Thingsboard

Thigsboard is a open source platform that enables device connectivity via industry standard IoT protocols - MQTT, CoAP and HTTP. ThingsBoard combines scalability, fault-tolerance and performance so you will never lose your data.

In this session we will use a local deployment of Thigsboard. Your instructor will provide you with connection information.

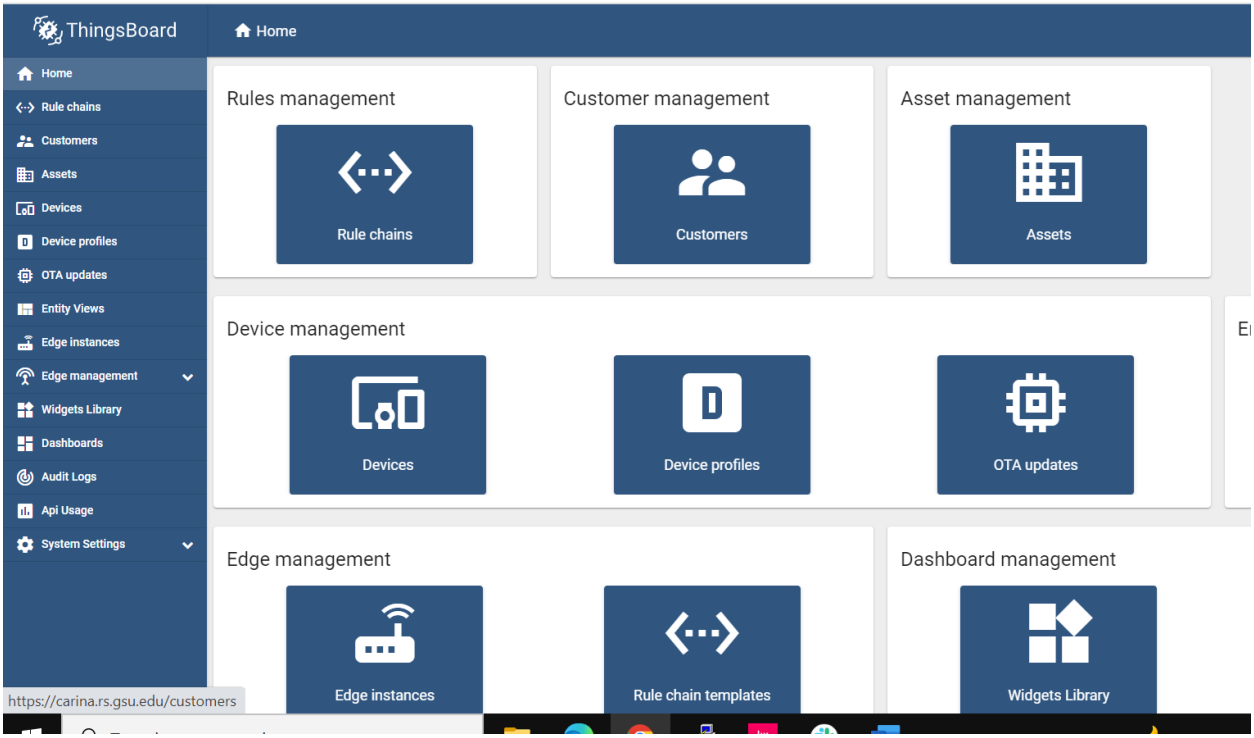
MQTT vs HTTP ?

They both protocols run over TCP connections, and are both client-server in architecture, but MQTT allows messages to pass in both directions between clients and servers whereas HTTP servers only respond to requests from clients

Log in to Thigsboard

Your instructor will provide you with credentials need to login in to the thingsboard. Please use the credentials provided and log in to the thingsboard instance assigned to you.

