WIP Concept of a Web-Connected Smart Garden

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Agenda

- Motivation
- Requirements
- Architecture
- Power Optimization Ideas
- Outlook

Motivation

- A novice gardener lacks intuition
  - Compensate with data
- Visiting the garden often is time-consuming
- Minimize maintenance visits
- It’s a fun project

Requirements

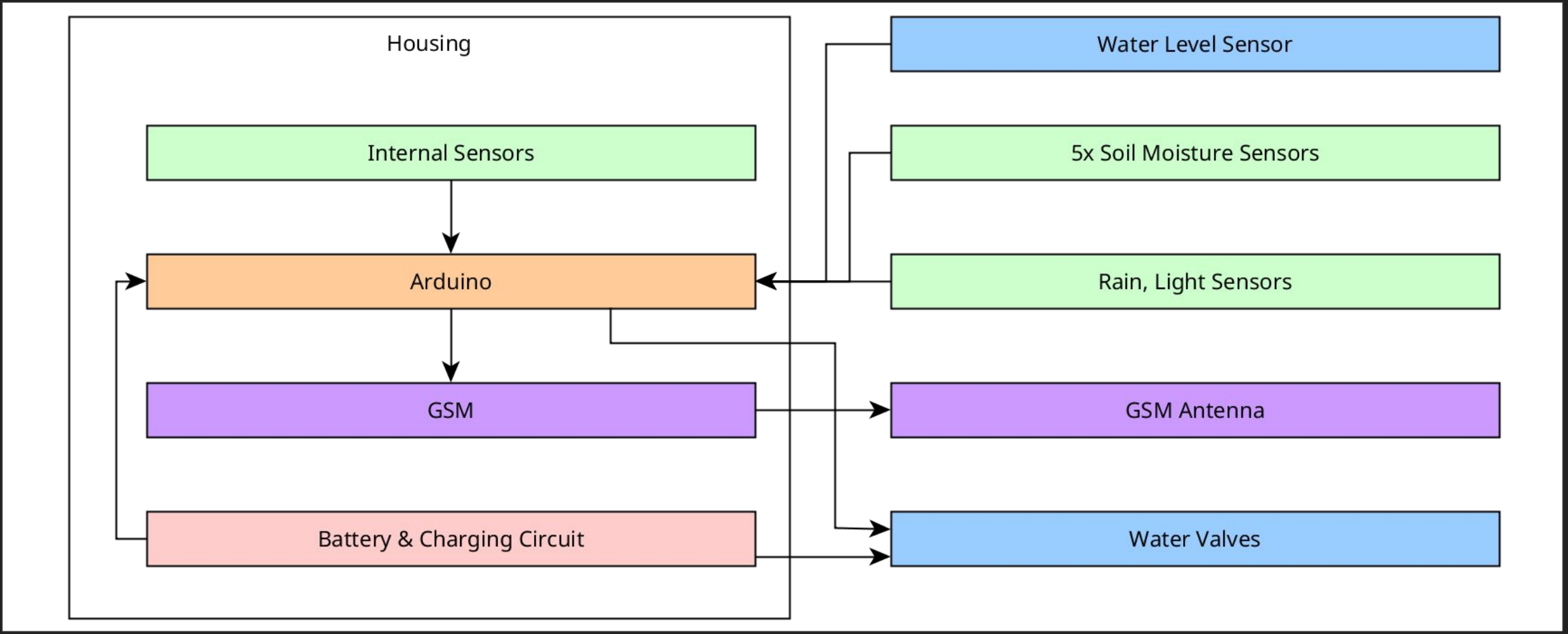
- No power available - solar-powered
- Solar-powered -> low power operation
- 27/7 monitoring of weather and soil conditions
- Possible extension to automate irrigation
- Cheap

