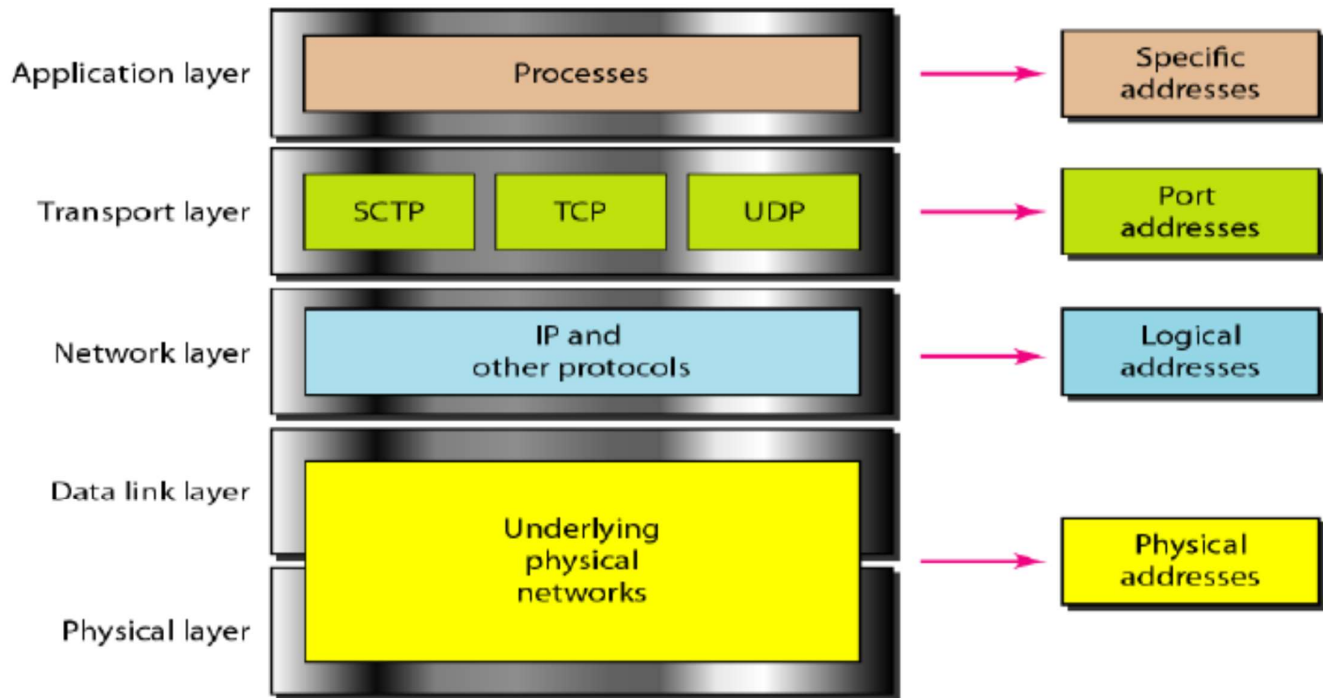# TCP/IP Model (Transmission Control Protocol/Internet Protocol)

- A *protocol* suite is a large number of related protocols that work together to allow networked computers to communicate.

Relationship of layers and addresses in TCP/IP

Application Layer
- Application layer protocols define the rules when implementing specific network applications
- Rely on the underlying layers to provide accurate and efficient data delivery
- Typical protocols:
    o FTP – File Transfer Protocol
        ▪ For file transfer
    o Telnet – Remote terminal protocol
        ▪ For remote login on any other computer on the network
    o SMTP – Simple Mail Transfer Protocol
        ▪ For mail transfer
    o HTTP – Hypertext Transfer Protocol
        ▪ For Web browsing
- Encompasses same functions as these OSI Model layers Application Presentation Session

