User Datagram Protocol (UDP)

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Recap

- Transport layer provides logical communication between processes

- Internet supports a few transport layer protocols

  - UDP, TCP, RPC, RTP

- UDP: 'bare bones' transport protocol

User Datagram Protocol

- Provides Mux/Demux capability over best-effort network layer service

- UDP segments can be lost, duplicated, delivered out of order to applications

- Connectionless: no handshaking between UDP sender, receiver

- Each UDP segment handled independently of others

Why used?

connection
setion

data

- No connection establishment (==which can add delay==)

  few

  – DNS uses UDP

- Simple: no connection state at sender, receiver

  – A server can support more clients

- Small segment header: Less overhead per packet

  L 8 Byte

  20 Byte

Why used?

- **No congestion control:** UDP can blast away as fast as desired (→ TCP) (→ rate → congestion in network)

- No retransmission delays: Useful for real-time applications like VoIP, online games

- Want additional features? Applications have to implement them themselves

Example Protocols

- DHCP ✓

- RIP ✓

- DNS → UDP

- SNMP (Simple Network Management Protocol)
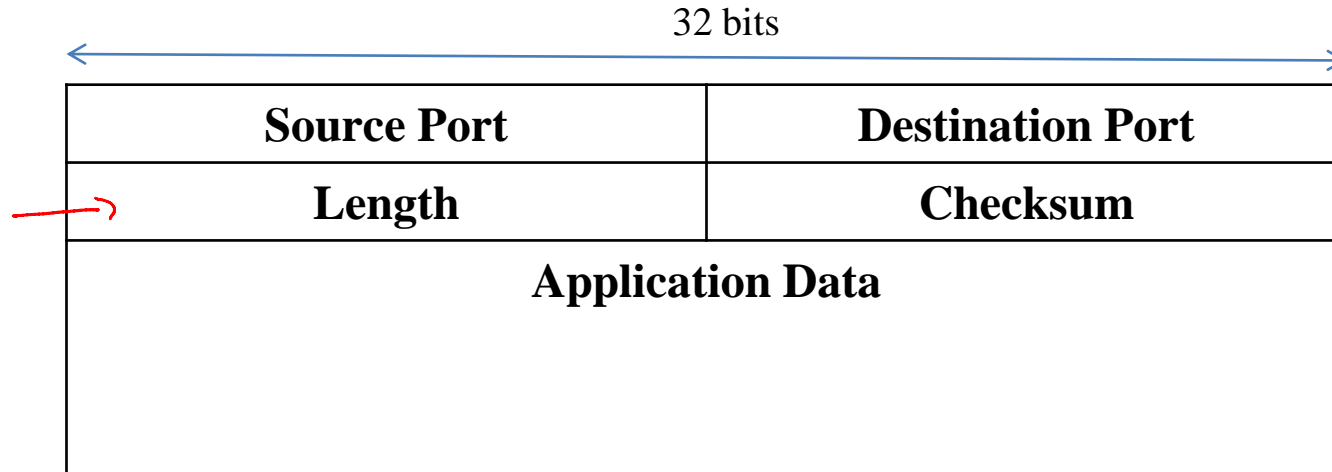 - Used for managing nodes (switches, routers, printers, servers etc) on IP networks

