



Soletta™

# Soletta Technical Introduction

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# Soletta overview

Features and Architecture



# IoT Questions and Problems



- Explosion of libraries
  - Subsets: I/O, comms
  - Specific targets
  - Too big for small devices
  - Hard to reuse knowledge
- Nothing is integrated
- Lack of documentation

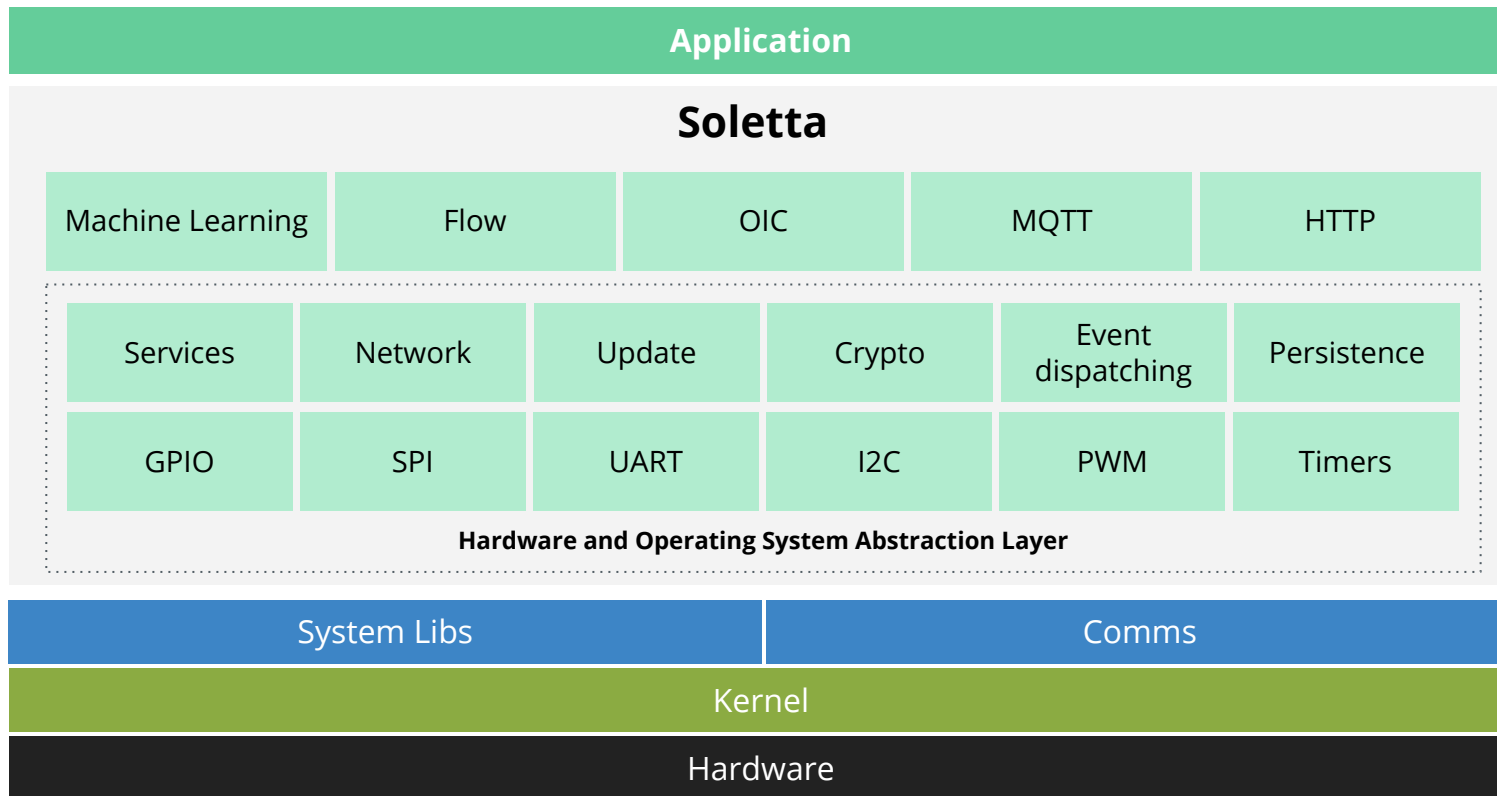
Bringing intelligence to IoT devices

# What is Soletta?

- IoT Framework
- Open Source
- Easy access:
  - Sensors
  - Actuators
  - Communication
- Portable code
- Different platforms, including small OSs



