

ZTRAP EI Analysis Enhancements (APAR PJ47076)

Development Tools Subcommittee

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2024 TPF Users Group Conference
May 05-07, New Orleans, Louisiana

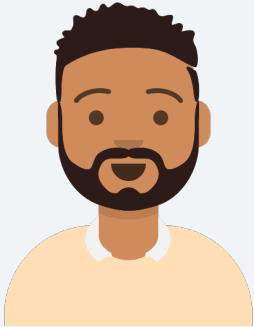
IBM Z



Problem Statement

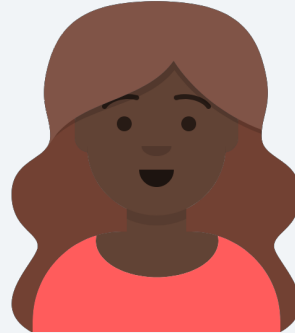
The z/TPF software profiler EI analysis does not always identify the program that is causing the performance impact.

Users



Zach
Application
Developer

Zach develops and maintains a custom middleware suite, which has its common API library defined in the shared object MLIB.



Carol
Coverage
Programmer

Carol analyzes and investigates any ongoing or potential concerns on the z/TPF environment.

As-Is User Story

- After a new load to the z/TPF environment, the operators noticed higher than normal utilization values over time.
- Carol reviews the ZTRAP EI reports and sees that MLIB has a larger percentage of hits.
- Zach is asked to investigate any changes to MLIB but is unable to attribute them to the increased utilization.

As-Is User Story (Cont.)

- Carol and Zach identify and work with other developers that also made recent changes to the codebase.
- For the time being, the load is pulled out of the z/TPF environment, losing out on new enhancements.
- After several hours across multiple teams, they identified that the developers for the new program APPL had poorly implemented their usage of the library APIs from MLIB.

Pain Points

- The EI analysis does not collect information about the calling program.
- The previous calling program might not be sufficient if it is a multilayered or centralized entry point for a library.

Value Statement

The EI report can identify the calling application program that is causing a performance impact on a library program.

To-Be User Story

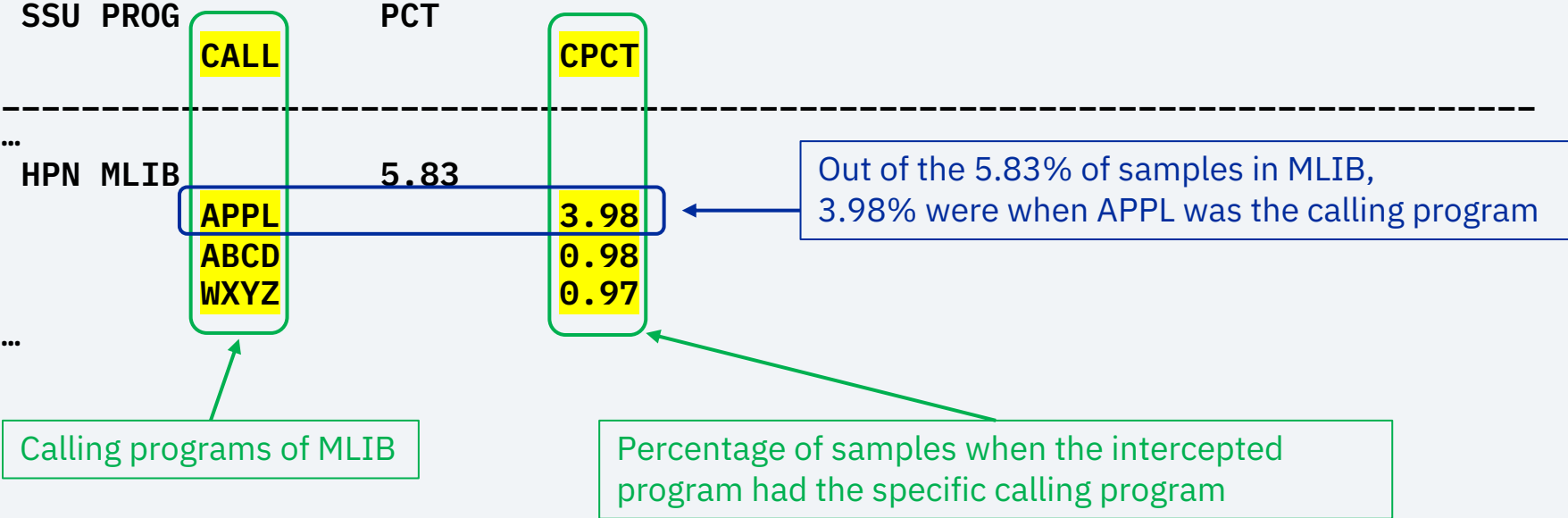
- After a new load to the z/TPF environment, the operators noticed higher than normal utilization values over time.
- Carol reviews the ZTRAP EI reports and sees that MLIB has a larger percentage of hits because of new calls by APPL.
- Zach assists the APPL developers with their MLIB usage.
- The APPL changes can be disabled or excluded without pulling the new load, and the fix was added within a day.

