

Bringing Innovation to Life



Markus van Kempen

Executive Architect &
Venture Capitalist



E: mvk@ca.ibm.com

T: @markusvankempen



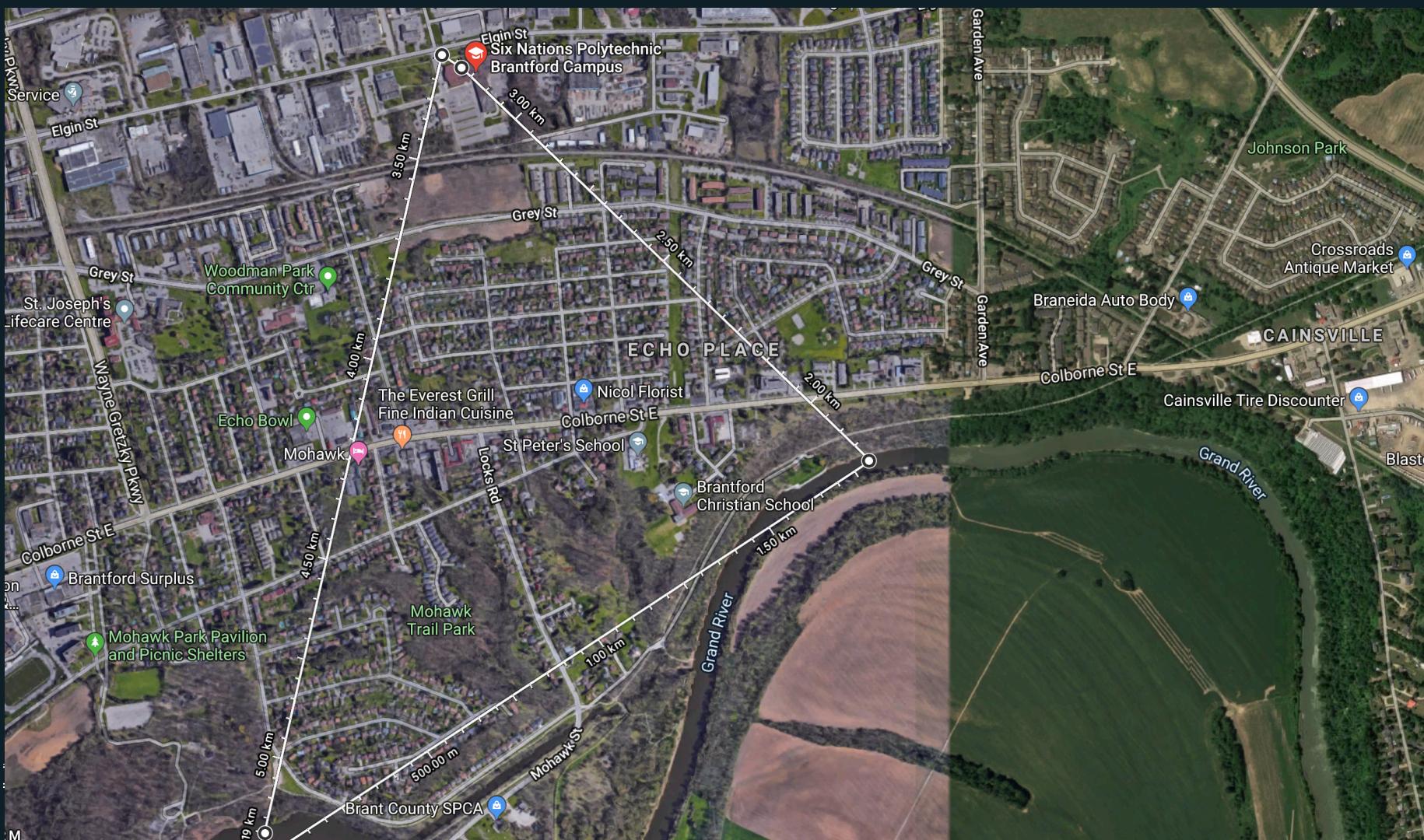
