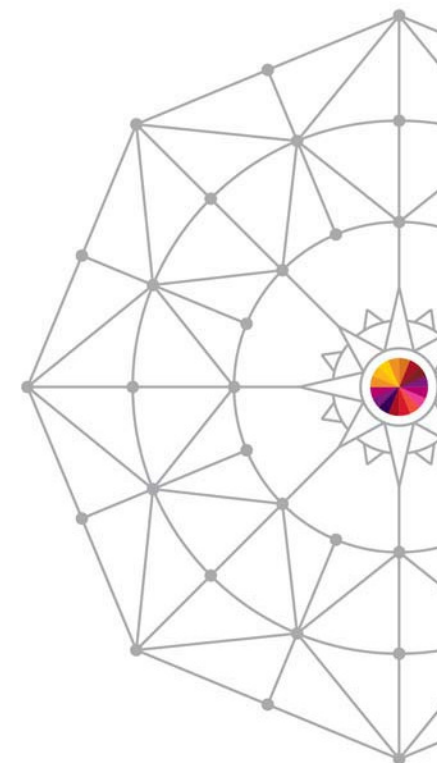


What's New In the IBM Problem Determination Tools

Francisco M Anaya
IBM Problem Determination Tools
Architect

Session 15458: What's New In the IBM Problem Determination Tools

August 8. 2014



#SHAREorg



[@IBMDebugTool](https://twitter.com/IBMDebugTool)



SHARE is an independent volunteer-run information technology association that provides **education, professional networking and industry influence.**



Disclaimer

THE INFORMATION CONTAINED IN THIS PRESENTATION IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY. WHILE EFFORTS WERE MADE TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION CONTAINED IN THIS PRESENTATION, IT IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. IN ADDITION, THIS INFORMATION IS BASED ON IBM'S CURRENT PRODUCT PLANS AND STRATEGY, WHICH ARE SUBJECT TO CHANGE BY IBM WITHOUT NOTICE. IBM SHALL NOT BE RESPONSIBLE FOR ANY DAMAGES ARISING OUT OF THE USE OF, OR OTHERWISE RELATED TO, THIS PRESENTATION OR ANY OTHER DOCUMENTATION. NOTHING CONTAINED IN THIS PRESENTATION IS INTENDED TO, OR SHALL HAVE THE EFFECT OF:

- CREATING ANY WARRANTY OR REPRESENTATION FROM IBM (OR ITS AFFILIATES OR ITS OR THEIR SUPPLIERS AND/OR LICENSORS); OR
- ALTERING THE TERMS AND CONDITIONS OF THE APPLICABLE LICENSE AGREEMENT GOVERNING THE USE OF IBM SOFTWARE.

Agenda

- What are the IBM Problem Determination Tools
- Application Performance Analyzer Enhancements
- File Manager Enhancement
- Fault Analyzer Enhancements
- Debug Tool Enhancements
- New Fault Analyzer COBOL Explorer
- Debug Tool IMS Private Message Region Creation and Dynamic rerouting of transactions.

IBM Problem Determination Tools Products

Products

Application Performance Analyzer for z/OS

A non-intrusive application performance analyzer that aids developers in the design, development and maintenance cycles.

Debug Tool for z/OS

IBM Debug Tool for z/OS helps examine, monitor, and control the execution of application programs.

Fault Analyzer for z/OS

Helps developers analyze and fix application and system failures. Fault Analyzer gathers information about an application and the surrounding environment.

File Manager for z/OS

Provides comprehensive, user-friendly tools for working with z/OS data sets, DB2®, CICS® or IMS™ data, or MQ queues. These tools include the familiar browse, edit and copy.

Workload Simulator for z/OS and OS/390

Enables you to conduct stress, performance, regression, function and capacity planning tests, while eliminating the need for large amounts of terminal hardware.

Problem Determination Tools Studio and Plug-ins

Provides easy access through a graphical user interface (GUI) to the z/OS Problem Determination Tools.

Problem Determination Solution Pack

Convenient package to help address your problem analysis needs.

Problem Determination Testing Solution Pack

Convenient package to help address your testing needs.

Data Set Commander for z/OS

Extends interactive and batch capabilities for performing operations on partitioned data sets and their members.

Hourglass

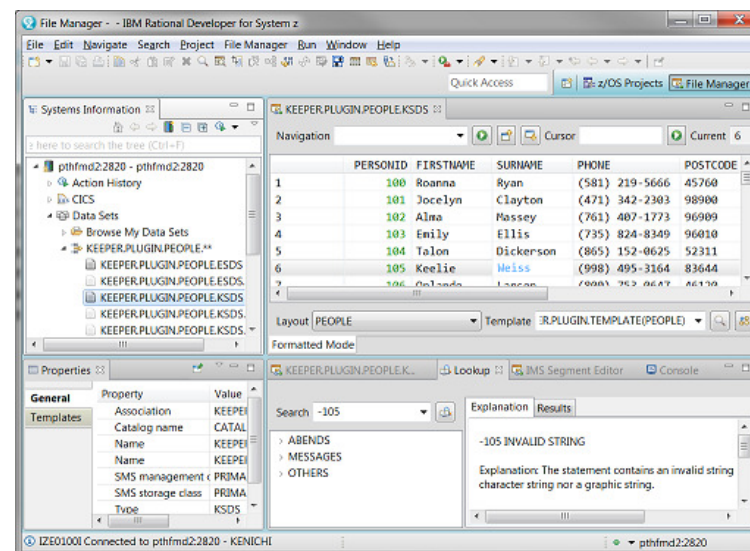
Allows sites to alter the Date/Time returned to a z/OS application when a time request is made (SVC 11 or PC Time Requests).

Migration Utility for z/OS

Generates IBM COBOL applications from programs written in the CA Easytrieve® languages.

Comprehensive z development environment

- **Choice of development environments:** PD Tools Eclipse GUIs are provided all inclusive and can be used in conjunction with other IBM development tools.
- **Rational Developer for System z:** Full Integrated Development Environment for mainframe application developers. When used in conjunction with PD Tools, developers can expect productivity improvement for writing programs but also faster problem diagnosis and resolution.
- **IBM Worklight:** provides a comprehensive solution for developing, deploying and the server infrastructure for enabling access to existing assets on z (System of Records).
 - PD Tools continue to be important for problem diagnosis while accessing existing assets on z.
 - PD Tools Eclipse GUIs can be installed into Worklight Studio.
 - New browser-based interface for Fault Analyzer so mobile/web developers can access abend information.
- **Continued support for 3270 based users:** many application developers continue to rely on 3270-based interface for developing and maintaining mainframe applications today. PD Tools continue to support those users as well as offering additional productivity gain through products like Data Set Commander..



```
File View Services Help
Interactive Reanalysis Report
Command ==>
JOBNAME: COBLT2  SYSTEM ABEND: 0CB  FMD2  2012/05/29  21:35:37

Fault Summary:
Module COBTSE, program COBTSE, offset X'420': Abend S0CB (Decimal-Divide Exception).

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

(Fault Analyzer maximum storage allocated: 1.62 megabytes.)

*** Bottom of data.
```


Exploitation of GUIs made Simple!

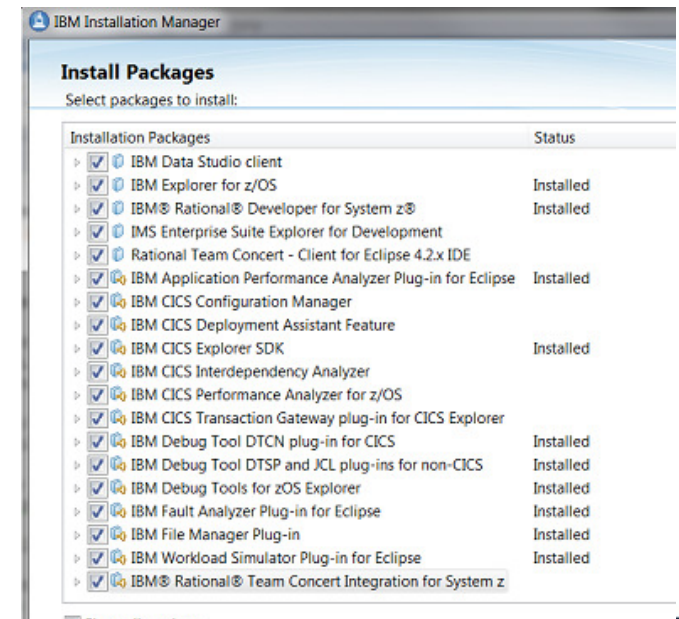
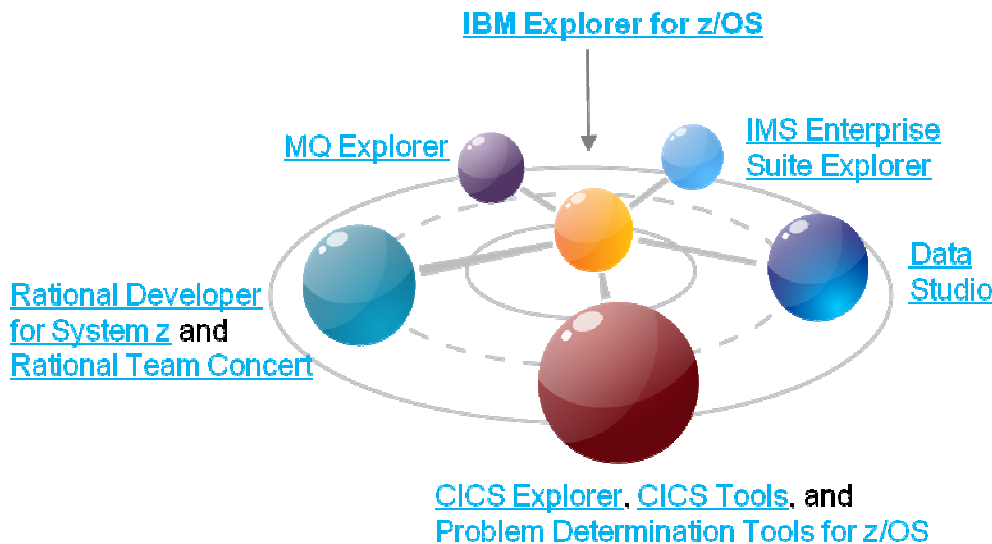


Simplicity

- All PD Tools GUIs talk to PD Tools Common Server (a quick to start and extensible!).
- Additional capabilities added to the server by a simple configuration script (APA V13.1 exploits this feature).

Flexibility

- Select capabilities needed to create your own workbench.
- Select capabilities you need from a single update site.



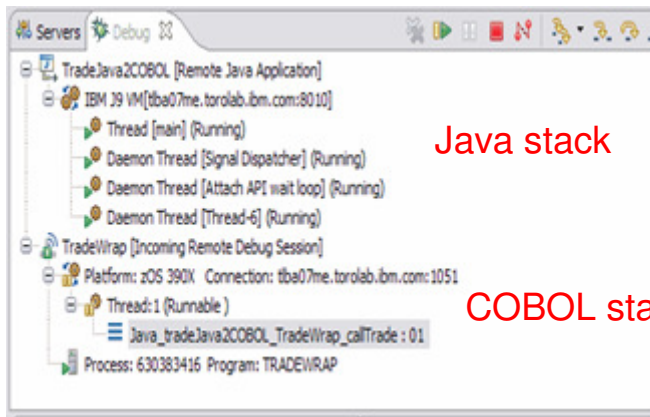
Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

Java on z/OS? It's real – Mobile, SOA, batch, modernization...



Debugging legacy and Java workload together – stepping through both programs smoothly.

Understand WAS resource consumption and WAS initiated workload together – reports call count, response time and more for CICS DPL calls and DB2 SQL calls.



Java stack

COBOL stack



Seqno	WAS Request/DB2 Call	Nbr of SQL Calls	--CPU Time-- Total	Mean	--Svc Time-- Total	Mean
00003	/wasDb2Tester/db2TesterServ1 et	674	0.20	0.00030	0.76	0.00113
- 000001	SYSLH200 0 FETCH > SELECT * FROM SYSIBM.SYSTABLES > (PREPARE of SQL was done at Stmt# 0 Seqno 000001)	668	0.19	0.00029	0.76	0.00114
- 000005	SYSSTAT 0 COMMIT	2	0.00	0.00170	0.00	0.00198
- 000002	SYSLH200 0 DESCRIBE > SELECT * FROM SYSIBM.SYSTABLES > (PREPARE of SQL was done at Stmt# 0 Seqno 000001)	1	0.00	0.00017	0.00	0.00017
- 000003	SYSLH200 0 OPEN	1	0.00	0.00024	0.00	0.00001

Diagnosing application failures involving legacy and Java workload.

Event #	Type	Fail Point	Module Name	Program Name	EP Name	Event Location (*)	Description
1	Call		BPXINLPA	n/a	n/a	M+4DD62	From LPA
2	Call		CEEBINIT	n/a	CEEOPCMM	E+96A	POSIX MiniMain routine; From LPA
3	>>> XPLink		CEEPLPKA	n/a	CEEVROND	E+1200	Run on down stack swap; From LPA
4	Call		java	n/a	JavaMain	E+15BC	From /u/atpoga/java6.0.1-31/J6.0.1/bin/
5	Java		n/a	n/a	JavaMain.main	L#6	From not determined
6	<<< XPLink		CEEPLPKA	n/a	CEEVRONU	E+107E	CEL Common Runtime; From LPA
7	Call		libCobolBase.so	n/a	COBOLBASE		

Complete your



Problem Determination Tools V13.1 Highlights



Key focus on Optimization and Modernization

PD Tools capabilities are continued to be enhanced to meet the requirements of problem diagnosis scenarios in the mainframe operating environments today and future. We are continuing to invest in supporting 3270 terminal based users while we are making significant improvements for Eclipse-based graphical user interface (aka PD Tools Studio) for those who are taking advantage of modern integrated development environment.

Simplification

Continuing to simplify the deployment of our products. With PD Tools V13.1, 1) all GUI capabilities are supported using the PD Tools comm server technology which enables quick deployment of PD Tools Studio. 2) File Manager provides XML-based APIs for creating templates to simplified the preparation of templates which describe your data layout and 3) Fault Analyzer side-file mismatch reporting capability for identifying programs with wrong side-file information for analysis just to name a few.

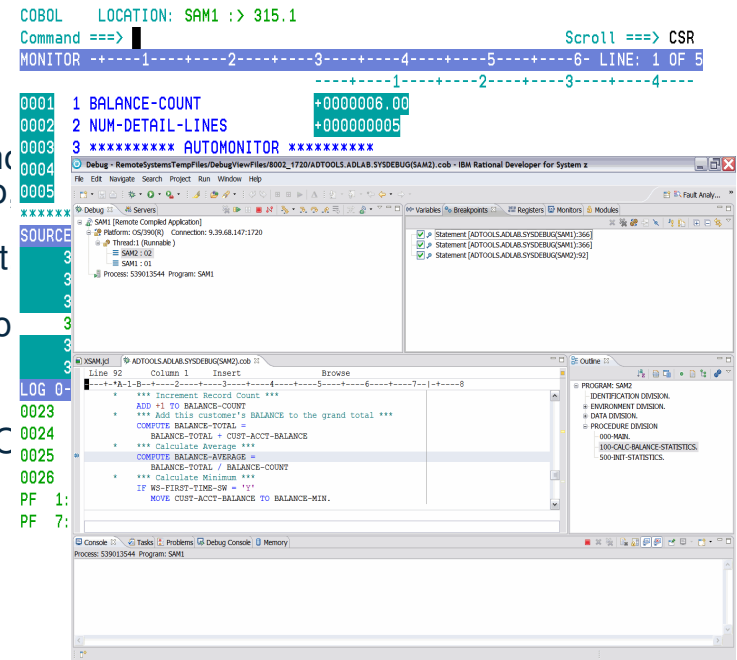
Support for the latest z/OS, subsystems and languages

Continuing to support the latest level of z/OS (V2.1), languages (COBOL V5.1, PL/I V4.4, C/C++ for z/OS V2.1, Java V7, and HLASM) and subsystems (CICS V5.1, DB2 V11, IMS V13, MQ 7.5, and WASz 8.5).

