Raspberry Pi 3 Documentation

Installation

1. Download NOOB's Raspberry Pi OS from https://www.raspberrypi.org/downloads/noobs/
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.

Connect Raspberry Pi Through SSH

Raspberry Pi Configuration

1. Start > Preferences > Raspberry Pi Configuration
2. Set Hostname e.g. node3
3. Interface tab > Enable SSH
4. You can enable VNC for remote desktop capability though VNC Viewer
5. Use this for login as

   User: pi
   Password: raspberry

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
```

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

1. Edit the interfaces file in /etc/network/

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

2. 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
```

3. Reboot Raspberry Pi to take effect.

Optimized Link State Routing Protocol Daemon (OLSRD)

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

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

2. Check the communication by using ping command

```
ping <IP address>
ping 10.10.0.5
```

3. 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
```

4. 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>
```