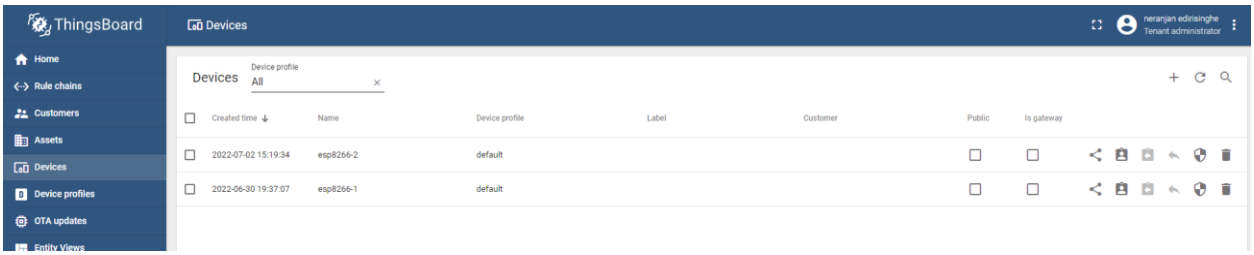
You will see a screen smiler to the this



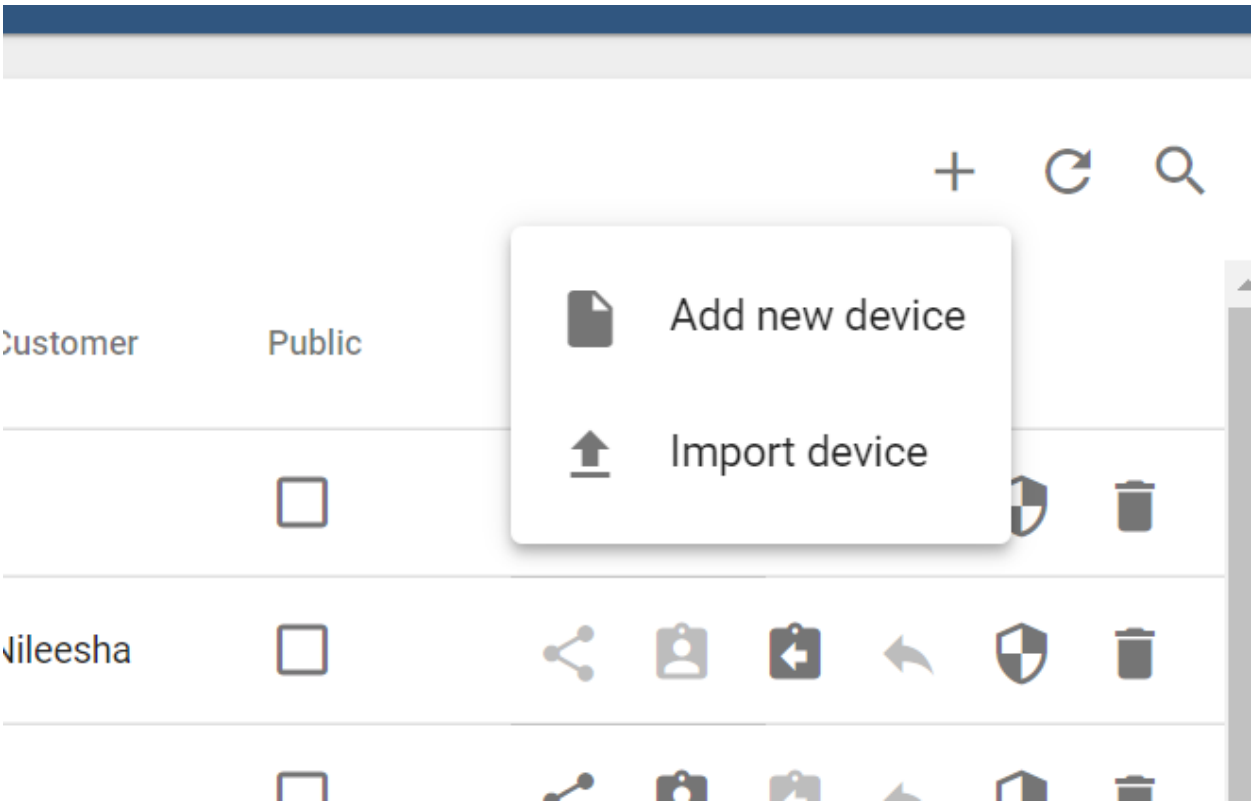
As you see it has many capabilities. We will use few of its capabilities in this workshop.

