# TCP/IP Model

- The Transmission Control Protocol/Internet Protocol is developed by ARPANET(Advanced research project agency network).
- The TCP/IP model has four layers.
    1. Network access layer
    2. Internet layer
    3. Transport layer
    4. Application layer

**Network access layer:**
- This layer corresponds to the combination of Data Link Layer and Physical Layer of the OSI model.
- It looks out for hardware addressing and the protocols present in this layer allows for the physical transmission of data.

**Internet layer:**
- This layer parallels the functions of OSI's Network layer. It defines the protocols which are responsible for logical transmission of data over the entire network.
- The main protocols residing at this layer are IP, ICMP(Internet control message protocol), ARP(Address resolution protocol).
- **IP** – stands for Internet Protocol and it is responsible for delivering packets from the source host to the destination host by looking at the IP addresses in the packet headers. IP has 2 versions IPv4(Internet protocol version 4), and IPv6(Internet protocol version 6).
- **IPv4:**
    - IPv4 has a 32-bit address length
    - IPv4 has a header of 20-60 bytes.
    - IPv4 can be converted to IPv6.
    - IPv4 supports VLSM(Variable Length subnet mask).
- **IPv6:**
    - IPv6 has a 128-bit address length
    - IPv6 has a header of 40 bytes fixed
    - Not all IPv6 can be converted to IPv4
    - IPv6 does not support VLSM.

**Transport layer:**
- It is also called the host-to-host layer.
- This layer is analogous to the transport layer of the OSI model.
- The two main protocols present in this layer are TCP(Transmission Control Protocol), UDP(User Datagram Protocol).
- **TCP:**
    - It is secure.
    - It is connection oriented.

- ○ It is slow.
- ○ It has guaranteed transmission.
- ○ It hasFlow control.
- **UDP:**
  - ○ Unsecure.
  - ○ Connectionless.
  - ○ It is Fast.
  - ○ It has no guaranteed transmission.
  - ○ It has no flow control.

**Application layer:**
- This layer performs the functions of the top three layers of the OSI model i.e, Application, Presentation and Session Layer.
- Some of the protocols present in this layer are: HTTP(Hypertext transfer protocol), HTTPS(Hypertext transfer protocol secure), Telnet, SSH(secure shell).
- **HTTP:**
  - ○ In HTTP, the URL begins with "http://".
  - ○ HTTP is considered to be insecure.
  - ○ HTTP works at Application Layer.
  - ○ HTTP Should be avoided.
  - ○ HTTP is faster than HTTPS.
- **HTTPS:**
- In HTTPs, the URL starts with "https://".
- HTTPs is considered secure.
- HTTPS works at Transport Layer.
- HTTPS slower than HTTP
- HTTPS Should be preferred.