



Keeping Your Plants Alive With An Arduino and Azure IoT

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Who am I?

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What is this talk about?

- Arduino Introduction
- What's needed to grow a plant
- Connecting to the cloud



My Plant Growing Journey



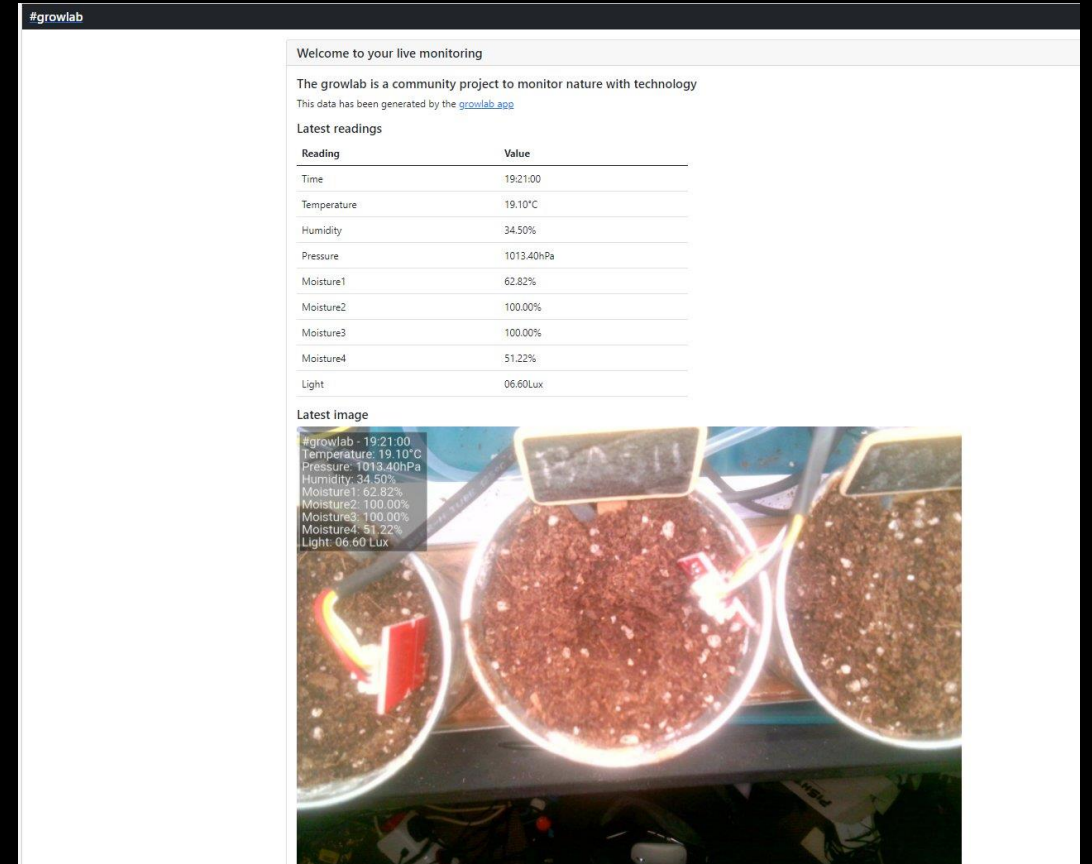
Started growing really nicely..



Started getting fancy..



<https://github.com/alexellis/growlab>



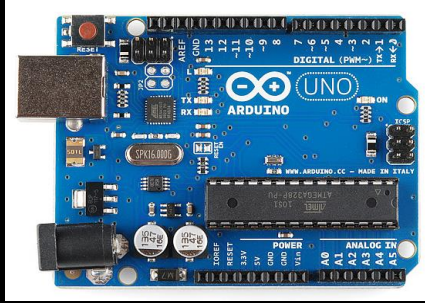
#growlab

What is an Arduino?

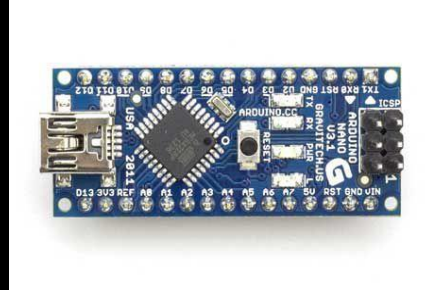
- Open-source electronics platform
- Easy to use hardware
- Easy to use software
- Standard Programming model
- **C++ like**



