User Datagram Protocol (UDP)

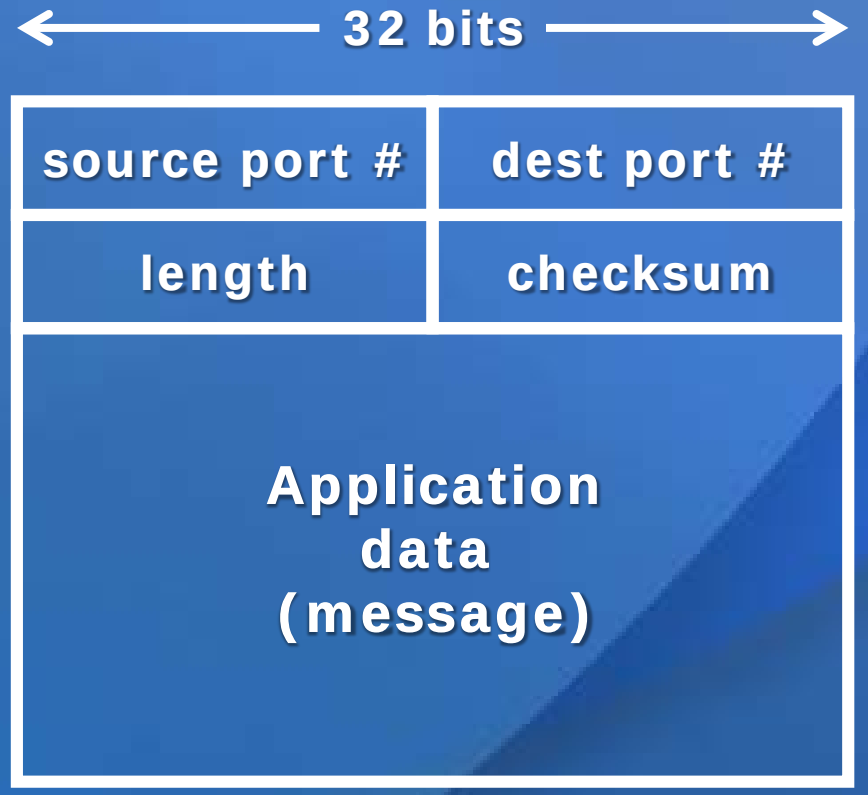
User Datagram Protocol

- "no frills" Internet transport protocol
  - very simple!
- Minimal extension of IP network layer
- UDP segments may be
  - lost
  - delivered out of order

- Applications
  - Real time systems
  - Multimedia streaming
    - loss tolerant
    - rate sensitive
  - Domain Name System (DNS)
  - Dynamic Host Configuration Protocol (DHCP)

