

arnes 
povezujemo znanje



MREŽA ZNANJA

Ljubljana, 3.–5. december 2024

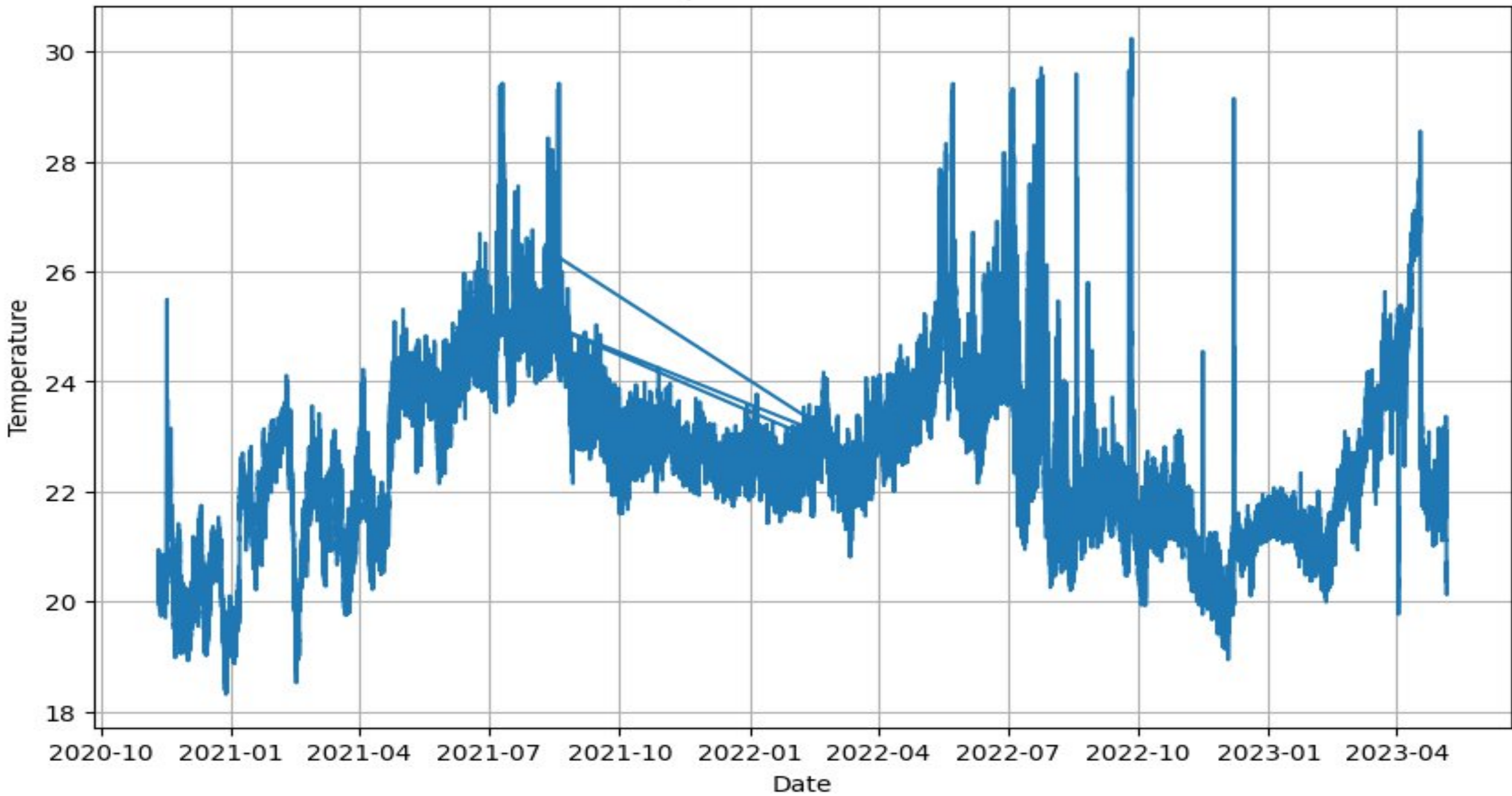
Cache the Heat Monitoring system for Server Room

Bojan Korečič, mag. gosp. inž.
Univerza v Novi Gorici

- University of Nova Gorica
- Multiple Server Rooms at multiple location
 - ▶ 1 Rožna Dolina
 - ▶ 1 Ajdovščina
 - ▶ 3 Vipava
- Overheating in summer
 - ▶ action to avoid servers shutdown due to overheating



