

Smart Farmer-IOT Enabled Smart Farming

Project Development Phase

SPRINT DELIVERY-1

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Team ID	PNT2022TMID33827
Project Name	Smart Farmer-IOT Enabled Smart Farming Application
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INTRODUCTION:

The main aim of this project is to minimize the involvement of farmers in every aspects of farming by involving the usage of sensors for detecting the amount of temperature, humidity, soil moisture so that the farmers can measure everything effortlessly by their smartphones and grow their plants effectively and get a lot of profits.

PROBLEM STATEMENT:

Farmers are not able to measure the amount of moisture, temperature accurately so without knowing them accurately they are watering the plants irrespective of knowing the water contents and this is leading to overwatering of crops and affecting the growth of plants. A major problem is that the farmers have to spend most of their life time in their farm in order to monitor the growth of plants continuously to grow the plant effectively.

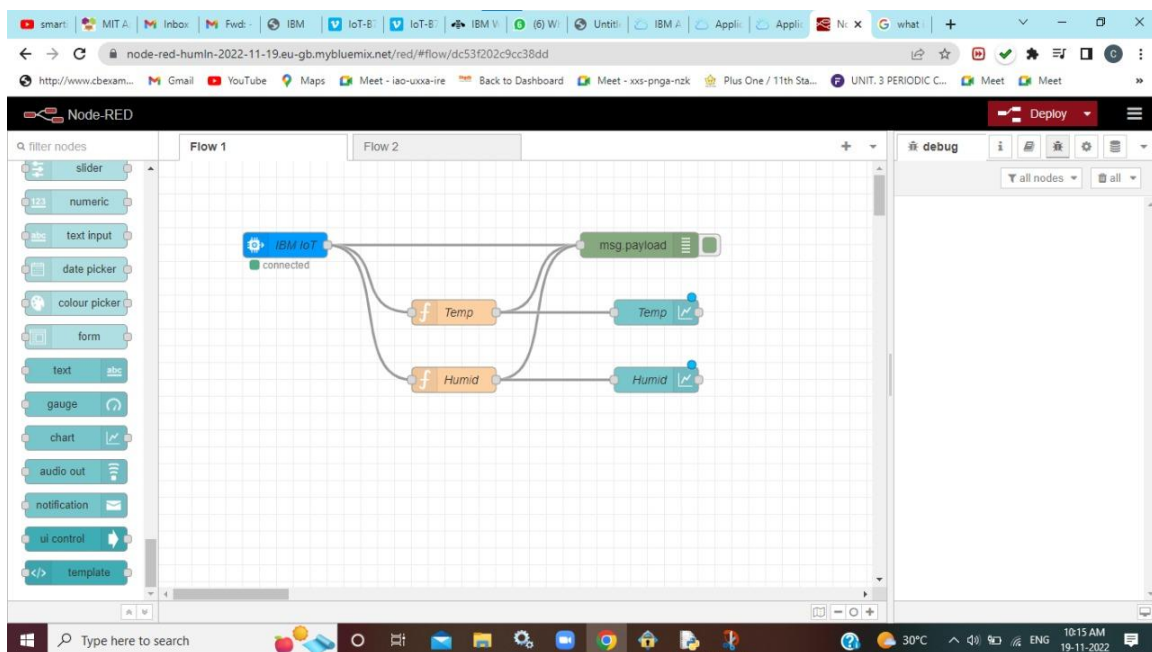
PROPOSED SOLUTION:

A suitable solution to this problem is involving the usage of sensors to measure the temperature, humidity, soil moisture and it will be informed to the farmers through their mobile phones. This will help the farmers to grow plants effectively without the farmers staying all the time in their respective farms.

REQUIRED SOFTWARE INSTALLMENTS:

NODE- RED:

Node-Red is a flow based development tool for visual programming developed originally by IBM for wiring together hardware devices, APIs and online services as part of the internet of Things. Node-Red provides a web browser based flow editor, which can be used to create JavaScript functions.



INSTALLATION:

- First install npm/node.js.
- Open cmd prompt.
- Type => npm install node-red.

TO RUN THE APPLICATION:

- Open cmd prompt.
- Type => Node-Red.
- Then open on your browser.

