

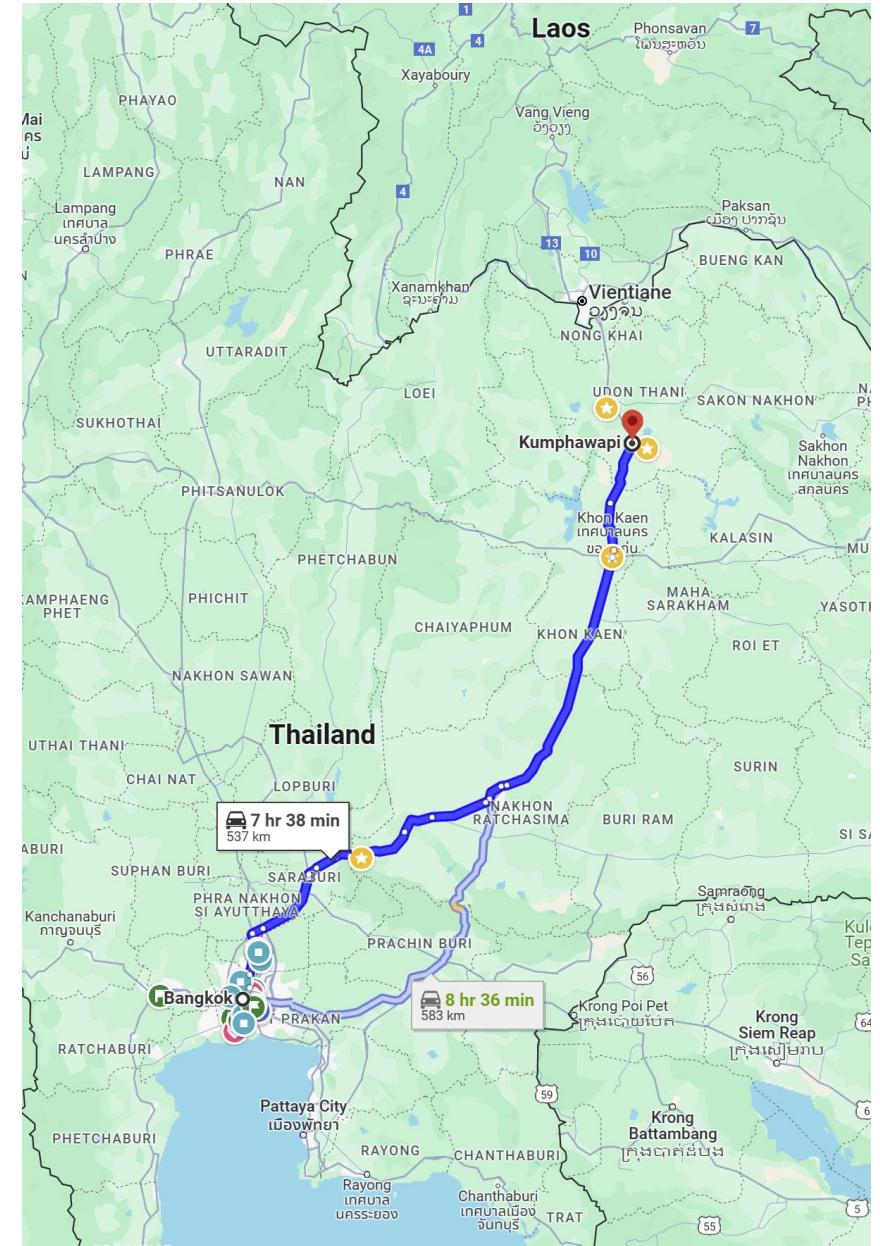


Python, Protobuf, and MQTT as a Robotic Communication Backbone

Nutchanon (Ben) Ninyawee



♀ Red Lotus lake





- Codustry Co-Founder
- Author of 20+ random PyPI libraries
- Daily Meditator 🧘
- Aeropress Coffee Maker ☕
- 1000 elo chess player ♟
- Anime Fan 😊
- the same birthday with Python(Feb 20) ❤️



