

浙江大学实验报告

姓名：沈赞 学号：3120101845 专业：计算机科学与技术
课程：嵌入式系统 项目：任务 10 浙大校网 VPN 日期：2015/3/29

一．实验目的：

1. 了解Acadia或RPi或WRTnode中如何对网络进行配置；
2. 了解Acadia或RPi或WRTnode中如何对VPN进行连接。

二．实验器材

硬件

1. Acadia或RPi或WRTnode板一块；
2. 5V/1A电源一个；
3. microUSB线一根；
4. USB-TTL串口线一根（FT232RL芯片或PL2303芯片）。

以下为自备（可选）器材：

- PC（Windows/Mac OS/Linux）一台；
- 声卡一个；
- 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 等。

三．实验步骤

1. 设置 Mac 地址

在/etc/rc.local 中加入

```
sudo ifconfig eth0 down hw ether 00:1C:42:C2:A5:BC
sudo ifconfig eth0 up
sudo /etc/init.d/networking restart &
sudo zjuvpn
```

之后 reboot 后可以看到 Mac 地址已经修改

```
COM3 - PuTTY
# rc.local
#
# This script is executed at the end of each multiuser runlevel.
# Make sure that the script will "exit 0" on success or any other
# value on error.
#
# In order to enable or disable this script just change the execution
# bits.
#
# By default this script does nothing.

# Print the IP address
_IP=$(hostname -I) || true
if [ "$_IP" ]; then
    printf "My IP address is %s\n" "$_IP"
fi
sudo ifconfig eth0 down

sudo ifconfig eth0 hw ether A0:48:1C:C2:D4:2B
sudo ifconfig eth0 up
sudo /etc/init.d/networking restart &
sudo zjuvpn
exit 0
```

2. 设置静态 IP 地址

在/etc/network/interfaces 中注释 iface eth0 inet dhcp

添加 iface eth0 inet static

address 10.110.39.237

gateway 10.110.39.1

netmask 255.255.255.0

network 10.110.39.0

broadcast 10.110.39.255

```
auto lo

iface lo inet loopback
iface eth0 inet static
#address 10.214.149.22
#gateway 10.214.149.1
#netmask 255.255.255.0
#network 10.214.149.0
#broadcast 10.214.149.255
address 10.110.39.237
gateway 10.110.39.1
netmask 255.255.255.0
network 10.110.39.0
broadcast 10.110.39.255
#auto wlan0
```

然后先执行

```
sudo /etc/init.d/networking stop
sudo /etc/init.d/networking start
sudo ifup eth0
```

之后执行 ifconfig 可以看到 IP 地址已绑定

```
eth0      Link encap:Ethernet  HWaddr a0:48:1c:c2:d4:2b
          inet addr:10.110.39.237  Bcast:10.110.39.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:62868 errors:0 dropped:2848 overruns:0 frame:0
          TX packets:314 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:4287993 (4.0 MiB)  TX bytes:25497 (24.8 KiB)
```

ping 10.10.0.21

```
pi@raspberrypi:~$ ping 10.10.0.21
PING 10.10.0.21 (10.10.0.21) 56(84) bytes of data.
64 bytes from 10.10.0.21: icmp_req=1 ttl=60 time=0.717 ms
64 bytes from 10.10.0.21: icmp_req=2 ttl=60 time=0.664 ms
64 bytes from 10.10.0.21: icmp_req=3 ttl=60 time=0.690 ms
64 bytes from 10.10.0.21: icmp_req=4 ttl=60 time=0.673 ms
64 bytes from 10.10.0.21: icmp_req=5 ttl=60 time=0.681 ms
64 bytes from 10.10.0.21: icmp_req=6 ttl=60 time=0.655 ms
64 bytes from 10.10.0.21: icmp_req=7 ttl=60 time=0.653 ms
64 bytes from 10.10.0.21: icmp_req=8 ttl=60 time=0.672 ms
64 bytes from 10.10.0.21: icmp_req=9 ttl=60 time=0.653 ms
64 bytes from 10.10.0.21: icmp_req=10 ttl=60 time=0.702 ms
64 bytes from 10.10.0.21: icmp_req=11 ttl=60 time=0.689 ms
64 bytes from 10.10.0.21: icmp_req=12 ttl=60 time=0.659 ms
```