First step is to get the data from a remote device into the things board.

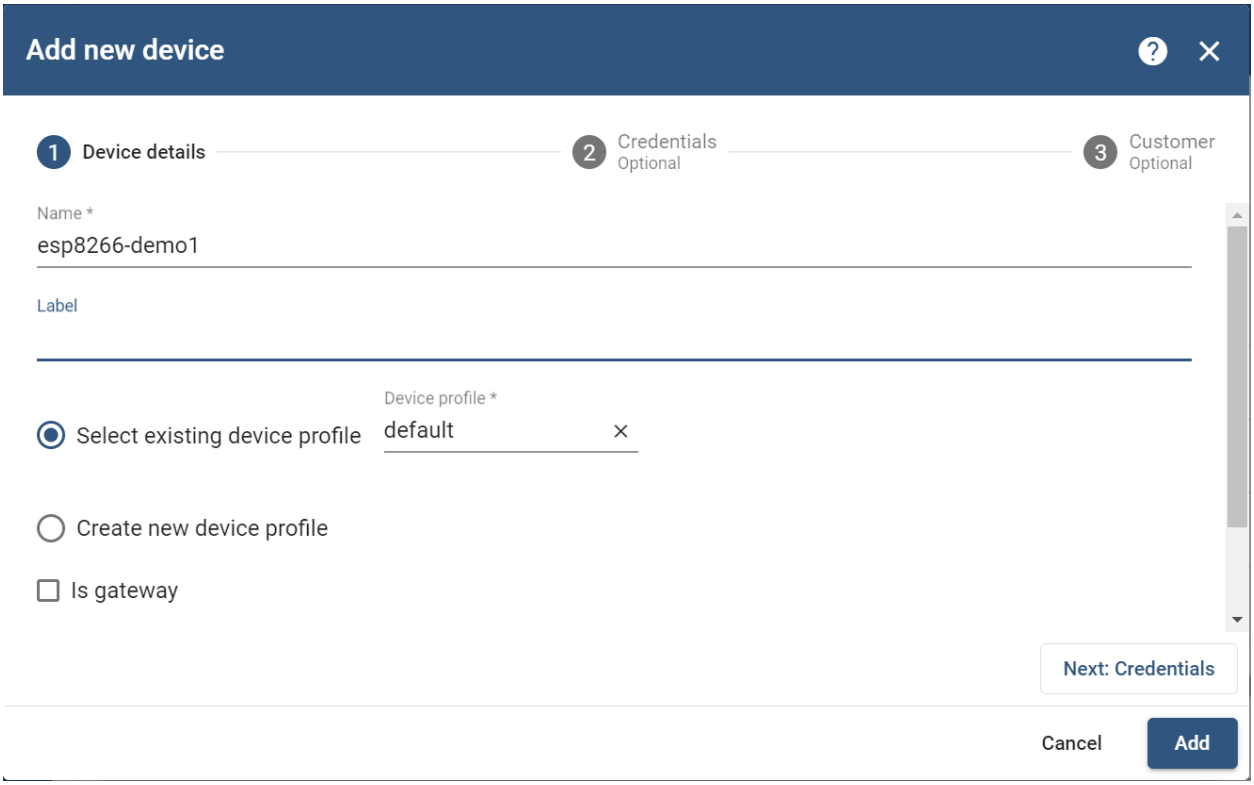
Adding a device to the things board



Go to the device and click the + sign in the top right corner and select add new device

