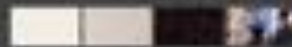


Hybris Labs (v)

2013 2014 2015 2016

IOT PROTOTYPES



ARCHITECTURE
HARDWARE
BLE
MQTT
ANDROID GATEWAY

DEMO

MQTT/BLE GATEWAY ON ANDROID

HARDWARE



Event Manager
(Poncamano)



ANDROID GATEWAY



MQTT

MQTT is a lightweight
messaging protocol
designed to be simple and
efficient for machines with
limited resources.



growing

BLE



MQTT/BLE GATEWAY ON ANDROID

Sven Haiges
@hansamann

Hybris Labs (v)



IOT PROTOTYPES

labs.hybris.com



moto

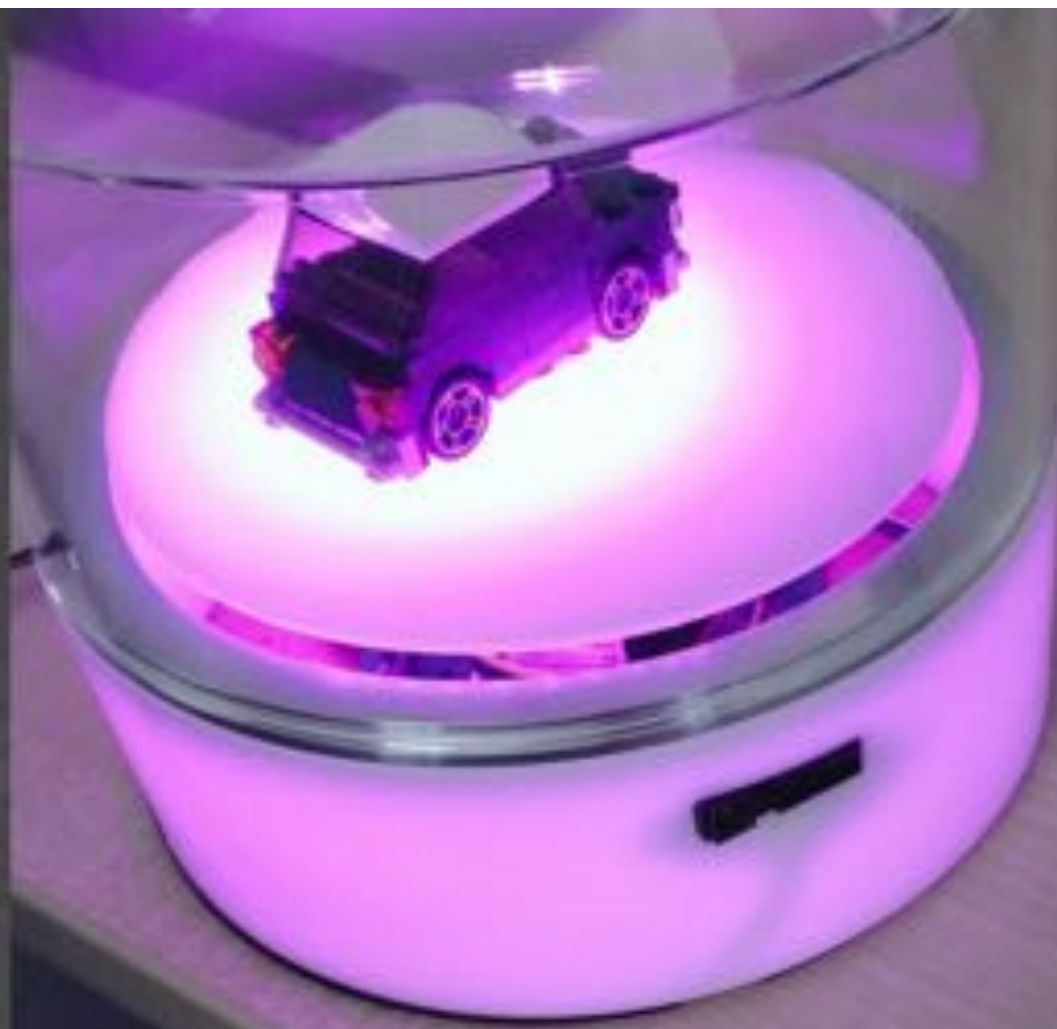
In-Store presentation platforms with in/output capabilities, connected via a MQTT/BLE gateway app on a smartphone.

