การใช้งาน ThingsBoard IoTs Platform เพื่อสร้างและจัดการระบบอัจริยะ
ThingsBoard IoTs Platform for smart system

ชื่อ-สกุล : วราสิริ ลิ้มประเสริฐ B6214005

5/5 -- คำถามท้ายบทเพื่อทดสอบความเข้าใจ

## Quiz_301 – MAP Widgets and Multilayer Dashboard – 2 Point Data

- แสดงรูป โปรแกรม ของผลการทำงานตามหัวข้อ Lab304 – Using Rule Chains, MAP Widget and Multilayer dashboard

Code:

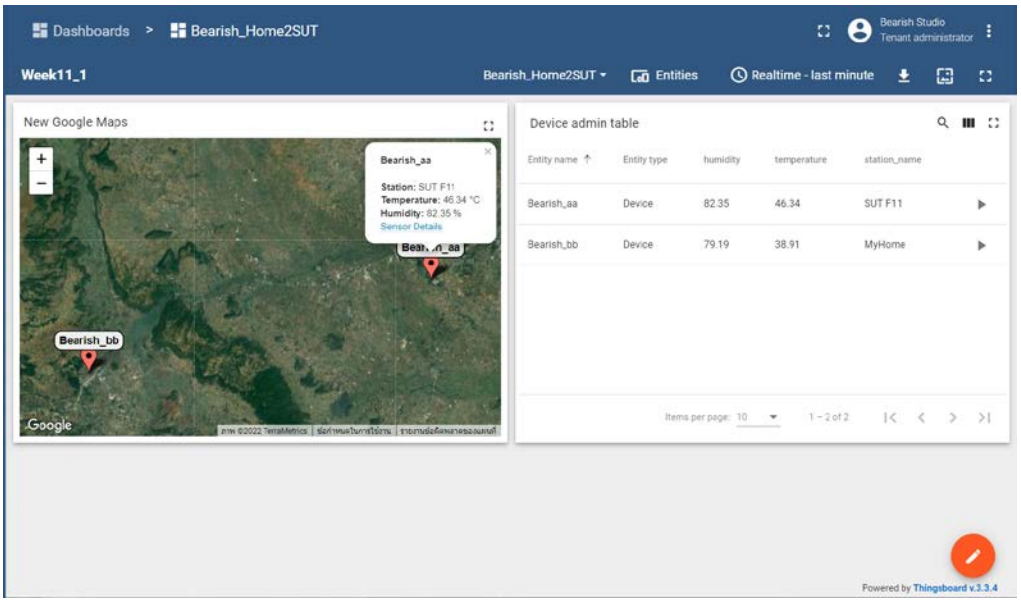
```
// Add Library “ThingsBoard by ThingsBoard Team -- V 0.4.0”
// Add Library “ArduinoHttpClient by Arduino -- V 0.4.0”
// Add Library “ArduinoJson by Benoit Blanchon – V6.18.3”
#include "ThingsBoard.h"
#include <WiFi.h>
#define WIFI_AP "V2036"
#define WIFI_PASSWORD "fnafchica"
#define TOKEN "0oTEO8EpTBamgCgBjfxp"
#define THINGSBOARD_SERVER "demo.thingsboard.io"
#define THINGSBOARD_PORT 1883
#define SERIAL_DEBUG_BAUD 115200

// Initialize ThingsBoard client
WiFiClient espClient;
// Initialize ThingsBoard instance
ThingsBoard tb(espClient);
// the Wifi radio's status
int status = WL_IDLE_STATUS;

void setup() {
  // initialize serial for debugging
  Serial.begin(SERIAL_DEBUG_BAUD);
  WiFi.begin(WIFI_AP, WIFI_PASSWORD);
  InitWiFi();
}
void loop() {
  if (WiFi.status() != WL_CONNECTED) {
    reconnect();
  }
  if (!tb.connected()) {
    // Connect to the ThingsBoard
    Serial.print("Connecting to: "); Serial.print(THINGSBOARD_SERVER);
    Serial.print(" with token "); Serial.println(TOKEN);
    if (!tb.connect(THINGSBOARD_SERVER, TOKEN, THINGSBOARD_PORT)) {
      Serial.println("Failed to connect");
      return;
    }
  }
  Serial.print("Sending data...");
  // Uploads new telemetry to ThingsBoard using MQTT.
  // See https://thingsboard.io/docs/reference/mqtt-api/#telemetry-upload-api
  // for more details
```

