# Open Aquaponics

The goal of this open source project is to develop an open source platform to support monitoring, controlling, logging, and displaying data related to an aquaponics setup. This is my first official attempt at contributing to the open source community although I have been an avid user for quite some time. I’m wading through how to properly build a deployment and I’d welcome any suggestions people might have for how to do this.

# Background:

I built my first aquaponics setup in 2012 on my apartment balcony and I had a lot of success even with the somewhat limited space and lighting. I was able to grow jalapenos, cherry tomatoes, a couple of small carrots, green beans, and a cucumber. This year was spent working through the initial design and getting a feel for how all of the components operate.

With the initial hardware setup, I created a small server application and GUI that the user could record system information like plant growth, water quality, fish growth, etc. The target deployment I’m leaning towards uses an Arduino as the node and the RPi as the server. My goal is to expand on the wealth of open source software and hardware that is already available to create a system that people can easily put together.

# Personal:

I am a computer engineer and my focus has been robotics, embedded programming, and prototype systems. I have limited experience in the areas of web interfaces, databases, mobile applications, and GUIs. I have developed in all of the areas, but my expertise is very limited to ‘Hello World’ applications and programs that I never want to see again.

# Hardware

Node – Arduino UNO with ethernet shield and microSD card

<http://www.adafruit.com/products/50> <http://www.adafruit.com/products/201>

Server – Raspberry Pi

GUI – Simple Qt GUI

Website - ?? ; BrewPi frontend?

Mobile – Android Application

# Software

Version 1:

Build Arduino sketches:

* Support device configuration file/ethernet (device ID, IP setup, sensor suite type (type and pin mapping))
* Support ethernet commands (time update, dump data, real-time sample request, start/stop recording, device statistics)
* Support sensor polling and logging (temperature, humidity, water level, PV charge voltage, battery voltage)
* (Optional) Supports sending SMS/Tweets

Build server application:

* Supports being a Linux startup process/service
* Supports runtime configuration (Linux virtual files system)
* Accepts remote connections (Arduino nodes and GUI)
* Support ethernet commands (All arduino packets, download data from node, health/status of configured nodes)
* Supports logging data to simple database

GUI:

* Supports commanding the server
* Displays simple information

Website:

* N/A

Mobile Device:

* N/A

Version 2:

Build Arduino sketches:

* TBD

Build server application:

* TBD

GUI:

* TBD

Website:

* Supports displaying the information from the database (possibly utilize the BrewPi frontend)
* TBD

Mobile Device:

* Supports listing the nodes with health/status