

Tutorial No.2

Roll No-CS22D003

Case Study:

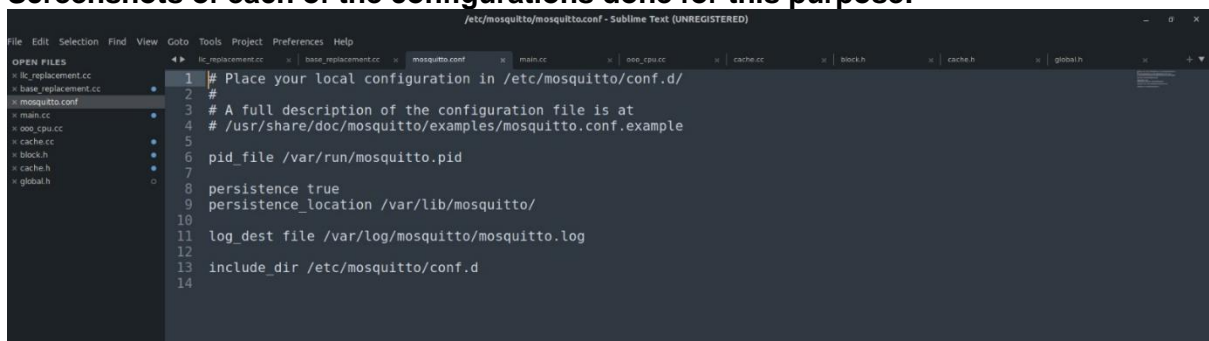
I am considering a simple case of an IKEA store. I am using a random number generator to generate a random number which shows the number of people in IKEA stores at the present time every 6 seconds.

If the number of people in an IKEA store is greater than 900, the sensor senses it and it will publish a message “over crowded with” with the number of people to the subscribers. Otherwise, the number of people will be published as a message. People with health issues, old people or people with children can better plan and leave the IKEA store.

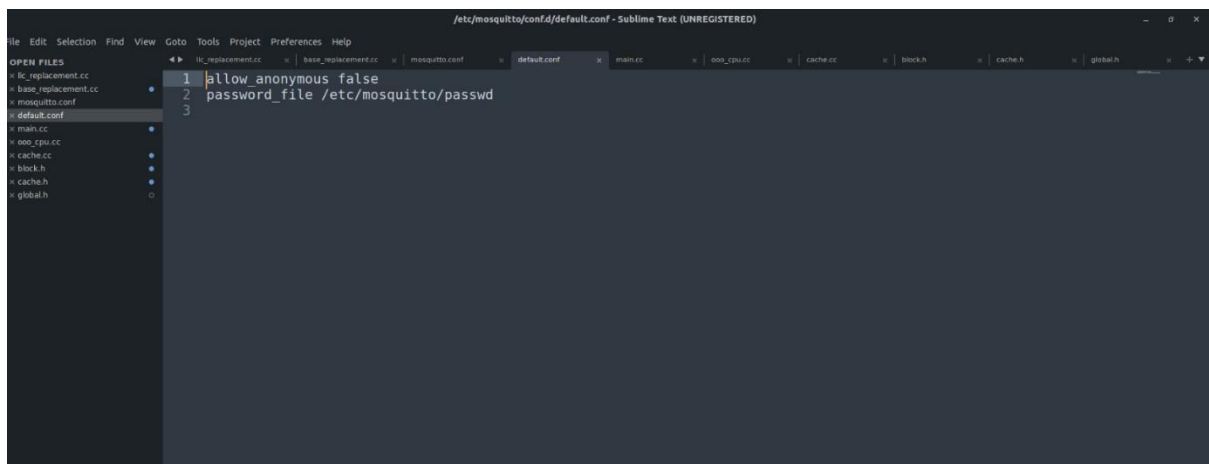
I have used Mosquitto which is an open-source message broker that implements the MQTT protocol. I wrote python code for publisher and subscriber.

Authentication of subscriber and publisher is done using a pre-set username & password. MQTT has a utility to generate a password file. I have used mosquitto_passwd tool to create a password and created a password file. conf.d/default.conf is a password file and mosquitto.conf is edited to include this file with “include /etc/mosquitto/conf.d”.

