Real-Time Analytics

Azure Stream Analytics enables real-time data analysis and insights, making it an ideal solution for processing data from IoT devices such as the Raspberry Pi Azure IoT Online Simulator. By integrating the simulator with Azure Stream Analytics, you can ingest telemetry data in real-time through Azure IoT Hub, process it using SQL-like query capabilities, and derive actionable insights or trigger workflows. This setup allows you to monitor key metrics like temperature, humidity, or device status, applying filtering, aggregations, or complex event processing to identify anomalies or trends instantly. The seamless integration with Azure services like Power BI or Azure Blob Storage ensures that the analyzed data can be visualized or stored for further analysis, creating a powerful pipeline for real-time IoT data analytics.

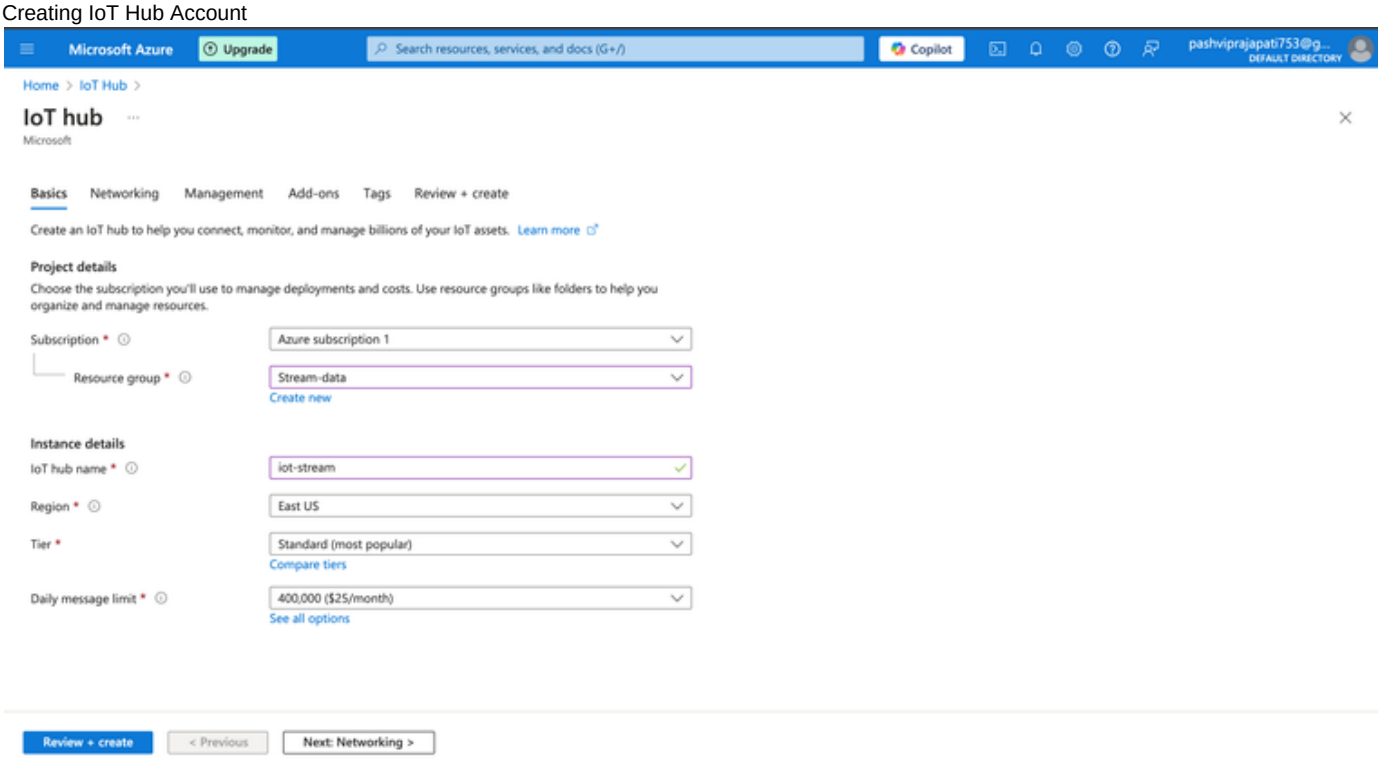
Service Used	Purpose
IoT Hub	To get Real time data from Raspberry Simulator
Azure Stream Analytics	To ingest Data, Transform and Sync Data
ADLS Gen 2	To store The Output Data
Azure Synapse Analytics	To use sink data, to connect in powerBI
PowerBI	To Create Dashboard

