SPRINT_2

Team ID	PNT2022TMID27888
Project Name	Smart Waste Management System for Metropolitan Cities

AIM:

To create a device for the Cloudant database and IoT Watson Cloud platform. Publish data on the IoT Watson Cloud platform, such as bin weight and bin status values(level). Store user information in the Cloudant database, including user name, password, and Gmail. Using a local Node-RED application, to design the workflow for IoT contexts.

COMPONENTS:

S.NO	COMPONENTS	QUANTITY
1	Ultrasonic sensor	2
2	Servo motor	1
3	ESP32 Microcontroller	1
4	HX711 Load Cell	1
5	LCD 16*2 Display	1

DESCRIPTION:

The below code will display the status of both bin level and bin load for a single smart bin. The status of the bin level is shown in the 16*2 LCD display. The data obtained from the sensors is then published to the Iot Watson Cloud Platform The sensor data can be visually depicted using node-red application.

CODE:

```
#include <ESP32Servo.h>
#include <LiquidCrystal_I2C.h>
#include <HX711.h>
#define DATA_PIN  12
#define CLOCK_PIN 14
#include <WiFi.h>
#include <PubSubClient.h>
WiFiClient wifiClient;
#define ORG "uuyxja"
#define DEVICE_TYPE "NodeMcu"
```

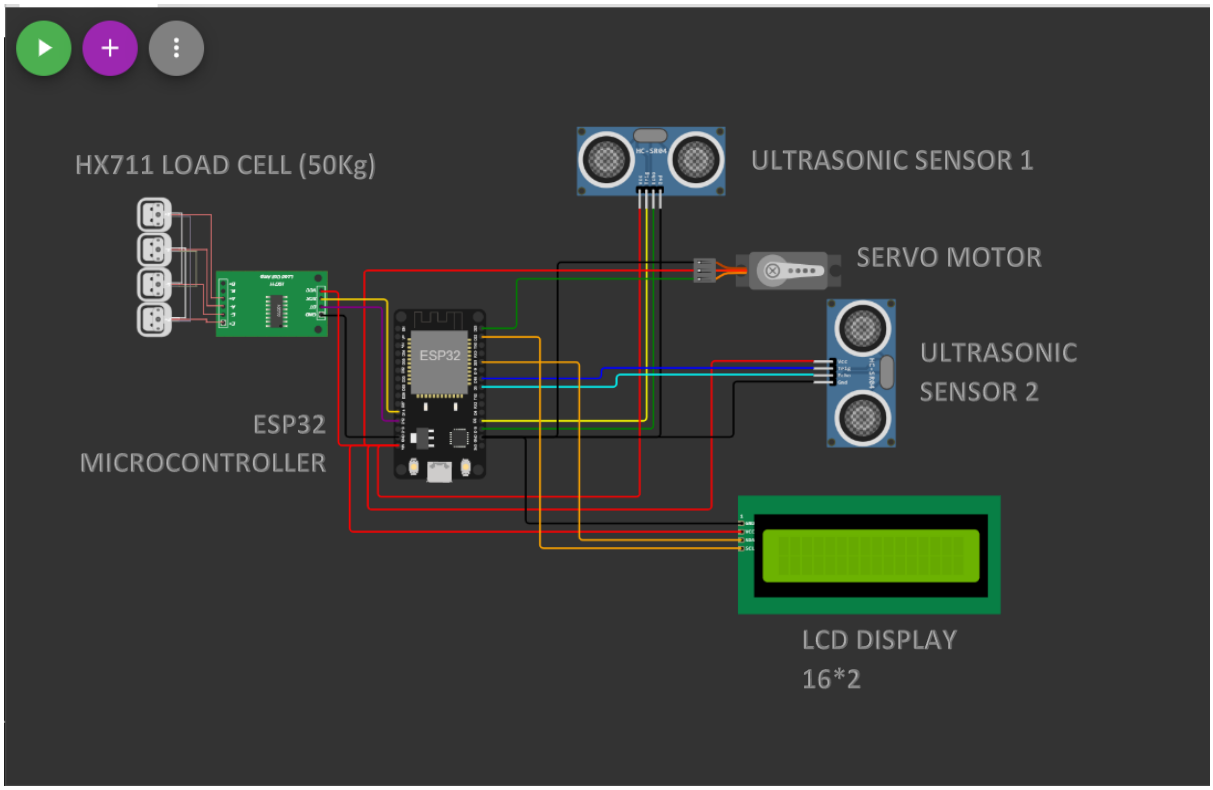
```
#define DEVICE_ID "12345"
#define TOKEN "23323850"
#define speed 0.034
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char topic[] ="iot-2/cmd/home/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
PubSubClient client(server, 1883, wifiClient);
void publishData();
const int trigpin=2;
const int echopin=15;
String command;
String data="";
long duration;
float dist;
LiquidCrystal_I2C LCD = LiquidCrystal_I2C(0x27, 16, 2);
Servo servo;
int trigPin1 = 2;
int echoPin1 = 15;
int trigPin2 = 18;
int echoPin2 = 5;
int duration1;
int distance1;
int duration2;
int distance2;
void setup()
{
Serial.begin(115200);
LCD.begin(16,2);
LCD.init();
LCD.backlight();
LCD.clear();
servo.attach(23);
Serial.begin(115200);
pinMode(trigPin1, OUTPUT);
pinMode(echoPin1, INPUT);
pinMode(trigPin2, OUTPUT);
pinMode(echoPin2, INPUT);
wifiConnect();
mqttConnect();
}
void loop() {
publishData();
delay(500);
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);
      }
       initManagedDevice();
       Serial.println();
    }
}
void initManagedDevice() {
   if(client.subscribe(topic)) {
     Serial.println(client.subscribe(topic));
     Serial.println("subscribe to cmd OK");
}
else {
  Serial.println("subscribe to cmd FAILED"); }
  }
void publishData()
{
  digitalWrite(trigPin1, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin1, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin1, LOW);
  duration1 = pulseIn(echoPin1, HIGH);
  distance1= duration1*0.034/2;
  delay(100);
  digitalWrite(trigPin2, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin2, HIGH);
  delayMicroseconds(10);
```