# Architecture



# Flow layer



- Domain-specific language (DSL)
- Interface
- Easy - target audience
- Code safety
- Visual
- OOBE

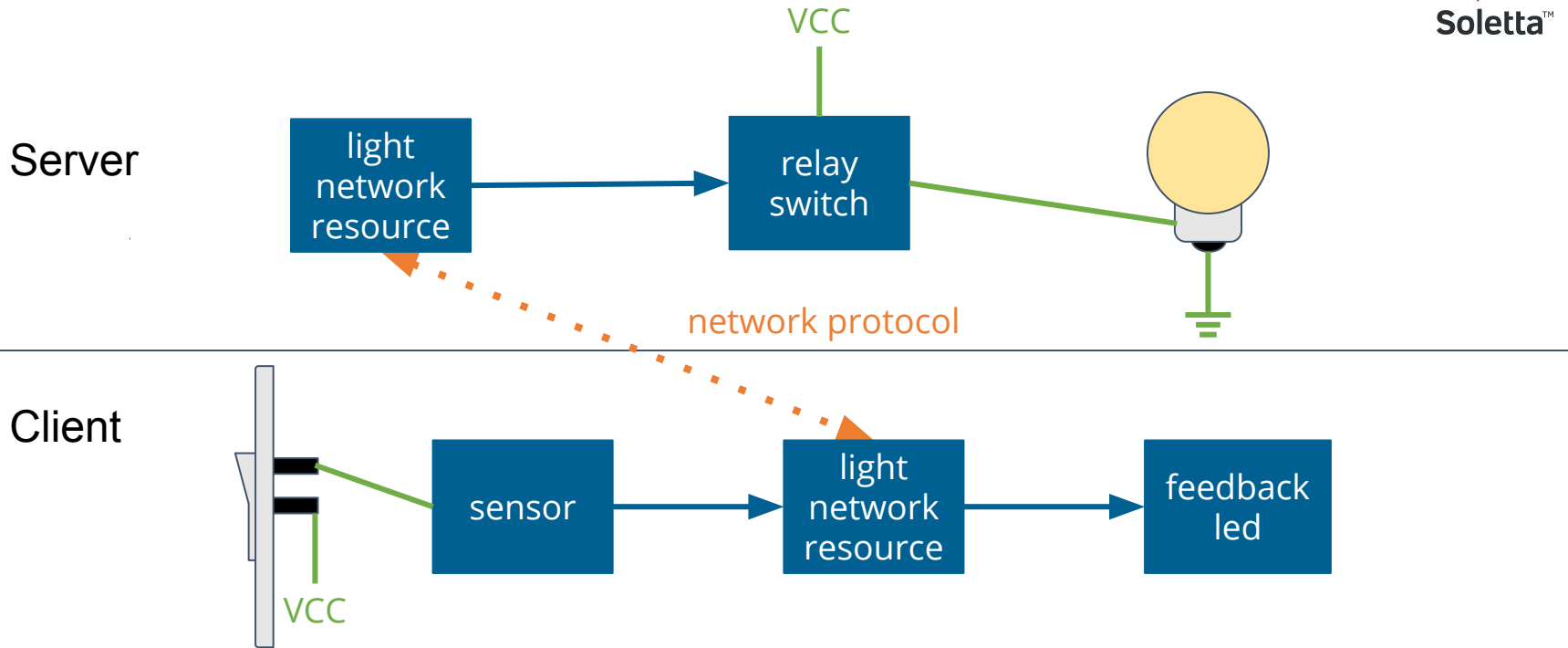


# How to remotely toggle a light bulb?

Simple and canonical example

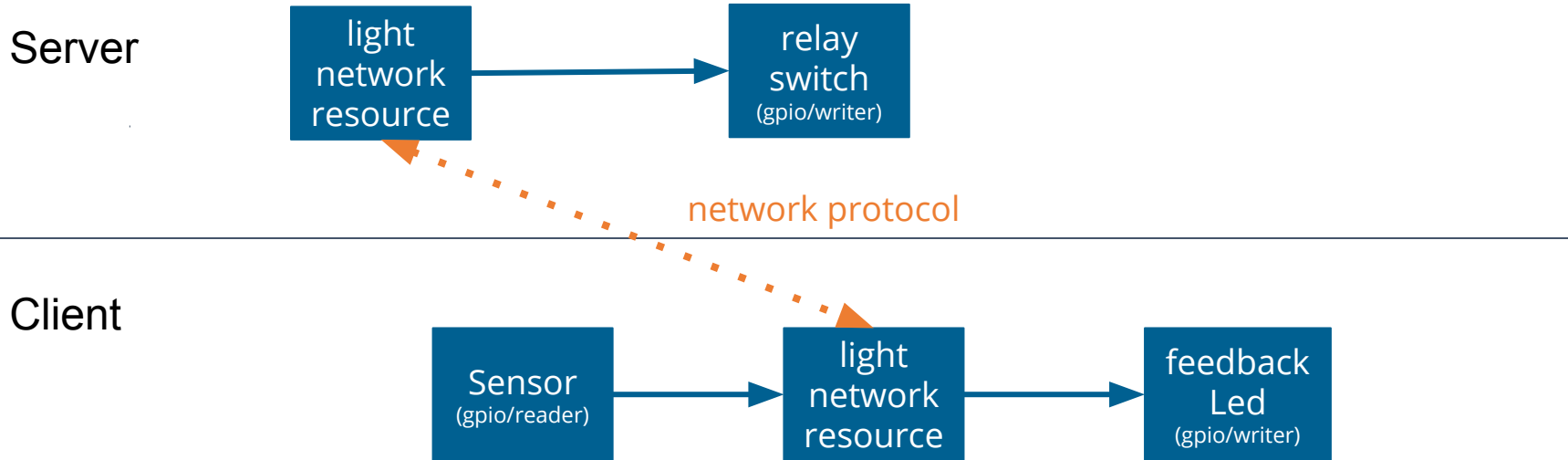


## How to remotely toggle a light bulb?





## How to remotely toggle a light bulb?



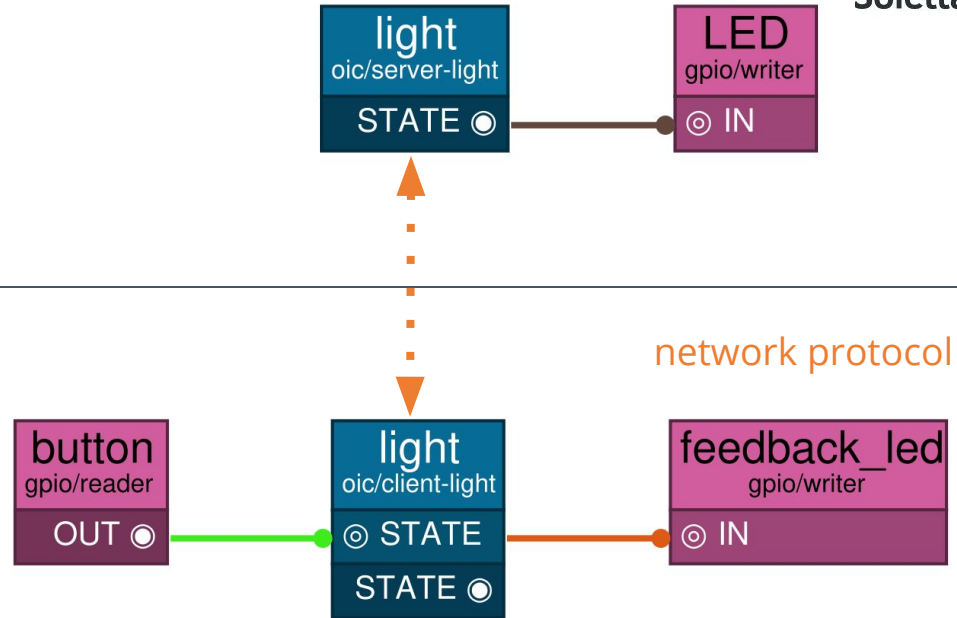
## How to remotely toggle a light bulb?

```
#Server fbp file  
light(oic/server-light)  
led(LED)
```

```
light STATE -> IN led
```

```
#Client fbp file  
button(Button)  
#Update device_id with server device id  
light(oic/client-light:device_id="")  
feedback_led(LED)
```

```
button OUT -> STATE light  
light STATE -> IN feedback_led
```



## How to remotely toggle a light bulb?

```
#Server config file
{
  "name": "LED",
  "options": {
    "pin": "7"
  },
  "type": "gpio/writer"
}
```

```
#Client config file
{
  "name": "LED",
  "options": {
    "pin": "3"
  },
  "type": "gpio/writer"
},
{
  "name": "Button",
  "options": {
    "pin": "5"
  },
  "type": "gpio/reader"
}
```



