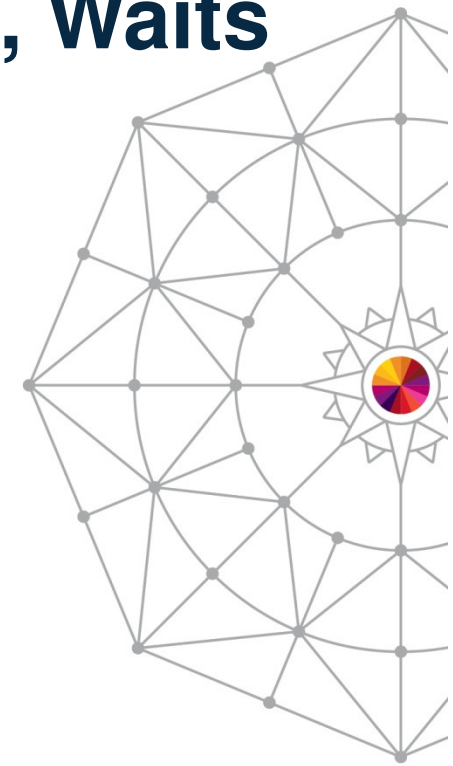
CICS Extreme Debugging: Abends, Waits and Enqueues

Ed Addison

IBM

Session 15553



#SHAREorg

Agenda

- **ABEND0C4 / AKEA / AFCZ**
- **FCPSWAIT / FCDSRECD Enqueue**
- **ABEND0C1**

Problem one ABEND0C4 / AKEA / AFCZ

ABEND0C4 / AKEA / AFCZ

- Customer called in with ABENDAKEA in CICS region
- Messages from SYSLOG

DFHFC0001 IYNXA An abend (code 0C4/AKEA) has occurred at offset X'FFFF' in module DFHFCVR.

DFHME0116 (Module:DFHMEME) CICS symptom string for message DFHFC0001 is MS/DFHFC0001 RIDS/DFHFCVR AB/S00C4 AB/UAKEA ADRS/0000FFFF

DFHDU0201 IYNXA ABOUT TO TAKE SDUMP. DUMPCODE: FC0001 , DUMPID: 17/0001

DFHDU0202 IYNXA SDUMPX COMPLETE. SDUMPX RETURN CODE X'00'

IEA611I COMPLETE DUMP ON DUMP.MV23.IYNXA.D100629.T164219.S00031

DUMPID=031 REQUESTED BY JOB (IYNXA) FOR ASID (0044) INCIDENT TOKEN: SYSPLEX1 MV23

- Messages from MSGUSR

DFHAC2236 29/06/2013 16:46:15 IYNXA Transaction MESS abend AFCZ in program MESSITUP term TC13. Updates to local recoverable resources will be backed out.

DFHDU0203I 29/06/2013 16:46:18 IYNXA A transaction dump was taken for dumpcode: AFCZ, Dumpid: 17/0004.

DFHAC2236 29/06/2013 16:46:18 IYNXA Transaction MESS abend AFCZ in program MESSITUP term TC13. Updates to local recoverable resources will be backed out.

ABEND0C4 / AKEA / AFCZ

- AKEA
  - Explanation: A program check has been detected by the kernel (KE) domain.
  - System Action: If an application is in control, the ASRA abend is presented to the application. Otherwise, the functional recovery routine of the CICS module in control at the time is given control. This recovery routine produces suitable diagnostics and may terminate CICS.
  - User Response: Look at the kernel domain section of the system dump to determine where the program check has occurred.
- AFCZ
  - Explanation: The transaction issued a file request resulting in a call to the main file control program (DFHFCFR). A "disastrous error" response was returned from DFHFCFR to its caller.
  - System Action: At the time the error is detected, CICS writes a message to the console, records an exception trace entry, and takes a system dump. The trace and dump identify the point of error. Subsequently, the task is abnormally terminated with a CICS transaction dump.
  - User Response: The system programmer should use the trace and dumps to determine what the error is, and why it has occurred.

IPCS Primary Menu

```
------------------- IPCS PRIMARY OPTION MENU  ---------------------------------
OPTION  ===>
                                                        ********************
   0  DEFAULTS     - Specify default dump and options     * USERID  - USASSC1
   1  BROWSE       - Browse dump data set                 * DATE    - 06/29/13
   2  ANALYSIS     - Analyze dump contents                *
   3  UTILITY      - Perform utility functions            * TIME    - 16:46
   4  INVENTORY    - Inventory of problem data            * PREFIX  - USASSC1
   5  SUBMIT       - Submit problem analysis job to batch * TERMINAL- 3278
   6  COMMAND      - Enter subcommand, CLIST or REXX exec * PF KEYS - 24
   T  TUTORIAL     - Learn how to use the IPCS dialog     ********************
   X  EXIT         - Terminate using log and list defaults

Enter END command to terminate IPCS dialog




 F1=HELP     F2=SPLIT    F3=END      F4=RETURN  F5=RFIND    F6=MORE     F7=UP
 F8=DOWN     F9=SWAP    F10=LEFT    F11=RIGHT  F12=CURSOR
```

IPCS Default Menu

```
------------------------ IPCS Default Values -------------------------------
Command ===>

  You may change any of the defaults listed below.  The defaults shown before
  any changes are LOCAL.  Change scope to GLOBAL to display global defaults.

  Scope    ==> BOTH    (LOCAL, GLOBAL, or BOTH)

  If you change the Source default, IPCS will display the current default
  Address Space for the new source and will ignore any data entered in
  the Address Space field.

  Source  ==> DSNAME('USASSC1.SHAREFC.DUMP')
  Address Space   ==> ASID(X'0044')
  Message Routing ==> NOPRINT TERMINAL
  Message Control ==> FLAG(WARNING) NOCONFIRM VERIFY
  Display Content ==> MACHINE REMARK REQUEST NOSTORAGE SYMBOL

Press ENTER to update defaults.

Use the END command to exit without an update.
```

MACHINE vs. NOMACHINE

- Specifying display content of **MACHINE**
  - Displays the ASID, virtual address and storage key
  - Here is an example:

```
command ===> ip l 7000 length(20)

LIST 7000. ASID(X'0396') LENGTH(X'14') AREA
ASID(X'0396') ADDRESS(7000.) KEY(88)
00007000. 02386EC4 C6C8D2C5 D2C3C240 40404040  A5900400
```

Note key of '88'

    - KEY(80) - key 8, not fetch protected
    - KEY(88) - key 8, fetch protected

- Specifying display content of **NOMACHINE**
  - Does not display the storage key
  - Here is an example:

```
command ===> ip l 7000 length(20)

LIST 7000. ASID(X'0396') LENGTH(X'14') AREA
00007000. 02386EC4 C6C8D2C5 D2C3C240 40404040  A5900400
```

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IPCS Command Menu

```
------------------------- IPCS Subcommand Entry --------------------------------
Enter a free-form IPCS subcommand or a CLIST or REXX exec invocation below:

===> ST SYS


----------------------- IPCS Subcommands and Abbreviations --------------------
ADDDUMP            | DROPDUMP, DROPD    | LISTDUMP, LDMP     | RENUM,     REN
ANALYZE            | DROPMAP,  DROPM    | LISTMAP,  LMAP     | RUNCHAIN, RUNC
ARCHECK            | DROPSYM,  DROPS    | LISTSYM,  LSYM     | SCAN
ASCBEXIT, ASCBX    | EPTRACE            | LISTUCB,  LISTU    | SELECT
ASMCHECK, ASMK     | EQUATE,   EQU, EQ  | LITERAL            | SETDEF,    SETD
CBFORMAT, CBF      | FIND,     F        | LPAMAP             | STACK
CBSTAT             | FINDMOD,  FMOD     | MERGE              | STATUS,    ST
CLOSE              | FINDUCB,  FINDU    | NAME               | SUMMARY,  SUMM
COPYDDIR           | GTFTRACE, GTF      | NAMETOKN           | SYSTRACE
COPYDUMP           | INTEGER            | NOTE,     N        | TCBEXIT,  TCBX
COPYTRC            | IPCS HELP, H       | OPEN               | VERBEXIT, VERBX
CTRACE             | LIST,     L        | PROFILE,  PROF     | WHERE,     W
```

Output from ST SYS Command

```
                          MVS Diagnostic Worksheet

Dump Title: CICS DUMP: SYSTEM=IYNXA    CODE=FC0001    ID=17/0001

CPU Model 2094 Version 00 Serial no. 23F6EA Address 00
Date: 06/29/2013     Time: 16:42:20.881062 Local

Original dump dataset: DUMP.MV23.IYNXA.D100629.T164219.S00031

Information at time of entry to SVCDUMP:

HASID 0044  PASID 0044  SASID 0044  PSW 070C1000 A735197C
 SYSTEM STATUS:
   Nucleus member name: IEANUC01
   I/O configuration data:
     IODF data set name: SYS1.IODF02
     IODF configuration ID: PLX1
     EDT ID: P1
   Sysplex name: SYSPLEX1
   TIME OF DAY CLOCK: C633E348 684A6DB4  06/29/2013 16:42:20.881062 local
   TIME OF DAY CLOCK: C633D5DF 2E0A6DB4  06/29/2013 15:42:20.881062 GMT
   Program Producing Dump: SVCDUMP
   Program Requesting Dump: DFHKETCB


   Incident token: SYSPLEX1 MV23     06/29/2013 15:42:19.979815 GMT
```

Note: Original Dump Dataset name and Incident Token matches messages seen on SYSLOG

CICS Verbexit options

Keyword	Functional area
AI = 0|2	Autoinstall Model Manager
AP = 0|1|2|3	Application Domain
APS=<TASKID=nnnnn>	
AU = 0|2	CICS affinities utility
BA = 0|1|2|3	Business application manager
BR = 0|1|2|3	3270 bridge
CC = 0|2	CICS catalog domain
CP = 0|2	Common Programming Interface
CQ = 0|1|2	Auto install model manager
CSA=0|2	CICS Common System Area
DB2=0|1|2|3	The CICS DB2 interface
DD = 0|1|2|3	Directory Domain
DH = 0|1|2|3	Document handling domain
DLI = 0|2	CICS DL/I Interface
DM = 0|1|2|3	Domain Manager
DP = 0|1|2|3	Debug Profiles manager
DS = 0|1|2|3	Dispatcher Domain
DU = 0|2	Dump Domain
EC = 0|1|2|3	Event Capture domain
EJ = 0|1	Enterprise JAVA
EM = 0|1|2|3	Event manager domain for BTS
EP = 0|1|2|3	Event Processing domain
FCP=0|2	File Control Program
FT = 0|1|2|3	CICS WEB Interface
ICP = 0|2	Interval Control Program
IE = 0|1|2|3	IP ECI Domain
II = 0|1|2|3	IIOP
IND = 0|1|2|3	Page number indexes for output
IS = 0|1|2|3	IP Interconnectivity domain
JCP=0|2	Journal Control Program
KE = 0|1|2|3	CICS Kernel
LD = 0|1|2|3	Loader Domain
LG = 0|1|2|3	Logger Domain
LM = 0|1|2|3	Lock Manager domain
ME = 0|2	Message domain
ML = 0|1|2|3	Markup Language domain
MN = 0|1|2|3	Monitoring domain
MQ = 0|1|2|3	CICS-MQ interface

