

NAME: TANKISO MASOEBE

HCL WK4

13/09/2025

1.

Internet streaming, data is transmitted from a content server to an end-user device in real time. For example, when a user watches a movie on a platform like Netflix, the video file is stored on distributed servers. The content is compressed into small data packets and transmitted via the internet using Transmission Control Protocol (TCP) or User Datagram Protocol (UDP). These packets travel across multiple routers, switches, and transmission media such as fiber optic cables, wireless signals, or satellite links. At the receiving end, the user's device reassembles the packets, decompresses the data, and plays the video without noticeable delay. Adaptive bitrate streaming ensures quality is maintained even under fluctuating network conditions. This process highlights the importance of reliable bandwidth, low latency, and efficient error correction to ensure smooth, uninterrupted playback for users.

2.

An Analog-to-Digital Converter (ADC) is a device that changes real-world analog signals into digital data that computers and electronic systems can understand. Analog signals, such as sound, temperature, or light, are continuous, while computers work with binary values (0s and 1s). The ADC samples the analog signal at set intervals and assigns each sample a digital value based on its strength. Two important factors are resolution and sampling rate. Resolution, measured in bits, affects how detailed the digital output is, while sampling rate, measured in Hertz, shows how many times per second the signal is recorded. A higher resolution and faster sampling rate give better accuracy. ADCs are commonly used in audio systems, smartphones, medical devices, and communication technologies. Without ADCs, it would be impossible for digital devices to process information from the physical world.

3.

While studying how to analyze packets with Wireshark, I learned the importance of observing data transmission at a very detailed level. Wireshark captures live network traffic and breaks it down into packets, showing the source, destination, protocol, and contents. This helped me understand how information travels through a network and how errors or delays can occur. I also saw how different protocols, such as TCP and UDP, handle data differently. The tool is

very useful for troubleshooting network issues and improving performance. Overall, this practice gave me practical insight into how digital communication works in real time.

4.

When I practiced analyzing packets with Wireshark, I gained a deeper understanding of how digital communication takes place across a network. Wireshark is a packet analyzer that captures live traffic and displays each packet with details such as source, destination, protocol, size, and time. By observing these packets, I could see how data is divided and transmitted in real time, as well as how protocols like TCP ensure reliability through acknowledgments and retransmissions. This gave me a clearer picture of how errors, congestion, or delays affect overall performance. The filtering tools in Wireshark made it easier to focus on specific protocols, such as HTTP or DNS, which helped me connect theoretical concepts from class to practical examples. Overall, this exercise improved my ability to troubleshoot network issues, strengthened my understanding of protocols, and showed me how important packet-level analysis is in maintaining efficient and secure communication systems.