Networking H/W + OSI Model

Local Area Network - LAN

Ethernet

Node Node Node

Broadcast to everyone, only receiver listens

Problem! \(\Rightarrow\) physics

Node Node Nodes

Hub \(\Rightarrow\) Broadcasts incoming data to all nodes/ports
Bridges/Switches

Switches - "learn" routes and which nodes are on which ports more efficiently than hubs.

All nodes connected by switches are on the same network or LAN.

Router connects multiple LANs together, making a WAN wide area network that can change network type to an "internet."
7 layer OSI Model
- often simplified to 5 layers or 4
- some layers combined

7 Application → HTTP / SMTP / FTP
6 Presentation → JPEG / XML / JSON
5 Session → Sockets / RPC
4 Transport → "Reliably" transport
   TCP / UDP
3 Network → actually transferring data based on addresses
2 Data link → node-to-node transfer (MAC)
1 Physical layer → electrical signals
   ↓ Skipped sometimes
HTTP GET http://www.google.com
POST

5 Session
open a socket
write

Client
128.204.1.1
read()

web page
153 KB

4 Transport
TCP
break message up into packets

Packet -> Socket #
header
from socket #

- Tracks each packet to see if it arrived
for each packet receiver sends an ACK

Packets can be dropped + resent + arrive out of order + other bad thing

Network layer: IP addresses of sender/recipient adds another header to packet

Network level: routers work on

Data-link layer: moves data, hardware to hardware

frame header → MAC addresses by which NIC to send to

frame

switches work here