Transport Layer TCP &UDP
- TCP is a connection-oriented protocol
  - Does not mean it has a physical connection between sender and receiver
- TCP provides the function to allow a connection virtually exists – also called virtual circuit
- UDP provides the functions:
  - Dividing a chunk of data into segments
  - Reassembly segments into the original chunk
  - Provide further the functions such as reordering and data resend
- Offering a reliable byte-stream delivery service
- Functions the same as the Transport layer in OSI
- Synchronize source and destination computers to set up the session between the respective computers
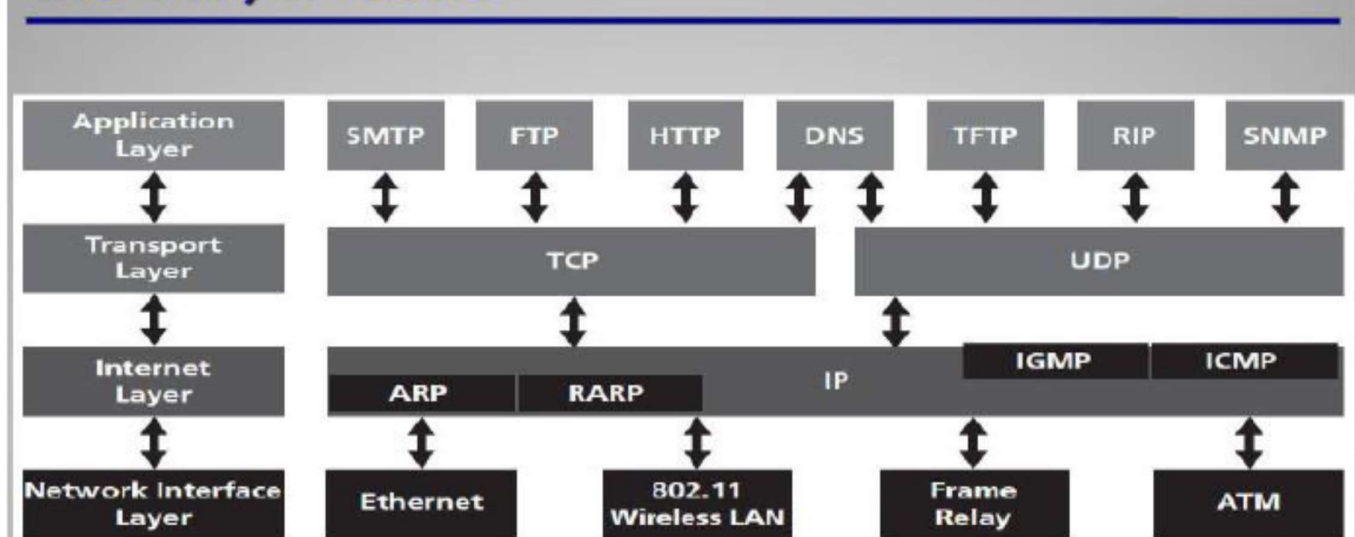
Internet Layer
- The network layer, also called the internet layer, <u>deals with packets</u> and connects independent networks to transport the packets across network boundaries.
- The network layer protocols are <u>the IP and the Internet Control Message Protocol (ICMP)</u>, which is used for error reporting.

Host-to-network layer
- The Host-to-network layer is the lowest layer of the TCP/IP reference model.
- It combines the link layer and the physical layer of the ISO/OSI model.
- At this layer, data is transferred between adjacent network nodes in a WAN or between nodes on the same LAN.

TCP/IP Model and its Relation to Protocols of the TCP/IP Suite

Application Layer	SMTP	FTP	HTTP	DNS	TFTP	RIP	SNMP
Transport Layer	TCP				UDP		
Internet Layer	ARP	RARP		IP	IGMP	ICMP	
Network Interface Layer	Ethernet		802.11 Wireless LAN		Frame Relay		ATM

OSI MODEL	TCP/IP MODEL
Contains 7 Layers	Contains 4 Layers
Uses Strict Layering resulting in vertical layers.	Uses Loose Layering resulting in horizontal layers.
Supports both connectionless & connection-oriented communication in the Network layer, but only connection-oriented communication in Transport Layer	Supports only connectionless communication in the Network layer, but both connectionless & connection-oriented communication in Transport Layer
It distinguishes between Service, Interface and Protocol.	Does not clearly distinguish between Service, Interface and Protocol.
Protocols are better hidden and can be replaced relatively easily as technology changes (No transparency)	Protocols are not hidden and thus cannot be replaced easily. (Transparency) Replacing IP by a substantially different protocol would be virtually impossible
OSI reference model was devised before the corresponding protocols were designed.	The protocols came first and the model was a description of the existing protocols