THE FUNCTIONS AND APPLICATIONS OF THE 5 LAYERS OF TCP/IP

Application	LAYER 5
Transport	LAYER 4
Internet	LAYER 3
Network Interface	LAYER 2
Physical	LAYER 1
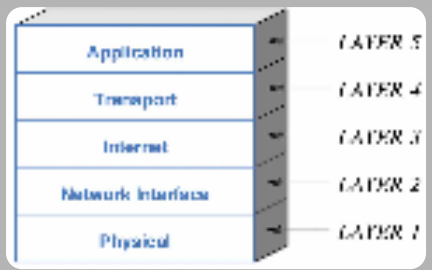
1. PHYSICAL LAYER

Considered the **domain of many hardware-related network** design issues such as LAN and WAN topology

Responsible for various **encoding and signaling functions** that transform the data from bits that reside within a computer/other device into signals that can be sent over the network.

Transmit and receive data in both wired and wireless networks.

Primarily executed in hardware by a network interface controller (NIC)

APPLICATIONS:
Wired and wireless device

2. DATA LINK LAYER (MAC)

LOGICAL LINK CONTROL (LLC). This layer establish and control logical links between local devices on a network.

MEDIA ACCESS CONTROL (MAC), Controls access to the network medium.

DATA FRAMING. Responsible for the final encapsulation of higher level messages into frames that are sent over the network at the physical layer.

ADDRESSING. Labels information with particular destination location where each device has a unique number called **MAC address** or **hardware address**.

ERROR DETECTION AND HANDLING. Handles errors that occurs at the lower level of network stack.

APPLICATIONS:
Wifi

3. NETWORK LAYER (IP)

ROUTING.
Moving data across a series of interconnected networks. **Handle** incoming packets from various sources, **determine** their final destination, and **figure out where** they need to be sent where they're supposed to be.

LOGICAL ADDRESSING. Every device that communicates over a network has associated with it a logical address, sometimes called a layer three address. For example, on the Internet, the Internet Protocol (IP) is the network layer protocol and every machine has an IP address. Note that addressing is done at the data link layer as well, but those addresses refer to local physical devices. In contrast, logical addresses are independent of particular hardware and must be unique across an entire internetwork.

DATAGRAM ENCAPSULATION. Encapsulates messages received from a higher layers by placing them into datagrams (packets) with a network layer header.

ERROR HANDLING AND DIAGNOSTICS. Special protocol are used to allow devices that to exchange information about the status of the hosts on the network/device.

FRAGMENTATION AND REASSEMBLY. Some data link layer technologies have limits on the length of any message that can be sent, so, the network layer **splits the packet** and send to data link layer. once arrived, the pieces are **reassembled** on the destination machine.

APPLICATIONS:
IP address and IPv4 & IPv6

4. TRANSPORT LAYER (TCP/UDP)

Generates the final address of the destination.

Provides services that support reliable **end-to-end communications.**

Responsible for all **end-to-end communication facilities.**

Packetization of the mess, **breaking up** of the message into packets of reasonable size.

APPLICATIONS:
TIP/VDP

5. APPLICATION LAYER

This is where the **message is created.**

Includes any application that provides software that can communicate with the network layer.

APPLICATIONS:
Email application