New issue

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Global Buffer overflow in gettoken at Main.c (Ver 1.91) #75

Closed **Halcy0nic** opened this issue on Oct 15 · 12 comments

Halcy0nic commented on Oct 15

Hi **@sasagawa888**,

I pulled down the most recent version of nprolog (Ver 1.91) and ran it through my fuzz tests. It looks like there is a global buffer overflow in gettoken at Main.c when you tell NPL to run a file in script mode.

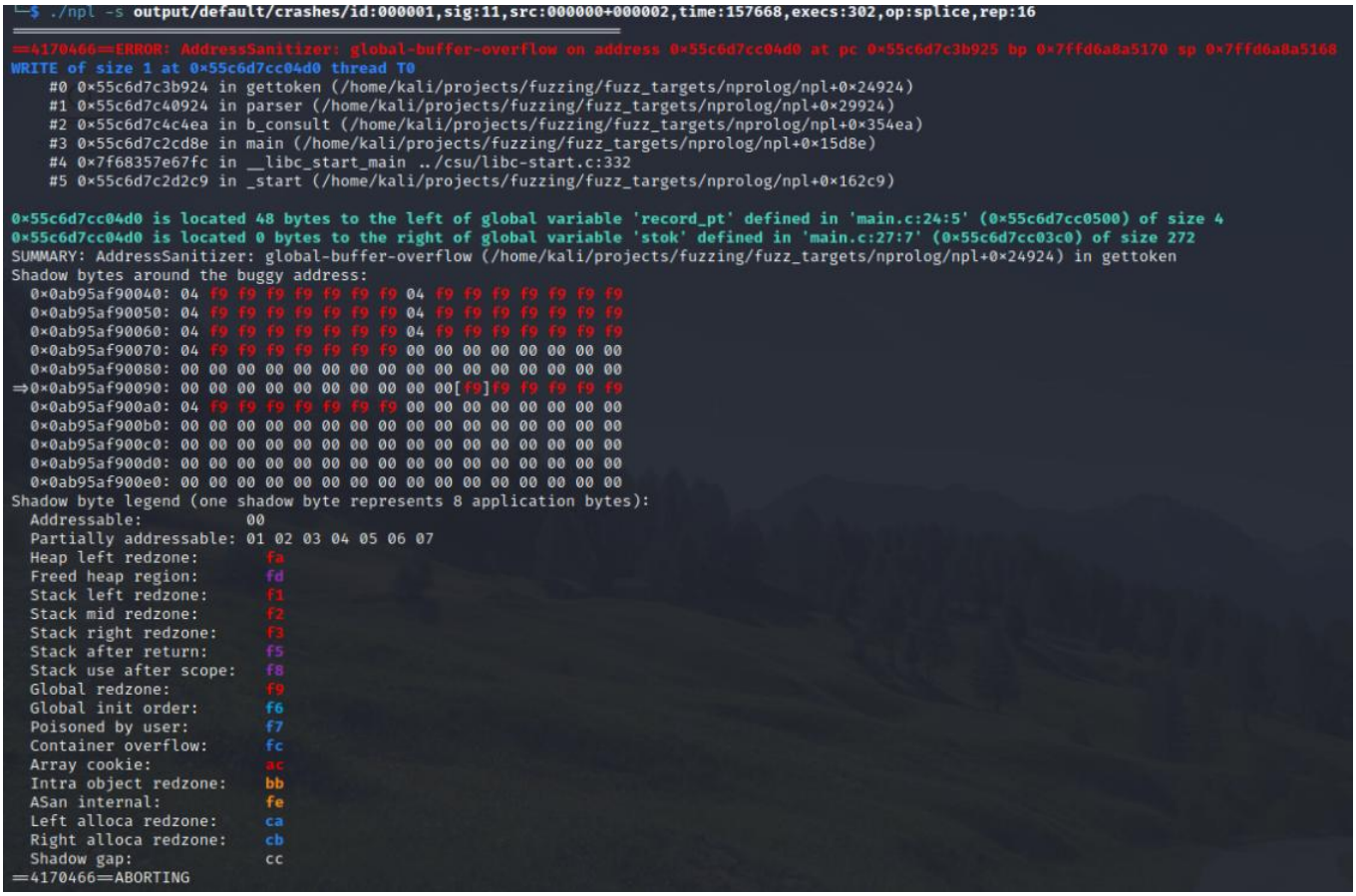
```
└─$ ./npl -s output/default/crashes/id:000001,sig:11,src:000000+000002,time:157668,execs:302,op:splice,rep:16
zsh: segmentation fault  ./npl -s
```