Nutchanon (Ben) Ninyawee





REDBLU

#PyConTH #PyConTH2023



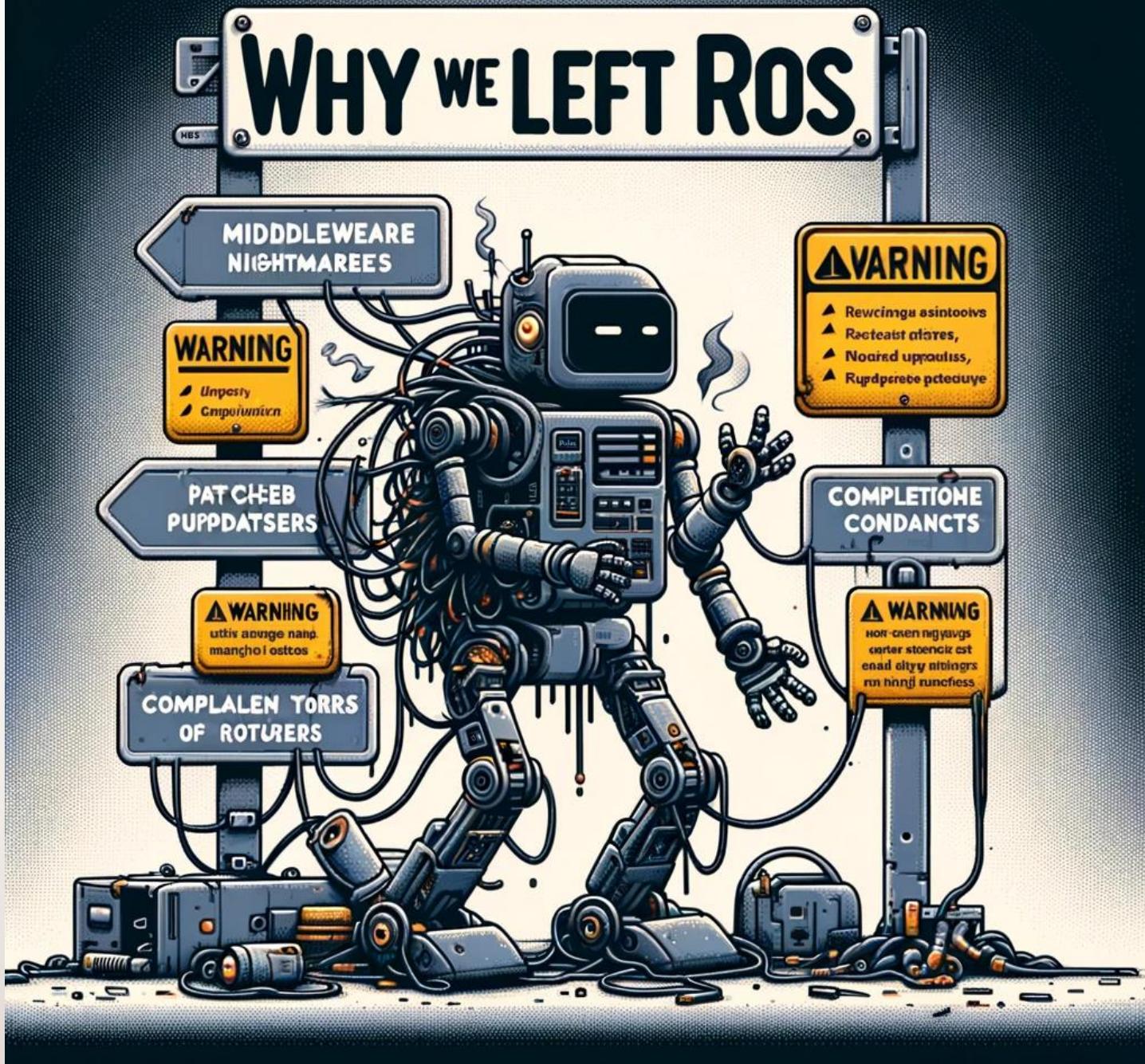
CODUSTRY



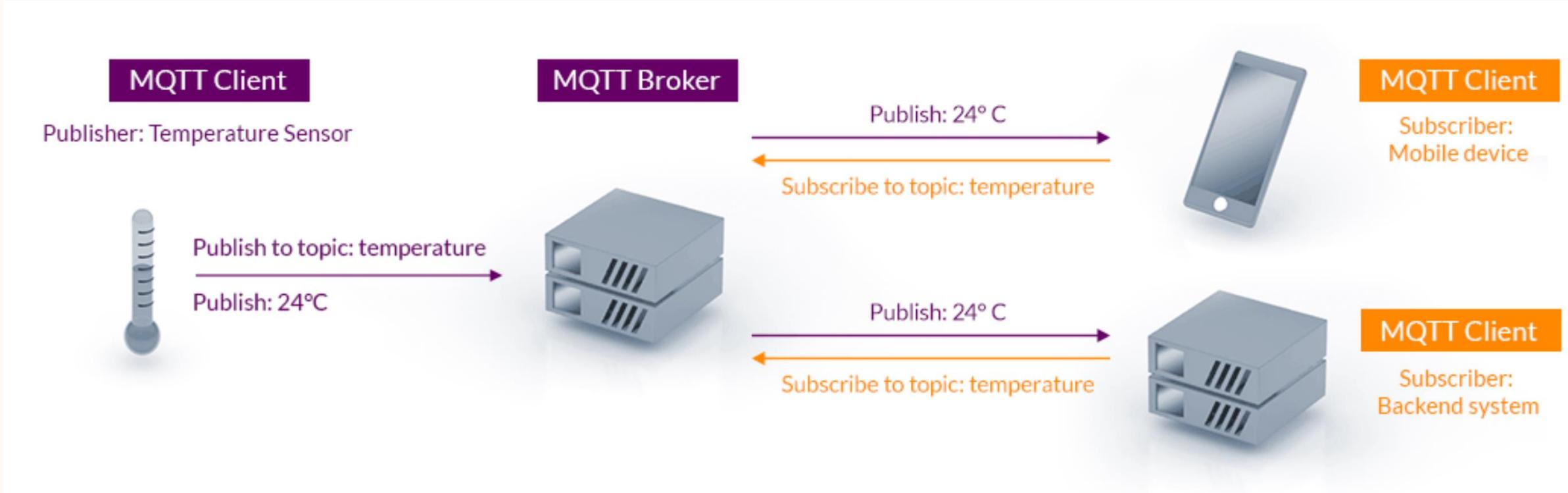
Why We Left ROS2

In 2021

#PyConTH #PyConTH2023

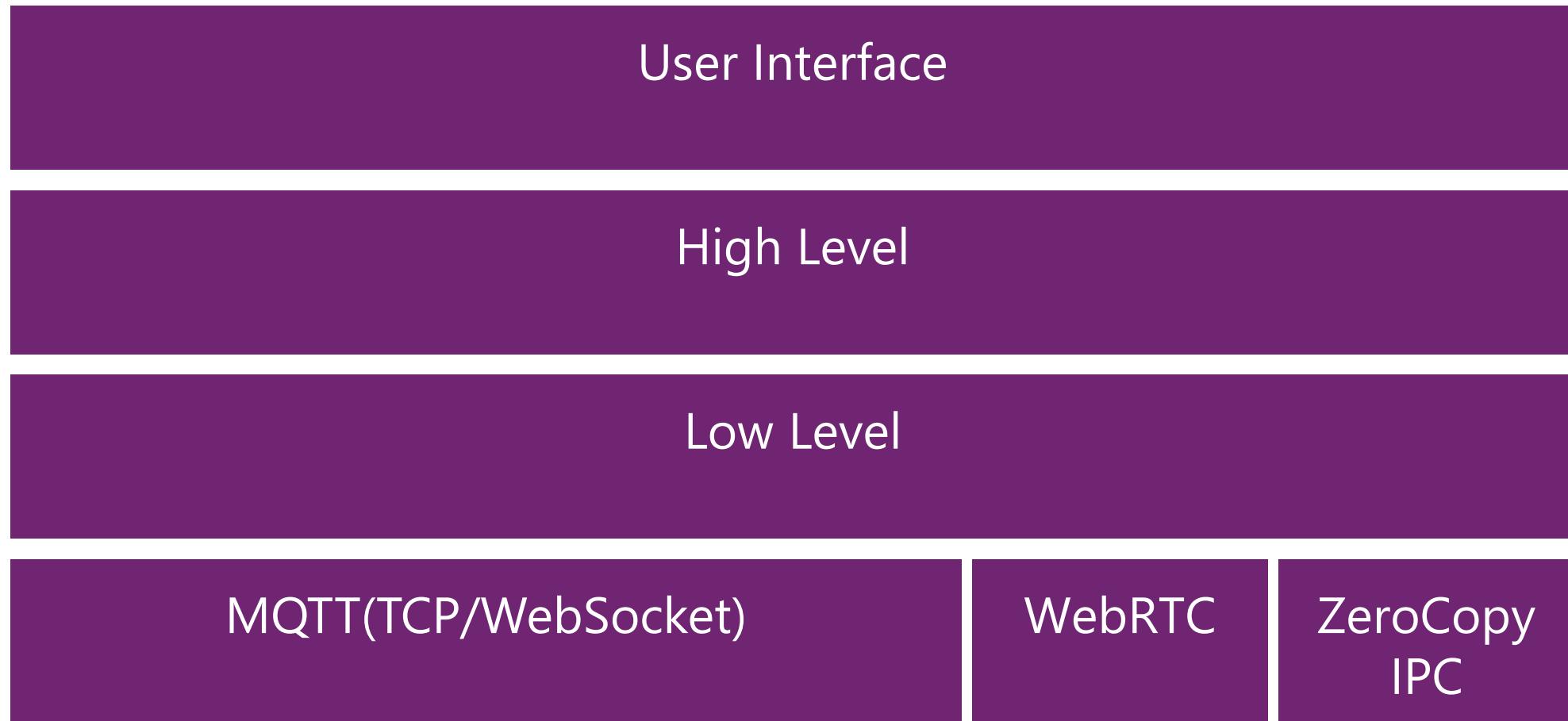


Our New Direction: MQTT

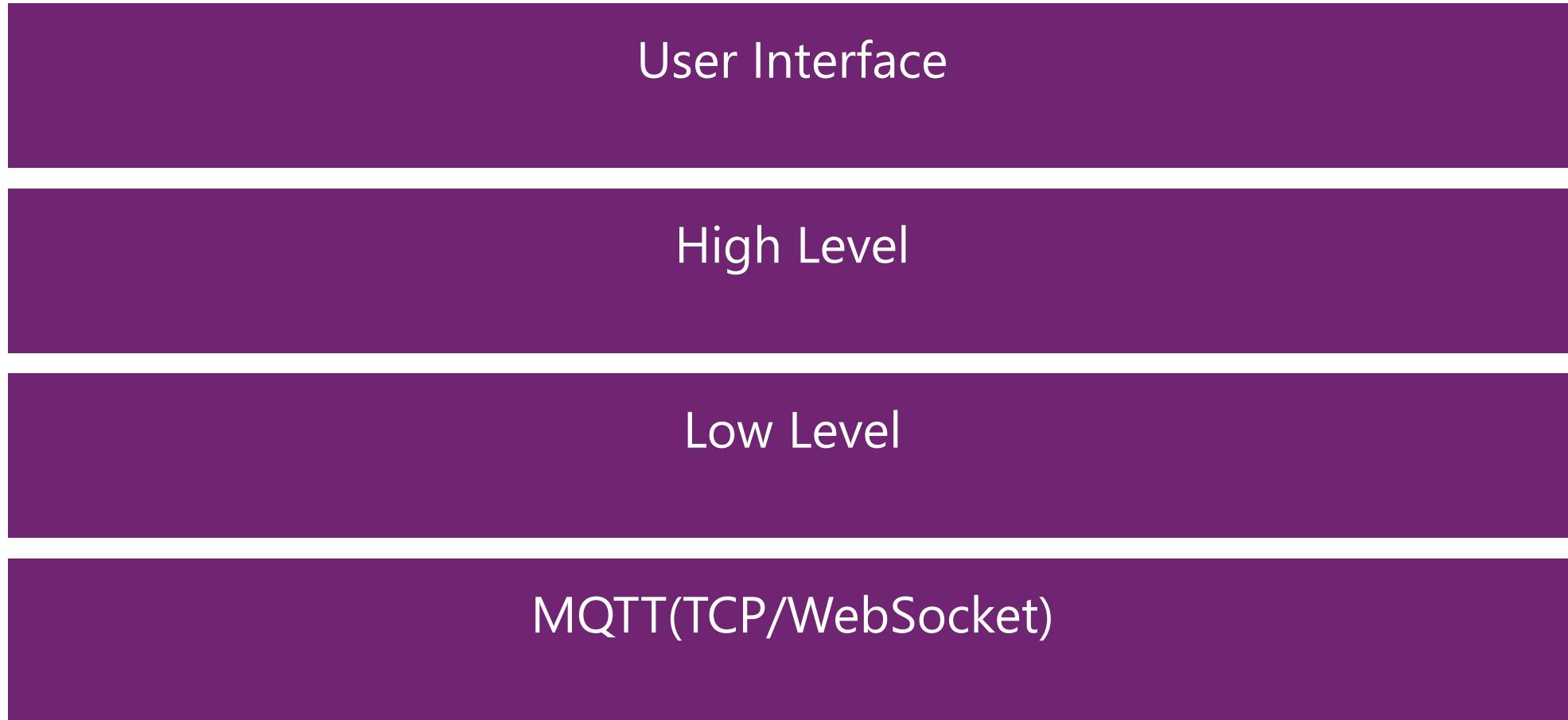


<https://mqtt.org/>

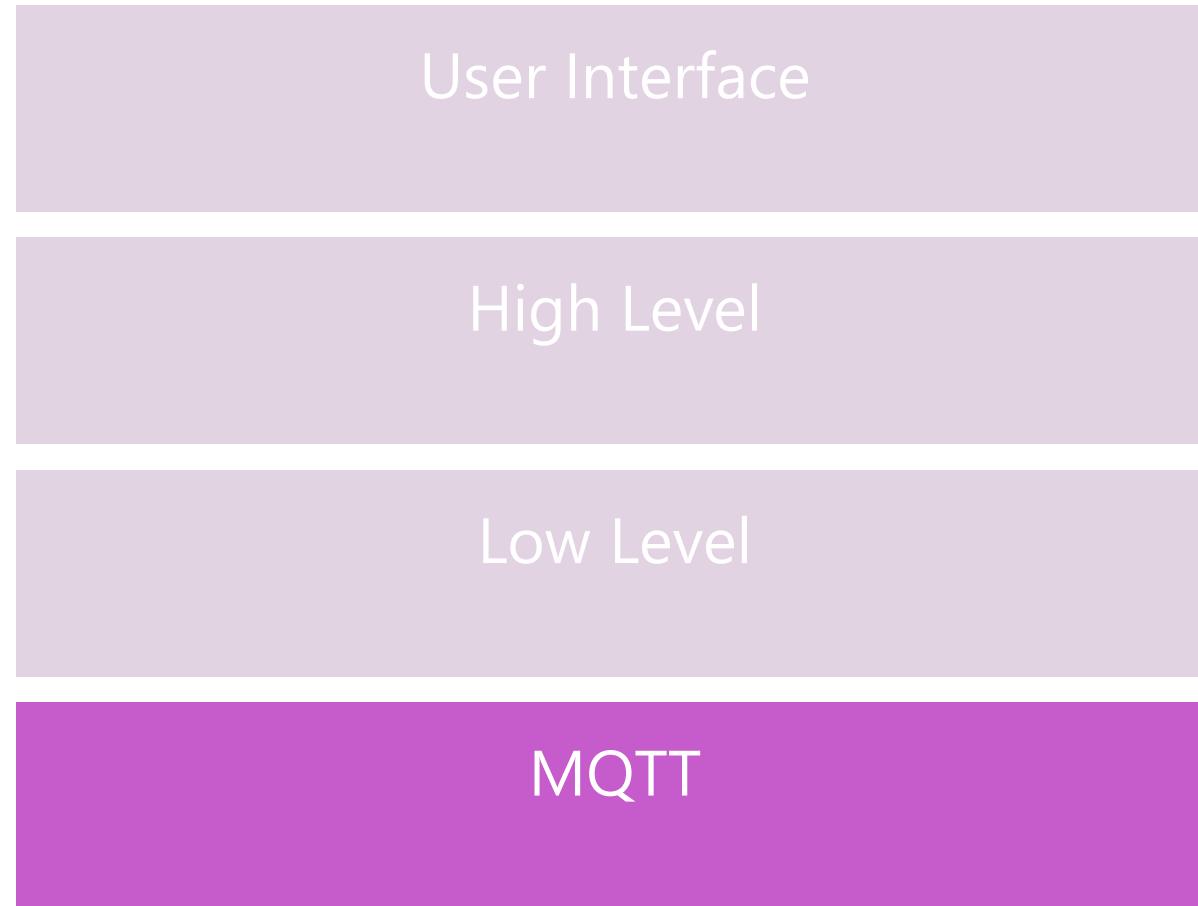
RedBlu Stack Diagram



MQTT Stack Diagram



Stack Diagram



Monitoring ^

Cluster Overview

Cluster Overview

Overview Nodes Metrics

Clients

Subscriptions

Retained Messages

Delayed Publish

Alarms

Access Control ^

Authentication

Authorization

Banned Clients

Flapping Detect

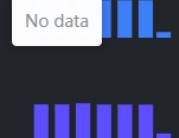
Integration ^

Management ^

Diagnose ^

System ^

Incoming Rate: 132 messages/sec



Outgoing Rate: 398 messages/sec

All Connections: 11 Live Connections: 11

Topics: 48

Subscriptions: 57

1 Node



Node Information

[View Nodes →](#)

Node Name: emqx@0.cmix.redblu.io

Node Role: core

Uptime: 26 minutes 59 seconds

Version: 5.3.0

Connections: 11

File Descriptors Limit: 1048576

Subscriptions: 57

OS CPU Load: 3.21/3.66/2.83

Topics: 48

OS Memory:

Last hour

Incoming Messages



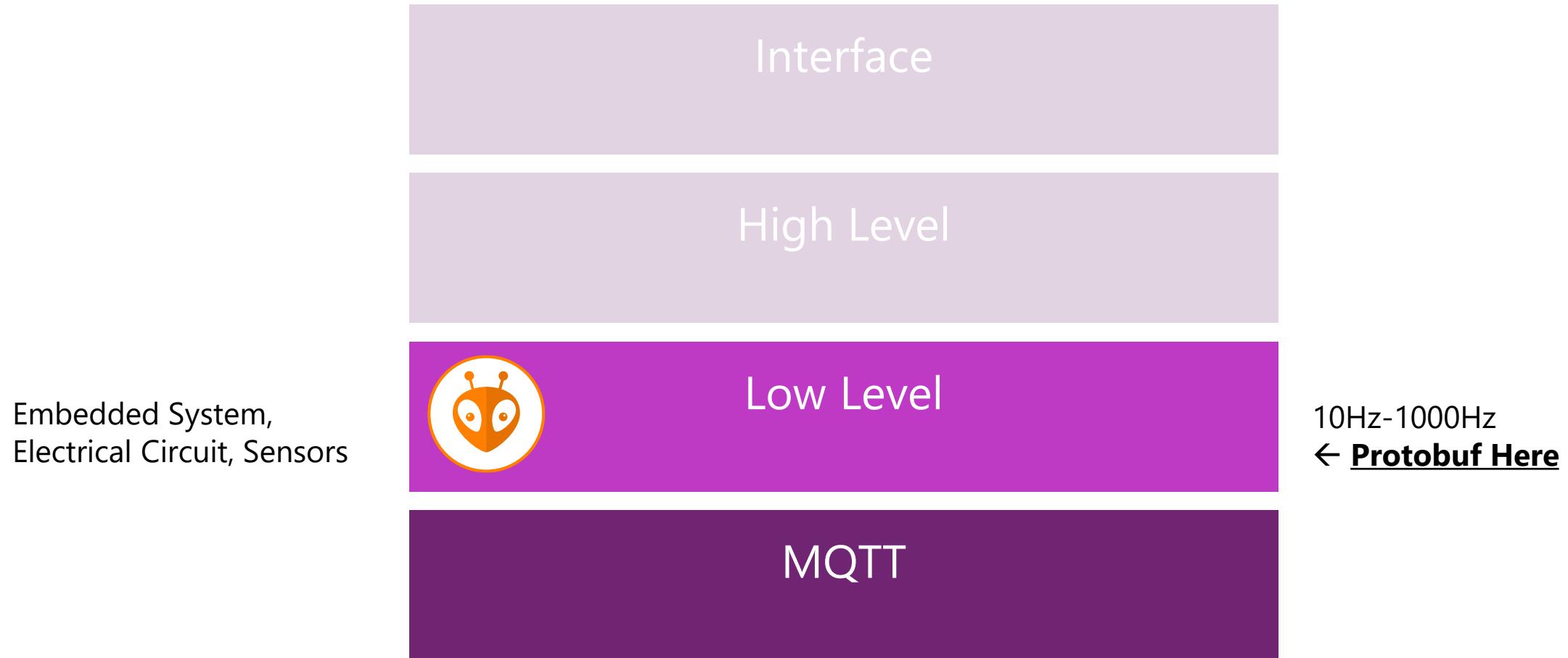
Outgoing Messages



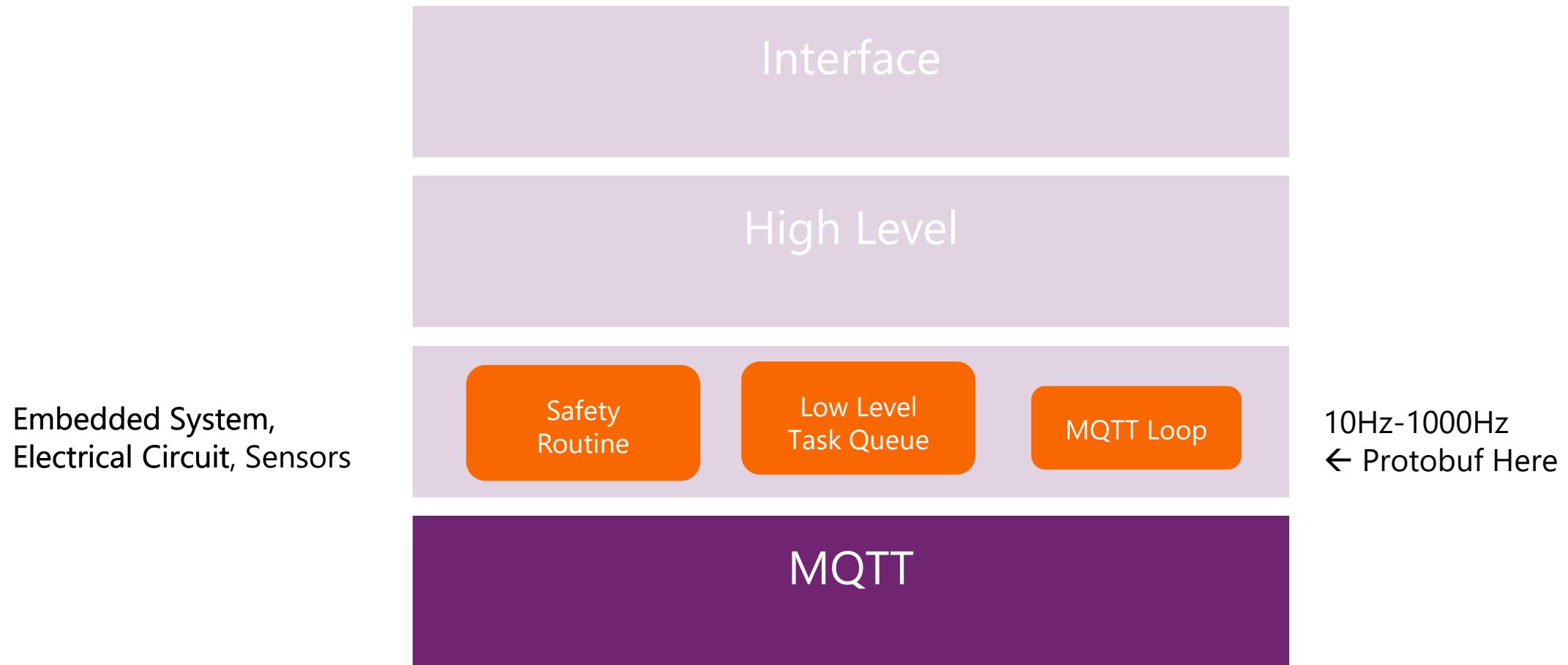
Dropped Messages



MQTT Stack Diagram



MQTT Stack Diagram



MQTT Stack Diagram

SBC + Desktop,
Vision/Audio Sensors



Interface

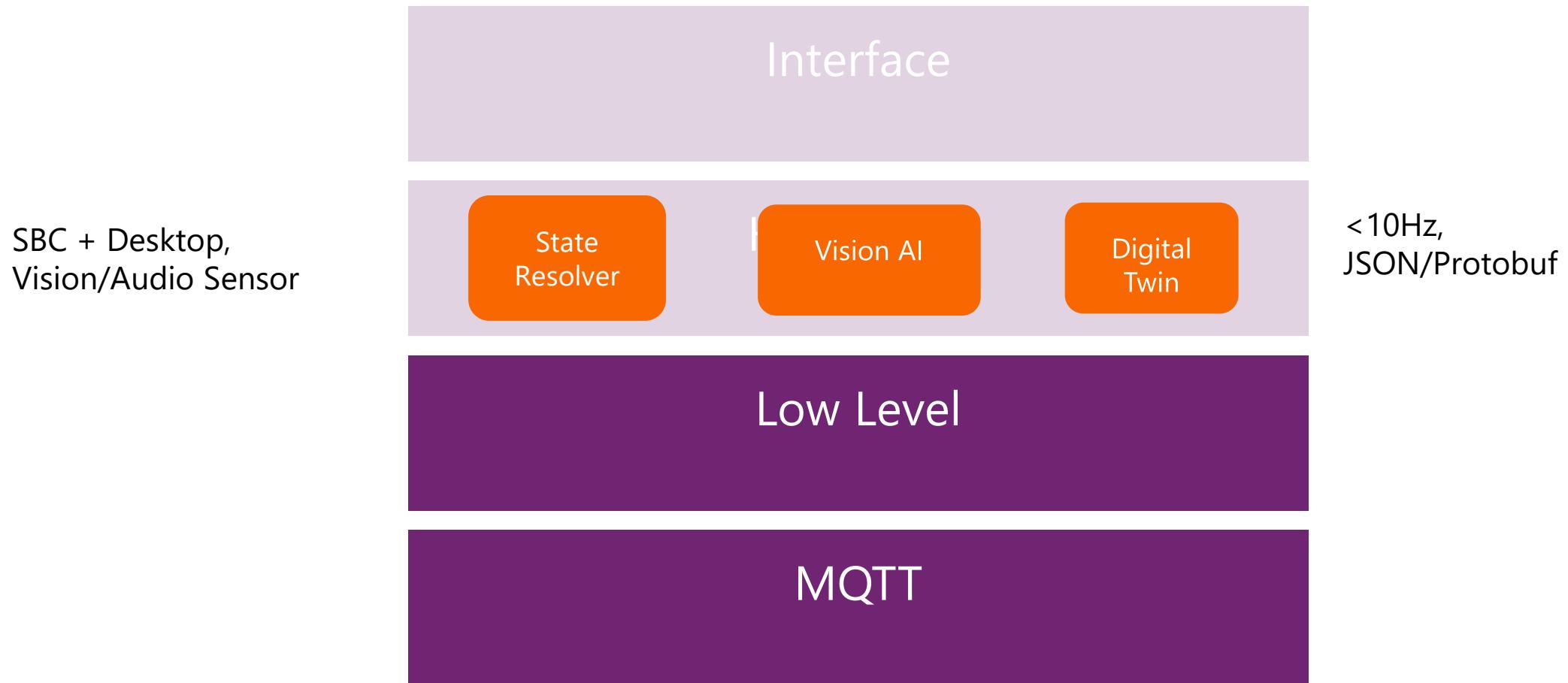
High Level

<10Hz,
JSON/Protobuf

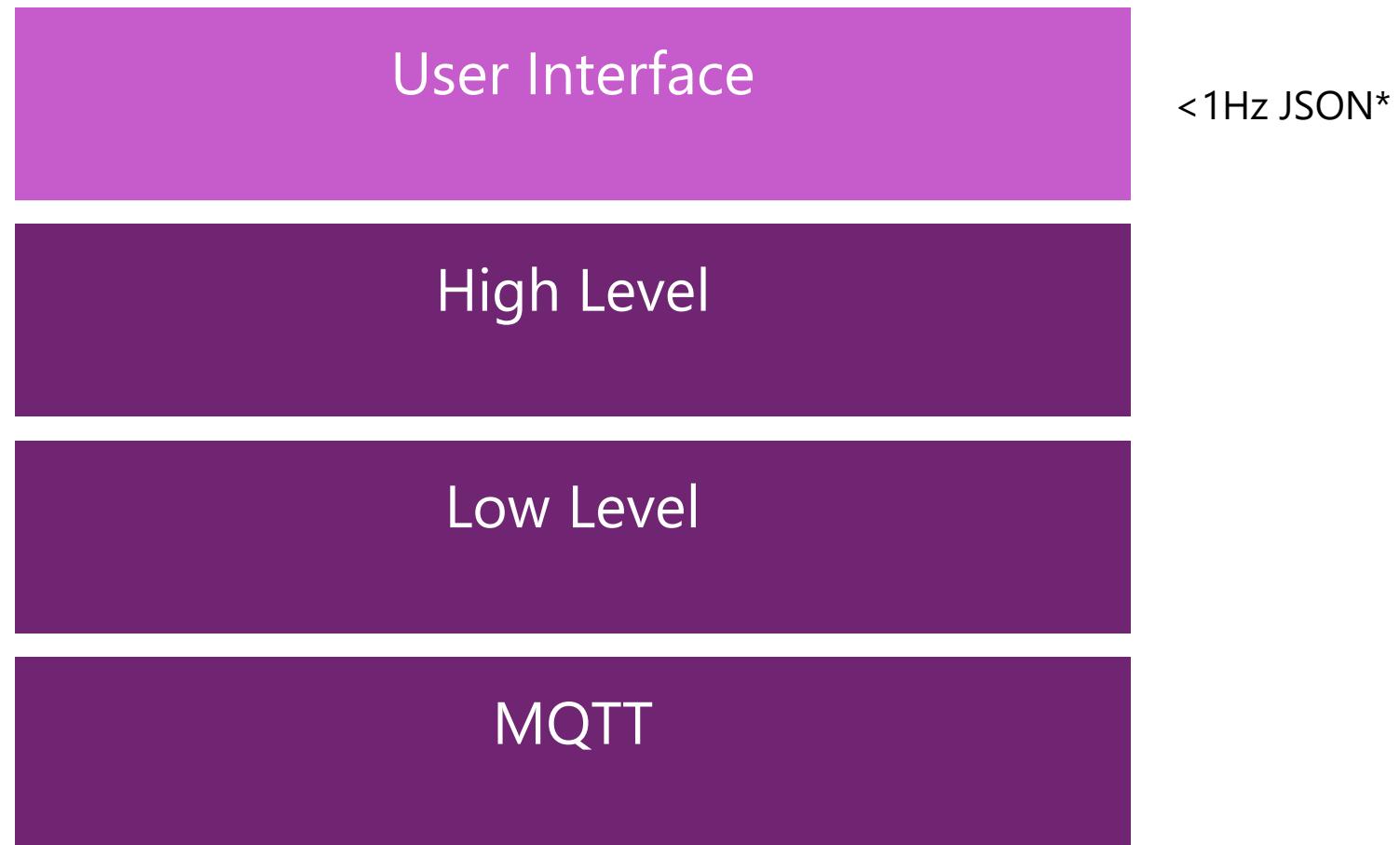
Low Level

MQTT

MQTT Stack Diagram



Stack Diagram



* Except fast remote telemetry Command

The screenshot shows a web interface for industrial monitoring and control. At the top, there are tabs for 'แดชบอร์ด' (Dashboard), 'ปรับเทียบ' (Compare), 'ปรับกอง' (Pile Adjust), 'ควบคุม' (Control), and 'ข้อมูลการใช้งาน' (Usage Data). Below these are two video feeds: one showing a construction site with a green truck and another showing a close-up of a concrete wall.

ระบบกล้อง (Camera System): Displays two camera feeds. The left feed shows a construction site with a green truck, timestamped 12-02-2023 Sat 17:26:00. The right feed shows a close-up of a concrete wall with a red horizontal stripe, timestamped 59.88.

ตั้งค่ากองหินตัดบด (Configure Stone Cutting Pile): Shows four sliders for pile 1, 2, 3, and 4. Pile 1 is set to 'หินกรวด' (Sandstone), pile 2 to 'หิน 3/4' (3/4 stone), pile 3 to 'หิน 3/8' (3/8 stone), and pile 4 to 'กราย' (Gravel).

