

Raspberry Pi 3 Getting Started Guide

Nantawat Pinkam

I649E Wireless Sensor Networks


June 27, 2018



School of Information Science Japan Advanced Institute of Science and Technology

I649E's Github

<https://github.com/i649e/wsn-lab>

 **i649e** / **wsn-lab** Watch 0 Star 0 Fork 0


[Code](#) [Issues 0](#) [Pull requests 0](#) [Projects 0](#) [Wiki](#) [Insights](#) [Settings](#)




No description, website, or topics provided. [Edit](#)

[Add topics](#)

9 commits 1 branch 0 releases 2 contributors

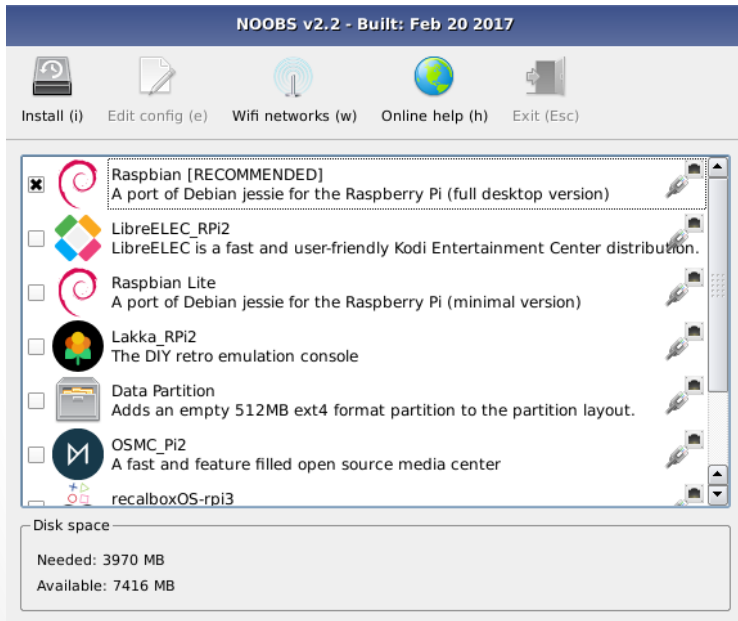
Branch: master [New pull request](#) [Create new file](#) [Upload files](#) [Find file](#) [Clone or download](#)

 **i649e** change guide Latest commit d61ffe8 3 minutes ago

 Project	add example	14 days ago
 Chapter_06_Raspberry_Pi_3_Model_B_Getting_Started_Guide.pdf	change guide	3 minutes ago
 README.md	Update README.md	14 days ago



Installation (NOOBS)



1. Download NOOB's Raspberry Pi OS from

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

or from mirror at JAIST

<http://ftp.jaist.ac.jp/pub/raspberrypi/NOOBS/images/>

2. Extract files into your SD card
3. Put the SD card back to Raspberry Pi
4. Boot and install (first item). It takes around 30 minutes to complete.



Installation (Etcher)

1. Download Raspbian Desktop at:

<http://ftp.jaist.ac.jp/pub/raspberrypi/raspbian/images/raspbian-2018-04-19/2018-04-18-raspbian-stretch.zip>

2. Extract file into your computer.

3. Download Etcher at:

<https://etcher.io>

4. Insert SD card and run Etcher
5. Select Raspbian image file and SD card's drive then click Flash!
6. After finish, **unplug** the SD card, wait for a while and **put it back**.
7. Create file name **ssh** in the **root folder** (without extension)
8. Create file name **wpa_supplicant.conf** in the **root folder** and edit this file as:

```
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
```

```
network={
```

```
    ssid="wsn-lab"
```

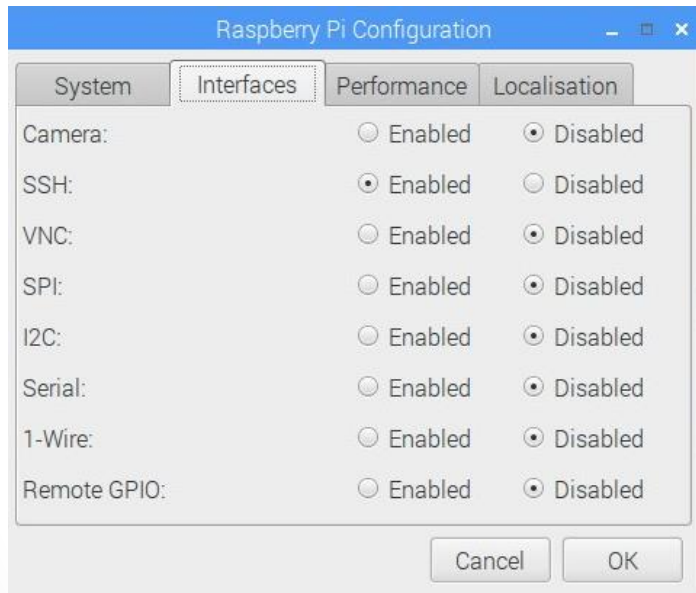
```
    psk="i649ewsn"
```

```
    key_mgmt=WPA-PSK
```

```
}
```



Connect Raspberry Pi through SSH



- i. Start > Preferences > Raspberry Pi Configuration
- ii. Set Hostname e.g. node3
- iii. Interface tab > Enable SSH
- iv. You can enable VNC for remote desktop capability though VNC Viewer
- v. Use this for login:
User: pi
Password: raspberry



