TELE 6510: IoT Project, 100 points total

Due on 12/16/22

I. Goal: Run MQTT traffic

Requirements:

1. Install an MQTT broker (i.e. MQTT mosquitto).
2. Install an MQTT client (i.e. Paho MQTT or MQTT mosquito subscriber/publisher).
3. Launch the broker on a VM/computer.
4. Have one client instance (app) (on another VM/computer) subscribe to a "temperature" topic.
5. Have another client instance (sensor) (on another VM/computer) publish a "temperature" event.

Questions:

I.1. Perform the following steps:

1. Capture (*and paste*) Wireshark traces between clients and broker.
2. Measure how long it takes for the sensor event to reach the app (use Wireshark timestamps).

for uniform 0%, 2%, 4% and 8% packet loss introduced at the sensor. Make a table *packet loss* vs *latency* for each quality level *at most once*, *at least once* and *exactly once*. Generate 100 readouts.

I.2. Describe the messages that are exchanged between devices and broker (per single readout).

I.3. What is the average transmission rate of the subscriber, publisher or broker ? (choose the one that is easier to measure on your setup) ?

I.4. How does quality affect latency? Why?

II. Goal #2: Run CoAP traffic

Requirements:

1. Install a CoAP server (i.e. libcoap based)
2. Install a CoAP client (i.e. libcoap based)
3. Have the server respond to confirmable/non-confirmable CoAP requests

4. Have the client send confirmable/non-confirmable CoAP requests
5. Any type of events is fine (temperature, time, humidity etc)

Questions:

II.1. Perform the following steps:

1. Capture (*and paste*) Wireshark traces between client and server.
2. Measure how long it takes for the server event to reach the client (use Wireshark timestamps).

for uniform 0%, 2%, 4% and 8% packet loss introduced at the client. Make a table *packet loss* vs *latency* for both *confirmable* and *non-confirmable* traffic. Generate 100 readouts.

II.2. Describe the messages that are exchanged between client and server for each case (what are the flows?)

II.3. What is the average transmission rate of the client or server (choose the one that is easier to measure on your setup) ?

III. Goal #3: Run HTTP traffic

Requirements:

1. Install an HTTP server (i.e. Apache, NodeJS)
2. Install an HTTP client (i.e. curl, wget)
3. Have the server respond to HTTP requests
4. Have the client send HTTP requests
5. Any type of events is fine (temperature, time, humidity etc)

Questions:

III.1. Perform the following steps:

1. Capture (*and paste*) Wireshark traces between client and server.
2. Measure how long it takes for the server event to reach the client (use Wireshark timestamps).

for uniform 0%, 2%, 4% and 8% packet loss introduced at the client. Make a table *packet loss* vs *latency*. Generate 100 readouts.

III.2. Describe the messages that are exchanged between client and server for each case (what are the flows?)

III.3. How do CoAP, HTTP and MQTT compare to each other?

III.4. What is the average transmission rate of the client or server (choose the one that is easier to measure on your setup) ?