05.TESTDATA(FMNCDATA)                               Top of 40
Command ==> sha sup on
SHAD                                Record AT TOP                                Format TABL
REC-TYPE NAME                       EMPLOYEE-NO   AGE   SALARY   MONTH(1)
#2      #3                               #4      #5      #6      #7
AN 1:2  AN 3:20                       BI 23:2 BI 25:2 PD 27:4   BI 31:4
<>      <---+-----1-----+---->   <---+>  <---+>  <---+---> <---+-----1>

***** **** Top of data ****
000003 01      Graham Purdie                5512    94    68000    7
000006 01      Bill Soper                    4412    28    68000    5
000008 01      Tyrone Dalais                 3312    21    60000   14
000012 01      Silvano Prez                  2312    50    60000    1
000016 01      Don Pharoah                   4412    55    63000   38
000017 01      John Levrington               3412    40    67000   14
000018 01      Liz Rushton                   3412    40    66000   44
000021 01      Keith Stewart                 2312    40    70000   26
000022 01      John Nicholls                 3412    40    69000   30
000026 01      Bnna Waghorn                  7812    33    60000    2
000029 01      Merrill Bani                   7712    96    58000   18
***** **** End of data ****

```

Edit

Process Options Help

```

Edit                               TSS05.TESTDATA (FMNCDATA)                               Top of 40
Command ==> _____ Scroll CSR
SHAD                               Record AT TOP                               Format TABL
REC-TYPE NAME                       EMPLOYEE-NO   AGE   SALARY   MONTH(1)
#2      #3      <img alt="Red arrow pointing right" data-bbox="338 338 478 428" style="vertical-align: middle;"/> #4      #5      #6      #7
AN 1:2  AN 3:20  BI 23:2 BI 25:2 PD 27:4  BI 31:4
<>      <-----1----->      <----> <----> <----> <-----1>
***** **** Top of data ****
000003 01      Graham Purdie                       5512    94    68000    7
- - - - - REC-TYPE02 - - - - - 2 Line(s) suppressed
000006 01      Bill Soper                       4412    28    68000    5
- - - - - REC-TYPE02 - - - - - 1 Line(s) suppressed
000008 01      Tyrone Dalais                     3312    21    60000   14
000012 01      Silvano Prez                      2312    50    60000    1
-v- - - - - REC-TYPE02 - - - - - 3 Line(s) suppressed
000016 01      Don Pharoah                       4412    55    63000   38
000017 01      John Levrington                   3412    40    67000   14
000018 01      Liz Rushton                       3412    40    66000   44
- - - - - REC-TYPE02 - - - - - 1 Line(s) suppressed
000021 01      Keith Stewart                     2312    40    70000   26
000022 01      John Nicholls                     3412    40    69000   30
- - - - - REC-TYPE02 - - - - - 2 Line(s) suppressed
  
```

Edit

Process Options Help

```

Edit                               TSS05.TESTDATA (FMNCDATA)                               Top of 40
Command ==> fs
SHAD                                Record AT TOP                                Format TABL
REC-TYPE NAME                       JOB-TITLE      ADDR1          ADDR2
#2          #3          <img alt="Red arrow pointing to column 4" data-bbox="328 328 468 408"/> #4          #5          #6  +
AN 1:2     AN 3:20     AN 23:14      AN 37:20      AN 57
<>         <-----1-----> <-----1----> <-----1-----> <-----1----->
***** **** Top of data ****
- - - - - REC-TYPE01 - - - - - 1 Line(s) suppressed
000004 02      Bndrew Bstle      Developer      44 Eagle Rise      River
000005 02      Jim Blexander      Manager        123 Wellington St  Gilfo
- - - - - REC-TYPE01 - - - - - 1 Line(s) suppressed
000007 02      Graham Purdie      Developer      256 Hay St         Canni
- - - - - REC-TYPE01 - - - - - 1 Line(s) suppressed
- - - - - REC-TYPE01 - - - - - 1 Line(s) suppressed
000013 02      Rod Turner         Manager        184 Blexander Dve  Swan
000014 02      Clive Nealon       Manager        28 Bern Rd         Middl
000015 02      Silvano Prez       Programmer     48 Small Lane      Mt Pl
- - - - - REC-TYPE01 - - - - - 3 Line(s) suppressed
000020 02      Liz Rushton        Sysprog       96 High Rd         Yange
- - - - - REC-TYPE01 - - - - - 2 Line(s) suppressed
000024 02      Don Pharoah        Programmer     661 Byton Way      Flore
  
```

Edit

Process Options Help

```

Edit                               TSS05.TESTDATA (FMNCDATA)                Rec 4 of 40
Command ==> hex on                                                         Scroll CSR
                                                                                               Record 4      Format SNGL
                                                                                               Top Line is 3    of 11
                                                                                               Length 80

Current 01: REC-TYPE02
Ref Field  Picture Typ  Start   Len   Data
  2  2 REC-TYPE
      XX      AN      1      2   02
  3  2 NAME  X(20)   AN      3     20  Bndrew Bstle
  4  2 JOB-TITLE
      X(14)   AN     23     14  Developer
  5  2 ADDR1 X(20)   AN     37     20  44 Eagle Rise
  6  2 ADDR2 X(20)   AN     57     20  Riverton
  7  2 POSTCODE
      X(4)    AN     77      4   6133
*** End of record ***

```

Edit

Process Options Help

```

Edit                TSS05.TESTDATA (FMNCDATA)                Rec 4 of 40
Command ==> ft_____ Scroll CSR
                                     Record 4 Format SNGL
                                     Top Line is 3 of 29
                                     Length 80

Current 01: REC-TYPE02
Ref Field  Picture Typ Start   Len   Data
  2  2 REC-TYPE
      XX      AN      1      2    02
                                      FF
                                      02

  3  2 NAME   X(20)   AN      3     20  Bndrew Bstle
                                      C9898A4CAA9844444444
                                      25495602233500000000

  4  2 JOB-TITLE
      X(14)   AN     23     14  Developer
                                      C8A89998944444
                                      45553675900000

  5  2 ADDR1  X(20)   AN     37     20  44 Eagle Rise
                                      FF44C88984D8A8444444

```


Edit

Process Options Help

```

Edit                               TSS05.TESTDATA (FMNCDATA)                               Rec 4 of 40
Command ==> hex off
SHAD                               Record 4                               Format TABL
REC-TYPE NAME                       JOB-TITLE                       ADDR1                           ADDR2
#2          #3                       #4                               #5                               #6 +
AN 1:2     AN 3:20                   AN 23:14                       AN 37:20                       AN 57
<>         <----+----1-----+----> <----+----1----> <----+----1-----+----> <----+
000004 02      Bndrew Bstle           Developer                       44 Eagle Rise                 River
FF      C9898A4CA9844444444         C8A899989444444         FF44C88984D8A8444444         D8A89
02      2549560223350000000         455536759000000         44005173509925000000         99559

000005 02      Jim Blexander          Manager                       123 Wellington St           Gilfo
FF      D894C98A89889444444         D898889444444         FFF4E899898A994EA444         C8989
02      1940235715459000000         4151759000000         12306533957365023000         79366

- - - - - REC-TYPE01 - - - - - 1 Line(s) suppressed

000007 02      Graham Purdie           Developer                       256 Hay St                   Canni
FF      C988894DA9888444444         C8A899989444444         FFF4C8A4EA4444444444         C8998
02      7918140749495000000         455536759000000         25608180230000000000         31559
  
```

Edit

Process Options Help

```

Edit                               TSS05.TESTDATA (FMNCDATA)                               Rec 4 of 40
Command ==>                               Scroll CSR
SHAD                                     Record 4                               Format TABL