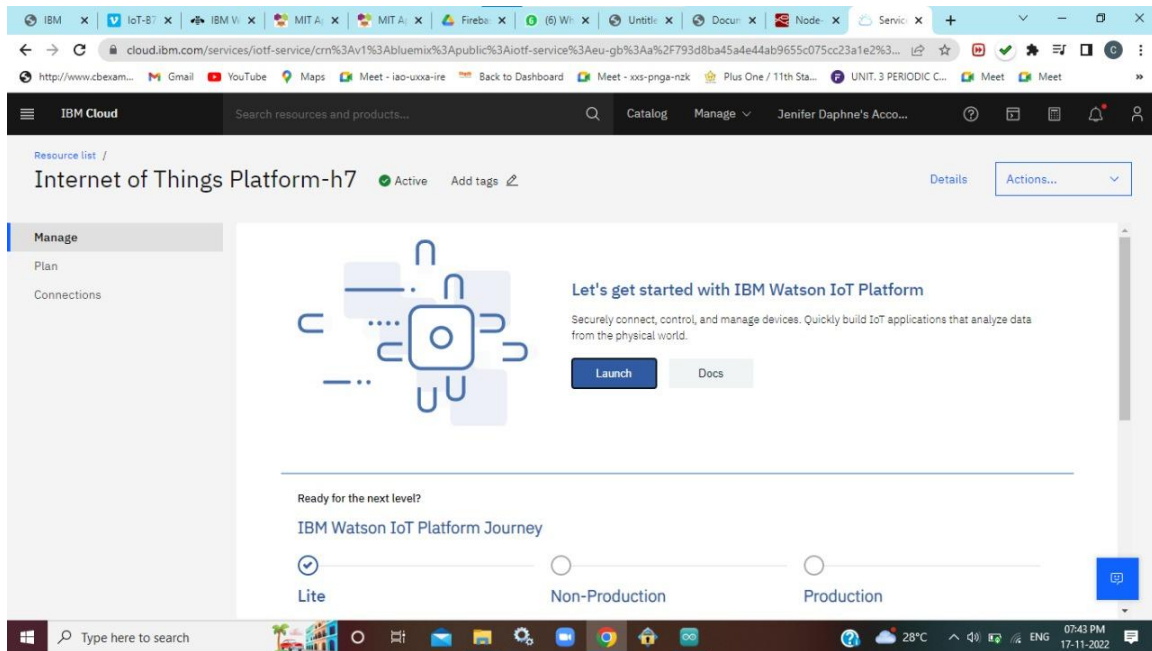
INSTALLATION OF IBM IOT AND DASHBOARD MODES FOR NODE-RED:

Inorder to connect to IBM Watson IOT platform and create the WEB UI these nodes are required.

1. IBM IOT node.
2. Dashboaard node.

IBM WATSON IOT PLATFORM:

A fully managed,cloud hosted service with capabilities for device registration,connectivity,control,rapid visualization and data storage.IBM Watson IOT platform is a managed,cloud hosted service designed to make it simple to derive value from your IOT devices.