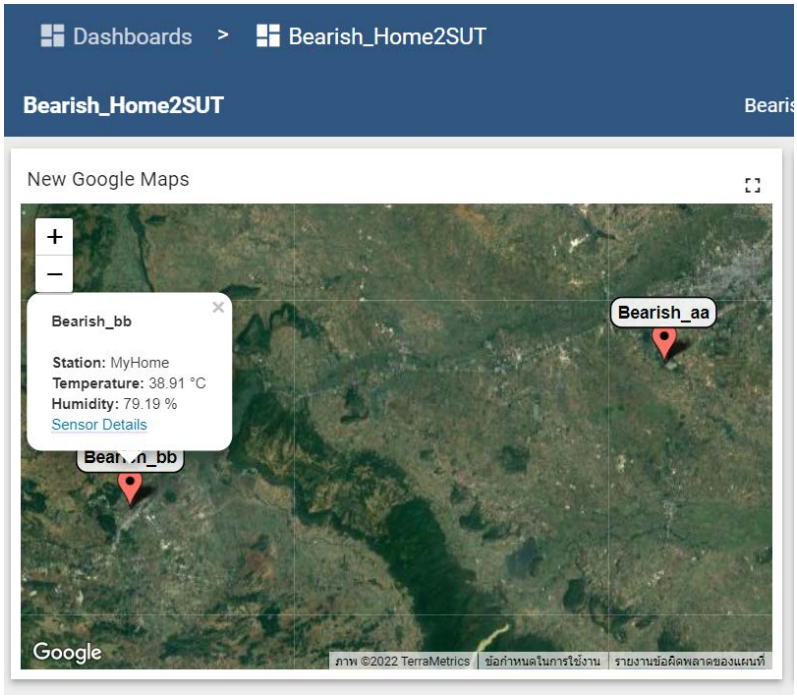
```
  float xTempp = random(2000, 5000) / 100.0;
  float xHdmid = random(6000, 8000) / 100.0;
  Serial.print(xTempp, 2); Serial.print(",");
  Serial.print(xHdmid, 2); Serial.println();
  //tb.sendTelemetryInt("temperature", xTempp);
  //tb.sendTelemetryInt("humidity", xTempp);
  tb.sendTelemetryFloat("temperature", xTempp);
  tb.sendTelemetryFloat("humidity", xHdmid);
  tb.loop();
  delay(5000);
}
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
  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");
  }
}
```

