This lecture will be recorded!

Welcome to

CS 3516:
Computer Networks

Prof. Yanhua Li

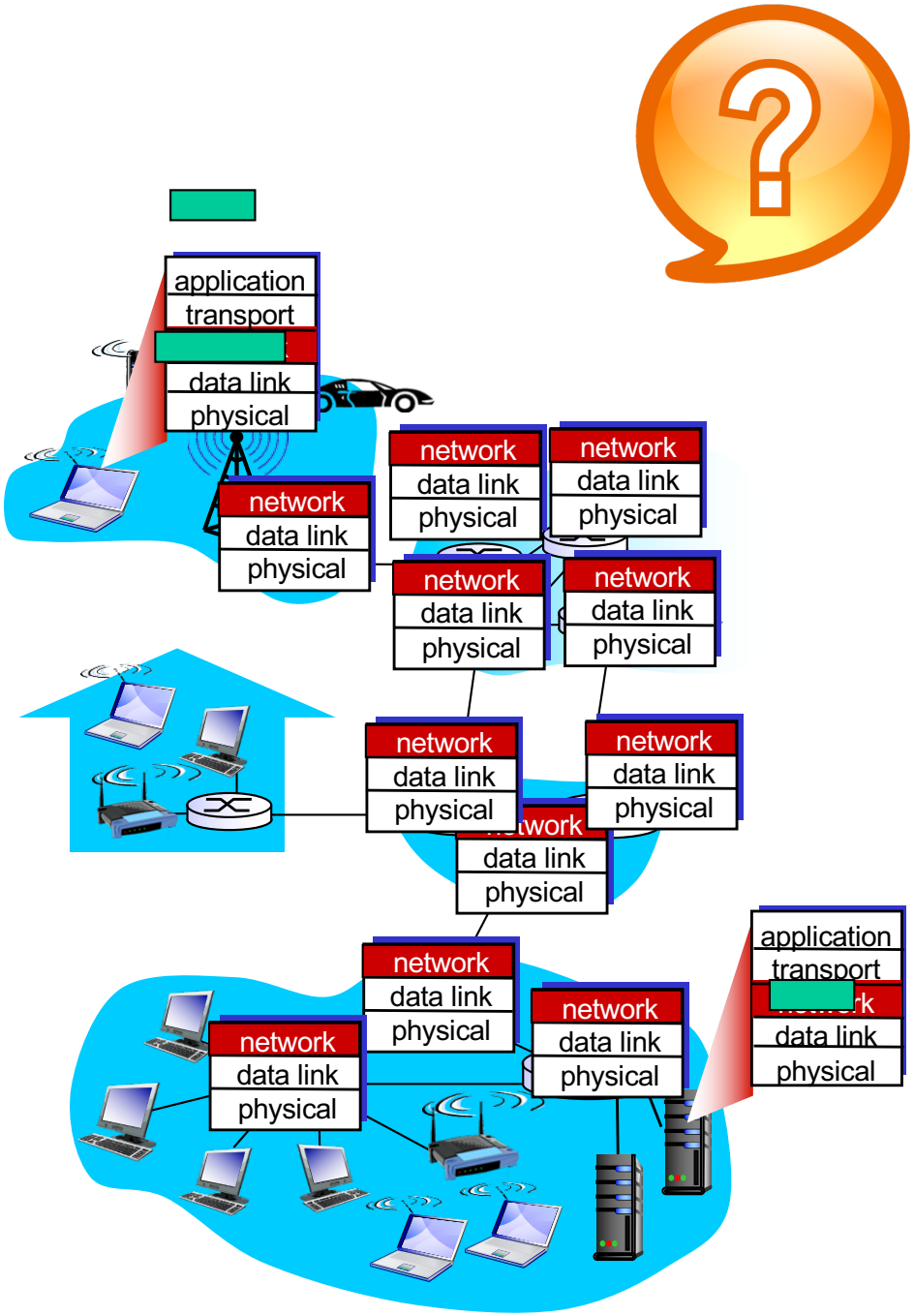
Time: 9:00am –9:50am M, T, R, and F
Zoom Lecture
Fall 2020 A-term

Updates

- Project 2
  - Due on 10/5 M
  - Extra office hours
  - Prof Li Friday 10/2 10:30-11:30AM
  - Heshan Monday 10/5 11:30AM-12:30PM
  - 10 bonus points for implementing GBN
- Quiz 7:
  - 10/2 (F) morning
  - *TCP, and Network Layer Intro!*