Arduino Devices



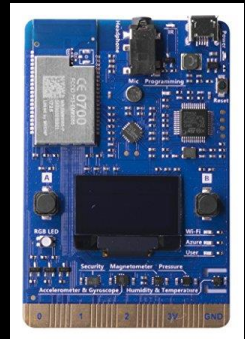
Arduino Uno



Arduino Nano



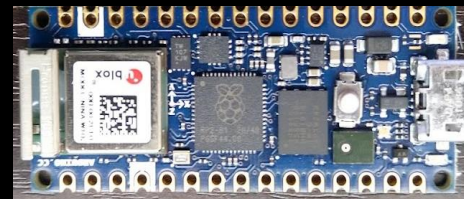
Wio Terminal



Mxchip AZ3166 Azure
Dev Kit



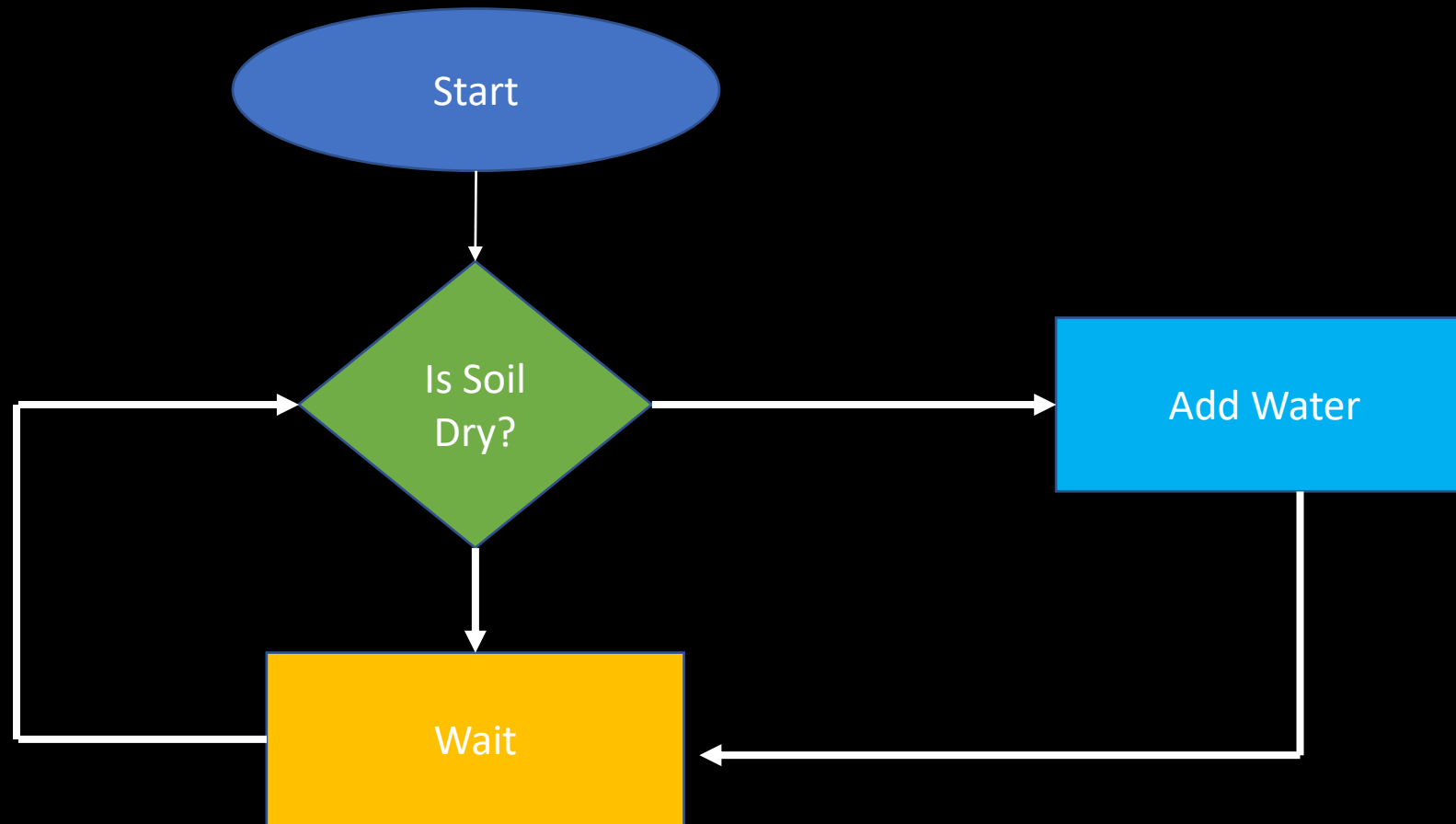
Maixduino



Arduino Pi 2040

Thousands of
different devices
and form factors!!

How do you keep your plant alive?



How can we use an Arduino for Plant Growth?

