Setup Guide for Raspberry Pi

Raspberry Pi 4, 8GB Kit - 08 August 11, 2020



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# Introduction

In this guide, there will step by step instructions for getting a raspberry pi to run as a DNS server along with Network Utility Tools to monitor a UPS. **Quick Tip**, a lot of the code in this guide can be found at <https://github.com/Zenetex/Monitoring-UPS-with-Raspberry-PI-NUT->. The files in GitHub can be accessed using your raspberry pi web browser, which will allow you to copy and paste majority of the code.

# Installation Requirements

* MicroSD 32 GB (or SD adapter for MicroSD)
* Raspberry Pi 4 8GB
* Computer/Laptop with SD slot

# Installation

## Download Raspberry Pi OS onto MicroSD card

1. Insert MicroSD card into your computer’s SD slot.
2. Copy 🡪 <https://www.raspberrypi.org/downloads/raspberry-pi-os/> 🡪 And paste into your web browser.
3. Find “Raspberry Pi OS (32-bit) with desktop and recommended software” 🡪 Click “**Download ZIP**”
4. This next step depends on your computer’s OS and your personal Preference on flashing software. I am using Windows 10 and went with a software called balenaEtcher.  
      
   Link to download balenaEtcher software: <https://www.balena.io/etcher/>   
   If you use balenaEtcher, make sure to choose the correct download image for your computer OS.   
     
   **Once** you have downloaded the flashing software, select the Raspberry Pi OS image we downloaded from Raspberrypi.org 🡪 select the drive you want to flash (SDHC) 🡪 start flashing.
5. When the MicroSD has been flashed, safely remove it from your computer.

## Boot up Raspberry Pi

1. Put the microSD card into the SD slot on your Raspberry Pi. The words on the MicroSD card should be facing you when installing on the Pi.
2. Plug all the Peripherals needed and start the Pi by pressing the power switch.
3. There will be a Welcome page, click “Next” and follow steps bellow.
   1. Choose correct Country, Language, and Time zone. **Make** sure you select the boxes next to “Use English Language” and “Use US keyboard”.
   2. Click “Next”
4. Enter Password, click “Next”.
5. Check the box if your screen has black borders. If not, click “Next”.
   1. If you are going to have the Pi connect to Wi-Fi instead of Ethernet, select your wireless network and connect.   
      Skip if you will be using a wired connection.
   2. Do not update the software, click “Skip”. 🡪 Do not restart the Pi, click “Later”.

## Update Raspberry Pi

1. In your terminal…
   1. type 🡪 sudo apt update -y 🡪 wait until Pi finishes updating.
   2. Type 🡪 sudo apt upgrade -y 🡪 wait until Pi finishes upgrading.
   3. Restart Raspberry Pi
      1. Type 🡪 sudo reboot

## Install and Configure dnsmasq

1. In your terminal…
   1. Type 🡪 sudo apt install dnsmasq -y   
      (Dnsmasq install reference: <https://pimylifeup.com/raspberry-pi-dns-server/>)
   2. Type 🡪 sudo nano /etc/dnsmasq.conf
      1. At the top of dnsmasq.conf file, type 🡪   
            
         server=8.8.8.8

server=9.9.9.9   
bogus-priv

no-resolv   
domain-needed   
cache-size=1000

* 1. Save and exit by pressing 🡪 crtl + X 🡪 Press Y key 🡪 press your “enter” key
  2. Restart dnsmasq
     1. Type 🡪 sudo systemctl restart dnsmasq

## Install and Configure Network Utility Tool (NUT)

1. In your terminal…
   1. Type 🡪 sudo apt-get install nut nut-client nut-server -y  
      (NUT install reference: <https://github.com/wynandbooysen/wynandbooysen.github.io-src/blob/master/content/2016-04-23-raspberry-pi-ups-server-using-nut.md>)
2. Configuring ups.conf
   1. Type 🡪 sudo nano /etc/nut/ups.conf
   2. Inside the ups.conf file, uncomment and change the information from..  
        
