CS 181AG
Lecture 21

Sockets & Application Layer

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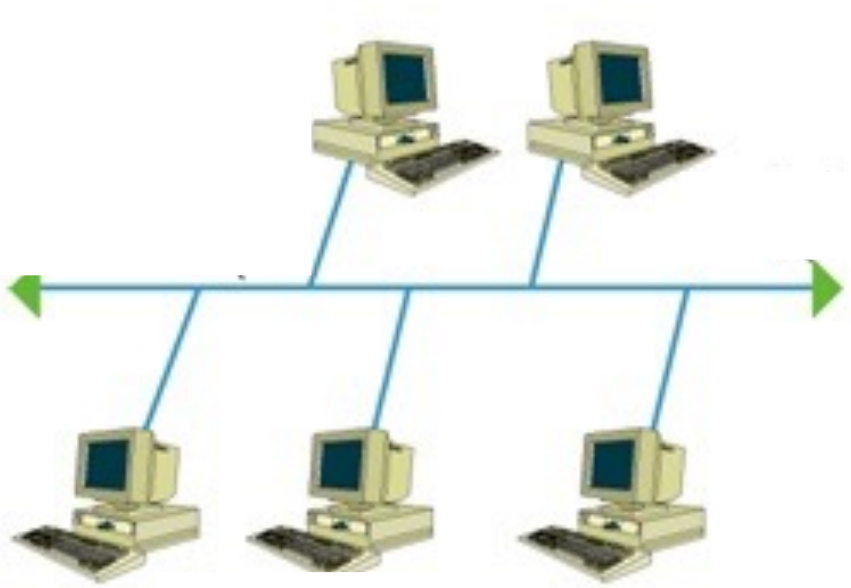
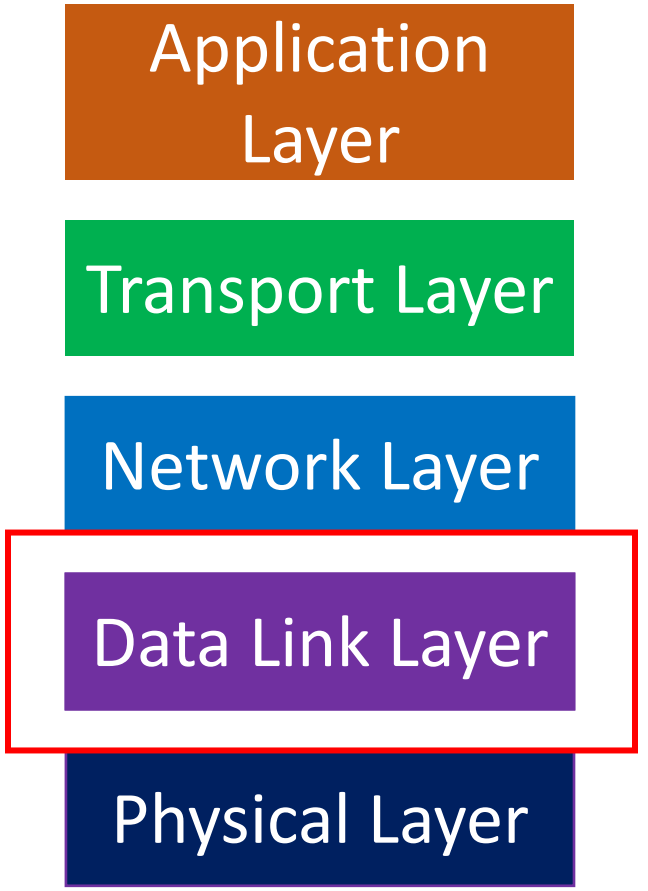
Assignment 7, #3

