# Enhance your monitoring with RTL-SDR

@JayFoxtrot

Simple Monitoring of Temperature and Humidity

- Acurite temp and humidity 3-pack
  - Reasonably priced ($70 on amazon)
  - One console which has temp/humidity sensor
  - Decent range (within 300 ft)

Simple Monitoring of Temperature and Humidity Problems

- Instantaneous data but no history
- No logging and notifications
- Can't increase sensors (channel selectors support only A, B, C)
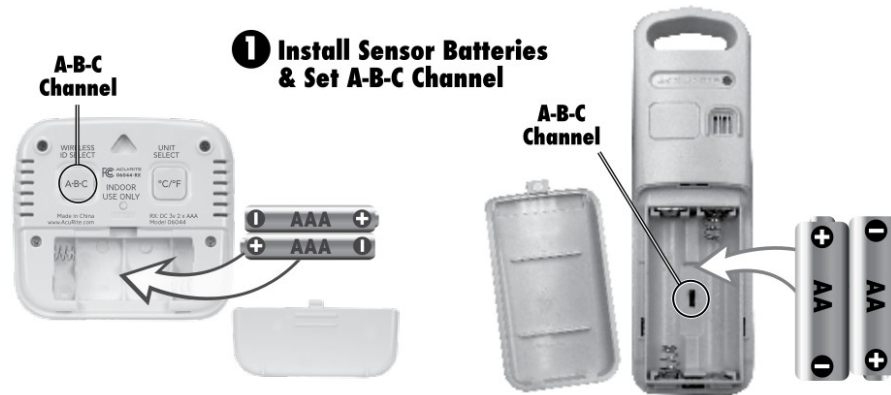
SDR to the rescue

- Add a computer and a cheap SDR dongle
  - Raspberry Pi ($30-$100)
  - Noo Electric RTL-SDR ($27 amazon)
  - Additonal sensors 06002M ($35 amazon)

Raspberry Pi

- Plug in RTL-SDR USB adapter
- Run rtl_433 code
  - Decodes data from temp sensors
- Run a time series database (InfluxDB)
  - Any TSDB can work
- Grafana to host dashboard

Building and Installing rtl_433

- Easy to build/install on rasbian
  - Instructions in the documentation
  - But rough steps:

```
sudo apt install -y librtlsdr-dev
git clone https://github.com/merbanan/rtl_433.git
cd rtl_433
mkdir build
cd build
cmake ..
make -j $(nproc)
cd ..
./build/src/rtl_433 -d rtl_tcp -C customary -F json | ~/temp_to_influx.py
```

