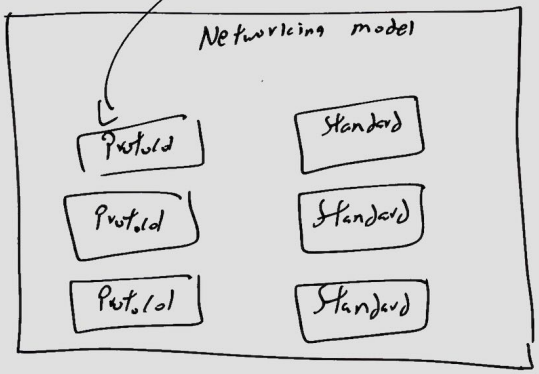
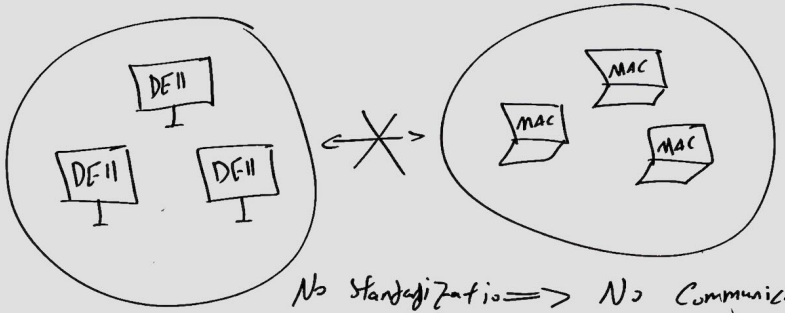
Networking models categorize and provide a structure for networking

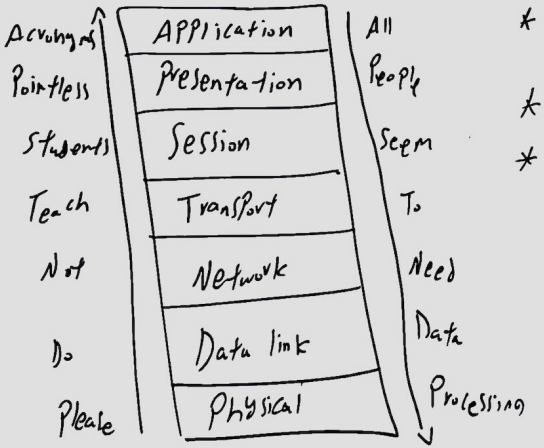
Protocols & Standards





No Standardization ⟹ No Communication

OSI Model



* Open Systems Interconnection ⟹ open standards
  ↳ not in use by just in individual Companies
* Created by ISO
* Functions are divided into 7 layers

