

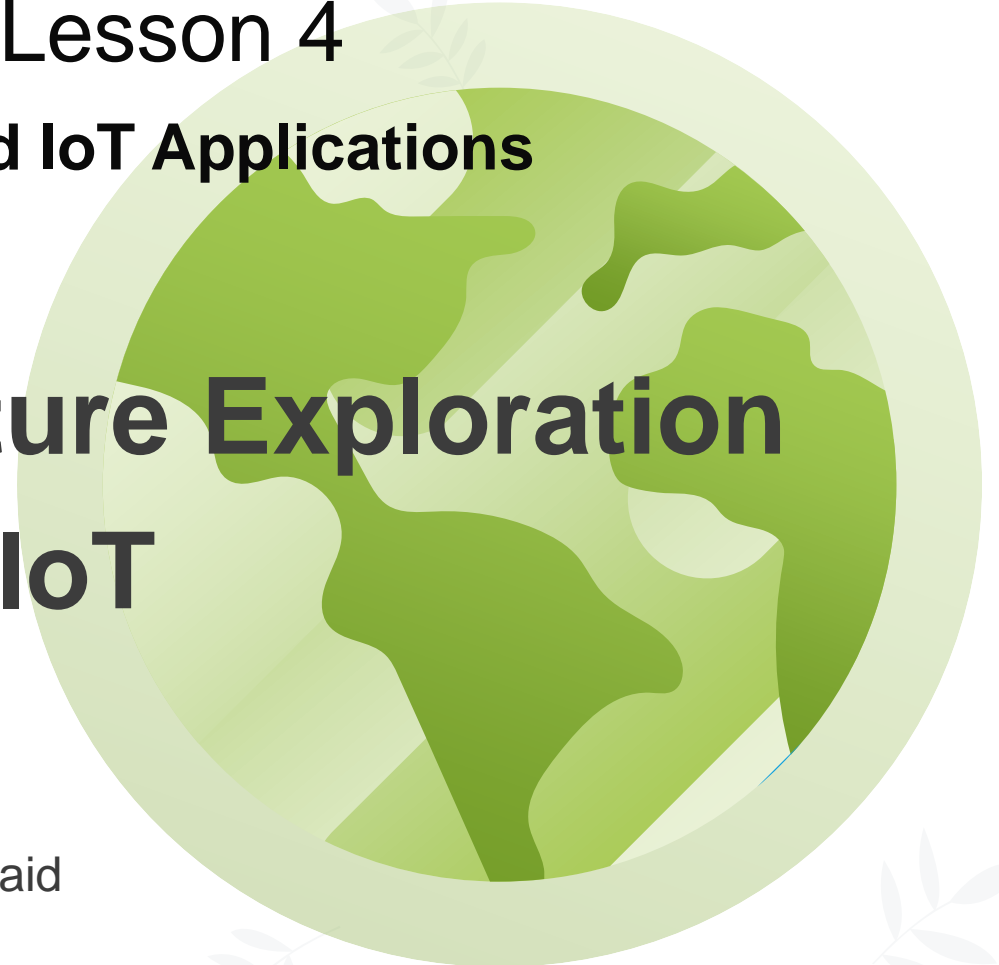
Steam Up 2gether – Lesson 4

Getting Started with Arduino and IoT Applications

Ignite Curiosity on Nature Exploration by using IoT

July 23rd, 2020

Stephen Chen & Junaid



Opening and Introduction

P1

Study and
implementation of IoT
AQM (3/5)

P3

Study and
implementation of IoT
AQM (5/5)

P2

Study and
implementation of IoT
AQM (4/5)

P4

Beyond the lesson

PART 1

- ❖ Study and implementation of IoT AQM (3/5)
- ❖ Explain IoT AQM MotoBlockly code step by step (2)



