

CICS Problem Support
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AGENDA

- Introduction
- **CICS Level 2 Support Center**
 - f* What are the different code areas, and who supports them?
 - f* Level 2 availability actions
 - f* New FTP address policy
- CICS Problem Determination
 - f* Abends
 - f* Hangs
 - f* Loops
 - f* Waits
 - f* Storage Violations
- The DFHPD410 Dump Formatter
 - f* CICS Level 2 recommended settings

The CICS Level 2 Support Center Hints & Tips

■ Is it MVS or VSE?

f "Code is Code"

■ CICS Host

f FILE CNTRL/DATABASES(VSAM, IMS, DL/I, DB2), JOURNAL, TEMP STORAGE, MONITOR, STATS, SPOOLER, RECOVERY, DUMPS NOT PRODUCED, BACKOUT, RESTART, SHUTDOWN, TRANSIENT DATA, ANY AREA NOT COVERED ABOVE.

■ CICS TC

f SECURITY, MRO, AUTOINSTALL, WEB, BMS, ISC, FEPI, TERMINAL INTERFACE(BTAM,VTAM,LU62), STORAGE PROBLEMS, RESOURCE DEF'N, SOCKETS, TCP/IP, REPORT CONTROLLER, TABLE MANAGER, XRF, SOAP.

CICS Level 2 Support Center Notes

- The code for CICS/TS for VSE/ESA has been ported from CICS/MVS R410, CICS/TS for MVS R130 and CICS/TS for z/OS. The code being used is dependent on which function is being utilized. However, the machine code in the storage does not know the difference between, VM, MVS or VSE as an operating system.
- The CICS Level 2 Support Center is divided into two distinct areas: CICS Host and CICS TC. This separation attempts to align the most common code areas into the two support groups.
- There is no longer a Level 1 and Level 2 support structure. The Customer Service Center fields a call and based on our customer selections, they will direct a call to the correct CICS Level 2 group. **All calls now are handled on a callback action instead of the traditional "live call" action.**
- The CICS Level 2 Support Center also answers fee based "how to" questions on separate queues. When a call comes on the SupportLine queue an entitlement check is done. If our customer is not entitled to SupportLine help they will be told they are not supported.

FTP Information

THE TESTCASE SITE WILL NO LONGER ACCEPT DOCUMENTATION

PLEASE SEND YOUR DOCUMENTATION USING FTP VIA THE INTERNET.

1. CONNECT TO OUR FTP SITE: <ftp.emea.ibm.com>
(or <192.109.81.7>) USER: ANONYMOUS PASSWORD: YOUR COMPLETE
E-MAIL ADDRESS.
2. IF YOU ARE SENDING A RAW DUMP CHANGE TO BINARY MODE.
3. IF THIS IS A FORMATTED DUMP/TRACE CHANGE TO ASCII MODE.
- 4 Place the dataset in the /toibm/vse directory with put command

Ensure the data set name conforms to the following naming convention:

XXXXX.YYY.ZZZ.DDD.DDD where: XXXXX =PMR #; YYY =Branch #;
ZZZ =Country Code; DDD.DDD =Short Descriptive Name;

(eg. PUT 'SYSDUMP.F4.DF500075' 87744.199.000.dump.untrs)

When the dump is transmitted to the ECUREP site, a secondary pmr will automatically be generated. This will let Level2 know the documentation is ready for analysis.

CICS Problem Determination

ABENDS

SCENARIO:

Running normally and all of a sudden the CICS partition crashes.

MESSAGES:

DFHSR0615 CICSPROD Program interrupt has occurred in recovery task

DFHDU0201 CICSRRREP ABOUT TO TAKE SDUMP. DUMPCODE: SR0615 ,
DUMPID: 1/0002

0S24I AN SDUMP OR SDUMPX MACRO WAS ISSUED 28/04-15:43:47

0S29I DUMP STARTED 28/04-15:43:47

0S30I DUMP STARTED. MEMBER=DF600034.DUMP IN SUBLIB=SYSDU 28/04-15:43:47

CICS Problem Determination

ABENDS

DFHSR0615 applid Program interrupt has occurred in recovery task

Explanation: An operating system abnormal termination occurred. CICS started to abend the task with an abend code of ASRB when a program check occurred. DFHSRP terminates CICS.

System Action: CICS abnormally terminates with system dump SR0615 and exception trace entries giving the kernel error data for the operating system abend and the program check.

User Response: The most likely cause of the program check is an error in a global user exit program running at the XSRAB exit. This is the global user exit that can be invoked when an abend code is found in the SRT. If such a program was running, determine the cause of the program check and correct it.

For advice on problem determination, refer to the CICS Problem Determination Guide.

Destination: Console

CICS Problem Determination

ABENDS

We go into the KE=3 output to see what the running task is doing:

```
00A2 046CB080 ***Running** 007E6680 00055 TV44 09A13380 09B51020
*YES*
```

We then check this task's stack entry to see what the module flow is:

```
00A2 046CC020 0120 Bot 89B8ABE8 89B8AEB8 02D0 DFHKETA
00A2 046CC140 01F0 Dom 89BAF6F8 89BAF7E6 00EE DFHDSKE
00A2 046CC330 03F0 Dom 89C2A898 89C2B396 0AFE DFHXMTA
```

CICS DUMP: SYSTEM=CICSPRCA

```
00A2 046CC720 03E0 Dom 841400C8 8414218C 20C4 DFHPGPG
      Int +00D4 84140156 008E INITIAL_LINK
      Int +1A06 841404A6 03DE ACQUIRE_FOR_LINK
00A2 046CCB00 0510 Dom 841AF480 841AFB9E 071E DFHAPLI1
00A2 046CD010 0450 Sub 841B4418 840612F6 0000 *YES* DFHAPLI3
00A2 046CD460 03A0 Sub 84061500 84061E14 0914 *YES* DFHSRP
00A2 046CD800 0F80 Dom 89BDEDD8 89BE23A2 35CA DFHMEME
      Int +2CD6 89BDEF4E 0176 SEND
```

CICS Problem Determination

ABENDS

We then see what the KE Domain Error Summary shows:

==KE: KE Domain Error Table Summary

| ERR_NUM | ERR_TIME | KE_NUM | ERROR TYPE | ERR_CODE | MODULE |
|----------|----------|--------|----------------------|----------|----------|
| 00000001 | 15:41:28 | 0000 | TRAN_ABEND_PERCOLATE | ---/APSI | DFHPCP |
| 000004EC | | | | | |
| 00000002 | 15:41:28 | 0000 | TRAN_ABEND_PERCOLATE | ---/APSI | DFHCXPA |
| 0000014C | | | | | |
| 00000003 | 15:41:28 | 0000 | TRAN_ABEND_PERCOLATE | ---/APSI | DFHLIRET |
| 00000020 | | | | | |
| 00000004 | 15:43:47 | 00A2 | ABEND | 2C5/AKEB | DFHYC220 |
| 00003022 | | | | | |
| 00000005 | 15:43:47 | 00A2 | PROGRAM_CHECK | 0C1/AKEA | -noheda- |
| 0000071A | | | | | |

CICS Problem Determination

ABENDS

We now know to key in on the abend2C5 so we find this KERRD information:

Error Code: 2C5/AKEB Error Type: ABEND
Timestamp: C083E66DA3200980

Reason Code: 47020033

Date (GMT) : 28/04/07 Time (GMT) : 15:43:47.098112
Date (LOCAL) : 28/04/07 Time (LOCAL) : 15:43:47.098112

KE_NUM: 00A2 KE_TASK: 046CB080 TCA_ADDR: 007E6680
DS_TASK: 09A13380

Error happened in program DFHYC220 at offset 00003022

Registers and PSW.

PSW: 07DD0000 0086E372 Instruction Length: 2 Interrupt Code: 25
Exception Address: 00000000

Execution key at Program Check/Abend: D

REGISTERS 0-15

0086E66E 0086EA40 0086F740 00826A10
0086B380 009C02AC 0086F740 00000D28
0086BEF0 6086E336 0086B380 0086B380
0086C1A8 0086E9A8 6086DBB2 0086E330

CICS Problem Determination

ABENDS

We now go to the PSW address area x'0086E372' and go backwards to find the beginning of the module:

The abend happened in:

```
*0.j.....f.y.f...fAy.f.0*  
*.b...f..COBF3000V00P44 .fA.15/0*  
*1/9710.06.09.....0000.....*  
*.....*  
*.....*
```

We then go to the PSW address area and see what is might be readable in storage and we find:

```
*.....&.o..0..ILBDDBG03010/05/90* 0086E330
```

*

CICS Problem Determination

ABENDS

Analysis:

DFHSR0615 ABEND2C5 occurs after migrating to CICS TS for VSE/ESA 1.1.1
Technote (FAQ)

Problem

You migrated to CICS® Transaction Server for VSE and you receive message:

DFHSR0606 abend (code 2C5/AKEB) has been detected.

CICS Kernel error data (KERRD) offset x'2C' contains the reason code x'47020033'. The description of this reason code in the VSE Message and Codes manual indicates that a program has issued a STXIT AB macro although an ESTAEX exit is already defined.

The Program Status Word (PSW) at time of abend points into COBOL module ILBDDBG0.

CICS Problem Determination

ABENDS

Cause

A COBOL program has been compiled with a restricted COBOL option or verb. This causes ILBDDBG0 to attempt to set up its own abend recovery routines using the STXIT AB. However, VSE rejects the STXIT AB request because CICS has already set up its abend recovery routine using an ESTAE.

Solution

Change the COBOL application to remove the restricted verbs or options.

To determine which COBOL programs contain the CICS restricted verbs and options, you can use LIBR LIST and look for eyecatcher ILBDDBG0. The presence of ILBDDBG0 indicates that the COBOL application was compiled with one of the restricted options.

The CICS Application Programming Guide contains a list of the restricted verbs and options under the topic COBOL Considerations .

CICS Problem Determination

ABENDS

Scenario:

Our customer upgraded to TCP/IP 15E Beta version for VSE. When they shutdown TCP/IP they get the following errors:

Messages:

DFHSO0106 06/28/06 09:45:21 VE31CICS A Language Environment Callable

Service error (code X'0226') has occurred in module DFH SOCK.

SYMPTOMS: PIDS/564805400 LVLS/411 MS/DFHSO0106 RIDS/DFH SOCK

PTFS/UK08369 PRCS/00000226

DFHSO0002 A severe error (code X'0211') has occurred In module DFH SOCK.