SNP STEAM ACADEMY

<https://www.snpolytechnic.com/steam-academy>

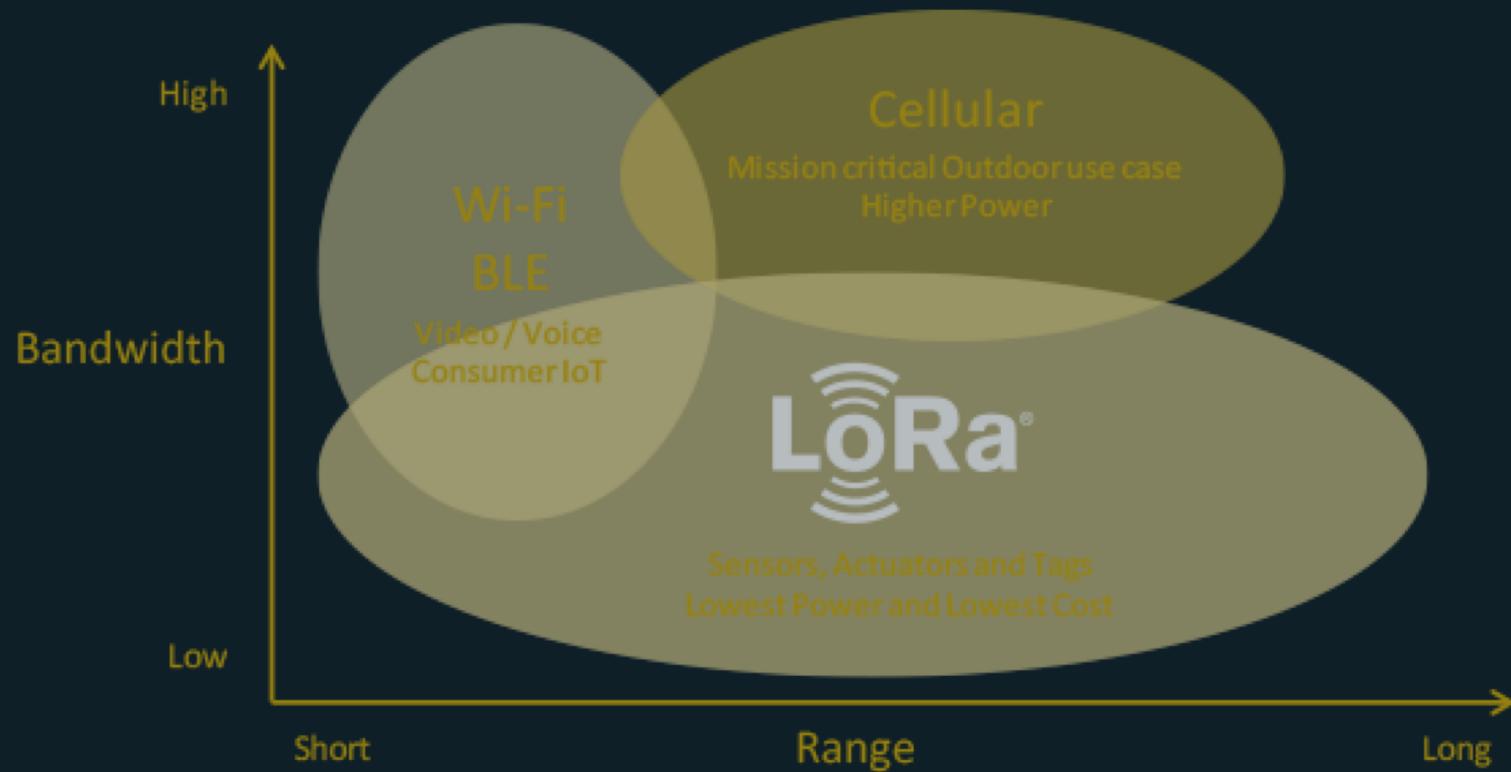


The Idea - IoT Monitoring – environment / things / people

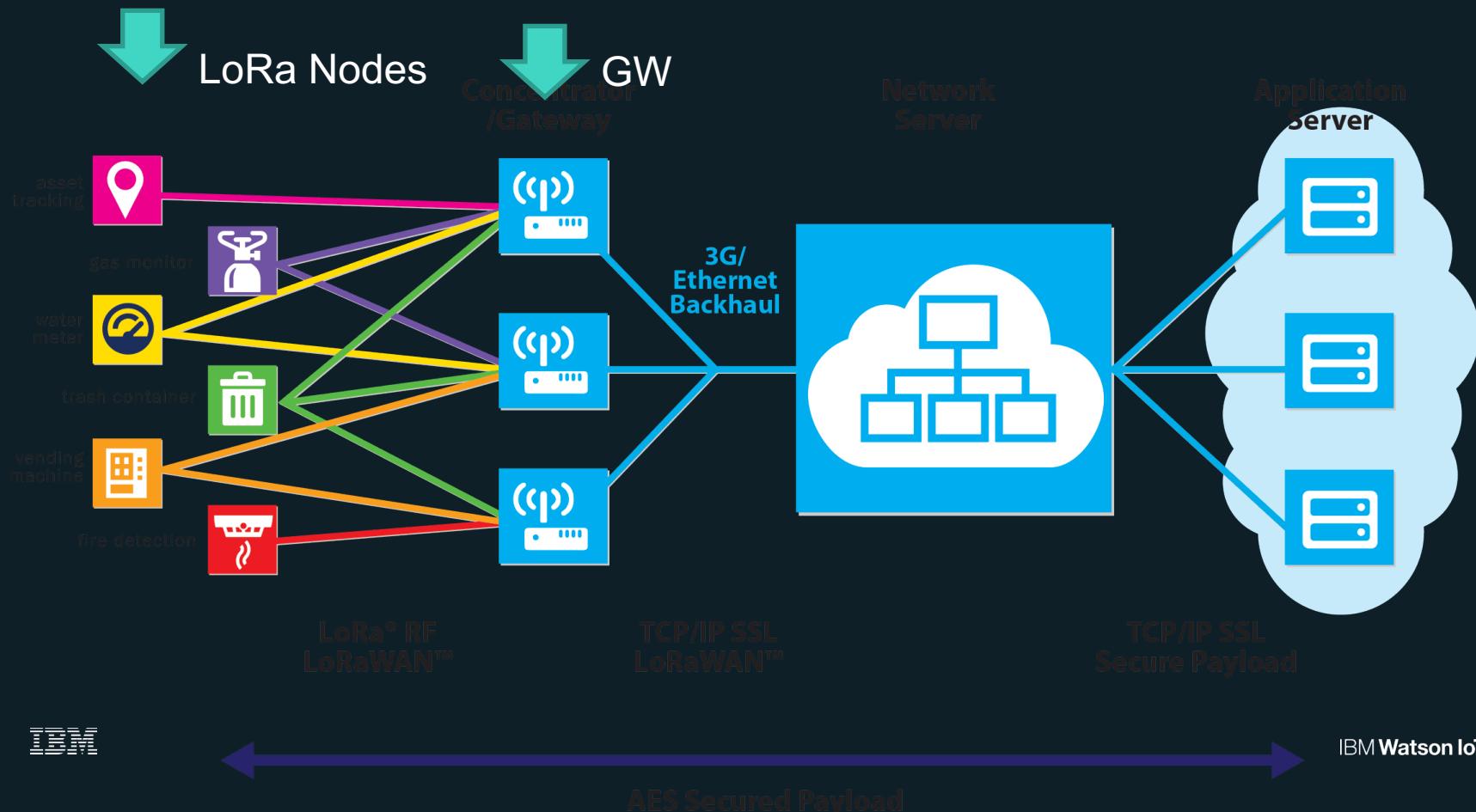




