

This is the tutorial for IBM's Fault Analyzer for z/OS[®], one of the IBM zSeries[®] problem determination tools.

- **Viewing a real-time fault analysis report**
- **Interactive reanalysis**
 - Interactive reanalysis tour
 - How to use the File Manager interface
- **Program source mapping during reanalysis**
 - Applying side files and compiler listings
 - Requesting prompts for file names during reanalysis
 - Automating the search for side files and listings with options
 - Re-creating a compiler listing for an existing module



In this section, you will learn how Fault Analyzer finds program side files and compiler listings, and how you can apply these files to enable source mapping.

Apply files for source mapping during reanalysis



- You can apply side files and listings during reanalysis to show program source and variables
 - Without it, the same reports are generated, but without source mapping
- Source files are created when programs are compiled
- If there are standard program compile processes, they should be updated to enable source support for these products

3

IBM Fault Analyzer for z/OS - V12 Tutorial

© 2012 IBM Corporation

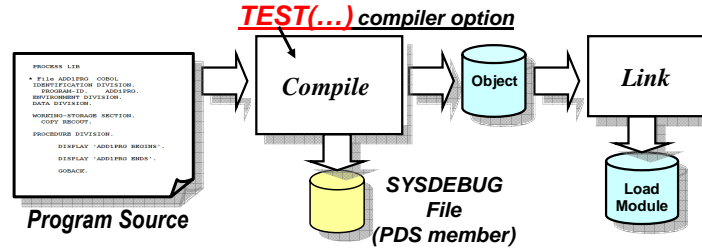
If Fault Analyzer has access to a matching side file or compiler listing for a program, it can use it to show source statements and variable values. If it does not, it generates the same reports, but shows machine instructions, offsets, and storage instead.

The needed files are generated when programs are compiled. The right files can be used by other IBM problem determination tools, such as IBM Debug Tool for z/OS, and IBM Application Performance Analyzer for z/OS. If there are standard compile processes in place, it is best to update those processes so that the files are always generated.

Compile programs for use with IBM PD Tools, including IBM Fault Analyzer for z/OS



- When using the Enterprise COBOL compiler, for example, a TEST(...) compiler option with appropriate sub-options produces a sysdebug file



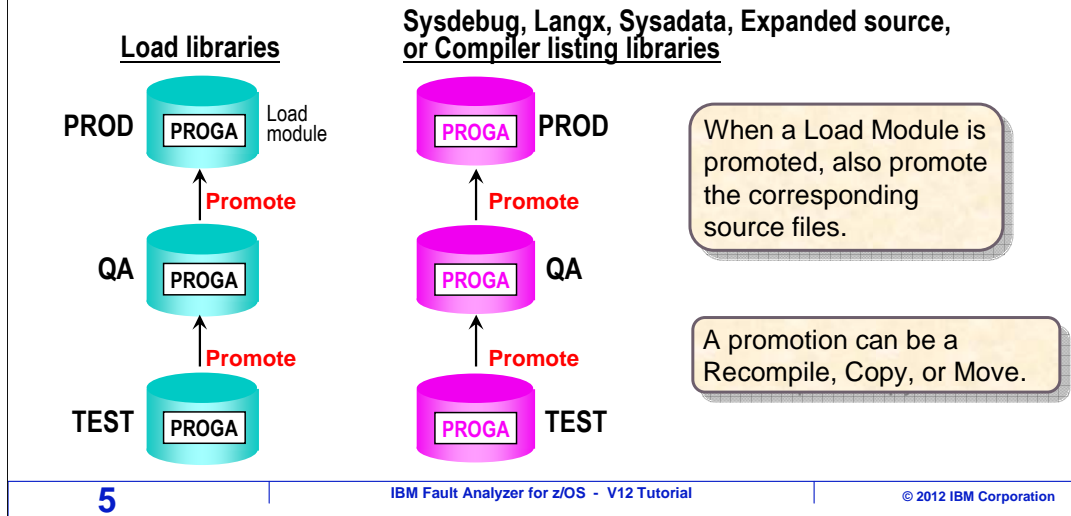
- Other compilers require different options, and generate different kinds of side files
 - For details about compiling programs, see [Fault Analyzer for z/OS User's Guide and Reference: Chapter 17. Quick start guide for compiling and assembling programs for use with IBM Problem Determination Tools](#)

For example, if the Enterprise COBOL compiler is used, a Sysdebug file can be generated when the program is compiled. A "test" compiler option with appropriate sub-options directs the compiler to create it. Different compilers can generate different kinds of side files, and require different compiler options. Updating compile processes is beyond the scope of these tutorials, but detailed information and examples can be found in the Fault Analyzer User's Guide and Reference manual, in the chapter titled "Quick start guide for compiling and assembling programs for use with IBM Problem Determination Tools".

Promote source files for IBM PD tools



- ToDo you want the ability to use Fault Analyzer, Debug Tool, or APA throughout a program's life cycle?
- Then the *promotion* processes should promote source files along with program load modules



Typically, program load modules are promoted through different stages of testing before reaching production. For example, when a new program is compiled for the first time, it may be placed into a 'test' load library. After unit testing is completed, it may be promoted to a 'quality assurance' environment. And eventually it may be promoted into production. On your system, you may know these stages by different names. "Unit test", "System test", and "Model office" are common names for some of the various stages.

Consider whether you want the ability to have program source support in Fault Analyzer, Debug Tool, and Application Performance Analyzer throughout your programs' life cycle. To enable source mapping at each stage, update your promotion processes to retain the side files or compiler listings. A promotion can be done by performing a recompile, a copy, or a move. Give the files for source mapping the same treatment as load modules. For each load library, you can have a corresponding set of side file or compiler listing libraries. When a module is promoted, promote the corresponding side file or listing right along with it. That way, you can continue to have source mapping in the tools at all stages of a program's life cycle.