Temperature Over Time



Monitor Server Room

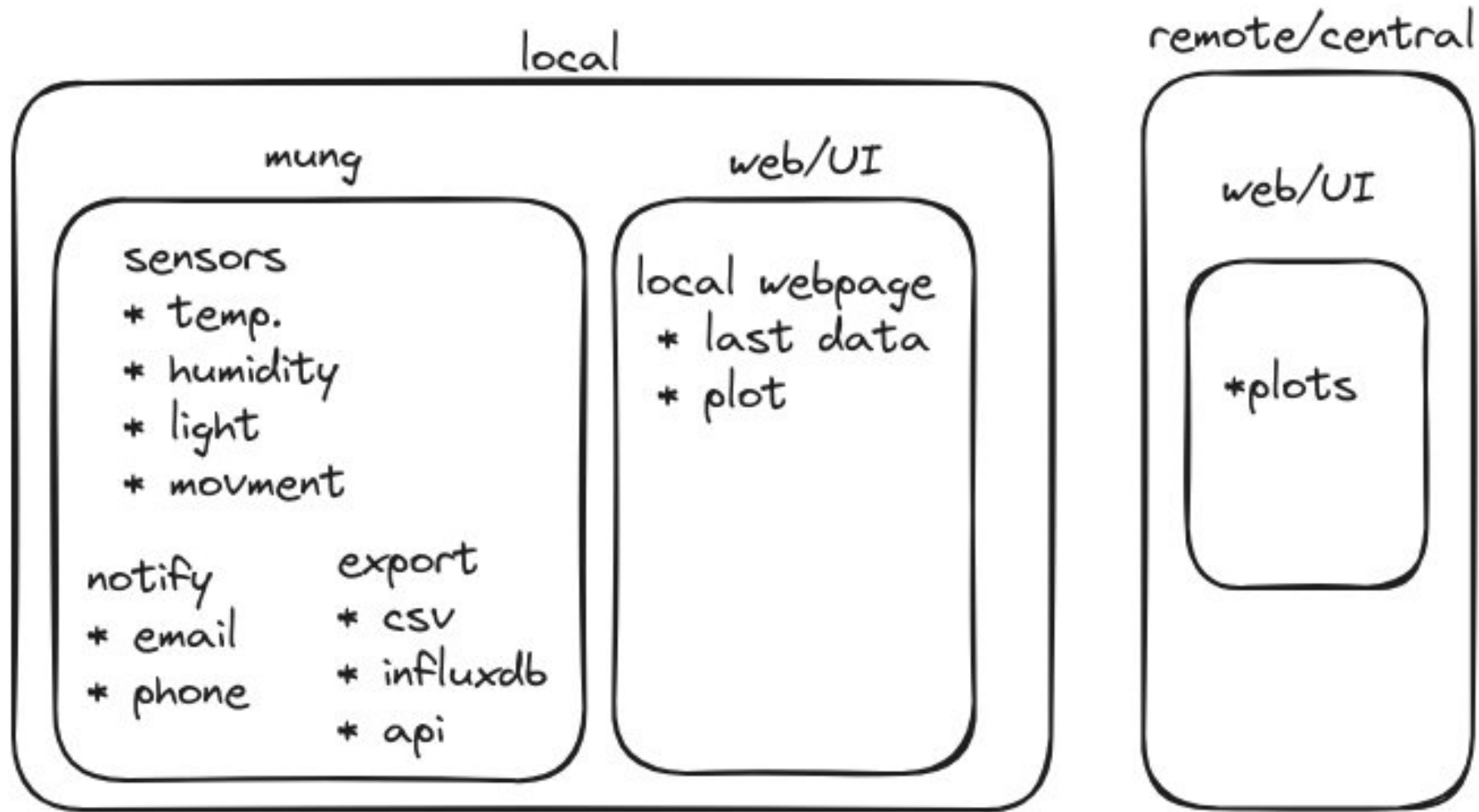
- Glass, digital thermometers
 - At least 1 in server room
 - Only in room !!!
- Server sensors
 - for temperature (CPU, MB, HDD, UPS)
 - trends?
- System for measuring temperature

- Requirements of System for measuring temperature
 - ▶ system should be independent for every location (3 location)
 - ▶ notification
 - ▶ possibility of central collection of data
 - ▶ possibility of adding addition sensors
 - Smoke
 - Water
 - Light
 - Movement
 - ...





