Build your own IOT platform with Hadoop & spark for Beginners
Part-1

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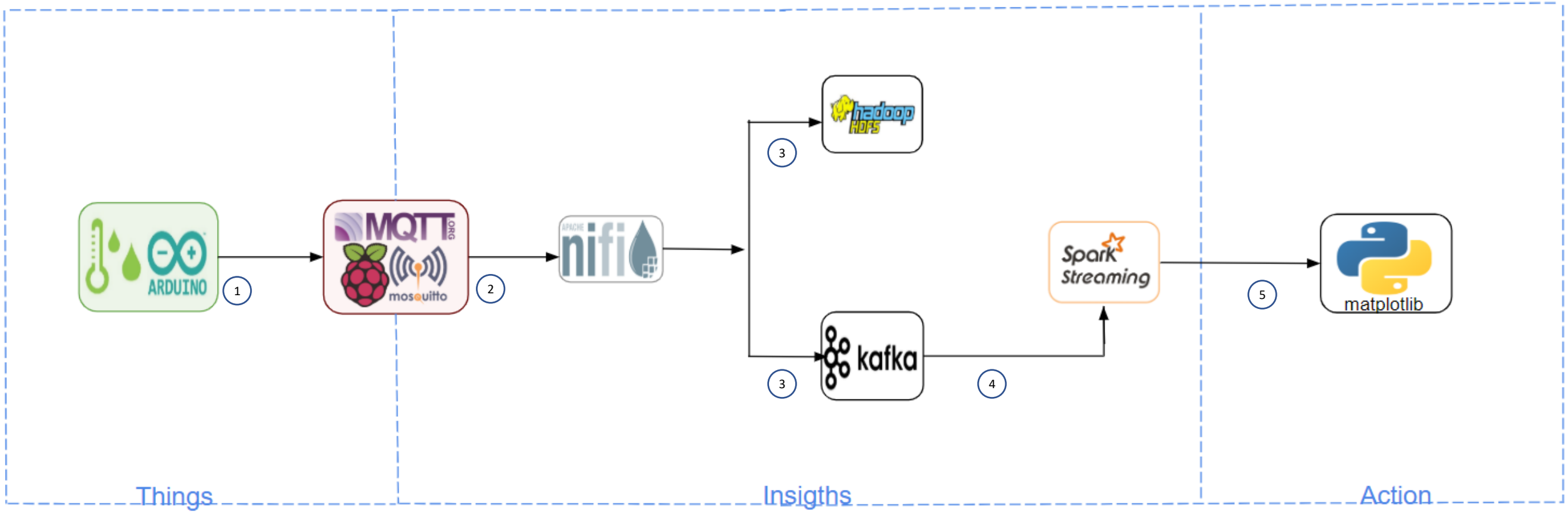
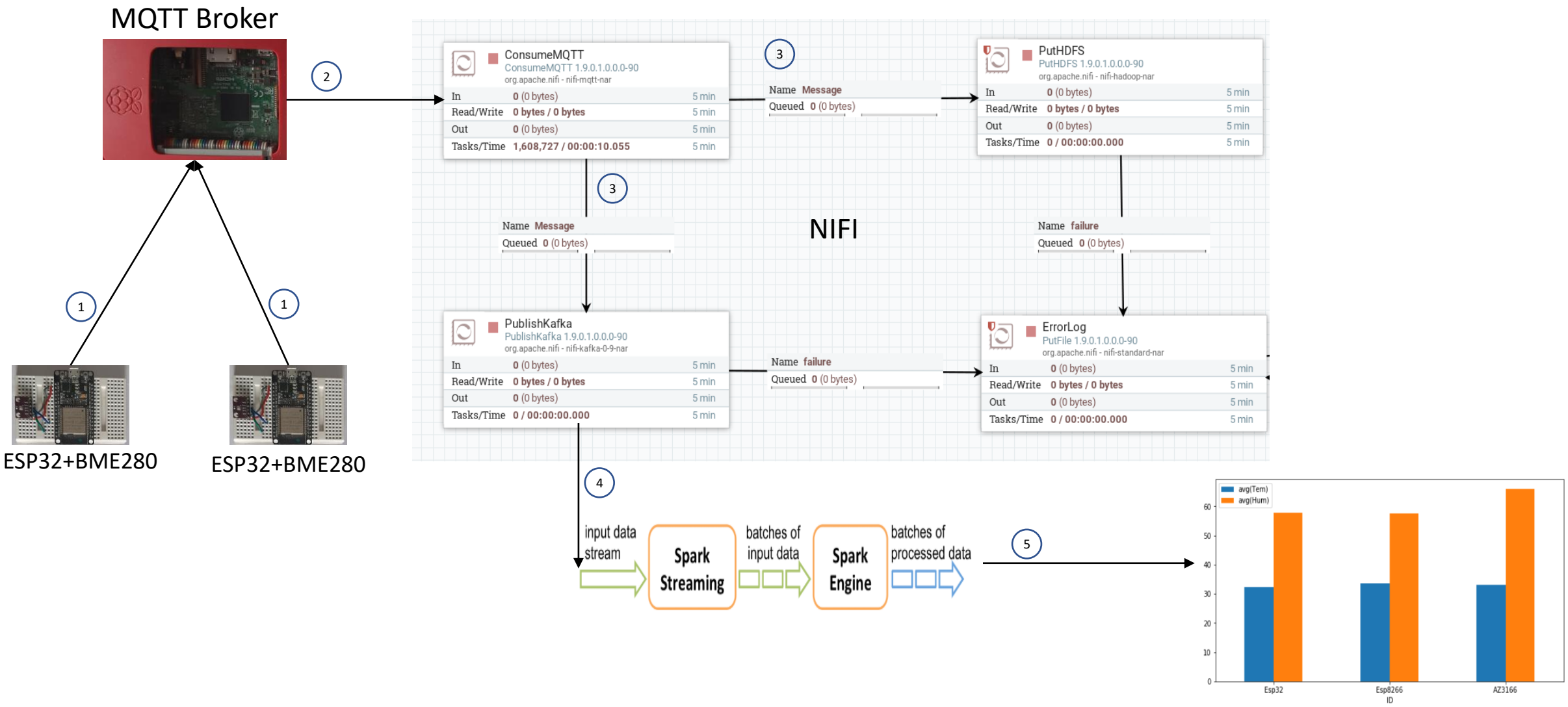
Topics