Use Case-

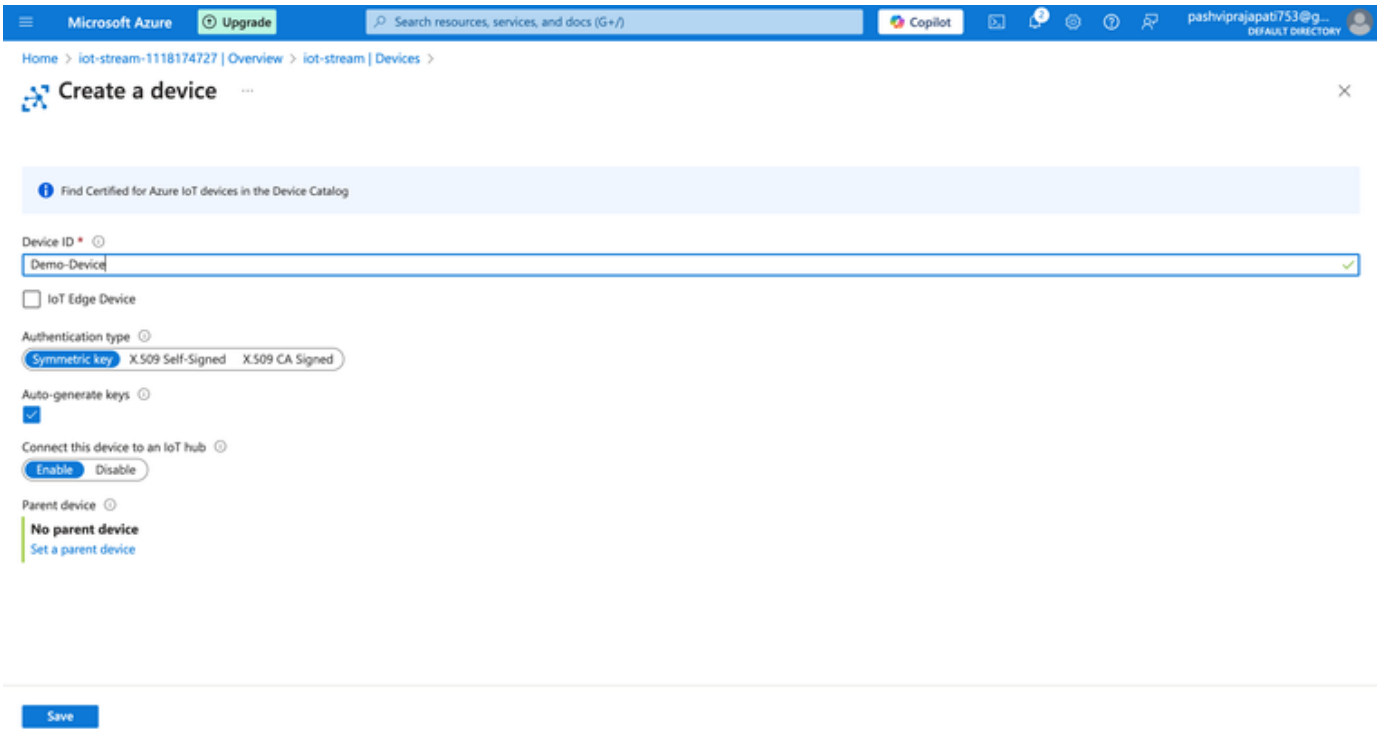
To analyze the raspberry pi data and monitor in app.powerbi.com