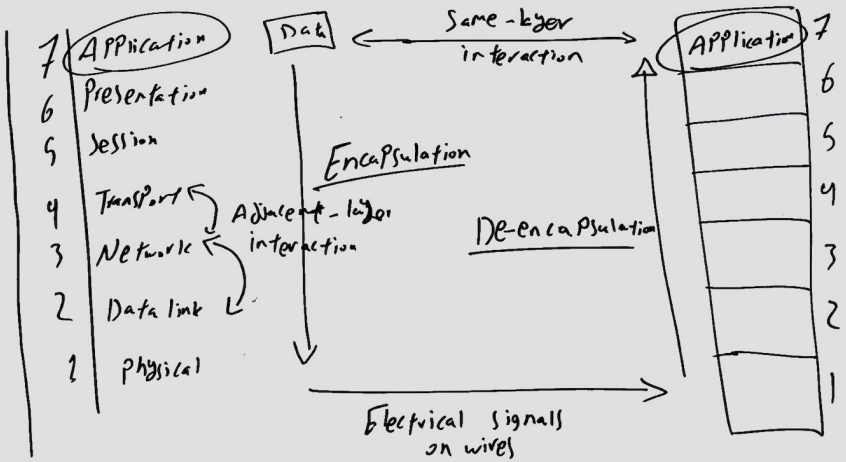
7: Application layer

- The closest to the end user
- Interacts with software application

ex. HTTP or HTTPS

https://sites.google.com/view/yasserzakhabdo

- Identifying communication partners
- Synchronizing communications



6: Presentation

Application Data

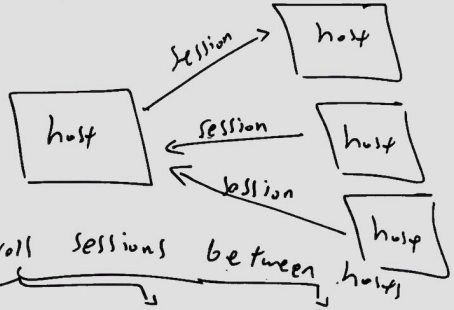
application format

- Data is translated to a different format to be sent over the network

application —translation / presentation→ network formats

- e.g: encryption (sent data)
  decryption (received data)
- It also translates between different application formats

5: Session



- Controll sessions between hosts

Establish — Manage — Terminate

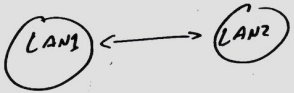
e.g

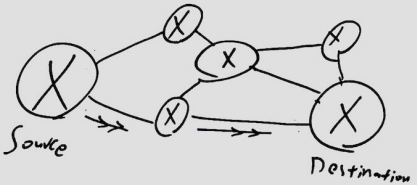
7 Application
6 Presentation
5 Session

- Network Engineers don't usually work with these layers
- It is more related to application developers

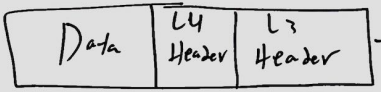
3: Network

- provides connectivity between end hosts on different networks

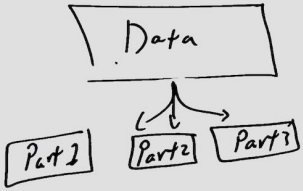




- Provides logical addressing (IP)
- Provides Path selection between Source and destination
- Routers operate at layer 3

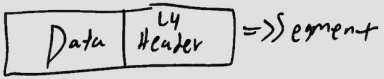


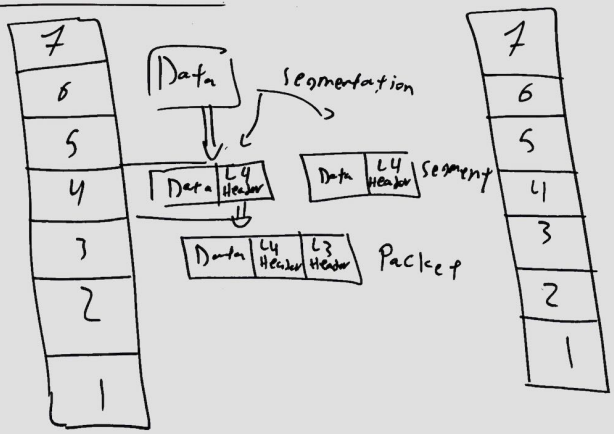
4: Transport



- Segments and reassembles data for communications between end hosts
- Breaks large pieces of Data into smaller segments
  - more easier to be sent
  - less transmission problems
- Provide
  - host-to-host
  - end-to-end

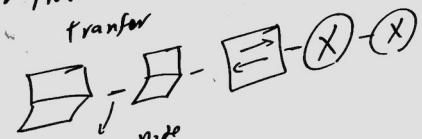
communication



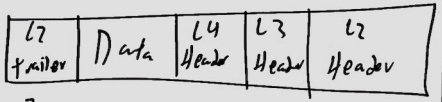


2 Data Link

- Provide node-to-node connectivity and data transfer



- Defines how data is formatted for transmission over a physical medium
  ex. coppe UTP Cables
- Detects & (possibly) corrects physical layer errors
- uses addressing ⊗ Layer 3 addressing
- Switches operate at L2