I have attached most of the crash files for reproduction. If you compile the project with AddressSanitizer it can also detect the global overflow:

Makefile

```
CC   = gcc
LIBS = -lm -ldl -fsanitize=address


LIBSRASPI = -lm -ldl -lwiringPi -fsanitize=address
INCS =
CFLAGS = $(INCS) -Wall -O3 -fsanitize=address
DEST = /usr/local/bin
```

Running NPL in script mode



crash.zip

sasagawa888 commented 10 days ago — Owner

Sorry for the late reply. I missed it. I will consider

sasagawa888 commented 10 days ago — Owner

I changed the game called lights-out included in hiroi.pl for script mode and tried it. It worked fine. My environment is Linux-MINT. Which Prolog file did you run? please tell me in detail.

```
 npl -s tests/hiroi.pl

11000
11011
00111
01110
01101

10110
01110
11100
11011
00011
```

```
01101
01110
00111
11011
11000

00011
11011
11100
01110
10110
sasagawa@sasagawa-Diginnos-PC:~/nprolog$
```

Halcy0nic commented 10 days ago • edited — Author

Hi there! In the original message I attached a file for reproduction (named crash.zip). If you unzip this file you will find a script to run using NPL. After running this file in script mode, NPL will segfault. Compiling the project with address sanitizer (above) and running the attached NPL script will indicate where the global buffer overflow takes place.

I tested this on Ubuntu 18, 20, 16.04, and Debian. All 64 bit operating systems

sasagawa888 commented 8 days ago — Owner

Thank you for your reply. I will try.

sasagawa888 commented 8 days ago — Owner

Hi HalcOnic.

I downloaded crash.zip and unzipped it. However, the contents could not be read. Could you please send the data again?

Halcy0nic commented 8 days ago • edited — Author

Hi **@sasagawa888**!

I just pulled down the file again and it seems like it is working correctly. If you unzip the file it should have a folder named report and another folder named vuln underneath it. The contents of the script may not be human readable (meaning the bytes of the file have been modified) but can still be executed by running the following:

```
npl -s [any file in the vuln directory]
```

