



What's New In the IBM Problem Determination Tools

Doug Stout

IBM Problem Determination Tools

stoutd@us.ibm.com

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IBM Problem Determination Tools
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#SHAREorg



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Agenda

- What are the IBM Problem Determination Tools
- Ongoing Enhancements
- 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 for z/OS (PD Tools)



Application Performance Analyzer for z/OS

- Identify performance and response time problems. Assists in reducing resource consumption.

Debug Tool for z/OS

- Interactive program debugging to monitor and control the execution of application programs on z/OS, COBOL modernization, code coverage

Fault Analyzer for z/OS

- Abend analysis at source-level to speed up problem analysis.

File Manager for z/OS

- Advanced editor, viewer, and z/OS data handling utilities to work with data sets, DB2, IMS, CICS, MQ, and HFS files

IBM Problem Determination Tools Modernization Solution Pack

Workload Simulator for z/OS & OS/390

HourGlass

Data Set Commander (formerly IPT)

Migration Utility

✓ Choice of User Interfaces (3270, Eclipse, CICS, Web)



• PD Tools can be used in a variety of environments and interfaces, because we recognise that you work with heterogeneous environments with a diverse workforce.

- ISPF interface is still the most commonly used interface for most products.
- Our IPV technology allows us to display ISPF-like panels under CICS. This enables usage of FA and FM functionality directly from CICS environment without switching to ISPF environment.
- Eclipse interface is available for all products. Integrates with seamlessly with IBM's key Eclipse-based products (RDz, CICS Explorer and others).
- Browser interface is available for Fault Analyzer.

1. ISPF interface

```

Process Options Help
View KENICHI.FM DATA Top of 40
Command ==> Scroll CSR
Record AT TOP Format TOBL
REC-TYPE NAME EMPLOYEE-NO AGE SALARY MONTH(1)
#2 #4 #5 #6 #7 #8
RN 1:2 AN 3:20 BI 29:2 B1 25:2 PD 27:4 B1 31:4
< <-----1-----> <----> <----> <-----1>
***** **** Top of data ****
000001 01 Grant Smith 7712 35 75000 8
000002 01 Andrew Apple 8645 53 78500 30
000003 01 Graham Prestcott 5583 28 48000 7
000004 01 Bill Somers 4418 33 66000 5
000005 01 Ted Dexter 3327 52 80250 14
000006 01 Roddy Armstrong 5093 34 77000 29
000007 01 Cliff Roberts 2295 57 100000 44
000008 01 James Browne 1117 46 125000 47
000009 01 Silvia Carrot 2308 29 61400 1
000010 01 Dan Peters 4479 54 63000 38
000011 01 John Laws 3422 21 46750 14
000012 01 Liz Childs 3438 55 66000 44
F1=Help F2=Zoom F3=Exit F4=CRetrieve F5=RFind F6=RChange
F7=Up F8=Down F9=Swap F10=Left F11=Right F12=Cancel
  
```

2. CICS interface

```

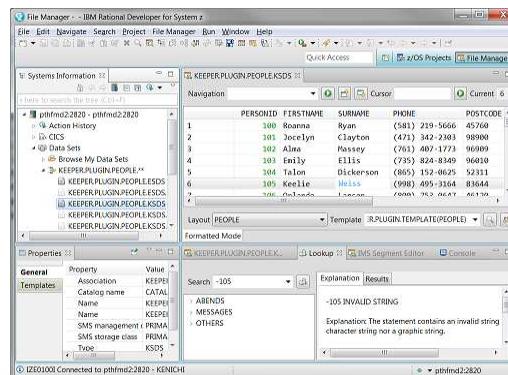
Process Options Help
FM/CICS Primary Option Menu Warning - PTF mismatch
User ID : JPHILP
CICS User : CICSUSER
CICS Appl : C64D2FH2
Date : 2014/08/28
Time : 18:24

0 Settings Set processing options
1 View View data
2 Edit Edit data
3 Utilities Perform utility functions
4 Templates Template and copybook utilities
5 WebSphere MQ List, view and edit MQ data
FM FM File Manager z/OS
F1 FM/IMS File Manager for IMS z/OS
FD FM/DB2 File Manager for DB2 z/OS
X Exit Terminate FM/CICS

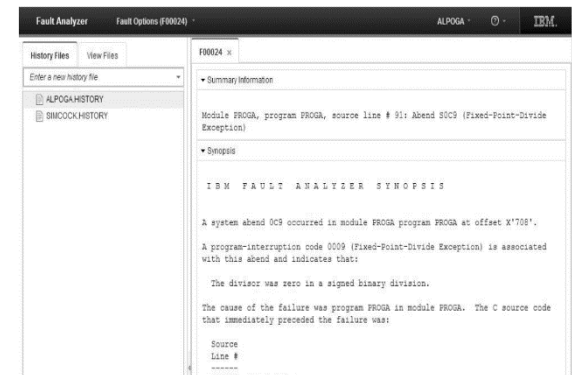
Processing Options:
CICS Resource
1. File
2. Temporary Storage
3. Transient Data

Command ==>
F1=Help F3=Exit F4=CRetrieve F7=Backward F8=Forward F10=Actions
F12=Cancel
  
```

3. Eclipse interface



4. Browser interface



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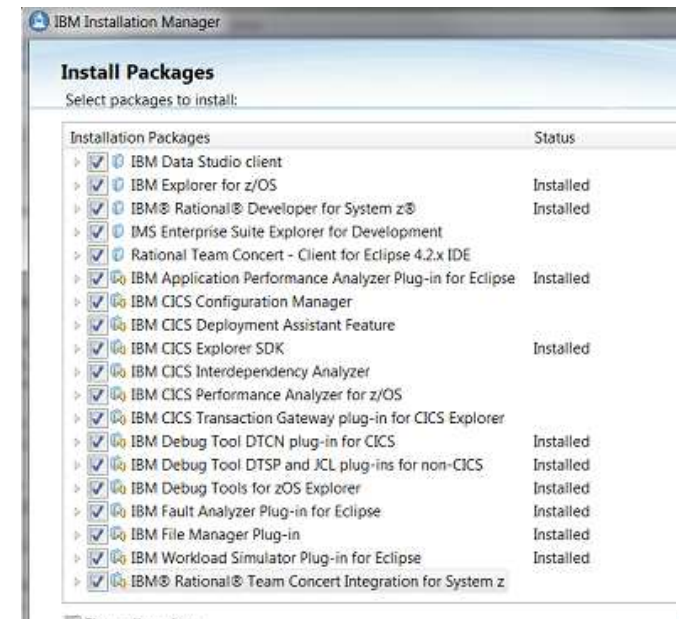
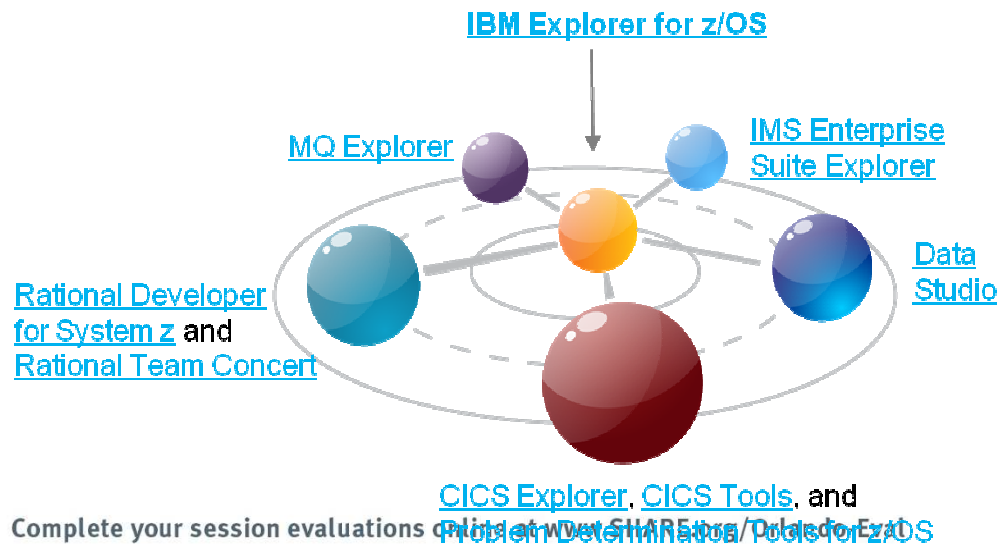
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Implementation of GUIs made Simple!



Simplicity

- PD Tools GUIs (FM, FA, APA, DT) talk to a single PD Tools Common Server address space
- PD Tools Studio: All PD Tools GUIs package together including z/OS Explorer
- You can integrate into RDz or CICS Explorer or IMS Explorer or your own Eclipse for Development.
- Select capabilities you need from a single update site.



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Choice of interfaces supports varying developer skills



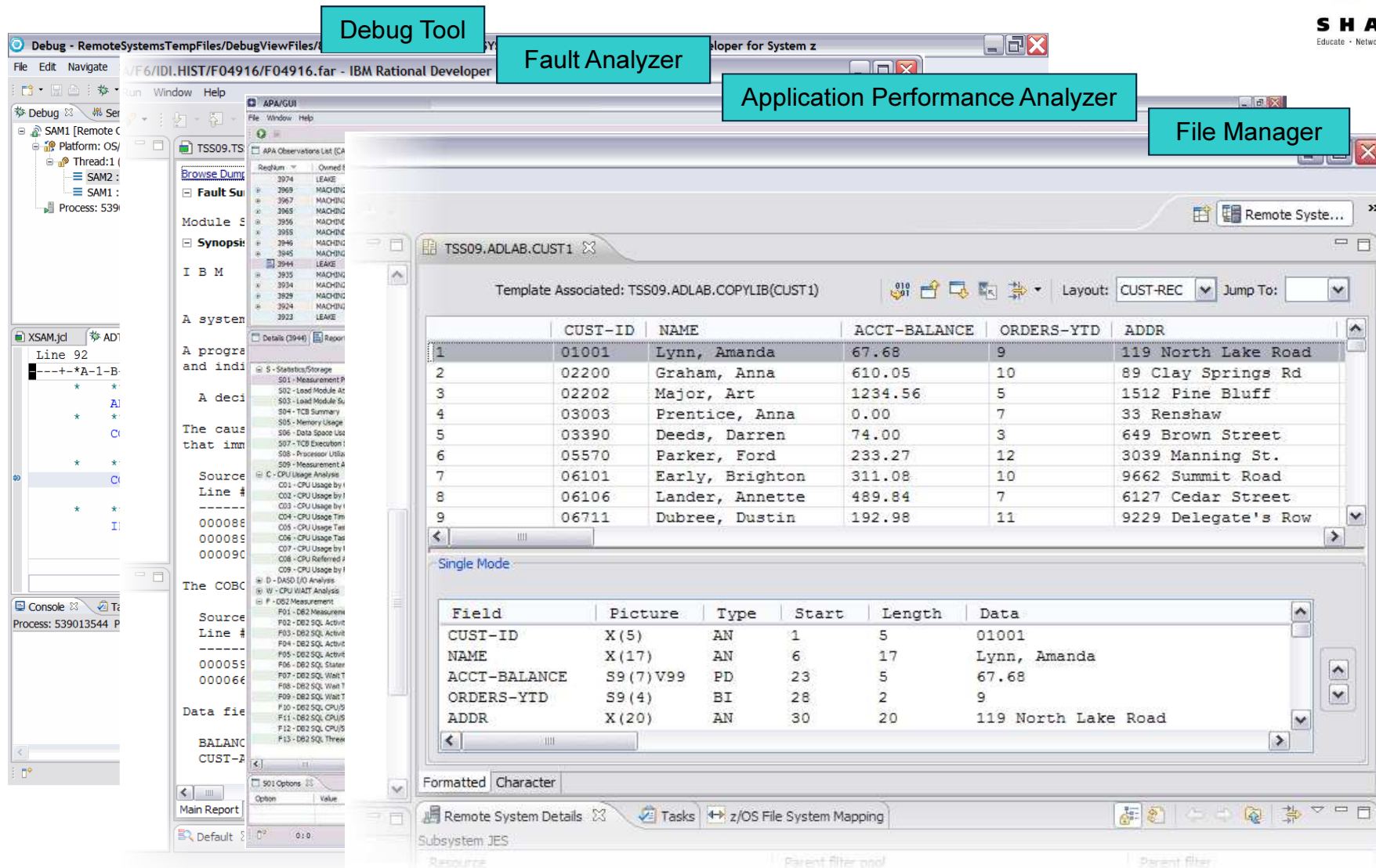
- Reusing mainframe application assets requires expertise in both traditional and new z/OS technologies
- To maximize productivity:
 - Some developers may prefer traditional interfaces
 - Others prefer GUIs
- Use common Eclipse-based tooling across multiple platforms and languages
 - GUIs can reduce training costs, and provide a more familiar environment for developers with experience on environments other than z/OS



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Graphical user interfaces for PD Tools



The screenshot displays the IBM Rational Developer for System z environment. Several windows are open, each with a label in a red box:

- Debug Tool:** Located at the top left, showing a project tree and a console window.
- Fault Analyzer:** Located in the middle left, displaying a list of faults with columns for ReadPgm, Owned, and other details.
- Application Performance Analyzer:** Located in the middle right, showing a table of customer data.
- File Manager:** Located at the top right, showing a file browser interface.

The Application Performance Analyzer window displays the following data table:

	CUST-ID	NAME	ACCT-BALANCE	ORDERS-YTD	ADDR
1	01001	Lynn, Amanda	67.68	9	119 North Lake Road
2	02200	Graham, Anna	610.05	10	89 Clay Springs Rd
3	02202	Major, Art	1234.56	5	1512 Pine Bluff
4	03003	Prentice, Anna	0.00	7	33 Renshaw
5	03390	Deeds, Darren	74.00	3	649 Brown Street
6	05570	Parker, Ford	233.27	12	3039 Manning St.
7	06101	Early, Brighton	311.08	10	9662 Summit Road
8	06106	Lander, Annette	489.84	7	6127 Cedar Street
9	06711	Dubree, Dustin	192.98	11	9229 Delegate's Row

Below this table, the 'Single Mode' section shows a field definition table:

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

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PD Tools GUIs are Eclipse plug-ins



- The graphical interfaces are plug-ins for Eclipse platforms, such as:
 - The PD Tools Studio
 - Rational Developer for System z (RDz)
 - CICS Explorer
 - IMS Explorer
- If you do not already have RDz or other Eclipse software installed on your workstation:
 - Install the PD Tools Studio
 - It is a free download from IBM
 - It is a complete Eclipse environment, with the PD Tools plug-ins already installed
- If you are already using an Eclipse platform, you can:
 1. Install the PD Tools GUI plug-ins into your favorite Eclipse
 - The plug-ins are available as new perspectives and views after they are added
 2. Or, install the PD Tool Studio separately
 - Your original Eclipse platform is unchanged, and you can use the PD Tools Studio as a completely separate Eclipse environment

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PD Tools Studio free download



- www.ibm.com/software/awdtools/deployment/pdplugins/
- Download and follow the installation instructions on the download page

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Problem Determination Tools Plug-ins

- Library
- News
- How to buy
- Training and certification
- Services
- Support

IBM Problem Determination Tools Studio and Plug-ins Downloads

Downloadable files

Abstract
Problem Determination Tools Studio and Plug-ins download packages.