รูปการทดสอบ 1: Dashboard

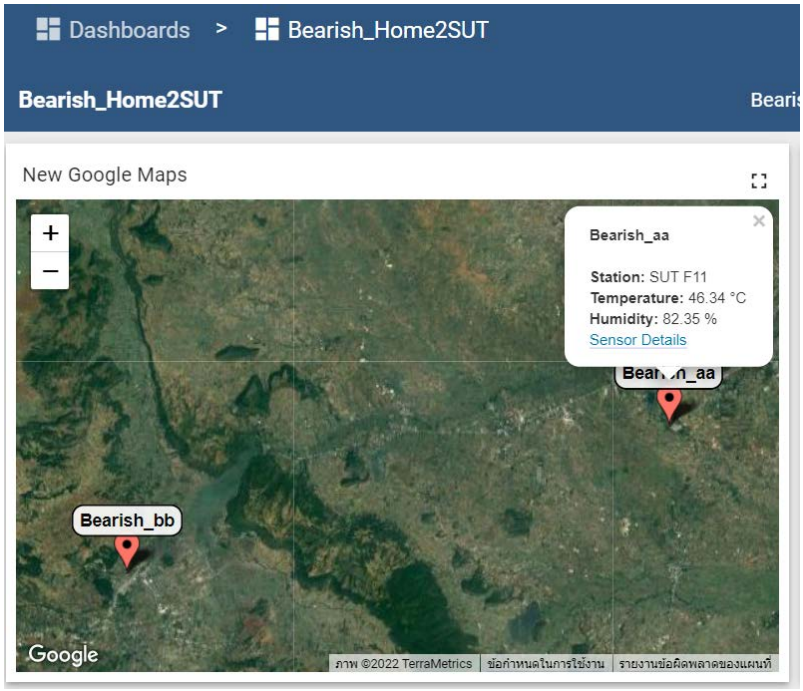


https://demo.thingsboard.io/dashboards/2886fab0-c822-11eb-9f3e-5da2986ee45a

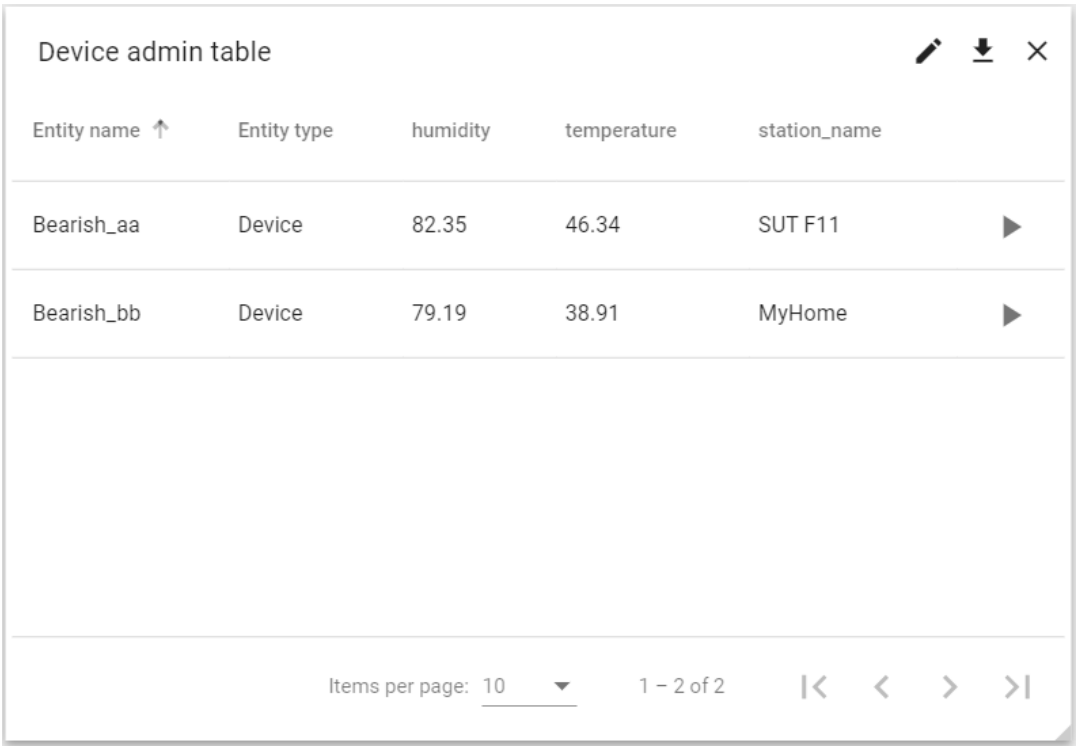
รูปการทดสอบ 2:



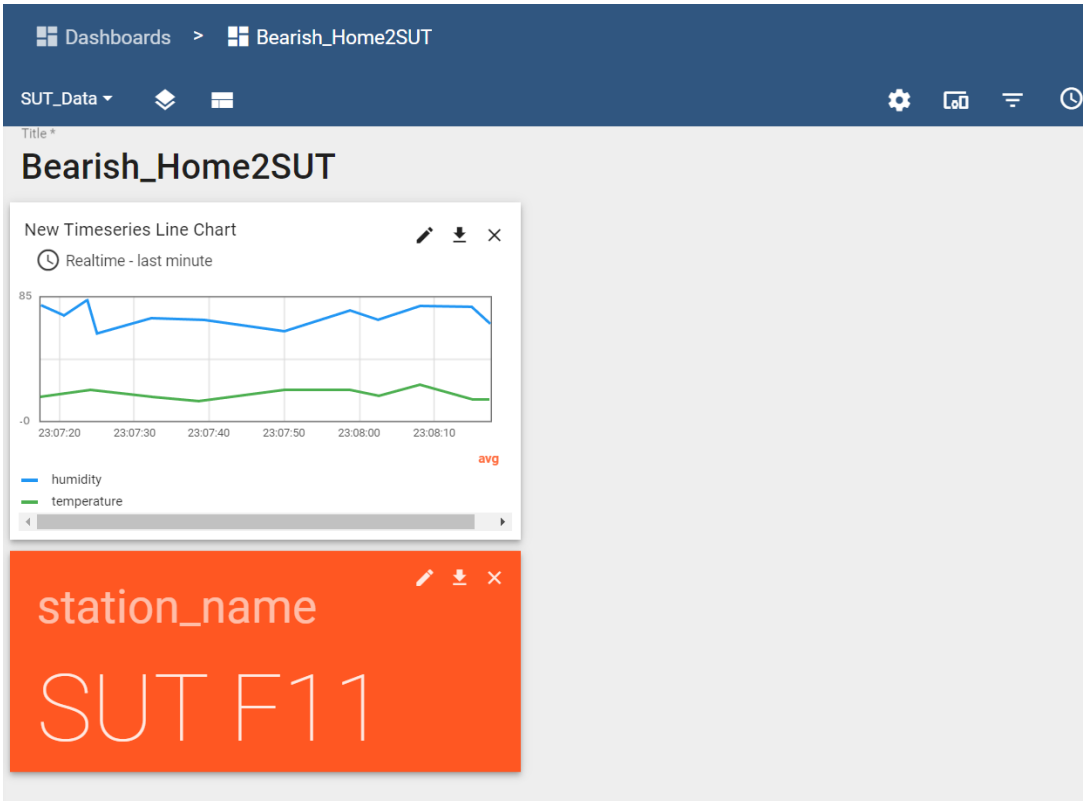

รูปการทดสอบ 3:



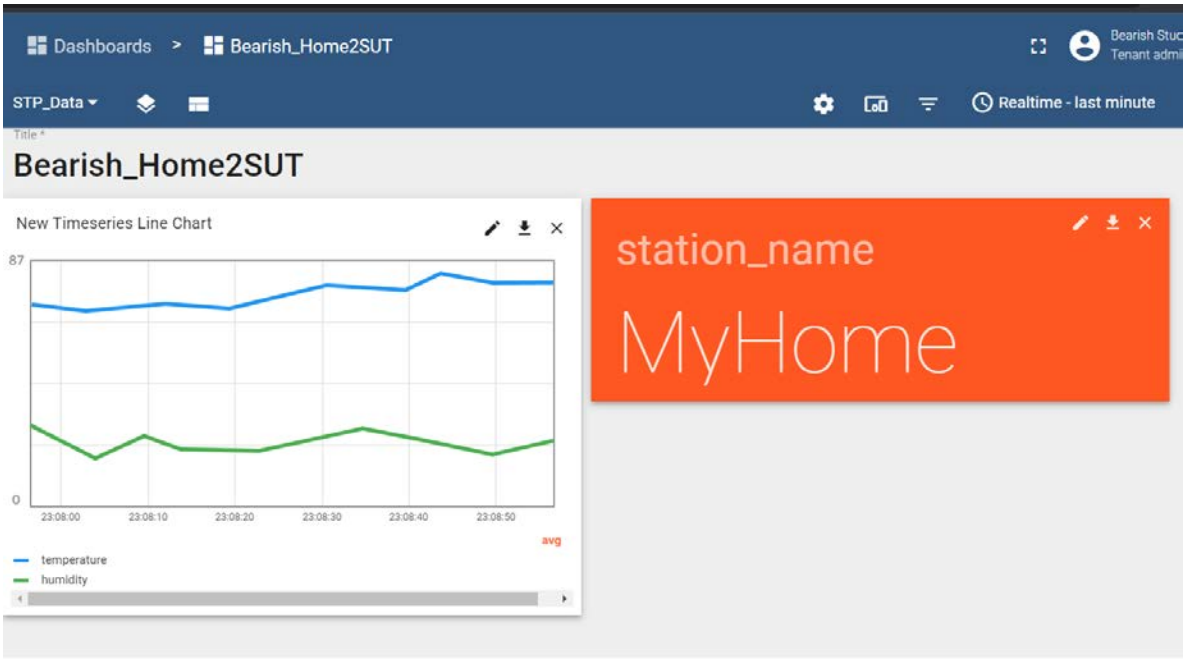
รูปการทดสอบ 4:




รูปการทดสอบ 5:



รูปการทดสอบ 6:



## Quiz_302 – MAP Widgets and Multilayer Dashboard – 4 Point Data

- จากหัวข้อ Quiz_301 ลองปรับเพิ่มจุดข้อมูลจากสองจุด(STP,SUT) เป็นสี่จุดข้อมูล ตามแต่ผู้เรียนกำหนด

Code :