Files used for source mapping



- Fault Analyzer can use side files and compiler listings in these formats:

Compiler	Sysdebug File	Compiler Listing	Langx File	Sysadata File
LE COBOL (incl. Enterprise COBOL)	✓	✓	✓	
VS COBOL II		✓	✓	
OS/VS COBOL		✓	✓	
Enterprise PLI	✓	✓	✓	
PL/I for MVS and VM		✓	✓	
OS PLI		✓	✓	
C and C++		✓	✓	
Assembler			✓	✓

6

IBM Fault Analyzer for z/OS - V12 Tutorial

© 2012 IBM Corporation

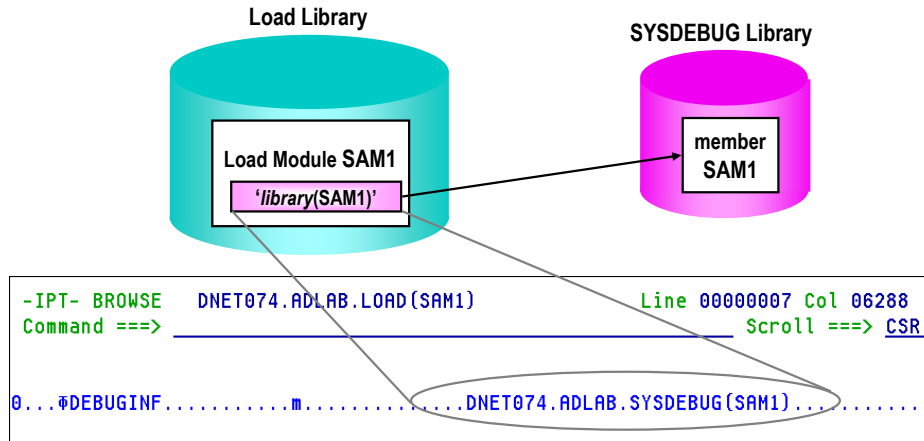
If someone in your organization already set up your compile processes for Fault analyzer, then the right files are generated for you when you compile a program. However, if it is your responsibility to update the compile processes, then research how to set up each compiler individually.

For the LE COBOL compilers, including Enterprise COBOL, and for recent versions of Enterprise PLI, fault analyzer can use sysdebug files, compiler listings, or LANGX files. With all other compiled languages in this list, fault analyzer can use compiler listings or LANGX files. With assembler programs, fault analyzer can use LANGX or SYSADATA files.

Fault Analyzer can automatically locate the file for some compilers



- Enterprise COBOL and Enterprise PL/I compilers can optionally embed the name of the SYSDEBUG file or compiler listing in the load module
 - Fault Analyzer can automatically locate it if it exists



7

IBM Fault Analyzer for z/OS - V12 Tutorial

© 2012 IBM Corporation

Enterprise COBOL and Enterprise PL/I compilers can embed the name of the Sysdebug file in the load module. This is a helpful feature, because Fault Analyzer can automatically find the file it needs for source mapping. If you browse a load module generated with one of these compilers, and it was compiled with the appropriate compiler options, you will be able to see the Sysdebug file name in the module.

Fault Analyzer automatically searches for side files and listings during reanalysis



- A search for the "best match" is performed in this order:
 1. The side file or listing identified during real-time analysis, if there was one
 2. The file name embedded in the load module, if there is one
 3. If you coded personal reanalysis options, side libraries you specified in the DATASETS option are searched
 4. If the installer coded a DATASETS option in the system-wide Fault Analyzer options, side file libraries specified there are searched
 5. If no match is found, you are automatically prompted to enter a side file or listing file name
 - The 'Prompt for missing side files' option must be specified in your Interactive Reanalysis Options
 6. Finally, if no matching side file or listing is found, reanalysis continues without source

During real-time analysis, and again during reanalysis, Fault Analyzer can automatically search for matching side files or compiler listings. As it searches for a matching file, it compares the time stamp and contents of the load module against the time stamp and contents of the side file or listing looking for the best match.

During interactive reanalysis, if a side file or listing was identified during real-time analysis, that file can be used. Next, if the compiler embedded the file name in the load module, it is checked. If you coded libraries in your personal Fault Analyzer options, those are searched next. After that, system-wide options are checked for libraries to search. Finally, if the installer provided a special exit, it runs and can provide additional libraries to search.

If a match is not found after searching all of these, the user may be prompted for the name of a side file or compiler listing. If you have the "Prompt for missing side files" option turned on in your reanalysis options, you are prompted at this point.

If no libraries are specified in options or at the prompt, then Fault Analyzer continues the reanalysis without source mapping.

While searching, how is a match determined?



- Fault Analyzer searches for the "best match", which is:
 - The file with a time stamp closest to, but not earlier than, the time stamp in the module
 - The file that matches the contents of the module, based on size and a partial comparison of machine instructions
- When an exact match is found, it is used (based on timestamp/signature and contents)
- If the search completes and an exact match is not found, the "best match" is used
- A side file or listing is not used if:
 - The time stamp in the file is earlier than the time stamp in the module
 - It fails a partial comparison of machine instructions
 - For COBOL, the size of the TGT, Working-Storage, Data Division, or Procedure Division do not match

Fault Analyzer looks for the best match when searching through libraries for each program. That is the file with a time stamp closest to, but not earlier than, the time stamp in the module, and the file that matches the contents of the module, based on size and a partial comparison of machine instructions.

