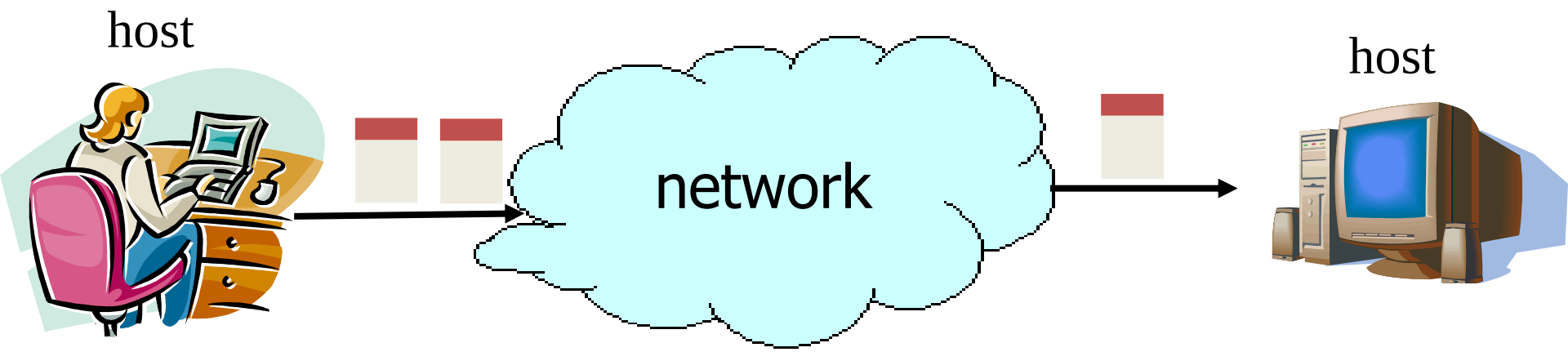
Best-effort Packet-delivery Service

This subset of slides is
based on slides by Jennifer Rexford

Host-network Division of Labor

- Packet switching
  - Divide messages into a sequence of packets
  - Headers with source and destination address
- Best-effort delivery
  - Packets may be lost
  - Packets may be corrupted
  - Packets may be delivered out of order



Host-Network Interface: Why Packets?

- Data traffic is bursty
  - Logging in to remote machines
  - Exchanging e-mail messages
  - Request webpage
- Don’t want to waste bandwidth
  - No traffic exchanged during idle periods
- Better to allow multiplexing
  - Different transfers share access to same links
- Packets can be delivered by most anything

Host-Network Interface: Why Best-Effort?

- Never having to say you're sorry…
  - Don't reserve bandwidth and memory
  - Don't do error detection & correction
  - Don't remember from one packet to next
- Easier to survive failures
  - Transient disruptions are okay during failover
- Can run on nearly any link technology
  - Greater interoperability and evolution