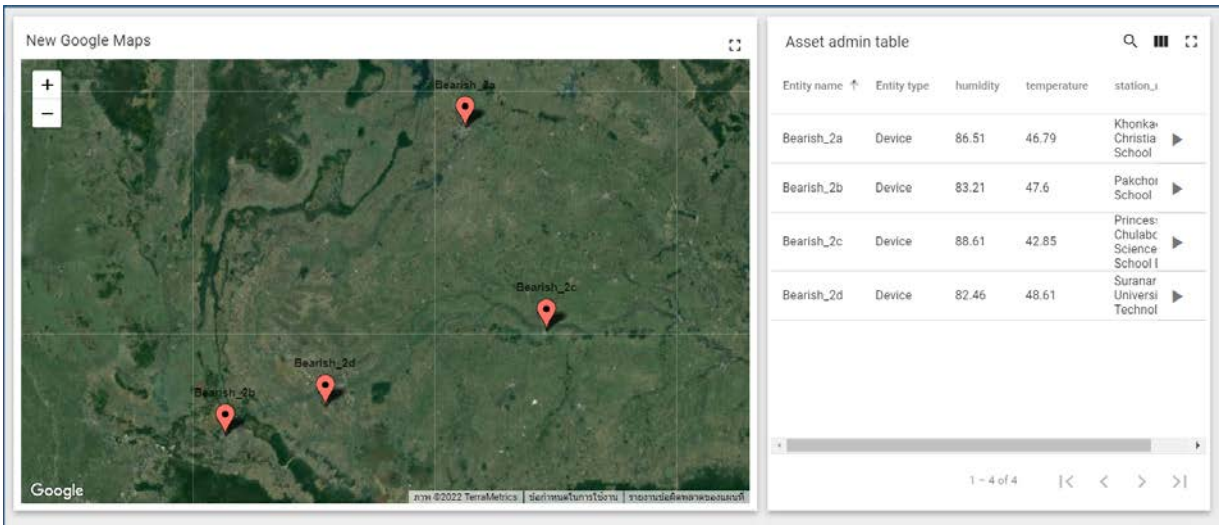
```
#include "ThingsBoard.h"
#include <WiFi.h>
#define WIFI_AP "V2036"
#define WIFI_PASSWORD "fnafchica"
#define TOKEN "0oTEO8EpTBamgCgBjfxp"
#define THINGSBOARD_SERVER "demo.thingsboard.io"
#define THINGSBOARD_PORT 1883
#define SERIAL_DEBUG_BAUD 115200
WiFiClient espClient;
ThingsBoard tb(espClient);
int status = WL_IDLE_STATUS;

void setup() {
  // initialize serial for debugging
  Serial.begin(SERIAL_DEBUG_BAUD);
  WiFi.begin(WIFI_AP, WIFI_PASSWORD);
  InitWiFi();
}
void loop() {
  if (WiFi.status() != WL_CONNECTED) {
    reconnect();
  }
  if (!tb.connected()) {
    // Connect to the ThingsBoard
    Serial.print("Connecting to: "); Serial.print(THINGSBOARD_SERVER);
    Serial.print(" with token "); Serial.println(TOKEN);
    if (!tb.connect(THINGSBOARD_SERVER, TOKEN, THINGSBOARD_PORT)) {
      Serial.println("Failed to connect");
      return;
    }
  }
  Serial.print("Sending data...");
  // Uploads new telemetry to ThingsBoard using MQTT.
