# Applications of
# Wireless Networking Systems in IoT

## Mini project

Professor: 黃琴雅 教授

Student / ID: 林彥廷 M11102202

鄭有宏 M11102206

潘宣伊 M11102266

1. The server listens to the packets, and the socket client send “Hello” to the server. When the socket server receives a “Hello”, it returns a “World” back.

This figure shows that the total time to send the message is 7.81 seconds

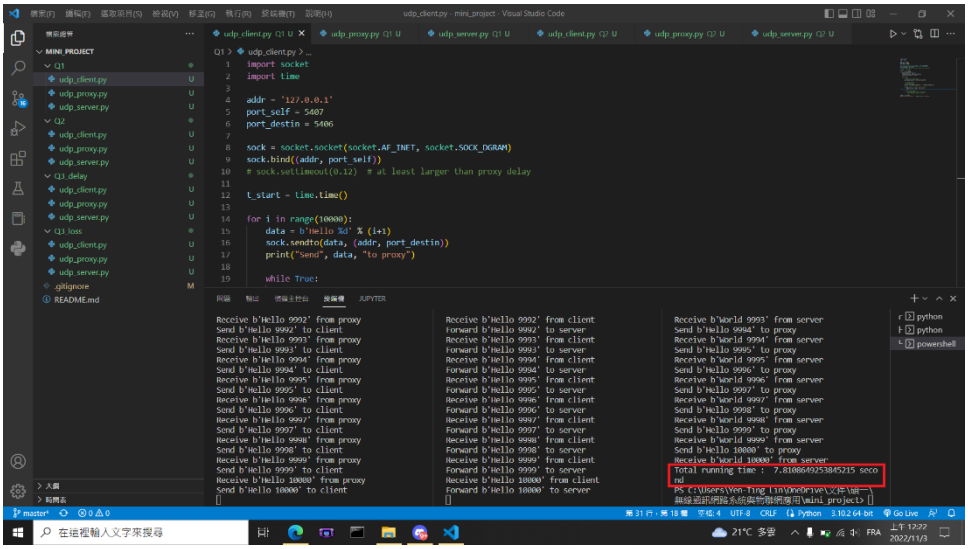


Fig.1-1 Result

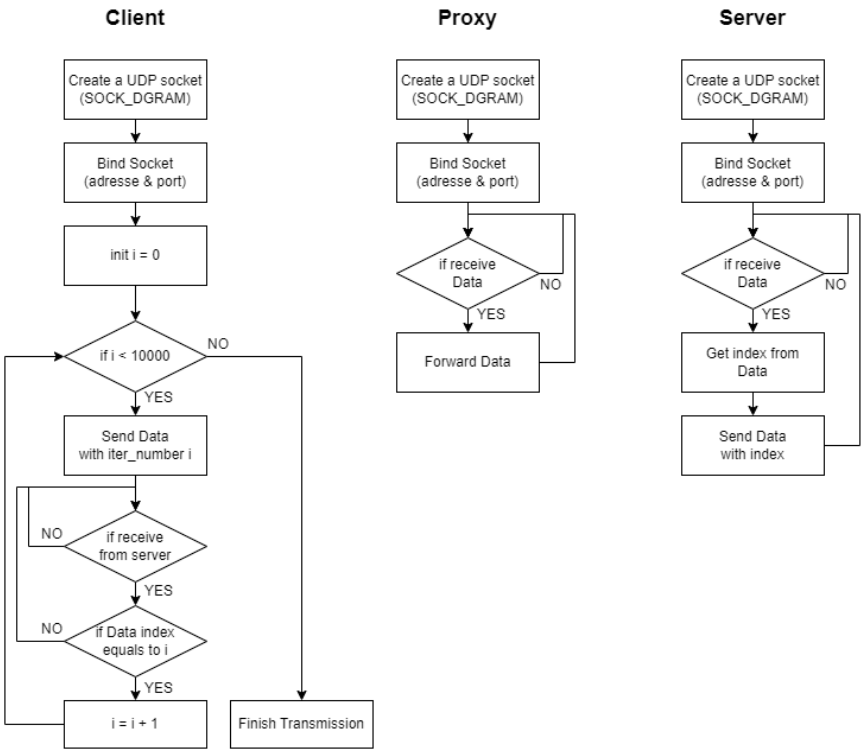


Fig.1-2 Flow Chart

2. Following 1, When the UDP proxy receives the “Hello i” message, --it drops each received packet with 10% probability if iis even number. -- it delays 100ms the received packet with 5% probability before forwarding to the server if is odd number.

