Project development phase

Sprint - III

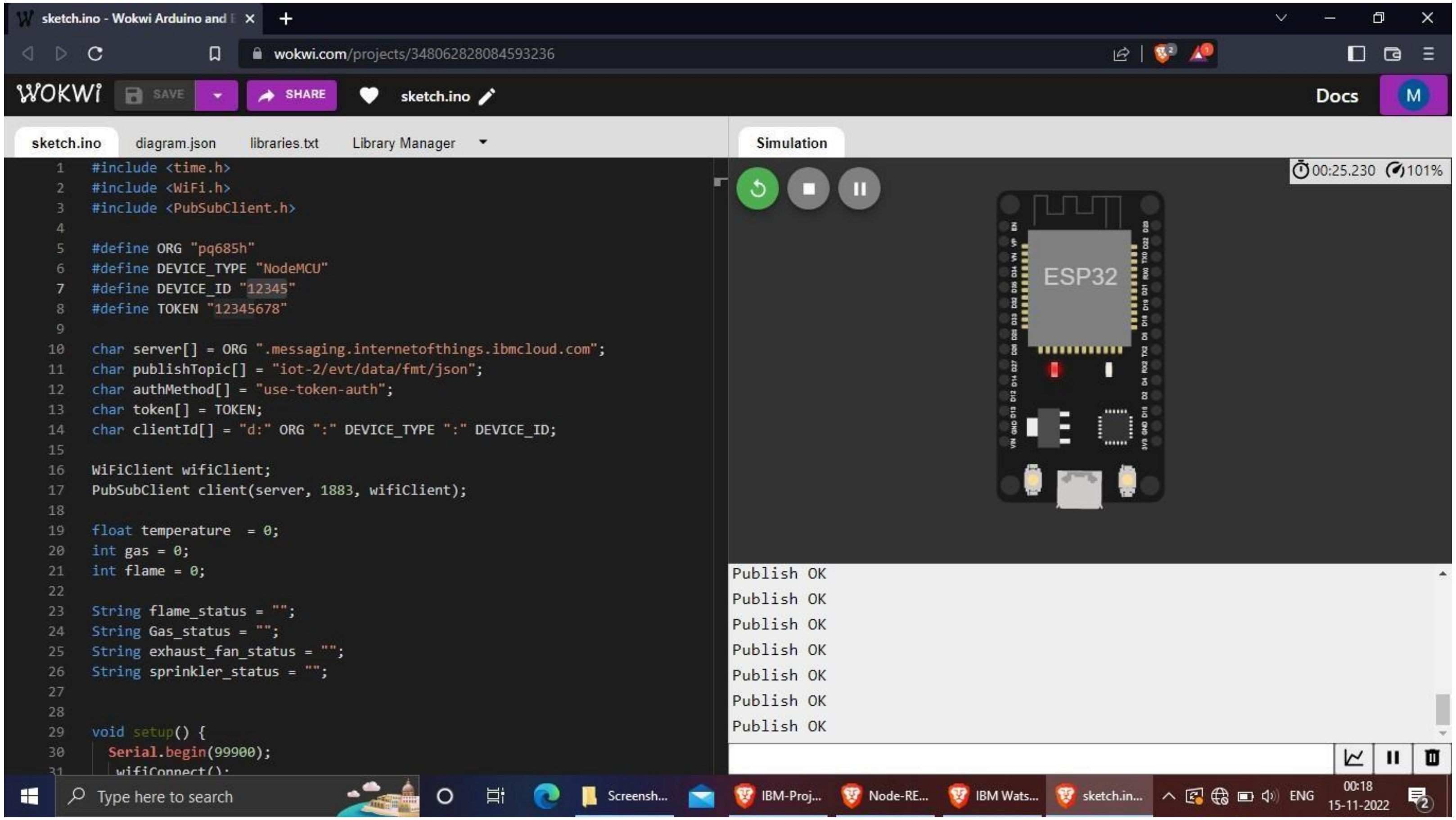
Date	11 November 2022
Team ID	PNT2022TMID13566
Project Name	Project - Industry-specific intelligent fire management system

LINK: https://wokwi.com/projects/348062828084593236

NODE-RED DASHBOARD UILINK:
https://node-red-iwivz-2022-11-13.eu-gb.mybluemix.net/ui/#!/0?socketid=RNNTsORzKbrlp-UqAAAu

OUTPUT:

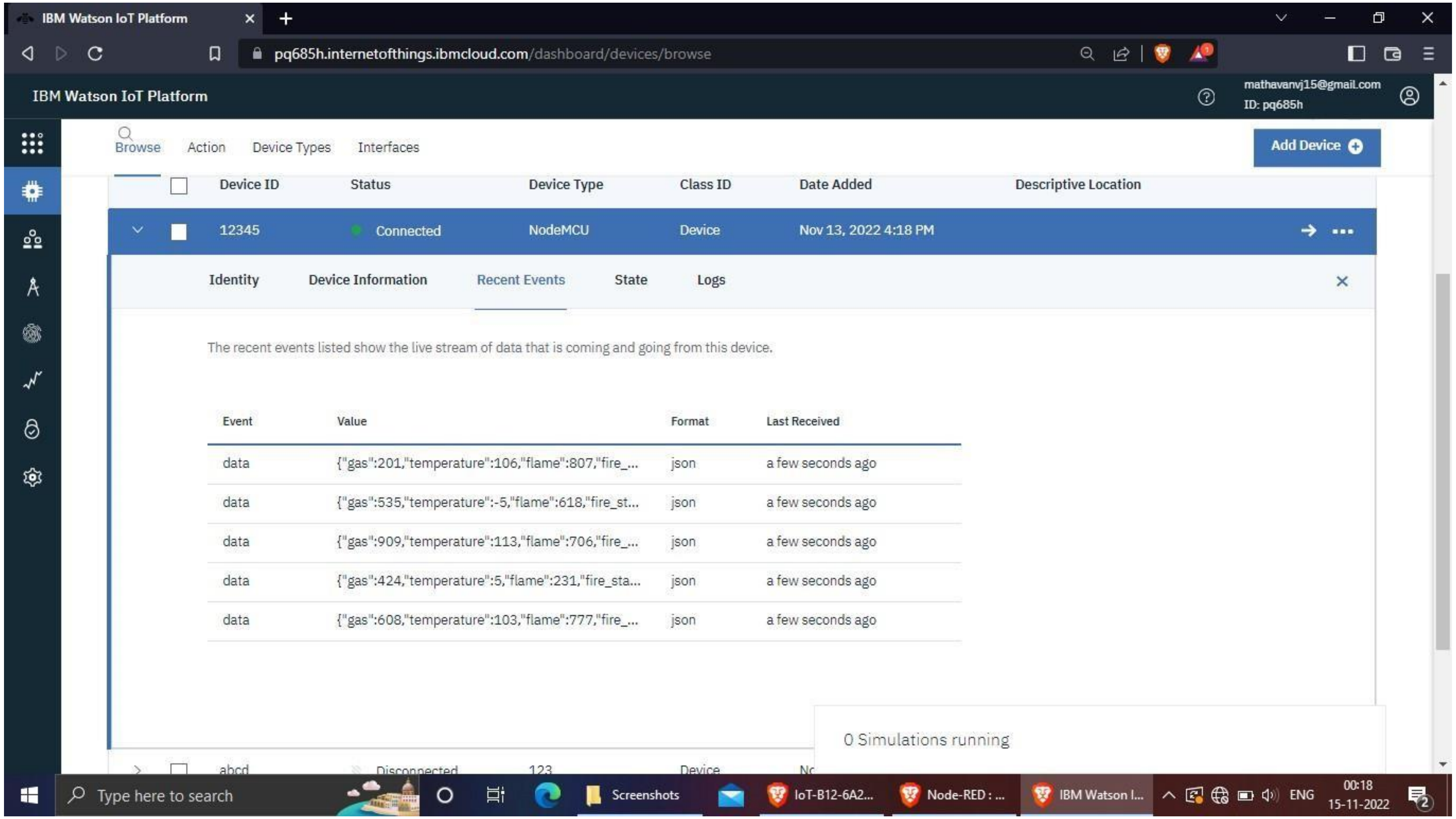
WOKWI SIMULATOR



```
#include <time.h>
#include <WiFi.h>
#include <PubSubClient.h>

#define ORG "pq685h"
#define DEVICE_TYPE "NodeMCU"
#define DEVICE_ID "12345"
#define TOKEN "12345678"

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

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

float temperature  = 0;
int gas = 0;
int flame = 0;

String flame_status = "";
String Gas_status = "";
String exhaust_fan_status = "";
String sprinkler_status = "";


void setup() {
  Serial.begin(99900);
  wifiConnect();
```

```
Publish OK
Publish OK
Publish OK
Publish OK
Publish OK
Publish OK
Publish OK
```