UDP Services

- Multiplexing
- Demultiplexing
- Error Detection



UDP segment format

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- Demultiplexing
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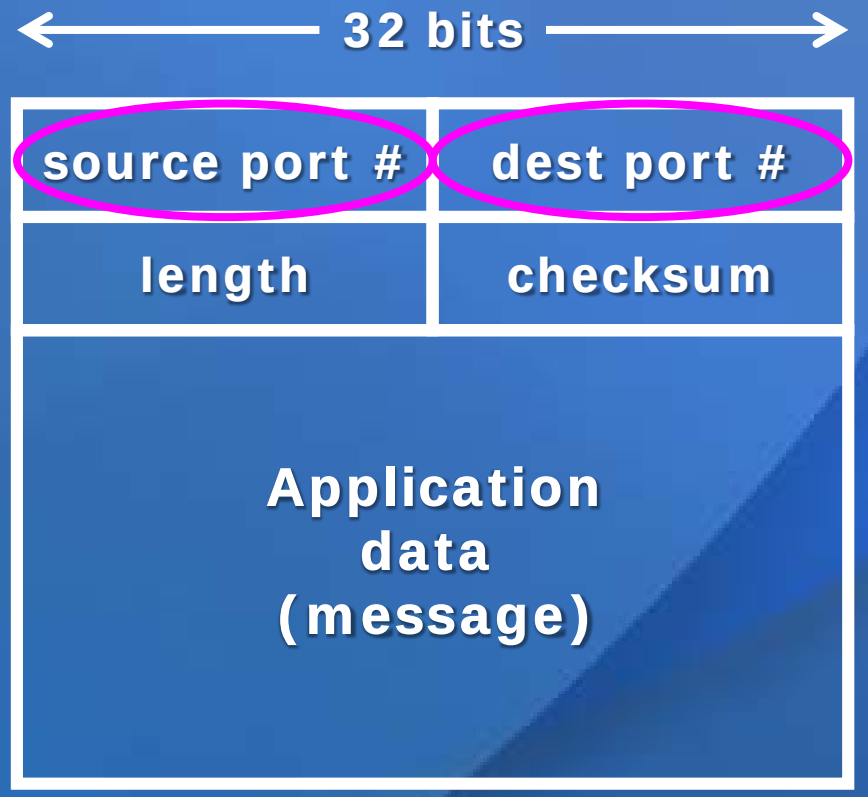
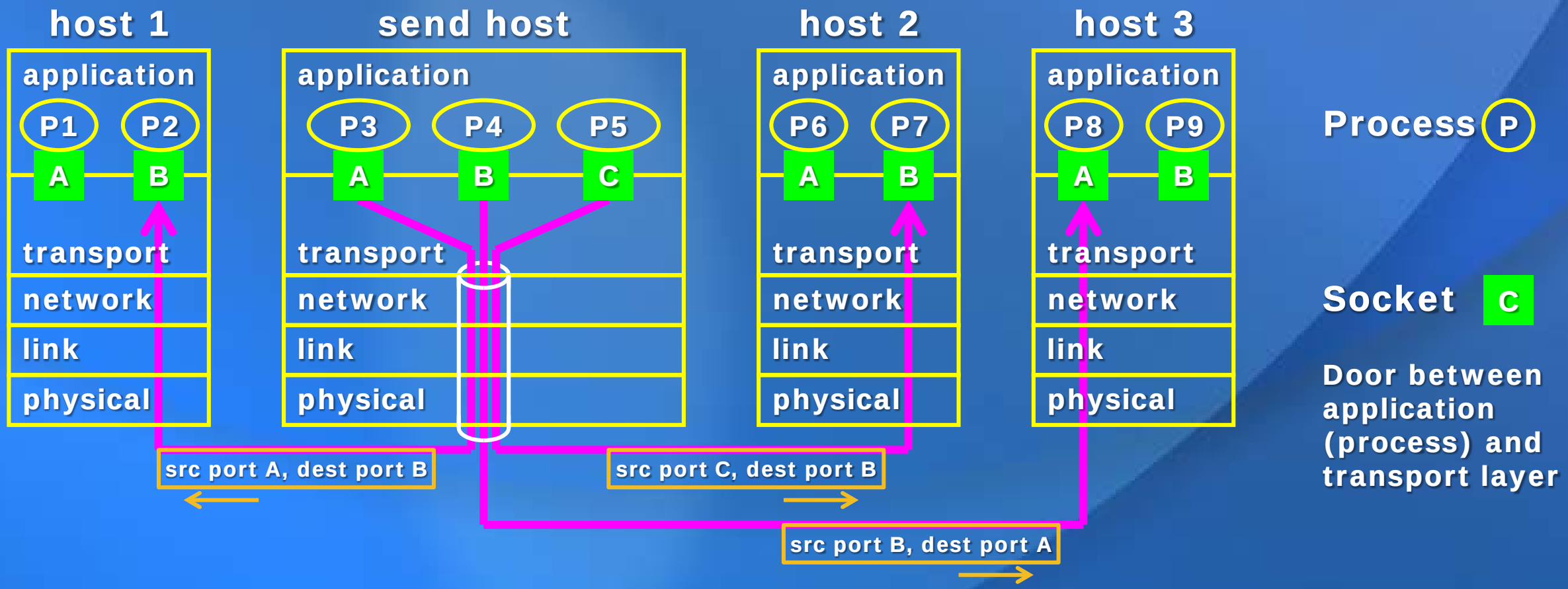


