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Assignment #1: (Intro to computer networks)

1. (packet switching)
   1. D(nodal)=d(trans)+d(prop) d(trans)= d(ab)+d(bc)+d(cd) = 800/1+800/10+800/.100 = 8,880s + d(prop)=3ms = 8,880.003s
2. (Circuit switching)
   1. D(nodal)= d(setup)+d(trans)+d(prop) = (d(set-up)=10ms) + (d(transe)=8,880s) + (d(prop)=3ms) = 8,880.013s
3. F
   1. Circuit switching guarantees the user a solid connection the whole time that they need it. For example a phone call, using a circuit switched network, will give an un-interrupted service the whole time that it is needed where as a packet switched network could get congested during the connection time.
   2. FMD (frequency division multiplexing) vs. TDM (time division multiplexing)

TDM allows for more burst data in other words if you need to send a file and it can be done within that frame then the connection is much faster

1. For this question we will look only at the transmission time and assume all the other latency issues are to small to make a difference. So D(trans)= 8\*10000 = 80,000 Gb over a 1Gb/s speed the transmission delay will be L/R = 80,000gb/1gb/s = 80,000s = 22.22 hrs. because I cant do both I can assume that there is no backup drive with this data on it. That being said even with this this discrepancy in time I would still use the data link because the overnight delivery has a greater chance of catastrophe. for example if the truck gets into an accident I will lose the data on those drives and I won’t be able to retrieve. On the other hand if the data transfer fails I havn’t lost anything I simply resend it.  
   1. D(prop) = m/s
   2. D(trans)= L(bits)/R(bits/second) bits cancel and we are left with L/R seconds
   3. D(nodal) = d(trans) + d(prop) = L/R + m/s
2. Google.com
   1. Avg=5.4ms std deviation 0.8333 ms
   2. 9,9,9 no
   3. Yes but not exactly
   4. Trace route maxes out at 30 hops so from here to Germany there I have to go through more then 30 different routers but the latency between the servers seems to be much higher after I get our of sac state I believe this to be part of propagation delay and perhaps congestion
3. 1. Yes, 7 out of the 10 shown are the same. Yes, they both took the exact same path across (4 routers)
   2. Much shorter path (see picture Q7b scene 1)
   3. It looks like they have only 3 routers in common and then they diverge, so yes. (see Q7c)
4. Trudy can send either one of the people emails and make it look like they are from each other using the information that she has collected by viewing there emails. There are many different ways she could attack; she could send malware or key savers on their computer she could attempt to trick them into giving her private information under the belief that she was there friend and many more.
5. The system will create packets according to the protocol type that the sender is intends to use. It will have a header telling the file where to go and so on along with the maximum amount of data allowed in a packet. The analogy of driving is very similar to the packet switched network. For example if I have the entire address for where someone lives I first look at what state I need to be in. Once I get to the state the local distributer looks at what city the letter is supposed to go to and sends it on, ignoring the rest of the information. After it arrives in the city that local distributor looks at the street number and bunches it together with many other letters and sends them on. When the driver gets to the street he looks at the house number and finally gives the letter to the intended recipient. A packet is the exact same the final number is the house number the next is the city and state and country except for a few more possible levels along the way maybe a better way to put it is the driver who is delivering the package keeps forgetting so he has to make stops along the way to make sure he is headed in the right direction.