LAB MANUAL 2

Deployment of MQTT protocol on IoT Devices

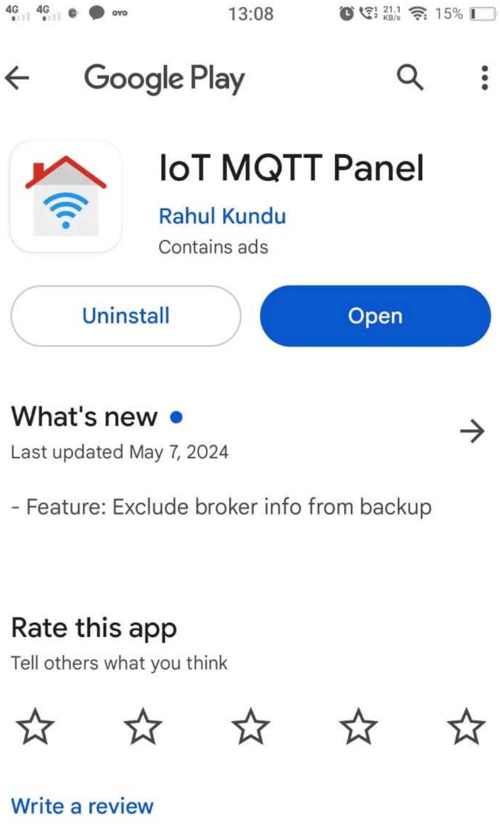
Disclaimer: The content is curated from online/offline resources and used for educational purpose only

Deployment of MQTT protocol on RaspberryPI with DFRobot Hat

Controlling LED using MQTT

Steps –

1. Connect LED to Digital port 12 on DFRobot hat
2. Install MQTT dashboard app on Android phone



IoT MQTT Panel

Rahul Kundu

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What's new

Last updated May 7, 2024

- Feature: Exclude broker info from backup

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[MQTT Dashboard App]

3. Create a Toggle Switch to control LED

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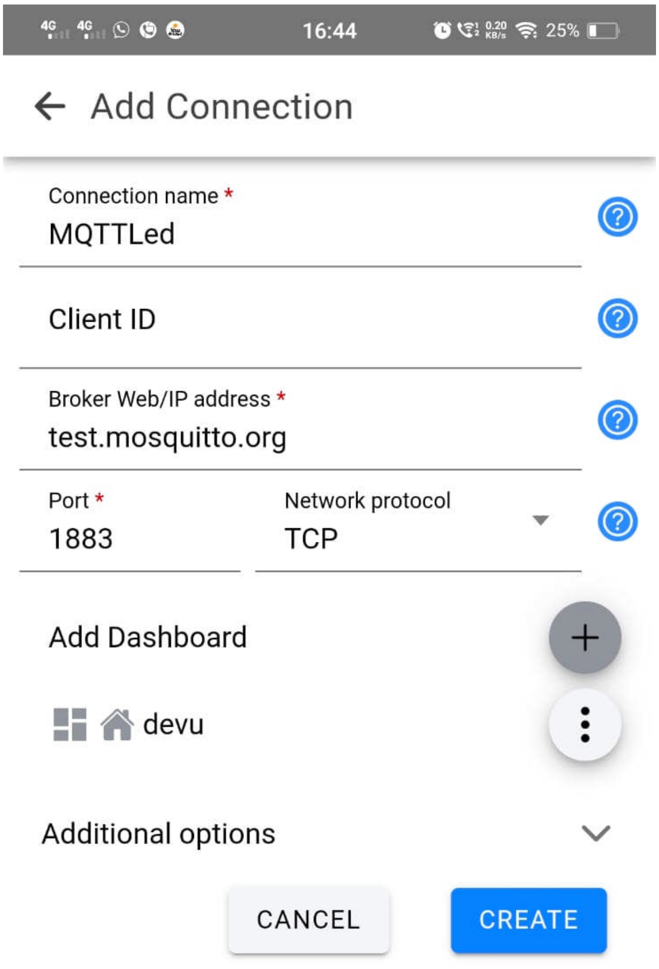

Add Connection

Connection name * MQTTLed

Client ID

Broker Web/IP address * test.mosquitto.org

Port * 1883

Network protocol TCP

Add Dashboard

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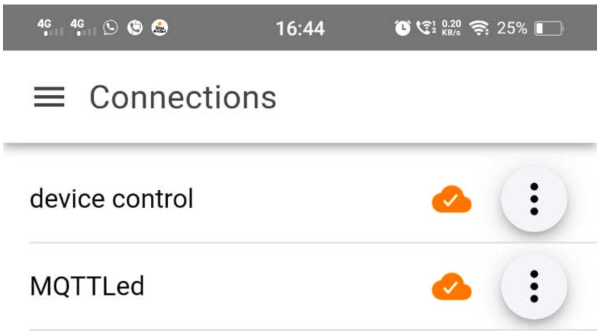
Additional options



