COMP90007 Internet Technologies

Week 8 Workshop

Question 1

Why does the maximum packet lifetime, *T*, have to be large enough to ensure that not only the packet but also its acknowledgements have vanished?

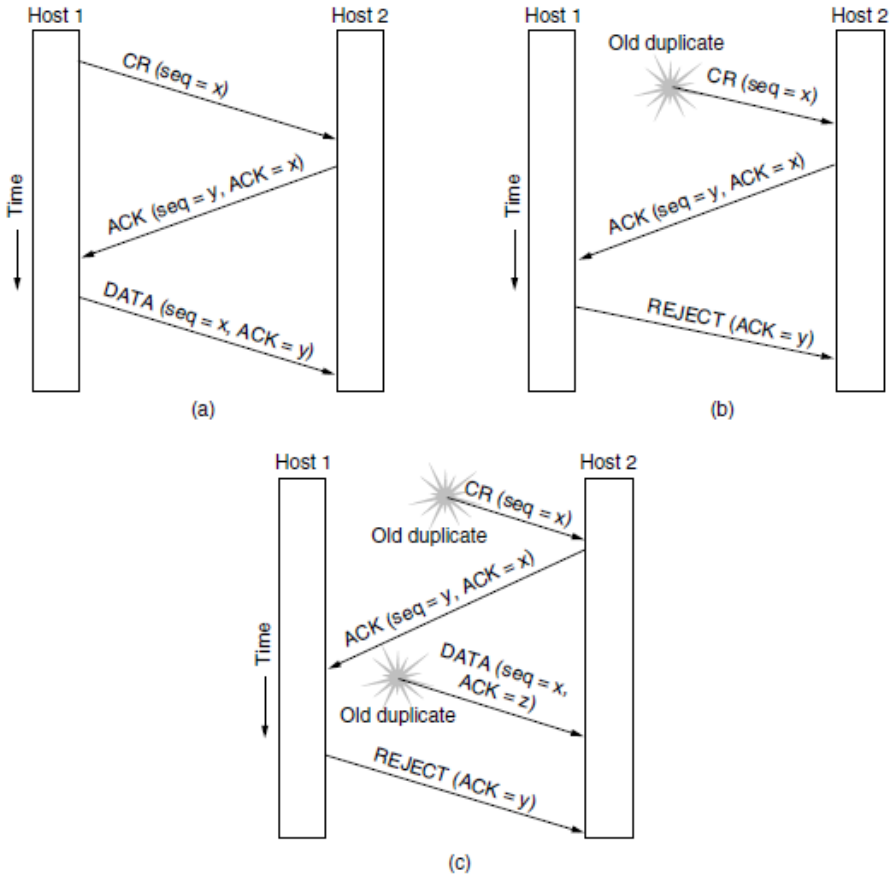

Figure 6-11. Three protocol scenarios for establishing a connection using a three-way handshake. CR denotes CONNECTION REQUEST. (a) Normal operation. (b) Old duplicate CONNECTION REQUEST appearing out of nowhere. (c) Duplicate CONNECTION REQUEST and duplicate ACK.

Question 2

Imagine that a two-way handshake, rather than a three-way handshake were used to set up connections. In other words, the third message was not required. Are deadlocks now possible? Give an example or show that none exist.

Question 3

Why does UDP exist? Would it not have been enough to just let the user processes send raw IP packets?

Question 4

A client sends a 128 byte request to a server located 100 km away over a 1 gigabit optical fibre. What is the efficiency of the line during the remote procedure call?

Question 5

Both UDP and TCP use port numbers to identify the destination entity when delivering a message. Give two reasons for why these protocols invented a new abstract ID (port numbers), instead of using process IDs, which already existed when these protocols were designed?

Question 6

Datagram fragmentation and reassembly are handled by IP and are invisible to TCP. Does this mean the TCP does not have to worry about data arriving in the wrong order?

Question 7

A process on host 1 has been assigned port *p*, and a process on host 2 has been assigned port *q*. Is it possible for there to be two or more TCP connections between these two ports at the same time?

Question 8

The maximum payload of a TCP segment is 65,495 bytes. Why was such a strange number chosen?

Question 9

To get around the problem of sequence numbers wrapping around while old packets still exist, one could use 64 bit sequence numbers. However, theoretically, an optical fibre can run at 75 Tbps.

What maximum packet lifetime is required to make sure that future 75 Tbps networks do not have wraparound problems even with 64 bit sequence numbers? Assume that each byte has its own sequence number, as TCP does.