Zephyr & Thingsboard

Zephyr Project Meetup

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About me

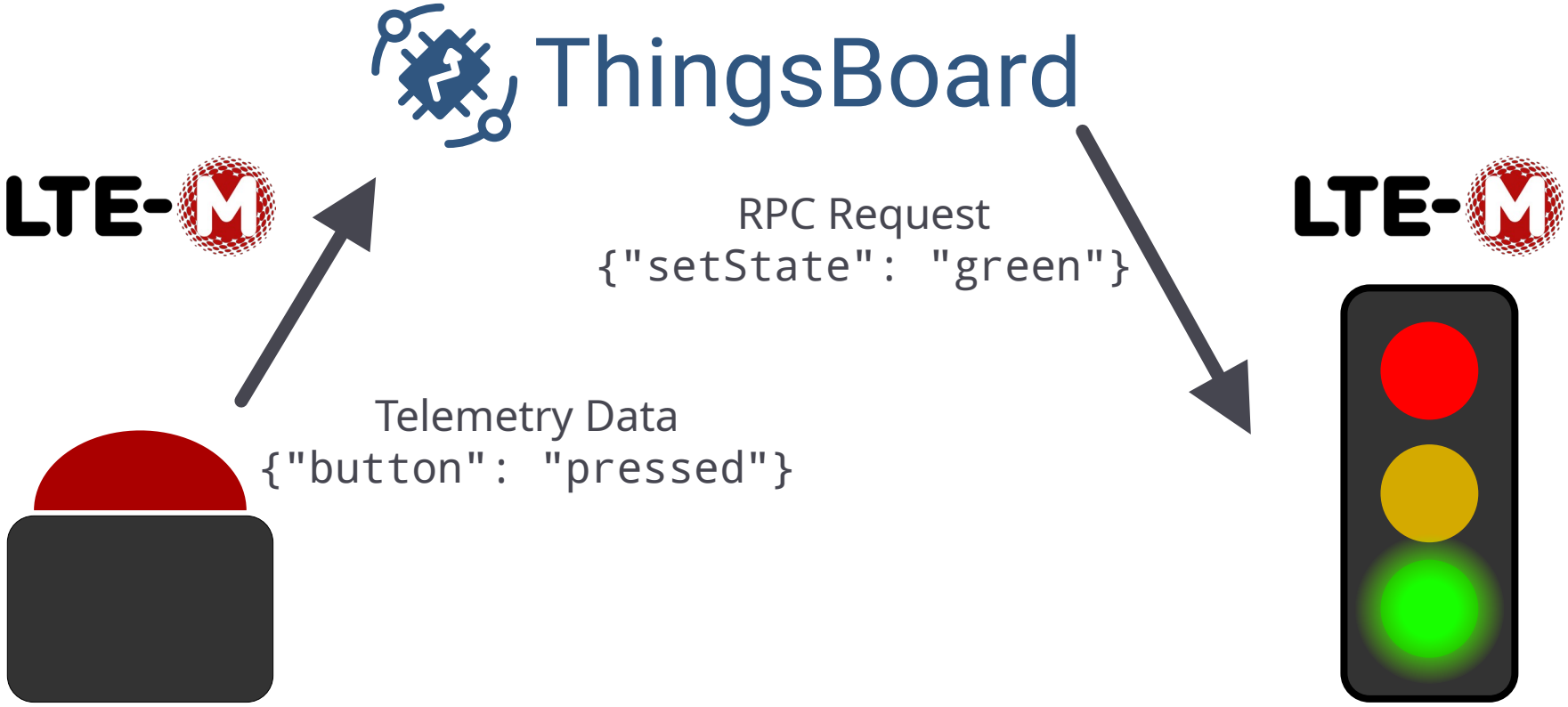
- **Self-employed**
  - Hardware- and Software Development
  - Developing *digidrip.eu*
- **Passionate about**
  - Embedded Design
  - Open Source
  - Brewing Beer
  - Farming