Keyword	Functional area
MRO=0|2	CICS Multi-Region Operation
NQ = 0|1|2|3	Enqueue Manager
OT = 0|1|2|3	Object Transaction Domain
PA = 0|2	Parameter manager domain
PCP=0|2	Program Control Program
PCT=0|2	Program Control Table
PG = 0|1|2|3	Program Manager Domain
PI = 0|1|2|3	Pipeline Domain
PR = 0|2	Partner Resource management
PT = 0|1|2|3	Partner Domain
RD = 0|2	Resource definition manager
RL = 0|1|2|3	Resource Lifecycle domain
RM = 0|2	Recovery Management
RS = 0|1|2|3	Region Status domain
RX = 0|1|2|3	Recoverable EXCI domain
RZ = 0|1|2|3	Request Streams
SH = 0|1	Scheduler services domain for BTS
SJ = 0|1|2|3	JVM Domain
SM = 0|1|2|3	Storage Manager domain
SO = 0|1|2|3	Sockets domain
SSA=0|2	Static Storage Areas
ST = 0|1|2|3	Statistics domain
SZ = 0|1	Front End Programming Interface
TCP= 0|1|2|3	Terminal Control Program
TDP= 0|1|2|3	Transient Data Program
TI = 0|1|2|3	Timer domain
TMP=0|2	Table Manager Program
TR = 0|1|2|3	Trace domain
TRS=<trace selection parameters>	
TS = 0|1|2|3	Temporary Storage Program
UEH=0|2	User Exit Handler
US = 0|1|2|3	User Domain
WB = 0|1|2	The web interface
W2 = 0|1|2|3	Web 2.0 domain
XM = 0|1|2|3	The transaction manager
XRF=0|2	The extended recovery facility
XS = 0|1	Security Domain

IPCS Command Menu

```
------------------------- IPCS Subcommand Entry --------------------------------
Enter a free-form IPCS subcommand or a CLIST or REXX exec invocation below:

===> VERBX DFHPD660 'KE'


----------------------- IPCS Subcommands and Abbreviations --------------------
ADDDUMP            | DROPDUMP, DROPD    | LISTDUMP, LDMP     | RENUM,     REN
ANALYZE            | DROPMAP,  DROPM    | LISTMAP,  LMAP     | RUNCHAIN, RUNC
ARCHECK            | DROPSYM,  DROPS    | LISTSYM,  LSYM     | SCAN
ASCBEXIT, ASCBX    | EPTRACE            | LISTUCB,  LISTU    | SELECT
ASMCHECK, ASMK     | EQUATE,   EQU, EQ  | LITERAL            | SETDEF,    SETD
CBFORMAT, CBF      | FIND,     F        | LPAMAP             | STACK
CBSTAT             | FINDMOD,  FMOD     | MERGE              | STATUS,    ST
CLOSE              | FINDUCB,  FINDU    | NAME               | SUMMARY,  SUMM
COPYDDIR           | GTFTRACE, GTF      | NAMETOKN           | SYSTRACE
COPYDUMP           | INTEGER            | NOTE,     N        | TCBEXIT,   TCBX
COPYTRC            | IPCS HELP, H       | OPEN               | VERBEXIT, VERBX
CTRACE             | LIST,     L        | PROFILE,  PROF     | WHERE,     W
```

VERBX DFHPD660 'KE'

```
 * * * * * CICS 6.6.0 - IPCS EXIT * * * * *

CICS660 OPERANDS:

 KE

 === SUMMARY OF ACTIVE ADDRESS SPACES

      ASID(hex):          JOBNAME:
      0044                IYNXA

 ADDRESS SPACE ASID NUMBER (HEX) =  0044

=== DUMP SUMMARY

    DUMPID:    17/0001

    DUMPCODE:  FC0001

    DATE/TIME: 29/06/13 16:42:20 (LOCAL)

    MESSAGE:   DFHFC0001 IYNXA An abend (code 0C4/AKEA) has occurred at offset X'FFFF' in module DFHFCVR.

    SYMPTOMS:  PIDS/5655S9700 LVLS/660 MS/DFHFC0001 RIDS/DFHFCVR PTFS/UK57059 AB/S00C4 AB/UAKEA ADRS/0000FFFF

    TITLE:     (None)

    CALLER:    (None)

    ASID:      X'0044'
```

VERBX DFHPD660 'KE' Continued

Find *running

```
===KE: Kernel Domain KE_TASK Summary

KE_NUM KE_TASK  STATUS       TCA_ADDR TRAN_# TRANSID DS_TASK  KE_KTCB  ERROR

004B   15647700 ***Running** 0005E700 00051  MESS    146F5080 13CD6FF8 *YES*
```

Find '004B '

```
004B   1564F020 0170 Bot  93B01F00 93B02316 000416     DFHKETA
004B   1564F190 0380 Dom  93B1C268 93B1C480 000218     DFHDSKE
004B   1564F510 0880 Dom  93B44D08 93B46048 001340     DFHXMTA
004B   1564FD90 0620 Dom  94A0B9A8 94A0C998 000FF0     DFHPGPG
                    Int   +0002DC 94A0BB3A 000192     INITIAL_LINK
004B   156503B0 0D40 Dom  94D09000 800829CC 000000     DFHAPLI1
                    Int   +00265C 94D09B82 000B82     CICS_INTERFACE
004B   156510F0 0500 Sub  94CE8300 94CE9AE8 0017E8     DFHEIFC
                    Int   +001458 94CE87E6 0004E6     CALL_FCFR
004B   156515F0 08F0 Dom  950EDA00 950F4032 006632     DFHFCFR
                    Int   +0045DE 950EE25E 00085E     ACCMTEST
004B   15651EE0 0A30 Sub  952D8E00 952DEFFE 0061FE     DFHFCVS
                    Int   +002E20 952D93A4 0005A4     PROCESS_INTO_REQUEST
                    Int   +00313E 952DBC7C 002E7C     READ_RECORD
                    Int   +006172 952DBF66 003166     VSAM
004B   15652910 09E0 Sub  952E7090 952E839E 00130E *Y* DFHFCVR
004B   156532F0 0EA0 Dom  93B911F0 93B94EF0 003D00     DFHMEME
                    Int   +003C34 93B927B8 0015C8     TAKE_A_DUMP_FOR_CALLER
004B   15654190 0670 Dom  93C34CD8 93C368EC 001C14     DFHDUDU
                    Int   +000C76 93C34EEE 000216     SYSTEM_DUMP
                    Int   +001BDE 93C35E54 00117C     TAKE_SYSTEM_DUMP
```

VERBX DFHPD660 'KE' Continued

Find Table

```
==KE: KE Domain Error Table Summary

ERR_NUM   ERR_TIME  KE_NUM  ERROR TYPE           ERR_CODE  MODULE    OFFSET
=======   ========  ======  ==========           ========  ======    ======

00000001  16:42:14   004C   PROGRAM_CHECK        0C4/AKEA  DFHTSDM-  000012D6

00000002  16:42:14   004C   PROGRAM_CHECK        0C4/AKEA  DFHTSTS-  000012D6

00000003  16:42:19   004C   PROGRAM_CHECK        0C4/AKEA  DFHTSDU-  000012D6

00000004  16:42:19   004B   PROGRAM_CHECK        0C4/AKEA  UNKNOWN   UNKNOWN
```

Find 'Error Number: 00000004'

```
=KE: Error Number:  00000004

 KERRD 13C87618 KERNEL ERROR DATA

    0000  F0C3F461 C1D2C5C1 018400C4 0000FFFF  C4C6C8C6 C3E5D940 152E7090 146F5080  *0C4/AKEA.d.D...DFHFCVR 13C87618
    0020  0005E700 15647700 00000004 00000010  078D1000 8370181C 00020010 40404000  *..X.................c  13C87638
    0040  8370181C 80800000 00000000 00000000  00000000 158163E8 00000000 1469635C  *c...................    13C87658
    0060  00000000 146B0158 00000000 40404040  00000000 00000017 00000000 2732496F  *.....,......    ....   13C87678
    0080  00000000 00000017 00000000 0000096F  00000000 0000D4C2 00000000 03701F01  *...............?....   13C87698
```

VERBX DFHPD660 'KE' Continued

```
Error Code:  0C4/AKEA    Error Type:  PROGRAM_CHECK          Timestamp:  C633D5DE50E93E34

   Date (GMT)    :  29/06/13        Time (GMT)    :  15:42:19.975315
   Date (LOCAL)  :  29/06/13        Time (LOCAL)  :  16:42:19.975315

   KE_NUM:  004B    KE_TASK:  15647700    TCA_ADDR:  0005E700    DS_TASK:  146F5080

 Program DFHFCVR  was in control, but the PSW was elsewhere.

  Error happened under the CICS RB.

  CICS Registers and PSW.

    PSW:  078D1000 8370181C   Instruction Length:  2  Interrupt Code:  10  Exception Address:  40404040

    Space at Program Check/Abend: Basespace           Branch Event Address: 00000000_0370171C

    64-BIT REGISTERS 0-15

  REGS 13C87660

     0000  00000000 00000000 00000000 158163E8  00000000 1469635C 00000000 146B0158
     0020  00000000 40404040 00000000 00000017  00000000 2732496F 00000000 00000017
     0040  00000000 0000096F 00000000 0000D4C2  00000000 03701F01 00000000 83700F02
     0060  00000000 837016D6 00000000 156530C0  00000000 837016D6 FFFFFFFF 00000000

    Data at PSW: 8370181C    Module: UNKNOWN    Offset: UNKNOWN

  PSWDATA 0370181C

  Storage addressed by PSW cannot be accessed **
```

