

Installing a Raspberry Pi Hole

Intro

The purpose of this tutorial is to show how to set up a Raspberry Pi as a DNS server known as a Pi Hole. This Pi Hole will be able to disable many different advertisements based on the advertiser's IP address.

Learning Objectives

- Install Rasbian to the Pi
- Remote into the Raspberry Pi using SSH
- Install Raspberry Pi Hole
- Explain why a Raspberry Pi may be useful


Prerequisites

- Raspberry Pi
- Micro SD Card
- Micro SD Card Reader
- Micro USB power cable
- Keyboard and HDMI cable to configure the Raspberry Pi

Step One - Install Raspian Stretch

- Raspbian Stretch is the newest version of the Raspberry Pi's operating system. Visit the below website to download the zip file for Stretch.

<https://www.raspberrypi.org/downloads/raspbian/>




Raspbian Stretch with desktop and recommended software

Image with desktop and recommended software based on Debian Stretch

Version: November 2018
Release date: 2018-11-13
Kernel version: 4.14
Release notes: [Link](#)

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SHA-256: 0ca644539fdaf4e19ec7ceb9e61c049b82ba45b1a21cdec91fa54bd59d660d2




Raspbian Stretch with desktop

Image with desktop based on Debian Stretch

Version: November 2018
Release date: 2018-11-13
Kernel version: 4.14
Release notes: [Link](#)

[Download Torrent](#) [Download ZIP](#)

SHA-256: a121652937ccde1c2583fe77d1caec407f2cd248327df2901e4716649ac9bc97



Raspbian Stretch Lite

Minimal image based on Debian Stretch


Version: November 2018
Release date: 2018-11-13
Kernel version: 4.14
Release notes: [Link](#)


[Download Torrent](#) [Download ZIP](#)

SHA-256: 47ef1b2501d0e5002675a50b6868074e693f78829822eef64f3878487953234d

- You'll also need to download software to flash the zip file to the micro sd card. You can download a flash software such as BalenaEtcher to get the job done. Find the link to the download below.

<https://www.balena.io/etcher/>

An open source project by  balena | More products



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Etcher Pro

Flash. Flawless.

Flash OS images to SD cards & USB drives, safely and easily.

