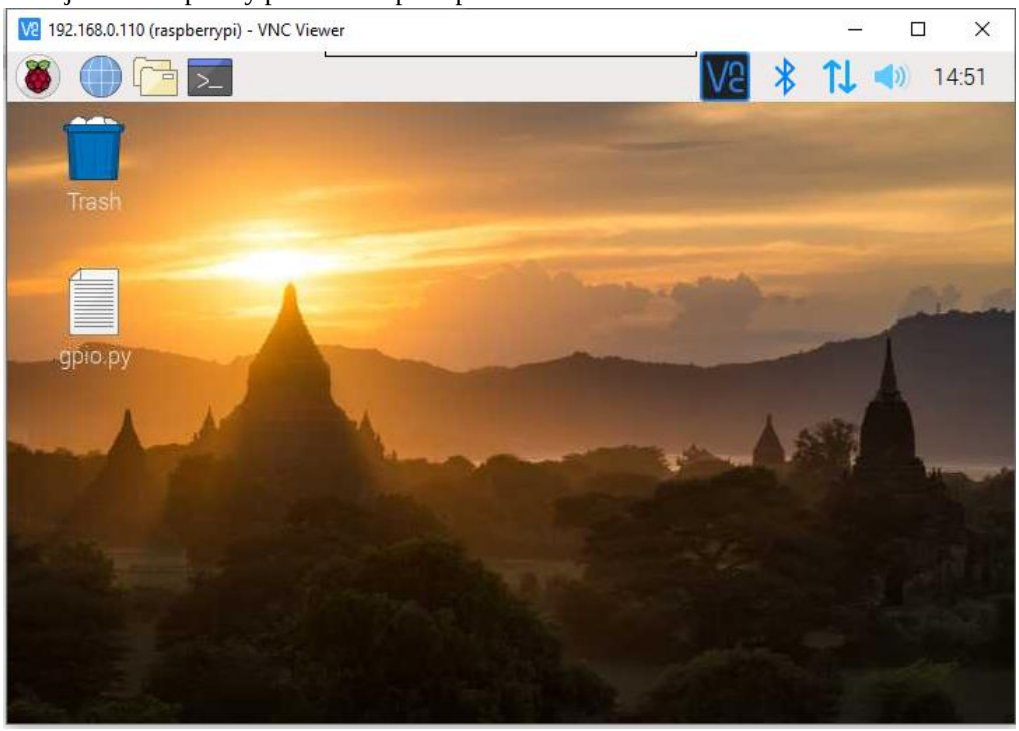
MODUL 3

Perancangan Node Device menggunakan Raspberry Pi 3 (Publisher)