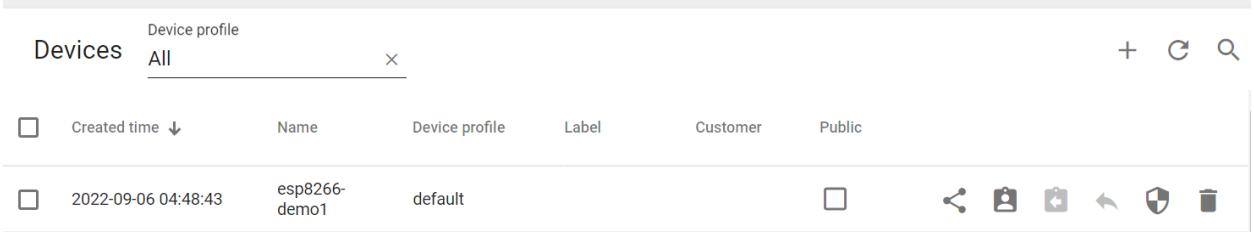


Then name your device as esp8266-demo

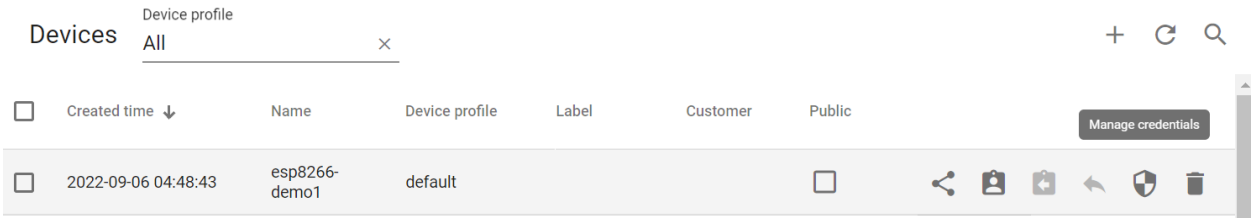


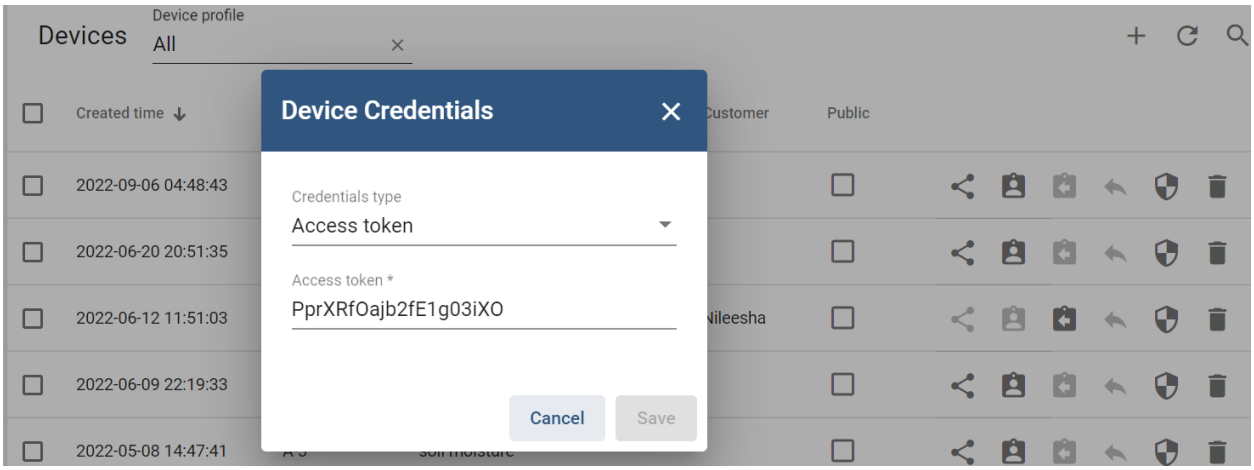
Other information is optional. We will keep device profile as default for now. Hit ‘add’ button to create the device in the things board.

It will create the device and it is now available for you to use.



This device we created in the thingsboard is a virtual reference to the actual device in the field. We will need to have a way to reference to this device when we feed data from the actual device. We will need some sort of identification in order to correctly reference to the device. Thingsboard uses unique access tokens for this purpose. Once device created, open its details and click “Manage credentials”. Copy auto-generated access token from the “Access token” field. Please save this device token. It will be referred to later as $ACCESS_TOKEN.





Now we need to connect real device to the virtual device in the thingsboard.

