**Setting up the Raspberry PI from Start to Finish**

**September 7, 2016**

**Raspberry Pi 3 From Start To finish: PAGE 12**

**May 4, 2016**

**Install List:**

1. **Raspian OS**
2. **Mongo**
3. **Node**
4. **Remote Desk Top**
5. **Git Setup**
6. **Static IP**
7. **Autorun**
8. **Create image**
9. **Node Necessities**
10. **Autostart Browser**
11. **SSH Keys**
12. **Automatic USB Flash mounting**
13. **NTP Time Disable**
14. **Handy Shortcuts**
15. **Misc**
16. **Update Node**

**1. Raspin install**

Go to: http://www.raspberrypi.org/downloads

scroll down to raw images and select Raspian

Burn image to SD card using "Win32 Disk Imager" It is located in /Hardware Info/Disk imager for pi

put SD card into Pi and turn on - select your defaults.

Then run:

sudo apt-get update

sudo rpi-update

**2. Mongo Install**

Follow these instructions: https://github.com/RickP/mongopi

sudo apt-get install git-core build-essential scons libpcre++-dev xulrunner-dev libboost-dev libboost-program-options-dev libboost-thread-dev libboost-filesystem-dev

NOTE: for RPI 2:

sudo apt-get install git-core build-essential scons libpcre++-dev libboost-dev libboost-program-options-dev libboost-thread-dev libboost-filesystem-dev

git clone git://github.com/RickP/mongopi.git

cd mongopi

scons

sudo scons --prefix=/opt/mongo install

PATH=$PATH:/opt/mongo/bin/

export PATH

now create data directory for Mongo:

From root: sudo mkdir \data

cd data

sudo mkdir \db

then: sudo chmod 777 /data/db

**3. Node Install – note two ways**

From here: <https://github.com/nathanjohnson320/node_arm>

wget http://node-arm.herokuapp.com/node\_latest\_armhf.deb

sudo dpkg -i node\_latest\_armhf.deb

# Check installation

node -v

Create the project directory: mkdir \Serialmango

**OR to install a specific version:**

Change 10.23

to desired version in 3 lines below

wget [**http://nodejs.org/dist/v0.10.23/node-v0.10.23.tar.gz**](http://nodejs.org/dist/v0.10.23/node-v0.10.23.tar.gz)

tar -xzf **node-v0.10.23**.tar.gz

cd **node-v0.10.23**

./configure

make

sudo make install

**4. Remote DeskTop**

sudo apt-get install xrdp

Then restart: sudo shutdown -r now

**5. Git Setup**

git clone git://[github.com/twitzel/Serialmango](http://github.com/twitzel/Serialmango)

cd Serialmango

npm install

npm

To pull(update)cd the code:

git pull

**6. Static IP**

**$ sudo nano /etc/network/interfaces**

This will allow you to edit the file using nano.  Change the line that reads

**iface eth0 inet dhcp**

to

**iface eth0 inet static**

Below this line enter the following: (assumes router at 192.168.2.200 and static ip of .11)

address 192.168.2.11

netmask 255.255.255.0

network 192.168.2.0

broadcast 192.168.2.255

gateway 192.168.2.200

**7. Autorun**

Auto run on boot script file:

create file: sudo nano /etc/init.d/autorun.sh

copy contents below dashed line and save it

Then: cd /etc/init.d

sudo chmod 755 autorun.sh

To make auto start: sudo update-rc.d autorun.sh defaults -->> makes autostart

----------------------------------------

#!/bin/bash

### BEGIN INIT INFO

# Provides: autorun.sh

# Required-Start: $all

# Required-Stop: $all

# Default-Start: 2 3 4 5

# Default-Stop: 0 1 6

# Short-Description: Short script description

# Description: Longer script description.

### END INIT INFO

#script file to remove mongod.lock if it exists

if [ -f /data/db/mongod.lock ];

then

rm /data/db/mongod.lock

echo "Mongod.lock deleted"

else

echo "Mongod.lock does not exist"

fi

/opt/mongo/bin/mongod &

echo "Started Mongo"

#/home/pi/node-v0.10.18/out/Release/node /home/pi/Serialmango/app.js cs4 &

#make sure where node is located!!

