

Setup Static IP Address on Raspberry Pi

1. Introduction

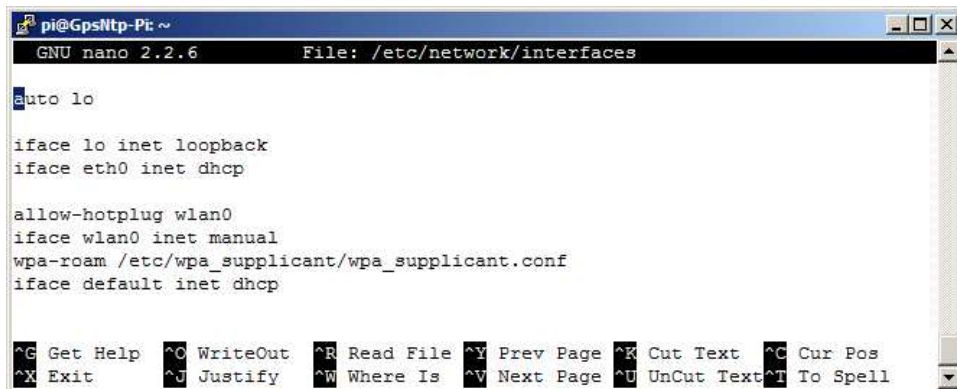
By default, the Raspberry Pi (RPI) obtains its IP address automatically from a LAN router using DHCP. However, depending on the router setup, the address could change whenever the RPI is removed from the network or its power is cycled. It may be preferable to operate the RPI with a static IP address, an address that never changes. For one thing, it simplifies connection to the RPI console from an SSH terminal because the address is always known.

This document describes how to setup the RPI wired Ethernet network interface with a static IP address. The following steps assume the RPI is connected to the LAN through the wired Ethernet interface and you know its IP address. As you go through the following steps, take screenshots before and after making changes – this will help in case you make a mistake and need to reverse your changes. A similar process can be used to setup a wireless network interface with a static IP address.

2. Check the Existing RPi Setup

Log into the RPI using PuTTY and enter the following at the prompt:

```
cat /etc/network/interfaces
```



```
pi@GpsNtp-Pi: ~
GNU nano 2.2.6 File: /etc/network/interfaces

auto lo

iface lo inet loopback
iface eth0 inet dhcp

allow-hotplug wlan0
iface wlan0 inet manual
wpa-roam /etc/wpa_supplicant/wpa_supplicant.conf
iface default inet dhcp

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

Note the line that indicates the **eth0** interface uses **dhcp**, but do not change it at this time:

```
iface eth0 inet dhcp
```

There are additional lines having to do with a wireless network interface (**wlan0** and **wpa-roam** or **wpa-conf**) but these will be left alone. If you plan to use a wireless interface, these will need to be changed, but that is beyond the scope of this document revision.

Type CTRL+X (Exit) to close the nano editor.

Now, enter the following at the prompt:

ifconfig

```
pi@Callisto-Pi ~  
iface eth0 inet dhcp  
  
allow-hotplug wlan0  
iface wlan0 inet manual  
wpa-roam /etc/wpa_supplicant/wpa_supplicant.conf  
iface default inet dhcp  
pi@Callisto-Pi ~ $ ifconfig  
eth0      Link encap:Ethernet  HWaddr b8:27:eb:13:40:76  
          inet addr:10.0.0.11  Bcast:10.0.0.255  Mask:255.255.255.0  
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1  
          RX packets:199383 errors:0 dropped:0 overruns:0 frame:0  
          TX packets:193416 errors:0 dropped:0 overruns:0 carrier:0  
          collisions:0 txqueuelen:1000  
          RX bytes:34234687 (32.6 MiB)  TX bytes:43215623 (41.2 MiB)  
  
lo        Link encap:Local Loopback  
          inet addr:127.0.0.1  Mask:255.0.0.0  
          UP LOOPBACK RUNNING  MTU:65536  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:0  
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)  
  
pi@Callisto-Pi ~ $
```

Note the information to the right of **eth0**:

```
eth0      Link encap:Ethernet  HWaddr b8:27:eb:13:40:76  
          inet addr:10.0.0.11  Bcast:10.0.0.255  Mask:255.255.255.0
```

In the above example:

```
inet addr: 10.0.0.11      Current IP address  
Bcast:     10.0.0.255    Broadcast IP range  
Mask:      255.255.255.0 Subnet mask
```

Your console screen most likely will show different values. Copy the following from your console:

```
inet addr: _____ (your current IP address)  
Bcast:     _____ (your broadcast IP range)  
Mask:      _____ (your subnet mask)
```

Now, enter the following at the prompt:

```
netstat -nr
```

```

pi@Callisto-Pi ~
iface default inet dhcp
pi@Callisto-Pi ~ $ ifconfig
eth0      Link encap:Ethernet  HWaddr b8:27:eb:13:40:76
          inet addr:10.0.0.11  Bcast:10.0.0.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:199383 errors:0 dropped:0 overruns:0 frame:0
          TX packets:193416 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:34234687 (32.6 MiB)  TX bytes:43215623 (41.2 MiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:65536  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:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

pi@Callisto-Pi ~ $ netstat -nr
Kernel IP routing table
Destination  Gateway      Genmask      Flags  MSS  Window  irtt  Iface
0.0.0.0     10.0.0.1    0.0.0.0      UG     0    0        0     eth0
10.0.0.0    0.0.0.0    255.255.255.0  U     0    0        0     eth0
pi@Callisto-Pi ~ $

```

Note the information shown in the Destination and Gateway columns. Ignore the 0.0.0.0 values:

```

Destination: 10.0.0.0      Network destination
Gateway:     10.0.0.1       Gateway address

```

Your console screen most likely will show different values. Copy the following details from your console:

```

Destination: _____ (your network destination)
Gateway:     _____ (your gateway address)

```

3. Setup the RPi Network Configuration for Static IP

Use the built-in editor nano to edit the network interface configuration file:

```
sudo nano /etc/network/interfaces
```

```

pi@Gpslltp-Pi ~
GNU nano 2.2.6 File: /etc/network/interfaces Modified
auto lo

iface lo inet loopback
iface eth0 inet dhcp

allow-hotplug wlan0
iface wlan0 inet dhcp
wpa-roam /etc/wpa_supplicant/wpa_supplicant.conf
iface default inet dhcp

```

Using the keyboard arrow keys, move to the end of the line that reads:

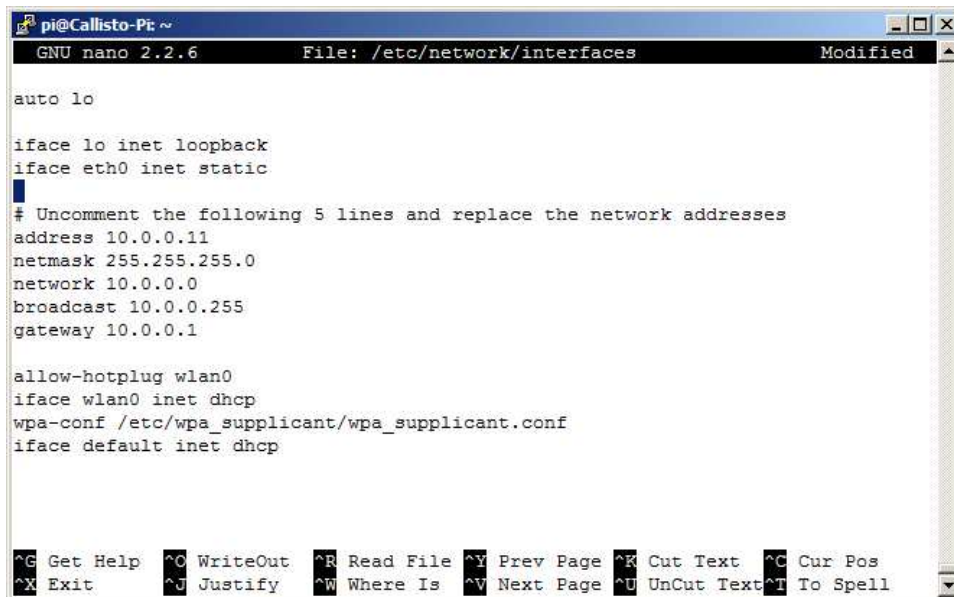
```
iface eth0 inet dhcp
```

Replace `dhcp` with `static`, as in:

```
iface eth0 inet static
```

Additional parameters preceded by the comment character # may be directly below the `iface` line that you just changed. If your configuration file has these parameters, uncomment them (delete the # character) and replace the address parameters with those you obtained previously. If your file does not already have these parameters, add them with the address parameters you obtained previously. Do not use the values shown in the example screenshot below:

address	Use your inet address
netmask	Use your subnet mask
network	Use your network destination
broadcast	Use your broadcast IP range
gateway	Use your gateway address



```
pi@Callisto-Pi: ~
GNU nano 2.2.6 File: /etc/network/interfaces Modified
auto lo

iface lo inet loopback
iface eth0 inet static
# Uncomment the following 5 lines and replace the network addresses
address 10.0.0.11
netmask 255.255.255.0
network 10.0.0.0
broadcast 10.0.0.255
gateway 10.0.0.1

allow-hotplug wlan0
iface wlan0 inet dhcp
wpa-conf /etc/wpa_supplicant/wpa_supplicant.conf
iface default inet dhcp

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

The **address** field in the above example is the static IP address that was originally dynamically assigned to the RPi. It could be any address within the router’s network range but it must not conflict with existing addresses on your LAN. Your console should look similar to the above screenshot but it will have your parameter values.

Type CTRL+X (Exit), Y (Yes) and then ENTER to save the changes and close the nano editor.

After any network changes you must reboot the RPi:

```
sudo reboot
```

4. Check RPi Static IP Configuration

After the RPi reboots, restart the PuTTY session if you used the original IP address or start a new session. To restart the previous session right-click the title bar at top of PuTTY window and select Restart Session, and to start a new session right-click the title bar and select New Session.... Log into the RPi and enter:

```
ifconfig
```

```
pi@Callisto-Pi: ~
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
You have new mail.
Last login: Sun Jan  4 21:45:58 2015 from 10.0.0.8
pi@Callisto-Pi ~ $ sudo nano /etc/network/interfaces
pi@Callisto-Pi ~ $ ifconfig
eth0      Link encap:Ethernet  HWaddr b8:27:eb:13:40:76
          inet addr:10.0.0.11  Bcast:10.0.0.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:142 errors:0 dropped:0 overruns:0 frame:0
          TX packets:91 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:12382 (12.0 KiB)  TX bytes:13284 (12.9 KiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:65536  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:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

pi@Callisto-Pi ~ $
```

Double-check your work by pinging the gateway (or other nodes on the LAN). The -c 5 option in the command below indicates to ping 5 times. Note: Without the -c 5 option the address will be pinged continuously. If you accidentally start a continuous ping, you can stop by typing CTRL+C. Be sure to use the actual IP address of your gateway (router) and not the one shown in the example here:

```
ping 10.0.0.1 -c 5
```

```
pi@Callisto-Pi: ~
          TX packets:94 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:12854 (12.5 KiB)  TX bytes:14027 (13.6 KiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:65536  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:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

pi@Callisto-Pi ~ $ ping 10.0.0.1 -c 5
PING 10.0.0.1 (10.0.0.1) 56(84) bytes of data:
64 bytes from 10.0.0.1: icmp_req=1 ttl=64 time=1.35 ms
64 bytes from 10.0.0.1: icmp_req=2 ttl=64 time=1.20 ms
64 bytes from 10.0.0.1: icmp_req=3 ttl=64 time=1.22 ms
64 bytes from 10.0.0.1: icmp_req=4 ttl=64 time=1.24 ms
64 bytes from 10.0.0.1: icmp_req=5 ttl=64 time=1.77 ms

--- 10.0.0.1 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4005ms
rtt min/avg/max/mdev = 1.203/1.360/1.779/0.218 ms
pi@Callisto-Pi ~ $
```

The pings should be successful with no packet loss. If not successful, then your setup is incorrect. Recheck each step above. If necessary, you can revert to DHCP by reversing the steps or by copying the information shown in your screenshots before the changes.

This completes the static IP network configuration.

Document information

Author: Whitham D. Reeve

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