Explain IoT AQM MotoBlockly code step by step (2)

```

delay 500
if IPmcf10 > 0
do
  ThingSpeak Upload data
  Write API Key
  Field1 IPmcf10
  Field2 IPmcf25
  Field3 IPmcf100
  Field4 Temperature
  Field5 Humidity
  Clear
  setCursor Col 0 Row 0
  Print create text with PM2.5
  IPmcf25
  ug/m3
  setCursor Col 0 Row 1
  Print create text with T
  Temperature
  C
  setCursor Col 9 Row 1
  Print create text with H
  Humidity
  %
  dispRGBLED
  delay 60000
  
```

IoT setting. Upload data to cloud by API KEY

With unique API key.
 Upload **PM1.0**, **PM2.5**, **PM100**, **Temperature** and **Humidity** to cloud "ThingSpeak"

Subroutine calls :
 RGB LED show different color as an indicator.

Upload Data to cloud every 60000ms = 1 min

Pop Quiz – Please complete in Corelab

Question (1)

What are the values you should set in R.G.B form to present pure white color in RGB LED ?

1. 213, 245, 187
2. 255, 368, 114
3. 231, 013, 043
4. 255, 255, 255



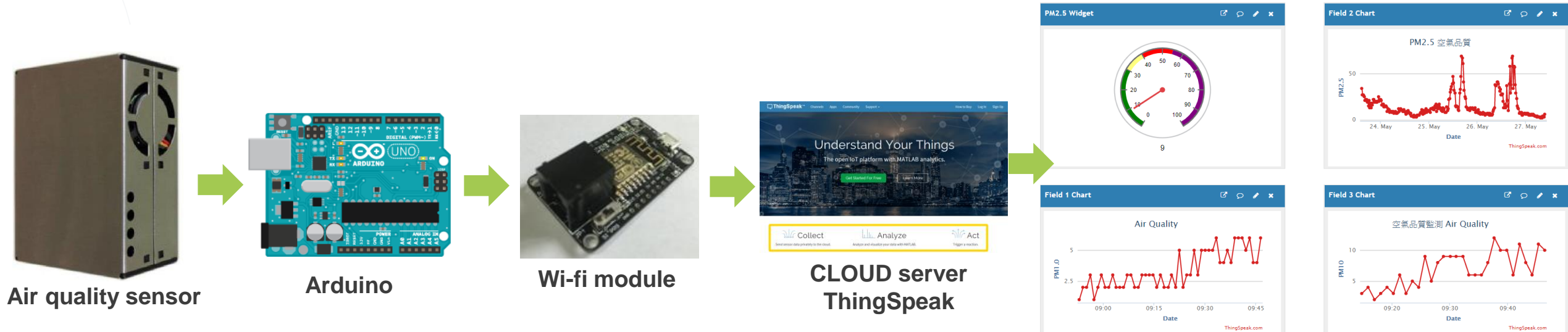
PART 2

- ❖ Study and implementation of IoT AQM (4/5).
- ❖ Uploaded data by internet(wi-fi) and storage the data on cloud
- ❖ Introduction to cloud: ThingSpeak. (Channel Stas + widget)



Uploaded data by internet (Wi-fi) and storage the data on cloud

Log in <https://thingspeak.com> to use cloud service “ThingSpeak” trial version.



