Anthony Jones Homework 3

Q1 **For the rdt 2.0 protocol, summarize three additional protocols required to address possible channel errors.** In reliable data transfer 2.0, the first protocol required to address channel errors is actually finding the errors. This is accomplished through using checksum, where errors are detected by counting the number of bits in a transmission. This is compared before and after a packet is sent to see if that packet was corrupted. The second protocol used in rdt 2.0 is the idea of feedback. The reliable channel will ensure that the receiver sends either an ACK or NAK message indicating if a packet was corrupted. This feedback protocol will help determine the behavior of the sender via the third additional protocol, the Stop and Wait protocol. If the sender sends a packet, it will modulate into a waiting status whereby it waits for the receiver to send a feedback message. This means the sender has two possible states, either sending or waiting, while the receiver only has one, which is to always wait for a packet and then immediately send feedback to the sender.

Q2 **The paper says, “Systems may appear to run fine in a LAN environment yet be unbearably slow in a WAN”. In no more the five sentences, explain this statement.** Well, the most important difference between LAN and WAN is that WAN has significantly larger round-trip-times. This is natural because LAN refers to Local Area Network, where the required trip is short, whereas WAN refers to Wide Area Network, where the required trip can be several magnitudes longer. Protocols like the ones referenced in Q1 require multiple messages to be sent back and forth between the sender and receiver. This means that protocol behavior requires large quantities of trips to occur when issuing packets. The larger the trip time, the much larger the actual performance time will be, as WAN can be on the scale of almost 1000 times slower per trip, across even more magnitudes of trips.

Q3.1 Well if the link data rates for Links 1 and 3 were 10 Mbps rather than 1 Gbps, then their link prorogation delays would probably be significant as well. If it paralleled the propagation delay for Link 2, then we might expect an addition 5 millisecond delay per link per trip, so the RTT would increase by 20 ms:

EXPECTED PROP DELAY = (1.5 / 30) \* 10 = 5 ms

EXPECTED PROP = 4

Q3.2 Throughput = w / RTT

W=1 packets

1520 bytes \* 8 = 12160 bits / 1000000 = 0.01216 Mb

0.01216 Mb / (70 ms \* (1s / 1000000ms)) = 174 Mb/s

• W=4 packets

4\*174 Mb/s = 695 Mb/s

• W=8 packets

8\*174 Mb/s = 1390 Mb/s

• W=12 packets

12\*174 Mb/s = 2085 Mb/s

Q4 - Sorry, I could not figure out how to run the server on SoC machine…

I will come to your office hours next week to have you walk me through it. Thanks.