IBM WATSON OUTPUT

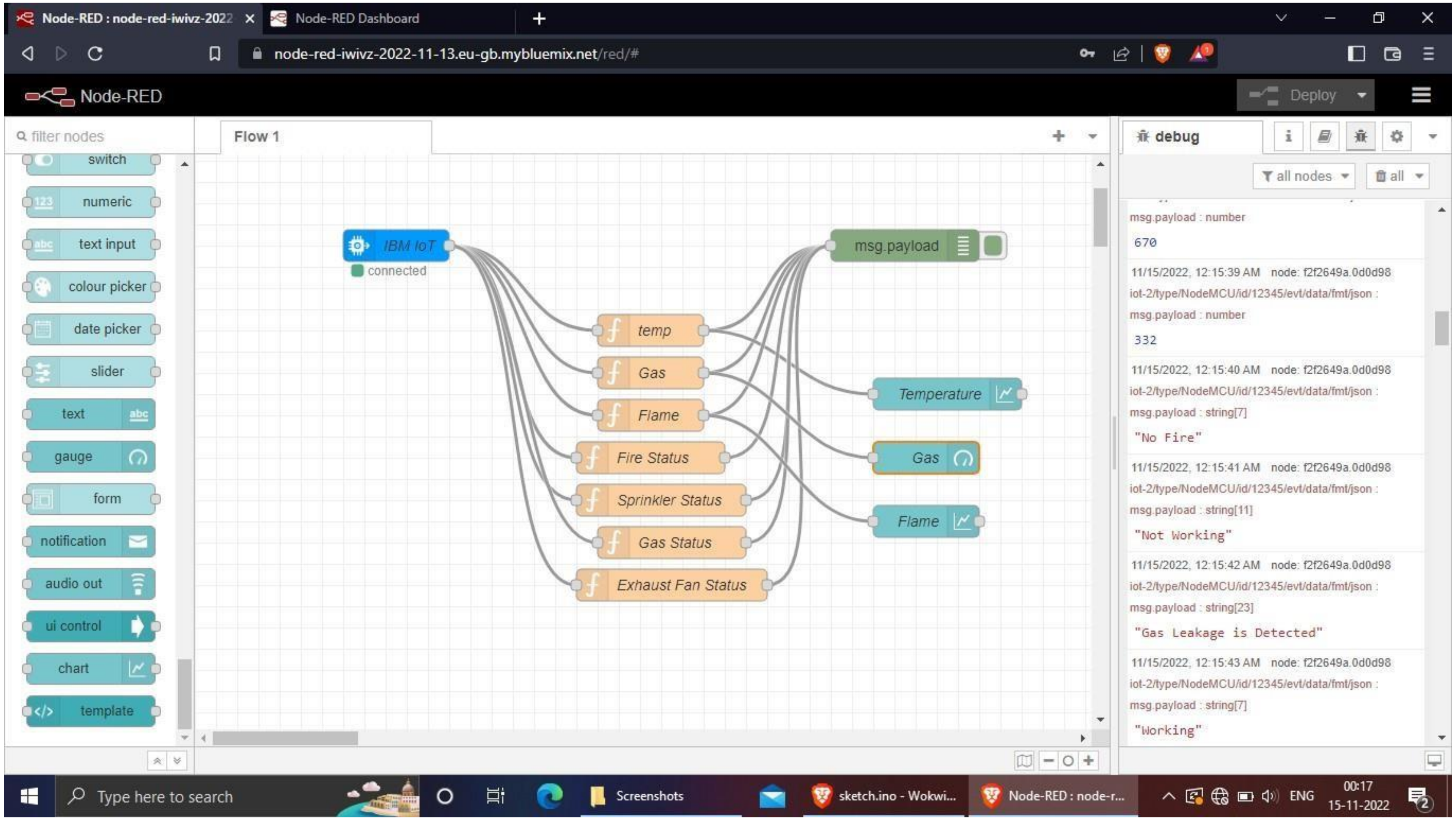


Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
12345	Connected	NodeMCU	Device	Nov 13, 2022 4:18 PM	
abcd	Disconnected	123	Device	Nc	

The recent events listed show the live stream of data that is coming and going from this device.

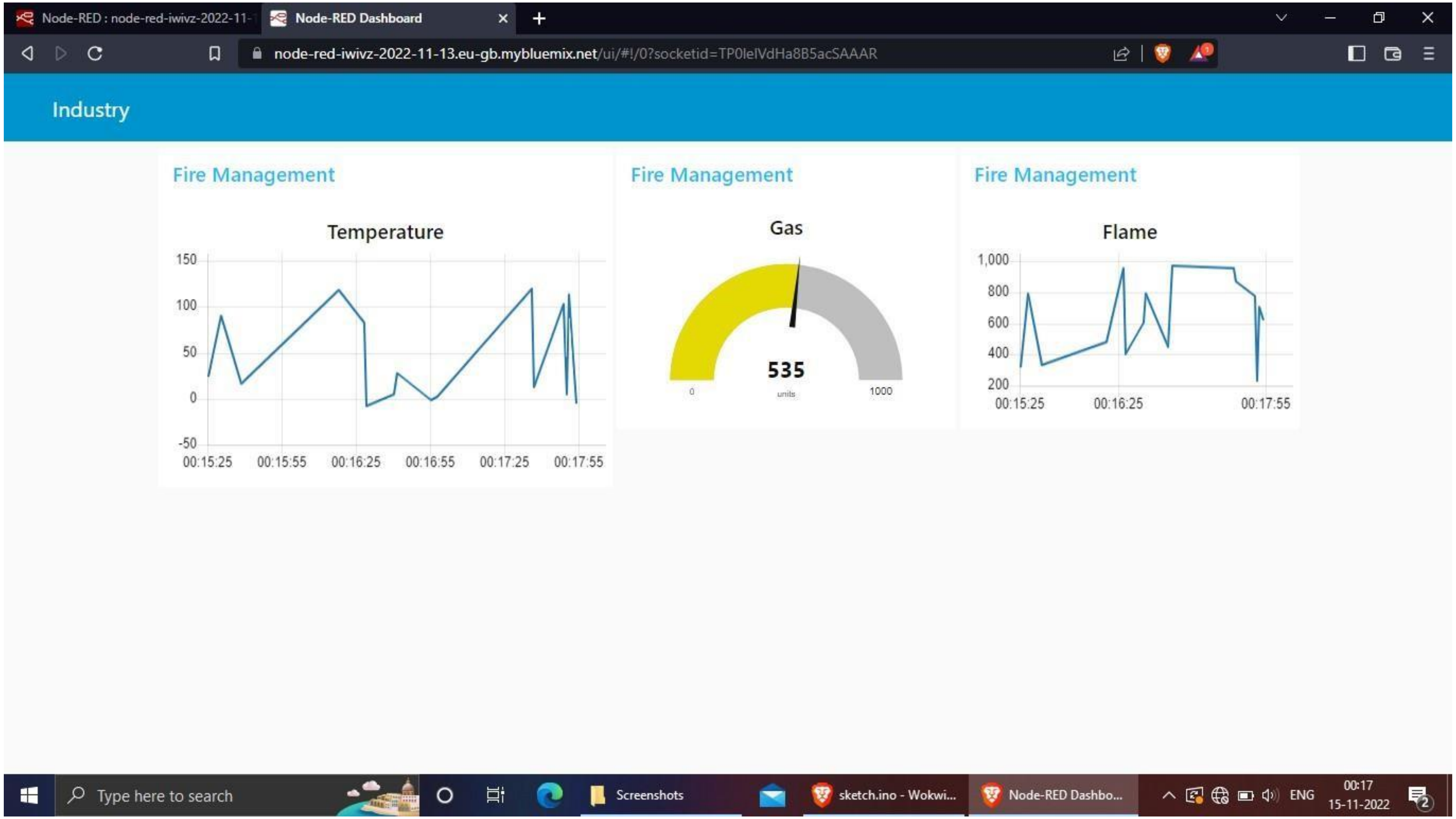
Event	Value	Format	Last Received
data	{"gas":201,"temperature":106,"flame":807,"fire_...	json	a few seconds ago
data	{"gas":535,"temperature":-5,"flame":618,"fire_st...	json	a few seconds ago
data	{"gas":909,"temperature":113,"flame":706,"fire_...	json	a few seconds ago
data	{"gas":424,"temperature":5,"flame":231,"fire_sta...	json	a few seconds ago
data	{"gas":608,"temperature":103,"flame":777,"fire_...	json	a few seconds ago