Network Type and Capabilities



How could this work



Recap Learning from field test

Distance

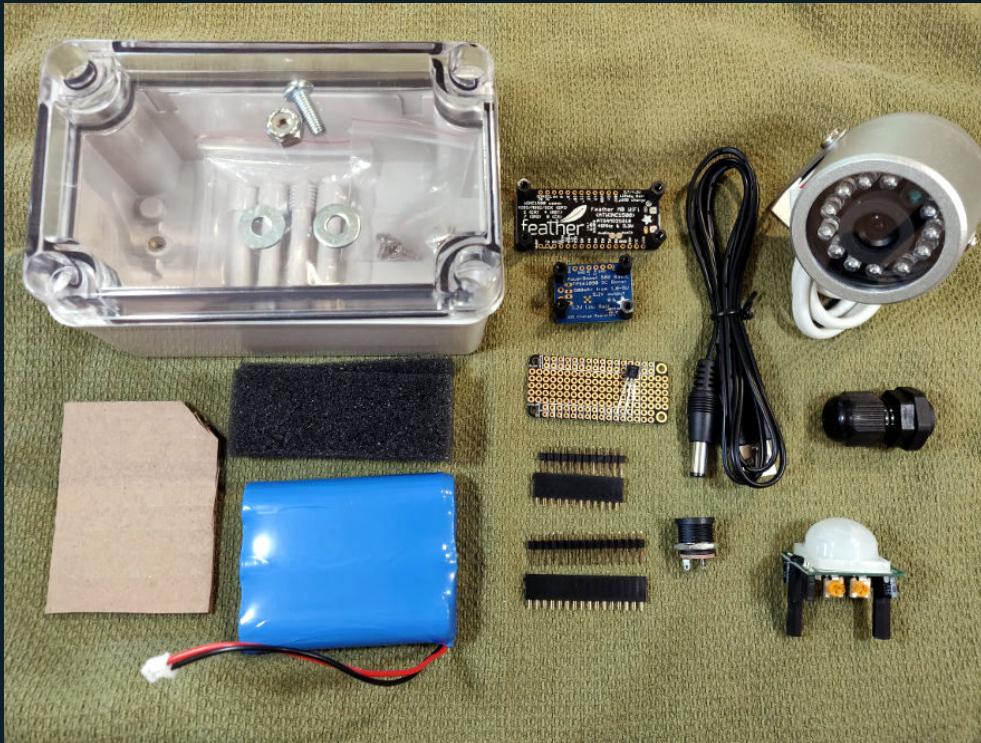
Obstacle issue

Antenna position



