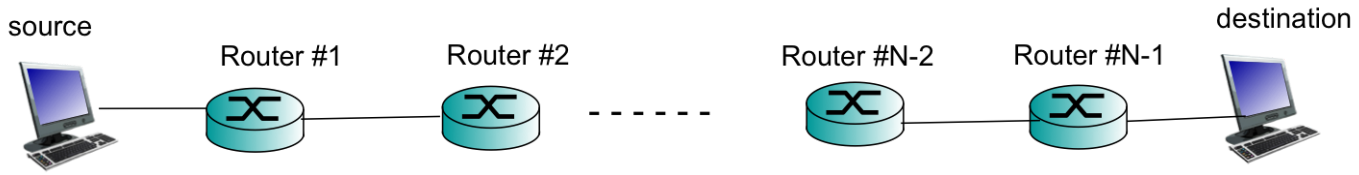
Students to Discuss: Message Switching vs Packet Switching (Week1)

This was a past exam question. Students are strongly encouraged to discuss the solution in the comments below. It may help to visualise the delays using the timing diagrams used in the lectures.

Consider an *N* -hop path (i.e. *N-1* intermediate routers) between a source and destination as depicted in the figure below. The source wants to transmit a file of size *kP* bits to the destination. There are two options: (i) Transmit the entire file as one large chunk (i.e. *packet*) of data. This is what we refer to as *message switching* or (ii) Break up the file into *k* packets, each of size *P* bits and transmit these packets back-to-back. As you may recall, this is *packet switching* .



All links (i.e. hops) have the same transmission delay and propagation delay. Assume that the propagation delay of a link is *d* sec. Assume that the transmission delay for transmitting P bits on a link is *T* sec. Thus, transmitting the entire file (as is the case in message switching) on a link takes *kT* sec.

Assume that there is no other traffic on the network. Ignore the time taken by each router to process each packet (or message). Assume that packet headers are negligible.

Compare the end-to-end delay incurred in transmitting the file for the two options outlined above, i.e. *message switching vs packet switching* . Which incurs *lower delay* and under what conditions?

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