+

→

→

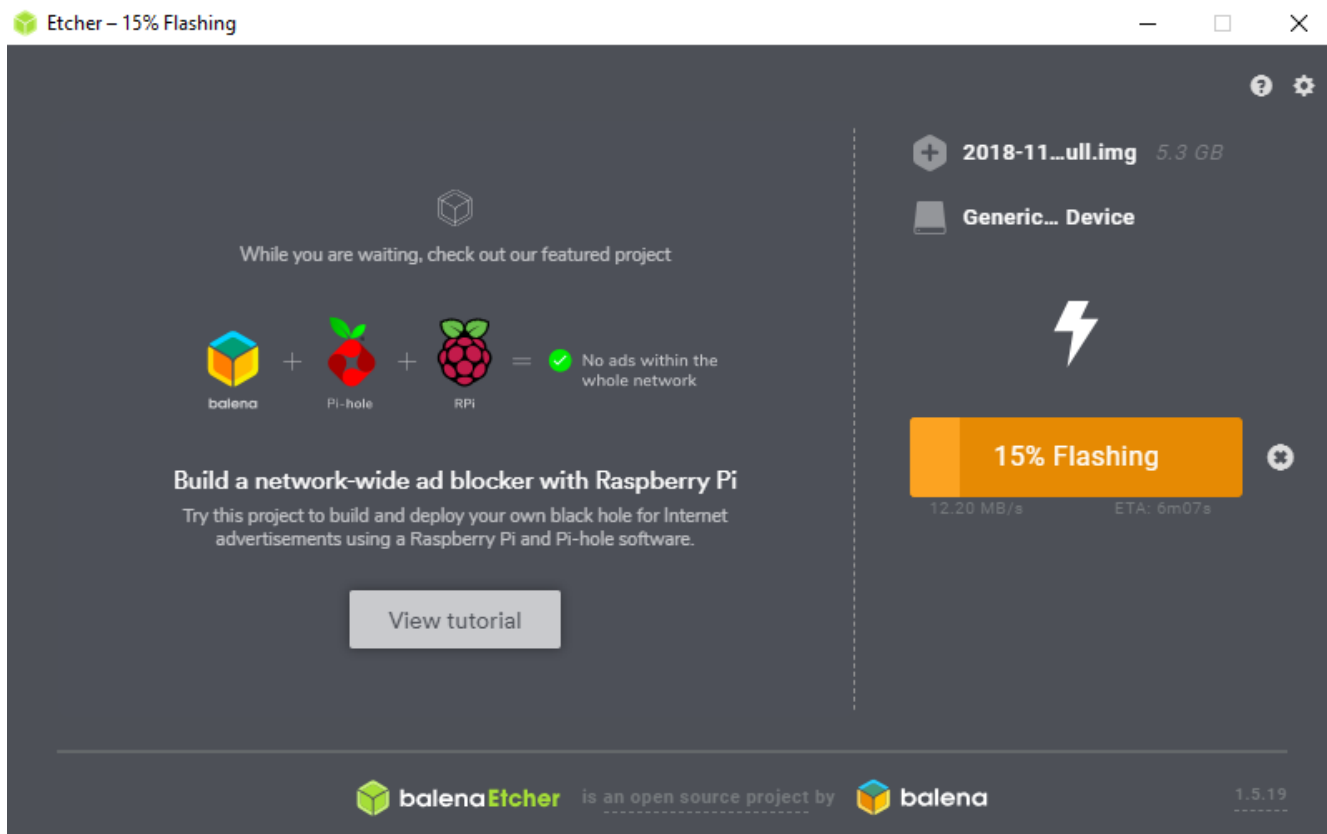
⚡

Select image
Select drive
Flash!

Download for Windows x64

v1.5.19 [See what's new](#)

- You will now need to plug in the USB micro SD card reader. The micro SD card should be in the reader. Open up Etcher and flash the download to the disk. If you've done so correctly, you'll get the something similar to the below screenshot.



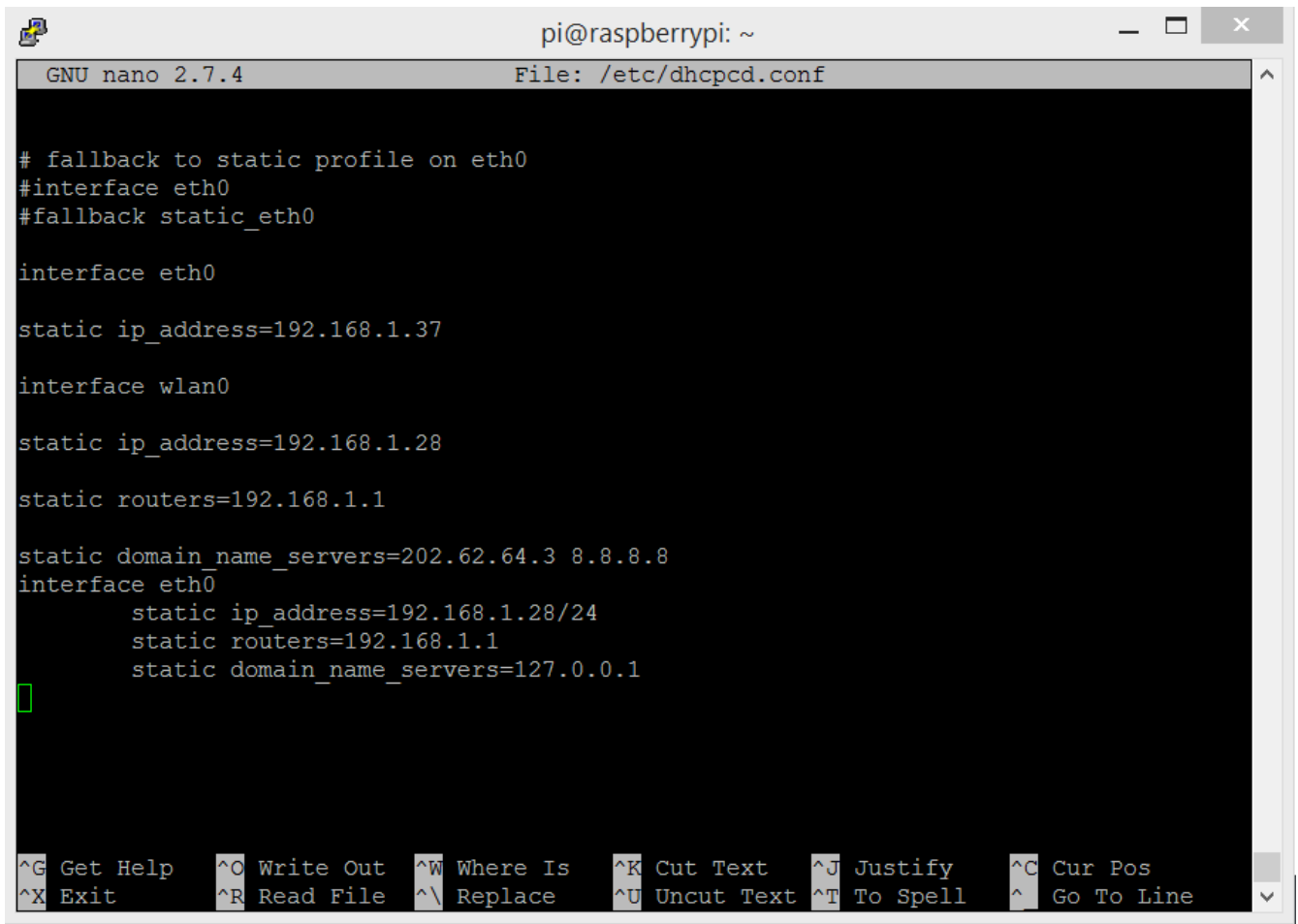
- Put the micro SD card into the Raspberry Pi.
- Now that the image is flashed to the micro SD card, you're going to want to plug in a HDMI cable, keyboard, and a mouse into the Raspberry Pi. The goal is to be able to set up the Raspberry Pi from a monitor, but once we set a static IP address, we can install the Raspberry Pi hole remotely using SSH.
- The Raspberry Pi 3 model B has built in wireless capabilities, but if your pi does not, you will need to invest in a wireless WiFi dongle.
- Follow the set up wizard and make sure to connect to your home network.