Steps

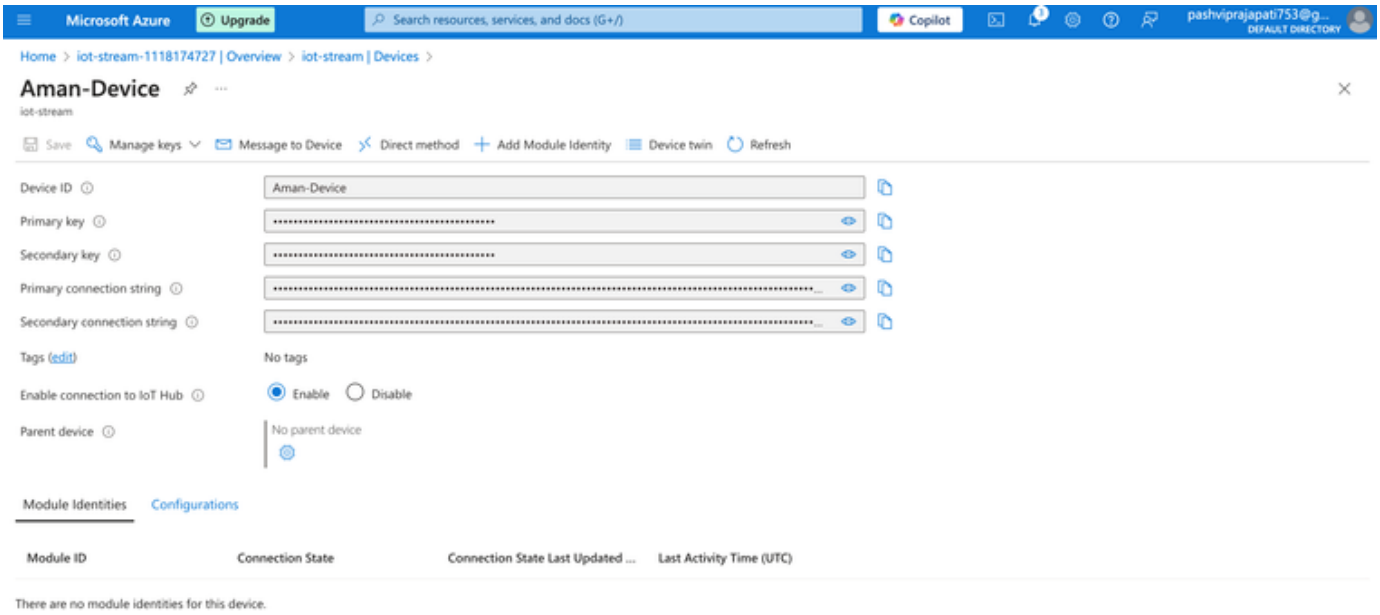
Creating IoT Hub Account

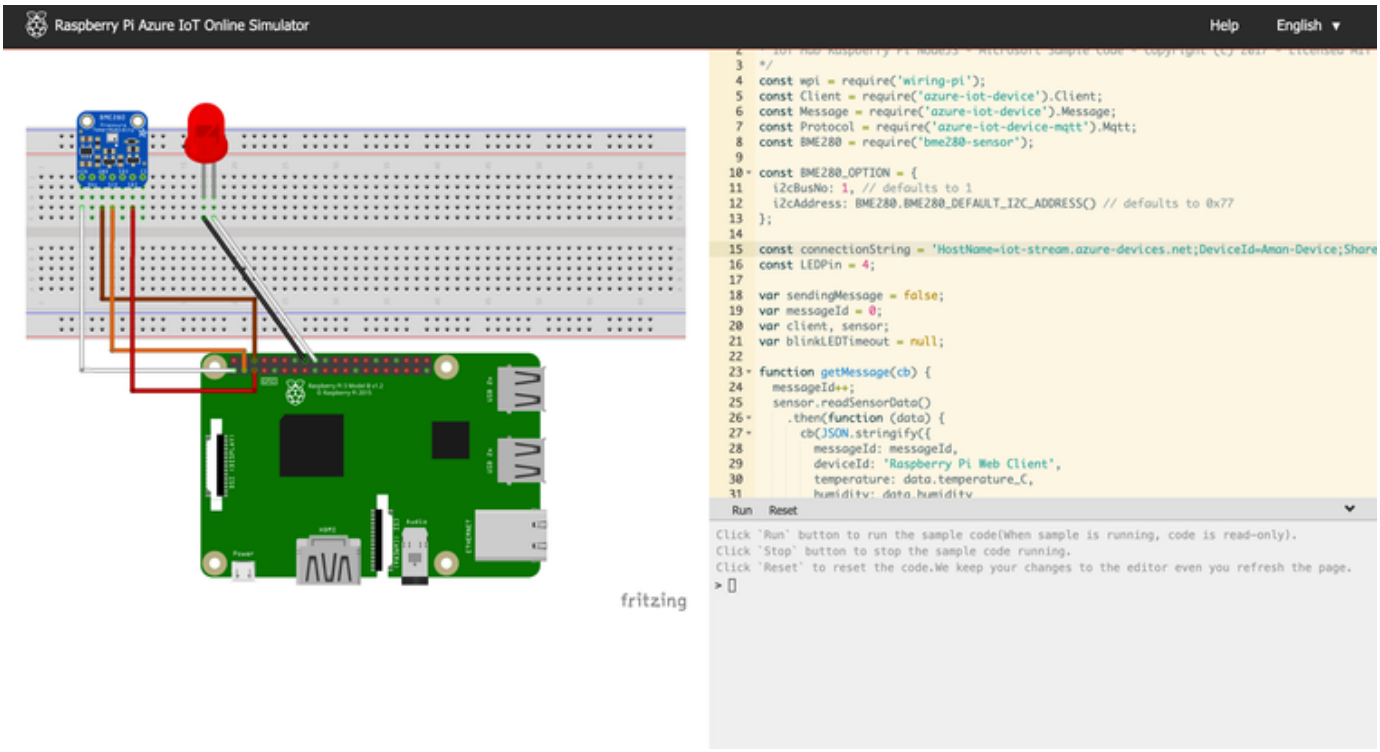


Now after configuring IoT hub we will add device to it.