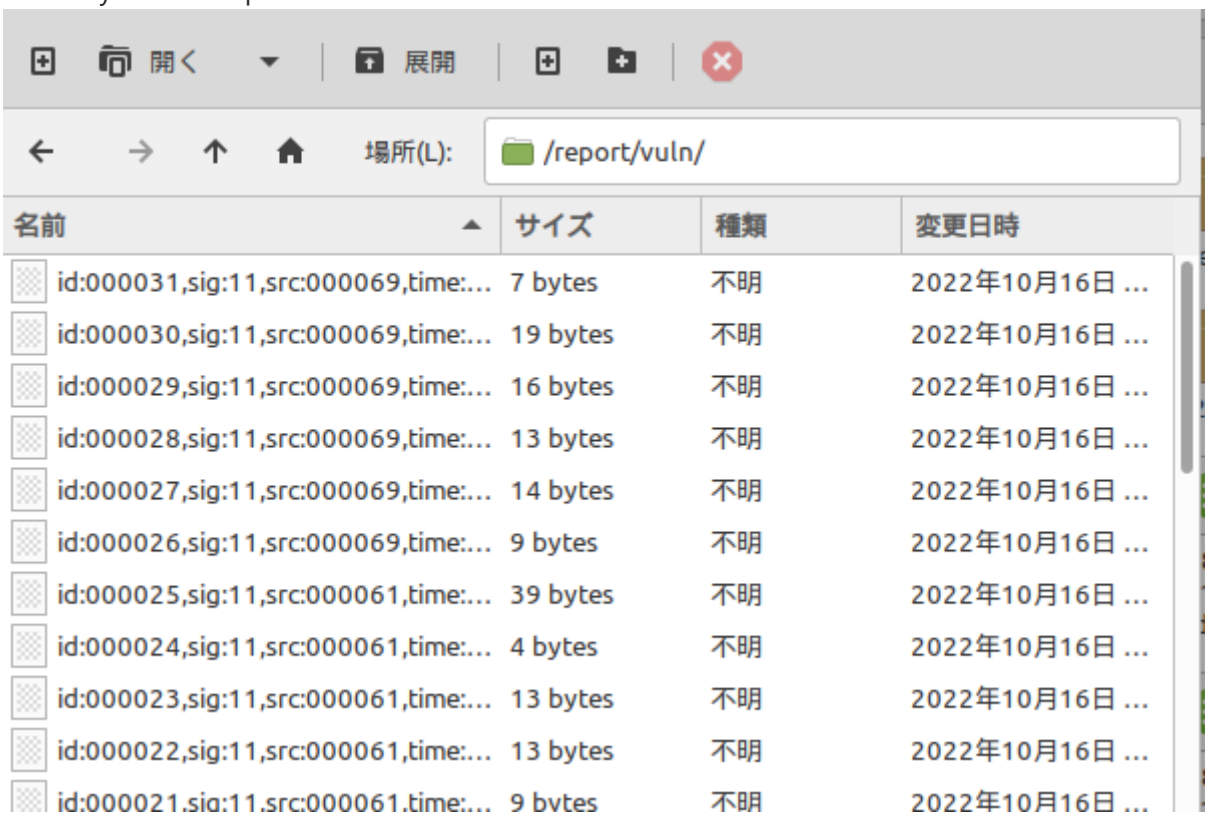
Some of the output isn't human readable, because it was generated by the fuzzer I am using (AFL), and the file bytes have been modified.

Are you able to see all of the files that start with the pattern id:000... in the report/vuln directory?

If not I will upload another sample.

sasagawa888 commented 8 days ago — Owner

When I unzipped the zip file, it looked like this: Cannot read inside the file. File name is also unknown. Do you have any other samples?



Halcy0nic commented 8 days ago — Author

@sasagawa888

Here are a few new examples. If you unzip the '**testcases.zip**' file:

testcases.zip

You will see a folder named '**testcases**' with the following contents inside:

- test1.pl

- test2.pl
- test3.pl

Viewing and executing test1.pl without AddressSanitizer

```
└─$ cat testcases/test1.pl
'''
```

```
└─$ ./npl -s ./testcases/test1.pl
zsh: segmentation fault  ./npl -s ./testcases/test1.pl
```