Connect Raspberry Pi through SSH

- *Windows*

1. Download PuTTY and install from <https://putty.org>
2. Enter Hostname.local or IP address

```
node5.local  
10.10.0.5
```

- *Mac and Linux*

1. Open terminal
2. Type

```
ssh pi<IP address>  
ssh pi<Hostname>  
ssh pi@10.10.0.4  
ssh pi@node4.local
```

Use this for login:

User: pi

Password: raspberry



Change Hostname

1. Connect ssh to raspberry pi
2. Use command:
`sudo raspi-config`
3. Navigate to **Network Options**.
4. Select **N1 Hostname**
5. Change your Pi's Hostname to **nodexxx** (x is the number of your Pi e.g. node001, node015)
6. Choose < Finish >



Connect Raspberry Pi through VNC (Command Line)

1. Connect ssh to raspberry pi
2. Use command:
`sudo raspi-config`
3. Navigate to **Interfacing Options**.
4. Scroll down and select **VNC > Yes**.
5. Download **VNCViewer**

<https://www.realvnc.com/en/connect/download/viewer/>

6. Input **Hostname.local** or IP address



Update and Install Essential Software

```
sudo apt-get update -y  
sudo apt-get upgrade -y  
sudo apt-get dist-upgrade -y  
sudo pip install --upgrade pip  
sudo apt-get install olsrd iperf wavemon python-  
numpy python-scipy python-matplotlib -y
```



Raspberry Pi wlan0 Ad-Hoc Setup

- Edit the interfaces file in /etc/network/

```
sudo nano /etc/network/interfaces
```

- Add the following

```
auto wlan0
iface wlan0 inet static
    address <IP address>
    netmask 255.255.255.0
    mtu 1500
    wireless-channel <channel>
    wireless-essid <network name>
    wireless-mode ad-hoc
    wireless-ap any
```

- Reboot Raspberry Pi to take effect.



Optimized Link State Routing Protocol Daemon (OLSRD)

- Start OLSRD using wlan0 interface on Raspberry Pi with debug level 1

```
sudo olsrd -i wlan0 -d 1
```

- Check the communication by using ping command

```
ping <IP address>
```

- For multi-hop capability. You need to force two nodes to use a gateway by using firewall to block each other. There is no direct implementation on OLSRD.

```
sudo iptables -A INPUT -m mac --mac-source XX:XX:XX:XX:XX:XX -j  
DROP
```

- Use the command route or traceroute to see if they use a gateway

```
route  
traceroute <IP address>
```



Throughput Measurement

The command is `iperf`. `iperf` is a tool for active measurements of the maximum achievable bandwidth on IP networks.

- Server side

```
sudo iperf -s
```

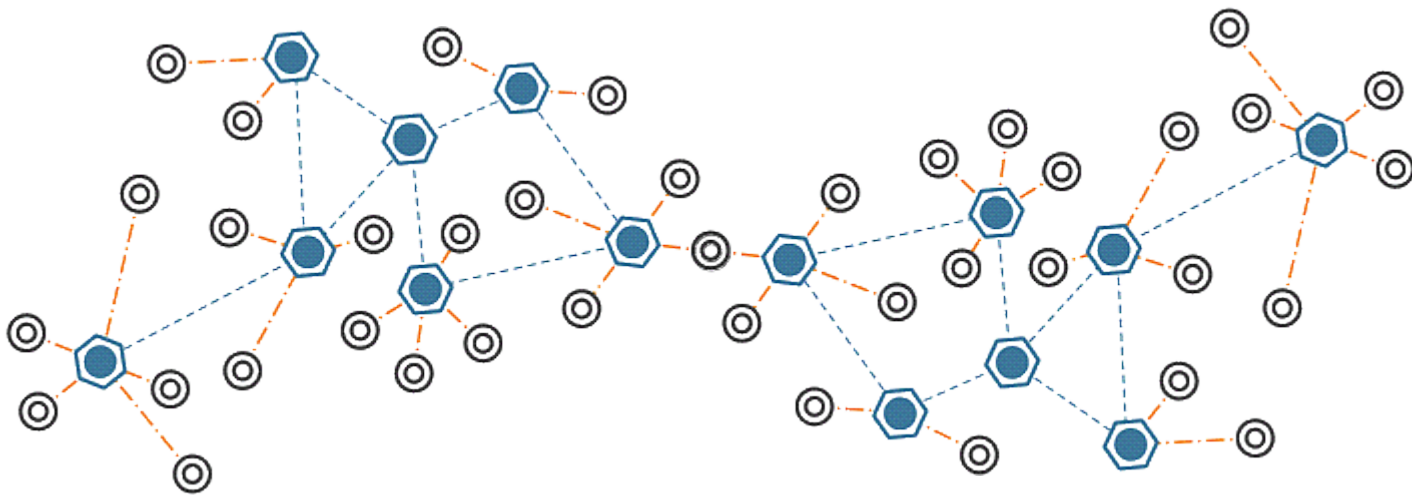
- Client side

```
sudo iperf -c <IP address> -t <time in second>
```



School of Information Science
Japan Advanced Institute of Science and Technology

Question and Answer



THANK YOU.