/usr/local/bin/node /home/pi/Serialmango/app.js cs4 &

echo "Started Node"

**8. Create Image**

git clone https://github.com/billw2/rpi-clone.git

cd rpi-clone

cp rpi-clone /usr/local/sbin

sudo apt-get install rsync

To USE: sudo rpi-clone sda -f -v

NOTE: sdX is the location of the SD card

Then follow prompts. Problems see: <https://github.com/billw2/rpi-clone/blob/master/README.md>

**9. Node Necessities**

Items necessary to compile node add ons:

sudo npm install -g node-gyp

sudo apt-get install libudev-dev libusb-1.0-0-dev

**10. Autostart Browser (https://github.com/MobilityLab/TransitScreen/wiki/Raspberry-Pi)**

Install matchbox - to control midori size: sudo apt-get install matchbox

Install unclutter to get rid of curser: sudo apt-get install unclutter

Create script file to store commands for xinit: sudo nano /home/pi/browser.sh

**Raspberry PI Original** -Add below to the script between the 2 dashed lines:

#!/bin/sh

xset -dpms  
 xset s off

unclutter &  
 matchbox-window-manager &  
 midori -e Fullscreen -a http://localhost:3000/cs4Home/test

**Raspberry PI 2** -Add below to the script between the 2 dashed lines:

#!/bin/sh

xset -dpms  
 xset s off

unclutter &  
 matchbox-window-manager &  
 epiphany-browser  http://localhost:3000/cs4Home/test

**Add** these as the last line of the auto start script: sudo nano /etc/init.d/autorun.sh

sleep 30;

xinit /home/pi/browser.sh ?

**11. SSH KEYS (**[**http://raspisimon.no-ip.org/key\_windowsbased.php**](http://raspisimon.no-ip.org/key_windowsbased.php)**)**

putty key gen for pi - files in Hardware Directory

**Public key:**

ssh-rsa AAAAB3NzaC1yc2EAAAABJQAAAQEAnYb4iV/8ME+nMNAFIKYUV7+gWgAyaI04R4VwuXGPh5pywtXLwADwhE0SjYRnMejT0SXjqZsi1iI4PmPjZxFfvRZT3rzjXJvvwJuLHKi/Z0PNEsFY4ING6agLi1IZmtqOGy3y8lMJShle8ZS8ULA9noTEueqwGzhJy3XZNbdIvo5RCF6t/R/hfZajQC6pSDPQueKzfHZLCHUbWrlO1/7eDlgEtniyKRbBe1JBljltqNCXGJNu4+1yHniY9gXJsNGEmiZXSBfVrcAwdCP180+KwVtXiEZizwoC6faXiRNFAM610zFqSB5b5ETBNAHkkZdfInBulFED3yQVHYjk2y7Zbw== rsa-key-20150125

Public key also in file: ‘cs4 public key’ (no suffix)

**Private key:**

cs4 private key.ppk

**Pass phrase: cs4**

**Create file /home/pi/.ssh – use remote desktop if necessary**

**sudo nano /home/pi/.ssh/authorized\_keys**

At a new line paste the public key above and save the file using ctrl+o.

To disable password (except from console) and/or change port #:

**sudo nano /etc/ssh/sshd\_config**

change port to 9090 – or whatever

change: #PasswordAuthentication yes to:

PasswordAuthentication no

**sudo reboot**

**To save login name and private key:** [**https://www.howtoforge.com/ssh\_key\_based\_logins\_putty**](https://www.howtoforge.com/ssh_key_based_logins_putty)

**12 USB Auto Start**

**For info see:** <http://www.instructables.com/id/Raspberry-Pi-Wi-Fi-Media-Server/step8/Install-USBmount/>

sudo apt-get install usbmount

**13 NTP Time Disable**

**To prevent internet time updates:**

sudo update-rc.d -f ntpdate remove

**14. HANDY SHORTCUTS**

**a. To create image: sudo rpi-clone sda -f -v**

**b.** To turn OFF autostart: *sudo* ***update-rc.d autorun.sh remove***

**c.** To turn ON autostart: **sudo update-rc.d autorun.sh defaults**

d. To find MAC address: **cat /sys/class/net/eth0/address**

e. To kill a process: ps axg (then find pid of process to kill)

sudo kill -9 pid

**15 MISC.**

**Mounting Flash Drive:**

sudo mkdir /media/usbstick

sudo mount -t vfat -o uid=pi,gid=pi /dev/sda1 /media/usbstick/

sudo umount /media/usbstick

Various Disk Commands for USB:

lsblk, df –h, lsusb, dmesg

**16 Update node:**

I hope you have NPM installed, if not then do it using **sudo apt-get install npm.**You can update to any version using node helper (n). Here how to update node to any version using npm.