  // See https://thingsboard.io/docs/reference/mqtt-api/#telemetry-upload-api
  // for more details
  float xTempp = random(2000, 5000) / 100.0;
  float xHdmid = random(6000, 8000) / 100.0;
  Serial.print(xTempp, 2); Serial.print(",");
  Serial.print(xHdmid, 2); Serial.println();
  //tb.sendTelemetryInt("temperature", xTempp);
  //tb.sendTelemetryInt("humidity", xTempp);
  tb.sendTelemetryFloat("temperature", xTempp);
  tb.sendTelemetryFloat("humidity", xHdmid);
  tb.loop();
  delay(5000);
}
void InitWiFi()
{
  Serial.println("Connecting to AP ...");
  // attempt to connect to WiFi network
  WiFi.begin(WIFI_AP, WIFI_PASSWORD);
```

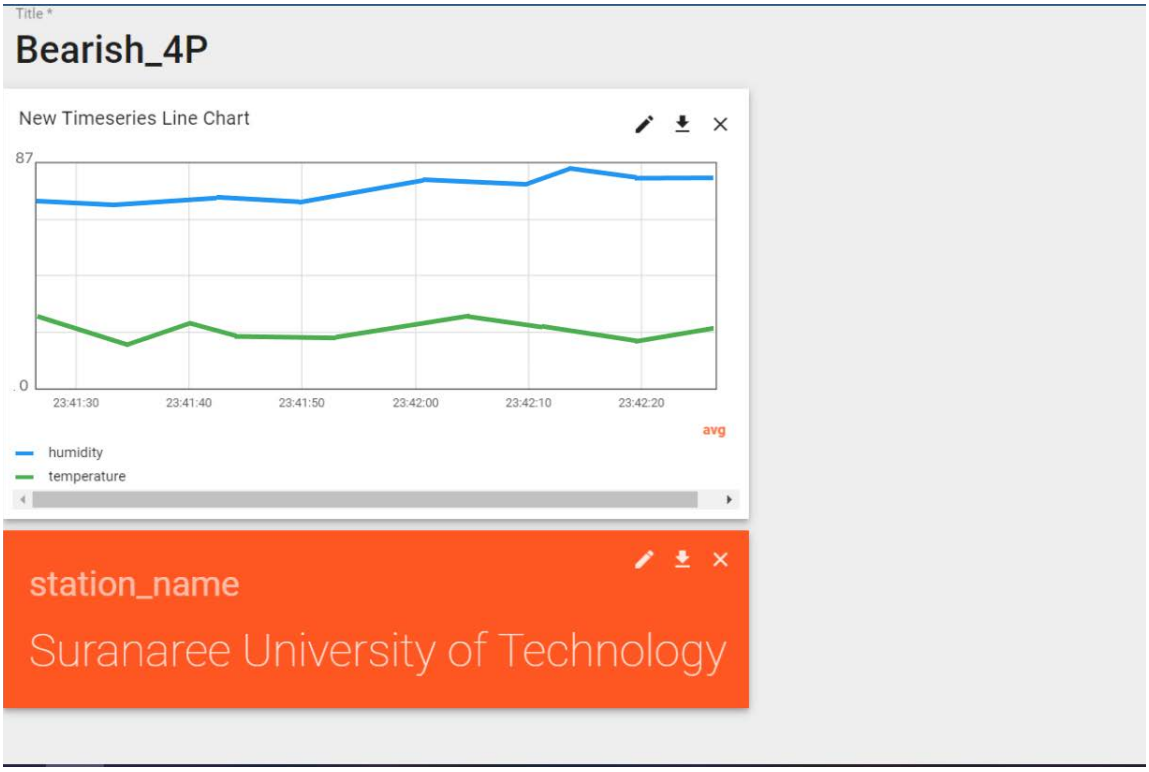
```
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("Connected to AP");
}
void reconnect() {
  // Loop until we're reconnected
  status = WiFi.status();
  if ( status != WL_CONNECTED) {
    WiFi.begin(WIFI_AP, WIFI_PASSWORD);
    while (WiFi.status() != WL_CONNECTED) {
      delay(500);
      Serial.print(".");
    }
    Serial.println("Connected to AP");
  }
}
```