When an exact match is found during the search, the file is used and it stops searching. If the search completes but an exact match is not found, then the best match is used.

A file is not used if the time stamp is earlier than the module, or if it fails comparisons of size or content.

- **Viewing a real-time fault analysis report**
- **Interactive reanalysis**
 - Interactive reanalysis tour
 - How to use the File Manager interface
- **Program source mapping during reanalysis**
 - Applying side files and compiler listings
 - Requesting prompts for file names during reanalysis
 - Automating the search for side files and listings with options
 - Re-creating a compiler listing for an existing module



Next, you will learn how to specify that you want to be prompted for the names of compiler listings or side files during reanalysis, if they are not found automatically.

Pull down the Options menu



The screenshot shows the IBM Fault Analyzer interface. The menu bar at the top includes File, Options, View, Services, and Help. The 'Options' menu is highlighted with a mouse cursor. A callout box with a yellow background and black border contains the text: "Place your cursor on 'Options' and press enter". Below the menu bar, the main display area shows the following text:

```
IBM Fault Analyzer - Fault Entry List 1 Col 1 80
Command ==> _____ ==> CSR
Fault History File or View : 'FAULTANL.V12R1.HIST'

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

Fault_ID	Job/Tran	Module	CICS_Trn	User_ID	Sys/Job	Abend	Dups	Date
— F00785	DNET074F	SAM2	n/a	DNET074	DEMOMVS	S0C7		2012/06/
— F00784	DNET074F	SAM2	n/a	DNET074	DEMOMVS	S0C7		2012/06/
— F00778	DDS0027P	DFSD0B10	n/a	DDS0027	DEMOMVS	U0717	1	2012/06/
— F00777	DDS0027P	DFSPCCCO	n/a	DDS0027	DEMOMVS	U0041	1	2012/06/
— F00776	DDS0027U	FABHURGB	n/a	DDS0027	DEMOMVS	U4013		2012/06/
— F00775	AGGLINK	AGGRACES	n/a	SYSSTC	DEMOMVS	SD22		2012/06/
— F00774	CEMT	DFHAIP	CEMT	DDS0089	CICSAOR1	ATNI	2	2012/06/
— F00773	DNET461L	SAM2	n/a	DNET461	DEMOMVS	S0C7		2012/06/
— F00772	AGGLINK	AGGRACES	n/a	SYSSTC	DEMOMVS	SD22	1	2012/06/
— F00771	DNET461L	SAM2	n/a	DNET461	DEMOMVS	S0C7		2012/06/
— F00770	DNET196M	SAM2	n/a	DNET196	DEMOMVS	S0C7		2012/06/

A yellow box with the word "Enter" is positioned at the bottom right of the table area.

11 | IBM Fault Analyzer for z/OS - V12 Tutorial | © 2012 IBM Corporation

To update your options, first pull down the 'options' menu by placing your cursor on the word options and pressing Enter.

Pull down the Options menu and Select Interactive Reanalysis Options



File **Options** View Services Help

IBM F **3** 1. Fault Analyzer Preferences...
 Comma 2. Batch Reanalysis Options...
 Fault 3. Interactive Reanalysis Options...

Line 1 Col 1 80
 Scroll ==> CSR

Select Interactive Reanalysis Options

{The following line S (View saved report), I (Interactive reanalysis), B (Batch reanalysis), D (Delete), H (Duplicate history), C (Copy fault entry), M (Move fault entry), X (XMIT fault entry).}

Fault_ID	Job/Tran	Module	CICS_Trn	User_ID	Sys/Job	Abend	Dups	Date
F00785	DNET074F	SAM2	n/a	DNET074	DEMOMVS	S0C7		2012/06/
F00784	DNET074F	SAM2	n/a	DNET074	DEMOMVS	S0C7		2012/06/
F00778	DDS0027P	DFSD0B10	n/a	DDS0027	DEMOMVS	U0717	1	2012/06/
F00777	DDS0027P	DFSPCCCO	n/a	DDS0027	DEMOMVS	U0041	1	2012/06/
F00776	DDS0027U	FABHURGB	n/a	DDS0027	DEMOMVS	U4013		2012/06/
F00775	AGGLINK	AGGRACES	n/a	SYSSTC	DEMOMVS	SD22		2012/06/
F00774	CEMT	DFHAIP	CEMT	DDS0089	CICSAOR1	ATNI	2	2012/06/
F00773	DNET461L	SAM2	n/a	DNET461	DEMOMVS	S0C7		2012/06/
F00772	AGGLINK	AGGRACES	n/a	SYSSTC	DEMOMVS	SD22	1	2012/06/
F00771	DNET461L	SAM2	n/a	DNET461	DEMOMVS	S0C7		2012/06/
F00770	DNET196M	SAM2	n/a	DNET196	DEMOMVS	S0C7		2012/06/

Enter

12

IBM Fault Analyzer for z/OS - V12 Tutorial

© 2012 IBM Corporation

Then select 'Interactive Reanalysis Options'.

Specify Y for 'Prompt for missing side file'