# Editor

Git repository URL



Status: inactive (dead)

Configuration file

## Projects

- sandbox
- demo

## Code Viewer

```
1 #Client
2 button(gpio/reader:pin=7)
3 #Update device id with server device id
4 light(oic/client-light)
5 feedback_led(gpio/writer:pin=3)
6
7 button OUT -> STATE light
8 light STATE -> IN feedback_led
```



Running on the target board, supports multiple users and allows fetching git repositories

# Cheat Sheet

**gpio/reader**  
GPIO reader

**INPUT PORTS**

**OUTPUT PORTS**

**OUT | boolean**  
GPIO reader, port out

**OPTIONS**

**pin | string**  
Label of the desired pin on the board. If raw is set to true, this should be the pin number as recognized by the platform.

**raw | boolean**  
Change 'pin' meaning to be the system parameters needed to address the desired pin. Use it if you know what you are doing.

**poll\_timeout | int**  
Polling time

**active\_low | boolean**  
Is active low

**edge\_rising | boolean**  
Is edge rising

**edge\_falling | boolean**  
Is edge falling

**pull | string**  
up for pull up, down for pull down, none for no pull

**gpio/writer**  
GPIO writer

**INPUT PORTS**

**IN | boolean**  
GPIO writer, port in

**OUTPUT PORTS**

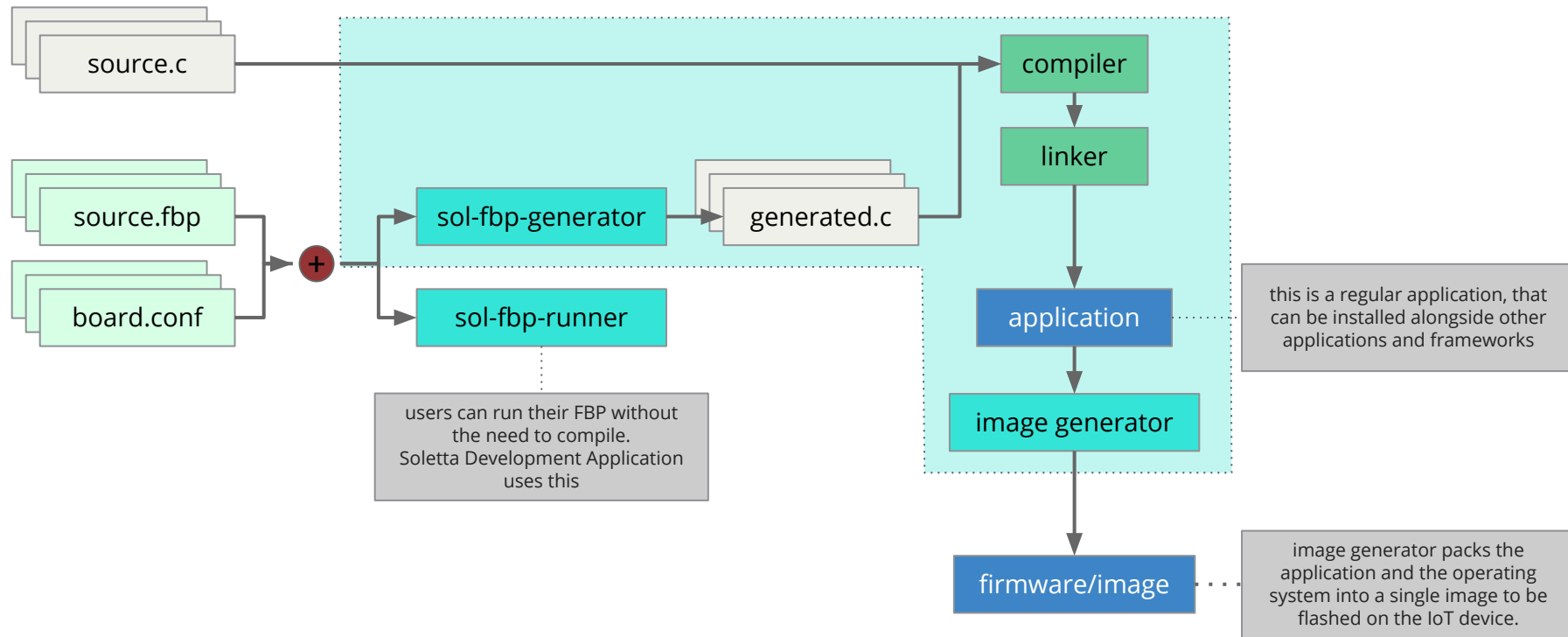
**OPTIONS**

**pin | string**  
Label of the desired pin on the board. If raw is set to true, this should be the pin number as recognized by the platform.