Capacitive Moisture Sensor

Dry: 520 - 430

Wet: 430 - 350

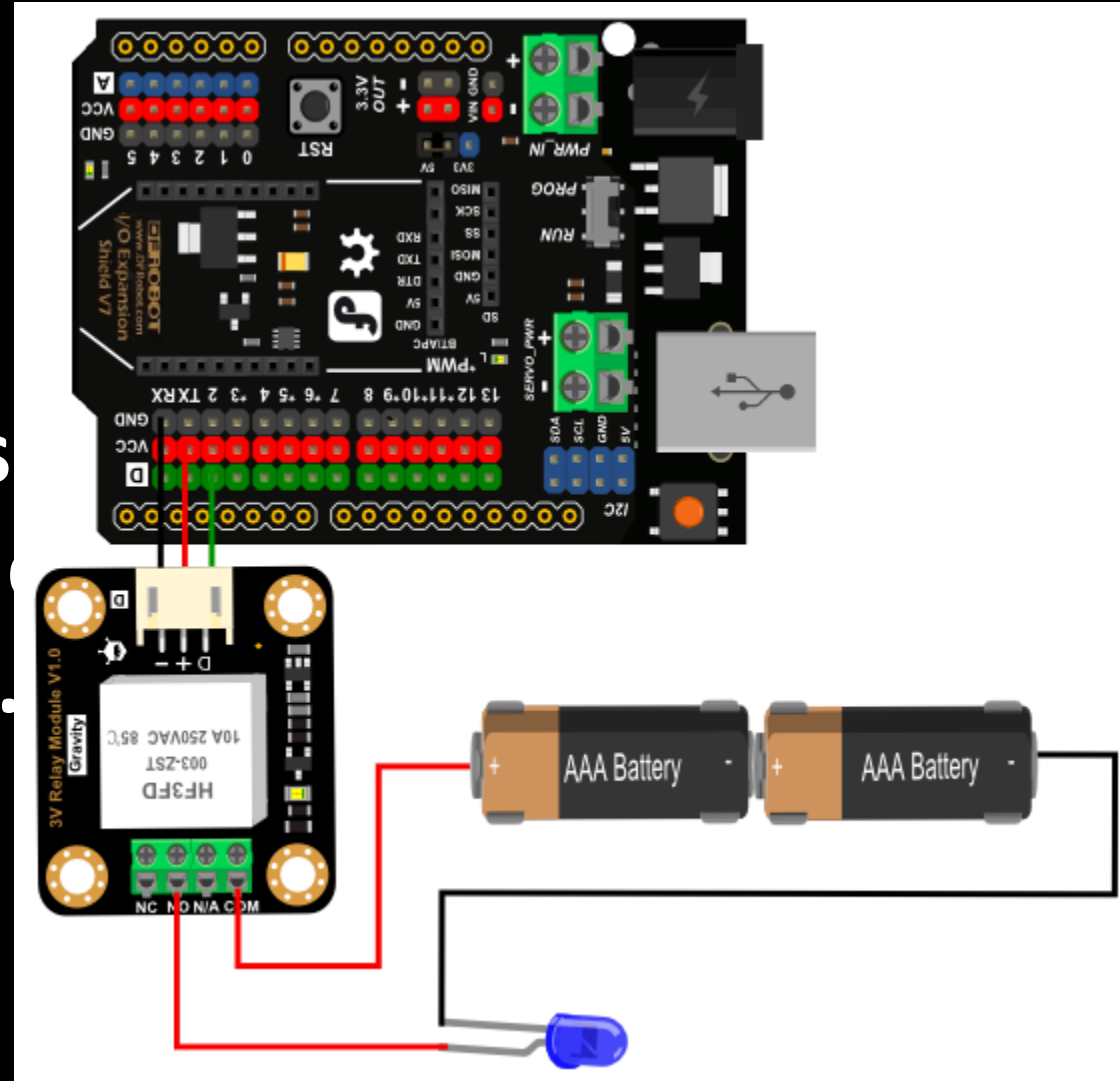
Water: 350 - 260



How can we use an Arduino for Plant Growth?

Relay

- Low voltage switches
- voltage, high
- Switches at 2.



