Topic 5: Physical Layer

Ross Emile Aparece

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- Physical layer is the lowest level:
  - Understanding that the physical properties of various transition mediums define the proctocls we use
  - Bit by bit encoding of information into physical signal
- Ethernet (copper) cables:
  - Encoded as pulses of electricity
- Fiber cables:
  - Encoded as pulses of light
- Different physical properties so they may have different protocols
- Cabled connections
  - DLL protocol = 802.3 Ethernet
  - Point to point connections (exactly two devices)
    - Fiber
      - Full enclosed glass tubes with mirrored shielding
      - Photons bounce along the cable until it reaches a detecor
      - Needs to be as straight as possible
    - Copper / Twisted Pair
      - Pair needed to complete the circuit
      - Two electrical magnetic field generated positive and negatively charged respectively
      - Field is powerful enough to corrupt data
      - Electomagnetic inteference cancel each other out if they are close enough hence twisted
- Wireless connections

  - DLL protocol = 802.11 WiFi
  - Non-directional
    * All wireless devices go in every direction
    * Only matters if the device is within the range
    * Everyone in the recipient range of the device recieves the data
  - Encryption by default
    * Encryption by default has speed cost
  - Encoded as radiowaves
- Channel Types
  - Simplex (unidirectionality)
  - Duplex (biderectionality)
    * Full Duplex (send and recieve at the same time)
    * Half Duplex (send or recieve at any time, only recieve a single signal)

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