Step Two - Set a Static IP on the Pi

- Open the terminal
- You will want to run `ifconfig` and `netstat` to find your Default Gateway (your router's IPv4 address), Netmask, and a desired IP address for both `wlan0` and `eth0`
- Edit the `/etc/dhcpd.conf` file with the following

```
sudo nano /etc/dhcpd.conf
```

- Here's what it should look like. The only information that should be different is my IPv4 information, subnet, and broadcast.



```
pi@raspberrypi: ~
GNU nano 2.7.4 File: /etc/dhcpd.conf

# fallback to static profile on eth0
#interface eth0
#fallback static_eth0

interface eth0

static ip_address=192.168.1.37

interface wlan0

static ip_address=192.168.1.28

static routers=192.168.1.1

static domain_name_servers=202.62.64.3 8.8.8.8
interface eth0
    static ip_address=192.168.1.28/24
    static routers=192.168.1.1
    static domain_name_servers=127.0.0.1

^G Get Help  ^O Write Out  ^W Where Is   ^K Cut Text   ^J Justify    ^C Cur Pos
^X Exit      ^R Read File  ^\ Replace    ^U Uncut Text ^T To Spell   ^_ Go To Line
```

- Reset the Raspberry Pi for changes to go into effect.

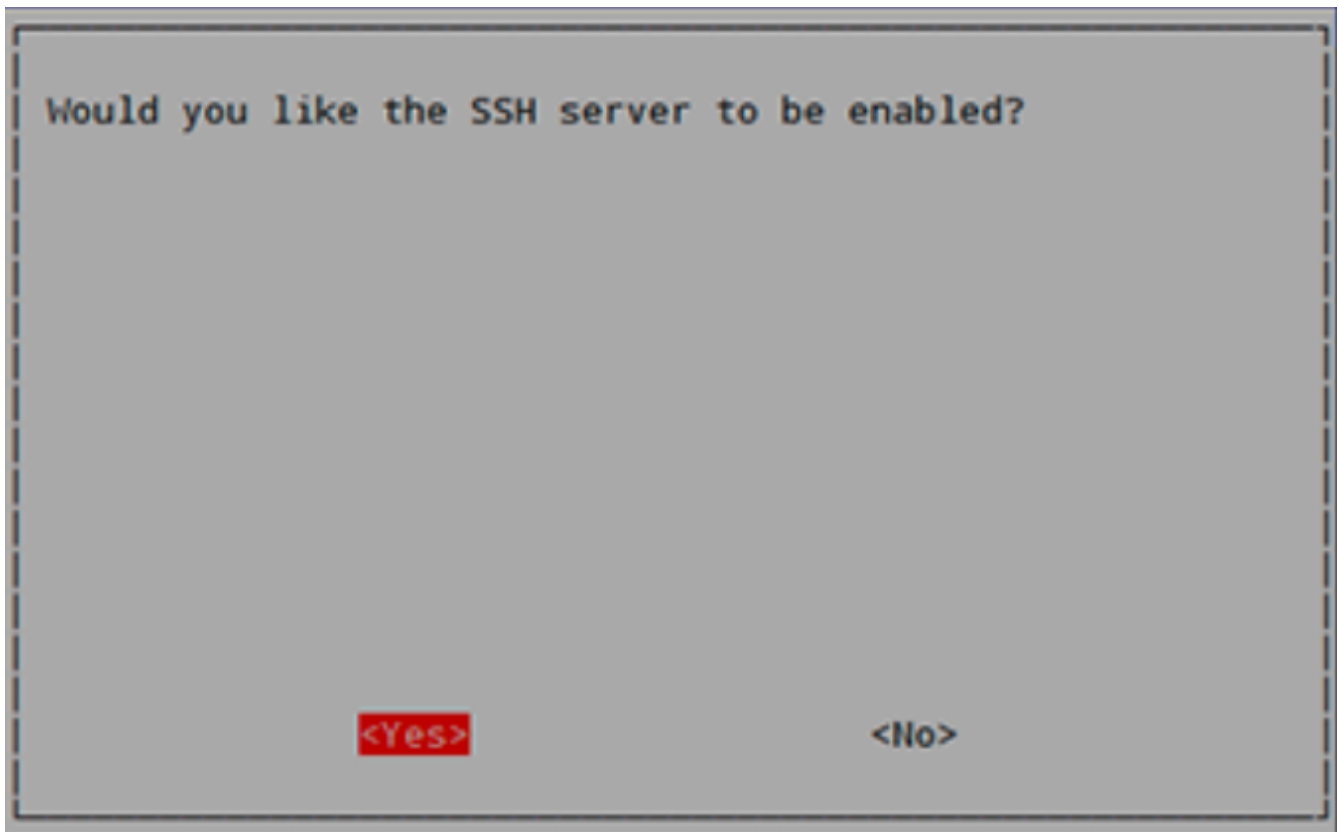
```
sudo reboot 0
```

Step Three - SSH into the Pi

- We need to enable SSH on the Raspberry Pi
- In the terminal, type the following

```
sudo raspi-config
```

- Select "Interfacing Options"
- Select SSH
- Enable SSH by pressing Enter



- Open the command prompt and ping your Raspberry Pi's static IP to make sure the Pi is both on and has the IP set correctly.
- Once your static IP is set, you can ssh into your Raspberry Pi using Putty
- Sign into your Pi using the credentials set up during installation of the Pi

A screenshot of a Windows Command Prompt window. The title bar reads 'C:\Windows\System32\cmd.exe'. The window content shows the following text:

```
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Windows\System32>ping 192.168.1.28

Pinging 192.168.1.28 with 32 bytes of data:
Reply from 192.168.1.28: bytes=32 time=488ms TTL=64
Reply from 192.168.1.28: bytes=32 time=506ms TTL=64
Reply from 192.168.1.28: bytes=32 time=418ms TTL=64
Reply from 192.168.1.28: bytes=32 time=311ms TTL=64

Ping statistics for 192.168.1.28:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 311ms, Maximum = 506ms, Average = 430ms

C:\Windows\System32>
```

Step four - Install the Pi Hole

- Open the terminal, whether through SSH or on a monitor
- In the terminal, install Raspberry Pi Hole