ABEND0C4 / AKEA / AFCZ What we know so far

- CICS Region IYNXA received ABEND0C4 / AKEA at offset X'FFFF' in module DFHFCVR
- CICS Region IYNXA produced a FC0001 System Dump
- Transaction MESS transaction number 00051 with TCA address 0005E700 received abend0C4 / AKEA/ AFCZ in program MESSITUP
- Program Status Word (PSW) for ABEND0C4 was 078D1000 8370181C
- Exception Address was 40404040
- Program DFHFCVR was in control, but the PSW was elsewhere

- **What module was in control for the ABEND0C4?**

Finding PSW Address

VERBX DFHPD660 'LD'

```
==LD: PROGRAM STORAGE MAP

 PGM NAME ENTRY PT  CSECT    LOAD PT. REL. PTF LVL. LAST COMPILED COPY NO. USERS LOCN  TYP ATTRIBUTE R/A MODE

DFHCCNV  96400028 DFHYA660 16400000 660                          1       0   ERDSA RPL RESIDENT   -    -
                  DFHCCNV  164001B0 0660 HCI6600  I  30/05 02.44
MESSITUP 96610000 DFHYA660 16610000 660                          1       1   ESDSA RPL REUSABLE   -    -
```

Note: PSW Address 0370181C not loaded or known by CICS

IP L 0370181C L(x'1000')

```
********************************************************* TOP OF DATA ************************************
LIST 0370181C. ASID(X'0044') LENGTH(X'03E8') AREA
0370181C. LENGTH(X'03E8')==>Storage not available
********************************************************* END OF DATA ************************************
```

Note: PSW Address not in dumped z/OS storage

IP WHERE 0370181C

```
********************************************************* TOP OF DATA ****************************
     ASID(X'0044') 0370181C. IDA019L1+03881C IN EXTENDED PLPA
********************************************************* END OF DATA ****************************
```

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- Transaction MESS transaction number 00051 with TCA address 0005E700 received abend0C4 / AKEA/ AFCZ in program MESSITUP
- Program Status Word (PSW) for ABEND0C4 was 078D1000 8370181C
- Exception Address was 40404040
- Program DFHFCVR was in control, but the PSW was elsewhere
- PSW was in VSAM Load Module IDA019L1 offset x'03881C'

- Are we done debugging?

VERBX DFHPD660 'TR=2'

```
AP 00E1 EIP ENTRY READ                                REQ(0004) FIELD-A(00140648 ....) FIELD-B(08000602 ....)

              TASK-00051 KE_NUM-004B TCB-QR   /008F8220 RET-966100BE TIME-20:57:37.9100501835 INTERVAL-00.0000017656        =05531

 AP E160 EXEC ENTRY READ FILE('BIGG     ' AT X'16610148') INTO( AT X'40404040') LENGTH(200 AT X'001406AC') RIDFLD( AT X'80140894')
                   EQUAL NOHANDLE ASM

              TASK-00051 KE_NUM-004D TCB-QR   /008F8220 RET-80082436 TIME-20:57:37.9100559648 INTERVAL-00.0000057812        =05531
                1-0000  003D0000 000D1661 01700602 F0002800  00800000 01010C16 610148C2 C9C7C740  *......./....0.....a...../..BIGG
                  0020  40404000 02A00440 40404001 03030600  1406AC00 C8000404 04801408 94        *    ....    .........H.......m
                2-0000  16610170 16610148 40404040 001406AC  80140894                            *./.../..    .......m
                3-0000  001406B0                                                                 *....
                4-0000  0205737C 0110196F D4E4C3D2 0000060C  E3C3F0F2 00000004 00007D00 00000000  *...@...?MESS....TC02......'....
                  0020  00000000 00000000 00000000 00000000  00000040 40404040 40404000 00000000  *...................         ....
                  0040  00000000 00000000 00000000 00000000  00000000 00                          *......................
                5-0000  00140648                                                                 *....
                6-0000  00000000 0014005C 00000000 966100BE  00000000 40404040 001406B0 8004F400  *.......*....o/......    ......4
                  0020  96610028 156393B0 15639CD4 14D12780  15639858 147E3B55 40404040 00140008  *o/....l....M.J....q..=..    ...
                  0040  001400D0 008B2000                                                          *...}....

AP 04E0 FCFR ENTRY - FUNCTION(READ_INTO) FILE_NAME(BIGG) BUFFER_ADDRESS(40404040) BUFFER_LENGTH(C8) ENVIRONMENT_IDENTIFIER(0000000
                     RECORD_ID_ADDRESS(80140894) GENERIC(NO) KEY_COMPARISON(EQUAL) READ_INTEGRITY(FCT_VALUE) RECORD_ID_TYPE(KEY)
                    CONDITIONAL(NO) BYPASS_SECURITY_CHECK(NO)

              TASK-00051 KE_NUM-004B TCB-QR   /008F8220 RET-948FE2E8 TIME-20:57:37.9100619335 INTERVAL-00.0000029531        =05531
                1-0000  00880000 00000038 00000000 00000000  B46AC12E 7C800000 01000100 00000000  *.h................A.@.........
                  0020  00000000 C2C9C7C7 40404040 00000000  00000000 00000000 00000000 40404040  *....BIGG    ................
                  0040  000000C8 00000000 00000000 00000000  00000000 00000000 80140894 00000000  *...H.......................m...
                  0060  00000000 00000000 00000000 00000000  00000000 00000202 01000002 01020002  *................................
                  0080  00000200 00004040                                                        *......

AP 04B0 FCVS ENTRY - FUNCTION(READ_INTO) FILE_NAME(BIGG) BUFFER_ADDRESS(40404040) BUFFER_LENGTH(C8) ENVIRONMENT_IDENTIFIER(0000000
                     FCTE_POINTER(15831030) RECORD_ID_ADDRESS(80140894) WORK_ELEMENT_ADDRESS(15842300) GENERIC(NO) KEY_COMPARISON
                    (EQUAL) READ_INTEGRITY(FCT_VALUE) RECORD_ID_TYPE(KEY) CONDITIONAL(NO) BYPASS_SECURITY_CHECK(NO)

              TASK-00051 KE_NUM-004B TCB-QR   /008F8220 RET-950F1932 TIME-20:57:37.9100753398 INTERVAL-00.0000076093        =05531
                1-0000  00880000 00000038 00000000 00000000  B46ED12E 7C800000 01000100 00000000  *.h................>J.@.........
                  0020  00000000 C2C9C7C7 40404040 00000000  00000000 00000000 00000000 40404040  *....BIGG
```

VERBX DFHPD660 'TR=2'

```
AP 0492 FCVR EVENT ISSUE_VSAM_RPL_REQUEST - REQUEST(GET) OPTION(DIR WTX ) KEY(D9C5C3F3)

              TASK-00051 KE_NUM-004B TCB-QR   /008F8220 RET-952E05FE TIME-20:57:37.9100850898 INTERVAL-00.0000097500        =05531
                1-0000  0000004C 00000000 00000000 00000000  00000000 00000000 15892080 00000000  *...<.....................i.....
                  0020  40404040 80140894 40840000 00000000  000000C8 000000C8 00000000 00000000  *    ...m d.........H...H.......
                  0040  00000000 00000080 158295D4                                                *.........bnM
                2-0000  158293E8                                                                   *.blY
                3-0000  D9C5C3F3                                                                   *REC3

 AP 0495 FCVR *EXC* - RECOVERY_ROUTINE_ENTERED

              TASK-00051 KE_NUM-004B TCB-QR   /008F8220 RET-952E05FE TIME-20:57:37.9148596054 INTERVAL-00.0047745156        =05532
                1-0000  00000000 98580000 158293E0 D1000004  50081577 01                         *....q....bl\J...&....
                2-0000  F0C3F461 C1D2C5C1 018400C4 0000FFFF  C4C6C8C6 C3E5D940 152E91C0 146F4200  *0C4/AKEA.d.D....DFHFCVR ..j{.?.
                  0020  0005E080 155FD100 0000000D 00000010  078D1000 8370181C 00020010 40404000  *..\..¬J.............c.......
                  0040  8370181C 80800000 00000000 00000000  00000000 158293E8 00000000 14696C6C  *c.....................blY......%
                  0060  00000000 146B2158 00000000 40404040  00000000 00000017 00000000 2732596F  *.....,......    ................
                  0080  00000000 00000017 00000000 0000096F  00000000 0000D4C2 00000000 03701F01  *...............?......MB.......
                  00A0  00000000 83700F02 00000000 837016D6  00000000 1563C0C0 00000000 837016D6  *....c.......c..O......{{....c..
                  00C0  00000000 00000000 00000000 00000002  00000000 00000000 00000000 00000000  *................................
                  00E0  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000  *................................
                  0100  00000000 00000000 078D1000 8370181C  00020010 40404000 8370181C 80800000  *............c.......   .c......
                  0120  00000000 00000000 00000000 158293E8  00000000 14696C6C 00000000 146B2158  *.............blY......%%.....,.
                  0140  00000000 40404040 00000000 00000017  00000000 2732596F 00000000 00000017  *....    ...............?.......
                  0160  00000000 0000096F 00000000 0000D4C2  00000000 03701F01 00000000 83700F02  *.......?......MB.............c..
                  0180  00000000 837016D6 00000000 1563C0C0  00000000 837016D6 00000000 00000000  *....c..O......{{....c..O.......

 ME 0301 MEME ENTRY - FUNCTION(SEND_MESSAGE) MESSAGE_NUMBER(1) SYSTEM_DUMPCODE(FC0001) INSERT1(155FD3D0 , 00000008) INSERT2(155FD3D
                    , 00000002) INSERT3(152EB7B0 , 00000008) COMPONENT_ID(FC)

              TASK-00051 KE_NUM-004B TCB-QR   /008F8220 RET-952EA4CE TIME-20:57:37.9148624804 INTERVAL-00.0000028750        =05532
                1-0000  00F80000 00000026 00000001 00000000  B5E00200 00000000 01000000 00000000  *.8.............\.............
                  0020  00000000 00000001 00000000 C6C3F0F0  F0F14040 155FD3D0 00000008 155FD3DE  *............FC0001  .¬L}.....¬L
                  0040  00000002 152EB7B0 00000008 00000000  00000000 00000000 00000000 00000000  *................................
                  0060  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000  *................................
```