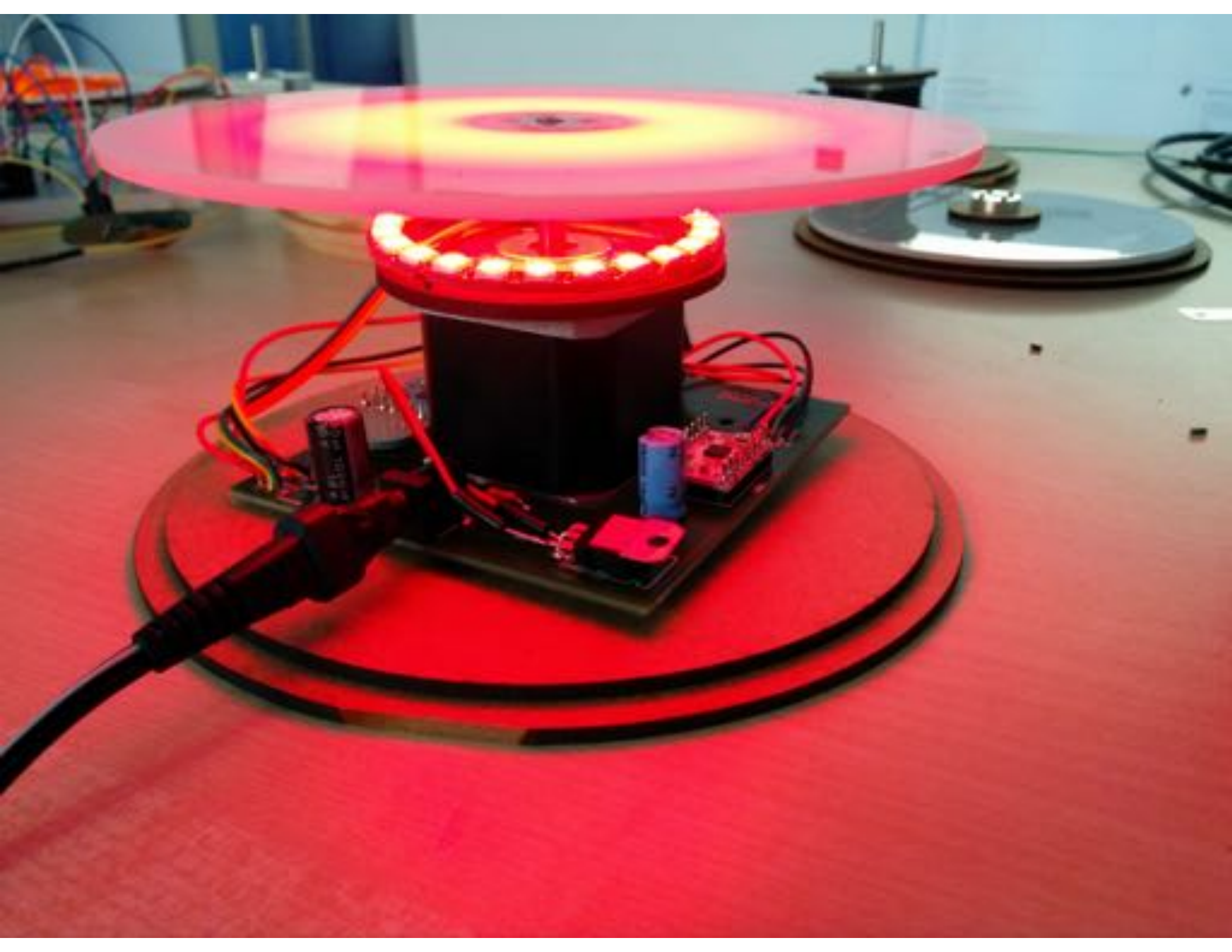
Be able to detect the presence of a customer
Be able to react, using color and rotation