CICS Problem Determination

ABENDS

We first go to the KE=3 output to see what the running task is doing:

```
KE_# KE_TASK STATUS TCA_ADDR TRAN_# TRANSID DS_TASK KE_KTCB ERROR
0027 0531DB00 *Running 04D8B080 00024 CSOL 06680480 06790020
```

We then check the task's stack output for clues as to the flow it is following:

```
KE_# @STACK LEN TYPE ADDRESS LINK REG OFFS ERROR NAME
0027 053D5020 0120 Bot 867C9BE8 867C9EB8 02D0 DFHKETA
0027 053D5140 01F0 Dom 867EE6F8 867EE7E6 00EE DFHDSKE
0027 053D5330 03F0 Dom 86869898 8686A396 0AFE DFHXMTA
0027 053D5720 03E0 Dom 84E400D8 84E40A6C 0994 DFHPGPG
      Int +00D4 84E40166 008E INITIAL_LINK
0027 053D5B00 0510 Dom 84FEA3E0 851D7148 0000 DFHAPLI1
      Int +166C 84FEA986 05A6 CICS_INTERFACE
0027 053D6010 0AF0 Dom 84E57AB0 84E5DABC 600C DFH SOCK
0027 053D6B00 0F80 Dom 8681DDD8 868214C8 36F0 DFHMEME
      Int +2CD6 8681DF4E 0176 SEND
      Int +14A2 86820B9C 2DC4 CONTINUE_SEND
      Int +3618 8681F2F8 1520 TAKE_A_DUMP_FOR_CALLER
0027 053D7A80 0480 Dom 867F4C50 867F60B0 1460 DFHDUDU
      Int +0A3C 867F4D38 00E8 SYSTEM_DUMP
      Int +178E 867F5B24 0ED4 TAKE_SYSTEM_DUMP
```

CICS Problem Determination

ABENDS

We then check the TR=3 output for any exceptions entries:

```
TR 0101 TRPT *EXC* - OVERLENGTH-ENTRY : CALLING DOMAIN WAS .. : PARAMETER LIST WAS FUNCTION(TRACE_PUT)
POINT_ID(226) DATA1(035DF580
, 00000040) DATA2(02590000 , 00000398) DATA3(00000000 , 00000248) DATA4(00000000 , 02590308)
```

```
TASK-00054 KE_NUM-0007 TCB-00364000 RET-82017AC8 TIME-11:54:28.5079103310 INTERVAL-00.0000673281 =000113=
1-0000 0021 *.. *
2-0000 00680000 00000028 00000000 00000000 A5E00000 00000000 01000100 00000000 *.....v\.....*
0020 00000000 0226006B 035DF580 00000040 02590000 00000398 00000000 00000248 *.....)5.....q.....*
0040 00000000 02590308 0000000F 00000000 00000000 00000000 00000000 00000000 *.....*
0060 00000000 00000000 *.....*
```

ME FF02 SUWT EVENT - BEFORE-VSE-WTO

```
TASK-00054 KE_NUM-0007 TCB-00364000 RET-8365FD4C TIME-11:54:28.5083155029 INTERVAL-00.0000474296 =000124=
1-0000 00268050 C4C6C8E2 D6F0F1F0 F640D7D9 D6C4C3C9 C3E24040 40404040 40404040 *...&DFHSO0106 PRODCICS *
0020 40404040 4040 *.....*
2-0000 0100005C 00000000 00000000 00000000 00000000 00000000 40200000 00000000 *...*.....*
0020 00000000 00000000 00000000 40404040 40404040 40404040 40404040 40404040 *.....*
0040 40404040 00000000 00000000 40404040 40404040 40404040 40404040 80000003 *.....*
0060 00492000 F0F761F2 F461F0F6 40F1F17A F5F47AF2 F840D7D9 D6C4C3C9 C3E240C1 *...07/24/06 11:54:28 PRODCICS A*
0080 40D38195 87A48187 8540C595 A5899996 95948595 A340C381 93938182 938540E2 * Language Environment Callable S*
00A0 8599A589 83854040 40004930 00859999 9699404D 83968485 40E77DF0 F2F2F67D *ervice ....error (code X'0226'*
00C0 5D408881 A2409683 83A49999 85844089 95409496 84A49385 40C4C6C8 E2D6C3D2 *) has occurred in module DFHSOCK*
00E0 404B4040 40404040 40404040 40404040 4040 *.....*
```

CICS Problem Determination

ABENDS

SO 0211 SOCK *EXC* - ASYNCIO_ERROR RETURN_VALUE(1) RETURN_CODE(1112) REASON_CODE(000000FF)

TASK-00054 KE_NUM-0007 TCB-00364000 RET-82017AC8 TIME-11:54:42.9993327062 INTERVAL-00.0016391423 =000233=
1-0000 FFFFFFFF 00000458 000000FF 00000000 00000000 02590000 00000080 02590308 *.....*
0020 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
2-0000 03986EC4 C6C8E2D6 D3E3C540 40404040 01C22084 01C22084 043D0000 00008000 *.q>DFHSOLTE .B.d.B.d.....*
0020 00000000 00000000 001C6EC4 C6C8E2D6 E2E3C5C8 C5C1C440 02590028 02590028 *.....>DFHSOSTEHEAD*
0040 00000000 00000000 00000001 00008000 00000005 00000000 00000000 78000000 *.....*
0060 E5E2C5C5 E2C1F2F6 4BD4C1C9 D5E94BC4 C54BC9C2 D44BC3D6 D4404040 40404040 *VSEESA26.MAINZ.DE.IBM.COM
0080 40404040 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
00A0 40404040 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
00C0 40404040 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
00E0 40404040 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
0100 40404040 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
0120 40404040 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
0140 40404040 40404040 40404040 40404040 40404040 40404040 40404040 40404040 * *
0160 19F94BF1 F5F54BF3 4BF3F840 40404040 00000000 D5D6E2E2 D3404040 C4C6C85B *.9.155.3.38NOSSL DFH\$*
0180 E6C2E2C1 C3E6E7D5 FFFFFFFF 00000000 00000000 00004040 40404040 40404040 *WBSACWXN..... *
01A0 40404040 40404040 00000000 00000000 0602043D 099B0326 00000000 00000000 **
01C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
01E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*

CICS Problem Determination

ABENDS

ANALYSIS:

We can see the errors are happening during SHUTDOWN processing. If the CICS Internal Trace is not started, this failure does not happen when closing the TCPIP SERVICE connection initially. Once the connection is closed and restarted, the error does not happen.

The trace domain shows us two errors:

An error response is returned on a `sock_call_async_accept_service`. The return codes are: `AioRv=-1` and `AioRc=ENOTCONN (1124)`. This error will give us the DFHSO0002 abend.

This in turn results in `call listener_error(tid_sock_accept_failure)`. `Listener_error` issues `trace_bpx_call_failure(trace_point_id)` this calls `trace_bpx` which selects which data areas to trace depending on the trace id.

In this case (`tid_sock_accept_failure`) we trace data1,2,3,4. However, we have no data3 or data4 (STE and `SOCKADDR_ADDR` respectively) so both addresses and the lengths are unpredictable.

In this case the length of `SOCADDR_ADDR` is overlength.

CICS Problem Determination

ABENDS

SOLUTION:

This failure resulted in creating two APARS for each error we found:

APAR Identifier PK29184 Last Changed 06/12/08

TR 0101 TRPT *EXC* - OVERLENGTH-ENTRY : CALLING DOMAIN WAS .. :
CLOSING A TCPIP SERVICE CONNECTION

The second APAR is:

APAR Identifier PK39175 Last Changed 07/03/09

SHUTTING DOWN TCP/IP LEADS TO A CICS DUMP DFHSO0106 X'0226' IN
DFH SOCK FOLLOWED BY DFHSO0002 WHEN INTERNAL TRACE IS ACTIVE.

CICS Problem Determination

ABENDS

- Steps to debug an ABEND
 - f* Ensure the DUMP=YES SIT parameter is set (this to get a dump of the abend)
 - f* Get the CICS and VSE message logs
 - f* Use the DFHPD410 formatter and format KE=3, TR=3, LD=3
 - f* Call the IBM Support Center if necessary

CICS Problem Determination

HANGS

SCENARIO

Because of a HANG Condition, a CICS partition had to be CANCELLED. This because when a shutdown had been started, it would not complete. CICS had been started, and even though TCPIP=NO was specified in the SIT, the CWBG transaction was in this hang state.

MESSAGES

MESSAGE: DFHXM0306 H3CICSA A severe error (code X'130C') has occurred while initializing task number 02395 with transaction identifier CWBG. The task is suspended indefinitely.

SYMPTOMS: PIDS/564805400 LVLS/411 MS/DFHXM0306 RIDS/DFHXMTA PTFS/UQ58418
PRCS/0000130C

CICS Problem Determination

HANGS

MESSAGE: DFHXM0306 applid A severe error (code X'code') has occurred while initializing task number tasknum with transaction identifier tranid. The task is suspended indefinitely.

Explanation: An internal error has prevented the initialization of task number tasknum with identifier tranid.

The task cannot run and cannot be abended. The task has no principal facility bound to it. Rather than terminate CICS, the transaction manager keeps CICS running and preserves its integrity by suspending the task.

The suspended task will hold its MXT slot until CICS is terminated.

Note that the task may hold resources (for example, locks and enqueues) so you should cancel CICS at your earliest convenience. Otherwise you may risk other tasks being prevented from running because they also need access to the same resources. You may wish to add a dump table entry to always terminate CICS on this message.

CICS Problem Determination

HANGS

MESSAGE: DFHXM0306 CONTD...

System Action: The task is suspended indefinitely. First failure diagnostics should be produced by the component which first detects the error. The transaction manager also takes a dump. Message DFHME0116 is normally produced containing the symptom string for this problem.

The task is suspended with a resource type of FOREVER and a resource name of DFHXMTA.

User Response: You must cancel CICS if you need to destroy the task. You cannot quiesce CICS since this task will not terminate. You cannot purge or force purge the task.

Note the error code X'code'. You need further assistance from IBM to resolve this problem. See Part 4 of the CICS Problem Determination Guide for guidance on how to proceed.

Destination: Console

CICS Problem Determination Hangs

We first go into the KE=3 Infoana output to see what the running task shows:

```
0064 02D73780 ***Running** 020AA080 02395 CWBG 01DF8780 053B4020
```

We then look at the STACK entry for KE_NUM 0064 to see what that flow shows:

```
KE_NUM @STACK  LEN  TYPE ADDRESS  LINK REG OFFS ERROR NAME
```

```
0064 02D7A020 0120 Bot 853E2BE8 853E2EB8 02D0 DFHKETA
0064 02D7A140 01F0 Dom 85407530 8540761E 00EE DFHDSKE
0064 02D7A330 03F0 Dom 854826A8 854854FC 2E54 DFHXMTA
      Int +2240 85482BBA 0512 PROCESS_ATTACH_ERROR
      Int +2A16 85484C12 256A ATTACH_WAIT_FOREVER
      Int +2DF2 854852AA 2C02 WAIT_FOREVER
0064 02D7A720 0F80 Dom 85436BE8 8543A2D8 36F0 DFHMEME
      Int +2CD6 85436D5E 0176 SEND
      Int +14A2 854399AC 2DC4 CONTINUE_SEND
      Int +3618 85438108 1520 TAKE_A_DUMP_FOR_CALLER
0064 02D7B6A0 0480 Dom 8540DA88 8540E6A8 0C20 DFHDUDU
      Int +0A3C 8540DB70 00E8 SYSTEM_DUMP
      Int +178E 8540E95C 0ED4 TAKE_SYSTEM_DUMP
```

CICS Problem Determination

Hangs

We now go into the TR=2 Infoana output to see if there is good trace information:

```
US 0402 USXM EXIT - FUNCTION(INIT_TRANSACTION_USER)
RESPONSE(EXCEPTION) REASON(INVALID_USER_TOKEN) USDOM_TRANSACTION_TOKEN(00000000
, 00000000) PRIORITY(0)
```

```
TASK-02395 KE_NUM-0064 TCB-003E6000 RET-85482BA4 TIME-23:36:53.2703683759
```

```
INTERVAL-00.0000011718 =002282=
```

```
1-0000 00B00000 000000C0 00000000 00000000 BD800000 08000000 05000208 00000002
```

```
* .....*
```

```
0020 2B000400 00000000 00000000 00000000 00000000 00000000 00000000 00000000
```

```
* .....*
```

```
0040 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
```

```
* .....*
```

```
0060 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
```

```
* .....*
```

```
0080 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
```

```
* .....*
```

```
00A0 00000000 00000000 01250F59 0268D378
```

```
* .....L.
```

```
*
```

```
XM 130C XMTA *EXC* - Logic_error - FUNCTION(TASK_REPLY) USER_TOKEN(02AA6500)
TASK_TOKEN(040E0027) SUSPEND_TOKEN(040E0027)
```

CICS Problem Determination Hangs

ANALYSIS:

In this scenario, the KERNEL and TRACE output did not show much information of much use for our customers. However, the stack and trace information was quite valuable to CICS support.

