Smart-Building Report

Simon Remington

January 26, 2019

Contents

1 Introduction

This is the report to for Smart Building Project. It covers the procedures I have taken so far.
This report is not a tutorial, nor does it cover all the rabbit holes and dead end to achieve my goal.

2 Setting-up Raspberry Pi

2.1 Obtaining the Raspberry Pi Operating System

The RPI image can be obtained from:
https://www.raspberrypi.org/downloads/raspbian/
The image is: Raspbian Stretch Lite, a minimal image based on Debian Stretch. The lite image is for a headless install. All communication to the RPI is made via ssh.
Version: November 2018
Release date: 2018-11-13
Kernel version: 4.14
Download and unpack the image.
I have used both Windows and Linux Debian to create the bootable operating system so that I get a greater knowledge and understanding of completing the flash process.

2.2 Windows flashing

Check the hash, SHA-256 of the image.
Use Windows built-in certUtil -hashfile Path/To/File/file.img SHA256 to compute the hash. Obtainable on both Windows 7 and 10 machines.
Insert the SD card into a Window's machine.
Use Etcher to flash image, obtained from:
https : //www.balena.io/etcher/
Download Etcher and install.
Using Etcher, select source (Path to .img), Destination (Tath to SD card) Flash the card.
Dismount then remount SD card. Donot repair the card when asked to by Windows.
CMD into the card then create an empty file named ssh with no extension, this can be accieved by entering the following command at the prompt:
C:\>type nul > ssh

This will give secure shell access at boot time.
Info can be found at:
$https://www.raspberrypi.org/documentation/configuration/wireless/headless.md$

Create a file named wpa_,supplicant.conf
Info can be found at:
$https://manpages.debian.org/stretch/wpasupplicant/wpa_supplicant.conf.5.en.html/$

$https://core-electronics.com.au/tutorials/raspberry-pi-zerow-headless-wifi-setup.html$

Add following to the file:

```
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1
country=IE

network={
        ssid="Your-network"
        key_mgmt=NONE # Use for no password

network={
        ssid="Your-network"
        key_psk="Your-password"
    }
```

Now boot the Raspberry Pi, this SD card can be used in any machine that recognises the Debian Stretch OS.
This card if for the arm6 instruction set of the chip, it is capable of running in machines with the arm7 achitexture, but not the other way around.

2.3 Linux flashing

Download Stretch.img and unpack.

Check hash at the prompt with:

```
user@host:~$ sha1sum /Path/To/file.img
```

Find the SD card.

```
user@host:~$ df -h
```

Dismount SD card.

```
user@host:~$ umount /dev/The SD card
```

Run the folliwing command:

```
user@host:~$ sudo dd bs=4M status=progress if=~/Path/To/stretch-lite.img
of=/dev/The SD card
```

Info can be found at:
https : //elinux.org/RPi_Easy_SD_Card_Setup

When SD card is written, mount the card and create files ssh, WPA

```
user@host:~$touch ssh
user@host:~$touch wpa_supplicant.conf
```

Use an editor and create file contents as above for Windows.

2.4 The Secure Shell

Find ipaddress of Pi, look into router settings
Download and install Bitvise Available at:
https : //www.bitvise.com/

ssh to Raspberry Pi eg ssh pi@network address
change password from raspberry to your choice of passwrd
sudo raspi-config
expand file system
reboot

apt update && upgrade

3 Docker

Docker can be installed on the RPI with:

```
$curl -fsSL https://get.docker.com -o get-docker.sh
$sudo sh get-docker.sh
```

Info at:
https : //docs.docker.com/install/linux/docker−ce/debian/#install−using−the − convenience − script

Problem for Pi zero is that the latest docker is not friendly toward the arm6 with a segment error and did not work so I eventualy got it going by following this advice in the following forum.

*https : //github.com/moby/moby/issues/*38175

at prompt: $apt-cache madison docker-ce

We can now see the packages

```
$sudo apt-get purge docker-ce
$sudo apt-get install docker-ce=<VERSION_STRING>
```

4 this is section

4.1 this is sub