      # [upsname]   
      # driver = <drivername>   
      # port = <portname>   
      # <any other… >   
        
      to..  
        
      [PutUPSNameHere]   
       driver = usbhid-ups  
       post = auto
   3. Scroll to the button of the config file and add a “#” in front of “maxretry = 3”   
        
      Should look like this 🡪 #maxretry = 3
   4. Save and exit by pressing 🡪 crtl + X 🡪 Press Y key 🡪 press your “enter” key
3. Configuring upsd.conf
   1. Open terminal and type 🡪 sudo sed -i 's/# LISTEN 127.0.0.1 3493/LISTEN 127.0.0.1 3493/g' /etc/nut/upsd.conf
4. Configuring upsd.users file
   1. In terminal, type 🡪 sudo nano /etc/nut/upsd.users
   2. Inside the upsd.users file, uncomment and change the information from…

# [admin]

# password = youradmpass

# actions = SET

# instcmds = ALL

#

# --- Configuring for a user who can execute tests only

#

# [testuser]

# password = testuserpass

# instcmds = test.battery.start

# instcmds = test.battery.stop

#

# --- Configuring for upsmon

#

# To add a user for your upsmon, use this example:

#

# [upsmon\_local]

# password = local\_pass

# upsmon master

#

#  
#

# MONITOR myups@localhost 1 upsmon pass master (or slave)

To...

[admin]

password = ZenPi31400

actions = SET

instcmds = ALL

#

# --- Configuring for a user who can execute tests only

#

# [testuser]

# password = testuserpass

# instcmds = test.battery.start

# instcmds = test.battery.stop

#

# --- Configuring for upsmon

#

# To add a user for your upsmon, use this example:

#

[upsmon\_local]

password = ZenLocal31422

upsmon master

#  
#  
#

MONITOR PutUPSNameHere@localhost 1 upsmon\_local ZenLocal31422 master

* 1. Save and exit by pressing 🡪 crtl + X 🡪 Press Y key 🡪 press your “enter” key

1. Configuring nut.conf
   1. Open terminal and type 🡪 sudo sed -i 's/MODE=none/MODE=standalone/g' /etc/nut/nut.conf
2. Configuring upsmon.conf
   1. Open terminal and type 🡪 sudo nano /etc/nut/upsmon.conf
   2. Inside upsmon.conf, find “# NOTIFYCMD /bin/notifyme” and replace with “NOTIFYCMD /home/pi/ticket.sh”  
      Make sure to uncomment when replacing.  
        
      Find...

# NOTIFYMSG ONLINE "UPS %s on line power"

# NOTIFYMSG ONBATT "UPS %s on battery"

# NOTIFYMSG LOWBATT "UPS %s battery is low"

# NOTIFYMSG FSD "UPS %s: forced shutdown in progress"

# NOTIFYMSG COMMOK "Communications with UPS %s established"

# NOTIFYMSG COMMBAD "Communications with UPS %s lost"

# NOTIFYMSG SHUTDOWN "Auto logout and shutdown proceeding"

# NOTIFYMSG REPLBATT "UPS %s battery needs to be replaced"

# NOTIFYMSG NOCOMM "UPS %s is unavailable"

# NOTIFYMSG NOPARENT "upsmon parent process died - shutdown impossible"

# NOTIFYFLAG ONLINE SYSLOG+WALL

# NOTIFYFLAG ONBATT SYSLOG+WALL

# NOTIFYFLAG LOWBATT SYSLOG+WALL

# NOTIFYFLAG FSD SYSLOG+WALL

# NOTIFYFLAG COMMOK SYSLOG+WALL

# NOTIFYFLAG COMMBAD SYSLOG+WALL

# NOTIFYFLAG SHUTDOWN SYSLOG+WALL

# NOTIFYFLAG REPLBATT SYSLOG+WALL

# NOTIFYFLAG NOCOMM SYSLOG+WALL

# NOTIFYFLAG NOPARENT SYSLOG+WALL

Uncomment and add “+EXEC”

