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HOW TO

## How to run Pi-Hole with Google WiFi (Raspberry Pi 4)

□ DECEMBER 12, 2019 BY □ MARK B

It has been about three years after Google started conquering the home-suitable networking market with its Google WiFi and it's clear that it has aged like a fine wine since it is still being regarded as one of the best dual-band WiFi systems available right now. This happened due to the manufacturer's somehow perfect understanding of what its audience needed, which was a set of small minimalist devices which would be very easy to set up and would offer a stable network over a long period of time.



If you got charmed by [the Google WiFi](#) and you got a system installed in your home, you may notice that the simplicity came at a cost since the app is very limited in terms of features and, if you want to run some advanced applications, it can become unnecessarily harder than with some traditional routers. For this reason, I decided to try and run Pi-Hole installed on a Raspberry Pi 4 alongside my Google WiFi system and see if the search engine giant has made this process more difficult than it needed to be or if everything is silky smooth (unfortunately, it's the former).

Taking into consideration the recent news that the Chromium-based browsers (may soon include Edge) will have a built-in ad-blocking engine, therefore taking away this role from the ad-block extensions, it's clear that Google desires to select which ads will be filtered and which will go through for you, so, if the ad-blocker extensions may become a thing of the past (even though I seriously doubt it), there is always the reliable Pi-Hole to block the annoying ads at the DNS level. This can help speed up the website loading time (since the ads are no longer downloaded), but it will leave a blank space in the place of the ads and you

won't be able to block the ads at a website level. Instead, you will have to block a certain category of ads globally and whitelist those ads that you deem unobtrusive (this is where the browser-based ad-blockers have the upper hand).