Screenshots of each of the configurations done for this purpose:



```
1 # Place your local configuration in /etc/mosquitto/conf.d/
2 #
3 # A full description of the configuration file is at
4 # /usr/share/doc/mosquitto/examples/mosquitto.conf.example
5
6 pid_file /var/run/mosquitto.pid
7
8 persistence true
9 persistence_location /var/lib/mosquitto/
10
11 log_dest file /var/log/mosquitto/mosquitto.log
12
13 include_dir /etc/mosquitto/conf.d
14
```



```
1 allow_anonymous false
2 password_file /etc/mosquitto/passwd
3
```

```
l3@shouvick: ~/NITI... x l3@shouvick: ~/NITI... x l3@shouvick: ~/NITI... x l3@shouvick: ~/NITI... x
l3@shouvick:~/NITIN-MTP-2/ChampSim$ mosquitto_pub -m "hello world" -t "Test"
Error: Unknown option 'world'.'.

Use 'mosquitto_pub --help' to see usage.
l3@shouvick:~/NITIN-MTP-2/ChampSim$ mosquitto_pub -m 'hello world' -t "Test"
l3@shouvick:~/NITIN-MTP-2/ChampSim$ mosquitto_pub -m 'hello world' -t "Test"
Connection error: Connection Refused: not authorised.
l3@shouvick:~/NITIN-MTP-2/ChampSim$ mosquitto_pub -m 'hello world' -t "Test" -u kranti -p kranti
Error: Invalid port given: 0

Use 'mosquitto_pub --help' to see usage.
l3@shouvick:~/NITIN-MTP-2/ChampSim$ mosquitto_pub -m 'hello world' -t "Test" -u kranti -P kranti
l3@shouvick:~/NITIN-MTP-2/ChampSim$ mosquitto_pub -m 'bye' -t "Test" -u kranti -P kranti
l3@shouvick:~/NITIN-MTP-2/ChampSim$ mosquitto_pub -m 'bye' -t "test" -u kranti -P kranti
l3@shouvick:~/NITIN-MTP-2/ChampSim$ mosquitto_pub -m 'bye' -t "test"
Connection error: Connection Refused: not authorised.
l3@shouvick:~/NITIN-MTP-2/ChampSim$
```

```
l3@shouvick: ~/NITI... x l3@shouvick: ~/NITI... x l3@shouvick: ~/NITI... x l3@shouvick: ~/NITI... x
l3@shouvick:~/NITIN-MTP-2/ChampSim$ mosquitto_sub -t "Test"
hello world
Connection error: Connection Refused: not authorised.
l3@shouvick:~/NITIN-MTP-2/ChampSim$ mosquitto_sub -t "test" -u kranti -P kranti
^X^Z
[1]+  Stopped                  mosquitto_sub -t "test" -u kranti -P kranti
l3@shouvick:~/NITIN-MTP-2/ChampSim$ mosquitto_sub -t "test" -u kranti -P kranti
bye
```

Python Code for publisher:

```
#Program for MQTT
import paho.mqtt.publish as publish
import sys
import random
import time

broker_url = "localhost"
broker_port = 1883
topic = "test/storeoccupancy"
username = "kranti"
password = "kranti"

while True:
    peoplecount = random.randint(0, 1000)
    if peoplecount >= 900:
        print("No of people in IKEA store are overcrowded with: " +
str(peoplecount))
        msg="overcrowded with: " + str(peoplecount)
        publish.single(topic, msg, hostname=broker_url, port=broker_port,
auth={'username': username, 'password': password})
    else:
        print("No of people in IKEA store is: " + str(peoplecount))
        publish.single(topic, peoplecount, hostname=broker_url,
port=broker_port, auth={'username': username, 'password': password})
        time.sleep(5)
```