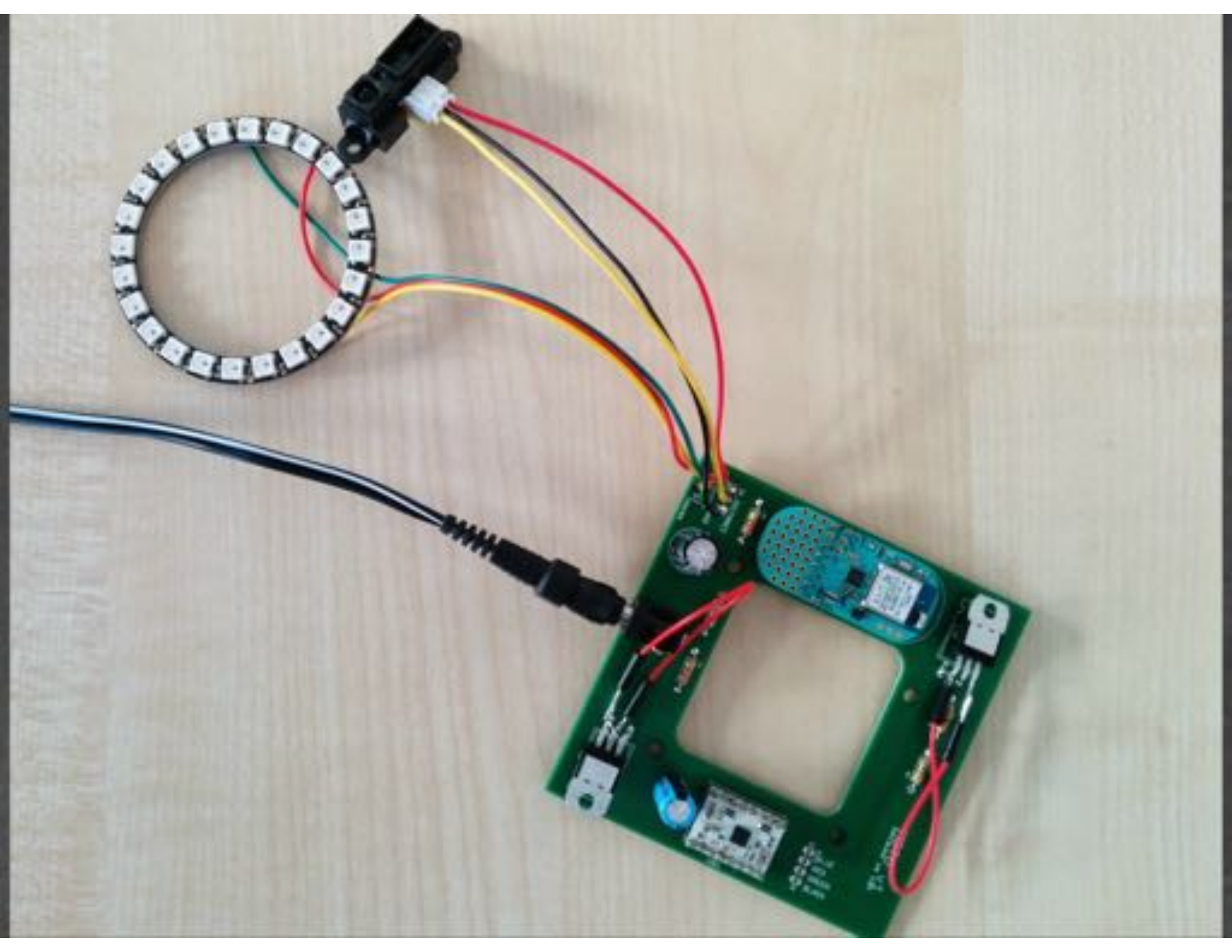
Stay connected, on a best effort basis



MOTO









moto



1 sec

Moto 3

Moto 2



hybris labs : moto

Moto 4	0 sec
Moto 8	
Moto 6	0 sec
Moto 2	0 sec 
Moto 3	0 sec
Moto 1	0 sec

<http://moto.labs.hybris.com/groups/default>



MOTO2 



0 sec



MOTO1 