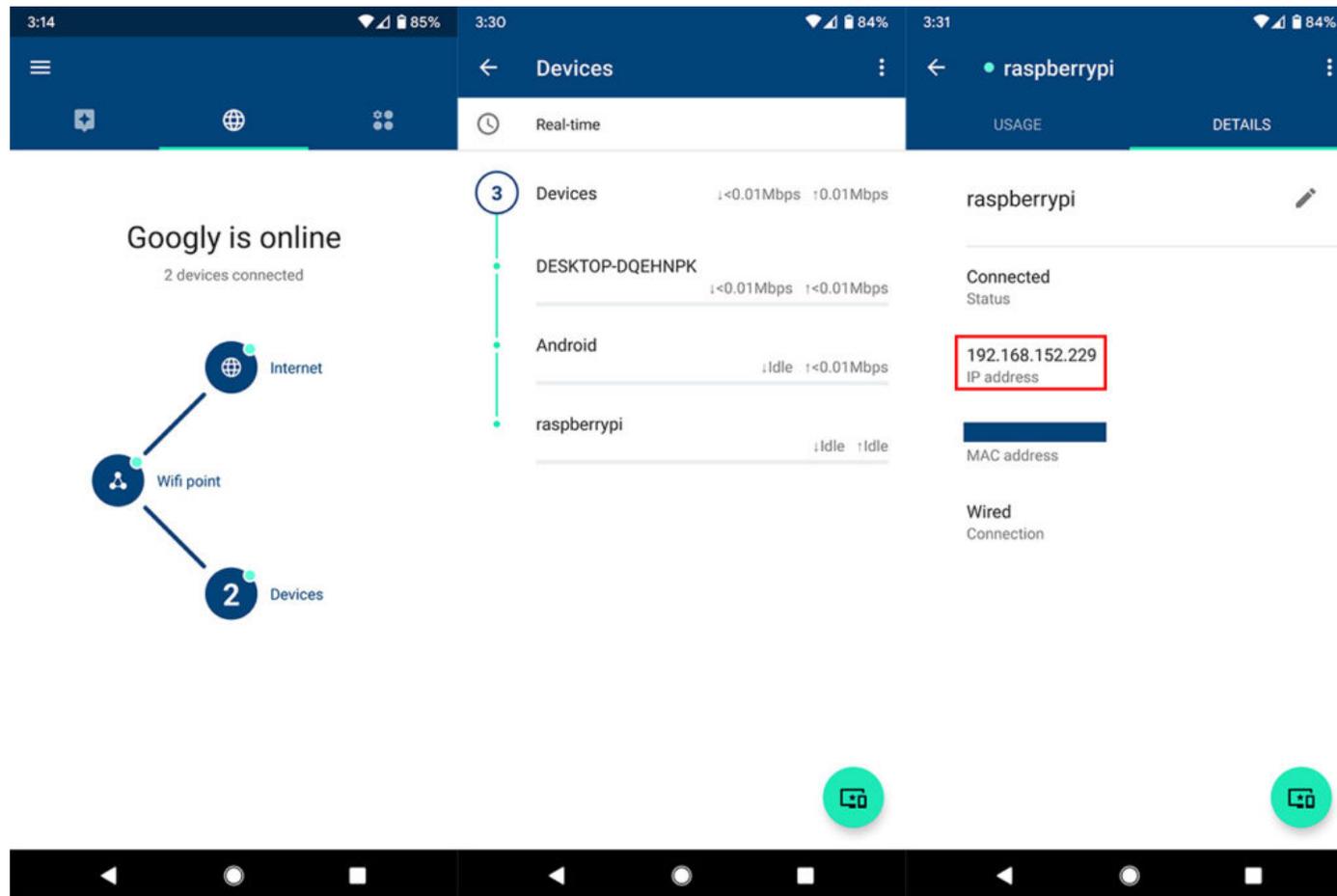


The developers did a great job with the Pi-Hole GUI, so the process is very simple and intuitive, but it's not that simple to get to this point since you will have to install Raspbian on a microSD card which you will then insert in a Raspberry Pi and then make the necessary adjustments to make sure that the router will play nicely with Pi-Hole. I am not going to get in detail on how to install Raspbian on an SD card since I already explored the needed steps in the ["Should you use Pi-Hole for blocking ads? \(using a Raspberry Pi 4\)"](#) article, but there are small adjustments that you need to do before installing Pi-Hole.

*Note:* It's important to know that you can't disable DHCP on the Google WiFi, well, you can, if you set it to Bridge Mode, but this is not an option if you have more than one unit installed since the mesh capabilities will be disabled. So, for now, we're going to leave DHCP enabled on the Google WiFi.

**Option 1:** DHCP enabled on Google WiFi, DHCP disabled on Pi Hole.

1. Since you don't want the Google WiFi to change the IP address of the Pi-Hole, you will have to create a **static IP address for the Raspberry Pi** and to do so, you will need to identify the assigned IP address of the device in the Google WiFi app: from the Dashboard, click on Devices, identify the raspberrypi client and tap on it to see the designated IP address (under Details). Afterwards, return to the Dashboard and select the Config icon (the third from the top) and under Settings, click on Network and General. Here, click on Advanced networking and select DHCP IP reservations: tap on the green Plus sign, select the raspberrypi from the list and click next, followed by selecting the preferred IP address.



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Navigation icons: Home, Back, App Drawer

**Shortcuts**

- Network check
- Priority device
- Show password
- More actions

**Settings**

- Network & General**
- Family Wi-Fi
- Guest Wi-Fi
- Home control

3:34 84%

← **Advanced networking** ⋮

- DNS**  
Automatic ⓘ
- WAN**  
DHCP, Static IP, PPPoE ⓘ
- LAN**  
Router LAN IP, DHCP Address Pool ⓘ