      REC-TYPE NAME                JOB-TITLE                ADDR1                ADDR2
      #2          #3                #4                #5                #6  +
      AN 1:2     AN 3:20            AN 23:14           AN 37:20           AN 57
      <>          <-----1-----> <-----1-----> <-----1-----> <-----1----->
000004 02      Bndrew Bstle         Developer             44 Eagle Rise       River
000005 02      Jim Blexander        Manager              123 Wellington St   Gilfo
- - - - - REC-TYPE01 - - - - - 1 Line(s) suppressed
000007 02      Graham Purdie        Developer            256 Hay St          Canni
- - - - - REC-TYPE01 - - - - - 1 Line(s) suppressed
- - - - - REC-TYPE01 - - - - - 1 Line(s) suppressed
000013 02      Rod Turner                 Manager              184 Blexander Dve   Swan
000014 02      Clive Nealon            Manager              28 Bern Rd          Middl
000015 02      Silvano Prez              Programmer           48 Small Lane       Mt Pl
- - - - - REC-TYPE01 - - - - - 3 Line(s) suppressed
000020 02      Liz Rushton                 Sysprog             96 High Rd          Yange
- - - - - REC-TYPE01 - - - - - 2 Line(s) suppressed
000024 02      Don Pharoah                Programmer           661 Byton Way       Flore
000025 02      Tyrone Dalais              Developer            92 Smith St         Belmo
- - - - - REC-TYPE01 - - - - - 1 Line(s) suppressed
  
```

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

Utilities

Process Options Help

File Manager

Utility Functions

Command ==> 3

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

File Manager for z/OS (FM)

IBM File Manager for z/OS

DB2 Feature

File Manager / DB2 functions

- Edit and Browse data
 - Edit a DB2 Table or View
 - select rows and columns displayed
- Print
 - Table or Single format
 - select rows and columns
- Create and Drop DB2 objects
- Copy data
 - select rows
 - “map” columns from an input table to an output table
 - reformat and generate data while copying
 - Scrambling of sensitive data for data privacy

File Manager / DB2 functions

- Work with a list of DB2 objects
 - Use line commands to initiate functions
- Grant and Revoke DB2 privileges
- Import and Export data
 - Select Rows
 - Export to a file in default FM/DB2 format, a format defined by a copybook, or a comma-delimited file
 - Import from a file generated by the Export function, or a file described by a copybook
- Generate JCL for DB2 utilities:
 - COPY, LOAD, REBUILD, RECOVER, REORG, and RUNSTATS
- Execute SQL Statements
- Create and test new SQL statements
 - Two methods: Basic and Advanced

File Manager for z/OS (FM)

IBM File Manager for z/OS

IMS Feature

File Manager / IMS functions

- **Online utilities for IMS databases**
 - Edit and Browse data
 - ISPF Job setup for batch utilities
 - Extract segments from a database
 - Load segments into a database
 - Print
 - Batch Edit/Browse

- **Support for processing databases using either:**
 - physical DBD
 - logical DBD

- **Access databases using either:**
 - Static (existing) PSBs
 - Dynamic PSBs

File Manager / IMS functions

- **Support for:**
 - PHDAM (HALDB)
 - HDAM
 - PHIDAM (HALDB)
 - HIDAM
 - HISAM
 - HSAM
 - DEDDB
 - MSDB

- **Process databases in alternate sequences using secondary indexes**

- **Optional audit trail to record database updates**

File Manager / IMS functions

- **Optionally use COBOL, Assembler or PL/I segment layouts to format data into fields**
 - Edit and Browse segments in tabular or character format
 - Access source in PDS, PDSE, or Panvalet libraries
 - Work with segments that have multiple layouts
- **Use flexible criteria to select segments for browse, edit, and extract processing**
- **Change segment selection criteria and formatting interactively, while browsing or editing**
- **Batch creation and refreshing of templates created from COBOL, Assembler or PL/I segments**

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File Manager for z/OS

Library

File Manager - English:

- ↓ Version 11 Release 1
- ↓ Version 10 Release 1
- ↓ Version 9 Release 1
- ↓ Version 8 Release 1
- ↓ Version 7 Release 1
- ↓ Version 6 Release 1
- ↓ Redbooks

Search for [text](#) across all books in the File Manager V11 Bookshelf

File Manager, Version 11 Release 1 Publications - English				
Title	View/download PDF	Order number	View Book	Last update
Program Directory	(PDF, 181 KB)	GI10-8858-02	-	12/2010

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IBM Application Performance Analyzer for z/OS Version 11



IBM Application Performance Analyzer for z/OS

Fine tune application performance

Performance
issues



Problem

- Application performance problems often mean unhappy users, missed deadlines, and unmet service levels.

IBM Application Performance Analyzer



Solution

- APA helps programmers identify constraints and the root cause of performance bottlenecks. Drill down to modules, programs, files, databases, SQL statements, CICS transactions, and even individual program source statements.

The IBM Problem Determination Tools Suite for z/OS

IBM Problem Determination Tools

IBM 2011 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

Migration
Utility

Hourglass

ISPF
Productivity Tool

www.ibm.com/software/awdtools/deployment

Application Performance Analyzer for z/OS

- Identify performance and response time problems in production
- Reduce batch application turnaround time
- Multiple languages:
 - COBOL
 - PL/I
 - C/C++
 - Assembler
 - Java
 - Natural
- Multiple z/OS environments
 - Batch
 - CICS
 - IMS
 - DB2 (SP, DDF/DRDA)
 - Websphere MQ
 - Websphere Application Server
 - Adabas
- Can be integrated with Fault Analyzer and Application Performance Analyzer with source mapping side files
- Workstation GUI plug-in

IBM Application Performance Analyzer for z/OS 3270 or GUI interfaces

Session A - [24 x 80]
File Edit View Communication Actions Window Help
File View Navigate Help

R01: IBM APA for z/OS Performance Reports (6852/MACHIND) Row 00001 of 00007
Command ==> Scroll ==> PAGE

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

- A Admin/Miscellaneous
- S **Statistics/Storage**
- C CPU Usage Analysis
- D DASD I/O Analysis
- W CPU WAIT Analysis
- H HFS Analysis
- V Variance Report
- I IMS Measurement
- E CICS Measurement
- F DB2 Measurement

Enter S to make a selection or enter the report

- S01 Measurement Profile
- S02 Load Module Attributes
- S03 Load Module Summary
- S04 TCB Summary
- S05 Memory Usage Timeline
- S06 Data Space Usage Timeline
- S07 T
- S08 P
- S09 M

F1=Help F2=Split F3=End F4=Jump F5
F9=Swap F10=Left F11=Right F12=Cancel

Connected to remote server/host 9.30.128.24 using lu/pool TCP00006 and port 23

Source-level support for:

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

Types of Observation Sessions

- Real-Time
- Scheduled
- Via batch submission

IBM CICS Explorer
Explorer Edit Window Help

APA Observations List (CAZA) - Local

ReqNo.	Owned By	Description	Job Name	Date/Time	Samples	Status
6263	MACHIN2	v10ref	PLITEST	May-04 09:40	5,282	Ended
6259	MACHIN2	v10ref-uc29-F7	JAVATST1	May-04 09:38	9,999	USS
6257	MACHIN2	v9	MQPUT	May-04 09:37	774	Ended
6246	TSS09	Jeremys performance capture of SA...	TSS09APA	May-03 17:39	10,000	Steps
6247		0001 IKJEFT01 CUSTKSDS CH...		May-03 17:46	5	Ended
6248		0002 IEFBR14 CUSTKSDS ALL...		May-03 17:46	1	Failed
