GNU radio安装与USRP连接

1 GNU radio安装及环境配置

1. VMware安装以及Linux-Ubuntu安装：（Ubuntu源选清华）

参考教程《虚拟机VMware安装ubuntu教程（ubuntu-20.04.1-desktop-amd64.iso）》
https://blog.csdn.net/weixin_45912291/article/details/108901106

2. 安装gnuradio

```
sudo apt install gnuradio
```

3. 安装pip3

```
sudo apt install python3-pip
```

4. 安装pybombs

```
sudo pip3 install pybombs
```

5. 获取安装库

```
pybombs recipes add gr-recipes git+https://github.com/gnuradio/gr-recipes.git
```

```
pybombs recipes add gr-etcetera git+https://github.com/gnuradio/gr-etcetera.git
```

2 USRP连接

1 UHD驱动安装

步骤1：UHD安装

```
sudo apt-get install libuhd-dev uhd-host
```

可以通过以下命令对uhd版本进行更新（若担心新版本会出现不匹配的问题可以不更新）

```
sudo add-apt-repository ppa:ettusresearch/uhd
```

```
sudo apt-get update
```

```
sudo apt-get install libuhd-dev uhd-post
```

步骤2：UHD FPGA安装

`sudo uhd_images_downloader`

步骤3：设置UHD镜像环境变量

使用该命令打开/etc/profile文件：`sudo gedit /etc/profile`

打开后在文件最后面添加语句：`export UHD_IMAGES_DIR=/usr/share/uhd/images`

保存退出，然后在bash中执行`source /etc/profile`命令使其生效，如果没有对全局生效，则重新登陆或者重启系统。

2 USRP连接

USRP-2920

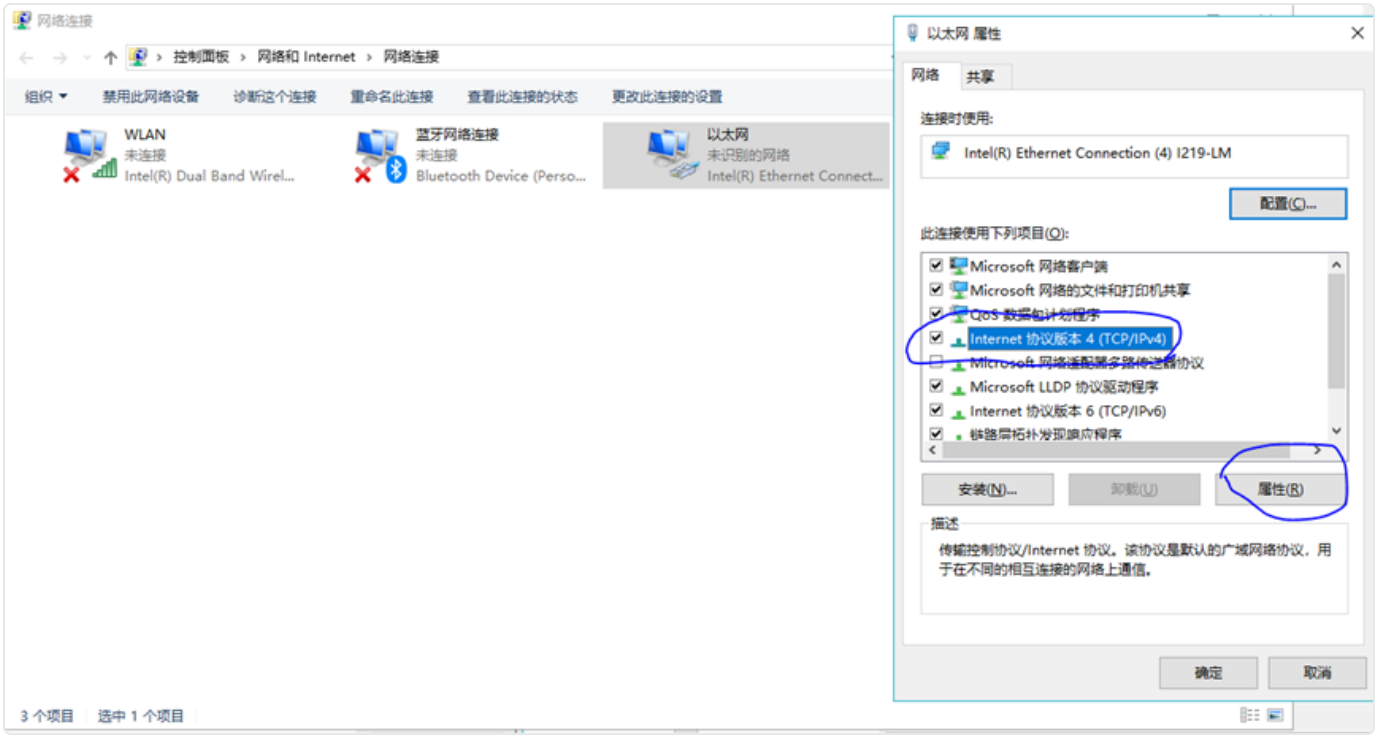
接口类型：网线（需要配置网络地址）

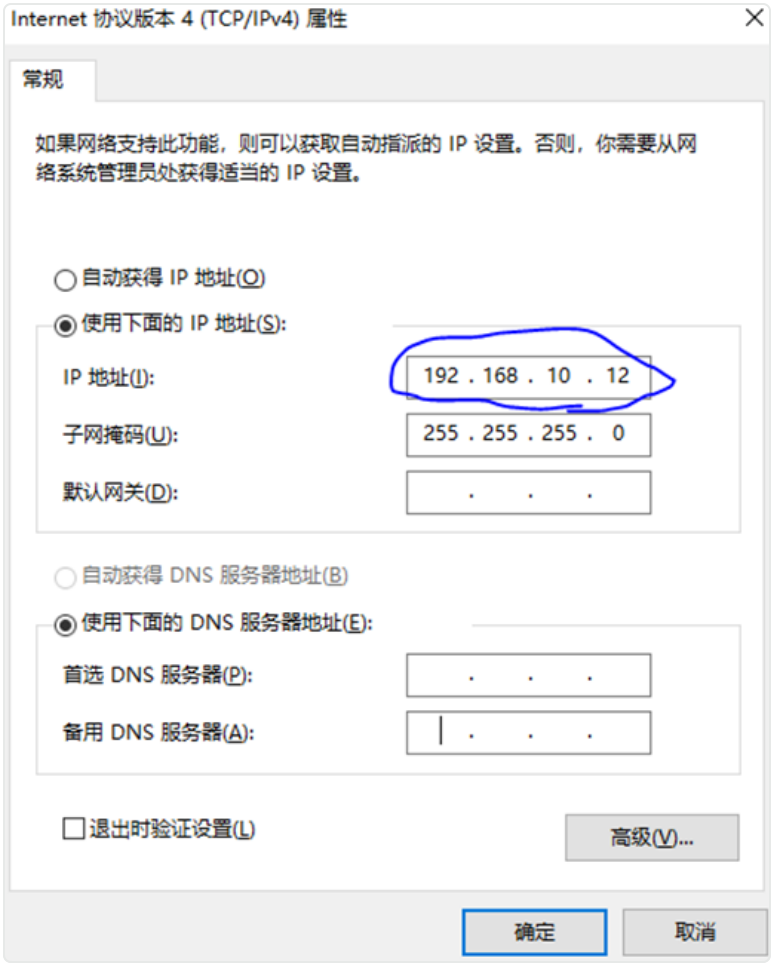
步骤1：设置虚拟机网络连接为桥接模式

若网络连接为灰色不能选择，则需要以管理员身份重新运行vmware。

