

2.10 Quality-of-Service (QoS)

- It refers to traffic control mechanisms that seek to either differentiate performance based on application or network-operator requirements or provide predictable or guaranteed performance to applications, sessions, or traffic aggregates. Basic phenomenon for QoS means in terms of packet delay and losses of various kinds.
- **Bandwidth:** The speed of a link. QoS can tell a router how to use bandwidth. For example, assigning a certain amount of bandwidth to different queues for different traffic types.
- **Delay:** The time it takes for a packet to go from its source to its end destination. This can often be affected by queuing delay, which occurs during times of congestion and a packet waits in a queue before being transmitted. QoS enables organizations to avoid this by creating a priority queue for certain types of traffic.
- **Loss:** The amount of data lost as a result of packet loss, which typically occurs due to network congestion. QoS enables organizations to decide which packets to drop in this event.
- **Jitter:** The irregular speed of packets on a network as a result of congestion, which can result in packets arriving late and out of sequence. This can cause distortion or gaps in audio and video being delivered.

Advantages of QoS

1. **Unlimited application prioritization:** QoS guarantees that businesses' most mission-critical applications will always have priority and the necessary resources to achieve high performance.
2. **Better resource management:** QoS enables administrators to better manage the organization's internet resources. This also reduces costs and the need for investments in link expansions.
3. **Enhanced user experience:** The end goal of QoS is to guarantee the high performance of critical applications, which boils down to delivering optimal user experience. Employees enjoy high performance on their high-bandwidth applications, which enables them to be more effective and get their job done more quickly.
4. **Point-to-point traffic management:** Managing a network is vital however traffic is delivered, be it end to end, node to node, or point to point. The latter enables organizations to deliver customer packets in order from one point to the next over the internet without suffering any packet loss.
5. **Packet loss prevention:** Packet loss can occur when packets of data are dropped in transit between networks. This can often be caused by a failure or inefficiency, network

congestion, a faulty router, loose connection, or poor signal. QoS avoids the potential of packet loss by prioritizing bandwidth of high-performance applications.

6. **Latency reduction:** Latency is the time it takes for a network request to go from the sender to the receiver and for the receiver to process it. This is typically affected by routers taking longer to analyze information and storage delays caused by intermediate switches and bridges. QoS enables organizations to reduce latency, or speed up the process of a network request, by prioritizing their critical application.