Q1. Consider an application that transmits data at a steady rate (for example, the sender

generates an N-bit unit of data every k time units, where k is small and fixed). Also,

when such an application starts, it will continue running for a relatively long period

of time. Answer the following questions. Briefly justifying your answer:

a. Would a packet-switched network or a circuit-switched network be more

appropriate for this application? Why?

b. Suppose that a packet-switched network is used and the only traffic in this

network comes from such applications as described above. Furthermore, assume

that the sum of the application data rates is less than the capacities of each and

every link. Is some form of congestion control needed? Why?

(This question is taken from Kurose & Ross’s book, Chapter 1 Problem 3)

Solution

a) A circuit-switched network would be well suited to the application, because the

application involves long sessions with predictable smooth bandwidth requirements.

Since the transmission rate is known and not bursty, bandwidth can be reserved for

each application session without significant waste. In addition, the overhead costs

of setting up and tearing down connections are amortized over the lengthy duration

of a typical application session.

b) In the worst case, all the applications simultaneously transmit over one or more

network links. However, since each link has sufficient bandwidth to handle the sum

of all of the applications' data rates, no congestion (very little queuing) will occur.

Given such generous link capacities, the network does not need congestion control

mechanisms.