```
File View Services Help
Interactive Reanalysis Options Line 1 Col 1 80
Command ==> | Scroll ==> CSR
Press PF3 to save options or PF12 to cancel.
General Options:
Options line for
interactive reanalysis. . . : _____
Redisplay this panel
before each reanalysis. . . : N (Y/N)
Display panel to alter
allocated data sets . . . : N (Y/N)
Prompt before opening a
SYSMDUMP. . . . . : N (Y/N)
Prompt for missing side
files . . . . . : Y (Y/N)
Reanalysis Options Data Set Control:
Options data set name . . : _____
Options member name . . . : _____ (If PDS or PDSE)
Use this data set during
reanalysis. . . . . : N (Y/N)
```

This is a permanent setting.

F3

13 IBM Fault Analyzer for z/OS - V12 Tutorial © 2012 IBM Corporation

Set the 'Prompt for missing side files' option to Y. This will be a permanent setting. Press F3 to exit.

Enter an I line command to start interactive reanalysis



```
File Options View Services Help
IBM Fault Analyzer - Fault Entry List          Line 1 Col 1 80
Command ==> _____ Scroll ==> CSR

Fault History File or View : '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).)
```

Fault_ID	Job/Tran	User_ID	Dups	Abend	Date	Jobname	Class	Time
i F05172	TSS13FA	TSS13		S0C7				37:19
F05167	TSS09A	TSS09		S0C7				43:15
F05166	ELDERON9	ELDERON		S0C4				52:00
F05165	ELDERON2	ELDERON		S0C7	2010/03/03	ELDERON2	n/a	11:41:51
F05164	ELDERON9	ELDERON		S0C6	2010/03/03	ELDERON9	n/a	10:40:57
F05163	ELDERON8	ELDERON		S0C1	2010/03/03	ELDERON8	n/a	10:29:46
F05162	ELDERON8	ELDERON		S0C9	2010/03/03	ELDERON8	n/a	10:12:04
F05161	ELDERON9	ELDERON		S0C4	2010/03/03	ELDERON9	n/a	09:46:28
F05160	ELDERON1	ELDERON		S0C4	2010/03/03	ELDERON1	n/a	
F05159	ELDERON7	ELDERON		S0C7	2010/03/03	ELDERON7	n/a	
F05158	ELDERON8	ELDERON		S0C6	2010/03/02	ELDERON8	n/a	

Use the **I** line command to start Interactive Reanalysis

Enter

14 IBM Fault Analyzer for z/OS - V12 Tutorial © 2012 IBM Corporation

Here is an example of how to specify the name of a side file or compiler listing for a program. First, start interactive reanalysis with an I line command next to an abend entry.

If a file is not found automatically, you may be prompted



File Options View Services Help

Compiler Listing Not Found

Command ==> _____

Compiler listing or side file not found for:

Module Name : SAM1
Program Name : SAM1
Entry Point Name . . : SAM1
Loaded From : TSS13.ADLAB.LOAD2
Language : COBOL
Compile Date : 2009/09/29 (YYYY/MM/DD)
Compile Time : 18:48:05 (HH:MM:SS)

Select one of the following options and press Enter:

2 1. Continue without compiler listing or side file for this program
2. Specify compiler listing or side file to use for this program
3. Retry search for compiler listing or side file for this program
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. Show program listing/side file search trace

If a matching side file or listing file is not found, this panel may be displayed

If you are not getting this prompt, review the section titled "Requesting prompts for file names during reanalysis "

Enter

15 IBM Fault Analyzer for z/OS - V12 Tutorial © 2012 IBM Corporation

Fault analyzer searches for a matching side file or compiler listing for each application program that it detects on the active call chain. If it does not automatically find a matching file, it may prompt you for a file, as shown here, depending on your options settings. Notice that the program name, SAM1 in this example, is displayed. If there is not a side file or compiler listing available for the a program, select an option to continue without it. Or consider recompiling the program now, to re-create one. To provide a file, select option 2, "Specify compiler listing or side file to use for this program", and press enter.

Specify the source file location



The screenshot shows the 'Specify the source file location' dialog box in the IBM Fault Analyzer. The window title is 'Specify the source file location' and it has a menu bar with 'File Options View Services Help'. The main area contains a 'Command ==>' field and a 'Specify Compiler Listing or Side File' section. This section prompts the user to 'Specify the data set and member name containing the compiler listing or side file and press Enter.' The 'Data Set Name' is set to 'TSS13.ADLAB.SYSDEBUG' and the 'Member' is 'SAM1'. A red oval highlights these two fields. Below the input fields, there is a list of file types to specify: '-_a sysdebug file, or', '-_a compiler listing, or', '-_a langx file, or', and '-_a sysadata file'. A yellow callout box with the text 'Specify: -_a sysdebug file, or -_a compiler listing, or -_a langx file, or -_a sysadata file' is positioned over this list. At the bottom of the dialog, there is a yellow callout box that says 'The file can be re-created before you continue' and a yellow 'Enter' button.

File Options View Services Help
Compiler Listing Not Found

Command ==>

Specify Compiler Listing or Side File

Command ==>

Specify the data set and member name containing the compiler listing or side file and press Enter.

Data Set Name . . . 'TSS13.ADLAB.SYSDEBUG'

Member SAM1

Specify:

- _a sysdebug file, or
- _a compiler listing, or
- _a langx file, or
- _a sysadata file

The file can be re-created before you continue

Enter

16 IBM Fault Analyzer for z/OS - V12 Tutorial © 2012 IBM Corporation

Then specify the file to be used for source mapping for the program. Depending on the compiler used, name the corresponding Sysdebug file, compiler listing, Langx file, or Sysadata file. In this example the corresponding file is entered for program SAM1.

You may be prompted separately for each module



```
File Options View Services Help
Compiler Listing Not Found
Command ==> _____

Compiler listing or side file not found for:
Module Name . . . . : SAM2
Program Name . . . . : SAM2
Entry Point Name . . : SAM2
Loaded From . . . . : TSS13.ADLAB.LOAD2
Language . . . . . : COBOL
Compile Date . . . . : 2009/09/29 (YYYY/MM/DD)
Compile Time . . . . : 18:48:05 (HH:MM:SS)

