

Python for MySQL

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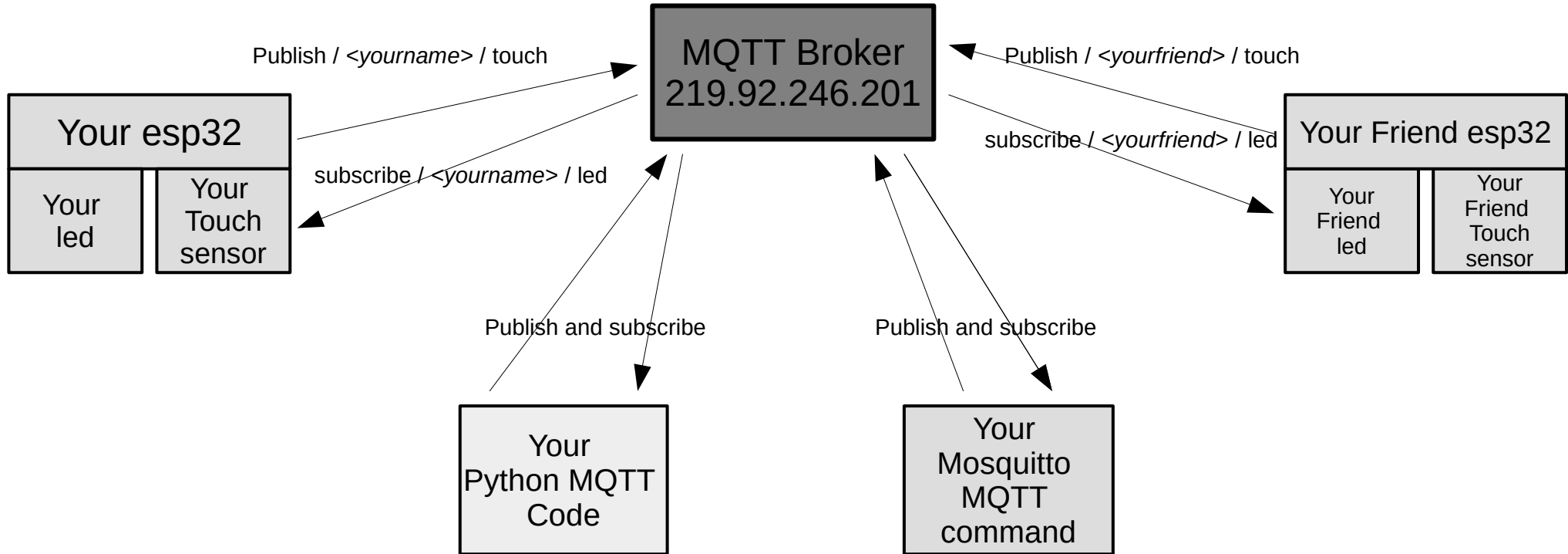
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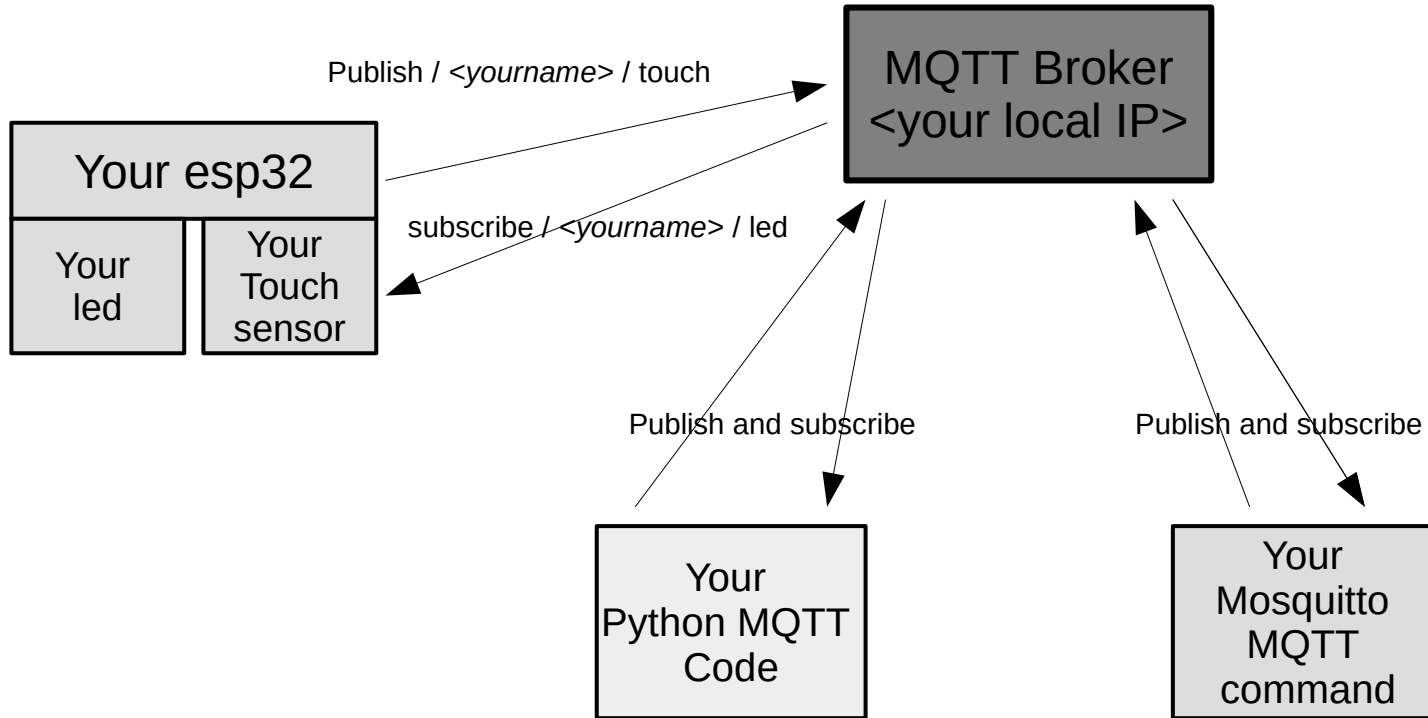
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Our IoT Layout



Your IoT Layout



MQTT and Data Persistency

- MQTT by default not providing data storage / persistency.
- We need to store our IoT transaction data to a more persistent storage.
- We will use MySQL, open source relational database management system.

