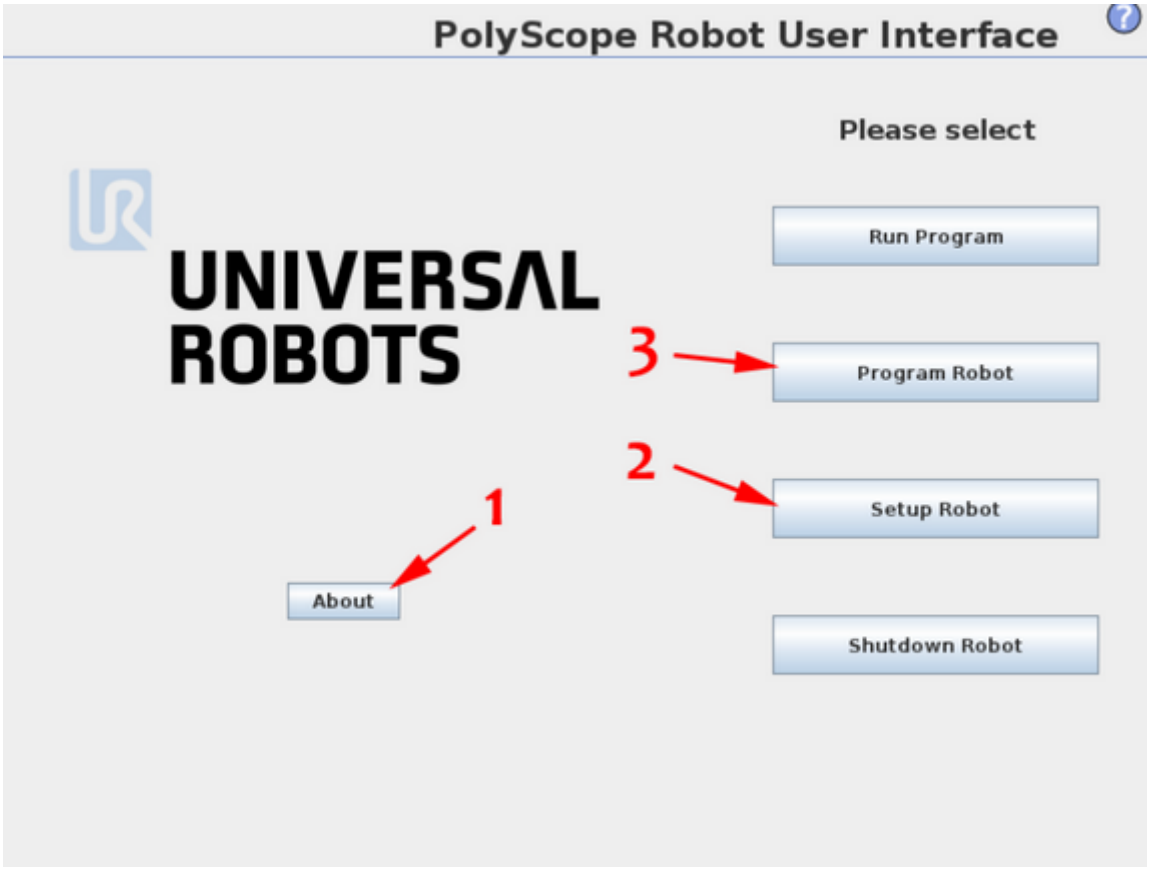
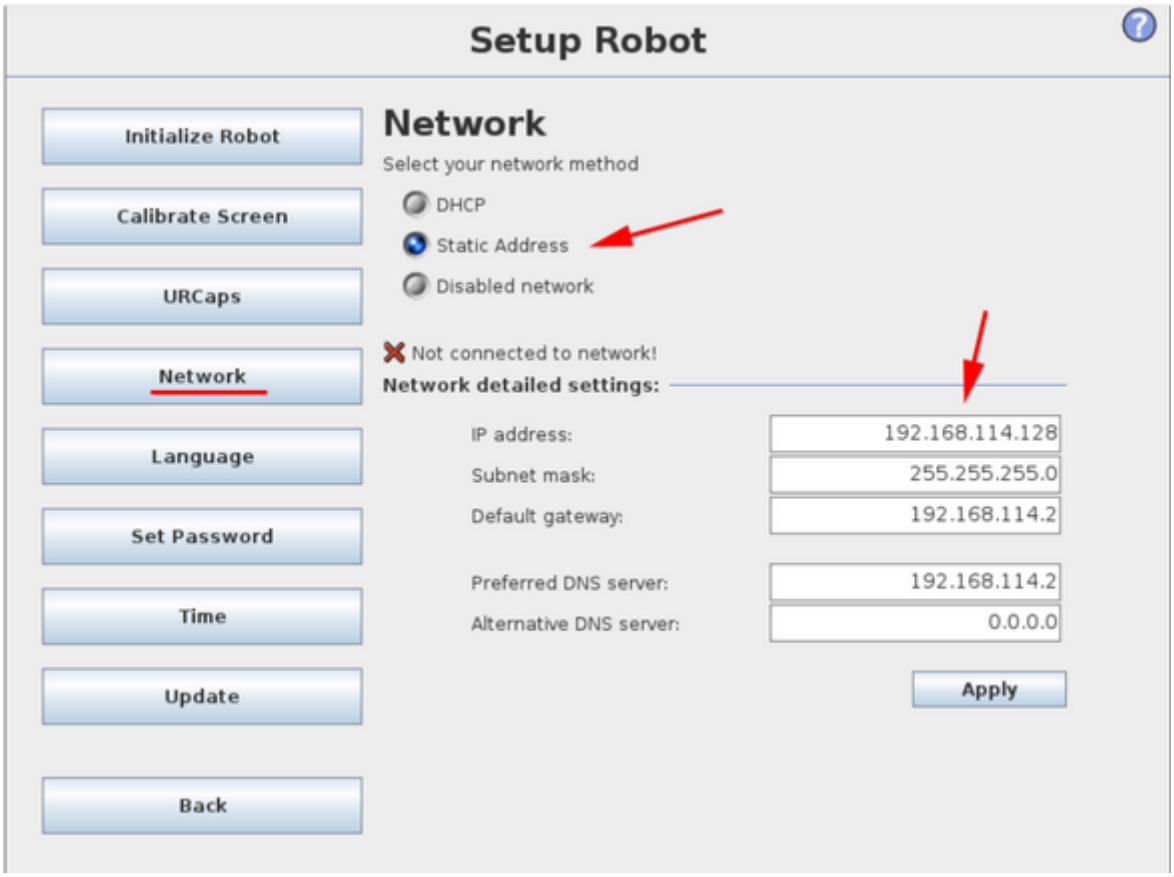
Setting Up RTDE with a UR Robot on Ubuntu

