OpenAg™ Cloud Description

v4.0 Design (as of 2019-07-03 by rbaynes)

- Device software (the *brain*)
    - Runs on any embedded linux microprocessor (Raspberry Pi, Beaglebone, etc).
    - Django python3 application with user interface and sqlite database.
    - Communicates with sensors and actuators using the I2C serial protocol.
    - Communicates with the back end using the MQTT pubsub protocol.
    - Google cloud IoT device.
    - https://github.com/OpenAgricultureFoundation/openag-device-software
- Google cloud platform app engine virtual machine deployments
    - MQTT / PubSub service to validate and store messages.
    - Notification service, manages notifications on a schedule.
    - ReactJS web EDU UI.
    - Flask Data API for UIs and device software.
- EDU UI
    - Our educator and student focused UI which can display data and images from the devices associated with their user account.
    - User can send a recipe to the device.
    - User can view the notifications acknowledge them.
    - User can store horticulture measurements of their plant.
- Notification service
    - Manages scheduled and recurring notifications per device.
    - Tracks runs (of recipes) for use by the UI data display.
- MQTT / PubSub IoT messaging
    - Secure data publishing from all devices and individual device control.
- IoT Core device registry
    - Manages our IoT devices.
- Firebase cloud functions
    - Open function to accept an IoT device public key and save it to the Firestore database during the registration process.
    - Open function to accept a POSTed image from a device and save it to cloud storage.
- Firestore
    - IoT device public key collection used for device registration.
- BigQuery
    - Research data, recipes, long term data warehouse.
- Datastore
    - Realtime cache of user and device data. Anything the UI renders is cached and stored here.

- Storage
    - Images, timelapses
    - Backups

Future Additions

- App Engine
    - Image time lapse creation task (Dataflow)
- ML for CV tasks
- Data analytics
- Memcached