Agenda

- Use-case / Example
- Thingsboard
- Zephyr Implementation
- Live Demo

Photo by Yurii Khomitskyi on Unsplash

Architecture Overview

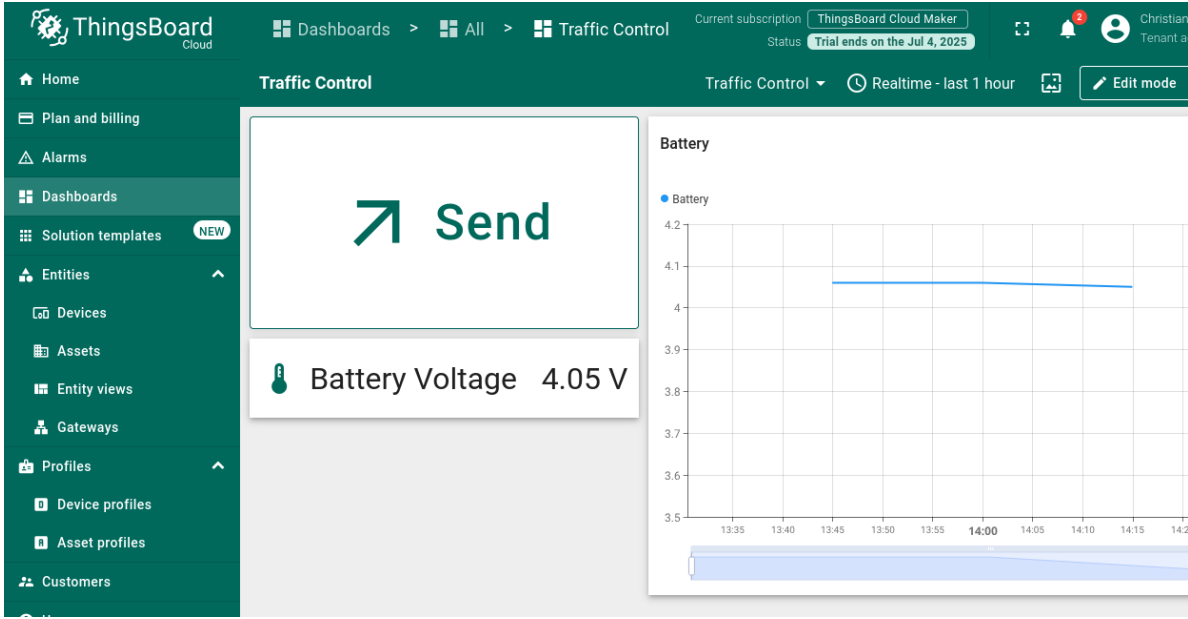


Thingsboard

- Open-Source IoT Platform
- Device Management
- Data Collection and Processing
- Visualization

Thingsboard

- Telemetry Data
  - Measurements
- Attributes
  - Client
  - Server
  - Shared
- RPCs