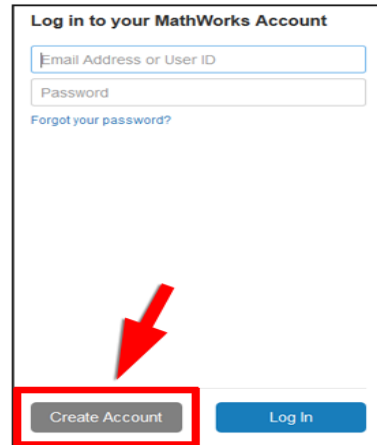
ThingSpeak data diagram

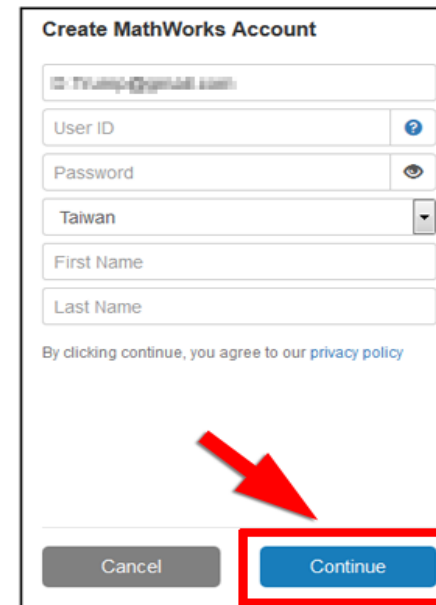
Introduction to cloud: ThingSpeak (Channel Stas + widget)

Type <https://thingspeak.com> to register a new account



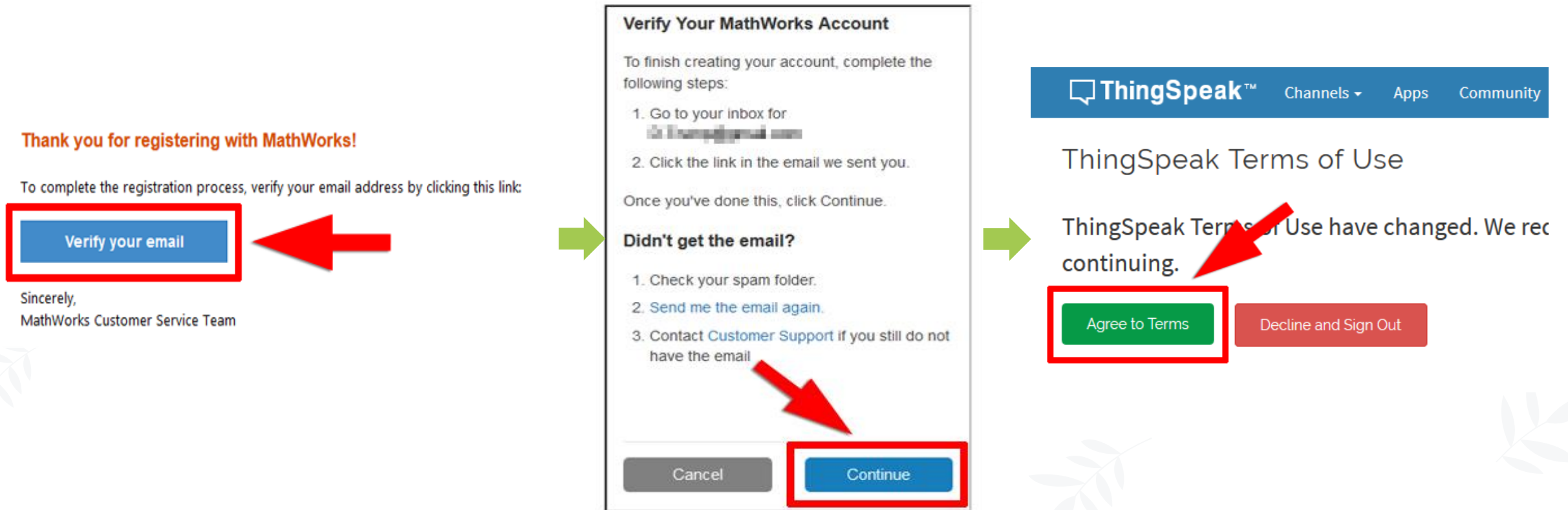
Sign up for ThingSpeak
In order to sign up for ThingSpeak, you must create a Inc.