6 sec



MOTO5 



5 sec



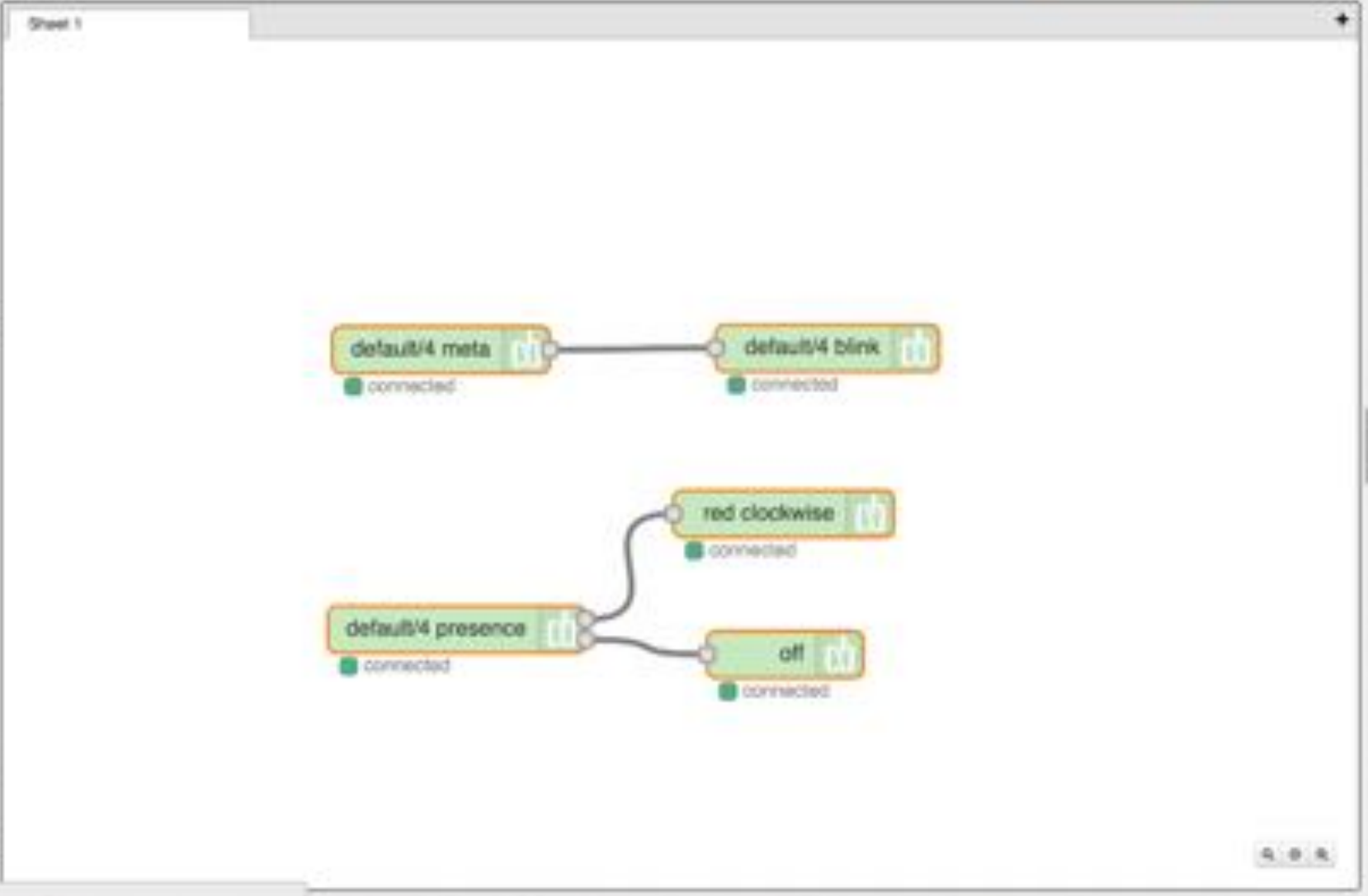
PRESENCES



DURATIONS



- ODM Capture
- hybrids lab family
 - events
 - presence
 - on
 - blink
- hybrids lab meta
 - events
 - meta event
 - presence event
 - command
 - blink
 - rainbow
 - product
- hybrids lab wine
 - blink