Idea

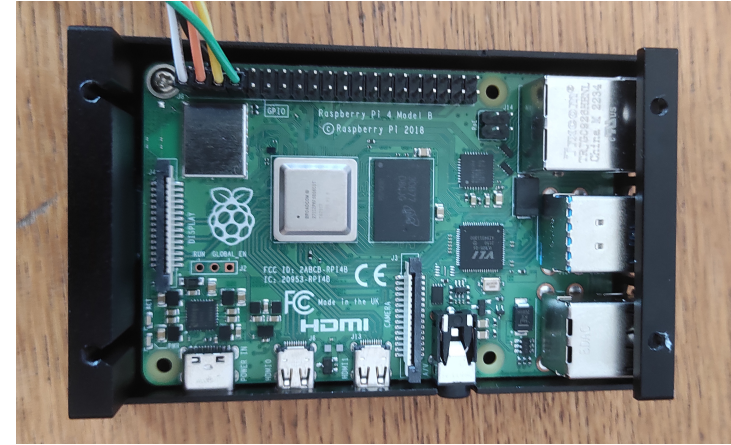


What about hardware?



- Micro-controller (Arduino)
 - Flashing
 - Low power consumption
- Single Board Computer (Raspberry PI)
 - Linux OS
 - Microprocessor ARM
- Sensors
 - ▶ DHT11/22
 - ▶ AHT20
 - ▶ BHT1750
 - ▶ BMP280
 - ▶ BTE16-19
 - ▶ FC-28
 - ▶ GY-521
 - ▶ VEML6070
 - ▶ NEO-6M GPS Module

Solution

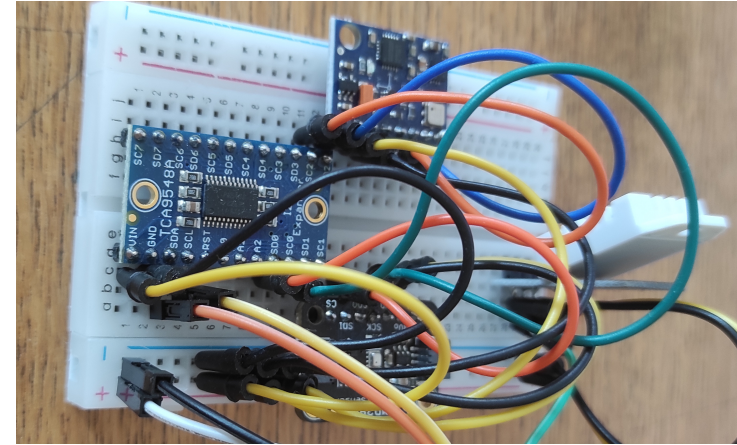


- Raspberry pi + sensors
 - Raspberry pi 4B+ 4G
 - Sensors
 - DHT22 (DHT11)
 - MPU6050
 - BMP280
 - Notification/Alerts
 - Email, Phone!
 - `apprise` (<https://github.com/caronc/apprise>)
send notification any platform
 - `ntfy.sh` - push notification to phone

- Mung program
 - ▶ capture sensor data
 - ▶ analyze data (notification)
 - ▶ save/export data
 - ▶ show current data (locally)
 - ▶ plot data (locally)

