

# OSI Layer Attacks

## (1) Physical Layer

The physical layer is the first and lowest layer of the Open Systems Interconnection ([OSI](#)) communications model. The physical layer's function is to transport data using electrical, mechanical or procedural interfaces.

OSI is a reference model used to show how applications communicate over a network. The model focuses on providing a visual design of how each communications layer is built on top of the other, starting with the physical cabling all the way to the application that's trying to communicate with other devices on a network. IT networking professionals use the OSI model to conceptualize how data is sent or received over a network.

To do this, the physical layer performs a variety of functions, including the following:

- **Defining bits.** Determines how bits are converted from zeros and ones to a signal.
- **Data rate.** Determines how fast the data flows in bits per second.
- **Synchronization.** Ensures that sending and receiving devices are synchronized.
- **Transmission mode.** Determines the direction of data transmissions and whether those are simplex (one signal is transmitted in one direction), half-duplex (data goes in both directions but not at the same time) or [full-duplex](#) (data is transmitted in both directions simultaneously).
- **Interface.** Determines how devices are connected to a transmission medium, such as Ethernet or radio waves.
- **Configuration.** Provides point-to-point configurations and multipoint configurations.

- **Modulation.** Converts data into radio waves.
- **Switching mechanism.** Sends data [packets](#) from one port to another.
- **Signal equalization.** Helps create more reliable connections and makes multiplexing easier.

## **(2) Data Link Layer**

The data link layer is the second layer from the bottom in the [OSI](#) (Open System Interconnection) network architecture model. It is responsible for the node-to-node delivery of data. Its major role is to ensure error-free transmission of information. DLL is also responsible for encoding, decode and organizing the outgoing and incoming data. This is considered the most complex layer of the OSI model as it hides all the underlying complexities of the hardware from the other above layers.

Sub-layers of the Data Link Layer

The data link layer is further divided into two sub-layers, which are as follows:

**Logical Link Control (LLC)**

This sublayer of the data link layer deals with multiplexing, the flow of data among applications and other services, and LLC is responsible for providing error messages and acknowledgments as well.

**Media Access Control (MAC)**

MAC sublayer manages the device's interaction, responsible for addressing frames, and also controls physical media access.

- ARP Spoofing/Poisoning
- MAC Flooding

## **(3) Network Layer**

The network layer (also packet level) provides a defined benefit services for switching connections and packet-oriented services for the relaying of data packets. The data transmission in both cases will go over the entire communication network and includes the route search (routing) between the network nodes. Because not always a direct communication between the sender and the target is possible, packets must be forwarded by nodes that are on the way. Next mediated packets do not reach the higher layers, but are provided with a new intermediate target and sent to the next node.

The main tasks of the network layer is one of providing cross-network addresses, the routing and the construction and updating of routing tables and the fragmentation of data packets. But the negotiation and ensure a certain quality of service falls within the remit of the network layer.

- IP Spoofing
- IPv6 Tunneling
- Smurf Attack
- ICMP Flooding
- DHCP Spoofing
- DHCP Starvation

**(4) Transport Layer:** The transport layer is located at layer 4 of the open systems interconnection communication model (OSI). It ensures that messages arrive reliably on the network and provides mechanisms for error checking and data flow control.

- TCP SYN Flood
- TCP Session Hijacking
- TCP Reset attack
- UDP Flooding

**(5) Session Layer:** The session layer is the lowest layer of the application system (layer 5-7) and establishes logical connections between the sender and receiver, controls them and terminates them again.

- Session Hijacking

**(6) Presentation Layer:** The Presentation Layer is located at Layer 6 of the OSI (Open Systems Interconnection) communications model and ensures that the communication that passes through it is in the form appropriate for the recipient application

- SSL
  - SSL Striping

**(7) Application Layer:**

In the Open Systems Interconnection (OSI) communication model, the application layer, also known as Layer 7, serves as a service for application programs to ensure that efficient communication with other application programs within a network is possible

- DNS
  - Zone transfer
  - DNS Spoofing

- HTTP/HTTPS
  - Web Attacks
- FTP (Plain-text protocol)
  - Brute force
  - Download critical files
  - Upload malicious files
- TELNET
  - Brute force
- BGP Hijacking