

Welcome to

CS 3516:

Computer Networks

Prof. Yanhua Li

Time: 9:00am –9:50am M, T, R, and F

Location: AK 219
Fall 2018 A-term



Lecture I: roadmap

I.1 what *is* the Internet?

“nuts and bolts” view
a service view

what’s a protocol?

I.2 network edge

- hosts, access networks, physical media/links



“Fun” internet appliances



IP picture frame
<http://www.ceiva.com/>



Internet
refrigerator



Web-enabled toaster +
weather forecaster



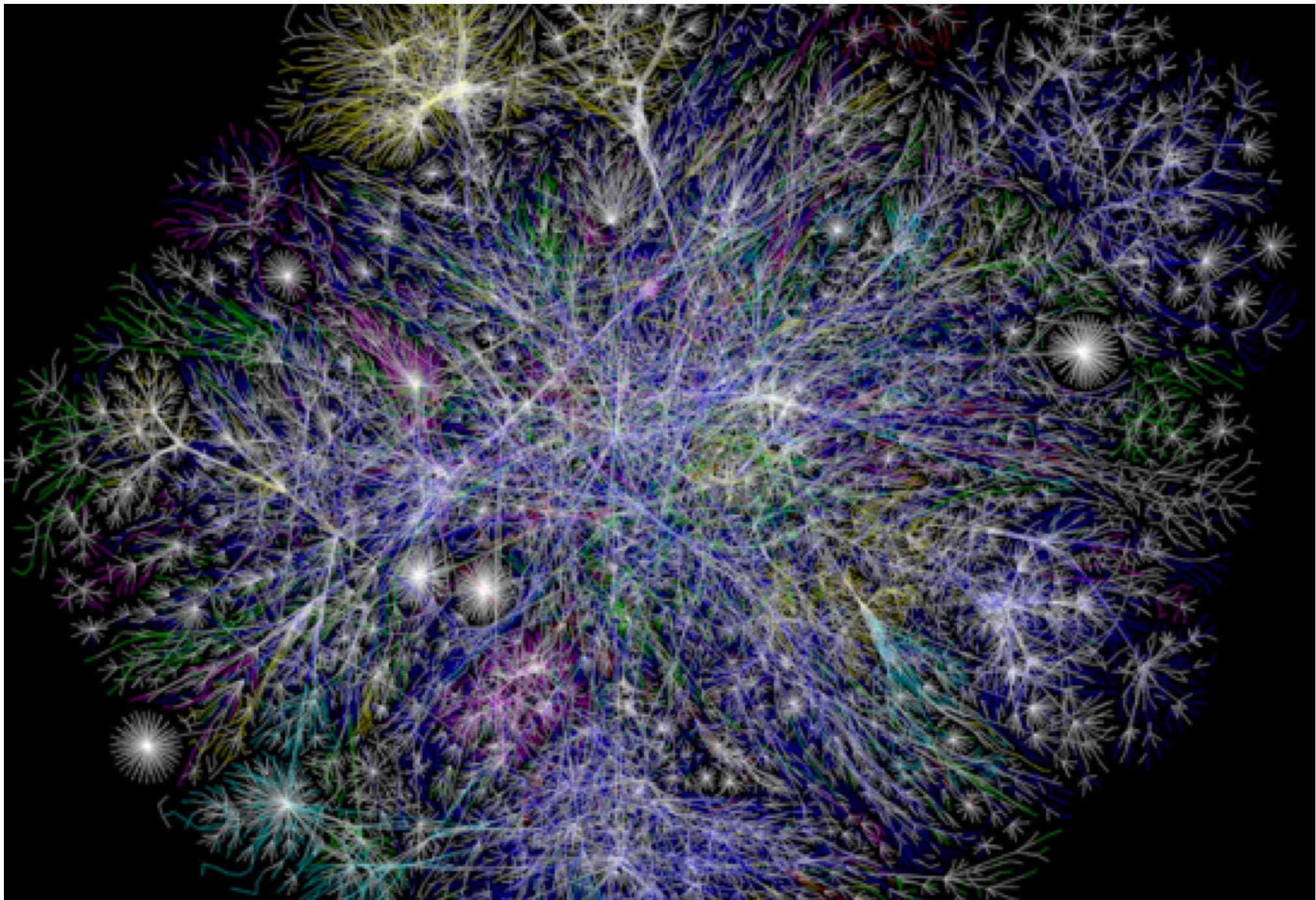
Tweet-a-watt:
monitor energy use



Slingbox: watch,
control cable TV remotely

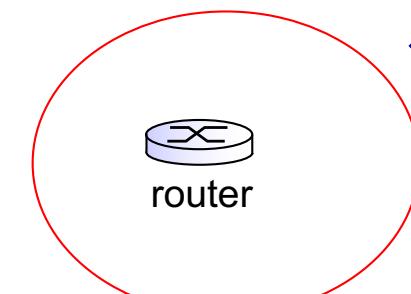
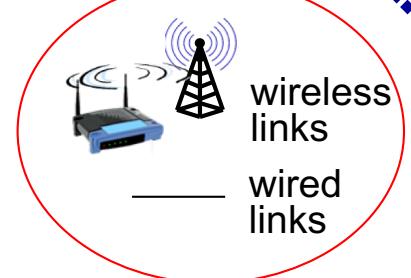
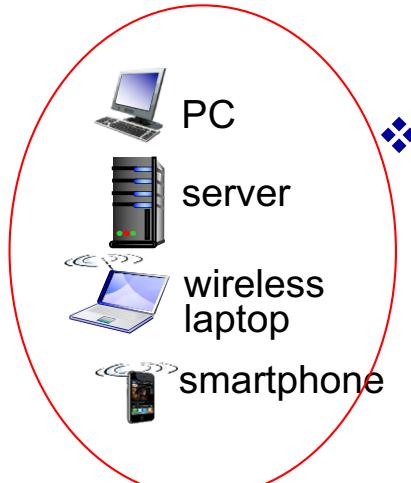