Example kit-

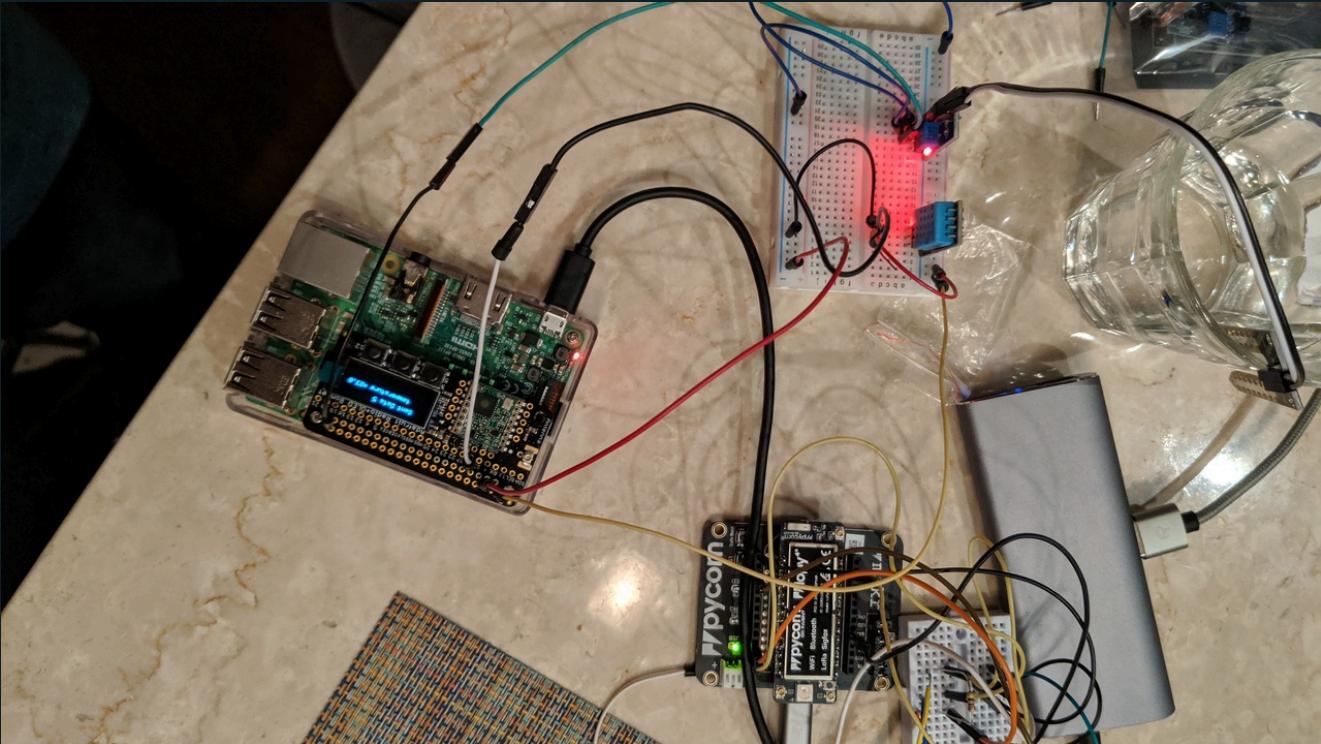
<https://blog.adafruit.com/2018/06/04/building-a-solar-powered-remote-environmental-monitor-with-adafruit-materials/>