- Architecture
- Setting up MQTT Broker – Mosquitto
- Programming ESP32 with Arduino IDE
- VMware with cloudera QuickStart
- Setting up NIF, KAFA,SPARK2
- Routing data using NIFI to KAFA & HDFS
- Process streaming Data Using SPARK

IOT with Hadoop Ecosystem (simple Architecture)



IOT with Hadoop Ecosystem (simple Architecture)



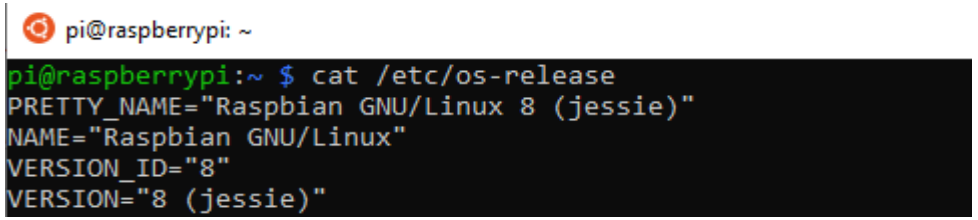
Installing MQTT Broker(Mosquitto) on Raspberry Pi

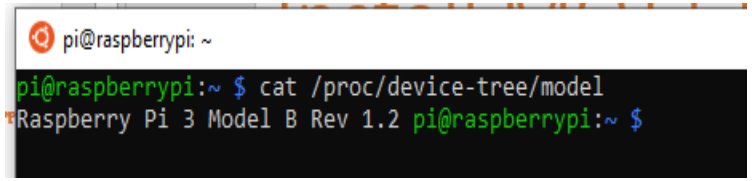
Install MQTT Broker Mosquitto

Step1: [Login into your Raspberry Pi Device]

