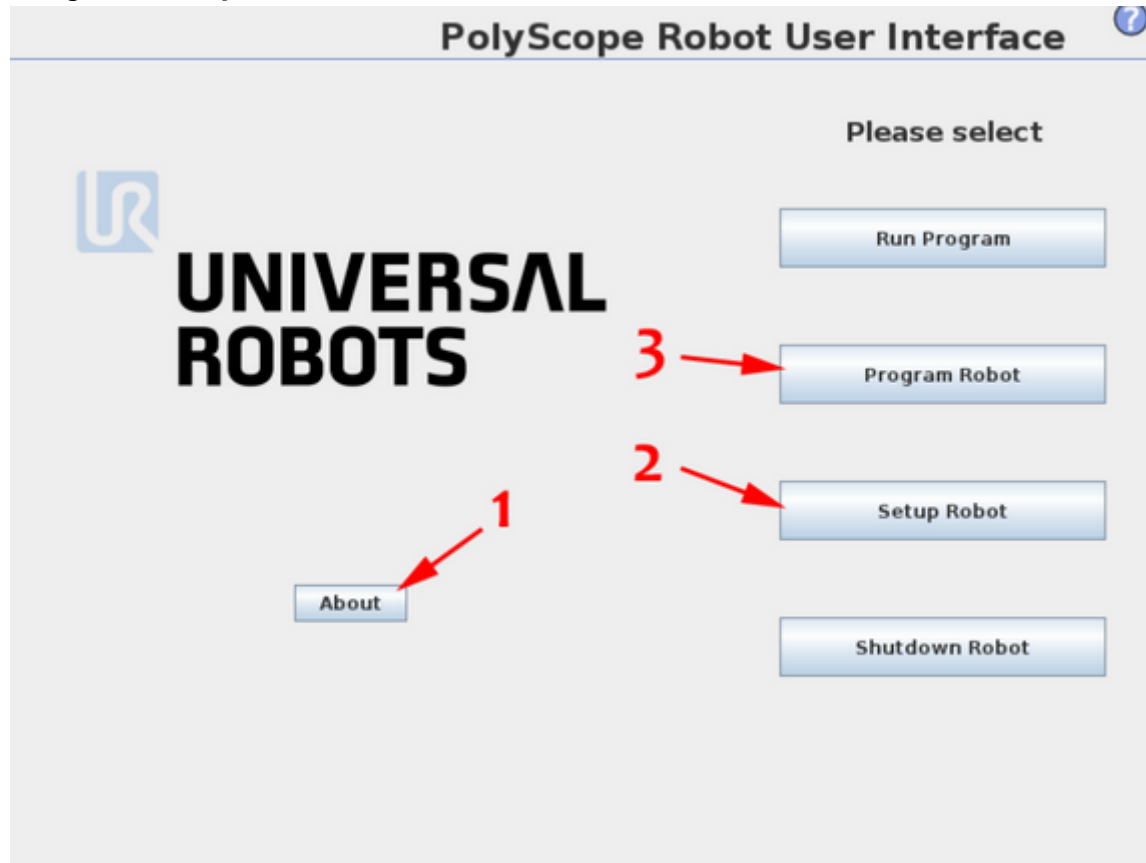


# Setting Up RTDE with a UR Robot on Ubuntu

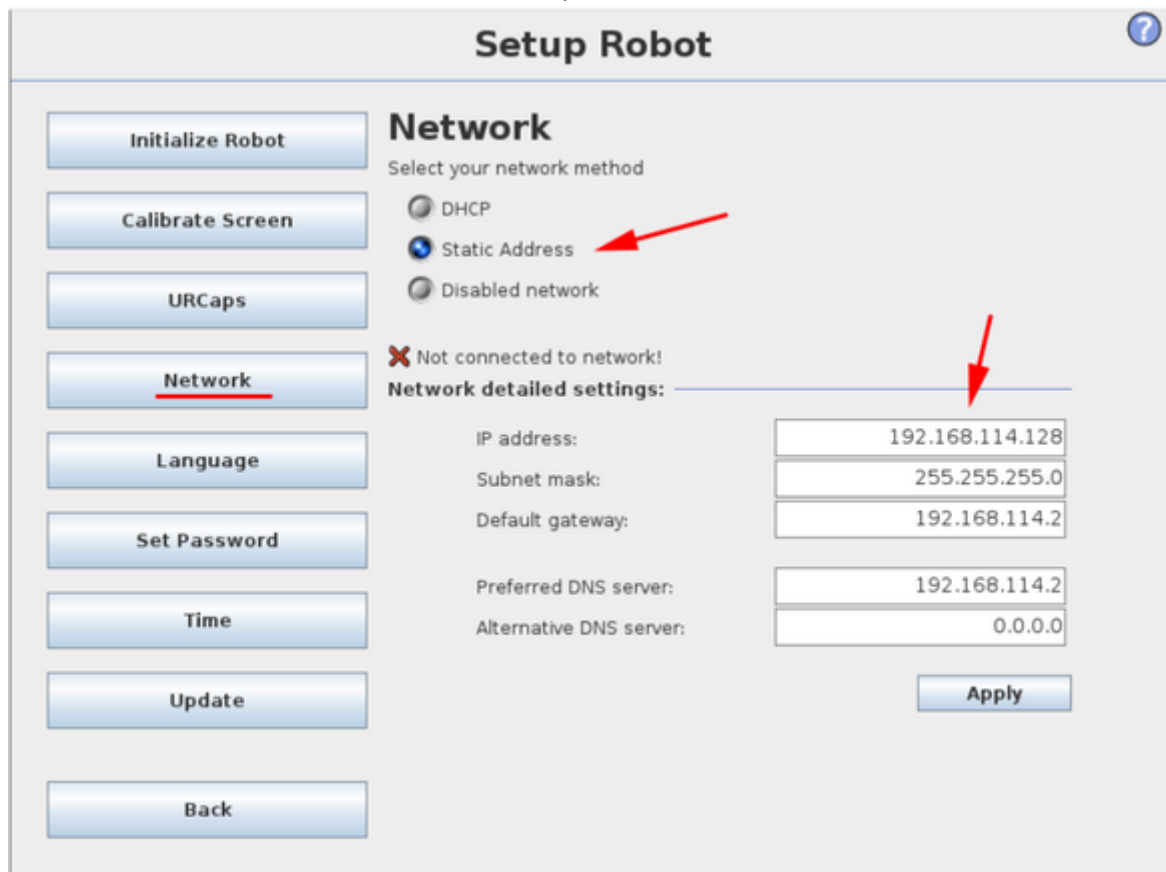
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## 1. Find the IP Address of the UR Robot

- 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**.

---

## 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:

```

ap@pc: ~
TX packets 200  bytes 32435 (32.4 KB)
TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

ap@pc:~$ ^C
ap@pc:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen
1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enp7s0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc fq_codel state DOWN group
default qlen 1000
    link/ether 08:97:98:b8:86:62 brd ff:ff:ff:ff:ff:ff
3: wlp0s20f3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group d
efault qlen 1000
    link/ether 9c:29:76:f5:6d:24 brd ff:ff:ff:ff:ff:ff
    inet 10.126.73.92/19 brd 10.126.95.255 scope global dynamic noprefixroute wlp0s20f3
        valid_lft 7173sec preferred_lft 7173sec
    inet6 fe80::476b:4592:976c:cbde/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
4: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group
default
    link/ether 02:42:e9:08:52:66 brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
        valid_lft forever preferred_lft forever
ap@pc:~$

```

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`).

### 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.**

---

## 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`.

```
ap@pc: ~  
ap@pc: ~ 87x28  
ap@pc:~$ ip a  
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000  
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00  
    inet 127.0.0.1/8 scope host lo  
        valid_lft forever preferred_lft forever  
    inet6 ::1/128 scope host noprefixroute  
        valid_lft forever preferred_lft forever  
2: enp7s0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc fq_codel state DOWN group default qlen 1000  
    link/ether 08:97:98:b8:86:62 brd ff:ff:ff:ff:ff:ff  
    inet 192.168.1.104/24 scope global enp7s0  
        valid_lft forever preferred_lft forever  
3: wlp0s20f3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000  
    link/ether 9c:29:76:f5:6d:24 brd ff:ff:ff:ff:ff:ff  
    inet 10.126.73.92/19 brd 10.126.95.255 scope global dynamic noprefixroute wlp0s20f3  
        valid_lft 6810sec preferred_lft 6810sec  
    inet6 fe80::476b:4592:976c:cbde/64 scope link noprefixroute  
        valid_lft forever preferred_lft forever  
4: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default  
    link/ether 02:42:e9:08:52:66 brd ff:ff:ff:ff:ff:ff  
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0  
        valid_lft forever preferred_lft forever  
5: enx1a2b3c4e7366: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000  
    link/ether 1a:2b:3c:4e:73:66 brd ff:ff:ff:ff:ff:ff  
    inet6 fe80::3a60:106d:3a35:d436/64 scope link noprefixroute
```

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! 🚀