CCE 3010: LAB 5
Learning about the Simple Lightweight Transport Protocol (SLTP)

The Lab is divided into 2 parts
PART 1: TCP performance
PART 2: SLTP performance

PART1: Learning about the New Transport Protocol
PART1 is divided into 4 sections:

1. Why design a New Transport Protocol
2. Looking at the TCP header
3. Looking at the SLTP: header
4. Difference between TCP and SLTP

SECTION1: Why design a new Transport Protocol
Download the SLTP specification in the Lab folder. Read the Introduction and answer the following questions.
What was the motivation behind the creation of SLTP? What is a VANET network why are VANETs different from other networks. Why doesn't TCP perform well on VANET networks?

SECTION2: Look at the TCP header
Answer the following questions:
1) What units are used for the sequence number and the acknowledgement number?
2) What is the maximum size of the receive window in a TCP header?
3) Does TCP use have a packet type field? How does TCP know which type of packets that are being received?
4) Describe how TCP starts a connection: describe the packets exchanged
5) Describe how TCP ends a connection: describe the packets exchanged
6) How does TCP prevent replay attacks?
7) Describe how TCP does flow control?

SECTION 3: Looking at an SLTP header
Look at the SLTP specification and answer the following questions:
1) What units mess_seq_no and the mess_ack_no in SLTP?
2) What is the maximum size of the receive window in a SLTP header?
3) Does SLTP use have a packet type field? How does SLTP know which type of

packets that are being received?
4) Describe how SLTP starts a connection: describe the packets exchanged
5) Describe how SLTP ends a connection: describe the packets exchanged
6) How does SLTP prevent replay attacks?
7) Describe how SLTP does flow control?

SECTION 4: The difference between TCP and SLTP
Using your answers in Sections 2 and Section 3 write a paragraph about the difference between TCP and SLTP.

PART2: Running the Simple Lightweight Transport Protocol
PART2 is divided into 4 sections:

1. Understanding C Libraries
2. Compiling the SLTP Server
3. Compiling the SLTP Client
4. Running the Server and Client
5. Explore More

SECTION1: Understanding C Libraries
Because SLTP is an experimental transport protocol, we cannot run it over the Internet because it is not TCP-friendly. Find out what being TCP-friendly means. In addition, these restrictions also mean that we cannot allow you to have the source code!! So you will be given access through a C library. Find out how C Libraries work, you do not get access to the code, so how does that work.

The source code for the SLTP client and server should be in the Files_for_Lab 5 folder on Unihub. Please put the files in your src directory.

Compile the SLTP server as follows:

gcc -o server server.c -no-pie –L./(a space here)libsp.a -lpthread

Take a look at the files, which file contains the SLTP library?

SECTION2: Compiling the TCP & SLTP Server

TCP
The source code for the TCP client and server are included here. Please put the files in your src directory.

First compile the TCP server: gcc -o xxtea_server_tcp xxtea_server_tcp.c
then compile the TCP client: gcc -o xxtea_client_tcp xxtea_client_tcp.c

Once this is done, move the executable files to the bin directory. Open a second terminal window.

In this new window start the server by typing: xxtea_server_tcp 0.0.0.0 2345

Then start the client by typing: xxtea_client_tcp 0.0.0.0 2345 1024 0 Look at the results in the client window.

This code measures how long it takes to transfer a given amount of data (in this case 1024) between the client and the server. This time taken is given by the time_diff value in the client window.

This value is given in microseconds.

Using this setup, measure the time taken to transfer data of various sizes: 1024, 2048, 4096, 8192, 16384, 32768 and 65536.

SLTP
gcc -o server server.c -no-pie –L./(a space here)libsp.a -lpthread

so please type:

gcc –o server server.c -no-pie –L./ libsp.a -lpthread

There may be some warnings depending on how strict your compiler is, but the code should compile.

Then compile the SLTP client as follows:

gcc -o client client.c -no-pie -L./ (a space here) libsp.a -lpthread

so please type:

gcc –o client client.c -no-pie –L./ libsp.a -lpthread

There may be some warnings depending on how strict your compiler is, but the code should compile.

Move the executable files for the SLTP client and server into the **bin** directory

In a second terminal window, start the server by typing:

server 0.0.0.0 6072

and in the other window type:

client 0.0.0.0 6072 1024 0

This code examines how long it takes to transfer a given amount of data (in this case 1024) between the client and the server using SLTP. This time taken is given by the time_diff value in the client window. This value is given in microseconds.

Using this setup, measure the time taken to transfer data of various sizes: 1024, 2048, 4096, 8192, 16384 and 32768

Discuss your overall results.