Other enhancements

- Improved code coverage reporting.
- GUI for working with IMS databases.
- Enhanced debugging capabilities for mixed workload and IMS transactions.
- Browser-based access to Fault Analyzer reports.

Announcement: October 1, 2013
eGA: October 18, 2013



Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

IBM Debug Tool Version 13 (Announce: October 1, GA: October 18)



What's new?

- Smooth debugging mixed apps JAVA/COBOL/PLI
- Improved Code Coverage. Support for E PL/1
- Automatic start IMS MPP regions, dynamic routing of transactions
- IMS Startup Cross Reference table for WASz and Web started transactions
- RDz Playback
- Support for DB2 V11, IMS V13, CICS TS 5.1, z/OS 2.1, WASz 8.5., COBOL V5.1, Enterprise PLI V4.4, C/C++ for z/OS 2.1, RDz 9.0
- JCL Instrumentation plugin

```
File View Services Help
Synopsis Line 12 Col 1 80
Command ==> Scroll ==> CSR
JOBNAME: DNET246S SYSTEM ABEND: 0C7 DEMOMVS 2007/10/30 20:00:12
Source
Line #
000088 * *** Add this customer's BALANCE to the grand total ***
000089 COMPUTE BALANCE-TOTAL =
000090 BALANCE-TOTAL + CUST-ACCT-BALANCE

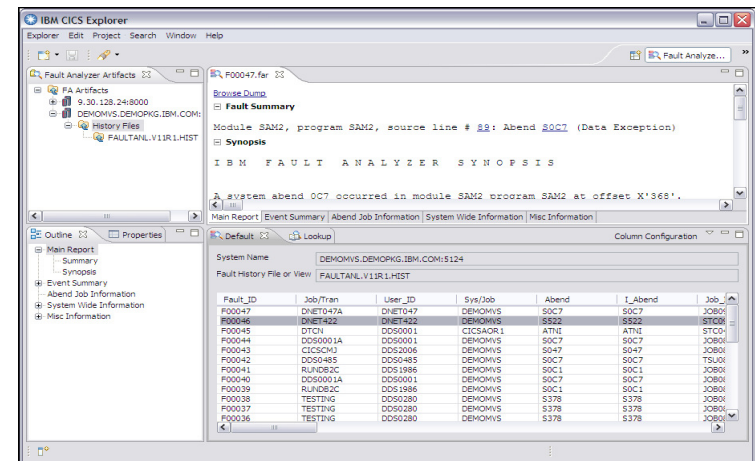
The COBOL source code for data fields involved in the failure:

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' *** Cause of error ***

*** Bottom of data.
```



IBM File Manager Version 13 (Announce: October 1, GA: October 18)



- **IBM File Manager** allows you to manage production, test, and development data across multiple formats and storage media.
- Create, edit, copy, browse, extract, print, and compare enterprise data (VSAM/DB2/IMS,CICS/MQ)
- Proven 3270-based interface and free graphical user interface.

What's new?

- IMS GUI
- FM DB2 enhancements
- Batch template and update support
- UNICODE and various CCSIDs support
- Support for DB2 V11, IMS V13, CICS TS 5.1, MQ8.5, z/OS2.1, PL/I 4.4,
- DB2 Large Object (LOB) including XML columns
- A range of other enhancements to address key customer requirements

The screenshot displays the IBM File Manager interface. The top window shows a 3270-style terminal view of a data table for 'CUST-REC'. The table has columns for Ref, Field, Picture, Typ, Start, Len, and Data. The data includes fields like CUSTOMER-KEY, CUST-ID, NAME, ACCT-BALANCE, ORDERS-YTD, ADDR, CITY, STATE, and OCCUPATION.

The bottom window shows a graphical view of the same data table. The table has columns for PERSONID, FIRSTNAME, SURNAME, PHONE, POSTCODE, and COUNTRY. The data includes rows for Roanna Ryan, Jocelyn Clayton, Alma Massey, Emily Ellis, Talon Dickerson, Keelie Weiss, and Orlando Larsen.



Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

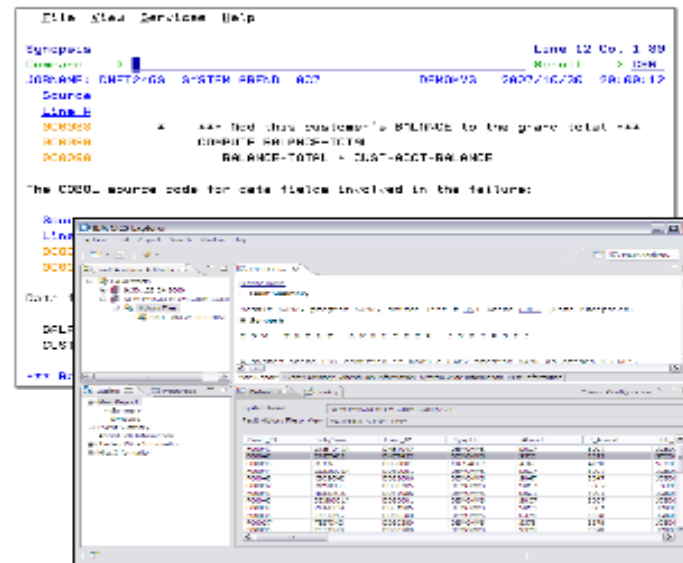
IBM Fault Analyzer Version 13 (Announce: October 1, GA: October 18)



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

What's new?

- Optimize
 - Sidefile checking and reporting
 - Customer specific module and abend descriptions
 - ISPF Virtual Relief
- Modernize
 - Enhanced web interface using Dojo
- Enhanced Java support
- Support for DB2 V11, IMS V13, CICS TS 5.1, z/OS 2.1, COBOL V5, PL/I V4.4, Java V7
- 13 A range of key customer requirements



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

© 2013 IBM Corporation



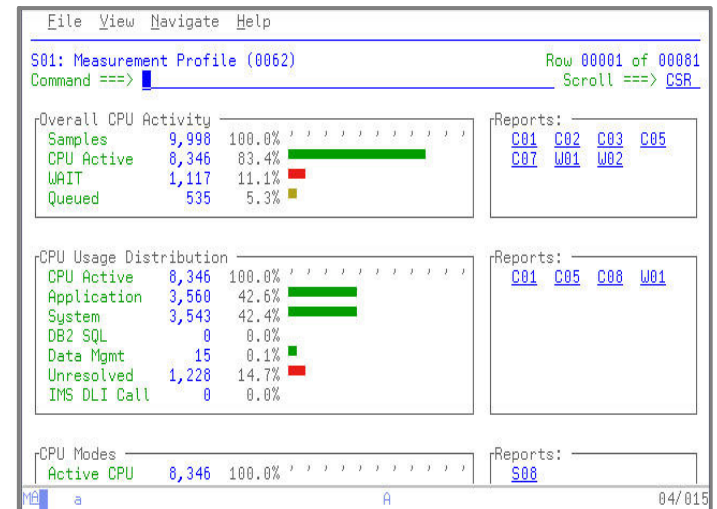
Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

IBM Application Performance Analyzer Version 13

(Ann: OCT 1, GA: OCT 18)

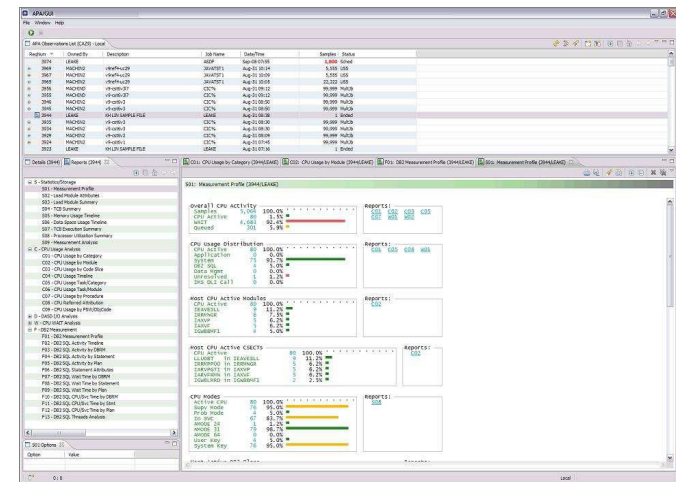


- **IBM Application Performance Analyzer** helps maximize the performance of your applications and improve the response time of your online transactions and batch turnaround.
- Identify constraints and improve the entire application's performance no matter where the problem resides (CICS/ IMS/DB2/MQ/COBOL/PLI/ASM/JAVA)
- Proven 3270-based interface and free graphical user interface.



What new?

- Enhanced support for WebSphere and Java
- Sampling enhancements to improve accuracy of reports
- WAS Phase 2 to support simultaneous sampling of servant regions, CICS and DB2 activity
- Support for DB2 V11, IMS V13, CICS TS V5.1, z/OS 2.1, WASz V8.5, COBOL V5.1, PL/I V4.4, Java V7
- A range of key customer requirements



Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval



Application Performance Analyzer: Features added since V13 GA

- Enhancement to CAZBATCH and CAZAPI01 to allow the user to provide a specific sample file data set name using the new keyword 'SampDSN'. This addresses PMR55254.
- New S10 Error Messages report.
- New configuration setting 'ErrMsgStatus' that is used to indicate what conditions the ErrMsg status is to be displayed in the observation list.
- Enhancement to the C09 report, to display up to three possible interpretations of the instruction before the PSW. These are displayed under the heading 'Alternate Disassembly'
- Enhancement to enforce user level security in APA when creating, updating, reading and deleting sample file data sets, and those data sets containing exported sample files. This feature introduces a new APA started task configuration setting 'SampleDSUserLevelSecurity', and new APA PDTCC extension configuration settings 'SecuritySuppMsg' and 'SampleDSUserLevelSecurity'. Establish RACF user environment in APA started tasks, as required to support datasets with &USERID HLQ. This addresses RFE 512.
- Enhancement to the configuration setting AltCICSStepNm to allow six alternate CICS execution module names.
- Enhancement to support reporting for Parallel Access Volumes. This addresses RFE 632.
- New DB2I configuration setting ABENDSTOP, used to indicate if APA is to stop or continue sampling after DB2 intercept and traps an abend.
- Support for the CICS TS 5.2

File Manager: Features added since V13 GA

- For FM/IMS, session timeout support - via PI09504. FM/IMS has been modified to provide two new installation options a time-based check pointing option and a timeout option. These options provide two alternative ways of resolving resource contention problem.
- For FM/DB2, Clone and History table support - via PI05860. File Manager DB2 component has been updated to support edit of DB2 clone and history tables.
- DB2 Editor Time Out support – via PI19147. A new FMN2SSDM macro option EDITOR_TIMEOUT is provided, which can be specified for those DB2 systems where an editor inactivity time-out is required. EDITOR_TIMEOUT specifies whether FM/DB2 editor edit sessions are subject to an inactivity time-out, and the length of time that must elapse before the inactivity time-out is triggered. The inactivity time-out applies to edit sessions, not to view or browse.
- Support inserting and deleting segments when editing data using a segmented template – via PI04887.
- Improve performance of copy with reformatting – via PI07105. This APAR significantly improves reformatting performance especially for packed to zoned field type conversions and for when a large number of fields are present and most fields are copied as-is.
- **FM Plugin**
 - Support files with large number of columns in formatted editor by implementing segmented columns.
 - Support browsing files with large record length (more than tens of thousands) by implementing segmented records.
 - Adding 'Structure Mode' to Single Record view.

Fault Analyzer: Features added since V13 GA

- Enhanced with a COBOL Explorer. A post-mortem debugger
- Support for CICS 5.2

FA Plugin

- Implemented FAAPI.OpenReport function which enables users to open a Fault Analyzer report from their own application. You can now access Fault Analyzer report using a provided API which you can exploit with your own tools.

—

•Common Component

Support for Security product stored certificates for SSL enablement. (RFE 41255) from APAR PI14699. The common server has been updated in order to accept a new configuration keyword SSL_KEYRING which provides the name of the keyring to be used. As the keyring is shared with the connecting users, the name should be specified in userid/ringname format. Userids (or groups) that are allowed to access the server need to be permitted UPDATE access to the profile IRR.DIGTCERT.LISTRING and also CONTROL access to IRR.DIGTCERT.GENCERT

Debug Tool: Features added since V13 GA

- Support for CICS 5.2
- CICS/TS 5.2 - Support "application versioning"
 - Supported using DTCN remote plugin only.
- Add capability to trap DB/2 SPs based on client ID
 - Using DTSP remote plug-in.
- Provide console interface to list Terminal Interface Monitor (TIM) users.
- Enhanced DT Code Coverage support for z/OS XL C.
- Enhanced DT Code Coverage support for RD/z and PD Tools Studio.
- SET LIST BY SUBSCRIPT ON support for COBOL for MFI. This includes QUERY LIST BY SUBSCRIPT.

```

1 02 ARRAY
03 ARRAY-FIRST
SUB(1)      'AB'
SUB(2)      'FG'
SUB(3)      'KL'
SUB(4)      'PQ'
SUB(5)      'UV'
SUB(6)      'Z1'
03 ARRAY-LAST
SUB(1)      'C'
SUB(2)      'H'
SUB(3)      'M'
SUB(4)      'R'
SUB(5)      'W'
SUB(6)      '2'
03 ARRAY-MIDDLE
SUB(1)      'DE'
SUB(2)      'IJ'
SUB(3)      'NO'
SUB(4)      'ST'
SUB(5)      'XY'
SUB(6)      '34'
  
```

```

1 02 ARRAY
02 ARRAY (1)
03 ARRAY-FIRST      'AB'
03 ARRAY-LAST       'C'
03 ARRAY-MIDDLE     'DE'
02 ARRAY (2)
03 ARRAY-FIRST      'FG'
03 ARRAY-LAST       'H'
03 ARRAY-MIDDLE     'IJ'
02 ARRAY (3)
03 ARRAY-FIRST      'KL'
03 ARRAY-LAST       'M'
03 ARRAY-MIDDLE     'NO'
02 ARRAY (4)
03 ARRAY-FIRST      'PQ'
03 ARRAY-LAST       'R'
03 ARRAY-MIDDLE     'ST'
02 ARRAY (5)
03 ARRAY-FIRST      'UV'
03 ARRAY-LAST       'W'
03 ARRAY-MIDDLE     'XY'
02 ARRAY (6)
03 ARRAY-FIRST      'Z1'
03 ARRAY-LAST       '2'
03 ARRAY-MIDDLE     '34'
  
```

z/OS Problem Determination Tools



IBM Fault Analyzer **COBOL Explorer**

(an interactive post-mortem debugger)