Python Code for subscriber:

```
import paho.mqtt.client as mqtt

broker_url = "localhost"
broker_port = 1883
username = "kranti"
password = "kranti"

def on_connect(client, userdata, flags, rc):
    print("Connected with result code "+str(rc))
    client.subscribe("test/storeoccupancy")

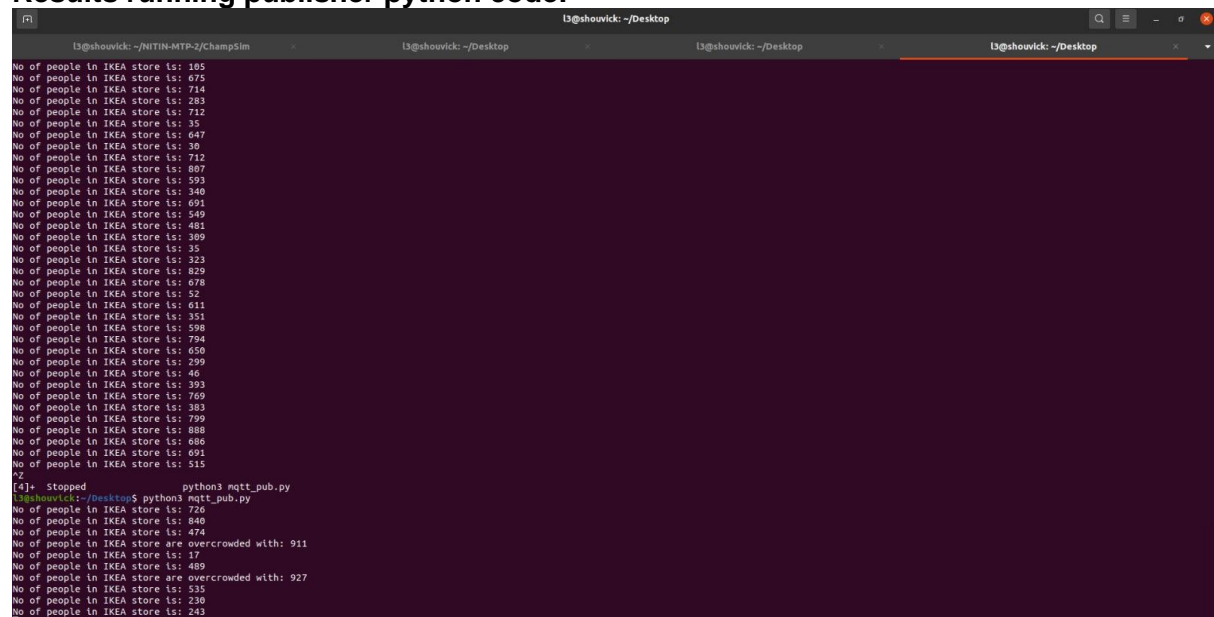
def on_message(client, userdata, msg):
    print(msg.topic+"- No of people in the IKEA store
now: "+str(msg.payload))

client = mqtt.Client()
client.username_pw_set(username, password) # set the username and password
client.on_connect = on_connect
client.on_message = on_message

client.connect(broker_url, broker_port, 60)

client.loop_forever()
```

Results running publisher python code:



```
l3@shouvik: ~/Desktop
No of people in IKEA store ts: 105
No of people in IKEA store ts: 675
No of people in IKEA store ts: 714
No of people in IKEA store ts: 283
No of people in IKEA store ts: 712
No of people in IKEA store ts: 35
No of people in IKEA store ts: 647
No of people in IKEA store ts: 30
No of people in IKEA store ts: 712
No of people in IKEA store ts: 887
No of people in IKEA store ts: 593
No of people in IKEA store ts: 340
No of people in IKEA store ts: 691
No of people in IKEA store ts: 549
No of people in IKEA store ts: 481
No of people in IKEA store ts: 309
No of people in IKEA store ts: 35
No of people in IKEA store ts: 323
No of people in IKEA store ts: 829
No of people in IKEA store ts: 678
No of people in IKEA store ts: 52
No of people in IKEA store ts: 611
No of people in IKEA store ts: 351
No of people in IKEA store ts: 598
No of people in IKEA store ts: 794
No of people in IKEA store ts: 650
No of people in IKEA store ts: 299
No of people in IKEA store ts: 46
No of people in IKEA store ts: 393
No of people in IKEA store ts: 769
No of people in IKEA store ts: 383
No of people in IKEA store ts: 799
No of people in IKEA store ts: 888
No of people in IKEA store ts: 686
No of people in IKEA store ts: 691
No of people in IKEA store ts: 515
^Z
[4]+  Stopped                  python3 mqtt_pub.py
l3@shouvik: ~/Desktop$ python3 mqtt_pub.py
No of people in IKEA store ts: 726
No of people in IKEA store ts: 840
No of people in IKEA store ts: 474
No of people in IKEA store are overcrowded with: 911
No of people in IKEA store ts: 17
No of people in IKEA store ts: 489
No of people in IKEA store are overcrowded with: 927
No of people in IKEA store ts: 535
No of people in IKEA store ts: 230
No of people in IKEA store ts: 243
```