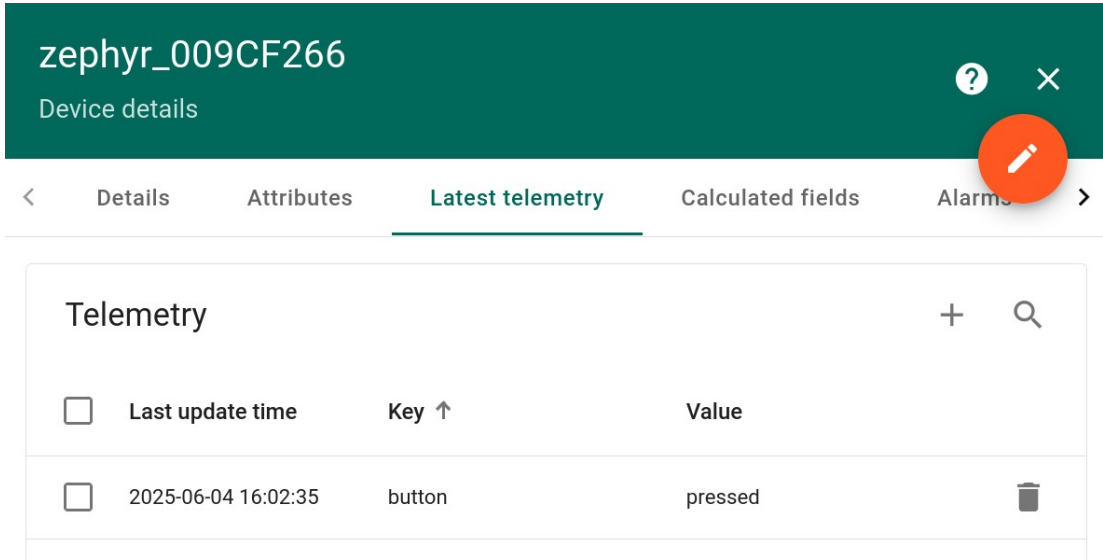


Thingsboard API

- MQTT
- CoAP
- HTTP
- LWM2M
- SNMP

Telemetry via MQTT

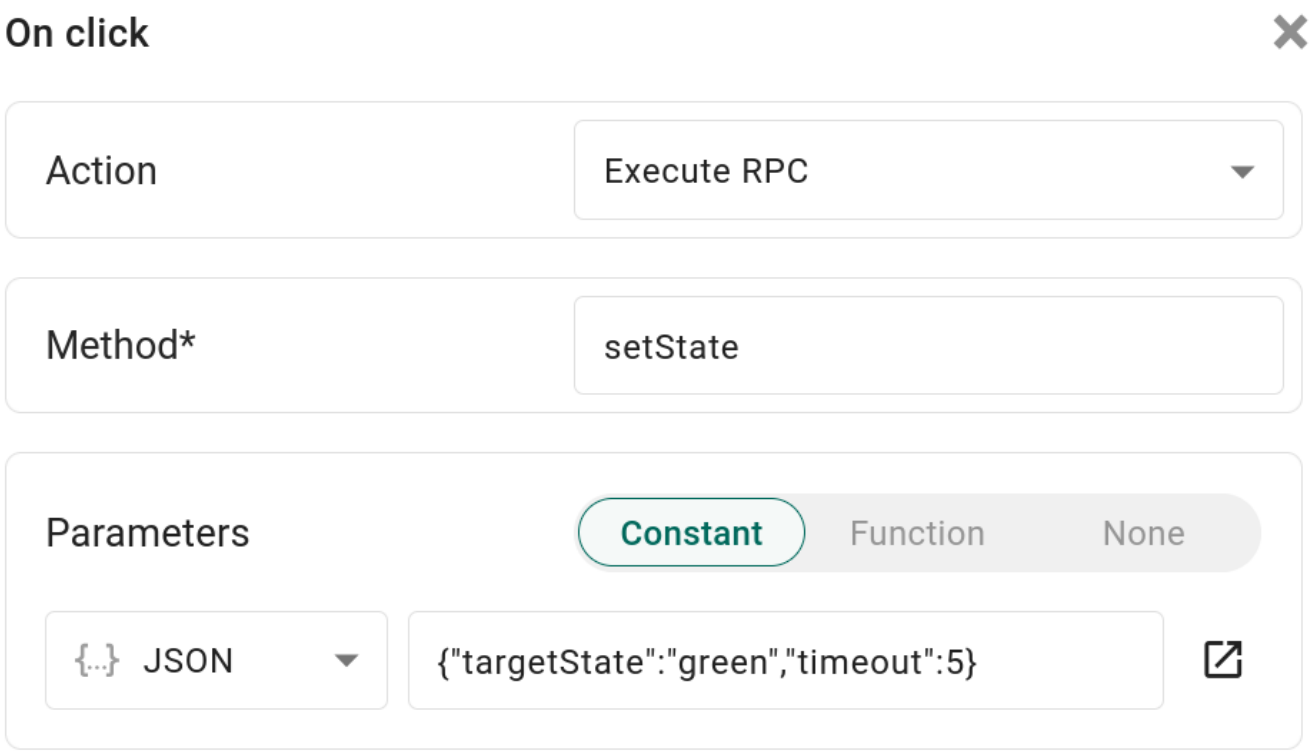
- Publish to `"v1/devices/me/telemetry"`
- `{"button": "pressed"}`