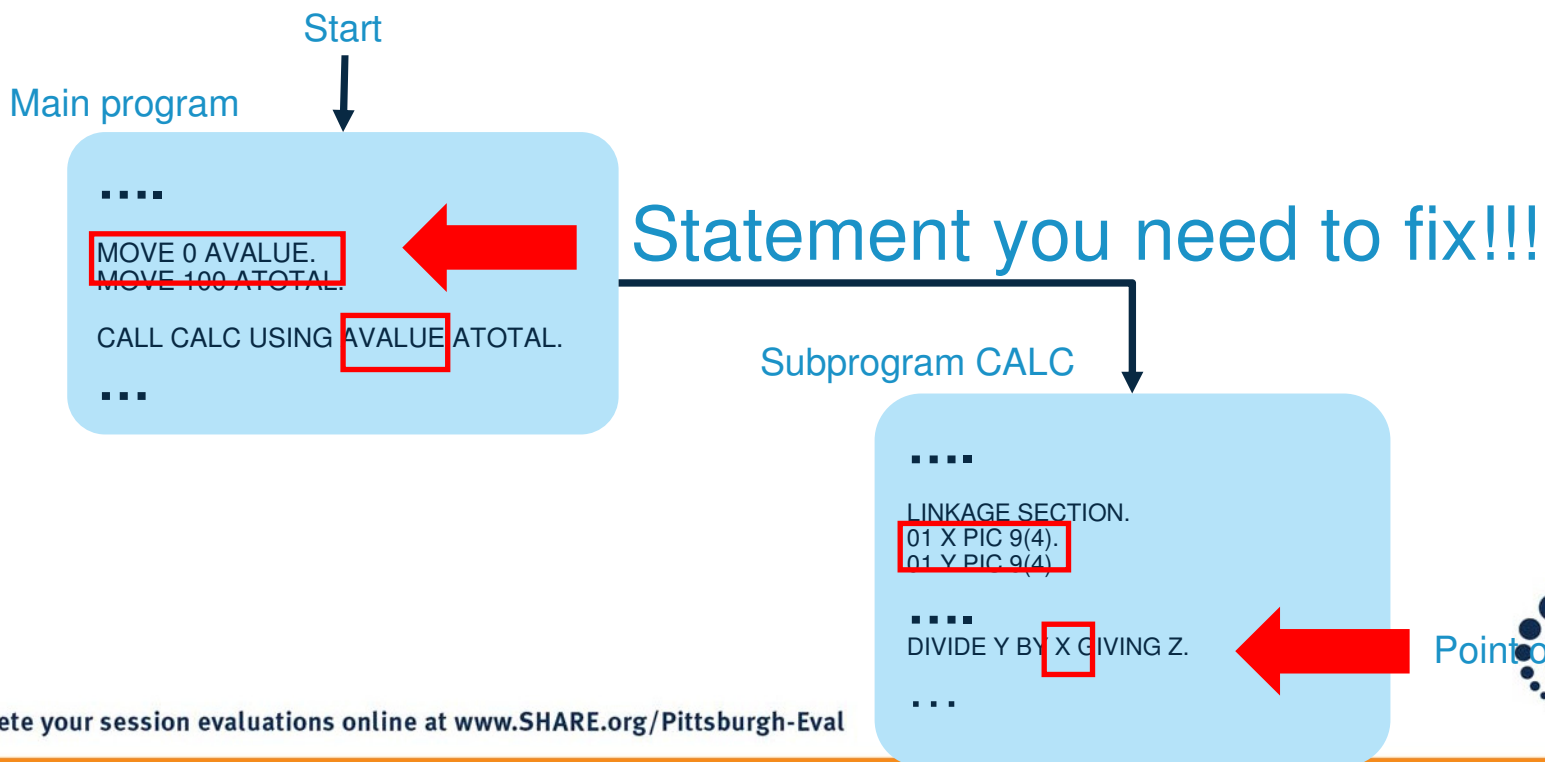


Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

COBOL Explorer: Post-mortem debugger



- Want to better understand the execution path which led to a failure from a dump?
- Want to see how value of a variable changed which contributed to a failure?
- COBOL Explorer is a new feature of Fault Analyzer which allows you to navigate your application's execution path from a point of failure interactively. It allows examination of a variable and how the value changed which led to failure.



What is COBOL Explorer?



- COBOL Explorer takes debugging your (abended) COBOL program to the next level by allowing you to work with a summary view of the program which starts by revealing only source lines you need to know about. You can then 'expand' sections of the program to investigate further, or create another summary view to pursue something different.
- Query your program to see all lines where a variable is used, all places a procedure is called, or the value of variables on any executable source line.
- IBM Fault Analyzer V13, PTF UI18641 introduced this new feature, documented in the latest User's Guide and Reference SC19-4116-04

Replaces the traditional source (editor style) viewer with a collapse/expand interface.



What exactly is a view?

- You create views of your program based on an executable source line and one or more variables from that source line. In FA we'd usually start with the abending source line, for example:

```
COMPUTE BASE-AMOUNT = PRICE / CC
```

if the program abended because of a divide by zero, we'd only really be interested in variable CC and we'd create a view with just one variable.

- The view shows a procedure traceback from the source line back to the origin. Any other source lines that reference selected variables are inserted into the view. Selected variable declarations also appear in the view. The view is a summary of your source program, showing only the parts you need to know about.
- Views use collapse/expand rather than the traditional source editor viewer. You can expand the view incrementally to see all variables in a DATA DIVISION section, all members of a structure, all procedures in the PROCEDURE DIVISION, all lines in a procedure.



How does the Collapse/Expand viewer work?

- The COBOL source program is made up of sections. In the DATA DIVISION sections are FILE SECTION, WORKING-STORAGE SECTION, LOCAL-STORAGE SECTION and LINKAGE SECTION. In the PROCEDURE DIVISION sections are procedures (SECTIONS and Paragraphs).
- The view uses collapse/expand rather than the traditional source editor to view the source program.
- The view shows a procedure traceback from the source line to the beginning of the program, any source lines that use selected variables are inserted into the view.



What else does it do?

- Shows all variables and their values in a given Data Division section (ie. FILE SECTION, WORKING-STORAGE SECTION, LOCAL-STORAGE SECTION, LINKAGE SECTION).
- Invoke FM (File Manager) with or without a template from any FD in the FILE SECTION (provided the dataset is still available).



Starting point: Fault Entry List

Select an entry by typing I next to the entry

```

IBM Fault Analyzer - Fault Entry List                               Line 1 Col 1 80
Command ==> _____ Scroll ==> CSR_

Fault History File or View : 'ADTCFG.IDI.HIST'

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

  Fault_ID  Job/Tran  User_ID  Sys/Job  Abend  Date       Time       Dups  Lock
  _____  _____  _____  _____  _____  _____  _____  _____  _____
I_          F14832  VHECKEA  VHECKE   ZT01    2014/07/08  12:42:44
_          F14827  CINT     STC      ADTMONO IUZ4      2014/07/04  12:53:06
    
```

Select 2 to specify the location of your listing or side file

```

Compiler Listing Not Found                                       Line 1 Col 1 76
Command ==> 2_ _____ Scroll ==> CSR_

Module ADTCFG.ADLAB.LOAD(COBEX1) containing COBOL program COBEX1 entry
point COBEX1 compiled date 2014/07/08 time 12:42:44 does not have a
matching listing/side-file/DWARF load module.
This is the point-of-failure program.
Select one of the following options and press Enter:
  1. (F3) Continue without compiler listing or side file for COBEX1
  2. Specify compiler listing or side file to use for COBEX1
  3. Retry search for compiler listing or side file for COBEX1
  4. Do not prompt again for any missing listing or side file
  5. Only prompt for the point-of-failure program listing or side file
  6. Add COBEX1 to your side file search exclude list

The trace of the listing/side-file search follows.

Rejected - ADTCFG.ADLAB.SYSDEBUG SYSDEBUG side file
Failed - IDISYSDB
         Member COBEX1 not found
    
```



Provide listing or side file location. IDILANGX files are also supported

```
Specify Compiler Listing or Side File                               Line 1 Col 1 76
Command ==> _____ Scroll ==> CSR_

Specify the data set and member name containing the compiler listing or
side file and press Enter.
Data Set Name . . . . : 'ADTCFG.ADLAB.LISTING'
Member . . . . . : COBEX1

Alternatively, place cursor on choice and press Enter to use previously
specified load module data set name.
=> 'ADTCFG.ADLAB.LISTING'
=> 'ADTCFG.EQAY12.BOOTCAMP.SYSDRUG'
```

From the Interactive Reanalysis Report panel select 2 for Event Summary

```
Interactive Reanalysis Report                                     Line 1 Col 1 80
Command ==> _____ Scroll ==> CSR_
JOBNAME: VHECKEA   SYSTEM ABEND: 0CB   ZT01   2014/07/08  12:42:44

Fault Summary:
Module COBEX1, program COBEX1, source line # 175 : Abend S0CB (Decimal-Divide
Exception).

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

^Fault Analyzer maximum storage allocated: 2.12 megabytes.ü
```



Select the event that you are interested in, in this case the Abend by typing 1

```

Event Summary                                     Line 1 Col 1 80
Command ==>                                     Scroll ==> CSR
JOBNAME: VHECKEA   SYSTEM ABEND: 0CB           ZT01       2014/07/08  12:42:44

The following events are presented in chronological order.

Event #   Type      Fail Point  Module  Program  EP      Event Location (*)  Descriptio
-----  -
1  Abend S0CB      ***** COBEX1  COBEX1   COBEX1   L#175 E+96E        From ADTCF
    
```

The cause of the Abend is a decimal-divide exception at line 175. Notice the COBOL Explorer selection (red circle). Press enter or double click to start the Explorer.

```

Event 1 of 1: Abend S0CB *** Point of Failure ***   Line 1 Col 1 80
Command ==>                                       Scroll ==> CSR
JOBNAME: VHECKEA   SYSTEM ABEND: 0CB           ZT01       2014/07/08  12:42:44

Abend Code. . . . . : S0CB
Program-Interruption Code : 000B (Decimal-Divide Exception)
The divisor was zero in a signed decimal division.

The source code below was executed via the following sequence of PERFORM
statements
Source
Line #
000105          PERFORM READ-FILE UNTIL END-OF-FILE = '1'.
000122          NOT AT END PERFORM PROCESS-VEHICLE
000133          PERFORM PROCESS-CAR
000151          PERFORM CALC-TAX.

COBOL Source Code:
Source
Line #
000175          COMPUTE BASE-AMOUNT = PRICE / CC

Data Field Declarations:
Source
Line #
000033          03 PRICE                               PIC 9(6) .
000049          07 CC                                 PIC 9(4) .
000094          01 BASE-AMOUNT                         PIC 9(3)V99 COMP-3.

Data Field Values:
BASE-AMOUNT = 0.00
CC = 0 *** Cause of error ***
PRICE = 50000

COBOL Explorer
    
```



Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

The COBOL Explorer presents a collapsed view of the event

```

Source Line and Data Values                                     Line 1 Col 1 76
Command ==> _____ Scroll ==> CSR_

Source:
000175                COMPUTE BASE-AMOUNT = PRICE / CC

Data Field Declarations:
000033                03 PRICE                                PIC 9(6) .
000049                07 CC                                  PIC 9(4) .
000094                01 BASE-AMOUNT                        PIC 9(3)V99 COMP-3.

Data Field Values:
⊞ BASE-AMOUNT = 0.00
⊞ CC          = 0   *** Cause of error ***
⊞ PRICE       = 50000

Select data fields to use with source line to create view.
  
```

Since we know the issue is with the value in variable CC, deselect the other two variables and press enter to create a new Explorer View with only the elements causing the Abend.

```

Source Line and Data Values                                     Line 1 Col 1 76
Command ==> _____ Scroll ==> CSR_

Source:
000175                COMPUTE BASE-AMOUNT = PRICE / CC

Data Field Declarations:
000033                03 PRICE                                PIC 9(6) .
000049                07 CC                                  PIC 9(4) .
000094                01 BASE-AMOUNT                        PIC 9(3)V99 COMP-3.

Data Field Values:
_ BASE-AMOUNT = 0.00
⊞ CC          = 0   *** Cause of error ***
_ PRICE       = 50000

Select data fields to use with source line to create view.
  
```



The Explorer View

```

Exploring COBOL Program COBEX1
Command ==>
JOBNAME: VHECKEA   SYSTEM ABEND: 0CB   ZT01   2014/07/08   12:42:44   Scroll ==> CSR
+ Expand all / - Collapse all   - Comments   - Level 88   - Redefines
+ 000001 IDENTIFICATION DIVISION.
+ 000003 ENVIRONMENT DIVISION.
+ 000011 FILE SECTION.
+ 000017 WORKING-STORAGE SECTION.
+ 000026 01 VEHICLE-RECORD.
000038 03 SPECIFICATION.
000042 05 ENGINE.
000049 07 CC PIC 9(4).
+ 000081 01 HEADINGS REDEFINES VEHICLE-RECORD.
+ 000084 01 WS-REC REDEFINES VEHICLE-RECORD.
+ 000098 LINKAGE SECTION.
+ 000101 PROCEDURE DIVISION USING PARMS.
000105 PERFORM READ-FILE UNTIL END-OF-FILE = '1'.
+ 000119 READ-FILE.
000122 NOT AT END PERFORM PROCESS-VEHICLE
+ 000125 PROCESS-VEHICLE.
000126 MOVE FS-REC TO WS-REC.
000133 PERFORM PROCESS-CAR
+ 000149 PROCESS-CAR.
000151 PERFORM CALC-TAX.
+ 000173 CALC-TAX.
000175 COMPUTE BASE-AMOUNT = PRICE / CC
000178 COMPUTE BASE-AMOUNT = CC / CYLINDERS
  
```

In above view notice the following:

- It shows a collapsed view showing only the execution path to the Abend
- Next to each relevant line there is a plus sign (see red circle). You can double click or place your cursor and press enter to expand each section.
- It also shows the place where CC is declared. Line 26 in the view.
- You can expand or collapse each section as needed.
- It also highlights the Abending line (175).
- By following the lines marked with the + sign you can determine that the execution path is: CALC-TAX < PROCESS-CAR < PROCESS-VEHICLE < READ-FILE < PROCEDURE DIVISION



Next lets take a look at variable CC more closely. So we expand line 26 by double clicking on + sign or placing cursor on plus sign and press enter

```
Exploring COBOL Program COBEX1
Command ==>
JOBNAME: VHECKEA  SYSTEM ABEND: 0CB  ZT01  2014/07/08  12:42:44
+ Expand all / - Collapse all - Comments - Level 88 - Redefines
+ 000001 IDENTIFICATION DIVISION.
+ 000003 ENVIRONMENT DIVISION.
+ 000011 FILE SECTION.
+ 000017 WORKING-STORAGE SECTION.
- 000026 01 VEHICLE-RECORD.
  000027 03 VEHICLE-NUMBER PIC 9(5).
  000028 03 VEHICLE-TYPE PIC 9.
  000029 88 CAR VALUE 1.
  000030 88 VAN VALUE 2.
  000031 88 UTE VALUE 3.
  000032 88 TRUCK VALUE 4.
  000033 03 PRICE PIC 9(6).
  000034 03 CARBON-TAX PIC 9(3)V99.
  000035*****
  000036* VEHICLE SPECIFICATION *
  000037*****
  000038 03 SPECIFICATION.
  000039 05 MAKE PIC X(20).
  000040 05 MODEL PIC X(20).
  000041 05 YEAR PIC 9(4).
  000042 05 ENGINE.
  000043 07 FUEL PIC 9.
  000044 88 PETROL VALUE 1.
  000045 88 DIESEL VALUE 2.
  000046 88 LPG VALUE 3.
  000047 88 ELECTRIC VALUE 4.
  000048 07 CYLINDERS PIC 9(2).
  000049 07 CC PIC 9(4).
  000050 07 KW PIC 9(4).
  000051 07 ZERO-100 PIC 9(2)V9.
  000052*****
  000053* VEHICLE FEATURES *
  000054*****
```

In the circled areas above you can select to remove all comments from the declaration section or remove the Level 88 variables, or the Redefines. This is done by double clicking on the minus sign next each option or placing the cursor on top of the minus sign and pressing enter.



If you are interested in seeing all the values for the variables in a section then from the same view you just need to double click on the + sign next to the section desired.

