OSI Reference Model Summary

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THIS IS MY INDIVIDUAI LIBRARY RESEARCH

In my lab research I focused on understanding the Open Systems Interconnection reference models, I used two main textbooks:

- Data and Computer Communications by William Stallings
- Computer Networking: A TOP-Down Approach by Kurose and Ross

Also, in addition I used Cisco Packet Tracer to simulate data flow through the Open Systems Interconnection Layers and Visualize encapsulation.

THE FOLLOWING ARE THE OSI MODEL LAYERS FROM TOP TO BOTTOM

The Application Layer is the 7 Layer

Function

- ✓ It provides network services directly with the user applications.

Examples

- ✓ HTPP; it is used to load websites
- ✓ SMTP; it is used for sending emails

Troubleshooting examples:

- ❖ Web page fails to load then check if HTTP service is available.

The presentation layer is layer number **6**

Functions

- ✓ It Translate data in to a format the application can understand
- ✓ It is responsible for data encryption, compression and coding

Examples

- ✓ The SSL/TLS, this one secure communication
- ✓ MPEG/JPEG, this one helps in media format encoding

Troubleshooting examples:

- ❖ Encrypted website not loading though the possible expired SSL certificate

The session layer is the layer number 5

Function

- ✓ It manages sessions and dialogs between applications.

Examples:

- ✓ NetBIOS for windows file sharing
- ✓ PPTP for VPN tunneling

Troubleshooting examples:

- ❖ The VPN session disconnects often the solution check session timeout settings

The Transport Layer is Layer number 4

Function:

- ✓ It ensures reliable data delivery
- ✓ It supports both connection between the TCP and UDP

Examples:

- ✓ TCP, it is reliable on communication like email
- ✓ UDP it is fast delivery like video streaming

Troubleshooting examples:

- ❖ Volp calls dropping it is due to packet loss on UDP connection

Networking layer is Layer number 3

Functions:

- ✓ It handles logical addressing and routing and packet forwarding
- ✓ It determines the best path for data transfer between devices

Examples:

- ✓ IP (IPV4 / IPV6), it is for assigning addresses
- ✓ ICMP, it is for ping/traceroute

Troubleshooting examples:

- ❖ There is no internet access because of the Incorrect IP settings.

Data Link Layer is the Layer number 2

Functions:

- ✓ It Transfers data between adjacent nodes.

Examples:

- ✓ Ethernet. its role is for framing data
- ✓ MAC Addressing. It also identifies devices

Troubleshooting examples:

- ❖ Switch not forwarding frames thus possible MAC conflict.

Physical layer is the layer number 1

Functions:

- ✓ It transmits raw bits through physical medium.

Examples:

- ✓ Cables
- ✓ Hubs, NICs

Troubleshooting examples:

- ❖ The cable unplugged thus no link detected.

MY EXPERIENCE

I used Cisco Packet Tracer to simulate PC-to -Server communication and observe encapsulation. Each Protocol added headers and trailers data moved down the OSI stack. Me as a person I focused on the Transport Layer. I compared the TCP and UDP and demonstrated port filtering using an Access Control List. The hands-on practice helped me visualize how real traffic is structured and why each layer matters in network troubleshooting.

MY NUTSHELL (IN Conclusion)

This lab greatly improved my understanding of the OSI models. I can now confidently identify which layer a networking issue belongs to, explain how protocols interact within the stack, and simulate real-world scenarios using Packet Tracer.