Recitation 10: DARPA Network

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Plan
- Survey results
- Recitation Qs
- Packets in Action
- Routers in Action

Logistics
* Thank you re: survey?
* Hards on due today at 11:59 pm
* Volunteers?
Survey Summary

- Pace - OK
- Technical - Not enough
- Most favorite: Demos, big group discussion
- Least favorite: Debate, small group discussion

Suggestions:
* Let people pick their groups sometimes
* Asking people to call things out
* All-class questions
* Notes after
* Telling stories from your life that are tangentially related to material

Recitation notes henrycg.com/teaching
What did you think of this paper?

Recitation Qs

1. What were three key goals?
   - connect nets (internet)
   - force despite loss
   - many service types
   - distrib mgmt

2. How did design meet these goals?
   - packet switching
   - datagrams \rightarrow simple network

3. If you could go back in time & redesign, what goals would you prioritize?
Two key ideas:

1. **Packets** ("datagrams")
   - Simplifies nodes in network — no state
   - Flexible — much more flexible than fixed-rate stream
   - Least common denominator — many net types

   [Alternative: Connection-oriented network]

2. **Gateways** ("routers")
   - Connect different networks together ASes
   - Many networks (Internet)
   - Power comes from fact that packets can flow over any type of link.
Packets in action: Wireshark

Things to notice

- encapsulation: Ethernet → IP → TCP → app data
- Acks & window as in lecture
- Out-of-order data
- Many protocols at once
- Show HTTP GET (no encryption)
Routers in action: **Traceroute**

You saw this in hands-on

- Explain how it works
  - Why does TTL exist?

- Show in wireshark

- Show mtr & traceroute.

- Examples:
  - market.scs.stanford.edu
  - www.ethz.ch
  - www.univ-antananarivo.mg

In groups

1. Longest link? (Hops or latency)
2. Link with most loss?
What did we get wrong with the Internet?

- Security - responsibility of end hosts
  - But no sec for routing, other protocols that keep net running

- Billing - e.g. Netflix
  - Magic! It costs the same to send a packet to NY as to Madagascar! Unlike phone.

- Management
  - Very distributed - no central view/plan

What would we do differently?