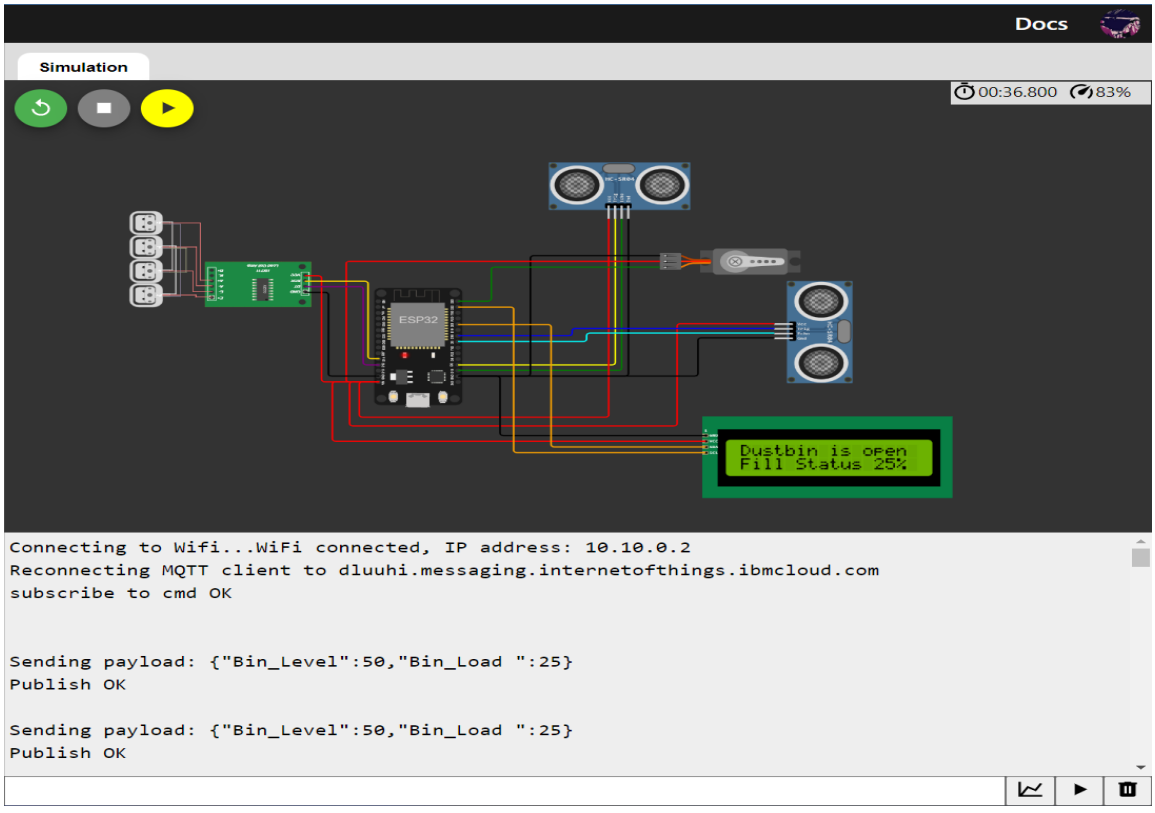
```
  digitalWrite(trigPin2, LOW);
  duration2 = pulseIn(echoPin2, HIGH);
  distance2= duration2*0.034/2;
  delay(100);

  LCD.setCursor(0,1);
  LCD.print("Fill Status ");
  if(distance2>300 && distance2<=400){
    LCD.setCursor(12,1);
    LCD.print("25% ");
    String payload = "{\"Bin_Level\":";payload += "25";payload += ",\"Bin_Load
\":";
    payload += "12.5";
    payload += "}";
    Serial.print("\n");
    Serial.print("Sending payload: ");
    Serial.println(payload);
    if (client.publish(publishTopic, (char*) payload.c_str())) {
      Serial.println("Publish OK");
      } else {
        Serial.println("Publish FAILED");
        }
  }
  else if(distance2 > 200 && distance2<= 299){
    LCD.setCursor(12,1);
    LCD.print("50%");
    String payload = "{\"Bin_Level\":";payload += "50";payload += ",\"Bin_Load
\":";
    payload += "25";payload += "}";
    Serial.print("\n");
    Serial.print("Sending payload: ");
    Serial.println(payload);
    if (client.publish(publishTopic, (char*) payload.c_str())) {
      Serial.println("Publish OK");
      } else {
        Serial.println("Publish FAILED");
        }
  }
  else if(distance2 >50 && distance2<=199){
    LCD.setCursor(12,1);
    LCD.print("75%");
    String payload = "{\"Bin_Level\":";payload += "75";payload += ",\"Bin_Load
\":";
    payload += "37.5";payload += "}";
    Serial.print("\n");
    Serial.print("Sending payload: ");
    Serial.println(payload);
    if (client.publish(publishTopic, (char*) payload.c_str())) {
```

```
      Serial.println("Publish OK");
      } else {
        Serial.println("Publish FAILED");
        }
  }
  else{
    LCD.setCursor(12,1);
    LCD.print("100%");
    String payload = "{\"Bin_Level\":";
    payload += "100";payload += ",\"Weight \":"; payload += "50";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");
        }
  }
  if(distance1<=50){
    LCD.setCursor(0,0);
    LCD.print("Dustbin is open ");
    servo.write(90);
  }
  else{
    LCD.setCursor(0,0);
    LCD.print("Dustbin is close ");
    servo.write(0);
  }
}
```