The problem is due a CICS module, DFHXMTA, called DFHUSXM for INIT_TRANSACTION_USER call and passing an invalid SESSION_USER_TOKEN. CWBG is a non terminal task and should never have a SESSION_USER_TOKEN.

DFHXMTA's stack storage was not being initialized to zeros. Thus causing CICS to make the bad choice of passing a SESSION_USER_TOKEN based on residual data within the area of the stack address.

CICS Problem Determination

TASK Hang

SOLUTION

APAR Identifier PK37353 Last Changed 07/05/01

TRANSACTION CWBG WAIT FOREVER STATE CAUSES
SHUTDOWN TO HANG

Symptom MS MSGDFHXM0306

PTF List:

Release B0P : UK24146 available 07/05/01 (1000)

CICS Problem Determination

CICS Hangs

- Steps to debug a HANG in a CICS partition
 - f* Inspect the MSG log for signs of abends
 - f* If there are no abends dump the CICS partition
 - f* Run Infoana against the CICS partition dump
 - f* Format KE=3, TR=3 and LD=3
 - f* If there is nothing obvious, call the IBM Support Center

CICS Problem Determination

VSE SUB-TASK Hangs

- Steps to debug a HANG

- f* Issue the STATUS command (more than once if you suspect a Loop condition)

- f* Issue MSG xx,dump 0-7FFFFFFFF,cpu or

- f* Create a Standalone dump or

- f* Dump the Partition(s) in question, SVA and Supervisor

- f* If the save areas are not application related, call the IBM Support Center

CICS Problem Determination LOOPS

A loop is the repeated execution of some code. If you have not planned the loop, or if you have designed it into your application but for some reason it fails to terminate, you get a set of symptoms that vary depending on what the code is doing.

In some cases, a loop may at first be diagnosed as a wait or a performance problem, because the looping task competes for system resources with other tasks that are not involved in the loop.

CICS Problem Determination

LOOPS

The following are some characteristic symptoms of loops:

The 'system busy' symbol is permanently displayed in the operator information area of a display unit, or stays displayed for long periods.

The transaction abends with abend code AICA.

CPU usage is very high, perhaps approaching 100%, yet some tasks stay suspended or ready, but not running, for a long time.

You can check what the CPU usage is for any VSE job by using the DISPLAY SYSTEM ACTIVITY screen of the VSE/ESA Interactive Interface.

See the VSE/ESA Operation manual for more information.

There is reduced activity at terminals, or possibly no activity at all.

One or more CICS partitions appear to be stalled, or to be continuing only slowly.

CICS Problem Determination LOOPS

No CICS messages are written to any destination, when they are expected.

No new tasks can be started.

Existing tasks remain suspended.

The CEMT transaction cannot be used.

Repetitive output is obtained. Try looking in these areas:

- Terminals, and the system console.
- Temporary storage queues. You can use CEBR to browse them online.
- Data files and CICS journals.
- Trace tables, but remember that some loops are intentional--some CICS system tasks use them, for example, to see if there is any work to be done.

CICS Problem Determination LOOPS

SCENARIO

Our customer has CICS/TS for VSE 1.1.1 under z/VSE R3.1.

He reported that sometimes, any of his terminals goes to a loop sending these error messages:

DFHXC3437 I 08/17/04 05:29:48 CICSBG01 37V8 CSNE Node LL78 action taken:
CLSDST ABTASK ABSEND ABRECV ((1) Module name: DFHZNAC)

DFHXC2467 E 08/17/04 05:29:48 CICSBG01 37V8 CSNE Invalid communications
ID (CID) detected. VTAM RETURN CODE 0000 ((1) Module name: DFHZLEX)

RPL_A 37V8,CSNE, 5:29:48,

00200064 81B19062 02000945 035F846C 00000069 0000040C 00692200 00230000

08002000 00000000 00000000 81B194CC 00000000 00000000 00000000 02498A08

80001000 00000010 20080484 10800000 00000000 00000195 00000000 FF000000

00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000

00000000 00000000

TCTTE 37V8,CSNE, 5:29:48,

F3F7E5F8 91F20004 035F8460 035F8460 00000000 00000000 007DAF00 FF000000

00000000 0CD2C3D9 C5D5E400 00000950 00887D34 40404040 40404040 00000000

00000000 00000000 07801850 00000000 80010000 01F80000 00000000 02488BA0

00000000 08000000 00200001 024946F0 01DE00C8 00000000 02497308 00000000

00000000 00000000 00000000 00000000 017D2030 005A5A00 00000000 00000000

00000000 00000000 00000000 00840000 0000018A 00000184 74A50000 00960000

CICS Problem Determination LOOPS

When this problem appears, all the users cannot access this CICS. The only way to bypass the problem is by vary inact this terminal from VTAM, but after that command, the terminal remains in this state:

CEMT i term(37V8)

STATUS: RESULTS - OVERTYPE TO MODIFY

Ter(37V8) Pri(000) Pag Ins Ati Tti **BEING RELEASED**

*

And this is the status in VTAM for this terminal:

F3 0003 IST097I DISPLAY ACCEPTED

F3 0003 IST075I NAME = ECIBMHH1.LL78, TYPE = LOGICAL UNIT

F3 0003 IST486I STATUS= ACT/S, DESIRED STATE= ACTIV

F3 0003 IST977I MDLTAB=***NA*** ASLTAB=***NA***

F3 0003 IST861I MODETAB=ISTINCLM USSTAB=***NA*** LOGTAB=***NA***

F3 0003 IST934I DLOGMOD=DLUR USS LANGTAB=***NA***

F3 0003 IST597I CAPABILITY-PLU INHIBITED,SLU ENABLED ,SESSION LIMIT

00000001

The only way to recover from this LOOP situation was to recycle and restart the CICS partition.

CICS Problem Determination

LOOPS

SOLUTION

APAR Identifier PK21191 Last Changed 06/03/31

MSGDFHZC2410 , THEN RESETSR FAILS WITH VTAM FDBK X'1413' AND MSG DFHZC2467. DFHZLEX PUTTCTTE ON NACP QUEUE WHICH CAUSES A LOOP

ERROR DESCRIPTION:

VTAM RECEIVE was active when the terminal was lost, DFHZC2410. Part of the error processing in DFHZNAC for message DFHZC2410 is to cancel the active VTAM RECEIVE. This is done by calling DFHZRST directly from DFHZNAC. DFHZRST does a VTAM RESETSR USING THE FIXED RPL in the TCT prefix. The RESETSR failed with VTAM feedback CODE OF X'1413'. VTAM also drive the LERAD exit, DFHZLEX, which sets message DFHZC2467 in the TCTTE and queues it for DFHZNAC.

Control is return to DFHZNAC which terminates the error processing for message DFHZC2410. DFHZNAC then picks up the next TCTTE which happens to be the same but for error message DFHZC2467.

Part of processing error CODE for message DFHZC2467 is to cancel the VTAM receive. DFHZRST is called and issues another RESETSR which also failed with RPL FEEDBACK code '1413' and DFHZLEX being driven. DFHZLEX put the TCTTE on the NACP queue which results in the loop.

CICS Problem Determination LOOP

SCENARIO

100% CPU Usage caused by CICS partition

We had our customer issue several commands: SIR and QUERY TD came back with information, whereas DA or DQ do not. PRTY string shows ...F1, F2. Our customer changed F2 (CICS) priority below F1 (POWER).

After changing the PRTY string (that is moving F2 to the left side), other partitions (especially POWER) worked fine. So F2 seems to be the culprit. Our customer saw no I/O for partition F2, so there might be a closed loop in F2.

CICS Problem Determination

LOOPS

We reviewed the dump and found the running task is #03803 and the transaction was MDI. The KERNEL domain output (KE=3) showed this task suffered an AICA abend around 08:00:23.

The abbreviated trace output (TR=1) for this task shows something is looping issuing READ request:

```
EIP ENTRY READ
FCFR ENTRY READ_INT0      02C797B0 , 00000069,02F42AB0,7D0
FCFR EXIT READ_INT0/EXCEPTION FILE_NOT_OPEN,0,0,00000000,,
EIP EXIT READ      NOTOPEN
```

These entries are issued repeatedly over and over.

The RET- address in the full trace output (TR=2), showed x'8309706C'. This points to x'3D8C' into an application module, RSM585.

The task was trying to read file, MASTNOT, which had a status of x'02' at FCT+1A. This is an indication the file is CLOSED,ENABLED. The loop on the READ of MASTNOT was due to the NOTOPEN condition not being correctly handled. When NOTOPEN was returned, the program re-issued the READ again and NOTOPEN is returned on until the AICA abend was presented.

CICS Problem Determination LOOPS

■ Steps to debug LOOPS

- f* Issue the STATUS command several times (this to see if the PSW is constantly changing)
- f* Issue "CEMT P SNAP" to get a dump of the partition
- f* Dump the SVA and SUPERVISOR
- f* Using the DFHPD410 dump formatter, format KE=3, TR=3, AP=3
- f* Gather all the CICS and message logs
- f* Contact the IBM Support Center for assistance

CICS Problem Determination

WAITS

| +-----+ | | | | |
|---|-----------|------------|-----------|--------|
| Table 20. Resources that a suspended task might be waiting on | | | | |
| +-----+ | | | | |
| Resource | Resource | Suspending | DSSR | Task |
| type | name | module | call | |
| +-----+ | | | | |
| (none) | DMWTQUEU | DFHDMWQ | SUSPEND | System |
| (none) | LMQUEUE | DFHMLM | SUSPEND | User |
| AP_QUIES | CSASSI2 | DFHSTP | WAIT_OLDC | System |
| AP_TERM | STP_DONE | DFHAPDM | WAIT_ | System |
| | | | EXTERNAL | only |
| EKCWAIT | Value of | DFHEKC | WAIT_OLDW | User |
| | NAME | | | |
| | argument | | | |
| | on EXEC | | | |
| | CICS WAIT | | | |
| | EVENT | | | |
| | command | | | |
| FCIOWAIT | file ID | DFHFCBD or | WAIT_OLDW | User |
| | | DFHFCVR | | |
| FCPSWAIT | file ID | DFHFCVR | WAIT_OLDC | User |
| FOREVER | DFHXMTA | DFHXMTA | WAIT_ | User |
| | | | EXTERNAL | |
| TCP_NORM | DFHZDSP | DFHZDSP | WAIT_OLDW | System |
| ZCIOWAIT | DFHZARQ1 | DFHZARQ | SUSPEND | User |

CICS Problem Determination

WAITS

DMWTQUEU

A system wait typically when domains are shutting down.