MUNG

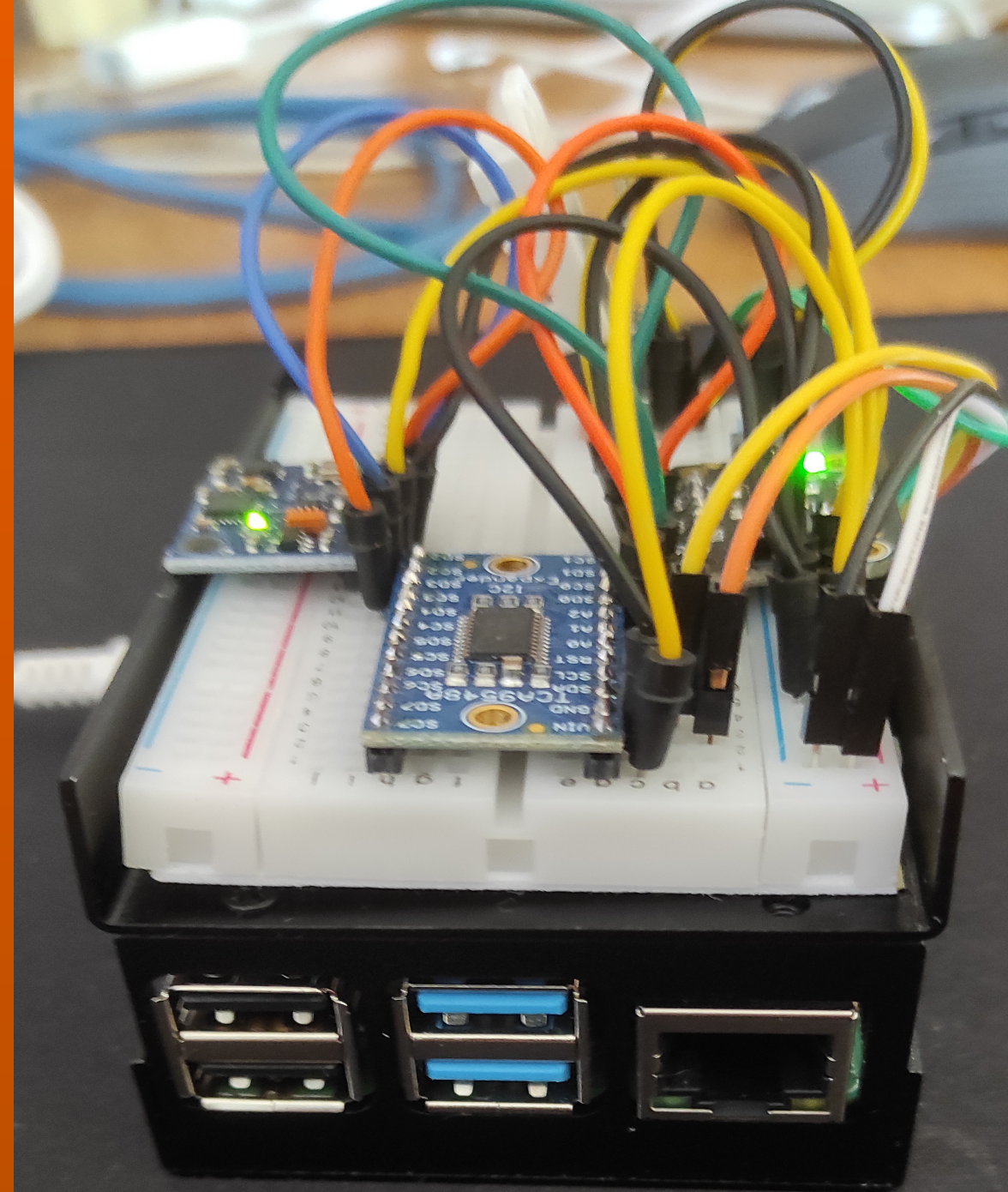
- Mung monitoring system
- Cost ~ 150 EUR
- 2h (setting up the system)
- Easy to setup