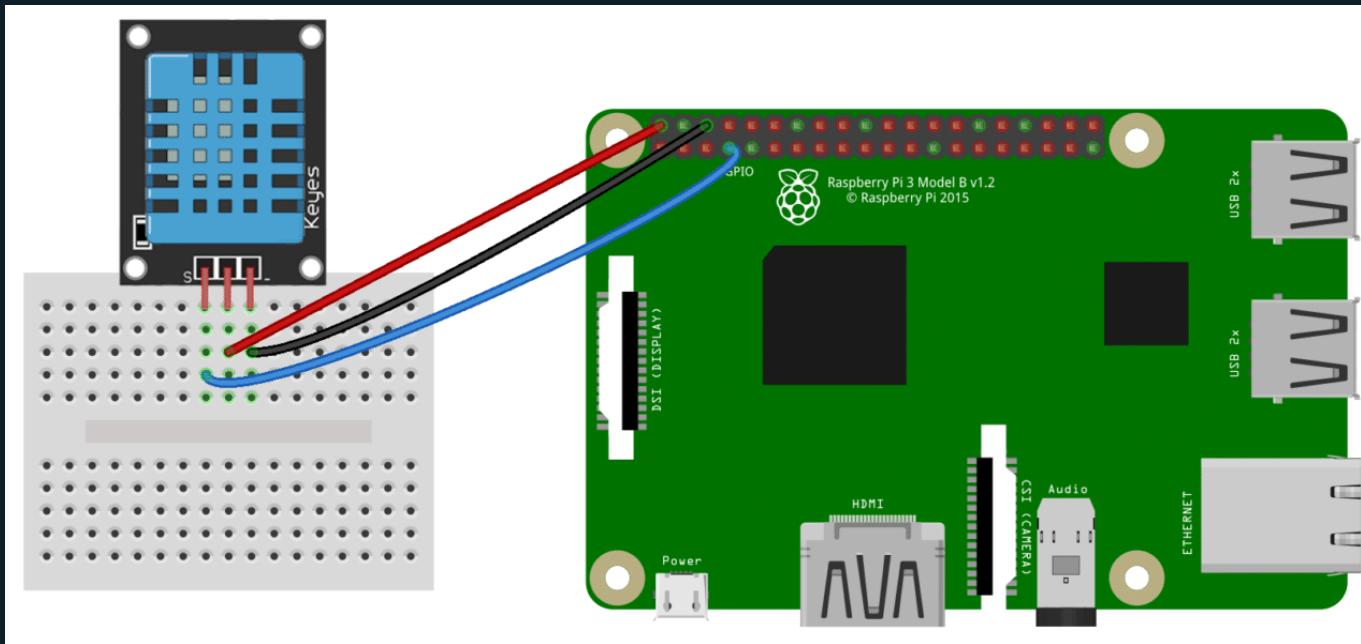
Todays Exercise

1. Connect PI with sensors
 - 2 Temperature sensors
 - One Soil/Water sensor
2. Send the Sensor to Gateway via Lora
 - We maybe have to solder
2. Send the Data to the could for Visualization and Processing

Setup up

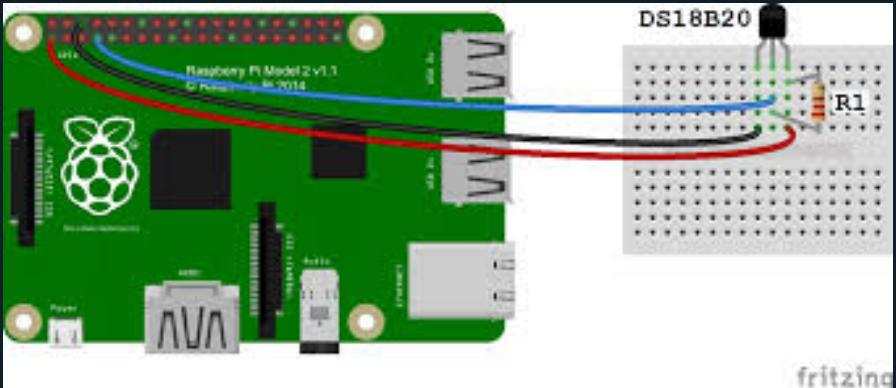
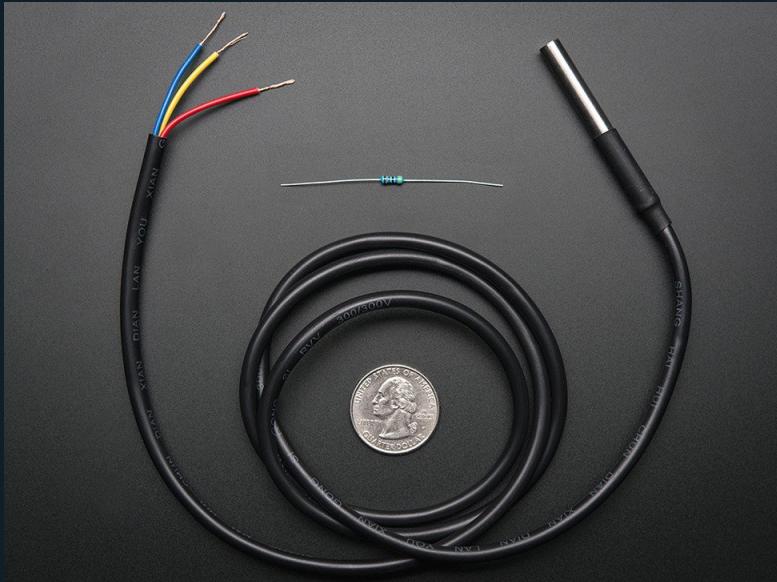