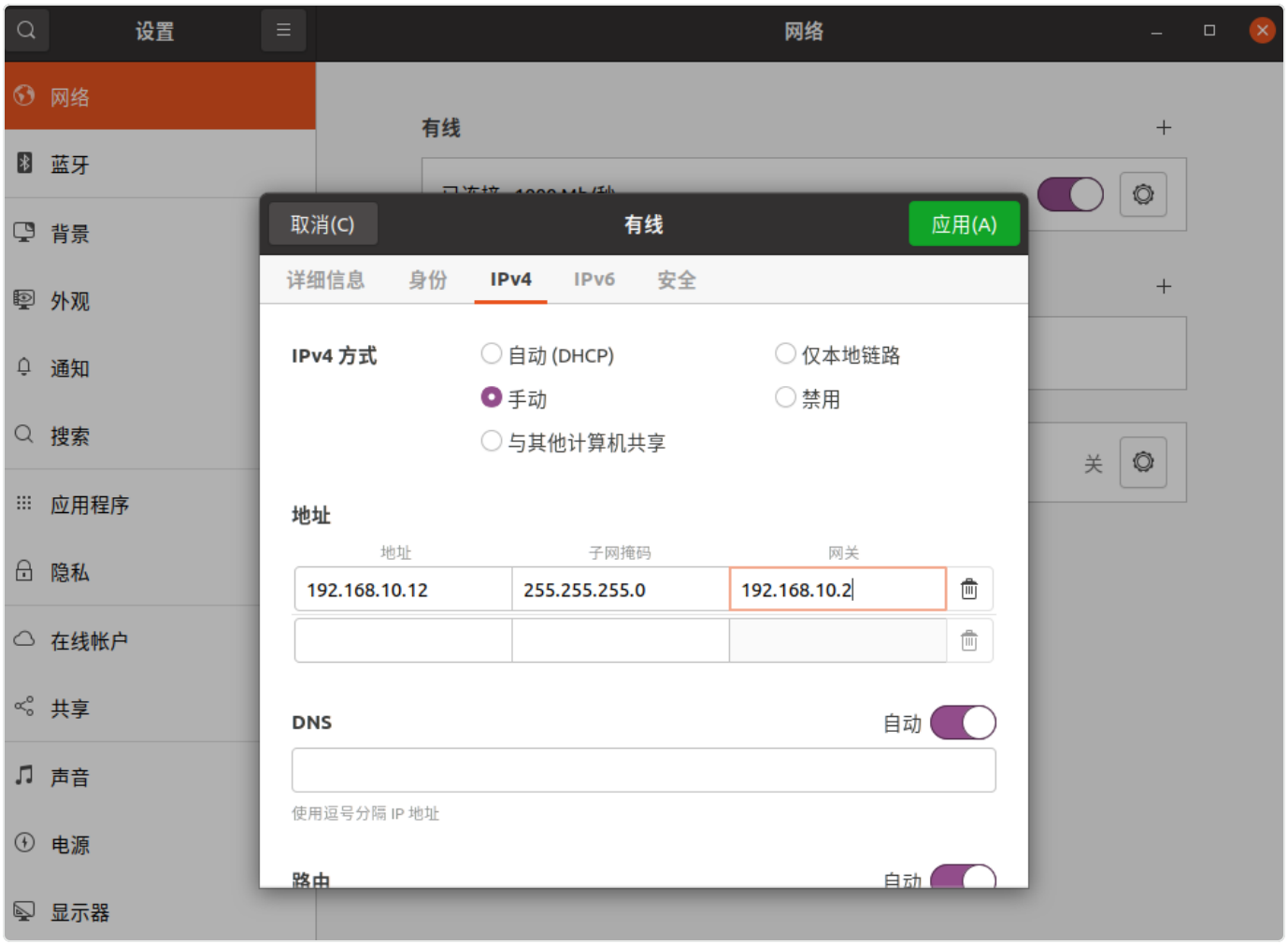
步骤2：配置主机的ip地址

USRP默认的ip地址为192.168.10.2（若不确定可借助“NI-USRP Configuration Utility”查看设备ip地址），所以需要将主机ip地址手动配置为和USRP同一网段的地址。





步骤3：配置虚拟机的ip地址



步骤4：用uhd测试设备是否正常

在终端中输入 `uhd_find_devices` 和 `uhd_usrp_probe`，正常显示则说明连接成功。

```
wang@ubuntu:~$ uhd_find_devices
[INFO] [UHD] linux; GNU C++ version 9.2.1 20200304; Boost_107100; UHD_3.15.0.0-2build5
--------------------------------------------------
-- UHD Device 0
--------------------------------------------------
Device Address:
    serial: 31A5BAA
    addr: 192.168.10.4
    name:
    type: usrp2
```