6249		0003 IDCAMS CUSTKSDS CO...		May-03 17:46	1	Failed
6250		0004 IKJEFT01 CUSTKSDS CH...		May-03 17:46	3	Ended
6251		0005 IEFBR14 CUSTKSDS ALL...		May-03 17:46	1	Failed
6252		0006 IDCAMS CUSTKSDS CO...		May-03 17:46	1	Failed
6253		0007 IDCAMS VERIFY		May-03 17:46	18	Ended
6254		0008 SAM1V RUNSAM		May-03 17:48	10,000	Ended
6277	TSS16	Downs performance capture of SAM	TSS16APA	May-03 13:36	1	Steps

STC Properties

Property Value

DSNHLQ ADTOOLS.APA010
Job CAZA
Started 2010-05-25 11:53:3
Sysplex CAZAPLEX
Version 10.10F

S - Statistics/Storage

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

C - CPU Usage Analysis

- C01 - CPU Usage by Category
- C02 - CPU Usage by Module
- C03 - CPU Usage by Code Slice

S01: Mea

CPU Usage D

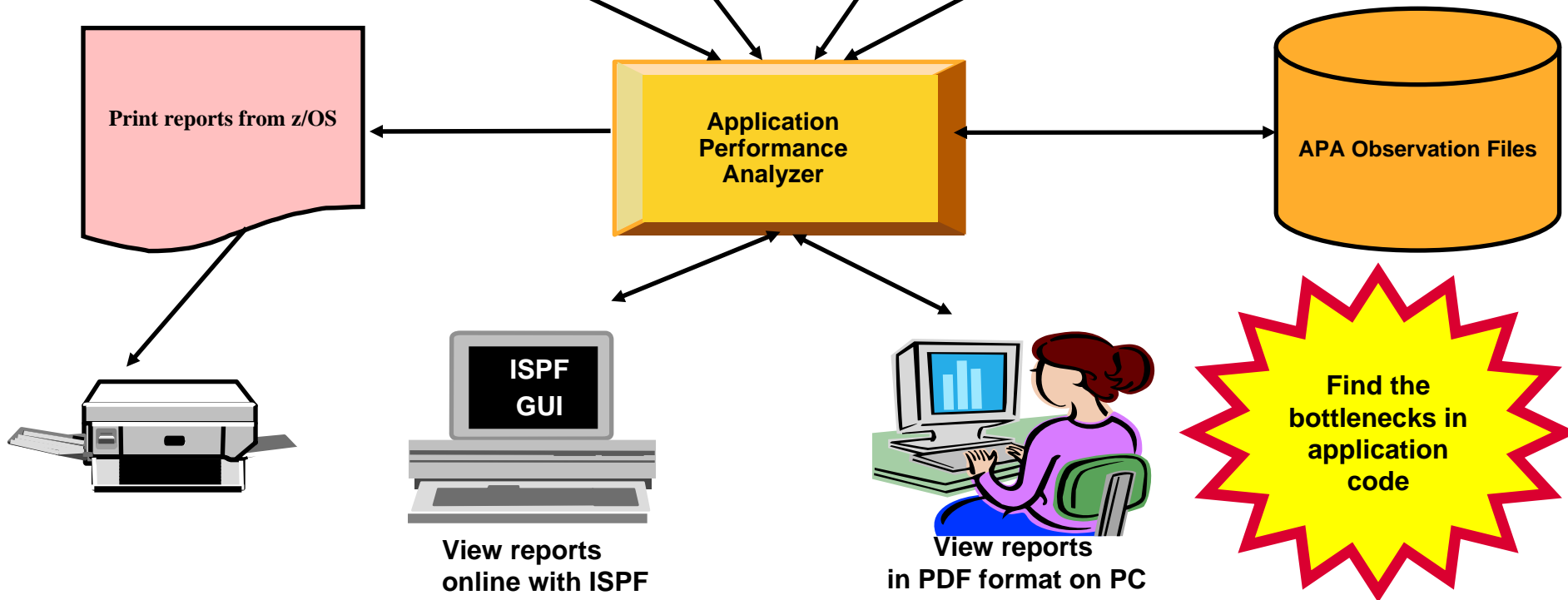
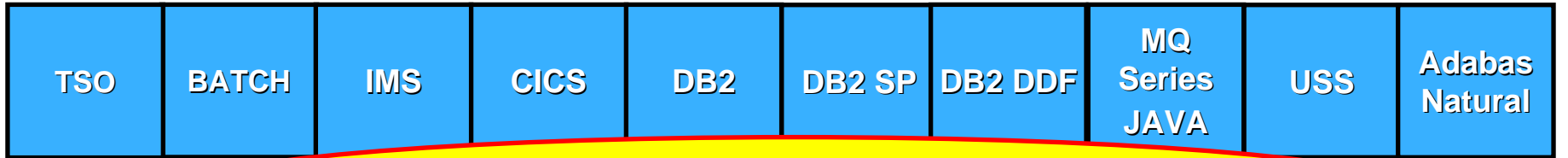
Category	Value	Percentage
CPU Active	4,507	45.07%
Application	4,181	41.81%
System	0	0.00%
DB2 SQL	0	0.00%
Data Mgmt	12	0.12%
Unresolved	714	7.14%
IMS DLI Call	0	0.00%

FREE!!

Eclipse Based GUI

IBM Application Performance Analyzer for z/OS

Provides rapid pinpointing of enterprise application bottlenecks



What is Application Performance Analyzer (APA) for z/OS ?

- Application Performance Analyzer for z/OS is an application performance-measurement tool that helps you perform application performance tuning for applications running on IBM z/OS systems
- APA will measure and report on how system resources are used by applications running in virtually any z/OS address space
- APA can minimize the time needed to resolve production performance problems by identifying the issue
- APA can also analyze transactions running under an online subsystem such as IBM CICS, IBM IMS, and WebSphere Application Server, as well as DB2 stored procedures
- Using APA helps you maximize the performance of your existing hardware resources and helps you improve the performance of your applications and subsystems
- APA aids application design, development and maintenance cycles. It helps evaluate application prototypes in the design phase, review the impact of increased data volume or changes in business requirements on performance

Application Performance Analyzer Features

- **Online analysis:** Displays overall system activity, enabling you to check job execution online and select which active job to monitor.
- **Monitoring:** Automatically starts to monitor job performance when the job or program becomes active
- **Reports:** Provides multiple summary reports to assist in identifying key areas of performance bottlenecks. Analysis data is available in printed reports, which can be created as an Adobe PDF file or as an XML file
- **Performance analysis:** Provides CPU usage, as well as multiple DASD statistics including EXCP, VSAM statistics, and I/O wait time
- **DB2 monitoring:** Delivers relevant information for DB2 performance analysis and tuning, including SQL statements
- **CICS monitoring:** Includes monitoring by specific transaction or transaction prefix with wildcards. CICS+ provides tracing support for critical situations
- **IMS support:** Delivers IMS application performance data on call time and service-call time for DL/I. IMS+ can be used to trace all IMS calls.
- **WebSphere MQ support:** Provides CPU usage by queue, by request, and by transaction, as well as service time and wait time for the same

Connected to the Mainframe

APA/GUI

File Window Help

APA Observations List (CAZA) - Remote

ReqNum	Owned By	Description	Job Name	Date/Time	Samples	Status
5513	#845409	5/3 SAMPLE	T263RAFT	Mar-23 12:37	2,000	Ended
5511	MACHIN2	v 10ref4-uc13	DONDRVRN	Mar-23 08:53	28,617	Ended
5510	MACHIN2	v 10ref4-uc30v2	-	Mar-23 08:34	68	Ended
5509	MACHIN2	v 10ref4-uc30-v2	-	Mar-23 08:31	77	Ended
5506	MACHIN2	v 10ref4-uc29v1	DSNTEJ6U	Mar-23 08:28	214	Ended
5505	MACHIN2	v 10ref4-uc29v1	DSNTEJ6R	Mar-23 08:23	1,257	Ended
5502	MACHIN2	v 10ref4-uc17,27	CICSC32G	Mar-23 07:59	44,444	Ended
5501	MACHIN2	v 10ref4-uc17,27	CICSC32F	Mar-23 07:59	44,444	Ended
5498	MACHIN2	v 10ref4-uc10	IMBFMP%	Mar-23 07:07	44,444	MultJob
5497	MACHIN2	v 10ref4-uc1	MACHIND	Mar-23 06:48	44,444	Ended

Details (5513) Observation Reports

General

Request Number: **5513**
 Request Description: 5/3 SAMPLE
 Request Status: Ended
 Owner Id: #845409
 Time of Request: Tuesday Mar 23 2010 12:37:58.79
 Session Start Time: Wednesday Mar 03 2010 14:18:33.91
 Session End Time: Wednesday Mar 03 2010 14:19:33.88
 Session Duration: 0 minutes, 59.97 seconds
 Session Delete Date: Monday Jun 21 2010 12:37:58.79

Measurement Criteria

Select by Job Name: T263RAFT
 Select by Sys Name: DEV2
 Sample Interval: 30,000 microseconds
 Duration: 60 seconds

Measurement Information

Sample File DSN: ADTOOLS.LEAKE.T263RAFT.R5513.SF
 Samples Requested: 2,000
 Samples Done: 2,000
 009F

Data Extractors
 No Extractors

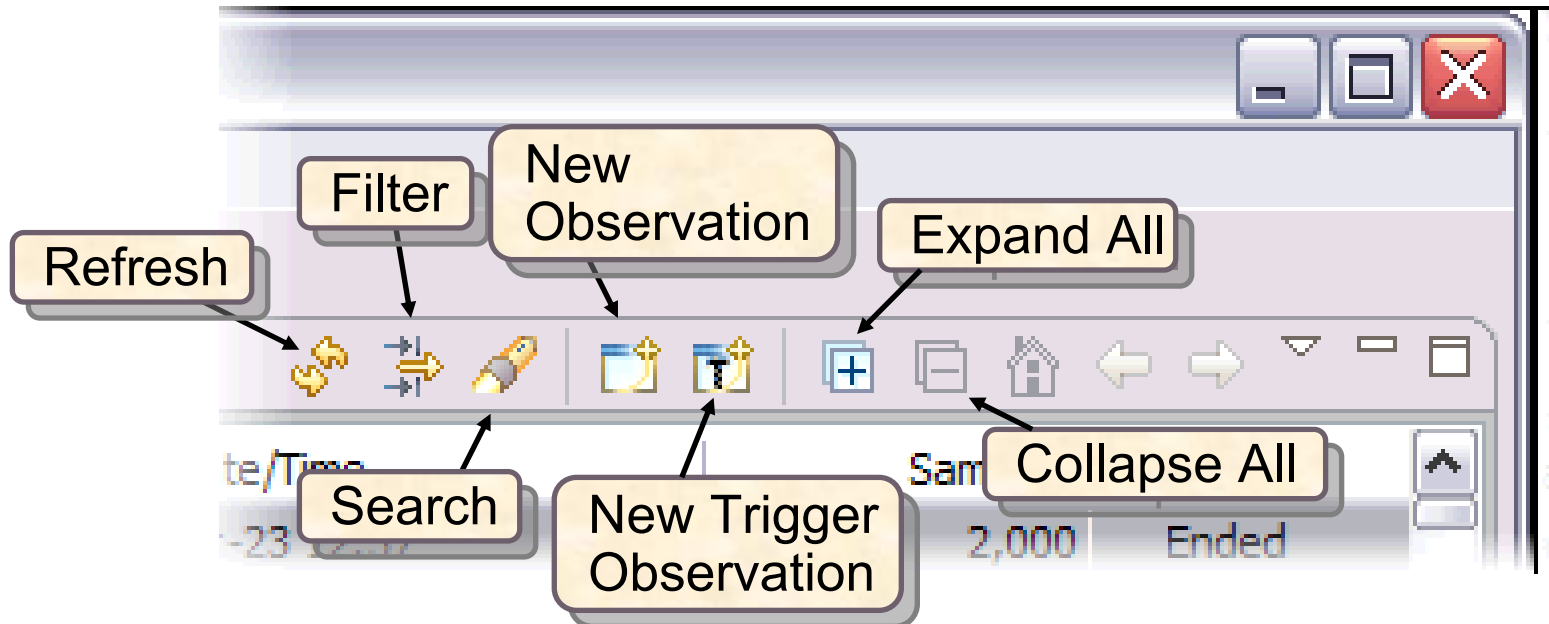
filter (*) - 904 observations

Remote (TSS09)

Indicates Local or Remote connection

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

The screenshot shows the IBM CICS Explorer interface. A 'New Observation' dialog box is open, titled 'Schedule New Measurement'. The dialog has several tabs: 'Job Information', 'Options', 'Multi Steps', 'Active Jobs', 'Subsystems', 'Schedule', and 'Sched Options'. The 'Job Information' tab is selected. In this tab, the 'Job Name/Pattern' is 'TSS13B' and the 'System' is 'STLABF6'. The 'Step Specification' section includes fields for 'Step Number' (set to '*'), 'Program Name', 'Step Name', and 'Proc Step Name'. The 'Description' is 'GUI test'. Other fields include 'Number of Samples' (5000), 'Duration (min:sec)' (1:00), 'Notify TSO User', 'Measure to step end' (unchecked), 'Delay by (secs)', 'Retain file for (days)' (90), and 'USS observations' (Max. 25). At the bottom of the dialog are 'Submit', 'Cancel', and 'Preview' buttons.

In the background, a table of 'Samples' is visible. A black circle highlights a button in the toolbar above the table, which is used to create a new observation. The table has columns for 'Samples' and 'Status'.

Samples	Status
88,888	Ended
88,888	Ended
41,940	Ended
99,999	MultiJb
99,999	MultiJb
77,777	MultiJb
77,777	MultiJb
5,000	Ended
811	Ended
5,000	Ended

Below the table, there is a section for 'Series' with the following details:

- Name: MACHIND
- Name: STLABF6
- Value: 14,850 microseconds
- Unit: 1,320 seconds

Below that, there is a section for 'Information' with the following details:

- SN: ADTOOLS.MACHIN2.MACHIND.R7562.SF
- Created: 88,888
- Modified: 88,888
- Version: 0085

At the bottom right, there is a 'Remote (tss13)' dropdown menu.

New observation details

- **Create and submit a new observations**
- **Enter the specification details**
- **Seven tabs where request information may be entered**
- **Each tab name indicates if data has been entered**
 - **Green Dot – entered data is error free.**
 - **Yellow or Red Dot - warnings or errors in the entered data**

New Observation

Schedule New Measurement

Please provide the Job Name

Job Information
 Options
 Multi Steps
 Active Jobs
 Subsystems
 Schedule
 Sched Options

Job Name/Pattern System

Inactive

Step Specification

Step Number Specify step number, programe, step name or step name + proc step name. Use 'Multi Steps' tab to specify more than one step

Program Name

Step Name

Proc Step Name

Description

Number of Samples Measure to step end