DHT11 Temperature & Humidity sensor



Temperature Sensor - Waterproof (DS18B20)

u need a 4.7K resistor



Multiple Sensor

<http://www.reuk.co.uk/wordpress/raspberry-pi/connect-multiple-temperature-sensors-with-raspberry-pi>
<https://timofurrer.github.io/w1thermsensor/>

```
from w1thermsensor import  
    W1ThermSensor for sensor in W1ThermSensor.get_available_sensors():  
        print("Sensor %s has temperature %.2f" % (sensor.id, sensor.get_temperature()))
```



Soil / Moister sensors – has Digital output ... water / no water



<https://tutorials-raspberrypi.com/measuring-soil-moisture-with-raspberry-pi/>

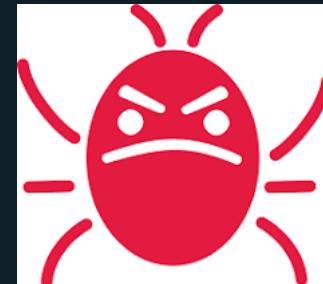
Code

Most code is on the PI in a directory ~snplora/

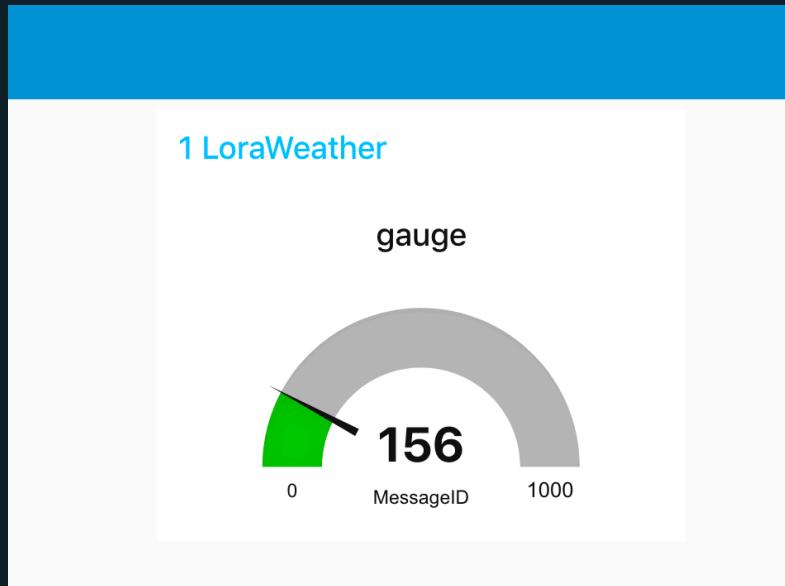
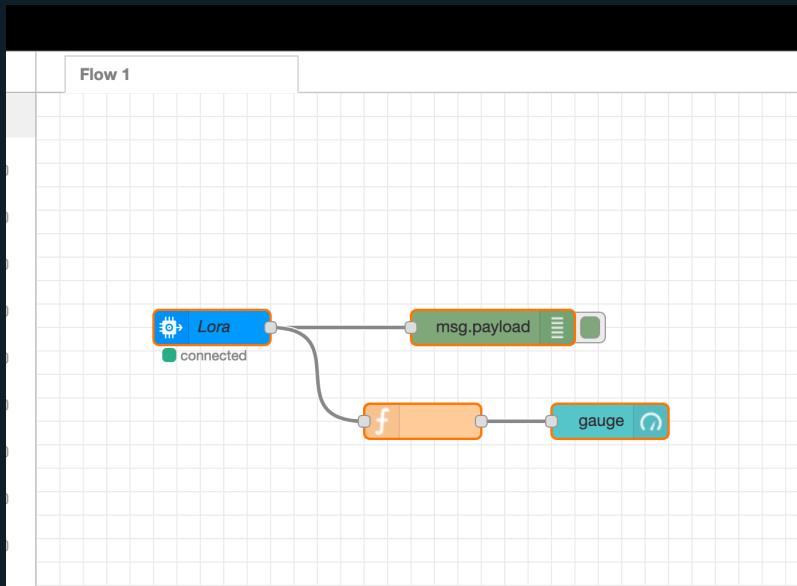
All programs are written in python3