We will need few libraries installed into Arduino IDE

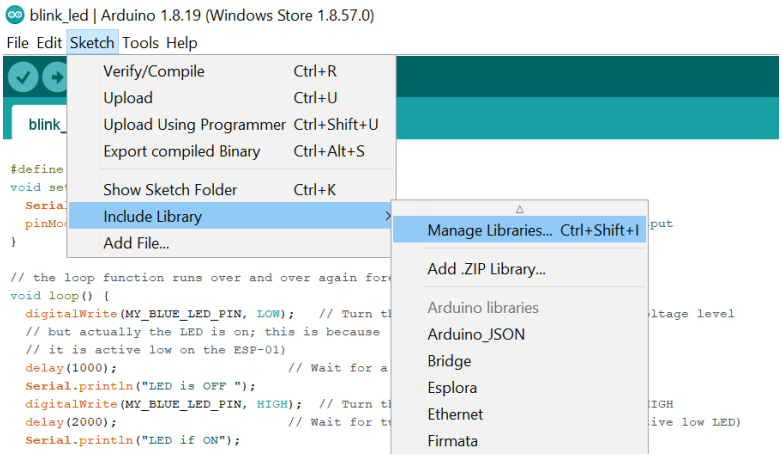
PubSubClient by Nick O'Leary. (https://pubsubclient.knolleary.net/)

ArduinoJSON by bblanchon (https://github.com/bblanchon/ArduinoJson)

Arduino Http Client (https://github.com/arduino-libraries/ArduinoHttpClient)

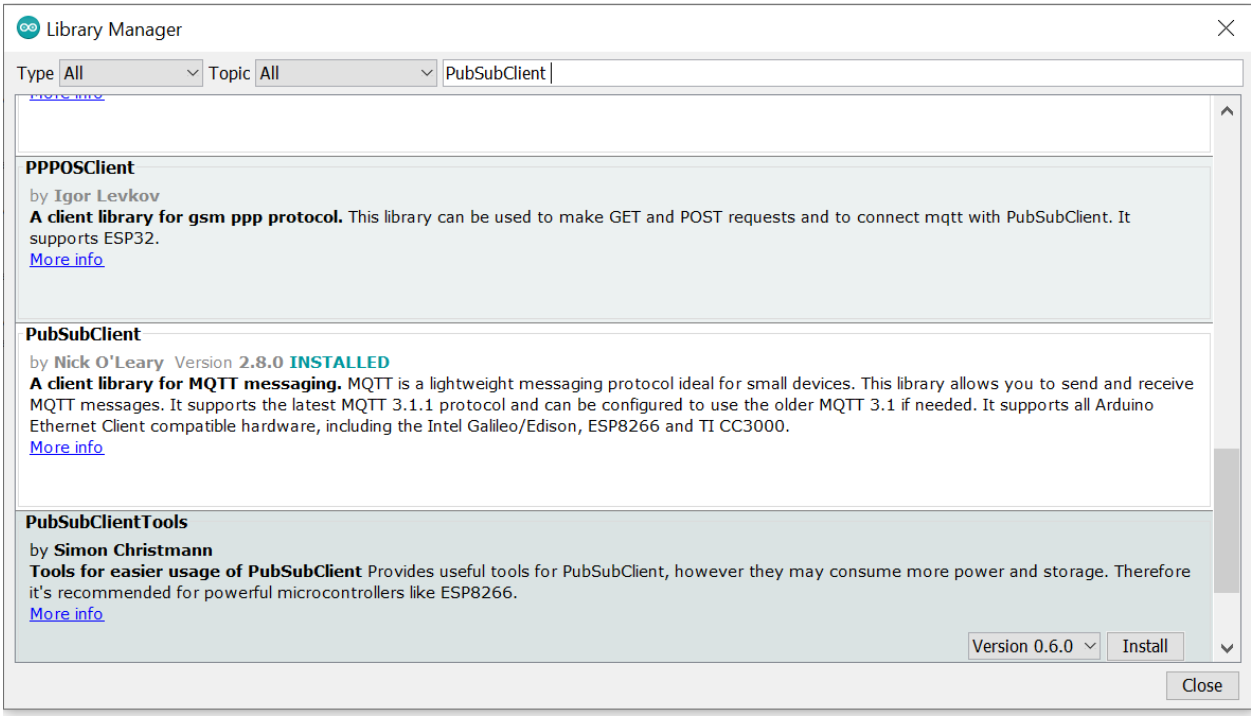
Arduino ThingsBoard SDK by ThingsBoard (https://github.com/thingsboard/thingsboard-arduino-sdk)