OS version : - pi@raspberrypi:~ $ cat /etc/os-release

Device Model : - pi@raspberrypi:~ $ cat /proc/device-tree/model





Step2: [Mosquitto installation]

pi@raspberry:~ $ **sudo apt update**

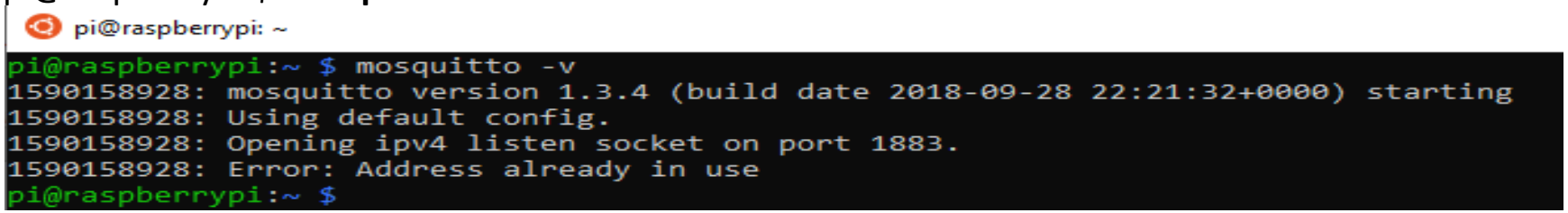
pi@raspberry:~ $ **sudo apt install -y mosquitto mosquitto-clients**

Step3: [To Start Mosquitto on boot up]

pi@raspberry:~ $ **sudo systemctl enable mosquitto.service**

Step4:[Check Mosquitto Installation]

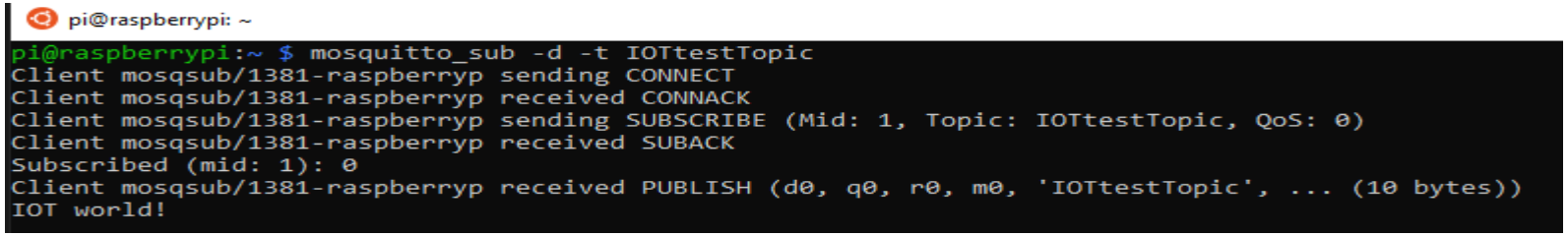
pi@raspberry:~ $ **mosquitto -v**



Testing MQTT Broker Mosquitto

Step5: [Subscribe to topic IOTtestTopic in Window1]

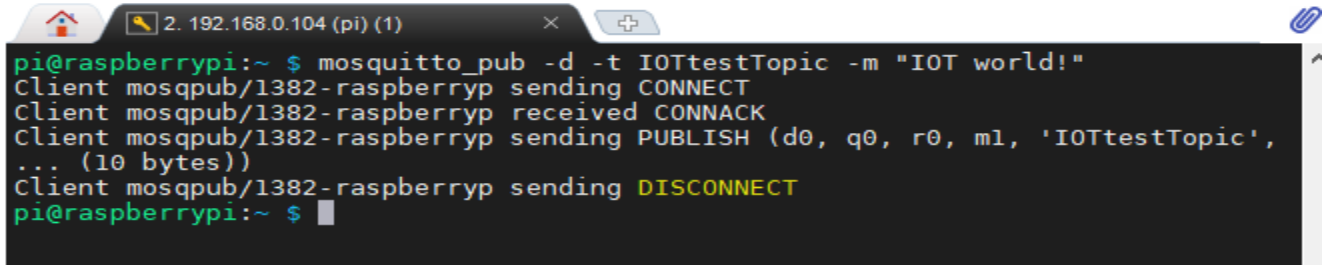
pi@raspberry:~ $ mosquitto_sub -d -t IOTtestTopic



