Assignment -5

Unit - 5

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Scenario:- A hospital uses VIOP for internal communication reports inconsisten voice.

Parameters:- packet delays range from 25m to 75m.

Question:-

a) Define jitter in the context of VoIP.

Ans) Step 1:- understand VIOP

=> VoIP is a technology used to transmit voice data over the internet

Step 2:- Identify what jitter.

=> jitter is the variation in the time delay in between data packet arriving at the receiver

Step 3:- Explain why jitter occurs

=> In VoIP, voice data is sent in small packets. Due to networks congestion or route changes the these packets time interval

Step 4:- Describe the effect of jitter

=> High jitter causes poor voice of the Quality such as choppy audio (or) delay in conversation

Step 5:- provide a Final Definition

=> jitter in VIOP is the variation in packet with arrival time, which affects the smooth delivery voice data and can degrade call quality

b) Compute jitter value given the variation in delay.

Ans) Step 1:- understand jitter calculation

=> jitter is usually calculated as the average of the absolute difference between

Step 2:- Take Delay samples

Assume we have packet delays in milliseconds

ex:- 100ms, 110ms, 95ms, 105ms

Step 3:- Find the variation b/w consective delay

=> calulate the absolute difference b/w each pair.

- $|110 - 100| = 10$
- $|95 - 100| = 15$
- $|105 - 95| = 10$

Step 4:- compute the Average of these differences

=> Add the differences $10 + 15 + 10 = 35$

Divided by numbers jitter $= 35/3 = 11.67$ ms

Final answer = 11.67 milli seconds

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c) Suggest jitter buffer techniques to enhance quality?

Ans) Step 1:- understand jitter Buffer

=> A jitter buffer is a temporary storage that collects voice packets and sends them to the receiver at evenly

=> Step 2:- Identify the Goal

=> The main goal of a jitter buffer is to reduce delay varaition and improve audio quality in VoIP communication

Step 3:- suggest Fixed jitter

=> A fixed jitter buffers holds packets for a set before playing them. but may drop late packets

Step 4:- Suggest Adaptive jitter Buffer

=> An adaptive jitter buffer dynamically adjusts buffer size based on network conditions

Step 5:- Final Recommendation

=> It use adaptive jitter buffers in real-time VoIP systems to balance delay and audio clarity

d) Recommend network upgrades to reduce delay?

Ans) Step 1:- Identify Delay causes

=> It understand that delay in networks can be due to congestion, low bandwidth high latency links.

Step 2:- upgrade bandwidth

=> Increases internet bandwidth to allow faster than transmission of voice packets

Step 3:- use Quality of service (QoS)

=> Implement the QoS to prioritize VoIP traffic over other types

=> Ensure voice packets are not delayed

Step 4:- Replace outdated hardware

=> Reduces processing delay and improves performance

Step 5:- Use wired connections

=> Replace Wi-fi with ethernet cables for the critical VoIP systems