Revisiting Layered Architecture

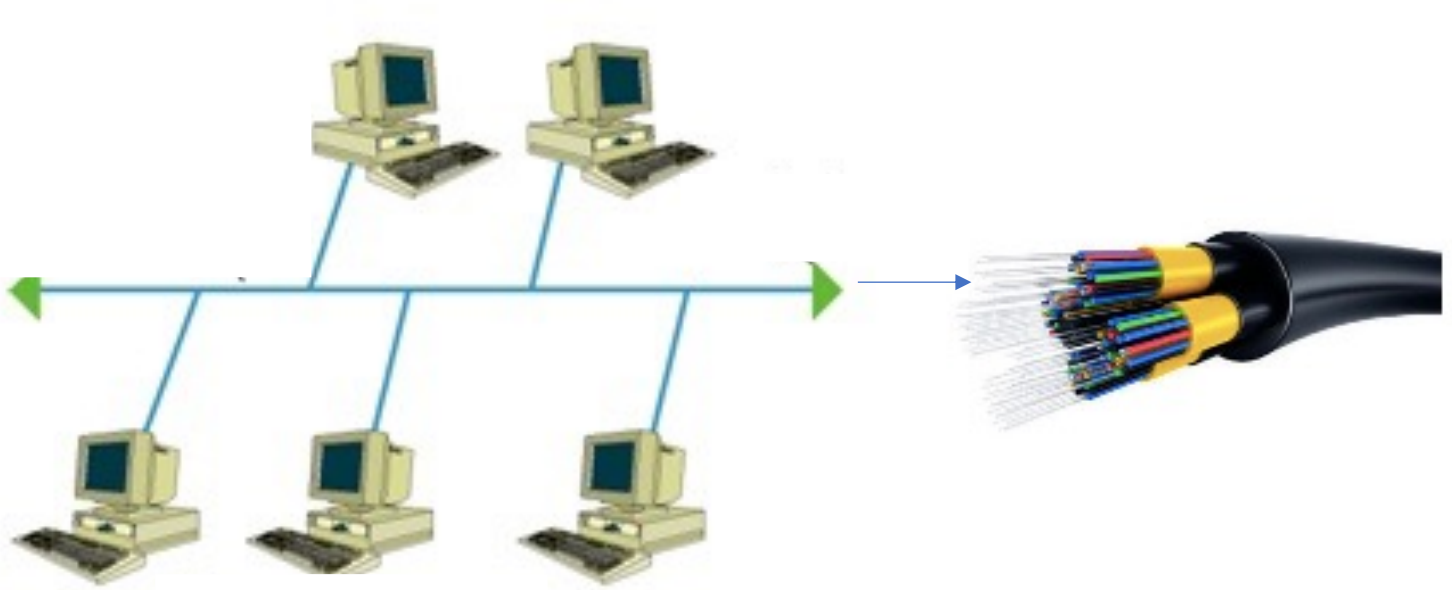
- **Single hop**: Start with one wire: how do multiple devices share a single wire to communicate with each other?





Revisiting Layered Architecture

- **Physical Medium**: What is the wire itself made of? What about wireless mediums?