Internet phones

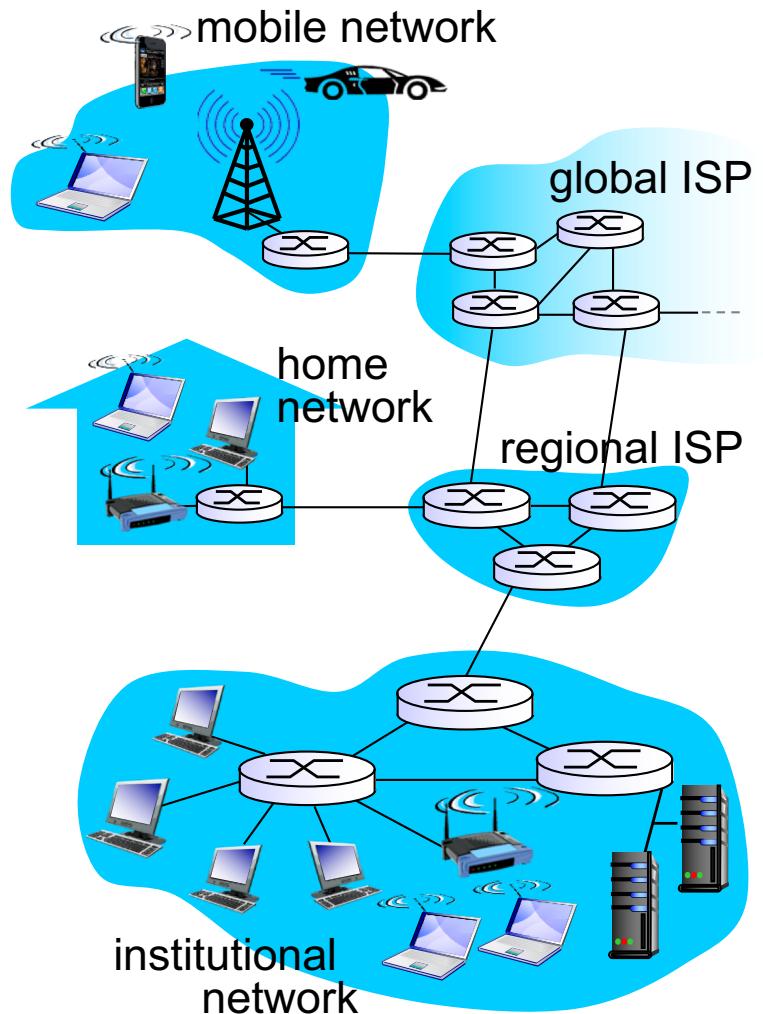


Partial map of the Internet based on the January 15, 2005 data found on opte.org. (from <http://atheistuniverse.net/group/internet>)

What's the Internet: “nuts and bolts” view



- ❖ millions of connected computing devices:
 - *hosts = end systems*
 - running *network apps*
- ❖ *communication links*
 - fiber, copper, radio, satellite
 - transmission rate: *bandwidth*
- ❖ *Packet switches*: forward packets (chunks of data)
 - *routers and switches*

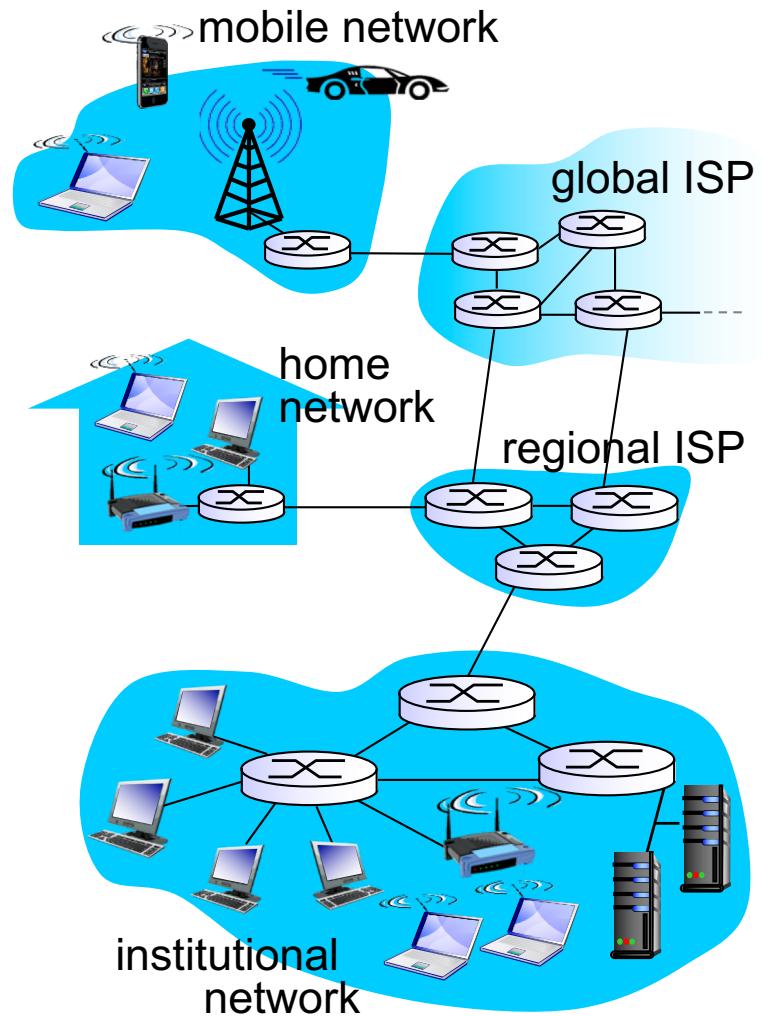


Hardware components.

