Connections
Switching
Routing
ITS 214

Connection
- Connection-oriented Networking
  - Requires up-front signaling
  - Very little signaling during the connection, possibly none
  - Connection is usually torn down after the “call” is done
  - Good for time-critical applications
- Connectionless Networking
  - Requires packets
  - Every packet moves through the network independent of the other ones
  - Very efficient

Switching
- Circuit switching
  - Sets up a fixed, exclusive path through the network
  - Can be switched (per call) or permanent
  - Fixed timing (delay), no jitter
- Packet Switching
  - Circuits are always shared
  - Performance is variable
  - Variable delay/jitter
  - Note: Delay = Latency = time for a bit to travel the network

Connection-oriented
Connectionless

Telephone
Cell Phone
(1G, 2G)

Not Possible!

ATM
Frame Relay
SS7
MPLS
The Internet

The Internet
Switching

- Usually refers to a process inside a network node
- Many circuits come in, many go out
- The switch creates (on demand) a connection between one input and one output
- Used in circuit switching in each node that is on the (pre-determined) path of the data

Routing

- Used in packet switching - superficially similar to switching, but:
  - Imagine a computer with at least three network cards (to be interesting)
  - A packet is received on one interface
  - Router stores the packet in its entirety
  - Router consults a local table to decide where the packet needs to go
  - Router now sends the packet out on the selected port

More Routing

- Connectionless
  - Routing decisions are made based on an address contained in the packet itself
- Connection Oriented
  - During connection setup, a routing decision is associated with a short label
  - Packets carry this label
  - Forwarding is done based on the label

Broader Definition

- Routing
  - Often refers to the overall process by which all the routers in a network do their job
  - Static routing
    - Forwarding decisions are built into the router by hand and changed by hand
  - Dynamic routing
    - Routers communicate with each other and build decision (routing) tables based on what they learn from the other routers