Energy Hackdays 2020
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Hightech Zentrum in Brugg

Challenge #3

Read your own Smart Meter

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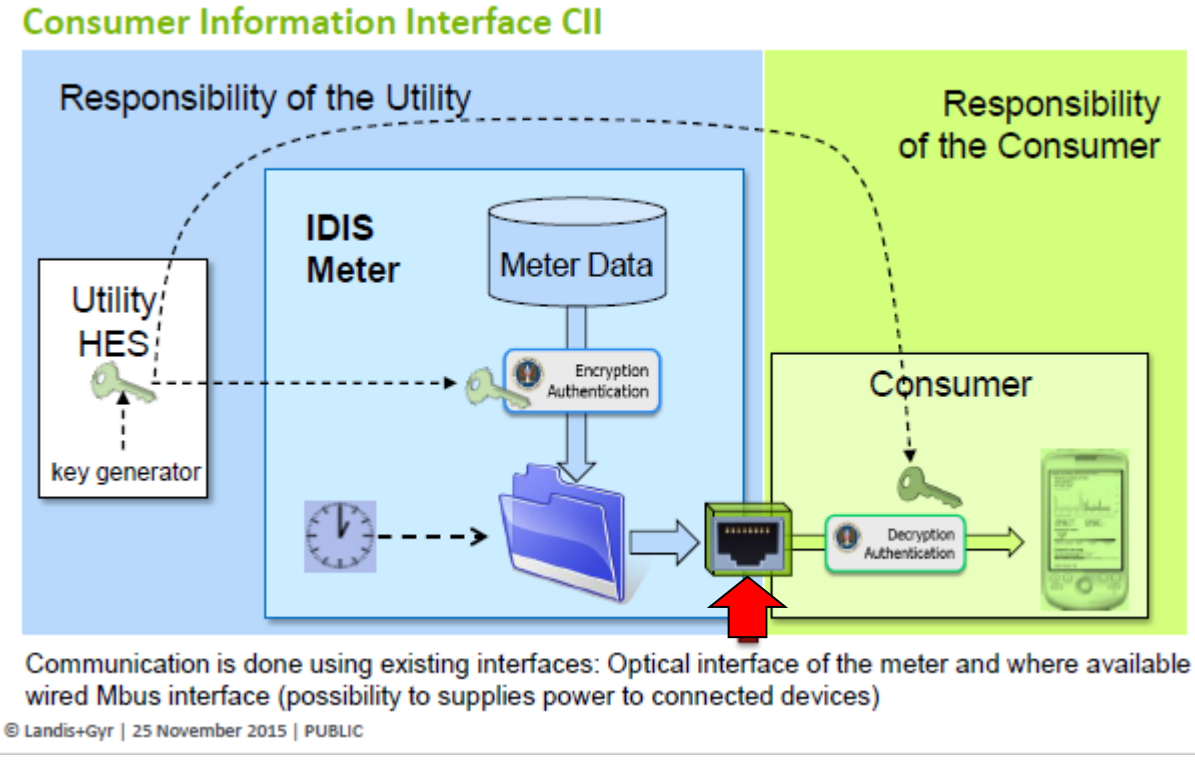
Challenge

Goal

Read your Smart Meter through the local **Customer Information Interface** (CII) and visualize your consumption. Design a dashboard with the most useful information.



Why

In Switzerland, it is prescribed by law that all electricity Smart Meters installed by utilities must have a local interface (CII), so that customers can have access to their own data. Transparency is increased as individuals can manage their own data. Innovation is promoted, as precise data is available for free in real time.

See also Challenge: "Unleashing the Swiss Smartmeter'