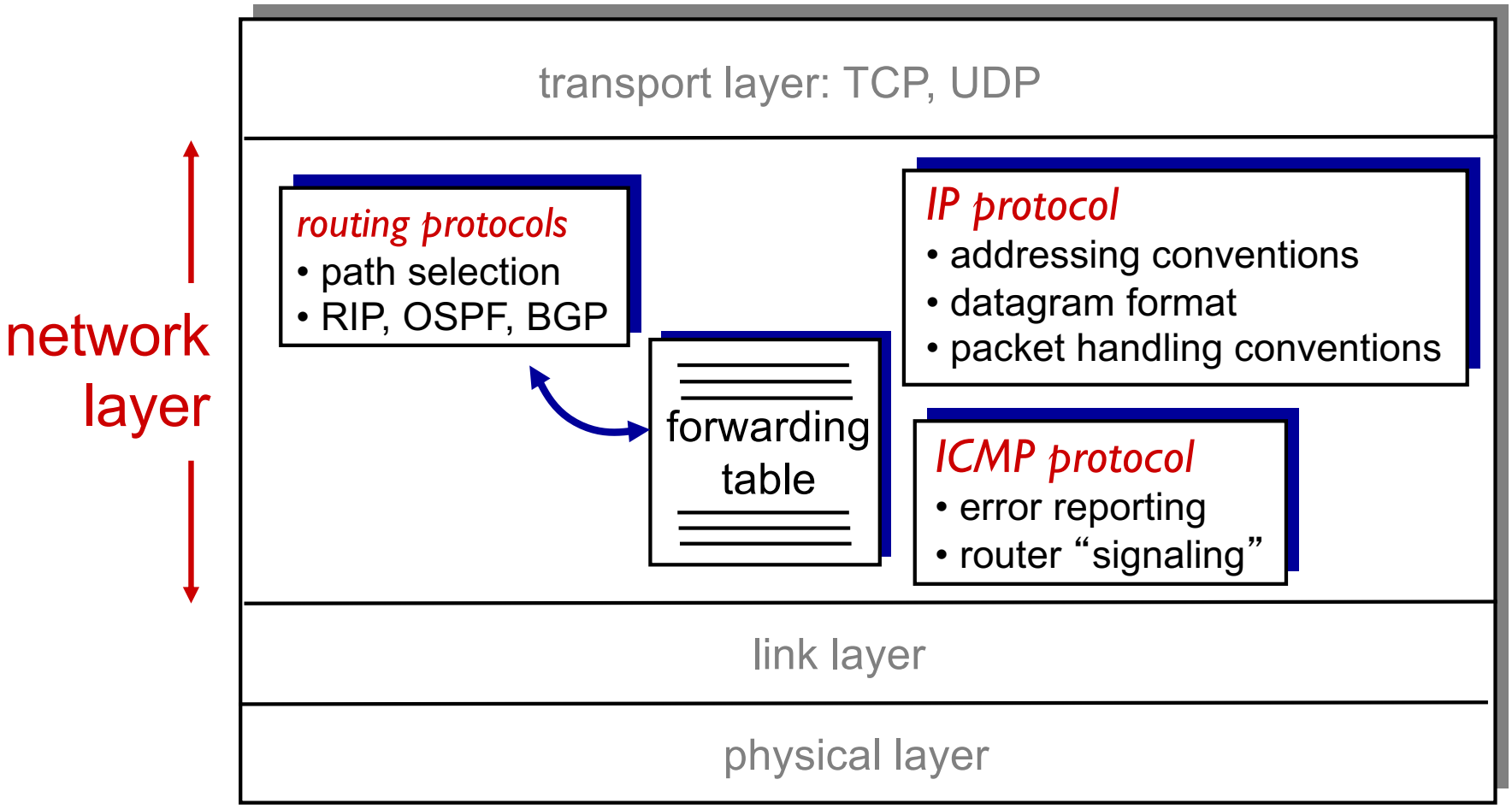
Network layer

- transport segment from sending to receiving host
- on sending side encapsulates segments into datagrams
- on receiving side, delivers segments to transport layer
- network layer protocols in *every* host, router
- router examines header fields in all IP datagrams passing through it



The Internet network layer

host, router network layer functions:



ICMP: Internet Control Message Protocol

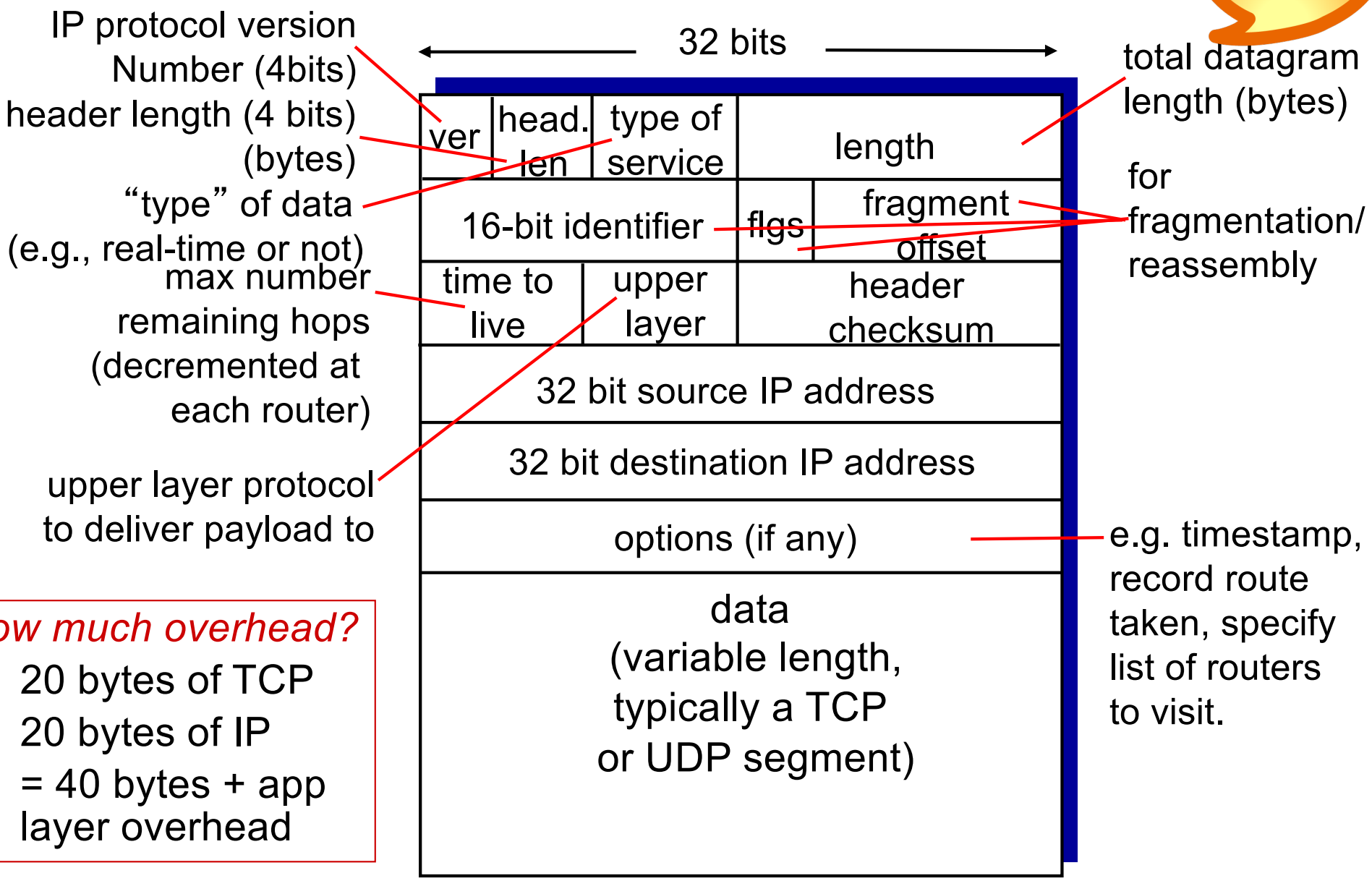
Chapter 4-5: outline

4.1 introduction

4.3 IP: Internet Protocol

- datagram format
- IPv4 addressing

IPv4 datagram format

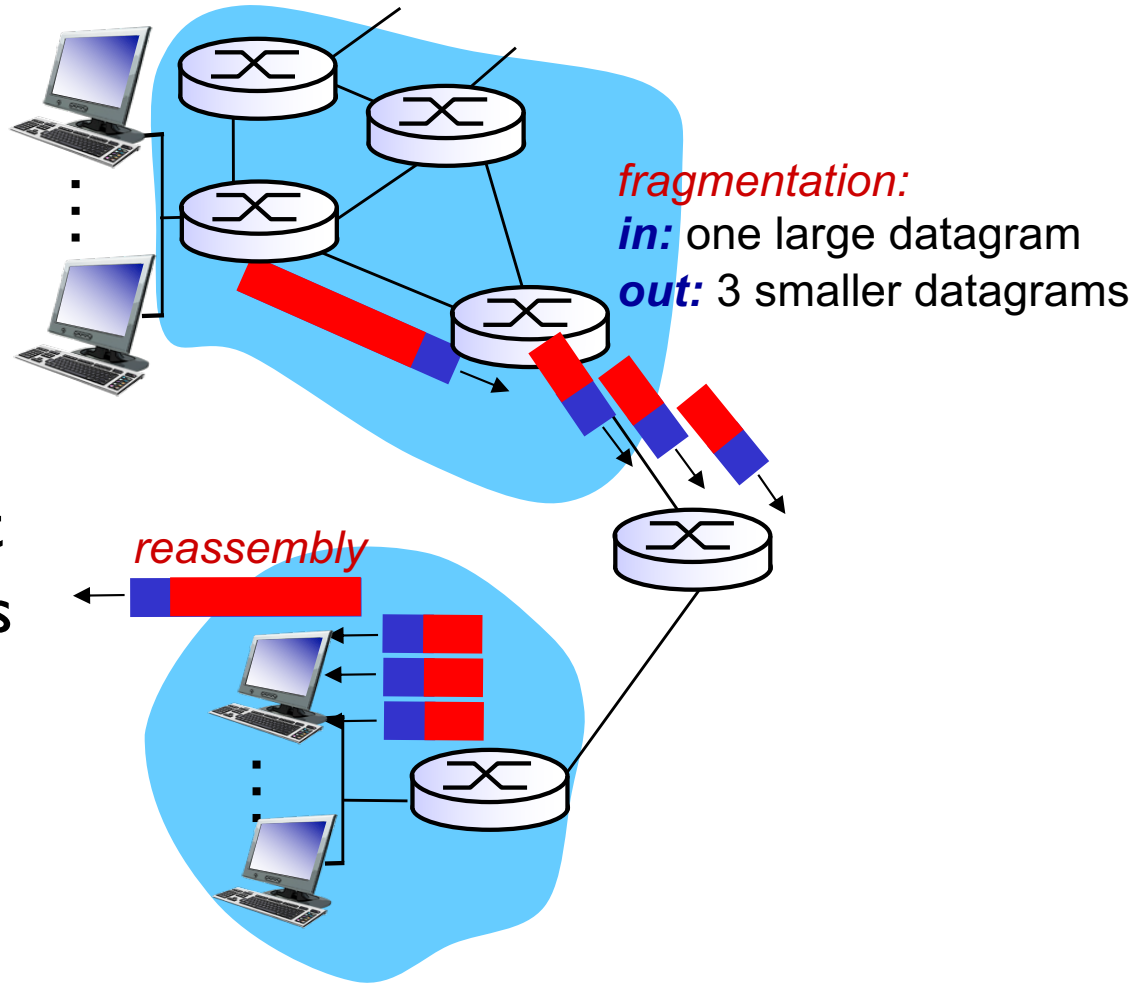


how much overhead?

- 20 bytes of TCP
- 20 bytes of IP
- = 40 bytes + app layer overhead

IP fragmentation, reassembly

- network links have MTU (max.transfer size) - largest possible link-level frame
  - different link types, different MTUs
- large IP datagram divided ("fragmented") within net
  - one datagram becomes several datagrams
  - "reassembled" only at final destination
  - IP header bits used to identify, order related fragments



IP fragmentation, reassembly

3980 bytes in data field

	length =4000	ID =x	fragflag =0	offset =0	

example:

- 4000 byte datagram
- MTU = 1500 bytes

one large datagram becomes several smaller datagrams

1480 bytes in data field

	length =1500	ID =x	fragflag =1	offset =0	

offset = 1480/8

	length =1500	ID =x	fragflag =1	offset =185	

1020 bytes in data field

	length =1040	ID =x	fragflag =0	offset =370	

Offsets are counted by 8 bytes in the data

Quiz 7

- Three questions
- Q1-Q2: Sequence/acknowledgement numbers in TCP
- Q3: Fragmentation in Network layer

Questions