Executing test1.pl with AddressSanitizer

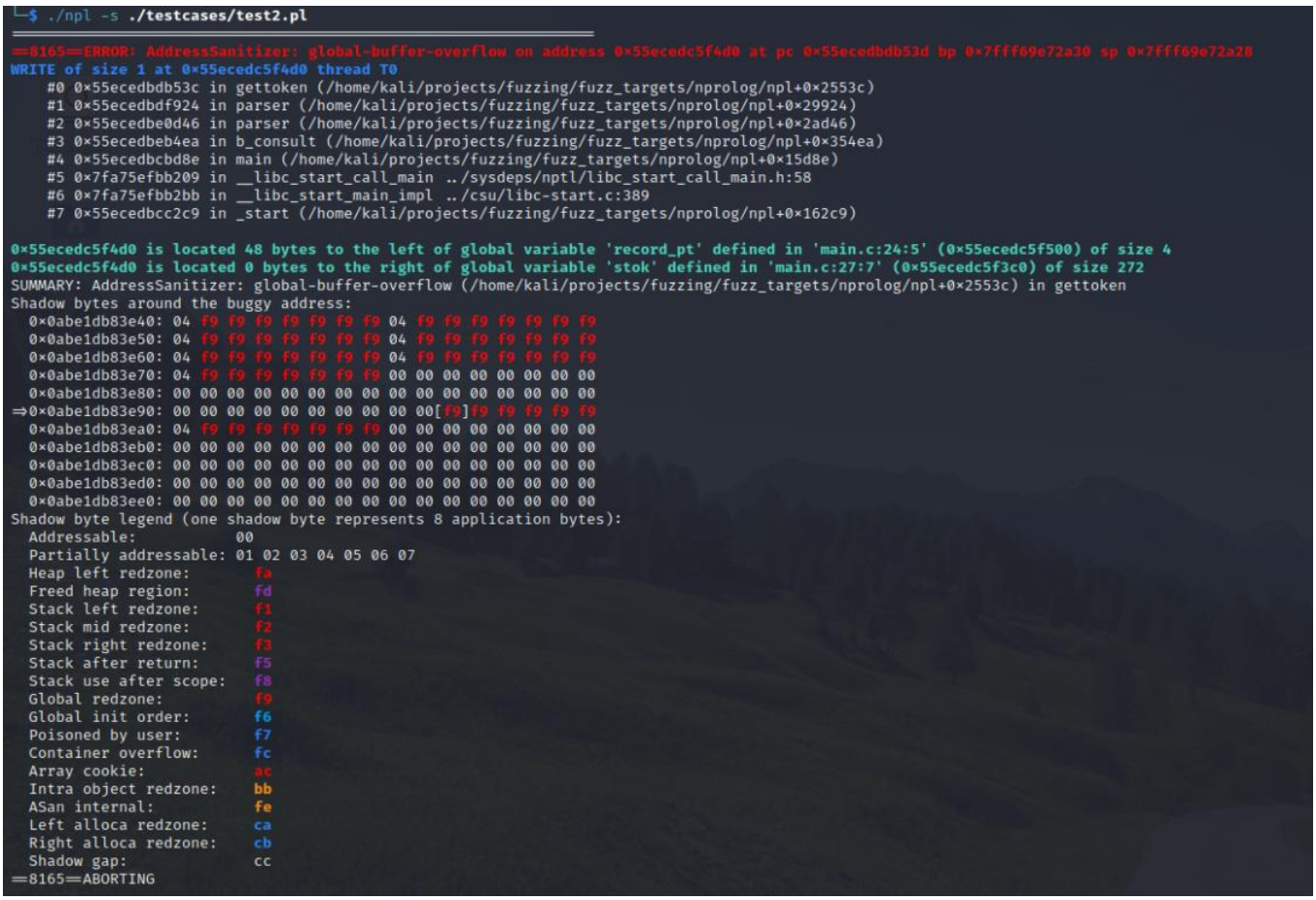
```
=================================================================
==8598==ERROR: AddressSanitizer: global-buffer-overflow on address 0x557313a9c4d0 at pc 0x557313a17925 bp 0x7ffe376e6b40 sp 0x7ffe376e6b38
WRITE of size 1 at 0x557313a9c4d0 thread T0
    #0 0x557313a17924 in gettoken (/home/kali/projects/fuzzing/fuzz_targets/nprolog/npl+0x24924)
    #1 0x557313a1c924 in parser (/home/kali/projects/fuzzing/fuzz_targets/nprolog/npl+0x29924)
    #2 0x557313a284ea in b_consult (/home/kali/projects/fuzzing/fuzz_targets/nprolog/npl+0x354ea)
    #3 0x557313a08d8e in main (/home/kali/projects/fuzzing/fuzz_targets/nprolog/npl+0x15d8e)
    #4 0x7fc6360b2209 in __libc_start_call_main ../sysdeps/nptl/libc_start_call_main.h:58
    #5 0x7fc6360b22bb in __libc_start_main_impl ../csu/libc-start.c:389
    #6 0x557313a092c9 in _start (/home/kali/projects/fuzzing/fuzz_targets/nprolog/npl+0x162c9)

0x557313a9c4d0 is located 48 bytes to the left of global variable 'record_pt' defined in 'main.c:24:5' (0x557313a9c500) of size 4
0x557313a9c4d0 is located 0 bytes to the right of global variable 'stok' defined in 'main.c:27:7' (0x557313a9c3c0) of size 272
SUMMARY: AddressSanitizer: global-buffer-overflow (/home/kali/projects/fuzzing/fuzz_targets/nprolog/npl+0x24924) in gettoken
Shadow bytes around the buggy address:
  0x0aaee274b840: 04 f9 f9 f9 f9 f9 f9 f9 04 f9 f9 f9 f9 f9 f9 f9
  0x0aaee274b850: 04 f9 f9 f9 f9 f9 f9 f9 04 f9 f9 f9 f9 f9 f9 f9
  0x0aaee274b860: 04 f9 f9 f9 f9 f9 f9 f9 04 f9 f9 f9 f9 f9 f9 f9
  0x0aaee274b870: 04 f9 f9 f9 f9 f9 f9 f9 00 00 00 00 00 00 00 00
  0x0aaee274b880: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
=>0x0aaee274b890: 00 00 00 00 00 00 00 00 00 00[f9]f9 f9 f9 f9 f9
  0x0aaee274b8a0: 04 f9 f9 f9 f9 f9 f9 f9 00 00 00 00 00 00 00 00
  0x0aaee274b8b0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x0aaee274b8c0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x0aaee274b8d0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0x0aaee274b8e0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Shadow byte legend (one shadow byte represents 8 application bytes):
  Addressable:           00
  Partially addressable: 01 02 03 04 05 06 07
  Heap left redzone:       fa
  Freed heap region:       fd
  Stack left redzone:      f1
  Stack mid redzone:       f2
  Stack right redzone:     f3
  Stack after return:      f5
  Stack use after scope:   f8
  Global redzone:          f9
  Global init order:       f6
  Poisoned by user:        f7
  Container overflow:      fc
  Array cookie:            ac
  Intra object redzone:    bb
  ASan internal:           fe
  Left alloca redzone:     ca
  Right alloca redzone:    cb
  Shadow gap:              cc
==8598==ABORTING
```

