IoT LAB1

Submitted by Group E

Sahar Hosseini, Pham Quoc Trung

1 First step with MQTT

In this part we implement the local broker, subscriber and publisher on our machine.

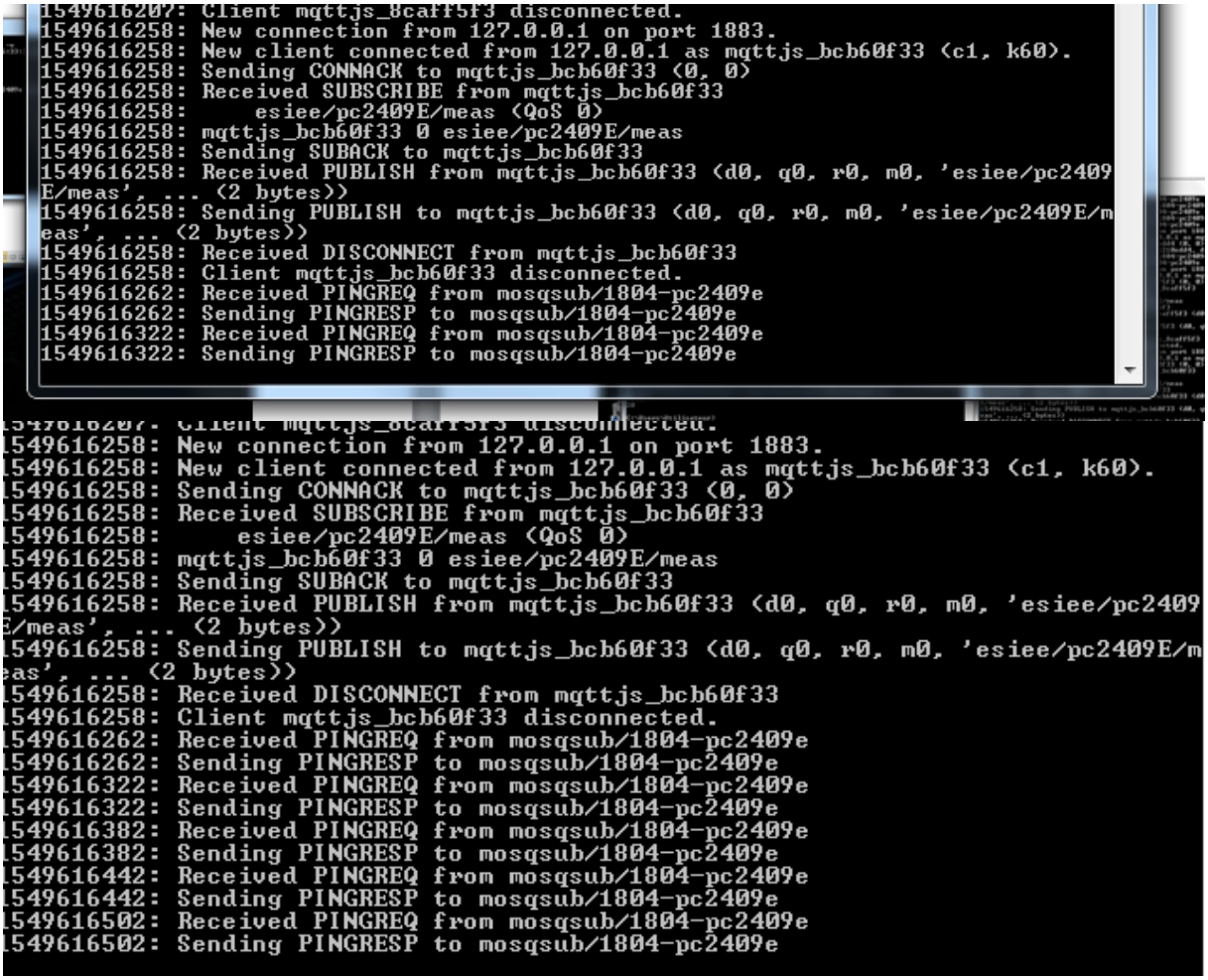
2 Using mqtt.js

We have written the script first we define the publisher and subscriber in the same script and then sparete them and execute them separetly.

- ✓ **The code has been put in the folder.**

Below screenshot is from the scripts include subscriber and publisher as you seen the messages send and recieve to the broker to establish the connection.

File name: mqtt.js



File name : sub.js

```
1549616599: New connection from 127.0.0.1 on port 1883.
1549616599: New client connected from 127.0.0.1 as mqttjs_d6433539 (c1, k60).
1549616599: Sending CONNACK to mqttjs_d6433539 (0, 0)
1549616599: Received SUBSCRIBE from mqttjs_d6433539
1549616599:     esiee/pc2409E/meas (QoS 0)
1549616599: mqttjs_d6433539 0 esiee/pc2409E/meas
1549616599: Sending SUBACK to mqttjs_d6433539
1549616622: Received PINGREQ from mosqsub/1804-pc2409e
1549616622: Sending PINGRESP to mosqsub/1804-pc2409e
1549616659: Received PINGREQ from mqttjs_d6433539
1549616659: Sending PINGRESP to mqttjs_d6433539
1549616682: Received PINGREQ from mosqsub/1804-pc2409e
1549616682: Sending PINGRESP to mosqsub/1804-pc2409e
```