UDP segment format

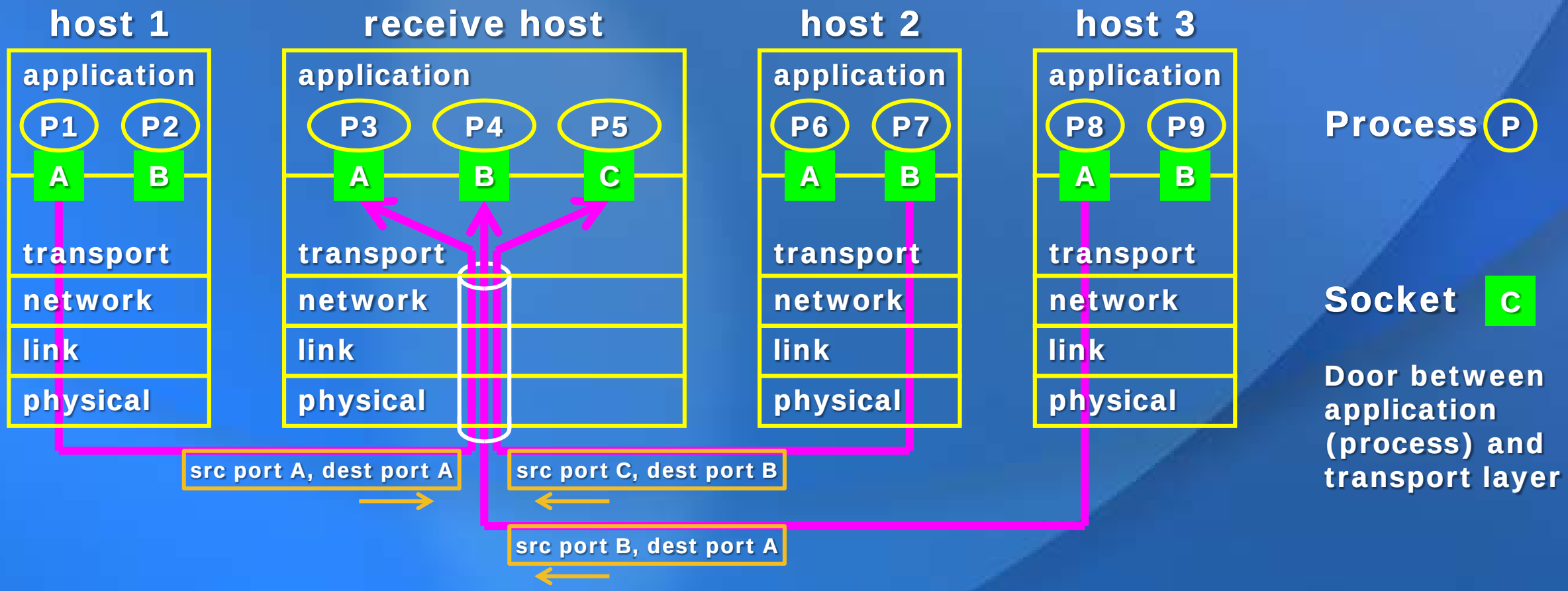
Multiplexing

Send host transport layer gathers messages from multiple sockets, adds headers and passes to network layer



