Lafayette College | Electrical and Computer Engineering

VSCADA User Manual

ECE 492 Spring 2017

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# Initial Setup

1. Download etcher from <https://etcher.io/>
2. Download latest Raspbian img/iso from <https://www.raspberrypi.org/downloads/>
3. Follow etcher.io install instructions
4. Change keyboard to US in Preferences -> Mouse and Keyboard Settings -> Keyboard -> Keyboard Layout

sudo raspi-config -> Interfacing options

SSH -> Yes

I2C  -> Yes

1. Connect to internet/wifi (should just need to select network and follow prompts accordingly)
2. ping [www.google.com](http://www.google.com) to check that connection works
3. Update apt-get to latest version

sudo apt-get update

1. Download tools for PI:

sudo apt-get --assume-yes install maven vim oracle-java8-jdk can-utils

1. Download tools for server:

sudo apt-get --assume-yes install hostapd isc-dhcp-server

1. Download additional tools for server

sudo apt-get --assume-yes install iptables-persistent

Select Yes to both prompts

# Prevent Screen from Sleeping

sudo echo "xserver-command=X -s 0 dpms" >> /etc/lightdm/lightdm.conf

# Optional Configurations for VIM

echo "set nu" >> ~/.vimrc

# ~/.bashrc Enhancements

vim ~/.bashrc

add:

alias ip='ifconfig wlan1 | grep "inet addr" | cut -d ':' -f 2 | cut -d ' ' -f 1'

save and close

source ~/.bashrc

# Server Setup

Option 1:

Follow the below tutorial (change wlan0 to wlan1 and omit mention of the driver, I’d recommend commenting it out.

<https://learn.adafruit.com/setting-up-a-raspberry-pi-as-a-wifi-access-point>

Option 2:

Follow the tutorial I have provided on the last page

# CAN Setup

sudo modprobe can

sudo modprobe can\_raw

sudo modprobe can

sudo sudo ip link add dev can0 type can bitrate 125000

sudo sudo ip link set up can0

# Getting and Running VSCADA

git clone <https://github.com/LafayetteFormulaElectricVehicle/VSCADA.git>

cd VSCADA/

./compile

./viewer or ./cockpit

# Editing VSCADA Code

It is recommended that you use IntelliJ as it is a clean and simple user experience with great debugging tools. Additionally it handles all work with imports and it’s very easy to import new packages. If you need another reason, IntelliJ is available on Linux, Mac and Windows. You can get the latest version of IntelliJ from <https://www.jetbrains.com/idea/download/>.

# Running Code from the Command Line With Maven

## Compiling:

mvn compile

## Executing:

mvn exec:java -Dexec.mainClass="<yourMainClassNameHere>"

# Server Setup

1. sudo su
2. Vim nano /etc/dhcp/dhcpd.conf
   1. Comment out
   2. option domain-name "example.org";
   3. option domain-name-servers ns1.example.org, ns2.example.org;
3. Ensure authoratative line is uncommented
4. Enter into file at end:

subnet 192.168.42.0 netmask 255.255.255.0 {

range 192.168.42.10 192.168.42.50;

option broadcast-address 192.168.42.255;

option routers 192.168.42.1;

default-lease-time 600;

max-lease-time 7200;

option domain-name "local";

option domain-name-servers 8.8.8.8, 8.8.4.4;

}

1. Save and close file
2. vim /etc/default/isc-dhcp-server
3. Set INTERFACES="" -> INTERFACES="wlan1"
4. Save and close file
5. ifdown wlan1
6. vim /etc/network/interfaces
7. Comment out any existing lines for wlan1 except for the one regarding hotplug
8. Add the lines

iface wlan1 inet static

address 192.168.42.1

netmask 255.255.255.0

ifconfig wlan1 192.168.42.1

1. vim /etc/hostapd/hostapd.conf
2. Paste in the code

interface=wlan1

ssid=VSCADAWifi

country\_code=US

hw\_mode=g

channel=6

macaddr\_acl=0

auth\_algs=1

ignore\_broadcast\_ssid=0

wpa=2

wpa\_passphrase=notSCADA

wpa\_key\_mgmt=WPA-PSK

wpa\_pairwise=CCMP

wpa\_group\_rekey=86400

ieee80211n=1

wme\_enabled=1

1. Save and close
2. vim /etc/default/hostapd
3. Make sure the line with DAEMON\_CONF reads as follows and is uncommented

DAEMON\_CONF="/etc/hostapd/hostapd.conf"

1. Save and close
2. vim /etc/sysctl.conf
3. Ensure the line about net.ipv4.ip\_forward is as follows

net.ipv4.ip\_forward=1

1. Save and close
2. sh -c "echo 1 > /proc/sys/net/ipv4/ip\_forward"
3. Run the following commands

sudo iptables -t nat -A POSTROUTING -o eth0 -j MASQUERADE

sudo iptables -A FORWARD -i eth0 -o wlan1 -m state –state RELATED,ESTABLISHED -j ACCEPT

sudo iptables -A FORWARD -i wlan1 -o eth0 -j ACCEPT

sudo sh -c "iptables-save > /etc/iptables/rules.v4"

1. To start the server

hostapd /etc/hostapd/hostapd.conf

1. Additional Steps to start server on boot

sudo service hostapd start

sudo service isc-dhcp-server start

sudo update-rc.d hostapd enable

sudo update-rc.d isc-dhcp-server enable

1. Reboot PI
2. Everything should be up and running