Notebook: Jonathan's engineering notebook
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URL: http://docs.satnogs.org/client/raspi2-install.html

Installing SatNOGS on a Raspberry Pi 2

The reference platform for SatNOGS is the BeagleBone Black. Since then, the Raspberry Pi 2 has been released with similar specs. The author's main reason behind using the RPi2 instead of the BBB is the added USB ports onboard. In my setup I have need for 3 ports when the BBB provides 1. The USB hub I used initially in my tracker caused many issues handling the load of the rtl_sdr. While this tutorial is written for the RPi2 running raspbian it could be used to guide similar setups with a debian based OS.

This tutorial assumes the following:

1. You have a raspberry pi 2b already installed. This tutorial was written with the Raspbian 2015-05-05 image.

2. You have working network connectivity for your SatNOGS tracker (some adapters may take extra work, get those hurdles out of the way first)

3. You are using a Class 10 SDHC card. Lower classes may work but my testing has been with Class 10. The performance is worth the extra cost.

4. You are not overclocking the board. Being that there is no climate control within the SatNOGS tracker, overclocking will run a high risk of overheating on warm days.

5. You will be installing and running as the default *pi* user.

6. You are using an rtl-sdr dongle per the reference platform.

7. You have an account on either network.satnogs.org or network-dev.satnogs.org and have 1) your ground station ID number, 2) your API key

8. Written for SatNOGS client v0.2.4, found at https://pypi.python.org/pypi/satnogsclient/0.2.4 or https://github.com/satnogs/satnogs-client.

Install OS dependencies

Let's get some required packages out of the way first:

```
sudo apt-get update
sudo apt-get upgrade
sudo apt-get install -y python-pip python-dev supervisor cmake libusb-1.0-0-dev l:
```

OS optional packages

(these may help in testing but are not required for SatNOGS)

- gpredict - for testing the rotor functionality of the tracker
- tightvncserver - running gpredict through VNC instead of ssh x-forwarding takes less resources, allowing you to stream rtl_tcp at the same time

These are optional, install them with:

```
sudo apt-get install -y gpredict tightvncserver
```

Installation

Install SatNOGS rtl-sdr

SatNOGS uses a custom modified rtl_fm binary made to change the frequency for doppler shifting.

First, uninstall the pre-existing dvb_usb_rtl28xxu driver if it exists for your dongle:

```
sudo bash -c "echo blacklist dvb_usb_rtl28xxu > /etc/modprobe.d/rtl28xxu-blacklist
sudo rmmod dvb_usb_rtl28xxu
```

Next, clone and build the rtl-sdr tools:

```
mkdir ~/git
cd ~/git
```

```
git clone https://github.com/satnogs/rtl-sdr.git
mkdir rtl-sdr/build
cd rtl-sdr/build
cmake ../
make
sudo make install
sudo ldconfig
sudo cp ../rtl-sdr.rules /etc/udev/rules.d
sudo udevadm trigger
```

At this point you should be able to run rtl_test with your dongle plugged in and it will be detected. Press CTRL-C to exit the test.

Install satnogs-client

Building from source is outside of the scope of this document, we will use the packaged install for now:

```
sudo pip install satnogsclient==0.2.4
```

supervisord & configuration

I like to manage SatNOGS with supervisord. There are plenty of other ways to do it and your mileage may vary. Before we get to the SatNOGS client we have one a dependency that has not yet been discussed: rotctld for providing rotor control interface to the SatNOGS Arduino board. This should have been installed with libhamlib-utils above.

As with SatNOGS, I run rotctld through supervisord. Open your favorite editor and drop this into /etc/supervisord/conf.d/rotctld.conf:

```
[program:rotctld]
command=/usr/bin/rotctld -m 202 -r /dev/ttyACM0 -s 19200 -T 127.0.0.1
autostart=true
autorestart=true
user=pi
```

```
priority=1
```

Now, for the SatNOGS supervisord config file. This is also where you will configure your client as today the settings are all passed in environment variables. Drop this into /etc/supervisord/conf.d/satnogs.conf:

```
[program:satnogs]
command=/usr/local/bin/satnogs-poller
directory=/home/pi/
autostart=true
autorestart=true
user=pi
environment=SATNOGS_SQLITE_URL="sqlite:////tmp/jobs.sqlite",SATNOGS_API_URL="https
```

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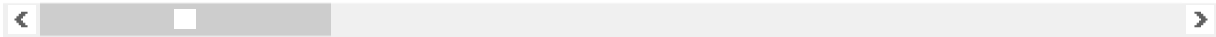
Obviously there are fields above that will need configured appropriately, your latitude/longitude/elevation (example: 43.210 -86.123, elevation is in meters), API token, station ID, and PPM. Log in to the SatNOGS Network console and click on your user icon in the upper-right, then "My Profile". If you have not already added your ground station to the web site please do so now with the "Add Ground Station" button. Once that is done your ground station ID will be shown. In this screen as well you can click the "API Key" button for the token needed in the configuration above. All settings that can be changed in the environment can be found in the [settings.py file] (https://github.com/satnogs/satnogs-client/blob/master/satnogsclient/settings.py)

With these files in place, run **sudo supervisorctl reload** and the new configuration files will be picked up and the apps started. You can follow the logs in /var/log/supervisord/.

Other configuration variables can be found by looking at the settings file at https://github.com/satnogs/satnogs-client/blob/0.2.3pypi/satnogsclient/settings.py

At this point your client should be fully functional! It will check in with the network URL at a 5 minute interval. You should check your ground station page on the website, the station ID will be in a red box until the station checks in, at which time it will turn green.