Download Description
The IBM Problem Determination Tools Studio and Plug-ins provide easy access through a graphical user interface (GUI) on the workstation to the power of the host IBM Problem Determination Tools — Application Performance Analyzer for z/OS, Debug Tool for z/OS, Fault Analyzer for z/OS, File Manager for z/OS, and Workload Simulator for z/OS and OS/390.

Installation Options		
Option	Description	Link
Installation Manager installation (recommended)	Create your own custom workbench by selecting products from a list of IBM compatible products including the Problem Determination Tools plug-ins. The	Link to install instructions

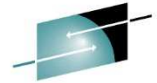
IBM Problem Determination Tools Studio is a standalone, Eclipse-based environment that contains the capability found in each of the individual product plug-ins for Application Performance Analyzer, Debug Tool, Fault Analyzer, File Manager, and Workload Simulator, including:

- With Application Performance Analyzer, it can be used for submitting new observation requests and navigating performance analysis reports.
- With Debug Tool, it helps debug load modules running on z/OS, including those run in CICS,

Compl



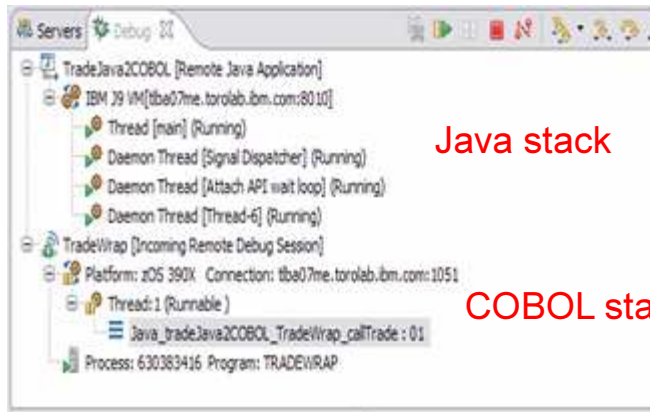
Java on z/OS? It's real – Mobile, SOA, batch, modernization...



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.

Debugging

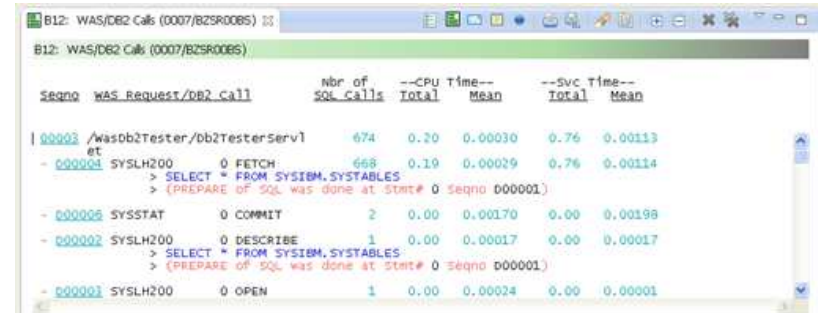


Java stack

COBOL stack



Performance Analysis



Abend analysis involving mixed 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		CEEBCINIT	n/a	CEEBCPMM	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		

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✓ Day 1 support for upgrades of of z Systems hardware, z/OS, languages and middleware



- **IBM z13 hardware and z/OS V2.1**
 - Support for all new compilers that exploits z13 hardware.
- **Enterprise COBOL V5.2 and V5.1 compilers**
 - Support for the latest compiler advancements.
 - Direct support for the new DWARF format side file.
- **CICS Transaction Server V5.2**
 - PD Tools support CICS TS V5.2 environment.
 - Exploitations of the key CICS TS V5.2 enhancements (eg. Support for “applications”).
 - Support for CICS TS V5.3 Open Beta program.
- **Enhancements in support of major languages and subsystems**
 - Enterprise PL/I V4.5 and z/OS XL C/C++ V2.1 compilers
 - DB2 11 for z/OS
 - IMS 13 Transaction and Database Servers
 - WebSphere Application Server for z/OS V8.5
 - WebSphere MQ for z/OS V8.0

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Upgrade example... SIMD (Single Instruction Multiple Data) A new instruction set with z13

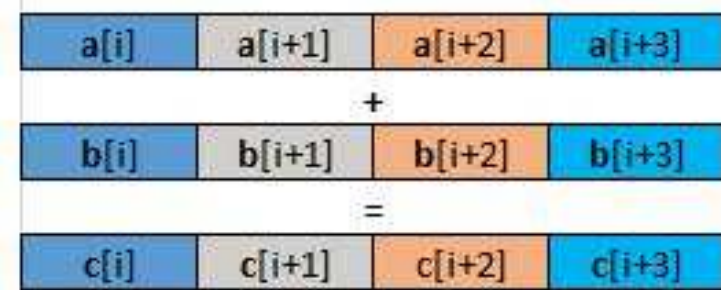


Operate on multiple data-elements (vectors) simultaneously

Can offer dramatic speed-up to data-parallel operations. For COBOL and PL/I we can speed up some string operations

Vector registers are 128-bits wide and can be used to operate concurrently on:

- Sixteen 8-bit characters
- Four 32-bit integer values
- Two 64-bit floating point values
- Four 32-bit floating point values
- Etc



4x less iterations in the SIMD loop

```
//SISD C example, adding two arrays
for (i=0;i<128;i++)
{
  c[i] = a[i] + b[i];
}
```

```
//SIMD C example, adding two arrays
for (i=0;i<32;i++)
{
  vec_add(c[i*4], a[i*4], b[i*4]);
}
```

COBOL V5.2 Exploitation of SIMD

- INSPECT TALLYING counts characters in a string
- INSPECT REPLACING replaces characters in a string

Sample code:

```
WORKING-STORAGE SECTION.  
01 VARS.  
  02 STR PIC X(255).  
  02 C PIC 9(5) COMP-5 VALUE 0.  
PROCEDURE DIVISION.  
  MOVE ALL 'abc def ghi jkl ' TO STR  
  PERFORM 100000000 TIMES  
    INSPECT STR TALLYING C FOR ALL ' '  
  END-PERFORM  
  GOBACK
```

30 times faster
97% less CPU

INSPECT TALLYING/REPLACING

V5.1 -- ARCH(10)

```
LHI R0,0xff
XR R1,R1
LA R12,152(,R8) # STR
L1: EQU *
CLI 0(,R12),X'40`
JNOP L2
LA R1,1(,R1)
L2: EQU *
LA R12,1(,R12)
BRCT R0,L1
A R1,407(,R8) # C
ST R1,407(,R8) # C
```

V5.2 -- ARCH(11)

```
LHI R0,0xfe
XR R1,R1
LA R12,152(,R8) # STR
VREPIB VRF27,0x40
VGBM VRF25,0x0
L1: EQU *
VLL VRF24,R0,0(,R12)
AHI R12,0x10
VCEQB VRF24,VRF24,VRF27
AHI R0,0xffff0
VLCB VRF24,VRF24
VAB VRF25,VRF25,VRF24
JNL L1
VGBM VRF26,0x0
VSUMB VRF25,VRF25,VRF26
VSUMQF VRF25,VRF25,VRF26
VLGVG R1,VRF25,1(,R1)
A R1,407(,R8) # C
ST R1,407(,R8) # C
```

Timing (100 million times in a loop)

V5.1 : 46.63 cpu seconds

V5.2 : 1.54 cpu seconds

Decimal Floating Point

- Packed Decimal (COMP-3) data items convert directly from/to DFP (decimal floating point)

Sample code:

```
WORKING-STORAGE SECTION.
```

```
01 VARS.
```

```
02 A PIC S9(25) Packed-Decimal VALUE +1234567890123456789012345.
```

```
02 B PIC S9(25) Packed-Decimal VALUE +2468097531246809753124680.
```

```
02 C PIC S9(25) Packed-Decimal VALUE 0.
```

```
PROCEDURE DIVISION.
```

```
PERFORM 100000000 TIMES
```

```
    DIVIDE A BY B GIVING C
```

```
END-PERFORM
```

Timing (100 million times in a loop)

V5.1 : 2.53 cpu seconds

V5.2 : 1.65 cpu seconds

36% less CPU

Using new instructions for Decimal Floating Point



V5.1 -- ARCH(10)

```
XGR R0,R0
ICMH R0,X'1',152(,R8) # A
L R0,153(,R8) # A
LG R1,157(,R8) # A
CXSTR FP0,R0
XGR R0,R0
ICMH R0,X'1',165(,R8) # B
L R0,166(,R8) # B
LG R1,170(,R8) # B
CXSTR FP1,R0
DXTR FP4:FP6,FP0:FP2,FP1:FP3
FIXTR FP0:FP2,9,FP4:FP6
CSXTR R0:R1,0,FP0:FP2
STCMH R0,X'1',178(,R8) # C
ST R0,179(,R8) # C
STG R1,183(,R8) # C
ZAP 178(13,R8),178(13,R8) # C
```

V5.2 -- ARCH(11)

```
CXPT FP0:FP2,152(13,R8),0x8
CXPT FP1:FP3,165(13,R8),0x8
DXTR FP4:FP6,FP0:FP2,FP1:FP3
FIXTR FP0:FP2,9,FP4:FP6
CPXT FP0:FP2,178(13,R8),0x9
```

Timing (100 million times in a loop)

V5.1 : 2.53 cpu seconds

V5.2 : 1.65 cpu seconds

36% less CPU

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✓ Enterprise COBOL V5.1 and 5.2 Support



•Enterprise COBOL V5.2

- Includes all enhancements delivered in COBOL V5.1 PTFs

- Provides Day 1 support for z13 processor

 - Expanded use of Decimal Floating Point for PACKED-DECIMAL data

 - Uses new SIMD instructions for INSPECT TALLYING or REPLACING statements

- Improves Application Performance

 - Well-structured, compute intensive applications running on z13 have shown CPU reduction up to 14%

 - (compared with COBOL v5.1 on ZEC12)**

•PD Tools Exploitation

- The new DWARF format side file of COBOL V5.1 brings a significant advantage

 - Program information required for problem diagnosis is stored in the same member as the load module.

 - Simpler management of side files - it is no longer necessary to maintain load modules and matching side files in separate libraries

 - It eliminates the possibility of side file mismatch

 - No performance penalty for selecting the DWARF option. DWARF information is not loaded into storage while program executes normally. It is only read from when it is needed by PD Tools

- This new DWARF format is used by:

 - Debug Tool

 - Fault Analyzer

 - Application Performance Analyzer

- All PD Tools support new z13 hardware instructions exploited by the compiler.

- File Manager for z/OS continues to support COBOL V5.1 level COPYBOOKS.

¹ Results are based on an internal compute-intensive test suite. Performance results from other applications may vary.

✓ Automatic Binary Optimizer for z/OS Open Beta Support



•Standalone Optimization Technology based on Enterprise COBOL V5

–Automatically performs optimization for existing programs without recompiling the source program

•Value To Clients

–Increase performance of business critical applications

–IBM internal benchmarks show performance averaging > 20% over **already optimized** COBOL benchmarks

–Requires no source recompiling or intensive performance options tuning

–Initial support planned for COBOL but technology can be extended to benefit PL/I and C/C++ applications

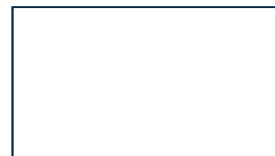
•Supports programs compiled by COBOL compiler V3 and V4. Investigating support for OS/VS COBOL and VS COBOL II.

•PD Tools Support

- FA can analyze abends in Optimus optimised programs and offer source level reporting
- APA can report performance with source mapping
- DT: planned support for debugging of Optimus optimized programs, with some limitations



existing COBOL module :
base (e.g. COBOL V4)



optimized COBOL module :
latest (e.g. z13)
instructions and
latest optimization technology



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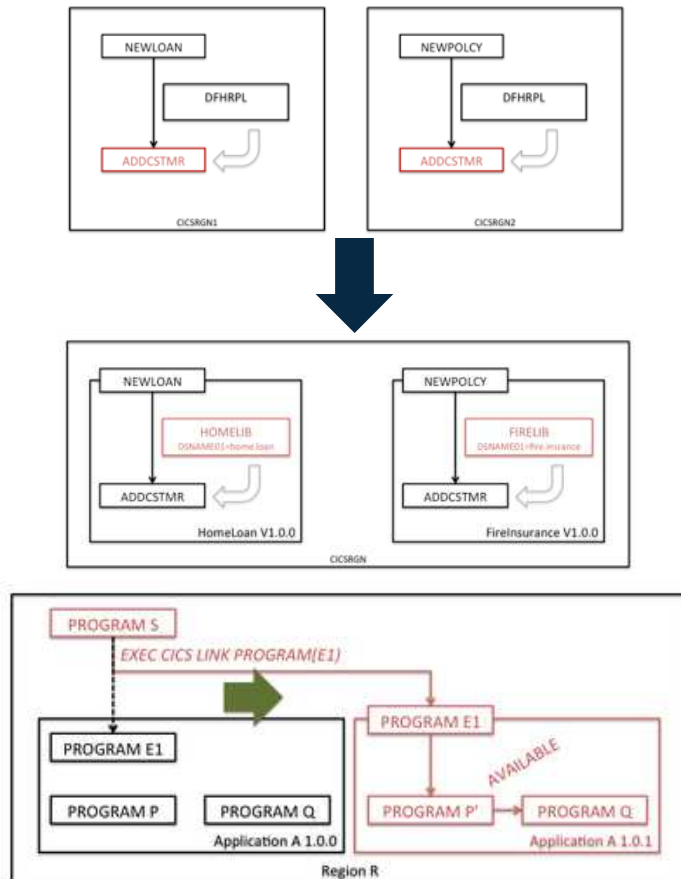
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✓ CICS TS V5.2 Exploitation and CICS TS V5.3 Open Beta



•CICS Multi-Versioning

- Increased operational efficiency – reducing # of CICS regions



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- Debug Tool supports CICS multi-versioning through DTCN remote plug-in.