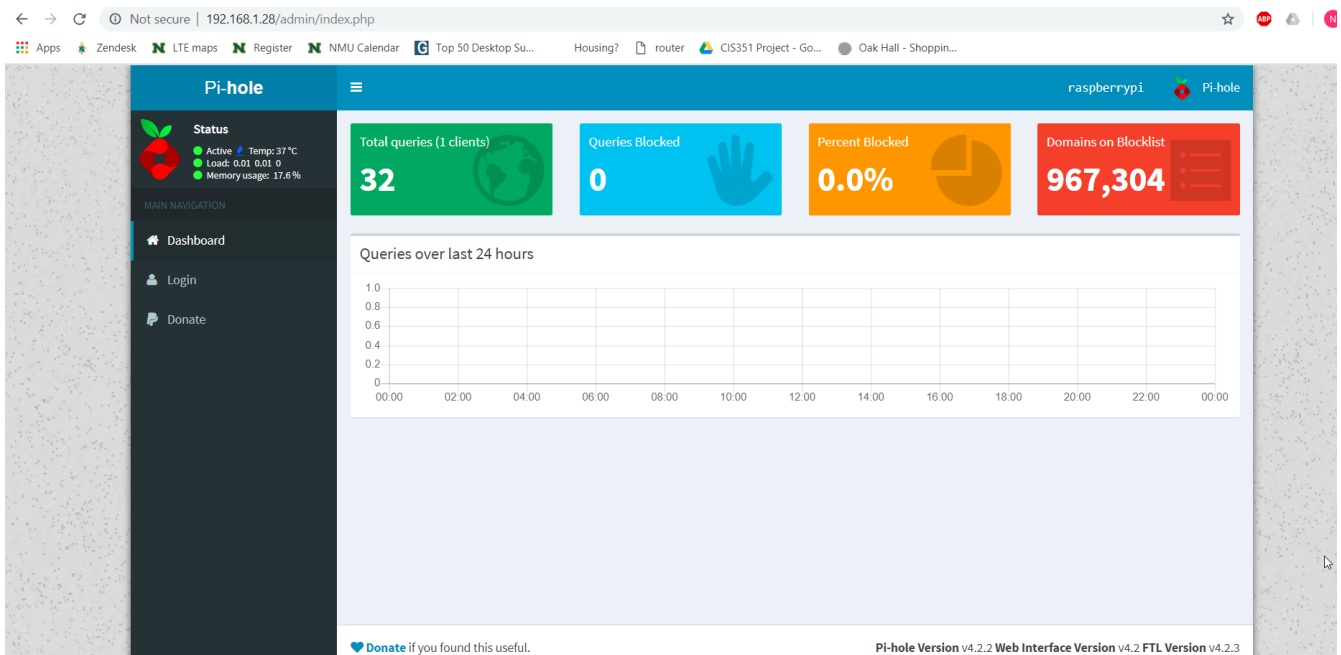
```
Sudo curl -sSL https://install.pi-hole.net | bash
```

- This step can take some time, but when the wizard becomes available, you can mostly just hit enter and accept things how they are.
- When asked about your upstream provider, any are acceptable.
- Once the wizard is complete, you should see a banner that says "Installation Complete!" Make sure that you take note of the password so that you can log into the Pi Hole's web interface.
- You should have the Pi Hole set up by now, so go to the web interface to start. Accomplish this by opening a browser on your preferred computer. Your web interface will be the static IP address of the Raspberry Pi /admin. Mine is listed below.

