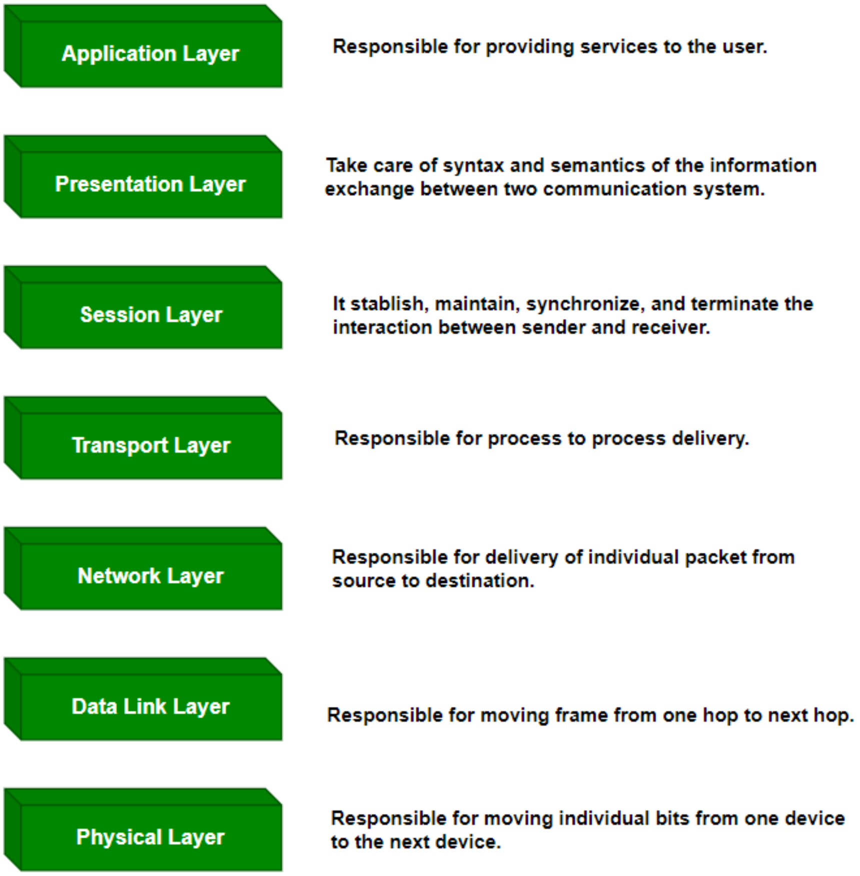
NETWORK DEVICES

Introduction

- Network devices allow communication between computers on a network. They are classified into various types, including intermediate, final, active and passive.

- In TCP (Transmission Control Protocol) there can be no more than 30 hops between devices. More than 30 hops means that the domain does not exist or there was an error in the address.

EXTRA NOTE: the OSI (Open Systems Interconnection) model is a model that provides a standard so that different computer systems can communicate with each other. It is based on the concept of dividing a communication system into 7 abstract layers, each stacked on top of the previous one.



Application Layer	Responsible for providing services to the user.
Presentation Layer	Take care of syntax and semantics of the information exchange between two communication system.
Session Layer	It stablish, maintain, synchronize, and terminate the interaction between sender and receiver.
Transport Layer	Responsible for process to process delivery.
Network Layer	Responsible for delivery of individual packet from source to destination.
Data Link Layer	Responsible for moving frame from one hop to next hop.
Physical Layer	Responsible for moving individual bits from one device to the next device.

Each layer has a specific function and communicates with the layers above and below. DDoS attacks are directed at specific layers of a network connection, attacks on the application layer are directed at 7, while protocol layers are directed at 3 and 4.

Intermediate devices

- They are the ones that control and manage network traffic. They include routers, switches and access points.
  - Router: intermediate device that is responsible for directing traffic between different networks (censes the medium so as not to overload it and routes). It is layer 3 in the OSI model.

  - Switch: device that connects devices on the same network and allows efficient data transfer. It is used in telephone switches. It is layer 2 in the OSI model.

  - Access Point: Allows wireless connection of devices to a wired network. It is layer 2 in the OSI model.

Final devices

- End devices: These are devices that connect to the network to send or receive data, such as computers, printers, and phones. An important note is that the phone is an end device, but when connecting it to the computer, sending data to it to access the Internet, it would act as a router.

Active devices

- They are those that actively produce and control network traffic. Includes routers, switches and firewalls.

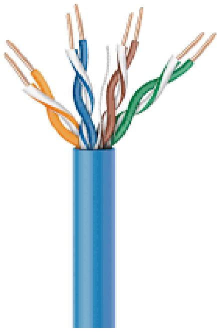
  - Firewalls: they control network traffic according to established security policies. They can be hardware or software.

Passive devices

- They do not actively process network traffic, but are essential to the infrastructure. They include cables, connectors and patch panels.

  - Network cables: physical media that carry data signals between devices. The most common ones to find are UTP, FTP, STP and SFTP; They are twisted to prevent interference and all have a cover except for UTP.

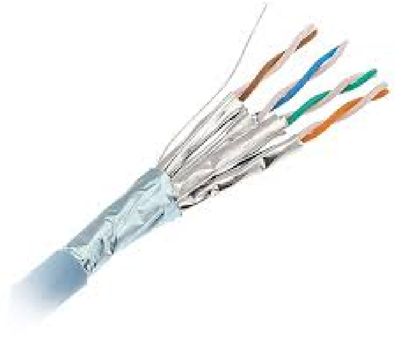
    1) UTP (Unshielded Twisted Pair):
       - It does not have any additional protection against interference.
       - It is economical and easy to install.
       - Used in standard LAN networks.



    2) FTP (Foiled Twisted Pair):
       - It has a layer of metallic foil that covers all the twisted pairs.
       - Protects against external interference (EMI - Electromagnetic Interference) of moderate level.
       - Improves signal quality in environments with some electrical noise.

3) STP (Shielded Twisted Pair):

- Each twisted pair has individual shielding and sometimes additional overall shielding.
- Provides better protection against interference than FTP.
- Used in industrial environments with high electrical noise.



4) SFTP (Shielded and Foiled Twisted Pair):

- Combines metal foil (FTP) and individual shielding of pairs (STP).
- Offers maximum protection against external interference and crosstalk.
- Used in critical and high-performance networks.

- Connectors: they allow physical connection between cables and network devices.
    - Patch panels: Organize and distribute network connections in a structured environment.

    - Keystone: female connector used in data communications (LAN).

    - RJ45: physical interface for connecting computer networks with structured cabling.