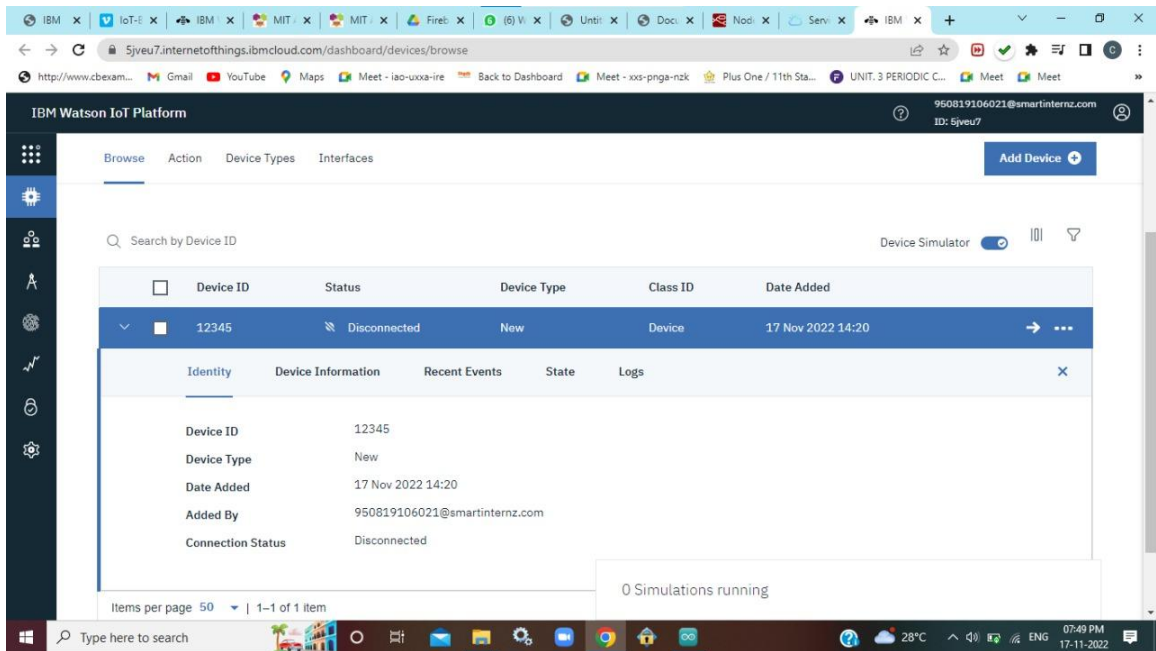


STEPS TO CONFIGURE:

- Create an account in IBM cloud using your email ID.
- Create IBM Watson platform services in your IBM cloud Account.
- Launch the IBM Watson IOT platform.

Create a new device.

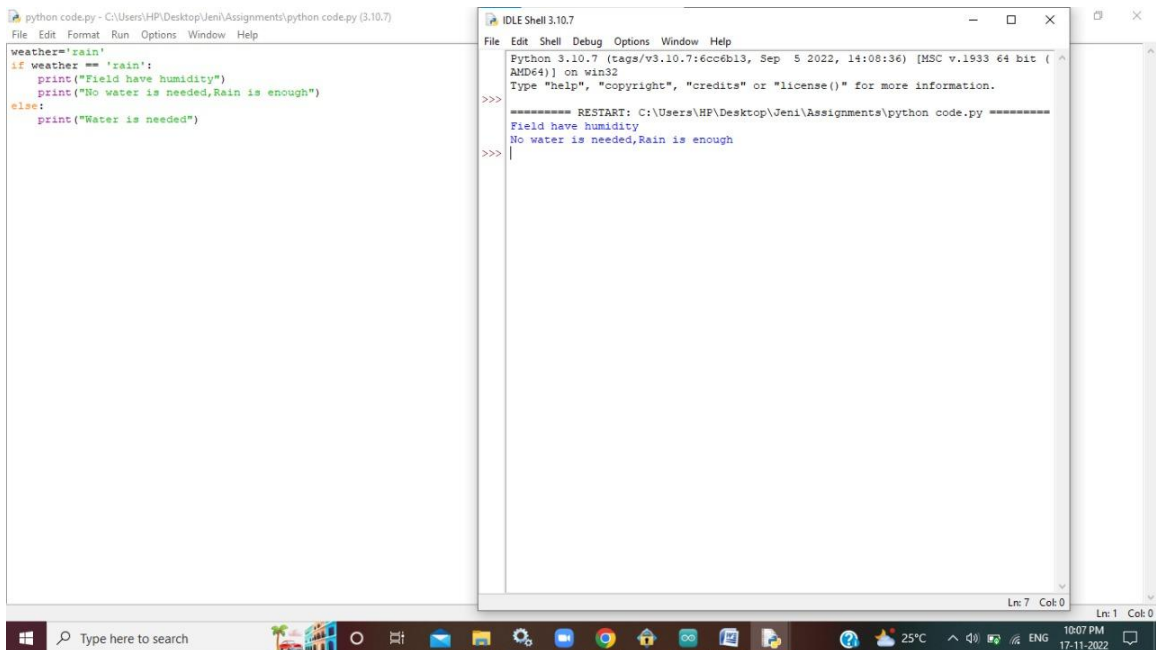
- Give credentials like device type,device ID,Auth.Token
- Create API key and store API key and token elsewhere.