Select one of the following options and press Enter:
 2 1. Continue without compiler listing or side file for this program
    2. Specify compiler listing or side file to use for this program
    3. Retry search for compiler listing or side file for this program
    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. Show program listing/side file search trace
This is the point of failure program.
```

This is the second program on the active call chain

Enter

17

IBM Fault Analyzer for z/OS - V12 Tutorial

© 2012 IBM Corporation

You are prompted separately for each program found on the call chain. In this example, it is prompting for another program, SAM2. Option two is selected again.

Specify the source file location



```
File Options View Services Help
Compiler Listing Not Found
Command ==>
Specify Compiler Listing or Side File
Command ==>
Specify the data set and member name containing the compiler listing or
side file and press Enter.
Data Set Name . . . 'TSS13.ADLAB.SYSDEBUG'
Member . . . . . SAM2
2 1. Continue without compiler listing or side file for this program
2. Specify compiler listing or side file to use for this program
3. Retry search for compiler listing or side file for this program
4. Do not prompt again for compiler listing or side file
5. Only prompt for the point of failure for compiler listing or side file
6. Show program listing/side file
This is the point of failure pr
```

Specify:
-_a sysdebug file, or
-_a compiler listing, or
-_a langx file, or
-_a sysadata file

Enter

18 IBM Fault Analyzer for z/OS - V12 Tutorial © 2012 IBM Corporation

And the name of the corresponding Sysdebug file is specified. Fault Analyzer validates the file against the program. If it does not match, it will give you a message and you can try another file or continue without one. Press enter to continue.

Interactive reanalysis with source applied



```
File View Services Help
Interactive Reanalysis Report                               Line 1 Col 1 80
Command ==> _____ Scroll ==> CSR
JOBNAME: TSS13FA   SYSTEM ABEND: 0C7                     STLABF6   2010/03/09  10:37:19

Fault Summary:
Module SAM2, program SAM2, source line # 89 : Abend SOC7 (Data Exception).

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

{Fault Analyzer maximum storage allocated: 1.74 megabytes.}

*** Bottom of data.
```

Once all the source files have been specified, the interactive reanalysis panel is displayed with source mapping for the programs.

- **Viewing a real-time fault analysis report**
- **Interactive reanalysis**
 - Interactive reanalysis tour
 - How to use the File Manager interface
- **Program source mapping during reanalysis**
 - Applying side files and compiler listings
 - Requesting prompts for file names during reanalysis
 - Automating the search for side files and listings with options
 - Re-creating a compiler listing for an existing module



Next, you will see how to automate Fault Analyzer's search for side files and compiler listings.

Select the Options pull-down menu



File **Options** View Services Help

IBM Fault Analyzer - Fault Entry List Col 1 80
Command ==> _____ ==> CSR

Fault History File or View : '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).}

Fault_ID	Job/Trans	Date	Time	MD
F00231	TSS16FA5	2010/11/12	12:45:42	
F00230	CICSSCAN	2010/11/11	10:55:18	
F00229	ATF	2010/11/11	07:33:59	
F00228	ATF * STLABF6 CIKICMVS S18A	2010/11/09	12:43:29	
F00227	IM1ACQS IMSPROD STLABF6 CQSIST30 U0014	2010/11/08	09:53:18	
F00226	IM1ACQS IMSPROD STLABF6 CQSIST30 U0014	2010/11/08	07:46:53	
F00225	IM1ACQS IMSPROD STLABF6 CQSIST30 U0014	2010/11/07	14:30:33	
F00223	TSS12X TSS12 STLABF6 SAM1 SOC4	2010/11/04	08:36:03	
F00222	TSS12X TSS12 STLABF6 SAM2 SOC7	2010/11/03	16:00:00	
F00221	TSS09A TSS09 STLABF6 SAM2 SOC7	2010/11/02	10:40:00	
F00220	IDIVPASM CONOVER STLABF6 G0 SOC7	2010/11/02	09:10:00	

21 IBM Fault Analyzer for z/OS - V12 Tutorial © 2012 IBM Corporation

Fault Analyzer options can be coded to provide lists of side file and compiler listing libraries. First, bring down the options menu. Place your cursor on the word "Options" in the menu bar, and press enter.

Select interactive reanalysis options



```
File Options View Services Help
IBM F 3 1. Fault Analyzer Preferences...
Comma 2. Batch Reanalysis Options...
Fault 3. Interactive Reanalysis Options...

Line 1 Col 1 80
Scroll ==> CSR

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

Fault_ID Job/Tran User_ID Sys/Job Module Abend Date Time MD_
F00231 TSS16FA5 TSS16 STLABF6 SAM2 SOC7 2010/11/12 12:45:42
F00230 CICSSCAN BOYERP STLABF6 DMH0734 SOC4 2010/11/11 10:55:18
F00229 ATF * STLABF6 CIKICMVS S18A 2010/11/11 07:33:59
F00228 ATF * STLABF6 CIKICMVS S18A 2010/11/09 12:43:29
F00227 IM1ACQS IMSPROD STLABF6 CQSIST30 U0014 2010/11/08 09:53:18
F00226 IM1ACQS IMSPROD STLABF6 CQSIST30 U0014 2010/11/08 07:46:53
F00225 IM1ACQS IMSPROD STLABF6 CQSIST30 U0014 2010/11/07 14:30:33
F00223 TSS12X TSS12 STLABF6 SAM1 SOC4 2010/11/04 08:36:03
F00222 TSS12X TSS12 STLABF6 SAM2 SOC7 2010/11/03 16:00:00
F00221 TSS09A TSS09 STLABF6 SAM2 SOC7 2010/11/02 10:40:00
F00220 IDIVPASM CONOVER STLABF6 GO SOC7 2010/11/02 09:10:00
```

Enter

22 IBM Fault Analyzer for z/OS - V12 Tutorial © 2012 IBM Corporation

In the drop-down menu, select 3 for interactive reanalysis options, and press enter.

Reanalysis options can be entered on the options line



```
File View Services Help
Interactive Reanalysis Options
Command ==> | Scroll ==> CSR

Press PF3 to save options or PF12 to cancel.