Application Layer

Transport Layer

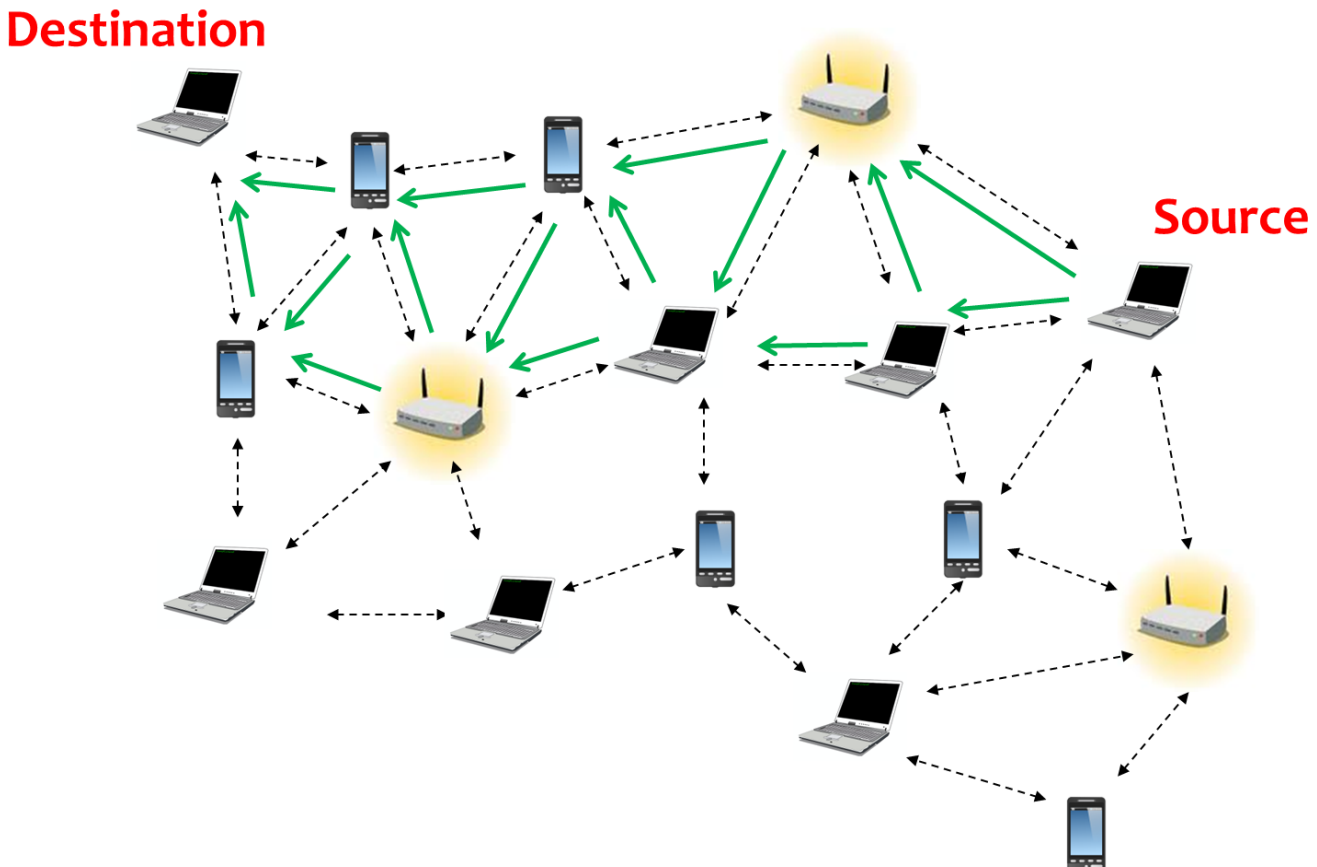
Network Layer

Data Link Layer

Physical Layer

Revisiting Layered Architecture

- **Routing**: What path should data take?



Application Layer

Transport Layer

Network Layer

Data Link Layer

Physical Layer

Revisiting Layered Architecture

- **End-to-end delivery**: How do we know the packet reached?

Application Layer

Transport Layer

Network Layer

Data Link Layer

Physical Layer

Revisiting Layered Architecture

- **User interaction**: How does an internet user interface with network services?

Application Layer

Transport Layer

Network Layer

Data Link Layer

Physical Layer

Dotcom Bubble

- Early 90's: web was developed and more people started using the internet at home
- 1995 – 2000: lots of hype (and money being pumped into) companies that were building networking technology (Cisco, Juniper, Nortel, etc)
- Caused valuation of such companies to balloon despite lack of concrete path to profitability
- Bubble burst: partly because applications to use the internet weren't robust enough

