How to Set up a Raspberry Pi as a Wireless Access Point

Configure the wireless adapter with a static IP address

1. Make sure you have performed **sudo apt-get update** and **sudo apt-get upgrade** before you continue!
2. Click on the terminal icon. It should look like a computer icon with a black screen in the upper left-hand corner.
3. The next step requires us to edit a file. Let's create a backup of this file so that if we make a mistake, we can go back to the back up. Type this in a press enter:
   sudo cp /etc/network/interfaces /etc/network/interfaces_old
4. In the terminal, first type or copy and paste (To copy highlight the text, right click and select copy. To paste, right click in the terminal and press paste. You can also press the middle mouse button to paste while in the terminal):
   sudo nano /etc/network/interfaces
5. Press enter.
6. Use the up and down directional arrows to move from line to line and the left and right arrows to move back and forth on a line. Place a "#" sign in front of all the lines which mention **wlan0, wlan1,** and **wpa**, except for "**allow hotplug wlan0**". Then add the following lines to the file right under "**allow hotplug wlan0"** (make sure make a new line by pressing enter and then paste):
   iface wlan0 inet static
   address 192.168.42.1
   netmask 255.255.255.0
7. Hold the control button and press x.
8. Press y, then enter to save.
   We now need to restart the wireless access point by typing in the terminal (press enter after typing in each command):
   sudo ifdown wlan0
   sudo ifup wlan0
   sudo ifconfig
   After last command, you should see the ip address "**192.168.42.1"** in the **wlan0** section.

Install and configure a DHCP server

9. In the terminal, type or copy and paste:

sudo apt-get install isc-dhcp-server

10. Remember to press enter after typing a command in the terminal. If you see "**Install these packages without verification? [y/N]**," press y and then enter.

11. The next step requires us to edit a file. Let's create a backup of this file so that if we make a mistake, we can go back to the back up. Type this in a press enter:
    sudo cp /etc/dhcp/dhcpd.conf /etc/dhcp/dhcpd.conf_old

12. When this is finished, type this in and then press enter (ignore the **service failed** portion):
    sudo nano /etc/dhcp/dhcpd.conf

13. Add a "#" character in front of the "option domain-name" lines like this:
    #option domain-name "example.org";
    #option domain-name-servers ns1.example.org, ns2.example.org;

14. Remove the "#" sign in front of the "authoritative;" statement like this:

    # If this DHCP server is the official DHCP server for the local
    # network, the authoritative directive should be uncommented.
    authoritative;

15. At the bottom of the file add the following lines:

    subnet 192.168.42.0 netmask 255.255.255.0 {
    range 192.168.42.10 192.168.42.50;
    option broadcast-address 192.168.42.255;
    option routers 192.168.42.1;
    default-lease-time 600;
    max-lease-time 7200;
    option domain-name "local";
    option domain-name-servers 8.8.8.8, 8.8.4.4;
    }

16. Exit from nano with "Ctrl + X", press y, and then press enter.

17. The next step requires us to edit a file. Let's create a backup of this file so that if we make a mistake, we can go back to the back up. Type this in a press enter:
    sudo cp /etc/default/isc-dhcp-server /etc/default/isc-dhcp-server_old

18. Make the wireless adapter the default for the DHCP request by typing in the terminal:
    sudo nano /etc/default/isc-dhcp-server

19. Change **INTERFACES=""** to **INTERFACES="wlan0"**

20. Exit from nano with "Ctrl + X", y, and then enter.

21. Restart the DHCP server by typing in the terminal:
    sudo service isc-dhcp-server restart

Install and configure the access point daemon

22. Install hostapd by typing or copying and pasting in the terminal:
    sudo apt-get install hostapd -y

23. Create a hostapd configuration file and create a wireless network by typing in:

sudo nano /etc/hostapd/hostapd.conf

24. Add the following lines:
    interface=wlan0
    driver=nl80211
    #driver=rtl871xdrv
    ssid=enteryourssid
    hw_mode=g
    channel=6
    macaddr_acl=0
    auth_algs=1
    ignore_broadcast_ssid=0
    wpa=2
    wpa_passphrase=enterpasswordmorethan7characters
    wpa_key_mgmt=WPA-PSK
    wpa_pairwise=TKIP
    rsn_pairwise=CCMP

25. This will create a password protected network called MyPi on channel 6 with the password "**raspberry**". Exit from nano with "Ctrl + X", y, and enter.

26. The next step requires us to edit a file. Let's create a backup of this file so that if we make a mistake, we can go back to the back up. Type this in a press enter:
    sudo cp /etc/default/hostapd /etc/default/hostapd_old

27. Tell hostapd where to find its configuration file by setting the default location by typing in the terminal:
    sudo nano /etc/default/hostapd
    Remove the "#" in front of "DAEMON_CONF" and alter the line to read:
    DAEMON_CONF="/etc/hostapd/hostapd.conf"

28. Exit from nano with "Ctrl + X", "y", and enter.

Configure IP routing between the wireless and Ethernet

29. The next step requires us to edit a file. Let's create a backup of this file so that if we make a mistake, we can go back to the back up. Type this in a press enter:

    sudo cp /etc/sysctl.conf /etc/sysctl.conf_old

30. Edit "/etc/sysctl.conf" to enable IP forwarding by typing in the terminal:
    sudo nano /etc/sysctl.conf

31. Find the line which reads "Uncomment the next line to enable packet forwarding for IPv4" and uncomment the next line like this:
    # Uncomment the next line to enable packet forwarding for IPv4
    net.ipv4.ip_forward=1

32. Exit from nano with "Ctrl + X", "y", and "enter".

33. Run the following command to activate forwarding now:
    sudo sh -c "echo 1 > /proc/sys/net/ipv4/ip_forward"
34. Now turn the Pi into a router with the following commands by typing in the terminal:
    sudo iptables -t nat -A POSTROUTING -o eth0 -j MASQUERADE
    sudo iptables -A FORWARD -i eth0 -o wlan0 -m state --state RELATED,ESTABLISHED -j ACCEPT
    sudo iptables -A FORWARD -i wlan0 -o eth0 -j ACCEPT
35. Remember to press enter after each of these commands.
36. Save the routing tables into the file "/etc/iptables.ipv4.nat" by typing in the terminal:
    sudo sh -c "iptables-save > /etc/iptables.ipv4.nat"
37. Edit "/etc/network/interfaces"by typing in the terminal:
    sudo nano /etc/network/interfaces
38. And add the following line to the end of the file. This line will restore the routing table whenever the Pi is booted:
    pre-up iptables-restore < /etc/iptables.ipv4.nat
39. Exit from nano with "Ctrl + X", "y", and "enter".
40. You should now reboot your Pi and test the wireless access using a laptop, smartphone, tablet or other Wi-Fi enabled device by typing in the terminal:
    sudo reboot