Step5: [Publish Message to topic IOTtestTopic from Window2]

pi@raspberry:~ $ mosquitto_pub -d -t IOTtestTopic -m "IOT world!"

After executing the above command in Window2 you can see the Message "IOT world" is printed in Window1, Your MQTT Broker is working properly.



Note:

Setting up Raspberry :https://projects.raspberrypi.org/en/projects/raspberry-pi-setting-up

Basics of MQTT :https://www.youtube.com/watch?v=WmKAWOVnwjE

Programming ESP32 with Arduino IDE

Setting up ESP32 Device

Required Items

Hardware:

1. BME280 - 2
2. ESP32 – 2

Software:

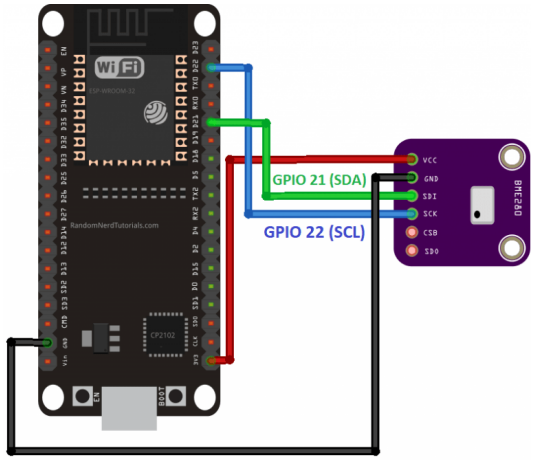
1. Arudino IDE
2. Programming - c/python

I have used

Setup1 : ESP32 + BME80

Setup2 : ESP8266 + BME280

for programming ESP32/ESP8266 I have used C.



BME280	ESP32
Vin	3.3V
GND	GND
SCL	GPIO 22
SDA	GPIO 21

This sensor communicates using I2C communication protocol

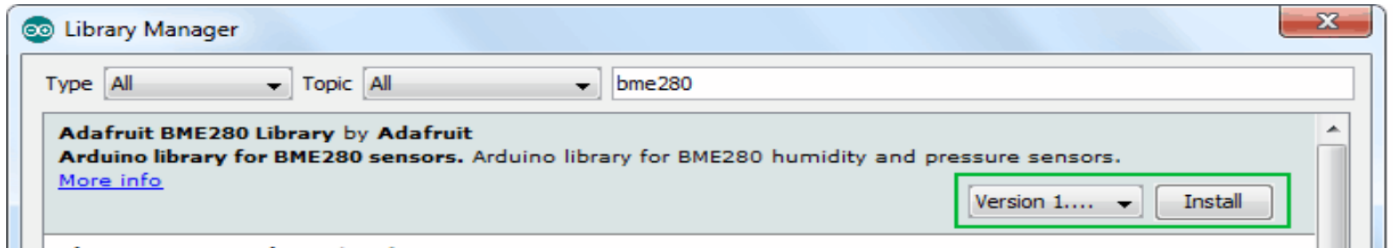
Programming ESP32

Step1:[Install Arduino IDE]

