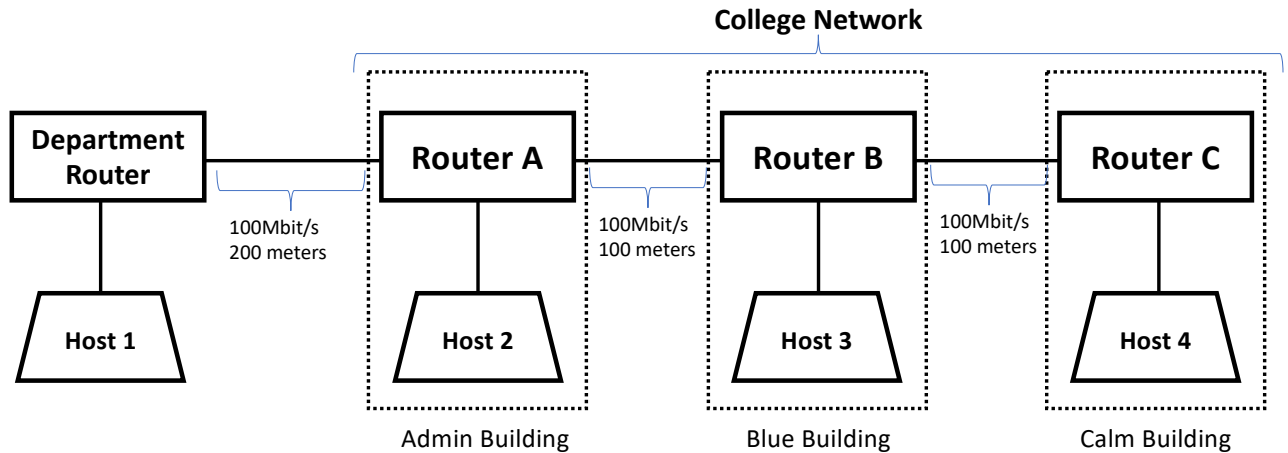


5 Computer Networking (awm22)



(a) Using a diagram, illustrate how long a packet of length  $L$  bytes will take to travel over an idle network from Host 4 to Host 1? The routers use a store-and-forward architecture. [5 marks]

(b) Computers in Calm building are often not getting allocated IP addresses and the performance is quite poor. The department router serves DHCP for the College network and is operating correctly. Residents in Blue report intermittent performance issues, but no one in Admin reports any problems. Network measurements reveal that the per-router packet loss for each switch under load can be as high as one packet in five thousand, but it is significantly worse for packets smaller than 1000 bytes, where as many as one packet in twenty are lost.

With these insights, explain the cause of the problems experienced. Make clear any simplifying assumptions you have made. [5 marks]

(c) Some students in Calm have found using IPv6 will ‘work’ (i.e., connecting to the wider University services is possible, but not to Internet services); although still not performing as well as when they are in the Admin building. Describe the steps by which IPv6 addresses are allocated without DHCP and consider why this service may be working more reliably than IPv4? [6 marks]

(d) Two approaches to improve the network performance are available: one is to upgrade the performance of the physical links between the buildings to 10Gbit/s. The alternative approach is to significantly change the topology of the network by adding an additional high performance router, but leaving the performance of the physical links unchanged.

Briefly give the advantages and disadvantages of each approach. [4 marks]