THE OSI MODEL VERSUS THE TCP/IP MODELS

THE OSI MODEL

OSI stands for Open Systems Interconnections (OSI), which is A 7 layered framework for designing and implementing computer networks, which was founded by the International Organization for Standardization (ISO) in 1984.

The layers are broken down into;

1. **Physical layer**: which defines the physical means of transmitting data for example electrical signals and light waves. The physical layer establishes how a device like a computer interacts with transmission medium like copper or an optical cable. Protocols like the USB and Ethernet operate this layer.

2. **Data link layer**: Ensures error-free transfer of data frames between nodes on the same network. The data link layer receives a raw bit stream from the physical layer that it may be error free. It adds source and destination addresses to the data stream as well as information to detect and control transmission errors. Protocols like Wi-Fi and Point-to-point (PPP) protocols are in this layer.

3. **Network layer**: Routes data between different networks using IP (Internet Protocol) addresses by determining the optimal path through which data will travel. It is part of the internet communication processes where these connections occur by sending packets of data back and forth between different networks. OSBF (Open Systems Interconnection Network)

protocol is one example of a protocol that runs this layer, which is a 7-layered framework for designing and implementing computer networks.

4. **Transport layer**: which ensures reliable data transfer between devices for example TCP and UDP (User Datagram Protocol).It is responsible for ensuring that the data packets arrive accurately and reliably between sender and receiver.

5. **Session layer**: which establishes, manages and terminates connections between applications. It allows applications to exchange control information and coordinate communication. Protocols like secure shell(SSH) and NetBIOS reside in this layer

6. **Presentation layer**: which focuses on data formatting and presentation. It converts data into a format that can be understood by the receiving device. It handles encryption, decryption, compression and decompression of data to ensure compatibility of applications exchanging information. Protocols like ASCII (American Standard Code for Information Exchange) operates this layer, which is widely used today in computing and communication systems.

7. **Application layer**: It provides network directly to user applications and supports functions like email, file transfer, and web browsing for example Hyper Text Transfer Protocol (HTTP) for web browsing and Simple Mail Transfer Protocol (SMTP) for email.

THE TCPIP MODEL

The TCIPIP (Transmission Control Protocol/Internet Protocol) is a suite of communication protocols used to interconnect devices on the internet. It defines how data is formatted, addressed, routed and delivered across networks.

This model consists of 4 layers which include;

1. The **Network Access Layer**: which defines how devices access a network and send data over it and interacts with the physical network hardware. It includes Network adapters, cables and wireless technologies responsible for transmitting raw data according to physical specifications. The protocols at this layer are specific to the network media being used like Ethernet, which defines how data is formatted and transmitted over wired networks, WIFI for wireless connections, ARP (Address Resolution Protocol) and also Bluetooth, enabling data exchange between short range devices.

2. The **Internet layer**: which accesses unique IP addresses to the devices on the network, acting like an addressing system. The internet layer adds header information to the data including the source and the destination IP address enabling packets to be routed across networks towards their final destination. It includes protocols like IPv4, IPv6, and ICMP (Internet Control Message Protocol). In addition, it is equivalent to OSI's network layer.

3. The **Transport Layer**: which is mainly concerned on how applications exchange data and ensures that reliable data

transfer between devices using TCP (Transmission Control Protocol) or UDP (User Datagram Protocol). The TCP offers reliable delivery of data, ensuring that packets arrive in the same sequence without errors while the UDP provides connectionless data transfer, prioritizing speed over reliability. UDP is often used for real-time applications like video streaming, online gaming and voice over.

4. The **Application layer**: which functions like email, file transfer, and web browsing using protocols like HTTP, the foundation of web communication, used for transferring web pages and data between web pages and web servers. FTP, used for transferring files between computers and SMTP used for sending emails as it establishes a connection between the email client and the mail server, enabling email delivery.

IMAGES OF DEVICES CONCERNING THE OSI AND THE TCPIP MODELS.

Network interface card

Repeater

Hub

Router

Switch

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