After selecting the Working-Storage Section.

```

Associated Storage Areas                                     Line 1 Col 1 80
Command ==>                                               Scroll ==> CSR
JOBNAME: VHECKEA      SYSTEM ABEND: 0CB                   ZT01      2014/07/08  12:42:44

WORKING-STORAGE SECTION
- Collapse hex + Expand Level 88
Off Hex Value                                     Data Value                                     Source (Starting a
BLW=0000 at address 193B70D0
  0 E6D6D9D2 C9D5C760 E2E3D6D9 C1C7C540 *WORKING-STORAGE * 01 FILLER
 10 40404040 *
 18 F1 *1 * 01 INIT-FLAG
 20 F0 *0 * 01 END-OF-FILE
 28 F0 *0 * 01 TAX-CALCULATED
                                * 01 VEHICLE-RECORD
                                03 VEHICLE-NUM
                                03 VEHICLE-TYP
 30 F0F0F0F0 F8 8
 35 F1 1
Level 88 Items
 36 F0F5F0F0 F0F0 50000 03 PRICE
 3C F0F0F0F0 F0 0.00 03 CARBON-TAX
                                03 SPECIFICATI
                                05 MAKE
 41 E3C5E2D3 C1404040 40404040 40404040 *TESLA *
 51 40404040 * *
 55 D4D6C4C5 D340E240 40404040 40404040 *MODEL S *
 65 40404040 * *
 69 F2F0F1F0 2010 05 YEAR
 6D F4 4 05 ENGINE.
                                07 FUEL
Level 88 Items
 6E F0F0 0 07 CYLIN
 70 F0F0F0F0 0 07 CC
 74 F0F0F0F0 0 07 KW
 78 F0F3F9 3.9 07 ZERO-
                                03 FEATURES.
 7B F0F2 2 05 SEATING
 7D F1 1 05 TRANSMIS
Level 88 Items
 7E F8 8 05 COLOUR
Level 88 Items
    
```

PF7 and PF8 can be use to scroll down and up in the view



Lets go back to the source view. You now know that the + and - signs next to each entry in the source are used to expand/collapse sections of the view.

```
Exploring COBOL Program COBEX1
Command ==>
JOBNAME: VHECKEA  SYSTEM ABEND: 0CB  ZT01  2014/07/08  12:42:44  Scroll ==> CSR
+ Expand all / - Collapse all  + Comments  + Level 88  - Redefines

+ 000001 IDENTIFICATION DIVISION.
+ 000003 ENVIRONMENT DIVISION.
+ 000011 FILE SECTION.
+ 000017 WORKING-STORAGE SECTION.
+ 000026 01 VEHICLE-RECORD.
+ 000038 03 SPECIFICATION.
+ 000042 05 ENGINE.
+ 000049 07 CC PIC 9(4).
+ 000081 01 HEADINGS REDEFINES VEHICLE-RECORD.
+ 000084 01 WS-REC REDEFINES VEHICLE-RECORD.
+ 000098 LINKAGE SECTION.
+ 000101 PROCEDURE DIVISION USING PARMS.
- 000105 PERFORM READ-FILE UNTIL END-OF-FILE = '1'.
+ 000119 READ-FILE.
+ 000122 NOT AT END PERFORM PROCESS-VEHICLE
+ 000125 PROCESS-VEHICLE.
+ 000126 MOVE FS-REC TO WS-REC.
+ 000133 PERFORM PROCESS-CAR
+ 000149 PROCESS-CAR.
+ 000151 PERFORM CALC-TAX.
+ 000173 CALC-TAX.
+ 000175 COMPUTE BASE-AMOUNT = PRICE / CC
+ 000178 COMPUTE BASE-AMOUNT = CC / CYLINDERS
```

Next we are going to expand the Procedure Division by Double Clicking on the + sign on line 101.



The Procedure Division is now expanded but note the following:

- All procedures are still collapsed
- You can expand incrementally by clicking the + sign next to the section
- If you want to expand all procedures you can double click on the Expand All selection at the top of the view
- Or reverse your action by selecting Collapse all at the top of the view
- Collapsing/Expanding Comments, Level 88 Variables, and Redefines is also an option.

We understand that real state is precious!!

```

Exploring COBOL Program COBEX1
Command ==>
JOBNAME: VHECKFA SYSTEM ABEND: 0CB Scroll ==> CSR
+ Expand all / - Collapse all + Comments + Level 88 - Redefines

+ 000001 IDENTIFICATION DIVISION.
+ 000003 ENVIRONMENT DIVISION.
+ 000011 FILE SECTION.
+ 000017 WORKING-STORAGE SECTION.
+ 000026 01 VEHICLE-RECORD.
000038 03 SPECIFICATION.
000042 05 ENGINE.
000049 07 CC PIC 9(4).
+ 000081 01 HEADINGS REDEFINES VEHICLE-RECORD.
+ 000084 01 WS-REC REDEFINES VEHICLE-RECORD.
+ 000098 LINKAGE SECTION.
- 000101 PROCEDURE DIVISION USING PARMs.
000102 DISPLAY '*** COBEX1 - STARTING...'.
000103 PERFORM INIT.
000104 OPEN I-O VEHICLE-FILE.
000105 PERFORM READ-FILE UNTIL END-OF-FILE = '1'.
000106 CLOSE VEHICLE-FILE.
000107 PERFORM PRINT-TOTALS.
000108 DISPLAY '*** COBEX1 - END OF PROGRAM'.
000109 GOBACK.
+ 000111 INIT.
+ 000119 READ-FILE.
000122 NOT AT END PERFORM PROCESS-VEHICLE
+ 000125 PROCESS-VEHICLE.
000126 MOVE FS-REC TO WS-REC.
000133 PERFORM PROCESS-CAR
+ 000149 PROCESS-CAR.
000151 PERFORM CALC-TAX.
+ 000153 PROCESS-COMMERCIAL.
+ 000157 STRING-NAME.
+ 000165 UNDO-TAX.
+ 000170 REDO-TAX.
+ 000173 CALC-TAX.
  
```

31

Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval



After all the navigation hints, lets go back to finding more about what caused the abend. Remember that the issue was a divide by zero because CC = 0.

Notice in the view the following:

- Line 126 is colored different, and the reason is because WS-REC is a redefine for VEHICLE-RECORD and CC is part of it.
- The collapsed view is showing all the relevant declarations
 - Line 26 the declare for VEHICLE-RECORD
 - Line 81 the redefine for HEADINGS
 - Line 84 the redefine for WS-RECORD

We need to take a close look at Line 126. Double click on the line.

```

Exploring COBOL Program COBEX1
Command ==>
JOBNAME: VHECKEA  SYSTEM ABEND: 0CB  ZT01  2014/07/08  12:42:44
+ Expand all / - Collapse all  + Comments  + Level 88  - Redefines
+ 000001 IDENTIFICATION DIVISION.
+ 000003 ENVIRONMENT DIVISION.
+ 000011 FILE SECTION.
+ 000017 WORKING-STORAGE SECTION.
+ 000026 01 VEHICLE-RECORD.
000038 03 SPECIFICATION.
000042 05 ENGINE.
000049 07 CC PIC 9(4).
+ 000081 01 HEADINGS REDEFINES VEHICLE-RECORD.
+ 000084 01 WS-REC REDEFINES VEHICLE-RECORD.
+ 000098 LINKAGE SECTION.
+ 000101 PROCEDURE DIVISION USING PARMS.
000105 PERFORM READ-FILE UNTIL END-OF-FILE = '1'.
+ 000119 READ-FILE.
000122 NOT AT END PERFORM PROCESS-VEHICLE
+ 000125 PROCESS-VEHICLE.
000126 MOVE FS-REC TO WS-REC.
000133 PERFORM PROCESS-CAR
+ 000149 PROCESS-CAR.
000151 PERFORM CALC-TAX.
+ 000173 CALC-TAX.
000175 COMPUTE BASE-AMOUNT = PRICE / CC
000178 COMPUTE BASE-AMOUNT = CC / CYLINDERS
    
```



All important data associated with line 26 shows in the new view

```

Source Line and Data Values                                     Line 1 Col 1 76
Command ==> _____ Scroll ==> CSR_

Source:
000126          MOVE FS-REC TO WS-REC.

Data Field Declarations:
000013          01 FS-REC.
000026          01 VEHICLE-RECORD.
000084          01 WS-REC REDEFINES VEHICLE-RECORD.

Data Field Values:
_ FS-REC        = 000081050000000000TESLA          MODEL S
                NOTE: Above value truncated after 113 bytes.
_ VEHICLE-RECORD = 000081050000000000TESLA          MODEL S
_ WS-REC        = 000081050000000000TESLA          MODEL S
                NOTE: Above value truncated after 113 bytes.

Select data fields to use with source line to create view.
F1=Help      F3=Exit      F5=RptFind  F7=Up      F8=Down     F12=Cancel

+ 000149 PROCESS-CAR.
000151      PERFORM CALC-TAX.
+ 000173 CALC-TAX.
000175      COMPUTE BASE-AMOUNT = PRICE / CC
000178      COMPUTE BASE-AMOUNT = CC / CYLINDERS
    
```

After selecting FS-REC we get a new view that includes where it is declared as well as the statements where FS-REC is used. Notice that it is part of FILE SECTION

```

Exploring COBOL Program COBEX1
Command ==> _____ Scroll ==> CSR_
JOBNAME: VHECKEA SYSTEM ABEND: 0CB ZT01 2014/07/08 12:42:44
+ Expand all / - Collapse all - Comments + Level 88 - Redefines

+ 000001 IDENTIFICATION DIVISION.
+ 000003 ENVIRONMENT DIVISION.
+ 000011 FILE SECTION.
+ 000013 01 FS-REC.
+ 000017 WORKING-STORAGE SECTION.
+ 000098 LINKAGE SECTION.
+ 000101 PROCEDURE DIVISION USING PARMS.
000105      PERFORM READ-FILE UNTIL END-OF-FILE = '1'.
+ 000119 READ-FILE.
000122      NOT AT END PERFORM PROCESS-VEHICLE
+ 000125 PROCESS-VEHICLE.
000126      MOVE FS-REC TO WS-REC.
000142      MOVE WS-REC TO FS-REC
000143      REWRITE FS-REC
    
```



Integration with IBM File Manager

Previous slide showed the FILE SECTION where FS-REC is declared. If you expand that section and then double click on the FD for FS-REC the IBM File Manager is invoked to provide additional information about the record.

```

Data Set Actions                                     Enter required field
Data Set . . . : ADTCFG.VEHICLES.VSAM
Select one of the following options and press Enter:
1=  1.  Edit
    2.  Browse
    3.  View
Use template currently associated with this dataset Y (Y/N)
F1=Help   F3=Exit   F12=Cancel

+ 000101 PROCEDURE DIVISION USING PARMS.
+ 000105     PERFORM READ-FILE UNTIL END-OF-FILE = '1'.
+ 000119 READ-FILE.
+ 000122     NOT AT END PERFORM PROCESS-VEHICLE
+ 000125 PROCESS-VEHICLE.
+ 000126     MOVE FS-REC TO WS-REC.
+ 000142     MOVE WS-REC TO FS-REC
+ 000143     REWRITE FS-REC
    
```

This is a VSAM record and because I choose Edit I can modify the value of CC directly. Since I don't have a FM template defined the display is not as neat as expected for File Manager.

```

Edit ADTCFG.VEHICLES.VSAM                               Top of 4
Command ==>                                           Scroll PAGE
                                           Format CHAR
Key <====>-----10-----2-----3-----4-----5-----6-----7-----
***** ***** Key used to set start point *****
000001 000081050000000000TESLA                MODEL S                2010400000000000
000002 000091025500000000MAZDA                3 MPS                 201210412261199
000003 000101023999000000PEUGOT              207 GTI               200710419510128
000004 000111050000000000BMW                 M3                    201210423000175
***** ***** End of data *****
    
```



Cross reference data and other navigation facilities available with the COBOL Explorer.

You can double click on any data item. I am choosing MAKE on line 39

```

Exploring COBOL Program COBEX1
Command ==>
JOBNAME: VHECKEA SYSTEM ABEND: 0CB ZT01 Scroll ==> CSR_
2014/07/08 12:42:44
+ Expand all / - Collapse all + Comments + Level 88 - Redefines

+ 000001 IDENTIFICATION DIVISION.
+ 000003 ENVIRONMENT DIVISION.
+ 000011 FILE SECTION.
+ 000017 WORKING-STORAGE SECTION.
- 000026 01 VEHICLE-RECORD.
000027 03 VEHICLE-NUMBER PIC 9(5).
000028 03 VEHICLE-TYPE PIC 9.
000033 03 PRICE PIC 9(6).
000034 03 CARBON-TAX PIC 9(3)V99.
000038 03 SPECIFICATION.
000039 05 MAKE PIC X(20).
000040 05 MODEL PIC X(20).
000041 05 YEAR PIC 9(4).
000042 05 ENGINE.
000043 07 FUEL PIC 9.
000048 07 CYLINDERS PIC 9(2).
000049 07 CC PIC 9(4).
000050 07 KW PIC 9(4).
000051 07 ZERO-100 PIC 9(2)V9.
000055 03 FEATURES.
000056 05 SEATING PIC 9(2).
000057 05 TRANSMISSION PIC 9.
000062 05 COLOUR PIC 9.
000072 05 BODY PIC 9.
+ 000081 01 HEADINGS REDEFINES VEHICLE-RECORD.
+ 000084 01 WS-REC REDEFINES VEHICLE-RECORD.
+ 000098 LINKAGE SECTION.
+ 000101 PROCEDURE DIVISION USING PARMS.
000105 PERFORM READ-FILE UNTIL END-OF-FILE = '1'.
+ 000119 READ-FILE.
000122 NOT AT END PERFORM PROCESS-VEHICLE
+ 000125 PROCESS-VEHICLE.
000126 MOVE FS-REC TO WS-REC.
    
```



The Data Cross-Reference view

- In the view you can see all statements that reference MAKE.
- If the variable is a GROUP then its MAP is shown. See red circle
- Double clicking on any entry in the popup view will navigate to that line and expand the source around the line.

```

Data Cross-Reference                               Line 1 Col 1 76
Command ==> <----->                          Scroll ==> CSR_

Data Item:
000039          05 MAKE                          PIC X(20) .

References:
000125 PROCESS-VEHICLE .
000128          DISPLAY 'VEHICLE: ' MAKE MODEL
000157 STRING-NAME .
000160          MAKE DELIMITED BY SPACES
000161          ' ' DELIMITED BY SIZE
000162          MODEL DELIMITED BY SPACES
000163          INTO NAME-STRING .

Map:
1 VEHICLE-RECORD                                DS 0CL80      Group
2 SPECIFICATION                                DS 0CL58      Group
3 MAKE                                           DS 20C        Display

F1=Help      F3=Exit      F5=RptFind  F7=Up          F8=Down      F12=Cancel

000048          07 CYLINDERS                      PIC 9(2) .
000049          07 CC                             PIC 9(4) .
000050          07 KW                             PIC 9(4) .
000051          07 ZERO-100                       PIC 9(2)V9 .
000052*****
000053* VEHICLE FEATURES
000054*****
000055          03 FEATURES .
000056          05 SEATING                         PIC 9(2) .
000057          05 TRANSMISSION                   PIC 9 .
000062          05 COLOUR                         PIC 9 .
000072          05 BODY                           PIC 9 .
+ 000081 01 HEADINGS REDEFINES VEHICLE-RECORD .
+ 000084 01 WS-REC REDEFINES VEHICLE-RECORD .
+ 000098 LINKAGE SECTION .
    
```



After expanding the source by double clicking on line 160, the Explorer creates a new view starting with that line.

```

Exploring COBOL Program COBEX1
Command ==>
JOBNAME: VHECKEA SYSTEM ABEND: 0CB ZT01 2014/07/08 12:42:44
+ Expand all / - Collapse all - Comments + Level 88 - Redefines
000160 MAKE DELIMITED BY SPACES
000161 ' ' DELIMITED BY SIZE
000162 MODEL DELIMITED BY SPACES
000163 INTO NAME-STRING.
+ 000173 CALC-TAX.
000175 COMPUTE BASE-AMOUNT = PRICE / CC
000178 COMPUTE BASE-AMOUNT = CC / CYLINDERS
    
```

Using PF7 (Scroll Up) you can see that line 160 is part of STRING-NAME proc.

```

Exploring COBOL Program COBEX1
Command ==>
JOBNAME: VHECKEA SYSTEM ABEND: 0CB ZT01 2014/07/08 12:42:44
+ Expand all / - Collapse all - Comments + Level 88 - Redefines
000036* VEHICLE SPECIFICATION *
000037*****
000038 03 SPECIFICATION.
000039 05 MAKE PIC X(20).
000040 05 MODEL PIC X(20).
000041 05 YEAR PIC 9(4).
000042 05 ENGINE.
000043 07 FUEL PIC 9.
000044 07 CYLINDERS PIC 9(2).
000045 07 CC PIC 9(4).
000046 07 KW PIC 9(4).
000047 07 ZERO-100 PIC 9(2)V9.
000048*****
000049* VEHICLE FEATURES *
000050*****
000051 03 FEATURES.
000052 05 SEATING PIC 9(2).
000053 05 TRANSMISSION PIC 9.
000054 05 COLOUR PIC 9.
000055 05 BODY PIC 9.
+ 000056 01 HEADINGS REDEFINES VEHICLE-RECORD.
+ 000057 01 WS-REC REDEFINES VEHICLE-RECORD.
+ 000058 LINKAGE SECTION.
+ 000059 PROCEDURE DIVISION USING PARMS.
000060 PERFORM READ-FILE UNTIL END-OF-FILE = '1'.
+ 000061 READ-FILE.
000062 NOT AT END PERFORM PROCESS-VEHICLE
+ 000063 PROCESS-VEHICLE.
000064 MOVE FS-REC TO WS-REC.
000065 PERFORM PROCESS-CAR
+ 000066 PROCESS-CAR.
000067 PERFORM CALC-TAX.
- 000068 STRING-NAME
    
```

37



Procedure Cross-Reference: In the previous slide we found about Procedure STRING-NAME. By double clicking on STRING-NAME the explorer creates the Cross-Reference View.

