

Group 9

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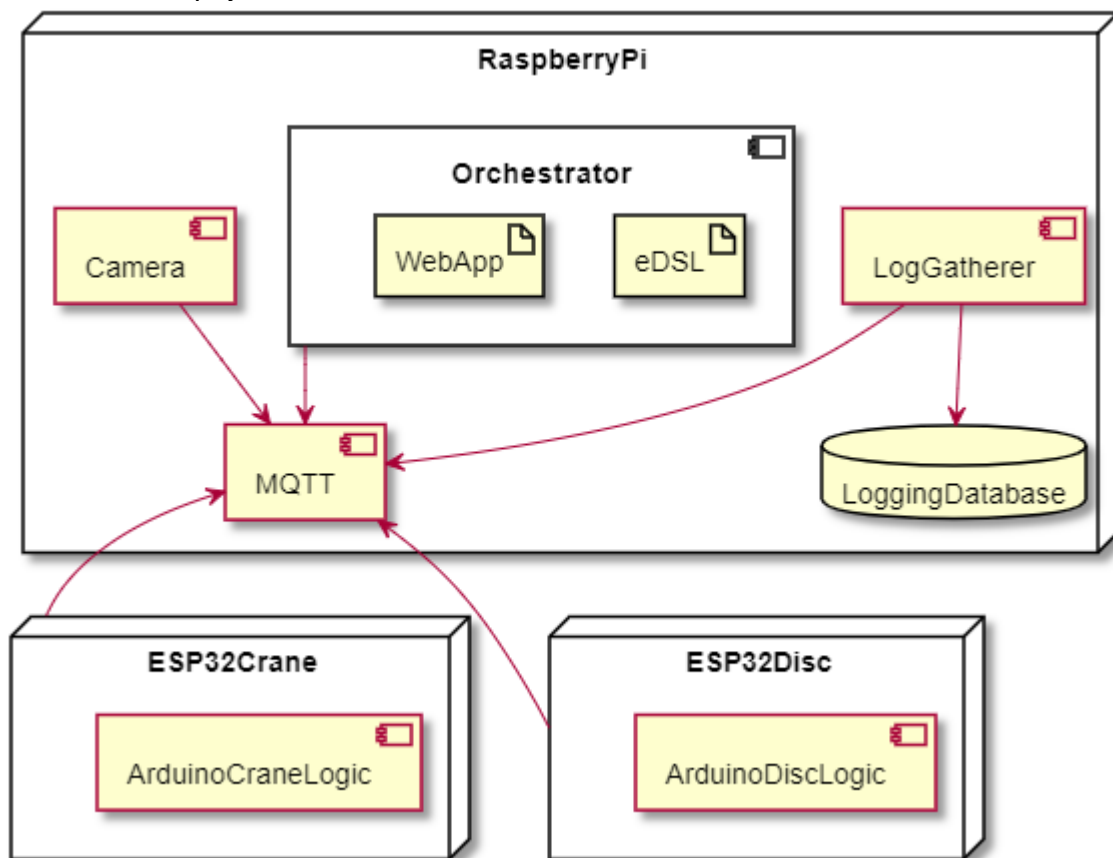
Project title:

Wirelessly controlled crane

Overall project description:

Using a combination of ESP32s, a Raspberry Pi, and a MQTT service, we want to remotely control a crane so it can pickup goods from a simulated assembly line (a rotating disk with zones). The system will be able to:

- Recognize item types based on colour (scanned with a camera interfaced with the Raspberry Pi)
- Be controlled remotely by actuating upon topic values in a hosted MQTT service
- Use various hardware components:
 - Phototransistor to count rotations on the crane winch.
 - DC and Stepper motors
 - Self-built electromagnet
- Subscribe and publish state to the MQTT service for wireless communication between physical devices



Tasks:

- Write Arduino code to control crane and disc

- Write Arduino code to connect esp32 to Wi-Fi and MQTT
- Setup PI as Wi-Fi access point
- Create shell scripts which start relevant services when the PI boots
- Create camera application for scanning items
- Create web app to control esp32s over MQTT
- Log relevant data of the system
- Allow automatic and manual control of the system

Which course objectives do you meet:

- Linux architecture
- Embedded linux systems
- Distributed embedded Linux systems, wired and wireless communication
- I/O interfacing to sensors and actuators
- Message passing design patterns
- Integrate simple embedded Linux systems into relevant applications (we use quite a few of the linux services to make our system possible e.g. to set up a wifi hotspot)
- Apply appropriate communication and message passing architectures for data exchange and remote management
- Setup and use version control systems