To install a library please select Mange libraries from Sketch->include library->Mange libraries



Just type the name of the library you like to install in the search field. If you do not see the correct library, please scroll down. Select the correct version you like to install and hit install.

It may take some time to download and install, but once done you will see It is labeled as installed.



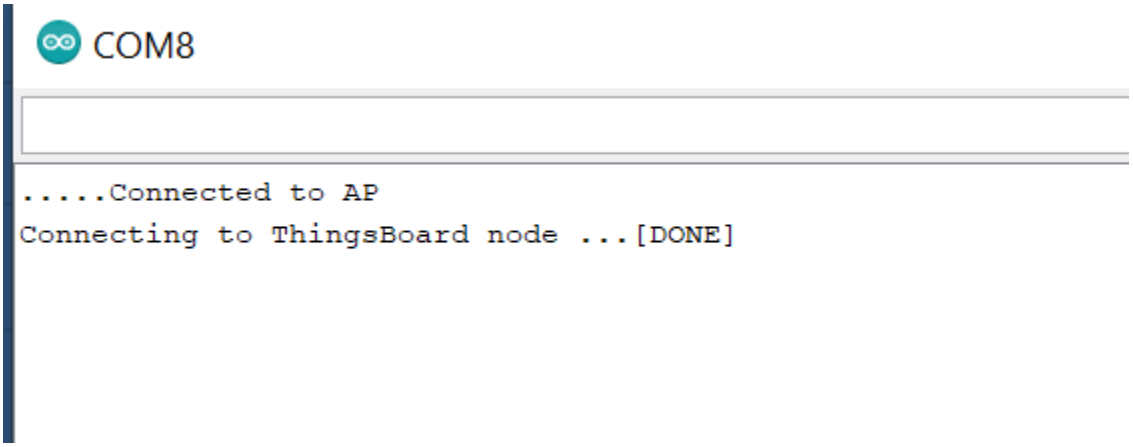
Once we have all the libraries installed, we are ready to program the device.

```
#include <ESP8266WiFi.h>
#include <ThingsBoard.h>

#define WIFI_AP "YOUR_WIFI_AP"
#define WIFI_PASSWORD "YOUR_WIFI_PASSWORD"

#define TOKEN "ESP8266_DEMO_TOKEN"
char thingsboardServer[] = "YOUR_THINGSBOARD_HOST_OR_IP";
WiFiClient wifiClient;
ThingsBoard tb(wifiClient);
long data1;
long data2;
int status = WL_IDLE_STATUS;
unsigned long lastSend;
void setup()
{
  Serial.begin(115200);
  InitWiFi();
  lastSend = 0;
}
```