Percobaan 1

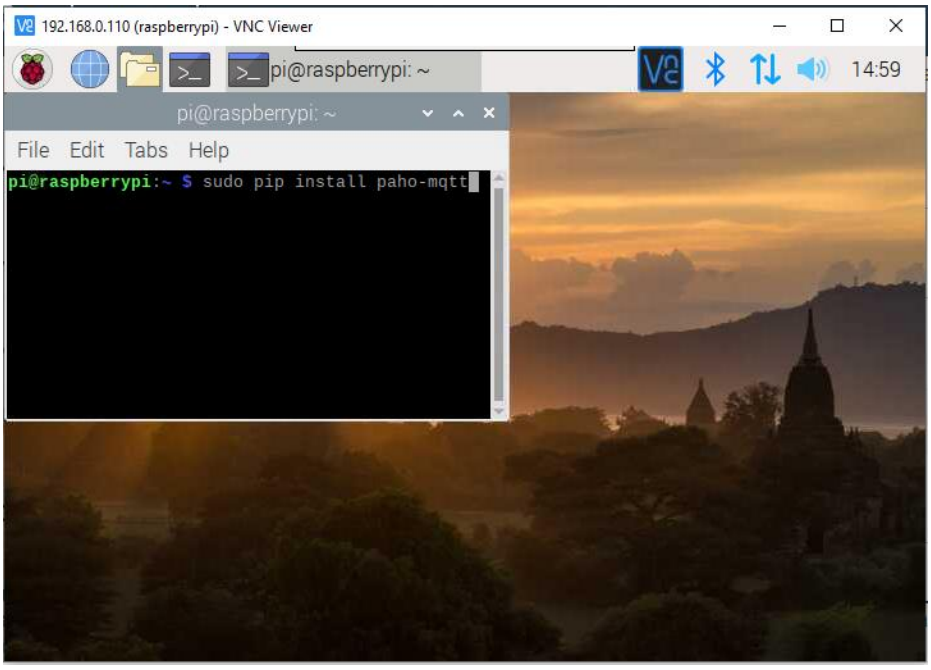
Programming Raspberry Pi

1. Gunakan monitor atau VNC yang sudah tersedia
2. Pada jendela raspberry pi akan tampil seperti berikut ini



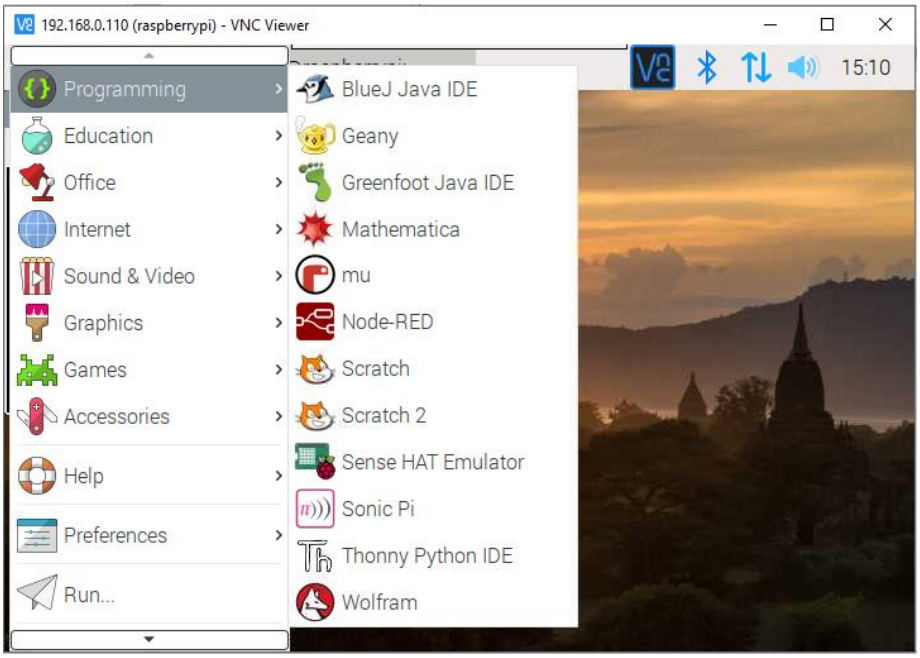
3. Kemudian buka terminal. Kemudian ketik dan install

```
sudo pip install paho-mqtt
```