General Options:
Options line for
interactive reanalysis. . DATASETS (IDISYSDB (TSS16.ADLAB.SYSDEBUG))
Redisplay this panel
before each reanalysis. . : N (Y/N)
Display panel to alter
allocated data sets . . . : N (Y/N)
Prompt before opening a
SYSMDUMP. . . . . : N (Y/N)

Reanalysis Options Data Set Control:
Options data set name . . :
Options member name . . . : (If PDS or PDSE)
Use this data set during
reanalysis. . . . . : N (Y/N)
Edit the options data set
before reanalysis . . . . : N (Y/N)
```

The interactive reanalysis options panel is displayed. The Datasets option is used to specify one or more side file or compiler listing libraries. You can specify options on the line labeled "Options line for interactive reanalysis".

A file containing reanalysis options can be specified



```
File View Services Help
Interactive Reanalysis Options                               Line 3 Col 1 80
Command ==> |_____ Scroll ==> CSR

General Options:
Options line for
interactive reanalysis. . . : _____
Redisplay this panel
before each reanalysis. . . : N (Y/N)
Display panel to alter
allocated data sets . . . . : N (Y/N)
Prompt before opening a
SYSMDUMP. . . . .          : N (Y/N)

Reanalysis Options Data Set Control:
Options data set name . . . : 'TSS16.ADLAB.FILES'
Options member name . . . . : FAOPTS (If PDS or PDSE)
Use this data set during
reanalysis. . . . .        : Y (Y/N)
Edit the options data set
before reanalysis . . . . . : Y (Y/N)

*** Bottom of data.
```

... specify a file containing Fault Analyzer options

But if your options will not fit on one line, you can code them in a file. In this example an options file is used, by specifying it in the field labeled "Options data set name". The "Use this data set during reanalysis" option must also be set on. The "Edit the options data set before reanalysis" option is suggested, but is optional.

You can specify Fault Analyzer options in a file



- Use the DATASETS option to specify side file / compiler listing libraries
- You can have multiple versions of a program in the lists (test, QA, production)
 - Fault Analyzer can find the matching file for any program because it does time stamp comparisons

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      TSS16.ADLAB.FILES (FAOPTS) - 01.01          Columns 00001 00072
Command ==> |                                         Scroll ==> CSR
***** ***** Top of Data *****
000001  DATASETS (
000002      IDISYSDB (TSS16.ADLAB.SYSDEBUG, ← SYSDEBUG libraries
000003          TEST.SYSDEBUG,
000004          PROD.SYSDEBUG
000005      )
000006      IDILANGX (TSS16.ADLAB.EQUALANGX, TEST.LANGX) ← Langx libraries
000007      IDILCOB (TEST.COBOL.LISTINGS,
000008          PROD.COBOL.LISTINGS ← COBOL compiler
000009      )                                listings
000010  )
***** ***** Bottom of Data *****
```

25

IBM Fault Analyzer for z/OS - V12 Tutorial

© 2012 IBM Corporation

The datasets option is used to specify files that Fault Analyzer should use, including side file and compiler listing libraries. In this example, a list of SYSDEBUG libraries is specified, a LANGX library, and a list of COBOL compiler listings libraries.

It is typical to provide a list of libraries that are at different stages of the program promotion process. There may be test, QA, production, and other versions of side files and compiler listings all listed in your library search lists. There may be multiple versions of your program in the list, but that is OK. Since time stamps are compared during the search, Fault Analyzer can find the matching file for any version of a program.

The DataSets option



- The DataSets option can name side file and compiler listing libraries to be searched automatically
- Syntax:
 - DATASETS (library-type1 (library , library, ... , library)
library-type2 (library , library, ... , library))
- Side file and listing library types:
 - **IDILC**: C/C++ compiler listings
 - **IDILCOB**: COBOL compiler listings (except OS/VS COBOL)
 - **IDILCOBO**: OS/VS COBOL compiler listings
 - **IDISYSDB**: SYSDEBUG files
 - **IDILANGX**: LANGX files
 - **IDILPLI**: PL/I compiler listings (except Enterprise PL/I)
 - **IDILPLIE**: Enterprise PL/I compiler listings

Several types of libraries can be specified in the datasets option. The keyword IDILC denotes compiler listings for C or C++ programs. IDILCOB denotes compiler listings libraries for COBOL programs except OS/VS COBOL, which can be specified with the IDILCOBO keyword. IDISYSDB denotes SYSDEBUG libraries, and IDILANGX denotes LANGX libraries. Enterprise PL/I compiler listings are specified with the IDILPLIE keyword, and listings generated by older versions of PL/I are denoted by the IDILPLI keyword. Options keywords and syntax are described in detail in the Fault Analyzer User's Guide.