The Cross-Reference shows us that STRING-NAME is called from PROCESS-VEHICLE

```

Procedure Cross-Reference                               Line 1 Col 1 76
Command ==> _____ Scroll ==> CSR_

Procedure:
000157 STRING-NAME.

References:
000125 PROCESS-VEHICLE.
000139          PERFORM STRING-NAME

*** Bottom of data.

F1=Help      F3=Exit      F5=RptFind  F7=Up          F8=Down      F12=Cancel

000062      05 COLOUR          PIC 9.
000072      05 BODY           PIC 9.
+ 000081 01 HEADINGS REDEFINES VEHICLE-RECORD.
+ 000084 01 WS-REC REDEFINES VEHICLE-RECORD.
+ 000098 LINKAGE SECTION.
+ 000101 PROCEDURE DIVISION USING PARMS.
000105          PERFORM READ-FILE UNTIL END-OF-FILE = '1'.
+ 000119 READ-FILE.
000122          NOT AT END PERFORM PROCESS-VEHICLE
+ 000125 PROCESS-VEHICLE.
000126          MOVE FS-REC TO WS-REC.
000133          PERFORM PROCESS-CAR
+ 000149 PROCESS-CAR.
000151          PERFORM CALC-TAX.
000157 STRING-NAME
    
```



Procedure Cross-Reference. After double clicking on PROCESS-VEHICLE the view is updated to show the start of the procedure

```

Exploring COBOL Program COBEX1
Command ==>
JOBNAME: VHECKEA SYSTEM ABEND: 0CB ZT01 2014/07/08 12:42:44
+ Expand all / - Collapse all - Comments + Level 88 - Redefines

+ 000001 IDENTIFICATION DIVISION.
+ 000003 ENVIRONMENT DIVISION.
+ 000011 FILE SECTION.
+ 000013 01 FS-REC.
+ 000017 WORKING-STORAGE SECTION.
+ 000098 LINKAGE SECTION.
- 000101 PROCEDURE DIVISION USING PARMs.
000102 DISPLAY '*** COBEX1 - STARTING...'.
000103 PERFORM INIT.
000104 OPEN I-O VEHICLE-FILE.
000105 PERFORM READ-FILE UNTIL END-OF-FILE = '1'.
000106 CLOSE VEHICLE-FILE.
000107 PERFORM PRINT-TOTALS.
000108 DISPLAY '*** COBEX1 - END OF PROGRAM'.
000109 GOBACK.
+ 000111 INIT.
+ 000119 READ-FILE.
000122 NOT AT END PERFORM PROCESS-VEHICLE
- 000125 PROCESS-VEHICLE.
000126 MOVE FS-REC TO WS-REC.
000127 IF WS-KEY NOT = 'KEY...'
000128 DISPLAY 'VEHICLE: ' MAKE MODEL
000129 ADD 1 TO TOTAL-VEHICLES
000130 MOVE ZERO TO BASE-AMOUNT
000131 MOVE 0 TO TAX-CALCULATED
000132 IF CAR
000133 PERFORM PROCESS-CAR
000134 ELSE
000135 PERFORM PROCESS-COMMERCIAL
000136 END-IF
000137 IF TAX-CALCULATED = 1
000138 IF TAX-AMOUNT > HIGHEST-TAX
000139 PERFORM STRING-NAME
    
```

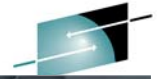
You can double click on any procedure or GOTO. In this example the view is repositioned to show PROCESS-COMMERCIAL

```

Exploring COBOL Program COBEX1
Command ==>
JOBNAME: VHECKEA SYSTEM ABEND: 0CB ZT01 2014/07/08 12:42:44
+ Expand all / - Collapse all - Comments + Level 88 - Redefines

- 000153 PROCESS-COMMERCIAL.
000154 IF INIT-FLAG = '1'
000155 PERFORM UNDO-TAX.
    
```





IBM Fault Analyzer COBOL Explorer

(an interactive post-mortem debugger)

Watch the video @ <http://www.youtube.com/watch?v=ZXwsaBnfk2Q>



Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

Debug Tool IMS Private Message Region Enhancement

Insert
Custom
Session
QR if
Desired.

Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

Agenda

- IMS private message region enhancement
 - Customer requirement
 - Proposed solution
 - Demo

Customer Requirement

- In IMS online environments, one or more users debugging transactions in Debug Tool can monopolize the scheduling environment for a given message class.
- Customers would like a way to isolate debug users in private message regions, serving a class dedicated to Debug Tool. This will allow the normal class to continue scheduling non-debug transactions.

Solution

- Debug Tool will add panels to Debug Tool Utilities to facilitate the following:
 - Allow administrators to create Message Region Templates, with dedicated message classes.
 - Allow debug users to select a Message Region Template to launch as a private message region.
 - Also, allow debug users to specify a transaction to schedule in their private message region and debug.

Installer Actions

- The Debug Tool installer will need to perform some customization of DTU and RACF.
 - Set defaults in EQAZDFLT for the default message region template data set, and the default job names for private message regions.
 - Give authority to the EQANBSWT BMP AOI to issue the /START, /STOP, /ASSIGN and /DISPLAY IMS commands.
 - Authorize administrators to the EQADTOOL.IMSTEMPCREATE FACILITY.

Administrator Use Case

- Administrator needs to create a new message region template.
- Use DTU option 4, sub-option 4.
- Copy from the JCL of an existing IMS message region.

Administrator panel

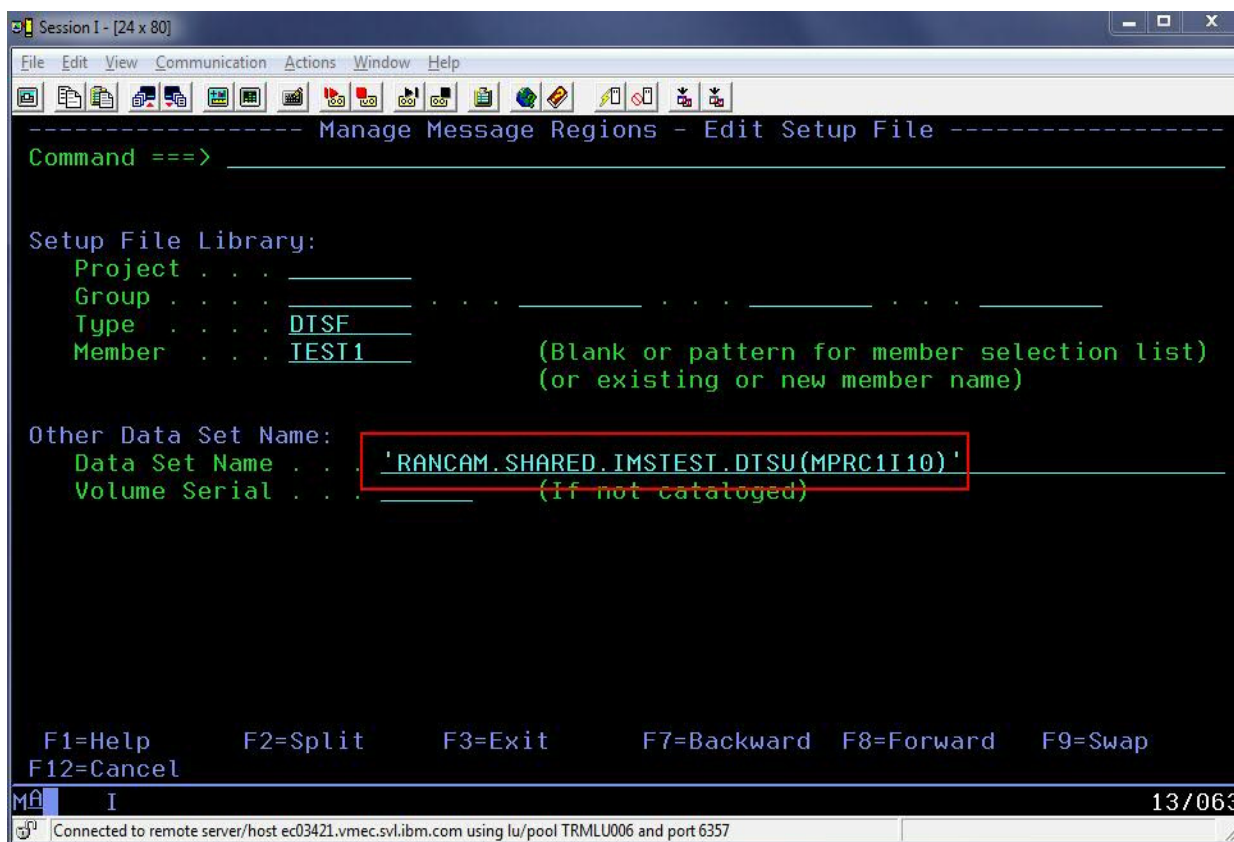
- This is the panel the administrator sees after selecting DTU option 4.4.
- The administrator may overtype the name of the template data set.
- To create a new template, the administrator enters “I” in the table.

```

Session I - [24 x 80]
File Edit View Communication Actions Window Help
Create IMS MPR Templates for dynamic transaction swapping      Row 1 to 2 of 2
Command ==> _____ Scroll ==> PAGE
Template Data Set . . . 'RANCAM.SHARED.IMSTEST.DTSU'
To create a new template, type I in the Sel field on any line and press Enter.
To edit a template, type E in the Sel field on the appropriate line and press
Enter.
To delete a template, type D in the Sel field on the appropriate line and press
Enter.
Sel Member Cls Comment
I ***** *** ***** TOP OF DATA *****
MPRCI10X 020 MPRCI10X region
***** Bottom of data *****
F1=Help F3=Exit F7=Backward F8=Forward F12=Cancel
MFI I 15/004
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357
  
```

Supply data set name for template

- The data set name will be pre-filled with the template name. The administrator adds a member name and presses Enter.



```
----- Manage Message Regions - Edit Setup File -----
Command ==>

Setup File Library:
Project . . .
Group . . .
Type . . . DTSF
Member . . . TEST1          (Blank or pattern for member selection list
                           (or existing or new member name)

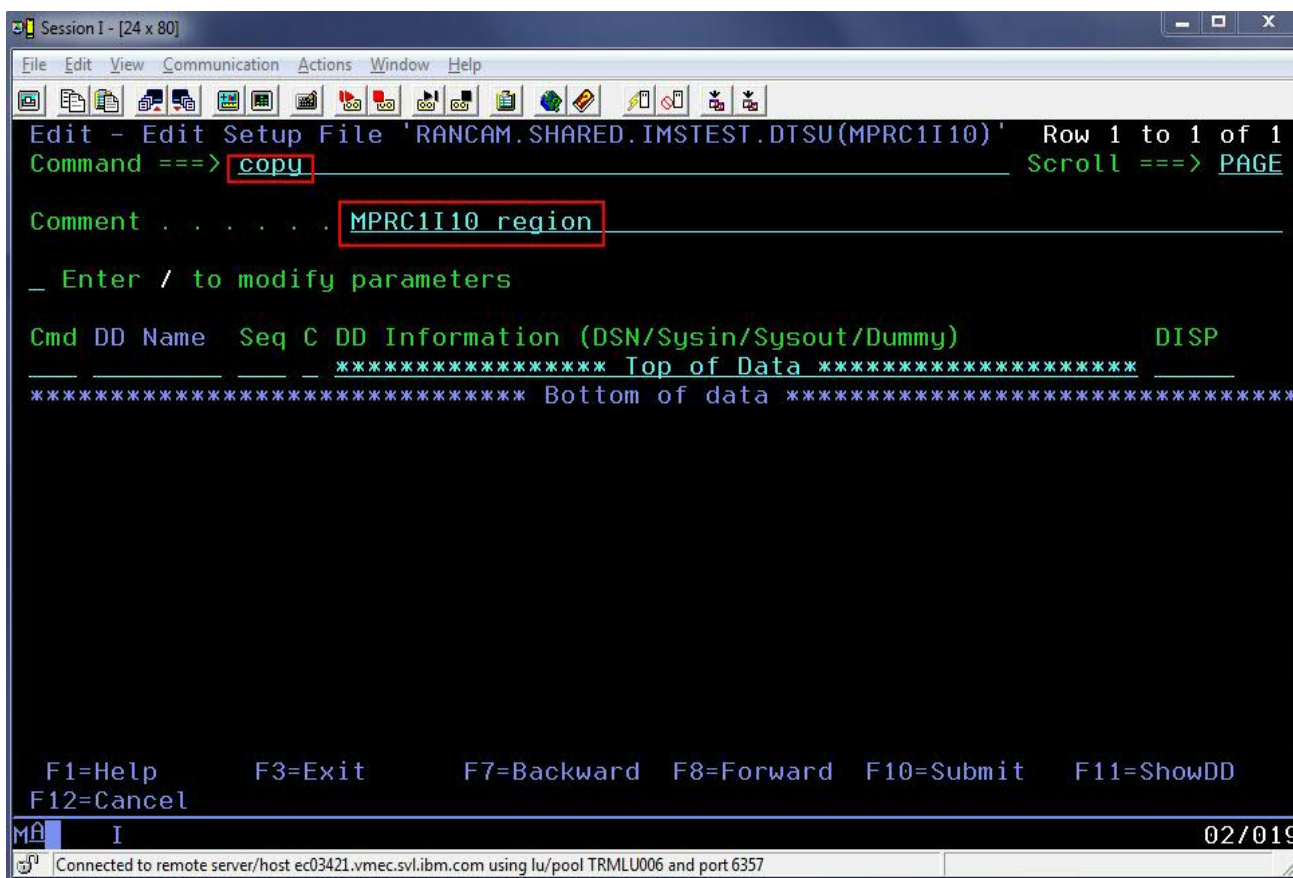
Other Data Set Name:
Data Set Name . . . 'RANCAM.SHARED.IMSTEST.DTSU(MPRC1I10)'
Volume Serial . . .          (If not cataloged)

F1=Help      F2=Split      F3=Exit      F7=Backward  F8=Forward  F9=Swap
F12=Cancel

M I 13/063
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357
```


