Lecture 21

Exercise 1: Two users on the same client connect to the same web server. Which of the addresses and ports are the same? Which are different?
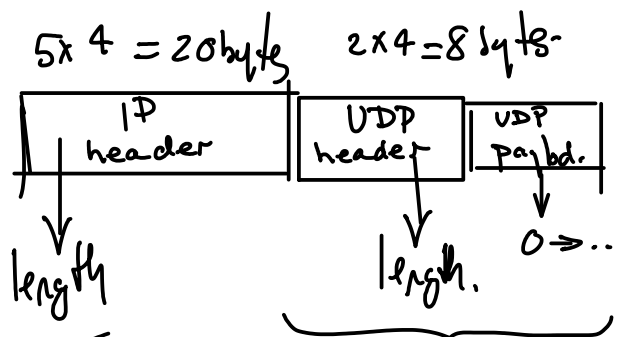
	src			dest	
	port	IP		port	IP
user 1	X	client IP		80	server IP
user 2	Y	cliet IP		80	server IP
	MUST BE DIFFERENT	SAME		SAME	SAME

Exercise 2: What are the minimum and maximum values for the UDP length field?

IP length field is a 16 bits unsigned number:
  minimum is 0, maximum is $2^{16}-1 = 65535$

IP header is 20 bytes minimum

UDP length includes the 8-byte header

$5 \times 4 = 20$ bytes $2 \times 4 = 8$ bytes
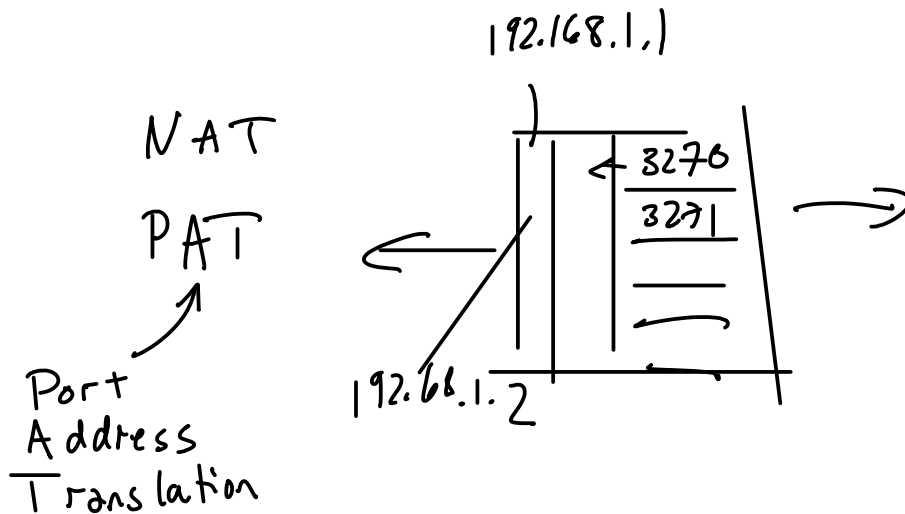

length

length. $0 \Rightarrow \ldots$

IP max = 65535
  $- 20$
  _____
UDP max length = 65515   UDP min length = 8 $\left(\begin{array}{c}\text{header} \\ \text{only}\end{array}\right)$

Q: What if two users behind NAT router connect to same server?

A: NAT routers also use the port address to differentiate responses (PAT).

192.168.1.1

NAT

PAT

↗

Port
Address
Translation

192.68.1.2

3270

3271

Exercise 3: The most recently received TCP packet for a connection had an Acknowledgement Number value of 1000 and a Window value of 64. Assuming 1024 bytes are ready to be sent, what will be the value of Sequence Number in the next packet transmitted for that connection? What will be the length of the IP packet?

— if the Acknowledgement Number was 1000 then the Sequence Number in the next transmitted packet must be 1001.

— if the window is 64, a maximum of 64 bytes of payload can be sent. The IP packet will be 20 + 20 = 40 bytes longer (104 bytes total)

(64 bytes will be sent because we have more than this available to send.)

Exercise 4: What will happen if a host responds to an initial SYN frame by sending back a frame with only SYN set?

- both sides tried to set up connection at same time

- both hosts send an ACK packet and move from the SYN RCVD to the SYN SENT state

Exercise 5: How can a host reduce the rate at which data is sent to it on a TCP connection?

- the maximum amount of data that can be sent back is set by the Window value in outgoing frames.

- by setting this to a small value the receiver can "throttle" the sender.