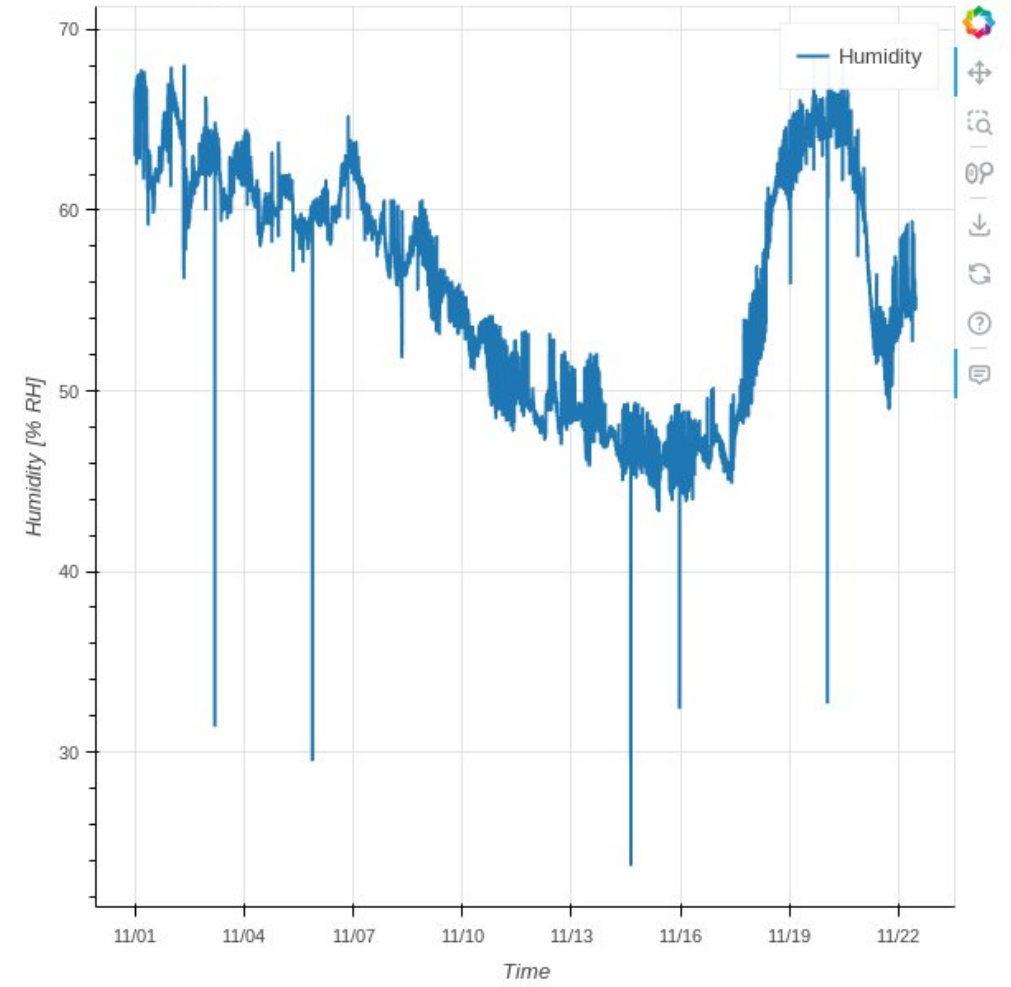
Possible use of Mung

- 3 + 1 location at UNG
- DIY projects
 - Monitoring Rooms
 - Monitor Plants

Opportunity for students to learn about electronics and computers



Humidity



RPI21 sensors
Server room 2, Vipava

SLING

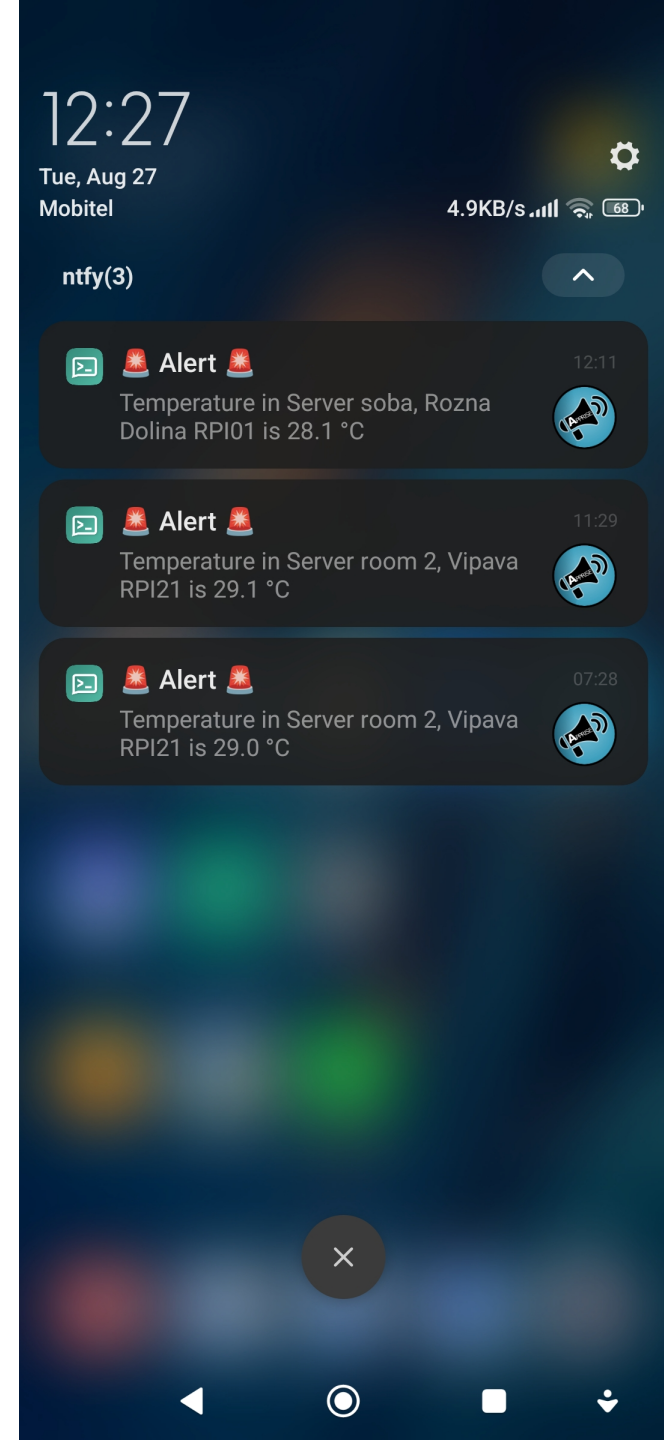