TRANSFERRING DATA FROM IBM WATSON INTO NODE-RED

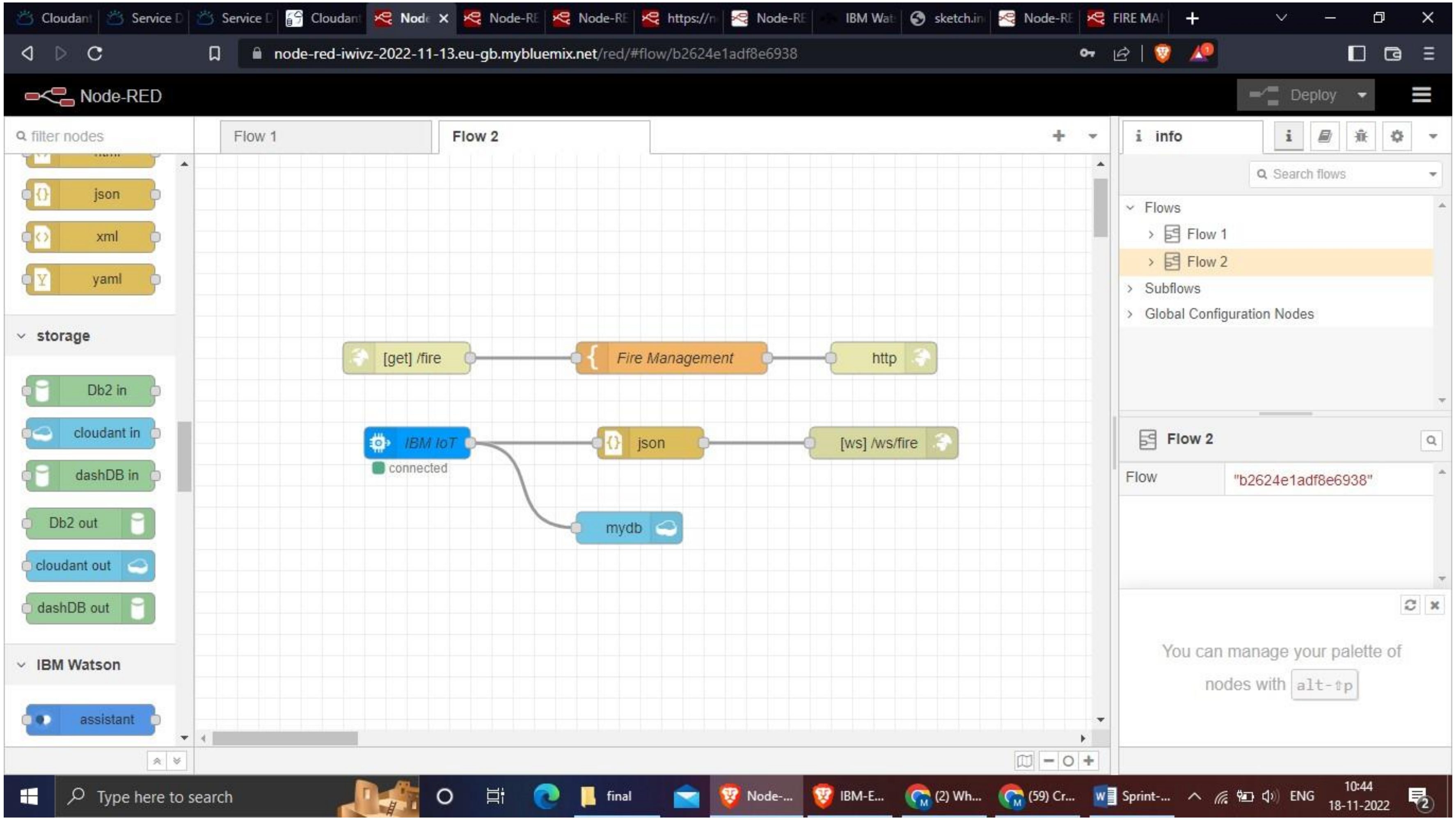


```
msg.payload : number
670
11/15/2022, 12:15:39 AM   node: f2f2649a.0d0d98
iot-2/type/NodeMCU/id/12345/evt/data/fmt/json :
msg.payload : number
332
11/15/2022, 12:15:40 AM   node: f2f2649a.0d0d98
iot-2/type/NodeMCU/id/12345/evt/data/fmt/json :
msg.payload : string[7]
"No Fire"
11/15/2022, 12:15:41 AM   node: f2f2649a.0d0d98
iot-2/type/NodeMCU/id/12345/evt/data/fmt/json :
msg.payload : string[11]
"Not Working"
11/15/2022, 12:15:42 AM   node: f2f2649a.0d0d98
iot-2/type/NodeMCU/id/12345/evt/data/fmt/json :
msg.payload : string[23]
"Gas Leakage is Detected"
11/15/2022, 12:15:43 AM   node: f2f2649a.0d0d98
iot-2/type/NodeMCU/id/12345/evt/data/fmt/json :
msg.payload : string[7]
"Working"
```

