**SEU-IS-19-ICT-046**

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PRACTICAL FOR SCALLING AND CONNECTING NETWORK

ASSIGNMENT

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**QOS: QUALITY OF SERVICES**

In networking, Quality of Service (QoS) refers to a group of technologies that operate on a network to manage traffic and guarantee the operation of vital applications with constrained network capacity. Through the prioritization of particular high-performance applications, it allows organizations to modify their overall network traffic. Usually, QoS is implemented on networks that transport traffic for systems with a lot of resources. Internet protocol television (IPTV), online gaming, streaming media, videoconferencing, video on demand (VOD), and voice over IP (VoIP) are among the common services for which it is necessary.

Organizations can use QoS in networking to see their network's bit rate, delay, jitter, and packet rate as well as to optimize the performance of several applications on the network. This guarantees that they can manipulate network traffic and alter packet routing to the internet or other networks in order to prevent transmission delays. Additionally, it guarantees that the company meets application service quality standards and provides expected user experiences.

By providing dedicated bandwidth, controlled jitter, and lower latency, networks and organizations can priorities traffic, which is the main objective according to the definition of QoS11. The technologies that make this possible are essential for improving the functionality of wide-area networks (WANs), service provider networks, and business applications.

In order for QoS networking technology to function, packets must first be marked to identify the different service types. Next, routers must be configured to create distinct virtual queues for each application based on priority. Thus, bandwidth is set aside for essential websites or applications that have been given priority access. Quality of Service (QoS) technologies allocate capacity and handling to individual network traffic flows. This allows the network administrator to allocate the bandwidth to each application or traffic flow in the proper order and at the appropriate time.

Determining the different kinds of traffic that QoS network software measures is essential to understanding how it functions.

These are the following:

***Bandwidth***:

A link's speed. A router can be instructed on bandwidth usage by QoS. Assigning a specific bandwidth to distinct queues based on the nature of the traffic, for instance.

***Delay:***

The amount of time a packet needs to travel from its point of origin to its final destination. Queuing delay, which happens during periods of congestion and causes a packet to wait in a queue before being transmitted, can frequently have an impact on this. QoS helps organizations to prevent this by setting up a priority queue for specific types of traffic.

Generally speaking, networks carrying traffic for resource-intensive systems are subject to Quality of Service (QoS).

***Here are a few typical situations in which QoS is applicable:*** **Internet Protocol Television (IPTV):**

IPTV is a system that uses the internet to deliver digital television services. High network performance is necessary because streaming media is involved, and quality of service (QoS) guarantees the service's quality.

**Online gaming:**

Playing online games calls for dependable, fast internet connections. The gaming experience may be ruined by any latency. Game traffic can be prioritized by QoS to guarantee fluid gameplay.

**Streaming Media**:

A lot of data is streamed by websites like YouTube and Netflix. By ensuring that these services have adequate bandwidth to deliver high-quality audio and video, QoS can help.

**Video Conferencing**:

Programs like Microsoft Teams or Zoom necessitate real-time, high-quality video transmission. This traffic can be prioritized by QoS to avoid delays or packet loss.11. Video on Demand (VOD): To stream high-quality video, VOD services need a strong network, much like streaming media. Network resources can be managed by QoS to enhance user experience.

**Voice over IP (VoIP):**

VoIP applications, such as Skype, require the real-time transfer of audio data. Poor call quality can be caused by packet loss or delays. To guarantee clear voice calls, QoS can give VoIP traffic priority.

Moreover, QoS is frequently employed in telecommunications and enterprise networks, where the calibre of data transfer is a crucial component. To prioritize traffic from vital applications that the company depends on, for example, QoS may be applied in an enterprise network.

***In networking, Quality of Service (QoS) provides numerous noteworthy advantages.***  
**Prioritizing Critical Applications:**

Setting aside certain types of data and critical applications is the main objective of QoS13. For example, high QoS13 is required for real-time transmissions like video telephony. This guarantees that these apps will always have the resources needed to run properly.

**Optimized Bandwidth Utilization:**

Quality of Service (QoS) enables the prioritization and classification of network traffic, guaranteeing that applications that require a lot of time, like voice and video, have the resources they need to run efficiently. Moreover, QoS facilitates the best possible use of available bandwidth.

**Enhanced Network Performance**:

QoS technologies aim to decrease latency, boost throughput, and cut down on packet loss. As a result, the user experience and network performance are enhanced.

**Improved User Experience**:

ISPs can prioritize your network traffic with QoS, so you will experience faster upload and download speeds for important traffic, such as voice, video calls, and video streaming. Better streaming quality, quicker downloads, and quicker uploads of files, photos, and videos are the results of this.

**Improved Resource Management:**

QoS gives network managers the ability to control the internet resources of the company more effectively. It offers the flexibility to alter network packet routing to the internet or other networks, enabling more effective use of already-existing resources.

**Prevention of Network Congestion:**

By allocating a priority queue to particular categories of traffic, QoS can help avoid network congestion. This reduces the amount of time a packet must wait in a queue before being transmitted during periods of congestion.

**Visibility and Control:**

Businesses can see their network's bit rate, delay, jitter, and packet rate by using QoS in networking. This guarantees that they can manipulate network traffic and alter packet routing to the internet or other networks in order to prevent transmission delay.

In conclusion, quality of service (QoS) is essential for maintaining a network's smooth operation, enhancing user satisfaction, and providing greater control over network resources.

***Configuring Quality of Service (QoS) in networking requires multiple steps***  
**1. Determine Applications:**

The first stage is to determine which applications stand to gain from packet loss, delay, and jitter management. Applications that need a lot of bandwidth or are susceptible to delays are usually included in this.   
  
**2. Mark Traffic:**

The second step after identifying the applications is to mark the traffic pertaining to these applications. There are multiple methods for recognizing or labelling the traffic. Two examples are the Differentiated Services Code Point (DSCP) and the Class of Service (CoS). A data stream will be identified by CoS in the layer 2 frame header and by DSCP in the layer 3 packet header.

**3. Set Up Routers:**

Following traffic marking, routers are set up to establish distinct virtual queues for every application, according to priority. This procedure entails setting up the router to detect the markings and handle traffic appropriately.  
  
  
**4. Distribute Resources**:

Quality of Service (QoS) technologies offer capacity and handling distribution to particular network traffic flows. This allows the network administrator to allocate the bandwidth to each application or traffic flow in the proper order and at the appropriate time.

**5. Monitor and Adjust**:

Following the initial setup, it's critical to keep an eye on the network to make sure the QoS settings are working as intended. Over time, as network conditions and application requirements change, adjustments might be necessary.