浙江大学

实验报告

课程名称：   嵌入式系统   实验类型：   综合

实验项目名称：   任务 10：浙大校网 VPN

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实验目的和要求

- 了解 Raspberry Pi 中如何对网络进行配置；

- 了解 Raspberry Pi 中如何对 VPN 进行连接。

- 搞定在校网上拨 VPN 出校。

实验器材

硬件：

- Raspberry Pi 板一块；

- 5V/1A 电源一个；

- microUSB 线一根；

- USB-TTL 串口线一根（PL2303 芯片）。

- PC（Windows/Mac OS/Linux）一台；

- 以太网线一根（可能还需要路由器等）

软件：

- PC 上的 USB-TTL 串口线配套的驱动程序；

- PC 上的串口终端软件，如 minicom、picocom、PuTTY 等；

- PC 上的 SSH 软件，如 PuTTY，XShell 等

实验内容和原理

1. 对 Raspberry Pi 上的网卡进行配置；
2. 拨通校网 VPN。

实验过程和数据记录

1. 申请静态 IP

   首先，在 service.chinasinew.com 根据 Raspberry Pi 的 MAC 地址申请一个静态 IP。
2. 配置本机网络

   ``` # sudo nano /etc/network/interfaces ```

   禁用 DHCP，添加之前申请的静态 IP、网关。Reload 网络配置。

sudo /etc/init.d/networking reload

```
pi@raspberrypi:~$ sudo /etc/init.d/networking reload
Reloading network interfaces configuration...RTNETLINK answers: No such process
ifup: interface lo already configured
done.
```

3. 安装 xl2tpd

sudo apt-get install xl2tpd

```
pi@raspberrypi ~ $ sudo apt-get install xl2tpd
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  libpcap0.8 ppp
The following NEW packages will be installed:
  libpcap0.8 ppp xl2tpd
0 upgraded, 3 newly installed, 0 to remove and 0 not upgraded.
Need to get 560 kB of archives.
After this operation, 1,275 kB of additional disk space will be used.
Do you want to continue [Y/n]? y
Get:1 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libpcap0.8 armhf 1.3.0-1 [135 kB]
Get:2 http://mirrordirector.raspbian.org/raspbian/ wheezy/main ppp armhf 2.4.5-5.1+deb7u1 [354 kB]
Get:3 http://mirrordirector.raspbian.org/raspbian/ wheezy/main xl2tpd armhf 1.3.1+dfsg-1 [70.8 kB]
Fetched 560 kB in 2s (199 kB/s)
Selecting previously unselected package libpcap0.8:armhf.
(Reading database ... 81578 files and directories currently installed.)
Unpacking libpcap0.8:armhf (from .../libpcap0.8_1.3.0-1_armhf.deb) ...
Selecting previously unselected package ppp.
Unpacking ppp (from .../ppp_2.4.5-5.1+deb7u1_armhf.deb) ...
update-rc.d: using dependency based boot sequencing
Selecting previously unselected package xl2tpd.
Unpacking xl2tpd (from .../xl2tpd_1.3.1+dfsg-1_armhf.deb) ...
Processing triggers for man-db ...
Setting up libpcap0.8:armhf (1.3.0-1) ...
Setting up ppp (2.4.5-5.1+deb7u1) ...
Setting up xl2tpd (1.3.1+dfsg-1) ...
Starting xl2tpd: xl2tpd.
pi@raspberrypi ~ $
```

4. 下载 VPN 脚本

   使用 98 上已有的 VPN 连接脚本，下载并移动，最后配置自己
   的账号。

```
pi@raspberrypi ~ $ wget http://file.cc98.org/uploadfile/2014/12/22/14165295189.txt -O vpn-zju
--2015-03-27 11:25:13--  http://file.cc98.org/uploadfile/2014/12/22/14165295189.txt
Resolving file.cc98.org (file.cc98.org)... 10.10.98.77
Connecting to file.cc98.org (file.cc98.org)|10.10.98.77|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 6165 (6.0K) [text/plain]
Saving to: `vpn-zju'

100%[===================================================================>] 6,165       --.-K/s   in 0s

2015-03-27 11:25:13 (58.2 MB/s) - `vpn-zju' saved [6165/6165]
```

```
pi@raspberrypi ~ $ sudo mv ./vpn-zju /usr/local/sbin/vpn-zju
pi@raspberrypi ~ $ sudo chmod u+x /usr/local/sbin/vpn-zju
pi@raspberrypi ~ $ vpn-zju -c
[ERR] You must be super user to run this utility!
pi@raspberrypi ~ $ sudo vpn-zju -c
rm: cannot remove `/etc/ppp/options.xl2tpd.zju': No such file or directory
WARNING: If you are connecting to ZJU VPN, you must append your domain name (e.g. @a / @c / @d) after your use
rname.
Username: 3120101836@d
Password:
RTNETLINK answers: File exists
[LOG] unset ppp route done!
[LOG] disconnect done!
```

5. 拨通 VPN

```
pi@raspberrypi:~$ sudo vpn-zju
RTNETLINK answers: File exists
[LOG] unset ppp route done!
[LOG] disconnect done!
[LOG] set static route done!
[LOG] pppd: Using interface ppp0
[LOG] pppd: Connect: ppp0 <--> /dev/pts/0
[LOG] pppd: CHAP authentication failed: E2620: You are already online.
[LOG] pppd: CHAP authentication failed
[LOG] pppd: Connection terminated.
[ERR] pppd: failed!
[ERR] can not start ppp!
pi@raspberrypi:~$ sudo vpn-zju
RTNETLINK answers: File exists
[LOG] unset ppp route done!
[LOG] disconnect done!
RTNETLINK answers: File exists
[LOG] set static route done!
[LOG] pppd: Using interface ppp0
[LOG] pppd: Connect: ppp0 <--> /dev/pts/0
[LOG] pppd: CHAP authentication succeeded
[LOG] pppd: CHAP authentication succeeded
[LOG] pppd: not replacing existing default route via 222.205.47.1
[LOG] pppd: Cannot determine ethernet address for proxy ARP
[LOG] pppd: local IP address 222.205.41.75
[LOG] pppd: remote IP address 10.5.6.2
[LOG] pppd: succeed!
RTNETLINK answers: File exists
CIDR_IPV4_CN.txt not exist!
[LOG] set ppp route done!
[LOG] connect done!
pi@raspberrypi:~$ ping www.baidu.com
PING www.a.shifen.com (115.239.210.27) 56(84) bytes of data.
64 bytes from 115.239.210.27: icmp_req=1 ttl=54 time=15.6 ms
64 bytes from 115.239.210.27: icmp_req=2 ttl=54 time=12.4 ms
64 bytes from 115.239.210.27: icmp_req=3 ttl=54 time=13.8 ms
64 bytes from 115.239.210.27: icmp_req=4 ttl=54 time=12.2 ms
64 bytes from 115.239.210.27: icmp_req=5 ttl=54 time=15.4 ms
64 bytes from 115.239.210.27: icmp_req=6 ttl=54 time=12.1 ms
64 bytes from 115.239.210.27: icmp_req=7 ttl=54 time=12.1 ms
```

实验结果分析

VPN 成功拨通，实验成功。