Results running subscriber python code:

```
l3@showwick: ~NITIN-MTP-2/ChampsIm l3@showwick: ~/Desktop l3@showwick: ~/Desktop l3@showwick: ~/Desktop
test/storeoccupancy No of people in the IKEA store now: b'340'
test/storeoccupancy No of people in the IKEA store now: b'691'
test/storeoccupancy No of people in the IKEA store now: b'549'
test/storeoccupancy No of people in the IKEA store now: b'481'
test/storeoccupancy No of people in the IKEA store now: b'overcrowded with: 975'
test/storeoccupancy No of people in the IKEA store now: b'309'
test/storeoccupancy No of people in the IKEA store now: b'335'
test/storeoccupancy No of people in the IKEA store now: b'323'
test/storeoccupancy No of people in the IKEA store now: b'829'
test/storeoccupancy No of people in the IKEA store now: b'678'
test/storeoccupancy No of people in the IKEA store now: b'52'
test/storeoccupancy No of people in the IKEA store now: b'611'
test/storeoccupancy No of people in the IKEA store now: b'351'
test/storeoccupancy No of people in the IKEA store now: b'588'
test/storeoccupancy No of people in the IKEA store now: b'794'
test/storeoccupancy No of people in the IKEA store now: b'650'
test/storeoccupancy No of people in the IKEA store now: b'299'
test/storeoccupancy No of people in the IKEA store now: b'46'
test/storeoccupancy No of people in the IKEA store now: b'overcrowded with: 949'
test/storeoccupancy No of people in the IKEA store now: b'395'
test/storeoccupancy No of people in the IKEA store now: b'769'
test/storeoccupancy No of people in the IKEA store now: b'383'
test/storeoccupancy No of people in the IKEA store now: b'799'
test/storeoccupancy No of people in the IKEA store now: b'888'
test/storeoccupancy No of people in the IKEA store now: b'overcrowded with: 977'
test/storeoccupancy No of people in the IKEA store now: b'686'
test/storeoccupancy No of people in the IKEA store now: b'691'
test/storeoccupancy No of people in the IKEA store now: b'515'
^Z
[1] Stopped python3 mqtt_sub.py
l3@showwick: ~/Desktop$ python3 mqtt_sub.py
connected with result code 0
test/storeoccupancy No of people in the IKEA store now: b'726'
test/storeoccupancy No of people in the IKEA store now: b'840'
test/storeoccupancy No of people in the IKEA store now: b'474'
test/storeoccupancy No of people in the IKEA store now: b'overcrowded with: 911'
test/storeoccupancy No of people in the IKEA store now: b'17'
test/storeoccupancy No of people in the IKEA store now: b'489'
test/storeoccupancy No of people in the IKEA store now: b'overcrowded with: 927'
test/storeoccupancy No of people in the IKEA store now: b'535'
test/storeoccupancy No of people in the IKEA store now: b'230'
test/storeoccupancy No of people in the IKEA store now: b'243'
test/storeoccupancy No of people in the IKEA store now: b'887'
test/storeoccupancy No of people in the IKEA store now: b'193'
test/storeoccupancy No of people in the IKEA store now: b'167'
test/storeoccupancy No of people in the IKEA store now: b'316'
test/storeoccupancy No of people in the IKEA store now: b'761'
test/storeoccupancy No of people in the IKEA store now: b'659'
test/storeoccupancy No of people in the IKEA store now: b'99'
```