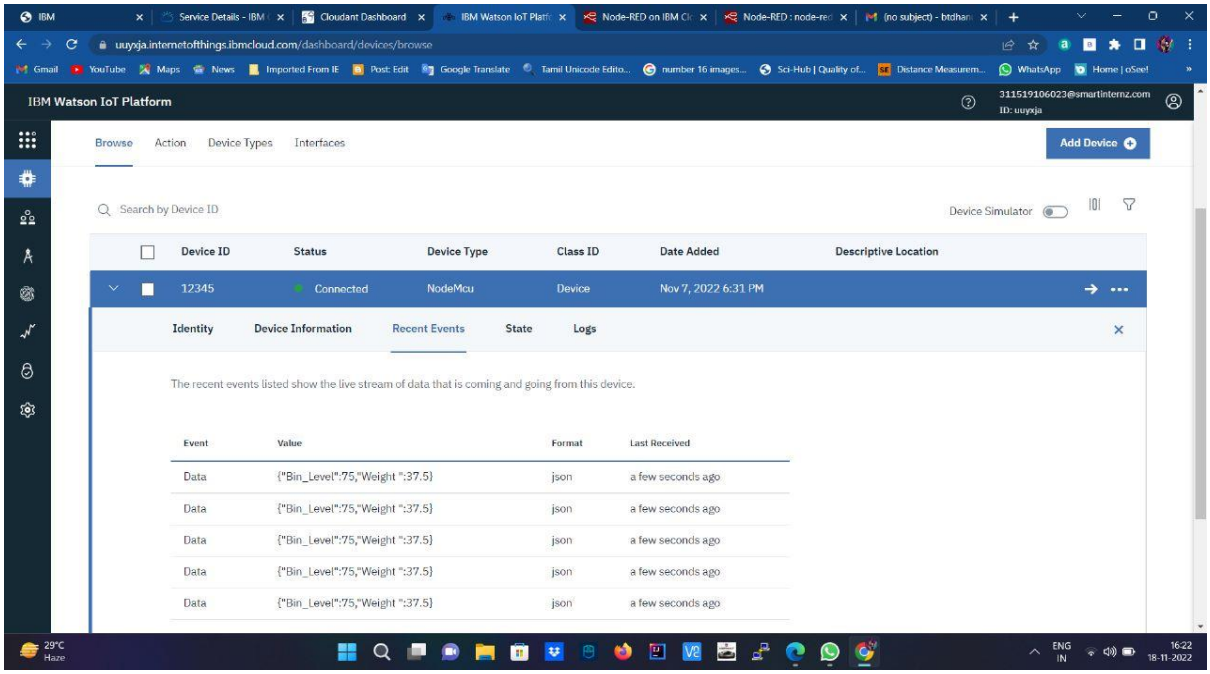
CIRCUIT DIAGRAM:



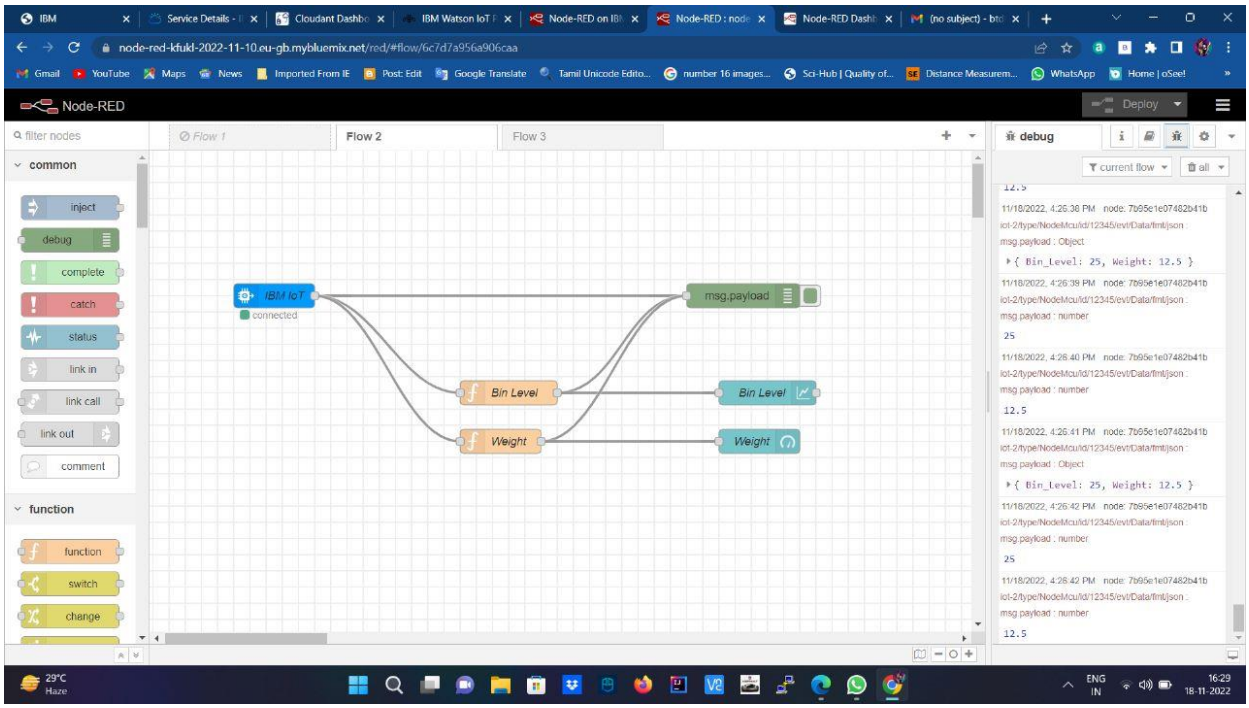
OUTPUT:



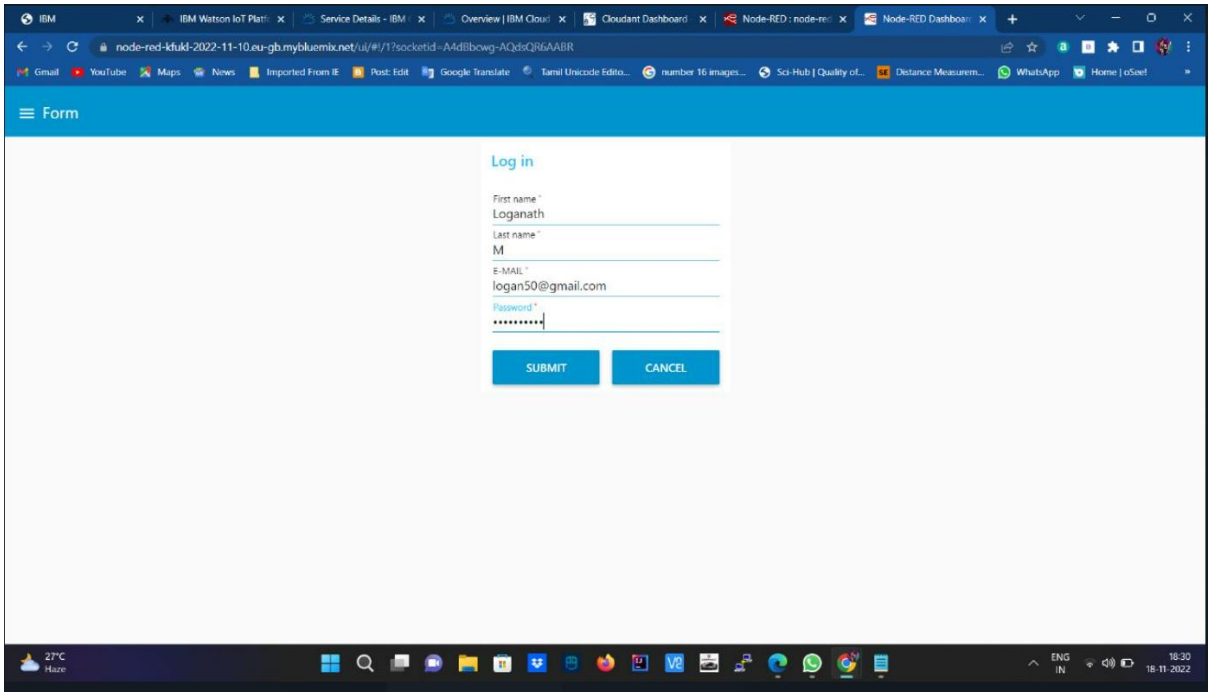
IBM WATSON IoT PLATFORM:

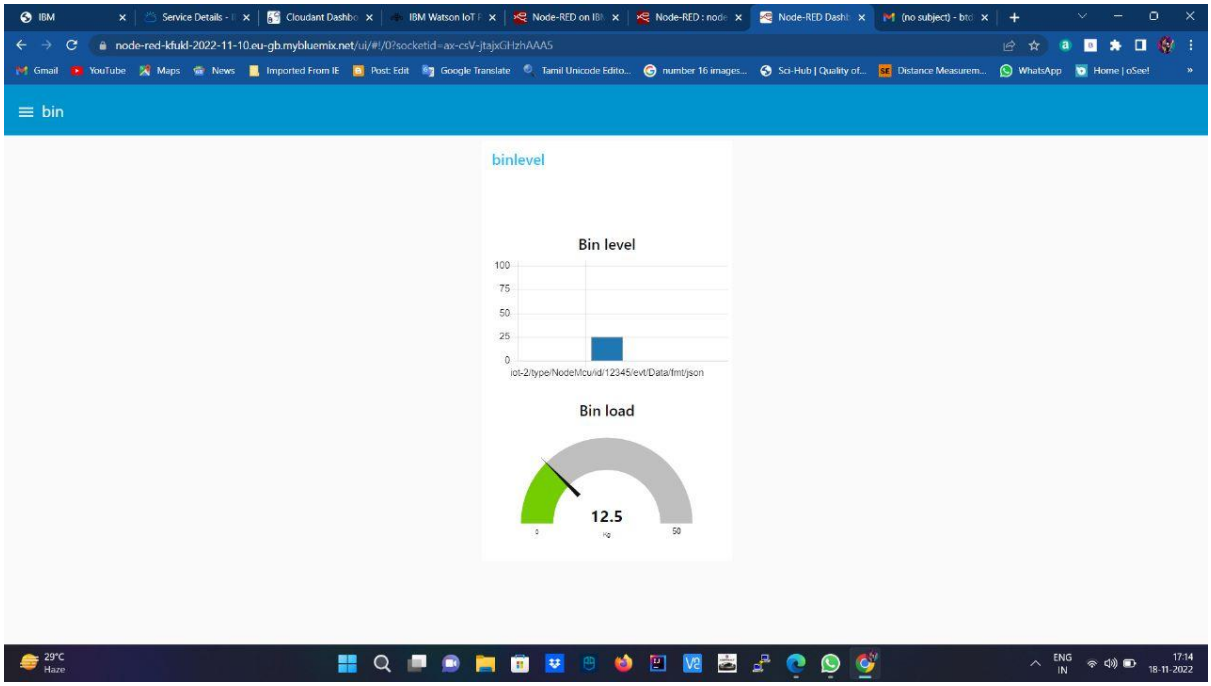


Node-red workflow:

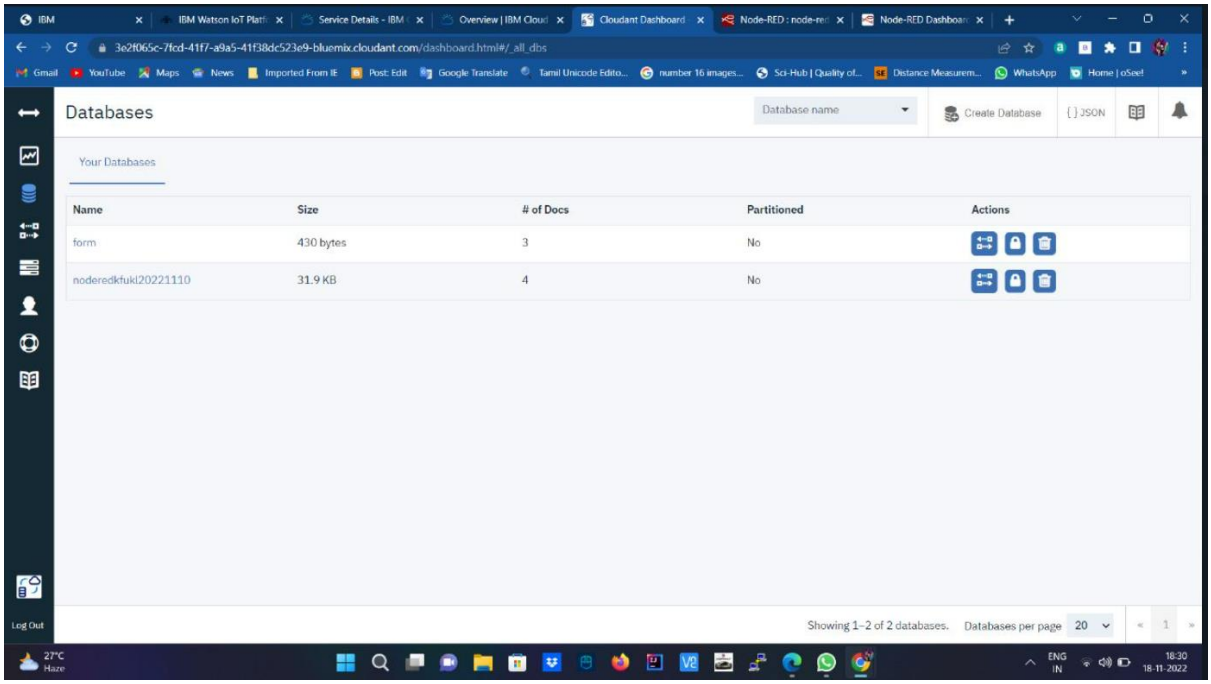


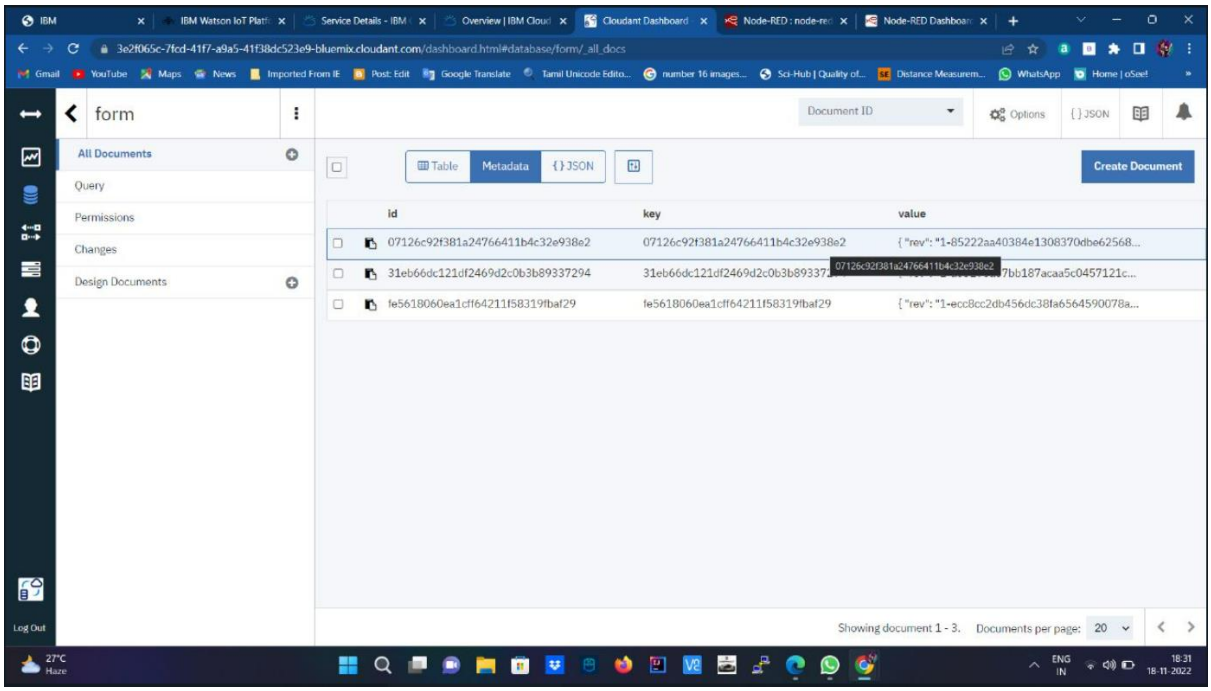
Node-red WEB UI:

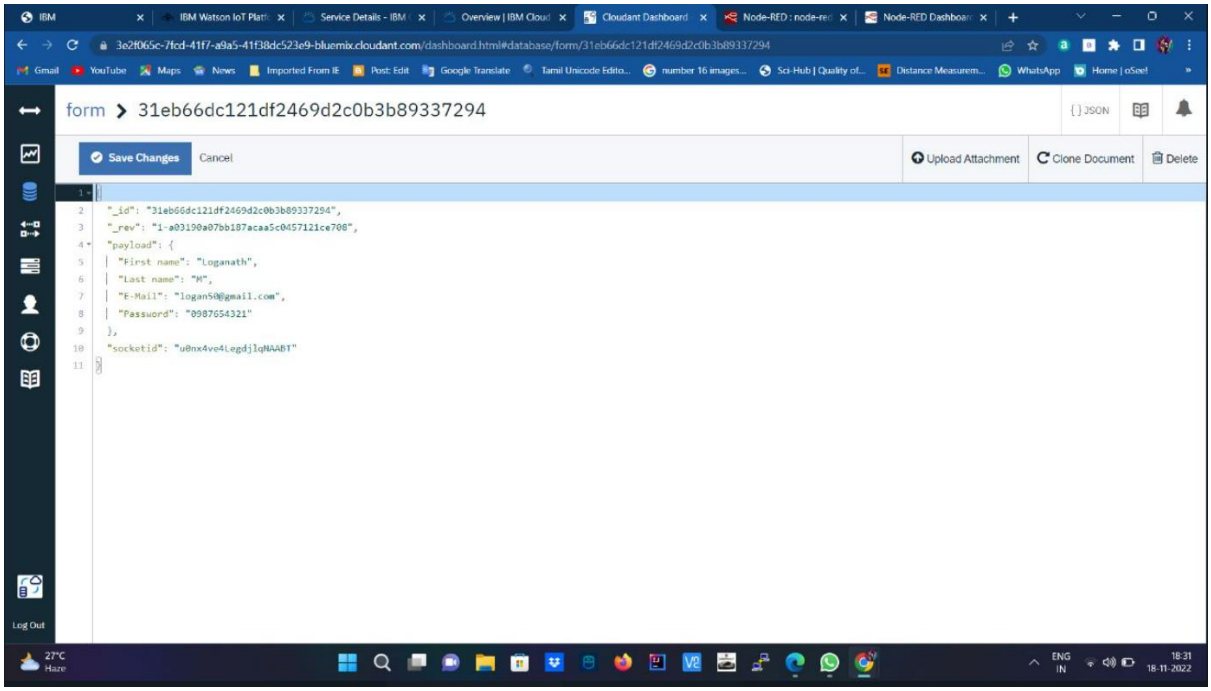




CLOUDANT DATABASE:






IBM
IBM Watson IoT Platf
Service Details - IBM
Overview | IBM Cloud
Cloudant Dashboard
Node-RED : node-red
Node-RED Dashboard
3e2f065c-7fcd-41f7-a9a5-41f38dc523e9-bluemix.cloudant.com/dashboard.html#database/form/31eb66dc121df2469d2c0b3b89337294
Gmail
YouTube
Maps
News
Imported From IE
Post: Edit
Google Translate
Tamil Unicode Edito...
number 16 images...
Sci-Hub | Quality of...
Distance Measurem...
WhatsApp
Home | oSee!
form > 31eb66dc121df2469d2c0b3b89337294
{ } JSON
Save Changes
Cancel
Upload Attachment
Clone Document
Delete
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2 "_id": "31eb66dc121df2469d2c0b3b89337294",
3 "_rev": "1-a03190a07bb187acaa5c0457121ce708",
4 "payload": {
5 "First name": "Loganath",
6 "Last name": "M",
7 "E-Mail": "loganS0@gmail.com",
8 "Password": "0987654321"
9 },
10 "socketid": "u0nx4ve4LegdjlqNAABT"
11 }
Log Out
27°C
Haze
ENG
IN
18:31
18-11-2022