

Connected Products — Medtech by Example

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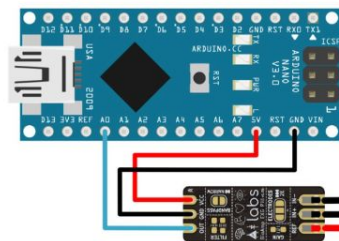


ECG

ELECTROCARDIOGRAPHY

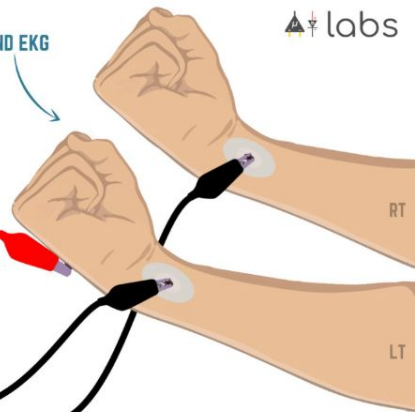
WITH

BIOAMP EXG PILL



HAND EKG

upside-down labs



v 1.0b

Checkout [the Supportive Technology project update](#) for information about ECG filtering and heart-beat detection, and more on ECG recording, with BioAmp EXG Pill.



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USD



SECURED PAYMENT



1-YEAR WARRANTY



30 DAYS RETURN



FAST DELIVERY



Strap-free Heart Rate Monitor for Sports

★★★★☆ 41 reviews | 🗨️ 11 questions

\$76.99 USD

Quantity

ADD TO CART

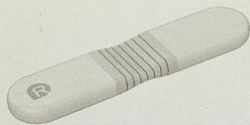
[Product Details](#)

- Specially designed for **sports**.
- Tracks and records **real-time Heart Rate**. Note: The data are for reference only and not for any medical use.
- The **device reminds you of vibration** to get your target heart rate.
- Continuous **Heart Rate tracking for up to 24**