After specifying options, press F3 to save and exit



```
File View Services Help
Interactive Reanalysis Options                               Line 3 Col 1 80
Command ==> █                                           Scroll ==> CSR

General Options:
Options line for
interactive reanalysis. . . : _____
Redisplay this panel
before each reanalysis. . . : N (Y/N)
Display panel to alter
allocated data sets . . . . : N (Y/N)
Prompt before opening a
SYSMDUMP. . . . . . . . . . : N (Y/N)

Reanalysis Options Data Set Control:
Options data set name . . . : 'TSS16.ADLAB.FILES'
Options member name . . . . : FAOPTS (If PDS or PDSE)
Use this data set during
reanalysis. . . . . . . . . : Y (Y/N)
Edit the options data set
before reanalysis . . . . . : Y (Y/N)

*** Bottom of data.
```



After specifying options, press F3 to exit.

Options were updated



```
File Options View Services Help
IBM Fault Analyzer - Fault Entry List                               Line 1 Col 1 80
Command ==> _____ Scroll ==> CSR

Fault History File or View : '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).}
```

Fault_ID	Job/Tran	User_ID	Dups	Abend	Date	Jobname	Class	Time
i F05172	TSS13FA	TSS13		S0C7				37:19
F05167	TSS09A	TSS09		S0C7				43:15
F05166	ELDERON9	ELDERON		S0C4				52:00
F05165	ELDERON2	ELDERON		S0C7	2010/03/03	ELDERON2	n/a	11:41:51
F05164	ELDERON9	ELDERON		S0C6	2010/03/03	ELDERON9	n/a	10:40:57
F05163	ELDERON8	ELDERON		S0C1	2010/03/03	ELDERON8	n/a	10:29:46
F05162	ELDERON8	ELDERON		S0C9	2010/03/03	ELDERON8	n/a	10:12:04
F05161	ELDERON9	ELDERON		S0C4	2010/03/03	ELDERON9	n/a	09:46:28
F05160	ELDERON1	ELDERON		S0C4	2010/03/03	ELDERON1	n/a	
F05159	ELDERON7	ELDERON		S0C7	2010/03/03	ELDERON7	n/a	
F05158	ELDERON8	ELDERON		S0C6	2010/03/02	ELDERON8	n/a	

Use the **I** line command to start Interactive Reanalysis

Enter

28 | IBM Fault Analyzer for z/OS - V12 Tutorial | © 2012 IBM Corporation

Your settings are saved in your profile, and they are retained permanently. When interactive reanalysis is started, Fault Analyzer automatically searches through the lists specified in your options for matching files for each program in the call chain.

Source was applied automatically after searching the libraries specified in options



```
File View Services Help
Interactive Reanalysis Report                               Line 1 Col 1 80
Command ==> _____ Scroll ==> CSR
JOBNAME: TSS13FA  SYSTEM ABEND: 0C7                      STLABF6  2010/03/09  10:37:19

Fault Summary:
Module SAM2, program SAM2, source line # 89 : Abend SOC7 (Data Exception).

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

{Fault Analyzer maximum storage allocated: 1.74 megabytes.}

*** Bottom of data.
```

If it still cannot find source for any programs, it will prompt you for them. If it finds all of the corresponding files, it proceeds to the interactive reanalysis menu.

- **Viewing a real-time fault analysis report**

- **Interactive reanalysis**
 - Interactive reanalysis tour
 - How to use the File Manager interface

- **Program source mapping during reanalysis**
 - Applying side files and compiler listings
 - Requesting prompts for file names during reanalysis
 - Automating the search for side files and listings with options
 - Re-creating a compiler listing for an existing module



Next, you will see an example of re-creating a compiler listing after an abend occurred, so it can be used for source mapping.

Create a file for source mapping *after* an abend occurs

- Recompile the program to create a compiler listing, SYSDEBUG file, or LANGX file
 - Fault Analyzer can use the new file, but only if it determines that the storage map matches the module
 - Fault Analyzer will issue a warning message in the report, since the time stamp will not match
- Everything has to be the same as when the module was originally created:
 - Exactly the same source code, including copybooks
 - The same version of the compiler
 - The same compiler options
- Will this work with Sysdebug files?
 - Yes, but the compiler options must be the same, including the TEST sub-options that are needed to generate a Sysdebug file

You may run into a situation where a file for source mapping is not already available when an abend occurs. Since source mapping can save you a lot of time, it can be worthwhile to re-create a compiler listing or side file after the abend occurred.

To do it, recompile the program to generate a fresh copy of a compiler listing, Langx file, or Sysdebug file. When Fault analyzer attempts to use the new file, it will perform a validity check on the new file. The size of the module that abended must match the module that is described by the listing or side file. If the module size matches, Fault analyzer will still issue a warning in the analysis report because the timestamp in the module will not match the timestamp in the listing, but that is OK.

Keep in mind that the program source code must be exactly the same as it was when the original module was compiled, including copybooks. Also, you must use the same version of the compiler that was used to produce the original module. And finally, all compiler options that could affect the size or layout of the module have to all be exactly the same. These are all common sense items, but sometimes easy to forget when you are in a hurry to solve a problem.

? line command will show sysout datasets



Display Filter View Print Options Help

SDSF HELD OUTPUT DISPLAY ALL CLASSES LINES 41,977 LINE 33-39 (39)
COMMAND INPUT ==> SCROLL ==> CSR

NP	JOBNAME	JobID	Owner	Prty	C	ODisp	Dest	Tot-Rec	Tot-
	DNET074D	JOB07341	DNET074	144	H	HOLD	LOCAL	1,232	
	DNET074D	JOB07341	DNET074	144	H	HOLD	LOCAL	268	
	DNET074X	JOB07342	DNET074	144	H	HOLD	LOCAL	700	
	DNET074X	JOB07342	DNET074	144	H	HOLD	LOCAL	1,232	
	DNET074X	JOB07342	DNET074	144	H	HOLD	LOCAL	270	
	DNET074F	JOB08025	DNET074	144	H	HOLD	LOCAL	1,335	
	DNET074C	JOB08167	DNET074	128	H	HOLD	LOCAL	2,918	

It is best to update your compile processes to automatically store the compiler listing or side file in a PDS. If you have a compiler listing in another format, you must copy it to a PDS for Fault Analyzer.