Smart Meter setup

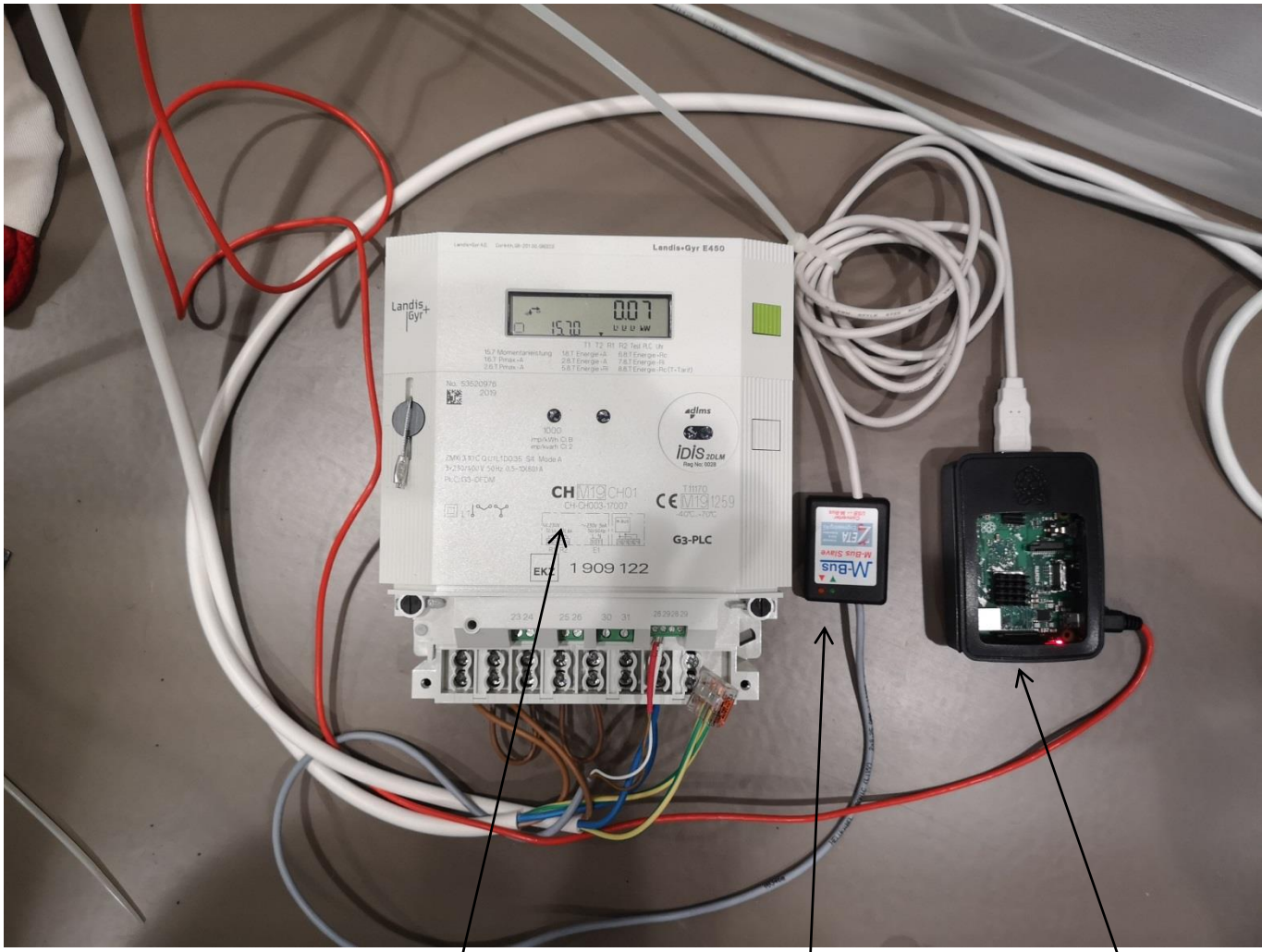
Idea:

Two Smart Meters will be installed on-site and will be measuring the consumption of different devices.

The live consumption is to be displayed on a web-based dashboard.

Live measurements are to be combined with historical data.

At the end, the dashboard will be able to display the most important information to an individual about their electricity consumption.

