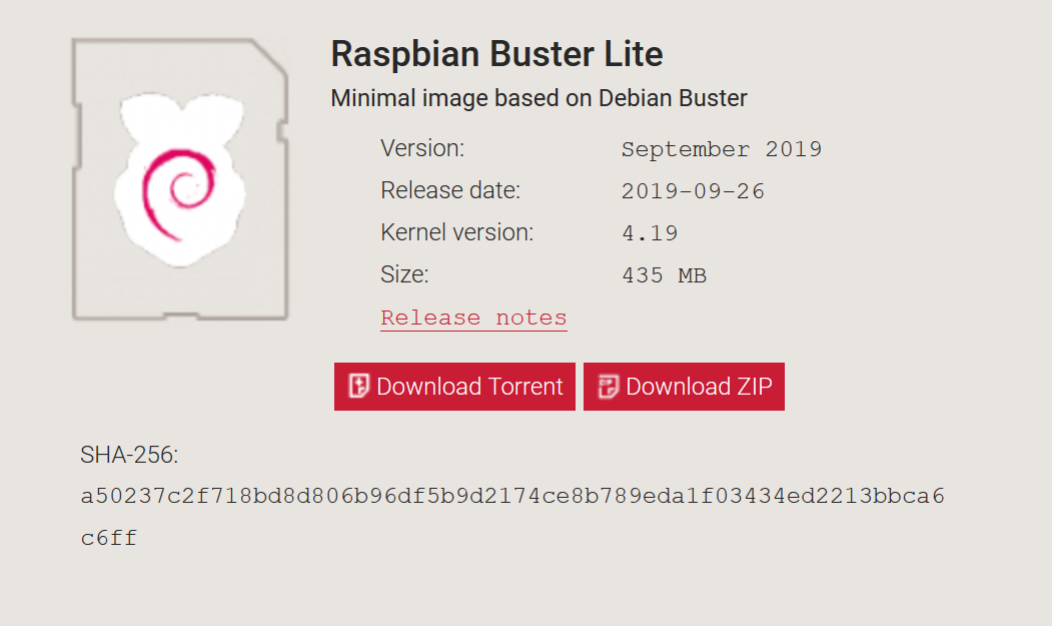
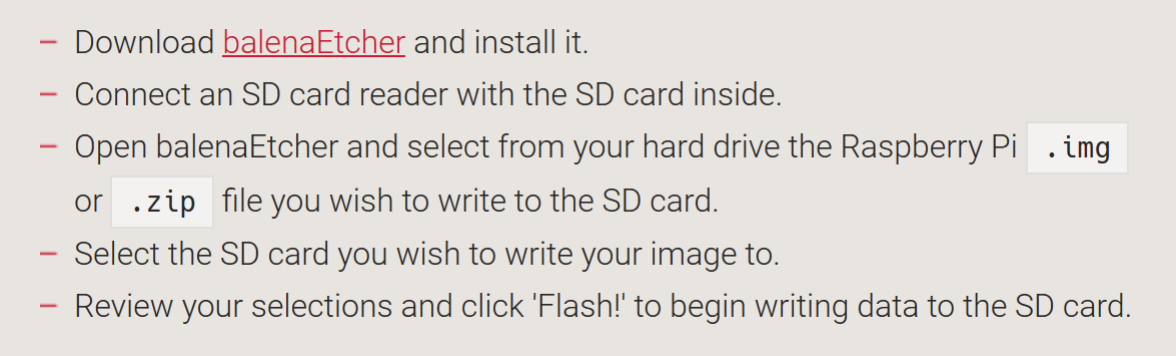
# How to set up a Pi-Hole local DNS server w/ DNSSEC and ad-blocking

## By Ryan “Techno-Agorist” Burgett

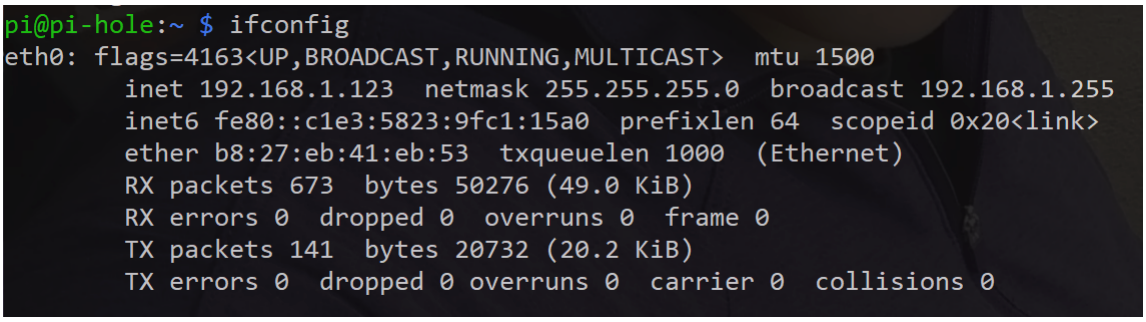



1. Download the Raspbian Light image from https://www.raspberrypi.org/downloads/raspbian/.




2. Download and install balenaEtcher on your computer then follow the above instructions from Installing operating system images to write the Raspbian Light image to the micro SD card.
3. Once finished, insert the micro SD card into the Raspberry Pi and boot up with the Pi hooked up to a keyboard and monitor.
4. For `raspberrypi login:` enter `pi`.
5. For `Password:` enter `raspberry`.
6. Open the Raspberry Pi Software Configuration Tool by entering `sudo raspi-config`.
7. First, change your password to something unique and record that somewhere.
8. Second, go to `Network Options` and change the `Hostname` to something recognizable like `pi-hole` so that you will be able to recognize the device on your local network.