Today’s Companies

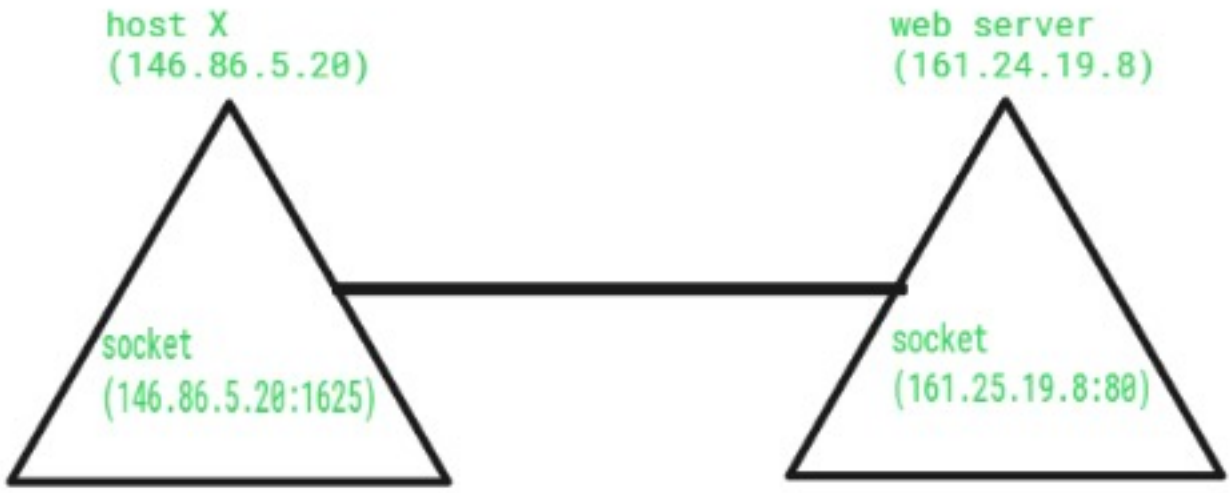
- Amazon, Google, Meta, Netflix -> all development is at the application layer (making use of networking technology, not building it)
- Application software runs on top of OS

Application Layer

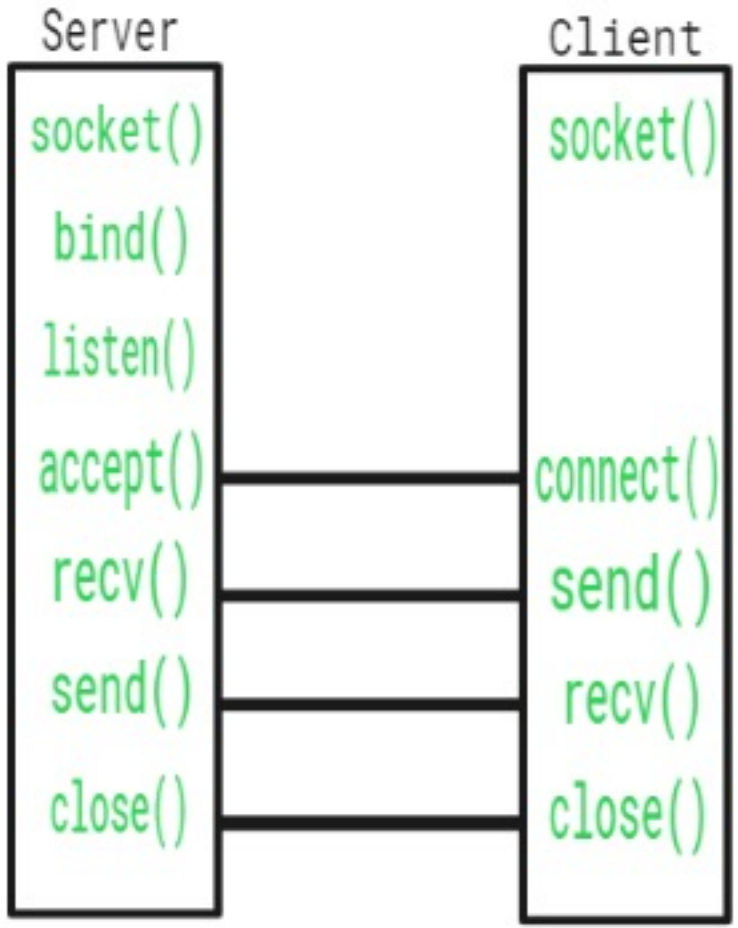
- Goal of everything we have learned so far: give application a simple “bit pipe” (send and receive bits here)
- Still need protocol to determine how two nodes should communicate, but different from transport (what should they say to each other? vs. can they establish a connection?)

Application Programming Interface

- Most common API: socket
- Socket: gateway between application layer and transport protocol
- Sockets were developed to look just like writing to and reading from a file



Client-Server Communication



Today's Goals

- Set up a chat room between the server and client
- Upon a connection, client sends server its name. Server responds with its name
- Chat proceeds indefinitely. Each side sees something like:
  - Bob: Hi, how are you?
  - Me: Good, how are you?
  - Bob: …
- Communication continues until client says "Bye", at which point both client and server close the connection. However, server keeps listening for other connections