Company Description:

The company sells distance sensors that track the depth of your Water Softener's Salt and notifies you when it's low.

- Firebase
  - Firestore (DynamoDB) uses a Collection/Document/Collection/Doc…. etc. formatted database. I have collections for "users"," sensors", and "variables".
  - I have used the Firebase SDK a lot in my project specifically for Firebase Authentication, and for all database queries.
  - The Firebase CLI was built for quick deployment of the application. I use it to deploy my frontend Vue.js application, and my backend node.js API.
    - But not for scheduled or triggered events like new users, getting data from sensors, and sending notifications.
    - I use python for those functions, I call it the Backend (referenced later), and I deploy them directly to the GCP without firebase

- Google Cloud Platform
  - VM in a docker container. (still working on that), it does now have a static IP
  - cloudbuild.yaml uses docker containers.
  - Backend: This is the format of my backend code I deploy to the GCP.
  - A single cloudbuild.yaml (picture below) file deploys all my Cloud Functions, [mode, message, new_user, restart].
  - As you can tell the format of each one is a [main.py, main_test.py, and requirements.txt]. I have a run method in the main.py to be run by the GCP.
  - Testing: (picture below main_test.py) I set ENV-VAR: GOOGLE_APPLICATION_CREDENTIALS to the ezsalt-app….json file. To then run the main_test.py to test locally.
  - IAM users were created to create that .json file and for my backend to have permissions to all firebase features.
  - gcloud CLI is used when needed and to build the cloudbuild.yaml correctly
  - The Backend code is deployed through Cloud Triggers connected to my Github repo
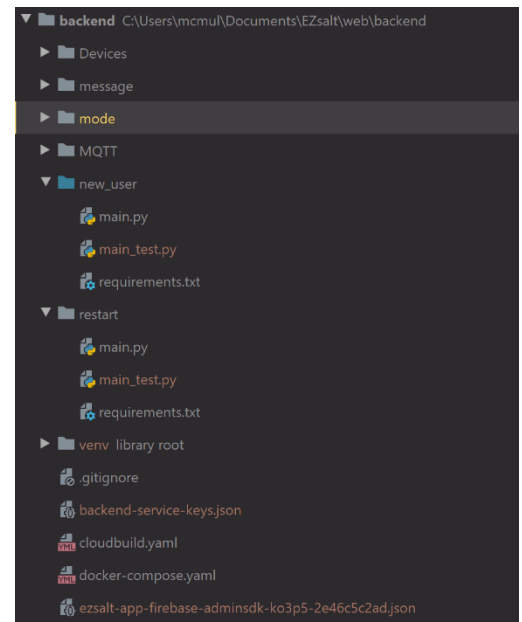
Code Snippets:

main_test.py:

```python
import os
# Set this ENV VAR before running from main import run
ROOT_DIR = os.path.dirname(os.path.dirname(__file__))  # One Dir UP to /backend/
# os.environ["GOOGLE_APPLICATION_CREDENTIALS"] = f"{ROOT_DIR}\\ezsalt-iot-dev-env-firebase-adminsdk-zalf0-2501d0b250.json"
os.environ["GOOGLE_APPLICATION_CREDENTIALS"] = f"{ROOT_DIR}\\ezsalt-app-firebase-adminsdk-ko3p5-2e46c5c2ad.json"


from main import run
run(None, None)
```

cloudbuild.yaml:

```yaml
#####################################
######    restart Function    #######
#####################################

# Scheduler
- name: 'gcr.io/cloud-builders/gcloud'
  entrypoint: 'bash'
  args:
    - '-c'
    - |
      gcloud scheduler jobs create pubsub restart-scheduler \
        --schedule="0 1 * * *" \
        --topic="restart-topic" \
        --message-body={} \
        --time-zone="America/Denver" \
        --description="This restarts all devices every day at
      || echo "Already Exists"

# Function
- name: 'gcr.io/cloud-builders/gcloud'
  args:
    - functions
    - deploy
    - restart-func
    - --entry-point=run
    - --source=./restart
    - --trigger-topic=restart-topic
    - --runtime=python37
    - --timeout=60


#######################################
#####    END restart Function    ######
#######################################
```

Cloud Platform Snippets:

Some Cloud Functions:

☐	✓	message-func	us-central1	Topic: message-topic	Python 3.7	256 MiB	run	Feb 21, 2021, 10:07:25 PM
☐	✓	mode-func	us-central1	Topic: mode-topic	Python 3.7	4 GiB	run	Feb 21, 2021, 10:05:36 PM
☐	✓	restart-func	us-central1	Topic: restart-topic	Python 3.7	256 MiB	run	Feb 21, 2021, 10:09:47 PM

Cloud Scheduler:

🕐 Cloud Scheduler Jobs ➕ CREATE JOB 🔄 REFRESH ✏ EDIT ⏸ PAUSE ▶ RESUME 🗑 DELETE

SCHEDULER JOBS   APP ENGINE CRON JOBS ❓

≡ Filter   Filter jobs   ❓

Name ↑	State	Description	Frequency	Target	Last run	Result	Logs	Run
message-scheduler	Enabled	Send a message to users if their salt level is low	30 16 * * * (America/Denver)	Topic : message-topic	Feb 28, 2021, 4:30:00 PM	Success	View	RUN NOW
mode-scheduler	Enabled	Runs the mode function to get the sensor data	0 */4 * * * (America/Denver)	Topic : mode-topic	Mar 1, 2021, 8:00:00 AM	Success	View	RUN NOW
restart-scheduler	Enabled	This restarts all devices every day at 1am, We cant do mid-night due to the mode function running at that time	0 1 * * * (America/Denver)	Topic : restart-topic	Mar 1, 2021, 1:00:00 AM	Success	View	RUN NOW