2024-11-12T21:41
temperature

22.2

2024-11-12T21:41
humidity

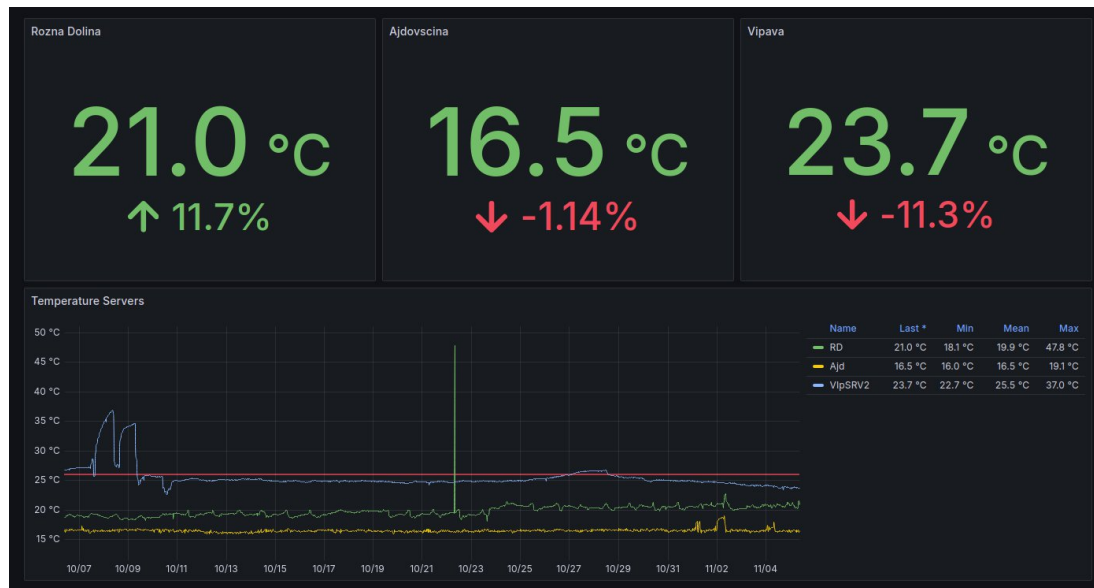
33.4

- Push notification
 - ▶ Ntfy self-hosted system





Central Visualization



- Central mung system
 - ▶ influxdb
 - ▶ grafana
- Export data to central mung system