Application	
Platform Name:	
Application Name:	
Operation Name:	
Application Version:	

- Fault Analyzer reports the application information.

```

File View Services Help
CICS Information
Command ==>
TRANID: Z123          CICS ABEND: Z123          SA07
CICS Release . . . . . 0690 (TS 5.2)
Application ID . . . . . CSYS01
CICS Transaction ID . . . . . Z123
CICS Task Number . . . . . 00055
CICS Terminal ID . . . . . 0053
CICS Terminal Netname . . . . . S0700053
Application Name . . . . . ZapAppProject123
Operation Name . . . . . ZAPP123entry
Platform Name . . . . . TonyPla1
Application Version . . . . . 1.2.3

Select one of the following:
1. CICS Control Blocks
2. CICS Transaction Storage Summary
3. CICS Transaction Storage
4. Last CICS 3270 Screen Buffer
5. Last CICS 3270 Screen Buffer Hex
6. Summarized CICS Trace
7. CICS Trace Formatting
8. CICS Recovery Manager
9. CICS Levels, Commareas, and Channels

*** Bottom of data.
    
```

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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

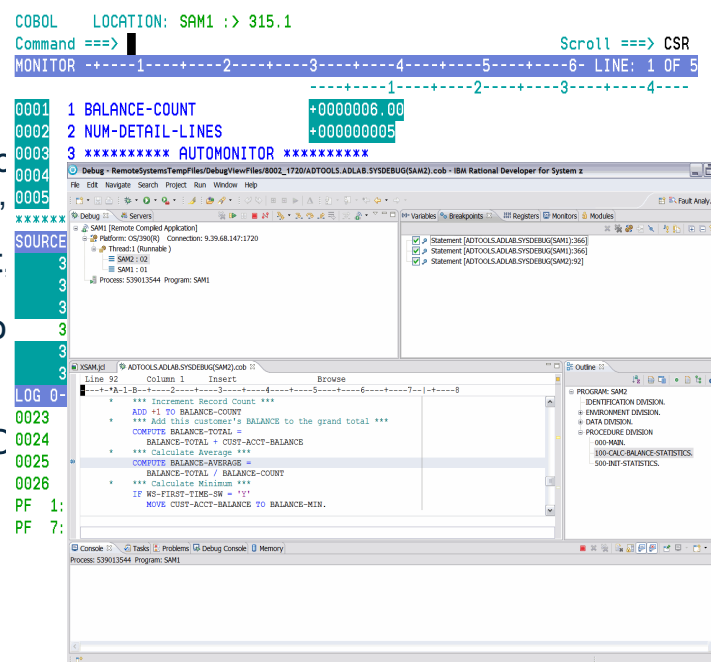
Continuing to support the latest level of z/OS (V2.1), languages (COBC V5.1, PL/I V4.4, C/C++ for z/OS V2.1, Java V7, and HLASM) and subsystems (CICS V5.1, DB2 V11, IMS V13, MQ 7.5, and WASz 8.5).

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



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IBM Debug Tool Version 13



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

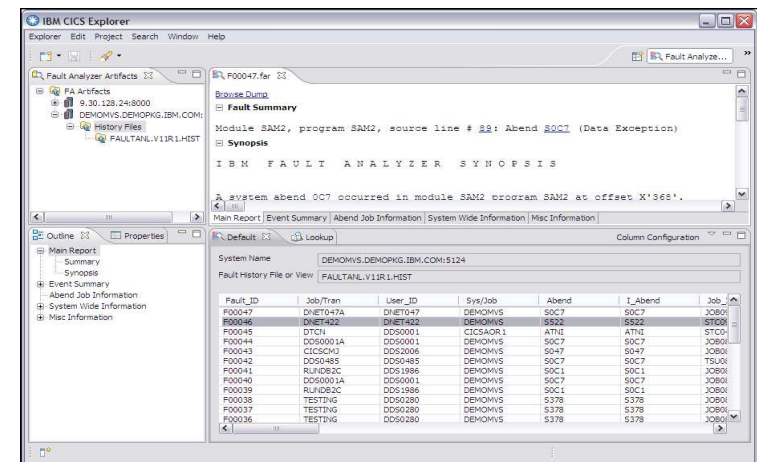
The COBOL source code for data fields involved in the failure:

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.
```



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



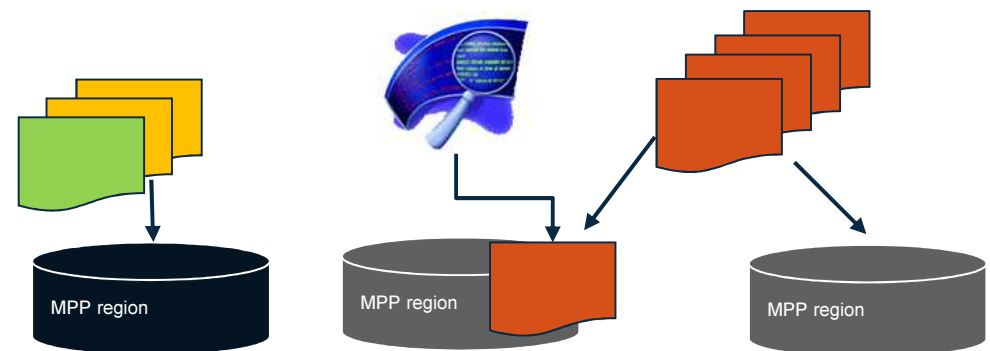
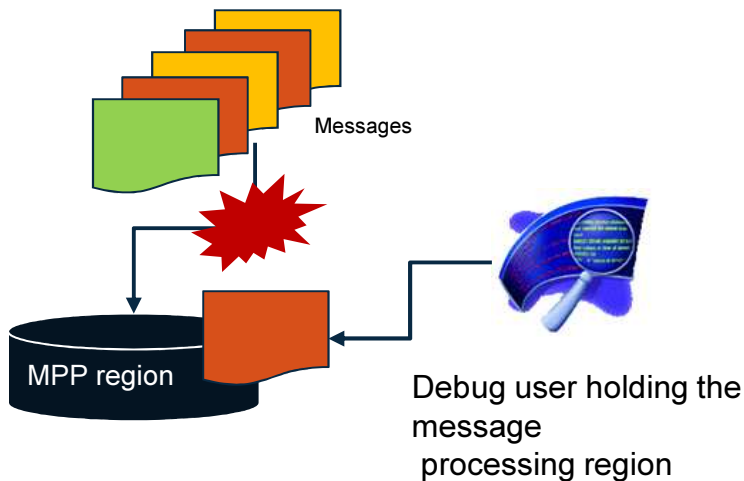
IMS/TM debugging wizard and automatic submission of a message processing region

•Problem trying to address:

- In IMS online environments, debugging a transaction in Debug Tool can monopolize the scheduling environment for a given message class
- 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:

- In Debug Tool utilities, 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.



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A message is posted to trigger a debug session. This is processed in a dedicated region.

The rest of transactions are routed to a different MPP region for processing.

✓ Delayed Debug capability



- By default, Debug Tool starts a debug session at the main program
 - (The first entry compile unit of the initial load module of an application)
- Without delay Debug, you can set an 'AT ENTRY' breakpoint to stop at a subroutine after the debugger starts
- With the Delay Debug feature, you can bypass the startup of Debug Tool at the main program, and begin the debugging session at a named subprogram
 - This can simplify debugging
 - It can also improve performance for complex long-running applications
- Debug Tool is in a dormant state in delay debug mode, and monitors only a few events

```
|----> TBND003A
|           |----> TBND003B
|           |----> TBND003C
|----> TBND003X
|----> TBND003D
|           |----> TBND003E
|           |----> TBND003F
|----> TBND003X
```

- <http://www-01.ibm.com/support/docview.wss?uid=swg21422089&aid=5>
Complete your session evaluations online at www.SHARE.org/Orlando-Eval



✓ Other debug Tool enhancements



•Code coverage eclipse and web interface

- Browser interface for reviewing code coverage report.
- Quickly understand coverage of regression testing effort.
- Drill down to source line level for detailed analysis.
- Code coverage services can be accessed via APIs.

•Load Module Analyzer Eclipse plug-in

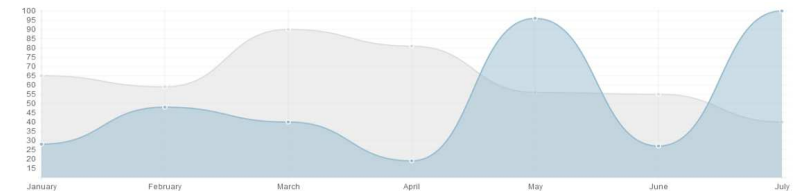
- Analyzes MVS load modules or program objects to determine the language translator (compiler or assembler) used to generate the object for each CSECT.
- Invoke Load Module Analyzer from Eclipse environment.

•JCL Wizard

- An ISPF edit macro that can be used to modify a JCL or procedure member, creating the statements to invoke Debug Tool in various environments.
- It has the capability to create statements that can be used to invoke Debug Tool for z/OS for the Terminal Interface Manager, Mainframe Interface, or Remote GUI.

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

Summary and chronological Information



Connected to: TLBA07ME.TOROLAB.IBM.COM

Groups		Users	
GUI	92%	glen	92%
Server	87%	jesse	87%
Regression	55%	francisco	55%

Working with CC reports expanding on a user: Annotated and color coded

```
71
72 e MOVE SPACE TO TBND003F-DATA-OUT.
73
74 e IF TBND003F-DATA-IN IS NUMERIC
75 e IF TBND003F-DATA-IN u 1 OR TBND003F-DATA-IN e 26
76 u MOVE 'INVALID TABLE 2 POINTER' TO TBND003X-MSG
77 u MOVE 341 TO RETURN-CODE
78 ELSE
79 e MOVE WK-LETTER (TBND003F-DATA-IN) TO
80 TBND003F-DATA-OUT
81 e MOVE 0 TO RETURN-CODE
82 END-IF
83 ELSE
84 u MOVE 'TABLE 2 PTR NOT NUMERIC' TO TBND003X-MSG
```

```
Lookup z/OS Job DTSP Server Profile DTSP Server Profiles Instrument JCL for Debug Tool Debugging Load Module Analyzer LMA Report Viewer
LMAReport_ELN.LCCS.LOADPDPSE LMAReport_ELN.LCCS.LOADPDPSE
DFS Active (IMS) IMS
DSN Active (DB2) DB2
EDC Active (C/C++) C/C++
E2A Active (TCF/IP) TCF/IP
IBM Active (PL/I) PL/I
TEDC Active (C/C++) C/C++
IEL Active (PL/I) PL/I
IEN Active (PL/I) PL/I
IOV Active (COBOL) COBOL
IOZ Active (COBOL) COBOL
IIBM Active (PL/I) PL/I
IILB Active (OS/VS COBOL) OS/VS COBOL
1 5655-Q10 Debug Tool Version 13 Release 1.2 Load Module Analyzer 2014/09/09 16:50 Page 3
EQAPRNMN:
0000000 (?) (No IDR data available)
```



✓ Other debug Tool enhancements



• Debug Tool usage log

- Log when each Debug Tool session starts and ends

• TRACE LOAD and LIST TRACE LOAD commands

- Displays an ongoing trace of all load modules loaded by the application

• Consolidation of Debug Tool LE user exits

- User exits EQADBCXT, EQADCCXT and EQADICXT have been consolidated into EQAD3CXT
- Use the same exit now for all environments: batch, CICS, IMS

• SET LIST BY SUBSCRIPT ON support for COBOL for 3270