**raw | boolean**  
Change 'pin' meaning to be the system parameters needed to address the desired pin. Use it if you know what you are doing.

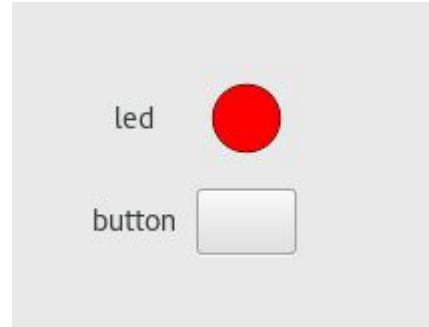
**active\_low | boolean**  
Is active low

## How to remotely toggle a light bulb?

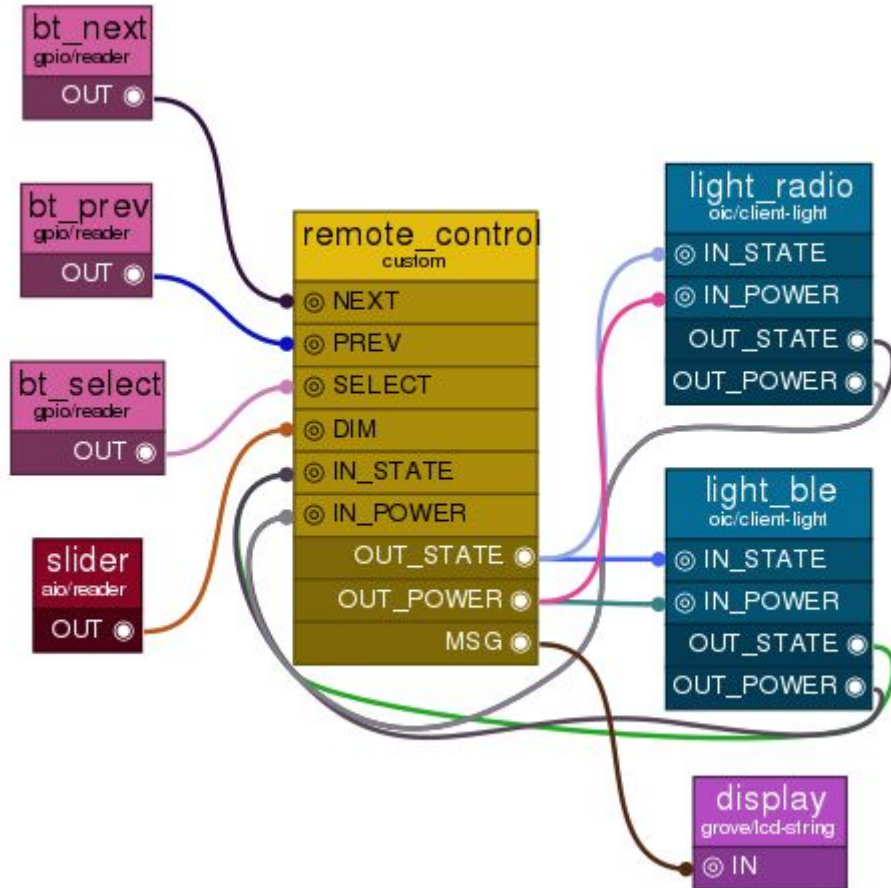


## How to remotely toggle a light bulb?

```
#Client config file to be used in a desktop
{
  "name": "LED",
  "type": "gtk/led"
},
{
  "name": "Button",
  "type": "gtk/button"
}
```