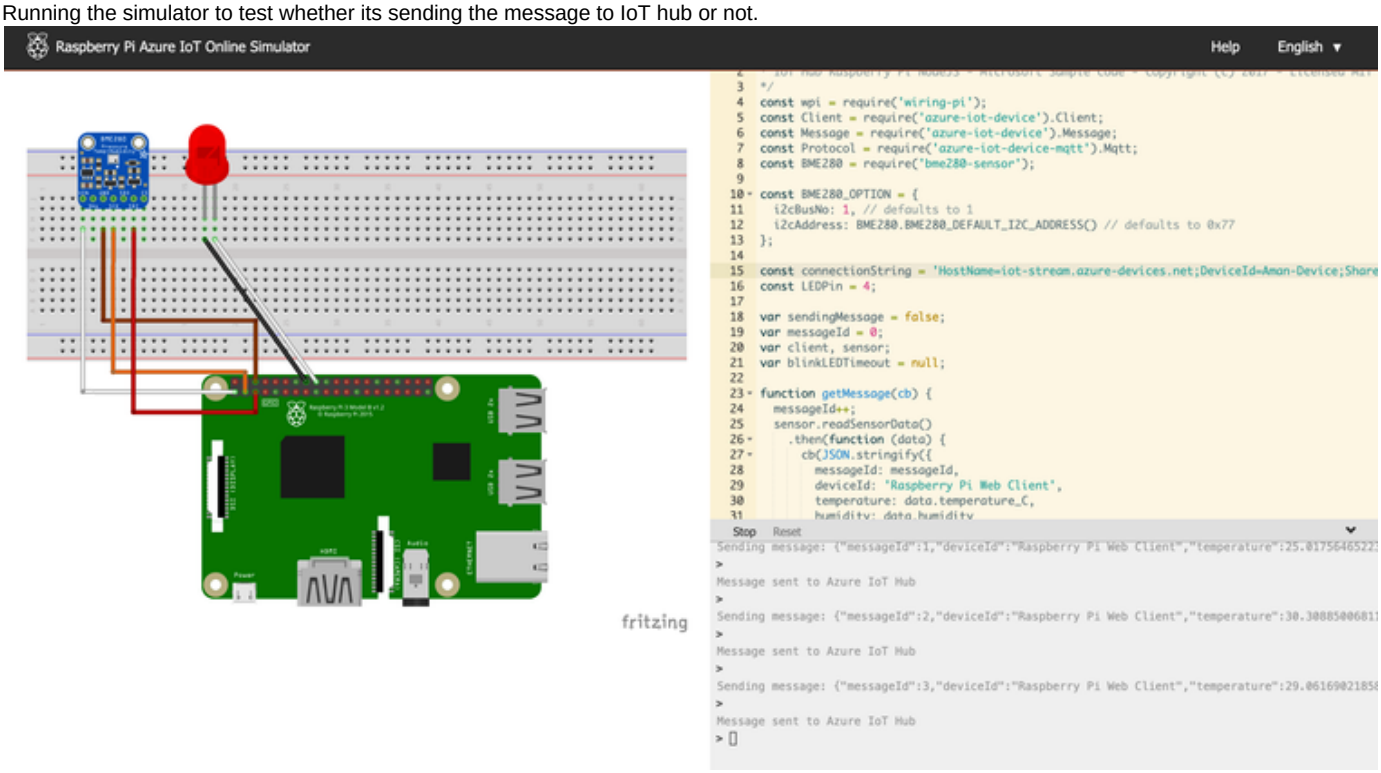


Adding IoT Simulator to our device - https://azure-samples.github.io/raspberry-pi-web-simulator/ As well, copying the primary key to our IoT Simulator