LMQUEUE

It means that the suspended task cannot acquire the lock on a resource it has requested, probably because another task has not released it.

CSASSI2

It means the AP domain is trying to shutdown and it has not finished. Typically it waits on the Terminals to finish their shutdown process.

STP_DONE

This wait is done to wait for DFHSTP to complete its processing before returning to Domain Manager, as DM will assume we have completed QUIESCE when we return and set the phase point etc, allowing other domains to complete their QUIESCE processing.

EKCWAIT

EKCWAIT indicates that a task has issued an EXEC CICS WAIT EVENT command. USERWAIT indicates that a task has issued an EXEC CICS WAITCICS or EXEC CICS WAIT EXTERNAL command. If the wait is prolonged, you should identify the event being waited on.

CICS Problem Determination

WAITS

FCIOWAIT

A wait on resource type FCIOWAIT occurs when the exclusive control conflict is deferred internally by VSAM and not returned as an error condition to CICS. An example of this is when a request against an LSR file is made for exclusive control of a control interval (for example, by EXEC CICS WRITE or READ UPDATE) and either this task or another task already holds shared control of this control interval (for example, by STARTBR).

FCPSWAIT

If your task is waiting on either of resource types FCPSWAIT or FCSRSUSP, it means that it cannot get a VSAM string. FCPSWAIT shows that the wait is for a private string, and FCSRSUSP shows that the wait is for a shared resource string.

FOREVER

If you have found that a user task is waiting on a resource type of FOREVER, and resource name DFHXMTA, transaction manager has detected a severe error during task initialization or task termination. Transaction manager has suspended the task.

ZCIOWAIT

Suspends on resource type ZCIOWAIT occur when the task is waiting for some terminal I/O. Once the expected I/O event occurs, the task is resumed.

DFHZARQ1 - resource type and name for all application requested waits involving NON-LU 6.2 devices.

DFHZARR1 - waiting for a receive issued to a LU6.2 ISC connection.

DFHZARL1 - waiting for a send issued to a LU6.2 device.

CICS Problem Determination

WAITS

SCENARIO

Our customer is in the process of migrating off from CICS/VSE R230 to CICS/TS R111 and z/VSE R3.1. Under a heavy workload, they set a maxtask limit of 220 tasks. Within a couple of hours they are in a maxtask condition.

MESSAGES

There were no messages in this case. However, things slowed down to a crawl and users were barely able to do any work. Each attempt to cut over to the new release ended up with this frustration.

CICS Problem Determination

WAITS

===DS: DISPATCHER DOMAIN - SUMMARY

KEY FOR SUMMARY

T = TYPE OF TASK S=SYSTEM N=NON-SYSTEM
S = STATE OF TASK D=DISPATCHABLE S=SUSPENDED R=RUNNING E=RESUMED EARLY
F = PURGEABILITY FLAG P=PURGEABLE N=NOT PURGEABLE
P = PURGE STATUS N=NO PURGE X=PURGED P=PURGE PENDING
TT = TIMEOUT TYPE IN=INTERVAL DD=DEADLOCK DELAYED DI=DEADLOCK IMMEDIATE
W = WAIT/SUSPEND TYPE X=WAIT_EXTERNAL S=SUSPEND C=WAIT_OLD C=WAIT_OLDW
DTA= DISPATCHER TASK AREA
AD = ATTACHING DOMAIN
M = TASK MODE Q=QUASI-REENTRANT R=RESOURCE OWNING S=FEPI OWNING
O=SOCKET OWNING L=LISTENER OWNING Y=SSL OWNING

CICS Problem Determination

WAITS

| KE_TASK | T | S | F | P | TT | RESOURCE | RESOURCE_NAME | W | TIME OF |
|----------|---|---|---|---|----|----------|---------------|---|--------------|
| | | | | | | TYPE | | | SUSPEND |
| 027B7780 | S | S | N | N | - | ICEXPIRY | DFHAPTIX | S | 12:30:46.327 |
| 0689FC80 | S | S | N | N | - | TCP_NORM | DFHZDSP | W | 12:30:46.360 |
| 068BC580 | S | S | N | N | - | ZC | DFHZNAC1 | S | 12:26:47.363 |
| 027D6400 | S | S | N | N | - | JCJOURDS | DFHJ01A | S | 12:30:46.358 |
| 027B7B00 | S | S | N | N | - | KCCOMPAT | SINGLE | W | 00:12:26.642 |
| 065A7C80 | S | S | N | N | - | ICMIDNTE | DFHAPTIM | S | 00:12:20.771 |
| 027F3780 | S | S | N | N | - | JCTERMN | SUBTASK | W | 00:12:20.833 |
| 027D6B00 | S | S | P | N | - | RECEIVE | DFHPSPIO | W | 00:12:21.409 |
| 01F1D080 | S | S | N | N | IN | SMSYSTEM | | S | 12:27:59.583 |
| 068BC900 | S | S | N | N | - | TIEXPIRY | DS_NUDGE | S | 12:30:46.327 |
| 0275A780 | N | S | N | N | - | LMQUEUE | | S | 12:30:44.542 |
| 026B9B00 | N | S | N | N | - | LMQUEUE | | S | 12:30:46.357 |

There were 145 LMQUEUE type waits repeated in the DS domain output (DS=1). The suspend time was all around the same time.

CICS Problem Determination

WAITS

===LM: LOCK MANAGER SUMMARY INFORMATION

Number of added locks - 48

Number of lock elements - 481

===LM: ALLOCATED LOCKS

| LOCK NAME | LOCK TOKEN | OWNER | MODE | COUNT | # LOCK REQUESTS | # LOCK SUSPENDS | -> QUEUE |
|--------------|---------------|----------|------|-------|--------------------|--------------------|----------|
| ---- | ----- | ----- | ---- | ----- | ----- | ----- | ----- |
| DDL_PPT | 0658E988 | 02723780 | | | 2436 | 0 | |
| MN_GBLOK | 0658E9B8 | 02723780 | EXCL | | 20975 | 87669 | 065C4658 |
| CCSERLCK | 0658E9E8 | | | | 0 | 0 | |
| DUDATSET | 0658EA18 | | | | 3 | 0 | |
| DUTABLE | 0658EA48 | | | | 0 | 0 | |
| DUSYSDMP | 0658EA78 | 0260C080 | EXCL | | 1 | 0 | |

CICS Problem Determination

WAITS

| -Address- | -Offset- | Hex | Char |
|-----------|----------|--|----------------------|
| V.2723780 | 0 | E3C1E2C5 D5E3D9E8 0297E400 00000089 | TASENTRY.pU....i * |
| V.2723790 | 10 | 0272B000 00770000 0272CFD0 00799000 | * |
| V.27237A0 | 20 | 0387B030 065A4A80 01FAE080 0272E000 | .g...!ç..... * |
| V.27237B0 | 30 | 0272CFD0 00770800 007700A0 96000000 |o... * |
| V.27237C0 | 40 | 0689B020 00260000 00000003 868E8C98 | .i.....f..q * |
| V.27237D0 | 50 | 02723780 00000000 00029C20 065DA000 |).. * |
| V.27237E0 | 60 | 868E7A80 02723780 068E8A7F 02723780 | f:....." * |
| V.27237F0 | 70 | 065A4A80 02723780 0272CD70 0650A480 | !ç.....u. * |
| V.2723800 | 80 | 02723780 02723780 0272CFD0 00000000 | * |
| V.2723810 | 90 | 00000000 00029C20 00008400 00020001 |d.... * |
| V.2723820 | A0 | 03841700 02723400 02723B00 00770000 | .d..... * |
| V.2723830 | B0 | 0272B000 00000000 00000000 00000000 | * |
| V.2723840 | C0 | 00000000 00000000 00000000 00000000 | * |
| V.2723850 | D0 | 00000000 00000000 00480000 00000001 | * |
| V.2723860 | E0 | 00000000 00000000 B8800000 00000000 | * |
| V.2723870 | F0 | 02000100 02723780 00000000 00000000 | * |

CICS Problem Determination

WAITS

| -Address- | -Offset- | Hex | Char |
|-----------|----------|--|----------------------|
| V.1FAE080 | 0 | 01FAE180 00000000 00000000 0068A648 |w. * |
| V.1FAE090 | 10 | 0272CC80 00684040 00000000 00000000 | * |
| V.1FAE0A0 | 20 | 00000000 0050342C 00000000 00000000 | * |
| V.1FAE0B0 | 30 | 00000000 820BE41E 03F019D8 00000000 | ...b.U..0.Q.... * |
| V.1FAE0C0 | 40 | 00641000 03F0105C 824E9ABA 006F2950 |0.*b+...?.. * |
| V.1FAE0D0 | 50 | 8068ADC0 824E9A60 024EAA5F 021F217F |b+.-.+....." * |
| V.1FAE0E0 | 60 | 00400101 00000000 00000000 02E4F810 |U8. * |
| V.1FAE0F0 | 70 | 00000001 00000000 00000000 00000000 | * |
| V.1FAE100 | 80 | 00000000 00000000 00000000 00000000 | * |
| V.1FAE110 | 90 | 00000000 00000000 00000000 00000000 | * |
| V.1FAE120 | A0 | 00000000 00000000 00000000 00000000 | * |
| V.1FAE130 | B0 | 00000000 00000000 00000000 00000000 | * |
| V.1FAE140 | C0 | 00000000 00018203 00000000 C5F90200 |b.....E9.. * |
| V.1FAE150 | D0 | 03F01458 03F01C48 00000000 8068ADC0 | .0...0..... * |
| V.1FAE160 | E0 | 00000000 00000000 00000000 00642000 | * |
| V.1FAE170 | F0 | 00000000 00000000 00000000 00000000 | * |

CICS Problem Determination

WAITS

| KE_TASK | T | S | F | P | TT | RESOURCE | RESOURCE_NAME | W | TIME OF | TIMEOUT | DTA | AD ATTACHER |
|----------|---|---|---|---|----|----------|---------------|---|--------------|--------------|----------|-------------|
| | | | | | | TYPE | | | SUSPEND | DUE | (DSTSK) | TOKEN |
| 02723780 | N | S | P | N | IN | | DLS_BUFR | W | 12:33:22.128 | 12:33:22.728 | 065A4A80 | XM 03841700 |

The KERNEL DOMAIN SHOWS:

0089 02723780 Not Running 01FAE080 50342 CATD 065A4A80 0689B020

Here is the stack for this task:

| KE_NUM | @STACK | LEN | TYPE | ADDRESS | LINK | REG | OFFS | ERROR | NAME |
|--------|----------|------|------|----------|----------|------|------|-------|-----------------------|
| 0089 | 0272B020 | 0120 | Bot | 868C9BE8 | 868C9EB8 | 02D0 | | | DFHKETA |
| 0089 | 0272B140 | 01F0 | Dom | 868EE6F8 | 868EE7E6 | 00EE | | | DFHDSKE |
| 0089 | 0272B330 | 03F0 | Dom | 86969898 | 8696A396 | 0AFE | | | DFHXMTA |
| 0089 | 0272B720 | 03E0 | Dom | 820400D8 | 82040A6C | 0994 | | | DFHPGPG |
| | | | Int | +00D4 | 82040166 | 008E | | | INITIAL_LINK |
| 0089 | 0272BB00 | 0510 | Dom | 821F1180 | 820BD770 | 0000 | | | DFHAPLI1 |
| | | | Int | +166C | 821F1726 | 05A6 | | | CICS_INTERFACE |
| 0089 | 007700A0 | 02B0 | Lifo | 020BD980 | 820BE41E | 0A9E | | | DFHSPP |
| 0089 | 0272C010 | 0540 | Lifo | 02150AD0 | 82153268 | 2798 | | | DFHSPZ |
| 0089 | 0272C550 | 0470 | Dom | 82025428 | 8202639E | 0F76 | | | DFHMMNMN |
| | | | Int | +05CC | 82025538 | 0110 | | | MNMN_PERFORMANCE_PUT |
| | | | Int | +1C78 | 82025A7C | 0654 | | | PERFORMANCE_PUT_BUILD |
| | | | Int | +1AB8 | 820270BE | 1C96 | | | PERFORMANCE_PUT |
| | | | Int | +0EFA | 82026F88 | 1B60 | | | INVOKE_USER_EXIT |
| 0089 | 0272C9C0 | 02C0 | Dom | 8215B8B0 | 8215C544 | 0C94 | | | DFHAPEX |
| | | | Int | +0D40 | 8215B96E | 00BE | | | INVOKE_USER_EXIT |
| | | | Int | +0C42 | 8215C620 | 0D70 | | | INVOKE_SUEX |

CICS Problem Determination

WAITS

Here is the snippet showing how the task gets into the lock condition:

```
50368 1 AP FD01 ZARQ ENTRY APPL_REQ      037FB810,ERASE,WRITE
50368 1 AP FD81 ZARQ EXIT APPL_REQ
50368 1 AP 00D5 SYSTE EXIT 213           0005,00
50368 1 AP 00E1 EIP  EXIT SEND-TC       OK 00F4,00
50368 1 AP 00E1 EIP  ENTRY RECEIVE-TC   0004,00
50368 1 AP 00D5 SYSTE ENTRY 213        0003,00
50368 1 AP FD01 ZARQ ENTRY APPL_REQ     037FB810,READ,WAIT
50368 1 AP FD18 ZSDS ENTRY SEND_DFSYN   037FB810,E359
50368 1 AP FCE0 ZGET ENTRY GETMAIN      BUFFERLIST 037FB810,E359
50368 1 SM 0301 SMGF ENTRY GETMAIN      065BC458 ,
0000009D,8C,NO,00,ZGETBUF
50368 1 SM 0302 SMGF EXIT GETMAIN/OK    03115360
50368 1 AP FCE1 ZGET EXIT GETMAIN/OK    03115360
50368 1 MN 0201 MNMN ENTRY PERFORMANCE_DATA_PUT CONVERSE
```

CICS Problem Determination

WAITS

Here is the expanded trace entry showing it:

```
AP 00E1 EIP EXIT SEND-TC OK                REQ(00F4) FIELD-A(00000000 ....) FIELD-B(00000404 ....)
      TASK-50368 KE_NUM-0086 TCB-0056B000 RET-50AD685E TIME-12:33:21.0092323911
      INTERVAL-00.0000006875 =008776=

AP 00E1 EIP ENTRY RECEIVE-TC              REQ(0004) FIELD-A(00B54018 .. .) FIELD-B(0B000402 ....)
      TASK-50368 KE_NUM-0086 TCB-0056B000 RET-50AD687C TIME-12:33:21.0092329223
      INTERVAL-00.0000005312 =008777=

AP 00D5 SYSTEM ENTRY 213                  REQ(0003) FIELD-A(00000000 ....) FIELD-B(00000000 ....)
      TASK-50368 KE_NUM-0086 TCB-0056B000 RET-820C40A6 TIME-12:33:21.0092339692
      INTERVAL-00.0000010468 =008778=

AP FD01 ZARQ ENTRY APPL_REQ TCTTE(037FB810) READ WAIT TASK-50368 KE_NUM-0086 TCB-0056B000
      RET-82F0B31E TIME-12:33:21.0092364067 INTERVAL-00.0000024375 =008779=

AP FCE1 ZGET EXIT FUNCTION(GETMAIN) RESPONSE(OK) 03115360 TASK-50368 KE_NUM-0086 TCB-0056B000
      RET-820E459E TIME-12:33:21.0092412661 INTERVAL-00.0000004375 =008784=

MN 0201 MNMN ENTRY - FUNCTION(PERFORMANCE_DATA_PUT) RECORD_TYPE(CONVERSE)
      TASK-50368 KE_NUM-0086 TCB-0056B000 RET-820C6286 TIME-12:33:21.0093378442
      INTERVAL-00.0000965781 =008785=

LMLM 0003 LMLM ENTRY - FUNCTION(LOCK) LOCK_TOKEN(0658E9B8) MODE(EXCLUSIVE)
      TASK-50368 KE_NUM-0086 TCB-0056B000 RET-82027794 TIME-12:33:21.0093396411
1-0000 00480000 0000001B 00000000 00000000 B4100000 00000000 03000190 869306C2 * .....fl.B*
   0020 065ECC00 0658E9B8 065F1C00 8693830C 86938ED0 08BC080 02720130 00609000 *;.....Z.^..flc.fl.....-*
   0040 86938CF2 80721F30                                     *fl.2.... *
2-0000 D4D56DC7 C2D3D6D2                                     *MN_GBLOK

DS 0004 DSSR ENTRY - FUNCTION(SUSPEND) SUSPEND_TOKEN(01890001)
      PURGEABLE(NO) WLM_WAIT_TYPE(LOCK) RETRY(NO)
```

CICS Problem Determination

WAITS -- SOLUTION

- We know the tasks in the LMQUEUE waits were owned by the same one task
- This one task was holding the MN_GBLOK lock and nobody else could get this lock
- This one task was waiting on a buffer wait
- Monitoring was turned on after CICS was started up
- This task is a long running task used by a monitor package to check and ensure buffers are available for recording purposes
- The task waits 6 milliseconds and gets purged and checks again
- The vendor needed to shorten the wait time and also increased the buffer count for our customer

CICS Problem Determination

WAITS

- Steps to DEBUG WAITS

- f* DUMP the CICS Partition --- CEMT P SNAP

- f* Run the "Analyze CICS Dumps" format the following domains: KE=3, TR=3, DS=1, LM=3

- f* Contact the IBM CICS Support Center

STORAGE VIOLATIONS

- Types of storage violations
- CICS detected storage violations
- SAAs and Check Zones
- SCEs and SCFs
- Storage violation debug

Types of Storage Violations

- CICS detected and reported
 - f* Reported by DFHSM0102 message
 - f* DFHSM0102 applid A storage violation (code X'code') has been detected by module modname
- Undetected by CICS
 - f* Require different problem determination techniques

CICS Detected Storage Violations

- Initial or duplicate Storage Accounting Area (SAA) of a Terminal Input/Output Area (TIOA) storage element has become corrupted.
- Leading or trailing Check Zone of a user-task storage element has become corrupted.
- Detected at freemain time. Not when the violation actually happened.
- SAA chains are checked when an individual element is requested to be freed, at least up to the target element.
- SAA chains are checked during freemain of storage belonging to a TCTTE after the last output has taken place.
- Check Zones are checked during freemain of a specific user-task storage element.
- Check Zones chains are checked during freemain of all user-task storage during task termination.

SAAs

- **Are eight bytes long**

- f* First eight bytes of the TIOA are known as the initial (leading) SAA

- f* Last eight bytes of the TIOA are known as the duplicate (trailing) SAA

- f* First word indicates Storage Class and length

- First byte represents the Storage Class (x'85' = TIOA storage)

- Last two bytes represent the length of the TIOA

- Length includes initial SAA and useable portion of TIOA only

- f* Second word is the chain pointer

- Will point to another TIOA in the chain or to the owning TCTTE +4

- **Comparison of the initial and duplicate SAA is done, at freemain time, to detect possible overlay**

SAA Storage for TIOAs

| Storage Address | Offset | Storage | | | |
|-----------------|--------|-----------------|-----------------|-----------------|-----------------|
| 12FBB310 | 0000 | <u>85000118</u> | <u>12FBB000</u> | 00000000 | 00000000 |
| 12FBB320 | 0010 | 00000000 | 00000000 | 00000000 | 00000000 |
| 12FBB330 | 0020 | 00000000 | 00000000 | 00000000 | 00000000 |
| 12FBB340 | 0030 | 00000000 | 00000000 | 00000000 | 00000000 |
| 12FBB350 | 0040 | 00000000 | 00000000 | 00000000 | 00000000 |
| 12FBB360 | 0050 | 00000000 | 00000000 | 00000000 | 00000000 |
| 12FBB370 | 0060 | 00000000 | 00000000 | 00000000 | 00000000 |
| | | .. | | | |
| | | .. | | | |
| 12FBB3F0 | 00E0 | 00000000 | 00000000 | 00000000 | 00000000 |
| 12FBB400 | 00F0 | 00000000 | 00000000 | 00000000 | 00000000 |
| 12FBB410 | 0100 | 00000000 | 00000000 | 00000000 | 00000000 |
| 12FBB420 | 0110 | 00000000 | 00000000 | <u>85000118</u> | <u>12FBB000</u> |

Check Zones

- Are eight bytes long
- First eight bytes are known as the leading check zone
- Last eight bytes are known as the trailing check zone
- Byte 0-3 indicates the task subpool name
 - f* C00 = CICS above the line storage (ECDSA)
 - f* M00 = CICS below the line storage (CDSA)
 - f* U00 = USER above the line storage (EUDSA)
 - f* B00 = USER below the line storage (UDSA)
- Bytes 4-7 indicates the owning task number
- There are no chain pointers as Storage Manager is aware of all task storage and their lengths via Storage Element Descriptors (SCE) and Free Storage Descriptors (SCF).
- Comparison of the leading and trailing check zone is done, at freemain time, to detect possible overlay

Storage Violation Analysis

CICS24.00005 00046000 CICS storage below 16MB

```
0000 D4F0F0F0 F0F0F0F5 00B46EC4 C6C8C5C9 *M0000005..>DFHEI*
0010 E4E24040 40404040 00000000 00000000 *US          .....*
0020 00000000 00000000 00000000 00000000 *.....*
0030 -    004F LINES SAME AS ABOVE
0050 000460D0 00000000 00000000 00000000 *..-}.....*
0060 00000000 00000000 00000000 00000000 *.....*
0070 -    009F LINES SAME AS ABOVE
00A0 00000000 00000000 00000000 00046050 *.....-&*
00B0 00046054 00000000 00000000 00000000 *..-.....*
00C0 00656EC4 C6C8C1D7 6DC4C6C8 C5C9C25C *..>DFHAP_DFHEIB**
00D0 0000000C 0106080F C3E2E2E8 0000005C *.....CSSY...**
00E0 00000000 00000000 00000000 00000000 *.....*
00F0 00000000 00000000 00000000 00000000 *.....*
0100 00000040 40404040 40404000 00000000 *...          .....*
0110 00000000 00000000 00000000 00000000 *.....*
0120 -    045F LINES SAME AS ABOVE
0460 00000000 00000000 D4F0F0F0 F0F0F0F5 *.....M0000005*
```

SCEs and SCFs

SCE.M0000005 11FD0290 Storage Element Descriptor

```
0000 11FD3610 11FD3610 00046000 00000470 *.....-.....*
0010 11F09040 00000000 *.0. .... *
```

SCF.M0000005 11FD0278 Free Storage Descriptor

```
0000 11FD3620 11FD3620 00046470 00000B90 *.....*
0010 11F09040 00000000 *.0. .... *
```

Third word contains the location of the storage.