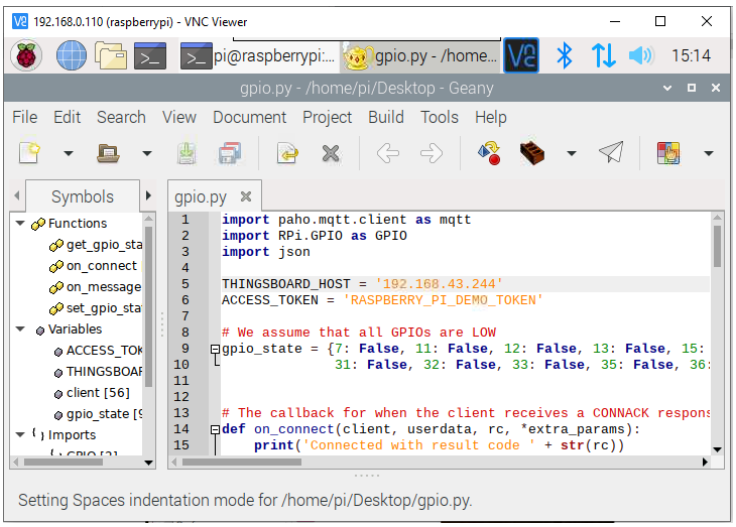


Apabila ditanyakan password ketikkan : **raspberry**

4. Buka programing IDE geany untuk memasukkan program



5. Maka akan muncul halaman pemrograman berikut ini

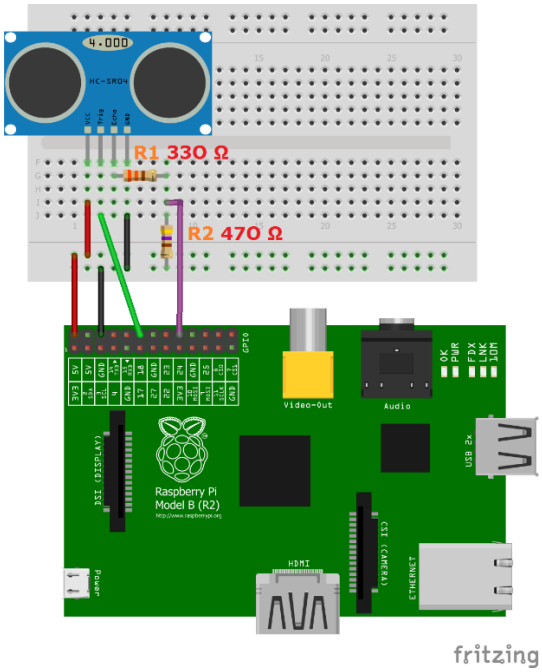


Masukkan program berikut ini

```
#Libraries
import os
import time
import sys
import paho.mqtt.client as mqtt
import json
import RPi.GPIO as GPIO
import time
#GPIO Mode (BOARD / BCM)
GPIO.setmode(GPIO.BCM)
#set GPIO Pins
GPIO_TRIGGER = 18
GPIO_ECHO = 24
#set GPIO direction (IN / OUT)
GPIO.setup(GPIO_TRIGGER, GPIO.OUT)
GPIO.setup(GPIO_ECHO, GPIO.IN)

THINGSBOARD_HOST = 'SERVER IP ADDRESS'
ACCESS_TOKEN = 'TOKEN_ACCESS'

# Data capture and upload interval in seconds. Less interval will eventually.
INTERVAL=1

sensor_data = {'distance': 0}

next_reading = time.time()

client = mqtt.Client()

# Set access token
client.username_pw_set(ACCESS_TOKEN)

# Connect to ThingsBoard using default MQTT port and 60 seconds keepalive
interval
client.connect(THINGSBOARD_HOST, 1883, 60)

client.loop_start()

def distance():
  # set Trigger to HIGH
```

```
  GPIO.output(GPIO_TRIGGER, True)
  # set Trigger after 0.01ms to LOW
  time.sleep(0.00001)
  GPIO.output(GPIO_TRIGGER, False)
  StartTime = time.time()
  StopTime = time.time()
  # save StartTime
  while GPIO.input(GPIO_ECHO) == 0:
            StartTime = time.time()
  # save time of arrival
  while GPIO.input(GPIO_ECHO) == 1:
            StopTime = time.time()
  # time difference between start and arrival
  TimeElapsed = StopTime - StartTime
  # multiply with the sonic speed (34300 cm/s)
  # and divide by 2, because there and back
  distance = (TimeElapsed * 34300) / 2
  return distance
if __name__ == '__main__':
  try:
            while True:
                     dist = distance()
                     print ("Measured Distance = %.1f cm" % dist)
                     sensor_data['distance'] = dist
                     client.publish('v1/devices/me/telemetry',
json.dumps(sensor_data), 1)
                     next_reading += INTERVAL
                     sleep_time = next_reading-time.time()
                     if sleep_time > 0:
                              time.sleep(sleep_time)
  # Reset by pressing CTRL + C
  except KeyboardInterrupt:
            print("Measurement stopped by User")
            GPIO.cleanup()

client.loop_stop()
client.disconnect()
```

6. **Kemudian buatlah device pada thingsboard terlebih dahulu**
7. Gunakan breadboard dan sensor jarak dan buatlah rangkaiannya terlebih dahulu



GPIO 18/PIN 12 – TRIGGER

GPIO 24/PIN 18 – ECHO (VOLTAGE DIVIDER)