If your Compiler Listing is in SYSOUT, here is an easy way to copy it to a PDS using SDSF.

Enter

32 | IBM Fault Analyzer for z/OS - V12 Tutorial | © 2012 IBM Corporation

Fault analyzer can read compiler listings and side files that are in PDSes or sequential files. But what if you need to use a compiler listing that is in the SYSOUT of your compile job? You need to copy it to a PDS member or sequential file. Most SYSOUT viewers give you a way to do that.

In this example, SDSF is being used, although you may have a different SYSOUT viewer. With SDSF, start by entering a "?" line command next to the compile job.

Select the compiler listing in sysout



Display Filter View Print Options Help

SDSF JOB DATA SET DISPLAY - JOB DNET074C (JOB08167) LINE 1-5 (5)
COMMAND INPUT ==> SCROLL ==> CSR

NP	DDNAME	StepName	ProcStep	DSID	Owner	C	Dest	Rec-Cnt	Page
	JESMSG LG	JES2		2	DNET074	H	LOCAL	22	
	JESJCL	JES2		3	DNET074	H	LOCAL	35	
	JESYSMSG	JES2		4	DNET074	H	LOCAL	83	
xdc	SYSPRINT	COBCOMP		101	DNET074	H	LOCAL	2,590	
	SYSPRINT	LKED		103	DNET074	H	LOCAL	188	

Compiler Listing

In SDSF, use the **XDC** line command to copy your Compiler Listing

Enter

33 | IBM Fault Analyzer for z/OS - V12 Tutorial | © 2012 IBM Corporation

That shows a list of DDs generated by the job. In this case, the compiler listing is in the SYSPRINT DD from the compiler step. Enter an "XDC" line command next to it.

Save the compiler listing to a PDS



```
SDSF Open Print Data Set
COMMAND INPUT ==> █ SCROLL ==> CSR

Data set name ==> 'DNET074.ADLAB.LISTING'
Member to use ==> SAM1
Disposition ==> SHR (OLD, NEW, SHR, MOD)

If the data set is to be created, specify the following.
Volume serial will be used to locate existing data sets if specified.

Management class ==>
Storage class ==>
Volume serial ==>
Device type ==>
Data class ==>
Space units ==> BLKS
Primary quantity ==> 500
Secondary quantity ==> 500
Directory blocks ==>
Record format ==> VBA
Record length ==> 240
Block size ==> 3120
```

In SDSF, the **XDC** line command prompts you for a file name. Specify the name of a PDS with the correct attributes for the compiler that you used.

Fault Analyzer can use the listing that you copied to a PDS member.

34

IBM Fault Analyzer for z/OS - V12 Tutorial

© 2012 IBM Corporation

The XDC command displays a panel where you can specify the name of a sequential file or a PDS member. When you press enter, the listing is copied to the file, and then the listing can be read by Fault Analyzer. Use care to ensure that the output file has correct record length and file attributes for the compiler listing. Different compilers require different attributes for compiler listing files.

That is the end of this section, performing source mapping during interactive reanalysis.

Feedback



Your feedback is valuable

You can help improve the quality of IBM Education Assistant content to better meet your needs by providing feedback.

- Did you find this module useful?
- Did it help you solve a problem or answer a question?
- Do you have suggestions for improvements?

Click to send email feedback:

mailto:iea@us.ibm.com?subject=Feedback_about_FAv12s07SourceMapping.ppt

This module is also available in PDF format at: [../FAv12s07SourceMapping.pdf](#)

You can help improve the quality of IBM Education Assistant content by providing feedback.



Trademarks, copyrights, and disclaimers

IBM, the IBM logo, ibm.com, z/OS, and zSeries are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of other IBM trademarks is available on the web at "[Copyright and trademark information](http://www.ibm.com/legal/copytrade.shtml)" at <http://www.ibm.com/legal/copytrade.shtml>

Other company, product, or service names may be trademarks or service marks of others.

THE INFORMATION CONTAINED IN THIS PRESENTATION IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY. WHILE EFFORTS WERE MADE TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION CONTAINED IN THIS PRESENTATION, IT IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. IN ADDITION, THIS INFORMATION IS BASED ON IBM'S CURRENT PRODUCT PLANS AND STRATEGY, WHICH ARE SUBJECT TO CHANGE BY IBM WITHOUT NOTICE. IBM SHALL NOT BE RESPONSIBLE FOR ANY DAMAGES ARISING OUT OF THE USE OF, OR OTHERWISE RELATED TO, THIS PRESENTATION OR ANY OTHER DOCUMENTATION. NOTHING CONTAINED IN THIS PRESENTATION IS INTENDED TO, NOR SHALL HAVE THE EFFECT OF, CREATING ANY WARRANTIES OR REPRESENTATIONS FROM IBM (OR ITS SUPPLIERS OR LICENSORS), OR ALTERING THE TERMS AND CONDITIONS OF ANY AGREEMENT OR LICENSE GOVERNING THE USE OF IBM PRODUCTS OR SOFTWARE.

© Copyright International Business Machines Corporation 2012. All rights reserved.