Running rtl_433

- Sample Output

pi@stream1:~ $ **rtl_433/build/src/rtl_433 -d rtl_tcp -C customary -F json**
rtl_433 version 21.12-160-geee869e7 branch master at 202210252023 inputs file rtl_tcp RTL-SDR
Use -h for usage help and see https://triq.org/ for documentation.
Trying conf file at "rtl_433.conf"...
Trying conf file at "/home/pi/.config/rtl_433/rtl_433.conf"...
Trying conf file at "/usr/local/etc/rtl_433/rtl_433.conf"...
Trying conf file at "/etc/rtl_433/rtl_433.conf"...
Registered 191 out of 223 device decoding protocols [1-4 8 11-12 15-17 19-23 25-26 29-36 38-60 63 67-71 73-100 102-105 108-116 119 121 124-128 130-149
151-161 163-168 170-175 177-197 199 201-215 217-223]
rtl_tcp input from localhost port 1234
connect: Connection refused
rtl_tcp connected to localhost:1234 (Tuner: R820T)
Sample rate set to 250000 S/s.
Tuner gain set to Auto.
Tuned to 433.920MHz.
baseband_demod_FM: low pass filter for 250000 Hz at cutoff 25000 Hz, 40.0 us
{"time" : "2023-01-29 19:40:51", "model" : "Acurite-Tower", "id" : 14435, "channel" : "C", "battery_ok" : 1, "temperature_F" : 68.900, "humidity" : 41,
"mic" : "CHECKSUM"}
{"time" : "2023-01-29 19:40:52", "model" : "Acurite-Tower", "id" : 15574, "channel" : "C", "battery_ok" : 1, "temperature_F" : 69.440, "humidity" : 43,
"mic" : "CHECKSUM"}
{"time" : "2023-01-29 19:40:52", "model" : "Acurite-Tower", "id" : 15574, "channel" : "C", "battery_ok" : 1, "temperature_F" : 69.440, "humidity" : 43,
"mic" : "CHECKSUM"}
{"time" : "2023-01-29 19:40:52", "model" : "Acurite-Tower", "id" : 15574, "channel" : "C", "battery_ok" : 1, "temperature_F" : 69.440, "humidity" : 43,
"mic" : "CHECKSUM"}
{"time" : "2023-01-29 19:40:52", "model" : "Acurite-Tower", "id" : 15441, "channel" : "C", "battery_ok" : 1, "temperature_F" : 47.300, "humidity" : 55,
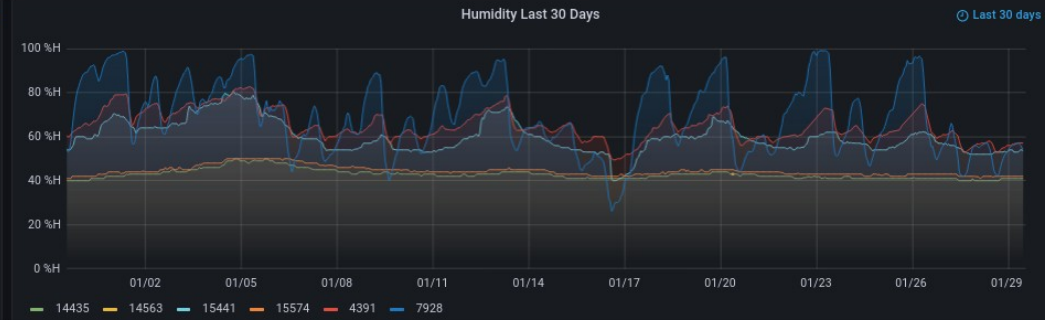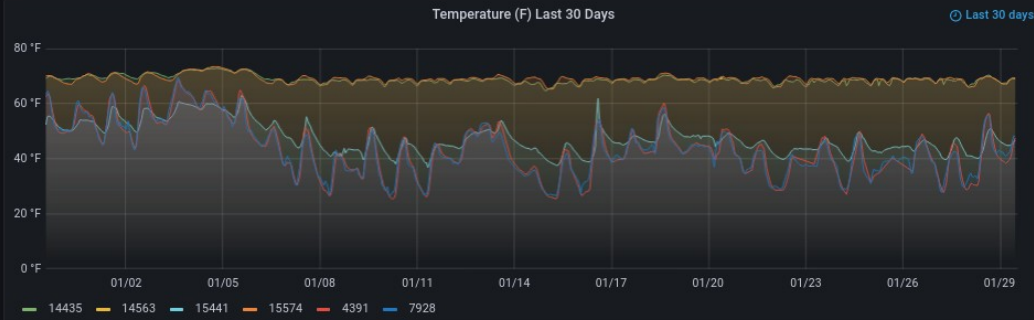"mic" : "CHECKSUM"}
{"time" : "2023-01-29 19:40:52", "model" : "Acurite-Tower", "id" : 15441, "channel" : "C", "battery_ok" : 1, "temperature_F" : 47.300, "humidity" : 55,
"mic" : "CHECKSUM"}
{"time" : "2023-01-29 19:40:52", "model" : "Acurite-Tower", "id" : 15441, "channel" : "C", "battery_ok" : 1, "temperature_F" : 47.300, "humidity" : 55,
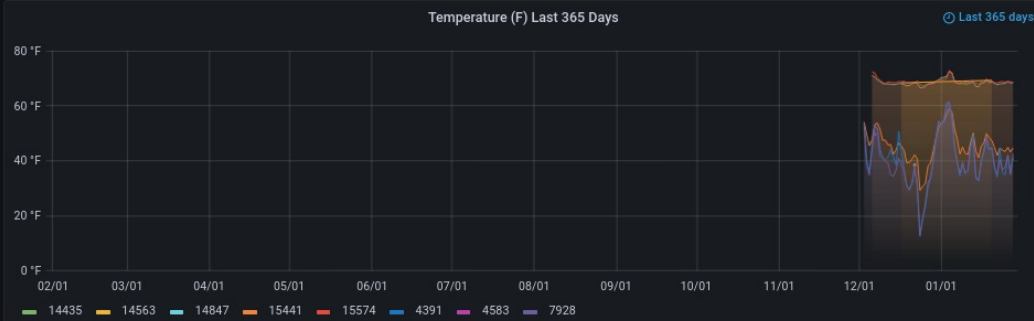"mic" : "CHECKSUM"}

Grafana Temp Dashboards

Grafana Temp Dashboards
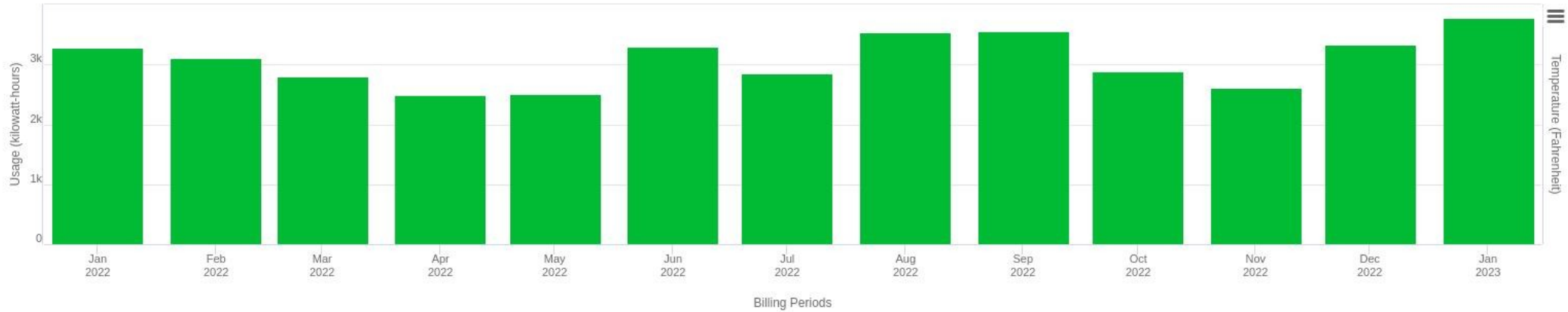
Power Monitoring

- Many homes have Itron Smart Meters
  - Power company reads them once a month from a vehicle in close proximity
  - Some have cellular capabilities to eliminate the need for close proximity

Power Monitoring

- Data is seldom accessible to users from the power company
- NOVEC launched a new customer portal last year
- Users can now download their data
- Already had access to the last year of monthly data

Power Monitoring

Power Monitoring

RTL-SDR and rtlamr

- Where NOVEC fails, open-source delivers
  - https://github.com/bemasher/rtlamr
  - https://github.com/bemasher/rtlamr-collect
- Go code to decode Itron power meters and insert into a Influx DB

