



WWW



# CSC 524

Computer Networks  
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Lecture 8  
6-7/5/2013

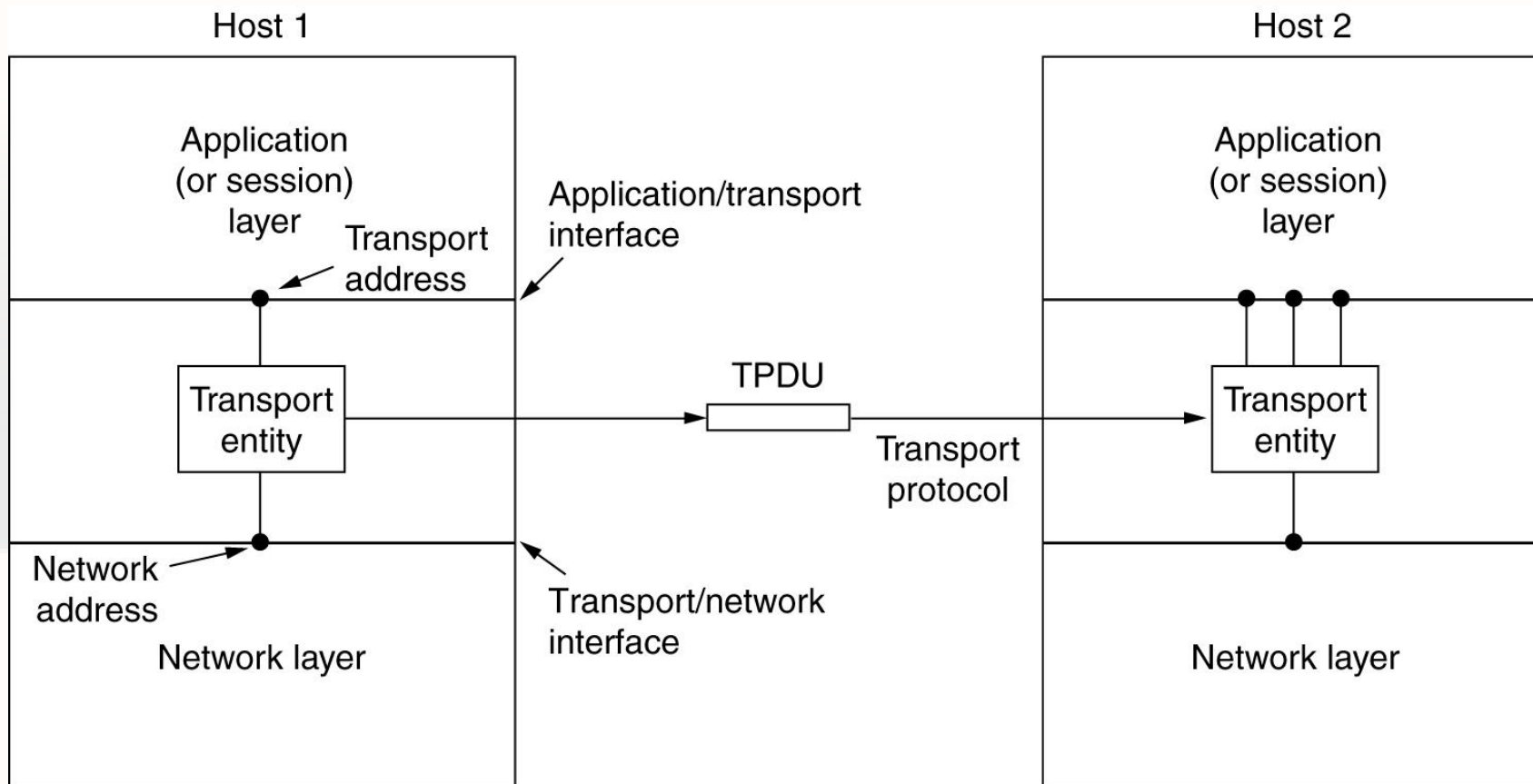




- Transport vs Network Layer
  - Both end-to-end
  - Network: Hosts ... Transport: Processes
  - Transport allows multiplexing
    - i.e. Same host might have multiple processes communicating with different processes on different hosts