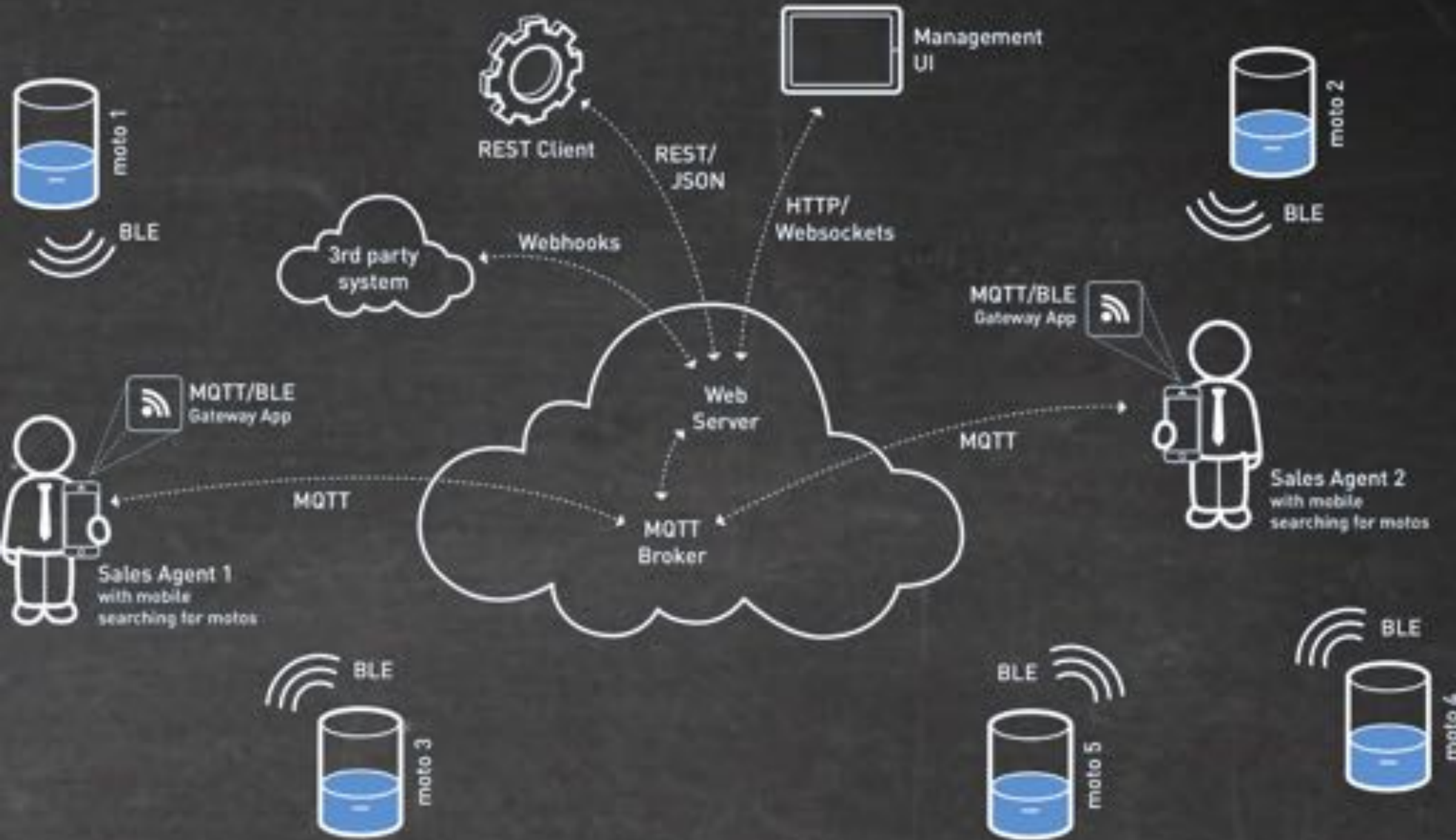
ARCHITECTURE

HARDWARE

BLE

MQTT

ANDROID GATEWAY



DEMO

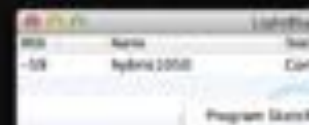
BEAN

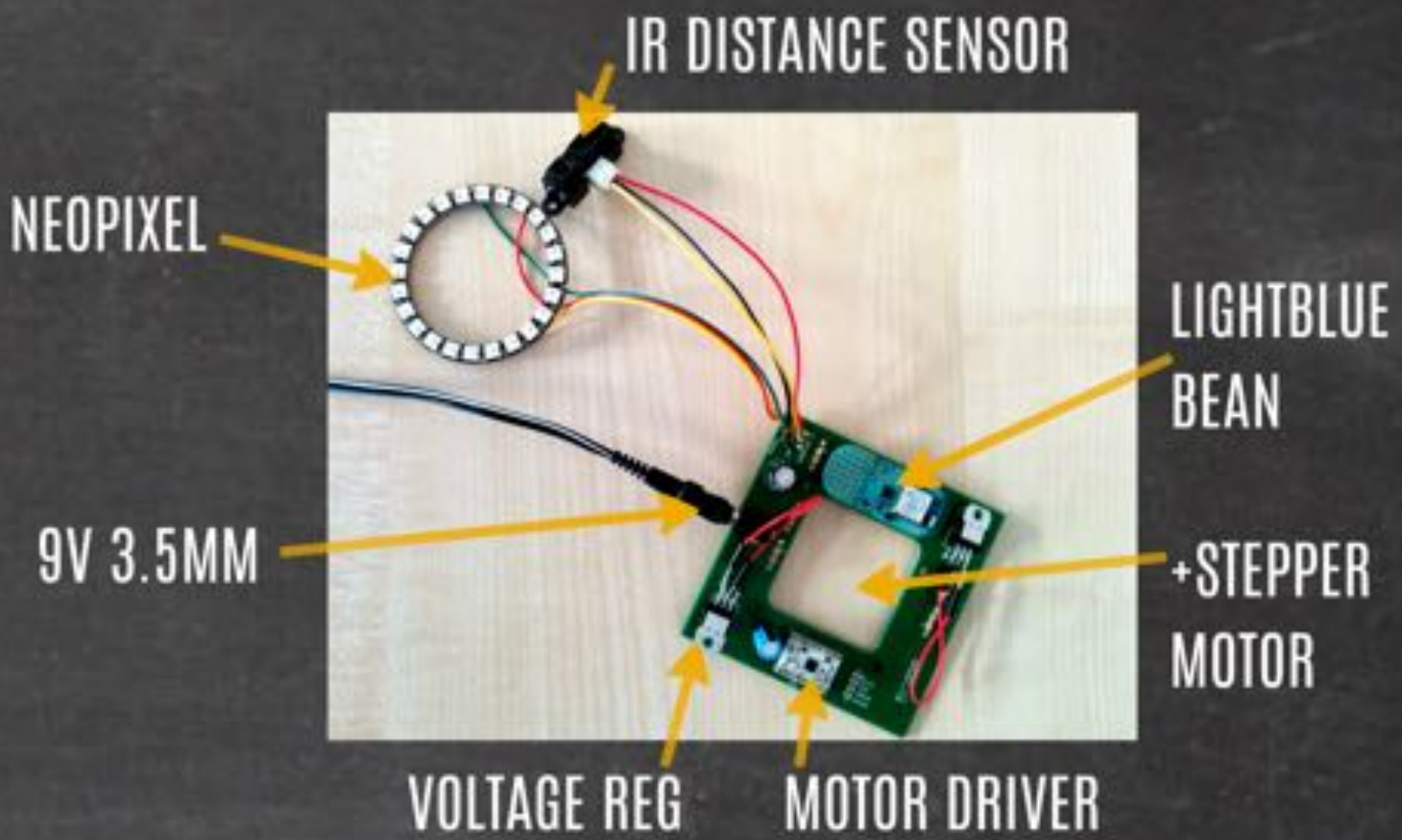
+STEPPER
MOTOR

Arduino

HARDWARE

Arduino
w Bean Lo





IR DISTANCE SENSOR

NEOPIXEL

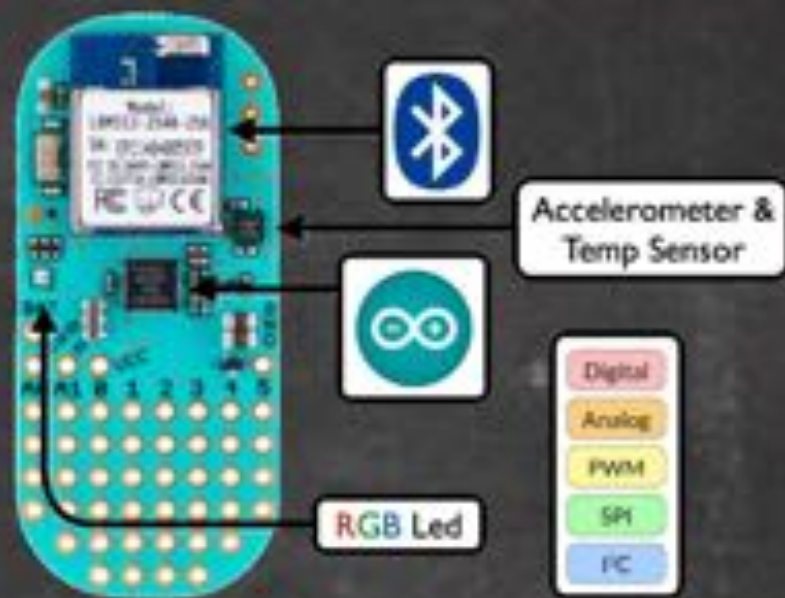
9V 3.5MM

VOLTAGE REG

MOTOR DRIVER

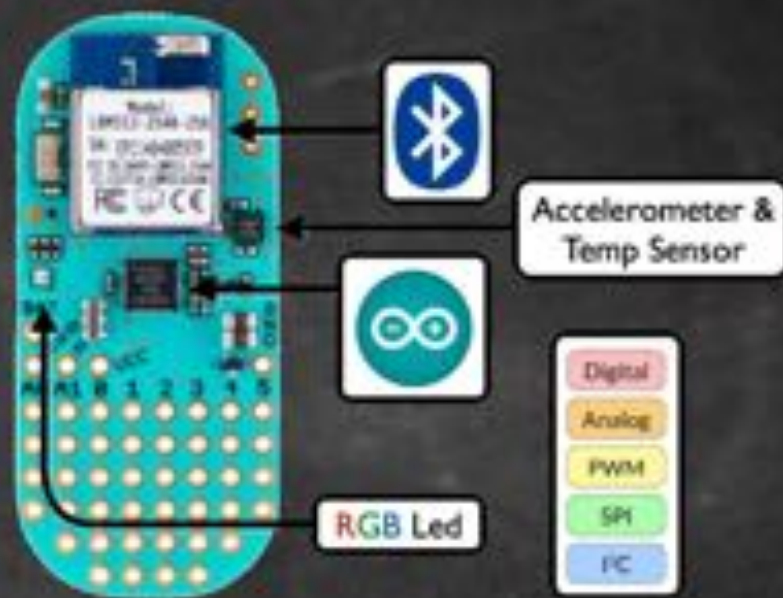
LIGHTBLUE
BEAN

+STEPPER
MOTOR



LIGHTBLUE BEAN

Arduino + BLE +
Atmega328p +
wireless
programming =
awesome



LIGHTBLUE BEAN

LBM313 (BLE Module) + Atmega328p (at 8MHz)

Accelerometer (BMA250 from Bosch), Temperature Sensor, RGB LED

CR2032 Battery holder

built-in protoboard

2 analog, 6 digital pins. Digital, Analog, PWM, I2C, SPI

Can be turned into an iBeacon easily

Read and write data to "Scratch Characteristics" easily.