1. Find the IP Address of the UR Robot

- Navigate to **Setup Robot** on the UR controller.



- To use RTDE, the UR controller **must** be set up with a fixed IP address.



- Your **PC's Ethernet connection** must be on the **same subnet** as the robot.
  - Example: If the robot's IP is **192.168.114.X**, your PC should have an IP like **192.168.114.Y**.

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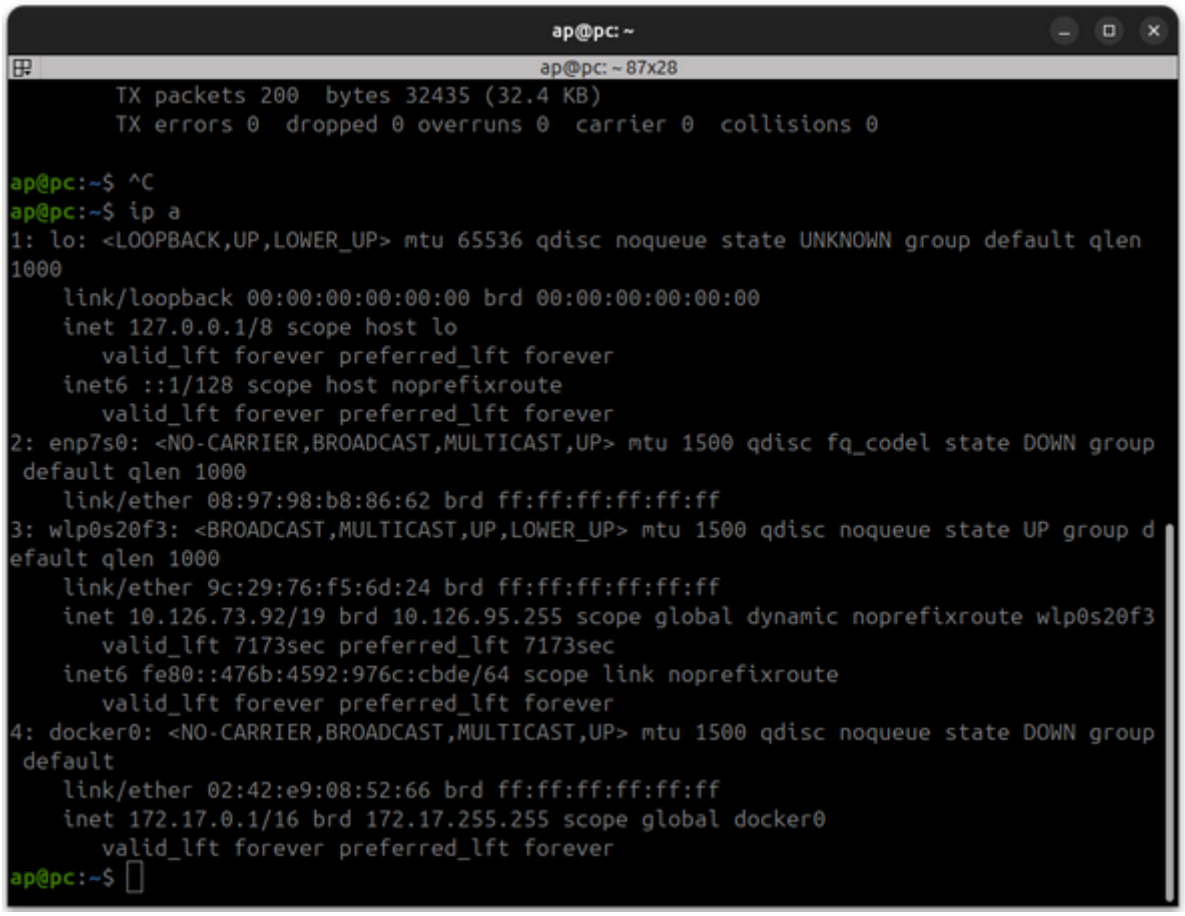
2. Check the Connection of Your PC (Ubuntu)

Run the following command to check your network interfaces:

```
ip a
```

Look for your **Ethernet connection**. It may look something like this:




```
2: enp7s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP
group default qlen 1000
```

- The correct interface typically has the **"fq_codel"** keyword.
- **Ensure that no IP address is assigned** to this connection (i.e., no `inet 192.168.x.x` entry).
- **Note the Ethernet ID** (e.g., `enp7s0`).

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3. Set Up the IP Address of Your PC

Assign a static IP to your Ethernet interface and bring it up:

```
sudo ip addr add 192.168.1.X/24 dev <ethernet_id>
sudo ip link set <ethernet_id> up
```

Example:

```
sudo ip addr add 192.168.1.104/24 dev enp7s0
sudo ip link set enp7s0 up
```

- If the commands run successfully, **there will be no output**.