First of all clean the NPM cache. You can do this using.

**sudo npm cache clean -f**

Install node helper (n) globally using following command.

**sudo npm install -g n**

Once node helper is installed. You can either get the latest stable version using

**sudo n stable**

Or if you want specific version like i needed 0.11.10 then you can do this using.

**sudo n 0.11.10**

After upgrade you can check the latest version of node using **node –version**or **node -v.**

**RPI 3 PROCEDURE**

1. **Raspian OS**
2. **Node**
3. **Mongo**
4. **Remote Desk Top**
5. **Git Setup**
6. **Screen**
7. **Autorun**
8. **Create image**
9. **Static IP**
10. **Autostart Browser**
11. **SSH Keys**
12. **Automatic USB Flash mounting**
13. **NTP Time Disable**
14. **Misc**
15. **SMB**
16. **Set up Access point**
17. **Handy Shortcuts**

**1. Raspin install**

Go to: http://www.raspberrypi.org/downloads

scroll down to raw images and select Jessie

Burn image to SD card using "Win32 Disk Imager" It is located in /Hardware Info/Disk imager for pi

put SD card into Pi and turn on - select your defaults.

Then run:

sudo raspi-config

Expand file system, then

sudo reboot

sudo apt-get update

sudo rpi-update

**2. Node Install –**

wget https://nodejs.org/dist/v4.3.2/node-v4.3.2-linux-armv6l.tar.gz

tar -xvf node-v4.3.2-linux-armv6l.tar.gz

cd node-v4.3.2-linux-armv6l

Copy to /usr/local

sudo cp -R \* /usr/local/

Then reboot: sudo reboot to get rid of v 10.29

That's it! To check Node.js is properly installed and you have the right version, run the command node -v and it should return v4.3.2

**3. Mongo Install**

sudo apt-get install mongodb

Edit config file:

sudo nano /etc/mongodb.conf

change:

dbpath=/var/lib/mongodb

to:

dbpath=/data/db

change:

#port = 27017

To:

Port = 27017

This installs mongo in /usr/bin

Copy mongodump and mongorestore to directory expected for cs4:

From ROOT:

cd ..

cd ..

cd opt

sudo mkdir \mongo

cd mongo

sudo mkdir \bin

sudo cp /usr/bin/mongodump /opt/mongo/bin

sudo cp /usr/bin/mongorestore /opt/mongo/bin

Now create data directory for Mongo:

From root: cd ..

cd ..

sudo mkdir \data

cd data

sudo mkdir \db

then: sudo chmod 777 /data/db

To check installation:

Just type in mongo. Should report version and show its running. To exit Crtl C

**4. Remote DeskTop**

sudo apt-get install xrdp

Then restart: sudo reboot

**5. Git Setup**

git clone git://[github.com/twitzel/Serialmango](http://github.com/twitzel/Serialmango)

cd Serialmango

npm install

npm

To pull(update)cd the code:

git pull

**6. Screen**

sudo apt-get install screen

screen –ls to see all running screens

screen –r (name) to go to a screen

screen exit to exit and kill processes running on that screen

reference from: http://aperiodic.net/screen/quick\_reference

## Getting in

|  |  |
| --- | --- |
| start a new screen session with session name | screen -S <name> |
| list running sessions/screens | screen -ls |
| attach to a running session | screen -x |
| … to session with name | screen -r <name> |
| the “ultimate attach” | screen -dRR (Attaches to a screen session. If the session is attached elsewhere, detaches that other display. If no session exists, creates one. If multiple sessions exist, uses the first one.) |

|  |  |
| --- | --- |
| detach a running session | screen -d <name> |

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## Getting out

|  |  |
| --- | --- |
| detach | [C-a d](http://aperiodic.net/screen/commands:detach) |
| detach and logout (quick exit) | [C-a D D](http://aperiodic.net/screen/commands:pow_detach) |
| exit screen | [C-a \](http://aperiodic.net/screen/commands:quit) Exit all of the programs in screen. (not recommended) |
| force-exit screen | [C-a C-\](http://aperiodic.net/screen/commands:quit) (not recommended) |
| getting out of the screen session | exit |