NODE DASHBOARD

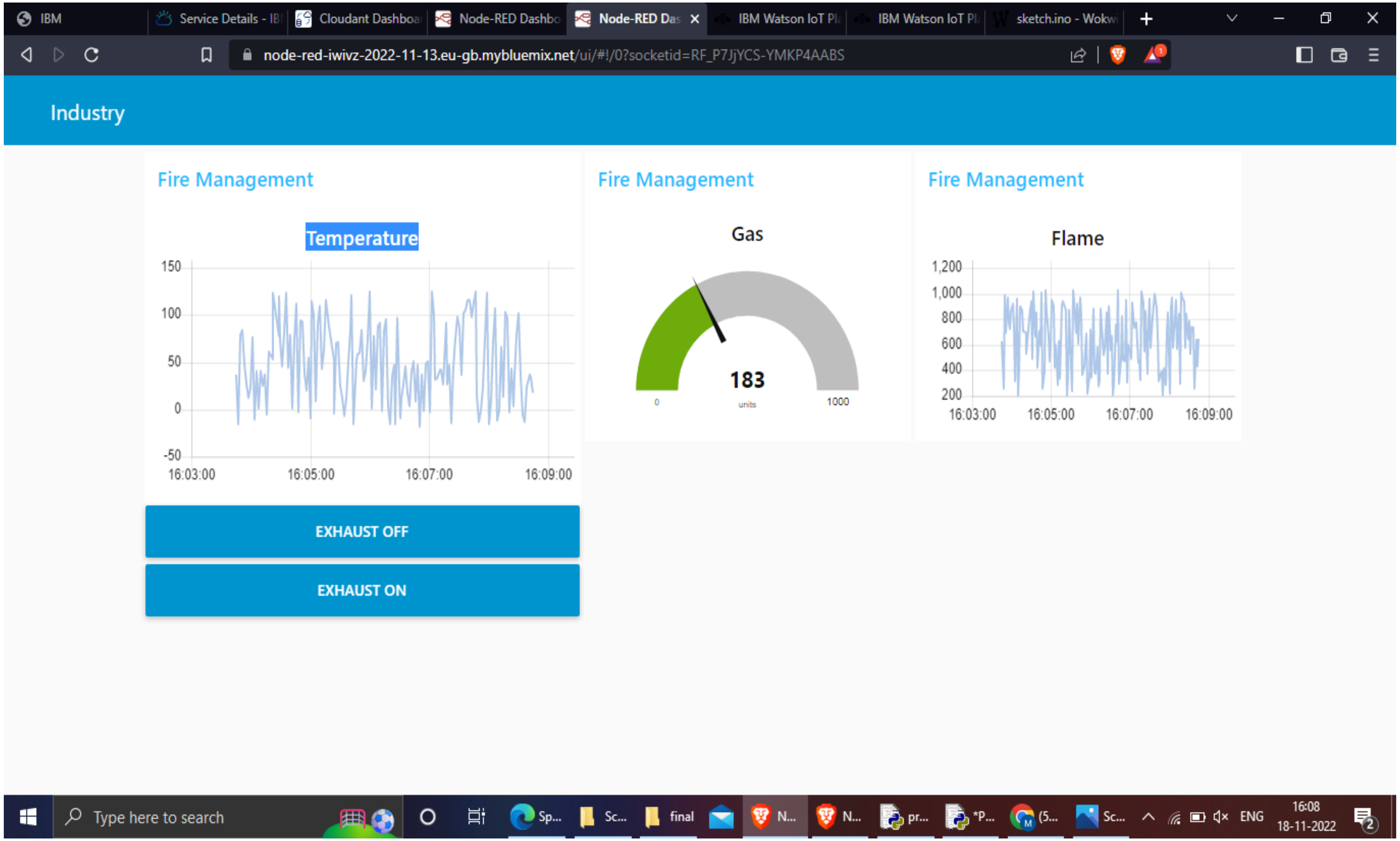


TRANSFERRING DATA FROM NODE-RED INTO WEB UI