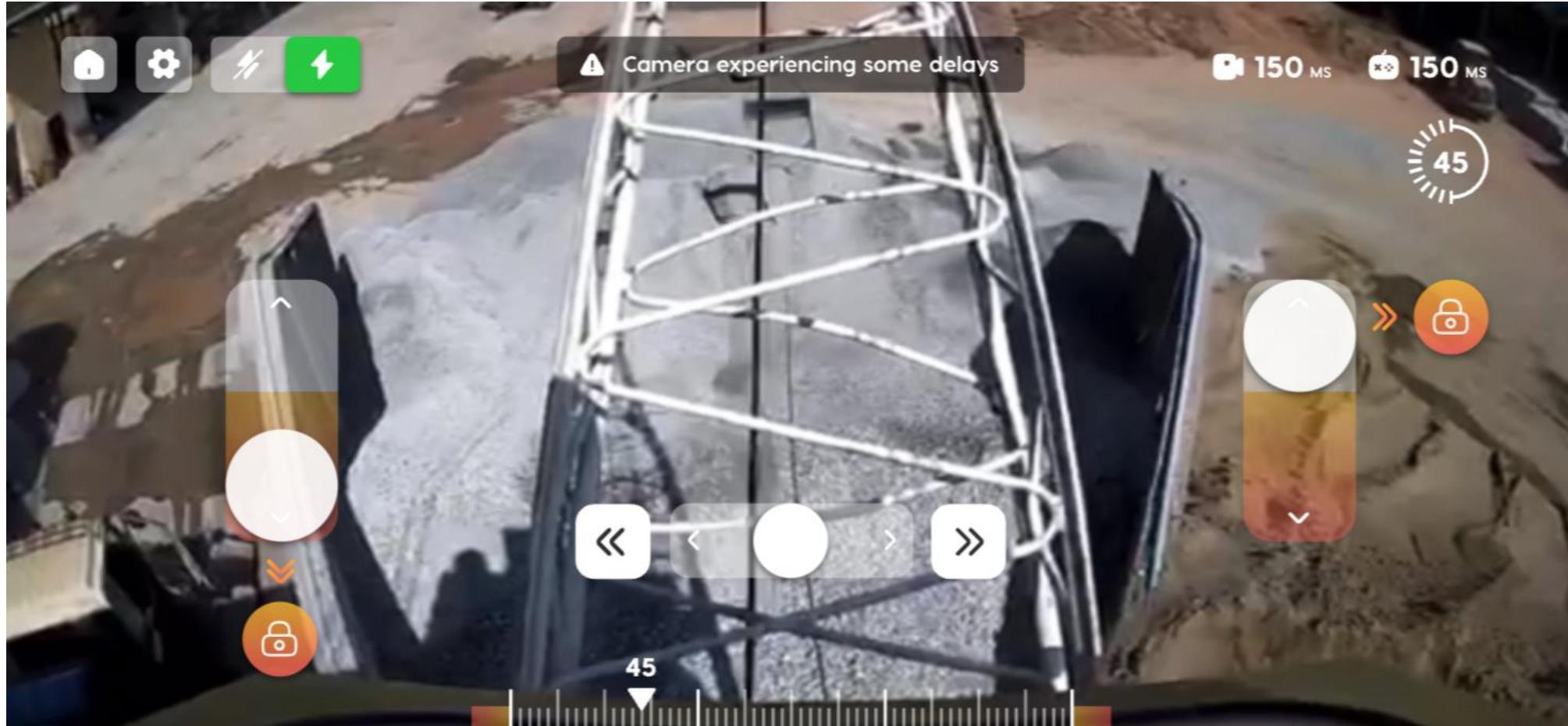
อุณหภูมิ : 20.15 องศา (Temperature : 20.15 degrees): A section showing temperature data. It includes a graph of temperature over time and a large red button labeled 'หยุด | STOP' (Emergency Stop) at the bottom.

ประเมินผล โดยระบบ AI (Evaluate by AI System): A section showing AI evaluation results. It includes a graph of a specific metric over time and a red button labeled 'หยุด | STOP' (Emergency Stop) at the bottom.



