Lecture 1

- What does "protocol" mean?

- Can you think of
  1) What function the protocol performs? (Places functions into layers)

  2) What problems protocols solve?

- Why are data networks an interesting topic?

  - Life and death infrastructure - see article on AT&T outage

  - 10x - 100x or more increase in data rate: fiber optic -> 10^{14} bits/sec possible, vs. 10^{12} for all U.S. voice and data traffic

  - Mixed video, voice, data finally to become reality

  - Every computer in the world (even laptops!) attached to computer network

  - Wireless LANs

  - 100 Mb/sec - 1Gb/sec LANs - new applications like Blacksburg Electronic Village

10^7 b/sec: Ethernet

10^8 b/sec: FDDI

10^9 b/sec: Gbit Net

10^{9}-10^{10} b/sec: one optical fiber, today's tech.

10^{12} b/sec: all voice and data traffic in U.S.

10^{14} b/sec one fiber cable, future tech.

- Terms to go over:

  1) Protocol

  2) Subnet

  3) Message

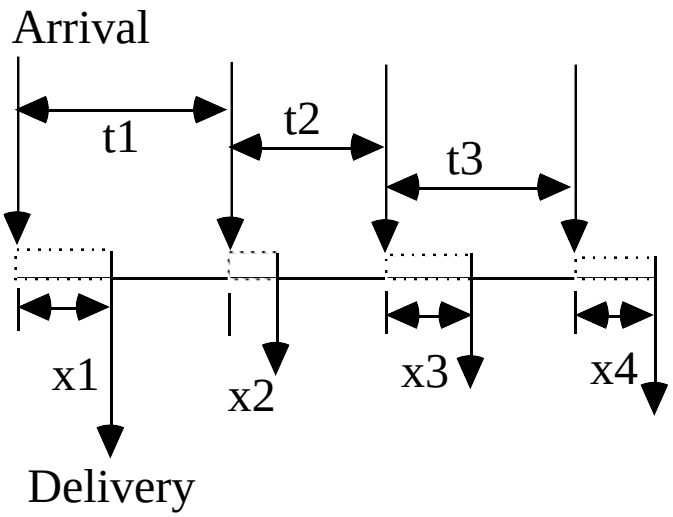
  4) Packet

  5) Session/Connection vs. Connectionless

  6) Circuit vs. Store/Forward packet switching

     - could be used in fiber nets with low utilization/high behavior

     - why store/forward for data:



Bursty Traffic

- circuit switched rarely used

- flow control problem in store/fwd
  -> speed mismatches
  -> excessive queue delay
  -> buffer capacity readily exhausted
  -> feedback delay; packets in subnet not choked

- store & forward taxonomy:
  -> msg vs. packet switching
  -> virtual circuit routing vs. dynamic (datagram) routing

- 1st Weekly Review Questions

1) Define & compare packet switching, physical circuit switching, and virtual circuit switching. List pro's and con's of each. Could a telephone system use packet switching?

2) List the 7 OSI reference model layers. For each layer, briefly describe its function.