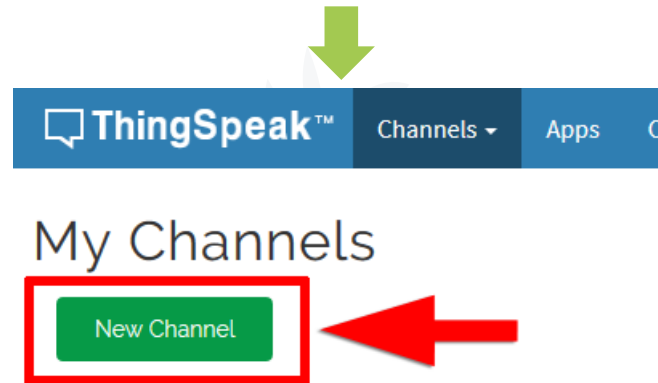
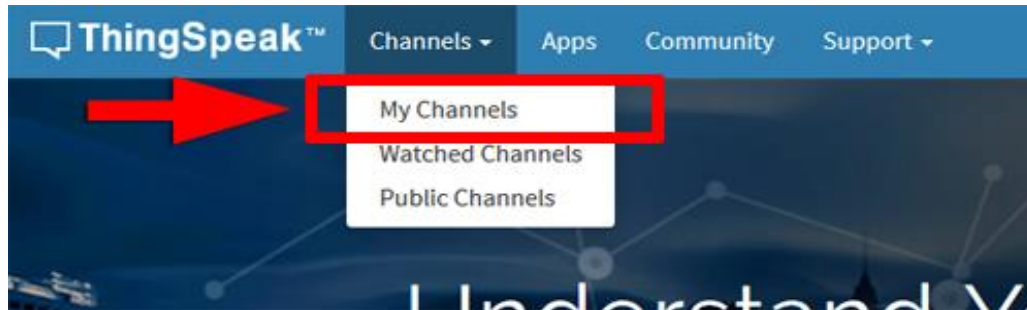
Introduction to cloud: ThingSpeak (Channel Stas + widget)

Type <https://thingspeak.com> to register a new account



Introduction to cloud: ThingSpeak (Channel Stas + widget)

Build a new [channel](#) in order to upload data from Arduino



Introduction to cloud: ThingSpeak (Channel Stas + widget)