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## Help

|  |  |
| --- | --- |
| See help | [C-a ?](http://aperiodic.net/screen/commands:help) (lists keybindings) |

**7. Autorun**

Auto run on boot script file:

create file: sudo nano startup.sh

copy to file

#!/bin/bash

### BEGIN INIT INFO

#script file to remove mongod.lock if it exists

if [ -f /data/db/mongod.lock ];

then

sudo rm /data/db/mongod.lock

echo "Mongod.lock deleted"

else

echo "Mongod.lock does not exist"

fi

screen -d -m -S mongo sudo /usr/bin/mongod

echo "Started Mongo"

sleep 8

screen -d -m -S cs4 bash -c "sudo /usr/local/bin/node /home/pi/Serialmango/app.js cs4; exec bash"

echo "Started Node"

(added bash –c and exec bash to keep screen open in case of program crash)

Save file then then make it executable*: sudo chmod 755 /home/pi/startup.sh*

Now that the startup script is finished – execute it at startup:

**Add** this above the last line of the auto start scrip (**before screensaver)**: sudo nano .config/lxsession/LXDE-pi/autostart

sh /home/pi/startup.sh

**8. Create Image**

git clone https://github.com/billw2/rpi-clone.git

cd rpi-clone

sudo cp rpi-clone /usr/local/sbin

sudo apt-get install rsync

To USE: sudo rpi-clone sda -f -v

NOTE: sdX is the location of the SD card

Then follow prompts. Problems see: <https://github.com/billw2/rpi-clone/blob/master/README.md>

**9. Static IP**

https://www.youtube.com/watch?v=yd2hwce98Aw

**10. Autostart Browser**

Install xautomation to get xte utility: sudo apt-get install xautomation

Create script file to store commands: sudo nano /home/pi/browser.sh

xset s off

xset -dpms

xset s noblank

sleep 30s

epiphany-browser -a --profile /home/pi/.config <http://localhost:3000/cs4Home/test> &

sleep 5s

xte "key F11" -x:0

Save file then then make it executable*: sudo chmod 755 /home/pi/browser.sh*

**Add** this as the last line of the auto start script: sudo nano .config/lxsession/LXDE-pi/autostart

sh /home/pi/browser.sh

**11. SSH KEYS (**[**http://raspisimon.no-ip.org/key\_windowsbased.php**](http://raspisimon.no-ip.org/key_windowsbased.php)**)**

putty key gen for pi - files in Hardware Directory

**Public key:**

ssh-rsa AAAAB3NzaC1yc2EAAAABJQAAAQEAnYb4iV/8ME+nMNAFIKYUV7+gWgAyaI04R4VwuXGPh5pywtXLwADwhE0SjYRnMejT0SXjqZsi1iI4PmPjZxFfvRZT3rzjXJvvwJuLHKi/Z0PNEsFY4ING6agLi1IZmtqOGy3y8lMJShle8ZS8ULA9noTEueqwGzhJy3XZNbdIvo5RCF6t/R/hfZajQC6pSDPQueKzfHZLCHUbWrlO1/7eDlgEtniyKRbBe1JBljltqNCXGJNu4+1yHniY9gXJsNGEmiZXSBfVrcAwdCP180+KwVtXiEZizwoC6faXiRNFAM610zFqSB5b5ETBNAHkkZdfInBulFED3yQVHYjk2y7Zbw== rsa-key-20150125

Public key also in file: ‘cs4 public key’ (no suffix)

**Private key:**

cs4 private key.ppk

**Pass phrase: cs4**

**mkdir /home/pi/.ssh**

**sudo nano /home/pi/.ssh/authorized\_keys**

At a new line paste the public key above and save the file using ctrl+o.

To disable password (except from console) and/or change port #:

**sudo nano /etc/ssh/sshd\_config**

change port to 9090 – or whatever

change: #PasswordAuthentication yes to:

PasswordAuthentication no

**sudo reboot**

**To save login name and private key:** [**https://www.howtoforge.com/ssh\_key\_based\_logins\_putty**](https://www.howtoforge.com/ssh_key_based_logins_putty)