Duration (min:sec) Delay by (secs)

Notify TSO User Retain file for (days)

USS observations Max.

Submit Cancel Preview

Observation is scheduled

APA Observations List (CAZA) - Remote

Req...	Owned By	Description	Job Name	Date/Time	Samples	Status
7552	TSS13	GUI test job	TSS13B	Jul-27 10:33	5,000	Steps
7551	MACHIN2	v10H-uc26	DB2V9TEP	Jul-27 10:33	22,222	Sched
7533	MACHIN2	v10H-cst6	CIC%	Jul-27 09:45	99,999	MultiJob
7532	MACHIN2	v10H-cst6	CIC%	Jul-27 09:45	99,999	MultiJob
7527	MACHIN2	v10H-cst6	CIC%	Jul-27 09:09	77,777	MultiJob
7522	MACHIN2	v10H-cst6	CIC%	Jul-27 08:47	77,777	MultiJob
7521	VNDBKNT	Natural pause II	VNDBKNT1	Jul-27 07:50	5,000	Ended
7520	VNDBKNT	Natural pause	VNDBKNT1	Jul-27 07:33	811	Ended
7511	TSS13	New measurement sampling	TSS13A	Jul-27 07:04	5,000	Steps

APA Details (7562) Reports (7562) X

Observation has completed

APA Observations List (CAZA) - Remote

Req...	Owned By	Description	Job Name	Date/Time	Samples	Status
7563	TSS13	GUI test	TSS13B	Jul-27 12:11	5,000	Steps
7564		0001 IKJEFT01 CUSTKSDS ...		Jul-27 12:15	3	Ended
7565		0002 IEFBR14 CUSTKSDS ...		Jul-27 12:15	2	Ended
7566		0003 IDCAMS CUSTKSDS ...		Jul-27 12:15	15	Ended
7567		0004 IKJEFT01 CUSTKSDS ...		Jul-27 12:15	7	Ended
7568		0005 IEFBR14 CUSTKSDS ...		Jul-27 12:15	1	Failed
7569		0006 IDCAMS CUSTKSDS ...		Jul-27 12:15	1	Failed
7570		0007 IDCAMS VERIFY		Jul-27 12:15	30	Ended
7571		0008 SAM1V RUNSAM		Jul-27 12:16	5,000	Ended

APA Details (7562) Reports (7562) x

Right click on report and select Download Reports

The screenshot shows the 'APA Observations List (CAZA) - Remote' window. A table lists observations with columns for Request ID, Owner, Description, Job Name, Date/Time, Samples, and Status. A 'Downloading Reports' dialog box is open in the foreground, displaying a progress bar and the message 'Step 3 of 3 : Extracting 28 of 28 G03: Coupling Facility Total Service Times'. The dialog also includes a checkbox for 'Always run in background' and buttons for 'Run in Background', 'Cancel', and 'Details >>'.

Req...	Owned By	Description	Job Name	Date/Time	Samples	Status
7563	TSS13	GUI test	TSS13B	Jul-27 12:11	5,000	Steps
756		0001 IKJEFT01 CUSTKSDS ...		Jul-27 12:15	3	Ended
756		0002 IEFBR14 CUSTKSDS ...		Jul-27 12:15	2	Ended
756					15	Ended
756					7	Ended
756					1	Failed
756					1	Failed
757					30	Ended
757					00	Ended
7563					30	Ended

Report list is displayed and can be clicked on to select S01 Measurement Profile report shows high CPU activity

The screenshot displays the 'APA Observations List (CAZA) - Remote' window. The table below shows the list of observations:

Req...	Owned By	Description	Job Name	Date/Time	Samples	Status
7563	TSS13	GUI test	TSS13B	Jul-27 12:11	5,000	Steps
756		0001 IKJEFT01 CUSTKSDS ...		Jul-27 12:15	3	Ended
756		0002 IEFBR14 CUSTKSDS ...		Jul-27 12:15	2	Ended
756		0003 IDCAMS CUSTKSDS ...		Jul-27 12:15	15	Ended
756		0004 IKJEFT01 CUSTKSDS ...		Jul-27 12:15	7	Ended
756		0005 IEFBR14 CUSTKSDS ...		Jul-27 12:15	1	Failed
756		0006 IDCAMS CUSTKSDS ...		Jul-27 12:15	1	Failed
757		0007 IDCAMS VERIFY		Jul-27 12:15	30	Ended
757		0008 SAM1V RUNSAM		Jul-27 12:16	5,000	Ended

The 'S01: Measurement Profile (7571/TSS13B)' window is open, showing the following data:

Overall CPU Activity

Samples	5,000	100.0%	
CPU Active	4,636	92.7%	
WAIT	317	6.3%	
Queued	47	0.9%	

CPU Usage Distribution

CPU Active	4,636	100.0%	
Application	2,255	48.6%	
System	1,997	43.0%	
DB2 SQL	0	0.0%	
Data Mgmt	17	0.3%	
Unresolved	367	7.9%	
IMS DLI call	0	0.0%	

Associated reports are displayed and can be selected:

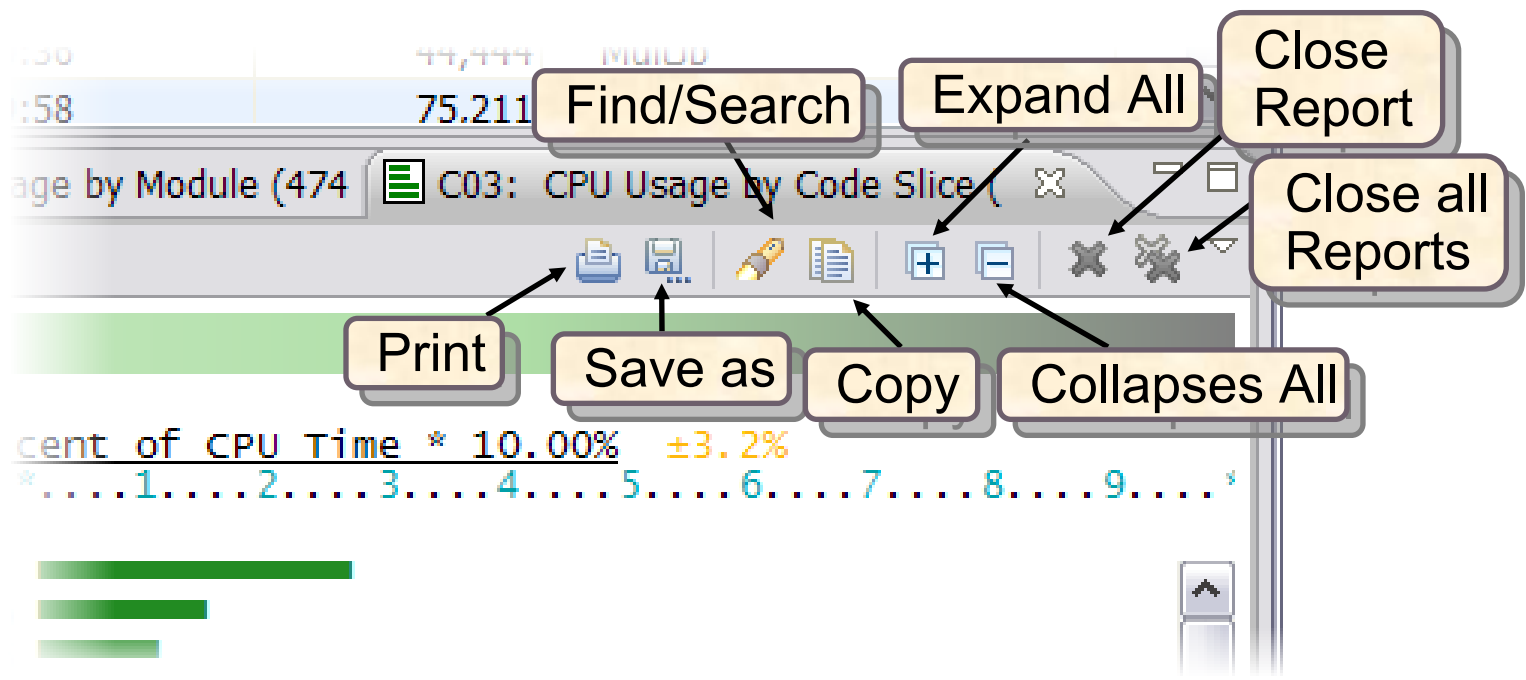
- Reports: [C01](#) [C02](#) [C03](#) [C05](#) [C07](#) [W01](#) [W02](#)
- Reports: [C01](#) [C05](#) [C08](#) [W01](#)
- Reports: _____

Report View (continued)

▪ Toolbar

– Provides buttons for report-level actions which include:

- Print
- Save As
- Find
- Copy
- Close Report
- Close All Reports
- Expand All
- Collapse All



S01 report also shows measurement significance

Measurement SRB shows APA CPU usage

APA Observations List (CAZA) - Remote

Req...	Owned By	Description	Job Name	Date/Time	Samples	Status
7563	TSS13	GUI test	TSS13B	Jul-27 12:11	5,000	Steps
756		0001 IKJEFT01 CUSTKSDS ...		Jul-27 12:15	3	Ended
756		0002 IEFBR14 CUSTKSDS ...		Jul-27 12:15	2	Ended
756		0003 IDCAMS CUSTKSDS ...		Jul-27 12:15	15	Ended
756		0004 IKJEFT01 CUSTKSDS ...		Jul-27 12:15	7	Ended
756		0005 IEFBR14 CUSTKSDS ...		Jul-27 12:15	1	Failed
756		0006 IDCAMS CUSTKSDS ...		Jul-27 12:15	1	Failed
757		0007 IDCAMS VERIFY		Jul-27 12:15	30	Ended
757		0008 SAM1V RUNSAM		Jul-27 12:16	5,000	Ended

Details (75) Reports (7) S01: Measurement Profile (7571/TSS13B)

S01: Measurement Profile (7571/TSS13B)

End time	12:16:32	End date	Tue Jul-27-2010
Total samples	5,000	Duration	1 min 0.13 sec
Sampling rate	83.15 per sec	Report dataspace	1.27MB
CPU/WAIT samples	4,953	Sample dataspace	4.99MB
TCB samples	5,000	Meas significance	99.06%
Overall CPU	50.13%	CPU queued samples	47
Pages in	0	EXCPS	4,529
Pages out	0		

CPU consumption

CPU active samples	4,636	CPU time TCB	54.74 sec
CPU active time	92.72%	CPU time SRB	0.08 sec
CPU WAIT samples	317	Service Units	2,450,053
CPU WAIT time	6.34%	Measurement SRB	0.34 sec

C01 CPU Usage by Category

APA Observations List (CAZA) - Remote

Req...	Owned By	Description	Job Name	Date/Time	Samples	Status
7563	TSS13	GUI test	TSS13B	Jul-27 12:11	5,000	Steps
756		0001 IKJEFT01 CUSTKSDS ...		Jul-27 12:15	3	Ended
756		0002 IEFBR14 CUSTKSDS ...		Jul-27 12:15	2	Ended
756		0003 IDCAMS CUSTKSDS ...		Jul-27 12:15	15	Ended
756		0004 IKJEFT01 CUSTKSDS ...		Jul-27 12:15	7	Ended
756		0005 IEFBR14 CUSTKSDS ...		Jul-27 12:15	1	Failed
756		0006 IDCAMS CUSTKSDS ...		Jul-27 12:15	1	Failed
757		0007 IDCAMS VERIFY		Jul-27 12:15	30	Ended
757		0008 SAM1V RUNSAM		Jul-27 12:16	5,000	Ended

Details (75) Reports (7) S01: Measurement Profile (7571/TSS13B) C01: CPU Usage by Category (7571/TSS13B)

C01: CPU Usage by Category (7571/TSS13B) Expand All

Name	Description	Percent of CPU Time * 10.00%	+1.4%
APPLCN	Application Code	48.64	
SYSTEM	System/OS Services	43.07	
NOSYMB	No Module Name	7.91	
DATAMG	DataMgmt Processing	0.36	

C01 Options

S09 Measurement Analysis report displays possible performance improvement

The screenshot displays the IBM Performance Analysis Workbench (PAW) interface. The left-hand pane shows a tree view of reports, with 'S09 - Measurement Analysis' selected. The main pane displays the content of the 'S09: Measurement Analysis (7571/TSS13B)' report. The report text states: 'This report presents various textual statements pertaining to specific aspects of application performance observed during the measurement session. Each statement identifies areas of activity and resource consumption or causes of execution delay and suggests areas where performance improvement opportunities might exist.' A highlighted section titled '1. System CPU overhead' contains the text: 'A high percentage of CPU activity was observed in system service routines. This indicates high system overhead. The level of system overhead might be normal for the type of job being measured or it might be an indication of a performance problem.' Below this text, it says 'See reports: [C01](#) [C02](#)'. The interface includes a top toolbar with various icons and a bottom toolbar with navigation arrows.

S09: Measurement Analysis (7571/TSS13B)