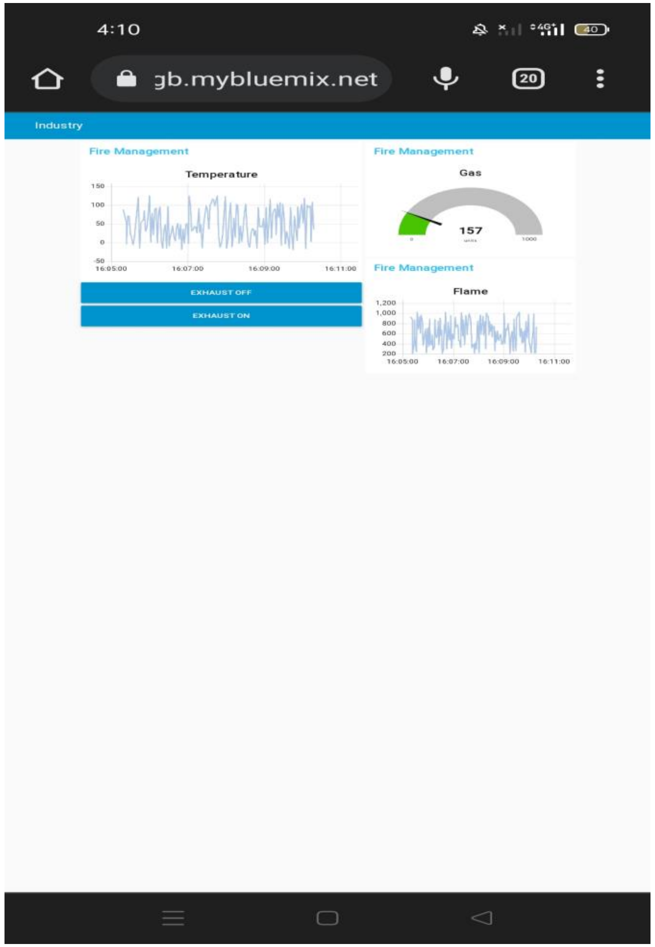


WEB UI

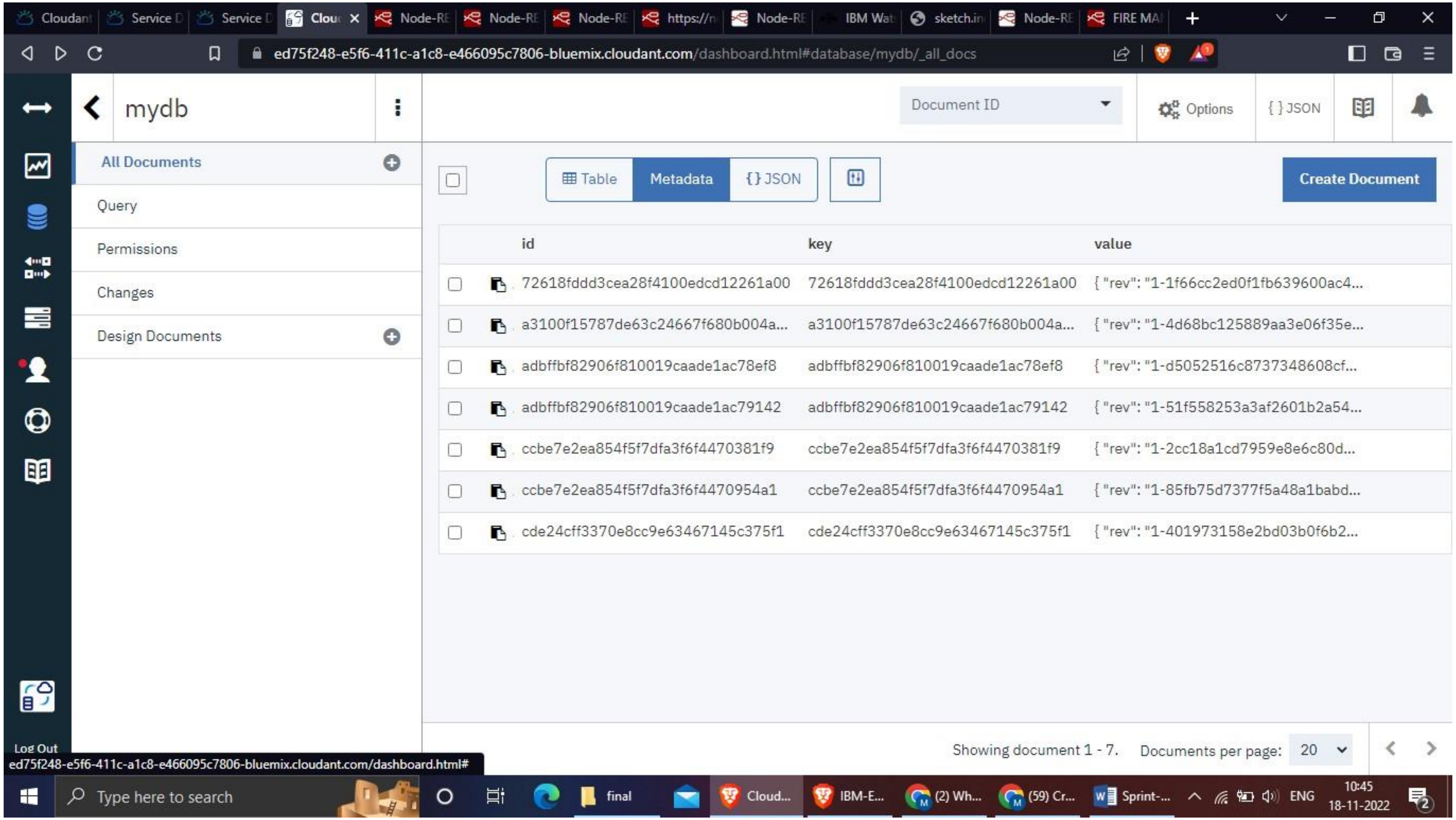
DESKTOP VIEW :



