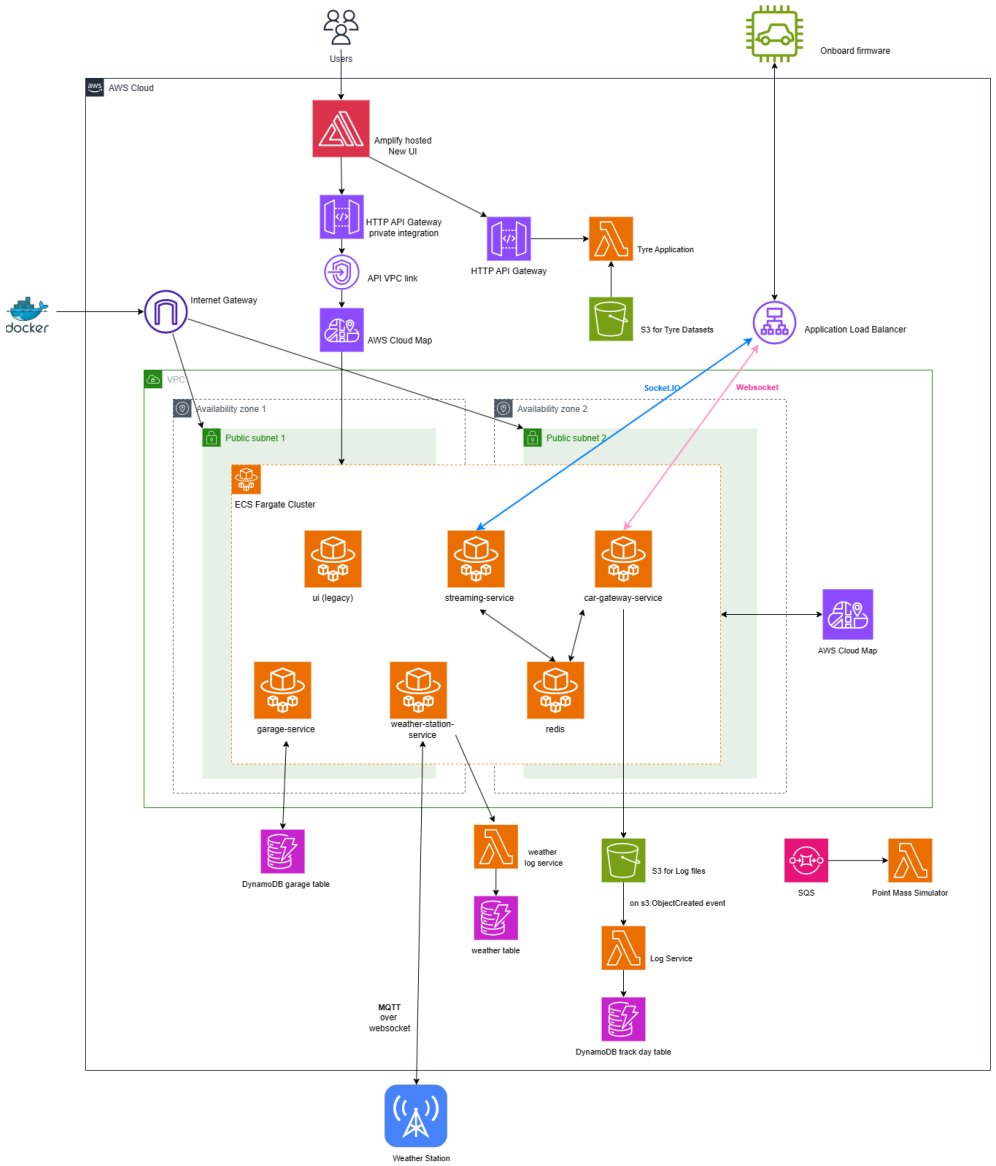
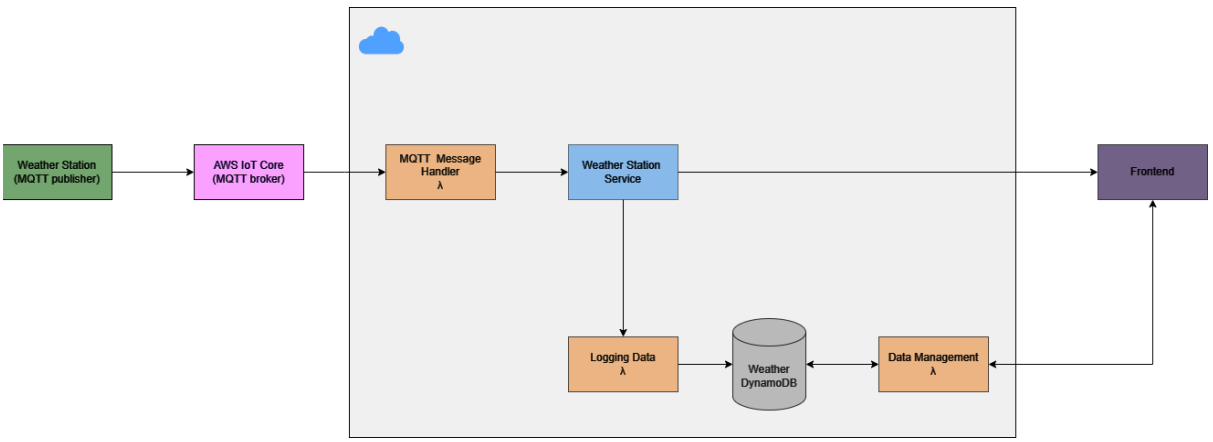
Cloud Technical Assessment

Proposed change to cloud architecture:



Implementation of proposed system:



Explanation:

The weather station has sensors that capture temperature, air, humidity, track temperature, wind and wind direction. Using the MQTT protocol, the weather station acts as a MQTT publisher, sending each type of data to a specific MQTT topic connected through AWS IoT Core. The incoming MQTT messages to the IoT core then trigger the “MQTT message handler” Lambda function which decodes the messages, extracting relevant weather data. The deployed “weather station service” in the ECS then receives the extracted data, and acts as a backend application to further process and later store the weather data. The application does the error handling, logging and monitoring of the weather station system. Once the application processes the required data, it sends it to the frontend application for user interaction and visualisation. The service also interacts with the logging data Lambda function to allow storing processed data and other metrics to the Weather DynamoDB table which can then be retrieved, and analysed by the frontend application.

The services for the weather station can be deployed using terraform. Since AWS is being used, it can be the provider which through required access keys, will allow Terraform to access needed AWS APIs. Terraform then allows you to define required resources such as the AWS IoT Core, the DynamoDB table, ECS service and Lambda functions and establish the relationships between these resources. The MQTT rules and topics must also be defined in these configurations for the IoT Core and message handling. Each resource will be configured according to their dependencies and requirements. Terraform will also then manage the resource dependencies in required resource order. The infrastructure can then be deployed and then modified over time by updating the terraform configuration.

Docker can be used to containerise the weather station system. The applications responsible for acquiring data from the sensors on the weather station, the weather station service in the ECS and the UI for the weather station can be put into a docker container. This will provide a consistent environment to run the applications and makes it an efficient way to deploy the weather station system.