This report presents various textual statements pertaining to specific aspects of application performance observed during the measurement session. Each statement identifies areas of activity and resource consumption or causes of execution delay and suggests areas where performance improvement opportunities might exist.

1. System CPU overhead
A high percentage of CPU activity was observed in system service routines. This indicates high system overhead. The level of system overhead might be normal for the type of job being measured or it might be an indication of a performance problem.

See reports: [C01](#) [C02](#)

S09 Measurement Analysis report displays possible performance improvement

The screenshot displays the IBM Performance Explorer interface. The left-hand pane shows a tree view of reports, with 'S09 - Measurement Analysis' selected. The main pane shows the details of the 'S09: Measurement Analysis (7571/TSS13B)' report. The report content is as follows:

2. High CPU usage in one module
A high percentage of CPU activity was observed in a single load module.
see reports: [S01](#) [C01](#) [C02](#)

3. High CPU usage in one CSECT
A high percentage of CPU activity was observed in a single CSECT (control section).
see reports: [S01](#) [C01](#) [C02](#)

4. Execution CPU intensive
The measured job was observed to be CPU intensive.

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Software > WebSphere > z/OS Problem Determination Tools >

Application Performance Analyzer for z/OS

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Overview

Application Performance Analyzer for z/OS measures and reports how your applications use resources

This problem determination tool helps you identify system constraints and improve application performance.

- Helps your business maximize the performance of your existing applications and improve the response time of your online transactions and batch turnaround times
- Gives you the information you need to isolate performance problems in applications and test the effect of increased workloads on your systems
- Monitors, analyzes and reports the performance of CICS®, Assembler, COBOL, PL/I, C/C++, DB2®, IMS™ and WebSphere® MQ applications
- Collects samples from the monitored address space and analyzes the system or resource application usage of CPU, DASD, I/O or the total address space
- Features online analysis and reports that can be created as PDF or XML files, so that you can view them on workstations or transfer easily to other applications
- Integrates with Fault Analyzer for z/OS and Debug Tool for z/OS
- [New features in V11.1 can be found here](#)
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IBM Workload Simulator for OS/390 and z/OS Version 2.1



IBM Workload Simulator for OS/390 and z/OS

Automated testing to simulate Load, Stress, Performance, and Regression tests

10,000 Users... what
will the response time
be like



Problem

- How do we get 100 users to hit the Enter Key at the same time?
- Can I find 300 people to do some work on this system to create some Load to see what the response time will be?
- Can this configuration support 2000 users? Or do I need more DASD or CPU?

IBM Workload
Simulator



Solution

- Simulate 1 or 50,000 users
- Assign work to the simulated users
- Feed data from files or user tables
- Set criteria for pass / fail of an execution
- Capture and report on response time

The IBM Problem Determination Tools Suite for z/OS

IBM Problem Determination Tools

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for z/OS

Fault Analyzer
for z/OS

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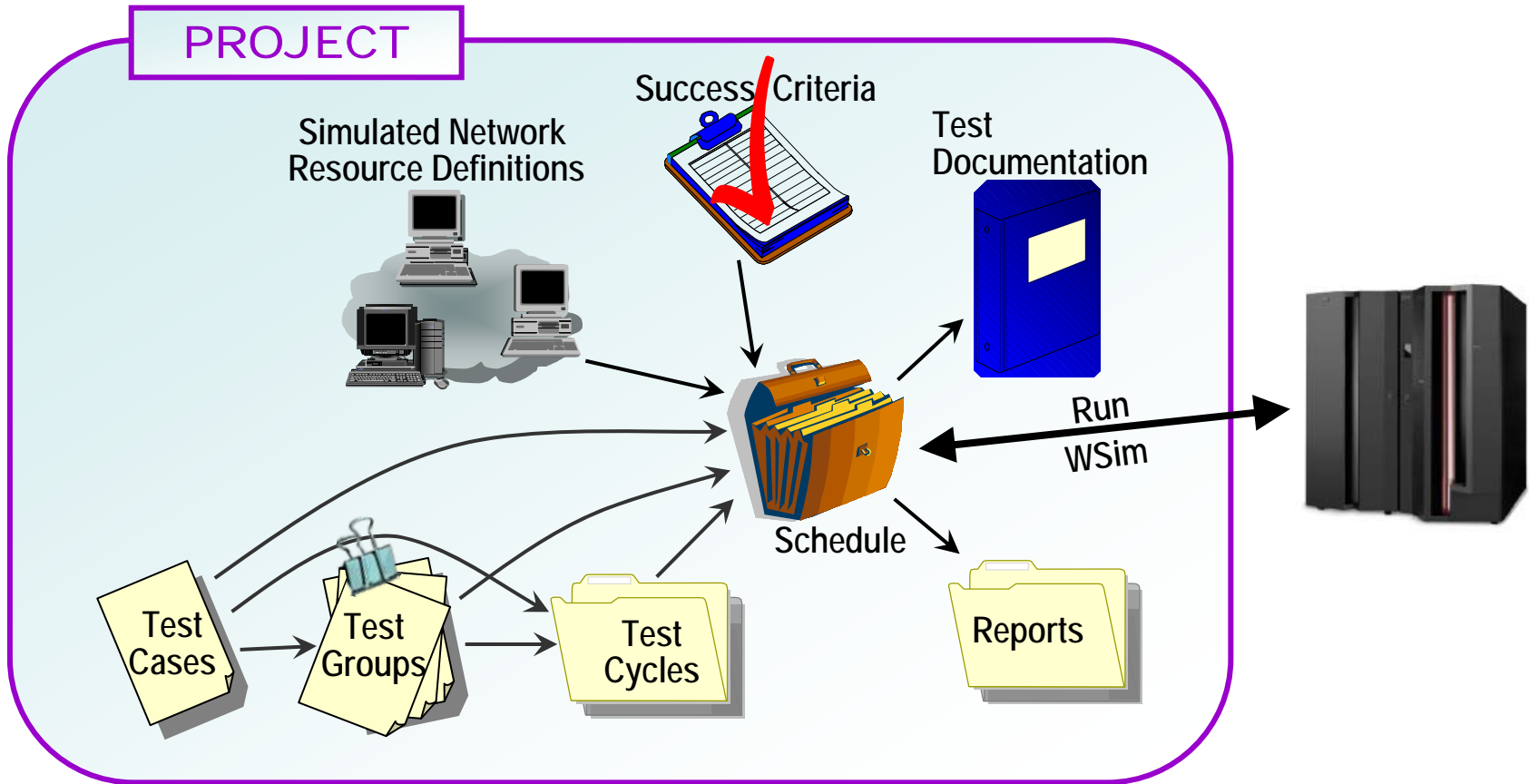
Workload Simulator

- Simulates network resources, such as VTAM terminals
 - WSim’s “logical” network resources appear to be real to the live system
- Run test scripts to simulate network traffic against live systems and applications
 - Simulate a single terminal or resource to test application functionality
 - Define multiple resources to simulate a large number of users and high transaction volumes
- Report the status and results of tests

What can be Simulated?

- VTAM terminals
 - Simulate secondary VTAM Logical Units (LUs) to test VTAM applications such as CICS, IMS, and TSO
- VTAM Applications
 - Simulate primary VTAM LUs to simulate an existing application or to prototype a new application
- TCP/IP clients
 - Simulate Telnet 3270, 3270E, 5250, NVT, or FTP clients communicating with servers such as TCP/IP for MVS
 - Simulate simple TCP or UDP clients
- CPI-C (CPI-C: Common Programming Interface Communications)
 - Simulate client or server CPI-C (LU6.2) transaction programs

The WSim Test Manager (WTM)



- Manage and organize your tests with WTM
- WTM provides a “front-end” to the original WSim panels

The WTM ISPF Application

- 1-3:** Build and manage the components of test scripts
- 4:** Run a test
- D:** Write and organize test documentation
- P:** Define and manage multiple test projects
- W:** Jump to the original WSim panels

WSim Test Manager

Select one of the following. Then press Enter.

Command	Action
1. CASE	Create and Process Testcases
2. GROUP	Create and Process Testgroups
3. CYCLE	Create and Process Testcycles
4. RUN	Create WSim Networks and Schedule WSim Simulation Runs
D. DOC	Create Test Documentation
P. PROJECT	Add/Change Project or Alternate HLI
U. UTIL	Run WSim Test Manager Utilities
W. WII	Invoke WSim/ISPF Interface

Project: _____ Alternate HLI: _____

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Command ==> _____

F1=Help	F2=Split	F3=End	F4=	F5=	F6=
F7=Up	F8=Down	F9=Swap	F10=Left	F11=Right	



WSim Test Manager main menu

Includes the Interactive Data Capture to assist in creating scripts

- Enter info about the new test case

Process Testcases
Add New Testcase

Enter required field

Type Testcase Name, Description and Source. Then press Enter.

Testcase Name: testrun

Description : Log on, Buy stock, Get quote, Log off

Source : 1

1. Add a 3270 testcase using IDC
2. Add a 3270 testcase using an SNA trace
3. Add a 3270 testcase using a WSim or IDC log
4. Add a testcase using the WSim STL models
5. Add a testcase using an STL skeleton
6. Add a CPI-C testcase using an LU 6.2 SNA trace

There are several ways to define a Test Case from this panel:

1. Use the IDC (Interactive Data Capture) utility to actually log on to the application capture your interactive 3270 session
2. Use an SNA trace file that you previously saved
3. Use a log file that was generated when you used the IDC utility previously
4. Use one of the WSim model scripts
5. Use one of the STL skeleton scripts
6. Use an SNA trace file that you previously saved to generated a CPI-C script



Info for a new Test Case

Creating Test Cases

IDCMAIN WSim Interactive Data Capture (IDC) Utility

Select one of the following, then press Enter.

- 1 1. Start a session with a host application and capture data
2. Generate an STL program from captured data
3. Generate a message generation deck from captured data
4. End the IDC utility program

- Select 1 to start a 3270 session with a host application

WSim Version 1 Release 1.0.0 Program Number 5655-I39

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F1=Help F3=Exit F12=Cancel

Enter

IDC Utility panel

Creating Test Cases

- Provide the name of the VTAM APPL id of the host application