**DHCP IP reservations**  
Manage IP addresses for local devices

**Port management**  
Manage port opening and forwarding rules

**UPnP**  
Enable or disable Universal Plug and Play

**Network Mode**  
NAT (standard), more...

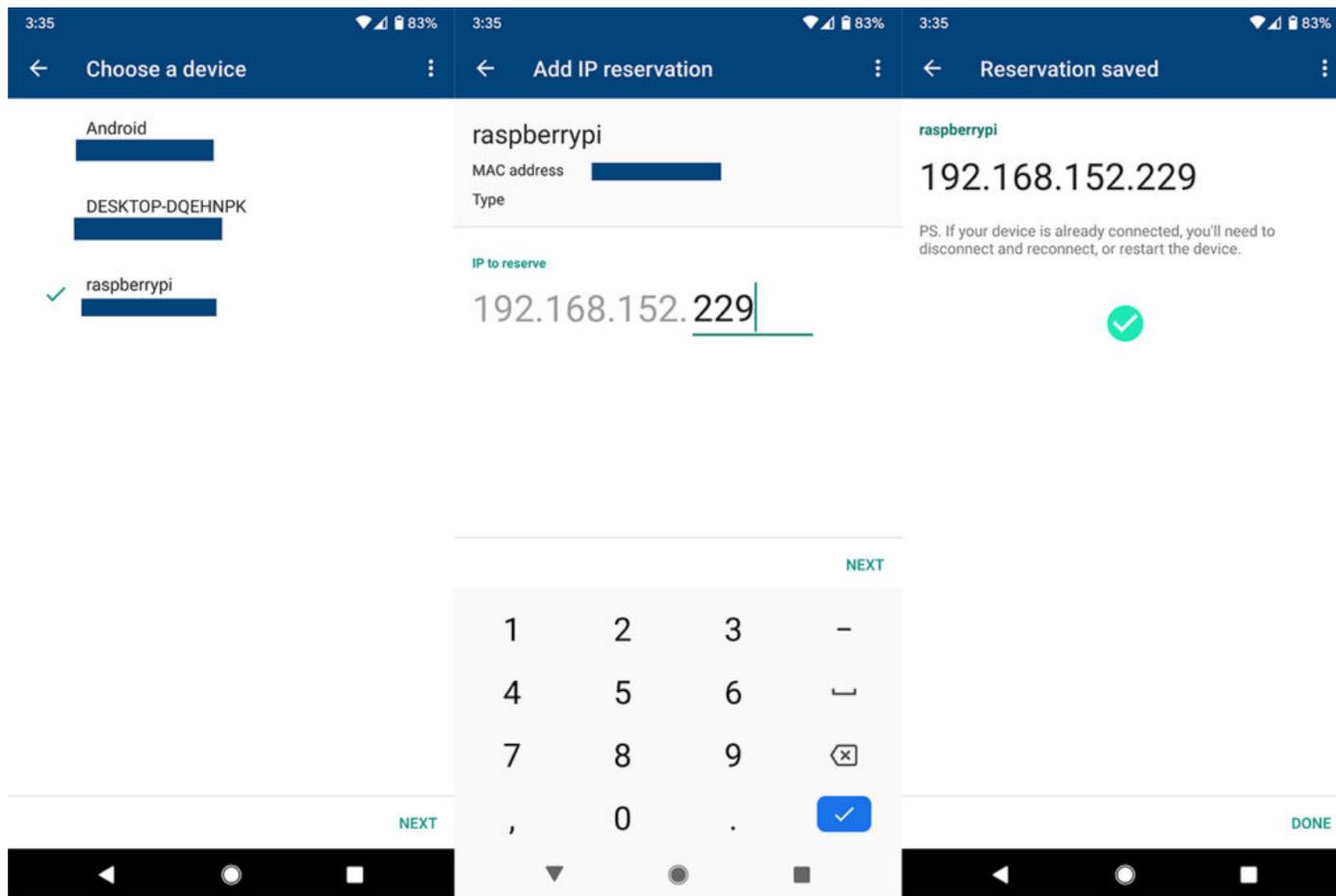
**IPv6**  
Enable or disable IPv6

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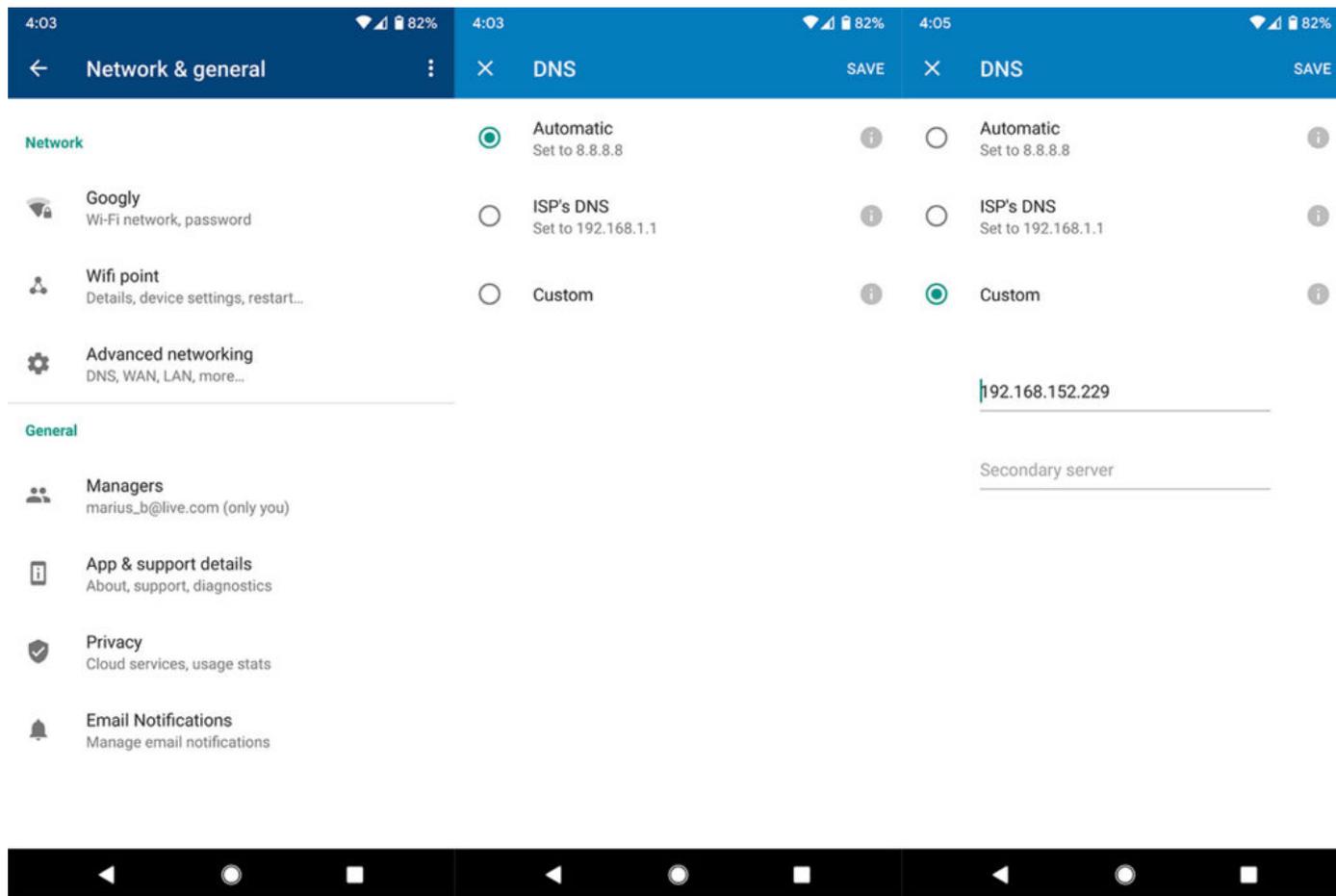
← **DHCP IP reservations** ⋮

You have no DHCP IP reservations.





