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IoT internship

The project's applicability, implementation & potentials *ft. personal commentary*

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- Project structure
  - Arduino - Firmware
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  - PC - Cross-platform GUI App
- Questions, discussion

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Use cases - providing context

Use cases - providing context

Outdoors - Local weather measurements and forecast

- You need your own measurements:
  - There are no well-known measurements nearby
  - You don’t trust the lizard people’s fake news
  - Maybe your surroundings are a pocket of different data

Use cases - providing context

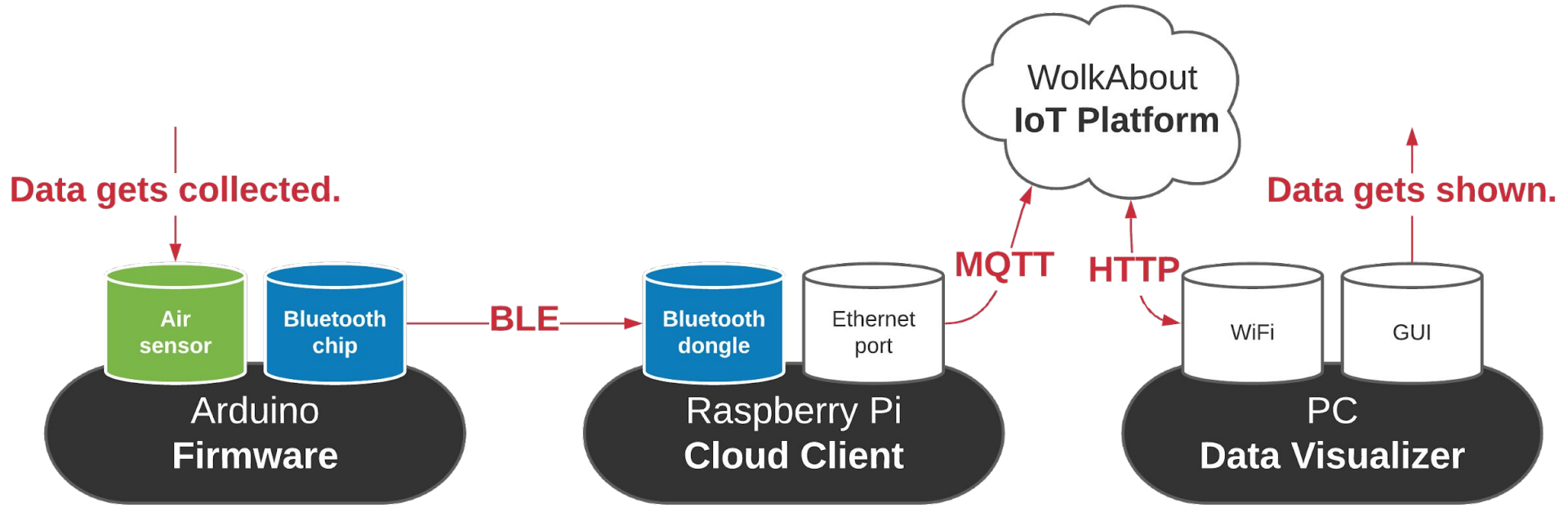
Indoors - Monitoring and regulating a microclimate

- Maybe you’re dealing with delicate processes:
  - Storing food, volatile substances, or otherwise sensitive materials
    - There is a VOC detector onboard!
  - Fermentation, dry aging, smoking, baking or other cooking processes
  - Growing sensitive crops, regulating their atmosphere
  - Scientific experiments, testing gas properties