Fourth word contains the length of the storage.

Output created via VERBX DFHPD410 `SM`



Storage Violation Analysis ...

- Message produced:

- f* DFHSM0102 IYNXH A storage violation (code X'0F0C') has been detected by module DFHSMAR.

- From the Messages and Codes manual:

- f* Explanation: A storage violation has been detected by module modname. The code X'code' is the exception trace point ID which uniquely identifies the type of storage violation.

- System Action:

- An exception entry (X'code' in the message) is made in the trace table.
 - Use the exception trace point ID, X'code', to investigate the cause of the storage violation. A description of the exception trace point ID, and the data it contains, is in the CICS Trace Entries manual.
 - A system dump is taken, unless you have specifically suppressed dumps in the dump table.
 - CICS continues unless you have specified in the dump table that CICS should terminate.

Storage manager domain trace points

Excerpt from CICS Trace Entries manual:

| Point ID | Module | Lvl | Type | Data |
|------------|---------|-----|----------------------------------|---|
| SM 0F0A | DFHSMAR | Exc | Insufficient storage for SCQs | 1 SMAR parameter list |
| SM 0F0B | DFHSMAR | Exc | Insufficient storage for SMXs | 1 SMAR parameter list |
| SM 0F0C | DFHSMAR | Exc | Storage check failure | 1 SMAR parameter list 2 Address of storage element 3 Length of storage element 4 First 512 bytes (max) of storage element 5 Last 512 bytes (max) of storage element 6 Data preceding storage element (1K max) 7 Data following storage element (1K max) |

DFHSM0102 Abbreviated Trace

Output via: VERBX DFHPD410 `TR=1`

| | | | | | | | |
|-------|----|---------|------|-------|--|--|----------|
| 00515 | QR | AP 05A8 | APRC | ENTRY | PERFORM_COMMIT | NO, FORWARD, 00000001 | =003685= |
| 00515 | QR | AP 05A9 | APRC | EXIT | PERFORM_COMMIT/OK | NO | =003686= |
| 00515 | QR | RM FA12 | RMUO | EXIT | COMMIT_UOW/OK | | =003687= |
| 00515 | QR | KE 0201 | KEDD | ENTRY | INQUIRE_ANCHOR | 0000002C | =003688= |
| 00515 | QR | KE 0202 | KEDD | EXIT | INQUIRE_ANCHOR/OK | 12075000 | =003689= |
| 00515 | QR | DP 0900 | DPXM | ENTRY | RELEASE_XM_CLIENT | | =003690= |
| 00515 | QR | DP 0901 | DPXM | EXIT | RELEASE_XM_CLIENT/OK | | =003691= |
| 00515 | QR | AP 0590 | APXM | ENTRY | RELEASE_XM_CLIENT | NORMAL | =003692= |
| XM | QR | AP 0591 | APXM | EXIT | RELEASE_XM_CLIENT/OK | | =003693= |
| XM | QR | US 0401 | USXM | ENTRY | END_TRANSACTION | | =003694= |
| XM | QR | XS 0401 | XSDM | ENTRY | END_TRANSACTION | | =003695= |
| XM | QR | XS 0402 | XSDM | EXIT | END_TRANSACTION/OK | | =003696= |
| XM | QR | US 0402 | USXM | EXIT | END_TRANSACTION/OK | | =003697= |
| XM | QR | PG 0801 | PGXM | ENTRY | TERMINATE_TRANSACTION | | =003698= |
| XM | QR | PG 0802 | PGXM | EXIT | TERMINATE_TRANSACTION/OK | | =003699= |
| XM | QR | SM 0F01 | SMAR | ENTRY | RELEASE_TRANSACTION_STG | | =003700= |
| XM | QR | XM 1001 | XMIQ | ENTRY | SET_TRANSACTION | INCREMENT | =003701= |
| XM | QR | XM 1002 | XMIQ | EXIT | SET_TRANSACTION/OK | | =003702= |
| XM | QR | AP 1700 | TFIQ | ENTRY | SET_TERMINAL_FACILITY | YES | =003703= |
| XM | QR | AP 1701 | TFIQ | EXIT | SET_TERMINAL_FACILITY/OK | | =003704= |
| XM | QR | SM 0F0C | SMAR | *EXC* | Storage_check_failed_at_address 001007D0 | | |
| | | | | | RELEASE_TRANSACTION_STG | | =003705= |
| XM | QR | ME 0301 | MEME | ENTRY | SEND_MESSAGE | 66, SM0102, 11C32D16, 00000002, 00000008SM | =003706= |
| XM | QR | KE 0101 | KETI | ENTRY | INQ_LOCAL_DATETIME_DECIMAL | | =003707= |
| XM | QR | KE 0102 | KETI | EXIT | INQ_LOCAL_DATETIME_DECIMAL/OK | | =003708= |

DFHSM0102 Full Trace

Output via: VERBX DFHPD410 `TR=2`

SM 0F0C SMAR *EXC* - Storage_check_failed_at_address - 001007D0

FUNCTION(RELEASE_TRANSACTION_STG)

TASK-XM KE_NUM-0049 TCB-QR /008CCE88 RET-91C40B8E TIME-15:31:20.60 INTERVAL-0.0000011 =003705=

```
1-00 00280000 000000D1 00000000 00000000 B0000000 00000000 02000100 00000000*.....J.....*
   20 00000000 00000000                                     *.....*
2-00 001007D0                                             *...}      *
3-00 000003D0                                             *...}      *
4-00 C2F0F0F0 F0F5F1F5 00000000 00000000 00000000 00000000 00000000 00000000 *B0000515.....*
   20 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
   40 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
   60 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
   80 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
   A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
   C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
   E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
  100 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
  120 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
  140 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
  160 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
  180 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
 1A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
 1C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
 1E0 00000000 00000000                                     *.....*
```

DFHSM0102 Full Trace

```
5-00 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
    20 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
    40 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
        . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *.....*
160 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
180 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
1A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
1C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00400020 *.....*
1E0 000400C8 00C800C8                                     *...H.H.H*
6-00 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
    20 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
    40 00000000 00000000 00000000 0010005C 00000000 500C10DC 0008211C 001007C4 *.....*...&..D*
    60 001004F0 12BF5838 00C1028 12BF4F70 12446F0F 12447F0E 12448F0D 12449F0C *...0..|.?."...*
    80 00100B94 1244BF0A 001000D0 008B8000 00100488 00000000 C2F0F0F0 F0F5F1F5 *.m.}.h.B0000515*
    A0 C2F0F0F0 F0F5F1F5 0008034E 00000000 00000000 00000000 00000000 0010005C *B0000515.+....**
        . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *.....*
360 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
380 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
3A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
3C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
3E0 00000000 00000000 00000000 00000000 00000000 03BC0000 C2F0F0F0 F0F5F1F5 *.....B0000515*
7-00 0C02C000 0800008C 00120800 00080000 20400E08 00000000 00000000 00000000 *..{.....*
    20 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
        . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *.....*
100 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
120 00000000 00000000 00000000 00000000 00000000 00000000 00000000 C2F0F0F0 F0F0F4F3 *.....B0000043*
140 C2F0F0F0 F0F0F4F3 000802E0 00000000 00100478 00100488 00000000 00100488 *B0000043..\h.h*
        . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . *.....*
3A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
3C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
3E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
```

Storage Manager View

SCA.B0000515 31471458 Subpool Control Area

```
0000 C2F0F0F0 F0F5F1F5 314713A4 11FD3B60 08010200 00000000 00000000 00000000 *B0000515.u..-.*
0020 00000000 00000000 00000000 00000000 00000004 00000000 00000002 00000000 *.....*
0040 00000000 00000000 00000000 00000000 11FD0BF0 11FD0C98 00100470 00000000 *.....0..q.....*
0060 11F9B368 11F9B308 7FFFFFFF 7FFFFFFF 00000000 11DF4470 314714D0 314714D0 *.9..9."..."}.}*
0080 00000000 00000000 FFFFFFFF0 00100201 01020000 00000000 00001000 00000840 *.....0.. *
00A0 00000000 00001000 11FEB228 00000000 00000000 *..... *
```

SCE.B0000515 11FD0BF0 Storage Element Descriptor

```
0000 11FD0C98 314714A8 001007D0 000003D0 11FD1A88 00000000 *..q..y..}... *
```

SCE.B0000515 11FD0C98 Storage Element Descriptor

```
0000 314714A8 11FD0BF0 00100000 00000470 11FD1A88 00000000 *..y...0..h.... *
```

SCF.B0000515 11F9B368 Free Storage Descriptor

```
0000 11F9B308 314714B8 00100470 00000360 11FD1A88 00000000 *.9....-..h... *
```

SCF.B0000515 11F9B308 Free Storage Descriptor

```
0000 314714B8 11F9B368 00100BA0 00000460 11FD1A88 00000000 *...9...-...h.. *
```

Output via: VERBX DFHPD410 `SM`

Storage Browse

```
00100470 C2F0F0F0 F0F5F1F5 0008034E 00000000 | B0000515...+....|
00100480 00000000 00000000 00000000 0010005C | .....*|
00100490 00000000 500C10DC 00000000 001007C4 | ...&.....D|
001004A0 001004F0 12BF5838 000C1028 12BF4F70 | ...0.....|.|
001004B0 12446F0F 12447F0E 12448F0D 12449F0C | ..?..."......|
001004C0 00100B94 1244BF0A 001000D0 008B8000 | ...m.....}....|
001004D0 00000000 00000000 00000000 00100488 | .....h|
001004E0 008B8000 001000D0 00000000 00000000 | .....}.....|
001004F0 800C184C 001005F8 801007C4 00000000 | ...<...8...D....|
00100500.:1005EF. LENGTH(X'F0')--All bytes contain X'00' |
001005F0 00000000 00000000 001007D8 00000000 | .....Q....|
00100600.:1007BF. LENGTH(X'01C0')--All bytes contain X'00' |
001007C0 00000000 03BC0000 C2F0F0F0 F0F5F1F5 | .....B0000515|
001007D0 C2F0F0F0 F0F5F1F5 00000000 00000000 | B0000515.....|
001007E0.:100B8F. LENGTH(X'03B0')--All bytes contain X'00' |
00100B90 00000000 00400020 000400C8 00C800C8 | .....H.H.H|
00100BA0 0C02C000 0800008C 00120800 00080000 | ..{.....|
00100BB0 20400E08 00000000 00000000 00000000 | .....|
00100BC0.:100CCF. LENGTH(X'0110')--All bytes contain X'00' |
00100CD0 00000000 00000000 C2F0F0F0 F0F0F4F3 | .....B0000043|
```

00100470 = Free storage x'360' long (SCF)

00100BA0 = Free storage x'460' long (SCF)

001007D0 = Allocated storage x'3D0' long (SCE)

Loader Domain

PGM |
USER

COPY NO.

