Announcements

- **Suggested problems**
  - Chapter 1: 4, 5, 8, 13, 22

- **Reading for next week**
  - Chapter 2: sections 2.1-2.3

- **Dr. Hollingsworth’s Office Hours This Week**
  - Th 10:45-12:00
Project #1 Notes

- Small bug in the sample code (Postscript handout)
  - near line 48: memset((void *) &server, sizeof server)
  - should have a second argument of zero

- Use of netstat
  - don’t forget it is installed in /usr/sbin/netstat
  - the “-f inet” option is useful for restricting output to IP only

- might want to look at man page for sendto/recvfrom
Arpanet

- First “public” wide area network
- Ideas Pioneered
  - packet switching
  - internetworking
    - radio, wire, satellite
  - build it before you standardize it!
  - many routing, congestion control, and management ideas
- Dates: 1969-1987
- How to get connected: have a DOD Arpa Contract
- Technology
  - 56 kbps dedicated links
  - custom built network switches (called IMPS)
NSFNet

- First general audience “public” wide area network
- Ideas Pioneered
  - wide area networking for the masses
  - TCP/IP Wan
  - backbone wide area network connecting regional nets
- Dates: 1984-1995
- How to get connected: be an academic site and join a regional network
- Technology
  - 448kbps - 45 Mbps
  - general purpose workstations as routers
Internet

● Ideas Pioneered
  – multi-vendor public networks
  – if you build it they will come!

● Dates: 1983- (TCP/IP protocol first used)

● How to get connected: stop by the mall, call 1-800...

● Technology
  – 9.6kbps to OC-48 (2 Gbps)
    • soon higher AND lower speeds will be supported
  – custom routers from many vendors
  – general computers for some routing
Gigabit Testbeds

- The Internet was taking, now what is next?
- A series of small projects to test new ideas
  - a “government gigabit” (622 Mbps)
- Issues:
  - the speed of light is fixed
    - round-trip coast to coast is 40msec
  - need for very high speed point-to-point connections
    - tele-medicine
    - video
    - coupling high-end computational resources
Telco Data Networks

- **X.25**
  - low speed (up to 64kbps) packet switched network
  - provides connection oriented services
    - call an end-point and hold the connection
- **ISDN**
  - slow speed (up to 128kbps) network
  - runs over a single copper pair
  - still connection oriented
- **B-ISDN**
  - higher speed version of ISDN
  - connection oriented