Project structure

Project structure

Three distinct pieces of software - and how they are tied together



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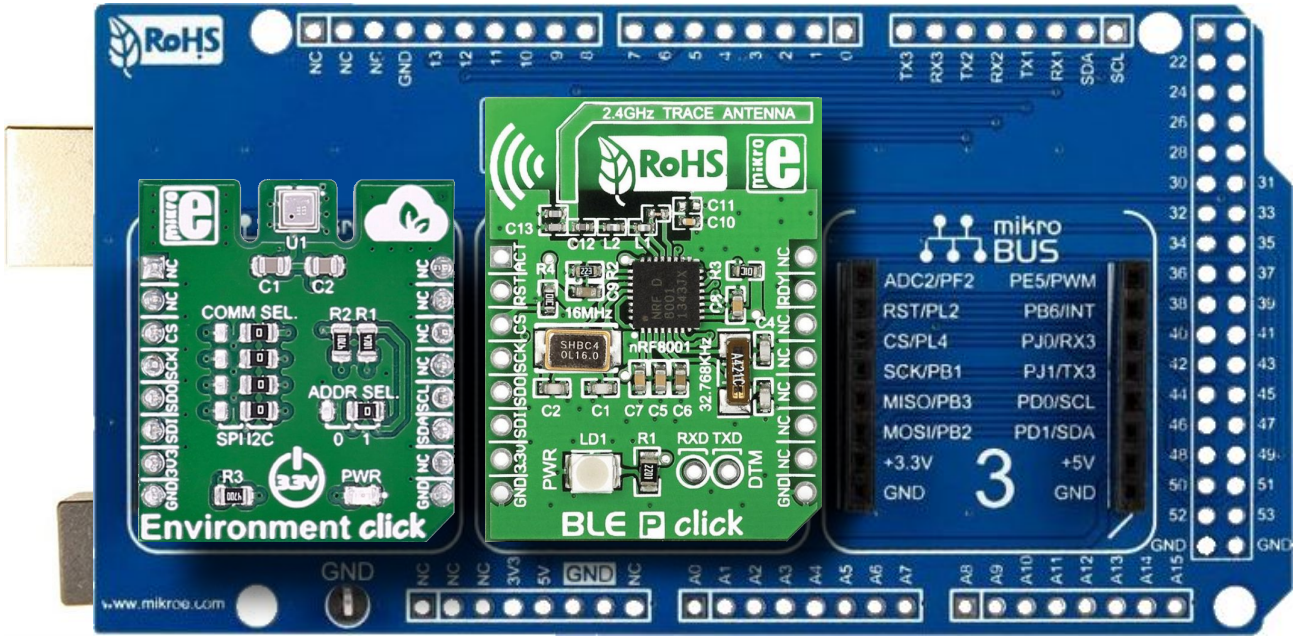
Arduino - Firmware

Arduino - the hardware

Key hardware components

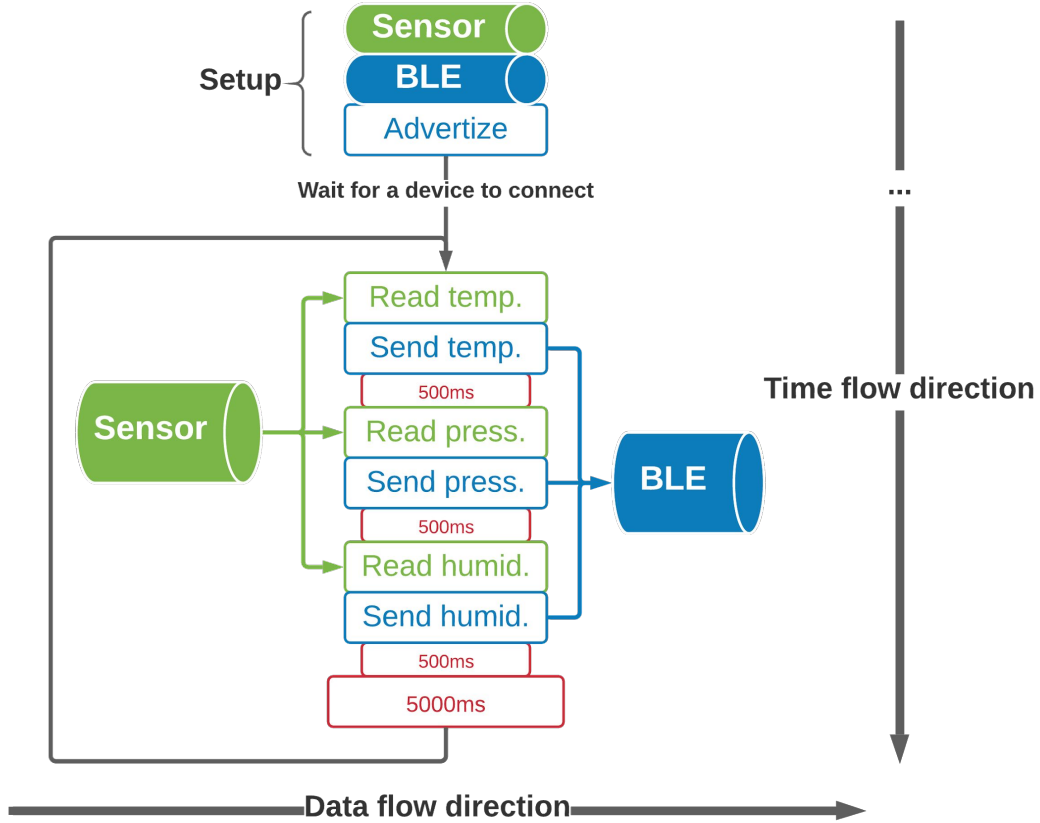


- Arduino Board
- Click Shield
- Environment Click
- BLE Click

Arduino - the tools utilized

- Access: From PC via Serial connection
- Working environment: Arduino IDE
- Programming language: C++
- Libraries:
  - Adafruit - **BME680 library**
  - Sandeep Mistry - **BLEPeripheral library**