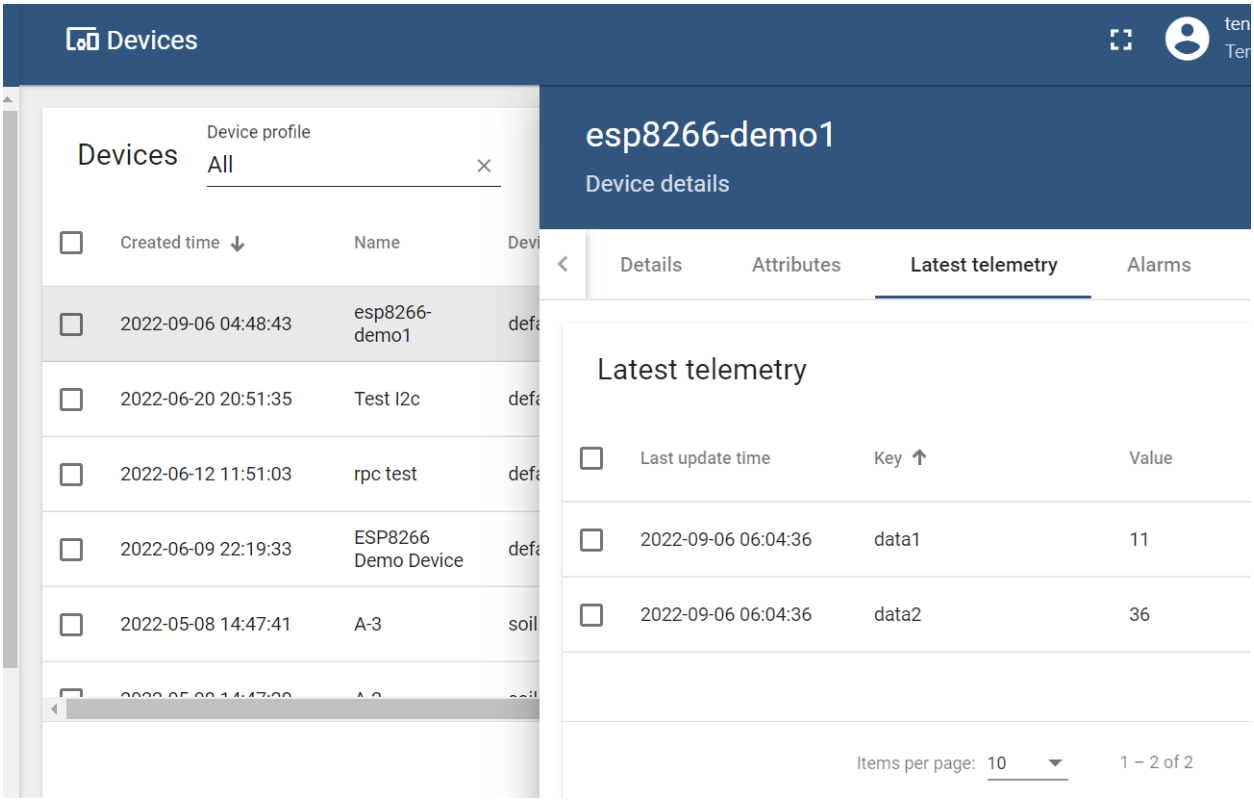
```
void loop()
{
 if ( !tb.connected() ) {
  reconnect();
 }
 if ( millis() - lastSend > 1000 ) { // Update and send only after 1 seconds
  SendData();
  lastSend = millis();
 }
 tb.loop();
}
void SendData()
{
data1 = random(10, 20);
data2 =  random(30, 70);
 tb.sendTelemetryFloat("data1", data1);
 tb.sendTelemetryFloat("data2", data2);
}
void InitWiFi()
{
 Serial.println("Connecting to AP ...");
 // attempt to connect to WiFi network

 WiFi.begin(WIFI_AP, WIFI_PASSWORD);
 while (WiFi.status() != WL_CONNECTED) {
  delay(500);
  Serial.print(".");
 }
 Serial.println("Connected to AP");
}
void reconnect() {
 // Loop until we're reconnected
 while (!tb.connected()) {
  status = WiFi.status();
  if ( status != WL_CONNECTED) {
   WiFi.begin(WIFI_AP, WIFI_PASSWORD);
   while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
   }
   Serial.println("Connected to AP");
  }
  Serial.print("Connecting to ThingsBoard node ...");
  if ( tb.connect(thingsboardServer, TOKEN) ) {
   Serial.println( "[DONE]" );
  } else {
   Serial.print( "[FAILED]" );
   Serial.println( " : retrying in 5 seconds]" );
   // Wait 5 seconds before retrying
   delay( 5000 );
  }
 }
}
```

Save the sketch to the device and run the code

Upon successful execution you will see something like this



On the thingsbord you will see the data



Congratulations !! you have successfully connected the device to the thingsboard.