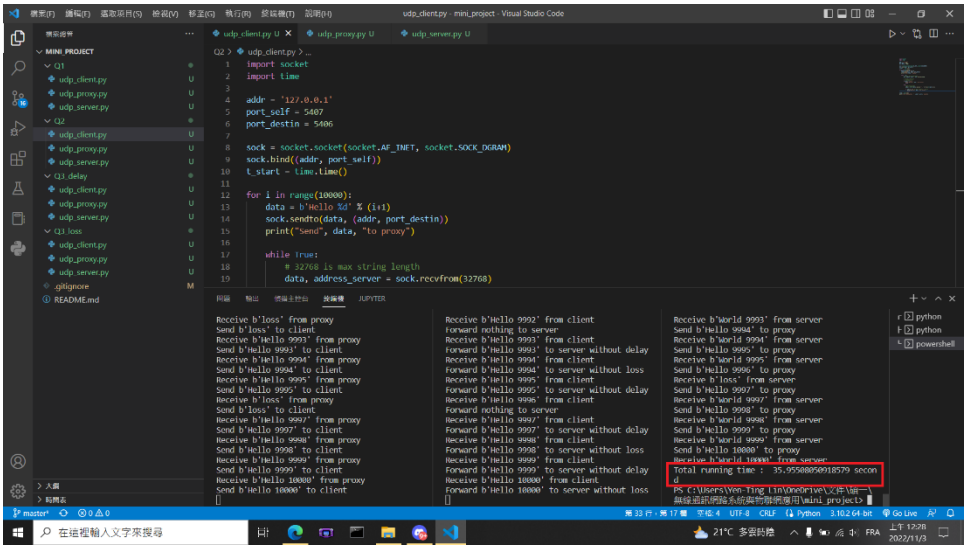


Fig. 2-1 Result

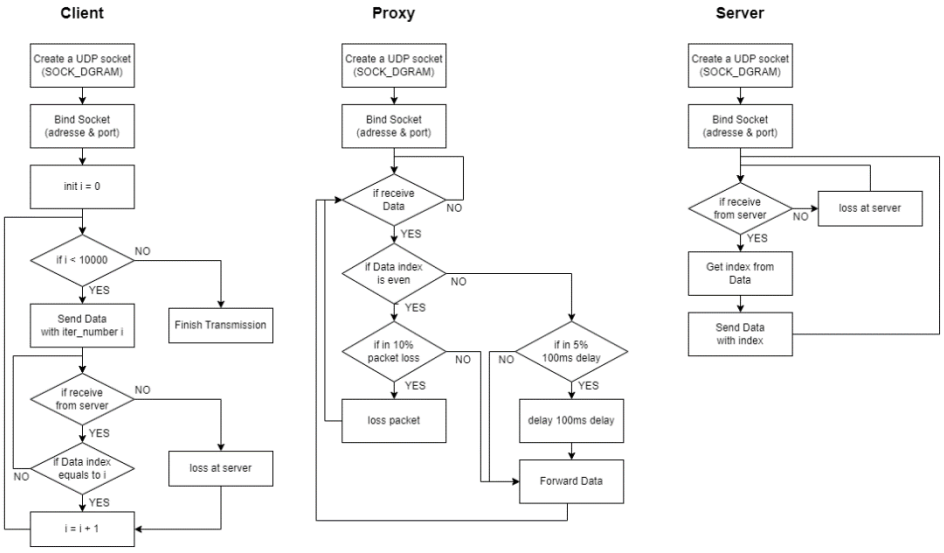


Fig. 2-2 Flow Chart

3. Following 2, Think and design any methods which can be implemented in the server or client side to improve the problems.