EI Report LINK Option

- The online EI collection will now always try to include caller information for each sample.
- The LINK option of the offline EI report will be used to provide enhanced report sections with caller information.
- The EI report will provide both the intercepted and calling programs when the LINK option is set to YES.
- When the LINK option is omitted or set to NO, the EI report output will be the same report layout as before.

EI Report LINK Option (Cont.)

A P P L I C A T I O N P R O G R A M S U M M A R Y



EI Report LINK Option (Cont.)

A P P L I C A T I O N P R O G R A M D E T A I L

SSU	PROG	OBJECT	MPCT	MTOT	OPCT	OTOT	COPCT	COTOT
...		CALL						
BSS	CTS7	cts7.goff	19.87	19.87	19.87	19.87		
		DONT					11.73	11.73
		CADM					7.63	19.36
		CONS					0.51	19.87
...								

Percentage of samples when the intercepted object had the specific calling program

Accumulated percentage values with the current and above rows

EI Report LINK Option (Cont.)

DETAIL FOR CALLING PROGRAMS

SSU	PROG	OBJECT	CALL	COBJECT	CFUNC	INST	COUNT
				DISP			

BSS	CTS7	cts7.goff					
			CADM	cadm.cpp			
				CADM			
			LM	000000000000386	LR		710
			LM	0000000000006F2	LR		929
			CONS	conn_send_messa			
				tpf_send_messag			
			LM	0000000000003C66	LTR		92
			DONT	linux_close.c			
				NET_Read			
			LM	0000000000002EC	LARL		2521
**	TOTAL FOR	BSS CTS7 =	4252	**			

Object and function of the caller return address

conn_send_messa
tpf_send_messag

Object offset and instruction of the caller return address

0000000000003C66 LTR

EI Report LINK Option (Cont.)

- To determine the calling program, the following program types will be skipped while traversing the application stack:
 - Programs with special library linkage (such as CISO, CTAL, or CTDF)
 - Programs with fast path linkage (such as CPP1, CTHD, or any user-defined program built with the compiler flag)
 - Programs indicated as a library program in the program configuration file

Program Configuration File

- The new version 4 format of the program configuration file supports a fifth column to indicate a library program.
- The library indicator is used only by the online EI collection.
- Even if set to NO or omitted, a program is still considered a library if it uses a special library or fast-path linkage.
- The IBM-provided program configuration file has a few entries as library programs such as CFVS, CJ00, and COMX.

Program Configuration File (Cont.)

Only the QEFG program is considered a library program:

4

Q000, fare.quote.A,, ,

QABC, flight.*.* , FEP, , NO

QDEF, *.newmid.* , NOFEP, EXCLUDE, NO

QEFG, , FEP, , YES

ZDPAT Enhancements

- The LIBRARY row in the ZDPAT COPY-C command output indicates whether the program was designated as a library in the program configuration file.
- In the detailed core display of the current loadsets, an asterisk marker is added in front of the LINK value to indicate that the program was compiled with the fast-path linkage option.

ZDPAT Enhancements (Cont.)

```
AAES0008I 00 ==> ZDPAT CNGH C-C
CSMP0097I 11.17.42 CPU-B SS-BSS SSU-HPN IS-01
DPAT0113I 11.17.42 BEGIN DISPLAY OF CORE COPY
```

```
PROGRAM          CNGH
SUBSYSTEM SHARED NO
AUTHORIZATION    BPAUTH overrides KEY0 MONTC RESTRICT CMB
FETCH           DEMAND
QUALIFIERS      DEBUG NOTIMESLICE
TIMEOUT         500
DUMP GROUP      NONE _
TRACE GROUP     IBM_DEFT
AFFINITY        PROGRAM
CONTROL FILE    TPF
FEP             NO
LIBRARY        NO
```

DISPLAY OF PAT SLOTS FOR CNGH

VV	LOADSET	ACT	NUM	STAT	FILE	ADDR	CORE	ADDR	COW	LINK	PAT	ADDR
	SECOND		15	ACT	D40A4BB2		000000009E6C2000		Y64	*CS0	0FC419F8	
	BASE		0	ACT	2C0547BB		000000009EEAD000		Y64	CS0	0F963C80	

END OF DISPLAY+

Migration Considerations

- PCFG0005E messages are issued for bad entries in the program configuration file that were previously ignored.
- For processing the new EI collection, APAR PJ47076 must be applied on both the online system and the offline utility.
- An old EI collection must be processed by using the offline software profiler utility without APAR PJ47076 applied.
- A few JCL data definition values must be increased to support the new larger EI collection records.

Conclusion

APAR PJ47076 (Sept 2023) delivers support for the enhancements to the z/TPF software profiler EI analysis.

Thank you

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