Q1:

Connection Less:

🡪Connectionless service comes with a single free-standing data unit for all transmission.

🡪In this, each unit contains all of the protocols that control information necessary for delivery perspective, but this also contains no provision for sequencing or flow control.

Acknowledged:

🡪This is achieved by the use of ACK and NAK control messages.

🡪There types of protocols are well suited for communication over the network, where high layers are very sensitive to loss and can have a significant probability of error these underlying networks.

Example: HDLC, which offers for unnumbered acknowledgment service( setup and release).

Unacknowledge:

This comes with a very simpler version and provides faster communication for networks, which are inherently reliable or provide service to a higher layer, that can tolerate loss in the information, or which has built – in error control/recovery feature.

Q2:

R = 1.5 Mbps, and nf = 250 bytes or 2000 bits ( 250 x 8). The distance that the information must travel is the earth-to-satellite distance, or d ≈ 36,000 km.

The speed of light c is 3 x 108.

We can calculate the propagation delay and processing rate as follows: tprop = d/c = 36 x 106 / 3 x 108 = 120 ms tf = nf/R = 2000/1.5 x 106 = 1.33 ms

We can use either Go-Back-N or Selective Repeat ARQ. The default window size is N = 7 (with a 3bit sequence number). 0 1 2 3 4 5 6 7 …  
  
  
The maximum information rate is achieved with no error, and hence, no retransmission.

tcycle = minimum time to transmit a group of N packets = tf + 2 tprop = 1.33 + 2x2120 = 241.33 ms n = no. of bits transmitted in a cycle = N.nf = 7 x 2000 = 14,000 bits Rmax = no. of bits sent in a cycle / minimum cycle time = n/tcycle = 58 kbps

If the extended sequence numbering option (7-bit) is used, the maximum send window size would be N = 27 – 1 = 127, and hence, the maximum information rate is: Rmax = N.nf / tcycle = 127x2000/(241.33x10-3) = 1.052 Mbps 49.

Q3:

a/Message size is important because in real-time signals of voice it is necessary to transfer a fixed packet size of that holds no more than 20 ms of the speech signal. The handling of arbitrary message size is not as important as long as the desired packet size for voice can be handled.

Sequencing is essential because each packet needs to arrive in the same sequence that it was generated. Reliability is moderately important since voice transmission can tolerate a certain level of loss and error.

Pacing and flow control are not as important because the synchronous nature of the voice signal implies that the end systems will be matched in speed.

Timing, for real-time voice transfer, is important because this adaptation function helps to control the jitter in the delivered signal.

Addressing is only during the connection setup phase if we assume some form of virtual circuit packet switching method.

Privacy, integrity, and authentication have traditionally not been as important as the other issues discussed above.

b/ If the underlying network is reliable then the end-to-end approach is better because the probability of error is very low so processing at the edge suffices to provide acceptable performance.

If the underlying network is unreliable then the hop-by-hop approach may be required. For example, if the probability of error is very high, as in a wireless channel, then error recovery at each hop may be necessary to make effective communication possible.

Q4:

|  |  |
| --- | --- |
| Address | Port |
| S1 | 1 |
| S3 | 2 |
| S4 | 2 |
| S2 | 1 |
| S5 | 2 |

|  |  |
| --- | --- |
| Address | Port |
| S5 | 1 |
| S2 | 2 |
| S3 | 2 |
| S1 | 1 |
| S4 | 2 |

Q5:

A, How many host addresses are needed in the largest required subnet?

Soln: 50

B, What is the minimum number of subnets required ?

Soln: According to the question , two subnet are required for LAN-A and LAN-B and two subnets are needed to be left for future use. Therefor the total number of subnets are 4.

C, The network that you are tasked to subnet is 192.168.0.0/24.What is the /24 subnet mask in binary?

Soln: /24 is prefix length.

a.In binary, it is 11111111.111111111.111111111.000000000

There are 24 bits 1. It means that the address left 24 first bits for network portion

D. The subnet mask is made up of two portions, the network portion, and the host portion. This is represented in the binary by the ones and the zeros in the subnet mask.In the network mask, what do the ones and zeros represent?

Soln: In the network mask, the ones represent the network portion and the zeros represent the host portion.

E. When you have determined which subnet mask meets all of the stated network requirements, derive each of the subnets. List the subnets form first to last in the table. Remember that the first subnet is 192.168.0.0 with the chosen subnet mask.

|  |  |  |
| --- | --- | --- |
| Subnet Address | Prefix | Subnet Mask |
| 192.168.0.0 | /26 | 255.255.255.192 |
| 192.168.0.64 | /26 | 255.255.255.192 |
| 192.168.0.128 | /26 | 255.255.255.192 |
| 192.168.0.192 | /26 | 255.255.255.192 |