Network Delays

The Idea

We need to be able to measure the performance of our ability to communicate. We do this by understanding the different delays that occur in network communication.

Delay Type	Description	Formula
Propagation Delay	The time it takes for a signal to travel from point A to point B over a network medium. It is influenced by the type of medium, the distance between the points, and typically the speed of the signal, which is often close to c, the speed of light (3×10^8 m/s) in vacuum.	$t_p = \frac{Distance}{Speed}$
Transmission Delay	The time required to transmit all the bits of a packet into the network medium. Packet size is denoted by L, and the bandwidth (data carrying capacity) is denoted by R.	$t_T = \frac{L}{R}$
Queuing Delay	The time a packet spends waiting in a queue before it can be transmitted over the network due to congestion or prior packet processing. If there is no space in the queue (i.e. not enough buffer in the router), that packet is dropped!	Depends on queue length and network traffic
Processing Delay	The time taken by a network device (e.g., router, switch) to process a packet.	Depends on device and packet complexity

Exercise 1

Contents