

Chapter 6

Q 1. Why do LANs tend to use broadcast networks? Why not use networks consisting of multiplexers and switches?

Solution

The computers in a LAN are separated by a short distance (typically < 100m) so high speed and reliable communication is possible using a shared broadcast medium. The cost of the medium is negligible and the overall cost is dominated by the cost of the network interface cards in each computer. In addition, the LAN users usually belong to the same group where all users are generally trusted, so broadcast does not pose much security danger.

The original reason for avoiding a multiplexer and switch approach to LANs is that a centralized, expensive “box” is required. The availability of Application Specific Integrated Circuits (ASICs) has reduced the cost of switching boxes and made switch-based LANs feasible, and in some environments the dominant approach.

Q 4. Suppose that the ALOHA protocol is used to share a 56 kbps satellite channel. Suppose that frames are 1000 bits long. Find the maximum throughput of the system in frames/second.

Solution

Maximum throughput for ALOHA = 0.184

Maximum throughput in frames/sec = (56000 bits/sec) x (1 frame/1000 bits) x 0.184 = 10.304

The maximum throughput is approximately 10 frames/sec.