```

IDCSSP          WSim IDC:  Start Session with Host Application

Type information, then press Enter.

Session Data
Host application name . . . . . cicsacb2
Logon mode name . . . . . SX32703 (Optional)
Logon user data . . . . . _____ (Optional)

IDC log data set name . . . . . DNET074.WTMUSER.IDCLOG (TESTRUN)
If data set already exists, specify R      (R=Replace or A=Append)

Start capturing data immediately? . . . Y      (Y=Yes or N=No)

IDC Escape key . . . . . PA1      (PAn, PFnn, CLEAR, or ATTN)
    
```

If needed, supply data for the LOGON APPLID command

WSim will log all interactions to this data set. Easiest to use the provided name.

Capture data now, or later? (use the IDC escape key to start later)

This key interrupts the application and returns to IDC

Enter

F1=Help F3=Exit F5=Refresh F11=Save F12=Cancel

IDC options panel

Creating Test Cases

- Perform the session actions that you want to capture in your script

```
                               Signon to CICS                               APPLID CICSACB2

WELCOME TO CICS

Type your userid and password, then press ENTER:

  Userid . . . . dnet074      Groupid . . . . _____
  Password . . . . _____
  Language . . . . _____

  New Password . . . . _____

DFHCE3520 Please type your userid.
F3=Exit
```



Connected to the application (CICS in this example)

Creating Test Cases

- Perform the session actions that you want to capture in your script

```
dstd █
```



```
DFHCE3549 Sign-on is complete (Language ENU).
```

Connected to the application (CICS in this example)

Creating Test Cases

- Perform the session actions that you want to capture in your script

The screenshot shows a CICS application window titled "Share Trading Demonstration" with the session ID "TRADER.T002". The main heading is "Share Trading Manager: Company Selection". Below this, there is a list of four company options:

1. Casey_Import_Export
2. Glass_and_Luget_plc
3. Headworth_Electrical
4. IBM

At the bottom of the list, the prompt "Please select a company (1,2,3 or 4) : 3" is displayed, with the number "3" entered and a cursor. A dashed orange line points from the text "PF3=Return" at the bottom left to a yellow "Enter" button at the bottom right.

Connected to the application (CICS in this example)

Reviewing Reports from a Simulation


- Reports from the Current Run, Baseline Run, and Comparison Reports are available

Reports for schedule TRAD1

Select one of the following. Then press Enter.

Command	Action	More: +
2 1. TLOG	View loglist report from the latest WSim run	
2. TRESP	View response time report from the latest WSim run	
3. TDM	Log display monitor for the latest WSim run	
4. TSP	View SYSPRINT from the latest WSim run	
5. MLOG	View baseline loglist report	
6. MRESP	View baseline response time report	
7. MDM	Log display monitor for the baseline log	
8. COMP	View screen compare report	
9. CDM	Log display comparator	
10. RTCOMP	Edit response time compare report	
11. COMPREP	Edit completion reports	

Command===> _____



Back to the list of reports

IBM Workload Simulator on the web

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Script Guide and Reference (PDF, 1.2MB)	SC31-8946-00	View	Download (386KB)	08/2002
Test Manager User's Guide and Reference (PDF, 608KB)	SC31-8949-00	View	Download (176KB)	08/2002

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IBM ISPF Productivity Tool for z/OS Version 6



IBM ISPF Productivity Tool

Productivity and Performance enhancement for TSO/ISPF

Split Screen, Start
ISPF, Swap.....



Problem

- Files Qualified Differently
- Multiple ISPF Sessions
- Cut and Paste Files from panel to panel

IBM IPT



Solution

- Reduce Navigation of ISPF Panels
- Create, Save, Maintain multiple ISPF Clipboards
- Point and Shoot Capabilities in ISPF
- Multiple list of files with different qualifiers on the same panel
- Search for text-strings in multiple members – in Multiple Datasets
- Filter datasets lists

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Migration
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ISPF
Productivity Tool

www.ibm.com/software/awdtools/deployment

ISPF Productivity Tool

- Productivity and Performance enhancement for TSO/ISP
- Use it to:
 - Save Keystrokes, time, effort
 - Reduce navigation of ISPF panels
 - Reduce number of steps to perform repetitive tasks
 - Organize files and work in customizable lists
 - Quickly work with any file in a list
 - Quickly find members or data in any file in a list
- New commands to:
 - Jump directly to edit, browse, view, and more
 - Display and work with a list of files and objects
- Point and shoot capabilities
 - If a file name appears on the screen, you can cursor-select it to edit, browse, view, copy, and more
 - Select files, members, and options on IPT panels with cursor selection

Object Lists

Object Lists can contain:

- z/OS Files
 - UNIX System Services files
 - VSAM files
 - Sequential
 - Tape
 - Migrated
 - Workstation files
 - Panvalet or Librarian
 - SCLM hierarchies
 - Files on specific volumes
 - Files referenced by DD name
- DB2 tables
- Dynamic list of APF libraries
- Linklist libraries
- LPA libraries

Object List example Multiple File Types and Qualifiers

```

Numbr Data Set Names / Objects
-----
 1 |----- LAB FILES -----
 2 :LISTS
 3 OLVS
 4 )/u/dnet424/test
 5 /u/dnet424/testfile
 6 ADLAB.JCL
 7 :LISTS APFLIB
 8 'DEBUG.V7R1.**'
 9 :LISTV DMPU2* DNET424.**
10 -DSNC_DSN8710.EMP
11 =DNET424 ADWORK ADLAB SOURCE
12 =DNET424 DEV1 DEV2 TEST RELEASE SOURCE
  
```

Member Selection Lists (MSLs)

MSL functions:

- Extended Search and Change Functions
- Extended Copy/Move Functions
- Expand directory blocks
- Extend size of PDS
- Empty a PDS
- Recover a deleted PDS member
- Sort and Filter Members
- Many more functions

Member Selection List

```

File Display Library Settings Menu Utilities
-----
-IPT--EDIT L1----- DNET424.ADLAB.JCL -----
COMMAND ==>
HOTBAR: UP          GLOBAL  INFO    COMPRESS EXPDIR  D
                                     ON

```

NAME	RENAME	LIB	VV.MM	CREATED	CHANGED
BCPROG		1			
BC01		1			
BDTDEMO		1	01.00	08/02/23	08/02/23 07:40
BJIM		1	01.01	08/05/01	08/05/01 13:44
BPLIE		1			
BPLIE34		1	01.16	07/09/20	08/09/24 09:36
BPLIE37		1	01.02	08/09/24	08/09/24 10:26

Example One: Find a member within an Object List (1/2)

```

File Edit Find Display Populate Settings Menu Util Test Help Exit
-----
-IPT- OLIST (V) ----- LEVEL DNET424.*.JCL ----- Row 1 to 13 of 13
Command ==> fm ldbcxt ----- SCROLL ==> CSR
Hotbar: REFRESH CLRVOL FILLVOL UPDATE CUT FLIP VALIDATE DOWN
*TEMPORARY LIST*

Command Member Numbr Data Set Names / Objects Class
-----
1 'DNET424.ADJIM.JCL' PDSE
2 'DNET424.ADLAB.JCL' PDSE
3 'DNET424.ADLAB.JCL.OUT' PDSE
4 'DNET424.DTCOBII.JCL'
5 'DNET424.KEYBANK.JCL' PDSE
6 'DNET424.OSVS.JCL'
7 'DNET424.PDPAK.JCL'
8 'DNET424.SP.JCL' PDSE
9 'DNET424.SP.JCL.OLD'
10 'DNET424.SP.JCL.TRIG' PDSE
11 'DNET424.TRADER.JCL'
12 'DNET424.WEB.JCL' PDSE
13 'DNET424.WILFRIED.JCL'

F1=HELP F2=SPLIT F3=END F4=IPT View F5=RFIND F6=RCHANGE
F7=UP F8=DOWN F9=SWAP F10=LEFT F11=RIGHT F12=RETRIEVE

```

Result of FM LDBCXT

```

Command Member Numbr Data Set Names / Objects Class
-----
--FOUND-- LDBCXT 13 'DNET424.WILFRIED.JCL' PDS
-----
END OF LIST -----

```

Example One: Find a member within an Object List (2/2)

ISPF – Find a member

- Steps Required:
 - Use option 3.4 to locate files
 - For each file:
 - Repeat the steps above for each of the 13 files
 - Steps required for 13 files:

ISPF Productivity Tool – Find a member in an OLIST

- Steps Required:
 - Issue FM command in an OLIST
 - Steps required: 1



**Improve
Productivity**

Example Two: Find text within an Object List for 13 PDS or PDSE libraries

ISPF Productivity Tool – Find Text JCLLIB in all members

```
Command    ===> ft JCLLIB all
Hotbar: REFRESH CLRVOL FILLVOL UPDATE CUT
```

Command	Member	Numbr	Data Set Names / Objects
		1	'DNET424.ADJIM.JCL'
		2	'DNET424.ADLAB.JCL'
		3	'DNET424.ADLAB.JCL.OUT'
		4	'DNET424.DTCOBII.JCL'
		5	'DNET424.KEYBANK.JCL'
		6	'DNET424.OSVS.JCL'
		7	'DNET424.PDPAK.JCL'
		8	'DNET424.SP.JCL'
		9	'DNET424.SP.JCL.OLD'
		10	'DNET424.SP.JCL.TRIG'
		11	'DNET424.TRADER.JCL'
		12	'DNET424.WEB.JCL'
		13	'DNET424.WILFRIED.JCL'

Result of Find Text JCLLIB

```
Command    ===> _
Hotbar: REFRESH CLRVOL FILLVOL UPDATE CUT
```

Command	Member	Numbr	Data Set Names / Objects
-TXT FND-	BATM01	1	'DNET424.ADJIM.JCL'
-TXT FND-	BATM01	2	'DNET424.ADLAB.JCL'
-TXT FND-	TEST	3	'DNET424.ADLAB.JCL.OUT'
		4	'DNET424.DTCOBII.JCL'
		5	'DNET424.KEYBANK.JCL'
-TXT FND-	BASM01	6	'DNET424.OSVS.JCL'
-TXT FND-	CICSDB2C	7	'DNET424.PDPAK.JCL'
		8	'DNET424.SP.JCL'
		9	'DNET424.SP.JCL.OLD'
		10	'DNET424.SP.JCL.TRIG'
-TXT FND-	CICSCOB	11	'DNET424.TRADER.JCL'
		12	'DNET424.WEB.JCL'
		13	'DNET424.WILFRIED.JCL'

Example Three: PDS error

- PDS full
 - Two conditions might occur:
 - Insufficient PDS directory blocks to save member
 - Insufficient space to save member
 - With ISPF Productivity Tool:
 - Press “Enter” on the confirmation panel to correct the condition, and continue working

```
-IPT- EDIT ----- DNET424.OSVS.JCL(MYMEM6) on DMPU20 -----  
COMMAND ==>  
  
You have issued a SAVE request for the following member: MYMEM6  
  
Your request has failed because there is not enough room in the library  
directory.  
  
The SAVE request may be successful if IBMIPT expands the directory.  
  
Expand the directory and then save? ==> Y (Y=yes,N=no)  
  
Specify your choice and press ENTER.  
  