Wireless serial (Serial BLE bridge)

Arduino IDE w Bean Loader

The image shows the Arduino IDE interface with a sketch titled 'lightblue_neo' and a 'LightBlue Bean - Loader' window. The sketch code includes the following:

```
#include <Adafruit_NeoPixel.h>

#define PIN 0
#define NPIXELS 64
ScratchData lastScratch;

Adafruit_NeoPixel strip = Adafruit_NeoPixel(NPIXELS, PIN, NEO_GRB + NEO_KHZ800);

void setup() {
  strip.begin();
  strip.show(); // Initialize all pixels to 'off' (0)
}

void loop() {
  // Do something over and over again forever:
  Scratch = Bean.readScratchData(1);
  writeScratch( &thisScratch, &lastScratch );
  delay(100);
}

Scratch;
```

The 'LightBlue Bean - Loader' window displays a table of connected devices:

RSSI	Name	Status	Sketch
-59	hybris1050	Connected	lightblue_sensor

A context menu is open over the 'hybris1050' device, listing the following actions:

- Program Sketch
- Use for Virtual Serial (/tmp/tty.LightBlue-Bean)
- Update Firmware
- Disconnect
- Blink Led
- Erase Sketch
- Power Off Arduino
- Turn Off Led
- iBeacon Settings
- Pin Code Settings
- Read LED Values
- Read Acceleration
- Read Temperature