**12 USB Auto Start**

**For info see:** <http://www.instructables.com/id/Raspberry-Pi-Wi-Fi-Media-Server/step8/Install-USBmount/>

sudo apt-get install usbmount

**13 NTP Time Disable**

**To prevent internet time updates:**

sudo update-rc.d -f ntpdate removen

**14 MISC.**

**Mounting Flash Drive:**

sudo mkdir /media/usbstick

sudo mount -t vfat -o uid=pi,gid=pi /dev/sda1 /media/usbstick/

sudo umount /media/usbstick

Various Disk Commands for USB:

lsblk, df –h, lsusb, dmesg

**Disable Internal Sound Card:**

cd /etc/modprobe.d

sudo nano alsa-blacklist.conf

Enter the following line

blacklist snd\_bcm2835

Save the file

reboot the machine

**To test if the sound card is removed: aplay –l**

**It should report no sound cards.**

**15 Install SMB – using Samba**

sudo apt-get update

sudo apt-get install samba (accept prompt)

sudo apt-get install samba-common-bin

sudo nano /etc/samba/smb.conf

then:

In [homes] section just above [printers] add:

[pihome]

path=/home/pi

read only = no

writable = yes

browseable = yes

guest ok = yes

create mask = 0755

directory mask = 0755

public = yes

[piroot]

comment = Pi root

path=/

Writeable = Yes

browseable=Yes

only guest=no

create mask=0777

directory mask=0777

public=no

then save

set up password: sudo smbpasswd -a pi

Do a restart just to make sure: sudo /etc/init.d/samba restart

TO REMOVE SAMBA: sudo apt-get purge samba

1. **Setup Access Point**

**Sets address of cs4 to 192.168.3.1:3000.**

**SSid: CS4-Edit, Password: CS4-Edit**

**Install dnsmasq and hostapd**

More about [dnsmasq](https://en.wikipedia.org/wiki/Dnsmasq) and [hostapd](https://en.wikipedia.org/wiki/Hostapd).

* sudo apt-get update
* sudo apt-get upgrade
* sudo apt-get install dnsmasq hostapd

**Configure wlan0**

* Inform dhcpd to ignore wlan0 by editing sudo nano /etc/dhcpcd.conf
  + To the end add denyinterfaces wlan0
  + This must be ABOVE any interface lines you may have added
* Configure the wlan IP, sudo nano /etc/network/interfaces
  + the wlan0 section should be changed to:

allow-hotplug wlan0

iface wlan0 inet static

address 192.168.3.1

netmask 255.255.255.0

network 192.168.3.0

broadcast 192.168.3.255

* Restart dhcpcd with sudo service dhcpcd restart
* Reload wlan0 with sudo ifdown wlan0; sudo ifup wlan0

**Setup hostapd**

* sudo nano /etc/hostapd/hostapd.conf
  + add the following

interface=wlan0

driver=nl80211

hw\_mode=g

channel=6

ieee80211n=1

wmm\_enabled=1

ht\_capab=[HT40][SHORT-GI-20][DSSS\_CCK-40]

macaddr\_acl=0

ignore\_broadcast\_ssid=0

# Use WPA2

auth\_algs=1

wpa=2

wpa\_key\_mgmt=WPA-PSK

rsn\_pairwise=CCMP

# Change these to your choice

# This is the name of the network

ssid=Pi3-AP

# The network passphrase

wpa\_passphrase=raspberry

TIP: If the passphrase is too short, hostapd won't start.

* Now edit the default configuration, sudo nano /etc/default/hostapd
  + Replace *#DAEMON\_CONF=""* with DAEMON\_CONF="/etc/hostapd/hostapd.conf"

**Configure dnsmasq**

* Rename the current configuration, sudo mv /etc/dnsmasq.conf /etc/dnsmasq.conf.orig
* Create and edit the new configuration, sudo nano /etc/dnsmasq.conf
  + Add the following

interface=wlan0 # Use interface wlan0

listen-address=192.168.3.1 # Specify the address to listen on

bind-interfaces # Bind to the interface

server=8.8.8.8 # Use Google DNS

domain-needed # Don't forward short names

bogus-priv # Drop the non-routed address spaces.

dhcp-range=192.168.3.50,192.168.3.150,12h # IP range and lease time

then reboot

**17. HANDY SHORTCUTS**

**a. To create image: sudo rpi-clone sda -f -v**

**b. To use screen: login and then: screen -r (name)**

c. To find MAC address: **cat /sys/class/net/eth0/address**

**d.** TO REMOVE SAMBA: sudo apt-get purge samba

e. To rename a file: mv fileA fileB