IoT Security and Privacy

Term Project – Saving DHT22 Data into DynamoDB of AWS
(10 points)

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Warning: Please visit AWS Free Tier to check free services from Amazon. Please ensure you do not send messages too fast and too many so as to avoid charge.

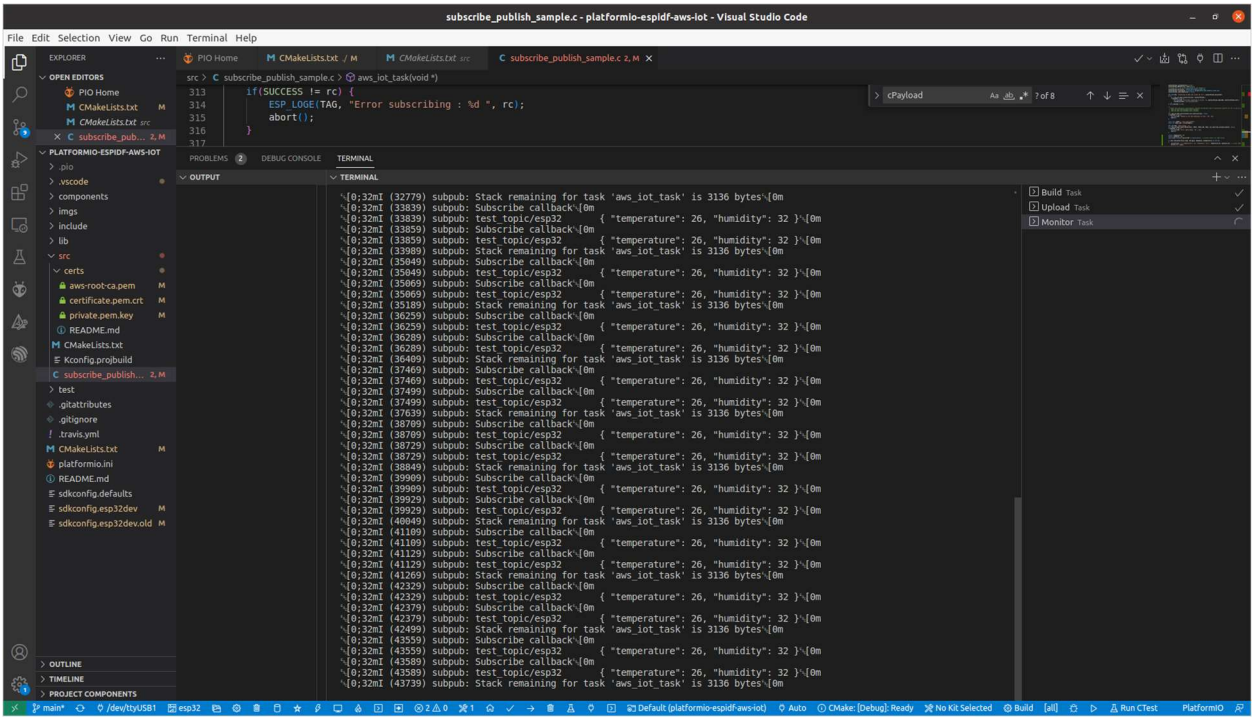
In this assignment, students will work on the lab on saving DHT22 readings into a DynamoDB table of AWS.

