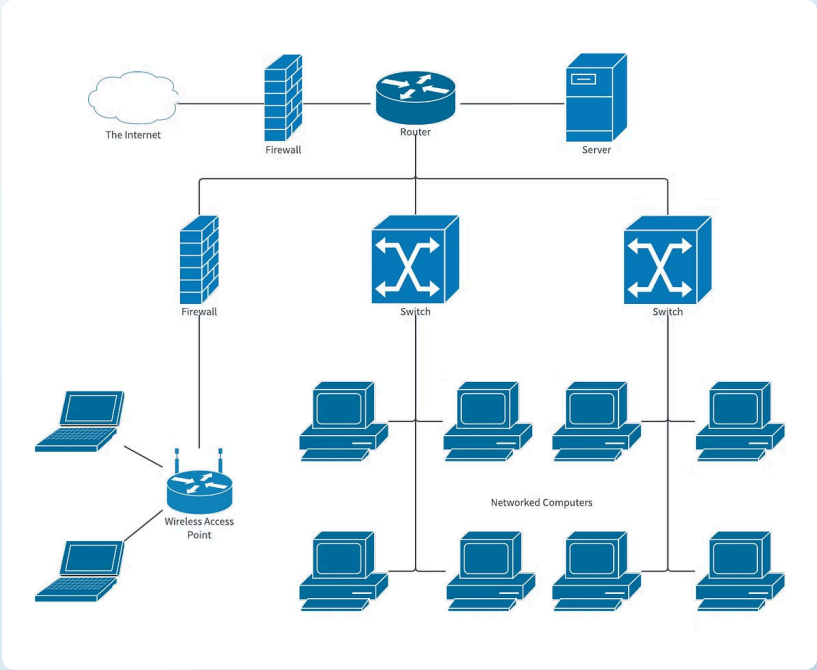


Introduction to the OSI Model

The OSI (Open Systems Interconnection) model is a conceptual framework used to describe the functions of a networking system. It consists of seven distinct layers, each with its own responsibilities and protocols.

by Rakesh Rai

Layer 1: Physical Layer

1 Hardware

This layer deals with the physical equipment involved in the network, such as cables, connectors, and network interface cards.

2 Electrical Signals

It is responsible for transmitting raw data as electrical signals across the physical medium.

3 Timing

The physical layer also manages the timing and synchronization of the data transfer.

Layer 2: Data Link Layer

Framing

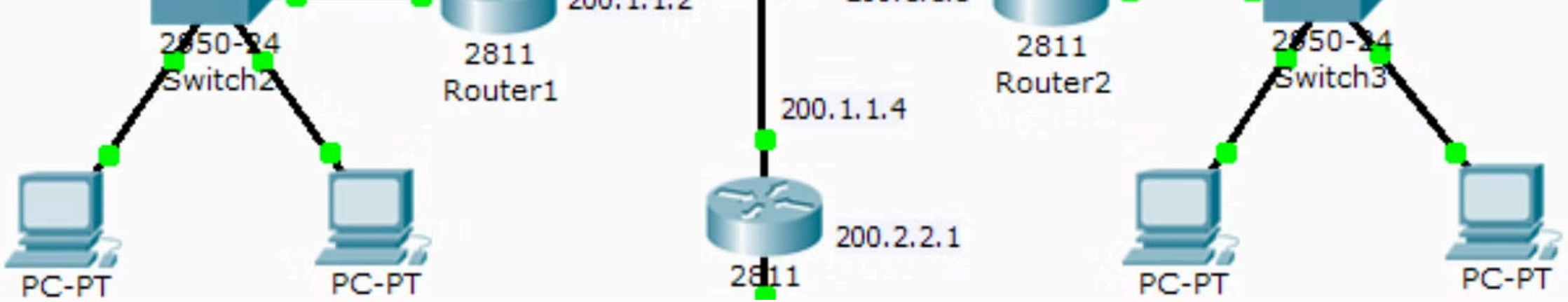
The data link layer organizes the raw data into frames, which include headers and trailers for identification and error checking.

Access Control

It manages access to the shared physical medium, ensuring that multiple devices can communicate without collisions.

Error Correction

This layer is responsible for detecting and correcting errors that may occur during data transmission.