Build a new **channel** in order to upload data from Arduino

Private View Public View Channel Settings Sharing API Keys I

Channel Settings

Percentage complete 50%

Channel ID 462633

Name 空氣品質監測 Air Quality

Description Air Quality

Field 1 PM1.0

Field 2 PM2.5

Field 3 PM10

Field 4 溫度

Field 5 濕度

Field 6



Video ID

Show Status

Save Channel

Create data name or category you want to upload

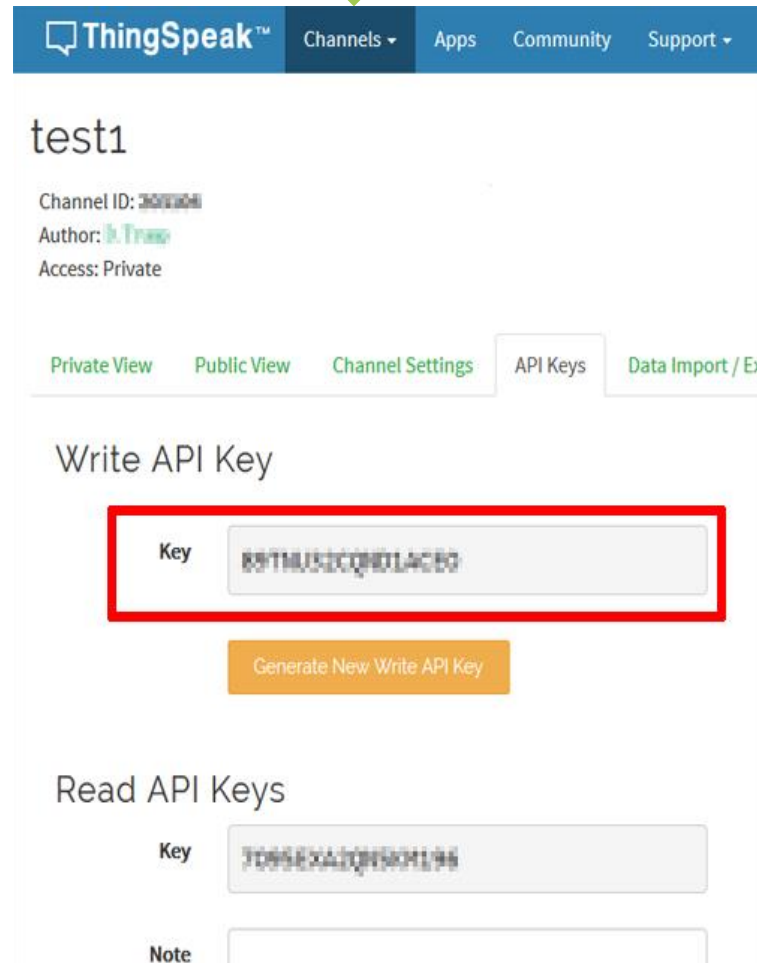
PART 3

- ❖ Study and implementation of IoT AQM (5/5)
- ❖ Acquire API KEY. Set WIFI SSID
Send data to cloud. Complete IoT AQM



Acquire API KEY. Set WIFI SSID. Send data to cloud.

Complete IoT AQM

ThingSpeak™ Channels Apps Community Support

test1

Channel ID: 3000044
Author: [A. Trias](#)
Access: Private

Private View Public View Channel Settings API Keys Data Import / Export

Write API Key

Key

Generate New Write API Key

Read API Keys

Key

Note

Remember this unique **API KEY**

Acquire API KEY. Set WIFI SSID. Send data to cloud. Complete IoT AQM

```

Setup
  Declare IPmcf10 as long Value 0
  Declare IPmcf25 as long Value 0
  Declare IPmcf100 as long Value 0
  Declare ITemperature as long Value 0
  Declare IHumidity as long Value 0
  Setup serial Speed to 9600 bps
  DigitalWrite PIN# 13 STAT LOW
  Set LCD1602 0x27
  Clear
  setCursor Col 0 Row 0
  Print "Motoduino Airbox"
  ESP8266 Terminal Begin
  WiFi Mode STATION
  TX# 12
  RX# 11
  SSID "motoduino-LTE"
  Password "motoS4A123"
  