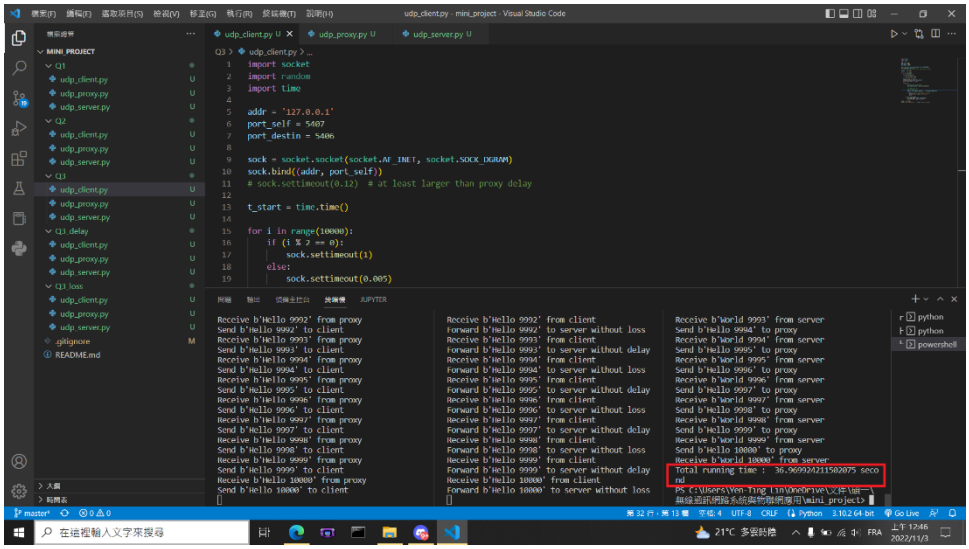


Fig. 3-1 Result

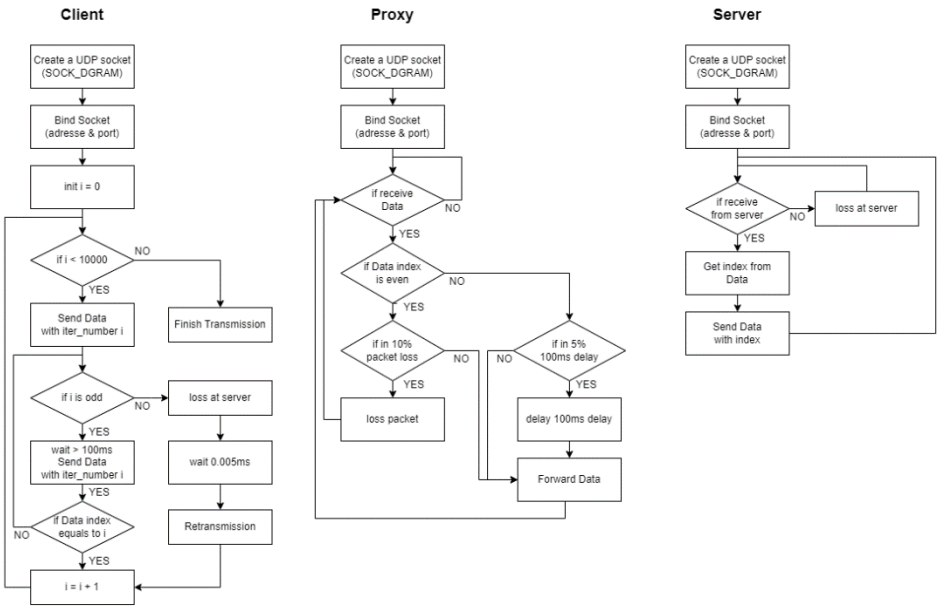


Fig. 3-2 Flow Chart

4. Describe methods
    a. According to packet loss problem, we can add a re-transmission function to re-send the packet to the proxy server.
    b. Because even number may occur packet loss and odd number may

occur 100ms delay, we can set different timeout to reduce the latency to retransmission.

c. Just consider packet loss or delay and try to solve it.

5. Implement methods into our socket implementations in 2.
    a. Retransmit the data if latency is larger than timeout.
    b. Timeout of even number is 5ms and timeout of odd number is 100ms.
    c. If we consider packet loss, we just let it be dropped and do not retransmit again.
    d. If we consider 100ms delay, we try to let client can transmit many same packet in a same time.
6. What happens for the transmission by applying our designed methods?
    a. If timeout is less than 5ms, the latency is larger than situation of 5ms.
    b. If the timeout number is less than 100ms the client will resend the data in an infinite loop (Because of 100ms delay).
    c. We cannot reduce latency if we want to solve delay and packet loss problem in the same time. We just can choose one to solve.
    d. There is a problem when client send many same packets in a same time, proxy's buffer will be crowed.
7. Share what you have learned/discovered/explored through the current discussions in the lecture and mini project.
    a. We had a lot of problems while improving the issue of the transmission delay and of the message lost at the same time. When we improved the transmission delay successfully, we needed to ignore the message lost issue, vice versa.

b. While implementing, we'd tried almost four different methods, but only one solution is more reasonable and more realistic. Actually, we had more ideas about how to solving these two transmission problems, however, we couldn't even program and finish them.
c. We have studied multiple possible solutions that are used in the current network in order to improve transmission critical problems. However, they are too complicated to apply in our use case.
d. In conclusion, we met a lot of problems while trying to finish this mini-project, but we still learnt many knowledge and interesting ideas, even we couldn't apply them successfully. We hope that after studying more things about wireless communication, we would have more abilities to conquer these difficulties.