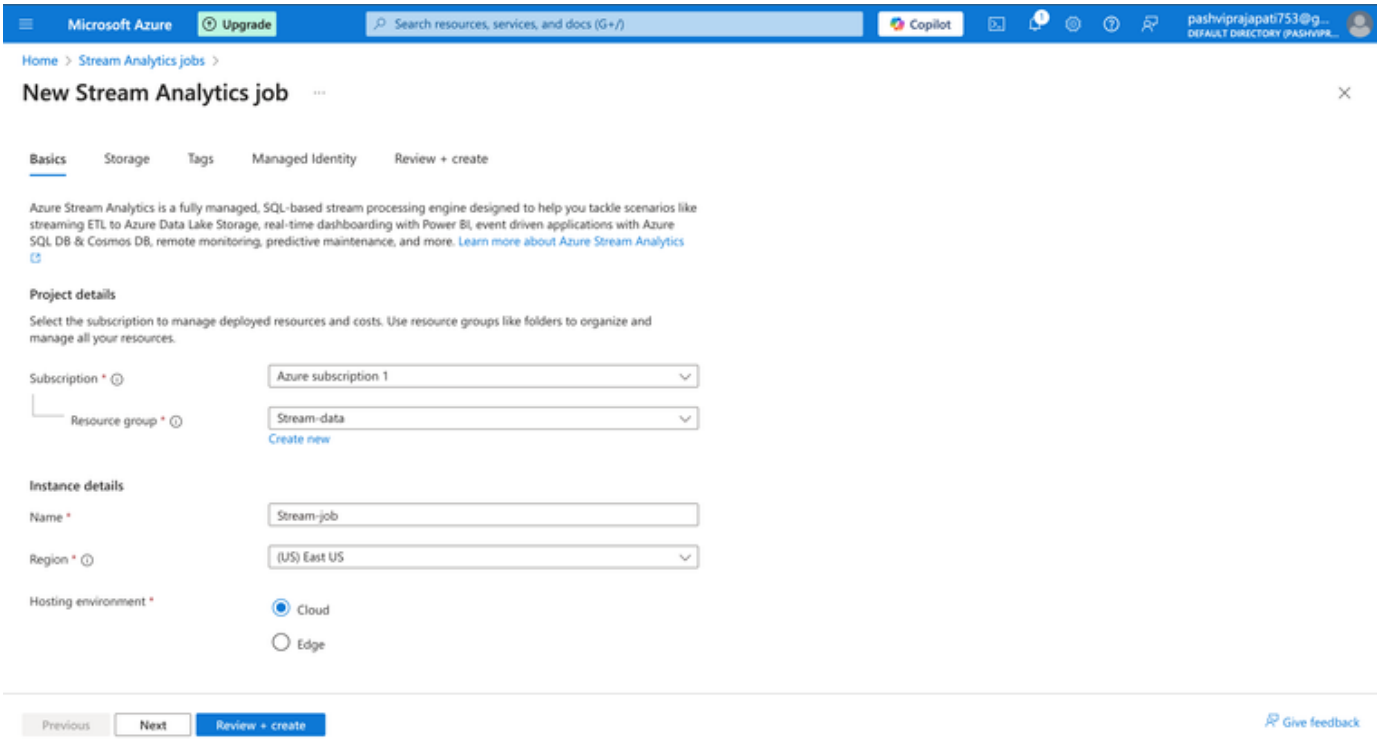




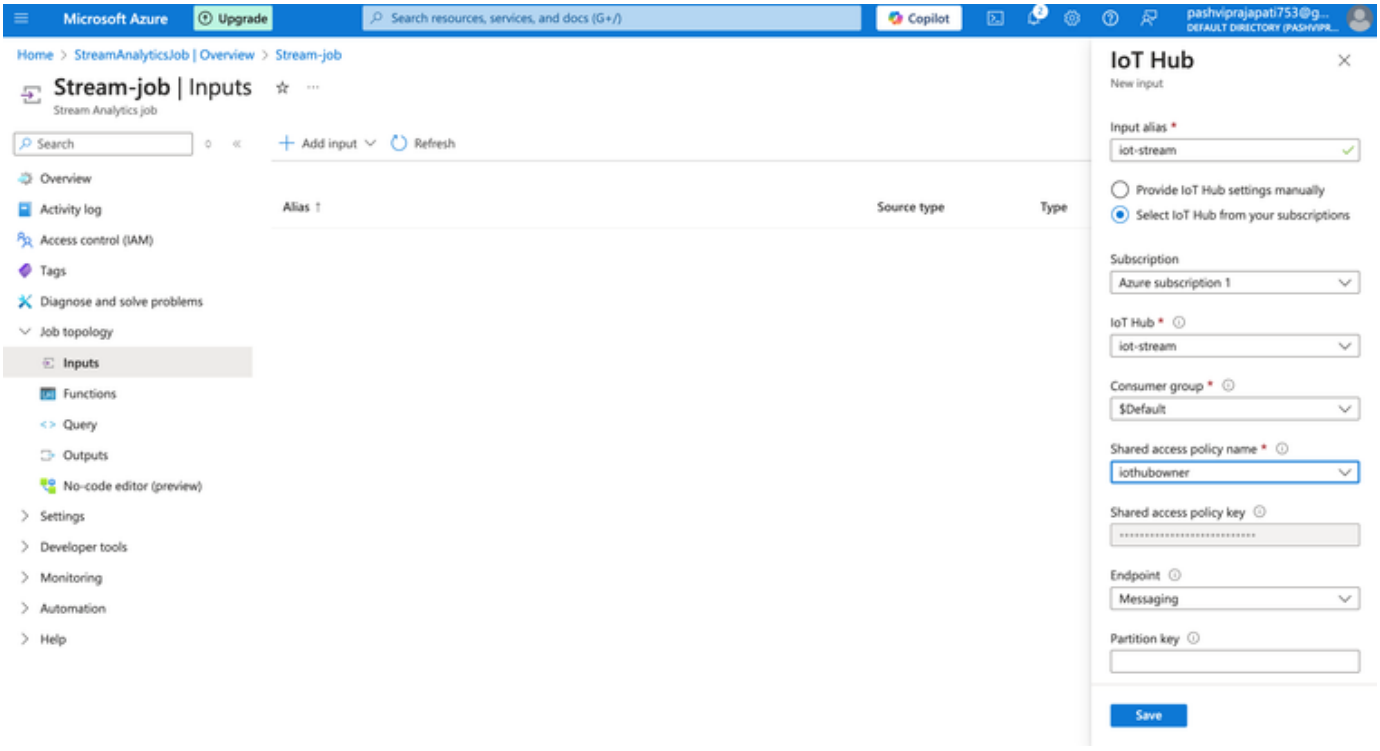
Running the simulator to test whether its sending the message to IoT hub or not.



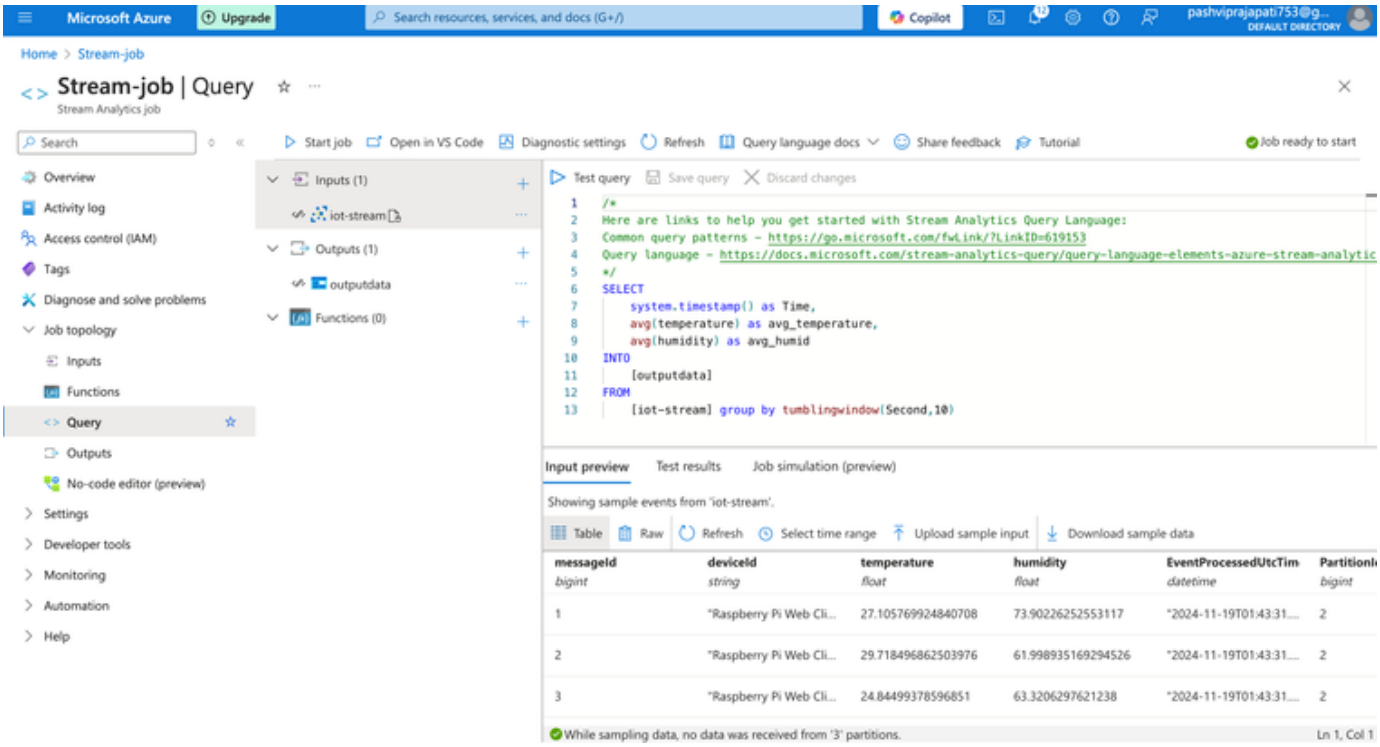
After testing we will create stream analytics job