Layer 3: Network Layer

Addressing

The network layer is responsible for logical addressing, such as IP addresses, and determining the best path for data to travel between networks.

Routing

It manages the routing of data packets between different networks, ensuring that the information reaches its intended destination.

Congestion Control

The network layer also plays a role in controlling network congestion and managing the flow of data to prevent overloading.

Layer 4: Transport Layer

1

Segmentation

The transport layer breaks the data into smaller, manageable segments for efficient transmission.

2

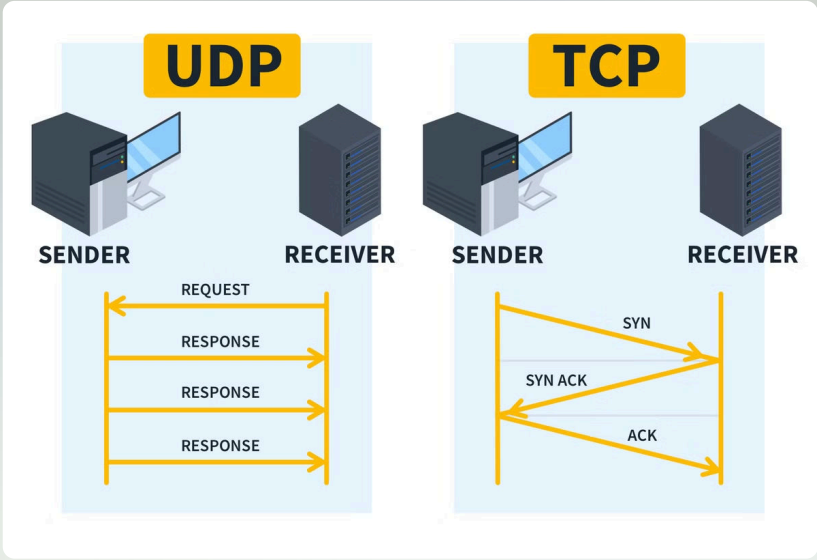
Error Checking

It ensures the reliable delivery of data by performing error checking and retransmission if necessary.

3

Flow Control

The transport layer also manages the flow of data, preventing the sender from overwhelming the receiver.



Layer 5: Session Layer

Synchronization

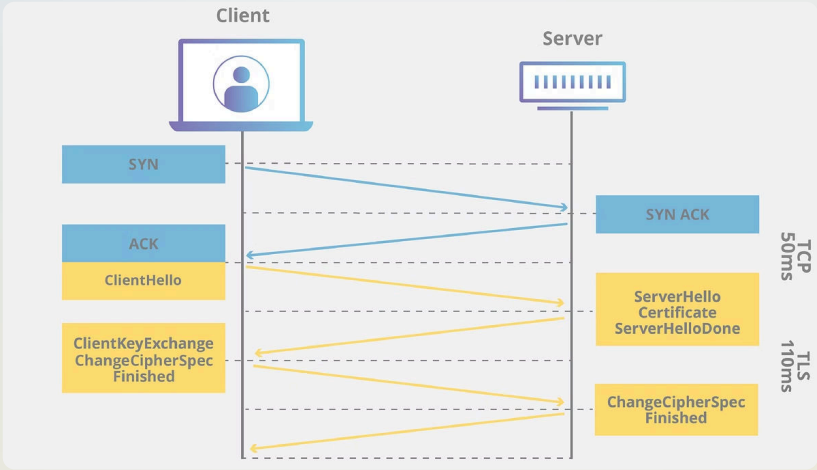
The session layer is responsible for establishing, maintaining, and synchronizing communication sessions between applications.