Connections

device control

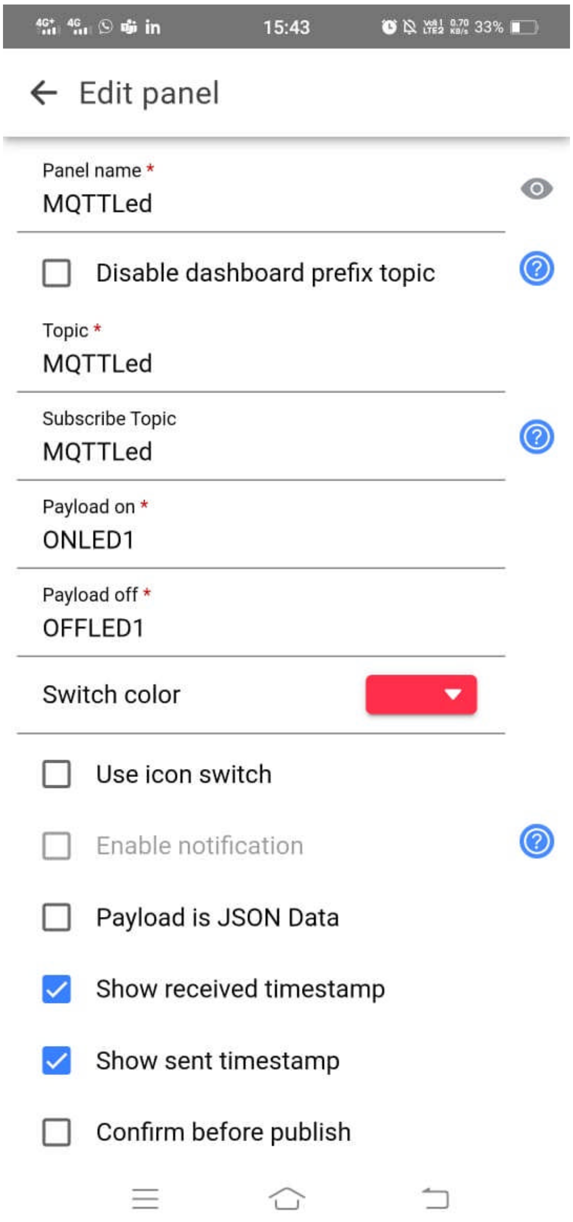
MQTTLed

4. Install mqtt library in raspberrypi using **sudo pip3 install paho-mqtt**. Run below code on RaspberryPI

Code-

```
  #pip3 install paho-mqtt
import paho.mqtt.client as mqtt
import RPi.GPIO as GPIO
import time
import atexit

LED = 12

atexit.register(GPIO.cleanup)
GPIO.setmode(GPIO.BCM)
GPIO.setup(LED,GPIO.OUT)


def on_connect(client, userdata, flags, rc):
    print("Connected to broker. Return of connection: "+str(rc))

    client.subscribe("/MQTTLED/#")

# Callback - when a message is received
def on_message(client, userdata, msg):
        print("Topic: "+msg.topic+" - Message Received: "+str(msg.payload))
        df=msg.payload.decode('utf-8')
        print(df)

        if (df == "ONLED1"):
          GPIO.output(LED,GPIO.HIGH)
          return 0

        if (df == "OFFLED1"):
          GPIO.output(LED,GPIO.LOW)
          return 0

#main program
client = mqtt.Client()
client.on_connect = on_connect   # configure callback (from when the connection$
client.on_message = on_message   # set callback (from when a message is receive$
client.connect("test.mosquitto.org", 1883, 60)
```

```
# Endless loop waiting to receive messages. .
client.loop_forever()
```