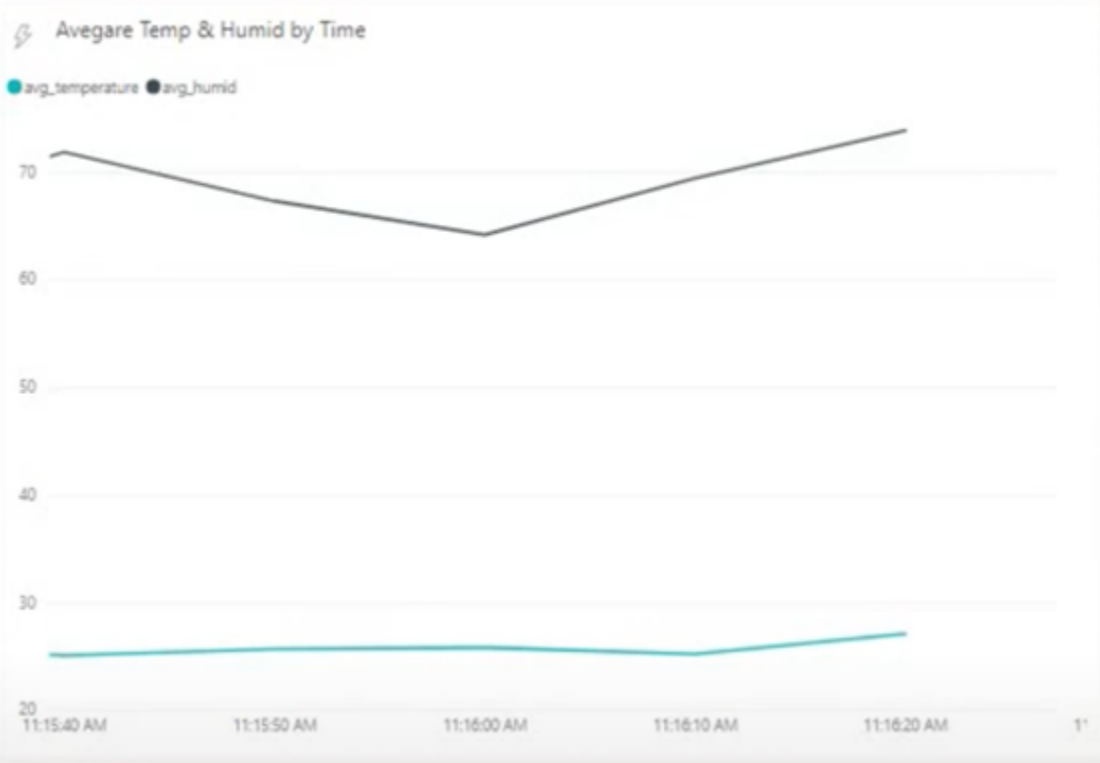
After creating stream analytics job creating an input from job-topology section.