Finding Information About the Request

DFHPD660 'AP=3'

```
TCA.00051 0005E700 Task Control Area (User Area)
  0000  0005E800 00000001 15810D50 0004FB48  15652910 157FE030 00000000 00000000  *..Y......a.&.........“\..... *
  0020  0000051C 00000000 00000000 9525D932  00000000 00000000 008B3000 0014005C  *............n.R.............* *
  0040  96610064 00086D84 80050400 96610028  156503B0 15650CD4 00000004 00004000  *o/....d....o/.............. . *
  0060  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000  *............................... *

SYSEIB.00051 0005EB14 System EXEC Interface Block
  -0008                                                          5CE2E8E2 C5C9C240  *                       *SYSEIB *
   0000  0164213C 0110180F D4E4C3D2 0000051C  E3C3F1F3 00000004 00007D06 02000000  *........MESS....TC13...'.... *
   0020  000000C2 C9C7C740 40404040 00000000  000000C2 C9C7C740 40404000 00000000  *...BIGG    ........BIGG .... *
   0040  00000000 00000000 00000000 00000000  00000000 00                        *.....................          *

EIB Function READ

EIUS.00051 00140008 EXEC Interface User Structure
   0000  00B46EC4 C6C8C5C9 E4E24040 40404040  00000000 00000000 00000000 00000000  *..>DFHEIUS      ............ *
   0020  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000  *............................... *
   0040  00000000 00000000 001400D0 00000000  00140648 00000000 00000000 00000000  *............}................ *
   0060  80087E14 96610028 00000512 00140050  80050400 14D0F3B0 156503B0 15650CD4  *..=.o/.........&..}3........ *
   0080  14D0B780 15650858 147E3B55 15647700  00140008 15733F54 008B3000 00000000  *.}.......=.................. *
   00A0  00000000 00140050 00140054 00000000  00000000                           *.......&..........          *

Application Register Savearea

EIB.00051 001400D0 EXEC Interface Block
  -0010                                                          00656EC4 C6C8C1D7  *            ..>DFHAP_DFHEIB  *
   0000  0164213C 0110180F D4E4C3D2 0000051C  E3C3F1F3 00000004 00007D06 02000000  *........MESS....TC13........ *
   0020  00000000 00000000 00000000 00000000  00000040 40404040 40404040 00000000  *...................     ....  *
   0040  00000000 00000000 00000000 00000000  00000000 00                        *.....................          *
```

IPCS Primary Menu

```
------------------- IPCS PRIMARY OPTION MENU  ---------------------------------
OPTION  ===>
                                                      ********************
   0  DEFAULTS     - Specify default dump and options  * USERID  - USASSC1
   1  BROWSE       - Browse dump data set              * DATE    - 06/29/13
   2  ANALYSIS     - Analyze dump contents             * JULIAN  -
   3  UTILITY      - Perform utility functions         * TIME    - 16:46
   4  INVENTORY    - Inventory of problem data         * PREFIX  - USASSC1
   5  SUBMIT       - Submit problem analysis job to batch * TERMINAL- 3278
   6  COMMAND      - Enter subcommand, CLIST or REXX exec * PF KEYS - 24
   T  TUTORIAL     - Learn how to use the IPCS dialog  ********************
   X  EXIT         - Terminate using log and list defaults

Enter END command to terminate IPCS dialog




 F1=HELP     F2=SPLIT    F3=END      F4=RETURN  F5=RFIND    F6=MORE     F7=UP
 F8=DOWN     F9=SWAP    F10=LEFT    F11=RIGHT  F12=CURSOR
```

Browse Mode – Register Savearea

```
ASID(X'0044')
Command ===> L 140648

00140648                          00000000   0014005C   |          .......* |
00140650   00000000   966100BE     00000000   40404040   | ....o/......      |
00140660   001406B0   80050400     96610028   156503B0   | ........o/....... |
00140670   15650CD4   14D0B780     15650858   147E3B55   | ...M.}.......=.. |
00140680   40404040   00140008     001400D0   008B3000   |     .......}.... |
00140690   00000000   00000000     00000000   00140648   | ................. |
```

Note: Registers 14 through 12 are stored in the Application Savearea at offset X'C'
when a CICS call is issued.
Register 14 will point to where the CICS call was issued from.
Register 1 will contain the parameters when the CICS call was issued.

Browse Mode – Register 14

```
 ASID(X'0044') ADDRESS(166100BE.) STORAGE ----------------------------------------
Command ===> L 166100BE
166100BE                                          D203    |                K. |
166100C0   D318B04C   D503D318   313C4780   30B4D503    | L..<N.L.......N. |
166100D0   D3183140   477030DE   47F030E2   4110D068    | L.. .....0.S..}. |
166100E0   41E03151   41F03120   4100D180   90E01000    | .\...0....J..\.. |
166100F0   41E03146   41F0D24C   90EF100C   96801010    | .\...0K<....o... |
16610100   58F03138   0DEF47F0   30E24110   D06841E0    | .0.....0.S..}..\ |
16610110   315A50E0   10009680   100058F0   31380DEF    | .!&\..o....0.... |
```

Backup from R14 to start of module

```
16610000   C4C6C8E8   C1F6F6F0   58F0021C   58F0F0D0    | DFHYA660.0...00} |
16610010   58F0F014   58F0F00C   58FF000C   07FF5CC6    | .00..00.......*F |
16610020   C9D3D3C9   D55C0000   47F0F028   23D9C5C1    | ILLIN*...00..MES |
16610030   C4E4D7C4   E34DE45D   40F0F661   F2F961F1    | SITUP(U) 06/29/1 |
16610040   F040F1F6   4BF3F440   A9D6E2F6   F6F04040    | 0 16.34 zOS660   |
16610050   90ECD00C   183FA715   0004031C   000058F0    | ..}...x........0 |
16610060   312805EF   50D01004   18F1BF1F   D018A784    | ....&}...1..}.xd |
```

Note: Register 14 will point to where the CICS call was issued from. Backing up from Register 14 will tell you the module that made the call.

Browse Mode – Register 1

Parameters

```
ASID(X'0044') ADDRESS(1406B0.) STORAGE ----------------------------------------------------
 Command ===> L 1406B0
 001406B0   16610170   16610148   40404040   001406AC   | ./.../..    .... |
 001406C0   80140894   00000000   00000000   00000000   | ...m............ |
```

First Parameter (EIB Function Code 0602 READ)

```
ASID(X'0044') ADDRESS(1406B0.) STORAGE ----------------------------------------------------
 Command ===> L 16610170
 16610170   0602F000   28000080   000604F0   00082800   | ..0........0.... |
```

Second Parameter (File Name BIGG)

```
ASID(X'0044') ADDRESS(16610148.) STORAGE ----------------------------------------------------
 Command ===> L 16610148
16610148                       C2C9C7C7   40404040   |         BIGG      |
```

Third Parameter (INTO AREA passed from application)

```
ASID(X'0044') ADDRESS(40404040.) STORAGE ----------------------------------------------------
 Command ===> L 40404040
 27D4C000.:7F0BFFFF. LENGTH(X'57374000')--Storage not available
```

Note: Register 1 will point to the parameters when CICS was called.

ABEND0C4 / AKEA / AFCZ What we know so far

- CICS Region IYNXA received ABEND0C4 / AKEA at offset X'FFFF' in module DFHFCVR
- CICS Region IYNXA produced a FC0001 System Dump
- Transaction MESS transaction number 00051 with TCA address 0005E700 received abend0C4 / AKEA/ AFCZ in program MESSITUP
- Program Status Word (PSW) for ABEND0C4 was 078D1000 8370181C
- Exception Address was 40404040
- Program DFHFCVR was in control, but the PSW was elsewhere
- PSW was in VSAM Load Module IDA019L1 offset x'03881C'
- Program MESSITUP issued EXEC CICS READ on file BIGG and passed 40404040 as the INTOAREA.

- What can be done?
  - Command Protect (CMDPROT) - CICS will test the first byte of passed parameters to ensure they are accessible. If not, the task will abend AEYD.

Problem Two: FCPSWAIT FCDSRECD Enqueue

Problem Two

- Customer called Support Center indicating access to their main production File EDZFILE stalled
- IPCS Option 6 (Command) '**ST SYS**' shows:

```
SYSTEM STATUS:
   Nucleus member name: IEANUC01
   Sysplex name: EDZPLEX
   TIME OF DAY CLOCK: BD969635 343B9A40  09/09/2013 16:16:45.011897 local
   TIME OF DAY CLOCK: BD96C9D0 C1DE4040  09/09/2013 20:07:38.329572 GMT
   Program Producing Dump: SVCDUMP
   Program Requesting Dump: DFHKETCB


   Incident token: EDZPLEX     09/09/2013 20:07:36.996768 GMT
```

Problem Two - VERBX DFHPD670 'DS=3'