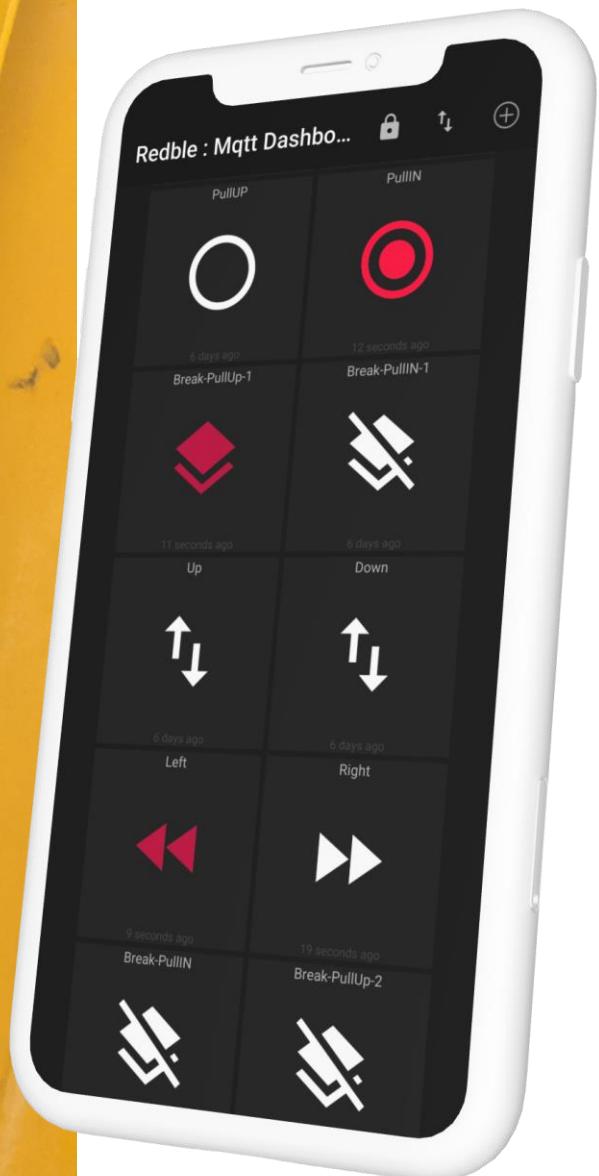


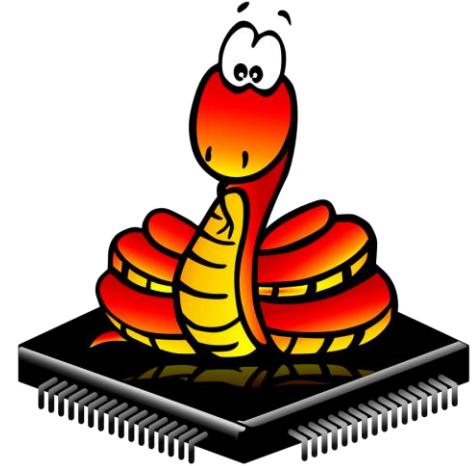
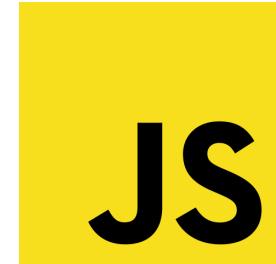
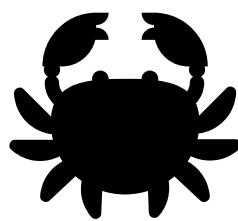
[mqtt client | Dart Package \(pub.dev\)](#)



MQTT is bringing the zen back into our
dev flow.

Nutchanon Ninyawee
PyCon Thailand 2023 Speaker





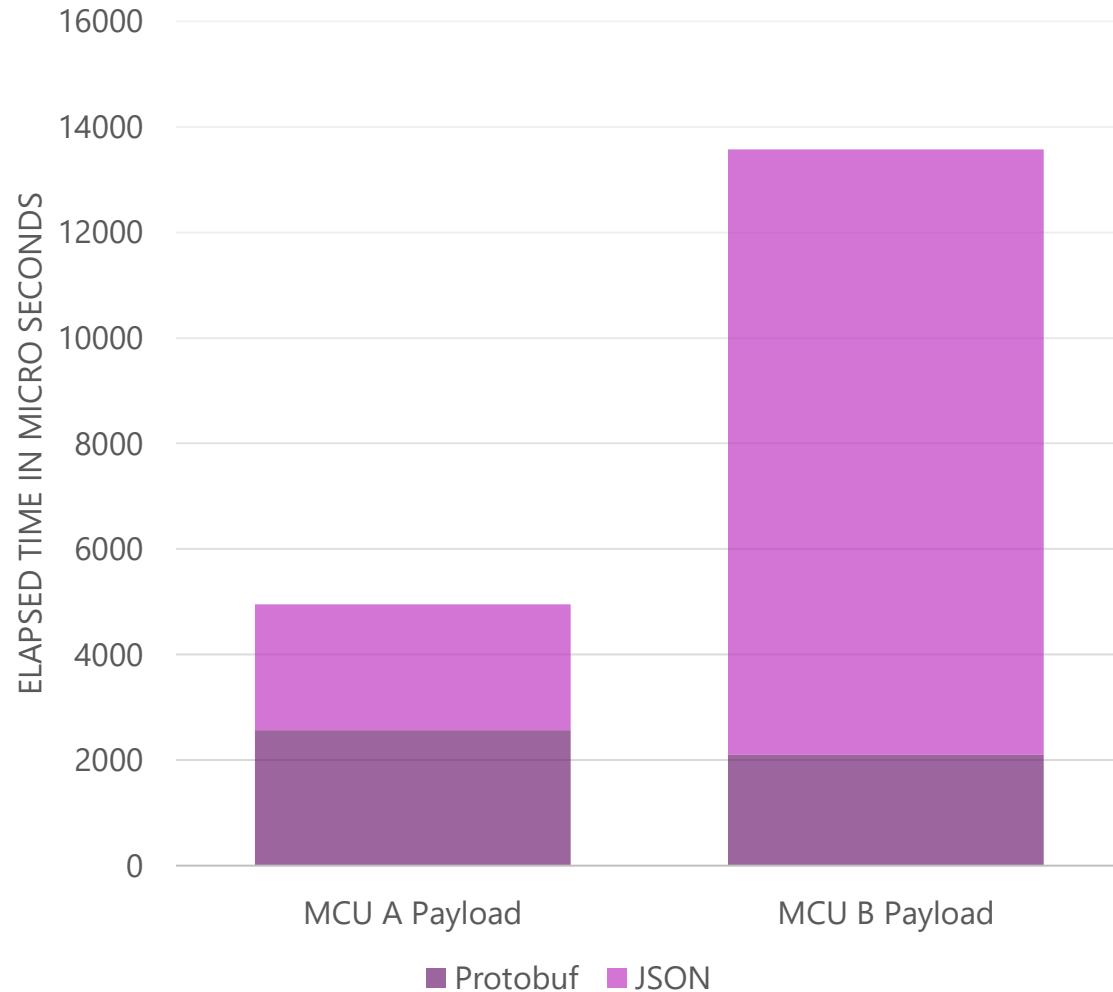
NVIDIA.
JETSON





```
// using https://json-to-proto.github.io/  
  
// {"uptime_ms":1846259,"publish_hz":71.42857361,"reconnect_ms":0,"encoders":{"rotation":  
{"position":0,"heading":0}}}  
  
syntax = "proto3";  
  
message RotationEncoderPacket {  
  
    message EncoderData {  
        int32 position = 1;  
        float heading = 2;  
    }  
  
    message Encoders {  
        EncoderData rotation = 1;  
    }  
  
    uint32 uptime_ms = 1;  
    float publish_hz = 2;  
    uint32 reconnect_ms = 3;  
    Encoders encoders = 4;  
}
```

PUBLISH LOOP ELAPSED



Up to
6x
faster



Postman now supports MQTT

 Jonathan Haviv
September 15, 2023 · 3 mins



Uptime Kuma

#PyConTH #PyConTH2023

MQTTX 1.9.4: Empowering High-Frequency MQTT Testing with Protobuf Integration

 EMQX Team | Jul 19, 2023

MQTTX



Table of Contents

- [Testing Message Transmission with Protobuf Format](#)
- [Optimized Automatic Updates in the Desktop Client](#)



Nutchanon (Ben) Ninyawee