```
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'
```

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

SHARE
in Orlando **2015**

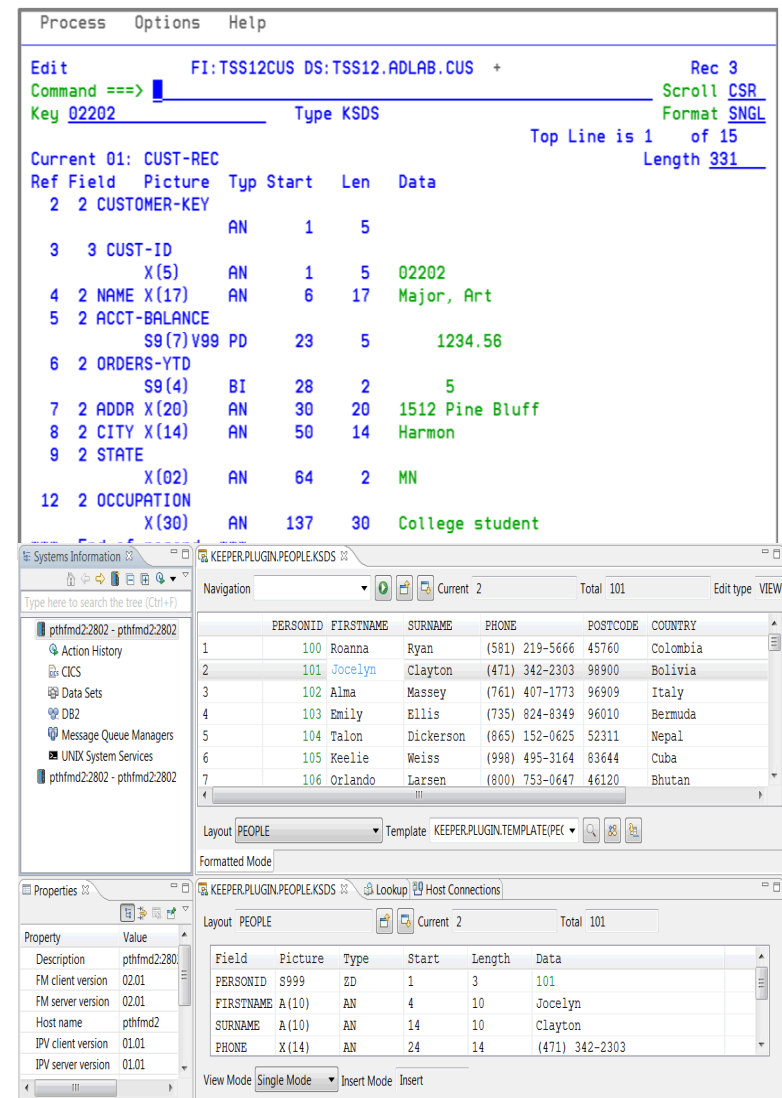
IBM File Manager Version 13

- **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

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



The screenshot displays the IBM File Manager interface. The main window shows a data record for 'CUST-REC' with fields like CUSTOMER-KEY, CUST-ID, NAME, ACCT-BALANCE, ORDERS-YTD, ADDR, CITY, STATE, and OCCUPATION. A secondary window titled 'Systems Information' shows a table of person records with columns for PERSONID, FIRSTNAME, SURNAME, PHONE, POSTCODE, and COUNTRY.

PERSONID	FIRSTNAME	SURNAME	PHONE	POSTCODE	COUNTRY
1	100	Roanna Ryan	(581) 219-5666	45760	Colombia
2	101	Jocelyn Clayton	(471) 342-2303	98900	Bolivia
3	102	Alma Massey	(761) 407-1773	96909	Italy
4	103	Emily Ellis	(735) 824-8349	96010	Bermuda
5	104	Talon Dickerson	(865) 152-0625	52311	Nepal
6	105	Keelie Weiss	(998) 495-3164	83644	Cuba
7	106	Orlando Larsen	(800) 753-0647	46120	Bhutan

in Orlando 2015

✓ File Manager enhancements



•IMS enhancements:

- Support for viewing / editing IMS Databases using the eclipse plug-in
- IMS Template Editor – Create / Modify in the eclipse plug-in
- Extract and Print have new keywords KEYRANGE and MAXRSEGS

•Multiple Layout Dynamic Templates

- You can now create a template, without using copybooks, that supports files with multiple types of records

•Template editor, and support for XML templates

- You can create and update templates using a batch utility
- You can export/import a template to an XML file. Also the XML file can be used directly as a template.

•DB2 support enhancements:

- XML and LOB (large object) support

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



File Manager: Features added since V13 GA

- For FM/IMS, session timeout support - via PI09504. Aimed at resolving resource contention problems.
- 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. 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 data segments when editing data using a segmented template – via PI04887.

File Manager: Features added since V13 GA

- 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.
 - Added 'Structure Mode' to Single Record view.

✓ Little known / under-used features of File Manager



•Support for MQ queues, CICS TS/TD queues, HFS file

- Interactively edit/view queues with the File Manager editor and viewer
- Use a queue or HFS file as either input or output for the copy utility. For example:
 - Copy from a file to an MQ queue
 - Copy from an MQ queue to a TS queue
- Similar access from the Print and Compare utilities

▪ Data scrambling

- While copying data, replace data with a different characters (or bytes) of data.
- Protecting sensitive information in data, typically used while preparing test data from production data sources.

▪ File Manager provides four types of scrambling:

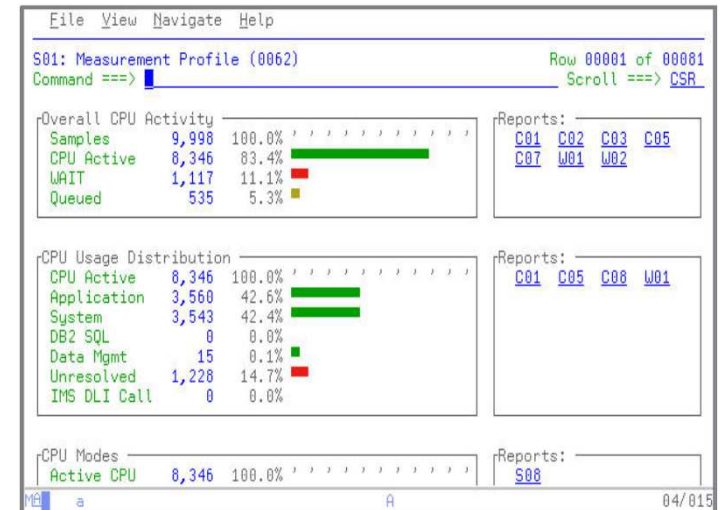
- “Random”: data scrambled to produce a random output value on each invocation.
- “Repeatable”: data scrambled to produce the same output value on each invocation.
- “Translate”: data scrambled using input and output values held in the value data set.
- “Exit”: data scrambled using a scrambling exit (write your own scrambling algorithm).

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



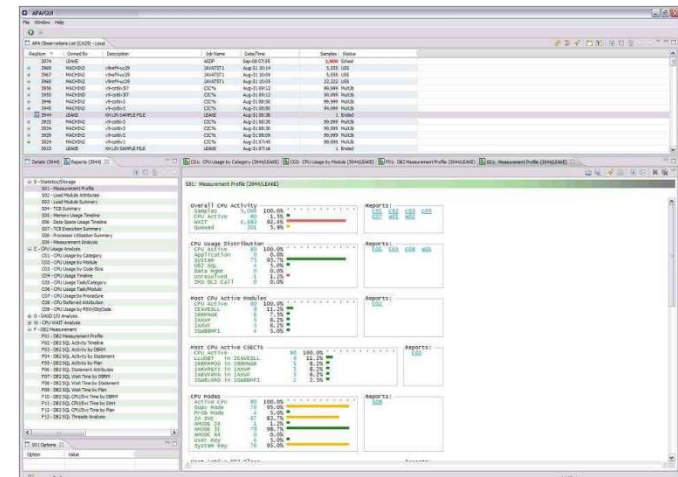
IBM Application Performance Analyzer Version 13

- **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



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Application Performance Analyzer: Features added since V13 GA

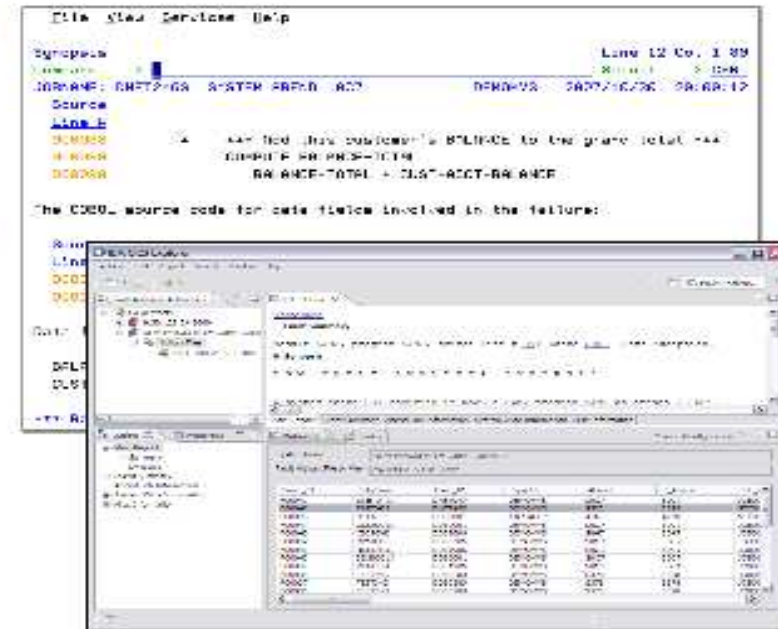
- Enhancement to CAZBATCH and CAZAPI01 allows override of sample file name
- New S10 Error Messages report.
- Enhancement to the C09 report, to display up to three possible interpretations of the instruction before the PSW
- Enhancement to enforce user level security in APA when creating, updating, reading and deleting sample file data sets, and data sets containing exported sample files.
- Enhancement to the configuration setting AltCICSStepNm to allow alternate CICS execution module names.
- Support for CICS TS 5.2

IBM Fault Analyzer Version 13

- **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
 - Modemize
 - 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



The screenshot displays the IBM Fault Analyzer interface. The top window shows a COBOL source code snippet with the following text:

```

Line 12 Col. 1-89
*****
INRANGE: INRANGE  A-SYSTEM  A-RANGE  A-CCT  A-PRDAYS  A-PROG/CLAS  A-PRGR:12
Source
000000  A-  Add New Customer's Balance to the grand total.
000000  COMPARE PR-PROP=101M
000000  B-RANGE-TOTAL + CLAS=ACCT-B-RANGE
  
```

Below the source code, the text reads: "The COBOL source code for this failure is the following:"

The bottom window, titled "IBM Fault Analyzer", displays a detailed error analysis. It includes sections for "Description", "Reason Code", "Problem Summary", and "Problem Details". The "Problem Details" section contains a table with columns for "Module", "Line", "Offset", "Reason Code", "Reason Code Description", "Problem Summary", "Problem Details", "Problem Action", and "Problem Status".

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

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

Fault Analyzer: Features added since V13 GA

- Enhanced with COBOL Explorer. A post-mortem debugger
- Support for CICS 5.2
- Implemented FAAPI. An OpenReport API which enables users to open a Fault Analyzer report from their own application.

z/OS Problem Determination Tools



IBM Fault Analyzer COBOL Explorer

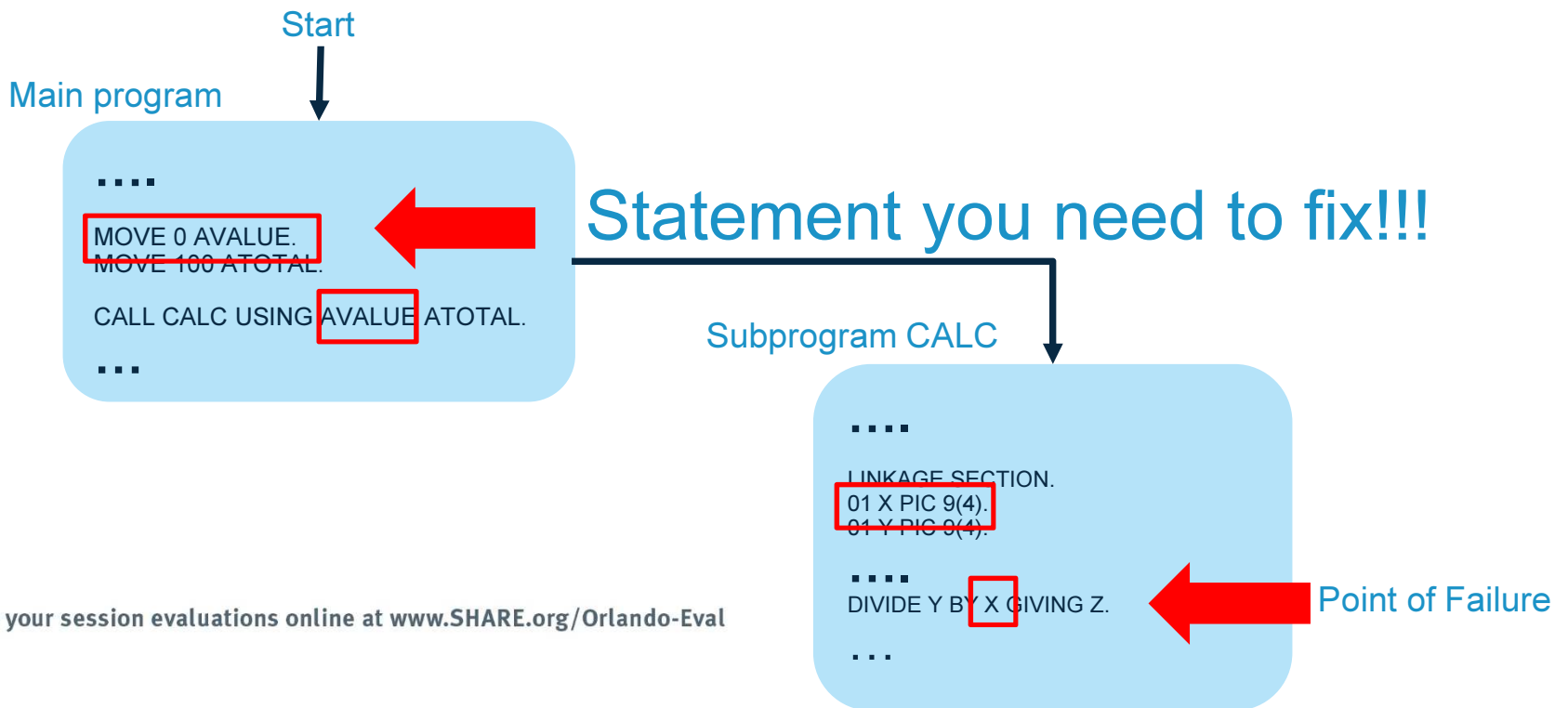
(an interactive post-mortem debugger)

Complete your session evaluations online at www.SHARE.org/Orlando-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
 - Navigate your application's execution path from a point of failure interactively
 - Examine a variable and how the value changed which led to failure



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

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 it

```

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).ü

  Fault_ID Job/Tran User_ID Sys/Job Abend Date Time Dups Lock
I_  F14832 VHECKEA VHECKE ZT01  S0CB 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.EOAY12.ROOTCAMP.SYSDEBUG'
  
```

From the Interactive Reanalysis Report panel select 2 for Event Summary

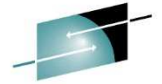
```

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

äFault Analyzer maximum storage allocated: 2.12 megabytes.ü
  
```



Select the event of interest, in this case the Abend by typing 1

```

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

äThe following events are presented in chronological order.ü

Event #   Type   Fail Point   Module Name   Program Name   EP Name   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). Cursor-select “COBOL Explorer”.

```

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

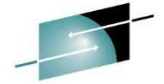
The source code below was executed via the following sequence of PERFORM
statements
Source
Line #
000105          PERFORM READ-FILE UNTIL END-OF-FILE = '1'.
000122          NOT AT END PERFORM PROCESS-VEHICLE
000133          PERFORM PROCESS-CAR
000151          PERFORM CALC-TAX.

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
  
```



```

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 ==> _____ 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.
+ 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
  
```

Notice:

- A collapsed view is displayed, showing only the execution path to the abend
- It also shows the place where CC is declared. Line 26 in the view.

Next lets take a look at variable CC more closely. We expand line 26 by cursor-selecting the + sign

```
Exploring COBOL Program COBEX1
Command ==>
JOBNAME: VHECKEA   SYSTEM ABEND: CCB   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 comments, 88 levels, or redefines

If you want to see all the variables in a section then from the same view then cursor-select the + sign next to the section wanted.

After selecting the Working-Storage Section.

