Fernando Juarez
HW 2

1) Trans. time $= \frac{16 \times 1024}{200 \times 10^6} \rightarrow 81.92 \mu sec$

Prop. time $= \frac{20 \times 10^3}{2 \times 10^8} = 100 \mu.sec$

$time = (P \times T_t) + ((r-1) \times T_t) + (r \times (T_p + T_{proc}))$
$= (8 \times 81.92) + (3 \times 81.92) + (4(100+4))$
$= 1.31712 ms.$

2) Since there are M server pairs rather than 10 and the bottleneck link is a link on end to end path that constrains end to end throughput, the min is a simple two link network link on the network so the per connection end to end throughput would be; Min(Rc, Rs, R, M) and Rc or Rs would be the the bottleneck link

3) End system A breaks the large files into multiple parts as it generates multiple packets from the file. By doing so, a header is added to each packet that is how the outgoing link is determined as it includes the IP Address within the header. Determining what route to take is analogous to a packet asking which link should be sent on, based on the destination's address.

4a) Application, Transport, Network, Link, Physical Layers

Application – uses transport layer protocols to establish host-to-host connection

Transport - responsible for end-to-end communication and provides reliable connection

Network – transports packets from one host to destination

Link – responsible for link-level communication and moves many frames from network elements

Physical - moves individual bits of frames to the next node

b) Application layer message - Protocols used to send and passed onto the transport layer

transport layer segment - Encapsulates application layer message with transport layer header

network layer datagram – encapsulates transport layer segment with a network layer header

link layer frame – encapsulates network layer datagram with a link layer header

c) Routers process network, link, and physical layers

link layer switch process link and physical layers

Host process all five layers