

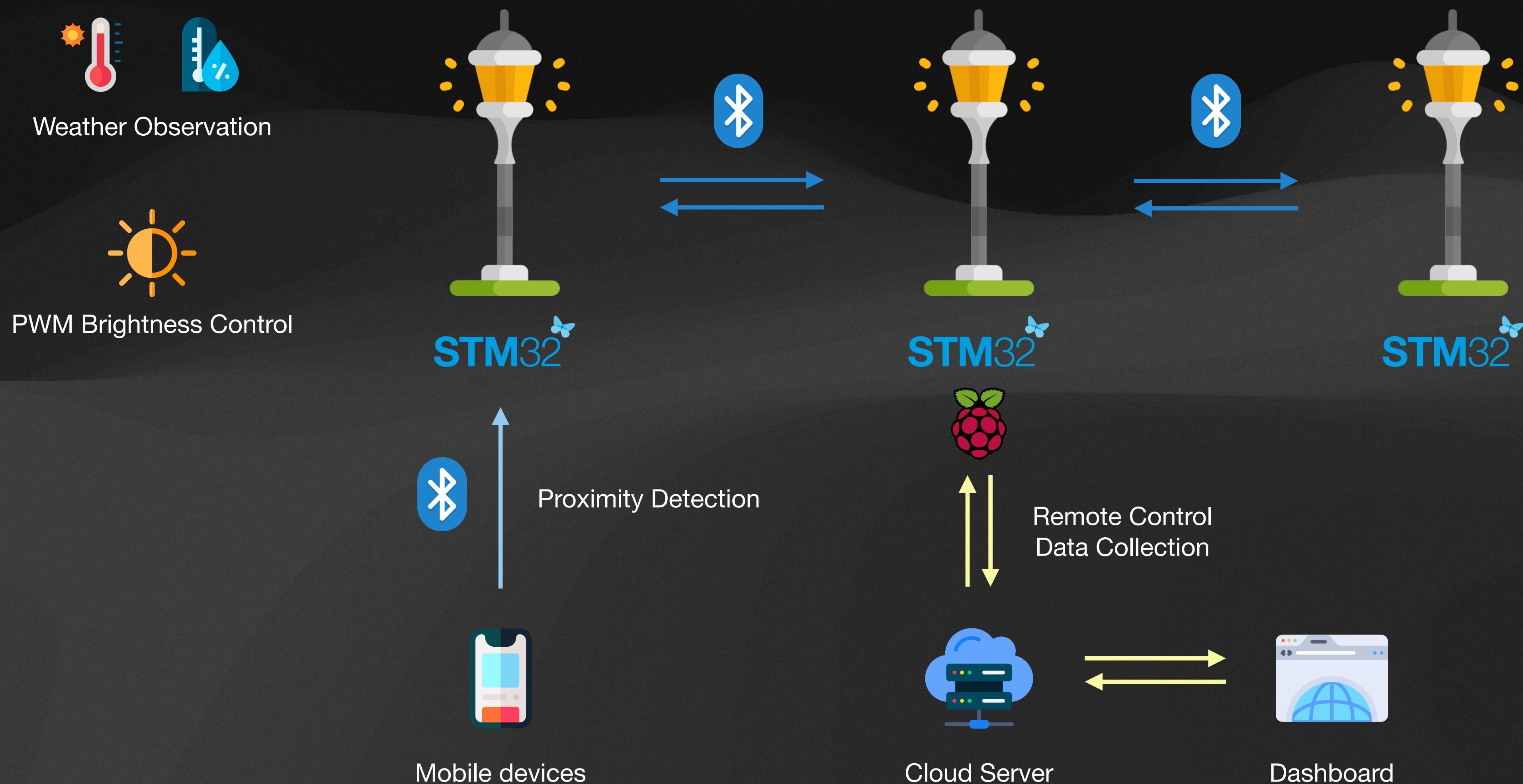
# Genie's Lamp

P2P IoT Intelligent Streetlight Network

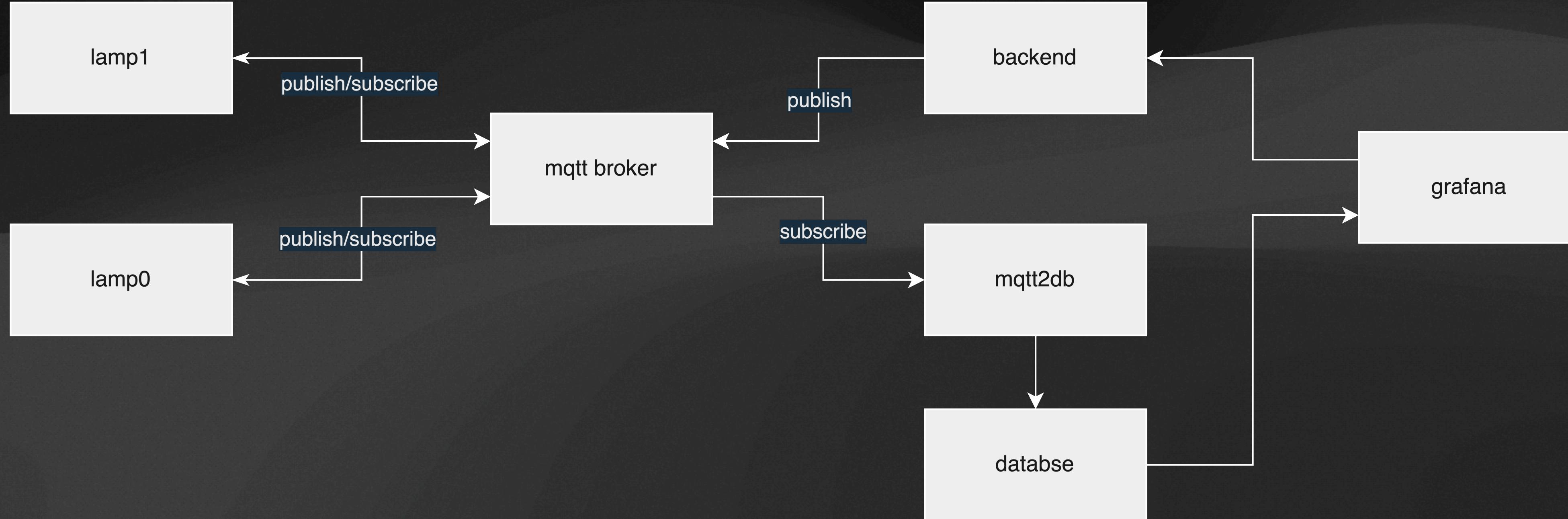
莊加旭 陳宏恩 黃柏睿



# Framework

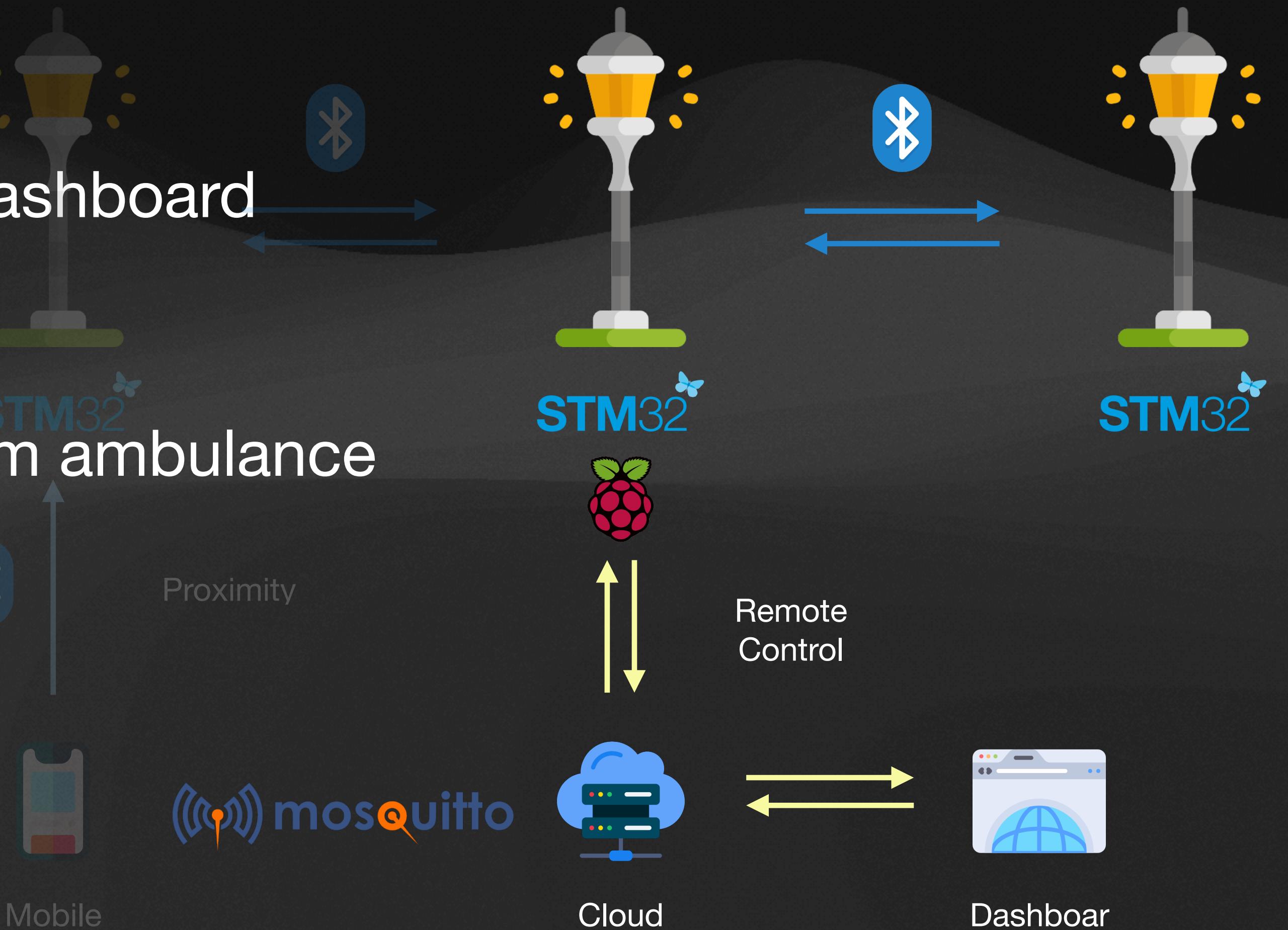


# System architecture



# Features

- Remote access    
• Turn on/off the lamp from web dashboard
- Emergency report    
• Report location and highlight from ambulance



# Features

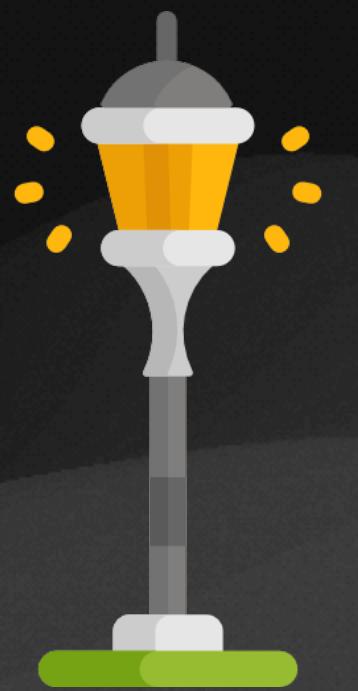
- Brightness control ✓
- Use PWM to control the brightness
- Scheduling or photoresistor
- Proximity detection
  - Bluetooth signal intensity
  - Report lost item or anomaly