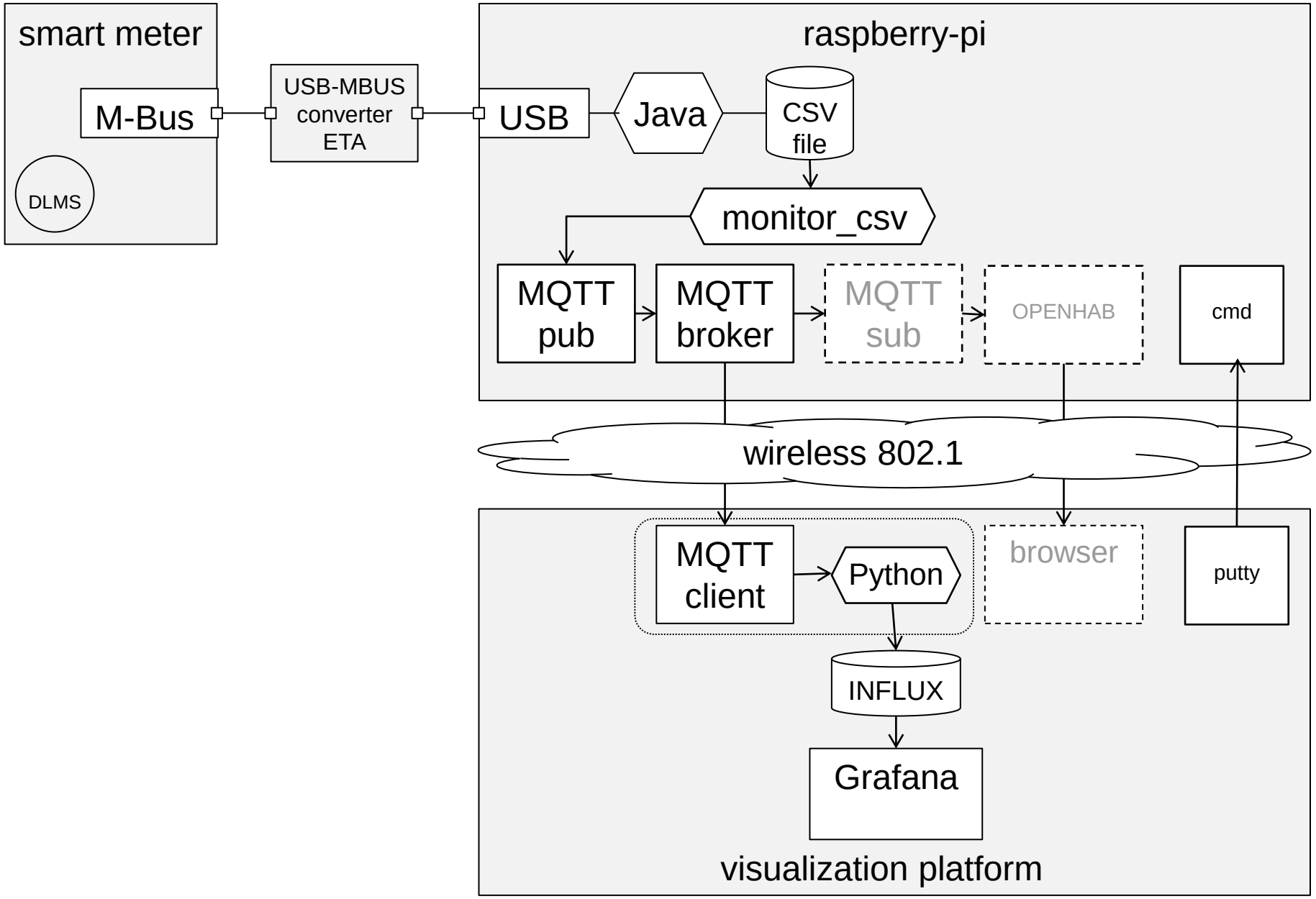


How did we proceed

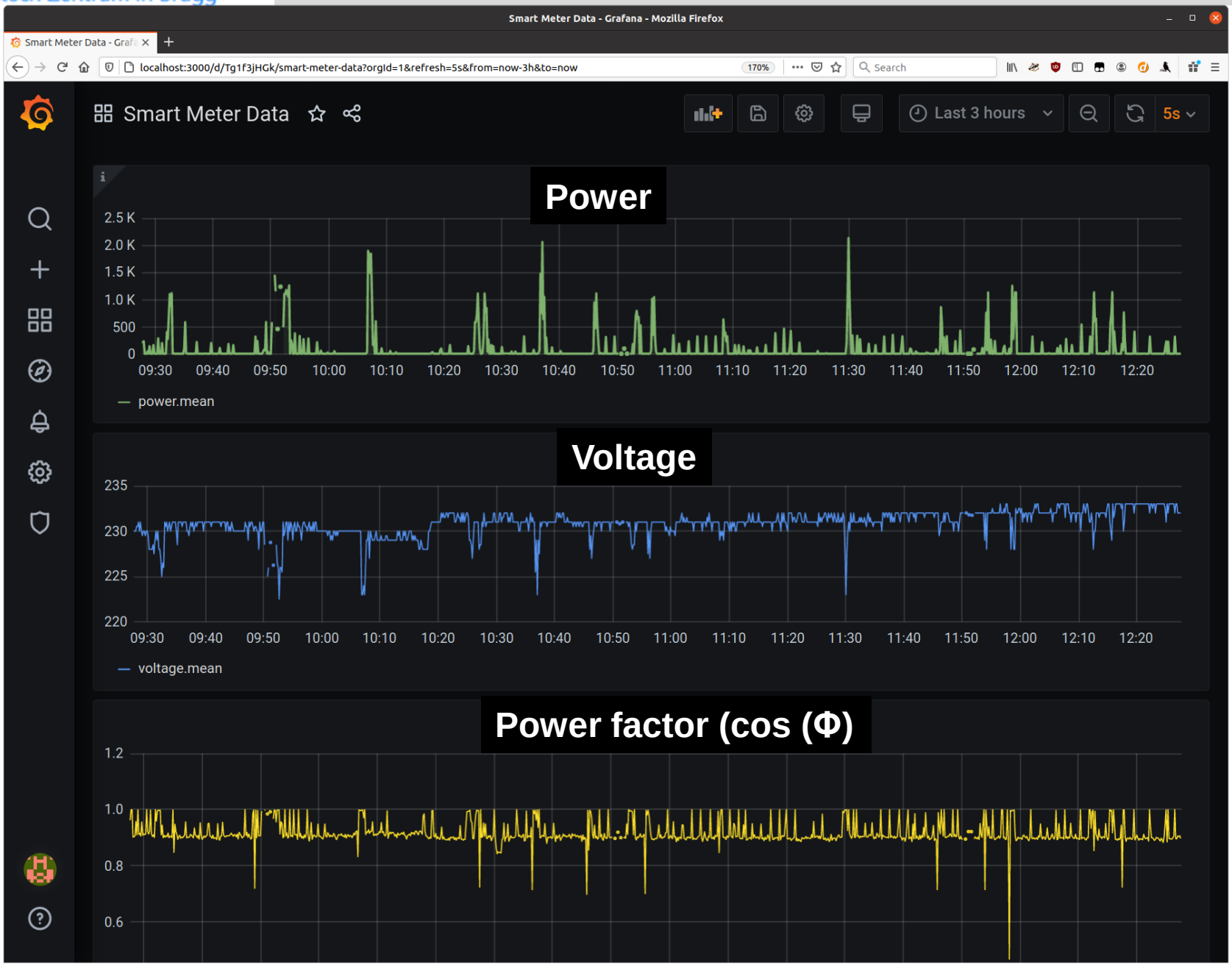
- The CII data are stored in a CSV file in the raspberry PI microprocessor.
- Looked for a way to get the CSV information from the raspberry PI over the wireless link.

  Needed for this a “broker” on the PI using Mosquitto, an open source interface for telemetry data (MQTT).
- Installed an MQTT broker on the PI and installed the MQTT client on the visualisation computer to feed it with CSV data, using a shell batch file.
- Used the Python MQTT client on the visualisation platform to read the data
- Did some trial with Openhab that worked unsatisfactorily.
- Used a graphical interface (Grafana) that gets the data from the MQTT client using a few lines of Python code.

Landscape


smart meter
M-Bus
DLMS
USB-MBUS converter ETA
raspberry-pi
USB
Java
CSV file
monitor_csv
MQTT pub
MQTT broker
MQTT sub
OPENHAB
cmd
wireless 802.1
MQTT client
Python
browser
putty
INFLUX
Grafana
visualization platform

Results


Smart Meter Data - Grafana - Mozilla Firefox
localhost:3000/d/Tg1f3jHGk/smart-meter-data?orgId=1&refresh=5s&from=now-3h&to=now
Smart Meter Data
Last 3 hours
5s
Power
2.5 K
2.0 K
1.5 K
1.0 K
500
0
09:30 09:40 09:50 10:00 10:10 10:20 10:30 10:40 10:50 11:00 11:10 11:20 11:30 11:40 11:50 12:00 12:10 12:20
power.mean
Voltage
235
230
225
220
09:30 09:40 09:50 10:00 10:10 10:20 10:30 10:40 10:50 11:00 11:10 11:20 11:30 11:40 11:50 12:00 12:10 12:20
voltage.mean
Power factor (cos (Φ)
1.2
1.0
0.8
0.6