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CS433-assignment 1

Problem 1

Imagine that you have trained your St. Bernard, Ashley, to carry a box of three 8-mm tapes instead of a flask of brandy. (When your disk fills up, you consider that an emergency.) These tapes each contain 12 gigabytes. The dog can travel to your side, wherever you may be, at 18km/hour. For what range of distances does Ashley have a higher data rate than a transmission line whose data rate (excluding overhead) is 200Mbps? How does your answer change if

1. Ashley's speed is doubled;
2. each tape capacity is doubled;
3. the data rate of the transmission is doubled.

Set the distances x
12*3*8*1000 / ((x/18)*3600) = 200 x = 7.2 Less then 7..2 km Dog>200Mbps

(i) 12*3*8*1000 / ((x/18*2)*3600) = 200 x = 14.4 Less then 14.4km
(ii) 12*3*8*1000*2 / ((x/18)*3600) = 200 x = 14.4 Less then 14.4km
(iii)12*3*8*1000*2 / ((x/18)*3600) = 200*2 x=3.6 Less then 3.6km

Problem 2

A factor in the delay of a store-and-forward packet-switching system is how long it takes to store and forward a packet through a switch. If switching time is 10μ sec, is this likely to be a major factor in the response of a client-server system where the client is in Ashland OH and the server is in Los Angeles CA? Assume the propagation speed is in copper and fiber to be 2/3 the speed of light in vacuum. You can use google map to figure the distance bewteen the two locations.

propaganda speed 300000km/s = 300 meters/µsec | 10µsec => 3km | 3km * 2/3 = 2km
AU to LA about 3732.07km
If through 37 switch . Total add about 74km3

74/3732 about 2%. Answer is NO

Problem 3

A disadvantage of a broadcast subnet is the capacity wasted when multiple hosts attempt to access the channel at the same time (i.e. contension). As a simplistic example, suppose that time is divided into discrete slots, with each of the n hosts attempting to use the channel with the same probability p during each slot. What fraction of the slots will be wasted due to collision? Keep in mind that once a contension occurs, the channel is wasted for the whole time slot.

Event 1: (1 -p)^n
Event 2: np(1 - p)^n-1
Event 3: The probability of a collision just 1- (1 -p)^n - np(1 - p)^n-1

Problem 4

A system has an n-layer protocol hierarchy. Applications generate messages of length M bytes. At each of the layers, an h-byte header is added. What fraction of the network bandwidth is filled with headers?

hn/(M + hn) * 100%

Problem 5

An image is 1900 x 1600 pixels with 4 bytes/pixel. Assume the image is uncompressed. How long does it take to transmit it over a 56k-modem channel? a 6-Mbps cable modem? Over a 100-Mbps Ethernet at AU? Over 10-Gbps Ethernet?

1900*1600*4*8 = 97280000 bits

56000bits / sec	about	1737sec
6*10^6/sec	about	16sec
100*10^6/sec	about	0.9728sec
10*10^9/sec	about	0.009728sec

Problem 6

Two networks each provide reliable connection oriented service. One of them offers a reliable byte steam and the other offers a reliable message stream. Are these identical? If so, why is the distinction made? If not, give an example of how they differ.

NO

In byte stream, the network don't keeps track of message boundaries. In message stream, it did.

Send twice 10 bytes. The receiver get 20 bytes.
For byte stream no count message boundaries so will get full 20 bytes and the original two different message is lost.
For message stream, get two message 20 bytes each.