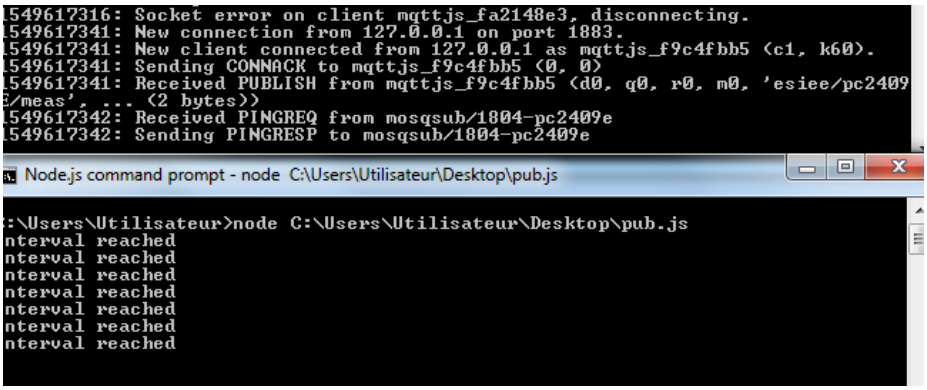
File name : pub.js

```
1549616719: Sending PINGRESP to mqttjs_d6433539
1549616726: New connection from 127.0.0.1 on port 1883.
1549616726: New client connected from 127.0.0.1 as mqttjs_1a0096ec (c1, k60).
1549616726: Sending CONNACK to mqttjs_1a0096ec (0, 0)
1549616726: Received PUBLISH from mqttjs_1a0096ec (d0, q0, r0, m0, 'esiee/pc2409
E/meas', ... (2 bytes))
1549616726: Sending PUBLISH to mqttjs_d6433539 (d0, q0, r0, m0, 'esiee/pc2409E/m
eas', ... (2 bytes))
1549616726: Received DISCONNECT from mqttjs_d6433539
1549616726: Client mqttjs_d6433539 disconnected.
1549616742: Received PINGREQ from mosqsub/1804-pc2409e
1549616742: Sending PINGRESP to mosqsub/1804-pc2409e
```

2.1 Simulated connected sonsor

We define the interval function thet could publish the messages every 1 second.

File.name pub2.js



3. Work with an external broker

In this section we have changed the broken address machine and select this machine address as a broker 'mqtt://pc2409m.lan.esiee.fr' by this command

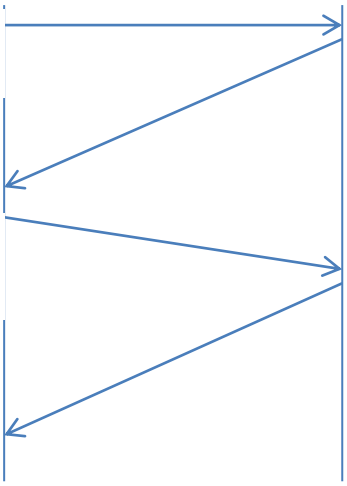
```
var client = mqtt.connect('mqtt://pc2409m.lan.esiee.fr')
```

3.1 Frame capture

By runing wiresharek software we are able to monitor the protocols on the network. Below screen shot has taken from wiresharek.

First we send the connection by mqtt protocl to establish the connection the we recieved the acknowledgement, after that we send a request to subscribe and publish the message then, We recieved the acknowledgment for subsciber and publihser enable to send the message.

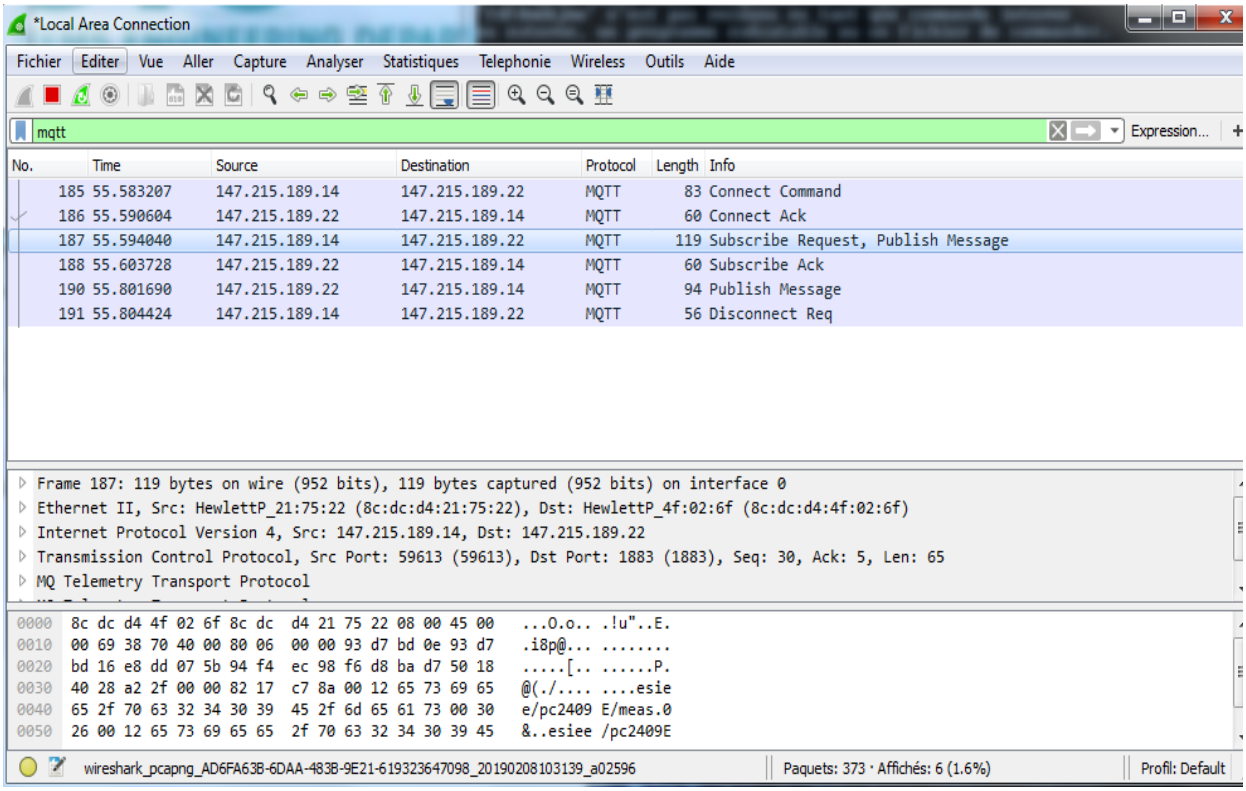
1.Send message to establish the connection to broker



2. recieved the ACK

3. subscriber and publisher send the reauest

4. receive Ack for subscriber and publihser send messge



Next screenshot has taken from the acknowledgment to to establish the connection we could see some details information like time arrival frame number and protocol name.

```
Wireshark · Paquet 186 · wireshark_pcapng_AD6FA63B-6DAA-483B-9E21-619323647098_20190208103139_a02596

Frame 186: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0
    Interface id: 0 (\Device\NPF_{AD6FA63B-6DAA-483B-9E21-619323647098})
    Encapsulation type: Ethernet (1)
    Arrival Time: Feb  8, 2019 10:32:34.857900000 Paris, Madrid
    [Time shift for this packet: 0.000000000 seconds]
    Epoch Time: 1549618354.857900000 seconds
    [Time delta from previous captured frame: 0.007397000 seconds]
    [Time delta from previous displayed frame: 0.007397000 seconds]
    [Time since reference or first frame: 55.590604000 seconds]
    Frame Number: 186
    Frame Length: 60 bytes (480 bits)
    Capture Length: 60 bytes (480 bits)
    [Frame is marked: False]
    [Frame is ignored: False]
    [Protocols in frame: eth:ethertype:ip:tcp:mqtt]
    [Coloring Rule Name: TCP]
    [Coloring Rule String: tcp]
Ethernet II, Src: HewlettP_4f:02:6f (8c:dc:d4:4f:02:6f), Dst: HewlettP_21:75:22 (8c:dc:d4:21:75:22)
    Destination: HewlettP_21:75:22 (8c:dc:d4:21:75:22)
    Source: HewlettP_4f:02:6f (8c:dc:d4:4f:02:6f)

No.: 186 · Time: 55.590604 · Source: 147.215.189.22 · Destination: 147.215.189.14 · Protocol: MQTT · Length: 60 · Info: Connect Ack
Close    Help
```

4. Subscribing to other topics

We change the code as Appendix A and subscribe other machine D,E and F and compute the average value of the messages. This value everytime after each subscribe has changed. Below the screenshot has shown publihser message from machine D with value 49

File name : 4.js

```
C:\Users\Utilisateur>node C:\Users\Utilisateur\Desktop\4.js
Liste des abonnents :
esiee/pc2409E/meas
esiee/pc2409D/meas
esiee/pc2409F/meas
test from E 1
test from E  1 end
0
find publisher :  esiee/pc2409D/meas
Received 49 from esiee/pc2409D/meas
value.length----< 3
result----< 16.333333333333332
0
find publisher :  esiee/pc2409D/meas
Received 49 from esiee/pc2409D/meas
value.length----< 3
result----< 16.333333333333332
0
find publisher :  esiee/pc2409D/meas
Received 49 from esiee/pc2409D/meas
value.length----< 3
result----< 16.333333333333332
0
find publisher :  esiee/pc2409D/meas
Received 49 from esiee/pc2409D/meas
value.length----< 3
result----< 16.333333333333332
0
find publisher :  esiee/pc2409D/meas
Received 49 from esiee/pc2409D/meas
value.length----< 3
result----< 16.333333333333332
0
```

The screen shot has taken the message from machine E we send value 15
15+49=64/3=21.33
So the average value has been updated.