MOBILE VIEW

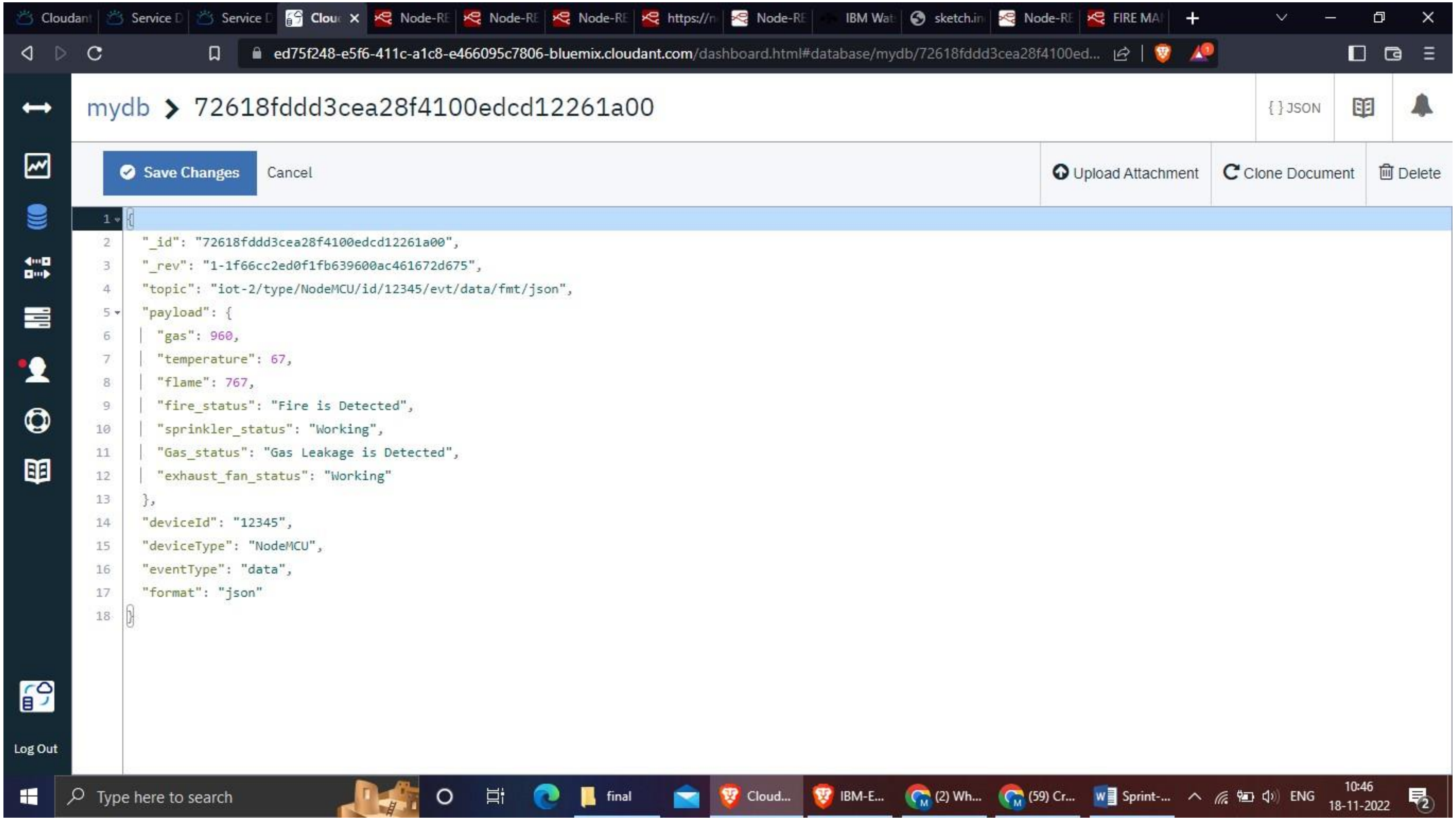

4:10
40
gb.mybluemix.net
20
Industry
Fire Management
Temperature
150
100
50
0
-50
16:05:00
16:07:00
16:09:00
16:11:00
EXHAUST OFF
EXHAUST ON
Fire Management
Gas
157
0
units
1000
Fire Management
Flame
1,200
1,000
800
600
400
200
16:05:00
16:07:00
16:09:00
16:11:00

