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Exercise Sheet 10

Computer Engineering and Communication Networks

Handout: 15.12.2019
Discussion: 19.12.2019 (start 10:00 am.)

1. TCP-UDP

1.1. which statement is not correct?

- a) TCP is a connection-oriented protocol.
- b) TCP has is highly reliable
- c) TCP provides service to IP
- d) TCP provides full duplex connection between a sender and receiver

1.2. Which protocol of the transport layer is most suitable for time-critical data (e.g., VoIP)?

1.3. The Advertised Window:

- a) is determined by the recipient
- b) is determined by the sender
- c) does not change during transmission
- d) grows and shrinks continuously
- e) is always larger than the “Congestion Window”

1.4. The congestion window:

- a) is determined by the recipient
- b) does not change during transmission
- c) grows and shrinks continuously
- d) is always larger than the “advertised window”

1.5. In TCP, the congestion window grows during the congestion avoidance phase.

- a) linearly
- b) exponentially

1.6. Study the following java code snippet to answer the questions. The class ServerThread is not shown. Assume that it processes the data in a new thread, but does not use any network features (i.e., no resending or the like). The other functions used are part of the standard Java class libraries:

```
import java . io . * ;
import java . net . * ;

class NetworkServer {

    public static void main ( String args [] ) throws Exception {

        DatagramSocket serverSocket = new DatagramSocket ( 9876 );

        while ( true ) {
            byte [] receiveData = new byte [ 1024 ];
            DatagramPacket receivePacket = new DatagramPacket ( receiveData , receiveData . Length );
            server socket . receive ( receivePacket );
            ServerThread serverT = new ServerThread ( receivePacket );
            serverT . start ();
        }
    }
}
```

1.6.1. The node using the program shown above is a transmitter or receiver?

1.6.2. Which transport protocol is used?

1.6.3. Which port is used?

1.7. In a TCP protocol that increases the size of congestion window based on the slow start algorithm, if the current size of the congestion window is 16, how is it going to be changed after the next Ack? What happens after a data loss occurs? How is the window size updated after reaching the threshold?

1.8. In a TCP connection, a client and server are connected via a channel that limits the propagation speed to $2 \cdot 10^8$ m/s. If the distance between the client and server is 100 km, and the client wants to download the data from server within the ratio of 8 Mb/s, how much should be the minimum size of the client buffer?

2. Security

Fill in the blanks with appropriate words:

2.1. ----- enables communication partners to prove their identity.

- a) Authentication
- b) Authorization
- c) Integrity

2.2. ----- regulates access to services and information.

- a) Authentication
- b) Authorization
- c) Integrity

2.3. ----- prevents the modification of a message by third parties.

- a) Authentication
- b) Authorization
- c) Integrity

2.4. In a network with $n > 2$ subscribers, each subscriber should be able to communicate confidentially with each other, *i.e.*, each subscriber should be able to send messages to each other subscriber that are encrypted so that the designated recipient can read them, but none of the $n-2$ participants uninvolved in the communication (whether the sender can decrypt the message again, is irrelevant at this point).

- a) How many symmetric keys must be present in the network for this to be possible?
- b) How many asymmetric key pairs (public / private key pairs) must exist in the network so that this is possible?