

SPRINT - 3

Date	11 November 2022
Team ID	PNT2022TMID00928
Project Name	Smart waste management system for metropolitan cities
Points	20

Created a IOT device to sense the level of bins and do code for device and send to Node Red using the API keys from Watson platform

CODE :

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);

#define ORG "fzv53v"
#define DEVICE_TYPE "ESP32"
#define DEVICE_ID "ESP32_iot"
#define TOKEN "7(Ro*nk83MB7ZpKjMU"
String data3;

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribetopic[] = "iot-2/cmd/test/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;

WiFiClient wifiClient;
PubSubClient client(server, 1883, callback ,wifiClient);

const int trigPin = 5;
const int echoPin = 18;
#define SOUND_SPEED 0.034
long duration;
float distance;
float level;

void setup() {
  Serial.begin(115200);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  wificonnect();
```

```
mqttconnect();  
}
```

```
void loop()  
{  
  digitalWrite(trigPin, LOW);  
  delayMicroseconds(2);  
  digitalWrite(trigPin, HIGH);  
  delayMicroseconds(10);  
  digitalWrite(trigPin, LOW);  
  duration = pulseIn(echoPin, HIGH);  
  distance = duration * SOUND_SPEED/2;  
  level = 400 - distance;  
  Serial.print("Distance (cm): ");  
  Serial.println(level);  
  if(level>300)  
  {  
    Serial.println("ALERT!!");  
    delay(1000);  
    PublishData(level);  
    delay(1000);  
    if (!client.loop()) {  
      mqttconnect();  
    }  
  }  
  else  
  {  
    Publishdata2(level);  
    delay(1000);  
    if (!client.loop()) {  
      mqttconnect();  
    }  
  }  
  delay(1000);  
}
```

```
void PublishData(float dist) {  
  mqttconnect();  
  String payload = "{\"Level\":";  
  payload += dist;  
  payload += ", \"ALERT!!\": \"\" \"Bin Level less than 100 Units \"\"";  
  payload += "}";  
  Serial.print("Sending payload: ");  
  Serial.println(payload);  
  
  if (client.publish(publishTopic, (char*) payload.c_str())) {  
    Serial.println("Publish ok");  
  }
```

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

```
void Publishdata2(float dist) {  
    mqttconnect();  
    String payload = "{\"Level\":\"";  
    payload += dist;  
    payload += "\"}";  
    Serial.print("Sending payload: ");  
    Serial.println(payload);
```