CLOUDANT:



	id	key	value
□	72618fddd3cea28f4100edcd12261a00	72618fddd3cea28f4100edcd12261a00	{ "rev": "1-1f66cc2ed0f1fb639600ac4...
□	a3100f15787de63c24667f680b004a...	a3100f15787de63c24667f680b004a...	{ "rev": "1-4d68bc125889aa3e06f35e...
□	adbffbf82906f810019caade1ac78ef8	adbffbf82906f810019caade1ac78ef8	{ "rev": "1-d5052516c8737348608cf...
□	adbffbf82906f810019caade1ac79142	adbffbf82906f810019caade1ac79142	{ "rev": "1-51f558253a3af2601b2a54...
□	ccbe7e2ea854f5f7dfa3f6f4470381f9	ccbe7e2ea854f5f7dfa3f6f4470381f9	{ "rev": "1-2cc18a1cd7959e8e6c80d...
□	ccbe7e2ea854f5f7dfa3f6f4470954a1	ccbe7e2ea854f5f7dfa3f6f4470954a1	{ "rev": "1-85fb75d7377f5a48a1babd...
□	cde24cff3370e8cc9e63467145c375f1	cde24cff3370e8cc9e63467145c375f1	{ "rev": "1-401973158e2bd03b0f6b2...

Showing document 1 - 7.   Documents per page: 20



```
{
  "_id": "72618fddd3cea28f4100edcd12261a00",
  "_rev": "1-1f66cc2ed0f1fb639600ac461672d675",
  "topic": "iot-2/type/NodeMCU/id/12345/evt/data/fmt/json",
  "payload": {
    "gas": 960,
    "temperature": 67,
    "flame": 767,
    "fire_status": "Fire is Detected",
    "sprinkler_status": "Working",
    "Gas_status": "Gas Leakage is Detected",
    "exhaust_fan_status": "Working"
  },
  "deviceId": "12345",
  "deviceType": "NodeMCU",
  "eventType": "data",
  "format": "json"
}
```

CODE:

```
#include <time.h>
#include <WiFi.h>
#include <PubSubClient.h>

#define ORG "pq685h"
#define DEVICE_TYPE "NodeMCU"
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char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/data/fmt/json";
char authMethod[] = "use-token-auth";                              char
token[] = TOKEN;  char clientId[] = "d:" ORG ":" DEVICE_TYPE
":" DEVICE_ID;

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

```
float temperature  = 0; int gas
= 0; int flame
= 0;
String flame_status = "";
String Gas_status = "";
String exhaust_fan_status = "";
String sprinkler_status = "";


void setup() {   Serial.begin(99900);
wifiConnect();    mqttConnect();
}

void loop() {

  srand(time(0));

    //initial variables and random generated data

    temperature = random(-20,125);     gas =
random(0,1000);     int flamereading = random(200,1024);
flame =  map(flamereading,200,1024,0,2);
```

```
    //set a flame status      switch
(flame) {     case 0:
flame_status = "No Fire";
        break;                    case    1:
flame_status = "Fire is Detected";
break;
    }

    //send the sprinkler status

    if(flame==1){
sprinkler_status = "Working";       }
else{          sprinkler_status =
"Not Working";

    }

    //toggle the fan according to gas reading

    if(gas > 100){
        Gas_status = "Gas Leakage is Detected";         exhaust_fan_status =
"Working";
    }     else{
        Gas_status = "No Gas Leakage is Detected";
exhaust_fan_status = "Not Working";
    }

    //json format for IBM Watson

    String payload = "{";     payload+="\"gas\":";     payload+=gas;
                                  payload+=",";
payload+="\"temperature\":";
payload+=(int)temperature;                                        payload+=",";
payload+="\"flame\":";     payload+=flamereading;
payload+=",";     payload+="\"fire_status\":\""+flame_status+"\",";
payload+="\"sprinkler_status\":\""+sprinkler_status+"\",";
payload+="\"Gas_status\":\""+Gas_status+"\",";
    payload+="\"exhaust_fan_status\":\""+exhaust_fan_status+"\"}";

    if(client.publish(publishTopic, (char*) payload.c_str()))
    {
        Serial.println("Publish OK");
    }     else{
        Serial.println("Publish failed");
    }
    delay(1000);
            if
(!client.loop())
```

```
    {
      mqttConnect();
    }
}


void wifiConnect()
{
  Serial.print("Connecting to ");
  Serial.print("Wifi");
  WiFi.begin("Wokwi-GUEST", "", 6);
  while (WiFi.status() != WL_CONNECTED)
  {
    delay(500);     Serial.print(".");
}
  Serial.print("WiFi connected, IP address: ");
  Serial.println(WiFi.localIP());

}

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

    Serial.println();
  }
}
```