```

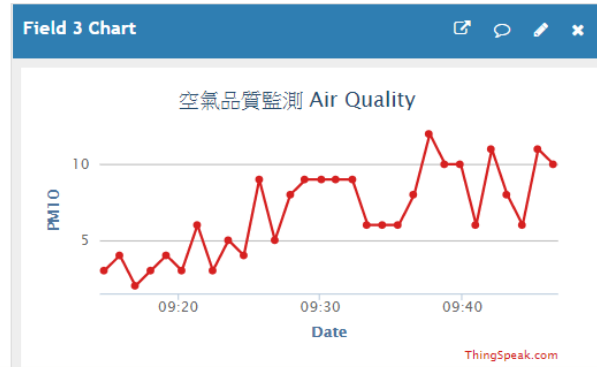
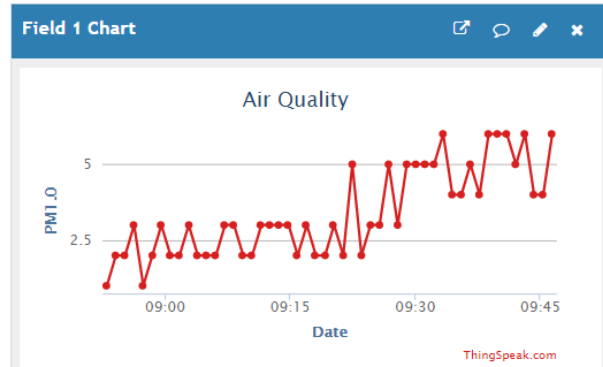
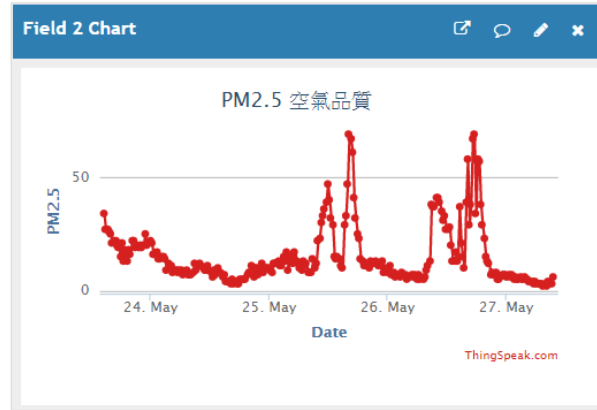
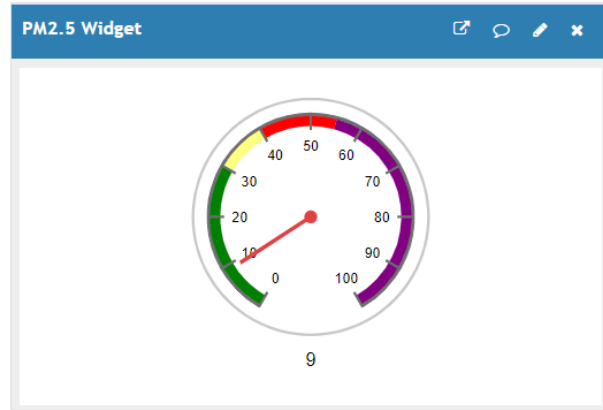
Key-in your API KEY here
Fill in variable you want to upload.

```

delay 500
if IPmcf10 > 0
do
  Upload data
  Write API Key "B152LK2RUXVQLY7F"
  Field1 IPmcf10
  Field2 IPmcf25
  Field3 IPmcf100
  Field4 ITemperature
  Field5 IHumidity
  Clear
  setCursor Col 0 Row 0
  Print create text with "PM2.5:"
  IPmcf25
  "ug/m3"
  setCursor Col 0 Row 1
  Print create text with "T:"
  ITemperature
  "C"
  setCursor Col 9 Row 1
  Print create text with "H:"
  IHumidity
  "%"
  dispRGBLED
  delay 60000
  
```

WIFI SSID and PW.
Connect to network.

Acquire API KEY. Set WIFI SSID. Send data to cloud. Complete IoT AQM



Now you can see your data on cloud server and show in diagram!

Pop Quiz – Please complete in Corelab

Question (2)

If You want to create a large IoT project. It is necessary to connect more than 10 sensors or modules to your Arduino, which Arduino may be the best choose ?

1. Arduino Nano 33 IoT with headers
2. ARDUINO UNO WiFi REV2
3. Arduino Mega 2560
4. Arduino Nano



Question (3)

If you want to create a extremely small Air Quality Monitor. You need to install all parts into a extremely small box. The size of every part matter. You need to select the parts which as small as possible. Which Arduino may be the best choose?

1. Arduino Nano 33 IoT with headers
2. ARDUINO UNO WiFi REV2
3. Arduino Mega 2560
4. Arduino Nano

Pop Quiz – Please complete in Corelab

Question (4)

What does "API" mean in this project?

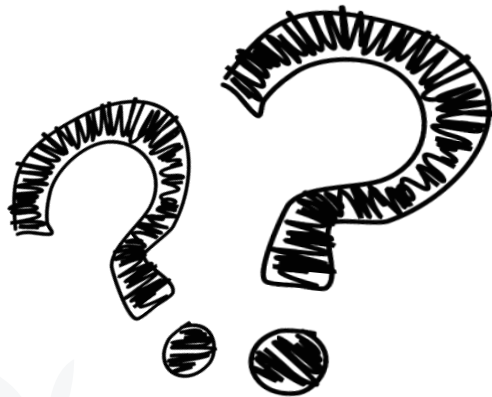
1. Access Point Interface
2. Air Project Index
3. Application Programming Interface
4. All Property Index

Question (5)

In order to complete a general IoT project, you need to upload data or download the data from CLOUD server.

