

Data Analytics Code Challenge

[Use Case](#)

[Requirements](#)

[Setup](#)

Use Case

Our technology is able to track carriers for special load (SLT, see image) through our customers manufacturing process. For this we attach Sensor Units on SLTs, which transmit every 10 seconds. We place receivers at important locations, which receive the transmitted signal, when it is in range. The quality of the signal can be measured with the RSSI (Received Signal Strength Indicator). This data is then forwarded to the cloud. You will get a database dump of those forwarded messages. Your task will be to analyse the data and visualize the results in python.



Technical Setup

The receivers use the MQTT to protocol send messages to a mqtt broker. This broker is the entry point of the cloud platform. In order to process this data the “mqtt-connector” connects to the the broker and subscribes for all relevant messages. When receiving a new message it is forwarded via HTTP to another server, where the message is processed. The data we provide in this challenge is a dump of the messages processed by the connector.

Introduction to Data

This is a line of the data dump you are going to get. Each file is named after a Sensor Unit ID and contains only the received messages send by this sensor unit.

```
{"timestamp":{"n":"1523985027.312444"},"sensors":{"l":[]},"message":{"m":{"payload":{"s":{"\"suID\": \"01-002-0001\", \"rssi\": -9, \"suData\": {\"sensor_config\": 72, \"bat\": 2976, \"temp\": 19.32}}}},\"destination\":{\"s\":\"v1/rec/02-002-0000/suStatus\"}}},\"request":
```

```
{"m":{"status":{"n":"200"},"responseTime":{"n":"0.15995407104492188"}}},  
"receiverid":{"s":"02-002-0000"}}
```

Typical formatting for easier reading:

```
"timestamp": 1528698140.8400846,  
"message": {  
  "destination": "v1/rec/02-004-0000/suStatus",  
  "payload": {  
    "rssi": -11.0,  
    "suData": {  
      "bat": 2976.0,  
      "sensor_config": 192.0,  
      "temp": 27.0  
    },  
    "suID": "01-003-0014"  
  },  
}  
},  
{  
  "sensors": ["01-003-0014"],  
  "receiverid": "02-004-0000",  
  "request": {  
    "responseTime": 92.0562744140625,  
    "status": 200.0  
  }  
}
```

- Timestamp: unix timestamp, when data was received at backend
- Message:
 - Payload: a JSON string, the JSON may have following schema:
 - SU_ID: Id of Sensor Unit
 - RSSI: Received signal strength indicator
 - su_Data:
 - Su_config: configuring, which data it sends
 - bat: Battery Voltage; 2976=2,976V. Full Battery 3V empty Battery ~ 2 V. Voltage also drops at low temperature
 - temp: sensor unit temperature. Not calibrated
 - Destination: Topic of Message, includes facility: MUC = München, rec-id, type of message, e.g. suStatus message
- Request:
 - status: HTTP response code of the processing server
 - responseTime: time the processing server needed for this request
- Receiver id: Receiver that forwarded the message

Requirements

- You main task will be to visualize for one sensor unit the change of the rssi value at every receiver over time.
- How you do it, is completely up to you, but please document every step you do and why you did it.
- Once you got a feeling of the data, please provide one more analysis of your choice.
- Whatever you do, please use python for it.