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Pre-Lab 3

Basics:

1. Which layer is below the transport layer?
The layer below the transport layer is network layer.

2. Which layer is above the transport layer?
The session layer is the layer above transport.

3. What is the name of the transport layer address? (e.g., IP addresses are the name of network layer addresses). Why do we need transport layer addresses in addition to network layer addresses?
The transport layer uses two forms of transport either the Transmission Control Protocol (TCP) or User Datagram Protocol (UDP), in addition to using the IP address they also determine where to send the data to in a port.

4. TCP has a mechanism called a **window**. This allows TCP to **acknowledge** groups of packets at a time.

5. TCP should be used in applications such as **online banking** because it performs **reliable** data delivery.

Theory:

1. Is the size of the Message Segment Size (MSS) > Maximum Transmission Unit (MTU)? (True/False)
False, the message cannot be bigger than what it is being passed through.

2. Which layer(s) do the MSS and MTU belong to?
The MSS and MTU are part of layer 2, the data link layer, and layer 3, the network layer.

3. How is Path Discovery related to TCP and the MTU?
Path discovery is used to determine what the MTU is along the path between 2 IP hosts and TCP is part of error-checking and delivery of data.

4. What happens when a packet size is larger than the MTU?
If a packet size is larger than the MTU then the packet must be fragmented until all the pieces can fit through the link size, the fragmented packets are marked to ensure that the receiving host knows to reassemble them.

Technical Questions:

1. What TCP variable will allow you to reuse a socket prior to the sockets timeout value expiring?
Using the “tcp_tw_reuse” variable allows the reuse of sockets in during their TIME_WAIT state, so you don’t have to wait until they close before reusing them.

2. What is the default time between keep-alive probes?
The default time between keep-alive probes is 75 seconds, by default there are 9 probes sent out by this interval.

3. What is an orphan in TCP? What happens if there are more orphans than sockets allowed?
A TCP orphan is when socket is closed while there is still data to be transmitted. When there are more orphans than sockets then the orphaned connection is reset and a warning is printed.

4. If your machine is overwhelmed (being sent more packets than can be acknowledged), what TCP variable would you use increase the number of packets you can accept at a time, but at the cost of increasing latency?
The TCP variable “tcp_max_syn_backlog” will allow more packets to be backlogged if there is too much congestion.

BE301A Lab Questions (35):
1. [10] Show (with a Wireshark screenshot) a packet containing a TCP segment, which is piggybacking an ACK.

2. [10] Transfer the file on PC1 ‘/usr/lib/libstdc++.so.6.0.8’ to PC2.

a. How long did it take?

b. Identify the control ports used as well as the data ports.

c. Did you use TCP or UDP to transfer the file?

3. [15] Create a Stevens Time-Sequence graph of the TCP stream from downloading the file. What (if anything) does this graph describe? [Hint: Wireshark – TCP Stream Graph]