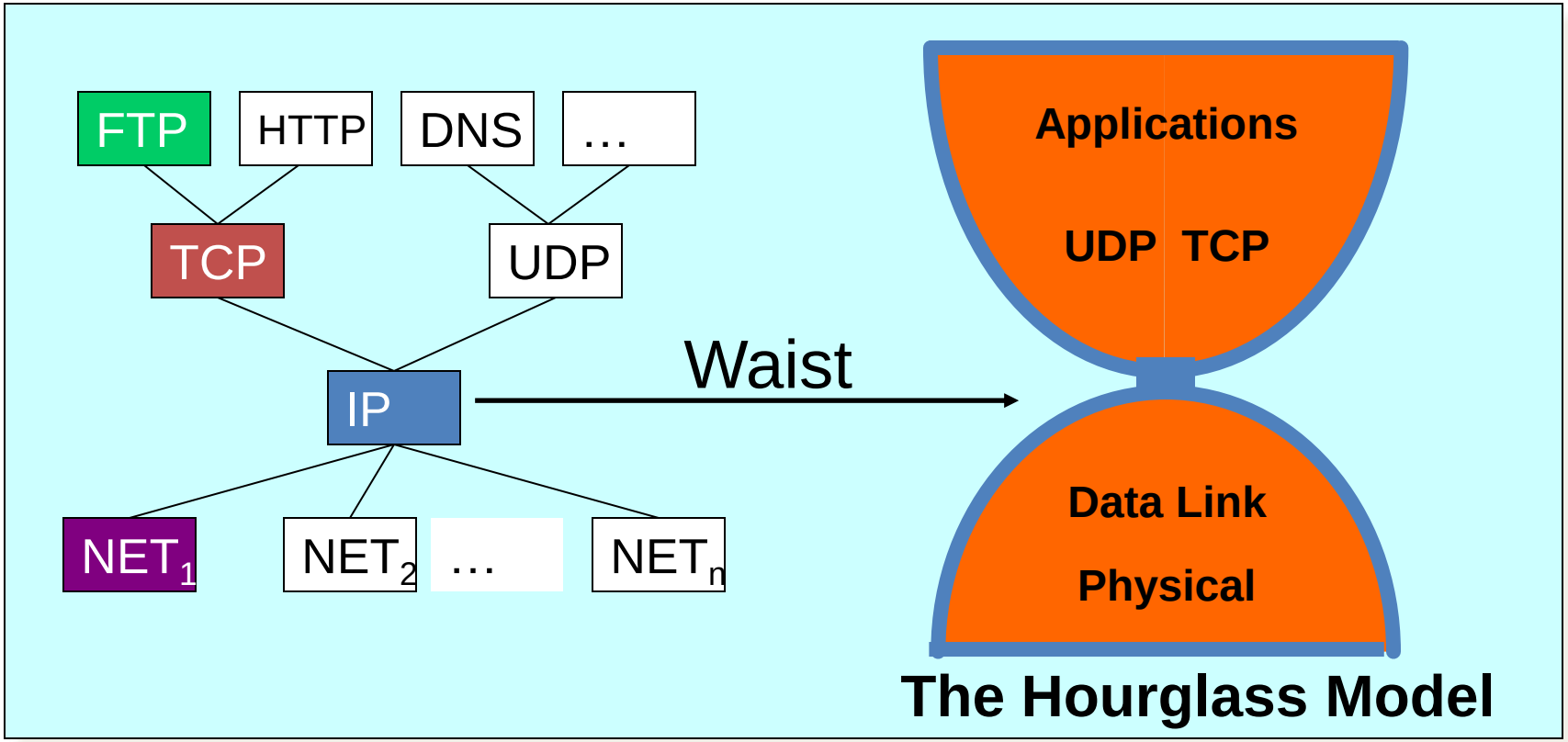
Intermediate Transport Layer

- But, *applications* want efficient, accurate transfer of data in order, in a timely fashion
  - Let the end hosts handle all of that
  - (An example of the "end-to-end argument")
- Transport layer can optionally…
  - Detect and retransmit lost packets
  - Put out-of-order packets back in order
  - Detect and handle corrupted packets
  - Avoid overloading the receiver
  - <insert your requirement here>