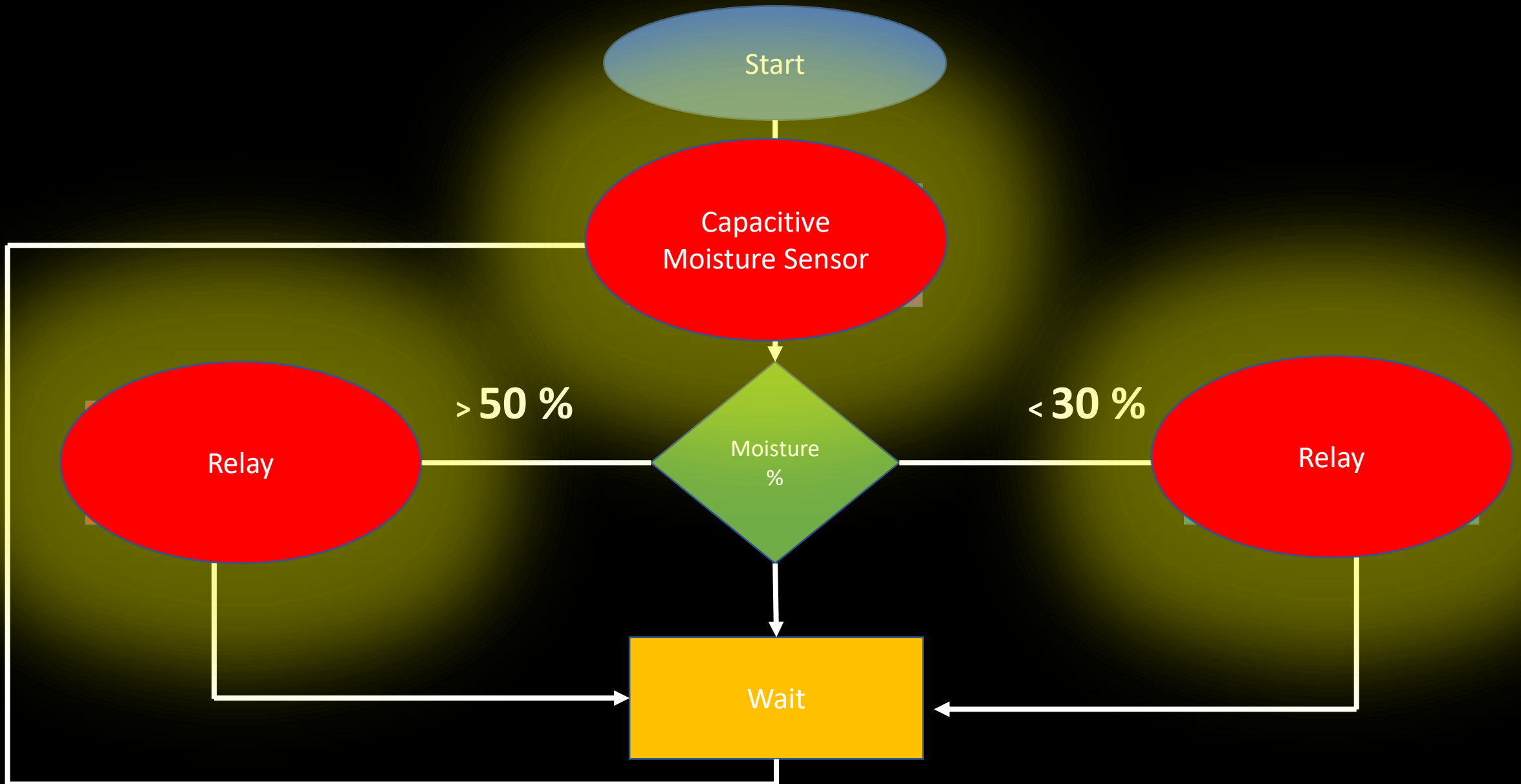
How can we use an Arduino for Plant Growth?

Peristaltic Pump

- Controls flow of water
- Doesn't have to be submerged
- Easy to connect with silicon tubing
- 12 V (with external power supply)



