cis3.2 — electronic commerce — 6 sep 2005 — lecture # 3

today

topics:

- open systems
- network concepts

reading:

- Ince chapter 2 (sections 1 through 3.2)

open systems

- "a system whose architecture is not a secret"
- prime example: UNIX, LINUX — runs on many hardware platforms; LINUX is free
- *protocol*
    - rules for how computers communicate with each other
    - TCP: transmission control protocol (computer ↔ computer)
    - UDP: user datagram protocol
    - IP: internet protocol
    - HTTP: hypertext transfer protocol (computer ↔ browser)
- *distributed system*
    - multiple computers are distributed geographically
    - example: banking system

network concepts

- network topologies
    - bus (linear model; inexpensive to run cables, but not robust to node failure)
    - ring (example: IBM token ring)
    - star (book calls it "hub"; can be expensive to run cables, but robust to node failure)
- layered models: OSI (below) is the classic model

Open System Interconnection (OSI) reference model

- also called the 7-layer model:
    1. application layer (displays data, communicates with lower layers via presentation layer)
    2. presentation layer (link between app and lower layers; converts application layer data to forms understandable by other layers, and back; translates the "meaning" of the bits)
    3. session layer (exchange of data between applications – "dialog" – and synchronization between applications)

4. transport layer (transfer of data through network; effects flow control; provides some error recovery)

5. network layer (physical routing of data from one computer to another; facilitates sender finding receiver)

6. data link layer (manages transmissions of low-level data; detects and corrects transmission errors)

7. physical layer (sends electronic signals, or "bits" – 0's and 1's) (usually linked to above)

- Here's a phrase to remember the layers: "**A**ll **p**eople **s**eem **t**o **n**eed **d**ata **p**rocessing." where the first letter of each word refers to a layer (above).

- information formats

  - "information units" are passed from one layer to another; "headers" are added as information passes from upper to lower layer
  - terminology is defined below (it is often not used clearly or precisely):
    * *frame* = information unit whose source and destination are the *data link* layer
    * *packet* = information unit whose source and destination are the *network* layer
    * *segment* = information unit whose source and destination are the *transport* layer
    * *message* = information unit whose source and destination are the *application*, *presentation* or *session* layers
    * *datagram* = information unit in a "connectionless" network (see below)

connection-oriented vs connectionless networks

- "connection-oriented"

  - like a telephone
  - first a connection must be established, then data is transferred, finally the connection is closed
  - e.g., TCP
  - monitors for lost packets and re-sends if necessary
  - more overhead than connectionless, but more reliable

- "connectionless"

  - like sending a letter in the mail:
  - there is no guarantee that the recipient ever gets the letter;
  - e.g., UDP
  - less overhead than connection-oriented, and less reliable

for next time

- read chapter 2 (sections 3.2—3.7 (we're skipping section 4))