```
    if (client.publish(publishTopic, (char*) payload.c_str())) {  
        Serial.println("Publish ok");  
    } 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();  
    }  
}
```

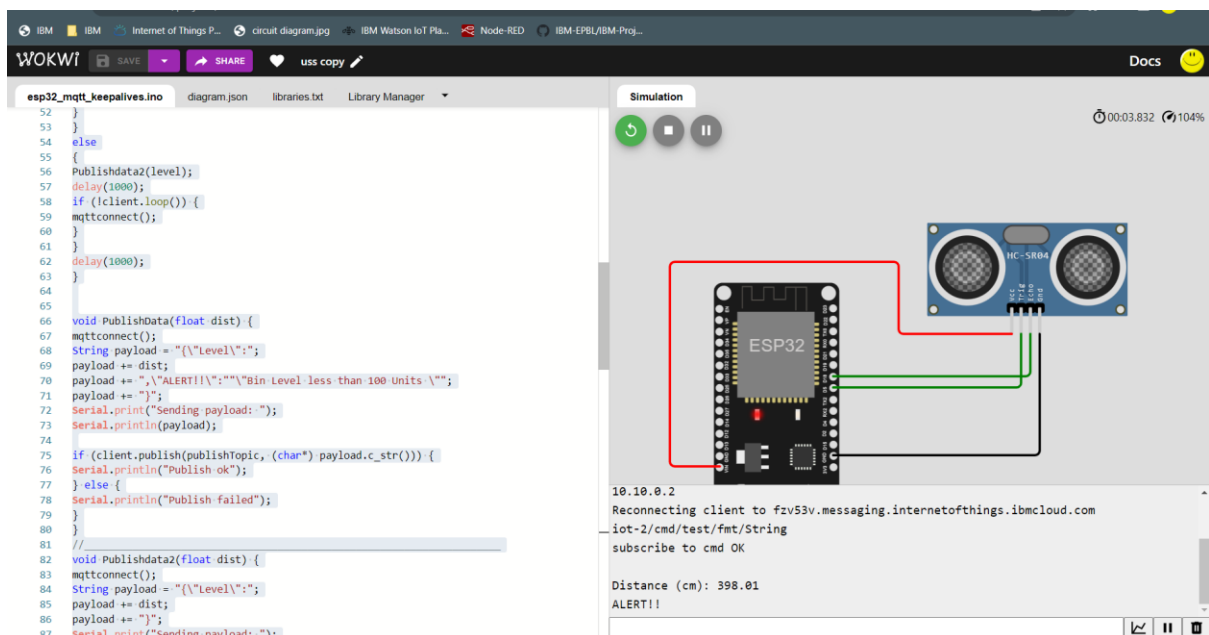
```
void wificonnect()  
{  
    Serial.println();  
    Serial.print("Connecting to ");  
    WiFi.begin("Wokwi-GUEST", "", 6);  
    while (WiFi.status() != WL_CONNECTED) {  
        delay(500);  
        Serial.print(".");  
    }  
    Serial.println("");  
    Serial.println("WiFi connected");  
    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);
  data3="";
}
```

Sensor circuit:



Watson IoT Platform:

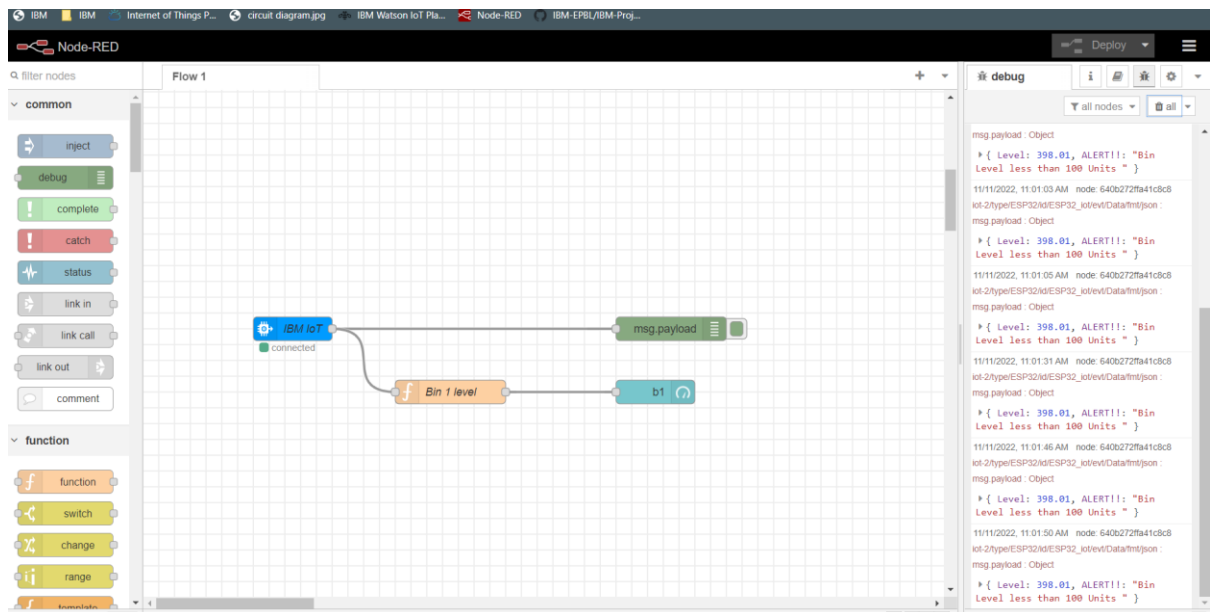
The screenshot shows the 'Browse Devices' page in the Watson IoT Platform. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. A user profile in the top right shows 'akashm3802@gmail.com' and 'ID: fzv53v'. A blue 'Add Device' button is in the top right corner. Below the navigation bar, there are two tabs: 'All Devices' (selected) and 'Diagnose'. A text block explains that the table shows a summary of all devices and can be filtered, organized, and searched. Below this is a search bar labeled 'Search by Device ID' and a 'Device Simulator' toggle switch. The main table lists four devices with columns for Device ID, Status, Device Type, Class ID, Date Added, and Descriptive Location. The status icons are: a grey square for disconnected and a green circle for connected. The bottom of the table shows 'Items per page 50' and '1 of 1 page'. A box at the bottom right indicates '0 Simulations running'.

Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
Bin_1	Disconnected	Bin	Device	Nov 10, 2022 6:50 PM	
ESP32_iot	Connected	ESP32	Device	Nov 8, 2022 7:26 PM	
weather_today	Disconnected	weather_device	Device	Nov 8, 2022 12:20 PM	
weatheribm	Disconnected	weather2	Device	Nov 9, 2022 9:01 PM	

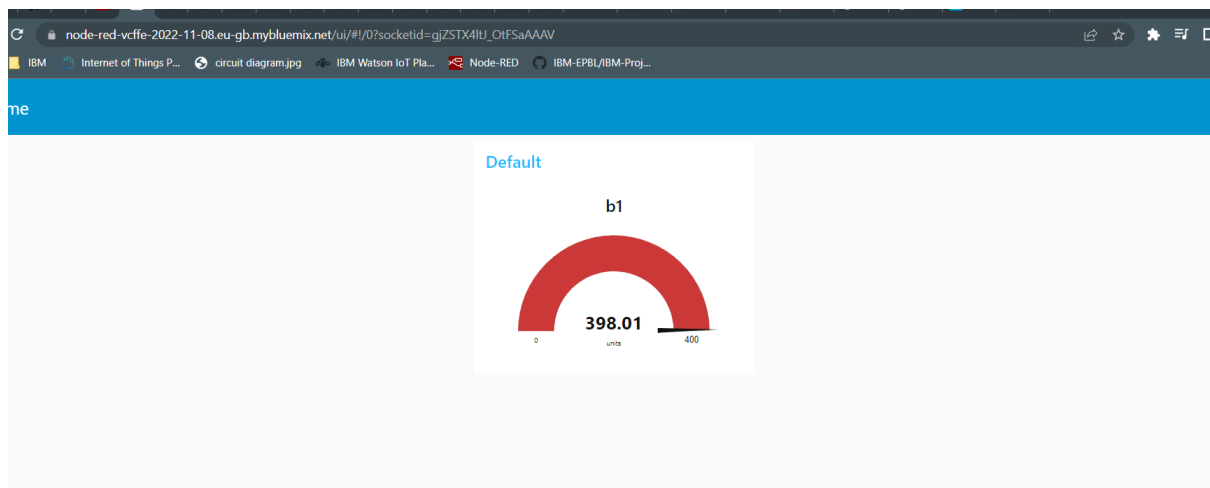
The screenshot shows the 'Recent Events' page for a device in the IBM Watson IoT Platform. The top navigation bar is the same as the previous screenshot. The page has tabs for 'Identity', 'Device Information', 'Recent Events' (selected), 'State', and 'Logs'. A text block explains that the recent events listed show the live stream of data coming and going from the device. Below this is a table with columns for Event, Value, Format, and Last Received. The table shows three identical rows of data. The bottom of the page shows 'Items per page 50' and '1 of 1 page'.

Event	Value	Format	Last Received
Data	{"Level":398.01,"ALERT!!":"Bin Level less than 1..."}	json	a few seconds ago
Data	{"Level":398.01,"ALERT!!":"Bin Level less than 1..."}	json	a few seconds ago
Data	{"Level":398.01,"ALERT!!":"Bin Level less than 1..."}	json	a few seconds ago

Node-RED Connections :



Web UI :



Run the code here : <https://wokwi.com/projects/348010712871731794>