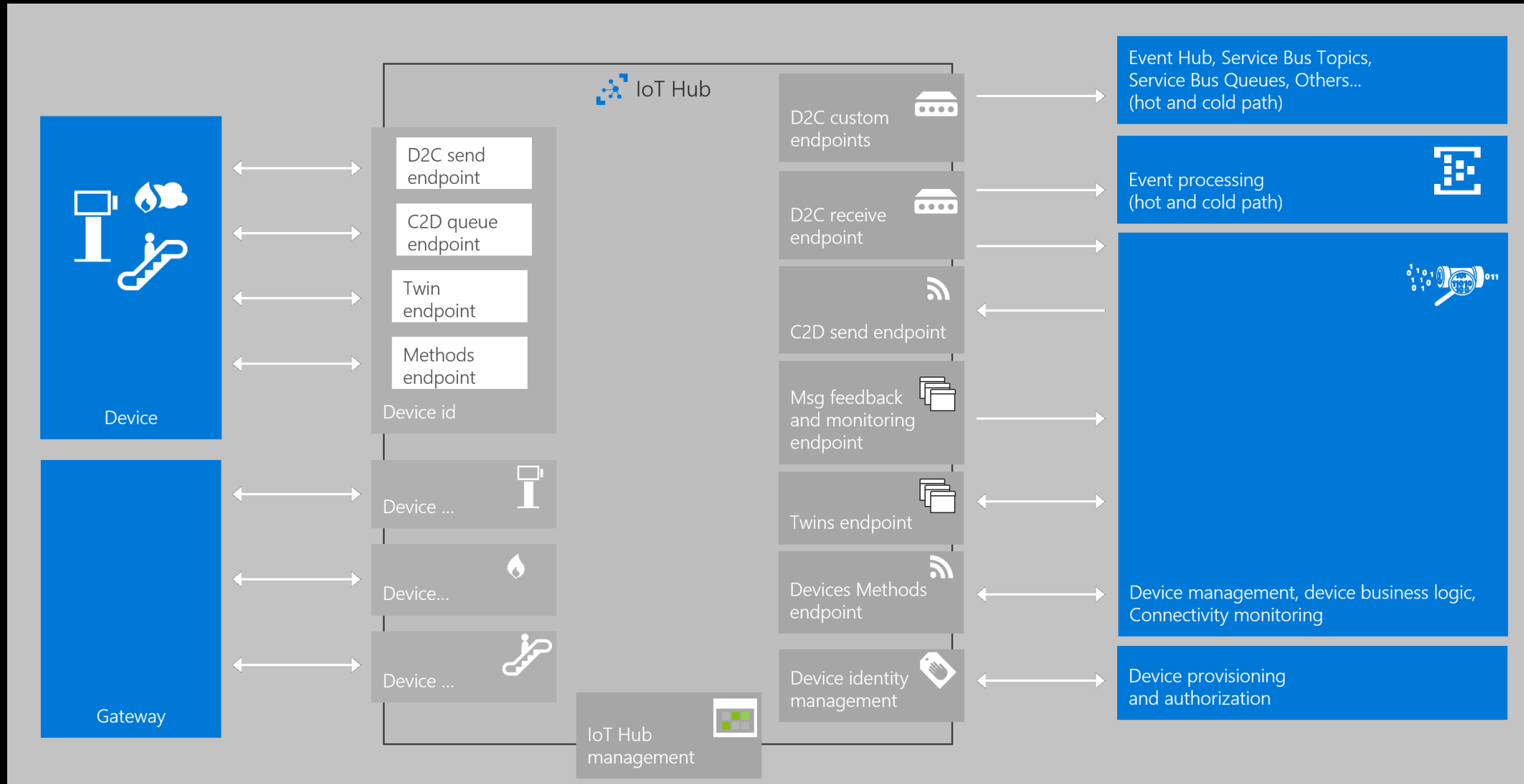
Mapping plant knowledge to electronics



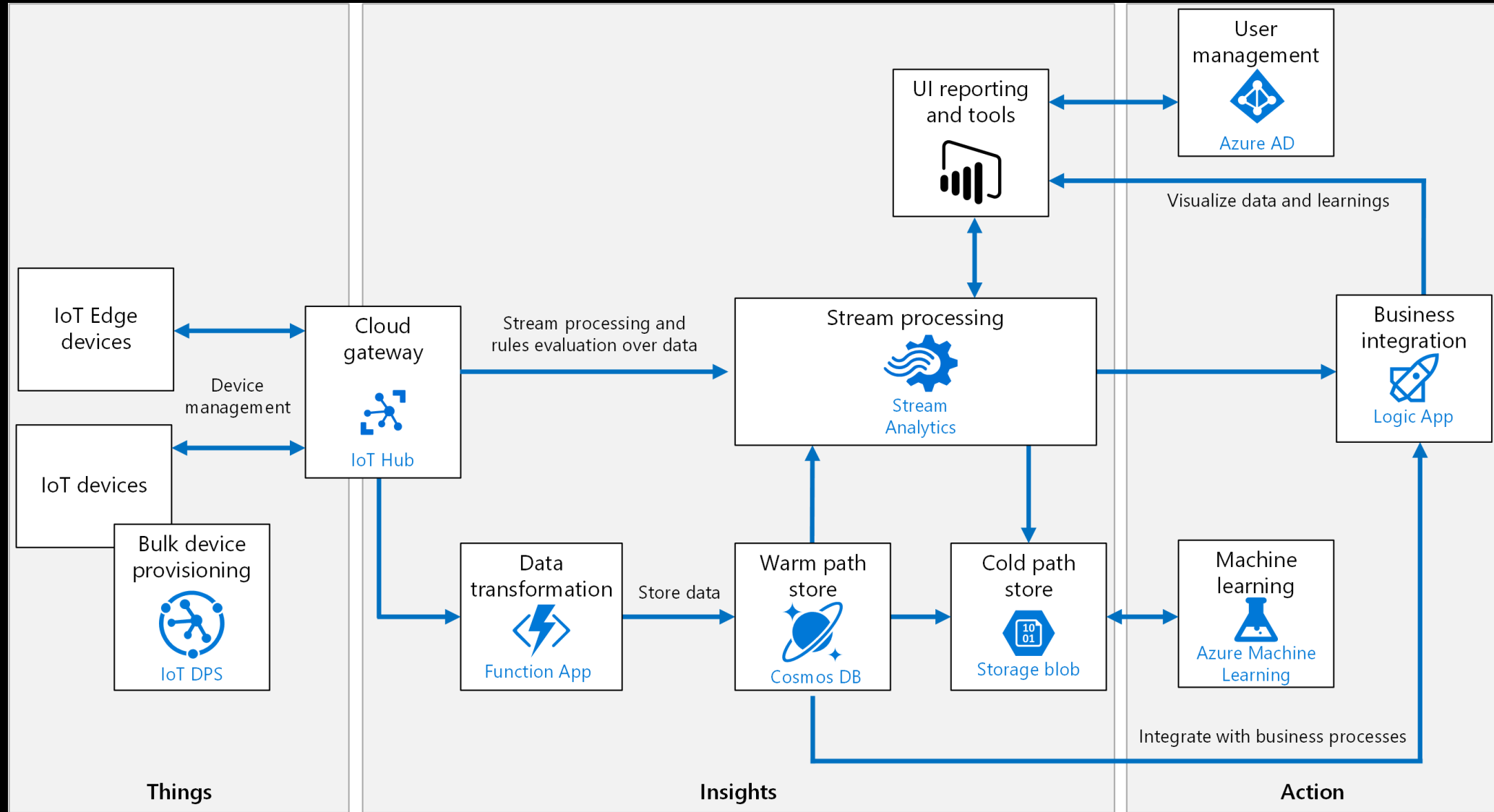
Adding the “I” in IoT - Azure IoT Hubs

- Establish bi-directional communication with billions of IoT devices**
- Work with familiar platforms and protocols (standard and custom protocols, including HTTP, Advanced Message Queuing Protocol (AMQP), and MQ Telemetry Transport (MQTT))**
- Authenticate per device for security-enhanced IoT solutions**
- Device Management**

Azure IoT Hubs



Azure IoT Reference Architecture