9. Third, go to `Network Options` and enter your Wi-fi information (if you have a Wi-fi enabled Pi and are going to use Wi-fi rather than a wired connection). A wired connection is generally preferable for something like this.
10. Next, go to `Interfacing Options` and enable the SSH server.
11. Select `Finish` and reboot.

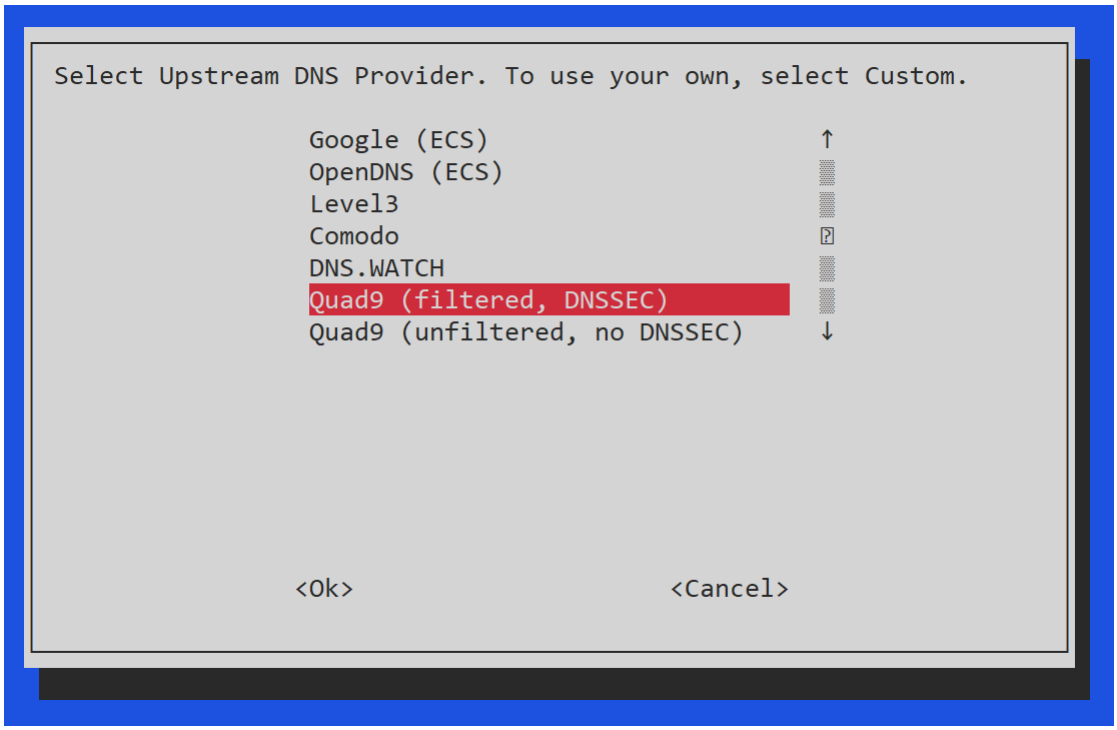



12. Once you are logged back in, enter `ifconfig` to see the Pi's network interfaces.
13. Find the device's IP address, usually something like `192.168.x.x`, in the above example, the IP address is 192.168.1.123. Pay attention to the first three numbers.
14. Enter `nano /etc/dhcpcd.conf` (or, use `vi` if you are like me).
15. Add the following to the bottom of the file, replacing each line with the appropriate address for your setup. For most people, if their dynamic IP address (what we looked at above) is `192.168.1.x`, their router is `192.168.1.1` and their domain name server is the same as the router. For your static IP, you can choose the current IP address or another one, but you probably make sure that the IP address isn't already in use by another device (you can check this from your router admin control panel). In my case, I already have my network configured to only dynamically give out addresses over 100, which leaves addresses 1-99 free for static IPs, so for my example I chose address 5.
    ```
    interface eth0
    static ip_address=192.168.1.5
    static routers=192.168.1.1
    static domain_name_servers=192.168.1.1
    ```
16. Save the file and reboot.
17. Enter `sudo su`.
18. Enter `apt-get update` to update the apt package lists.
19. Enter `apt-get install -y ufw` to install the UFW firewall.
20. Enter the following to configure the firewall to allow SSH and to open the necessary ports for the Pi-Hole:
    ```
    ufw allow 22
    ufw allow 80/tcp
    ufw allow 53/tcp
    ufw allow 53/udp
    ufw allow 67/tcp
    ufw allow 67/udp
    ```
21. Enter `ufw enable` to enable the firewall.

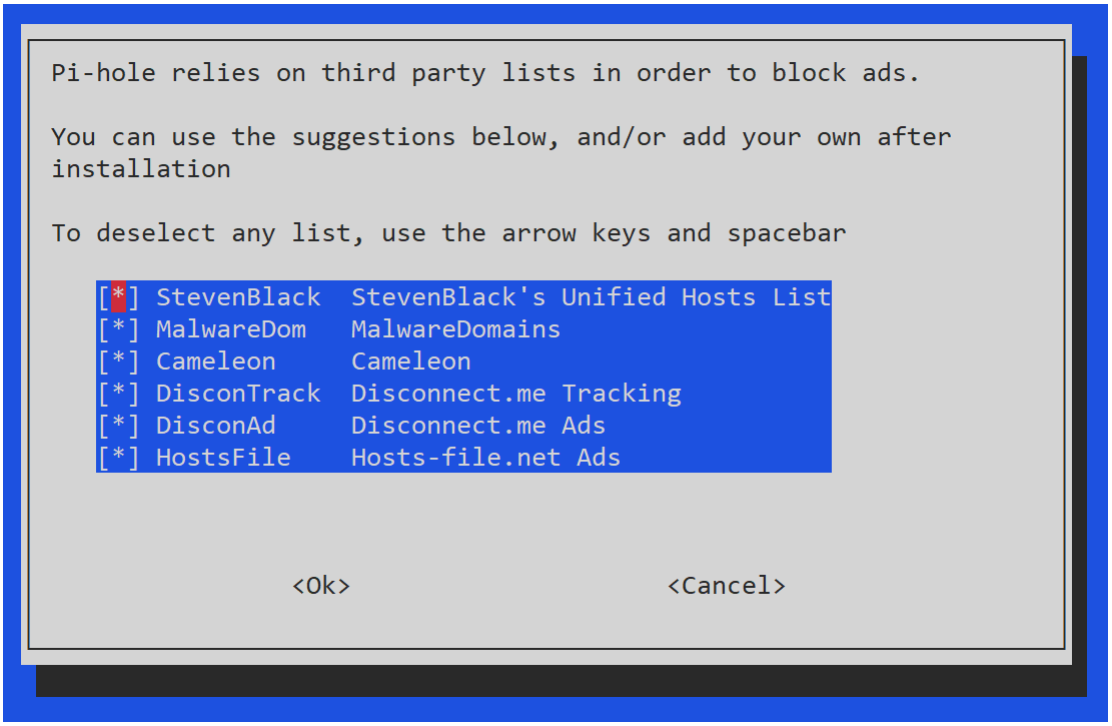
```
root@pi-hole:/home/pi# ufw status
Status: active

To                         Action      From
--                         ------      ----
22                         ALLOW       Anywhere
80/tcp                     ALLOW       Anywhere
53/tcp                     ALLOW       Anywhere
53/udp                     ALLOW       Anywhere
67/tcp                     ALLOW       Anywhere
67/udp                     ALLOW       Anywhere
22 (v6)                    ALLOW       Anywhere (v6)
80/tcp (v6)                ALLOW       Anywhere (v6)
53/tcp (v6)                ALLOW       Anywhere (v6)
53/udp (v6)                ALLOW       Anywhere (v6)
67/tcp (v6)                ALLOW       Anywhere (v6)
67/udp (v6)                ALLOW       Anywhere (v6)
```

22. Enter `ufw status` to make sure that all the necessary ports were opened.
23. Enter `exit` to leave sudo mode.
24. Enter the following to run the [One-Step Automated Pi-hole Install]:

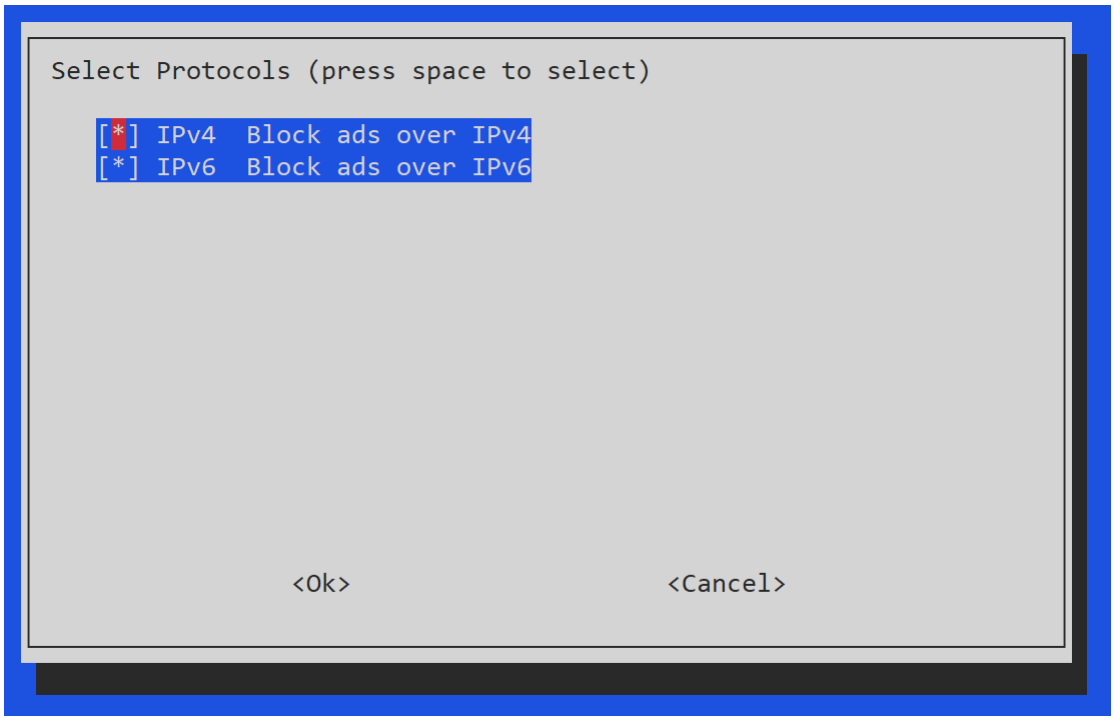
    `sudo curl -sSL https://install.pi-hole.net | bash`



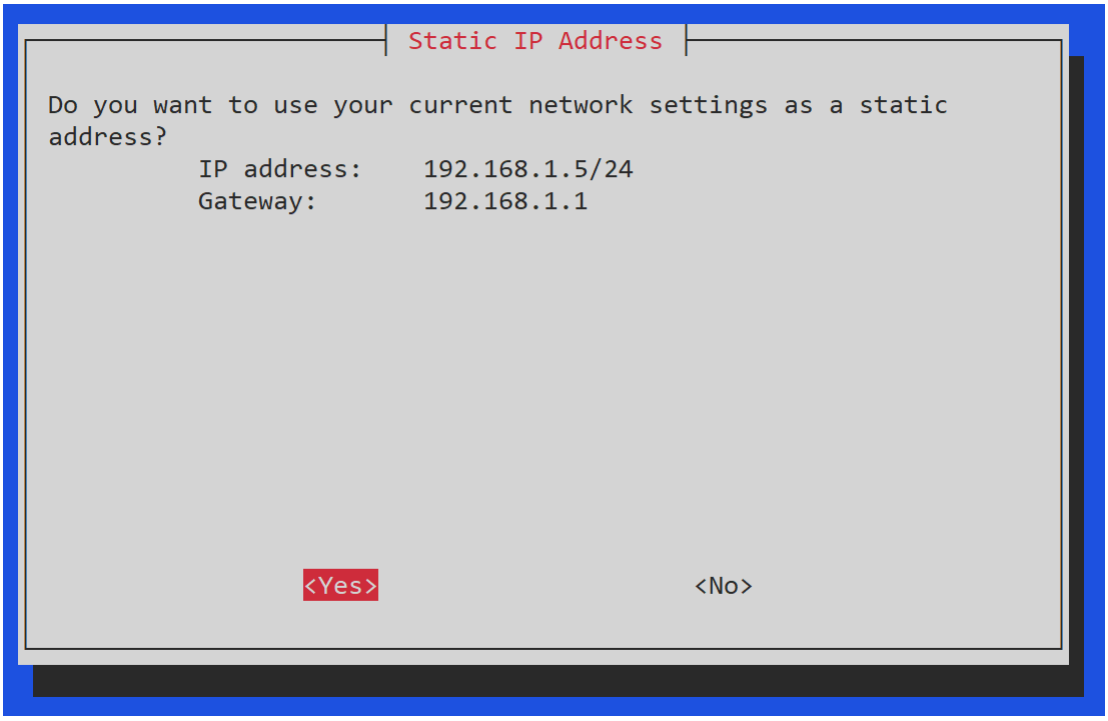

25. When asked which DNS Provider to use, select whichever one you would like, but I recommend Quad9 filtered with DNSSEC.



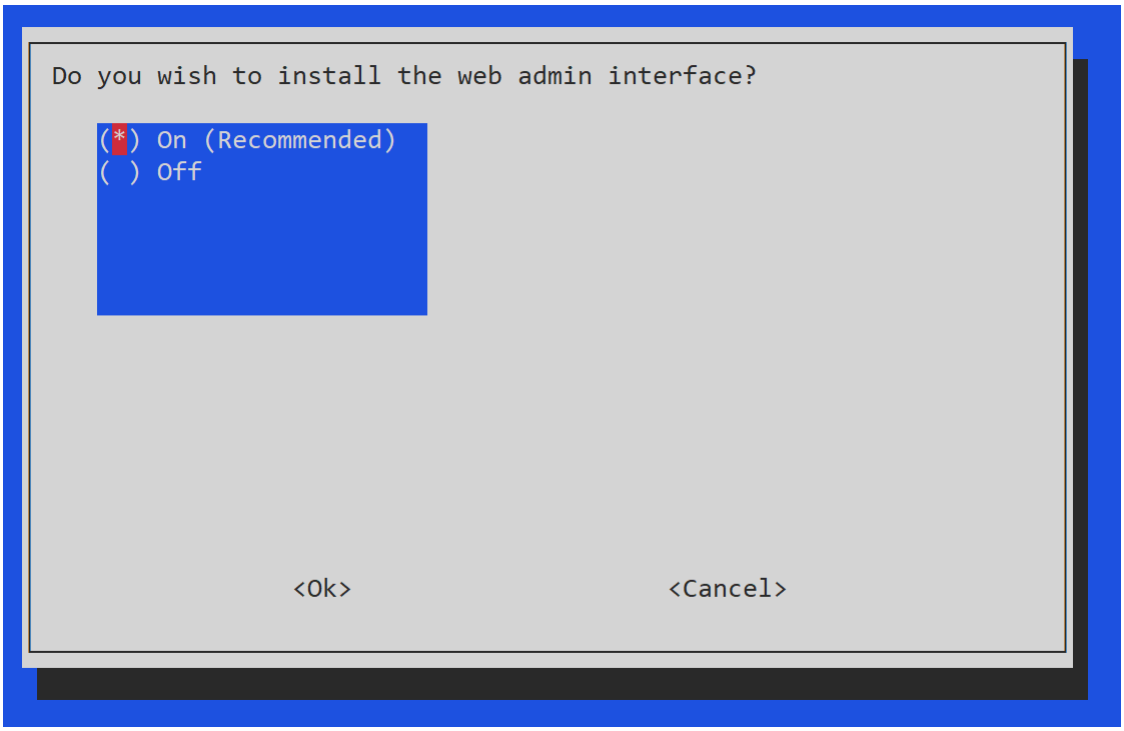

26. When asked which lists to use, I would recommend leaving the default settings as they are and just selecting Ok.



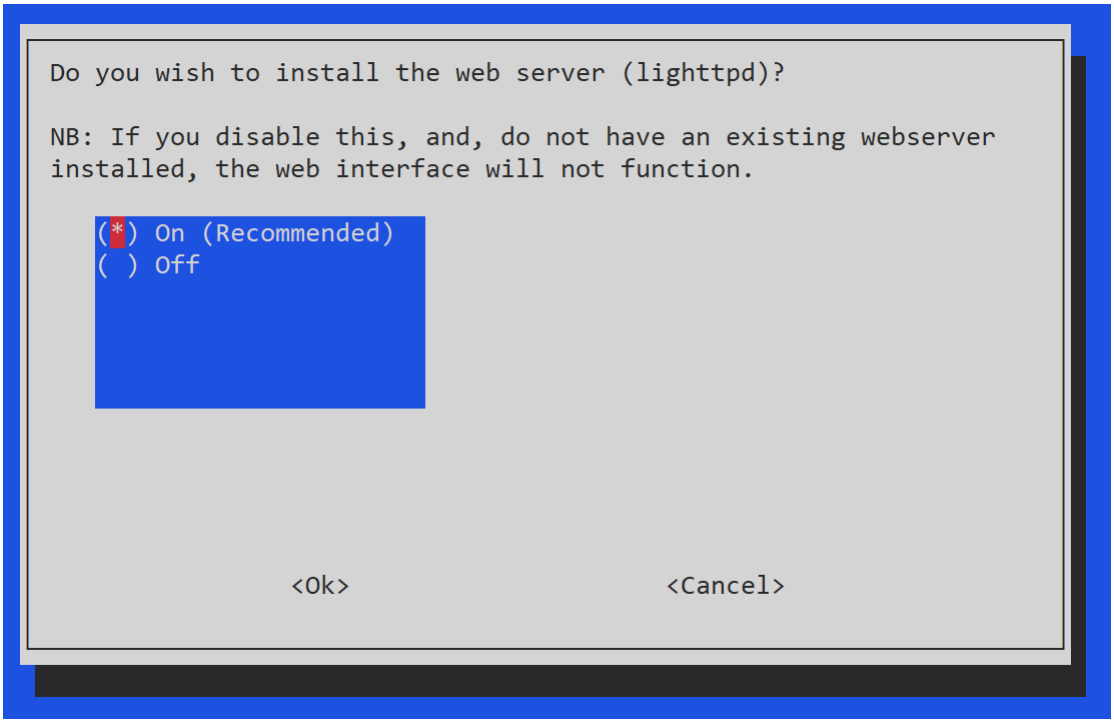

27. Leave the protocols as is.



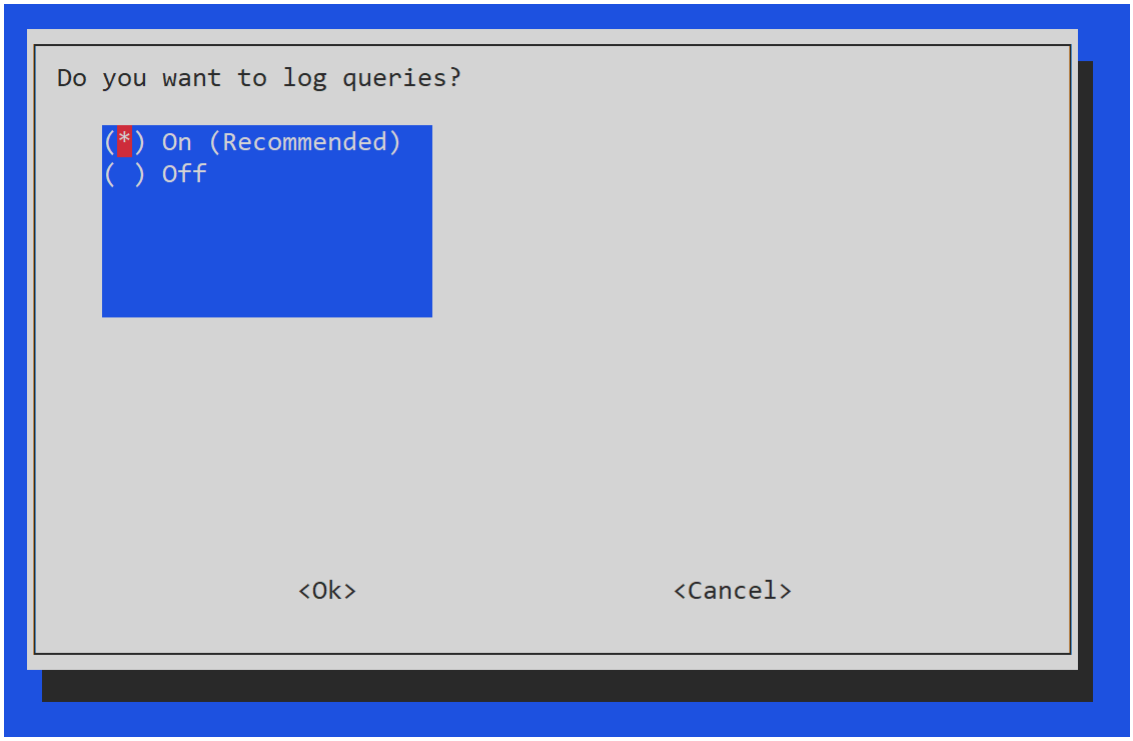

28. Verify that the network settings match what you entered earlier, then select `Yes`.



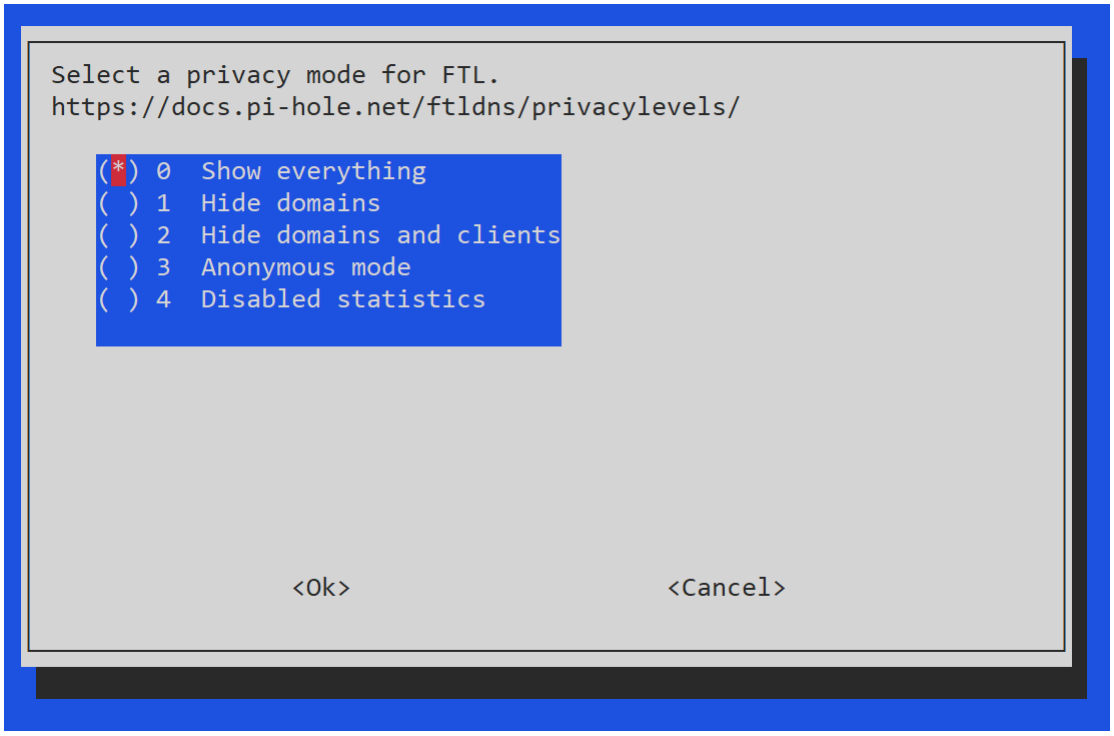

29. Install the web interface.




30. Install the web server.

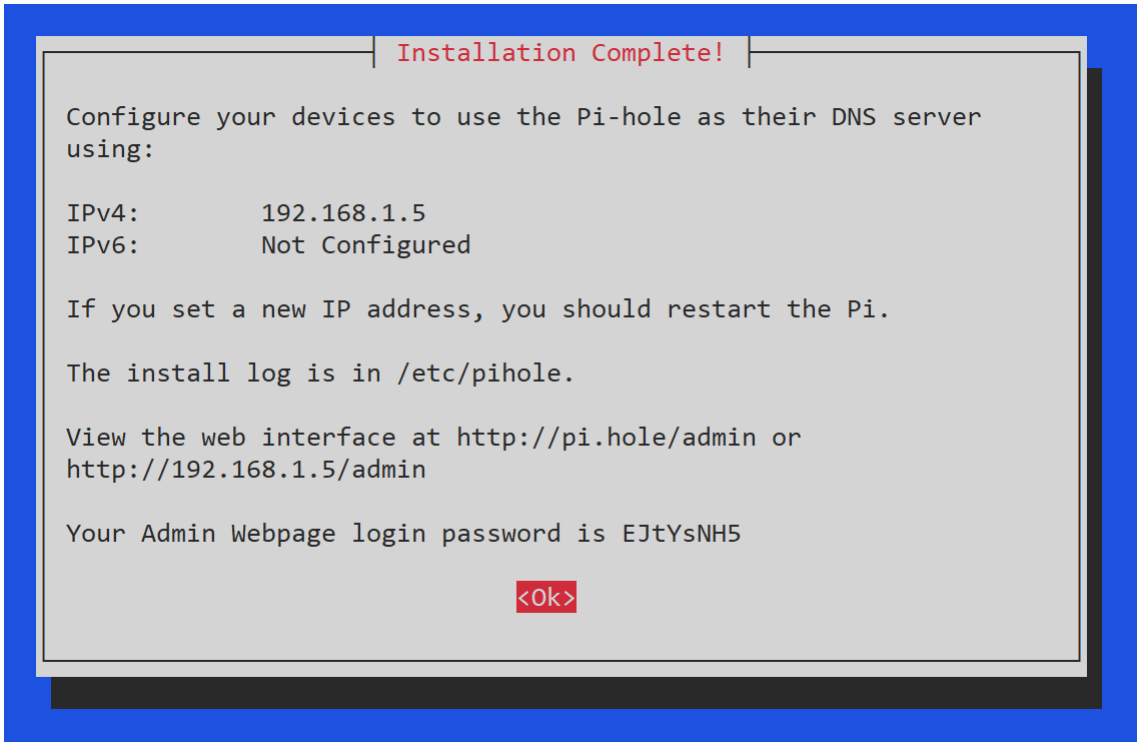



31. Log queries.

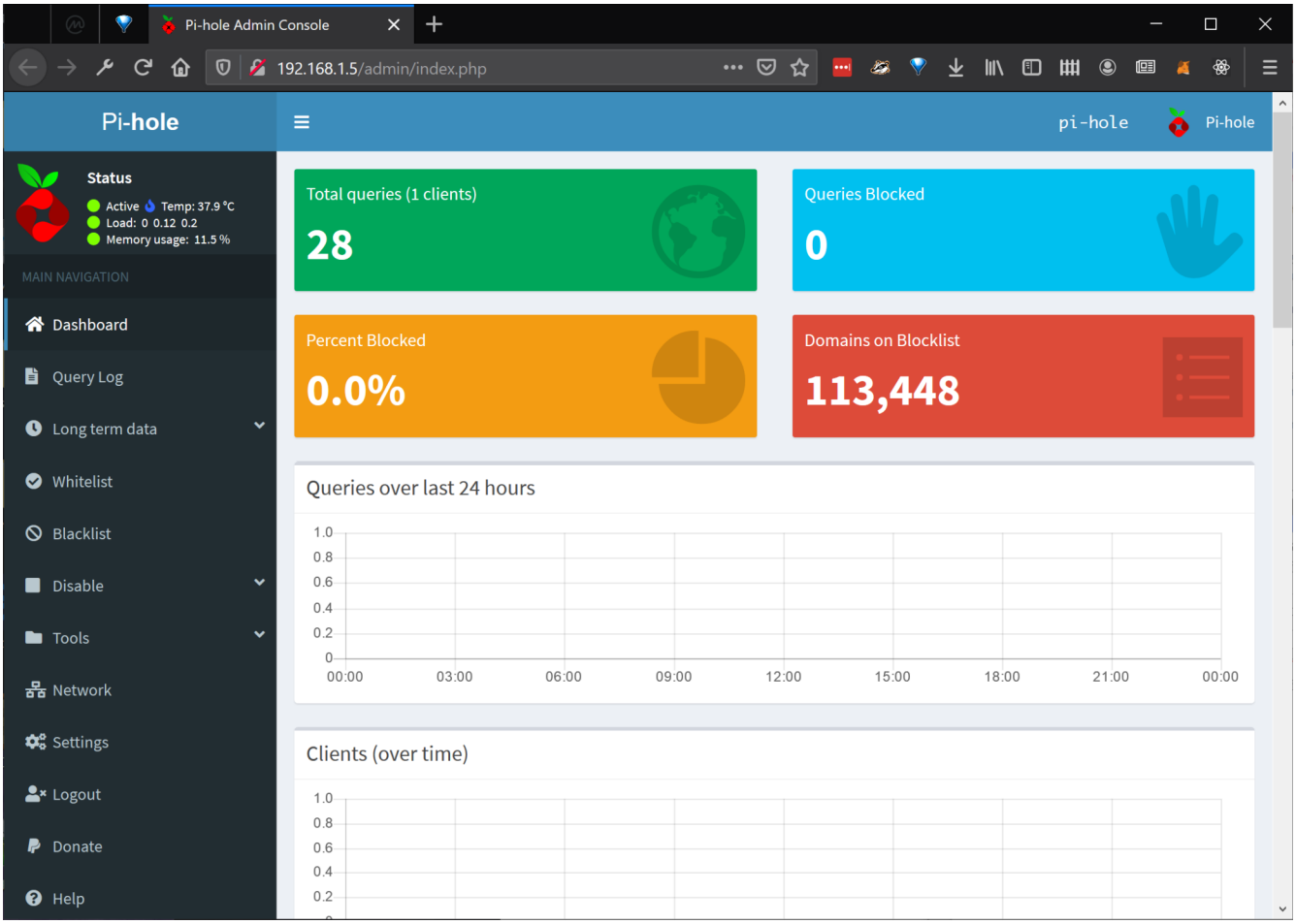



32. Select your desired privacy mode (I always select `Show everything`).

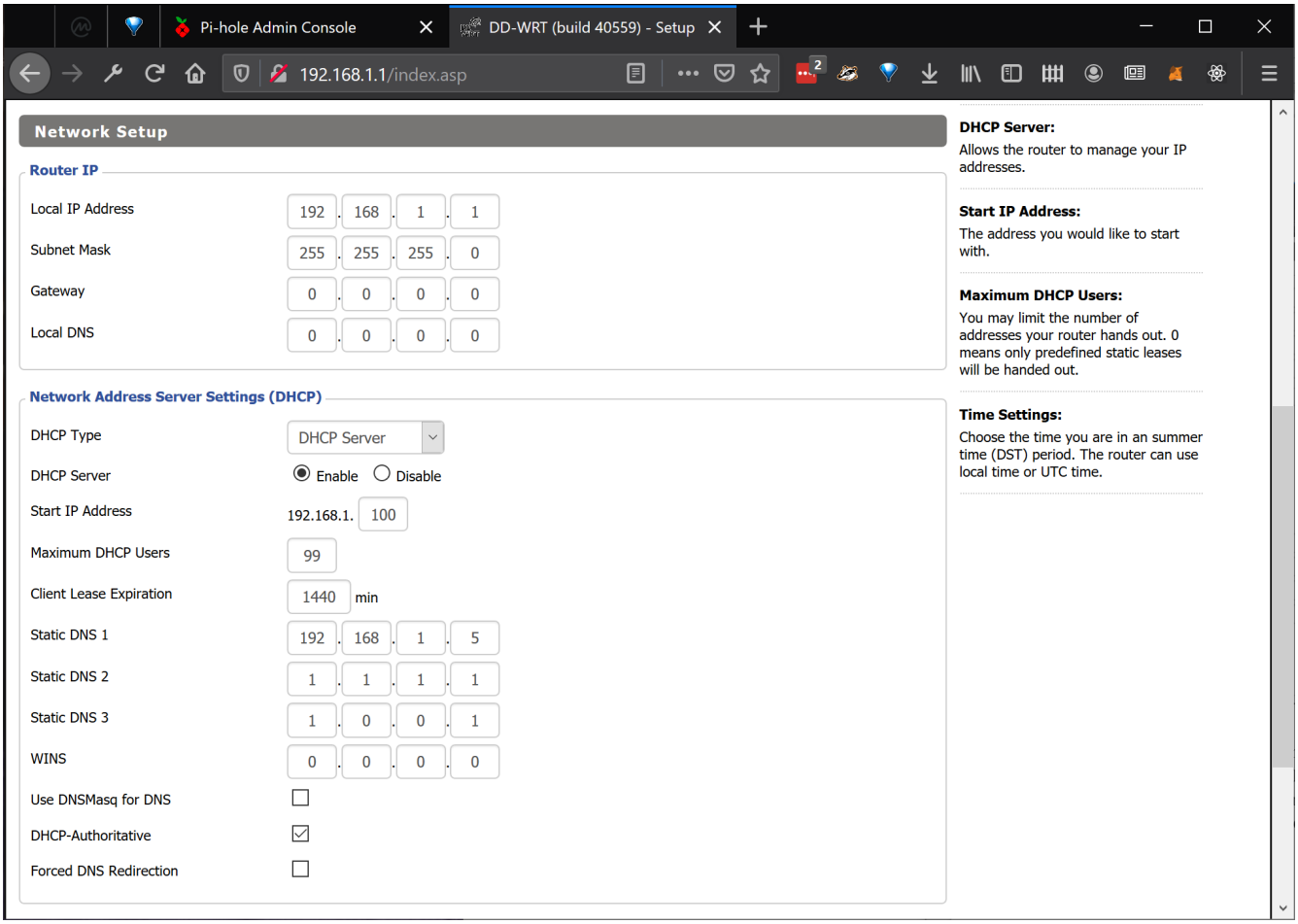

33. You already configured the firewall, so select `No` when asked about auto-configuring the firewall.




34. Pay close attention to the Installation Complete screen. The Ipv4 address (the same static IP address that you configured earlier) will be the address for your fancy new Pi-Hole DNS server. You will want to record the admin address (e.g. `http://192.168.1.5/admin`) so that you can log into the admin control panel. Finally, record the admin login password (if you accidentally missed this screen or if you want to change the password, you can set a new password from the command line by entering `pihole -a -p`).
35. Enter the admin control panel address into a web browser on your local network and login.




36. If the status is Active, then congratulations! You have a working Pi-Hole.




Now that the device is up and running, you can set your internet browser, your operating system, or your network router to use it for all DNS requests. I would recommend that you log into your router and update it to use your Pi-Hole for all DNS requests on the network. This way every device, every browser, every operating system, and every application will use the Pi-Hole for DNS queries.

Enjoy!