```

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

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
 30 F0F0F0F0 F8 8 03 VEHICLE-NUM
 35 F1 1 03 VEHICLE-TYP

Level 88 Items
 36 F0F5F0F0 F0F0 50000 03 PRICE
 3C F0F0F0F0 F0 0.00 03 CARBON-TAX
 * * * 03 SPECIFICATI
 41 E3C5E2D3 C1404040 40404040 40404040 *TESLA * 05 MAKE
 51 40404040 * * *
 55 D4D6C4C5 D340E240 40404040 40404040 *MODEL S * 05 MODEL
 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-

 7B F0F2 2 03 FEATURES.
 7D F1 1 05 SEATING
 * * * 05 TRANSMIS

Level 88 Items
 7E F8 8 05 COLOUR
Level 88 Items
    
```

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 ==> _____ 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.
+ 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:

- All procedures are still collapsed

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.
+ 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.
```

Complete your session evaluations online at www.SHARE.org/Orlando-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 differently, 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. Cursor-select 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
    
```

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

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
Data Set . . . : ADTCFG.VEHICLES.VSAM
Enter required field

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 ==>
Type KSDS RBA 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 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.
  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 .
    
```



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

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 ==> Scroll ==> CSR
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 ==> Scroll ==> CSR
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
    
```



65m|

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
    
```



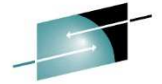
Procedure Cross-Reference. After double clicking on PROCESS-VEHICLE the view is updated to show the start of the procedure

```
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/Orlando-Eval



Debug Tool IMS Private Message Region Enhancement

Insert
Custom
Session
QR if
Desired.

Comp on evaluations online at www.SHARE.org/Orlando-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 's Debug Tool Utilities (ISPF) enhanced 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.

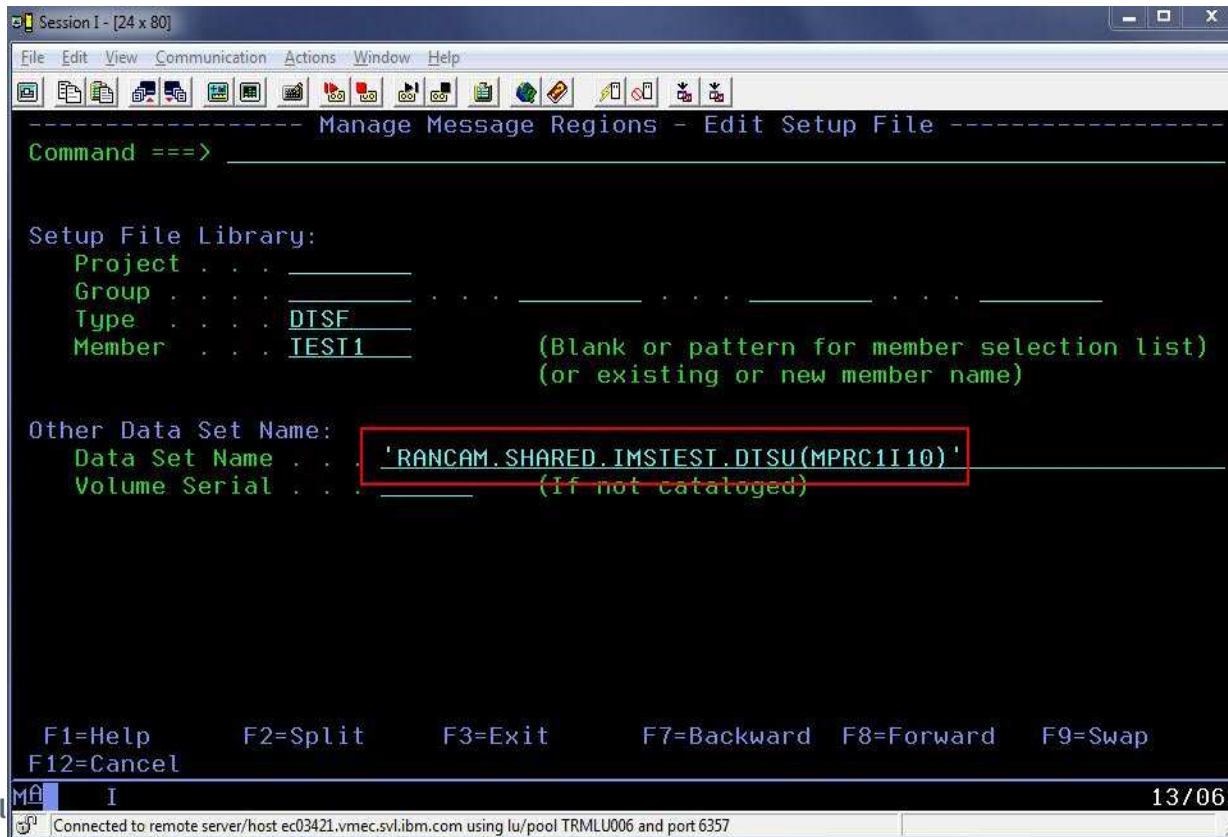
Sel  Member  Cls  Comment
I   *****  ***  ***** TOP OF DATA *****
   MPRCI10X  020  MPRCI10X region
   *****  ***** Bottom of data *****

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)

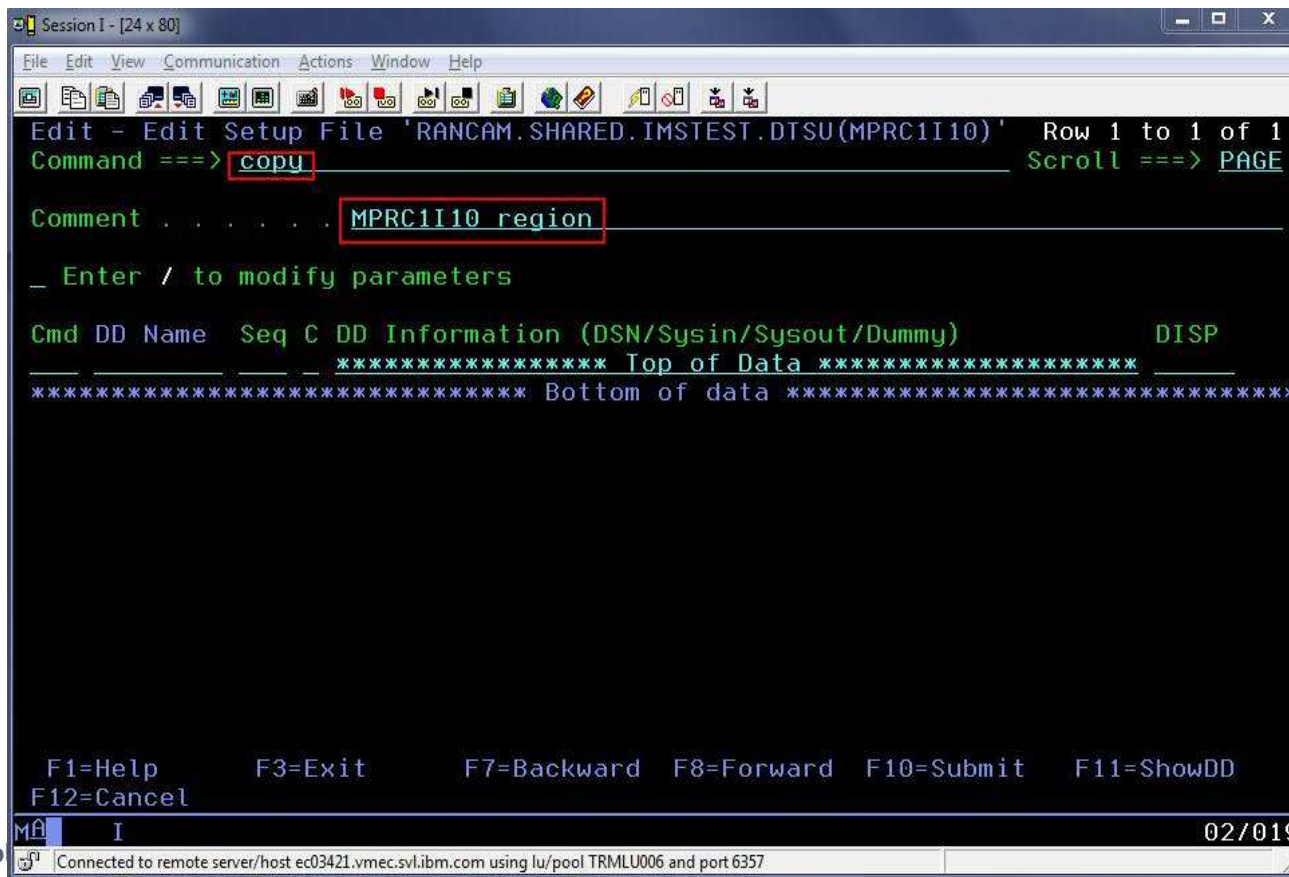
Other Data Set Name:
Data Set Name . . . 'RANCAM.SHARED.IMSTEST.DTSU(MPRC1I10)'
Volume Serial . . . _____ (If not cataloged)

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.

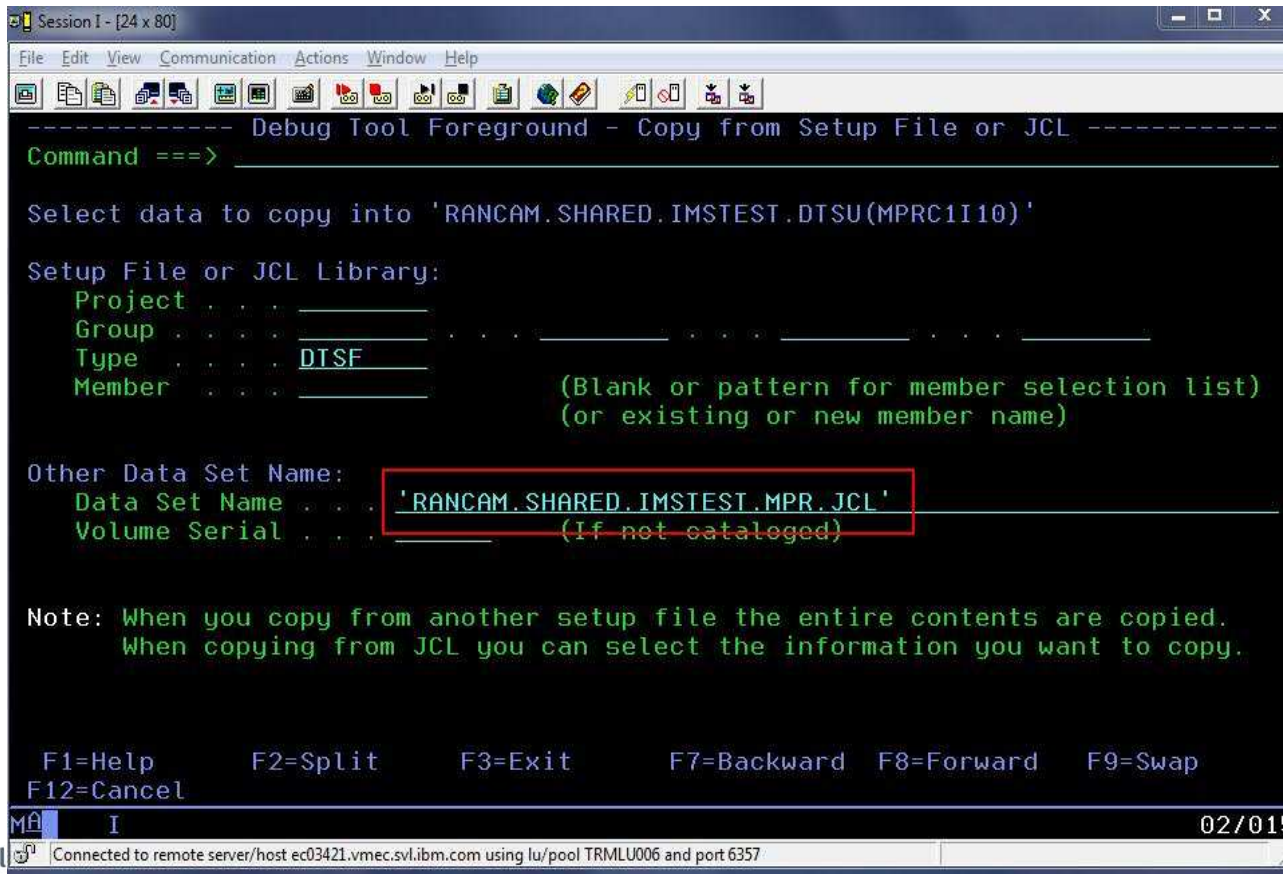


```
Session I - [24 x 80]
File Edit View Communication Actions Window Help
Edit - Edit Setup File 'RANCAM.SHARED.IMSTEST.DTSU(MPRC1I10)' Row 1 to 1 of 1
Command ==> copy Scroll ==> PAGE
Comment . . . . . MPRC1I10 region
_ Enter / to modify parameters
Cmd DD Name Seq C DD Information (DSN/Sysin/Sysout/Dummy) 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.

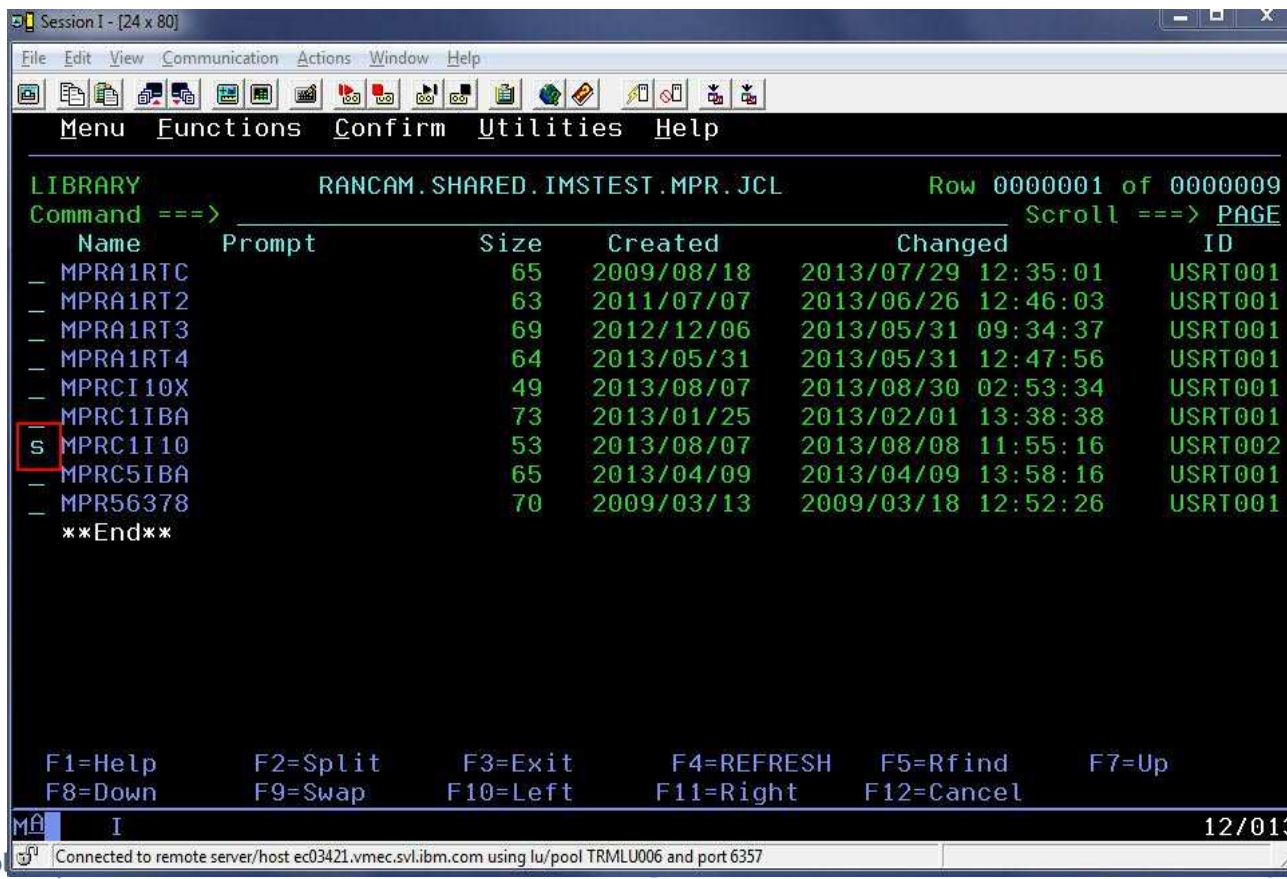
F1=Help F2=Split F3=Exit F7=Backward F8=Forward F9=Swap
F12=Cancel