Which platform can't be your IoT server?

1. Google drive
2. ThingSpeak
3. Azure
4. Firebase

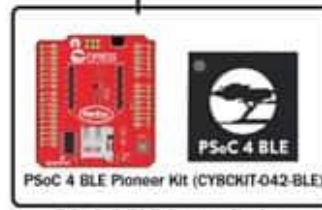


PART 4

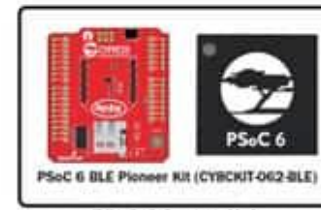
- ❖ Review: Beyond the lesson
- ❖ What is core concept of IoT
- ❖ What else more we can do?
- ❖ How do we do more and better?



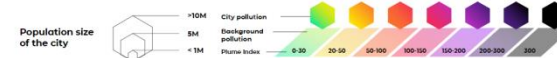
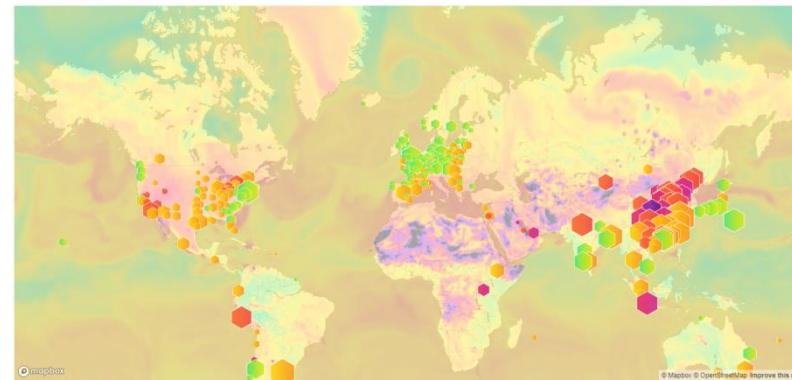
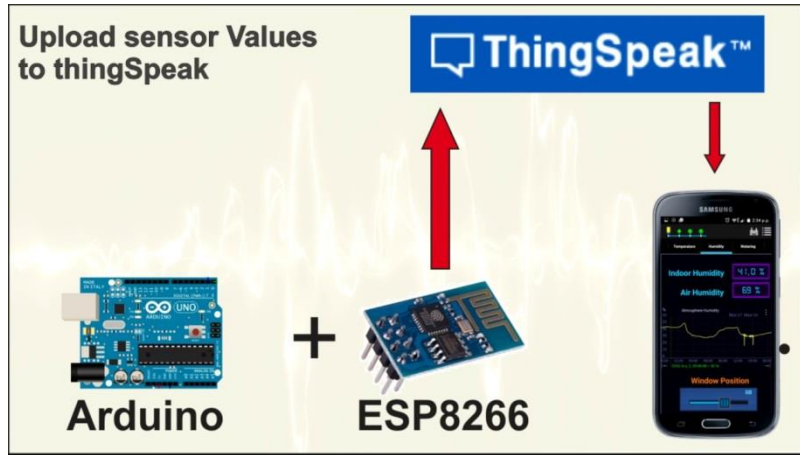
Review: Beyond the lesson



PSoC 4 BLE Sensor Node



PSoC 6 Sensor Hub



MENTOR: Stephen Chen



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<https://pse.is/TFX8W>



<https://pse.is/UCQFJ>



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Thank You !

July 23th, 2020

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