PYTHON IDE:

Install python 3 compiler

Install and python IDE to execute python scripts in many case I used command prompt to execute.



CODE:

```
#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 11
#define LED 2
```

```
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 "5jveu7"//IBM ORGANITION ID
#define DEVICE_TYPE "abcdef"//Device type
mentioned in ibm watson IOT Platform
#define DEVICE_ID "123456"//Device ID mentioned
in ibm watson IOT Platform
#define TOKEN "123456789"      //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/command/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()// configureing 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("temp:");
    Serial.println(t);
    Serial.print("Humid:");
    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 = "{\"temp\":";
    payload += temp;
    payload += "," " \"Humid\":";
    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)
{

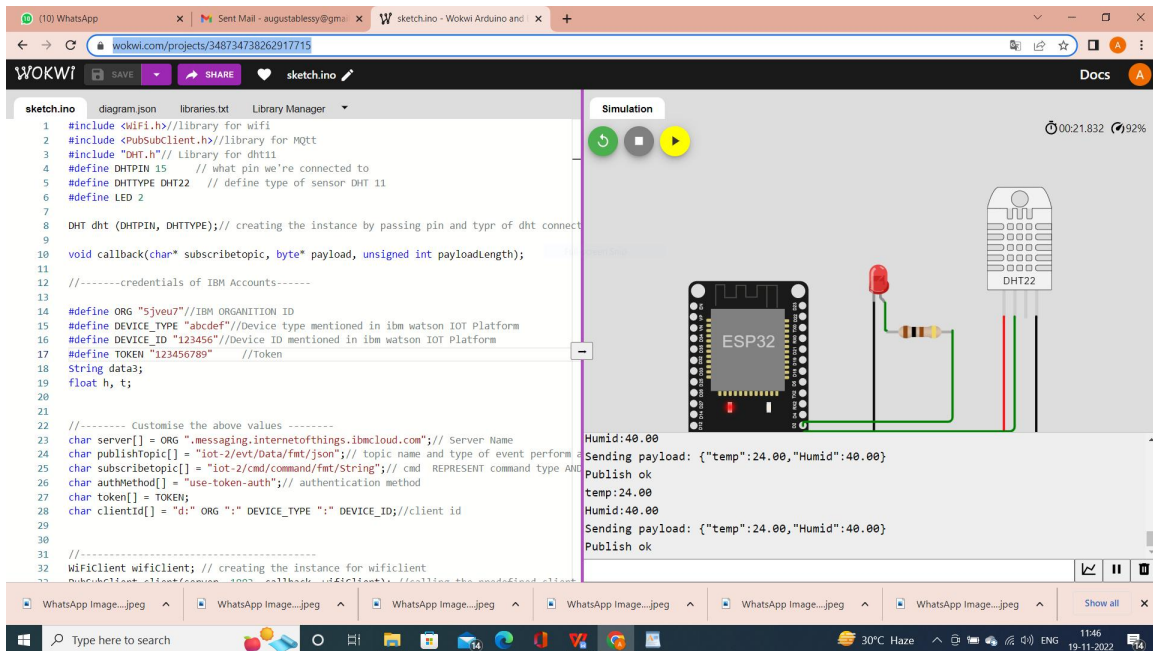
    Serial.print("callback invoked for topic: ");
    Serial.println(subscribetopic);
    for (int i = 0; i < payloadLength; i++) {
        //Serial.print((char)payload[i]);
        data3 += (char)payload[i];
    }
    Serial.println("data: "+ data3);
    if(data3=="lighton")
    {

```

```

Serial.println(data3);
digitalWrite(LED,HIGH);
}
else
{
Serial.println(data3);
digitalWrite(LED,LOW);
}
data3="";
}

```



IOT SIMULATOR:

In our project in place of sensors we are going to use IOT sensor simulator which give random readings to the connected cloud.

THE LINK TO SIMULATOR:

<https://wokwi.com/projects/348734738262917715>

We need to give the credentials of the created device in IBM Watson IOT platform to connect cloud to simulator.