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

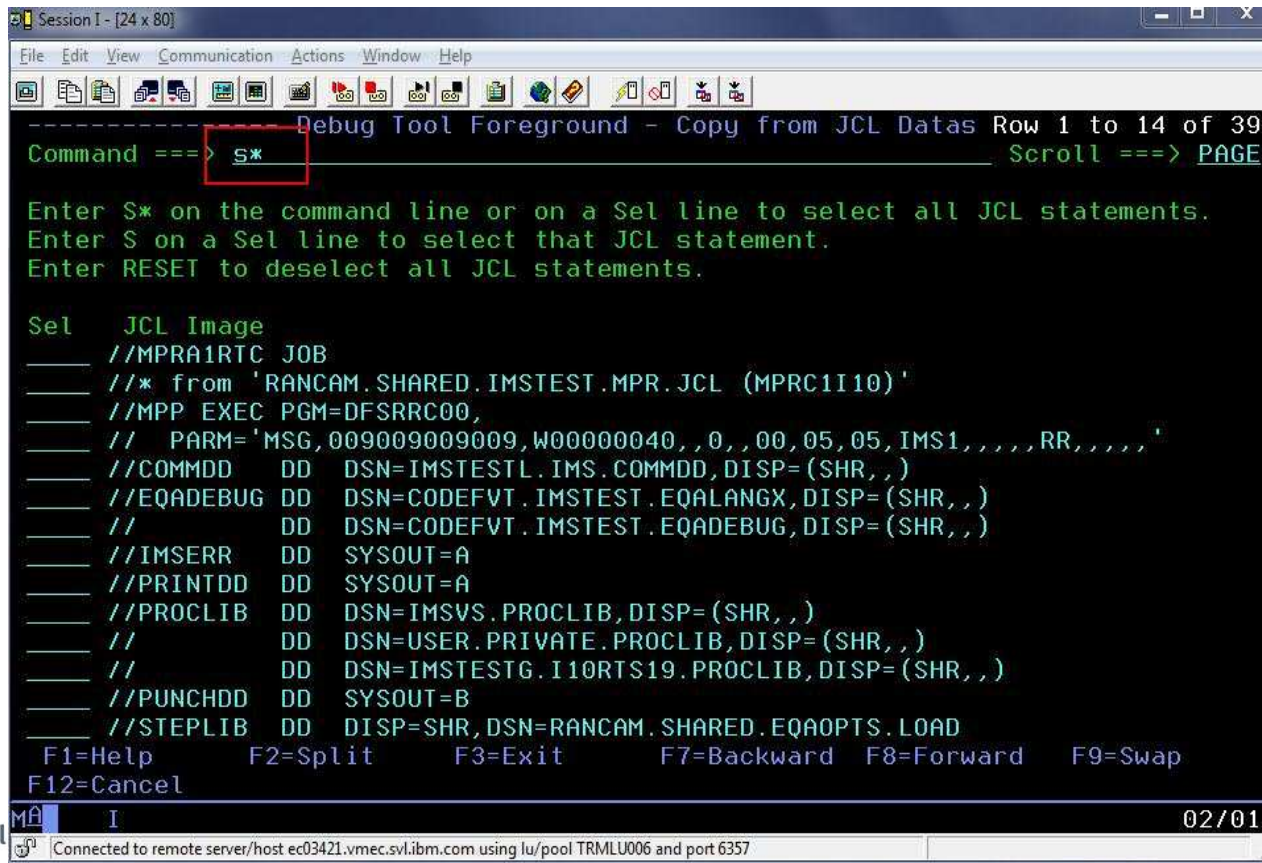
  Name      Prompt      Size   Created      Changed      ID
- MPR1RTC   MPR1RTC      65    2009/08/18   2013/07/29 12:35:01   USRT001
- MPR1RT2   MPR1RT2      63    2011/07/07   2013/06/26 12:46:03   USRT001
- MPR1RT3   MPR1RT3      69    2012/12/06   2013/05/31 09:34:37   USRT001
- MPR1RT4   MPR1RT4      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

Mâ 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=DFSRRRC00,
____ // PARM='MSG,009009009009,W00000040,,0,,00,05,05,IMS1,,,,,RR,,,,,'
____ //COMDD 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
  
```

Comp

“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.

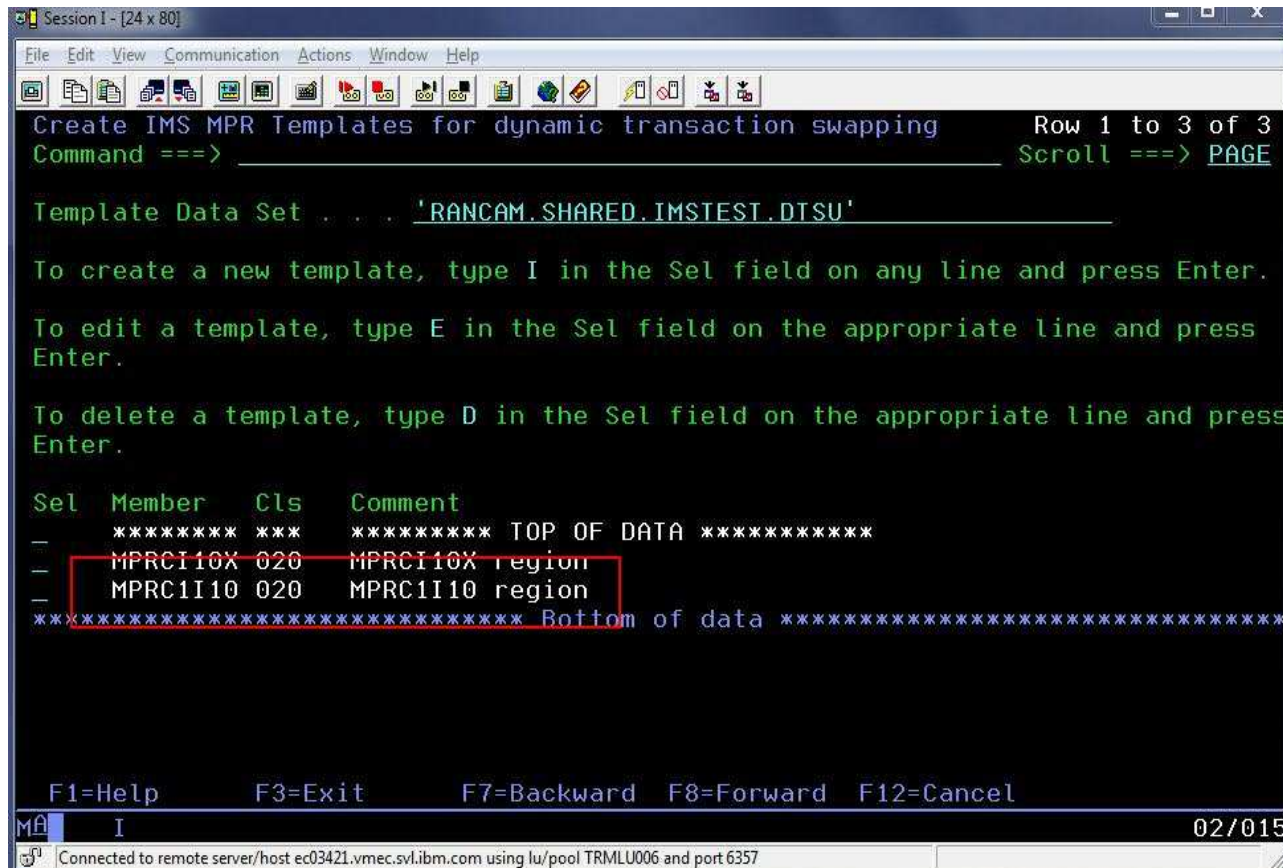
AGN . . . . _____   ALTID . . . . _____   More: +
F1=Help      F2=Split    F3=Exit      F7=Backward  F8=Forward  F9=Swap
F12=Cancel

Comp M 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 1 - [24 x 80]
File Edit View Communication Actions Window Help
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
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU006 and port 6357

```

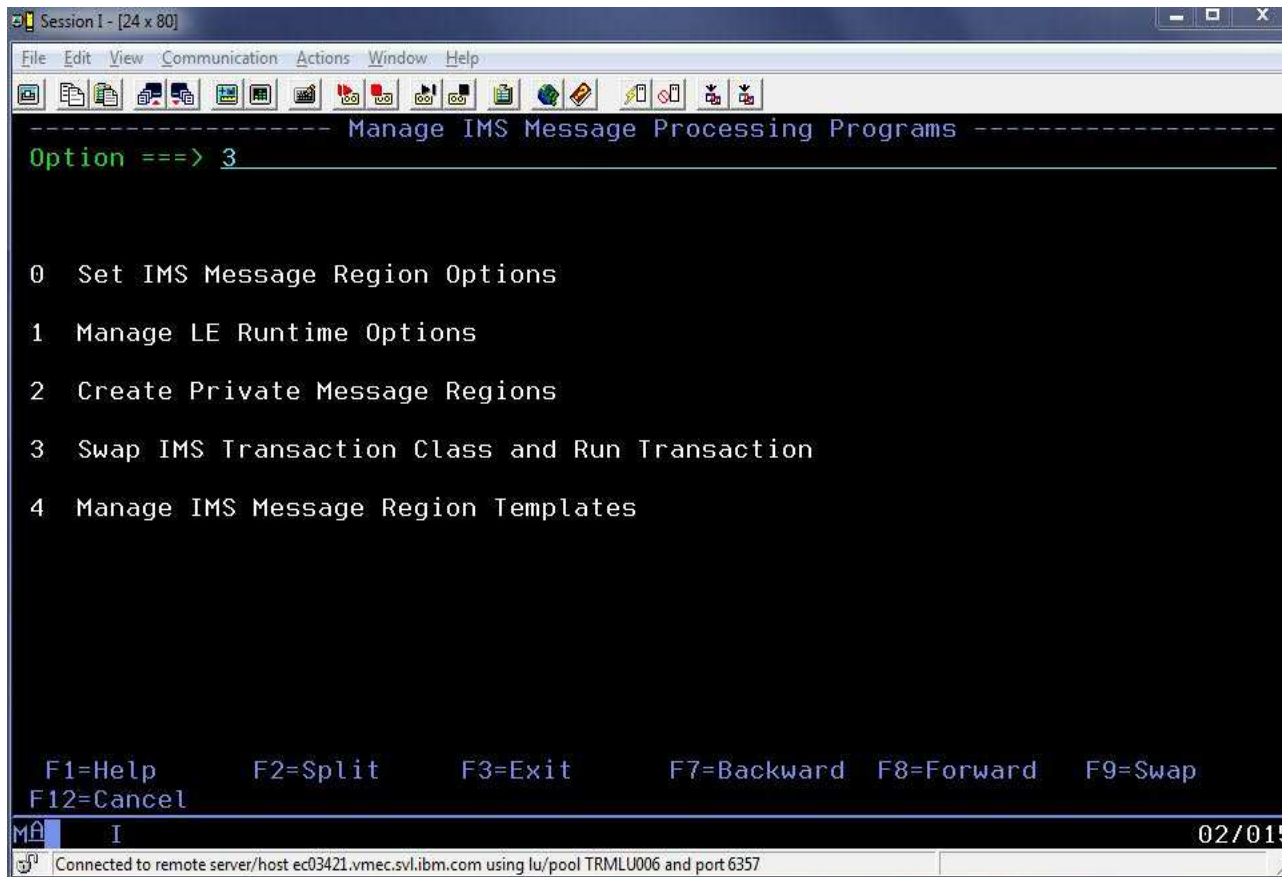
Complete your session evaluations online at www.SHARE.org/Orlando-Eval

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

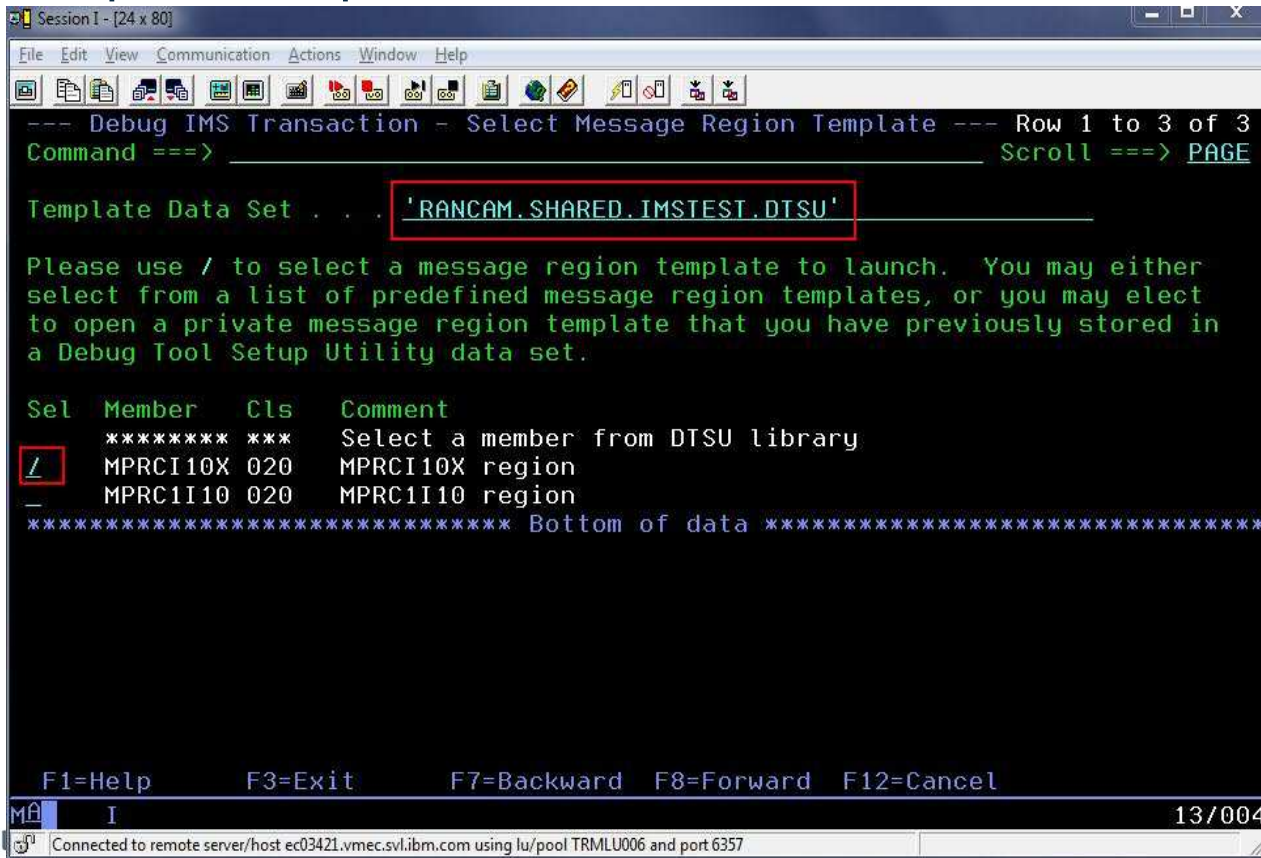
F1=Help      F2=Split    F3=Exit     F7=Backward F8=Forward  F9=Swap
F12=Cancel

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

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

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.



```

--- Debug IMS Transaction - Select Message Region Template --- Row 1 to 3 of 3
Command ==> _____ Scroll ==> PAGE

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

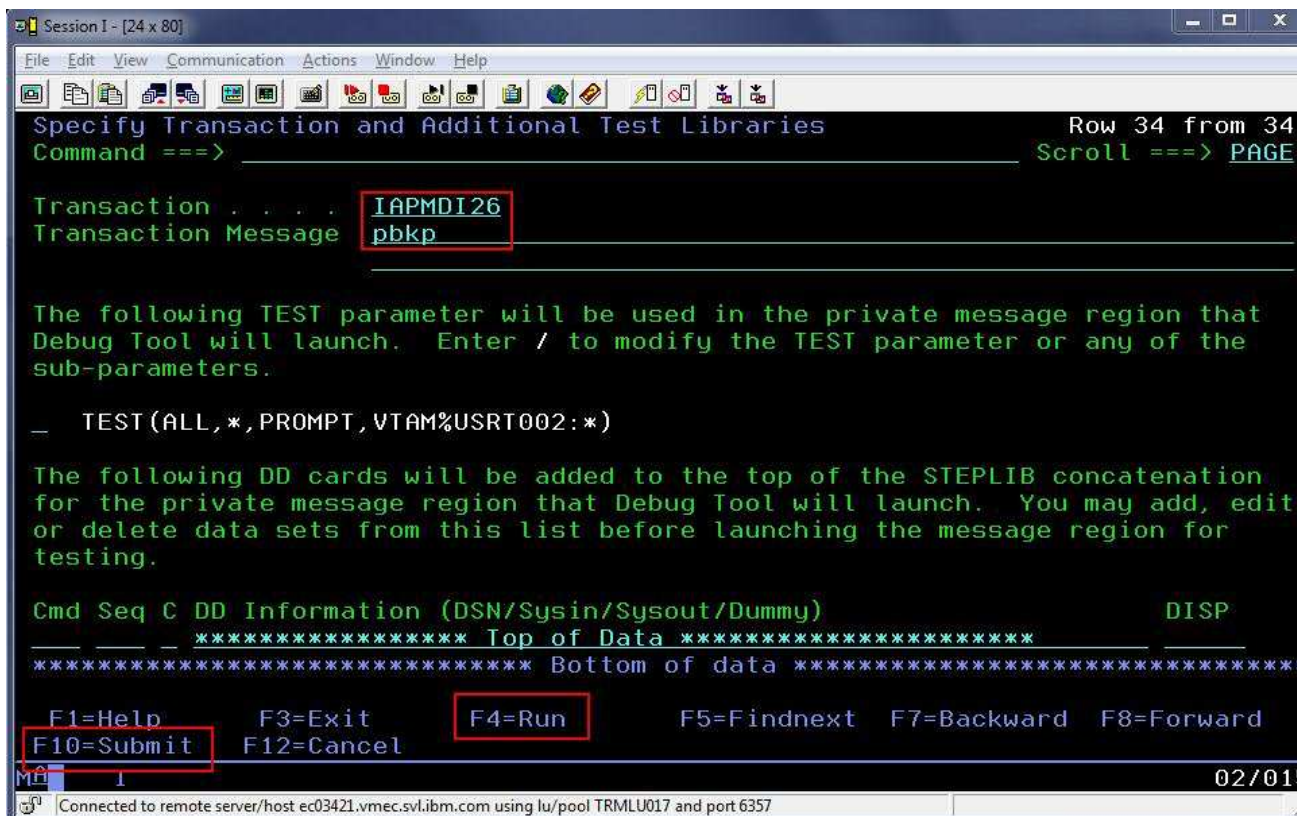
Please use / to select a message region template to launch. You may either
select from a list of predefined message region templates, or you may elect
to open a private message region template that you have previously stored in
a Debug Tool Setup Utility data set.

Sel Member Cls Comment
***** *** Select a member from DTSU library
/ MPRCI10X 020 MPRCI10X region
_ MPRCI110 020 MPRCI110 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

```

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

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

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

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

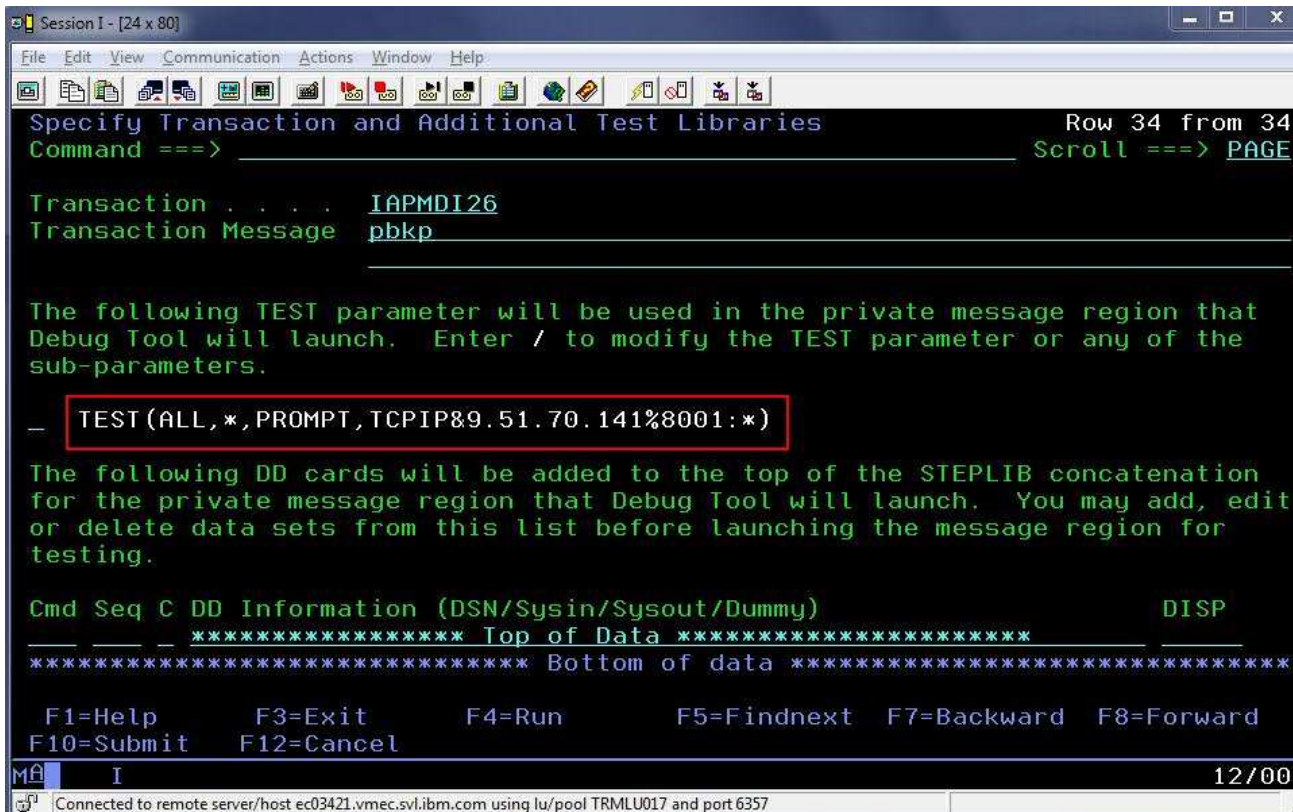
M I 02/015
Connected to remote server/host ec03421.vmec.svl.ibm.com using lu/pool TRMLU017 and port 6357

```

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

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

```

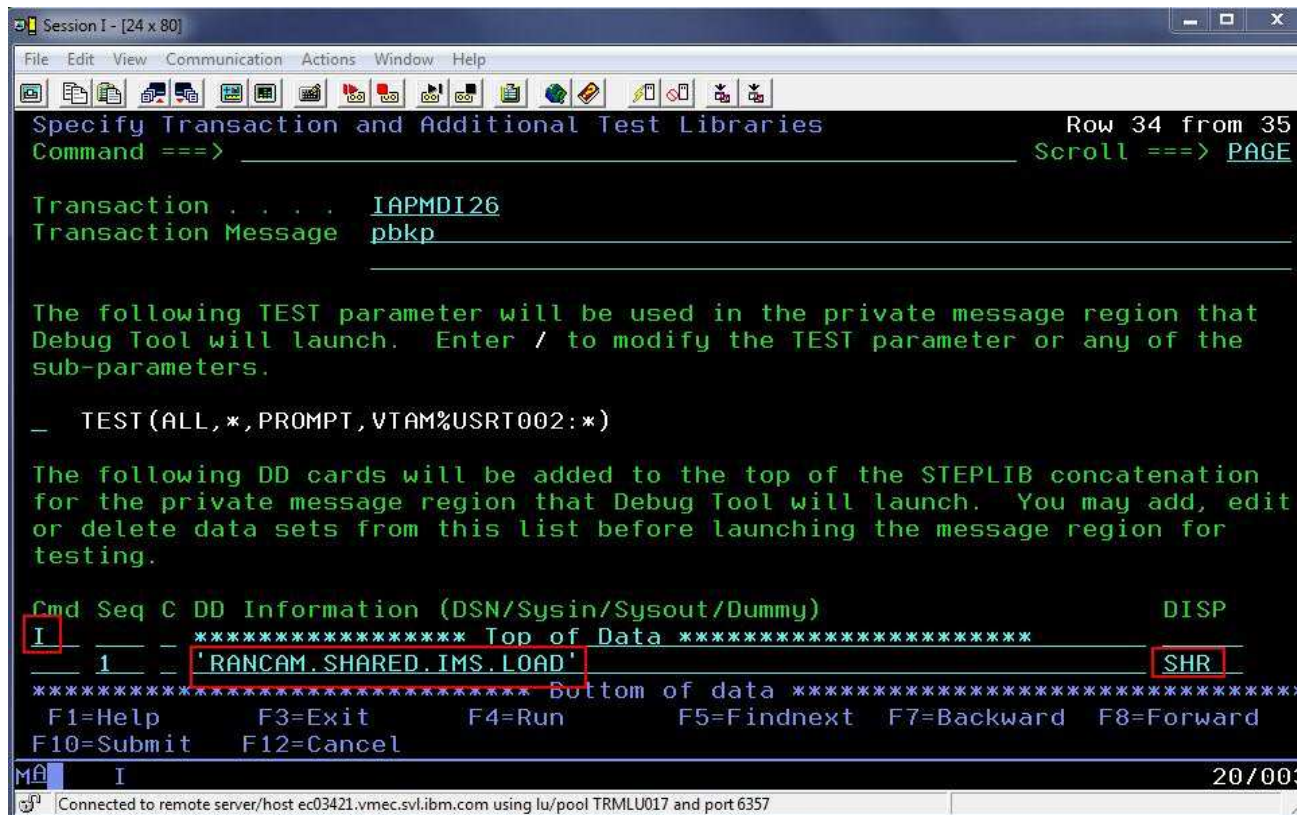
Complete your session evaluations online at www.SHARE.org/Orlando-Eval

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
  
```

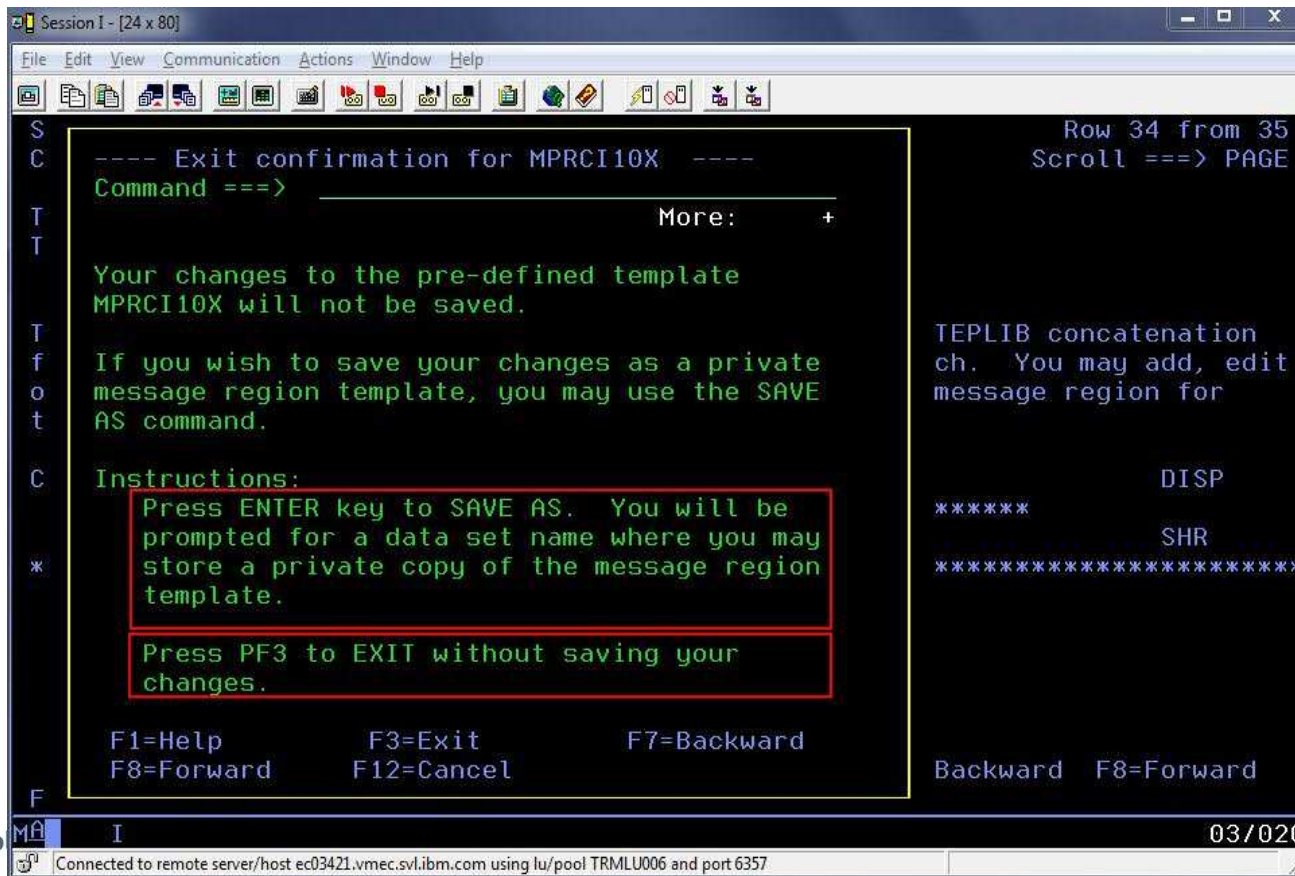
Complete your session evaluations online at www.SHARE.org/Orlando-Eval

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.

```

Session I - [24 x 80]
File Edit View Communication Actions Window Help
----- 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)

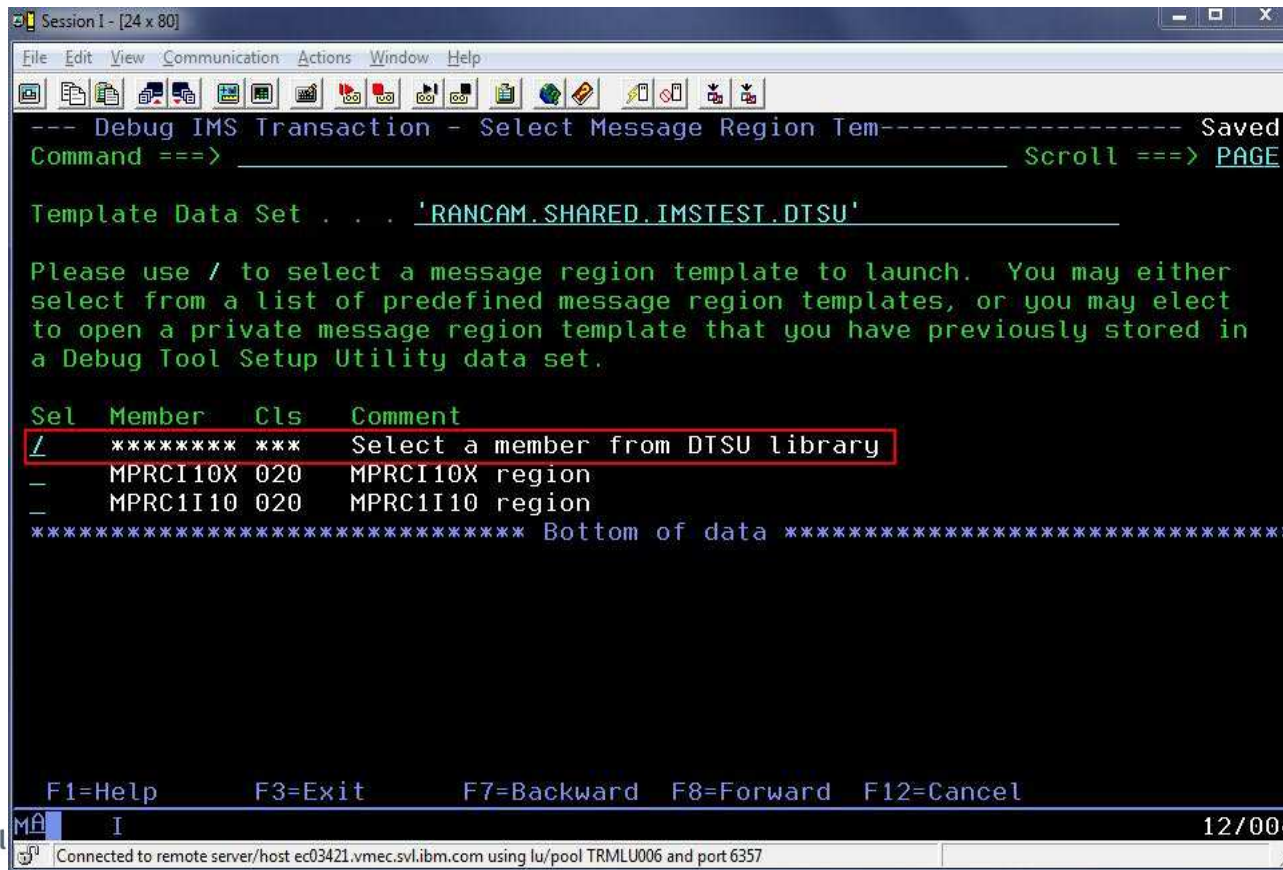
_ Initialize New setup file for DB2 (/)

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

Comp MA 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.



```

--- Debug IMS Transaction - Select Message Region Tem----- Saved
Command ===> _____ Scroll ===> PAGE

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

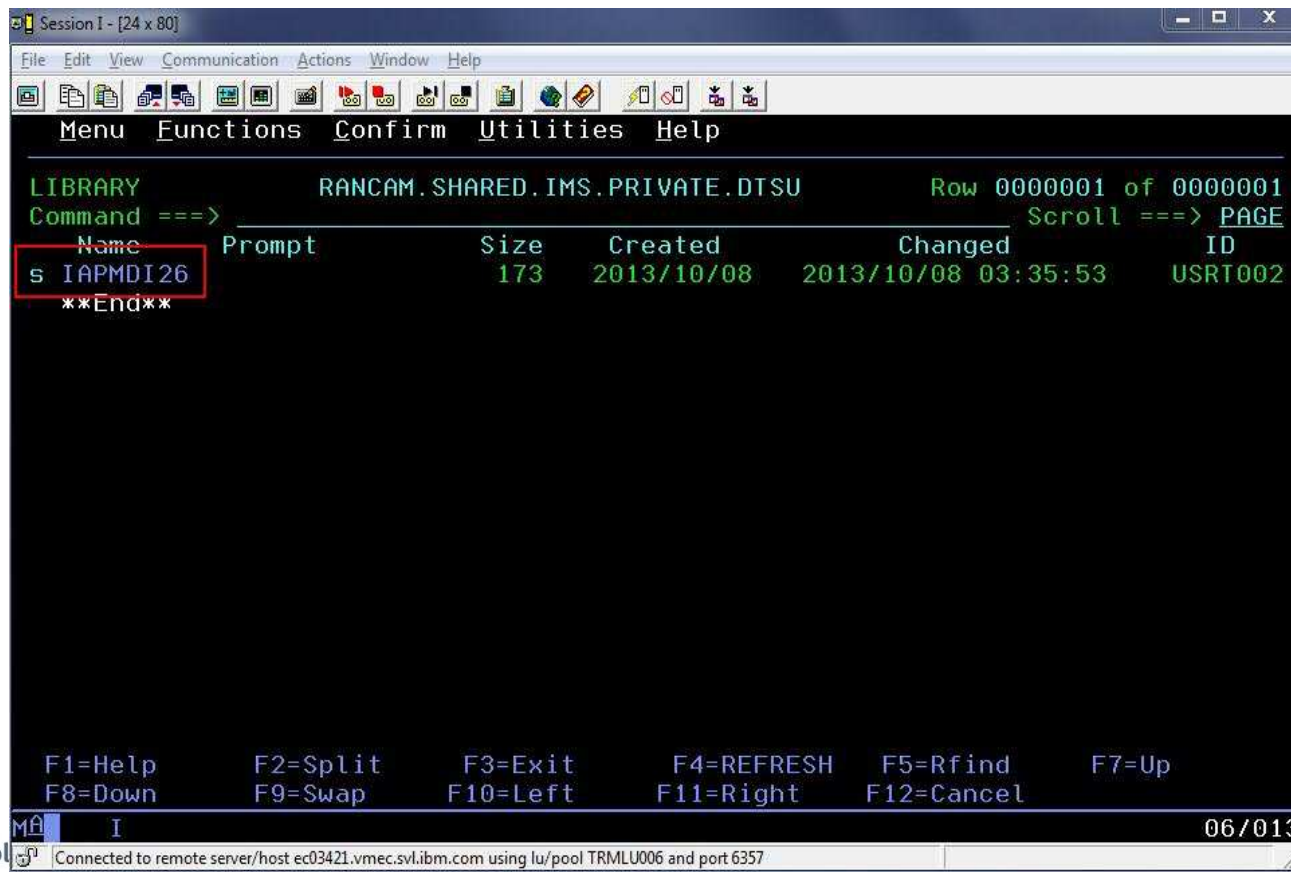
Please use / to select a message region template to launch. You may either
select from a list of predefined message region templates, or you may elect
to open a private message region template that you have previously stored in
a Debug Tool Setup Utility data set.

Sel Member Cls Comment
/ ***** *** Select a member from DTSU library
- MPRCI10X 020 MPRCI10X region
- MPRC1I10 020 MPRCI1I10 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.



```

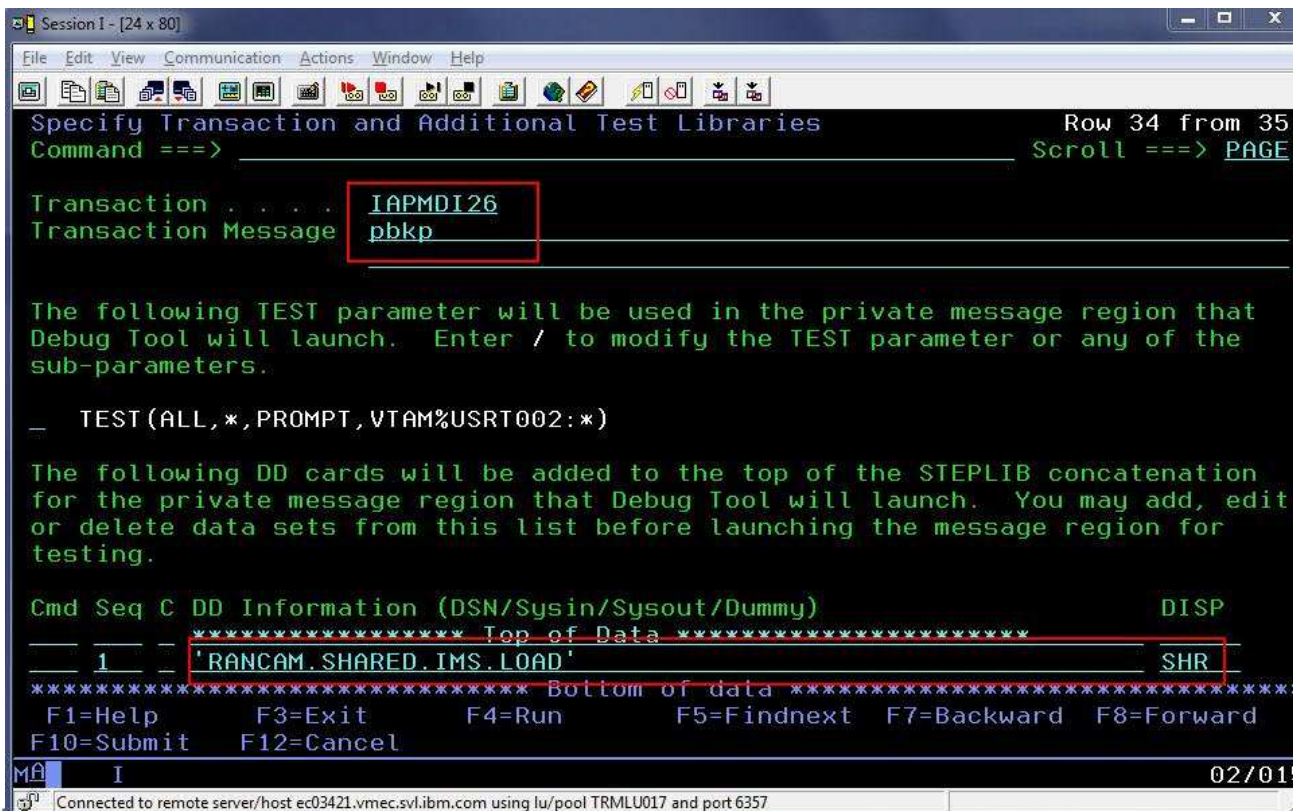
Session I - [24 x 80]
File Edit View Communication Actions Window Help
Menu Functions Confirm Utilities Help
LIBRARY          RANCAM.SHARED.IMS.PRIVATE.DTSU      Row 0000001 of 0000001
Command ===>          Scroll ===> PAGE
Name Prompt      Size  Created      Changed      ID
s IAPMDI26      173  2013/10/08  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 1 - [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

```

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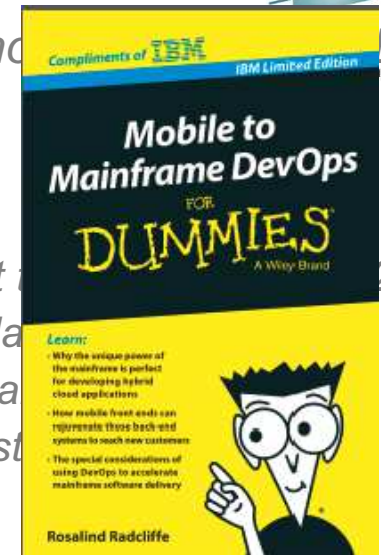
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