Wifi Access Point

A Raspberry Pi within an Ethernet network can be used as a wireless access point, creating a secondary network. The resulting new wireless network is entirely managed by the Raspberry Pi.

#pi #wifi #access point

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1. Update the system

Ensure the system is at the latest version:

```
sudo apt-get update
sudo apt-get upgrade -y
```

and then reboot.

2. Install necessary packages

Next, in order to work as an access point, the Raspberry Pi needs to have the `hostapd` access point software package installed:

```
sudo apt-get install hostapd
```

Enable the wireless access point service and set it to start when the Raspberry Pi boots up:

```
sudo systemctl unmask hostapd
sudo systemctl enable hostapd
```

In order to provide network management services (DNS, DHCP) to wireless clients, the Raspberry Pi needs to have the `dnsmasq` software package installed:

```
sudo apt-get install dnsmasq
```

Finally, install `netfilter-persistent` and its plugin `iptables-persistent`. This utility helps by saving firewall rules and restoring them when the Raspberry Pi boots:

```
sudo DEBIAN_FRONTEND=noninteractive apt-get install -y netfilter-persistent
iptables-persistent
```

3. Setup Wifi Interface IP

The Raspberry Pi runs a DHCP server for the wireless network; this requires static IP configuration for the wireless interface (`wlan0`) in the Raspberry Pi. The Raspberry Pi also acts as the router on the wireless network, and as is customary, set the first IP address in the network, e.g: `192.168.4.1` .

```
sudo nano /etc/dhcpcd.conf
```

Add below line to the file and save it:

/etc/dhcpcd.conf

```
interface wlan0
    static ip_address=192.168.4.1/24
    nohook wpa_supplicant
```

4. Setup DHCP and DNS

Rename the default configuration file and edit a new one:

```
sudo mv /etc/dnsmasq.conf /etc/dnsmasq.conf.orig
sudo nano /etc/dnsmasq.conf
```

Add the following to the file and save it:

/etc/dnsmasq.conf

```
# Listening interface
interface=wlan0

# Pool of IP addresses served via DHCP
dhcp-range=192.168.4.2,192.168.4.20,255.255.255.0,24h

# Local wireless DNS domain
domain=wlan

# Alias for this router
address=/gw.wlan/192.168.4.1
```

The address range 192.168.4.2 ~ 192.168.4.20 is an example

The Raspberry Pi will deliver IP addresses between `192.168.4.2` and `192.168.4.20`, with a lease time of `24` hours, to wireless DHCP clients. Raspberry Pi can be accessed under the name **gw.wlan** from wireless clients.

5. Turn on Wifi

To ensure WiFi radio is not blocked on the Raspberry Pi, execute the following command:

```
sudo rfkill unblock wlan
```

6. Setup Access Point

Create the hostapd configuration file, located at */etc/hostapd/hostapd.conf*, to add the various parameters for a new wireless network:

```
sudo nano /etc/hostapd/hostapd.conf
```

Add the information below to the configuration file. This configuration assumes to use channel `7`, with a network name of `NameOfNetwork`, and a password `AardvarkBadgerHedgehog`. Note that the name and password should *not* have quotes around them. The passphrase should be between 8 and 64 characters in length.

/etc/hostapd/hostapd.conf

```
country_code=US
interface=wlan0
ssid=NameOfNetwork
hw_mode=g
channel=7
macaddr_acl=0
auth_algs=1
ignore_broadcast_ssid=0
wpa=2
wpa_passphrase=AardvarkBadgerHedgehog
wpa_key_mgmt=WPA-PSK
wpa_pairwise=TKIP
rsn_pairwise=CCMP
```

Now restart the Raspberry Pi and verify that the wireless access point becomes automatically available.

```
sudo systemctl reboot
```

Once the Raspberry Pi has restarted, search for wireless networks with a wireless client. The network SSID specified in file `/etc/hostapd/hostapd.conf` should now be present, and it should be accessible with the specified password.

If SSH is enabled on the Raspberry Pi, it should be possible to connect to it from a wireless client as follows, assuming the pi account is present: `ssh pi@192.168.4.1` or `ssh pi@gw.wlan`.