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PICOC Null Pointer Dereference Denial of Service #34

Open Halcy0nic opened this issue on Jun 21 · 1 comment

Halcy0nic commented on Jun 21

PICOC Suffers from a Denial of Service (CWE476) vulnerability as a result of a Null Pointer Dereference. Any project or library that uses Picoc also suffers from this issue. An example of this would be picoc-js (<https://www.npmjs.com/package/picoc-js>). As a result PICOC will immediately segfault.

Reproduction Steps

1. Create a file to be executed by the PICOC interpreter

```
$ touch vulncode
```

2. Add the following code to the file:

```
printf("Before Crash\n");
**4%;
printf("This code won't execute because of the crash\n");
```

3. Execute PICOC against the file:

```
$ ./picoc -s vulncode
```

4. You will receive a segfault and the program will crash. This is a result of a null pointer dereference that is not caught or handled by the interpreter. The vulnerable line of code can be seen below:

```
**4%;
```

Solution

Adding a few if statements that verify the pointer is not NULL before usage will solve this problem. You can find more information about this here:

https://owasp.org/www-community/vulnerabilities/Null_Dereference

Halcy0nic commented on Jul 6

Author

GDB Trace:

```
Starting program: /home/kali/projects/fuzzing/picoc/picoc vuln/crash1
Program received signal SIGSEGV, Segmentation fault.
VariableDereferencePointer (PointerValue=0x62d2b8, DerefVal=0x7fffffff580, DerefOffset=0x7fffffff58c, DerefType=0x7fffffff578, DerefIsLValue=0x7fffffff588) at variable.c:519
519      DerefType = PointerValue->Type->FromType;
LEGEND: STACK | HEAP | CODE | DATA | RWX | RODATA

[ REGISTERS ]
RAX 0x0
RBX 0x0
RCX 0x7fffffff578 ← 0x0
RDX 0x7fffffff58c ← 0x62d2b800000000
RDI 0x62d2b8 ← 0x0
RSI 0x7fffffff580 ← 0x0
R8 0x7fffffff588 ← 0x1
R9 0x0
R10 0xffffffffffff90d
R11 0x20
R12 0x405cf0 (_start) ← xor ebp, ebp
R13 0x0
R14 0x0
R15 0x0
RBP 0x7fffffff540 → 0x7fffffff5a0 → 0x7fffffff620 → 0x7fffffff680 → 0x7fffffff7d0 ← ...
RSP 0x7fffffff540 → 0x7fffffff5a0 → 0x7fffffff620 → 0x7fffffff680 → 0x7fffffff7d0 ← ...
RIP 0x413fa0 (VariableDereferencePointer+56) ← mov rdx, qword ptr [rax + 0x18]

[ DISASM ]
> 0x413fa0 <VariableDereferencePointer+56> mov rdx, qword ptr [rax + 0x18]
0x413fa4 <VariableDereferencePointer+60> mov rax, qword ptr [rbp - 0x20]
0x413fa8 <VariableDereferencePointer+64> mov qword ptr [rax], rdx
0x413fab <VariableDereferencePointer+67> cmp qword ptr [rbp - 0x18], 0
0x413fb0 <VariableDereferencePointer+72> je VariableDereferencePointer+84 <VariableDereferencePointer+84>
↓
0x413fbc <VariableDereferencePointer+84> cmp qword ptr [rbp - 0x28], 0
0x413fc1 <VariableDereferencePointer+89> je VariableDereferencePointer+101 <VariableDereferencePointer+101>
↓
0x413fcd <VariableDereferencePointer+101> mov rax, qword ptr [rbp - 8]
0x413fd1 <VariableDereferencePointer+105> mov rax, qword ptr [rax + 8]
0x413fd5 <VariableDereferencePointer+109> mov rax, qword ptr [rax]
0x413fd8 <VariableDereferencePointer+112> pop rbp
[ SOURCE (CODE) ]
```

Assignees

No one assigned

Labels

None yet

Projects

None yet

Milestone

No milestone

Development

No branches or pull requests

1 participant