Enter the COPY command

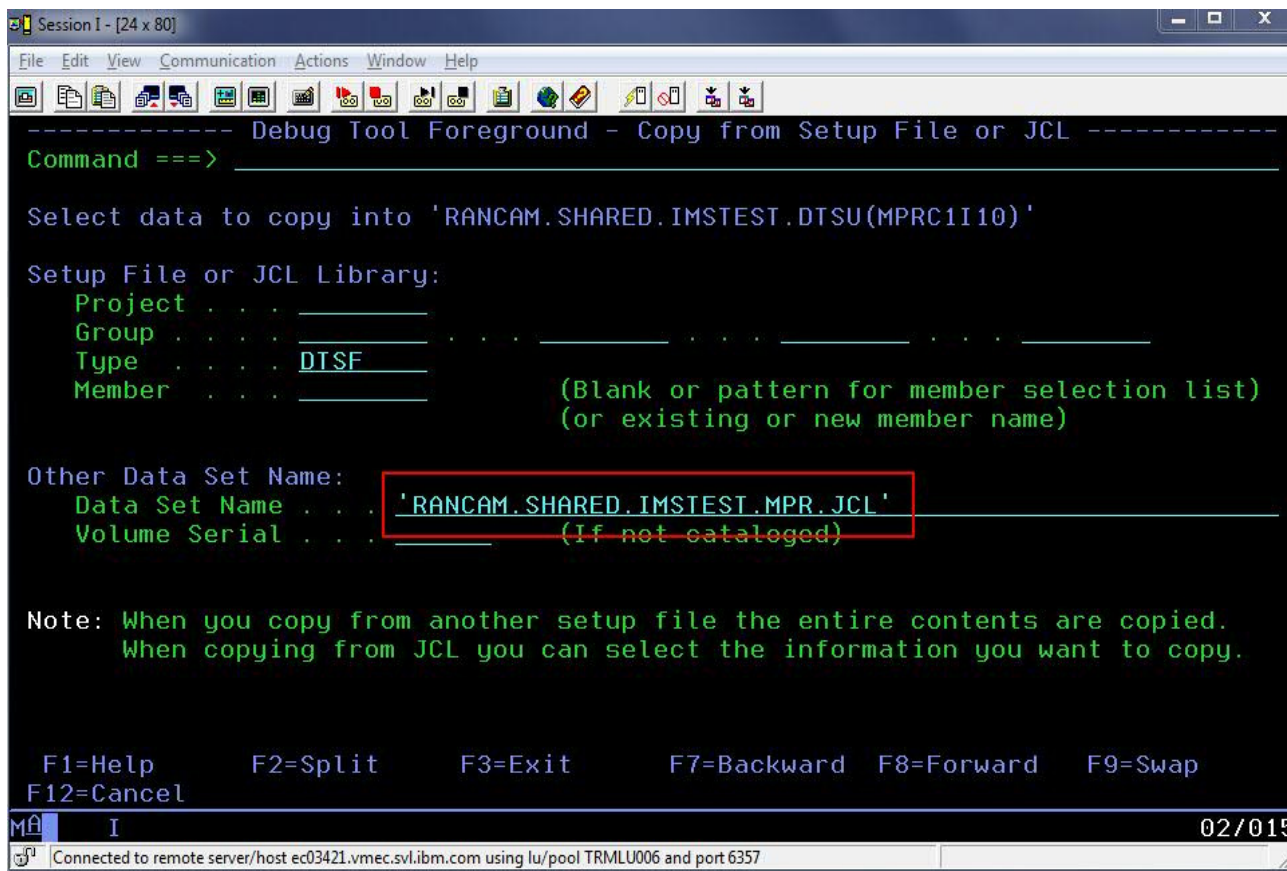
- The administrator types in a region comment, and then enters the “copy” command and presses Enter.



```
Session I - [24 x 80]
File Edit View Communication Actions Window Help
Edit - Edit Setup File 'RANCAM.SHARED.IMSTEST.DTSU(MPRC1I10)' Row 1 to 1 of 1
Command ==> copy Scroll ==> PAGE
Comment . . . . . MPRC1I10 region
_ Enter / to modify parameters
Cmd DD Name Seq C DD Information (DSN/Sysin/Sysout/Dummy) DISP
***** Top of Data *****
***** Bottom of data *****
F1=Help F3=Exit F7=Backward F8=Forward F10=Submit F11=ShowDD
F12=Cancel
M I 02/019
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357
```

Supply JCL data set name

- The administrator will type the name of a data set which contains IMS MPR JCLs and press Enter.



```
----- Debug Tool Foreground - Copy from Setup File or JCL -----
Command ==> _____

Select data to copy into 'RANCAM.SHARED.IMSTEST.DTSU(MPRC1I10)'
```

Setup File or JCL Library:

Project	. . .	_____
Group	. . .	_____
Type	. . .	DTSF
Member	. . .	_____

(Blank or pattern for member selection list
(or existing or new member name)

Other Data Set Name:

Data Set Name	. . .	'RANCAM.SHARED.IMSTEST.MPR.JCL'
Volume Serial	. . .	_____

(If not cataloged)

Note: When you copy from another setup file the entire contents are copied.
When copying from JCL you can select the information you want to copy.

F1=Help F2=Split F3=Exit F7=Backward F8=Forward F9=Swap
F12=Cancel

M I 02/015

Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357

Select member from JCL data set

- The administrator selects the member to copy and presses Enter.

```

Session I - [24 x 80]
File Edit View Communication Actions Window Help
Menu Functions Confirm Utilities Help

LIBRARY          RANCAM.SHARED.IMSTEST.MPR.JCL          Row 0000001 of 0000009
Command ===>          Scroll ===> PAGE

  Name      Prompt      Size      Created      Changed      ID
- MPR1RTC   MPR1RTC      65      2009/08/18   2013/07/29 12:35:01   USRT001
- MPR1RT2   MPR1RT2      63      2011/07/07   2013/06/26 12:46:03   USRT001
- MPR1RT3   MPR1RT3      69      2012/12/06   2013/05/31 09:34:37   USRT001
- MPR1RT4   MPR1RT4      64      2013/05/31   2013/05/31 12:47:56   USRT001
- MPRCI10X  MPRCI10X     49      2013/08/07   2013/08/30 02:53:34   USRT001
- MPRC1IBA  MPRC1IBA     73      2013/01/25   2013/02/01 13:38:38   USRT001
s MPRC1I10  MPRC1I10     53      2013/08/07   2013/08/08 11:55:16   USRT002
- MPRC5IBA  MPRC5IBA     65      2013/04/09   2013/04/09 13:58:16   USRT001
- MPR56378  MPR56378     70      2009/03/13   2009/03/18 12:52:26   USRT001
**End**

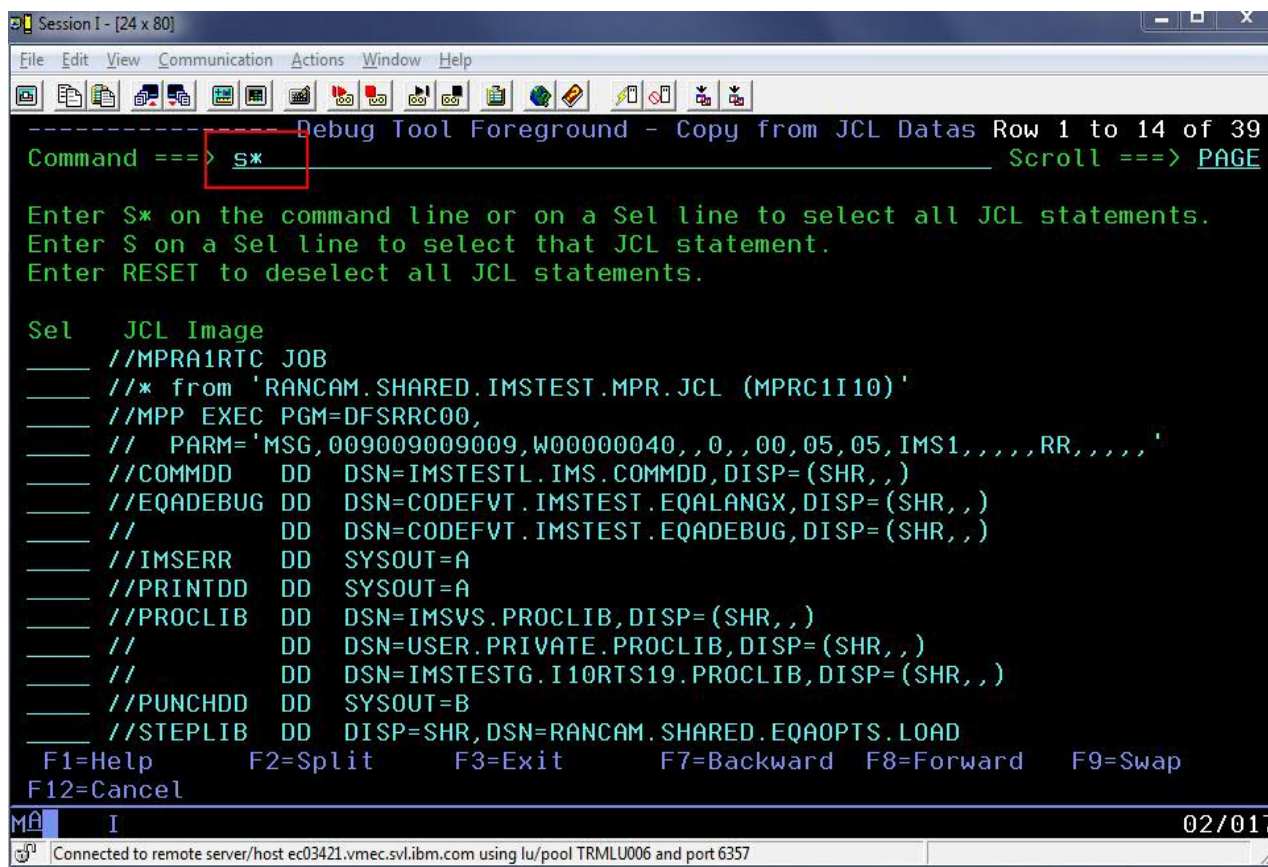
F1=Help      F2=Split     F3=Exit      F4=REFRESH   F5=Rfind     F7=Up
F8=Down      F9=Swap      F10=Left     F11=Right    F12=Cancel

M& I 12/013
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357

```

Select JCL cards to import to template

- This will present a panel with the JCL cards for the MPR.
- To select the entire job, the administrator types the command S* and hits Enter, and then presses PF3 to populate the template from the JCL.



```

Session I - [24 x 80]
File Edit View Communication Actions Window Help
----- Debug Tool Foreground - Copy from JCL Datas Row 1 to 14 of 39
Command ==> S* Scroll ==> PAGE

Enter S* on the command line or on a Sel line to select all JCL statements.
Enter S on a Sel line to select that JCL statement.
Enter RESET to deselect all JCL statements.

Sel  JCL Image
____ //MPRA1RTC JOB
____ //* from 'RANCAM.SHARED.IMSTEST.MPR.JCL (MPRC1I10)'
____ //MPP EXEC PGM=DFSRRCO0,
____ //  PARM='MSG,009009009009,W00000040,,0,,00,05,05,IMS1,,,,,RR,,,,,'
____ //COMMDD  DD  DSN=IMSTESTL.IMS.COMMDD,DISP=(SHR,,)
____ //EQADEBUG DD  DSN=CODEFVT.IMSTEST.EQALANGX,DISP=(SHR,,)
____ //        DD  DSN=CODEFVT.IMSTEST.EQADEBUG,DISP=(SHR,,)
____ //IMSERR  DD  SYSOUT=A
____ //PRINTDD DD  SYSOUT=A
____ //PROCLIB DD  DSN=IMSVS.PROCLIB,DISP=(SHR,,)
____ //        DD  DSN=USER.PRIVATE.PROCLIB,DISP=(SHR,,)
____ //        DD  DSN=IMSTESTG.I10RTS19.PROCLIB,DISP=(SHR,,)
____ //PUNCHDD DD  SYSOUT=B
____ //STEPLIB DD  DISP=SHR,DSN=RANCAM.SHARED.EQAOPTS.LOAD

F1=Help      F2=Split    F3=Exit     F7=Backward F8=Forward  F9=Swap
F12=Cancel

M I 02/017
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357

```


Modify parameters to set message class

- The administrator types a forward slash (/) to modify the parameters. This allows the administrator to assign a message class to the template.

```

Session I - [24 x 80]
File Edit View Communication Actions Window Help
Edit - Edit Setup File 'RANCAM.SHARED.IMSTEST.DTSU(MPRC1I10) Row 1 to 14 of 36
Command ==> _____ Scroll ==> PAGE
Comment . . . . . MPRC1I10 region
/ Enter / to modify parameters
Cmd DD Name Seq C DD Information (DSN/Sysin/Sysout/Dummy) DISP
-----
CEEMSG 1 SYSOUT=A
CEEOPST 1 SYSIN
COMMDD 1 'IMSTESTL.IMS.COMMDD' SHR
DFSESL 1 'IMSBLD.I10RTS19.CRESLIB' SHR
2 'MQS.V7R1M0.SCSQAUTH' SHR
EQADEBUG 1 'CODEFVT.IMSTEST.EQALANGX' SHR
2 'CODEFVT.IMSTEST.EQADEBUG' SHR
IMSERR 1 SYSOUT=A
INSPLOG 1 SYSOUT=*
PRINTDD 1 SYSOUT=A
PROCLIB 1 'IMSVS.PROCLIB' SHR
2 'USER.PRIVATE.PROCLIB' SHR
3 'IMSTESTG.I10RTS19.PROCLIB' SHR
F1=Help F3=Exit F7=Backward F8=Forward F10=Submit F11=ShowDD
F12=Cancel
MA I 06/004
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357
  
```

“Classes” field will contain new message class.

- The administrator changes the message classes.
- Also, note that APPLFE of EQANIAFE is required and will be forced on if not specified.

```

Session I - [24 x 80]
File Edit View Communication Actions Window Help
----- Parameters for Message Processing Region -----
Command ==> _____

Key parameters for message processing region.

  IMSID . . . IMS1          specify a 1-4 character IMS subsystem ID

  CLASSES . . . 020 020 020 020 specify 4 3-digit decimal numbers indicating
                                classes of messages to be served

  APPLFE . . . EQANIAFE    specify a 1-8 character name of an appli-
                                cation front-end routine that is called
                                whenever a message processing program is
                                scheduled. (Front-end routine is required
                                to debug non-LE Assembler program)

  STIMER . . . 0           specify a process time statistics code (0,1,
                                2). 0 means no statistics are gathered.

Other parameters for message processing region.

  AGN . . . . _____    ALTID . . . . _____    More:      +
  F1=Help      F2=Split    F3=Exit      F7=Backward  F8=Forward  F9=Swap
  F12=Cancel

Mâ I 08/035
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357

```

New template is now in the list

- Once the administrator presses PF3 to back all the way out, the new template will appear in the list.

```

Session I - [24 x 80]
File Edit View Communication Actions Window Help
[Icons]
Create IMS MPR Templates for dynamic transaction swapping      Row 1 to 3 of 3
Command ==> _____ Scroll ==> PAGE

Template Data Set . . . 'RANCAM.SHARED.IMSTEST.DTSU'

To create a new template, type I in the Sel field on any line and press Enter.
To edit a template, type E in the Sel field on the appropriate line and press
Enter.
To delete a template, type D in the Sel field on the appropriate line and press
Enter.

Sel Member  Cls  Comment
-----
***** ***  ***** TOP OF DATA *****
- MPRCI10X 020  MPRCI10X region
- MPRCI110 020  MPRCI110 region
***** Bottom of data *****

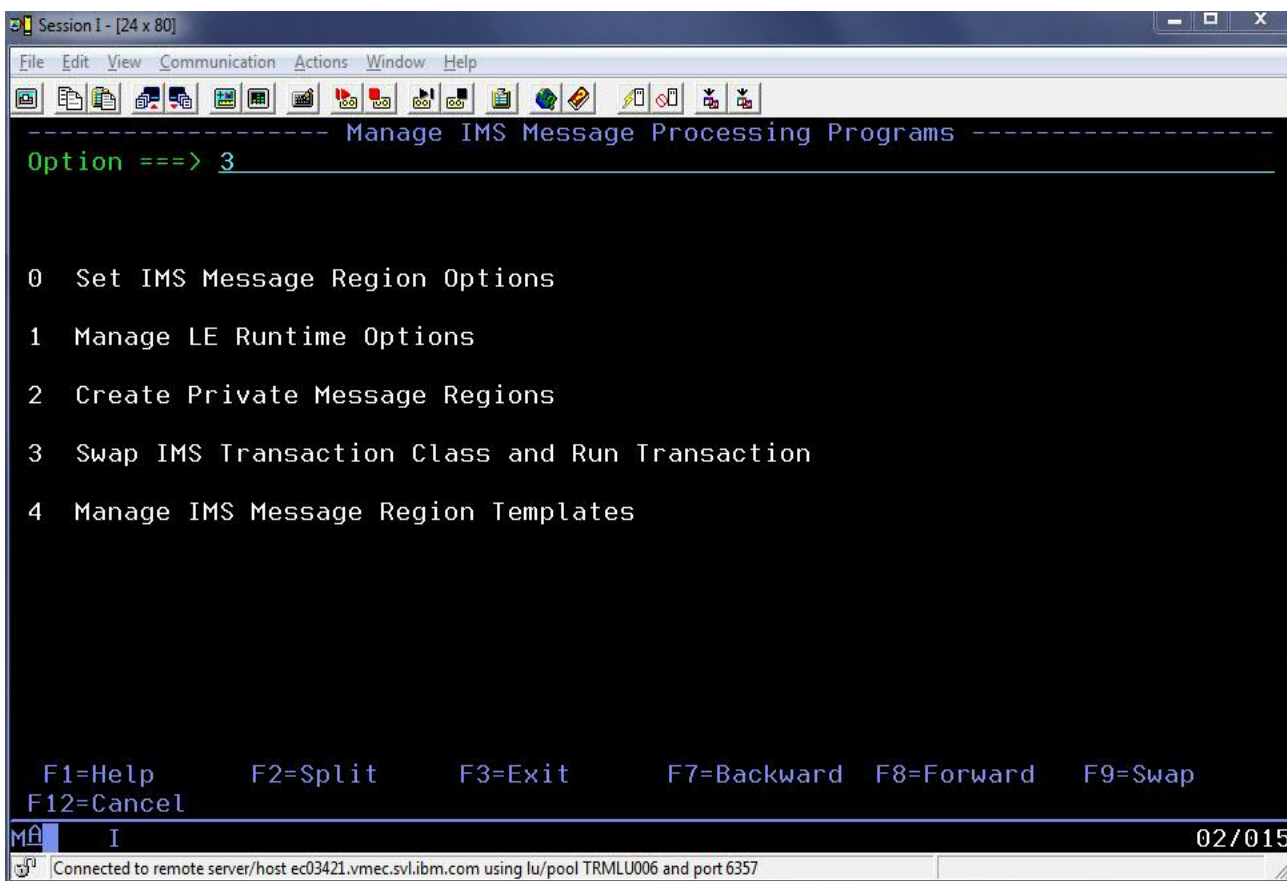
F1=Help      F3=Exit      F7=Backward  F8=Forward  F12=Cancel
MA I                                               02/015
[Icon] Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357
  