RPL IBMR:

1 1 RDSA

RPL READ

1 0 SDSA

Output via: VE

Storage Browse of READUPDT Program

```
000C1000 C4C6C8E8 C1F6F4F0 58F0021C 58F0F0D0 | DFHYA640.0...00} |
000C1010 58F0F014 58F0F00C 58FF000C 07FF5CC6 | .00..00.....*F |
000C1020 C9D3D3C9 D55C0000 47F0F028 23D9C5C1 | ILLIN*...00..REA |
000C1030 C4E4D7C4 E34DE45D 40F0F461 F0F461F0 | DUPDT(U) 04/04/0 |
000C1040 F640F1F6 4BF2F940 C5E2C1F6 F4F04040 | 6 16.29 ESA640 |
000C1050 90ECD00C 183F4510 3036033E 000058F0 | ..}.....0 |
000C1060 37C805EF 50D01004 18F1BF1F D0184780 | .H..&}...1..}... |
000C1070 3050D207 F05C1000 18DF58B0 D05CD201 | .&K.0*.....}*K. |
```

Note: To calculate a proper offset into the module, you must account for the length of the Exec Interface stub. The entry point is offset x'28' because this is the branch instruction that will branch to the STM instruction (offset x'50') upon entry to the module.

FINDINGS

- Task 515 was terminating when storage violation was determined
- AP 0F0C trace entry indicates:
 - f* Violated storage is located at address 001007D0
 - f* Violated storage is x'3D0' bytes long
 - f* Trailing Check Zone is overlaid with value of 000400C8 00C800C8
 - Violation was at least x'8' bytes long
 - Unable to determine if violation affected more storage as the following storage was never allocated
- Program READUPDT getmained this storage
- Program READUPDT most likely wrote past his allocated storage
 - f* When / Where / Why

Command Protection

- **If you ask, CICS will overlay storage for you**

- f EXEC CICS READ INTO(a CICS storage area)*

- Corrupted CICS control blocks

- f EXEC CICS READ SET(another transaction's area)*

- Corrupted data, program or control blocks

- f EXEC CICS RECEIVE INTO(0)*

- Could crash CICS

- **CMDPROT={YES | NO }**

- f Checks first byte of referenced target fields*

- f ABEND AEYD if incorrect area is referenced*

Storage Violation Tools

■ Messages

f DFHSM0102/DFHSM0103

DFHSM0102 *applid* A storage violation (code x'*code*') has been detected in module *name*
'*CODE*' is the exception trace point that identifies the type of violation

f DFHSR0622

DFHSR0622 *applid* An attempt to {*overwrite|access*} the *dsaname* has caused the
abend

f which follows

f DFHSR0618

DFHSR0618 *applid* An illegal macro call or reference to the CSA or TCA has caused the
f abend which follows

f DFHAP0001/DFHSR0001 produced for program checks;
may be an indication of storage overlays

Storage Violation Tools

- SM0102/SM0103 dumps
- Trace
 - f* SM 0Cxx, SM 0Dxx, SM 0Exx, SM 0Fxx
 - f* SM 09xx - storage checker
 - f* Use a BIG trace
- CSFE DEBUG
 - f* CHKSTSK=CURRENT|ALL
 - Validates SCZs for task storage
 - ALL** option is gone in CICS TS 1.3
 - f* CHKSTRM=ALL
 - Validates SAAs
 - f* Produces SM0103 dump
- DFHTRAP

Storage Violation Trap (CSFE)

- Built in storage violation trap
- Runs each time an old style AP trace entry is written (has old style Field A and Field B)
 - f* Ensure level 1 trace is turned on for all components and level 1-2 for the EI component
 - Ensure Monitoring package is not suppressing EI trace entries
- Checks all storage areas on the transaction storage chain for the currently running task
- Produces a DFHSM0103 dump and turns itself off when a violation is detected
 - f* Will catch the violation within a window much closer to when the violation actually occurs
 - f* If window is still too large, consider adding additional user trace points to the application using EXEC CICS ENTER TRACENUM commands
- Turned ON/OFF via:
 - f* SIT parameter CHKSTSK
 - f* CHKSTSK=CURRENT
 - f* CHKSTSK=NONE
- Manually as a transaction
 - f* CSFE DEBUG,CHKSTSK=CURRENT
 - f* CSFE DEBUG,CHKSTSK=NONE

DFHSM0103 Debugging

- Message produced:

f DFHSM0103 IYNXH A storage violation (code X'0932') has been detected by the storage violation trap. Trap is now inactive.

- From the Messages and Codes manual:

- Explanation: A storage violation has been detected by the storage violation trap, which may be enabled via the CHKSTSK or the CHKSTRM system initialization parameters or via the CSFE transaction. The code X'code' is the exception trace point ID which uniquely identifies the type of storage violation detected.

- System Action: CICS disables the storage violation trap. An exception entry (X'code' in the message) is made in the trace table. A system dump is taken, unless you have specifically suppressed dumps in the dump table.

- CICS continues unless you have specified in the dump table that CICS should terminate.

Storage Violation Summary

■ Use the "Preventative" facilities

f Reentrant Program Protection

- WRITE protects ALL programs linked as RENT
- Independent from other 'preventative' facilities
- NO performance impact

f Storage Protection

- Minimum level of protection between CICS key storage and USER key storage only
- No inter-transaction protection
- No performance impact

f Command Protection

- Stops the overlay before it happens
- Run in test
- .5% overhead

■ Fix problem applications!

f Suppressing the SM0102 dumps doesn't make the problem disappear!

Storage manager domain trace points

| Point ID | Module | Lvl | Type | Data |
|----------|---------|-----|------|--|
| SM 0932 | DFHSMCK | | Exc | Storage zone check failed 1 SMCK parameter list 2 Subpool name 3 Address of storage 4 First 128 bytes of storage element 5 Last 16 bytes of storage element |

DFHSM0103 Full Trace

AP 1940 APLI ENTRY - FUNCTION(START_PROGRAM) PROGRAM(READUPDT) CEDF_STATUS(CEDF)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-9229C972 TIME-17:19:29 INTERVAL-0.0000046 =004694=

SM 0C01 SMMG ENTRY - FUNCTION(GETMAIN) GET_LENGTH(34E) SUSPEND(YES) INITIAL_IMAGE(00)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-80085E44 TIME-17:19:29 INTERVAL-0.0000065 =004695=

SM 0C02 SMMG EXIT - FUNCTION(GETMAIN) RESPONSE(OK) ADDRESS(00100478)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-80085E44 TIME-17:19:29 INTERVAL-0.0000016 =004696=

AP 00E1 EIP ENTRY GETMAIN REQ(0004) FIELD-A(00100488 ...h) FIELD-B(08000C02)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-500C10A2 TIME-17:19:29 INTERVAL-0.0000020 =004697=

SM 0901 SMCK ENTRY - FUNCTION(CHECK_STORAGE) TASK_STORAGE(CURRENT_TASK) TP_STORAGE(NO)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-80083BB6 TIME-17:19:29 INTERVAL-0.0000014 =004698=

SM 0902 SMCK EXIT - FUNCTION(CHECK_STORAGE) RESPONSE(OK)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-80083BB6 TIME-17:19:29 INTERVAL-0.0000013 =004699=

AP E160 EXEC ENTRY GETMAIN SET(AT X'001005F8') LENGTH(956 AT X'801007C4') ASM
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-8008245C TIME-17:19:29 INTERVAL-0.0000044 =004700=

SM 0C01 SMMG ENTRY - FUNCTION(GETMAIN) GET_LENGTH(3BC) SUSPEND(YES) STORAGE_CLASS(USER24)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-928B4CBC TIME-17:19:29 INTERVAL-0.0000052 =004701=

DFHSM0103 Full Trace (cont....)

SM 0C02 SMMG EXIT - FUNCTION(GETMAIN) RESPONSE(OK) ADDRESS(001007D8)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-928B4CBC TIME-17:19:29 INTERVAL-0.00000082 =004702=

AP E161 EXEC EXIT GETMAIN SET(X'001007D8' AT X'001005F8') LENGTH(956 AT X'801007C4') RESP(0)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-80083A5C TIME-17:19:29 INTERVAL-0.00000023 =004703=

AP 00E1 EIP EXIT GETMAIN OK REQ(00F4) FIELD-A(00000000) FIELD-B(00000C02)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-500C10A2 TIME-17:19:29 INTERVAL-0.00000067 =004704=

SM 0901 SMCK ENTRY - FUNCTION(CHECK_STORAGE) TASK_STORAGE(CURRENT_TASK) TP_STORAGE(NO)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-80083BB6 TIME-17:19:29 INTERVAL-0.00000035 =004705=

SM 0902 SMCK EXIT - FUNCTION(CHECK_STORAGE) RESPONSE(OK)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-80083BB6 TIME-17:19:29 INTERVAL-0.00000075 =004706=

AP 00E1 EIP ENTRY SUSPEND REQ(0004) FIELD-A(00100488 ...h) FIELD-B(08001208)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-500C10C6 TIME-17:19:29 INTERVAL-0.00000073 =004707=

SM 0901 SMCK ENTRY - FUNCTION(CHECK_STORAGE) TASK_STORAGE(CURRENT_TASK) TP_STORAGE(NO)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-80083BB6 TIME-17:19:29 INTERVAL-0.00000035 =004708=

DFHSM0103 Full Trace (cont....)

XM 1001 XMIQ ENTRY - FUNCTION(SET_TRANSACTION) STORAGE_VIOLATIONS(INCREMENT)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-91CECD68 TIME-17:19:29 INTERVAL-0.0000016 =004709=

XM 1002 XMIQ EXIT - FUNCTION(SET_TRANSACTION) RESPONSE(OK)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-91CECD68 TIME-17:19:29 INTERVAL-0.0000011 =004710=

AP 1700 TFIQ ENTRY - FUNCTION(SET_TERMINAL_FACILITY) TERMINAL_TOKEN(12C4C4D0)
COUNT_STORAGE_VIOLATION(YES)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-91CECDE6 TIME-17:19:29 INTERVAL-0.0000019 =004711=

AP 1701 TFIQ EXIT - FUNCTION(SET_TERMINAL_FACILITY) RESPONSE(OK)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-91CECDE6 TIME-17:19:29 INTERVAL-0.0000019 =004712=

SM 0932 SMCK *EXC* -Zone_check_failed-FUNCTION(CHECK_STORAGE) TASK_STORAGE(CURRENT_TASK) TP_STOR

TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-80083BB6 TIME-17:19:29 INTERVAL-0.00000034 =004713=
1-00 00200000 00000010 00000000 00000000 BC000000 00000000 01000100 0201C621 *.....F*
2-00 C2F0F0F0 F0F1F0F8 *B0000108 *
3-00 001007D0 *...} *
4-00 C2F0F0F0 F0F1F0F8 00000000 00000000 00000000 00000000 00000000 00000000 *B0000108.....*
20 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
40 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
60 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
5-00 00000000 00400020 000400C8 00C800C8 *..H.H.H *

NOTE: The SM 0932 trace point does not offer the length of the violated storage.
Storage Manager must be used to determine the length.