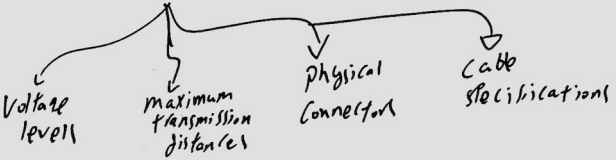


Frame

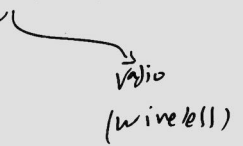
- No more encapsulation happens

1 Physical

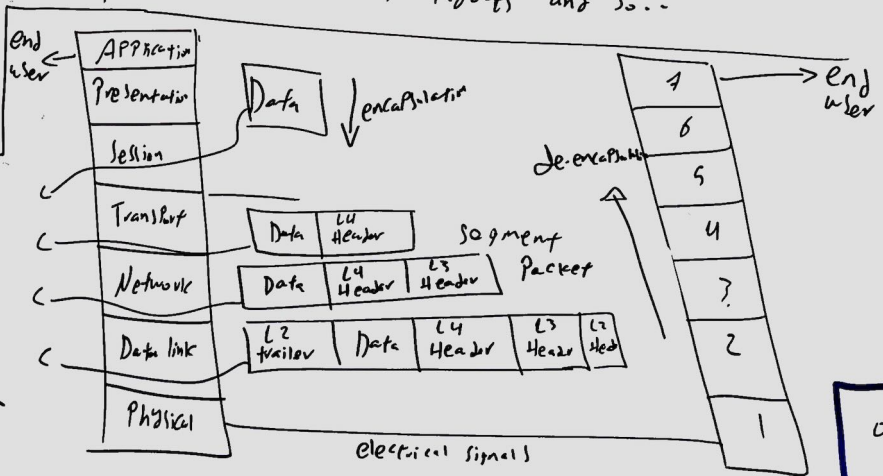
- Defines physical characteristics of the medium used to transfer data



- Digital bits 0, 1

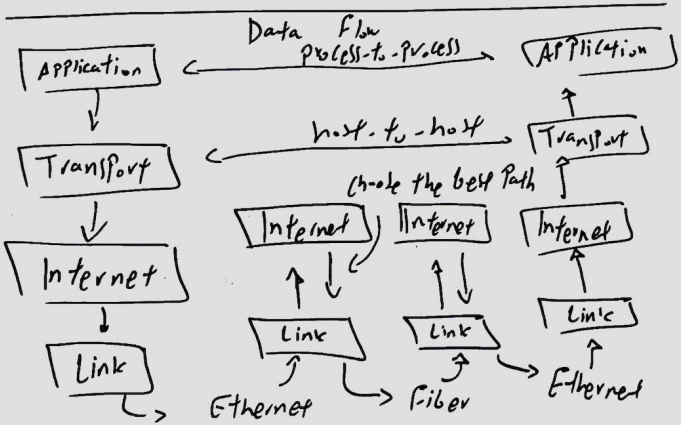


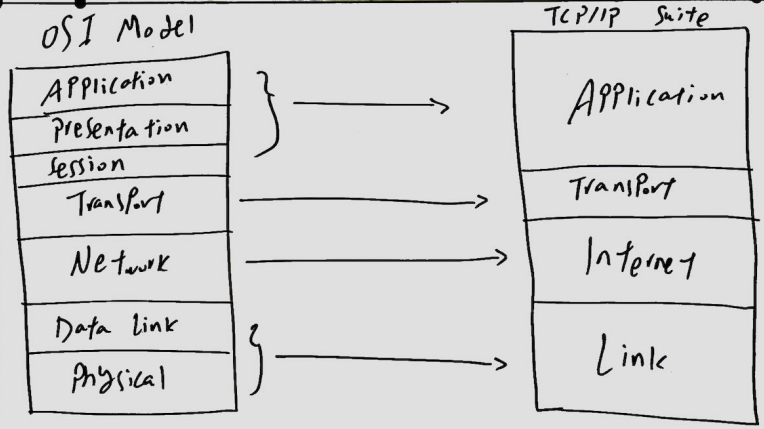
- Cables, Pins, layouts and so...



TCP/IP Suite

* Conceptual model (protocols + standards)
* TCP/IP => two foundational protocols
* Developed by DARPA
  Defense Advanced Research Projects Agency
* Similar to OSI but fewer layers
* This is the model in use in modern networks
  → OSI influence how network engineers think and talk about networks





* Network engineers don't much work with 5-7 layers
  So we put them into 1 Layer in TCP/IP suite
* If you say layer 4 ⇒ Transport (OSI)
  Application (TCP/IP)
* You might hear different names for the layer
  ex. Link ⇒ Network Interface
  → Network Access