IoT Solutions – IoT Central



Azure IoT Central

Experience the simplicity of SaaS for IoT, with no cloud expertise required



Fast and easy

- Start in minutes and create a finished solution in hours
- Build without any cloud development expertise



Scalable and secure

- Connect your devices at any scale without worrying about infrastructure
- Get best-in-class security

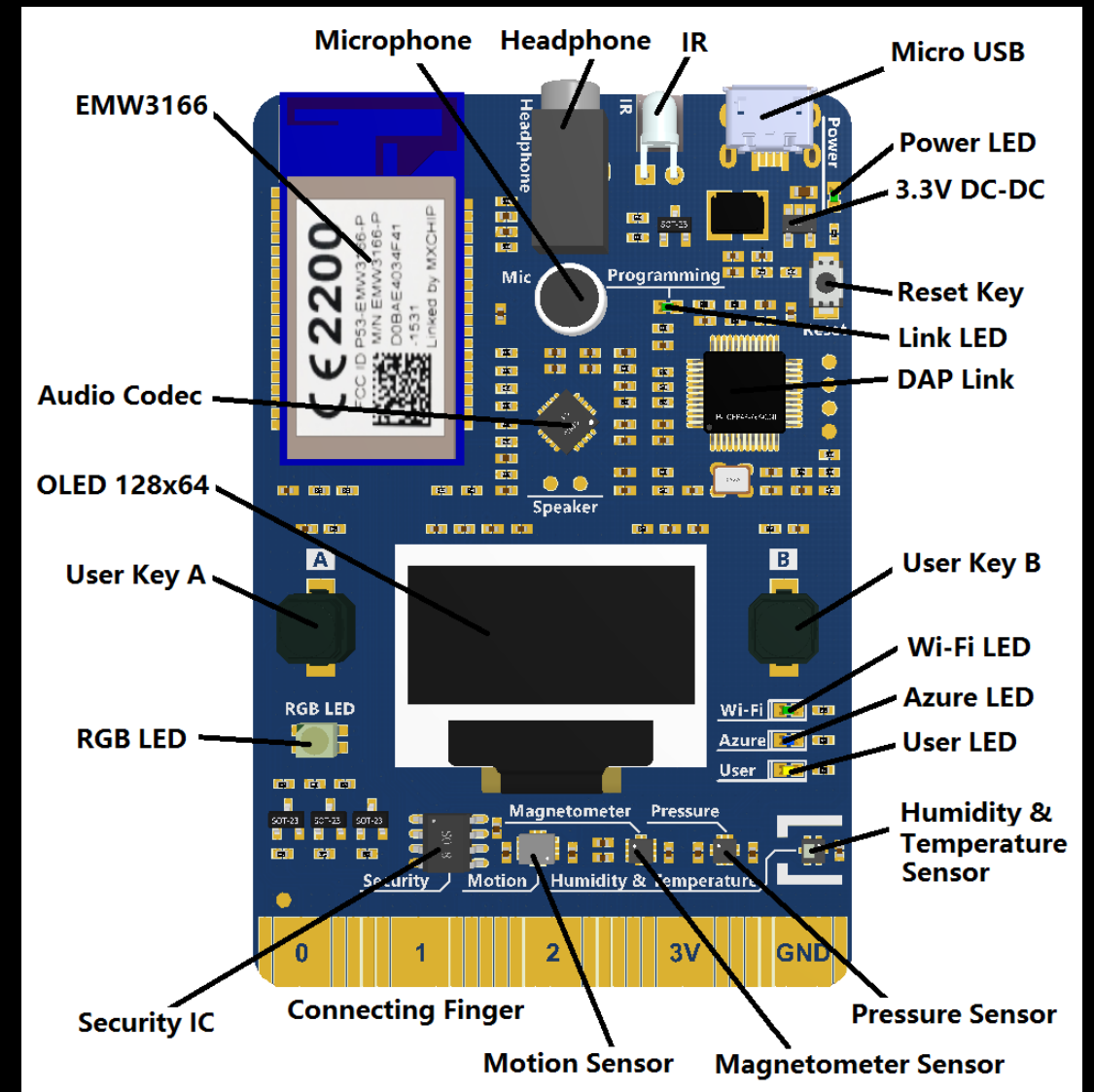


Enterprise grade

- Built on proven enterprise-grade Azure services
- Full integration into your existing business systems and processes