Storage Manager

SCA.B0000108 314529F8 Subpool Control Area

```
00 C2F0F0F0 F0F1F0F8 31452944 31452AAC 08010200 00000000 00000000 00000000 *B0000108.....*
20 00000000 00000000 00000000 00000000 00000003 00000000 00000000 00000000 *.....*
40 00000000 00000000 00000000 00000000 11FD1D58 11FD1A70 00000000 00000000 *.....*
60 11FD1B90 11FD1B90 7FFFFFFF 7FFFFFFF 00000000 11DF4470 31452A70 31452A70 *.....".....".....*
80 00000000 00000000 FFFFFFFF 00100201 01020000 00000000 00001000 00000BA0 *.....0.....*
A0 00000000 00001000 11FF225C 00000000 00000000 *.....* * *
```

SCE.B0000108 11FD1D58 Storage Element Descriptor

```
0000 11FD1518 31452A48 001007D0 000003D0 11FD2160 00000000 *.....}...}...- *
```

SCE.B0000108 11FD1518 Storage Element Descriptor

```
0000 11FD1A70 11FD1D58 00100470 00000360 11FD2160 00000000 *.....-...- *
```

SCE.B0000108 11FD1A70 Storage Element Descriptor

```
0000 31452A48 11FD1518 00100000 00000470 11FD2160 00000000 *.....- *
```

SCF.B0000108 11FD1B90 Free Storage Descriptor

```
0000 31452A58 31452A58 00100BA0 00000460 11FD2160 00000000 *...-...-... *
```

Output via: VERBX DFHPD410 'SM'

Storage Browse

```
001007D0 C2F0F0F0 F0F1F0F8 00000000 00000000 | B0000108..... |
001007E0.:100B8F. LENGTH(X'03B0')--All bytes contain X'00'
00100B90 00000000 00400020 000400C8 00C800C8 | .....H.H.H |
00100BA0 0C02C000 0800008C 00120800 00080000 | ..{..... |
00100BB0 20400E08 00000000 00000000 00000000 | . ..... |
00100BC0.:100FFF. LENGTH(X'0440')--All bytes contain X'00'
00101000 C2F0F0F0 F0F0F5F8 00B46EC4 C6C8C5C9 | B0000058..>DFHEI |
```

001007D0 addresses the violated storage (trailing check zone is overlaid)

00100BA0 addresses an SCF

Violation Caught !!!!

AP 00E1 EIP EXIT GETMAIN OK REQ(00F4) FIELD-A(00000000) FIELD-B(00000C02)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-500C10A2 TIME-17:19:29 INTERVAL-0.00000067 =004704=

SM 0901 SMCK ENTRY - FUNCTION(CHECK_STORAGE) TASK_STORAGE(CURRENT_TASK) TP_STORAGE(NO)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-80083BB6 TIME-17:19:29 INTERVAL-0.00000035 =004705=

SM 0902 SMCK EXIT - FUNCTION(CHECK_STORAGE) RESPONSE(OK)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-80083BB6 TIME-17:19:29 INTERVAL-0.00000075 =004706=

AP 00E1 EIP ENTRY SUSPEND REQ(0004) FIELD-A(00100488 ...h) FIELD-B(08001208)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-500C10C6 TIME-17:19:29 INTERVAL-0.00000073 =004707=

SM 0901 SMCK ENTRY - FUNCTION(CHECK_STORAGE) TASK_STORAGE(CURRENT_TASK) TP_STORAGE(NO)
TASK-00108 KE_NUM-0048 TCB-QR/008CCE88 RET-80083BB6 TIME-17:19:29 INTERVAL-0.00000035 =004708=

The window, of the violation being detected, is between the exit of the getmain request and the entry to the suspend request. The code running between this window is responsible for the violation. Make note of the two RET addresses for calculation of offset into responsible program.

Loader Domain

PROGRAM STORAGE MAP

| PGM NAME | ENTRY PT | CSECT | LOAD PT. | REL. | PTF LVL. | LAST COMPILED | COPY NO. | USERS | LOCN | TYP |
|----------|----------|----------|----------|------|----------|---------------|----------|-------|------|-----|
| IBMRSAP | 800ABA20 | -noheda- | 000ABA20 | | | | 1 | 1 | RDSA | RPL |
| READUPDT | 000C1000 | DFHYA410 | 000C1000 | 410 | | | 1 | 0 | SDSA | RPL |
| DFHSIP | 11C554B8 | DFHCICS | 11C00000 | 0410 | HCI4100 | I 02/03 08.21 | 1 | 0 | ERGN | ANY |

Output via: VERBX DFHPD410 'LD=1

READUPDT Program

```
000056 D201 D33C 3804 0033C 00804 904 MVC THELEN,=X'03BC'
905 * EXEC CICS GETMAIN LENGTH(THELEN) SET(9)
906 DFHECALL =X'0C02C0000800008C00',
(PTR4__RF,9),(FB_2,THELEN)
907+*****

00005C 908+ DS 0H
00005C 4110 D068 00068 909+ LA 1,DFHEIPL
000060 41E0 3812 00812 910+ LA 14,=X'0C02C0000800008C00'
000064 41F0 D170 00170 911+ LA 15,DFHEITP1
000068 4100 D33C 0033C 912+ LA 0,THELEN
00006C 90E0 1000 00000 913+ STM 14,0,0(1)
000070 9680 1008 00008 914+ OI 8(1),X'80' LAST ARGUMENT
000074 58F0 37CC 007CC 915+ L 15,=V(DFHEI1)
000078 05EF 916+ BALR 14,15 INVOKE EXEC INTERFACE
00007A 5890 D170 00170 917+ L 9,DFHEITP1
918+*****

00007E 4199 03BC 003BC 919 LA 9,X'3BC'(9)
000082 D21F 9000 3806 00000 00806 920 MVC 0(32,9),=X'0040'
921 * EXEC CICS SUSPEND
922 DFHECALL =X'120800000800002040'
923+*****

000088 924+ DS 0H
000088 4110 D068 00068 925+ LA 1,DFHEIPL
00008C 41E0 381B 0081B 926+ LA 14,=X'120800000800002040'
000090 50E0 1000 00000 927+ ST 14,0(,1)
000094 9680 1000 00000 928+ OI 0(1),X'80' LAST ARGUMENT
000098 58F0 37CC 007CC 929+ L 15,=V(DFHEI1)
00009C 05EF 930+ BALR 14,15 INVOKE EXEC INTERFACE
00009E 935+ DS 0H 0
```

READUPDT Program

| | | |
|-------------------------|------|------------------------------------|
| 000806 0040 | 3433 | =X'0040' |
| 000808 0020 | 3434 | =X'0020' |
| 00080A 0004 | 3435 | =X'0004' |
| 00080C 00C8 | 3436 | =X'00C8' |
| 00080E 00C8 | 3437 | =Y(L'REC) |
| 000810 00C8 | 3438 | =Y(L'RECB) |
| 000812 0C02C0000800008C | 3439 | =X'0C02C0000800008C00' |
| 00081B 1208000008000020 | 3440 | =X'120800000800002040' |
| 000824 0E08000008000010 | 3441 | =X'0E0800000800001000' |
| 00082D 1004800008000020 | 3442 | =X'100480000800002000' |
| 000836 0402C00008000000 | 3443 | =X'0402C0000800000014000040000000' |
| 000845 0602FA0008000084 | 3444 | =X'0602FA000800008400' |
| 00084E 0606E20008000040 | 3445 | =X'0606E2000800004000' |
| 000857 0E0E800008000020 | 3446 | =X'0E0E80000800002002' |
| 000860 020C0000088000 | 3447 | =X'020C0000088000' |

Storage Browse

```
001007D0 C2F0F0F0 F0F1F0F8 00000000 00000000 | B0000108..... |
001007E0.:100B8F. LENGTH(X'03B0')--All bytes contain X'00'
00100B90 00000000 00400020 000400C8 00C800C8 | .....H.H.H |
00100BA0 0C02C000 0800008C 00120800 00080000 | ..{..... |
00100BB0 20400E08 00000000 00000000 00000000 | ..... |
00100BC0.:100FFF. LENGTH(X'0440')--All bytes contain X'00'
00101000 C2F0F0F0 F0F0F5F8 00B46EC4 C6C8C5C9 | B0000058..>DFHEI |
```

We now know the violation actually started at location 00100B94 and carried on into the following (free) piece of storage located at 00100BA0.

AP Domain within DFHSM0103 Dump

USER24.00108 001007D0 USER storage below 16MB

```
000 C2F0F0F0 F0F1F0F8 00000000 00000000 00000000 00000000 00000000 00000000 *B0000108.....*
020 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
040 - 03BF LINES SAME AS ABOVE
3C0 00000000 00400020 000400C8 00C800C8 *..... ..H.H.H *
```

** DFHPD0125 Storage violation detected at 001007D0. Trailing SAA is invalid.

USER24.00108 00100470 USER storage below 16MB

```
000 C2F0F0F0 F0F1F0F8 0008034E 00000000 00000000 00000000 00000000 0010005C *B0000108...+.....*
020 00000000 500C10C6 00000000 001007C4 001004F0 12BEF838 000C1028 12BEEF70 *...&..F...D..0.8.*
```

Note: The AP domain is useful within a DFHSM0103 dump because the violation was caught during normal execution of the application and not at task termination time.

Output via: VERBX DFHPD410 'AP=3'

WARNING THIS FORMAT WILL TAKE SOME TIME TO COMPLETE AND THE OUTPUT IS LARGE

Findings / Solution

■ Findings

- f* Program READUPDT was responsible for the violation
- f* Violation was caught between an EXEC CICS Getmain command issued at offset x'78' and an EXEC CICS SUSPEND command issued at offset x'9C'
- f* Inspection of program READUPDT:
 - Shows register 9 originally pointed to the getmained storage but was incremented by x'3BC' just prior to a MVC instruction to move x'20' bytes. This move instruction was the cause of the violation.

■ Possible Solutions

- f* If you truly want to move data into this getmained storage:
 - Adjust the increment of register 9 to a value that falls within the getmained storage, allowing for x'20' bytes to be moved.
- If the move was not meant to be:
 - f* Remove the MVC instruction or
 - f* Possibly remove both the LA and MVC instructions

CICS dump formatter

```
* $$ JOB JNM=DMPACD1,DISP=D,PRI=8,          C /===/
* $$ NTFY=YES,                               C *===*
* $$ CLASS=0                                 *===*
* $$ LST DISP=H,RBS=1000                     *===*
// JOB DMPACD1 ANALYZE CICS/TS DUMP          *===*
// EXEC PROC=DTRINFOA                        *===*
// EXEC INFOANA,SIZE=INFOANA,OS390          *===*
      SELECT DUMP MANAGEMENT                 *===*
      DUMP NAME SYSDUMP.BG.DBG00002         *===*
      RETURN                                 *===*
      SELECT DUMP VIEWING                    *===*
      CALL DFHPD410 DATA AP=0,KE=3,DS=1,TR=2,LD=3 *===*
RETURN                                       *===*
      DUMP NAME SYSDUMP.BG.DBG00002         *===*
      RETURN                                 *===*
      SELECT END                             *===*
/*                                           *===*
/&                                           *===*
* $$ EOJ                                     *===*
```