MySQL

- MySQL is a database system that store data in a form of relational database.
- We need to create one subscriber and store topic message into mysql table
- MySQL store data in the database table.
- Each database can have arbitrary number of tables.

Installing MySQL on Windows

- https://blog.devart.com/how-to-install-mysql-on-windows-using-mysql-installer.html?gclid=Cj0KCQjwiNSLBhCPARIsAKNS4_fcLs-_Mv45AXssUTMZSZeriTZ_YMu1fWsj94dFHfdx84eztx1ZA_caArgtEALw_wcB
- Follow above link to install MySQL on your laptop

Installing and Running MySQL on Windows

- Download MySQL Installer
- Connect to your MySQL server
- Create database
- Create Table
- Run Code to subscribe to topic and insert to table

Connect to MySQL

```
msrohmad@bytesoul:~$ mysql -u root -p
```

```
Enter password:
```

```
Welcome to the MySQL monitor.  Commands end with ; or \g.
```

```
Your MySQL connection id is 43
```

```
Server version: 5.7.35-0ubuntu0.18.04.2 (Ubuntu)
```

```
Copyright (c) 2000, 2021, Oracle and/or its affiliates.
```

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```

```
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
```

```
mysql>
```


Create and use new database

- `mysql> create database epo666_IoT;`
- `mysql> use epo666_IoT;`

Create and use new table

- mysql> create table touch_sensor(recordid int auto_increment not null key, topic varchar(128), value varchar(128));
- mysql> describe touch_sensor;

```
+-----+-----+-----+-----+-----+-----+
| Field  | Type      | Null | Key | Default | Extra      |
+-----+-----+-----+-----+-----+-----+
| recordid | int(11)    | NO   | PRI | NULL    | auto_increment |
| topic    | varchar(128) | YES  |     | NULL    |              |
| value    | varchar(128) | YES  |     | NULL    |              |
+-----+-----+-----+-----+-----+-----+
```

3 rows in set (0.02 sec)

- mysql>

Testing Insert from MySQL

- mysql> insert into touch_sensor(topic,value)values("/saufy/test","10");
Query OK, 1 row affected (0.06 sec)

- mysql> select * from touch_sensor;

```
+-----+-----+-----+
```

```
| recordid | topic      | value |
```

```
+-----+-----+-----+
```

```
|      1 | /saufy/test | 10    |
```

```
+-----+-----+-----+
```

1 row in set (0.00 sec)

Insert from python

- You need to install mysql.connector, python mysql library
- `#pip install mysql-connector-python`

Insert from python

```
#!/usr/bin/python
import mysql.connector as mysql

mydb = mysql.connect(
    host="localhost",
    user="root",
    password="saufy1982",
    database="epo666 IoT"
)

mycursor = mydb.cursor()

sql = "INSERT INTO touch_sensor (topic,value) VALUES (%s, %s)"
val = ("/saufy/test", "21")
mycursor.execute(sql, val)

mydb.commit()

print(mycursor.rowcount, "record inserted.")
```

Subscribe and Store

```
import paho.mqtt.client as mqtt
import mysql.connector as mysql
import time

#####
def on_message(client, userdata, message):
    print("message received " ,str(message.payload.decode("utf-8")))
    print("message topic=",message.topic)
    print("message qos=",message.qos)
    print("message retain flag=",message.retain)
    sql = "INSERT INTO touch_sensor (topic,value) VALUES (%s, %s)"
    val = (message.topic, str(message.payload.decode("utf-8")))
    mycursor.execute(sql, val)
    mydb.commit()
    print(mycursor.rowcount, "record inserted.")

#####

mydb = mysql.connect(
    host="localhost",
    user="root",
    password="saufy1982",
    database="epo666_iot"
)
mycursor = mydb.cursor()

broker_address="219.92.246.201"
print("creating new instance")
client = mqtt.Client("P1") #create new instance
client.on_message=on_message #attach function to callback

print("connecting to broker")
client.username_pw_set(username="epo666",password="epo666!@#")

client.connect(broker_address) #connect to broker
client.loop_start() #start the loop
print("Subscribing to ALL Topic")
client.subscribe("#")
time.sleep(240) # wait
client.loop_stop() #stop the loop
```

Show new table values

```
mysql> select * from touch_sensor;
```

recordid	topic	value
1	/saufy/test	10
2	/saufy/test	21
3	/zalilah/touch_read	105
4	/zalilah/touch_read	104
5	/zalilah/touch_read	105
6	/zalilah/touch_read	105
7	/zalilah/touch_read	105
8	/zalilah/touch_read	105
9	/zalilah/touch_read	103

```
9 rows in set (0.00 sec)
```

Conclusion

- Setup all this in your laptop
- Your machine is now a MySQL server
- You are storing your sensor values into a database
- Now you can also store led status
- You can also add time to your table to know time of the insert
- Congratulations!

Have Fun!