Lecture 8
Virtual Circuits, ATM, MPLS

David Andersen
School of Computer Science
Carnegie Mellon University

15-441 Networking, Fall 2006
http://www.cs.cmu.edu/~srini/15-441/F06/

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Outline

- Exam discussion
- Layering review (bridges, routers, etc.)
  - » Exam section C.
- Circuit switching refresher
- Virtual Circuits - general
  - » Why virtual circuits?
  - » How virtual circuits? -- tag switching!
- Two modern implementations
  - » ATM - teleco-style virtual circuits
  - » MPLS - IP-style virtual circuits

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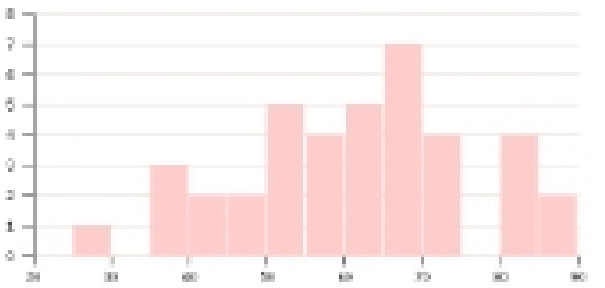
Exam stats

Max/avg/min: 90 / 63 / 20

A	B	C	D
19.6	17.9	12.8	11.0
57.6%	74.8%	58.3%	68.6%



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Common Exam Problems

- Routing: No one big problem; many small misunderstandings. Please check your scores.
- Short answer: Many incorrect round-trip times vs. one-way times.
- DNS
  - Always sends the full query! (e.g. "ra1.streaming.npr.org", not just "npr.org")
  - Clients don't recurse; the local recursive DNS server does. Could run on clients, but usually doesn't.
- Routing and bridging and addressing...

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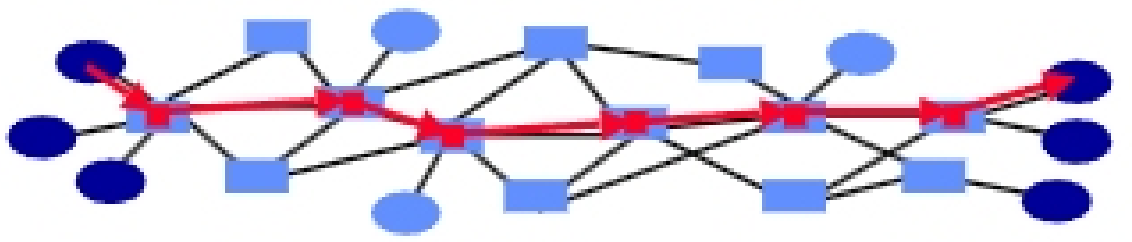
Packet Switching

- Source sends information as self-contained packets that have an address.
  - » Source may have to break up single message in multiple
- Each packet travels independently to the destination host.
  - » Routers and switches use the address in the packet to determine how to forward the packets
- Destination recreates the message.
- Analogy: a letter in surface mail.



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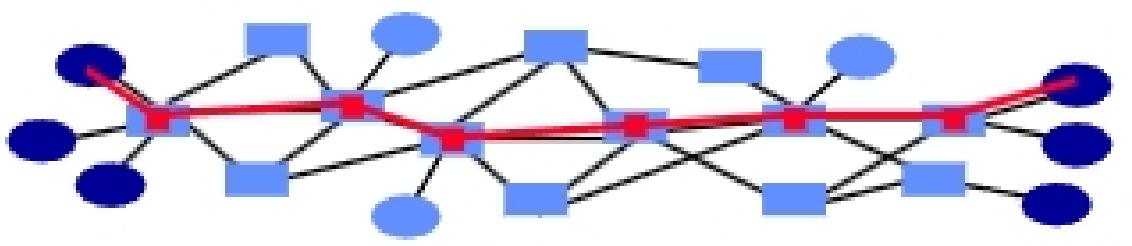
Circuit Switching

- Source first establishes a connection (circuit) to the destination.
  - » Each router or switch along the way may reserve some bandwidth for the data flow
- Source sends the data over the circuit.
  - » No need to include the destination address with the data since the routers know the path
- The connection is torn down.
- Example: telephone network.



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