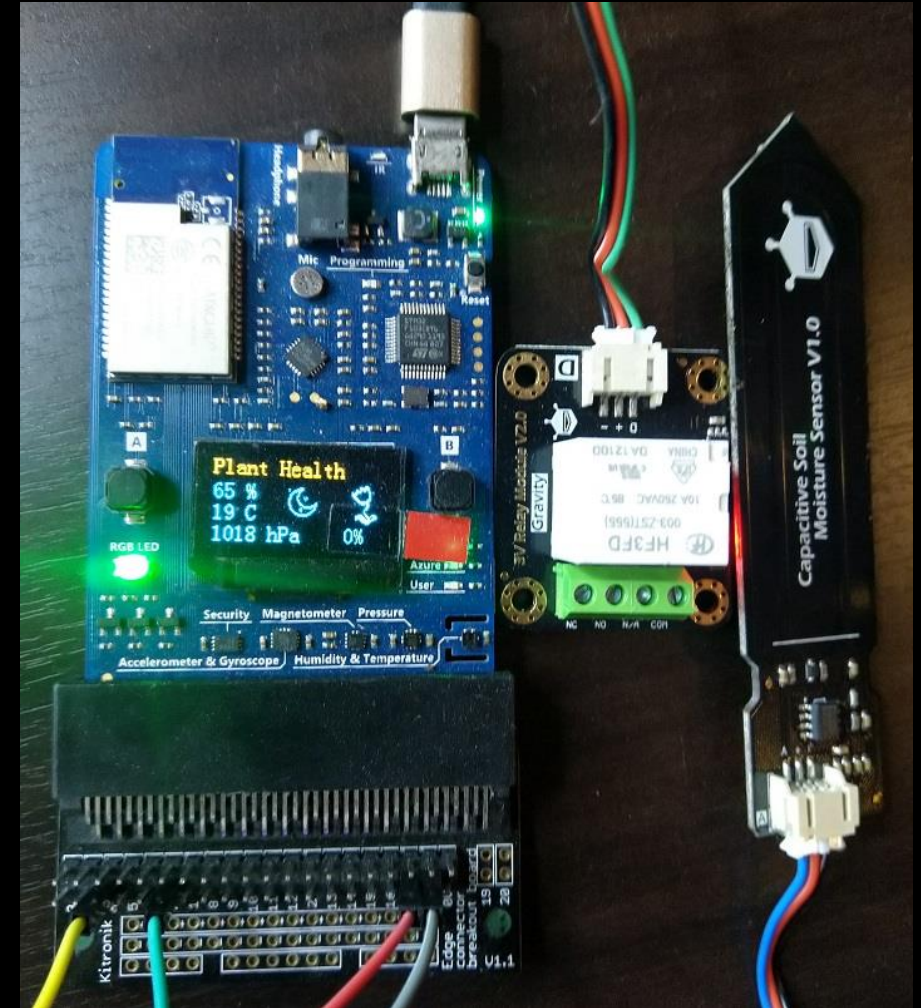
DEMO

Connecting a plant to IoT Central



AZ3166 Plant Waterer

- **Moisture Reading**
 - Analog In - Edge Connector Pin 4 -> Arduino Pin 5
- **Relay**
 - **Digital Out** - Edge Connector Pin 7 -> Arduino Pin 19 (also green LED)