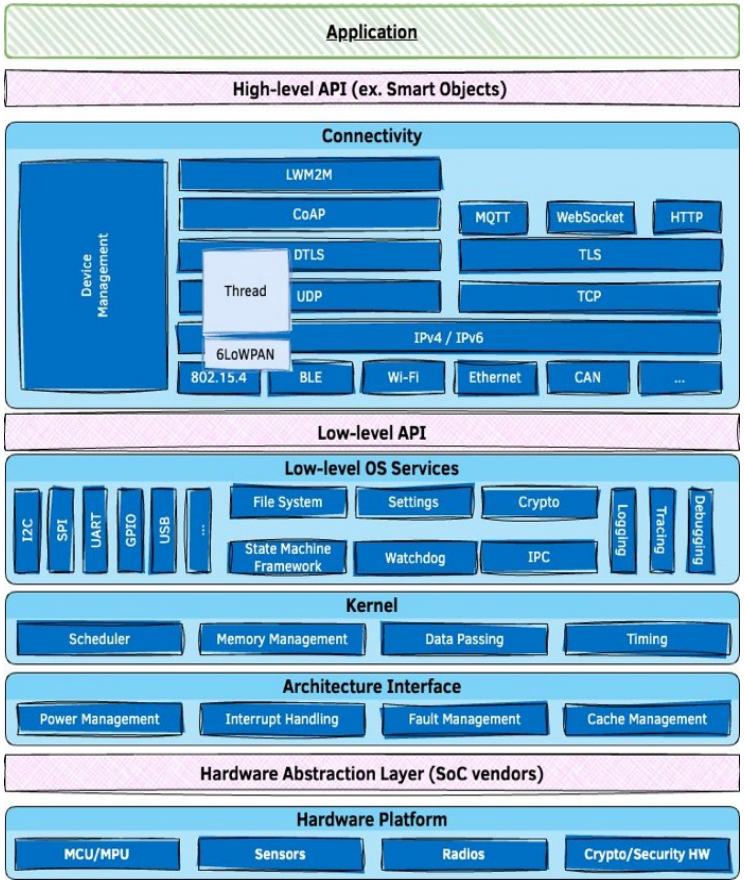
RPC via MQTT

- Subscribe to `"v1/devices/me/rpc/request/+"`
- ```
  {
    "method": "setState"
    "params": {"targetState":"green"}
  }
  ```
  ```

RPC via MQTT with TB Widget

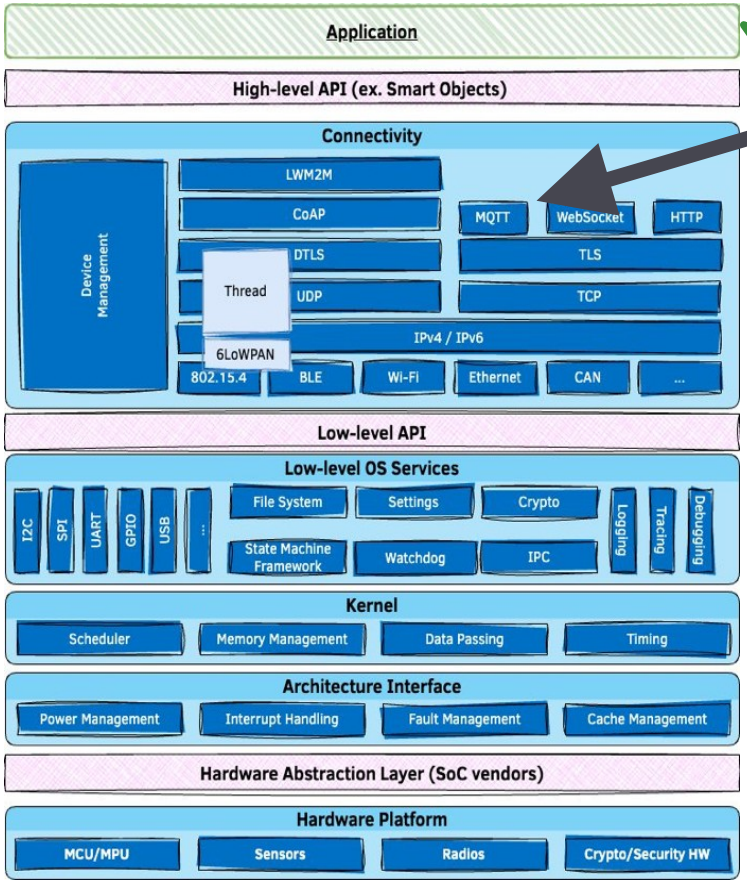


Zephyr + Thingsboard



- Connect via
  - MQTT
  - CoAP
  - LwM2M
  - HTTP
- Using
  - WiFi / Ethernet / LTE-M

Zephyr + Thingsboard w/ MQTT



MQTT Client
`mqttc.c`

TB Client
`tb_client.c`

Application
`main.c`

MQTT Client

- Connect to Broker
- Handle Connection
- Publish Messages
- Subscribe to Topics

Zephyr Thingsboard Client

- Uses MQTT Client
- Provisions Devices
- Sends
  - Attributes
  - Telemetry
- Receives
  - Attributes
  - RPC Requests

Telemetry Upload