Wellue® | Viatom®
Powered by Viatom Technology

VisualBeat™ Heart Rate Monitor

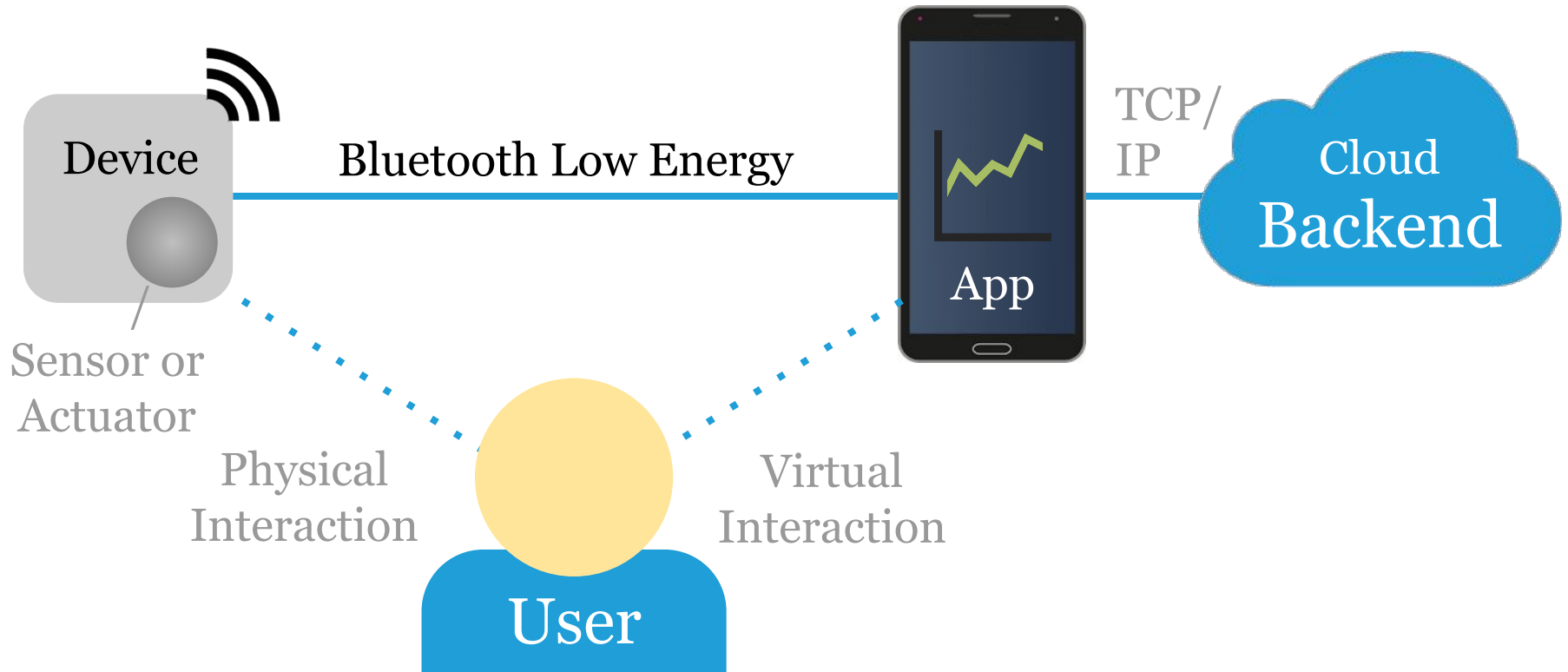
Model ER1



User Manual (EN)
Benutzerhandbuch (DE)
Manuale d'uso (IT)
Manual de usuario (ES)
Manuel de l'utilisateur (FR)