DS_TOKEN	KE_TASK	T	S	F	P	TT	RESOURCE TYPE	RESOURCE_NAME	W	TIME OF SUSPEND	TIMEOUT DUE	DTA (DSTSK)	AD	ATTACHER TOKEN	M	SUSPAREA	XM_TXN_TOKEN
02020001	09729080	N	R									0E7AF200	XN	0B3603F0	QR		0B3603F000**08957**C
050A0025	0A1FF780	N	S	P	N	-	FCPSWAIT	EDZFILE	C	20:01:44.442	-	0E71B800	XM	0B3F47D8	QR	0A61C535	0B3F47D80013008C
050E0023	0A1FEB00	N	S	P	N	-	FCPSWAIT	EDZFILE	C	20:02:33.005	-	0E71BB00	XM	0B3F4C70	QR	0A61C535	0B3F4C700013120C
0510000D	0A1FF080	N	S	P	N	-	FCPSWAIT	EDZFILE	C	20:02:14.952	-	0E71BC80	XM	0B3F4AE8	QR	0A61C535	0B3F4AE80013071C
05800067	0A31E780	N	S	P	N	-	FCPSWAIT	EDZFILE	C	19:55:47.812	-	0E746080	XM	0B3A4340	QR	0A61C535	0B3A43400012054C
05820087	0A301B00	N	S	P	N	-	FCPSWAIT	EDZFILE	C	19:57:51.212	-	0E746200	XM	0B3A4960	QR	0A61C535	0B3A49600012374C
05844E79	0A376B00	N	S	P	N	-	ENQUEUE	FCDSRECD	C	19:52:06.948	-	0E746380	XM	0B3714C8	QR	0A4FEC85	0B3714C80011373C
05868EE7	0A33BB00	N	S	P	N	-	ENQUEUE	FCDSRECD	C	19:49:34.307	-	0E746500	XM	0970A4C8	QR	0B34FA4C	0970A4C80010882C
058CACBB	0A31EB00	N	S	P	N	-	ENQUEUE	FCDSRECD	C	19:51:38.836	-	0E746980	XM	0970A7D8	QR	0A4FEC85	0970A7D80011290C
058E0019	0A31E080	N	S	P	N	-	FCPSWAIT	EDZFILE	C	19:57:08.312	-	0E746B00	XM	0B3A47D8	QR	0A61C535	0B3A47D80012261C
05902EC7	0A33B400	N	S	P	N	-	ENQUEUE	FCDSRECD	C	19:54:11.273	-	0E746C80	XM	0B3717D8	QR	0A4FEC85	0B3717D80011733C
05920009	0A2C6400	N	S	P	N	-	FCPSWAIT	EDZFILE	C	20:00:14.734	-	0E746E00	XM	0B3CCAE8	QR	0A61C535	0B3CCAE80012747C
0600A279	0A394080	N	S	P	N	-	ENQUEUE	FCDSRECD	C	19:53:35.267	-	0E747080	XM	0B371340	QR	0A4FEC85	0B3713400011613C
0604C013	0A359780	N	S	P	N	-	ENQUEUE	FCDSRECD	C	19:51:10.696	-	0E747380	XM	0970A960	QR	0A4FEC85	0970A9600011204C
0606B575	0A3B1400	N	S	P	N	-	ENQUEUE	FCDSRECD	C	19:44:57.451	-	0E747500	XM	0970A1B8	QR	0B348CEC	0970A1B80010048C
06080CC5	0A3B1080	N	S	P	N	-	ENQUEUE	FCDSRECD	S	19:44:53.971	-	0E747680	XM	0970A340	QR	0E747680	0970A3400010033C
060A001F	0A2E3400	N	S	P	N	-	FCPSWAIT	EDZFILE	C	19:58:36.040	-	0E747800	XM	0B3CC4C8	QR	0A61C535	0B3CC4C80012520C
060E004D	0A2A8080	N	S	P	N	-	FCPSWAIT	EDZFILE	C	20:01:14.040	-	0E747B00	XM	0B3F44C8	QR	0A61C535	0B3F44C80012918C
06108E1D	0A359080	N	S	P	N	-	ENQUEUE	FCDSRECD	C	19:44:53.997	-	0E747C80	XM	0970A650	QR	0A7D8CDC	0970A6500010037C
068014B9	0A2C6780	N	S	P	N	-	FCPSWAIT	EDZFILE	C	19:59:44.382	-	0E756080	XM	0B3CC960	QR	0A61C535	0B3CC9600012685C
0684EC17	0A2E3080	N	S	P	N	-	FCPSWAIT	EDZFILE	C	19:59:47.687	-	0E756380	XM	0B3CC650	QR	0A61C535	0B3CC6500012695C
0686A7ED	0A3CE400	N	S	P	N	-	**FCPSWAIT**	**EDZFILE**	C	**19:54:29.698**	-	0E756500	XM	0B371C70	QR	0A61C535	0B371C7000**11794**C
06880657	0A301780	N	S	P	N	-	FCPSWAIT	EDZFILE	C	19:58:13.938	-	0E756680	XM	0B3A4AE8	QR	0A61C535	0B3A4AE80012456C
068AB401	0A394780	N	S	P	N	-	ENQUEUE	FCDSRECD	C	19:51:46.592	-	0E756800	XM	0B3711B8	QR	0A4FEC85	0B3711B80011337C
068C63E7	0A33B080	N	S	P	N	-	FCPSWAIT	EDZFILE	C	19:54:45.801	-	0E756980	XM	0B371DF8	QR	0A61C535	0B371DF80011840C
06902DE1	0A359B00	N	S	P	N	-	ENQUEUE	FCDSRECD	C	19:52:57.186	-	0E756C80	XM	0B371030	QR	0A4FEC85	0B3710300011500C
0692006F	0A2E3B00	N	S	P	N	-	FCPSWAIT	EDZFILE	C	19:58:23.868	-	0E756E00	XM	0B3CC030	QR	0A61C535	0B3CC0300012481C
07083A63	0A394400	N	S	P	N	-	FCPSWAIT	EDZFILE	C	19:56:04.976	-	0E784680	XM	0B3A41B8	QR	0A61C535	0B3A41B80012088C
070A2D33	0A2C6B00	N	S	P	N	-	FCPSWAIT	EDZFILE	C	19:59:13.894	-	0E784800	XM	0B3CC7D8	QR	0A61C535	0B3CC7D80012612C
070C6D39	0A394B00	N	S	P	N	-	ZCIOWAIT	DFHZARQ1	S	17:16:50.098	-	0E784980	XM	0970AC70	QR	0E784980	0970AC700074140C
070ECA83	0A359400	N	S	P	N	-	ENQUEUE	FCDSRECD	S	19:53:08.475	-	0E784B00	XM	0B371650	QR	0E784B00	0B3716500011526C

Note: None of the tasks have a TIMEOUT DUE value. This indicate the transactions do not have DTIMOUT coded.
Many of the tasks are in FCPSWAIT for EDZFILE
Task waiting longest time in FCPSWAIT is 11794
Currently running task on QR TCB is 08957

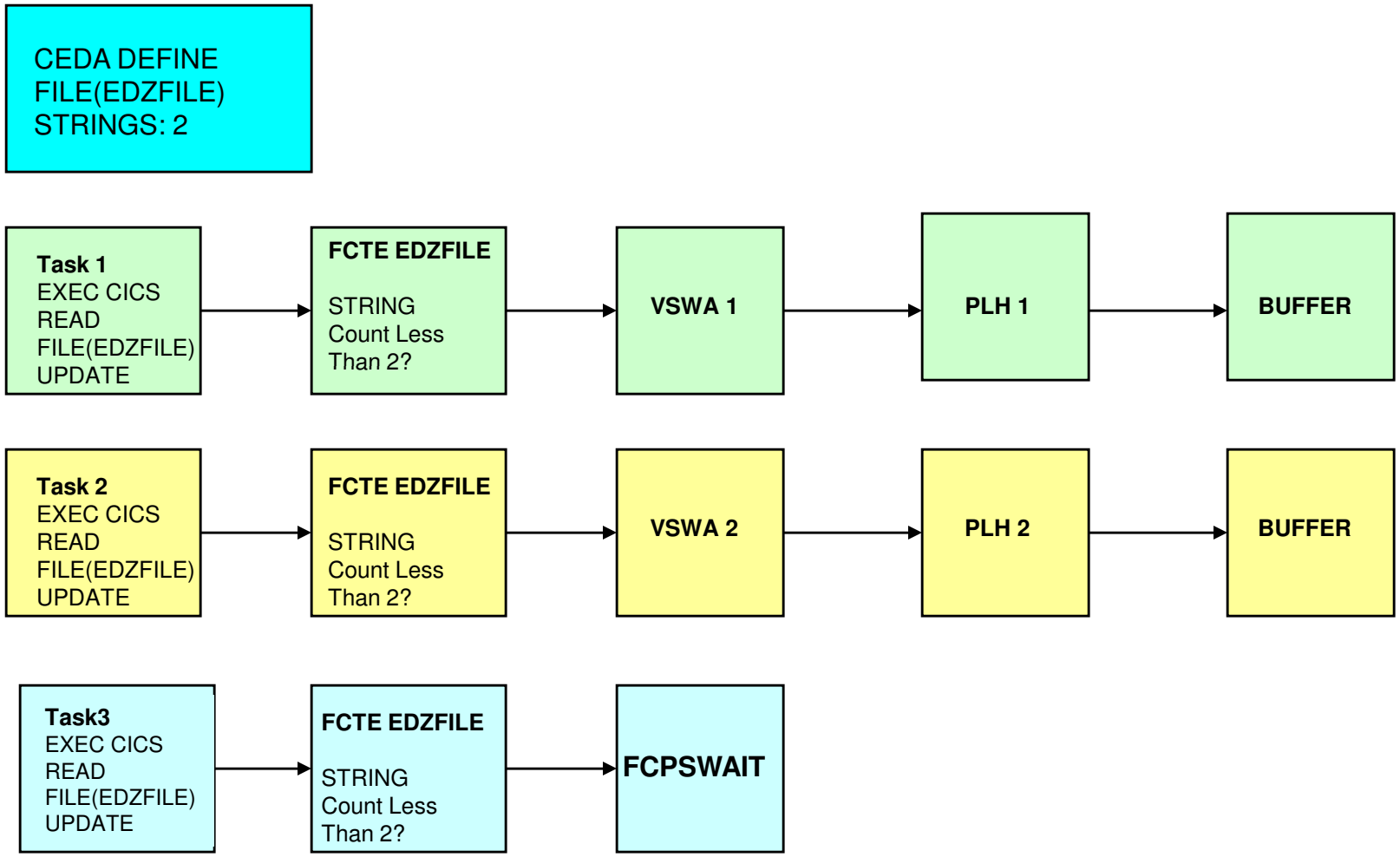
Problem Two – What We Know So Far

- Customer's access to file EDZFILE stalled
- Customer provided a dump taken at 20:07:36.996768 GMT
- CICS Dispatcher shows many tasks in FCPSWAIT for file EDZFILE
  - Earliest task in FCPSWAIT is 11794 at 19:54:29.698 GMT
  - DTIMOUT not set on the Transaction (no Timeout due)

Problem Two

- FCPSWAIT
  - Waiting on a VSAM String
  - CICS commands that hold strings
    - Read for Update
      - Released at Rewrite, Delete without RIDFLD, Unlock
    - StartBrowse / ReadNext / ReadPrev / ResetBrowse
      - Released at EndBrowse or Unlock
    - MassInsert
      - Released at Unlock
    - Generic Delete
      - Released when all records are deleted
- Which tasks own the Strings for File EDZFILE?

Problem Two - Example of FCPSWAIT



Problem Two – FCPSWAIT - 'FCP=3'

Find EDZFILE

```
==FCP: FILE CONTROL TABLE ENTRIES

  Key for FCTE summary table :
    ACC        : Access type, VSAM or BDAM
    TYPE       : File type, KSDS, ESDS, RRDS, VRRDS
    MODE       : File mode, PATH, AIX=Alternate index, BASE
    LSR        : LSR pool ID
    REM        : Remote file ?
    SLG        : Use system log ?
    SREQS      : Servreq settings, R=Read, U=Update,
                 A=Add, D=Delete, B=Browse,
    STATUS     : File status, OPEN=OPEN, CLOS=CLOSE,
                 OING=OPENING, CING=CLOSING,
                 ENA=ENABLED, DIS=DISABLED, UNE=UNENABLED
    JID        : Journal ID
    DSNB-OJB   : Address of the object DSNB
    DSNB-BAS   : Address of the base DSNB
    FR         : Forward recovery ?
    FRL        : Forward recovery log ID
    TIME OPEN  : Time file opened (store clock value)

ADDRESS  FILENAME ACC  TYPE  MODE RLS LSR REM SLG SREQS STATUS   JID DSNB-OBJ DSNB-BAS FR  FRL TIME OPEN
-------------------------------------------------------------------------------------------------------
0A61BD98 BATCHFIL VSAM KSDS  BASE NO  1   NO  YES RUADB OPEN ENA 0   0A61AD30 0A61AD30 YES 2    9/09/05 06:57:03
0A61C030 DDDFILE  VSAM KSDS  PATH NO  1   NO  YES RUADB OPEN ENA 0   0A61AE00 0A61AD30 YES 2    9/09/05 06:57:03
0A61C510 EDZFILE  VSAM KSDS  BASE NO  1   NO  YES RUADB OPEN ENA 0   0A61D1D0 0A61D1D0 YES 2    9/09/05 06:57:12
0A61C648 FFFFILE  VSAM KSDS  BASE NO  1   NO  YES RUADB OPEN ENA 0   0A61D2A0 0A61D2A0 YES 2    9/09/05 06:57:12
0A61C780 GGGFILE  VSAM KSDS  BASE NO  1   NO  YES RUADB OPEN ENA 0   0A61D370 0A61D370 YES 2    9/09/05 06:57:12
```

NOTE: EDZFILE has SLG set to YES. This indicates all updates to this file are to use the System Log for backout purposes. This makes EDZFILE a recoverable file.