5V – VCC

GND - GND

Percobaan 2

Halaman Dashboard

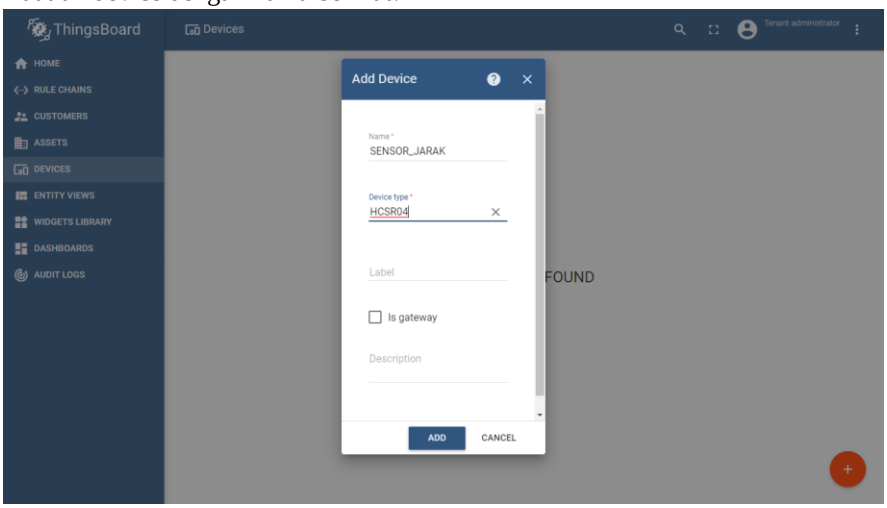
1. Buka dan buat akun di Alamat IP yang ada di papan tulis
2. Masuk dengan user yang sudah tersedia sebagai berikut:

   Email : praktikum_iot_1@thingsboard.com

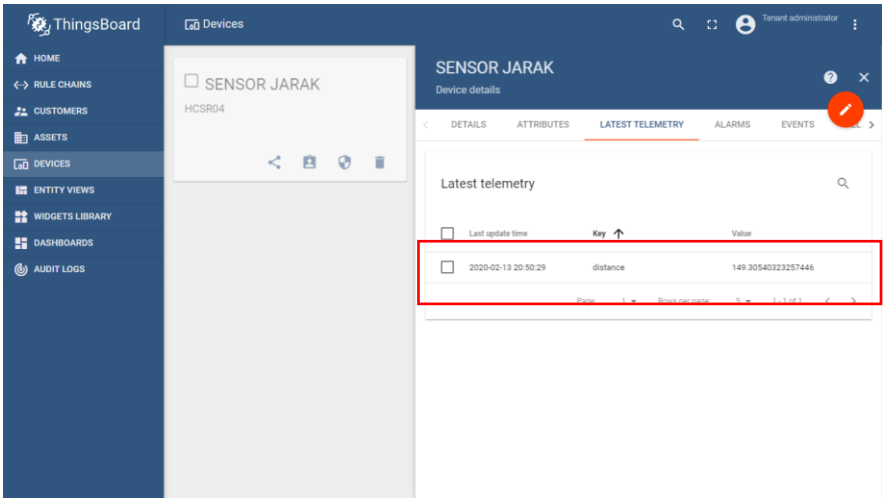
   Pass : praktikumiot

   *untuk email yang digunakan sesuai dengan kelompok praktikum, jika kelompok 2 maka emailnya adalah praktikum_iot_2@thingsboard.com, dan seterusnya. Untuk password adalah sama.

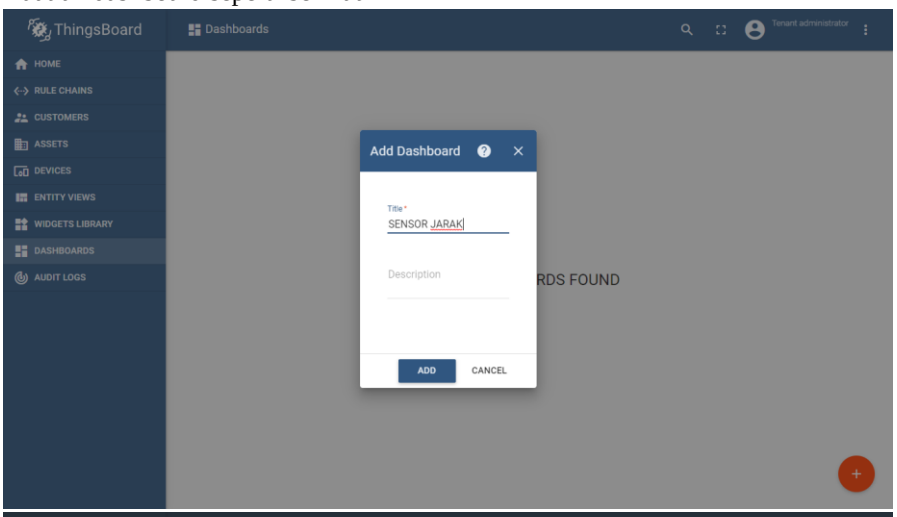
3. Buatlah device dengan nama berikut:

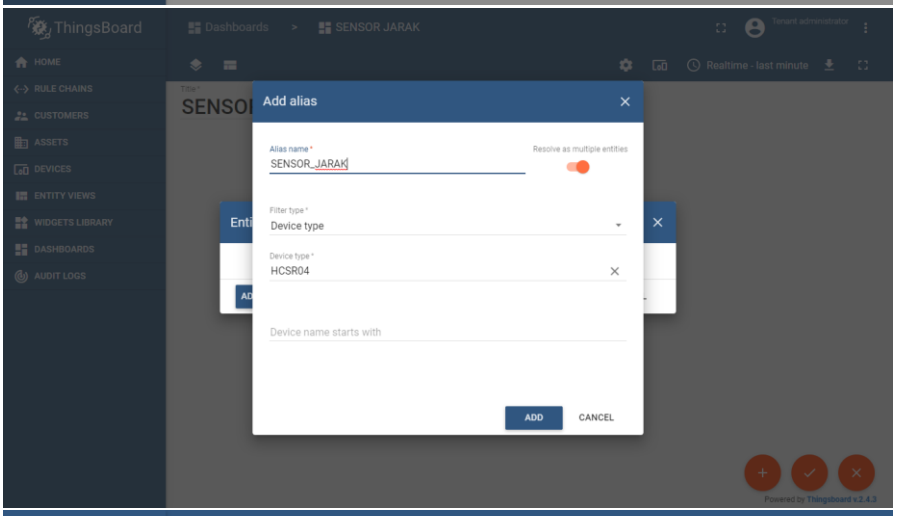


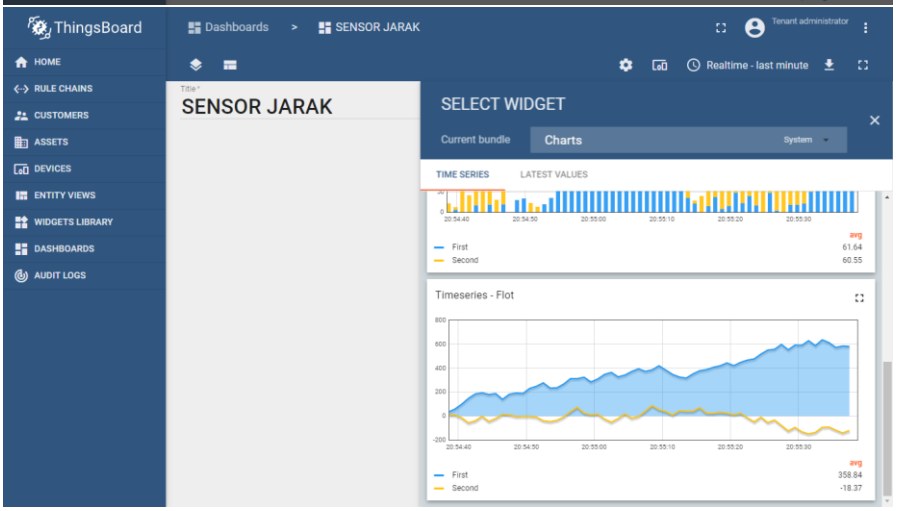
4. Kemudian copy token dari device dan jalankan program yang ada di **Python.** Kemudian cek data pada device sudah masuk atau belum. Jika sudah kemudian buatlah dashboard.