OSPF
BGP
ARP

use TCP

UDP Segment Format

- Source/Destination Port: Identifies sending/receiving process

  – Client: Ephemeral port; Server: Well-known port

32 bits

Source Port	Destination Port
Length	Checksum
Application Data	

header

Payload
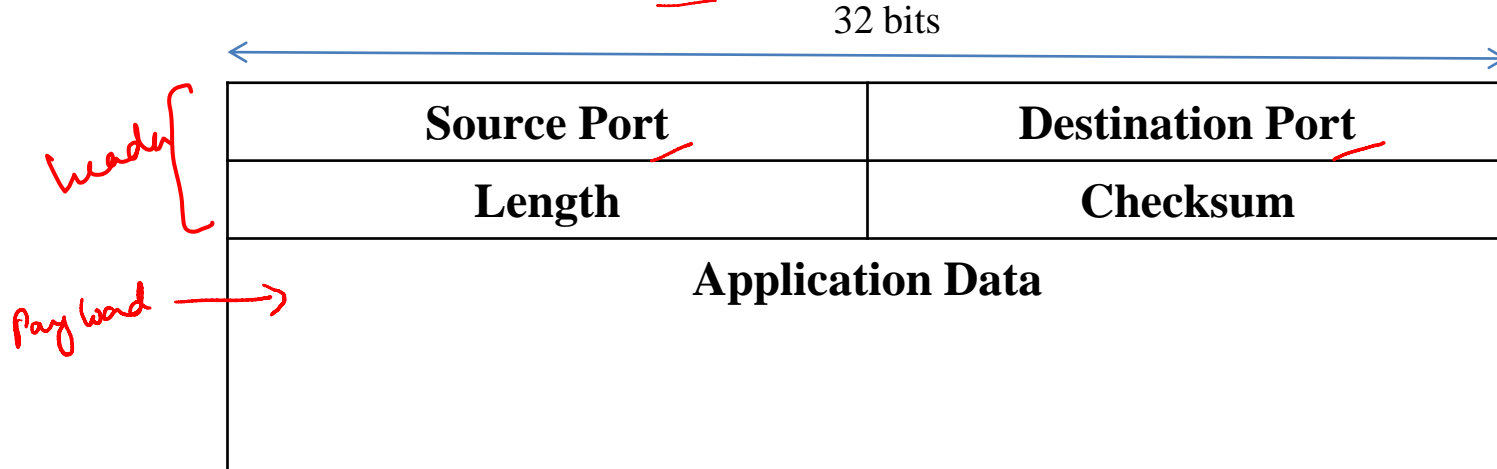
UDP Segment Format

- Length: Specifies the total length of the segment in bytes

32 bits

Source Port	Destination Port
Length	Checksum
Application Data	

Checksum

- Optional in IPv4, Compulsory in IPv6   ip has no checksum

- Ensures correctness of message

- Uses same algorithm as IP checksum

32 bits

Source Port	Destination Port
Length	Checksum
Application Data	
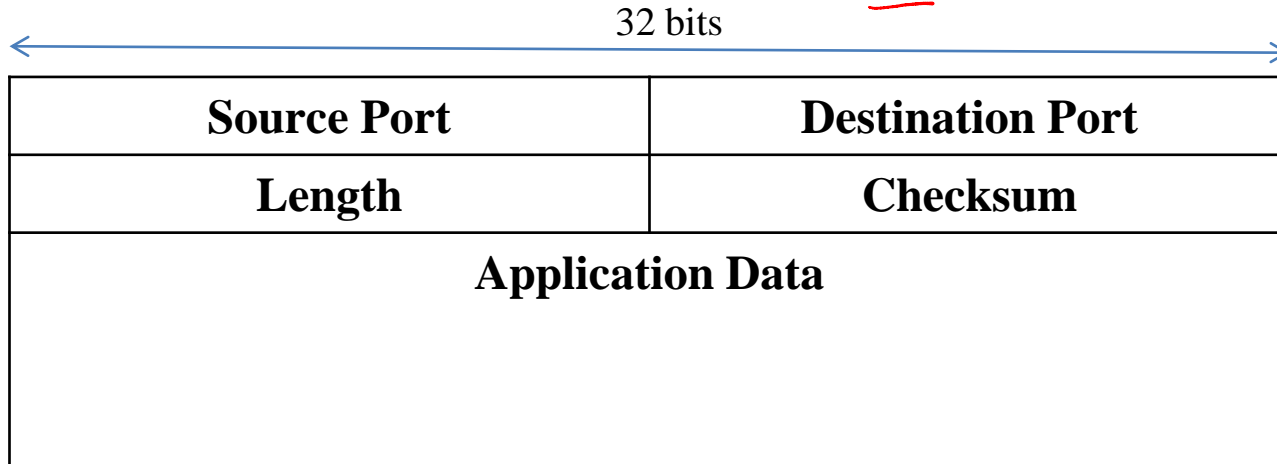
Checksum

- Calculated over UDP header, body and pseudoheader

  - Pseudoheader: three fields from IP (protocol number, source IP, destination IP) and UDP length field

  - Pseudoheader included to help verify if packet is indeed delivered to the right host

Summary

- UDP is a simple transport protocol

- Provides multiplexing/demultiplexing and simple error detection capability

- Finds good use in many protocols in spite of its simplicity