Special topics Homework

Area 1

This project is made IoT and mobile devices with Google Cloud backend (or firebase)with serverless backend for IoT (MQTT protocol) and mobile devices (web HTTP REST API) with firestore database. IoT (any VM here we are using google colab) and mobile devices (web)

**Demo Video url:** <https://youtu.be/H0OoHlJtlng>

**GitHub url**: <https://github.com/alekhyaved/IoT_Mqtt_WebApp_GoogleCloud>

**Steps** followed is as follows:

Created a project for IoT and done all required configurations and enables IoT Core, Pub Sub APIsGraphical user interface, application

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Created Registry and uploaded roots certificate from https://pki.goog/roots.pem Graphical user interface, text, application, email

Description automatically generated

Created device for this registryGraphical user interface, text, application, email

Description automatically generated

Graphical user interface, text, application, email

Description automatically generated

Now I have created a virtual environment and downloaded the certificates in .pem files and added required files

Graphical user interface, text, application, email

Description automatically generated

I have run the google colab and test for publish message

Graphical user interface, text, application, email

Description automatically generated

Check for the response of data that is received by running the python sub.py fileA picture containing text

Description automatically generated

Number of requests log for IoT and pubSub

Graphical user interface, application, table, Excel

Description automatically generated

Triggering cloud function can either be done through Topics section in Cloud PubSub or directly by enabling cloud function.

Graphical user interface, application, Teams

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Added necessary changes in iotPubsub cloud function to acces data through pubsub , load and save data to firestore and send command.Graphical user interface, text, application, Word

Description automatically generated

Create a native firestore Graphical user interface, application, Teams

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Read sensor data from virtual machine and run the code set up for mqtt pub sub communication from notebook file

A picture containing graphical user interface, text, application

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Code for mqtt device demoGraphical user interface, text, application, email

Description automatically generated

Graphical user interface, text, application, email

Description automatically generated

Create another cloud function to do http calls from firestore and access them on to the web application

Graphical user interface, text, application, email

Description automatically generated

**Web application as mobile device:**

I have created a react web app to Get the data and plot graphs using the historical data of temperature and humidity sensorsGraphical user interface, text, application

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When number of intervals is less the graph is as below as number of records is less.

A picture containing chart, bar chart

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When number of intervals is more the graph is as below as number of records is more. Chart, timeline

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**API Logs**

Graphical user interface, application, table

Description automatically generated

**Conclusion:**

As per requirements, a simulated application is created, where IoT device provides sensor data via MQTT to the Cloud, mobile device can receive real-time updates from the backend (REST API + Websocket ), mobile device can also send command to the IoT device, mobile device can fetch history data and plots the graph diagram for temperature and humidity via REST API.