Viewing and executing test2.pl without AddressSanitizer

```
└─$ cat testcases/test2.pl
:-
$1 is N+u is N+u
```

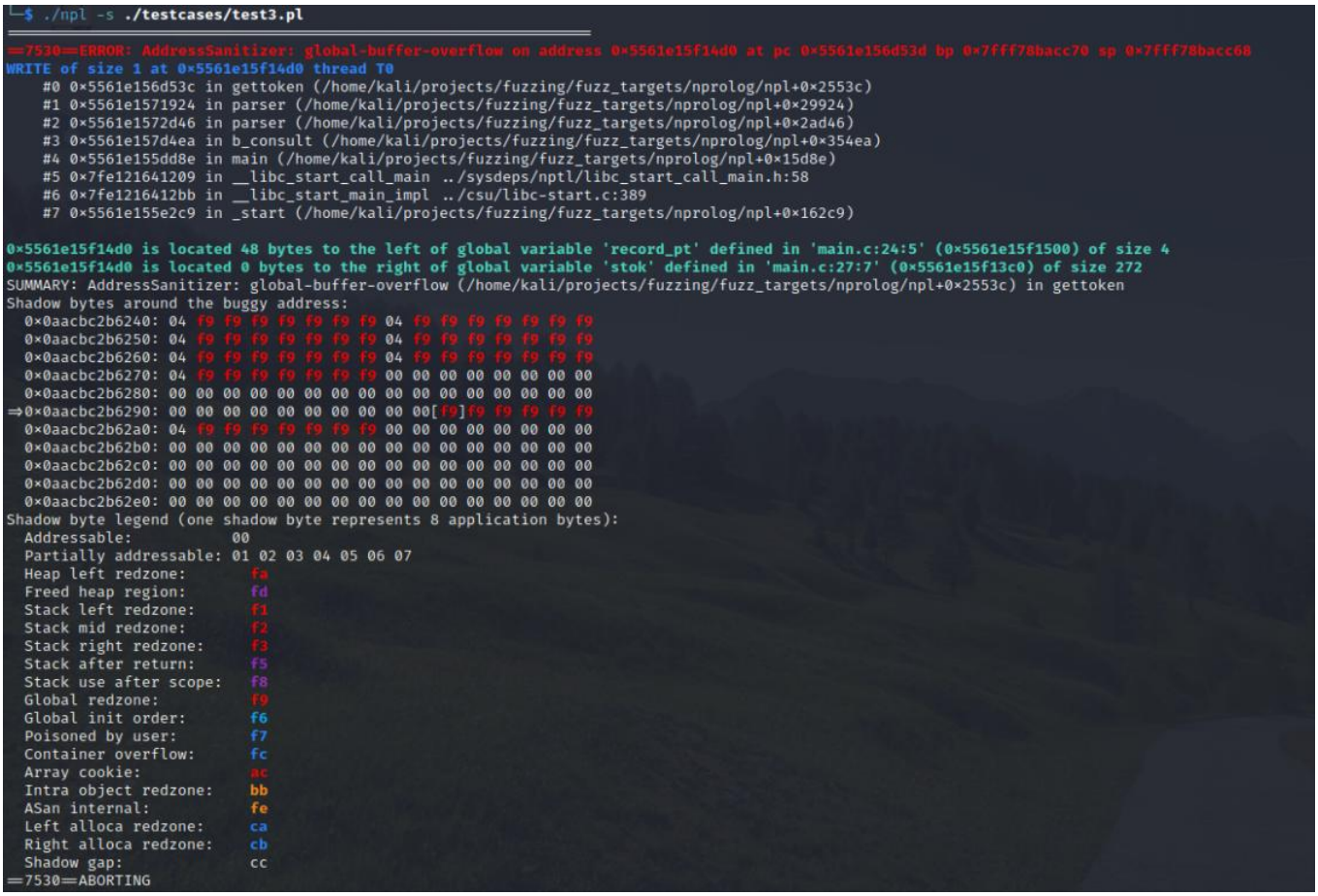
```
└─$ ./npl -s ./testcases/test2.pl
zsh: segmentation fault  ./npl -s ./testcases/test2.pl
```

