

# Publish Data to the IBM Cloud

Team ID	PNT2022TMID21669
Project Name	Hazardous Area Monitoring for Industrial Plant powered by IoT

WOKWI Simulation using ESP32 and Ultrasonic Sensor:

The screenshot displays the WOKWI simulation interface. On the left, the 'sketch.ino' file is open, showing C++ code for an ESP32 microcontroller. The code includes libraries for WiFi and MQTT, defines pins for an ultrasonic sensor, and sets up an MQTT client to publish distance data to the IBM Watson IoT Platform. The right side shows a 3D simulation of the ESP32 and an HC-SR04 ultrasonic sensor. Below the simulation, a console window shows the output of the program, including the distance measured in centimeters and the JSON payload sent via MQTT.

```
1 //----- IBM ASSIGNMENT-4 PREEITH GOVINDARAJ (312319196123)-----//
2 #include <WiFi.h> //library for wifi
3 #include <PubSubClient.h> //library for MQTT
4
5 #define ECHO_GPIO 12
6 #define TRIGGER_GPIO 13
7 #define MAX_DISTANCE_CM 100 // Maximum of 0.1 meters
8 #include "Ultrasonic.h"
9
10 Ultrasonic ultrasonic(13, 12);
11 int distance;
12
13 void callback(char* topic, byte* payload, unsigned int payloadLength);
14
15 //-----credentials of IBM Accounts-----
16
17 #define ORG "zfc7n" //IBM ORGANIZATION ID
18 #define DEVICE_TYPE "ESP32_Controller" //Device type mentioned in ibm watson IOT Platform
19 #define DEVICE_ID "ibmA-4" //Device ID mentioned in ibm watson IOT Platform
20 #define TOKEN "GRT1AP*2vcMAPBIOft" //Token
21 String data3;
22 float h, t;
23
24 //----- Customise the above values -----
25 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
26 char publishTopic[] = "iot-2/evt/data/fmt/json"; // topic name and type of event perform
27 char subscribeTopic[] = "iot-2/cmd/command/fmt/String"; // cmd REPRESENT command type AND
28 char authMethod[] = "use-token-auth"; // authentication method
29 char token[] = TOKEN;
30 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id
31
32 //-----
33 WiFiClient wifiClient; // creating the instance for wifiClient
34 PubSubClient client(server, 1883, callback, wifiClient); //calling the predefined client
```

Simulation Output:

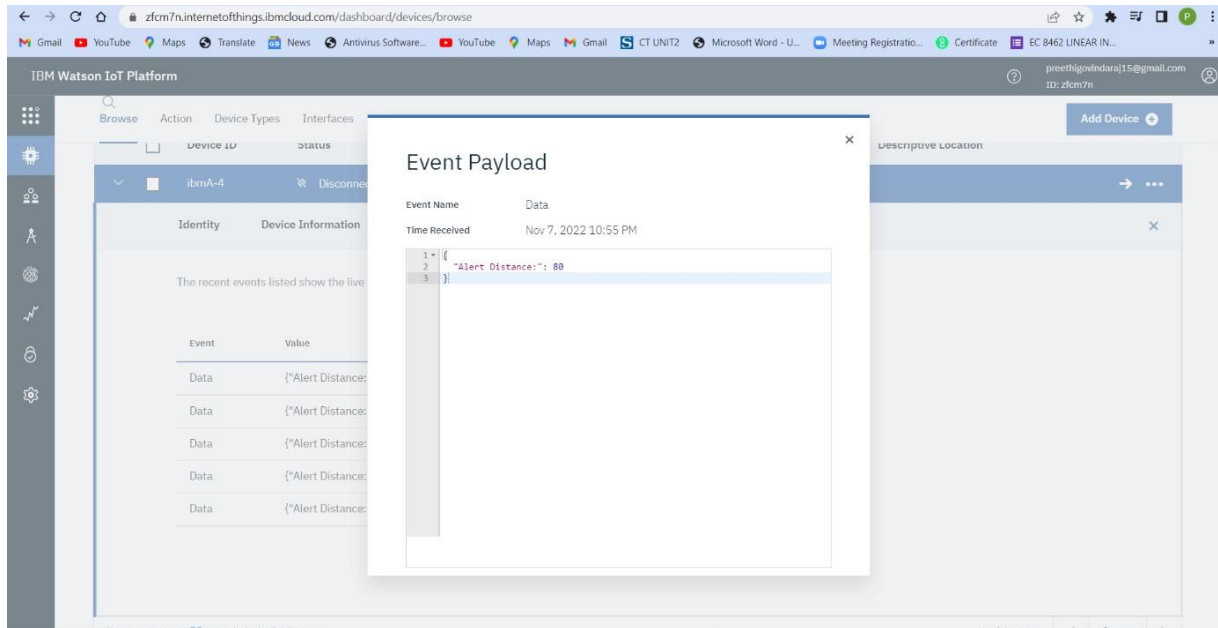
```
Publish ok
Distance in Centimeters: 84
Sending payload: {"Alert Distance":84.00}
Publish ok
Distance in Centimeters: 35
Sending payload: {"Alert Distance":35.00}
Publish ok
```

IBM WATSON PLATFORM DEVICE-EVENT LOG:

The screenshot shows the IBM Watson IoT Platform dashboard. The 'Browse' tab is selected, displaying a table of devices. The device 'ibmA-4' is highlighted, and its 'Recent Events' are shown in a table below. The events table lists the data received from the device, including the alert distance and the time it was received.

Event	Value	Format	Last Received
Data	{"Alert Distance":76}	json	a few seconds ago
Data	{"Alert Distance":80}	json	a few seconds ago
Data	{"Alert Distance":73}	json	a few seconds ago
Data	{"Alert Distance":69}	json	a few seconds ago
Data	{"Alert Distance":68}	json	a few seconds ago

## IBM WATSON PLATFORM DEVICE-EVENT PAYLOAD:



## IBM WATSON PLATFORM DEVICE-BOARD AND GRAPHICAL REPRESENTATION OF DATA FROM WOKWI SIMULATION:



IBM CLOUDANT DB DATA LOG:

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All Documents

Query

Permissions

Changes

Design Documents

library

Document ID

Options

{ } JSON

🔔

Create Document

	_id	Gas Sensor	Humidity	Temperature	Alert Distance
<input type="checkbox"/>	02a1d7eee6685d5adcd1...	0	85.5	39.5	
<input type="checkbox"/>	02a1d7eee6685d5adcd1...	1	59	-21.7	
<input type="checkbox"/>	0375c422ec7b856f24d0...				79
<input type="checkbox"/>	0375c422ec7b856f24d0...				PNT2022TMID0034086
<input type="checkbox"/>	0375c422ec7b856f24d0...				74
<input type="checkbox"/>	0375c422ec7b856f24d0...				44
<input type="checkbox"/>	0375c422ec7b856f24d0...				83
<input type="checkbox"/>	0375c422ec7b856f24d0...				79
<input type="checkbox"/>	0375c422ec7b856f24d0...				58