BLE



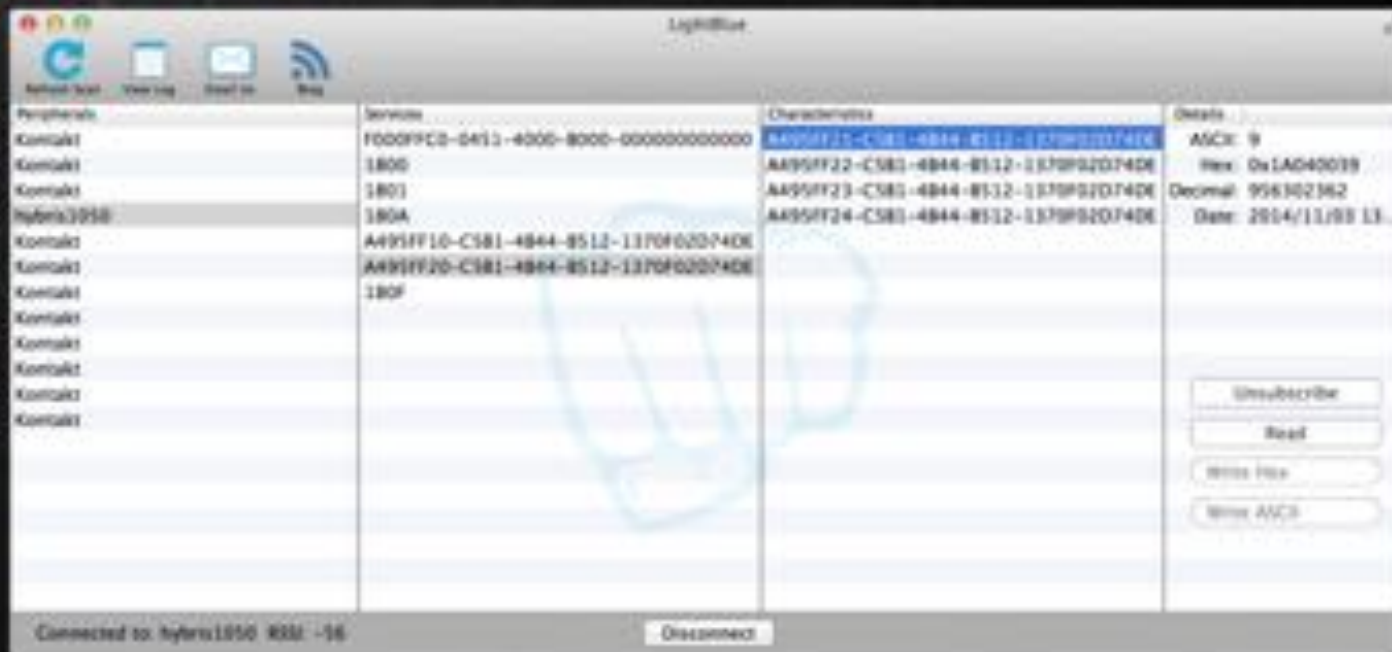
UUIDs - Universally Unique IDs

server*services*characteristics*descriptors



read|write|notify

LightBlue Mac App



arduino
code

MQ Telemetry Transport

MQTT

MQ Telemetry Transport

MQTT

Paho Java Client 1.0.2
State of Paho Android?
MQTT Client as a Service

Subscribe to topics based on app namespace

Publish events to topics that include app namespace

Server: Mosca, extended

ANDROID

GATEWAY

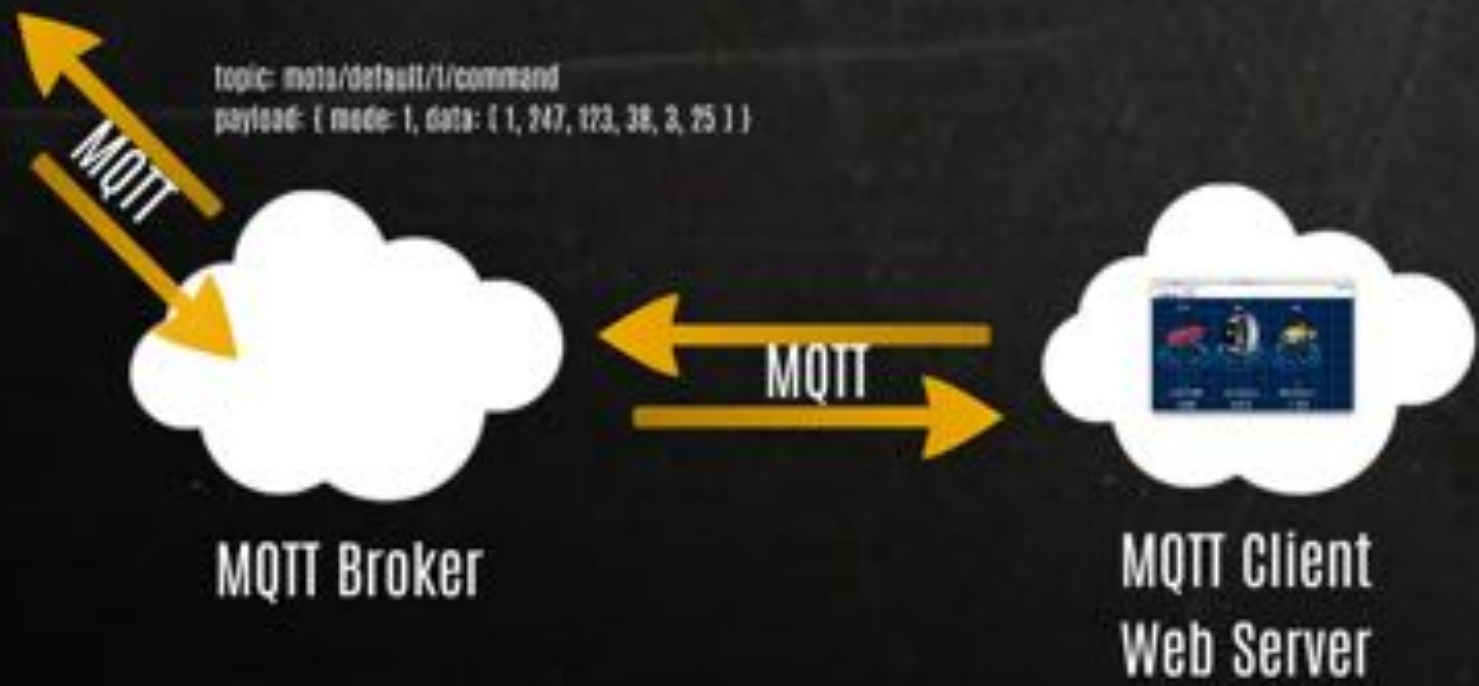


ANDROID GATEWAY

android
code

Service

topic: meta/default/1/command
payload: { mode: 1, data: [1, 247, 123, 38, 3, 25] }



MQTT Broker

MQTT Client
Web Server



send out BLE intents

BLEService

listen for BLE intents

MQTTService

listen for MQTT intents

send out MQTT intents





Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
0	e.g. 128	e.g. 255	e.g. 0	e.g. 1	e.g. 0	e.g. 1
Normal	Red	Green	Blue	Motor on/off	Motor direction 1 = <u>clockwise</u>	Motor Speed (high/low)



byte-based protocol



Q & A

@hansamann