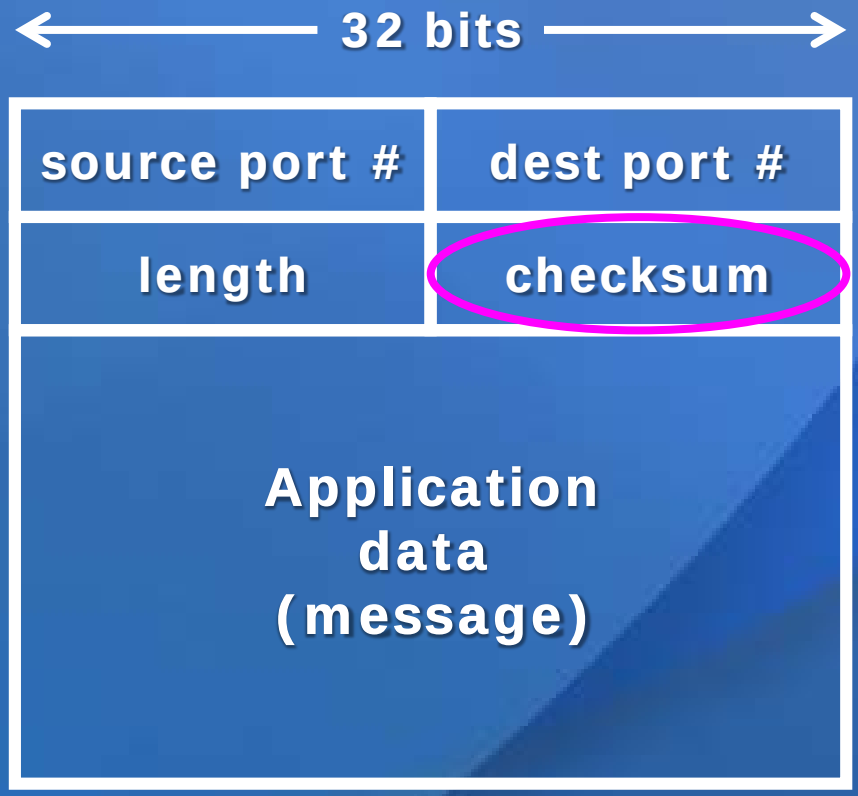
Demultiplexing

Receive host transport layer delivers segments to correct sockets according to header information.



Error Detection Coding

- Sender computes checksum by
  - Consider segment to be sequence of 16 bit integers
  - Compute sum of sequence
    - If a carry is generated, add to LSB
  - Take the complement

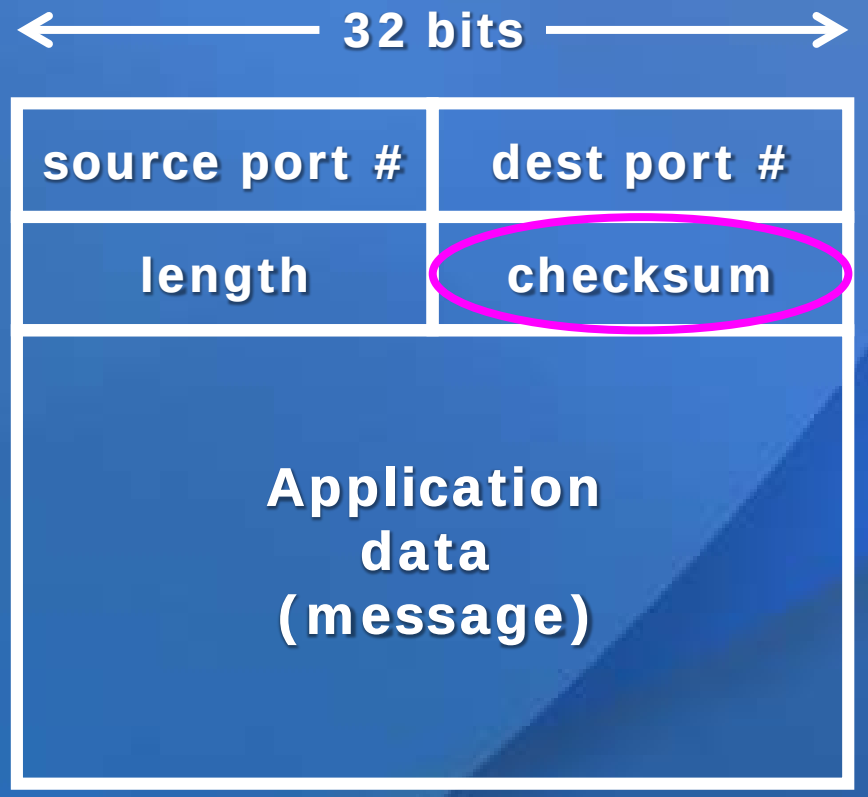


UDP segment format

Example checksum

Error Detection

- Receiver detects errors by
  - Compute checksum of received segment
  - Compare with checksum
    - If same, assume no error and deliver segment
    - If different, one or more bit errors have occurred. Discard segment.



UDP segment format

UDP

Advantages

- simple
- less delay
- no congestion control
- little overhead (small segment header)
- no connection management

Disadvantages

- segments may be lost
- segments may be delivered out of order