Project Lab Data Analytics Solution using AWS

This project replaces labs 6 and 7 and will cover all the course content. The objective of this project is to develop a complete data flow (end-to-end) to feed an analytics application using the Pycom Dev kit and AWS as main tools. The idea of this project is that you perform the tasks indicated with the minimum teacher's help as possible. So, I expect form you to perform internet research, trials and error and apply what you have learned during the course.

This is an individual assignment but can be worked in pairs during the development. Submission are individual

Part 1: Connect Pycom board to AWS (Lab 6)

In this lab you need to connect the Pycom board to AWS using a Wi-Fi connection and MQTT as the application protocol.

Requirements

At least the following requirement should be meet:

- The connection to the AWS broker (IoT Core) should be secured using certificate and key pair
- The pycom device should be able to send the device ID, at least 2 environment measurements (temperature in Celsius and humidity as percentage) and
- A time stamp should be added to each message using the format: ("%Y-%m-%d %H:%M:%S")
- The data format used should be JSON
- A test that proves that messages arrive successfully to IoT core (subscription to topic of interest)

Reference links:

- https://docs.pycom.io/tutorials/networkprotocols/aws/
    - Hint: from this link use only the sub/pub client example
- https://docs.pycom.io/tutorials/expansionboards/sensing/
    - Hint: The using all sensors example provide you with the code you need
- The certificates can be easily uploaded to the pycom using the version 2 of Pymakr:

Device File explorer

Mount your device inside VSCode and access it like a USB storage device. You can even save files directly to the device.
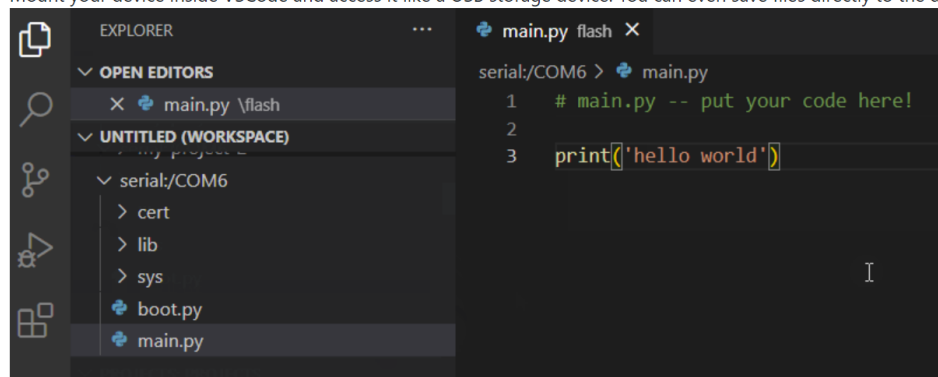
Part 2: Move the data from the Broker to the dataset using Aws IoT Analytics (Lab 7)

In this lab you need to create an IoT Rule that moves every message arriving to the broker to the IoT Analytics channel. Then using a data pipeline, the data should be extracted, transformed, and loaded to a Datastore then data need to be materialized in a Dataset that contains raw data. Finally, a Quicksight dashboard must be created using the data coming from the raw data Dataset.
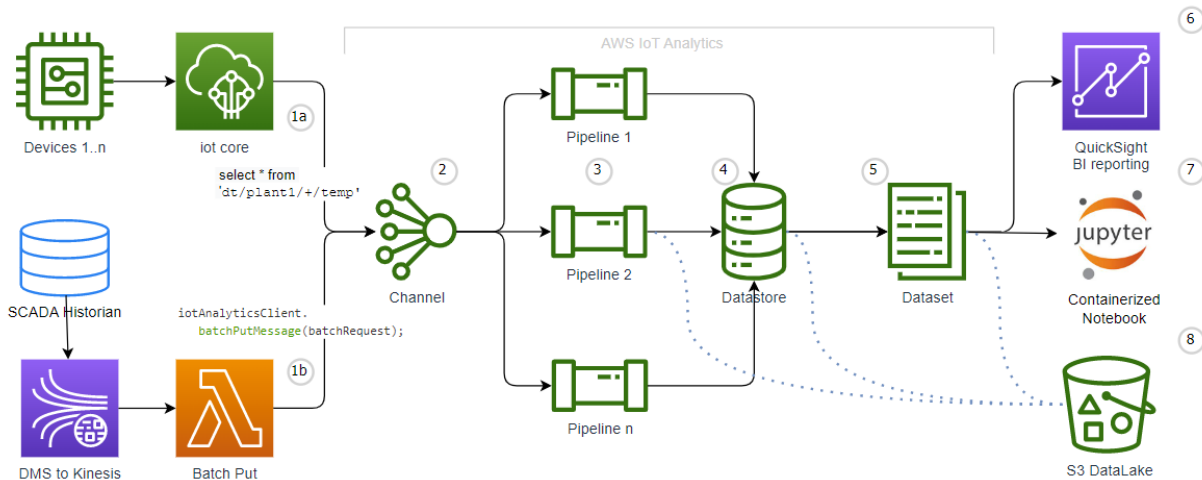
Requirements:
- The Data Pipeline should be executed just when needed
- The pipeline should convert the temperature from Celsius to Fahrenheit
- Create a data set that queries the raw data
- Create a Quicksight dashboard that uses the raw data to provide insights over the data collected

Reference links:

https://github.com/gabrielastudillo/iot-atlas/blob/main/src/hugo/content/en-us/implementations/aws/telemetry_archiving/iot_analytics1/_index.md#iot-analytics-channel

https://iotatlas.net/en/implementations/aws/telemetry_archiving/iot_analytics1/