OSI Model | Ivan Notes 2022

- **L1 - Physical**
  - ✪ Media
    - Wired: twisted pair, coaxial, fiber
    - Wireless: readio frequency, infrared, microwave
  - Topologies
    - Bus
      - Tree
    - Star
    - Mesh
    - Ring (Token ring)
  - Collisions
    - CSMA/CA
      - wireless networks
    - CSMA/CD
      - wired networks
  - Devices
    - hubs, repeaters, concentrators
      - dumb, but fast
  - Protocols
    - 802.11
      - family for wireless
- **L2 - Datalink**
  - ✪ MAC Address
  - Devices
    - switches
      - interconnect multiple devices, forward data based on MAC address
    - bridges

- connect 2 physical network segments together

- Protocols
  - 802.1x
    - NAC
  - ARP
    - RARP
  - PPTP
  - PPP
  - PAP, CHAP, EAP
    - authentication

L3 - Network

- ⭐ IP Address
- Devices
  - routers
  - packet filtering firewalls
- Protocols
  - ICMP (ping)
  - IPSec
    - security suite
  - IGMP
    - enables multicast groups

L4 - Transport

- ⭐ Ports / Services
  - Common ports
    - 21 - FTP
    - 22 - SSH
    - 23 - Telnet
    - 80 - HTTP
    - 443 - HTTPS
    - 53 - DNS

- Protocols
  - TCP/UDP
  - SSL/TLS
    - encrypt http traffic

L5 - Session

- Devices
  - Circuit proxy firewall
- Protocols
  - NetBIOS
    - allows apps to communicate to each other over LAN
  - RPC
    - remote procedure call, enables client to send request to server to execute a procedure with supplied parameters

L6 - Presentation

- character conversion, codex compression and decompression for audio & video, image conversion, formatting

L7 - Application

- Devices
  - Application firewalls
    - DPI
- Protocols
  - HTTPS
    - request/response services for web
  - DNS
    - internet phonebook
  - SSH
    - remote connection
  - SNMP
    - collecting data from and managing config of network devices
  - LDAP

- accessing and maintaining distributed directory information, connect to access, modify, and search directories

- DHCP
  - assign IPs to devices as they are added to the network to ensure no duplication

Misc

- Down = encapsulation
- Up = deencapsulation
- Data L4 - L1 = segments, packets, frames, bits