Executing test2.pl with AddressSanitizer



Viewing and executing test3.pl without AddressSanitizer

Executing test3.pl with AddressSanitizer



sasagawa888 commented 7 days ago — Owner

I tested.
An error occurred in test1.pl.

test2.pl Test3.pl becomes a segmentation fault. The reason is that $ is a symbol representing a string and the terminating $ is not given. I needed to detect file_end and make it an error.

N-Prolog is ARITY-Prolog compatible. Not ISO-Prolog.

```
N-Prolog Ver 1.91
?- X = $abcd$.
X = $abcd$ .
yes
?-

sasagawa@DESKTOP-0D0L6O5:~/nprolog$ cat tests/test1.pl
...
sasagawa@DESKTOP-0D0L6O5:~/nprolog$ npl -s tests/test1.pl
Syntax error expected operator
around here line=1 column=0
?- halt.
Not callable ?-  .halt
?- halt.
- good bye -
```

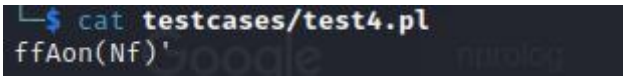
```
sasagawa@DESKTOP-0D0L6O5:~/nprolog$ cat tests/test2.pl
:-
$1 is N+u is N+u.
sasagawa@DESKTOP-0D0L6O5:~/nprolog$ npl -s tests/test2.pl
Segmentation fault (core dumped)
sasagawa@DESKTOP-0D0L6O5:~/nprolog$ cat tests/test3.pl
:-
%1-
$1 :-:-
%.
sasagawa@DESKTOP-0D0L6O5:~/nprolog$ npl -s tests/test3.pl
Segmentation fault (core dumped)
sasagawa@DESKTOP-0D0L6O5:~/nprolog$
```