3. 下载 libpcap0.8, ppp, xl2tpd, zjuvpn 四个软件包

通过 scp 在终端传给树莓派

```
scp /Users/yunshen/libpcap0.8_1.3.0-1_armhf.deb
pi@10.110.39.237:/home/pi/file_upload
sudo scp /Users/yunshen/ppp_2.4.5-5.1_armhf.deb
pi@10.110.39.237:/home/pi/file_upload
sudo scp /Users/yunshen/xl2tpd_1.3.1\ dfsg-1_armhf.deb
pi@10.110.39.237:/home/pi/file_upload
sudo scp /Users/yunshen/zjuvp-8.2.tar.gz
pi@10.110.39.237:/home/pi/file_upload
```

在树莓派中执行以下过程

```
COM3 - PuTTY
pi@raspberrypi:~/file_upload$ sudo dpkg -i libpcap0.8_1.3.0-1_armhf.deb
(Reading database ... 77091 files and directories currently installed.)
Preparing to replace libpcap0.8:armhf 1.3.0-1 (using libpcap0.8_1.3.0-1_armhf.de
b) ...
Unpacking replacement libpcap0.8:armhf ...
Setting up libpcap0.8:armhf (1.3.0-1) ...
Processing triggers for man-db ...
pi@raspberrypi:~/file_upload$ sudo dpkg -i ppp_2.4.5-5.1_armhf.deb
(Reading database ... 77091 files and directories currently installed.)
Preparing to replace ppp 2.4.5-5.1 (using ppp_2.4.5-5.1_armhf.deb) ...
Unpacking replacement ppp ...
Setting up ppp (2.4.5-5.1) ...
Processing triggers for man-db ...
pi@raspberrypi:~/file_upload$ sudo dpkg -i xl2tpd_1.3.1\ dfsg-1_armhf.deb
(Reading database ... 77091 files and directories currently installed.)
Preparing to replace xl2tpd 1.3.1+dfsg-1 (using xl2tpd_1.3.1 dfsg-1_armhf.deb) .
..
Stopping xl2tpd: xl2tpd.
Unpacking replacement xl2tpd ...
Setting up xl2tpd (1.3.1+dfsg-1) ...
Starting xl2tpd: xl2tpd.
Processing triggers for man-db ...
```

然后输入 `sudo zjuvpn -c`

```
COM3 - PuTTY
Processing triggers for man-db ...
pi@raspberrypi:~/file_upload$ sudo tar -zxvf zjuvpn-8.2.tar.gz
usr/
usr/share/
usr/share/zjuvpn/
usr/share/zjuvpn/xl2tpd.conf-example
usr/share/zjuvpn/options
usr/sbin/
usr/sbin/zjuvpn
pi@raspberrypi:~/file_upload$ sudo zjuvpn -c
Configure L2TP VPN for ZJU.
Username: 3120101845
Password:
[MSG] Disconnecting VPN ... Done!
[MSG] Restarting l2tpd...
Restarting xl2tpd: xl2tpd.
[MSG] Done!
[MSG] Trying to bring up vpn... 67 secs... Done!
[MSG] Detected gateway: 10.110.39.1, PPP device: ppp0 .
[MSG] Setting up route table... Done!
pi@raspberrypi:~/file_upload$ ping www.baidu.com
PING www.a.shifen.com (115.239.211.112) 56(84) bytes of data.
64 bytes from 115.239.211.112: icmp_req=1 ttl=54 time=5.60 ms
64 bytes from 115.239.211.112: icmp_req=2 ttl=54 time=4.44 ms
```

再 ping www.baidu.com 成功!