# Introduction



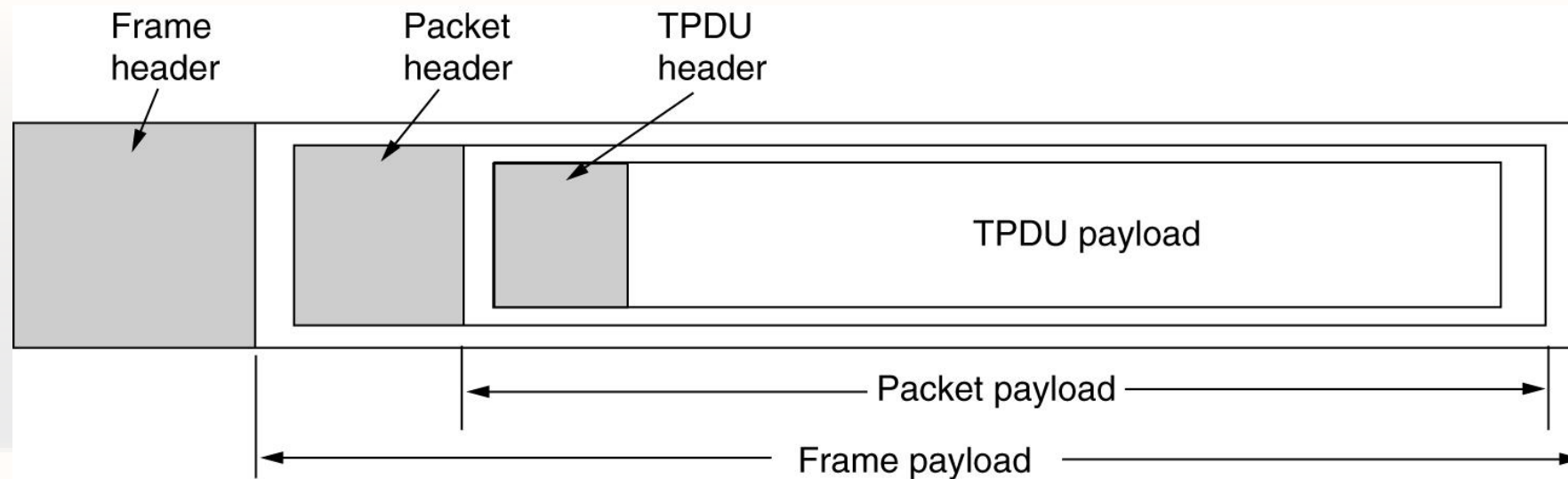
# Introduction



<b>Primitive</b>	<b>Packet sent</b>	<b>Meaning</b>
LISTEN	(none)	Block until some process tries to connect
CONNECT	CONNECTION REQ.	Actively attempt to establish a connection
SEND	DATA	Send information
RECEIVE	(none)	Block until a DATA packet arrives
DISCONNECT	DISCONNECTION REQ.	This side wants to release the connection



# Introduction



# Transport Layer protocols



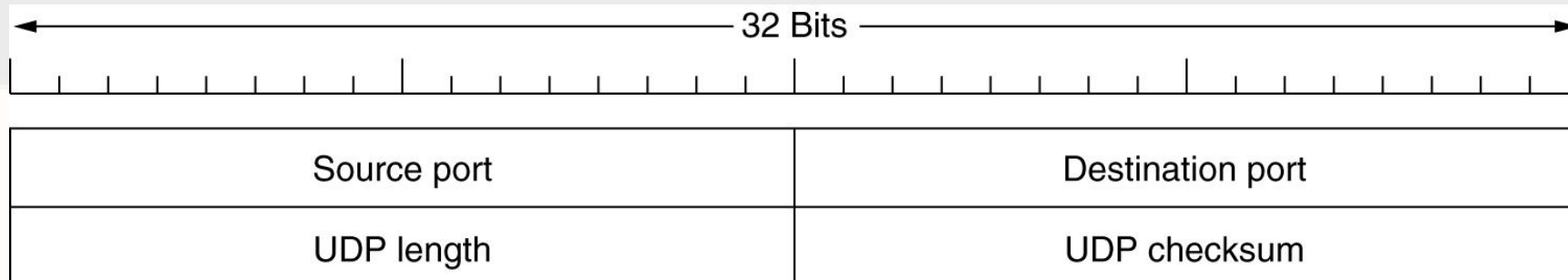
- UDP (User Datagram Protocol)
- TCP (Transmission Control Protocol)



# UDP



- As simple as it gets !
- Almost like IP! Except with the port
- RFC 768
- 8 byte header



# UDP



- UDP does NOT do
  - Flow control
  - Error Control
  - Retransmission
- Up to application layer to do them ..
  - E.g. DNS !
- Suitable for Client-Server apps
  - Short command.. Short reply ..
  - No need to establish connections