15:43

Edit panel

Panel name *
MQTTLed

□ Disable dashboard prefix topic

Topic *
MQTTLed

Subscribe Topic
MQTTLed

Payload on *
ONLED1

Payload off *
OFFLED1

Switch color 🟥

□ Use icon switch

□ Enable notification

□ Payload is JSON Data

☑ Show received timestamp

☑ Show sent timestamp

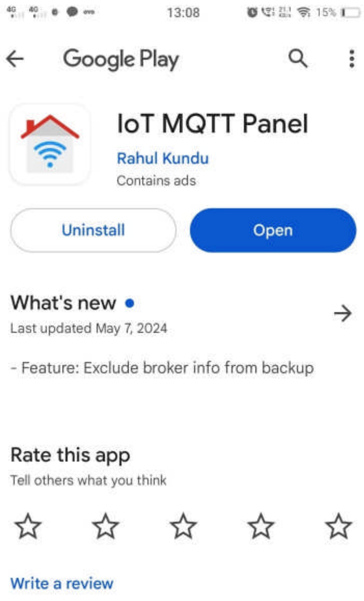
□ Confirm before publish

Monitor Temp & Humidity sensor and controlling the operation

Steps –

1. Connect LED to Digital port 12, Temp and humidity sensor on port A0 & A1 on DFRobot hat
2. Install MQTT dashboard app on Android phone

[Mqtt Dashboard - IoT and Node- - Apps on Google Play]



IoT MQTT Panel

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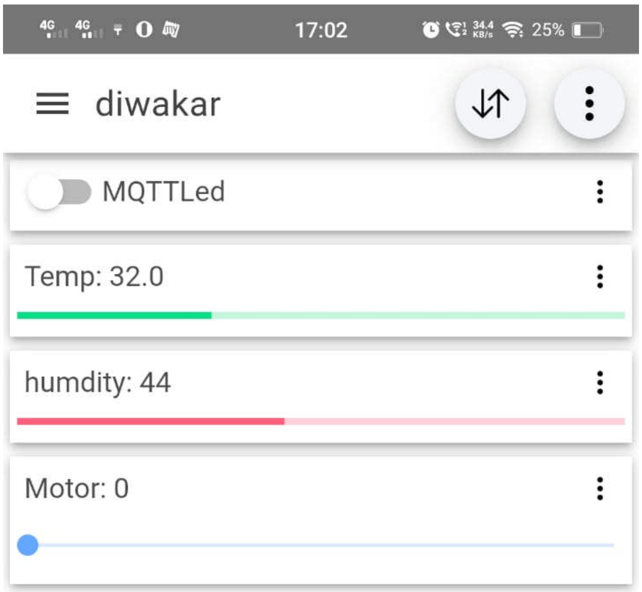
MQTT Dashboard App

3. Create dashboard with Text for Temperature & Humidity and toggle switch for LED



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MQTTLed

Temp: 32.0

humdity: 44

Motor: 0

4. Install mqtt library in RaspberryPI using **sudo pip3 install paho-mqtt**. Run below code on RaspberryPI

Code-

```
#pip3 install paho-mqtt
import paho.mqtt.client as mqtt
import RPi.GPIO as GPIO
import time
import atexit

from dfadc import *

board_detect()

while board.begin() != board.STA_OK:
   print_board_status()
   print("board begin faild")
   time.sleep(2)
print("board begin success")
```

```
board.set_adc_enable()

LED = 12

atexit.register(GPIO.cleanup)
GPIO.setmode(GPIO.BCM)
GPIO.setup(LED,GPIO.OUT)


def on_connect(client, userdata, flags, rc):
    print("Connected to broker. Return of connection: "+str(rc))
    client.subscribe("MQTTLED/#")

# Callback - when a message is received
def on_message(client, userdata, msg):
        print("Topic: "+msg.topic+" - Message Received: "+str(msg.payload))
        df=msg.payload.decode('utf-8')
        print(df)

        if (df == "ONLED1"):
          GPIO.output(LED,GPIO.HIGH)
          return 0

        if (df == "OFFLED1"):
          GPIO.output(LED,GPIO.LOW)
          return 0


def on_publish(client, userdata, mid):
    print("mid: " + str(mid))


def on_subscribe(client, userdata, mid, granted_qos):
    print("Subscribed: " + str(mid) + " " + str(granted_qos))

#main progra6m

client = mqtt.Client()
client.on_connect = on_connect   # configure callback (from when the connection$
client.on_message = on_message   # set callback (from when a message is receive$
client.on_publish = on_publish
client.on_subscribe = on_subscribe
client.connect("test.mosquitto.org", 1883, 60)

rc = 0
while rc == 0:
    rc = client.loop()
    temp = board.get_adc_value(board.A0)   # A0 channels read
    humidity = board.get_adc_value(board.A1)
    temperature = (temp/4096)* 100+20
    humidity = (humidity/4096)* 100
    if humidity is not None and temperature is not None:
      print('Temp={0:0.1f}*C  Humidity={1:0.1f}%'.format(temperature,
humidity))
      client.publish("humidity",str(humidity))
      client.publish("Temp",str(temperature))
      time.sleep(1)

    else:
      print('Failed to get reading. Try again!')
```