Modularity Through Layering

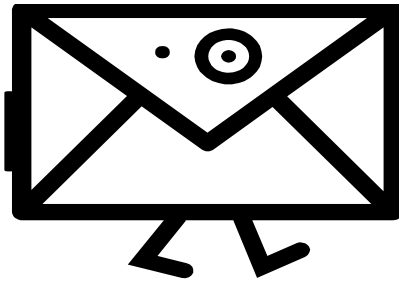
IP Protocol Stack

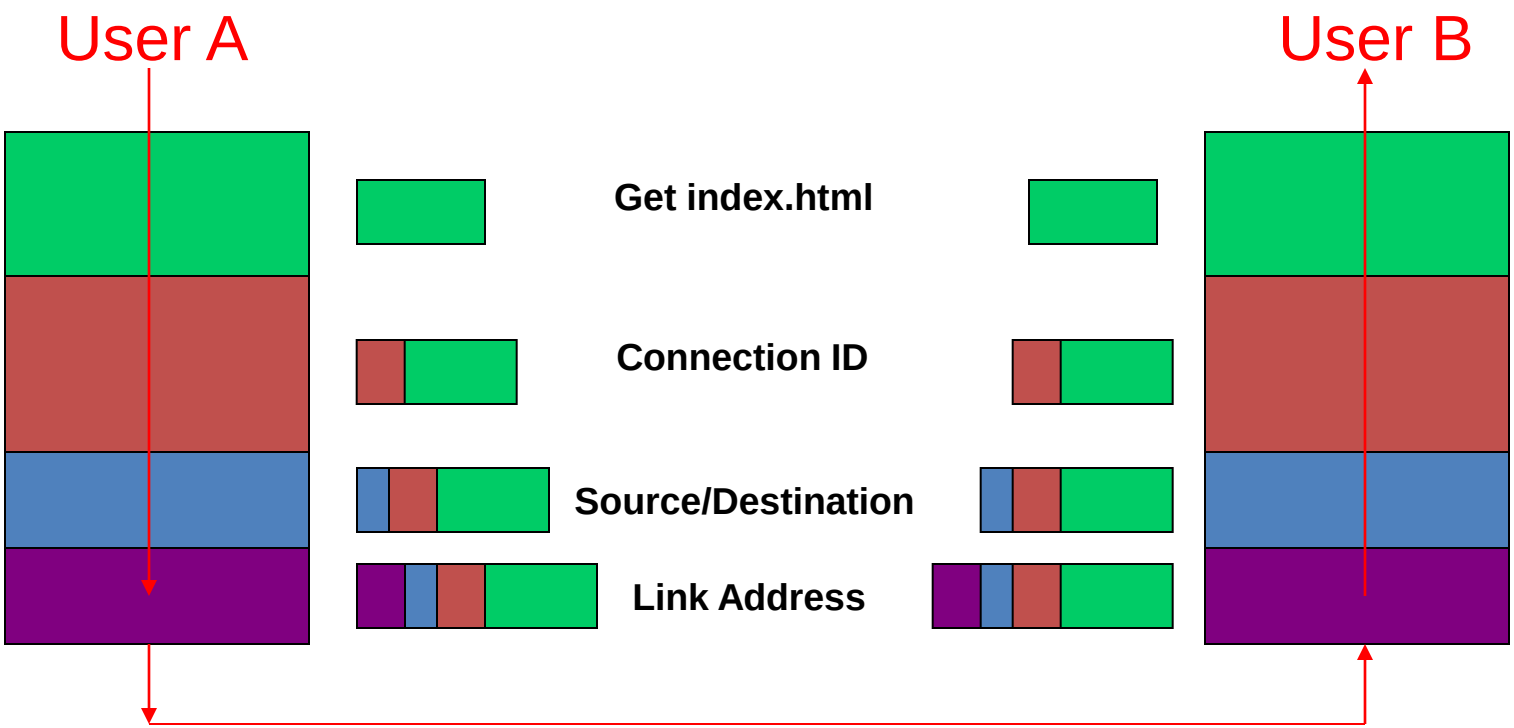
The "Narrow Waist" of IP



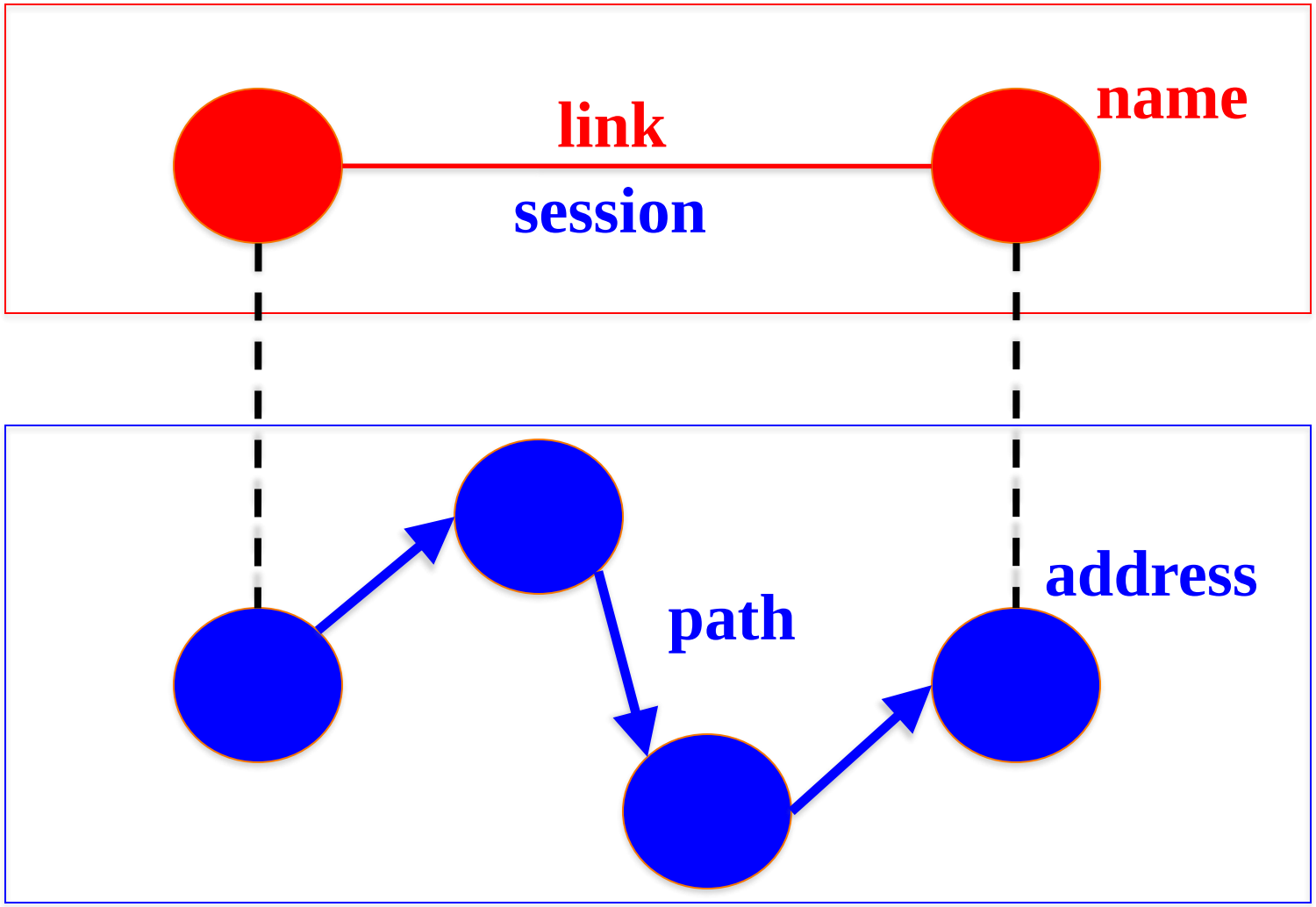
The waist facilitates interoperability

Layer Encapsul





Relationship Between Layers



IP Suite: End Hosts vs. Routers