

OSI MODEL

- The OSI (Open Systems Interconnection) Model is a way to understand how different computer systems communicate. It has seven layers, each with a specific job.
- OSI is not an Protocol it is an it is a guideline, hence referred as OSI reference model.
- OSI model was never fully implemented.
- The layers are
 - Physical Layer **Please**
 - Data Layer **Do**
 - Network Layer **Not**
 - Transport Layer **Throw**
 - Session Layer **Sauge**
 - Presentation Layer **Pizza**
 - Application Layer **Away**

The **Physical Layer** is the foundational layer of the OSI Model, dealing with the physical connections between devices, such as cables, switches. This layer is responsible for transmitting raw binary data (0s and 1s) over the network medium. It defines the hardware specifications, including electrical signals, cable, and connector designs, ensuring that data can physically move from one device to another.

Above the Physical Layer, the **Data Link Layer** ensures that data is accurately transferred between two directly connected devices. It packages the raw bits from the Physical Layer into frames and performs error detection and correction. This layer also utilizes Media Access Control (MAC) addresses to uniquely identify devices on the same local network, enabling smooth communication and reducing data collisions.

The **Network Layer** is crucial for routing data between different networks. It manages the logical addressing of devices through Internet Protocol (IP) addresses, allowing packets to be sent from the source to the destination across multiple hops. This layer determines the most efficient path for data to travel, using routing algorithms and protocols to ensure that information reaches its intended target.

At the next level, the **Transport Layer** is responsible for ensuring that data is sent reliably and in the correct order. This layer breaks larger messages into smaller packets. It provides error recovery and flow control mechanisms to ensure data integrity, utilizing protocols like Transmission Control Protocol (TCP) for reliable delivery and User Datagram Protocol (UDP) for faster, connectionless communication.

The **Session Layer** plays a vital role in managing sessions or connections between applications. It establishes, maintains, and terminates communication sessions, ensuring that data flows smoothly between applications on different devices. This layer can also manage user authentication and permissions, similar to how a phone call is organized and maintained.

The **Presentation Layer** serves as the translator between the application and the network, handling data formatting, encryption, and compression. It ensures that data is converted into a format that the receiving application can understand, facilitating the effective exchange of information. This layer is crucial for data security and compatibility, especially when dealing with different file formats or encryption methods.

Finally, the **Application Layer** is where users interact with software applications, like web browsers and email programs. It provides network services to end users.