Department of Electronic & Telecommunications Engineering

University of Moratuwa

EN3251 Internet of Things

Laboratory Exercise 1: MQTT Implementation and Testing

2021 Batch **Semester 5**

Overview:

In this exercise you will implement an MQTT publisher and a subscriber on your computers, connect to a public MQTT Broker and analyze the message transfer operations via Wireshark. You will work in your groups in this exercise.

Objective:

To implement an MQTT-based communication system and analyze its operation.

Learning outcomes covered:

LO3: Use standard application layer protocols for the IoT.
LO5: Use appropriate devices, software and tools to implement an end-to-end IoT system.

Prerequisites:

- Python installed and running on your computer
- An IDE for Python such as IDLE
- The paho-mqtt library installed on your computer
- Wireshark installed and running on your computer
- The MQTT.Cool test client
- Python code for MQTT Publisher (Provided on Moodle)
- Python script for MQTT Subscriber (Provided on Moodle)

Activities:

Step 1:

Create your test setup as follows and connect all three computers to the Internet.

Computer A	**Computer B**	**Computer C**
Wireshark	Wireshark	MQTT.Cool test client
MQTT Publisher	MQTT Subscriber	

Step 2:

A. Open the Python scripts and examine their operation.
B. Create your own publish/subscribe topics by editing the scripts provided.
C. Set up topics as appropriate on the MQTT.Cool test client for testing.
D. Run Wireshark on Computers A and B with the protocol filter set to MQTT.
E. Run the Publisher on Computer A and the Subscriber on Computer B.
F. Observe the Wireshark traces and analyze the message transfer sequence from publishing by Computer A to receiving by Computer B.
G. Identify the keep-alive message exchange in the Wireshark traces.
H. Record your observations including screenshots in a report.

Step 3:

A. Change the QoS setting to 1 and analyze the message transfer sequence.
B. Repeat with QoS set to 2.
C. Record your observations including screenshots in a report.

Homework:

Develop your own full-blown publish/subscribe client and demonstrate it.

Report:

Submit your report (one per group). The report should include:

- A discussion of your observations in Steps 2 and 3. Submit your Python code and the corresponding Wireshark files.
- Your Python code for the Homework assignment.