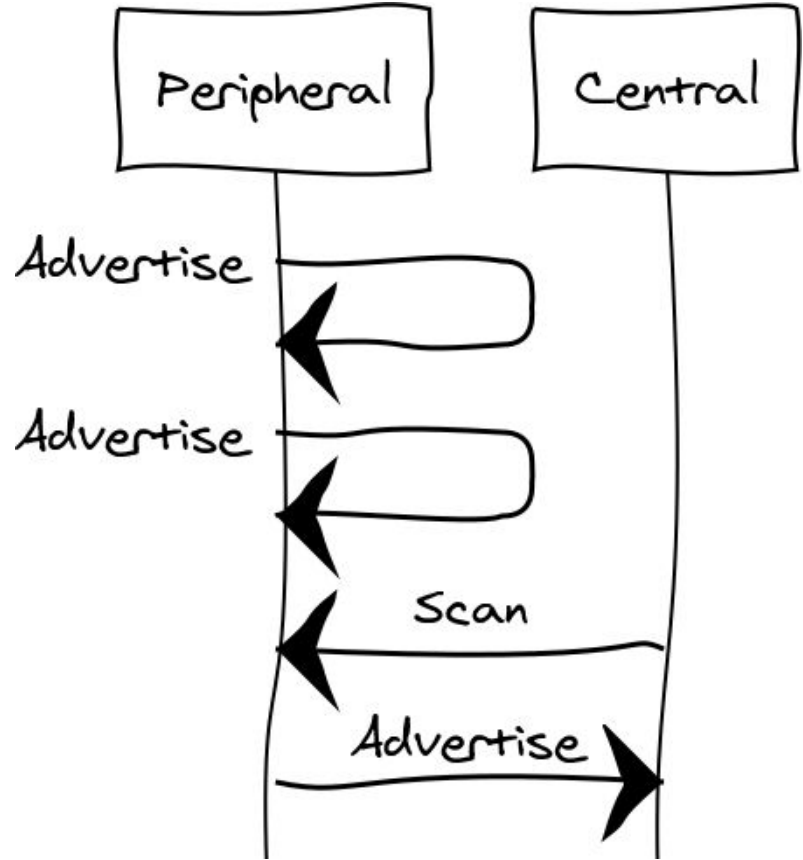
BLE reference model



BLE scan

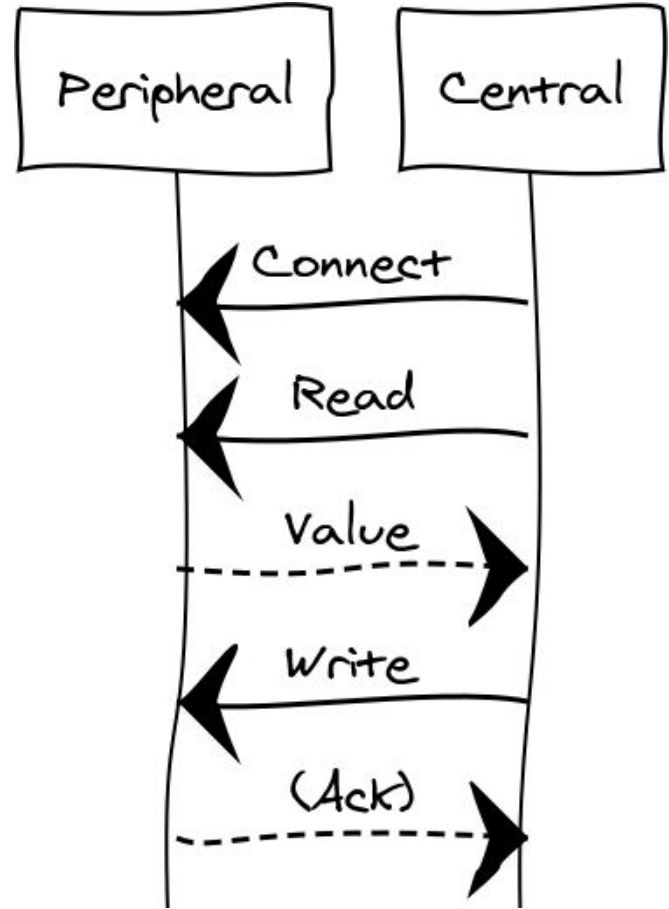
A peripheral *advertises* its BLE services by broadcast.

A central *scans* for services and gets device addresses.