Grafana Power Dashboards

Grafana Power Dashboards
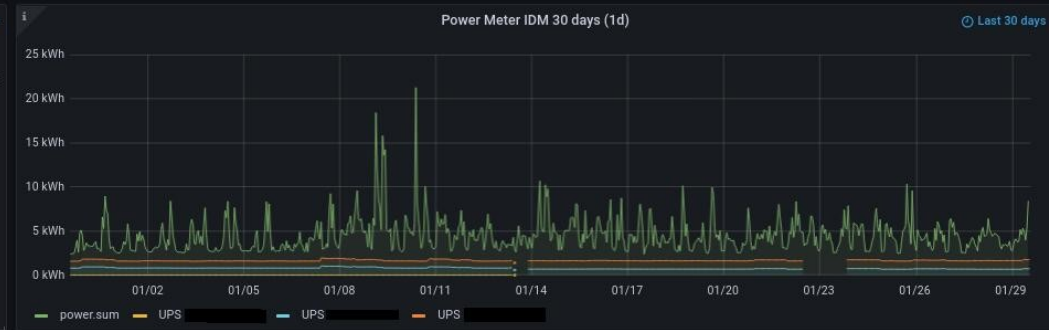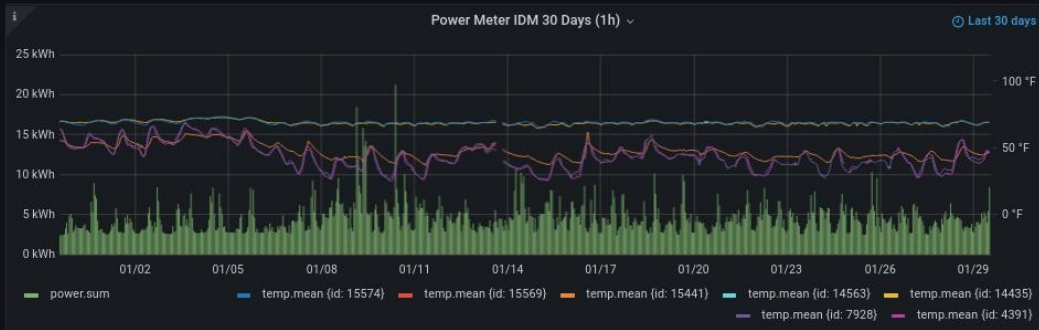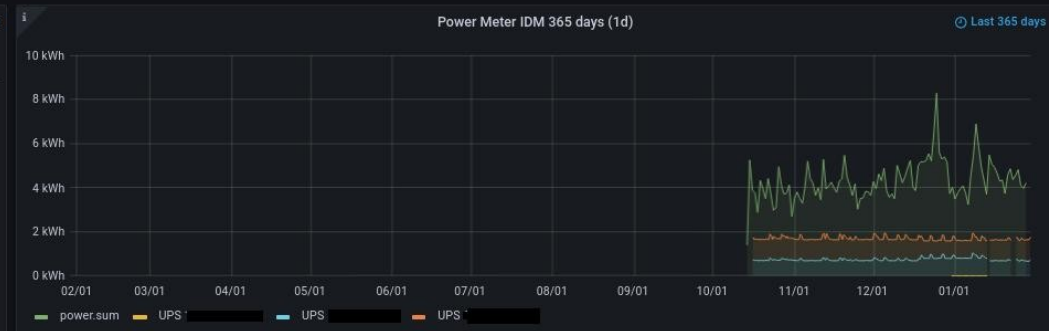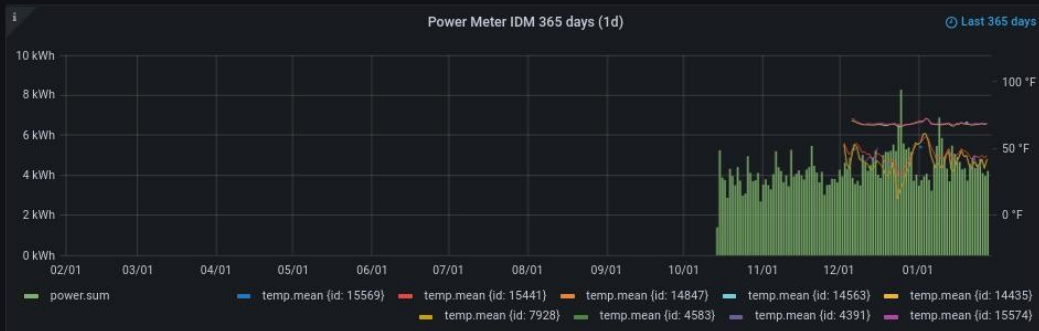
Resources:

- https://github.com/bemasher/rtlamr
- https://github.com/bemasher/rtlamr-collect
- https://github.com/merbanan/rtl_433.git
- https://github.com/hmatuschek/libsdr.git