Problem Two – FCPSWAIT - 'FCP=3' FCTE

```
FCTE.EDZFILE 0A61C510 FCT ENTRY

   0000  C5C4E9C6 C9D3C540 00000000 00000000  00000000 0134BA0A 8001440A 84000000  *EDZFILE ...................*
   0020  00000000 40000000 00800000 00004000  00000000 00000000 00000000 001EC70F  *.... ......... ..........G.*
   0040  001EC5D3 00000000 0000057E 00000000  00000000 BD961923 E89B7640 00000000  *..EL.......=.........o.....*
   0060  0A61D1D0 0A61D1D0 0A4362E0 00000000  00000000 00000000 00000000 00000000  *./J}./J}...\...............*
   0080  0801A804 01008000 000C001F 000F000C  0000001F 00000000 001F0001 0000046C  *..y.......................%*
   00A0  00000000 0010000F 0A41FDF0 40000200  00000000 00000000 40404040 40404040  *...........0 ...........   *
   00C0  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000  *............................*
   00E0  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000  *............................*
   0100  00000000 40404040 40404040 40404040  40404040 00000000 00000000 00000000  *....                   .......*
   0120  00000000 00000000 00000000 00000000  00000000                            *.....................       *
```

FCTE OFFSETS

```
+00 FCTDSID - DDNAME
+60 FCTDSDP - DSNB Pointer
+88 FCTDSASC - Active String Count                              X '000C' = 12
+8A FCTDSCWC - Current String Wait Count                        X '001F' = 31
+8C FCTDSMSC - Upper Limit for String Count                     X '000F' = 15
+8E FCTDSPMS - Upper Limit for non-direct Read String Count     X '000C' = 12
+90 FCTDSTSW - Total Tasks Waited for Strings                   X '001F' = 31
```

Note: All 12 strings for non-direct Reads are active. There are 31 tasks waiting for a string to file EDZFILE

Problem Two – What We Know So Far

- Customer's access to file EDZFILE stalled
  - EDZFILE is a Recoverable file (use System Log = YES)
- Customer provided a dump taken at 20:07:36.996768 GMT
- CICS Dispatcher shows many tasks in FCPSWAIT for file EDZFILE
  - Earliest task in FCPSWAIT is 11794 at 19:54:29.698 GMT
  - DTIMOUT not set on the Transaction (no Timeout due)
- VERBX DFHPD630 'FCP=3' for file EDZFILE shows
  - 12 (x'C') Active Strings against the file
  - 31 (X'1F') Tasks waiting for a string
  - 15 (x'F') Strings defined for the file
  - 12 (x'C') Strings for non-direct reads

Problem Two – FCPSWAIT - 'FCP=3' DSNB and VSWAs

```
  DSNB 0A61D1D0 DATASET NAME BLOCK

 0000  C4E2D56D C2D3D27A C5C4E9C6 C9D3C54B  D2E2C4E2 40404040 40404040 40404040  *DSN_BLK:EDZFILE.KSDS            *
 0020  40404040 40404040 40404040 40404040  40404040 0000016B 0000016B 00011DD2  *                     ...,...,...K*
 0040  80000000 00010001 F902000A 00000000  00004800 0DBCC2C0 00000000 00010000  *........9.............B{........*
 0060  01400000 00000000 00000000 00000000  00000000 00000000 00000000 00000000  *. ..............................*
 0080  00000000 0A61C510 0000082C 10404040  40404040 40404040 40404040 40404040  *......./E.....................*
 00A0  40404040 40404000 00000000 00000000  00000000 0A61C510 00000000 00000000  *...    ................/E.........*
 00C0  00000000 00000000 00000000                                               *............                    *

VSWA 0DBCC2C0 VSAM WORK AREA

 0000  8F400160 40404040 000000 4C 00000000  00000000 00000000 00010000 00000000  *. .-    ...<.....................*
 0020  0A41FDF0 00000000 00000000 09FF42E8  40820000 00000000 0000046C 0000046C  *...0...........Y.e.........%...%*
 0040  00000000 00000000 00000000 00000080  0DBCC3A0 0A61C510 0DBCC380 0DBCC390  *...................C../E...C...C.*
 0060  000E000A 00000000 00000000 8000000A  00000000 00000000 0DB9FB00 00000000  *................................*
 0080  00000000 00000000 00000000 00D00000  00000003 00000000 00000000 0DBBF080  *.............}.................0.*
 00A0  0DBB7300 00010000 00000000 00000000  00000000 C1C1C1C1 C1C1C1C1           *.....................AAAAAAAA    *
```

DSNB Offsets

+08 FCTDNAME – Dataset Name
+54 FCTBCVSC – VSWA Anchor Chain

VSWA Offsets

+0A VSWAREQ – RPL Request Type
+0C VSWAPLHP – PLH Address
+30 VSWAOPTC – RPL Options
+9C VSWASV12 – TCA Address

NOTE: PLH Address of 00000000 indicates this VSWA is not connected to a VSAM String.
The Task associated to this VSWA would be in a FCPSWAIT waiting for a VSAM String.

Problem Two – FCPSWAIT - VSWA Owning a String

```
VSWA 0B398570 VSAM WORK AREA

   0000  8F000160 00000000 000000 4C 0E8294AC  40000000 00000000 00010000 00000000  *...-.......<.bm. ..........*
   0020  0A41FDF0 00000000 0D4B34A0 0D4B34A0  40820000 00000000 0000046C 0000046C  *...0.............e....%...%*
   0040  00000000 00000000 00000000 00000080  0B398650 0A61C510 0B398630 0B398640  *..................f&.f...f *
   0060  000E000A 00000000 00000000 B000000A  00000000 00000000 0B382830 0B398DB0  *............................*
   0080  00000000 00000000 00000000 00C80001  00000000 00000000 26850000 097A5680  *..............H......e...:..*
   00A0  0B3910A8 00010000 00000000 00000000  00000000 C1C1C1C1 C1C1C1C1           *................AAAAAAAA    *


VSWA 0B382830 VSAM WORK AREA

   0000  8F000160 00000000 000000 4C 0E8290BC  40000000 00000000 00010000 00000000  *...-....b.. ................*
   0020  0A41FDF0 00000000 0D443910 0D443910  40820000 00000000 0000046C 0000046C  *...0........e.........%...%*
   0040  00000000 00000000 00000000 00000080  0B382910 0A61C510 0B3828F0 0B382900  *................./E....0....*
   0060  000E000A 00000000 00000000 B000000A  00000000 00000000 0B382580 0B398570  *............................e.*
   0080  00000000 00000000 00000000 00C80001  00000000 00000000 26850000 097AA080  *........H............e...:..*
   00A0  0B35EF30 00010000 00000000 00000000  00000000 C1C1C1C1 C1C1C1C1           *................BBBBBBBB    *
```

VSWA Offsets

+0A VSWAREQ – RPL Request Type
+0C VSWAPLHP – PLH Address
+30 VSWAOPTC – RPL Options
+9C VSWASV12 – TCA Address
+B4 VSWAXKEY – RIDFLD (KEY)

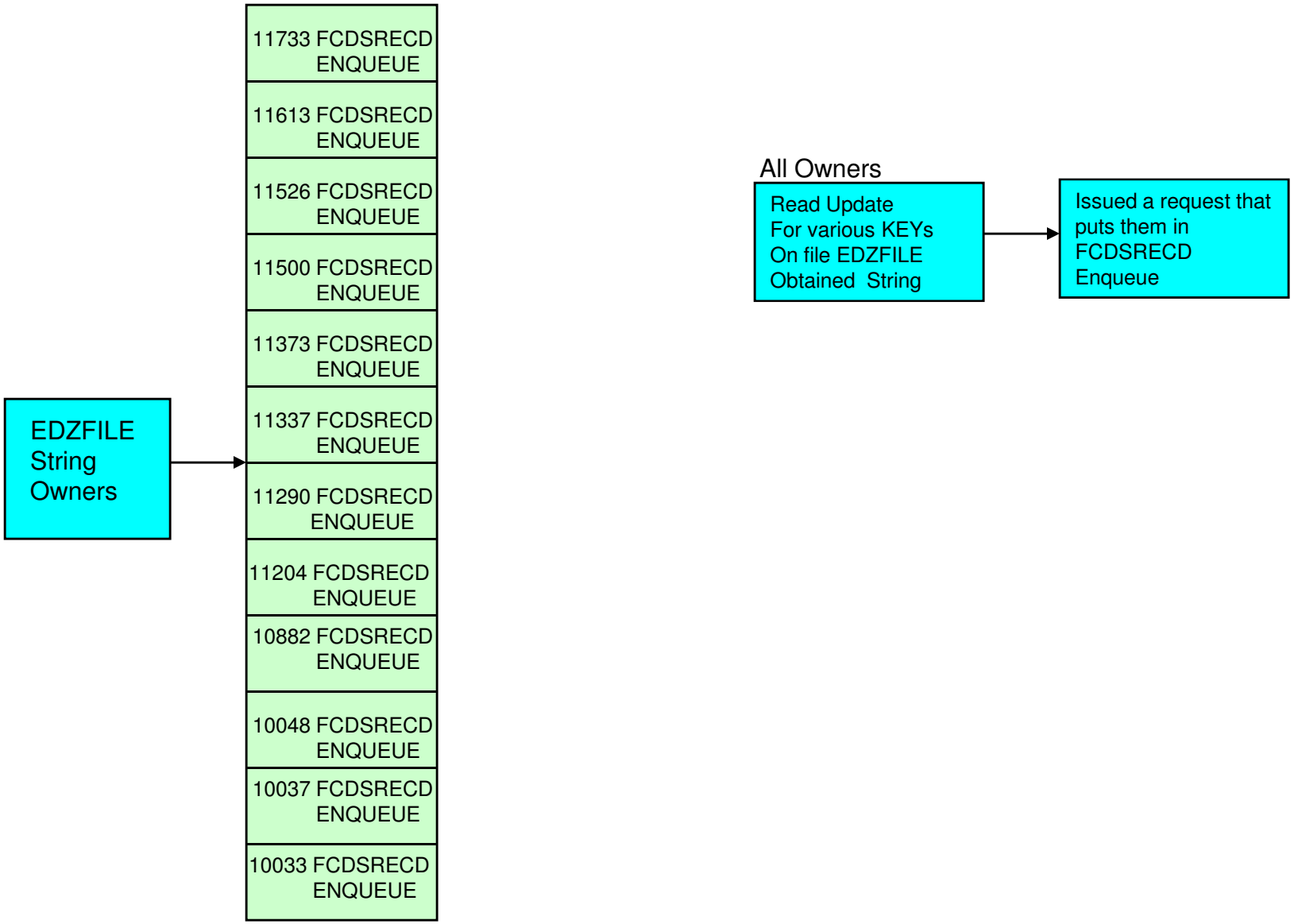
Note: PLH of non-zero indicates this VSWA owns a VSAM String on File EDZFILE. The 00 for VSWAREQ indicates this is a READ command. VSWAOPTC has Update Access set on, so this is a READ UPDATE command. The VSAM String will not be released until a REWRITE or Unlock is issued. The RIDFLD for VSWA1 is AAAAAAAA, VSWA2 is BBBBBBBB