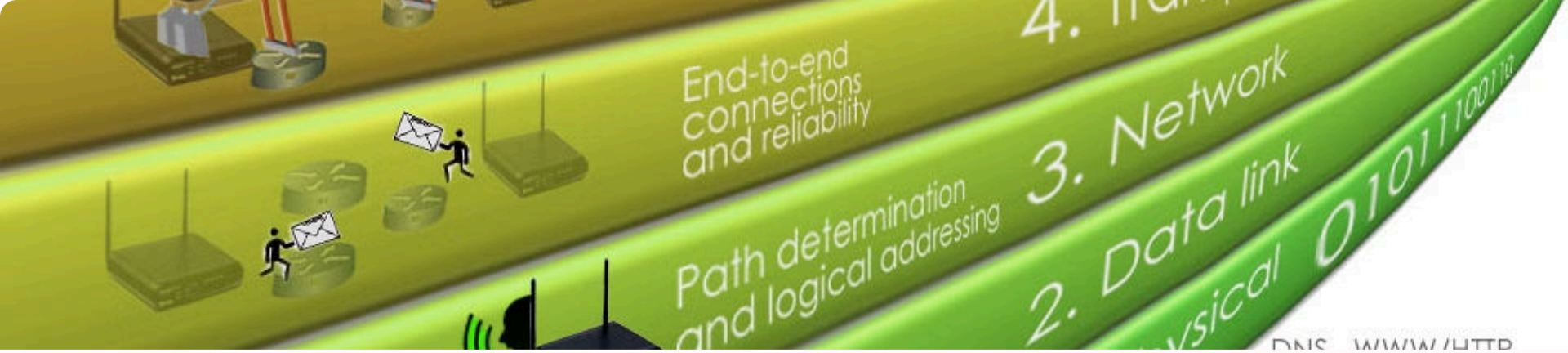
Checkpointing

It provides mechanisms for checkpointing and restarting data transfers in the event of a disruption.

Recovery

The session layer also handles the recovery of communication sessions if they are interrupted.





Layer 6: Presentation Layer

1 | 2 | 3

Data Formatting

The presentation layer is responsible for translating and formatting data between different systems, ensuring compatibility.

Encryption

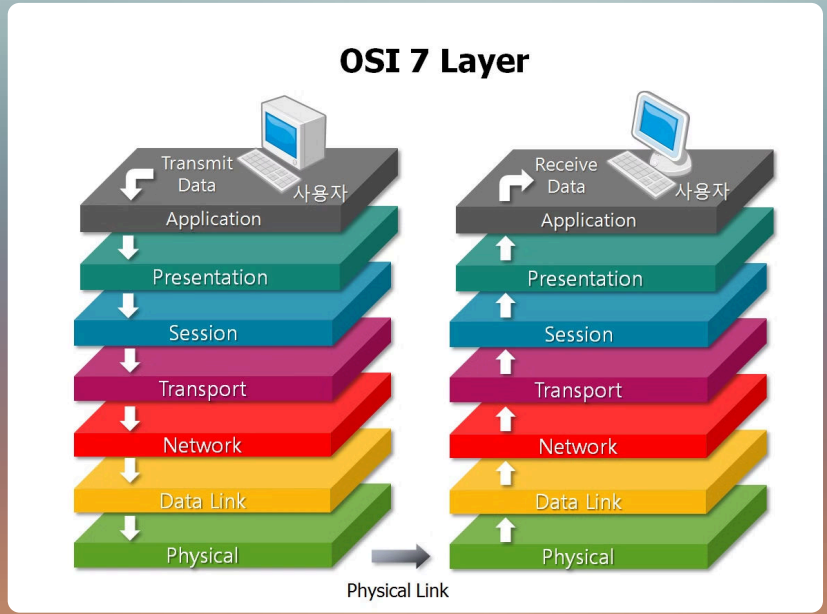
It provides encryption and decryption services to ensure the confidentiality of the data.

Compression

The presentation layer can also compress and decompress data to optimize network performance.

Layer 7: Application Layer

Layer	Purpose
Application	Provides interfaces for network services and applications, such as email, web browsing, and file transfer.
Presentation	Translates and formats data for compatibility between different systems.
Session	Establishes, maintains, and synchronizes communication sessions between applications.



Importance of the OSI Model

1 Standardization

The OSI model provides a standardized framework for network communication, enabling interoperability between different network technologies and devices.

2 Troubleshooting

The layered approach of the OSI model makes it easier to identify and resolve issues within a network system.

3 Modular Design

The separation of concerns in the OSI model allows for a more modular and flexible network architecture.

Comparison to the TCP/IP Model

OSI Model

The OSI model has seven distinct layers, each with its own responsibilities and protocols.

TCP/IP Model

The TCP/IP model has four layers, which are similar to the OSI model but with a more practical and simplified approach.

Differences

While the OSI model is more theoretical, the TCP/IP model is more widely used and implemented in real-world networking applications.