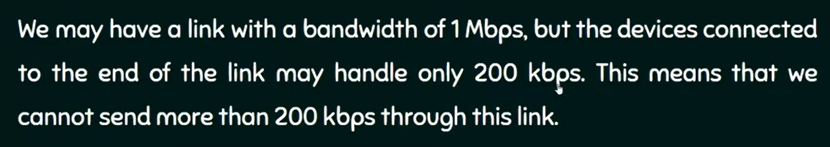
Network Performance

One important issue in networking is the performance of the network – how good is it?

Network performance is measured in following fundamental ways:

1. Bandwidth
   1. Informal: Maximum amount of data can be transmitted per second.
   2. Formal: The bandwidth of a network is given by the number of bits that can be transmitted over the network in a certain period of time.
   3. In wired communication – bits per second (bps)
   4. In wireless communication – hertz per second
   5. Bandwidth = capability.
   6. Example: Gigabit ethernet can provide a bandwidth of 1 Gbps. (gigabits per second)
2. Throughput
   1. Informal: Actual amount of data that passes through the medium.
   2. Formal: The throughput is a measure of how fast we can actually send data through a network.
   3. Although bandwidth in bits per second and throughput seem the same theta re different.
   4. A link may have a bandwidth of ‘B’ bps, but we can only sen ‘T’ bps through this link with T<B always.
   5. 
3. Latency (Delay)
   1. The latency or delay defines how long it takes for an entire message to completely arrive at the destination from the time the first bit is sent to the source.
   2. Made of four components:
      1. Transmission delay
      2. Propagation delay
      3. Queuing delay
      4. Processing delay
   3. Latency = Transmission + Propagation + Queuing + Processing