Rozna Dolina

21.0 °C

↑ 11.7%

Ajdovscina

16.5 °C

↓ -1.14%

Vipava

23.7 °C

↓ -11.3%

Temperature Servers



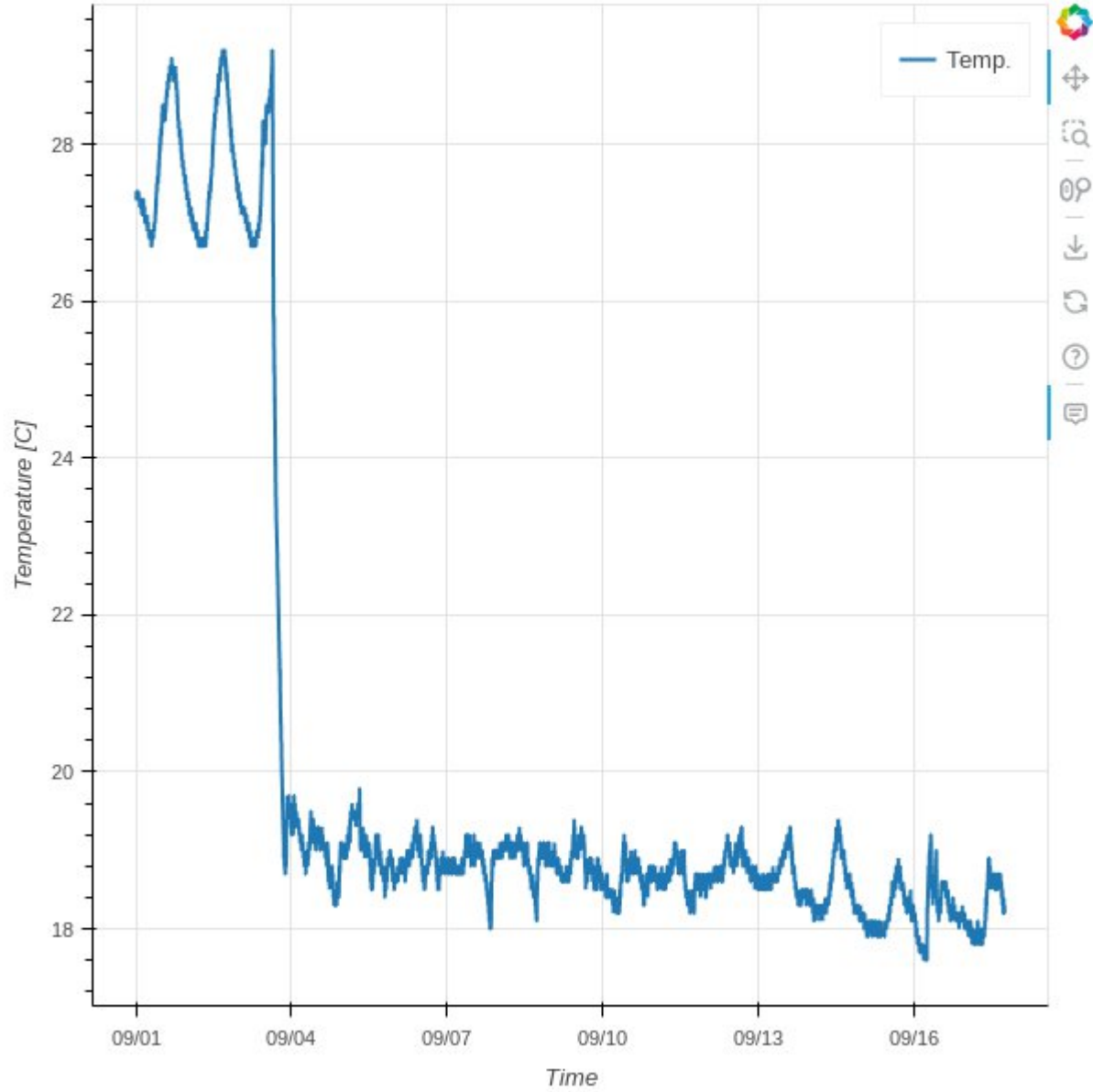
Name	Last *	Min	Mean	Max
RD	21.0 °C	18.1 °C	19.9 °C	47.8 °C
Ajd	16.5 °C	16.0 °C	16.5 °C	19.1 °C
VipSRV2	23.7 °C	22.7 °C	25.5 °C	37.0 °C