```
/* tb_client.h */

int tb_client_telemetry_publish(uint8_t *_data);




/* main.c */

void button_pressed_work_handler(struct k_work *work)
{
    ...
    tb_client_telemetry_publish("{\"button\":\"pressed\"}");
    ...
}
```

RPC Handling

```
/* tb_client.h */

int tb_client_rpc_subscribe(const char *method, int(*callback)(uint8_t *,
size_t));

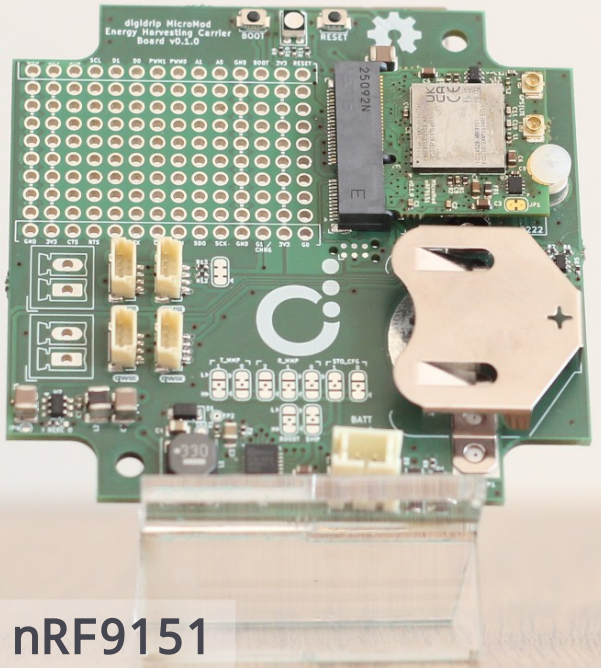
/* main.c */

void rpc_set_state_cb(uint8_t *message, size_t len) {
    /* handle RPC request */
}

