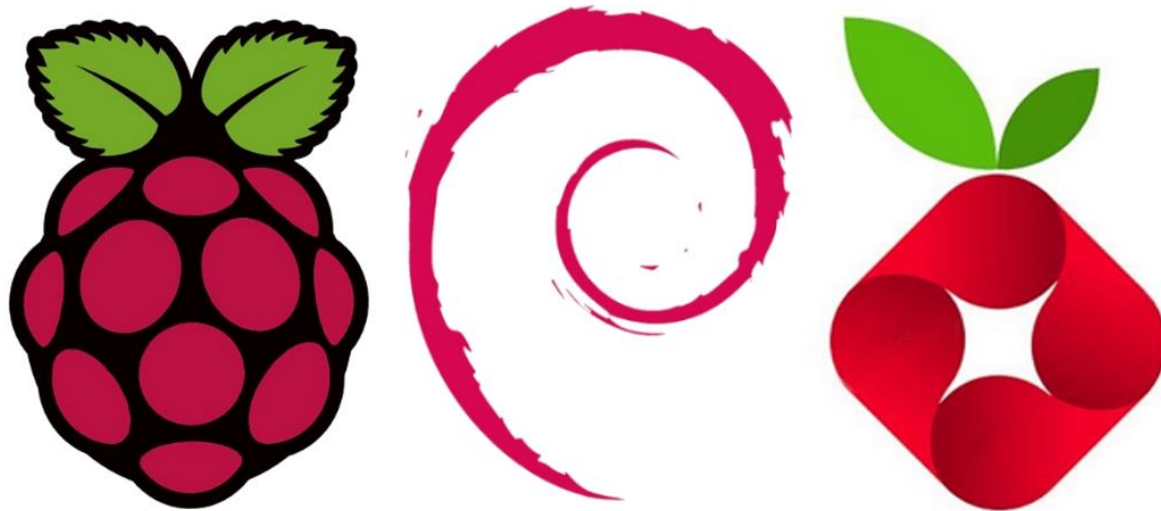


Building a Pi-Hole Ad Blocker on a Raspberry Pi running Raspbian



Abstract:

[\(jump to TOC\)](#)

This document is a set of notes to help experienced Windows admins setup a Pi-Hole DNS-based ad blocker on a Raspberry Pi running the Raspbian OS.

Intended Audience:

[\(jump to TOC\)](#)

These notes are high-level and are intended to be used by experienced Windows admins.

Document Revision and History:

[\(jump to TOC\)](#)

version	date	description
1.0	2020.12.20.1037	document creation
1.1	2020.12.20.1601	added 'update OS' section

Freeware License and Disclaimer:

[\(jump to TOC\)](#)

This document is freeware, done in the spirit of open-source. You may distribute unchanged copies of this document freely to anyone at anytime. Care has been taken to cite contributing sources and individuals, please do the same. If you find errors in anything contained herein, please comment on them and/or contact me so that we may all help the community.

About the Author:

[\(jump to TOC\)](#)



Daniel L. Benway

Active Directory and Information Security Architect / Engineer

BSc CS, MCSE (NT4, 2000), MCTS (SCCM 2012), CISSP, Security+, Network+, CCNA (2.0), CLP (AD R4)



<http://www.Linkedin.com/in/DanielLBenway>



<http://www.DanielLBenway.net>



@Daniel_L_Benway

Special Thanks:

[\(jump to TOC\)](#)

- Special thanks to Brandon Shreiber for getting me interested in Raspberry Pi.

Table of Contents:

Abstract:.....	2
Intended Audience:.....	2
Document Revision and History:.....	2
Freeware License and Disclaimer:.....	3
About the Author:	3
Special Thanks:	3
Table of Contents:.....	4
Base Installation:.....	5
Install GUI and VNC:.....	6
Update OS:	7
Update Pi-Hole:.....	8

Base Installation:

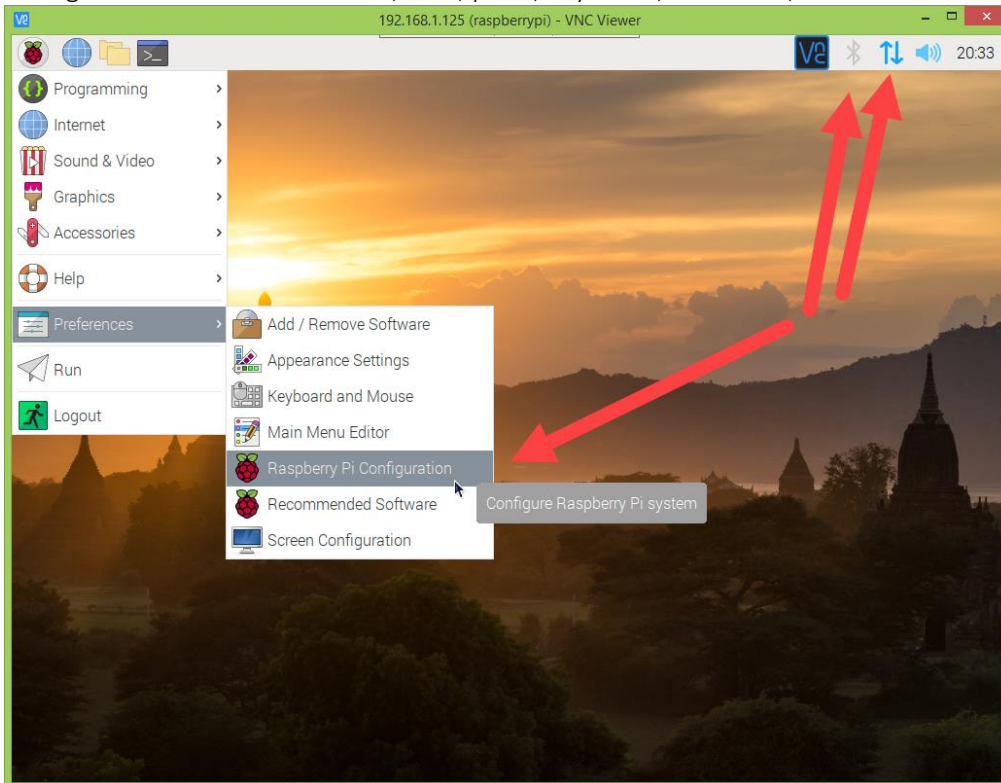
[\(jump to TOC\)](#)

1. Case - <https://www.argon40.com/argon-one-raspberry-pi-4-case.html>
 - 1.1. install Raspberry Pi into its 3rd-party case
2. OS - <https://www.raspberrypi.org/documentation/installation/installing-images/>
 - 2.1. enable the SD card in your laptop's BIOS, or use a USB SD card reader
 - 2.2. use the imager from Raspberry Pi's site (Raspberrypi.org) to put the files of Raspbian (a Debian-based OS) onto the micro SD card (which is inserted into the SD card reader via a micro SD -> regular SD adapter, which just looks like a regular SD card)
 - 2.3. enable SSH on the Raspberry Pi by opening the SD card in Windows Explorer, and putting a file called 'ssh' (lowercase, no extension, no content) into the top-level directory along with the other Raspbian files
 - 2.4. put the micro SD card into the Raspberry Pi
3. Cat5e the Raspberry Pi into your home router, and power-up the Raspberry Pi
4. Go to your home router to learn the Raspberry Pi's MAC, and assign it a DHCP reserved IP4 address from within your router
5. Use Putty to SSH on port 22 into the Raspberry Pi by its IPv4 address
 - 5.1. UID: pi, PW: raspberry
 - 5.2. change pw with: `sudo raspi-config`
6. Install the Argon ONE Pi 4 power button and fan control software onto the Pi (defaults are fine [no need to configure]), then reboot:
 - 6.1. `curl https://download.argon40.com/argon1.sh | bash`
 - 6.2. `sudo reboot`
7. Go to Pi-Hole's website and follow the instructions to install Pi Hole on the Raspberry Pi
 - 7.1. <https://github.com/pi-hole/pi-hole/#one-step-automated-install>
 - 7.1.1. `curl -sSL https://install.pi-hole.net | bash`
8. Change your home router to use the Raspberry Pi for DNS, and/or to tell its DHCP clients to use the Raspberry Pi for DNS
9. Check things out on the Pi-Hole admin web portal: `http://w.x.y.z/admin` (where w.x.y.z is the IPv4 you DHCP reserved to the Raspberry Pi)
10. Test that blocking is successful at a user-level system on your network (I used ads.google.com, but you can use any of the top blocked domains that appear at the bottom of the Pi-Hole's dashboard page)
 - 10.1. `Cmd > NSLookup > ads.google.com`
 - 10.2. `Cmd > NSLookup > Server 8.8.8.8 > ads.google.com`
 - 10.3. `Cmd > NSLookup > Server 1.1.1.1 > ads.google.com`
 - 10.4. `Cmd > NSLookup > Server w.x.y.z > ads.google.com` (where w.x.y.z is the IPv4 you DHCP reserved to the Raspberry Pi)