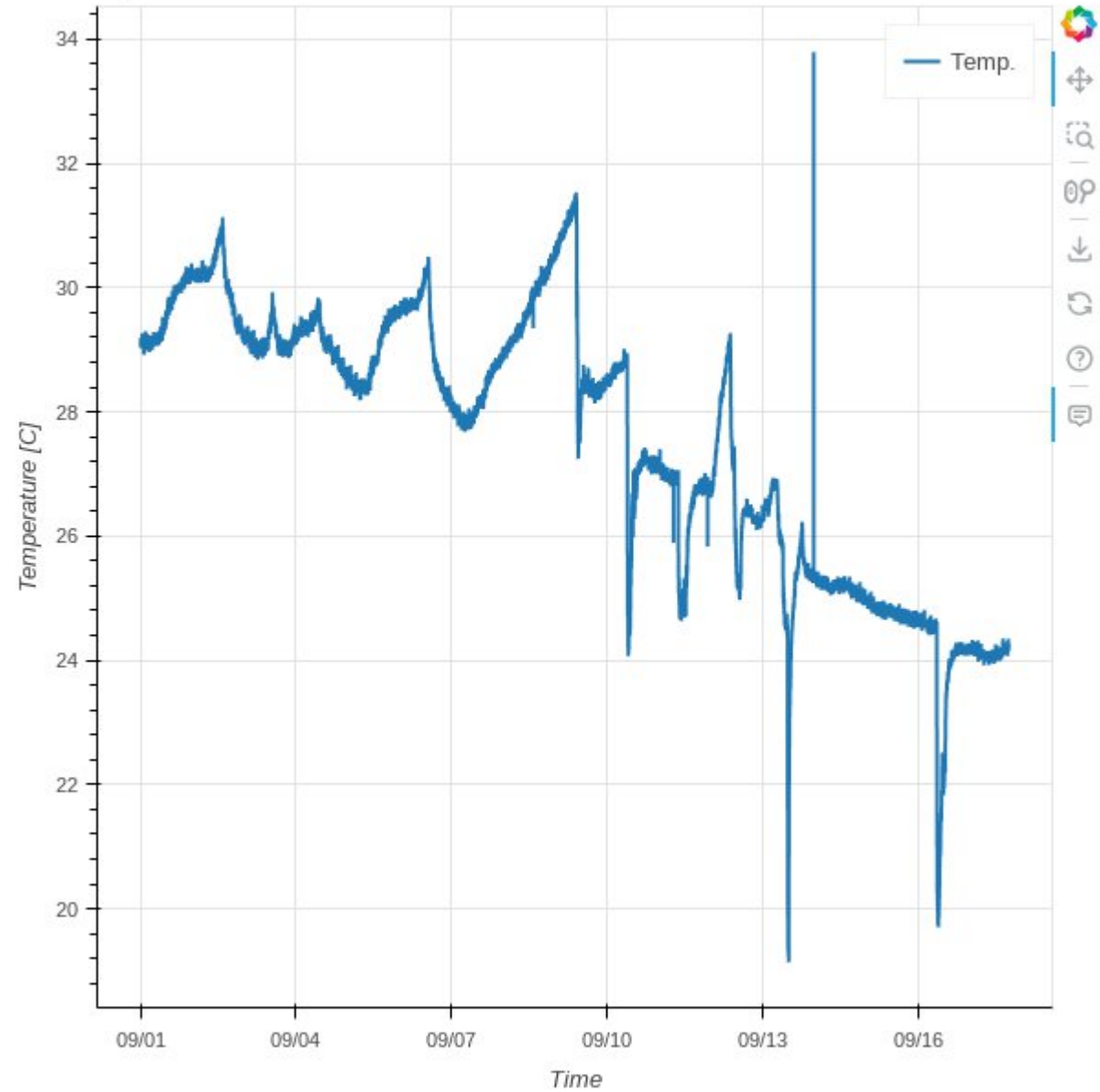
What next?

- Infrastructure as code
 - ▶ Ansible
 - Casing
 - ▶ 3D printed
 - PCB (printed circuit board) instead of breadboard
 - Testing in adding sensors to mung
 - SMS notification
 - LCD display, on site info
- Sensors
 - ▶ DHT11/22(temperature, humidity)
 - ▶ AHT20 (temperature, humidity)
 - ▶ BHT1750 (light)
 - ▶ BMP280 (temperature, pressure, altitude)
 - ▶ BTE16-19 (PIR - motion)
 - ▶ FC-28 (soil moisture sensor)
 - ▶ GY-521(Acceleration, Gyro, Temperature)
 - ▶ VEML6070 (light, UV index)
 - ▶ NEO-6M GPS Module

Temperature



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**Thank you for your
attention !**

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Monitoring system for Server
Room**

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