



ONE IDENTITY

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Measuring and analyzing humidity data using Python, syslog-ng and Elasticsearch

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About me

- Working at One Identity
- Sudo & syslog-ng upstream
- Helping in RPM and FreeBSD packaging
- Explaining them in blogs and talks

Plan vs. reality

- Practice Python and Elasticsearch using sensor data on a Raspberry Pi
- Learn how to regulate humidity

- Raspberry Pi too small for Elasticsearch -> no 24/7 collection
- Buffering -> syslog-ng

Collecting data

- Raspberry Pi + SparkFun sensor addon board
- Data collection using Python

- Driver:

```
pip3 install sparkfun-qwiic-bme280
```

- Sample code:

```
git clone
```

```
https://github.com/sparkfun/Qwiic\_BME280\_Py/
```

Collecting data

```
pi@raspberrypi:~/Documents/Qwiic_BME280_Py/examples $ python3 qwiic_bme280_ex1.py
```

SparkFun BME280 Sensor Example 1

```
Humidity:    58.396
Pressure:    128911.984
Altitude:    -6818.388
Temperature: 70.43
```

```
Humidity:    58.390
Pressure:    128815.051
Altitude:    -6796.598
Temperature: 70.41
```

```
^C
```

Ending Example 1

Collecting data

- I'm in Europe...
- Replace **temperature_fahrenheit** with **temperature_celsius**

Collecting data: Python code

```
#!/usr/bin/python3
import qwiic_bme280
import time
import sys
import syslog

# initialize sensor
sensor = qwiic_bme280.QwiicBme280()
if sensor.connected == False:
    print("Sensor not connected. Exiting")
    sys.exit(1)
sensor.begin()

# collect and log time, humidity and temperature
while True:
    t = time.localtime()
    current_time = time.strftime("%H:%M:%S", t)
    current_humidity = sensor.humidity
    current_temperature = sensor.temperature_celsius
    print("time={ } humidity={ } temperature={ }".format(current_time,current_humidity,current_temperature))
    message = "humidity=" + str(current_humidity) + " temperature=" + str(current_temperature)
    syslog.syslog(message)
    time.sleep(1)
```


Collecting data: syslog output

```
pi@raspberrypi:~ $ tail -3 /var/log/messages
```

```
Jan  5 12:11:24 raspberrypi sensor2syslog_v2.py[6213]:  
humidity=58.294921875 temperature=21.4
```

```
Jan  5 12:11:25 raspberrypi sensor2syslog_v2.py[6213]:  
humidity=58.294921875 temperature=21.4
```

```
Jan  5 12:11:26 raspberrypi sensor2syslog_v2.py[6213]:  
humidity=58.294921875 temperature=21.39
```

Configuring Elasticsearch

- Current syslog-ng versions treat all data as string
- Kibana does not do graphs from string data
- Workaround: mapping

- Upcoming syslog-ng versions will resolve this limitation

Configuring Elasticsearch

```
{
  "mappings": {
    "_doc": {
      "properties": {
        "@timestamp": {
          "type": "date"
        },
        "sensors": {
          "properties": {
            "humidity": {
              "type": "float"
            },
            "temperature": {
              "type": "float"
            }
          }
        }
      }
    }
  }
}
```

Installing syslog-ng

- You need JSON and HTTP destination support:

```
apt-get install syslog-ng-mod-json syslog-ng-mod-http
```

- Configuration extends existing base `syslog-ng.conf`

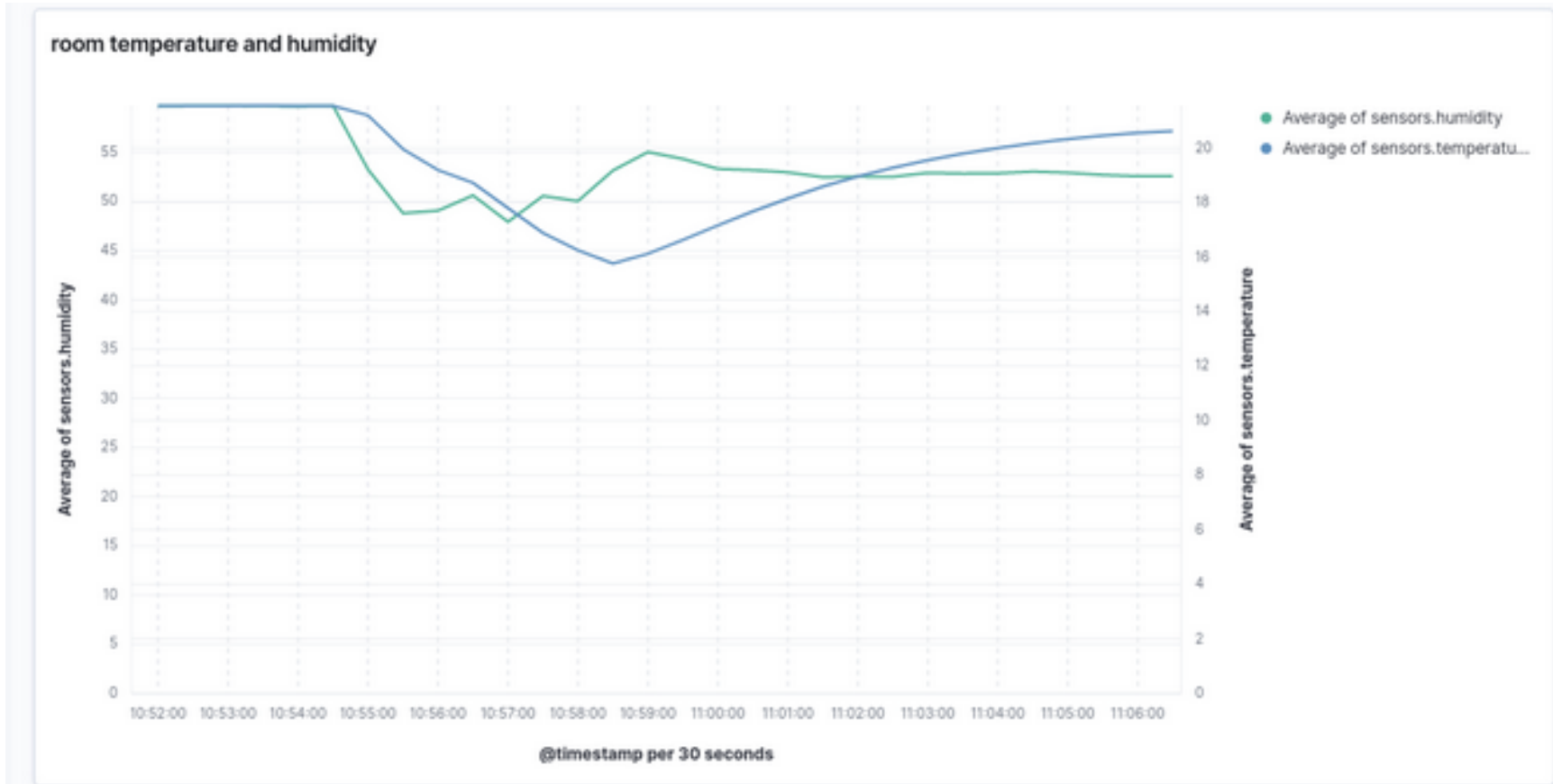
Configuring syslog-ng

```
filter f_sensors {program("sensor2syslog_v2.py")};  
parser p_kv {kv-parser(prefix("sensors."));};  
destination d_sensors {  
  file("/var/log/sensors" template("${format-json @timestamp=${ISODATE} --key sensors.*}\n\n"));  
  elasticsearch-http(  
    index("sensors")  
    type("")  
    url("http://192.168.1.129:9200/_bulk")  
    template("${format-json @timestamp=${ISODATE} --key sensors.*}")  
    disk-buffer(  
      disk-buf-size(1G)  
      reliable(no)  
      dir("/tmp/disk-buffer")  
    )  
  );  
};
```

Configuring syslog-ng

```
log {  
    source(s_src);  
    filter(f_sensors);  
    parser(p_kv);  
    destination(d_sensors);  
};
```

Configuring syslog-ng



Summary

- A simple Python script running on cheap hardware can provide valuable input:
 - Humidity returns to the original level almost immediately when windows are open only for a short time
 - Keeping windows open for 5+ minutes has long-term impact on indoors humidity

Questions?

- Syslog-ng website: <https://syslog-ng.com/>
- My email: peter.czanik@oneidentity.com
- Twitter: @Pczanik





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