Tuesday, October 27, 2026, 3:30 PM, Lear Room

Ex Post Facto OpenVMS DEBUG

2026 OpenVMS Bootcamp
Portsmouth Sheraton
Portsmouth, New Hampshire USA

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Agenda –

- Debugging does not stop with release
- Our phrasing changes: remediation, troubleshooting
- Problem remains the same
- Evidence preservation

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References

- VSI OpenVMS System Management Manual
- VSI OpenVMS Debugger Manual
- VSI OpenVMS System Service Reference Manual: A–GETUAI
- VSI OpenVMS System Service Reference Manual: GETUTC–Z
- VSI OpenVMS DCL Dictionary: N–Z
- VSI OpenVMS RTL Library (LIB$) Manual

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Introduction

```
%SYSTEM-F-ACCVIO, access violation, reason mask=04, virtual address=000000000000
0000, PC=0000000080000033, PS=0000001B
%TRACE-F-TRACEBACK, symbolic stack dump follows
image     module    routine              line      rel PC           abs PC
ACCVIO  ACCVIO  main                     659 0000000000000033 0000000080000033
ACCVIO  ACCVIO  __main                   655 00000000000000E9 00000000800000E9
                                           0 FFFF83000694FCC6 FFFF83000694FCC6

DCL                                        0 0000000080045134 000000007AE0B134
%TRACE-I-END, end of TRACE stack dump
```


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Immediate Actions and Alternatives

- Traditional action: STOP /PROCESS/ID=xx
- IMHO Better First Step: SET PROCESS/DUMP=NOW/ID=xx
- Use ANALYZE/PROCESS to examine DUMP file
- Compiling with /DEBUG
- Result: Less guessing at 0300L

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Production Hang/Customer Call

- Traditional answer: Stop the process; sometimes reboot
- Disruptive; Evidence of failure uncollected
- Struggle to reproduce problem
- If only we knew what had happened
- Akin to scrubbing a crime scene with bleach

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More thoughtful approach: Preserve Evidence

- Some problems have obvious causes
- Other problems are subtle
- Storage is inexpensive
- Preserve evidence – take a dump

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Taking an application process dump

- SET PROCESS/DUMP[=NOW]/ID=xx
- Works on Alpha, IA64, x-86-64
  (Bug in 9.2-3)
- Generates .DMP file in default directory
- Analyze with ANALYZE/PROCESS_DUMP

```
$ set process/dump=now/id=9f
$ sho sys/sub
OpenVMS V8.4-2L1  on node ODYSS2    1-OCT-2026 00:08:22.50   Uptime  0 00:09:40
  Pid    Process Name    State  Pri      I/O       CPU       Page flts  Pages
0000009F GEZELTER_50674  COM      4       71   0 00:00:59.55       185    287
S
$ dir *.dmp

Directory SYS$SYSDEVICE:[GEZELTER.BOOTCAMP]

SPINNER.DMP;1

Total of 1 file.
```


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ANALYZE/PROCESS_DUMP

- Limited access to DEBUG commands
- EXAMINE
- NO code execution
- Can examine stack and local/global variables
- DMP file can be exported, viewed on same CPU architecture

```
$ analyze/process_dump spinner

         OpenVMS Alpha Debug64 Version V8.4-002


%SDA-W-EXCLDATA, data excluded from dump due to insufficient privilege
%SYSTEM-F-IMGDMP, dynamic image dump signal at PC=00000000000200EC, PS=00000018
break on unhandled exception preceding SPINNER\main\%LINE 17289
 17289:                 }
DBG> examine Record
SPINNER\main\Record
    Value1:     100
    Name:       "ABCD."
    Pointer:    65560
DBG>
```


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Example: SPINNER.C

```
#include <starlet>
#include <ssdef>
#include <string>

int main(){
        long Result;

        struct {
                long Value1;
                char Name[4];
                char *Pointer;
                } Record;

        Record.Value1 = 100;
        memcpy(&Record.Name[0], "ABCD", 4);
        Record.Pointer = "ABCDEFGHI";
        while (1) {
                // Result = sys$hiber();
                }

        return SS$_NORMAL;
        }
```


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Run and Generate DUMP

- Force: SET PROCESS/DUMP=NOW/ID=xx
- No privilege needed
- .DMP file appears in default directory

```
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$ sho sys/sub
OpenVMS V8.4-2L1  on node ODYSS2    1-OCT-2026 00:08:22.50   Uptime  0 00:09:40
  Pid    Process Name    State  Pri      I/O       CPU       Page flts  Pages
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Summary

- Significant information retrievable from failures
- User-level Process Dumps
- Triggering Bug Checks
- Invalidity traps

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Questions?

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Session Notes & Materials:
http://www.rlgsc.com/openvms-bootcamp/2026/index.html

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