Halcy0nic commented 7 days ago — Author

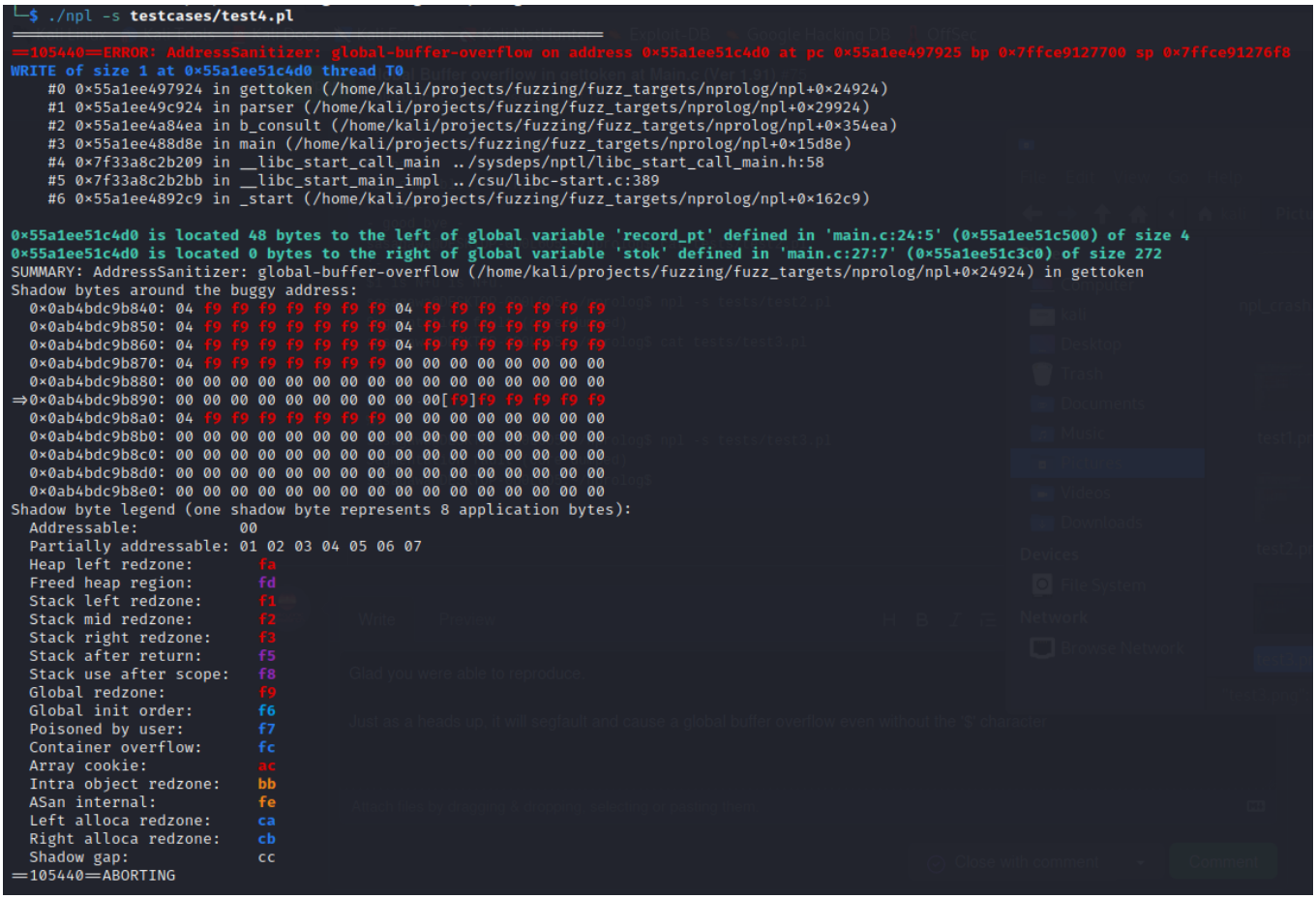
Glad you were able to reproduce.

Just a heads up, it will segfault and cause a global buffer overflow even without the '$' character. Here is an example (attached):

test4.zip



Executing with AddressSanitizer



sasagawa888 commented 7 days ago — Owner

Reproduced. The reason is that I didn't expect the case without the period. Finding file_end should be an error.

```
sasagawa@sasagawa-Diginnos-PC:~/nprolog$ cat tests/test4.pl
ffAon(Nf)'sasagawa@sasagawa-Diginnos-PC:~/nprolog$ npl -s tests/test4.pl
Segmentation fault (core dumped)
sasagawa@sasagawa-Diginnos-PC:~/nprolog$
```

sasagawa888 commented 6 days ago — Owner

I fixed it. Please continue testing.

sasagawa888 closed this as completed 5 days ago

Assignees

No one assigned

Labels

None yet

Projects

None yet

Milestone

No milestone

Development

No branches or pull requests

2 participants