本次使用的USRP地址为192.168.10.4

```
wang@ubuntu:~$ uhd_usrp_probe
[INFO] [UHD] linux; GNU C++ version 9.2.1 20200304; Boost_107100; UHD_3.15.0.0-2build5
[INFO] [USRP2] Opening a USRP2/N-Series device...
[INFO] [USRP2] Current recv frame size: 1472 bytes
[INFO] [USRP2] Current send frame size: 1472 bytes
[WARNING] [UDP] The send buffer could not be resized sufficiently.
Target sock buff size: 2500000 bytes.
Actual sock buff size: 1048576 bytes.
See the transport application notes on buffer resizing.
Please run: sudo sysctl -w net.core.wmem_max=2500000
[WARNING] [UDP] The send buffer could not be resized sufficiently.
Target sock buff size: 2500000 bytes.
Actual sock buff size: 1048576 bytes.
```

```
Actual sock buff size: 1048576 bytes.
See the transport application notes on buffer resizing.
Please run: sudo sysctl -w net.core.wmem_max=2500000
[WARNING] [UDP] The send buffer could not be resized sufficiently.
Target sock buff size: 2500000 bytes.
Actual sock buff size: 1048576 bytes.
See the transport application notes on buffer resizing.
Please run: sudo sysctl -w net.core.wmem_max=2500000
[INFO] [USRP2] Detecting internal GPSDO....
[INFO] [GPS] No GPSDO found
[WARNING] [UHD] Unable to set the thread priority. Performance may be negatively affected.
Please see the general application notes in the manual for instructions.
EnvironmentError: OSError: error in pthread_setschedparam
  ____________________________________________________
 /
|       Device: USRP2 / N-Series Device
|     ______________________________________________
|    /
|   |       Mboard: N210r4
|   |   hardware: 2577
|   |   product: 30194
|   |   mac-addr: 00:80:2f:26:b2:63
|   |   ip-addr: 192.168.10.4
|   |   subnet: 255.255.255.255
|   |   gateway: 255.255.255.255
|   |   gpsdo: none
|   |   serial: 31A5BAA
|   |   FW Version: 12.4
|   |   FPGA Version: 11.1
|   |
|   |   Time sources:  none, external, _external_, mimo
|   |   Clock sources: internal, external, mimo
|   |   Sensors: mimo_locked, ref_locked
|   |     ____________________________________________
|   |    /
|   |   |       RX DSP: 0
|   |   |
|   |   |   Freq range: -50.000 to 50.000 MHz
|   |     ____________________________________________
|   |    /
|   |   |       RX DSP: 1
|   |   |
|   |   |   Freq range: -50.000 to 50.000 MHz
|   |     ____________________________________________
|   |    /
|   |   |       RX Dboard: A
|   |   |   ID: WBX v4, WBX v4 + Simple GDB (0x0063)
|   |   |   Serial: 319DB1F
|   |   |     ________________________________________
|   |   |    /
|   |   |   |       RX Frontend: 0
|   |   |   |   Name: WBXv4 RX+GDB
|   |   |   |   Antennas: TX/RX, RX2, CAL
|   |   |   |   Sensors: lo_locked
|   |   |   |   Freq range: 25.000 to 2200.000 MHz
|   |   |   |   Gain range PGA0: 0.0 to 31.5 step 0.5 dB
|   |   |   |   Bandwidth range: 40000000.0 to 40000000.0 step 0.0 Hz
|   |   |   |   Connection Type: IQ
|   |   |   |   Uses LO offset: No
|   |   |     ________________________________________
|   |   |    /
|   |   |   |       RX Codec: A
|   |   |   |   Name: ads62p44
|   |   |   |   Gain range digital: 0.0 to 6.0 step 0.5 dB
|   |   |   |   Gain range fine: 0.0 to 0.5 step 0.1 dB
|   |     ____________________________________________
|   |    /
|   |   |       TX DSP: 0
|   |   |
|   |   |   Freq range: -200.000 to 200.000 MHz
|   |     ____________________________________________
|   |    /
|   |   |       TX Dboard: A
|   |   |   ID: WBX v4 (0x0062)
|   |   |   Serial: 319DB1F
|   |   |   ID: WBX + Simple GDB, WBX v3 + Simple GDB, WBX v4 + Simple GDB, WBX-120 + Simple GDB (0x004f)
|   |   |   Serial: 319C3DF
|   |   |     ________________________________________
|   |   |    /
|   |   |   |       TX Frontend: 0
```

```
|   |   |   |       TX Frontend: 0
|   |   |   |   Name: WBXv4 TX+GDB
|   |   |   |   Antennas: TX/RX, CAL
|   |   |   |   Sensors: lo_locked
|   |   |   |   Freq range: 25.000 to 2200.000 MHz
|   |   |   |   Gain range PGA0: 0.0 to 31.0 step 1.0 dB
|   |   |   |   Bandwidth range: 40000000.0 to 40000000.0 step 0.0 Hz
|   |   |   |   Connection Type: IQ
|   |   |   |   Uses LO offset: No
|   |   |   |    ____________________________________________________
|   |   |   |   /
|   |   |   |       TX Codec: A
|   |   |   |   Name: ad9777
|   |   |   |   Gain Elements: None
```