Problem Two – FCPSWAIT - EDZFILE String Owners

TCA Address	Task Number	Wait Type		Wait Time
097A5680	11733	ENQUEUE	FCDSRECD	19:54:11.273
097AA080	11613	ENQUEUE	FCDSRECD	19:53:35.267
097AF080	11526	ENQUEUE	FCDSRECD	19:53:08.475
097AF680	11500	ENQUEUE	FCDSRECD	19:52:57.186
097A8080	11373	ENQUEUE	FCDSRECD	19:52:06.948
097A7680	11337	ENQUEUE	FCDSRECD	19:51:46.592
097A8680	11290	ENQUEUE	FCDSRECD	19:51:38.836
097A9680	11204	ENQUEUE	FCDSRECD	19:51:10.696
097A9080	10882	ENQUEUE	FCDSRECD	19:49:34.307
097AC080	10048	ENQUEUE	FCDSRECD	19:44:57.451
097AC680	10037	ENQUEUE	FCDSRECD	19:44:53.997
097AB680	10033	ENQUEUE	FCDSRECD	19:44:53.971

Note:

1. Retrieve the TCA Address from all VSWAs owning a String.
2. Issue CICS VERBX with ‘KE=3’ and find the TCA Address to get the Task Number.
3. Issue CICS VERBX with ‘DS=3’ and find the Task Number to see the wait type of the String owners.


11733 FCDSRECD ENQUEUE
11613 FCDSRECD ENQUEUE
11526 FCDSRECD ENQUEUE
11500 FCDSRECD ENQUEUE
11373 FCDSRECD ENQUEUE
11337 FCDSRECD ENQUEUE
11290 FCDSRECD ENQUEUE
11204 FCDSRECD ENQUEUE
10882 FCDSRECD ENQUEUE
10048 FCDSRECD ENQUEUE
10037 FCDSRECD ENQUEUE
10033 FCDSRECD ENQUEUE
EDZFILE String Owners
All Owners
Read Update For various KEYs On file EDZFILE Obtained String
Issued a request that puts them in FCDSRECD Enqueue

Problem Two – What We Know So Far

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  - EDZFILE is a Recoverable file (use System Log = YES)
- Customer provided a dump taken at 20:07:36.996768 GMT
- CICS Dispatcher shows many tasks in FCPSWAIT for file EDZFILE
  - Earliest task in FCPSWAIT is 11794 at 19:54:29.698 GMT
  - DTIMOUT not set on the Transaction (no Timeout due)
- VERBX DFHPD630 'FCP=3' for file EDZFILE shows
  - 12 (x'C') Active Strings against the file - 31 (X'1F') Tasks waiting for a string
  - 15 (x'F') Strings defined for the file - 12 (x'C') Strings for non-direct reads
- String Owners for EDZFILE have all issued Read Update commands for various Ridflds (obtaining a string) and are now in FCDSRECD ENQUEUE suspends

FCDSRECD ENQUEUE

- A resource name of FCDSRECD indicates a wait for a record lock in a VSAM file
- When a transaction updates a record in a VSAM file locking occurs at two levels:
  - VSAM locks the CI when the record has been read, and CICS locks the record
- The CI lock is released as soon as the REWRITE (or UNLOCK) request is completed. However, if the file is recoverable, the record is not unlocked by CICS until the updating transaction has reached a syncpoint
  - This is to ensure that data integrity is maintained if the transaction fails before the syncpoint and the record has to be backed out
- If a transaction attempts to update a record that is locked by another transaction, it is suspended on resource type ENQUEUE until the lock is released.
  - This can be a long wait since the owner of the ENQUEUE may itself be waiting

Problem Two – FCDSRECD Enqueue – 'NQ=3'

```
                        OWNER  /  WAITER
                                              NQEA    Tran  Tran                    Lifetime Hash
          Enqueue Name                 Len Sta Address   id   Num    Local Uowid    Uow Tsk  Indx
------------------------------ --- --- -------- ---- ----- ---------------- --- ---  ----

X'0A61AD30'.........            14 Act 09748600 BTCH 08957 BD96C4BB6ED08820   1   0    19
        X'C1C1C1C1C1C1C1C1'
                               Waiter :    097483C0 EAA2 10033 BD96C4BA46EF8680   1   0    19

X'0A61AD30'.........            14 Act 09748600 EAA2 08957 BD96C4BB6ED08820   1   0    19
        X'C2C2C2C2C2C2C2C2'
                               Waiter :    097483C0 EAA2 10037 BD96C4BA46EF8680   1   0    19

X'0A61AD30'.........            14 Act 09748600 EAA2 08957 BD96C4BB6ED08820   1   0    19
        X'C3C3C3C3C3C3C3C3'
                               Waiter :    097483C0 EAA2 10048 BD96C4BA46EF8680   1   0    19

.
.
.

X'0A61AD30'.........            14 Act 09748600 EAA2 08957 BD96C4BB6ED08820   1   0    19
        X'D3D3D3D3D3D3D3D3'
                               Waiter :    097483C0 EAA2 11773 BD96C4BA46EF8680   1   0    19
```

NOTE: An FCDSRECD ENQUEUE name will always be the HEX address of the DSNB (0A61AD30) followed by the RIDFLD that is locked (C1C1C1C1C1C1C1C1 or AAAAAAAA). In this case, the owner of all the record locks that the string holders for EDZFILE need is task number 08957. This happened to be the running task identified on slide 31.

The DSNB that all the enqueues are for (0A61AD30) is recoverable file BATCHFIL which was identified on slide 35. These enqueues will not be released until task 08957 either syncpoints or terminates.

Problem Two – What We Know

- Customer's access to file EDZFILE stalled
  - EDZFILE is a Recoverable file (use System Log = YES)
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  - 12 (x'C') Active Strings against the file - 31 (X'1F') Tasks waiting for a string
  - 15 (x'F') Strings defined for the file - 12 (x'C') Strings for non-direct reads
- String Owners for EDZFILE have all issued Read Update commands for various Ridflds (obtaining a string) and are now in FCDSRECD ENQUEUE suspends
- Owner of the FCDSRECD Enqueues for file EDZFILE is Task 08957 which is currently running and updating BATCHFIL

Problem Two – What can be done???

- Code all applications to access files in the same order
  - In this case, the owner of FCDSRECD Enqueue was a new transaction that updated all records in the recoverable dataset BATCHFIL
  - Application logic was moved from batch environment since the company went global and the files had to be available 24X7
- Code Syncpoint commands to release record locks
- Code DTIMOUT value for the transactions
  - Transactions waiting would abend AFCY

Problem Three ABEND0C1

ABEND0C1 – SYSLOG

```
DFHAP0001 EDZAOR An abend (code 0C1/AKEA) has occurred at offset X'FFFFFFFF' in module EDZPROG

DFHME0116 EDZAOR (Module:DFHMEME) CICS symptom string for message DFHAP0001 is MS/DFHAP0001 RIDS/DFHSRP
                  AB/S00C1 AB/UAKEA RIDS/EDZPROG ADRS/FFFFFFFF

DFHDU0201 EDZAOR ABOUT TO TAKE SDUMP. DUMPCODE: AP0001 , DUMPID: 1/0002

IEA045I AN SVC DUMP HAS STARTED

IEA794I SVC DUMP HAS CAPTURED:
        DUMPID=001 REQUESTED BY JOB (DFHSTART)
        DUMP TITLE=CICS DUMP: SYSTEM=EDZAOR CODE=AP0001

DFHDU0202 EDZAOR SDUMPX COMPLETE. SDUMPX RETURN CODE X'00'

IEA611I COMPLETE DUMP ON SYS2.DUMP.EAA.D090929.T162421.S00001
```

VERBX DFHPD670 'KE'

```
* * * * * CICS 6.7.0 - IPCS EXIT * * * * *

 CICS670 OPERANDS:

 KE

 === SUMMARY OF ACTIVE ADDRESS SPACES

      ASID(hex):          JOBNAME:
      006C                EDZAOR

-- DFHPD0121I FORMATTING CONTROL BLOCKS FOR JOB EDZAOR

=== DUMP SUMMARY

   DUMPCODE:  AP0001

   MESSAGE:   DFHAP0001 EDZAOR An abend (code 0C1/AKEA) has occurred at offset X'FFFFFFFF' in module EDZPROG.

   SYMPTOMS:  MS/DFHAP0001 RIDS/DFHSRP / AB/S00C1 AB/UAKEA RIDS/EDZPROG ADRS/FFFFFFFF

   TITLE:     (None)

   CALLER:    (None)

   ASID:      X'006C'
```

VERBX DFHPD670 'KE' Continued

Find *running

```
===KE: Kernel Domain KE_TASK Summary

KE_NUM KE_TASK  STATUS       TCA_ADDR TRAN_# TRANSID DS_TASK  KE_KTCB  ERROR

0033   2B1FF900 ***Running** 0005D080 00048  EDZZ    2A4D8500 2A2CAFF8 *YES*
```