IQIS040 The END, RETURN keys and the JUMP function (=n) are rejected
```


Example Four: Browse file in SDSF, find load module date **Point and Shoot**

1) Browse a file from SDSF

```

UTPUT DISPLAY DNET424V JOB09715 DSID 3 LINE 1 COLS 02- 81
D INPUT ==> browse SCROLL ==> CSR
1 //DNET424V JOB (LAB), 'APA RUN',MSGCLASS=A,
  // REGION=OK,NOTIFY=DNET864,CLASS=A
2 //RUNSAM1 EXEC PGM=SAM1,
  // REGION=4M
3 //INSPLOG DD SYSOUT=*
4 //STEPLIB DD DSN=&SYSUID..ADLAB.LOAD,DISP=SHR
  IEFC653I SUBSTITUTION JCL - DSN=DNET424.ADLAB.LOAD,DISP=SHR
5 //CUSTFILE DD DSN=&SYSUID..ADLAB.FILES(CUST2FA),DISP=SHR
  IEFC653I SUBSTITUTION JCL - DSN=DNET424.ADLAB.FILES(CUST2FA),DISP=SHR
6 //SYSPRINT DD SYSOUT=*
  
```

4) Date SAM1 was last linked

 THIS PROGRAM OBJECT WAS ORIGINALLY PRODUCED ON 12/04/2008 AT 11:55:54

2) List program Map

```

-IPT--BROWSE L1---- DNET424.ADLAB.LOAD ---
COMMAND ==>
HOTBAR: UP GLOBAL INFO COMPRESS

NAME RENAME LIB SIZE TTR AL
SAM1I1
1 SAM1 1 00003048 000145
SAM1V 1 000037C0 00014E
SAM2 1 00001388 000144
SAM2V 1 00001568 00014D
  
```

3) Change view to "History"

```

Display mode ==> h (M=Map, H=History)
  
```

Example Five: View a VSAM file (Interface with File Manager)

1) Browse VSAM file from SDSF

```

SDSF OUTPUT DISPLAY DNET424V JOB09793 DSID 3 LINE 129 COLS 02- 81
COMMAND INPUT ==> br SCROLL ==>
34 //RUNSAM1 EXEC PGM=SAM1V,REGION=4M
35 //STEPLIB DD DSN=&SYSUID..ADLAB.LOAD,DISP=SHR
    IEFC653I SUBSTITUTION JCL - DSN=DNET424.ADLAB.LOAD,DISP=SHR
36 //      DD DSN=DEBUG.V8R1.SEQAMOD,DISP=SHR
37 //SYSPRINT DD SYSOUT=*
38 //CISTRPT DD SYSOUT=*
39 //CUSTFILE DD DSN=&SYSUID..ADLAB.CUST2.KSDS,DISP=SHR
    IEFC653I SUBSTITUTION JCL - DSN=DNET424.ADLAB.CUST2.KSDS,DISP=SHR
    
```

2) Unformatted view - File Manager

```

Browse          DNET424.ADLAB.CUST2.KSDS
Command ==>
Type KSDS      RBA
Key            Col 1
<====+====10=>+-----2-----3-----4-----5-----6-
**** Top of data ****
01001C        Lynn, Amanda      .....Spirit Lake      Musician
01001PAG00487Acoustic guitar    2004-05-13..2006-03-30
01001PVN00048Violin            2004-03-25..2004-03-26
02200C        Graham, Anna     ../.*.Atwon            Cryptogra
02200PBG00459Bass Guitar        1996-04-30..2003-06-14
02200PDS00099Starter Drum Set   2001-09-04..2002-10-05
02200PEG00057Electric Guitar    2003-07-31..2004-03-30
    
```

3) Formatted view - File Manager

```

Browse          DNET424.ADLAB.CUST2.KSDS
Command ==>
SHAD Key      + Type KSDS      RBA
CUST-ID RECORD-TYPE FILLER  NAME          ACCT-BALANCE
#3      #4          #5          #6          #7
AN 1:5  AN 6:1      AN 7:7  AN 14:17    PD 31:5
<--->  -          <-----> <-----1-----> <-----1>
**** Top of data ****
01001  C          Lynn, Amanda          67.68
02200  C          Graham, Anna          610.05
02202  C          Major, Art            1234.56
    
```

ISPF Productivity Tool extends the productivity of ISPF

- Seamless integration with ISPF
- Organize files using Object Lists
- Use Member Selection Lists to work with PDS members
- Minimize panel navigation and improve productivity
 - Shortcuts
 - ISPF Productivity Tool commands
 - Extensive “Find” capabilities across multiple files
 - **Reduce keystrokes**



IBM HourGlass for z/OS Version 11



IBM HourGlass for z/OS

Alter Date and Time to accommodate Application Testing

Date and Time
Testing



Problem

- Test changes to date and time sensitive applications without creating new regions or resetting current System Date and Time

IBM HourGlass



Solution

- Provide specific Date and Times to be used by applications in Batch, CICS, and IMS without creating new regions or altering the actual System Date and Time
- Test Regulatory Changes to applications

The IBM Problem Determination Tools Suite for z/OS

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for z/OS

Fault Analyzer
for z/OS

Application
Performance
Analyzer for
z/OS

Workload Simulator
for z/OS & OS/390

Migration
Utility

Hourglass

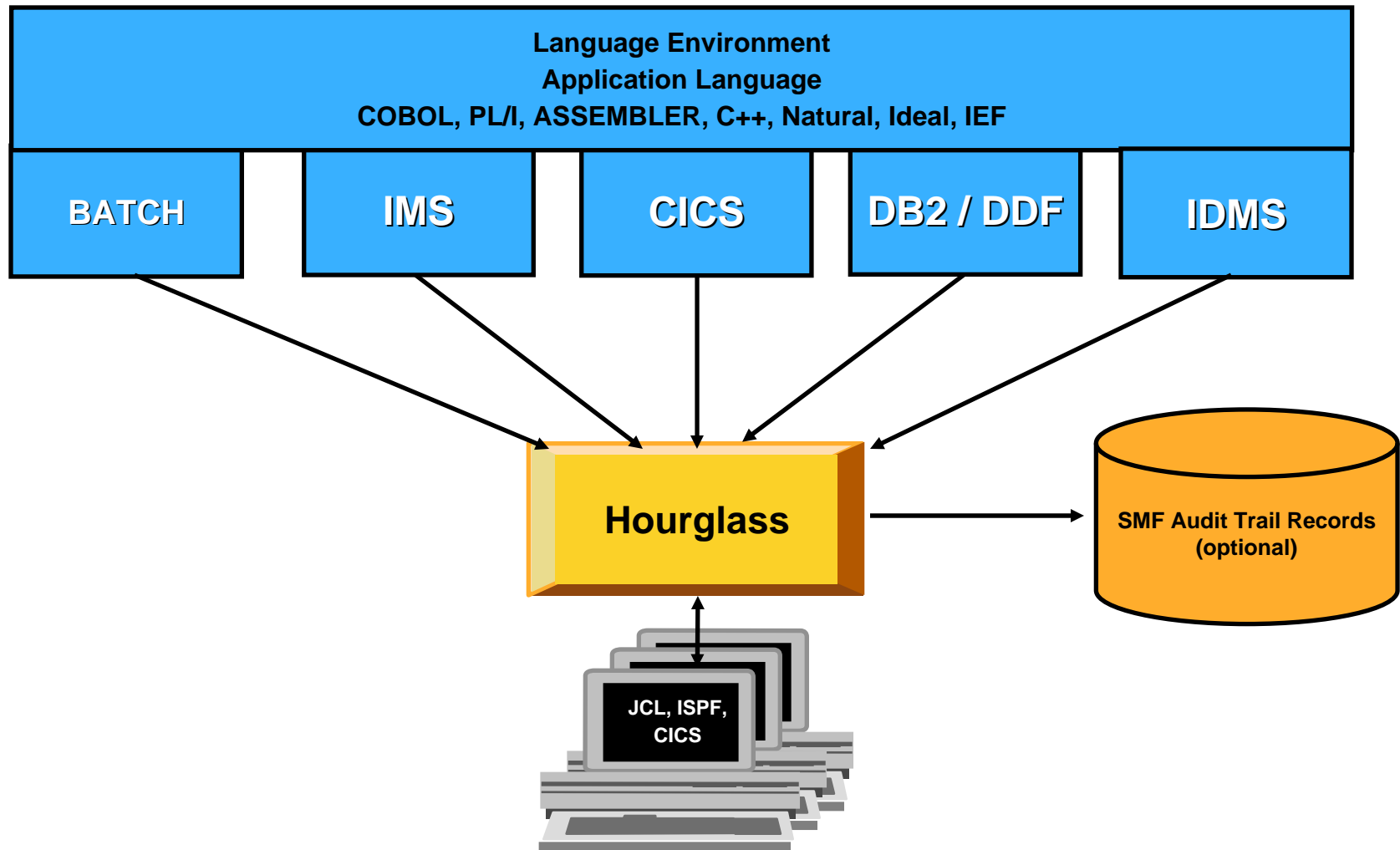
ISPF Productivity
Tool

www.ibm.com/software/awdtools/deployment

HourGlass

- Eligibility Checking
 - Security to identify applications that may use Hourglass
- Activate HourGlass via standard JCL
 - Override DD Statement for Date and/or Time
 - REXX Wizard to Accurately Generate Override DD Statement
 - Overrides for an entire JOB or a specific STEP
- Activate HourGlass using the provided ISPF Interface
 - Set Date and/or Time processing for JOBS
 - Restore Prior Settings
 - Review All JOB Settings
 - Review Hourglass Settings
- HourGlass Scheduling Facility
 - Continuously Roll Dates for JOBS or STEPS
 - Create/Drop Schedules
 - Up To 100 Active Schedules with Specifications for Up To 100 STEPS in each Schedule

HourGlass – alter dates and times for application processing or testing



What does HourGlass Intercept

- z/OS System Time Requests
 - LINKAGE=SVC (SVC11)
 - LINKAGE=SYSTEM
- STCK (Store Clock Instruction)
- STCKSYNC Macro
- CICS
 - EIBDATE
 - EXEC CICS ASKTIME command
- DB2 DATE/TIME/TIMESTAMP
- Language Environment (LE) Date/Time Functions

HourGlass Primary Menu

```
HourGlass Date/Time Selection  
COMMAND===> 1  
  
1) View or Set Date/Time For Your Own Jobs  
2) View or Set Date/Time For Any Job  
3) Restore Previously Saved Date/Time Settings  
4) View Date/Time Settings for All Jobs  
5) View HourGlass Installed Options (Memory)  
X) Exit  
  
Select Option or End to Exit
```

Option 1 is for single user mode.

Option 2 is for administration mode

A Closer Look At How It Works

HourGlass Date/Time Selection

Single User Mode

Command ==> █

Rows: 001 to 012 of 500

Jobname	Userid	Date	Time
---------	--------	------	------

Jobname	Userid	Date	Time
---------	--------	------	------

USER4*__	USER4__	2008-05-30	P0100
----------	---------	------------	-------

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Make Desired Changes (Scroll with UP & DOWN), Then Hit End for Update Options

A Closer Look At How It Works

```
HourGlass Date/Time Selection                                Edit Complete  
COMMAND===>  
  