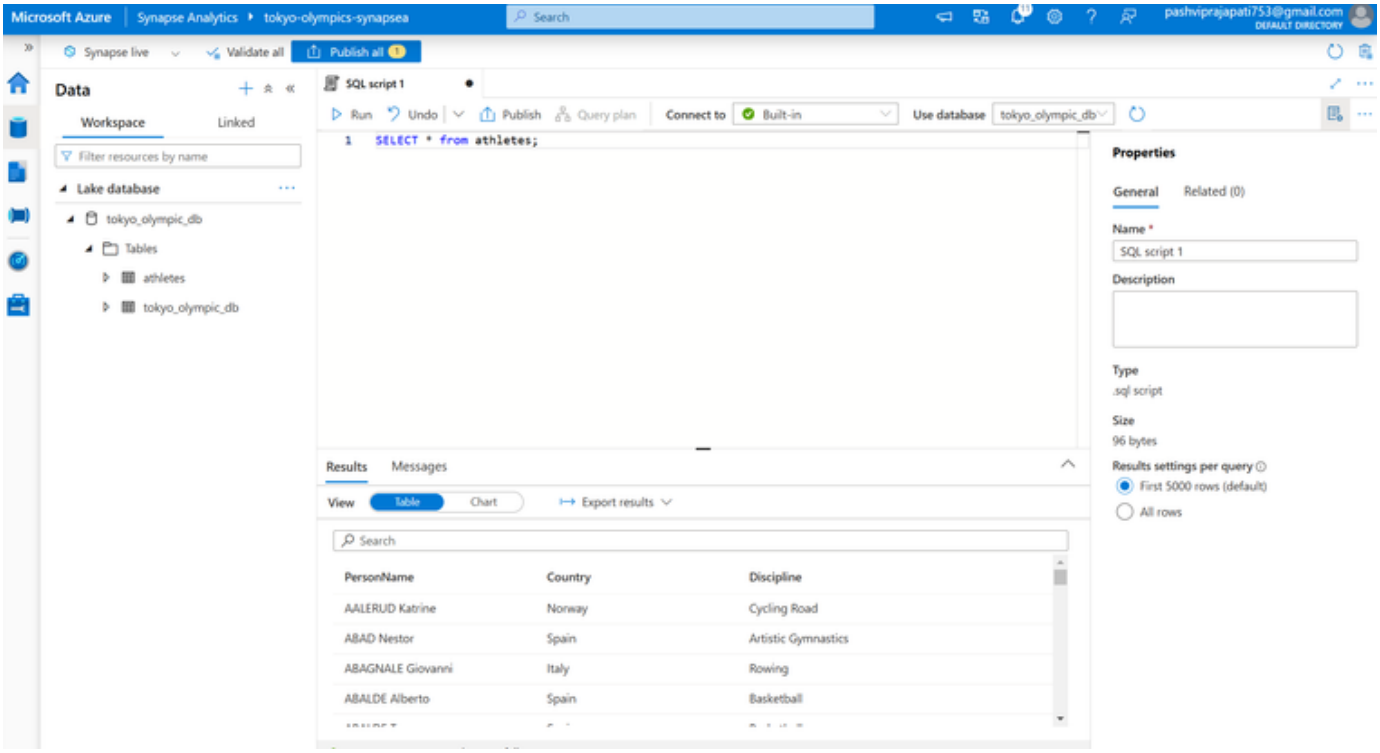
Query to get the Average temperature and average humidity.



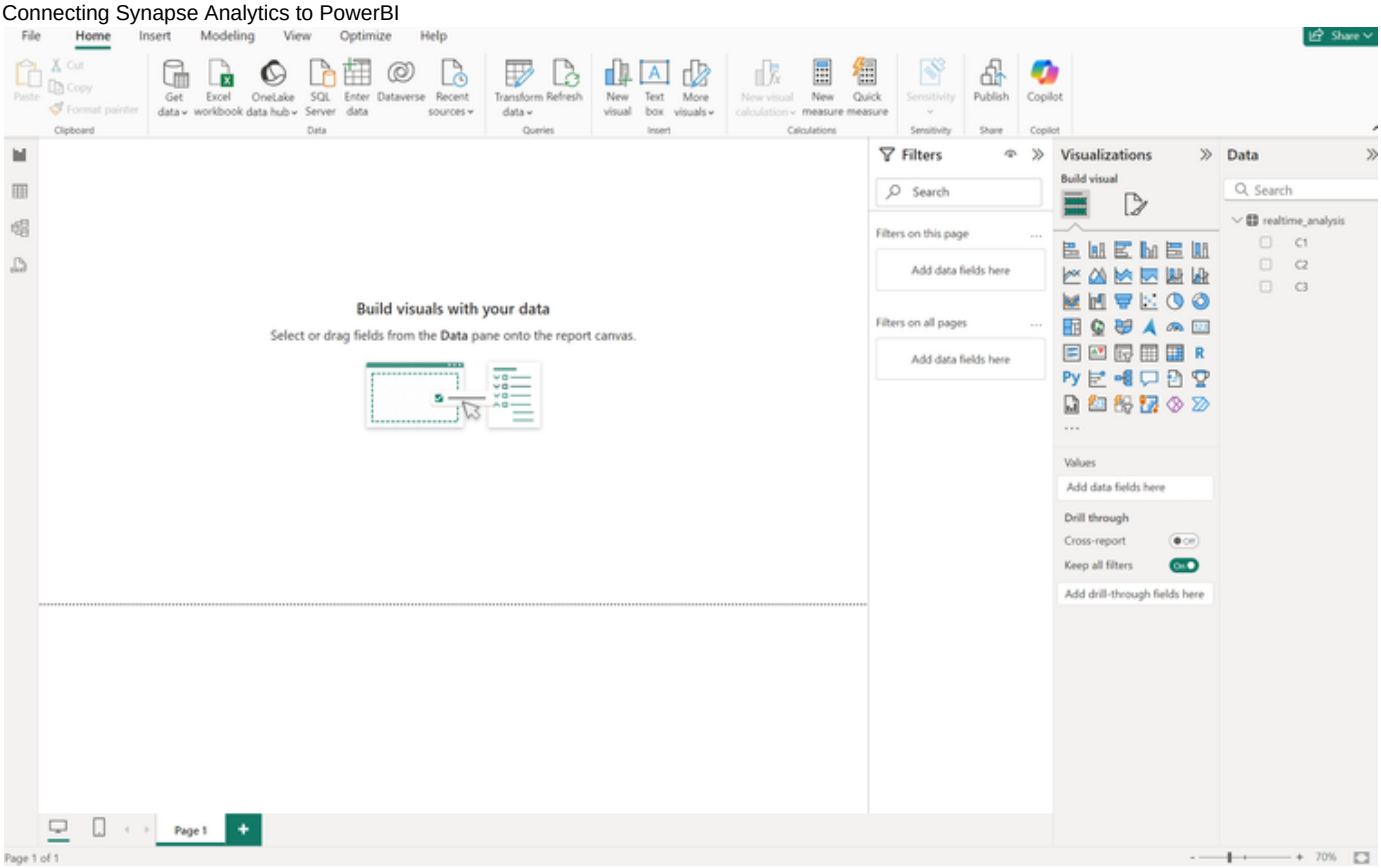
On PowerBi web we can analyze it as follow:



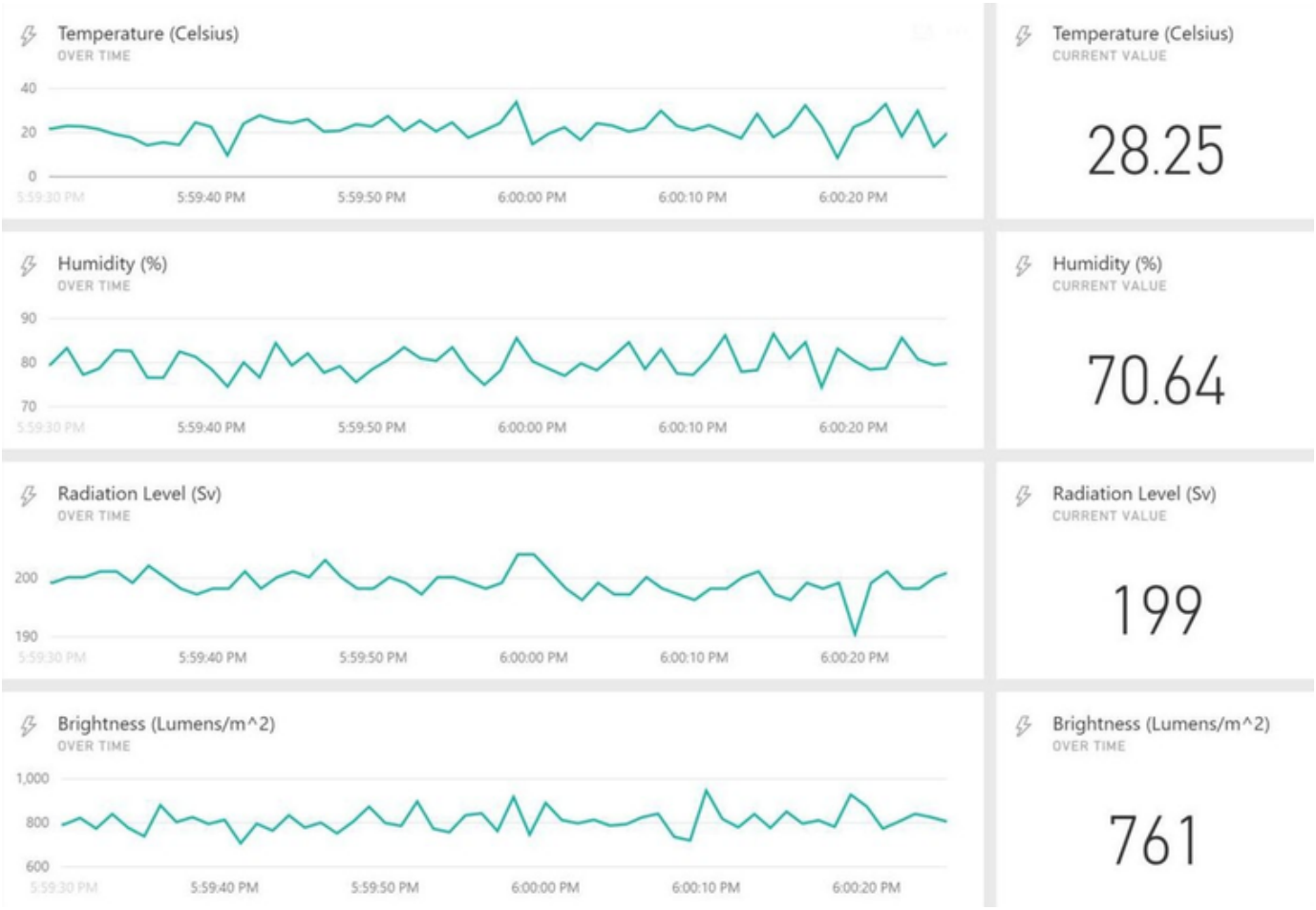
Now connecting the datasource to synapse analytics



Connecting Synapse Analytics to PowerBI



PowerBi Dashboard



Challenges Faced	Solution
Due to OS issue was not able to download PowerBi Dashboard	Download Azure VM and installed PowerBI
Unable to link synapse as output sync destination in azure stream analytics due to free subscription, dedicated sql pool was not being created	Loaded into ADLS Gen2 and then created a LinkedIn service in synapse analytics to add the output data to Synapse Analytics.
Output dataset were only being sent as json format	Created a pipeline in synapse and performed copy activity to move dataset format to parquet