As our textbook (Marsic, 2010) has stated on numerous occasions, networks are not built to support peak traffic. As such, there will be times when congestion causes packet delay or drops. Considering packets may traverse the network by hopping from node to node along a pathway from sender to receiver, each hop has the potential for being a point of

congestion. Depending on the type of data, packet delays and packet loss may be more problematic for the user. For example, the perception of 10 second delays in voice data is noticeable to users, whereas the same delay goes unnoticed for email data. In order to provide Quality of Service (QoS), routers at each hop need to account for congestion and attempt to mitigate it for ”priority” data. At each hop, routers make decisions about which packets are accepted or dropped and which packets will be sent immediately or wait in queue. Network **Policing** is the mechanism by which routers decide which packets to block or drop due to congestion (Marsic, 2010).

Marsic (2010) describes various packet-by-packet scheduling methods to try to distribute the network resources and bandwidth such that there will be lower packet delays and losses. Although the average delay or loss is mitigated with these methods, individual packets can still become dropped. One method to prevent congestion is to limit the rate of flow of packets into a router. This method of policing is best described with the “leaky bucket” analogy (Marsic, 2010).

Using the “leaky bucket” analogy, a router will have a mechanism for regulating the number of packets that enter it per unit of time (Marsic, 2010). Every packet entering the router would be assigned one of a limited number of tokens. Packets can enter the router so long as there are free tokens. If there are no free tokens, no more packets can enter the router. Upon leaving the router a packet releases its token for later reuse. In this way, a finite number of packets are inside the router at once, regulated by the number of tokens. As tokens are freed up for re-use by packets leaving the router, new packets are picked up (Marsic, 2010).

References

Marsic, I. (2010). Computer Networks: Performance and Quality of Service. Retrieved from http://www.ece.rutgers.edu/~marsic/books/QoS/