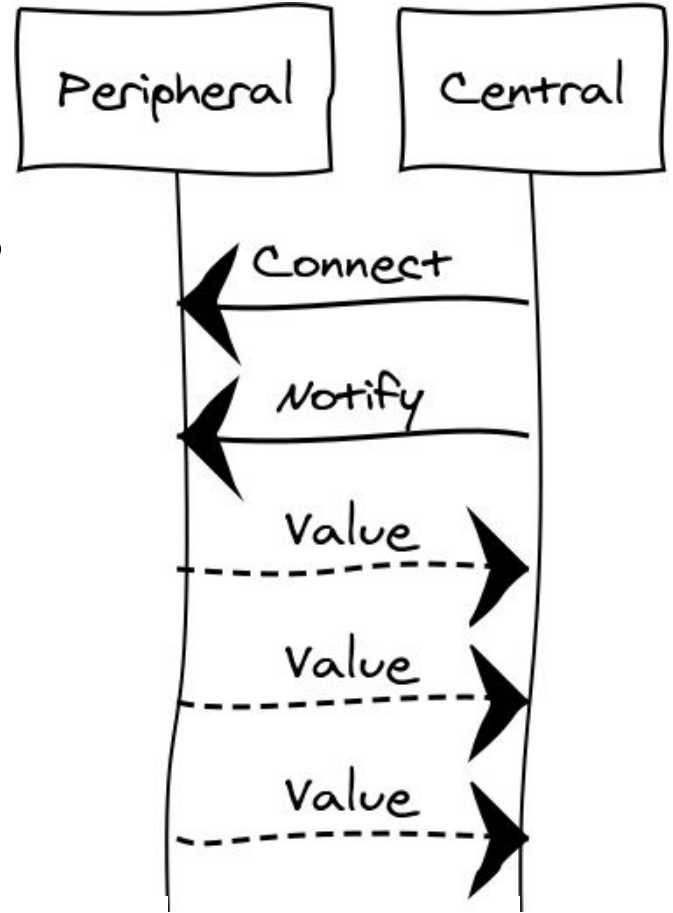
BLE read and write

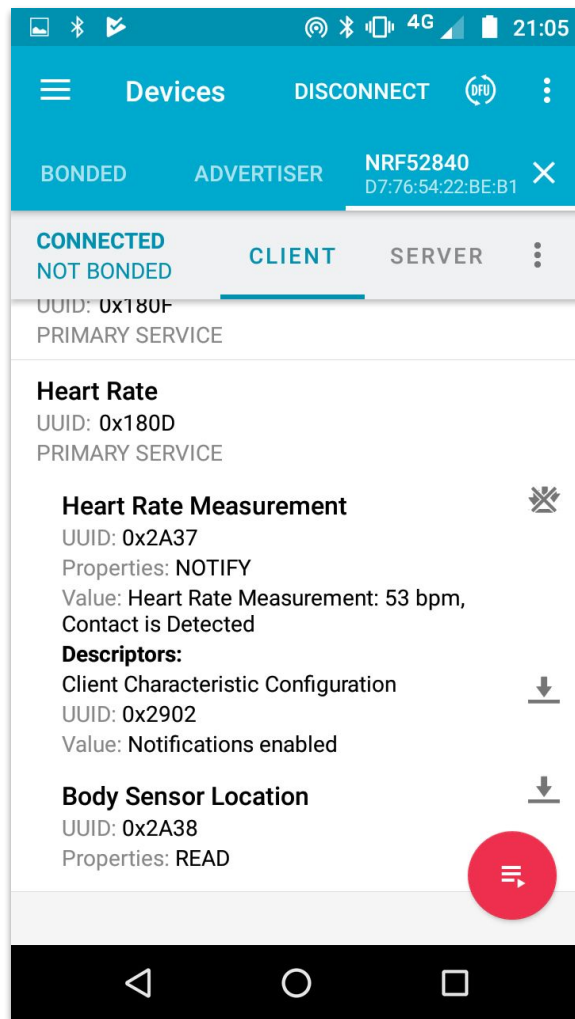
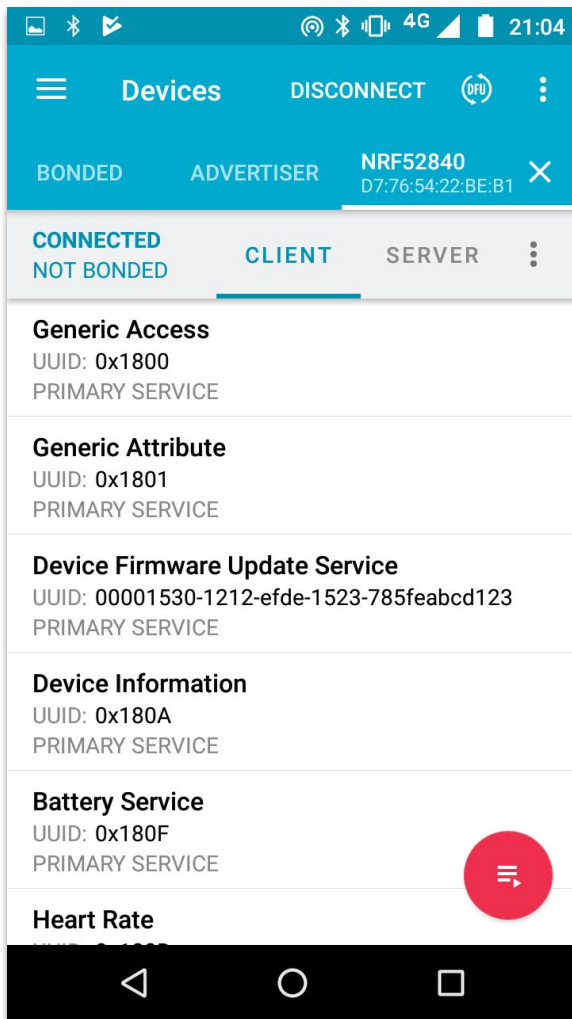
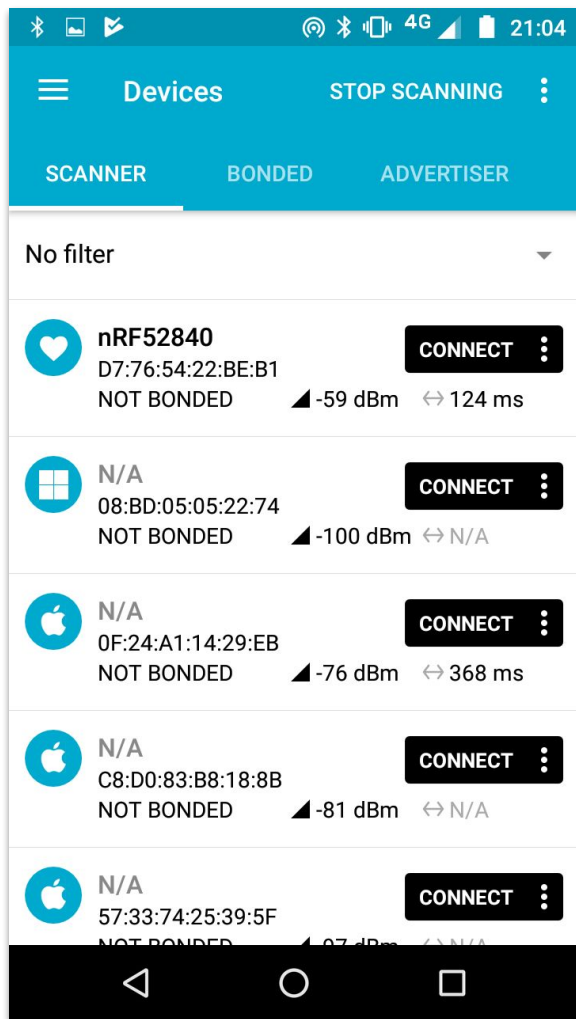
A central *connects* to a peripheral using its BLE address, then *reads* or *writes* a characteristic value.