Find '0033 '

```
KE_NUM @STACK   LEN  TYPE ADDRESS  LINK REG OFFSET ERR NAME

0033   2B266020 0120 Bot  AA101C00 AA101FBC 0003BC     DFHKETA
0033   2B266140 0320 Dom  AA11A5F8 AA11A810 000218     DFHDSKE
0033   2B266460 0820 Dom  AA142A48 AA143C08 0011C0     DFHXMTA
0033   2B266C80 05D0 Dom  AA80B970 AA80C92A 000FBA     DFHPGPG
                     Int   +0002DC AA80BB02 000192     INITIAL_LINK
0033   2B267250 0AD0 Dom  AAA0E900 AA5A0876 000000 *Y* DFHAPLI1
                     Int   +002FCA AAA0F3A4 000AA4     LE370_INTERFACE
                     Int   +00267C AAA12A70 004170     DO_LE370_RUNUNIT_END_INVOCATION
                     Int   +002BAA AAA11010 002710     INVOKE
0033   2B267D20 04F0 Sub  AA59E738 AA59F802 0010CA     DFHSRP
0033   2B268210 0E50 Dom  AA18CDB0 AA190A14 003C64     DFHMEME
                     Int   +003222 AA18D016 000266     SEND
                     Int   +00146E AA1900A8 0032F8     CONTINUE_SEND
                     Int   +003B98 AA18E328 001578     TAKE_A_DUMP_FOR_CALLER
0033   2B269060 0620 Dom  AA22E960 AA22F5E4 000C84     DFHDUDU
                     Int   +000B26 AA22EB60 000200     SYSTEM_DUMP
                     Int   +001934 AA22F8B4 000F54     TAKE_SYSTEM_DUMP
```

VERBX DFHPD670 'KE' Continued

Find Table

```
==KE: KE Domain Error Table Summary

ERR_NUM   ERR_TIME  KE_NUM  ERROR TYPE            ERR_CODE  MODULE    OFFSET
=======   ========  ======  ==========            ========  ======    ======

00000001  12:24:21   003B   PROGRAM_CHECK         0C4AKEA   UNKNOWN   UNKNOWN

00000002  12:24:25   003B  TRAN_ABEND_PERCOLATE  ---/ASRA  DFHSR1    00000598

00000003  12:34:22   0033   PROGRAM_CHECK         0C1/AKEA  UNKNOWN   UNKNOWN
```

Find 'Error Number: 00000003'

```
=KE: Error Number:  00000003

KERRD 2A27E880 KERNEL ERROR DATA

   0000  F0C3F161 C1D2C5C1 018400C1 0000FFFF  C4C6C8C1 D7D3C9F1 2AA0E900 2A4D8500  *0C1/AKEA.d.A....DFHAPLI1..Z..(e.*
   0020  0005D080 2B1FF900 00000003 00000001  FF850001 00000000 078D2000 80000002  *..}...9.........e..............*
   0040  00020001 7F537000 80000002 802B7A46  00000000 7FFFF000 7FFFF000 7FFFF000  *....".........:.....".0.".0.".0.*
   0060  7FFFF000 7FFFF000 7FFFF000 00000000  00000000 7FFFF000 7FFFF000 00000000  *".0.".0.".0.........".0.".0.....*
   0080  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000  *................................*
```

VERBX DFHPD670 'KE' Continued

```
Error Code:  0C1/AKEA    Error Type:  PROGRAM_CHECK          Timestamp:  C4DCA455280B9CC6

   Date (GMT)    :  29/09/13        Time (GMT)    :  16:34:22.295225
   Date (LOCAL)  :  29/09/13        Time (LOCAL)  :  12:34:22.295224

   KE_NUM:  0033    KE_TASK:  2B1FF900    TCA_ADDR:  0005D080    DS_TASK:  2A4D8500

Program DFHAPLI1 was in control, but the PSW was elsewhere.

 Error happened under the CICS RB.

 CICS Registers and PSW.

   PSW:  078D2000 80000002   Instruction Length:  2  Interrupt Code:  01

   Execution key at Program Check/Abend: 8

   Space at Program Check/Abend: Basespace          Branch Event Address: 2B7A46E4

   REGISTERS 0-15

 REGS 2A27E8D0

    0000  00000000 7FFFF000 7FFFF000 7FFFF000  7FFFF000 7FFFF000 7FFFF000 00000000
    0020  00000000 7FFFF000 7FFFF000 00000000  00000000 00000000 00000000 00000000


   Data at PSW: 80000002    Module: UNKNOWN    Offset: UNKNOWN
```

ABEND0C1 What we know so far

- Transaction 00048 EDZZ received ABEND0C1 at x'FFFFFFFF' in EDZPROG
- PSW points to 80000002
- Registers do not show any clue as to how the PSW points to low core

Introduction to the BEAR

- BEAR – Breaking Event Address Register
- The BEAR is a hardware enhancement in z9-109 (z/Architecture mode)
- The BEAR contains the address of the last instruction that caused a break in sequential instruction - the last successful branch address
- The minimum operating system level to take advantage of the BEAR is z/OS V1.7
- The BEAR is in the base product beginning with CICS TS V4.1
  - If you are running CICS TS V3.1 or V3.2, apply the following PTFs to use the BEAR:
    - APAR PK47015, PTF UK28041 - CICS TS V3.1
      APAR PK47715, PTF UK28429 - CICS TS V3.2
- When the Kernel domain is formatted in a CICS dump with the added BEAR support, the new BEAR data will be formatted in the Kernel error information with the title 'Branch Event Address'

Browsing BEAR address

L 2B7A46E4

```
2B7A46E4                07FE0000   D7C1E3C3   C840C1D9   |      ....PATCH AR |
2B7A46F0   C5C14060     40404040   40404040   40F2F0F0   | EA - EDZPROG 200 |
2B7A4700   F74BF0F8     F740B13E   B140B142   B144B146   | 7.087 ... ...... |
```

NOTE: 07FE is an Unconditional Branch to what's in R14. R14 at the time of the ABEND0C1 was 00000000. This is an Unconditional Branch to location 0. This is why there is ABEND0C1 PSW of 80000002

Backing up from PSW Address

```
2B7A46C0   41302004     5030D088   58F0B178   4110D088   | ....&.}h.0....}h |
2B7A46D0   05EF5850     C2E0D247   41400000   18D498EC   | ...&B\K.&.}..Mq. |
2B7A46E0   D00C1FFF     07FE0000   D7C1E3C3   C840C1D9   | }.......PATCH AR |
2B7A46F0   C5C14060     40C3C5C5   C3C5D5C3   40F2F0F0   | EA - EDZPROG 200 |
2B7A4700   F74BF0F8     F740B13E   B140B142   B144B146   | 7.087 ... ...... |
```

```
41400000    LOAD ADDRESS R4, with 00000000 (R4=00000000)
18D4        LOAD REGISTER R13 with R4 (R13=00000000)
98ECD00C    LOAD MULTIPLE R14 through REG12 with what is in REG13 PLUS OFFSET 12
            Load all registers from lowcore
1FFF        SUBTRACT LOGICAL REGISTER R15 with R15 (R15=00000000)
07FE        UNCONDITIONAL BRANCH TO R14
```

Using INSTR to list Assembler Instructions

Raw storage at 2B7A46D0

```
2B7A46D0   05EF5850   C2E0D247   41400000   18D498EC   | ...&B\K.&.}..Mq. |
2B7A46E0   D00C1FFF   07FE0000
```

ip list 2B7A46D8 instr len(14)

```
LIST 2B7A46D8. ASID(X'006C') LENGTH(X'30') INSTRUCTION
 2B7A46D8 | 4140 0000      | LA    R4,X‘00’
 2B7A46DC | 18D4           | LR    R13,R4
 2B7A46DE | 98EC D00C      | LM    R14,R12,X'C'(R13)
 2B7A46E2 | 1FFF           | SLR   R15,R15
 2B7A46E4 | 07FE           | BCR   X'F',R14
```

Browsing Lowcore and Load Multiple

L 0

```
00000000   000A0000   000130E1   00000000   00000000   | ................ |
00000010   00FDBA30   00000000   7FFFF000   7FFFF000   | ........".0.".0. |
00000020   7FFFF000   7FFFF000   7FFFF000   7FFFF000   | ".0.".0.".0.".0. |
00000030   00000000   00000000   7FFFF000   7FFFF000   | ........".0.".0. |
00000040   00000000   00000000   00000000   00FDBA30   | ................ |
```

Registers after Load Multiple 98ECD00C

```
REG14 00000000 REG15 00FDBA30 REG0  00000000 REG1  7FFFF000 REG2  7FFFF000
REG3  7FFFF000 REG4  7FFFF000 REG5  7FFFF000 REG6  7FFFF000 REG7  00000000
REG8  00000000 REG9  7FFFF000 REG10 7FFFF000 REG11 00000000 REG12 00000000
```

Registers at time of ABEND0C1

```
00000000 7FFFF000 7FFFF000 7FFFF000  7FFFF000 7FFFF000 7FFFF000 00000000
00000000 7FFFF000 7FFFF000 00000000  00000000 00000000 00000000 00000000
```

ABEND0C1 What we know

- Transaction 00048 EDZZ received ABEND0C1 at x'FFFFFFFF' in EDZPROG
- PSW points to 80000002
- Registers do not show any clue as to how the PSW points to low core
- BEAR pointed to last successful branch address
- EDZPROG loaded registers from low core and branched to location 00000000

Summary

- **Problem One –** ABEND0C4 / AKEA / AFCZ
- **Problem Two – FCPSWAIT / FCDSRECD Enqueue**
- **Problem Three – ABEND0C1**

Additional Product Resources

- WebSphere and CICS Support blog *New*
  https://www.ibm.com/developerworks/mydeveloperworks/blogs/aimsupport/?lang=en
- IBM_CICS support news on Twitter
  http://www.ibm.com/support/docview.wss?uid=swg21384915
- Track specific CICS APARs or CICS APARs by component id
  http://www.ibm.com/support/docview.wss?uid=swg21422149
- Sign up to receive technical support e-mails
  http://www.ibm.com/software/support/einfo.html
- CICS Featured documents
  http://www.ibm.com/support/docview.wss?uid=swg27006900
- Webcasts for CICS and OMEGAMON
  http://www.ibm.com/support/docview.wss?uid=swg27007244
- CICS Transaction Server Support Web page
  http://www.ibm.com/support/entry/portal/Overview/Software/Other_Software/CICS_Transaction_Server