NOTIFYMSG ONLINE "UPS %s on line power"

NOTIFYMSG ONBATT "UPS %s on battery"

NOTIFYMSG LOWBATT "UPS %s battery is low"

NOTIFYMSG FSD "UPS %s: forced shutdown in progress"

NOTIFYMSG COMMOK "Communications with UPS %s established"

NOTIFYMSG COMMBAD "Communications with UPS %s lost"

NOTIFYMSG SHUTDOWN "Auto logout and shutdown proceeding"

NOTIFYMSG REPLBATT "UPS %s battery needs to be replaced"

NOTIFYMSG NOCOMM "UPS %s is unavailable"

NOTIFYMSG NOPARENT "upsmon parent process died - shutdown impossible"

NOTIFYFLAG ONLINE SYSLOG+WALL+EXEC

NOTIFYFLAG ONBATT SYSLOG+WALL+EXEC

NOTIFYFLAG LOWBATT SYSLOG+WALL+EXEC

NOTIFYFLAG FSD SYSLOG+WALL

NOTIFYFLAG COMMOK SYSLOG+WALL+EXEC

NOTIFYFLAG COMMBAD SYSLOG+WALL+EXEC

NOTIFYFLAG SHUTDOWN SYSLOG+WALL

NOTIFYFLAG REPLBATT SYSLOG+WALL+EXEC

NOTIFYFLAG NOCOMM SYSLOG+WALL+EXEC

NOTIFYFLAG NOPARENT SYSLOG+WALL+EXEC

* 1. After, find “# MONITOR <system> …” and replace with 🡪 MONITOR PutUPSNameHere@localhost 1 upsmon\_local ZenLocal31422 master
  2. Save and exit by pressing 🡪 crtl + X 🡪 Press Y key 🡪 press your “enter” key

1. Creating a file to send tickets
   1. Open terminal and type 🡪 sudo nano ticket.sh
   2. At the top of the empty file, type 🡪 #!/bin/bash
   3. A couple lines down, type (You can copy and paste this code from GitHub, it is located in the ticket.sh file)🡪 curl --request POST 'https://prod-28.eastus2.logic.azure.com:443/workflows/42517d4652c9446d8808fe0665c76088/trigers/request/paths/invoke?api-version=2016-10-01&sp=%2Ftriggers%2Frequest%2Frun&sv=1.0&sig=oqY1WrPZX1\_xK23Tj0h4lthuYT0vltjyW8QyRmou\_GU' --header 'Content-Type: application/json' --data-raw '{ "location": "20171-00" }'
   4. Save and exit by pressing 🡪 crtl + X 🡪 Press Y key 🡪 press your “enter” key

## Update PutUPSNameHere 🡪 $LocationName

1. Open terminal and type 🡪 LocationName=’20171-00’ 🡪 note that the location should be different if 20171 is not the zip code of where your raspberry pi will be located.
   1. Type 🡪 sudo sed -i "s/PutUPSNameHere/$LocationName/g" /etc/nut/ups.conf
   2. Type 🡪 sudo sed -i "s/PutUPSNameHere/$LocationName/g" /etc/nut/upsd.users
   3. Type 🡪 sudo sed -i "s/PutUPSNameHere/$LocationName/g" /etc/nut/upsmon.conf

## Start UPS Driver and NUT Client & Server

1. Type 🡪 sudo upsdrvctl start
2. Type 🡪 sudo service nut-server start
3. Type 🡪 sudo service nut-client start

## Check if it works

1. Check if everything is working by typing 🡪 sudo upsc $LocationName
   1. This will show you all information of the UPS.
2. If you do not get a list of information:
   1. Type 🡪 sudo service nut-server status 🡪 read for an error feedback you receive and diagnose.
   2. Type 🡪 sudo service nut-client status 🡪 read for an error feedback you receive and diagnose.