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ALCS Support for Debug Tool

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History and Overview

- Initial Debug Tool (D/T) support added in 1999
- D/T moved forward, ALCS did not, till eventually it broke
- PK95556 & PM25133 brought ALCS support up to date
- Support for C and C++ only
- May require changes to number & size of type 2 storage units
I use: NBRSU=(100,100,50),SUSIZE=(4,9,9),
- Programs must be compiled with 'hooks'
- Uses 'Eclipse' based Workstation Trace
- Enable tracing with ZTRAC command:

ztrac ws,start,wsaddr=192.168.1.51 ← addr of your workstation

Debug Tool Components

- Back End: IBM Debug Tool for z/OS
<http://www-01.ibm.com/software/awdtools/debugtool/>
- Front End:
 - ▶ IBM Rational Developer for System Z

<http://www.ibm.com/developerworks/downloads/r/rdz/>
 - or**
 - ▶ CICS Explorer

<http://www-01.ibm.com/software/htp/cics/explorer/>

Debug - \\DebugViewFiles\8001_13546\IALJB.ALCS.C(TSTBTD).c - IBM Rational Developer for System z

File Edit Navigate Search Project Run Window Help

Debug Variables Breakpoints Monitors Registers Modules

TSTBTD [Incoming Remote Debug Session]
 Platform: zOS 390X Connection: 9.20.122.87:13546
 Thread:1 (Runnable)
 TSTBTD : 03
 dxcbcall : 02
 dxcbhlif : 01
 Process: 284910520 Program: IALJB.ALCS.C(TSTBTD)

Name	Value
__func__	"TSTBTD"
buf	"\x10" "AAA"
citycode	0
ptr	"\x18&Ã~ -ÃcÃ"\x18"
n	0
m	0
aaaord	0
cstord	0
aaaptr	
cstptr	

```

IALJB.ALCS.C(TSTBTD).c
int  cstord;          /* CST ordinal */
struct wa0aa *aaaptr; /* AAA pointer */
struct st0st *cstptr; /* CST pointer */

/* prolog code */
gets(buf);           /* Any input */
ptr=&buf[0];         /* No, clear & exit*/
if (*ptr == 0) entdc("CFMT",NULL); /* Does not return */

/* Echo input - for testing */
printf("TSTBTD debugger test version started: ecb=%08X", ecbptr());
printf("\ninput data / length : %s / %u\n",buf, strlen(buf));

/* BT entry? If not leave..... */
if ( !( (*ptr) == 'B' && *(ptr+1) == 'I' ) ) {
    printf("Non BT entry; use ZROUT to change application");
    puts(usage);
}
    
```

Outline

- tpfeq.h
- tpfapi.h
- tpfio.h
- cSwa0aa.h
- cSst0st.h
- stdio.h
- stdlib.h
- string.h
- # ugb1
- BTA(char*) : void
- BTD(char*) : void
- getOrdinal() : int
- getAAA(int) : void
- getCST(int) : void
- showDuty(unsigned short) : char
- usageÿ : char
- TSTBTD() : void
- BTA(char*) : void

Source Properties

Console Tasks Problems Memory Trace View Debug Console

Monitors

2:1 Writable Smart Insert

Program preparation

Programs must be compiled with 'hooks':

```
//CDMAIN EXEC PGM=CCNDRVR,REGION=300M,PARM='/CXX OPTF(DD:CPARMS)'  
//CPARMS DD *  
    longname source nostart langlvl(extended)  
    debug(format(isd),hook(noblock,nopath))  
    search('dxc.v2r4m1.dxhdr1')  
    search('dxc.v2r4m1.dxhdr2')  
/*
```

For Details on Debug option see "z/OS XL C/C++ Users Guide" SC09-4767

Hook Statements

			000115	*	regs->r7 = (int) &(ecbptr()->ebw000);
000B42	4400	C1AC	000115	EX	r0,HOOK..STMT
000B46	58F0	34DA	000115	L	r15,=V(ecbptr)(,r3,1242)
000B4A	4400	C1C0	000115	EX	r0,HOOK..CALLBGN
000B4E	0DEF		000115	BASR	r14,r15
000B50	4400	C1C4	000115	EX	r0,HOOK..CALLRET
000B54	181F		000115	LR	r1,r15
000B56	4100	1008	000115	LA	r0,#AddressShadow(,r1,8)
000B5A	5810	D0C8	000115	L	r1,regs(,r13,200)
000B5E	5000	101C	000115	ST	r0,(*)TPF_regs.TPF_regs.r7(,r1,28)

The Fine Print

- Debug option = opt(0)
- Source must be in permanent dataset (no &&temp or //SYSIN)
- C++ programs create dataset same as source with suffix .DBG
- ALCS needs RACF authority to read C/C++ source and .DBG
- All datasets in DXCHLIB concatenation must be APF authorized
- ALCS program name must begin with DXCMON
- DXC10OSM must be linked with AC(1) into APF library

Live Demo

- Overview of screen layout
- Step Over/Into/Return
- Change variables
- Change Representation
- Jump to location
- Run to breakpoint

Questions ?