UIT2403 – Data Communication and Networking

UNIT IV TRANSPORT LAYER AND SOCKET PROGRAMMING

Tutorial - I

TCP and UDP

Date: 16.05.2024, 17.05.2024 & 23.05.2024 & 24.05.2024

1. Suppose a TCP connection is transferring a file of 1000 bytes. The first byte is numbered 5001. What is the sequence number of the segment if all data is sent in only one segment?

2. Answer the following questions:

   a) What is the minimum size of a UDP user datagram?
   b) What is the maximum size of a UDP user datagram?
   c) What is the minimum size of the application-layer payload data that can be encapsulated in a UDP user datagram?
   d) What is the maximum size of the application-layer payload that can be encapsulated in a UDP user datagram?

3. The following is a dump of a TCP header in hexadecimal format.

   05320017 00000001 00000000 500207FF 00000000

   a) What is the source port number?
   b) What is the destination port number?
   c) What is the sequence number?
   d) What is the length of header?
   e) What is the type of segment?
   f) What is the window size?
   g) What is the acknowledgment number?

4. The following is part of a TCP header dump (contents) in hexadecimal format.

   E293 0017 00000001 00000000 5002 07FF...

   a) What is the source port number?
   b) What is the destination port number?
   c) What is the sequence number?
   d) What is the acknowledgment number?
   e) What is the length of the header?
   f) What is the type of the segment?
   g) What is the window size?

5. In TCP, if the value of HLEN is 0111, how many bytes of options are included in the segment?

6. A client uses UDP to send data to a server. The data length is 16 bytes. Calculate the efficiency of this transmission at the UDP level (ratio of useful bytes to total bytes).

7. The following is a dump (contents) of a UDP header in hexadecimal format.

   0045DF0000580000

   a) What is the source port number?
   b) What is the destination port number?
   c) What is the total length of the user datagram?
   d) What is the length of the data?
   e) Is the packet directed from a client to a server or vice versa?
   f) What is the application-layer protocol?
   g) Has the sender calculated a checksum for this packet?

8. Compare the TCP header and the UDP header. List the fields in the TCP header that are not part of the UDP header. Give the reason for each missing field.

9. What can you say about each of the following TCP segments, in which the value of the control field is:

   a) 000000
   b) 000001
   c) 010001
   d) 000100
   e) 000010
   f) 010010

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