Arduino - the algorithm



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Arduino - future

Which features could be added or improved upon

- Make it possible for other types of clicks to collect data
- Add LEDs which indicate current state of device
- Add LCDs to print out the data
- Advertize itself more clearly and descriptively
- Add physical switches for different units of measurements

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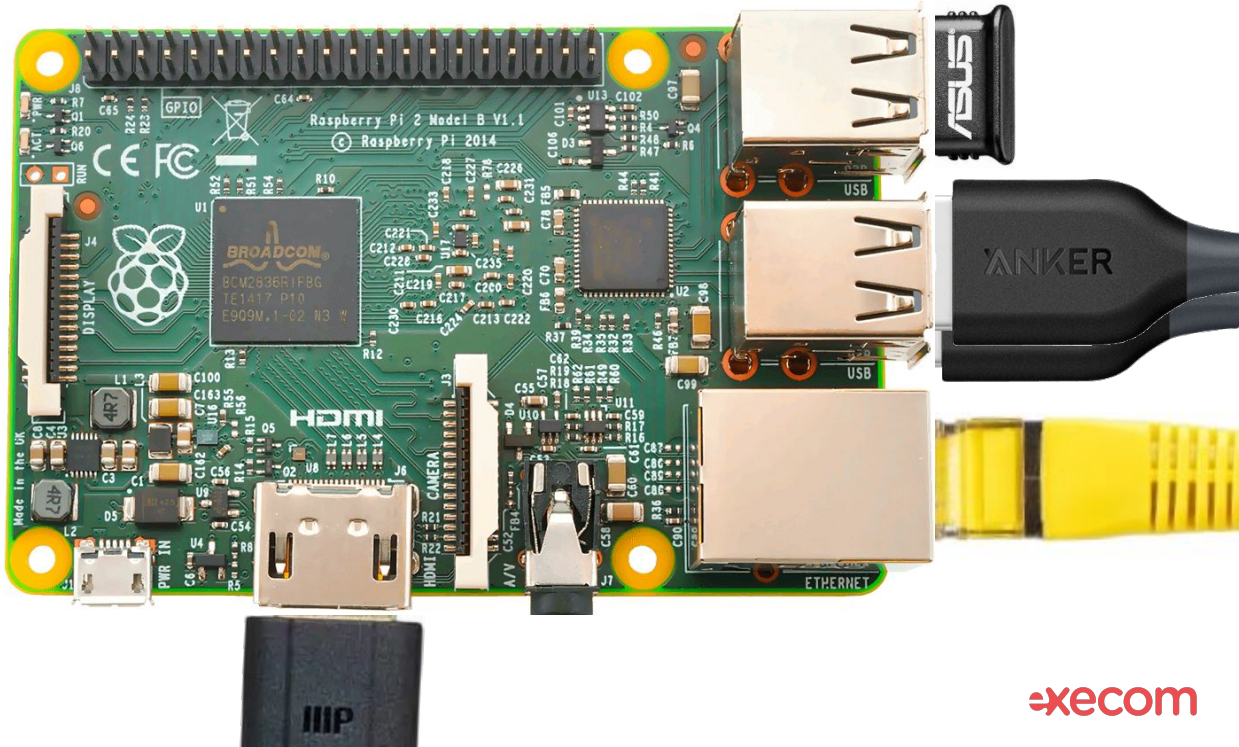
Raspberry Pi - Cloud Client