# TCP



- Connection-oriented
- Allows for
  - Reliability
  - Error control
  - Flow control



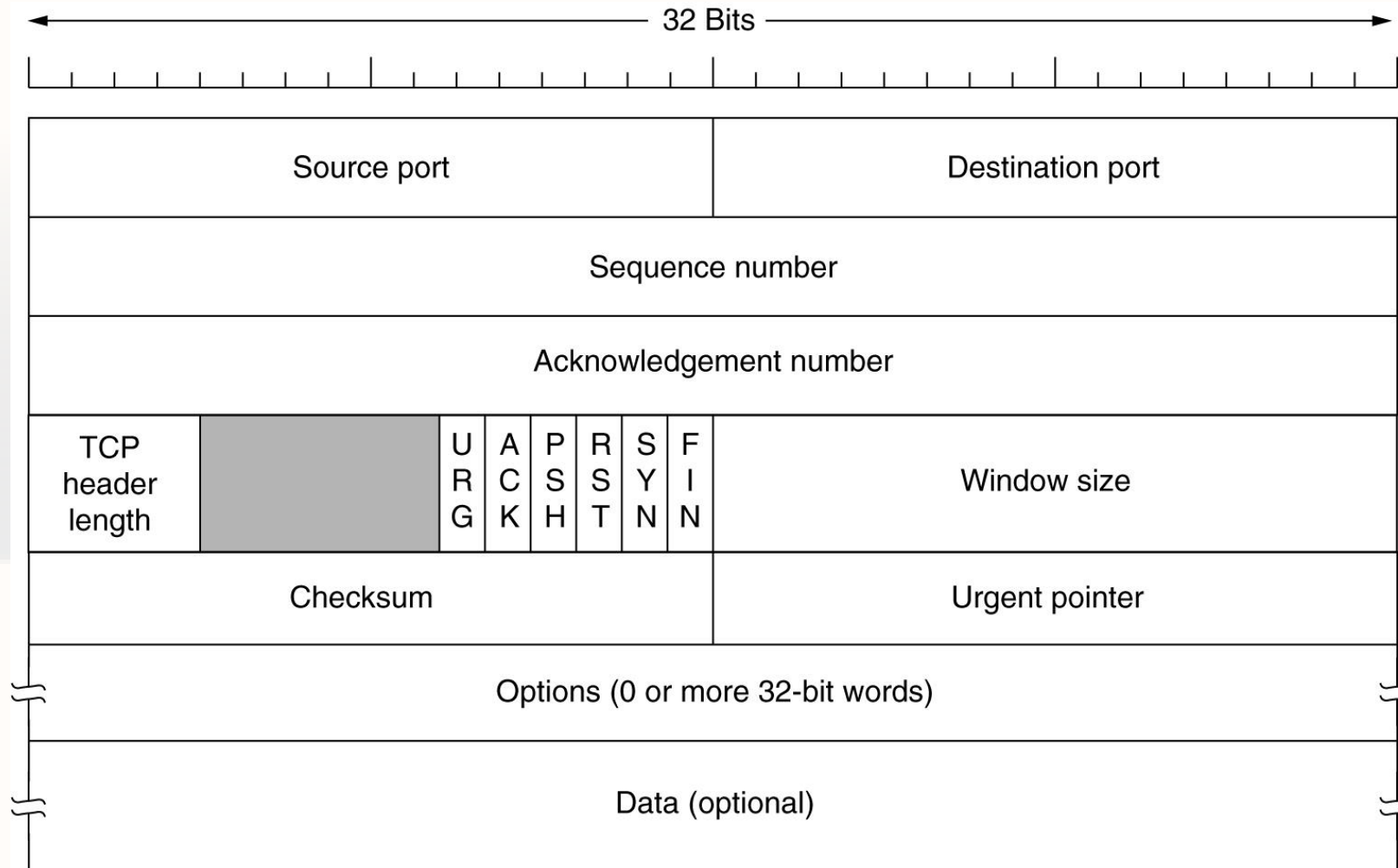
# TCP



- Ports ..
- Below 1024 .. Well-known ports
  - <http://www.iana.org/assignments/service-names-port-numbers/service-names-port-numbers.xml>



# TCP



# TCP



- Ports+IP = unique endpoint 48-bit (16bit port + 32 bit IP)
  - Remember NAT ?
- Want to see really what happens ?
  - Use NETSTAT command
  - Open Google.com
  - Use NETSTAT again
  - Close browser
  - Use NETSTAT again, one more time