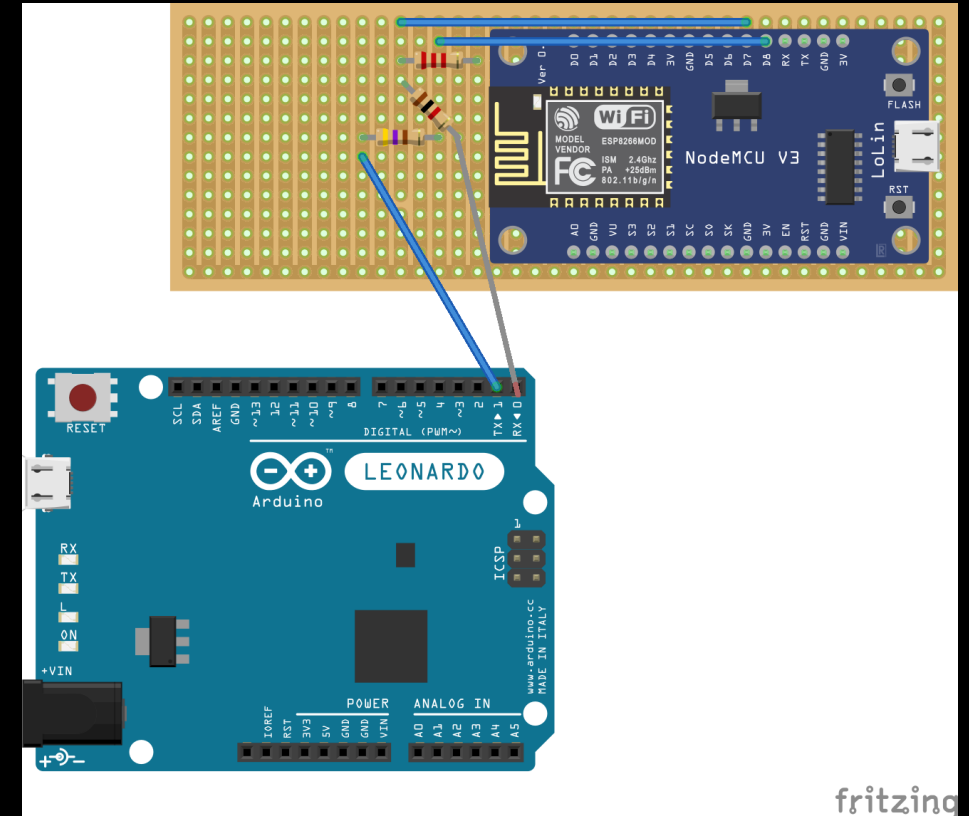
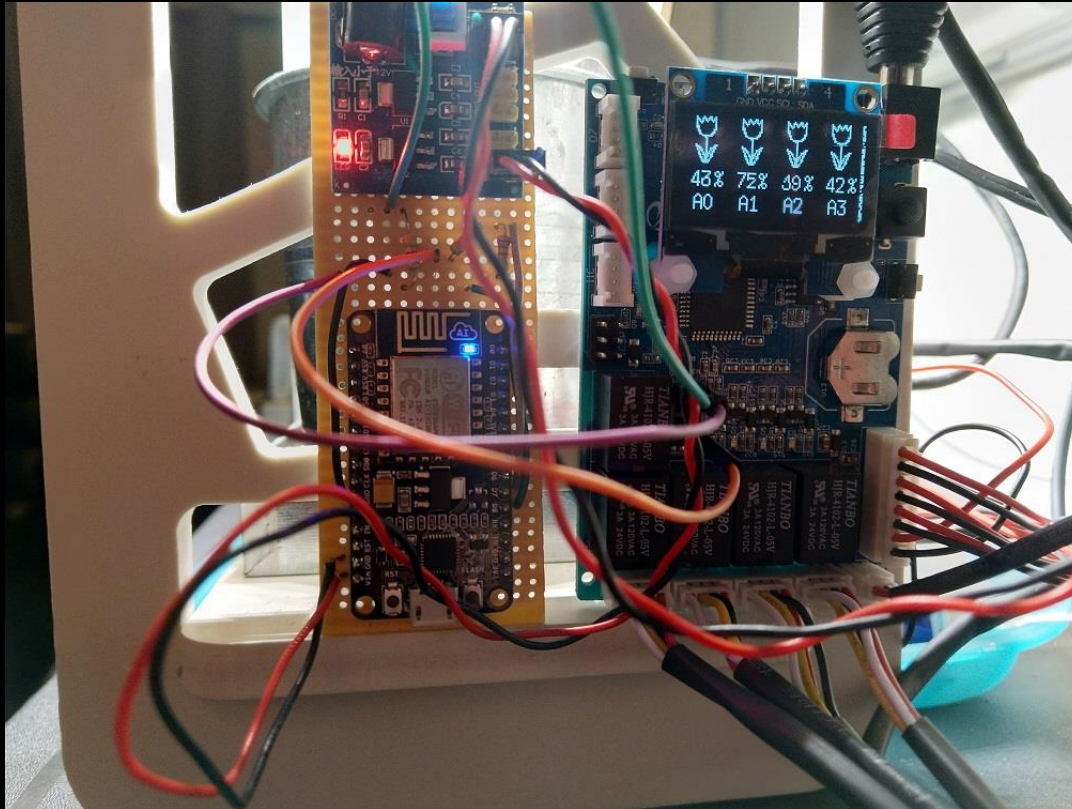


Off the shelf plant growing with an Arduino



<https://www.robotics.org.za/AAK90039K>

Connecting Kit to IoT Central



<https://explorationspace.co.za/2021/02/07/arduino-smart-watering-kit-with-azure-iot-central/>

Questions?

- Twitter: @adpead
- About.me: https://about.me/allan_pead
- LinkedIn: <https://www.linkedin.com/in/adpead/>
- Blog: <https://explorationspace.co.za>

Resources

IoT Central

<https://azure.microsoft.com/en-us/services/iot-central/>

Azure Dev Kit - Az3166 Device

<https://za.rs-online.com/web/p/arduino-compatible-boards-kits/1845096/>

Elecrow Smart Waterer

<https://www.robotics.org.za/AAK90039K>

Thank you!!

