Summary of OSI Model with Protocol Examples

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# Introduction

The OSI (Open Systems Interconnection) model is a framework that standardizes the functions of a telecommunication or computing system into seven distinct layers. This model helps in understanding and designing networks by providing a universal language for network communication.

# The Seven Layers of the OSI Model

## Layer 1: Physical Layer

Deals with the physical connection between devices, including the transmission of raw bit streams over a physical medium.

* Examples of Protocols:
* Ethernet
* USB
* DSL

## Layer 2: Data Link Layer

Provides node-to-node data transfer and error detection/correction. It frames data packets for transmission.

* Examples of Protocols:
* Ethernet (IEEE 802.3)
* Wi-Fi (IEEE 802.11)
* PPP (Point-to-Point Protocol)

## Layer 3: Network Layer

Manages the routing of data packets between devices across different networks. It handles logical addressing.

* Examples of Protocols:
* IP (Internet Protocol)
* ICMP (Internet Control Message Protocol)
* ARP (Address Resolution Protocol)

## Layer 4: Transport Layer

Ensures complete data transfer and error recovery. It provides flow control and segmentation of data.

* Examples of Protocols:
* TCP (Transmission Control Protocol)
* UDP (User Datagram Protocol)

## Layer 5: Session Layer

Manages sessions between applications, establishing, maintaining, and terminating connections.

* Examples of Protocols:
* NetBIOS
* RPC (Remote Procedure Call)

## Layer 6: Presentation Layer

Translates data between the application layer and the network. It handles data encryption, compression, and translation.

* Examples of Protocols:
* SSL/TLS (Secure Sockets Layer / Transport Layer Security)
* JPEG (Joint Photographic Experts Group)

## Layer 7: Application Layer

Closest to the end user, it interacts with software applications to provide network services.

* Examples of Protocols:
* HTTP (Hypertext Transfer Protocol)
* FTP (File Transfer Protocol)
* SMTP (Simple Mail Transfer Protocol)

# Conclusion

The OSI model is crucial for understanding how different networking protocols interact and function. It provides a standardized approach to network communication, facilitating interoperability between diverse systems and technologies.