BLE notifications

A central *connects* to a peripheral, then asks to be *notified*, to get a feed of characteristic values.





BLE heart rate service

This service is intended for fitness heart rate sensors:

Heart Rate Service UUID (16-bit): 0x**180D**

This service includes the following characteristics:

Heart Rate Measurement UUID: 0x**2A37** [N]

Body Sensor Location UUID: 0x**2A38** [R]

Heart Rate Control Point UUID: 0x**2A39** [W]

It's a standard service, defined by Bluetooth SIG.

BLE heart rate service in Arduino C

```
hrmSvc = BLEService(0x180D); // See HRM spec
hrmChr = BLECharacteristic(0x2A37); // UUIDs

hrmSvc.begin(); // to add characteristics
hrmChr.setProperties(CHR_PROPS_NOTIFY); ...
hrmChr.begin(); // adds characteristic

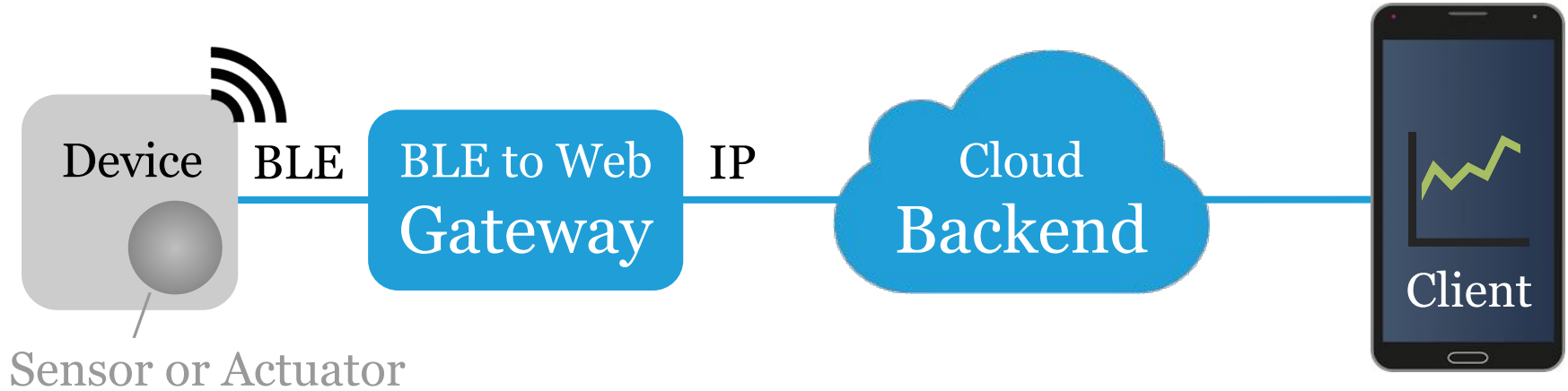
uint8_t hrmData[2] = { 0b00000110, value };
hrmChr.notify(hrmData, sizeof(hrmData));
```

Here's the [full example](#).



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BLE to Web gateway



A gateway connects devices in the local network to a backend, where their data is accessible from the Web.

Remote BLE scan from Web client

Device \leftarrow Gateway (BLE Scan) \leftarrow ... \leftarrow Client (GET)