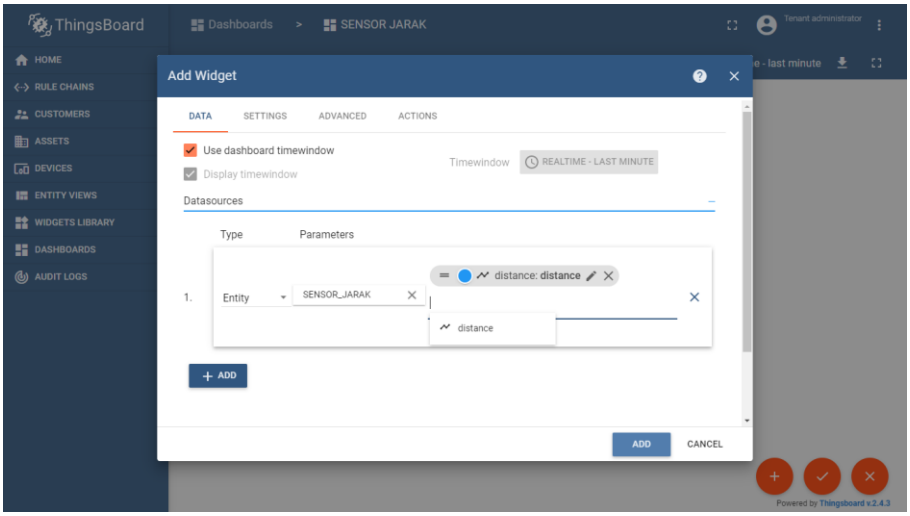


5. Buatlah dashboard seperti berikut ini

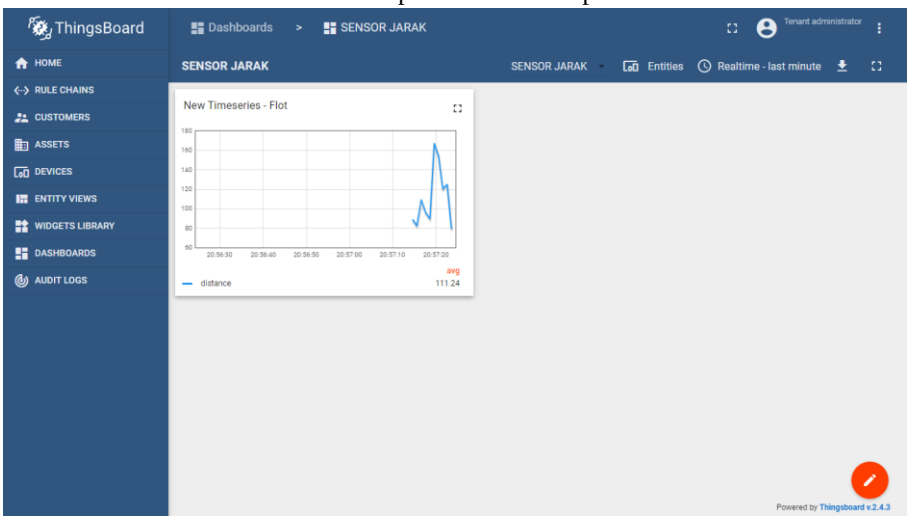








6. Maka akan muncul dashboard seperti berikut ini apabila sudah berhasil



Tugas

1. Buatlah tampilan dashboard data untuk pembacaan sensor DHT11 dengan Raspberry Pi

DHT-11 Data	Raspberry Pi GPIO 4
DHT-11 VCC	Raspberry Pi 3.3V
DHT-11 GND (-)	Raspberry Pi GND

```
sudo apt-get install python-dev
git clone https://github.com/adafruit/Adafruit_Python_DHT.git
cd Adafruit_Python_DHT
sudo python setup.py install
```

```
import os
import time
import sys
import Adafruit_DHT as dht
import paho.mqtt.client as mqtt
import json

# Data capture and upload interval in seconds. Less interval will eventually
hang the DHT11.

try:
    while True:
        humidity,temperature = dht.read_retry(dht.DHT11, 4)
        humidity = round(humidity, 2)
        temperature = round(temperature, 2)
        print(u"Temperature: {:g}\u00b0C, Humidity:
{:g}%".format(temperature, humidity))

        next_reading += INTERVAL
        sleep_time = next_reading-time.time()
        if sleep_time > 0:
            time.sleep(sleep_time)
except KeyboardInterrupt:
    pass
```

2. Buatlah dashboard yang menampilkan data gauge digital & analog untuk DHT11 dan HCSR04