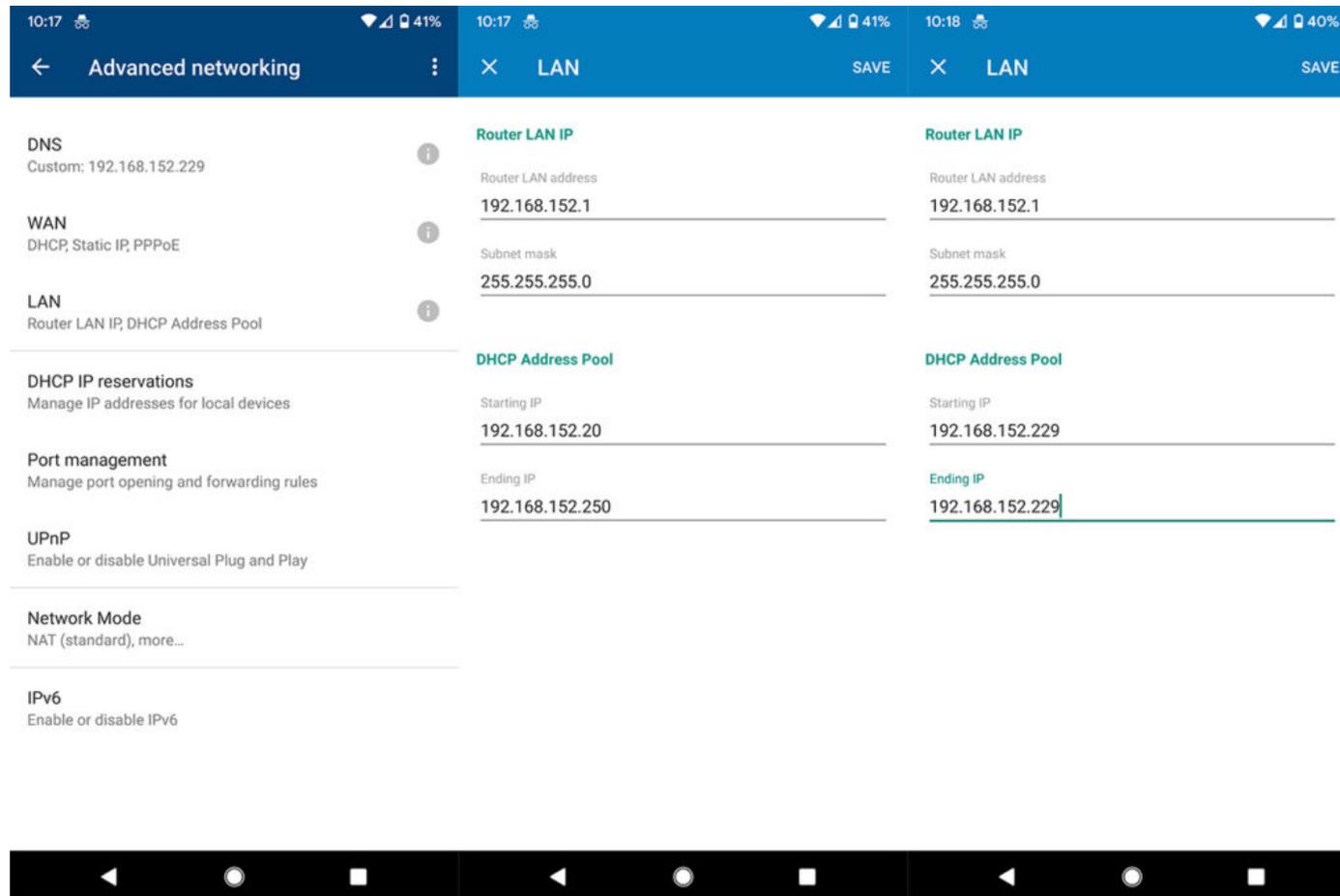
2. After that's done, you need to install Pi-Hole using SSH (again, check [the guide for instructions](#)) and **make Pi-Hole your DNS server**. To do this, enter the Google WiFi app, tap on the Config icon and from the Settings, tap on Network and General followed by tapping on the Advanced networking. Here, enter the DNS option which should be set to Automatic (8.8.8.8) by default and select Custom: at this point, enter the IP address of Pi-Hole on the Primary server and then tap on Save. And that's it, you should now be able to enter the Pi-Hole GUI (pi.hole) and adjust any desired parameters.



But, the problem is that **you won't be able to see the clients individually** in the Pi-Hole Dashboard, instead it will be a single IP, that of the router, as in my case, it's 192.168.152.1. Before using the Google WiFi, I let [the AmpliFi HD GE](#) for a while with PI-Hole and to alleviate the aforementioned problem, Ubiquiti has added the Bypass DNS cache feature in order to easily see what clients are active and which are heaving the ads blocked. Google didn't bother with such functions and there is no easy work around it, but there is a difficult one, as provided by the user Geczy on [github.com](#). This definitely works, but the problem is that you will have to root the Google WiFi by physically opening the device, put it in developer's mode and then install GaleForce using a USB drive, so, besides saying bye-bye to the warranty, a lot of things can go wrong. Again, it's a valid solution and opens up a plethora of possibilities, but, specifically for Pi-Hole, there is another option.

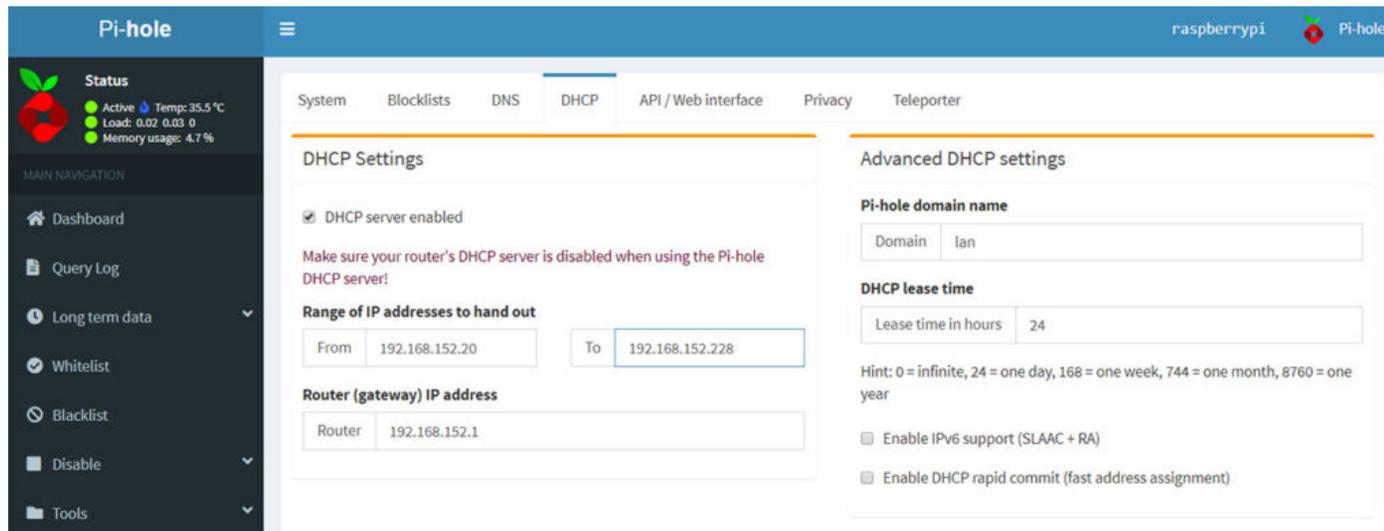
**Option 2:** DHCP enabled on Google WiFi, DHCP enabled on Pi-Hole: Google WiFi only gives an IP address to the Raspberry Pi, while the devices that connect to the Google WiFi will receive the IP address from the Raspberry Pi.

1. As in the step one of the previous option, it's important to **reserve an IP address for the Pi-Hole** device and use this address as **the DHCP Address Pool for the Google WiFi**: open the Google WiFi app and from the Settings > Network and General, select Advanced networking, followed by entering the Pi-Hole IP address for both the Starting IP and the Ending IP under the DHCP Address Pool.



2. Afterwards, enter the Pi-Hole graphical user interface and, after logging in (to get access to the full suite of settings), go to Settings and select DHCP from the top menu. Here, you will have to **enable the DHCP server** and then **enter a large enough**

**pool in the 'Range of IP addresses to hand out' for your clients**, but make sure that the subnet is the same as the Google WiFi and that there is no overlapping with the DHCP scope of the router (in my case, it was 192.168.152.229, so I stopped at 192.168.152.228); lastly, make sure that **the Google WiFi IP is set as the default gateway** (in my case, it was 192.168.152.1). Now, after restarting the router, if you go to the Query Log in the Pi-Hole GUI and hit refresh, it should start showing the IP address or the name of each client.



The screenshot shows the Pi-hole web interface on a Raspberry Pi. The top navigation bar includes 'System', 'Blocklists', 'DNS', 'DHCP', 'API / Web interface', 'Privacy', and 'Teleporter'. The 'DHCP' tab is selected. The 'DHCP Settings' section shows 'DHCP server enabled' checked. Below this, a warning states: 'Make sure your router's DHCP server is disabled when using the Pi-hole DHCP server!'. The 'Range of IP addresses to hand out' is set from 192.168.152.20 to 192.168.152.228. The 'Router (gateway) IP address' is set to 192.168.152.1. The 'Advanced DHCP settings' section shows the 'Pi-hole domain name' as 'lan', and the 'DHCP lease time' as 24 hours. There are also checkboxes for 'Enable IPv6 support (SLAAC + RA)' and 'Enable DHCP rapid commit (fast address assignment)'. The left sidebar shows system status (Active, Temp: 35.5 °C, Load: 0.02 0.03 0, Memory usage: 4.7 %) and main navigation options (Dashboard, Query Log, Long term data, Whitelist, Blacklist, Disable, Tools).

The screenshot displays the Pi-hole web interface. At the top, the status bar shows 'raspberrypi' and 'Pi-hole'. The left sidebar contains navigation options: Dashboard, Query Log (selected), Long term data, Whitelist, Blacklist, Disable, Tools, Network, Settings, Logout, Donate, and Help. The main content area is titled 'Recent Queries (showing up to 100 queries), show all'. It features a search bar, a 'Show 10 entries' dropdown, and a pagination control. Below this is a table with the following data:

| Time                | Type | Domain                       | Client         | Status         | Reply             | Action    |
|---------------------|------|------------------------------|----------------|----------------|-------------------|-----------|
| 2019-12-12 10:41:17 | A    | e17437.dscb.akamaiedge.net   | marks-mbp.lan  | OK (forwarded) | IP (11.6ms)       | Blacklist |
| 2019-12-12 10:41:16 | A    | su.itunes.apple.com          | marks-mbp.lan  | OK (forwarded) | CNAME (11.5ms)    | Blacklist |
| 2019-12-12 10:41:15 | A    | init.itunes.apple.com        | marks-mbp.lan  | OK (forwarded) | CNAME (11.6ms)    | Blacklist |
| 2019-12-12 10:41:12 | A    | www.youtube.com              | 192.168.1.10   | OK (forwarded) | CNAME (33.3ms)    | Blacklist |
| 2019-12-12 10:41:11 | A    | stats.g.doubleclick.net      | 192.168.152.20 | OK (forwarded) | CNAME (11.4ms)    | Blacklist |
| 2019-12-12 10:41:09 | A    | swdist.apple.com             | marks-mbp.lan  | OK (forwarded) | CNAME (11.4ms)    | Blacklist |
| 2019-12-12 10:41:08 | A    | wpad.lan                     | 192.168.152.20 | OK (cached)    | NXDOMAIN (0.3ms)  | Blacklist |
| 2019-12-12 10:41:01 | A    | xp.apple.com                 | marks-mbp.lan  | OK (forwarded) | CNAME (11.4ms)    | Blacklist |
| 2019-12-12 10:41:00 | PTR  | 109.152.168.192.in-addr.arpa | localhost      | OK (forwarded) | NXDOMAIN (12.0ms) | Blacklist |
| 2019-12-12 10:40:58 | A    | swscan.apple.com             | marks-mbp.lan  | OK (forwarded) | CNAME (24.3ms)    | Blacklist |

At the bottom of the table, there is a checkbox labeled 'Apply filtering on click on Type, Domain, and Clients' which is checked. The footer of the table area shows 'Showing 1 to 10 of 100 entries' and another pagination control.

This way, you will be able to see the clients in the Google WiFi application and in the Query Log from the Pi-Hole GUI – I know that it's not the most elegant solution (and I will keep it in my home network to see if I discover any issues), but, since [the Google WiFi system](#) is so rigid in its configuration, this is a working way to achieve network-wide ad-blocking. One negative consequence is that the Guest network is not going to be covered by the Pi-Hole ad-blocking abilities, but, in a way, it's also a positive since you will be able to check if everything is working properly by simply switching between networks (instead of logging into Pi-Hole and pause its services).

## □ Mark B

Mark is a graduate in Computer Science, having gathered valuable experience over the years working in IT as a programmer. Mark is also the main tech writer for MBReviews.com, covering not only his passion, the networking devices, but also other cool electronic gadgets that you

may find useful for your every day life.



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