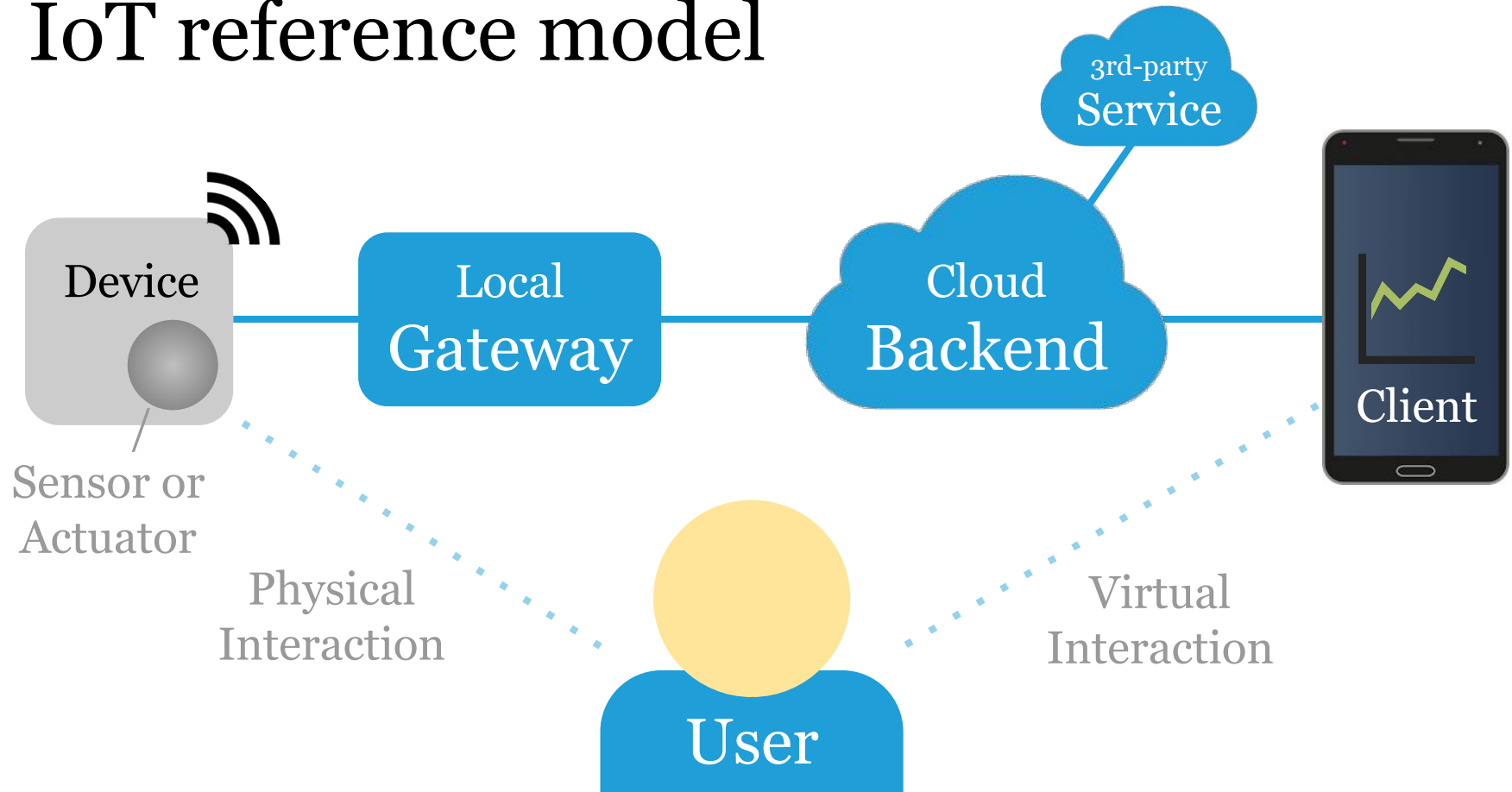
```
$ curl -v https://LOCAL_IP/devices?uuid=...
{
  "devices": [
    {"bt_addr": "2c-41-a1-14-2e-b1"},
    {"bt_addr": "d7-76-54-22-b4-b1"}
  ]
}
```

Remote BLE read from Web client

Device ← Gateway (BLE Read) ← ... ← Client (GET)

```
$ curl -v https://LOCAL_IP/devices\  
/d7-76-54-22-b4-b1/0x180d/0x2a37/value  
{  
  "value": 180  
}
```