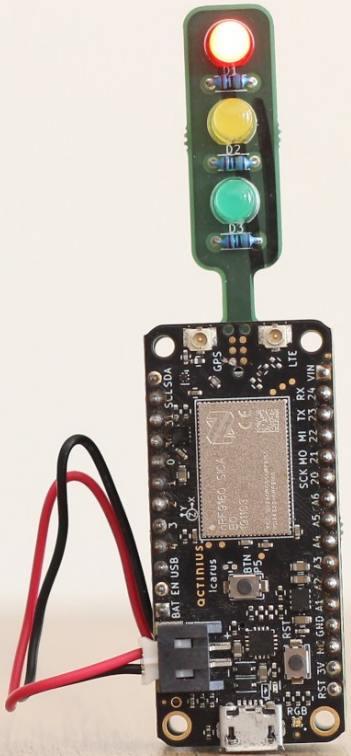

...
int main(void) {

    tb_client_rpc_subscribe("setState", &rpc_set_state_cb);
}
```

Example / Hardware



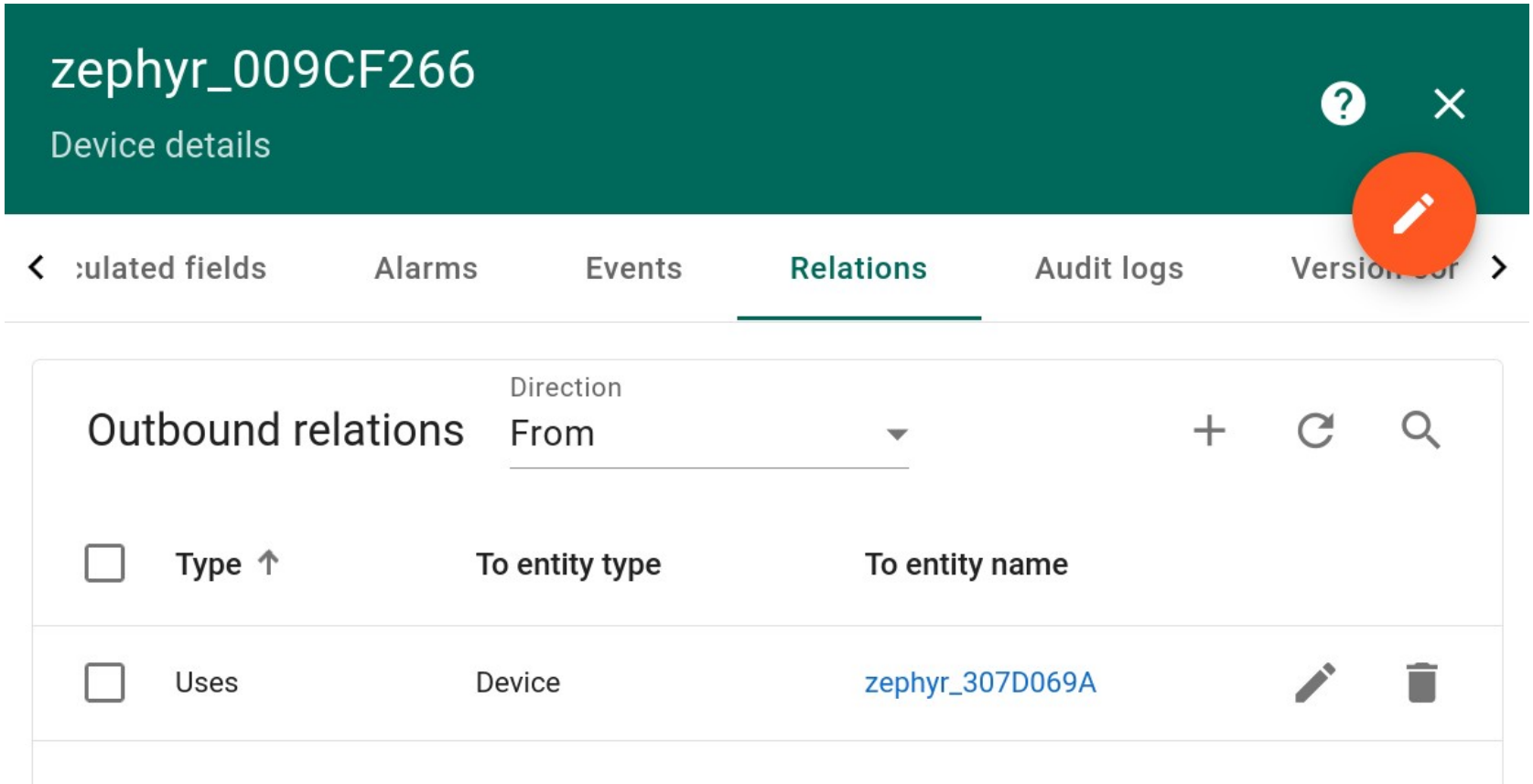
MicroMod nRF9151
Processor Board



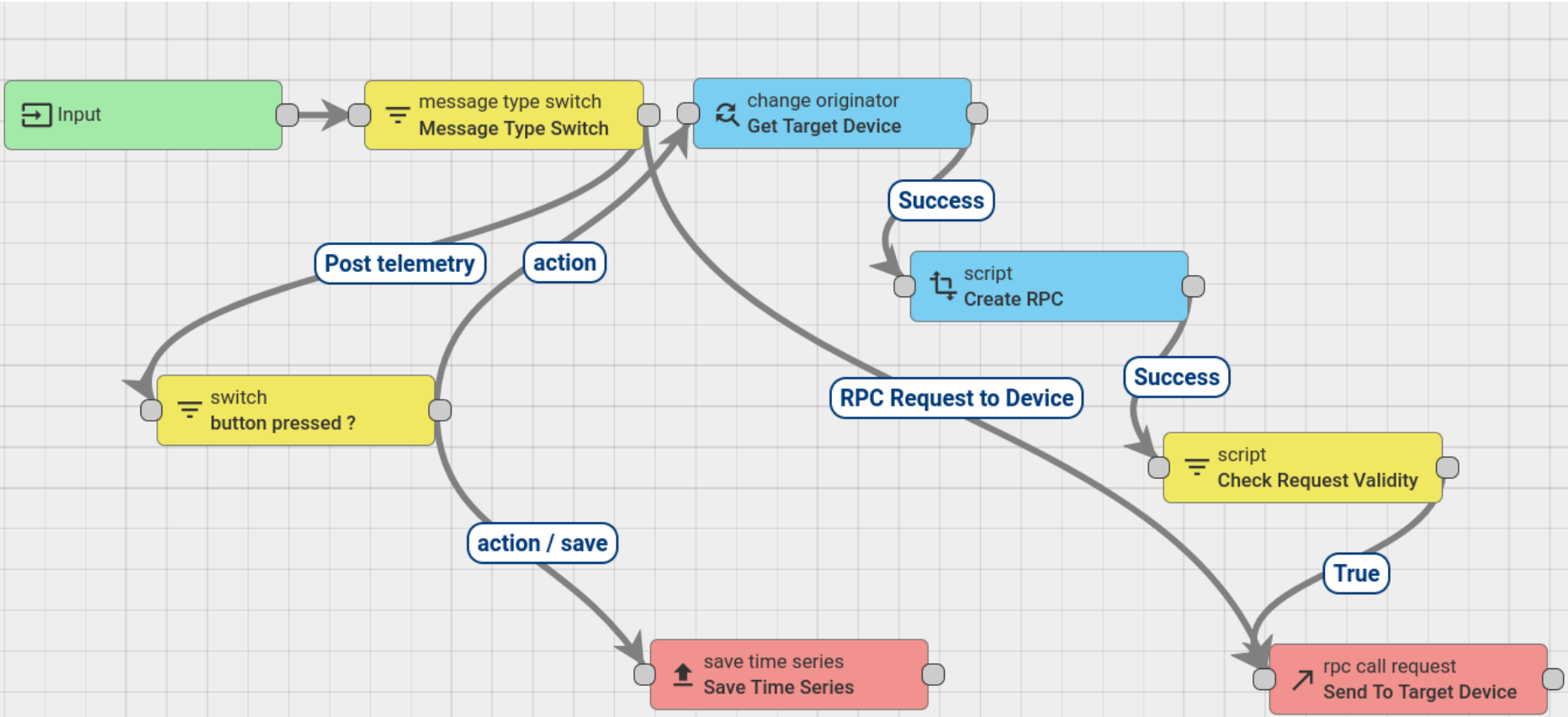