```


Developer Use Case

- A developer knows that a certain transaction has a problem.
- The developer would like to debug to determine the location & cause of the failure, in a private message region.
- After debugging, the developer codes a fix and would like to test it without affecting other users.
- The developer would use a private message region template to accomplish these tasks.

Select DTU option 4, sub-option 3

- User selects sub-option 3 to test with a private message region template.



```
----- Manage IMS Message Processing Programs -----
Option ==> 3

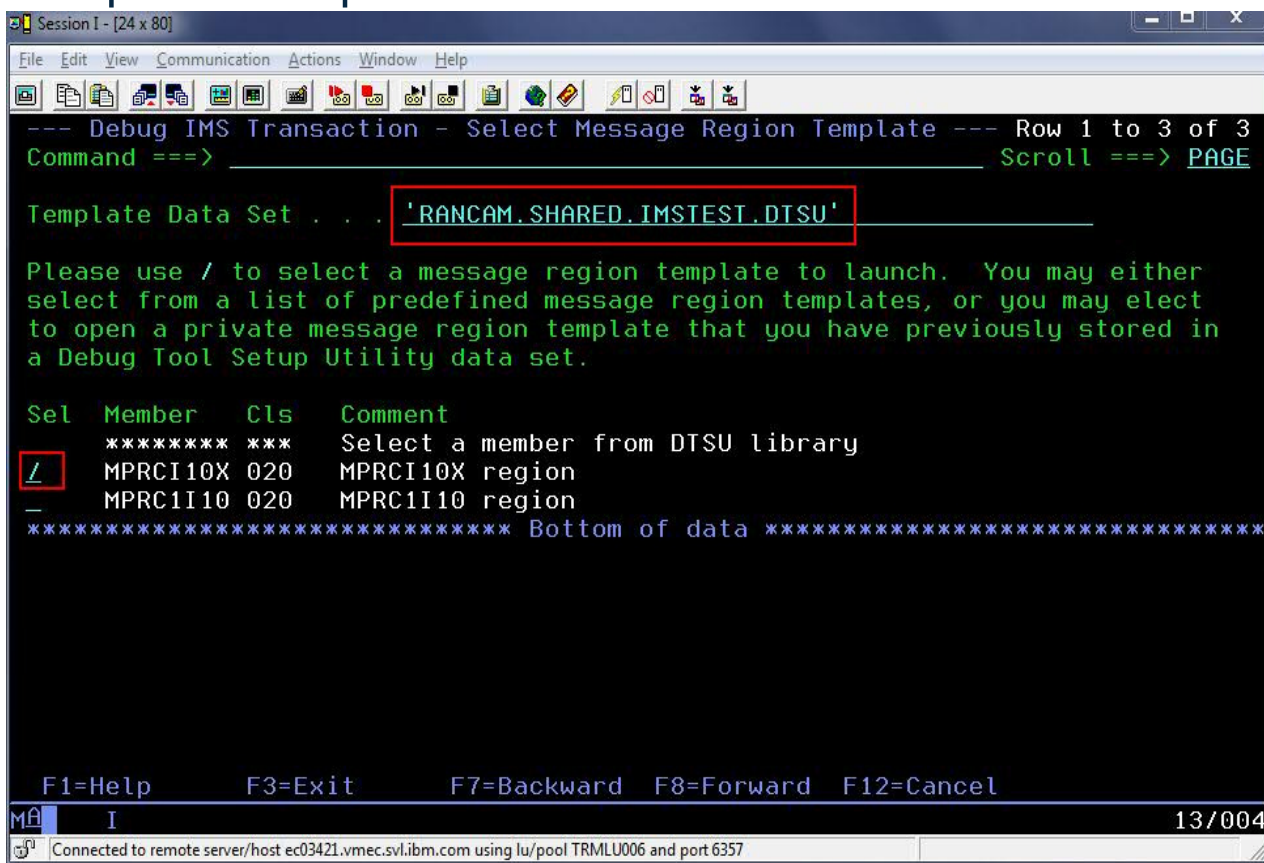
0 Set IMS Message Region Options
1 Manage LE Runtime Options
2 Create Private Message Regions
3 Swap IMS Transaction Class and Run Transaction
4 Manage IMS Message Region Templates

F1=Help      F2=Split    F3=Exit     F7=Backward F8=Forward  F9=Swap
F12=Cancel

M I 02/015
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357
```

Select a pre-defined IMS region template

- User can overtype the template data set name, if desired. Then, user enters forward slash (/) next to the desired template and presses Enter.



```

Session I - [24 x 80]
File Edit View Communication Actions Window Help
--- Debug IMS Transaction - Select Message Region Template --- Row 1 to 3 of 3
Command ==> _____ Scroll ==> PAGE

Template Data Set . . . 'RANCAM.SHARED.IMSTEST.DTSU'

Please use / to select a message region template to launch. You may either
select from a list of predefined message region templates, or you may elect
to open a private message region template that you have previously stored in
a Debug Tool Setup Utility data set.

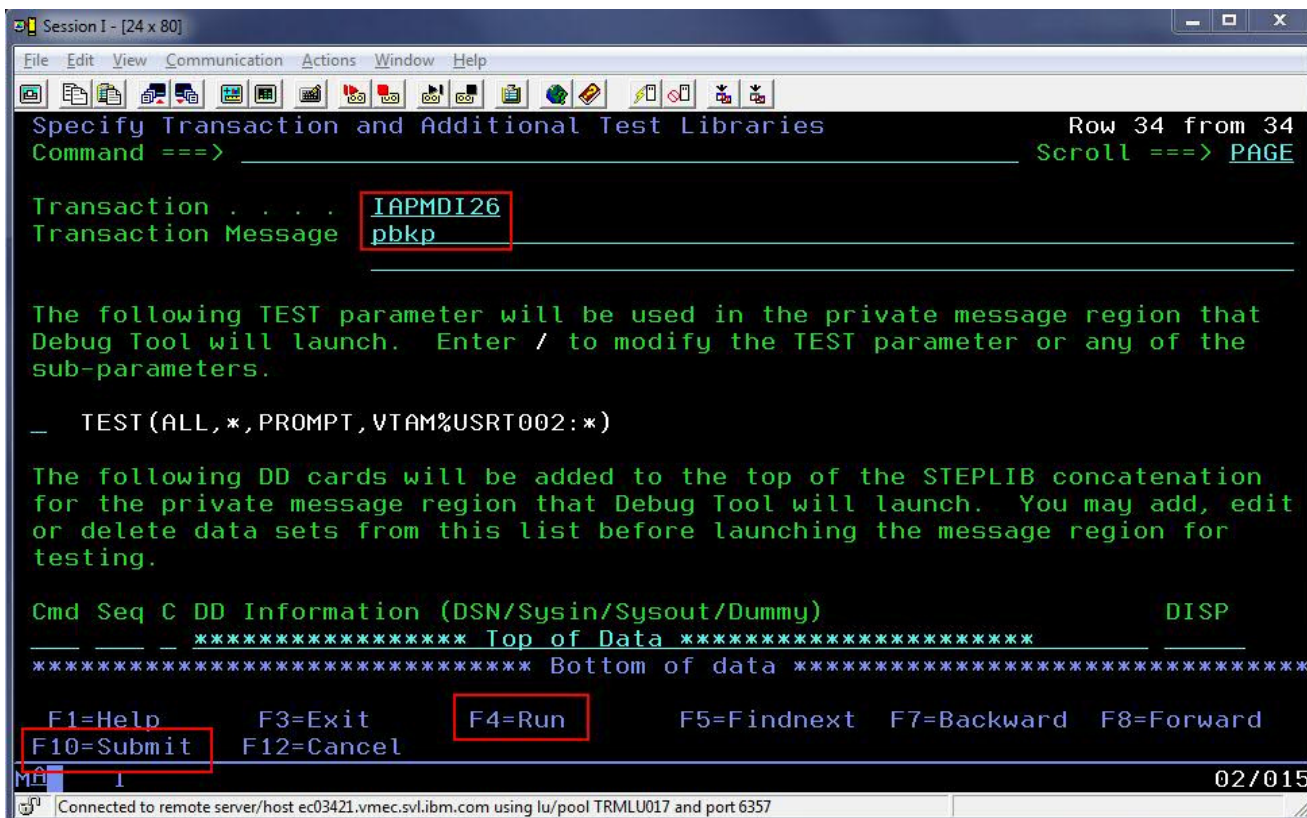
Sel Member Cls Comment
***** ** Select a member from DTSU library
/ MPRCI10X 020 MPRCI10X region
- MPRCI1I10 020 MPRCI1I10 region
***** Bottom of data *****

F1=Help F3=Exit F7=Backward F8=Forward F12=Cancel
M I 13/004
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357

```

Supply a transaction name and message

- To debug with the template, the user will fill in the transaction and any message for the transaction, then hit PF4 to “Run” or PF10 to “Submit”.



```

Session I - [24 x 80]
File Edit View Communication Actions Window Help
Specify Transaction and Additional Test Libraries Row 34 from 34
Command ==> _____ Scroll ==> PAGE

Transaction . . . . IAPMDI26
Transaction Message pbkp

The following TEST parameter will be used in the private message region that
Debug Tool will launch. Enter / to modify the TEST parameter or any of the
sub-parameters.

_ TEST (ALL,*,PROMPT,VTAM%USRT002:*)

The following DD cards will be added to the top of the STEPLIB concatenation
for the private message region that Debug Tool will launch. You may add, edit
or delete data sets from this list before launching the message region for
testing.

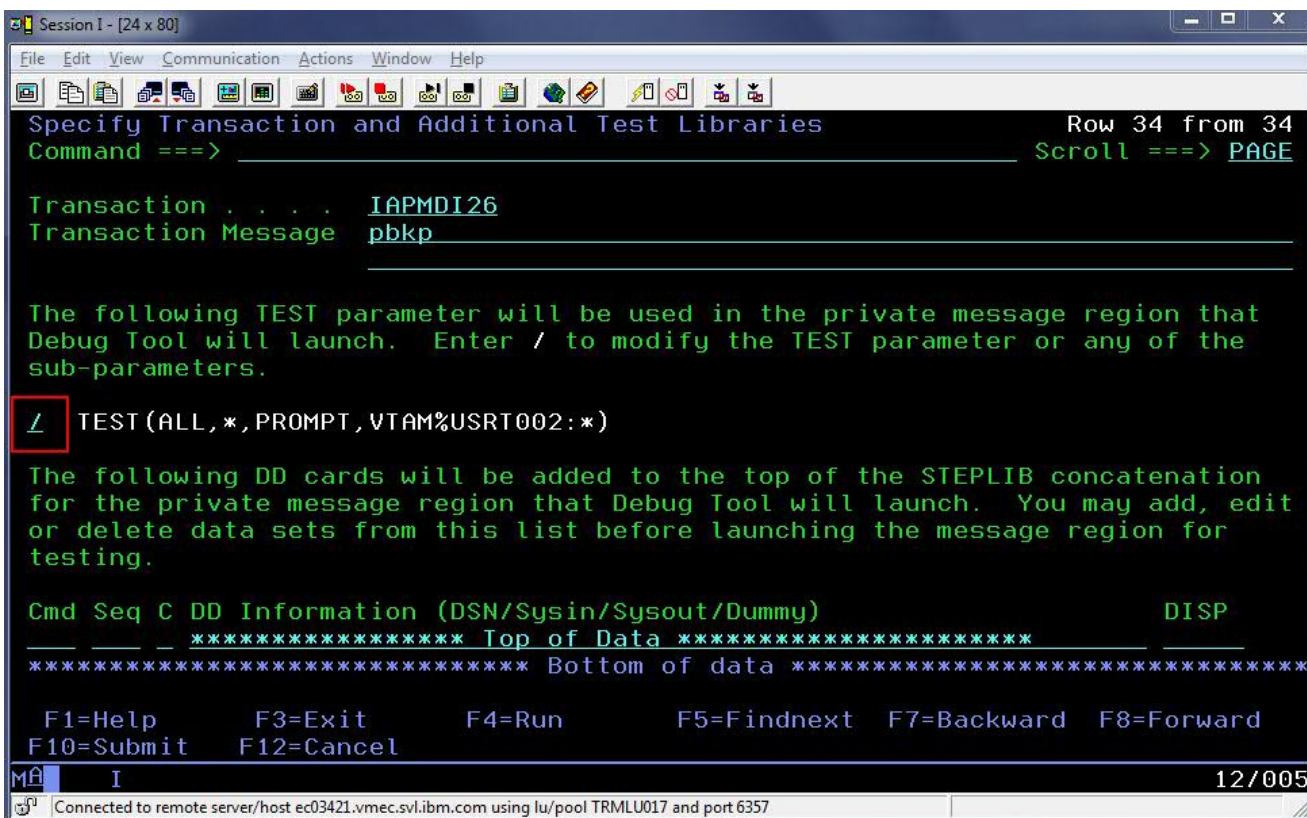
Cmd Seq C DD Information (DSN/Sysin/Sysout/Dummy) DISP
_____ ***** Top of Data *****
***** Bottom of data *****

F1=Help F3=Exit F4=Run F5=Findnext F7=Backward F8=Forward
F10=Submit F12=Cancel

02/015
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU017 and port 6357
  
```

Edit the TEST parameter string

- The user can modify the TEST parameter by placing a forward slash (/) next to the existing parameter and pressing Enter.



```

Session I - [24 x 80]
File Edit View Communication Actions Window Help
Specify Transaction and Additional Test Libraries Row 34 from 34
Command ==> _____ Scroll ==> PAGE

Transaction . . . . IAPMDI26
Transaction Message pbkp

The following TEST parameter will be used in the private message region that
Debug Tool will launch. Enter / to modify the TEST parameter or any of the
sub-parameters.

/ TEST (ALL, *, PROMPT, VTAM%USRT002:*)

The following DD cards will be added to the top of the STEPLIB concatenation
for the private message region that Debug Tool will launch. You may add, edit
or delete data sets from this list before launching the message region for
testing.

Cmd Seq C DD Information (DSN/Sysin/Sysout/Dummy) DISP
_____ ***** Top of Data *****
***** Bottom of data *****

F1=Help F3=Exit F4=Run F5=Findnext F7=Backward F8=Forward
F10=Submit F12=Cancel

M I 12/005
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU017 and port 6357
  
