

## Assignment 4 – Extension: Application development using UDP Socket

Time: 1 week

**Note: If Assignment-4 is completed, then attempt the following extension –**

This assignment is an extension of above problem. Create a copy of the developed code and make the required changes in this extension. Only `ClientPacketGen.c/cpp` will need some modification.

### **Technique**

On receiving a datagram from Server, the Client program decrements the TTL value and checks if this new value is zero. If the new TTL is not zero, the Client sends the datagram (with the decremented TTL value) back to Server. However, if TTL is zero, the Client calculates the difference between the current time and the time of datagram first sent. Let's call this as the "Cumulative RTT". The Client saves the "Cumulative RTT" value to a file (in a new line).

### **Running Environment:**

As stated earlier, run the Serve on your laptop/terminal computer, and the Client is at Hamsa (10.2.1.40) or Hanau (10.2.1.41).

Every time you run the Client, it generates new datagrams with TTL set to T and payload length P. The value of P and T and the name of the output file for storing the "Cumulative RTT" should be entered as command line arguments when executing the Client. The P should be within the range of 100 to 1000 bytes, and the T between 2 and 20 (and must be even). The Client program initiates the packet transmission process for a total of 50 datagrams (using the sequence numbers 0, 1, 2, ..., 49) and then stops.

At first, run the Client for  $T = 2$  and different values of  $P = 100, 200, 300, \dots, 1000$ . Plot a scatter-plot (using any suitable software, such as Matlab, Gnuplot, etc.) of "Cumulative RTT" for all 50 datagrams vs. P for the different values of P when  $T = 2$ .

What do you observe? What information does the slope of the graph contain?

**Repeat the process when  $T = 8$  and  $16$  and mention your understanding.**