Questions

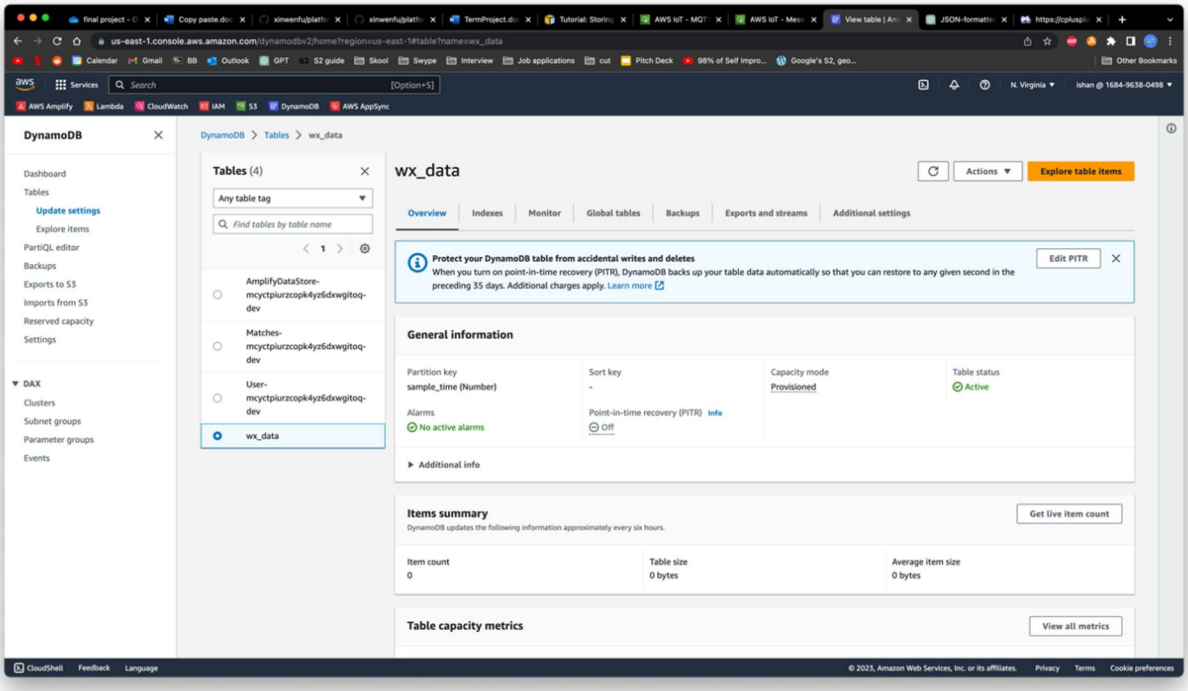
1. Please refer to Assignment 2 on reading DHT22/DHT11 and Assignment 5 on the Amazon Web Services IoT MQTT Subscribe/Publish Example. The DHT22/DHT11 reading has to be formatted in the JSON format in C so that it can work with the AWS IoT rules. Please refer to the example below. Students may have to change the example so it works for the purpose of formatting the DHT22 readings.
   sprintf(cPayload, "{\"temperature\": 28, \"humidity\": 80, \"barometer\": 1013, \"wind\": {\"velocity\": 22, \"bearing\": 255}}");
   a. Please copy and paste your C code snippet/statement used to format the DHT22 readings below. (1 point)

```
int16_t temperature = 0;
int16_t humidity = 0;
char* json = (char*) malloc(500 * sizeof(char)); // allocate memory for JSON string

if (dht_read_data(sensor_type, dht_gpio, &humidity, &temperature) == ESP_OK)
{
    sprintf(json, "{ \"temperature\": %d, \"humidity\": %d }", temperature/10, humidity/10); // format JSON string
    printf("%s", json);
}

vTaskDelay(pdMS_TO_TICKS(2000));

sprintf(cPayload, "%s : %d ", "hello from SDK", i);

paramsQOS0.qos = QOS0;
paramsQOS0.payload = (void *) cPayload;
paramsQOS0.isRetained = 0;

paramsQOS1.qos = QOS1;
paramsQOS1.payload = (void *) cPayload;
paramsQOS1.isRetained = 0;

while((NETWORK_ATTEMPTING_RECONNECT == rc || NETWORK_RECONNECTED == rc || SUCCESS == rc)) {

    //Max time the yield function will wait for read messages
    rc = aws_iot_mqtt_yield(&client, 100);
    if(NETWORK_ATTEMPTING_RECONNECT == rc) {
        // If the client is attempting to reconnect we will skip the rest of the loop.
        continue;
    }

    ESP_LOGI(TAG, "Stack remaining for task '%s' is %d bytes", pcTaskGetTaskName(NULL), uxTaskGetStackHighWaterMark(NULL));
    vTaskDelay(1000 / portTICK_RATE_MS);
    sprintf(cPayload, "%s", json);
    paramsQOS0.payloadLen = strlen(cPayload);
    rc = aws_iot_mqtt_publish(&client, TOPIC, TOPIC_LEN, &paramsQOS0);
```

b. Please include a screenshot of the VS Code serial console which shall show the IoT kit sends the DHT22 readings to AWS IoT. (1 point)

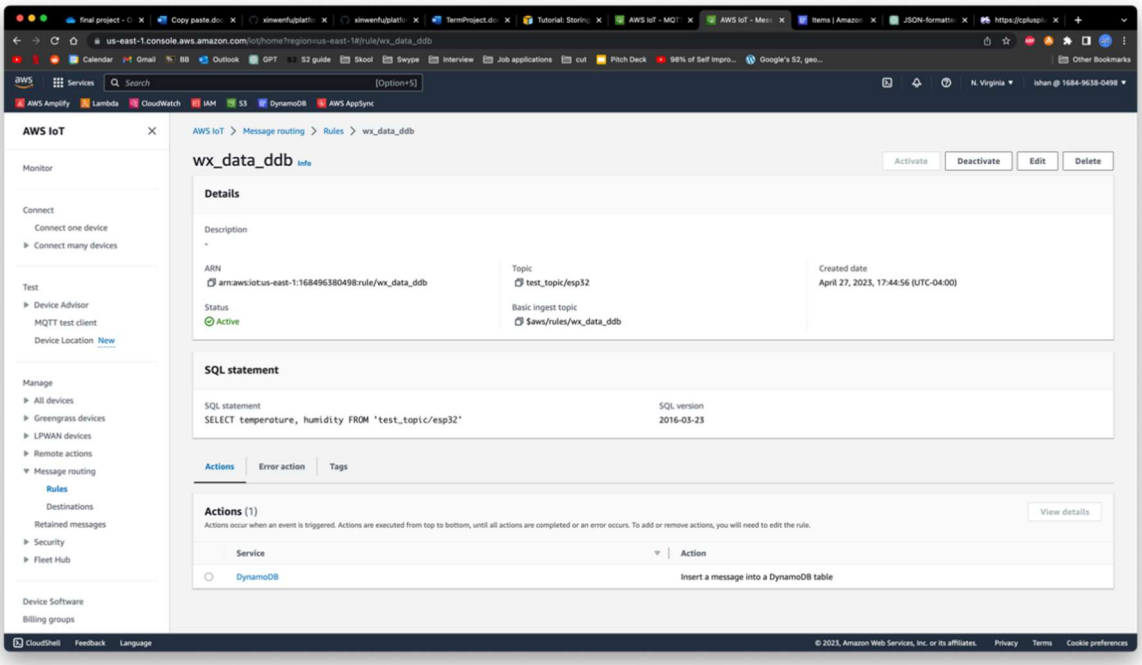


2. Please read carefully Store device data in a DynamoDB table. Students may have to read the whole post first and design their own DynamoDB table and AWS IoT rule while a similar table and rule can be used.
    a. Create the DynamoDB table. Please provide a screenshot to show the DynamoDB table is successfully created. (3 points)



b. Create an AWS IoT rule to send data to the DynamoDB table. Please copy and paste your rule query statement below. (3 points)

```
SELECT temperature, humidity FROM 'test_topic/esp32'
```



c. Please include a screenshot of the DynamoDB table that contains the DHT22 readings. (2 points)