

Sprint 2

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Team ID	PNT2022TMID54458
Project Name	Hazardous Area Monitoring for Industrial Plant powered by IoT

In this sprint, we are getting Temperature and Humidity as input from the ESP32 using wokwi which is considered to get the input from the environment condition.

Solution:

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQTT
#include "DHT.h"// Library for dht11
#define DHTPIN 15 // what pin we're connected to
#define DHTTYPE DHT22 // define type of sensor DHT 22
#define LED 5
DHT dht (DHTPIN, DHTTYPE);// creating the instance by passing pin and typr of dht
connected

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

//-----credentials of IBM Accounts-----

#define ORG "6yafic"//IBM ORGANITION ID
#define DEVICE_TYPE "Sensor"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "Sensorid"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "VghKTvPaSlbz+vICyz" //Token
String data3;
float h, t;

//----- Customise the above values -----
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of event perform
and format in which data to be send
char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd REPRESENT command type
AND COMMAND IS TEST OF FORMAT STRING
char authMethod[] = "use-token-auth";// authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id

//.....
WiFiClient wifiClient; // creating the instance for wificlient
PubSubClient client(server, 1883, callback ,wifiClient); //calling the predefined client id by
passing parameter like server id,portand wificredential
void setup()// configueing the ESP32
```

```

{
  Serial.begin(115200);
  dht.begin();
  pinMode(LED,OUTPUT);
  delay(10);
  Serial.println();
  wificonnect();
  mqttconnect();
}

void loop()// Recursive Function
{

  h = dht.readHumidity();
  t = dht.readTemperature();
  Serial.print("Temperature:");
  Serial.println(t);
  Serial.print("Humidity:");
  Serial.println(h);

  PublishData(t, h);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}

/*.....retrieving to Cloud ..... */

void PublishData(float temp, float humid) {
  mqttconnect();//function call for connecting to ibm
  /*
    creating the String in in form JSon to update the data to ibm cloud
  */
  String payload = "{\"Temperature\":\"";
  payload += temp;
  payload += "\", \"Humidity\":\"";
  payload += humid;
  payload += "\"}";

  Serial.print("Sending payload: ");
  Serial.println(payload);

  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");// if it sucessfully upload data on the cloud then it will print
    publish ok in Serial monitor or else it will print publish failed
  }
}

```

```

    } else {
        Serial.println("Publish failed");
    }

}

void mqttconnect() {
    if (!client.connected()) {
        Serial.print("Reconnecting client to ");
        Serial.println(server);
        while (!!!client.connect(clientId, authMethod, token)) {
            Serial.print(".");
            delay(500);
        }

        initManagedDevice();
        Serial.println();
    }
}

void wificonnect() //function defination for wificonnect
{
    Serial.println();
    Serial.print("Connecting to ");

    WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the
connection
    while (WiFi.status() != WL_CONNECTED) {
        delay(500);
        Serial.print(".");
    }
    Serial.println("");
    Serial.println("WiFi connected");
    Serial.println("IP address: ");
    Serial.println(WiFi.localIP());
}

void initManagedDevice() {
    if (client.subscribe(subscribetopic)) {
        Serial.println((subscribetopic));
        Serial.println("subscribe to cmd OK");
    } else {
        Serial.println("subscribe to cmd FAILED");
    }
}

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{
    Serial.print("callback invoked for topic: ");
    Serial.println(subscribetopic);
    for (int i = 0; i < payloadLength; i++) {

```

```

    //Serial.print((char)payload[i]);
    data3 += (char)payload[i];
}

Serial.println("data: "+ data3);
if(data3=="Alarmon")
{
    Serial.println(data3);
    digitalWrite(LED,HIGH);

}

else
{
    Serial.println(data3);
    digitalWrite(LED,LOW);

}

data3="";
}

```

Data gathering from sensors (wokwi)

The screenshot displays the Wokwi web IDE interface. On the left, the 'sketch.ino' file is open, showing a C++ program for an ESP32. The code includes the following components:

- Libraries:** `<WiFi.h>` for WiFi, `<PubSubClient.h>` for MQTT, and `"DHT.h"` for the DHT11 sensor.
- Pin Definitions:** `#define DHTPIN 15` (DHT11 data pin), `#define DHTTYPE DHT22` (DHT11 sensor type), and `#define LED 5` (LED pin).
- Instance Creation:** `DHT dht (DHTPIN, DHTTYPE);` creates the DHT11 sensor instance.
- MQTT Setup:** The `void callback` function is defined. The `void setup` function initializes the MQTT client with IBM Watson IoT credentials (ORG, DEVICE_TYPE, DEVICE_ID, TOKEN) and the server name (`6yafic.messaging.internetofthings.ibmcloud.com`).
- Data Collection:** The `void loop` function reads the temperature and humidity from the DHT11 sensor and publishes the data as a JSON payload to the topic `iot-2/evt/Data/fmt/json`.

On the right, the 'Simulation' window shows a visual representation of the ESP32 board and the DHT11 sensor. Below the simulation, a log of the MQTT publishing process is visible:

```

Sending payload: {"Temperature":47.80,"Humidity":43.00}
Publish ok
Temperature:47.80
Humidity:43.00
Sending payload: {"Temperature":47.80,"Humidity":43.00}
Publish ok
Reconnecting client to 6yafic.messaging.internetofthings..

```

Uploaded data in Cloud from sensors (wokwi - ESP32)

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This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API.

Search by Device ID Device Simulator ☒

	Device ID	Status	Device Type	Class ID	Date Added
>	11	Disconnected	sensor1	Device	Nov 14, 2022 2:05 PM
>	sensor1_1	Connected	sensor1	Device	Nov 17, 2022 12:41 PM
>	sensor1_2	Connected	sensor1	Device	Nov 17, 2022 12:41 PM

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2 Simulations running