```


Panel to modify the parameter string

- On this panel, the user can change the TEST string to specify a commands or preference file, and also change the “session type” (VTAM or via the remote plugin).

```

Session 1 - [24 x 80]
File Edit View Communication Actions Window Help
----- Debug Tool Foreground - Modify Parameter String -----
Command ==> _____ More: -
Test Option ==> TEST _____ Test/Notest
Test Level ==> ALL _____ All/Error/None
Commands File ==> * _____ *, DDname, or Data Set Name
Prompt Level ==> PROMPT _____ Prompt/NoPrompt/"cmd"
Preference File ==> * _____ *, DDname, or Data Set Name

Select (/) a session type and provide parameters:
_ Full-screen mode using the Debug Tool Terminal Interface Manager
  User ID ==> _____ User ID
/ Remote debug mode
  Address ==> 9.51.70.141
  Port ==> 8001

F1=Help F2=Split F3=Exit F7=Backward F8=Forward F9=Swap
F12=Cancel
MA I 02/015
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU017 and port 6357
  
```

TEST parameter has been modified

- Note that the TEST parameter will now direct debug sessions to the remote plugin at the specified IP address and port.

```

Session 1 - [24 x 80]
File Edit View Communication Actions Window Help
Specify Transaction and Additional Test Libraries Row 34 from 34
Command ==> Scroll ==> PAGE

Transaction . . . . IAPMDI26
Transaction Message pbkp

The following TEST parameter will be used in the private message region that
Debug Tool will launch. Enter / to modify the TEST parameter or any of the
sub-parameters.

- TEST (ALL,*, PROMPT, TCPIP&9.51.70.141%8001:*)

The following DD cards will be added to the top of the STEPLIB concatenation
for the private message region that Debug Tool will launch. You may add, edit
or delete data sets from this list before launching the message region for
testing.

Cmd Seq C DD Information (DSN/Sysin/Sysout/Dummy) DISP
***** Top of Data *****
***** Bottom of data *****

F1=Help F3=Exit F4=Run F5=Findnext F7=Backward F8=Forward
F10=Submit F12=Cancel

M I 12/005
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU017 and port 6357

```


Notes on “Run” and “Submit”

- Both options run an IMS BMP called EQANBSWT.
- EQANBSWT will launch two message regions based on the selected template, will assign the selected transaction to the new message class, and will send a message to the transaction.
- The first region will hard code the TEST parameter selected by the user.
- The second region will hard code NOTEST.
- “Run” executes EQANBSWT in the foreground.
- “Submit” shows JCL to run EQANBSWT, which the user can SUBMIT to JES.

Adding a personal library to template JCL

- The user determines the cause of the failure and codes a fix. To test the fix, the user may use a private message region template with an additional test library. The user accesses the same panel as before, but now uses “I” to insert a library at the top of the STEPLIB concatenation, and then presses PF4 or PF10.

```

Session I - [24 x 80]
File Edit View Communication Actions Window Help
Specify Transaction and Additional Test Libraries Row 34 from 35
Command ==> _____ Scroll ==> PAGE

Transaction . . . . IAPMDI26
Transaction Message pbkp

The following TEST parameter will be used in the private message region that
Debug Tool will launch. Enter / to modify the TEST parameter or any of the
sub-parameters.

_ TEST (ALL, *, PROMPT, VTAM%USRT002:*)

The following DD cards will be added to the top of the STEPLIB concatenation
for the private message region that Debug Tool will launch. You may add, edit
or delete data sets from this list before launching the message region for
testing.

Cmd Seq C DD Information (DSN/Sysin/Sysout/Dummy) DISP
I _____ ***** Top of Data *****
1 _____ 'RANCAM.SHARED.IMS.LOAD' SHR
***** Bottom of data *****
F1=Help F3=Exit F4=Run F5=Findnext F7=Backward F8=Forward
F10=Submit F12=Cancel
MA I 20/003
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU017 and port 6357
  
```

Saving a test case

- After successful completion of testing, the user may wish to save a test case for later.
- To do this, the user may use the “SAVE AS” command.
- If the user attempts to exit without saving, he/she will be prompted.
- To use the test case later, the user may choose “Select a member from DTSU library” on the “Select Message Region Template” panel.

SAVE AS

- After testing, the user can enter SAVE AS or simply press F3 to exit. If the changes are not saved, a prompt will be shown.

```

Session I - [24 x 80]
File Edit View Communication Actions Window Help
----- Exit confirmation for MPRCI10X -----
Command ==> _____
More: +
Your changes to the pre-defined template
MPRCI10X will not be saved.
If you wish to save your changes as a private
message region template, you may use the SAVE
AS command.
Instructions:
Press ENTER key to SAVE AS. You will be
prompted for a data set name where you may
store a private copy of the message region
template.
Press PF3 to EXIT without saving your
changes.
F1=Help      F3=Exit      F7=Backward
F8=Forward   F12=Cancel

TEPLIB concatenation
ch. You may add, edit
message region for

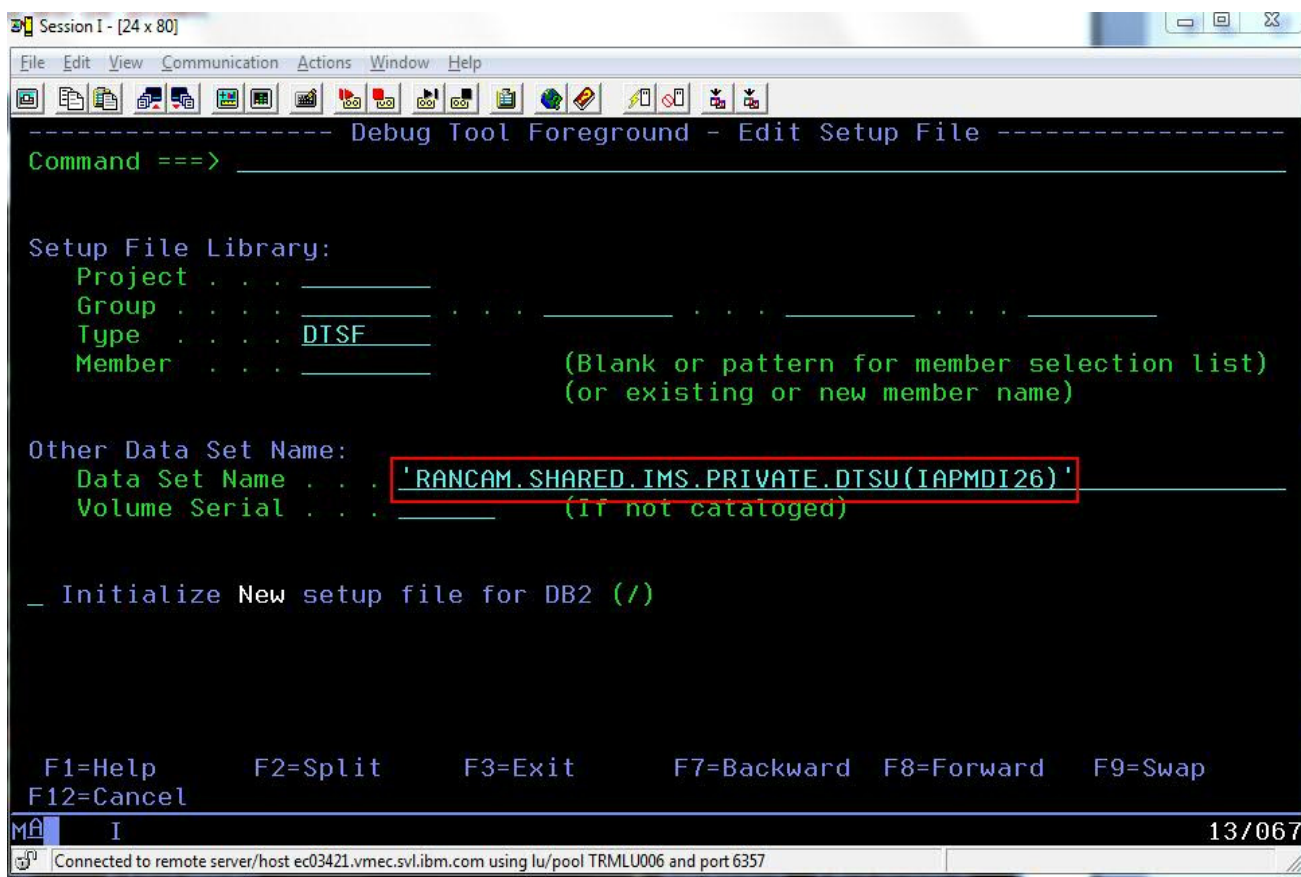
DISP
*****
SHR
*****
Backward F8=Forward

Row 34 from 35
Scroll ==> PAGE
03/020
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357

```

SAVE AS Step 2

- The user can type the name of a DTSU data set and a member name to store the private template. If a member is not specified, a member list will be shown.



```
----- Debug Tool Foreground - Edit Setup File -----
Command ==> _____

Setup File Library:
Project . . . _____
Group . . . _____
Type . . . DTSF
Member . . . _____ (Blank or pattern for member selection list
                        (or existing or new member name)

Other Data Set Name:
Data Set Name . . . 'RANCAM.SHARED.IMS.PRIVATE.DTSU(IAPMDI26)'  
Volume Serial . . . _____ (if not cataloged)

_ Initialize New setup file for DB2 (/)

F1=Help      F2=Split    F3=Exit     F7=Backward F8=Forward  F9=Swap
F12=Cancel

M I 13/067
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357
```


Using a saved test case

- To use the template later, the user will choose “Select a member from DTSU library” and press Enter. This will allow the user to browse a DTSU data set and choose a specific member.

```

Session I - [24 x 80]
File Edit View Communication Actions Window Help
--- Debug IMS Transaction - Select Message Region Tem----- Saved
Command ===> _____ Scroll ===> PAGE

Template Data Set . . . 'RANCAM.SHARED.IMSTEST.DTSU'

Please use / to select a message region template to launch. You may either
select from a list of predefined message region templates, or you may elect
to open a private message region template that you have previously stored in
a Debug Tool Setup Utility data set.

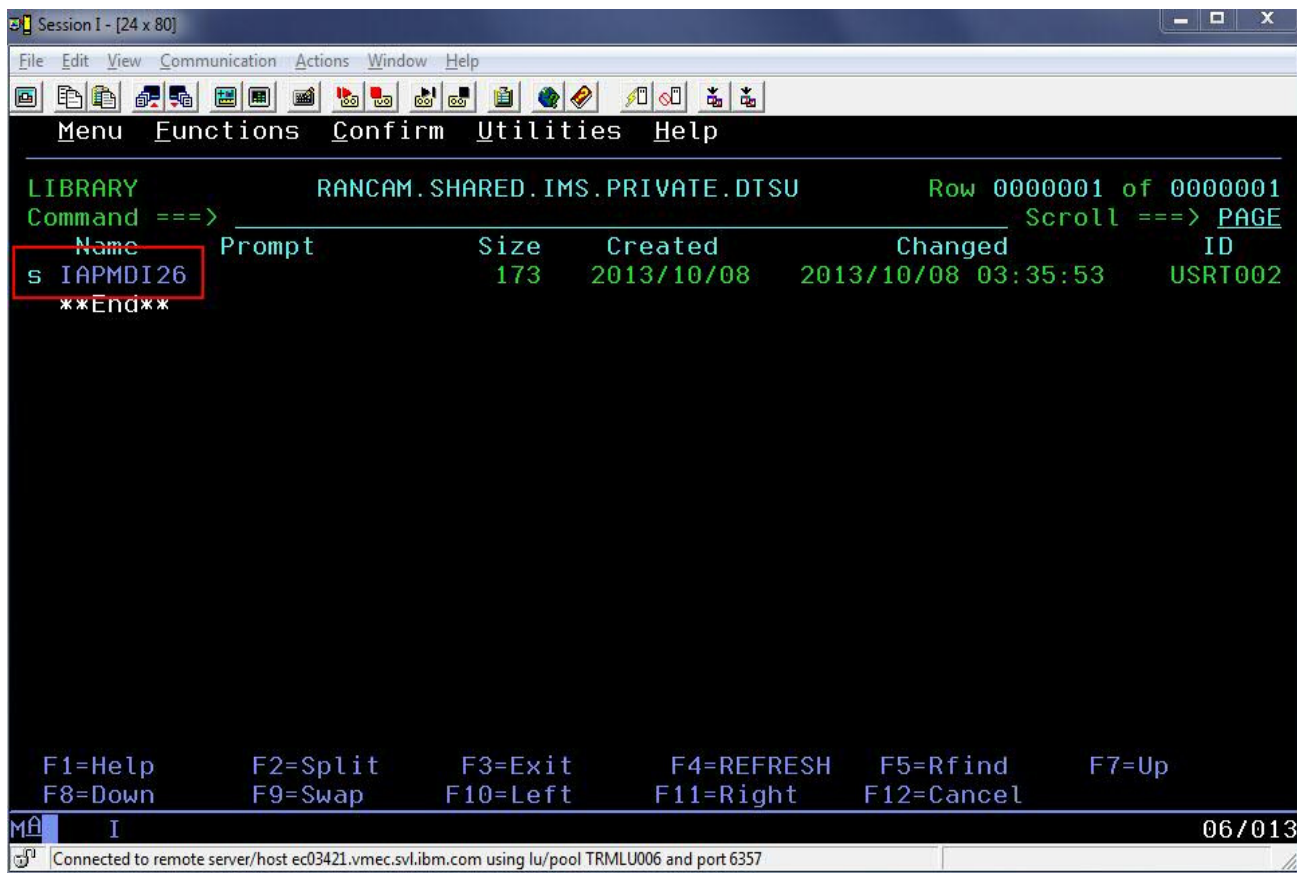
Sel Member Cls Comment
/ ***** *** Select a member from DTSU library
- MPRCI10X 020 MPRCI10X region
- MPRCI110 020 MPRCI110 region
***** Bottom of data *****

F1=Help F3=Exit F7=Backward F8=Forward F12=Cancel
M I 12/004
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357

```


Select test case member

- The user selects the member to use for testing.



```

Session I - [24 x 80]
File Edit View Communication Actions Window Help
Menu Functions Confirm Utilities Help
LIBRARY RANCAM.SHARED.IMS.PRIVATE.DTSU Row 0000001 of 0000001
Command ===> Scroll ===> PAGE
Name Prompt Size Created Changed ID
s IAPMDI26 173 2013/10/08 2013/10/08 03:35:53 USRT002
**End**

F1=Help F2=Split F3=Exit F4=REFRESH F5=Rfind F7=Up
F8=Down F9=Swap F10=Left F11=Right F12=Cancel
M I 06/013
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357

```

Running the saved test case

- The saved template will be shown. Note that the Transaction, Transaction Message and additional libraries have been saved.

```

Session I - [24 x 80]
File Edit View Communication Actions Window Help
Specify Transaction and Additional Test Libraries Row 34 from 35
Command ===> Scroll ===> PAGE

Transaction . . . . IAPMDI26
Transaction Message pbkp

The following TEST parameter will be used in the private message region that
Debug Tool will launch. Enter / to modify the TEST parameter or any of the
sub-parameters.

_ TEST (ALL, *, PROMPT, VTAM%USRT002: *)

The following DD cards will be added to the top of the STEPLIB concatenation
for the private message region that Debug Tool will launch. You may add, edit
or delete data sets from this list before launching the message region for
testing.

Cmd Seq C DD Information (DSN/Sysin/Sysout/Dummy) DISP
-----
1 - 'RANCAM.SHARED.IMS.LOAD' SHR
***** Bottom of data *****
F1=Help F3=Exit F4=Run F5=Findnext F7=Backward F8=Forward
F10=Submit F12=Cancel
MA I 02/015
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU017 and port 6357

```