Raspberry Pi - the hardware

Key hardware components

- Raspberry Pi 2
- BLE Dongle
- Ethernet Cable
- Peripherals



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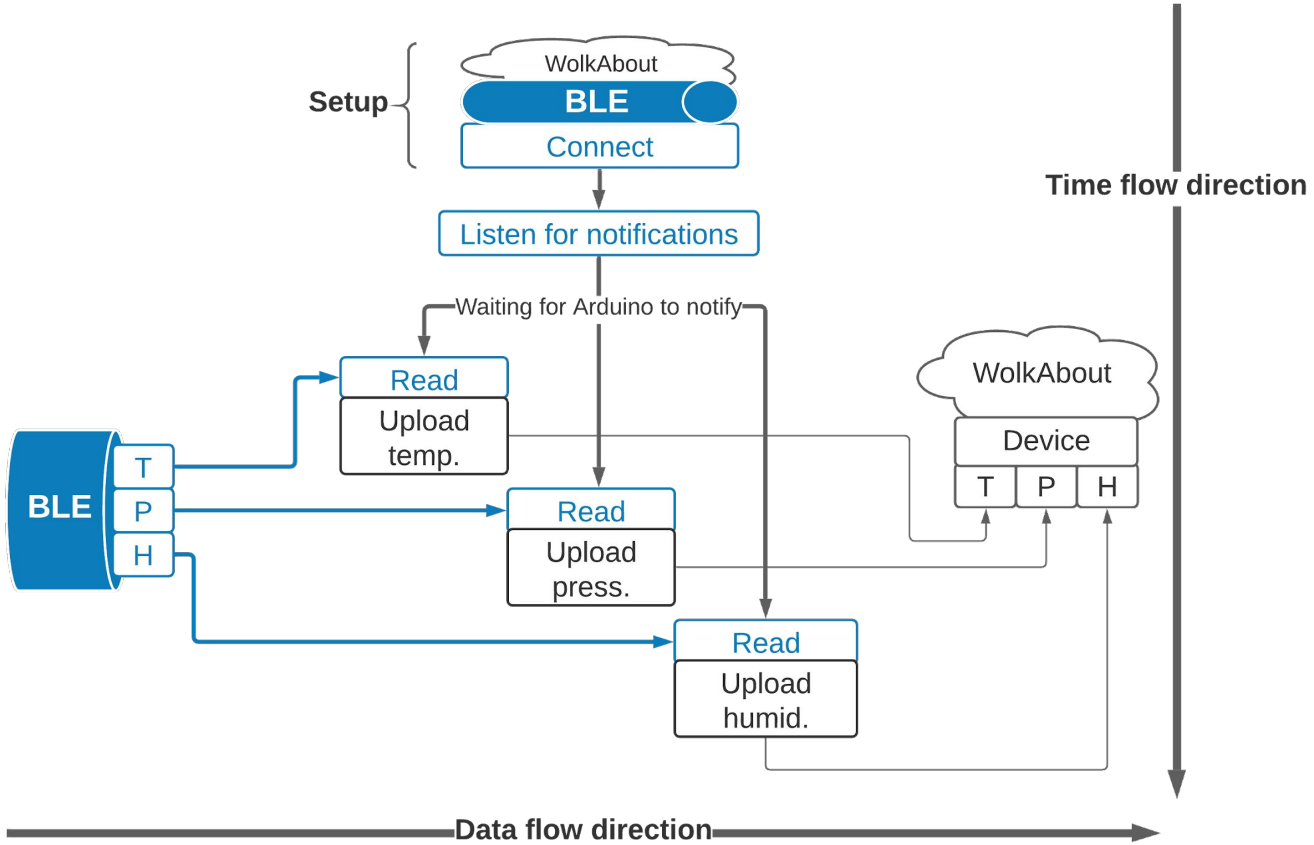
Raspberry Pi - the software

Tools utilized & algorithm in broad strokes

- Access: Linux - Raspberry Pi OS (formerly Raspbian)
  “Headless”, from PC via SSH
- Working environment: Geany IDE
- Programming language: C++
- Libraries:
  - Psychogenic - **Gattlibpp**
  - WolkAbout - **WolkConnect C++**

Raspberry Pi - the algorithm



Raspberry Pi - future

Which features could be added or improved upon

- Access multiple devices (although not at once) and juggle all of them
- Figure out the inconsistencies and random bugs with BLE
- Expand from T, P, H into other types of data
- Figure out type of data received on the spot, from a previously unconnected device
- Connect to multiple Wolk virtual devices and juggle all of them

PC - GUI App

PC - Hardware

Key hardware components

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GUI App - the software

Tools utilized

- Access: Windows 10
- Working environment: Qt Creator
- Programming language: C++
- Libraries:
  - Qt Company - **Qt**
  - cURL Project - **libcurl**

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GUI App - the software

Qt's strength - Expanding on the hardware

- Qt offers the ability to build projects for all major platforms
  - Windows PC
  - Linux PC
  - Android
  - iOS
- Vastly broadens the target market with little additions

End user - Hardware

All major platforms

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Qt App - the algorithm

It’s best to just see it in action during the demo.

End user platform - future

Which features could be added or improved upon

- Build for all other major platforms, especially mobile ones
- Add charts
- Save charted data to files
- Other types of data
- Looking at multiple devices simultaneously
- Separating each device with its data into own GUI unit
- Add warnings/alarms for too high or too low values
    - Add additional intervals (apart from too low, ok, too high) for complexity
- Add actuators, managing them
- Being able to make and save multiple configurations (set of sensors, actuators and their mutual influences)

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Thank you!
Questions?

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