## Another example: Custom node







# Soletta Support



# Operating Systems support



- Linux
- Zephyr
- RIOT
- Contiki

# Boards tested so far

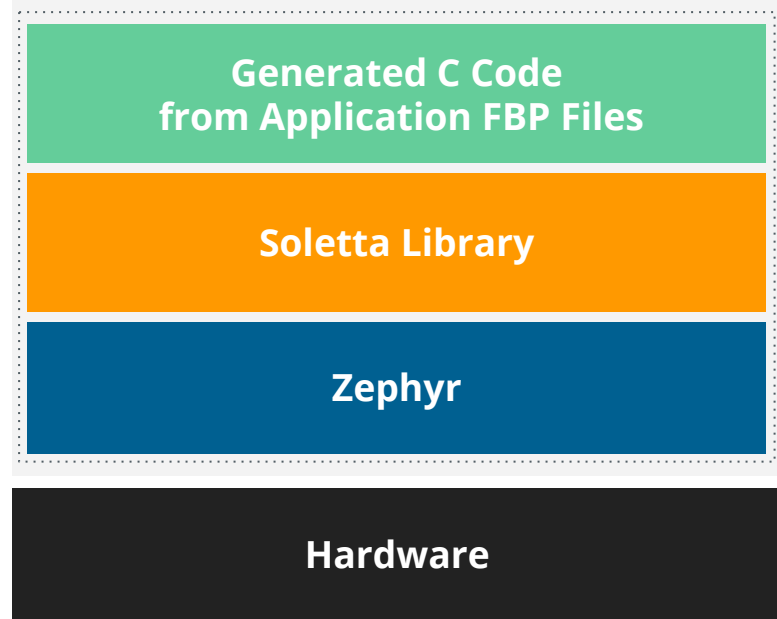


- Intel Edison (Linux)
- Intel Galileo Gen 2 (Linux)
- Intel Minnowboard Max (Linux)
- Quark SE Dev Board (Zephyr)
- Atmel SAMR21 Xplained Pro (RIOT)
- Raspberry Pi (Linux)

# Small OSes measurements



- Zephyr on Quark SE Dev Board
- Image size: 107k
- Peak used RAM: around 32k



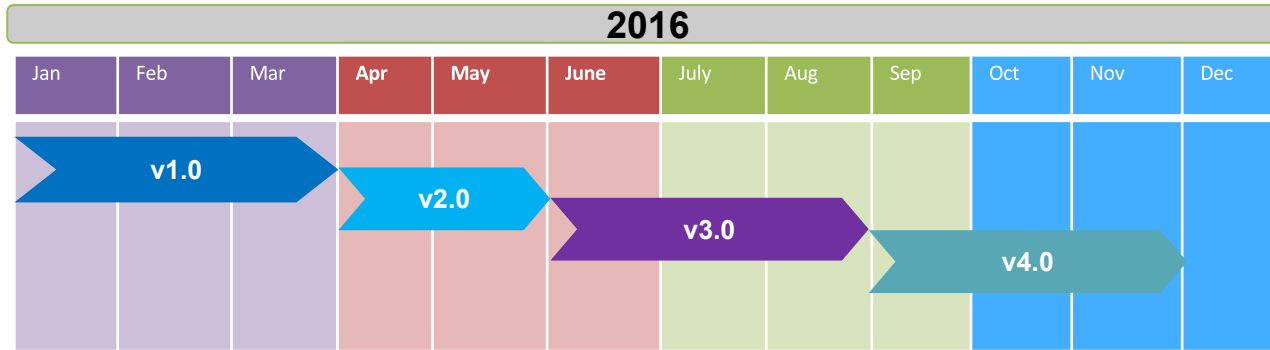


# How to get involved

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# Roadmap



## Go Stable (Embedded World)

- Initial Public announcement
- Stable API (1.0)
- 100% API documentation
- **OS:** Linux, Zephyr (initial)...
- **Languages:** C/C++, FBP, JS
- **Comms:** OIC, CoAP, MQTT, HTTP
- Real-world usage samples

## v2.0

- **Zephyr:** full I/O, persistence and 6LoWPAN
- **FBP:** community packages (similar to npm)
- **Node.js:** full bindings

## v3.0

- **Zephyr:** BLE, HTTP, MQTT, OTA updates
- **Comms:** BLE, Bluetooth, Management (ConnMan)

## v4.0

- **Zephyr:** Small JS on 80Kb and FBP on 8Kb

How to get involved

# Cool stuff we want to do



- Language bindings
- Visual Editor
- Plugins for other IDEs
- Communication protocols

How to get involved

# Community



- GSoC
- Workshops / Talks
- Partnerships
- #soletta @ freenode
- Wiki - <https://github.com/solettaproject/soletta/wiki>
- Mail lists - <https://lists.solettaproject.org/>
- Site - <https://solettaproject.org/>
- Repos - <https://github.com/solettaproject>



# Q&A

# Thanks

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