Architecture

Hardware Components

- Arduino Mega
- GSM Module
- Sensors:
  - Thermometer
  - Rain
  - Air hygrometer
  - Multiple soil hygrometers
  - Light intensity
  - Battery charge
  - Water level
- Charging circuit
- Water valves
- Solar panel
- Battery
- Waterproof housing
- Water tank
- Hoses
- Wires and wire guards
- Prototype board
- LEDs and buttons
- Transistors or relays

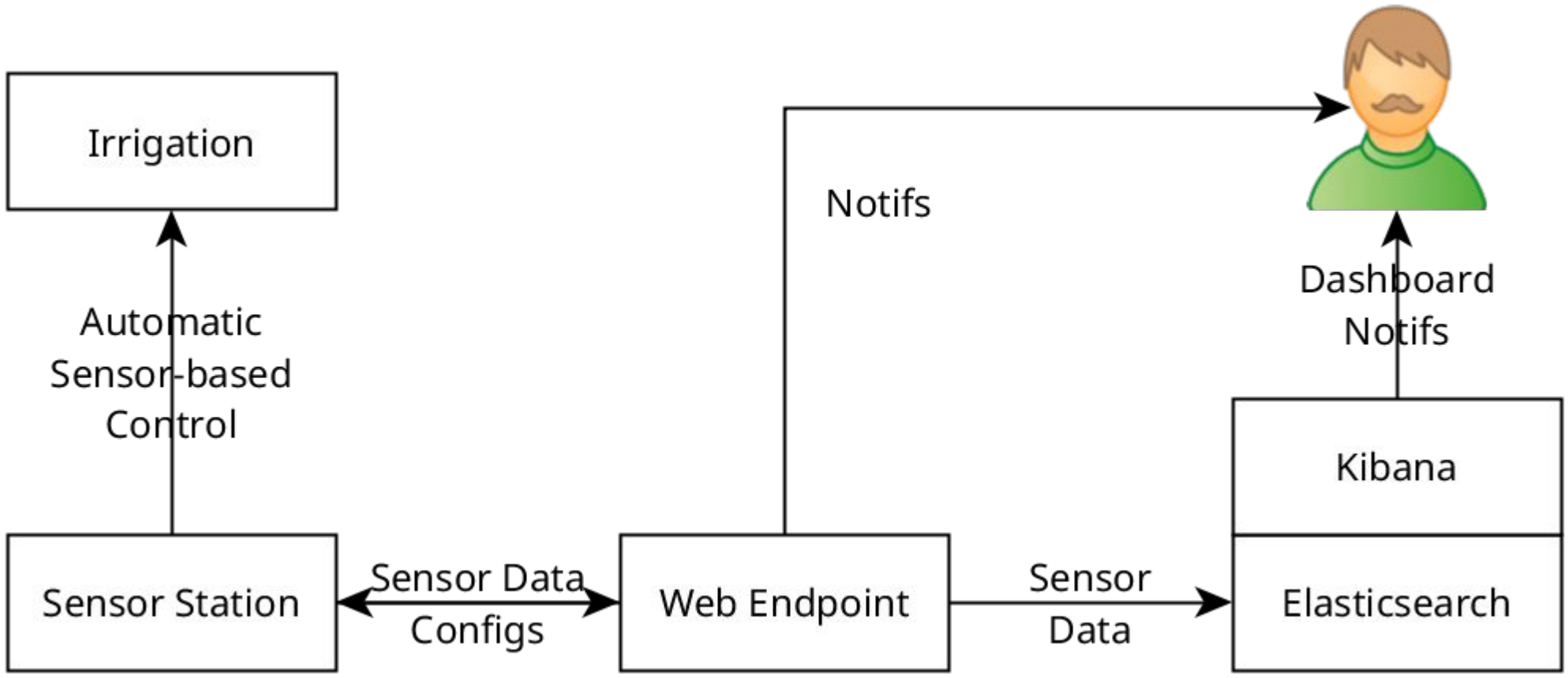
Construction Overview



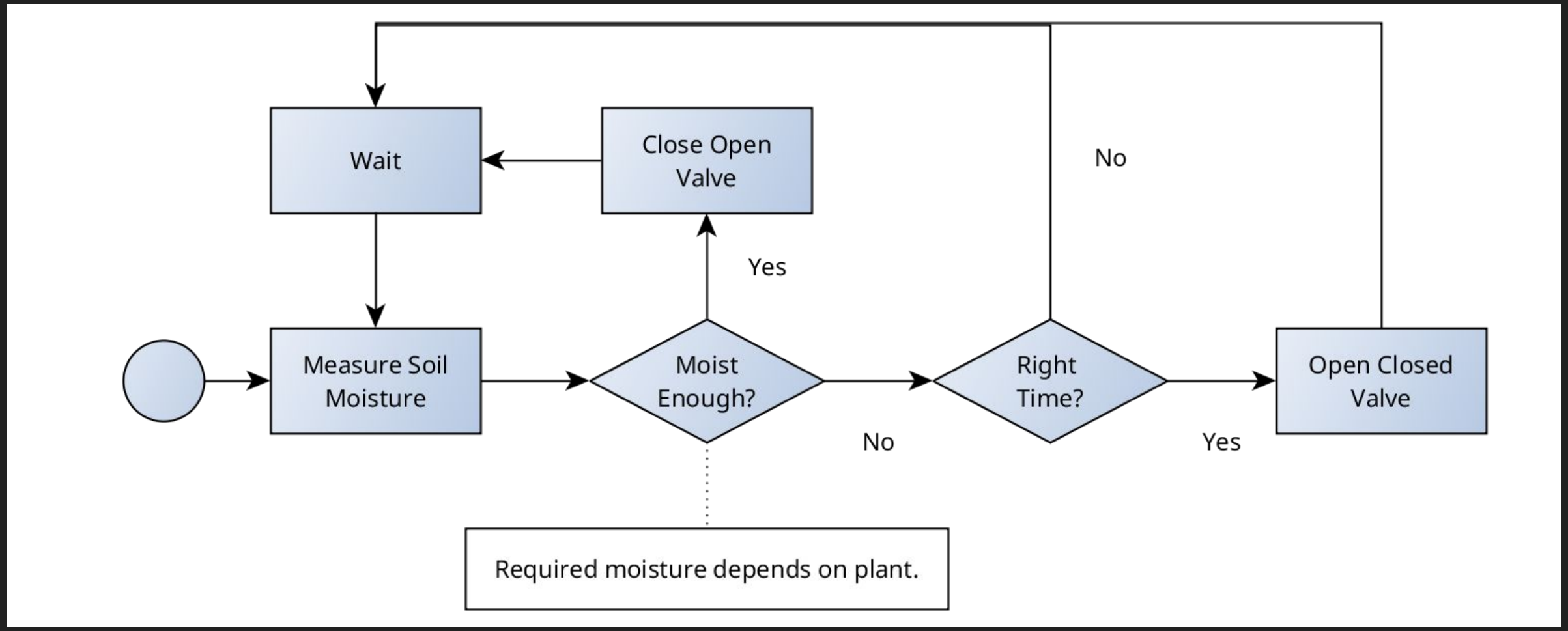
Software Components

- Arduino IDE for software development
- Fritzing for circuit design
- Elasticsearch
- Kibana
- Simple web endpoint to receive and save data

Communication



Automatic Irrigation



Power Optimization Ideas

- Adjust sensor data resolution
  - ...b-but muh data!
- Send data in bulk to reduce GSM power drain
  - ...b-but muh realtime!
- Bigger solar panels and batteries
  - Takes space away from the actual garden
- Servos to make the solar panels follow the sun
  - Requires strong motors and much power due to weight of panels

Outlook

- Stage 1 (current): Prototype, collect parts, write code
- Stage 2: Build test type to use in the wild
- Stage 3: Add automatic irrigation
- Stage 4: Webcam? Presence detection? Party mode? Seismometer? Lightning tracking microphones?

Schematics and code will be published at https://github.com/howard/smart-garden


That's all Folks!