Install GUI and VNC:

[\(jump to TOC\)](#)

11. Setup Raspbian GUI - <https://desertbot.io/blog/headless-raspberry-pi-4-remote-desktop-vnc-setup>
12. Configure Raspbian OS: BlueTooth, WiFi, ports, keyboard, time zone, etc...



Update OS:

[\(jump to TOC\)](#)

13. <https://www.raspberrypi.org/documentation/raspbian/updating.md>

13.1. `sudo apt clean` (remove old update files)

13.2. `df -h`

13.3. `sudo apt update`

13.4. `sudo apt full-upgrade`

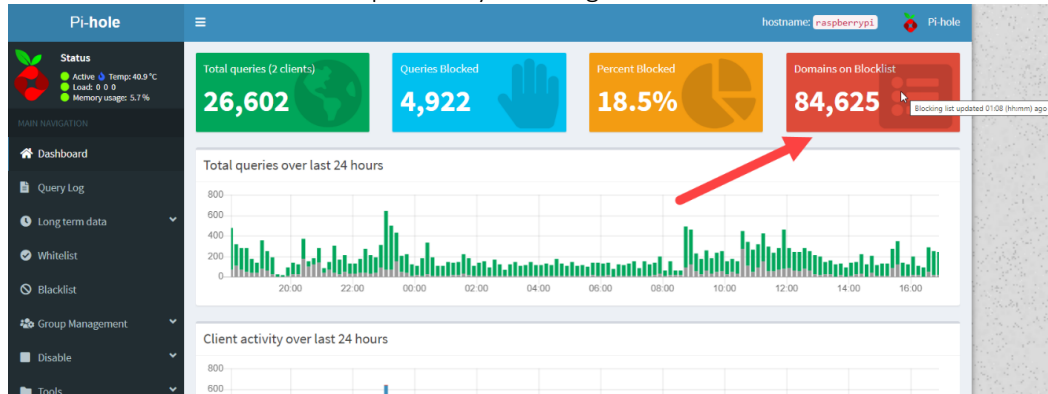
13.4.1. “Generally speaking, doing this regularly will keep your installation up to date for the particular major Raspberry Pi OS release you are using (e.g. Stretch). It will not update from one major release to another, for example, Stretch to Buster. However, there are occasional changes made in the Foundation's Raspberry Pi OS image that require manual intervention, for example a newly introduced package. These are not installed with an upgrade, as this command only updates the packages you already have installed.”

Update Pi-Hole:

[\(jump to TOC\)](#)

14. Update Pi Hole regularly:

- 14.1. Pi Hole (the application) requires manual update: `pihole -up`
- 14.2. Gravity (the blacklist) is automatically updated weekly by a cron job:
 - 14.2.1. check to see when it was last updated by hovering over 'Domains on Blocklist':



14.2.2. update if needed:

The screenshot shows the Pi-hole Admin Console with the 'Update Gravity (list of blocked domains)' page. The 'Update Gravity' button in the sidebar is highlighted with a red box. The main content area shows a 'Success!' message and a log of the update process:

```
Update
[!] Neutrino emissions detected...
[✓] Pulling blocklist source list into range
[✓] Preparing new gravity database
[!] Target: https://raw.githubusercontent.com/StevenBlack/hosts/master/hosts
[✓] Status: Retrieval successful
[!] Received 57464 domains
[!] Target: https://mirror1.malwaredomains.com/files/justdomains
[✓] Status: No changes detected
[!] Received 26853 domains
[!] Target: https://s3.amazonaws.com/lists.disconnect.me/simple_tracking.txt
[✓] Status: No changes detected
[!] Received 34 domains
[!] Target: https://s3.amazonaws.com/lists.disconnect.me/simple_ad.txt
[✓] Status: No changes detected
[!] Received 2701 domains
[✓] Storing downloaded domains in new gravity database
[✓] Building tree
[✓] Swapping databases
[!] Number of gravity domains: 87852 (84625 unique domains)
```