You can execute the program with python3 and than program.py

The Gateway code is written but

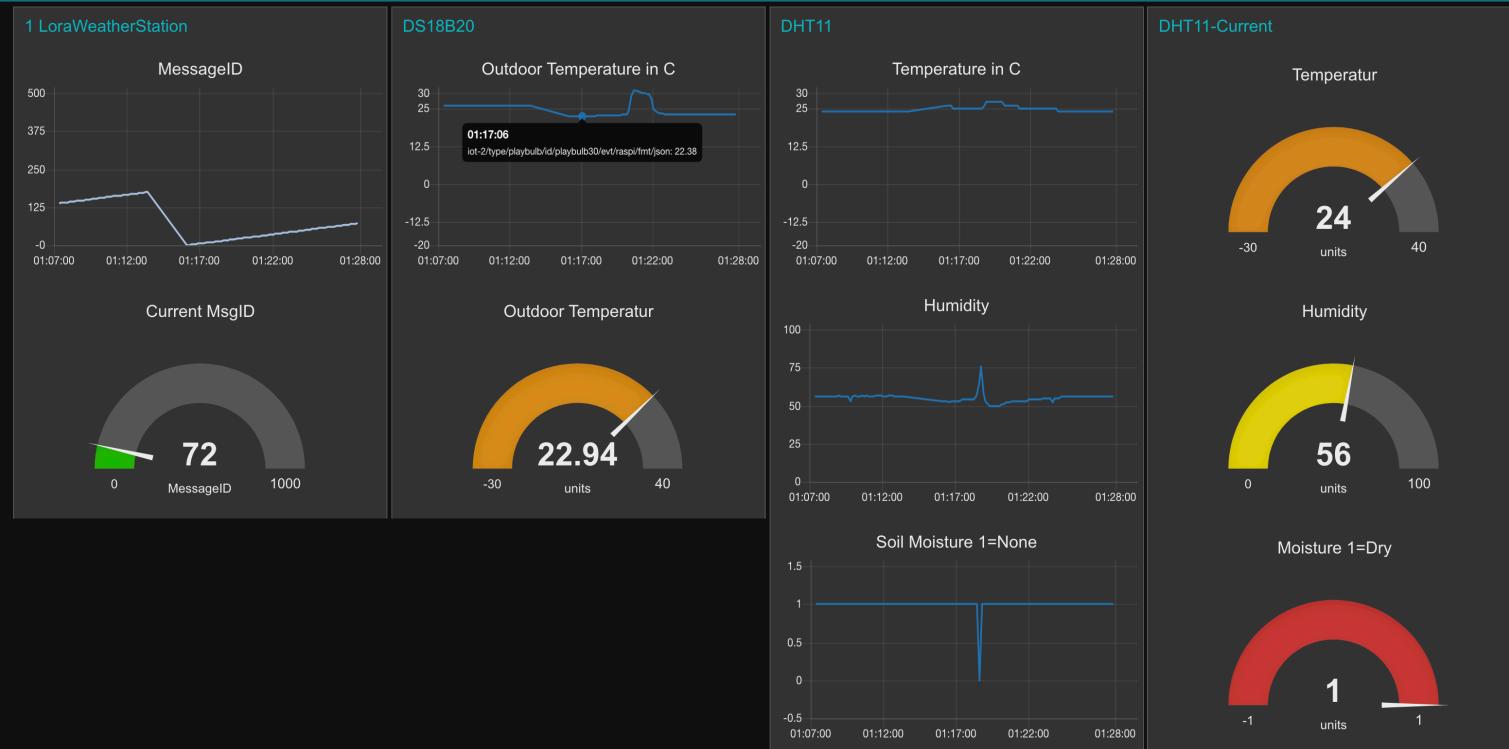


Visualization is on Bluemix
like snp30.mybluemix.net and snp31.mybluemix.net



Dashboards

LoraWeatherStation

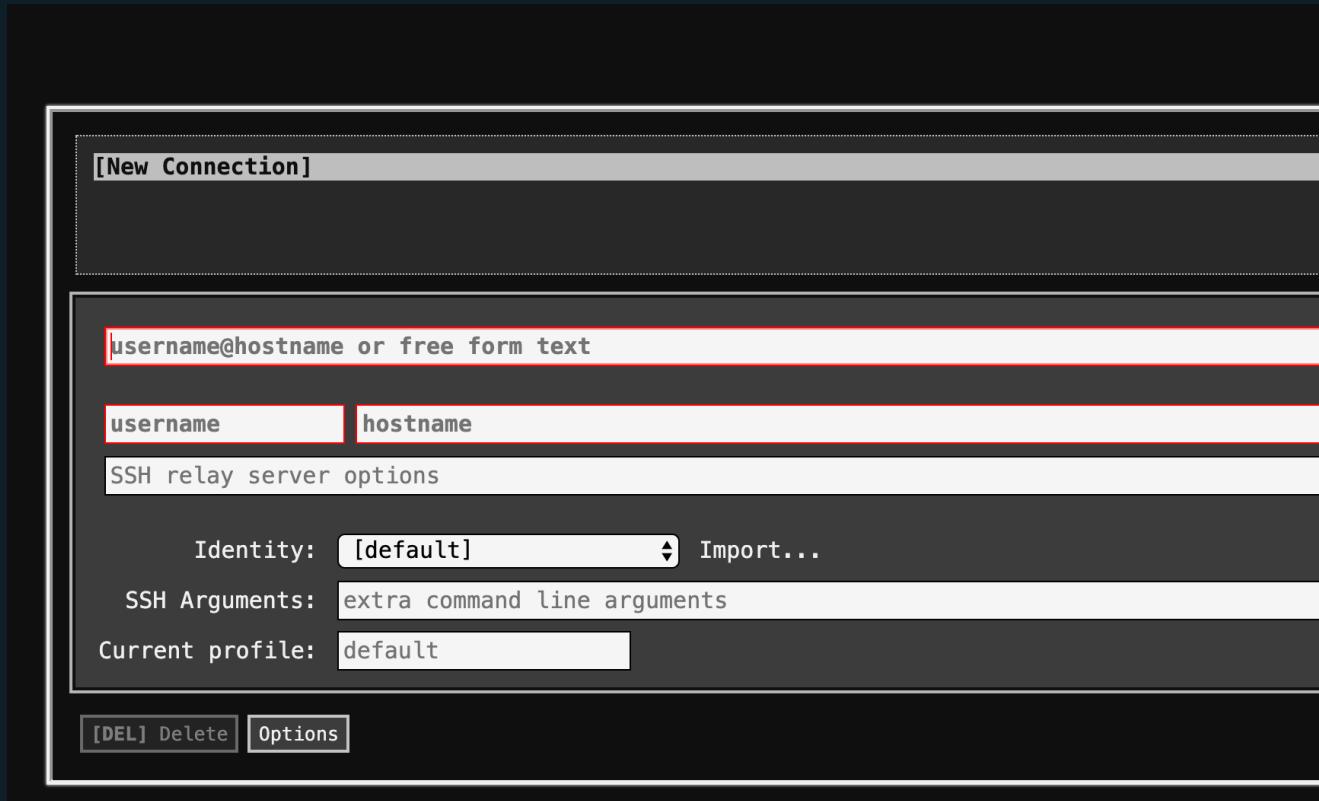


Lots of code to play

- 1 dht11.py. – watch for the PIN Numbers
- 2 soil1.py
- 3 ds18x20.py
- 4 check oled_button.py
- 5 Use the and change the temp_to_lora.py

```
[^C
(base) Markuss-MacBook-Pro:snplora-picode mvankempen@ca.ibm.com$ scp * pi@192.168.1.19:~/snplora/
[pi@192.168.1.19's password:
blinkatest.py                                100%   364      58.3KB/s
dht11.py                                     100%  2117     403.7KB/s
ds18x20.py                                    100%   420      54.1KB/s
font5x8.bin                                   100% 1282     228.1KB/s
mvk.py                                         100%  5685     673.0KB/s
oled_button.py                               100%  1237     166.4KB/s
rfm9x_check.py                             100%  1880     305.4KB/s
soil.py                                       100%   242      23.6KB/s
soil1.py                                      100%   595      87.4KB/s
temp_to_lora.py                            100%  3067     320.0KB/s
w1temp.py                                     100%   210      33.4KB/s
(base) Markuss-MacBook-Pro:snplora-picode mvankempen@ca.ibm.com$ ssh pi@192.168.1.14
```

Access the PI via ssh using Chrome ssh app
userid: pi / raspberry



Data flow

Example Json message

```
{"id": 10, "t": 12, "h": 0 , "msgid": 156}
```

id = PI /Lora ID

t= temperature

H=humidity

Msgid = msg counter



Demo

Walk through



References

Github

<https://github.com/markusvankempen/LoraWeatherStation>

<https://github.com/SixNationsPolytechnic>

YouTube

https://youtu.be/j_9OsHQvFYY



Extra- Gas Sensor

<https://tutorials-raspberrypi.com/configure-and-read-out-the-raspberry-pi-gas-sensor-mq-x/>



Equipment Setup