1) Activate Changes  
2) Save Edits to Disk for Later Activation  
X) Exit  
  
Select Option or End to Exit
```

HourGlass in Batch

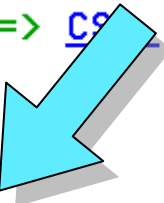
A Closer Look At How It Works

File Edit Edit_Settings Menu Utilities Compilers Test Help

```

-IPT- EDIT AGG.PROD.SAMPLIB(HGSAMPLE) - 01.00          Columns 00001 00072
Command ==> _____ Scroll ==> C9
000600 //STEP01 EXEC PGM=HGVRFY,REGION=2M
000700 //STEPLIB DD DISP=SHR,DSN=AGG.PROD.LOADLIB
000710 //* DD DSN=SYS1.SCEERUN.TEST,DISP=SHR <== CHANGE
000720 //* DD DSN=SYS1.SCEERUN,DISP=SHR <== CHANGE
000800 //SYSUDUMP DD SYSOUT=*
000801 /*THE FOLLOWING CARD SETS THE SYSTEM DATE FOR THIS PGM TO FEB 5, 2000
000802 //HG100036 DD DUMMY
000810 /*THE FOLLOWING CARD OFFSETS THE SYSTEM TIME AHEAD 1 HOUR
000900 //HGP0100 DD DUMMY
***** ***** Bottom of Data *****

```



Specifying the date and time using DD statements

- Two formats for specifying the date
 - **//HG100001 DD DUMMY**
 - Specifies January 1, 2000.
 - **HG** Statement prefix.
 - **1** Indicates 21st century.
 - **00** Year value. Combined with century indicator designates year 2000.
 - **001** Julian day 001, or January 1st.
 - **//HGY05 DD DUMMY**
 - Specifies that 5 years are to be added to the current date.
 - **HG** Statement prefix.
 - **Y** Required literal to designate year offset.
 - **P** Increment the current date.
 - **05** Number of years to offset the current date.

Time specification

- Single format with multiple options
 - **//HGP0230 DD DUMMY**
 - Specifies the current time is to be increased by 2 hours and 30 minutes.
 - **HG** Statement prefix.
 - **P (plus)** Increment the current time. (Could be M for minus)
 - **02** Number of hours to offset the current time.
 - **30** Number of minutes to offset the current time.
 - **//HGA1150 DD DUMMY**
 - Specifies an absolute or "frozen" time at 11:50 AM.
 - **HG** Statement prefix.
 - **A** Indicates an absolute time.
 - **Note:** This value is valid only for batch steps, CICS, and IMS.
 - **11** Set hour to 11.
 - **50** Set minutes to 50.

Bypassing a Jobstep

- User may choose to bypass a step without turning off Hourglass
 - **//HGBYPASS DD DUMMY**
 - Specifies the current jobstep is to be bypassed.

- **Specifying the date and time at the job level**
 - HourGlass date and time overrides can be specified at the job level by placing the DD statements within the JOB statement programmer name field.
 - `//TESTA JOB 909680300,'//HG107015
//HGP0100',CLASS=A,MSGCLASS=Q`

HourGlass in CICS

A Closer Look At How It Works

hgcc

A Closer Look At How It Works

----- HOURGLASS CICS CONTROL PRIMARY OPTIONS V5.2 -----

OPTION ==>

- 1 SPECIFY GLOBAL DATE/TIME VALUE
- 2 SPECIFY GLOBAL USERID SELECTION CRITERIA
- 3 SPECIFY GLOBAL TRANID SELECTION CRITERIA
- 4 SPECIFY GLOBAL TERMID SELECTION CRITERIA
- 5 ENABLE/UPDATE HOURGLASS CICS CONTROL
- 6 DISABLE HOURGLASS CICS CONTROL
- X EXIT

A Closer Look At How It Works

----- HOURGLASS CICS CONTROL: SPECIFY GLOBAL DATE/TIME VALUE -----

SPECIFY THE HOURGLASS GLOBAL DATE WITH TIME OFFSET. THE DATE APPLIES TO THE ENTIRE CICS REGION AND TIME VALUES (PLUS OR MINUS) OFFSET THE CURRENT TIME FOR ALL ELIGIBLE TRANSACTIONS.

HGCC GLOBAL DATE ==>

FORMAT IS ccyymm-dd, WHERE:

ccyy = FULL 4 DIGIT YEAR

mm = 2 DIGIT MONTH

dd = 2 DIGIT DAY

HGCC GLOBAL TIME ==>

FORMAT IS dhhmm, WHERE:

d = "P" OR "E" FOR PLUS OFFSET

d = "M" OR "W" FOR MINUS OFFSET

d = "A" FOR ABSOLUTE TIME VALUE

hh = HOURS (00-23)

mm = MINUTES (00-59)

A Closer Look At How It Works

----- HOURGLASS CICS CONTROL: SPECIFY GLOBAL TRANID SELECTION CRITERIA -----

SPECIFY UP TO 42 ENTRIES, USING WILDCARDS AS NEEDED. TRANID ENTRIES ARE A MAXIMUM OF 4 CHARACTERS AND PREFIX ENTRIES ARE A MAXIMUM OF 3 CHARACTERS FOLLOWED BY AN ASTERISK. TRANID ELIGIBILITY IS TESTED IN THE ORDER OF THE ENTRIES.

ENTER GLOBAL TRANIDS AND/OR PREFIXES:

01:	02:	03:	04:	05:	06:
07:	08:	09:	10:	11:	12:
13:	14:	15:	16:	17:	18:
19:	20:	21:	22:	23:	24:
25:	26:	27:	28:	29:	30:
31:	32:	33:	34:	35:	36:
37:	38:	39:	40:	41:	42:

Get more information about these tools at:
<http://www.ibm.com/software/awdtools/hourglass/library>

United States [change]

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- HourGlass
- Features and benefits
- System requirements
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- How to buy
- Support

Related links

- z/OS
- System z Servers

IBM Software > WebSphere >

HourGlass library

PDF files require [Adobe® Reader®](#)

Product documentation

IBM HourGlass V6.1: Usage and Installation Guide

User guide and installation instructions for the IBM HourGlass V6.1 product

Last updated: 15 Feb 2010

[View PDF \(384KB\)](#)

HourGlass v6.1 Usage and Installation Guide

Many data processing installations have applications that contain time-sensitive logic—special processing that executes at certain intervals such as at the end of a week, month, or quarter.

Last updated: 05 Feb 2009

[View PDF \(388KB\)](#)

HourGlass v6.1 License Information

The Programs listed below are licensed under the following terms and conditions in addition to those of the International Program License Agreement.

Last updated: 29 Jan 2009

[View PDF \(492KB\)](#)

HourGlass v6.1 Program Directory

This Program Directory is intended for the system programmer responsible for program installation and maintenance.

Last updated: 05 Jan 2009

[View PDF \(76KB\)](#)

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The value of 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**

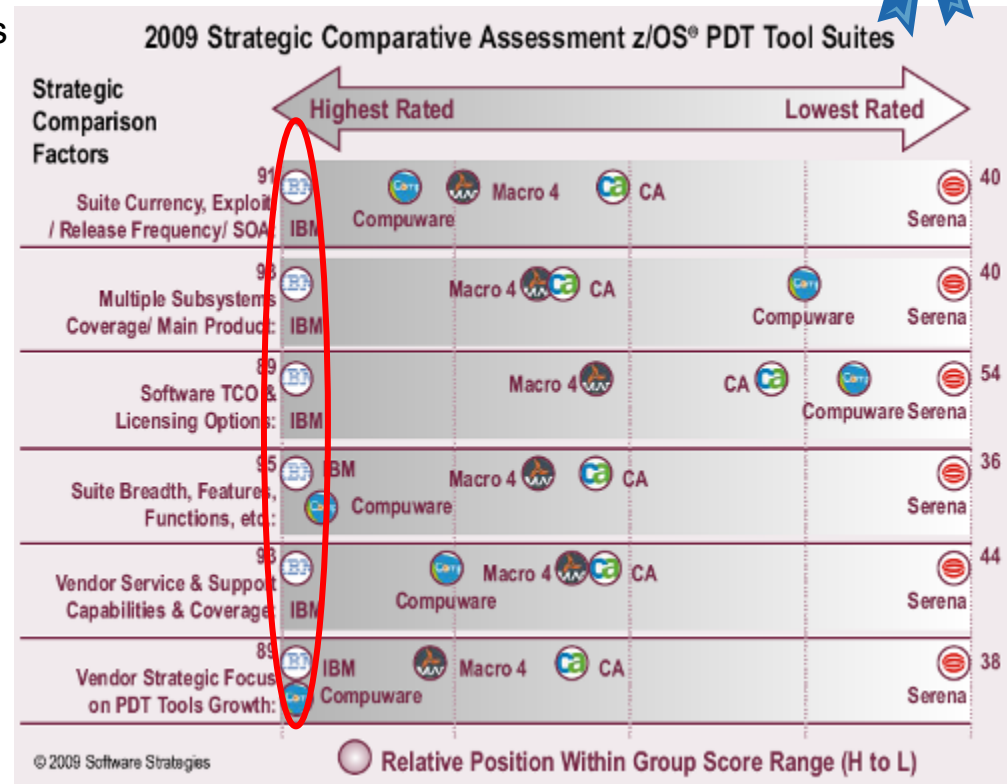
IBM Problem Determination Tools Wins Top Spot

Software Strategies Analyst Report, January 2009



IBM's PD Tools Suite Extends Technology Lead:

- IBM successfully challenged existing vendors in this segment since 2000
- Modern, well-featured, fully integrated, inclusive, and good-value
- The latest suite (V10) has now extended clear technology, feature and functional leadership



Problem Determination Tools “Live” Road Show

- **¾ Day Event**
 - **8:30 AM until 2:00 PM local time**
 - **Continental Breakfast and Lunch Served**
 - **Presentation and Live Demos of PD Tool Products**
 - **Please Register**

- **IBM Locations**
 - **Dallas, TX February 17, 2011**
 - 1503 Lyndon B. Johnson Freeway, Floor 4, Room 4015, Southwest Area
 - <http://www.ibm.com/events/DeveloperToolsLiveDallas2011>
 - **San Francisco (area), CA February 24, 2011**
 - 1001 Hillside Blvd, Floor 4, Ste 400, Foster City,
 - <http://www.ibm.com/events/DeveloperToolsLiveSanFrancisco2011>
 - **Washington, DC March 1, 2011**
 - 600 14th Street NW, Ste 300
 - <http://www.ibm.com/events/DeveloperToolsLiveWashingtonDC2011>
 - **Atlanta, GA March 3, 2011**
 - 4111 Northside Parkway NW, Hillside Building, Floor 3 Room 03C
 - <http://www.ibm.com/events/DeveloperToolsLiveAtlanta2011>
 - **Toronto, Canada March 8, 2011**
 - IBM, 120 Bloor Street, Toronto, Ontario Canada
 - <http://www.ibm.com/events/DeveloperToolsLiveToronto2011>



Thank
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