https://demo.thingsboard.io/dashboards/2ccee2f0-c835-11eb-9f3e-5da2986ee45a?state=W3siaWQiOiJkZWZhdWx0IiwicGFyYW1zIjp7fX1d

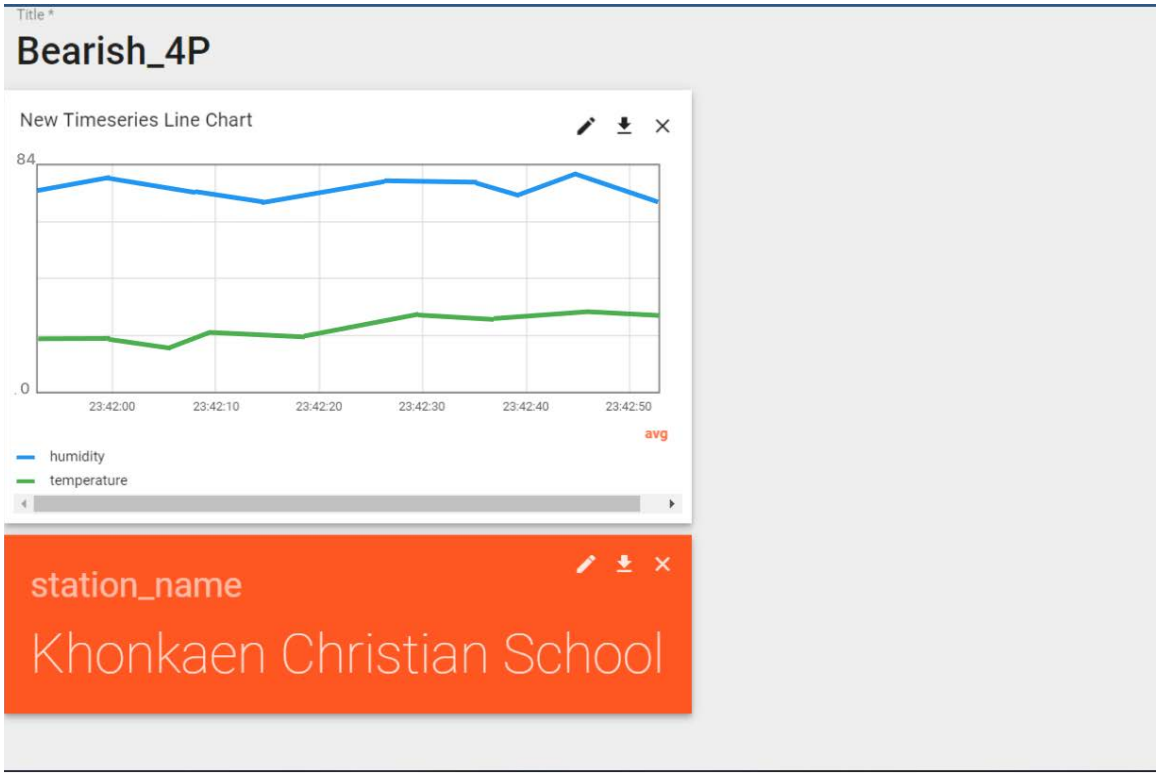
รูปการทดสอบ 1: Dashboard



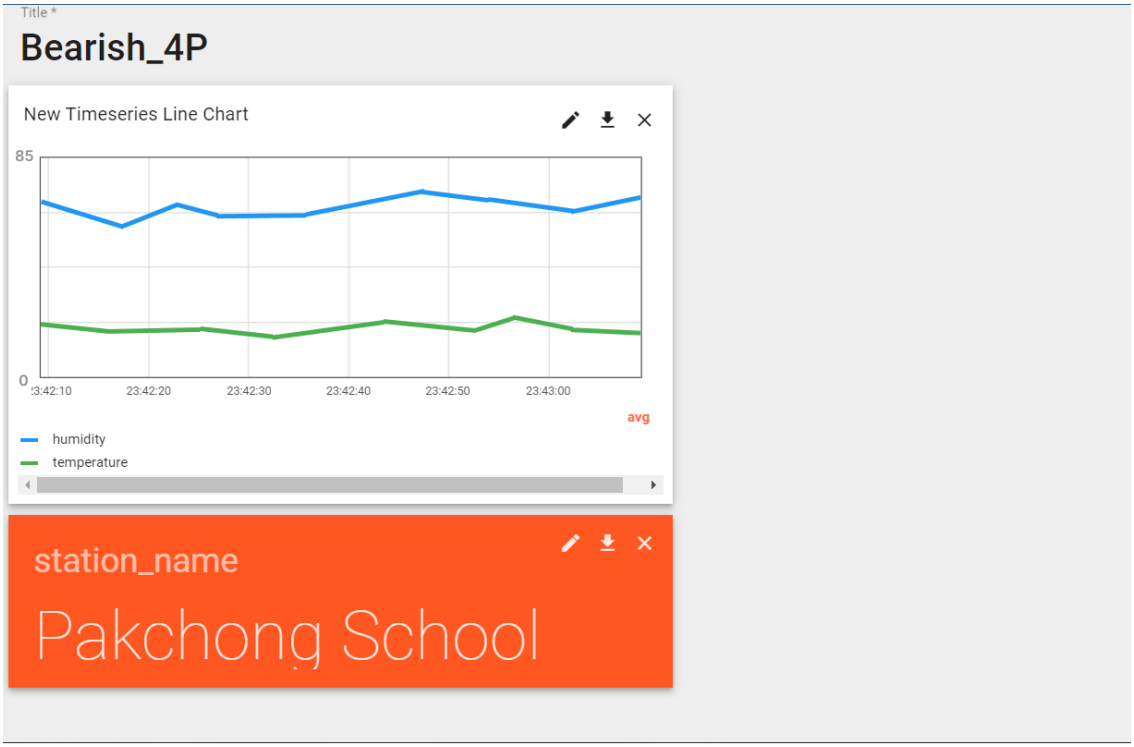
รูปการทดสอบ 2:




รูปการทดสอบ 3:



รูปการทดสอบ 4:




รูปการทดสอบ 5: