

一、ROS 配置

1.修改 ~/.bashrc 文件，添加

```
export ROS_IP=IP
export ROS_MASTER_URL=http://IP:11311
source /opt/ros/kinetic/setup.bash
source (ros_workspace)/devel/setup.bash
```

修改后执行 source ~/.bashrc。

注：**IP** 替换为 openVPN 虚拟出来的地址。

2.修改 /etc/hosts 文件，添加

IP 远程主机名

例：10.8.0.10 sunwin

注：**IP** 替换为 openVPN 虚拟出来的远程客户端地址。

二、IP 映射

1.

将云台对应网口设置为手动配置，地址配置为同网段下默认网关，地址掩码 255.255.255.0。

例：云台 IP 为 192.168.10.139，云台对应网口就配置为：192.168.10.1 掩码：255.255.255.0
网关：192.168.10.1。

注：云台网段不能与 5G 终端网段一样。

2.

编辑 /etc/sysctl.conf 将 net.ipv4.ip_forward 设置为 1,注意将前面的#去掉。

3.

编辑 /etc/rc.local,添加

```
iptables -t nat -A PREROUTING -s 0/0 -d 10.8.0.6 -p tcp --dport 19000 -j  
DNAT --to 192.168.10.139:8000  
iptables -t nat -A POSTROUTING -d 192.168.10.139 -p tcp --dport 8000 -o  
enp4s0 -j SNAT --to 192.168.10.1
```

蓝色部分为远程访问的地址和端口，**红色**部分为云台的地址和端口，**绿色**为主机上连接云台对应网卡号和地址。上面两行将 10.8.0.6:19000 映射到 192.168.10.139:8000，修改后重启生效。

注：在连接 openVPN 时要先将连接云台的网口关闭，否则会连不上网导致 openVPN 启动失败，openVPN 启动后再将云台网口开启。

4.

使用命令 sudo iptables -t nat --list 查看配置结果。

```
enp4s0: UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:112259 errors:0 dropped:3 overruns:0 frame:0
TX packets:59282 errors:0 dropped:0 overruns:0 frame:0
collisions:0 txqueuelen:1000
RX bytes:166756690 (166.7 MB) TX bytes:4859308 (4.8 MB)
Interrupt:20 Memory:f7f00000-f7f20000

enp4s0
Link encap:Ethernet HWaddr c4:00:ad:25:ce:0d
inet addr:192.168.0.1 Bcast:192.168.0.255 Mask:255.255.255.0
UP BROADCAST MULTICAST MTU:1500 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)
Memory:f7e00000-f7e7ffff

lo
Link encap:Local Loopback
inet addr:127.0.0.1 Mask:255.0.0.0
inet6 addr: ::1/128 Scope:Host
UP LOOPBACK RUNNING MTU:65536 Metric:1
RX packets:172 errors:0 dropped:0 overruns:0 frame:0
TX packets:172 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:12574 (12.5 KB) TX bytes:12574 (12.5 KB)

sunwin@sunwin-UNO-2483G-453AE:~$ gedit /etc/network/interfaces
(gedit:12996): Gtk-WARNING **: Attempting to read the recently used resources file at '/home/sunwin/.local/share/recently-used.xbel', but the par
recently-used.xbel': Permission denied.
sunwin@sunwin-UNO-2483G-453AE:~$ gedit /etc/network/interfaces
sunwin@sunwin-UNO-2483G-453AE:~$ gedit /etc/sysctl.conf
sunwin@sunwin-UNO-2483G-453AE:~$ gedit /etc/rc.local
sunwin@sunwin-UNO-2483G-453AE:~$ sudo iptables -t nat --list
[sudo] password for sunwin:
Chain PREROUTING (policy ACCEPT)
target prot opt source destination
DNAT tcp -- anywhere 192.168.1.125 tcp dpt:19000 to:192.168.0.64:80

Chain INPUT (policy ACCEPT)
target prot opt source destination

Chain OUTPUT (policy ACCEPT)
target prot opt source destination

Chain POSTROUTING (policy ACCEPT)
target prot opt source destination
SNAT tcp -- anywhere 192.168.0.64 tcp dpt:http to:192.168.0.1
sunwin@sunwin-UNO-2483G-453AE:~$
```

三、ROS 驱鸟工程启动

- 1.\$ cd ~/home/sunwin/bmp_ws
- 2.\$ roslaunch src/birdy_config/launch/birdy_run.launch