Weather



Automatic Brightness



STM32



Proximity



Mobile

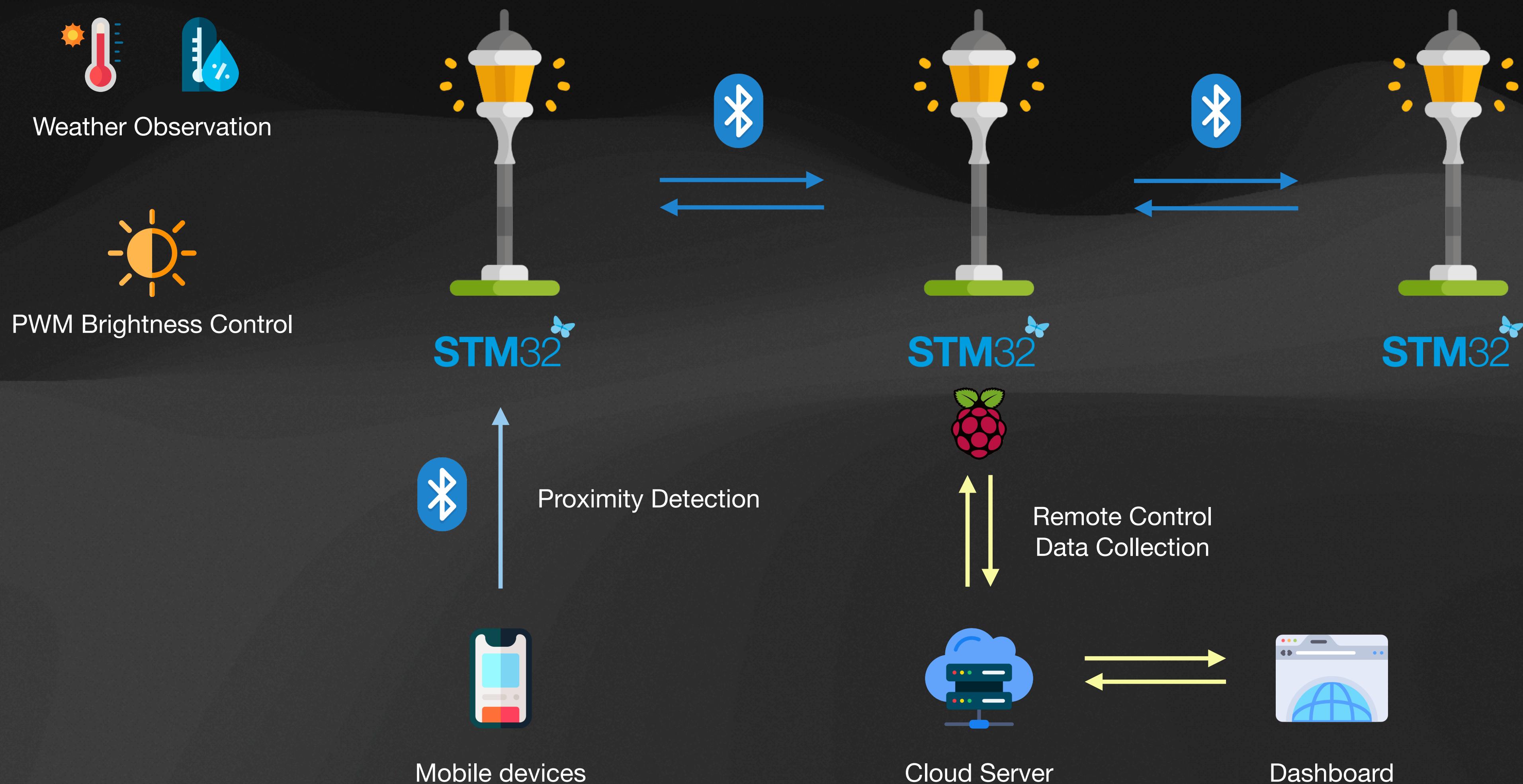


STM32



Cloud

# Framework



# Implementation

## Proximity Detection & Brightness Control

- Use PWM to control brightness ✓
- Only turn on the light when people pass by
- Detect if people pass by via BLE signal strength

# Implementation

## Data Transmission

- Wifi node
  - RPi sends data to backend
- MQTT ✓
- Web dashboard
- Grafana ✓



# Implementation

## Communication between Streetlights

- Bluetooth P2P communication
  - BLE peripheral device transmit data
  - Routing protocols: Link state / Distance vector
- Bluetooth Central - Peripheral communication
  - STM32 advertise sensor data
  - RPi subscribe to notification

# Implementation

## Weather Observation

- Plug and play interface for any sensor
- Apply DSP program to preprocess raw data
- Collect Temperature / Humidity / ... data and send to backend

# Teamwork & Checkpoints

- Sensor input, PWM output, DSP preprocessing ✓
- BLE communication between streetlights
- Proximity detection for on/off control
- WiFi communication between Raspberry Pi and server ✓

# References

- STM32 BLE Mesh:  
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