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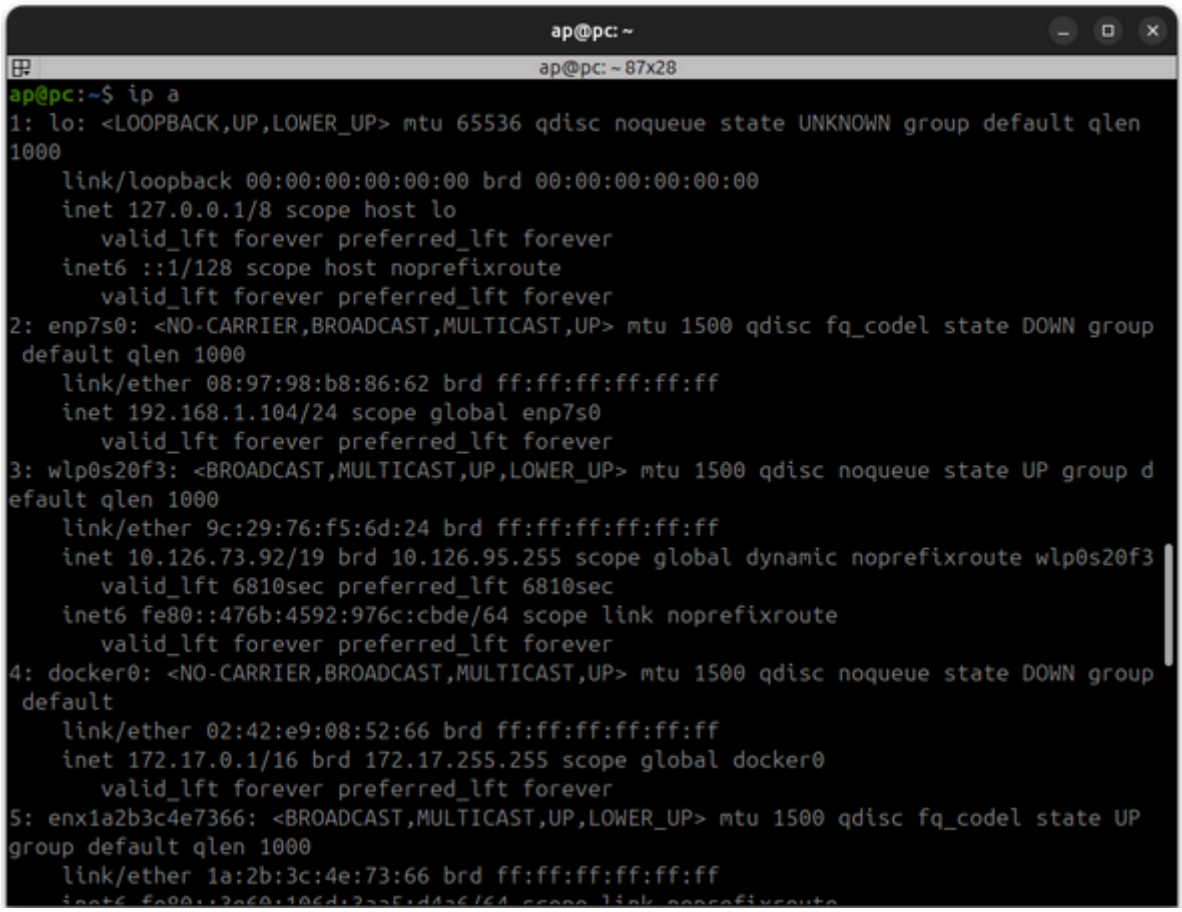
4. Verify That the IP Address Has Changed

Run:

```
ip a
```

- You should now see an assigned IP, e.g., `inet 192.168.1.104/24`.

Example:



5. Check the Connection to the Robot

Ping the robot to confirm the connection:

```
ping 192.168.1.X
```

- If successful, you should see a response similar to:

```
64 bytes from 192.168.1.X: icmp_seq=1 ttl=64 time=0.123 ms
```

```
ap@pc:~$ ping 192.168.1.30
PING 192.168.1.30 (192.168.1.30) 56(84) bytes of data.
64 bytes from 192.168.1.30: icmp_seq=1 ttl=64 time=0.287 ms
64 bytes from 192.168.1.30: icmp_seq=2 ttl=64 time=0.200 ms
64 bytes from 192.168.1.30: icmp_seq=3 ttl=64 time=0.204 ms
64 bytes from 192.168.1.30: icmp_seq=4 ttl=64 time=0.252 ms
64 bytes from 192.168.1.30: icmp_seq=5 ttl=64 time=0.203 ms
64 bytes from 192.168.1.30: icmp_seq=6 ttl=64 time=0.230 ms
```

6. Check if RTDE is Working

Check if Ports Are Open

Run:

```
nc 192.168.1.X 30002
```

Expected output: A connection confirmation.

```
ap@pc:~$ nc -vz 192.168.1.30 30002
Connection to 192.168.1.30 30002 port [tcp/*] succeeded!
```

Check the Robot State

Run:

```
nc 192.168.1.X 29999
robotmode
```

Expected output: The **robot mode** based on its current state.

```
ap@pc:~$ nc 192.168.1.30 29999
Connected: Universal Robots Dashboard Server
robotmode
Robotmode: POWER_OFF
```

This should get your UR robot and RTDE connection properly configured! 🚀