Actinius Icarus
- nRF9160

Photo by Yurii Khomitskyi on Unsplash

Thingsboard Relations



Thingsboard Rulechain

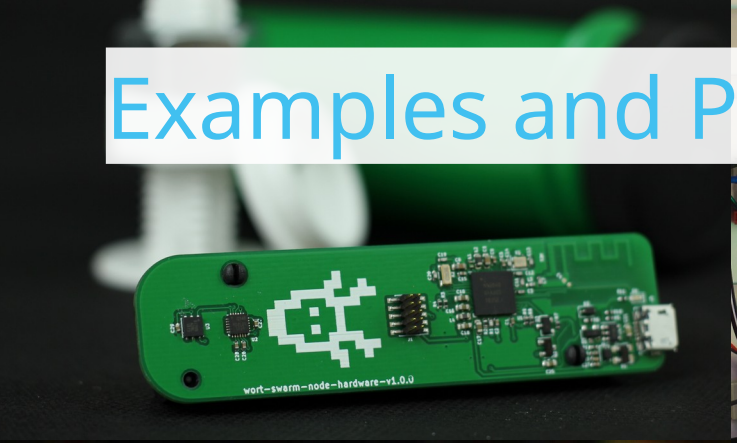


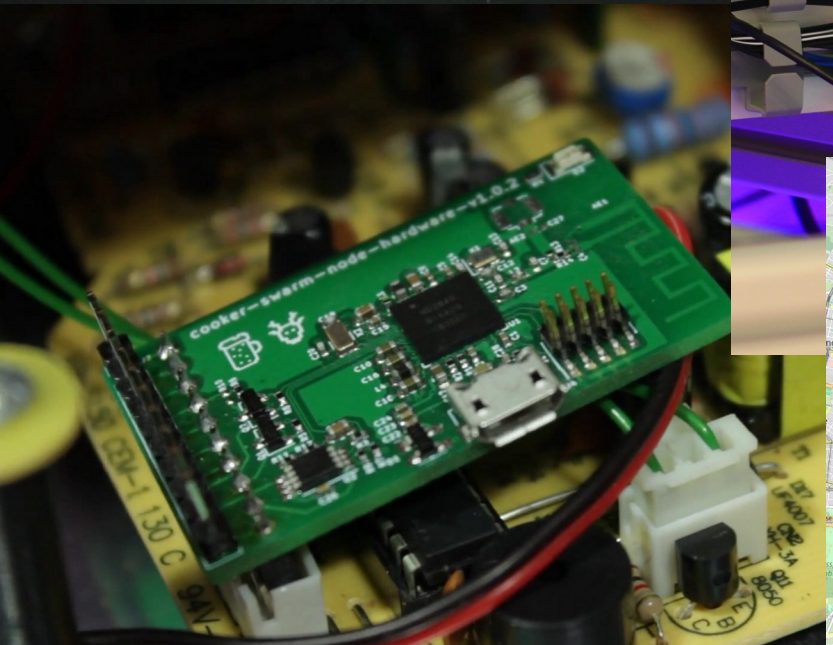
Showtime II

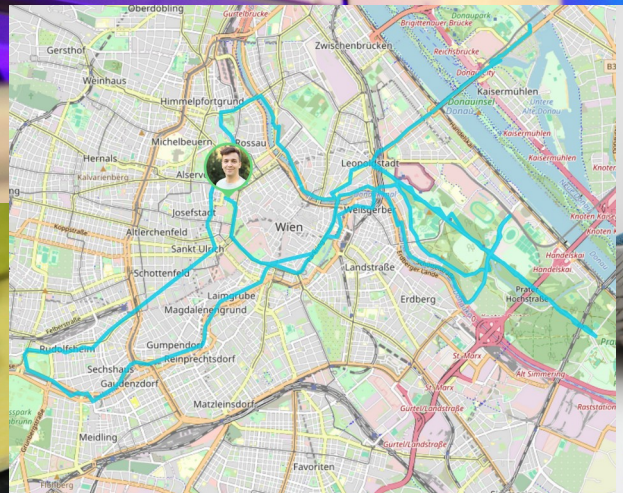
Photo by Yurii Khomitskyi on Unsplash

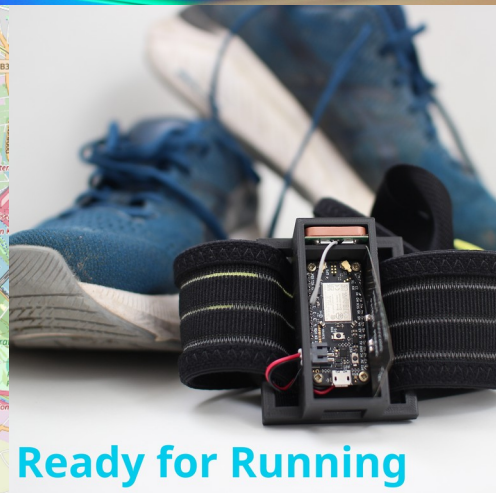
Real-World Example: Irrigation

Examples and Projects









Ready for Running

Kontakt

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- GitHub