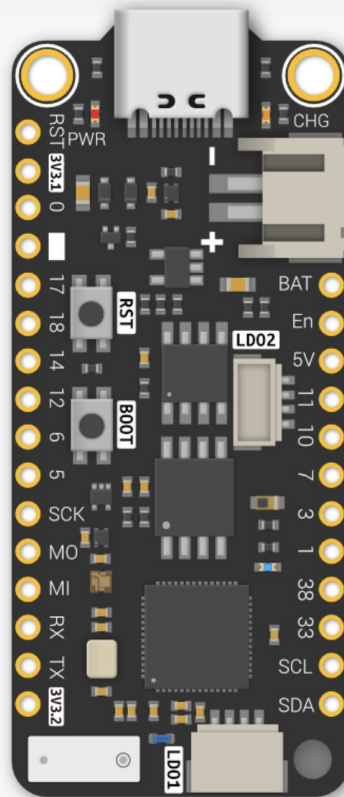
IoT reference model



Features & Specifications

- 32Bit Dual Core 240MHz
- RISC-V ultra low power core
- 2.4GHz Wifi - 802.11b/g/n
- Bluetooth 5, BLE + Mesh
- **16MB QSPI Flash**
- 8MB Extra QSPI PSRAM
- USB-C Connector
- Reverse USB back-feed protection
- 2x 700mA 3.3V LDO Regulator
- Ultra low deep sleep current
- **2x STEMMA connectors**
- Low Power RGB LED
- VBAT voltage check and 5V presence detection
- LiPo Battery Charging
- Power (red), Charge (orange) LEDs
- 21x GPIO broken out
- USB Serial JTAG
- 3D High Gain Antenna
- Compatible with FeatherWings

ESP32-S3



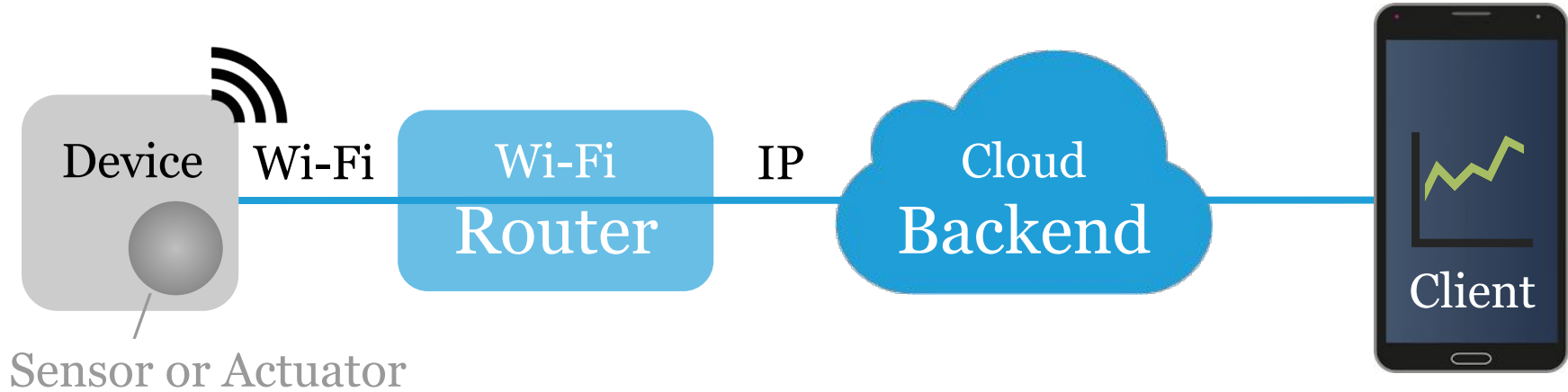
Wi-Fi setup in Arduino C

```
#include <WiFi.h> // or similar

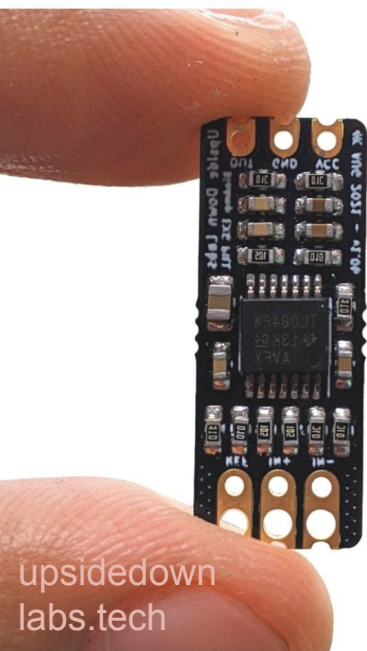
void setup() {
    Serial.begin(115200); // for debug output
    WiFi.begin("MY_SSID", "MY_PASSWORD");
    while (WiFi.status() != WL_CONNECTED) {
        delay(500);
    }
    Serial.println(WiFi.localIP());
}
```

Here's the [full example](#).

IoT device



An IoT device with Wi-Fi can send data to a backend.
The Wi-Fi router acts as a transparent local gateway.



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