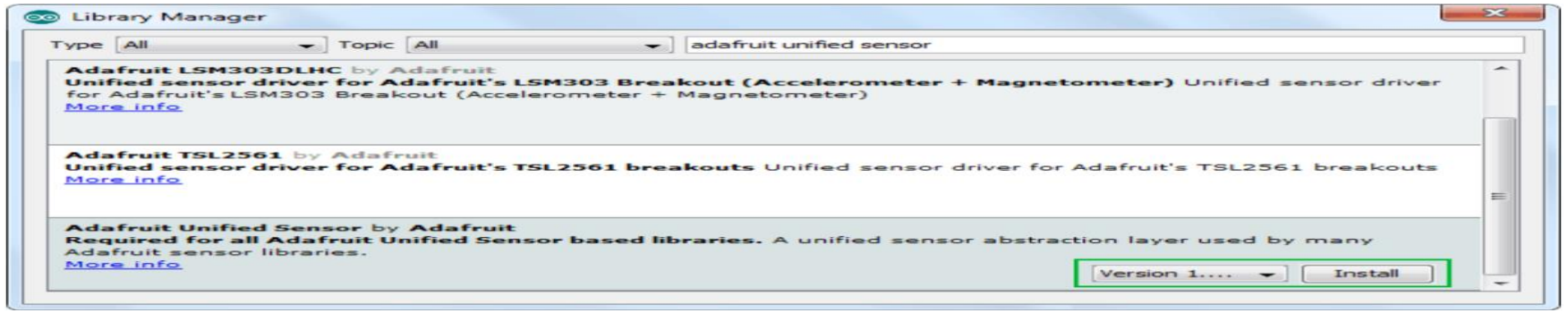
https://www.arduino.cc/en/Main/Software (current project IDE is installed on windows10)

Step2:[Install BME280 library]

Open your Arduino IDE and go to **Sketch > Include Library > Manage Libraries**. The Library Manager should open. Search for “bme280 ” and install the library.



The BME280 sensor library uses the Adafruit sensor support_backend. So, search the library manager for Adafruit Unified Sensor and install that too



Programming ESP32

Step3:[Additional Board Managers URL]

Go to **File>Preferences> Additional Board Manager URL's** add the below link
https://dl.espressif.com/dl/package_esp32_index.json

Step4:[Write the code to collect BME280 data and send to MQTT Broker]

Refer to Git Link : https://github.com/rpalaani30/IOT-Hadoop/blob/master/Esp32Bme280.ino

Step5:[Set Board Manager before Complication]

Go To **Tools>Board> Boards Manger**> select "**ESP2 Dev Module**" and press Upload button to compile and flash.

Note : while flashing keep your Boot/Flash button pressed in ESP32 board.

once flashing is completed. Press RST/EN button in your board. The device will start sending message to MQTT Broker.

Step5:[Check your MQTT Broker]

```
pi@raspberrypi:~ $ mosquitto_sub -d -t Weather/#
Client mosqsub/1214-raspberryp sending CONNECT
Client mosqsub/1214-raspberryp received CONNACK
Client mosqsub/1214-raspberryp sending SUBSCRIBE (Mid: 1, Topic: Weather/#, QoS: 0)
Client mosqsub/1214-raspberryp received SUBACK
Subscribed (mid: 1): 0
Client mosqsub/1214-raspberryp received PUBLISH (d0, q0, r0, m0, 'Weather/ESP32', ... (101 bytes))
{"ID":"Esp32","Date":"2020-05-23T19:28:52Z","Tem":32.49,"Hum":54.13672,"Per":95712.11,"Alt":478.1564}
Client mosqsub/1214-raspberryp received PUBLISH (d0, q0, r0, m0, 'Weather/ESP32', ... (101 bytes))
{"ID":"Esp32","Date":"2020-05-23T19:28:57Z","Tem":32.47,"Hum":54.20996,"Per":95717.63,"Alt":477.6751}
Client mosqsub/1214-raspberryp received PUBLISH (d0, q0, r0, m0, 'Weather/ESP32', ... (101 bytes))
{"ID":"Esp32","Date":"2020-05-23T19:29:02Z","Tem":32.45,"Hum":54.18652,"Per":95715.97,"Alt":477.8199}
```

Thank You