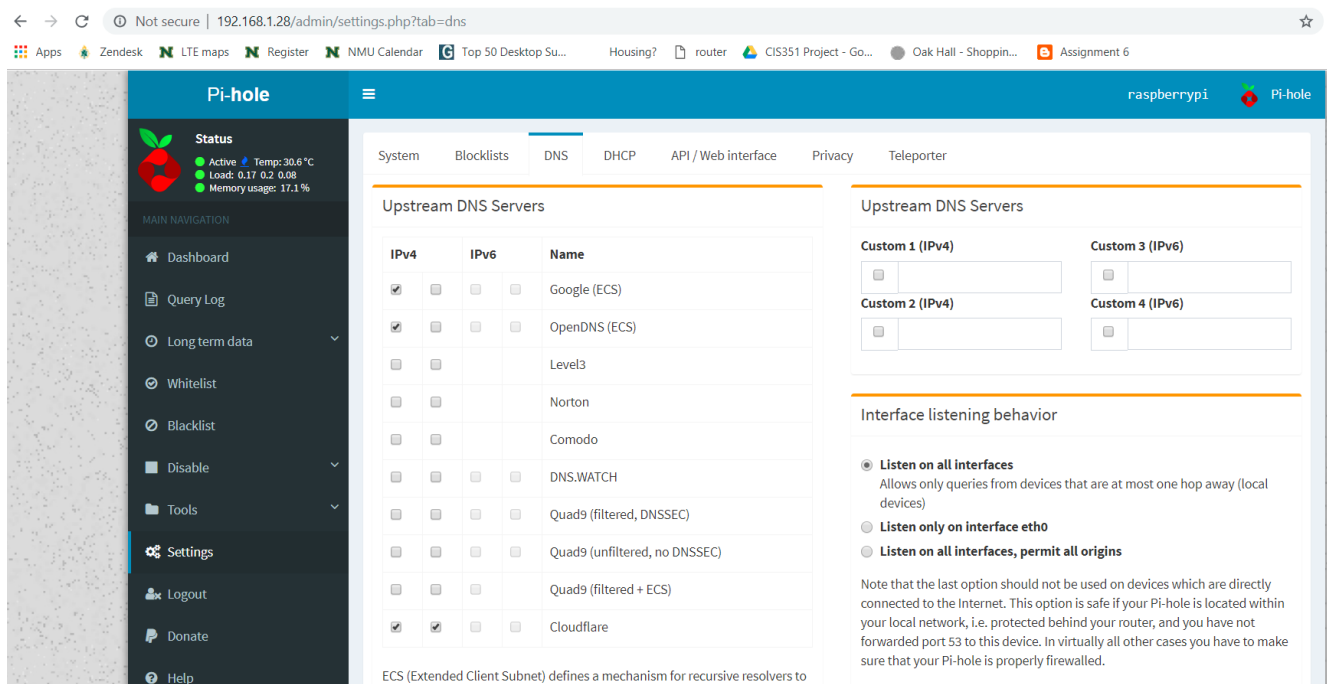
```
192.168.1.28/admin
```

- You can now login using the password that you've saved earlier
- If you don't remember the pi hole password or didn't write it down (like I did) you can reset the pi hole's password with the following

```
pi hole -a -p
```



- Once signed in, you need to enable listening on all interfaces.
- Go to Settings → DNS → Interface Listening Behavior → Listen on all interfaces



Step five - Set up the DNS Server

- Your router naturally has a DNS server that is automatically enabled, so you will need to turn your ISP's DNS server off and enable yours as an alternate. My DNS settings are found under Basic Settings.
- This DNS server will send the advertisers a 'fake' IP address, that way many advertisements will never be loaded on a webpage to begin with
- Every router has a different web interface, so it may be difficult to find. Just log into your router by typing its IP address into the address bar. If you don't know the user name and password, you can likely find that information on the router. The login and username are probably just admin and password.

Domain Name Server (DNS) Address

- ☐ Get Automatically from ISP
☒ Use These DNS Servers

Primary DNS

Secondary DNS

192	.	168	.	1	.	28
	.		.		.	

Step six - Install a blacklist

- The Pi Hole needs a block list to know what to block. I use Wally's List to find a good ad blocking list. They include 3 different lists to choose from. One that basically blocks everything, one that blocks only some things, and one right in the middle. The choice is yours. I recommend choosing whichever one suits you, based on how much you want blocked on your home network. Go to the website and just copy and paste the block list to the Block List section under Settings in the Pi Hole's web interface.

<https://v.firebog.net/hosts/lists.php>



The Firebog

This page will provide the current URL's from <https://wally3k.github.io>, so that they can all be copy and pasted within your `adlists.list` file, or to Pi-hole's Block Lists menu.

Available List Types (all exclude Pornography) and use cases:

- › **Ticked lists:** For when installing Pi-hole where no one will be whitelisting falsely blocked sites
- › **Non-crossed lists:** For when someone is usually around to whitelist falsely blocked sites
- › **All lists:** For those who will always be around to whitelist falsely blocked sites

This site and its content © WaLLy3K

<input checked="" type="checkbox"/>	https://ransomwaretracker.abuse.ch/downloads/TC_C2_DOMBL.txt	
<input checked="" type="checkbox"/>	https://ransomwaretracker.abuse.ch/downloads/TL_C2_DOMBL.txt	
<input checked="" type="checkbox"/>	https://v.firebog.net/hosts/Shalla-mal.txt	
<input checked="" type="checkbox"/>	https://raw.githubusercontent.com/StevenBlack/hosts/master/data/add.Risk/hosts	
<input checked="" type="checkbox"/>	https://www.squidblacklist.org/downloads/dg-malicious.acl	
<input checked="" type="checkbox"/>	https://zerodot1.gitlab.io/CoinBlockerLists/hosts	
<input checked="" type="checkbox"/>	media.trafficjunky.net	

<https://hosts-file.net/grm.txt>

Save

Important: Save and Update when you're done!

Save and Update

You're DNS server through the Raspberry Pi Hole should be configured at a very basic level and working!

Challenge

- Can you find a way to secure the Raspberry Pi so that data is encrypted and safe?
- Put the Raspberry Pi on a VPN so that you can access the Pi Hole from anywhere

Reflection

- Why would you want to block ads on a network, besides the fact that they are annoying?
- Why are web page advertisement blocked but not video ads, like on YouTube?
- Does having a Network wide ad blocker have any advantage over an adblocking application such as Adblock Plus? Why?