What's the Internet: “nuts and bolts” view



- ❖ *Internet: “network of networks”*
 - Interconnected ISPs
- ❖ *protocols* control sending, receiving of msgs
 - e.g., TCP, IP, HTTP, Skype, 802.11
- ❖ *Internet standards*
 - RFC: Request for comments
 - IETF: Internet Engineering Task Force – an open international community of network designers



Software components.

Analogy to Road Networks

End systems=buildings

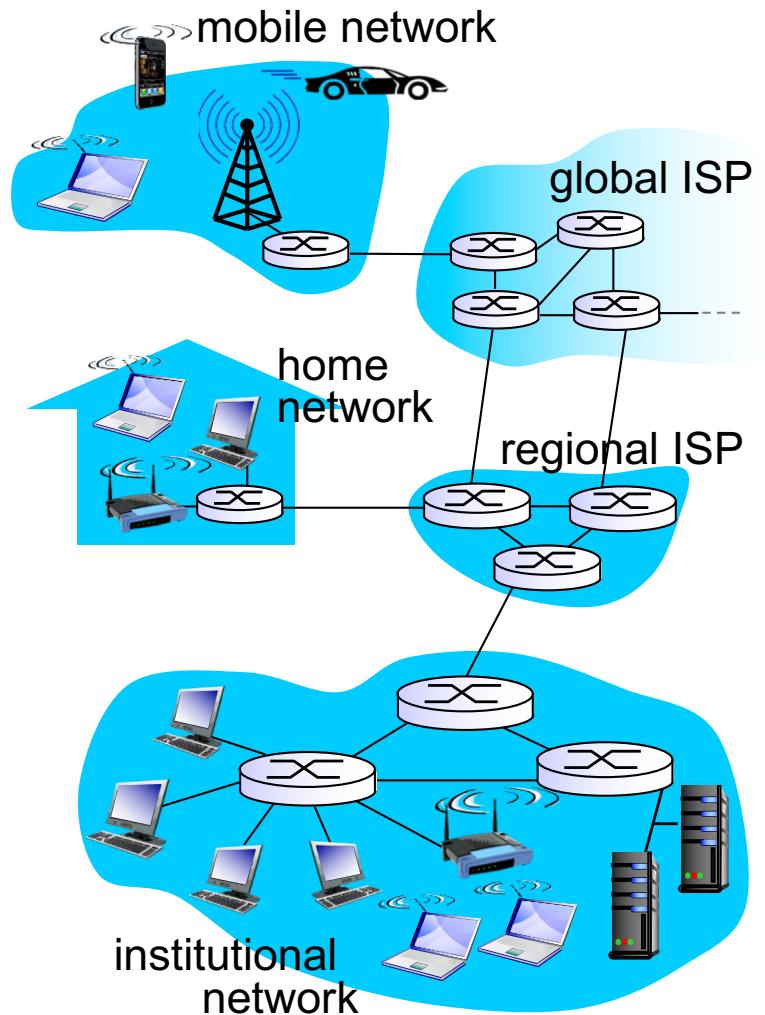
Packet switches=intersections

Links=road segments

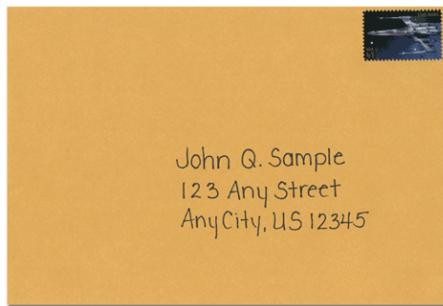


What's the Internet: a service view

- ❖ *Infrastructure that provides services to applications:*
 - Web, VoIP, email, games, e-commerce, social nets, ...
- ❖ *provides programming interface to apps*
 - hooks that allow sending and receiving app programs to “connect” to Internet
 - provides service options, analogous to postal service



Analogy to Post Service



What's a protocol?

human protocols:

- ❖ “what’s the time?”
- ❖ “I have a question”
- ❖ introductions

... specific msgs sent

... specific actions taken
when msgs received, or
other events

network protocols:

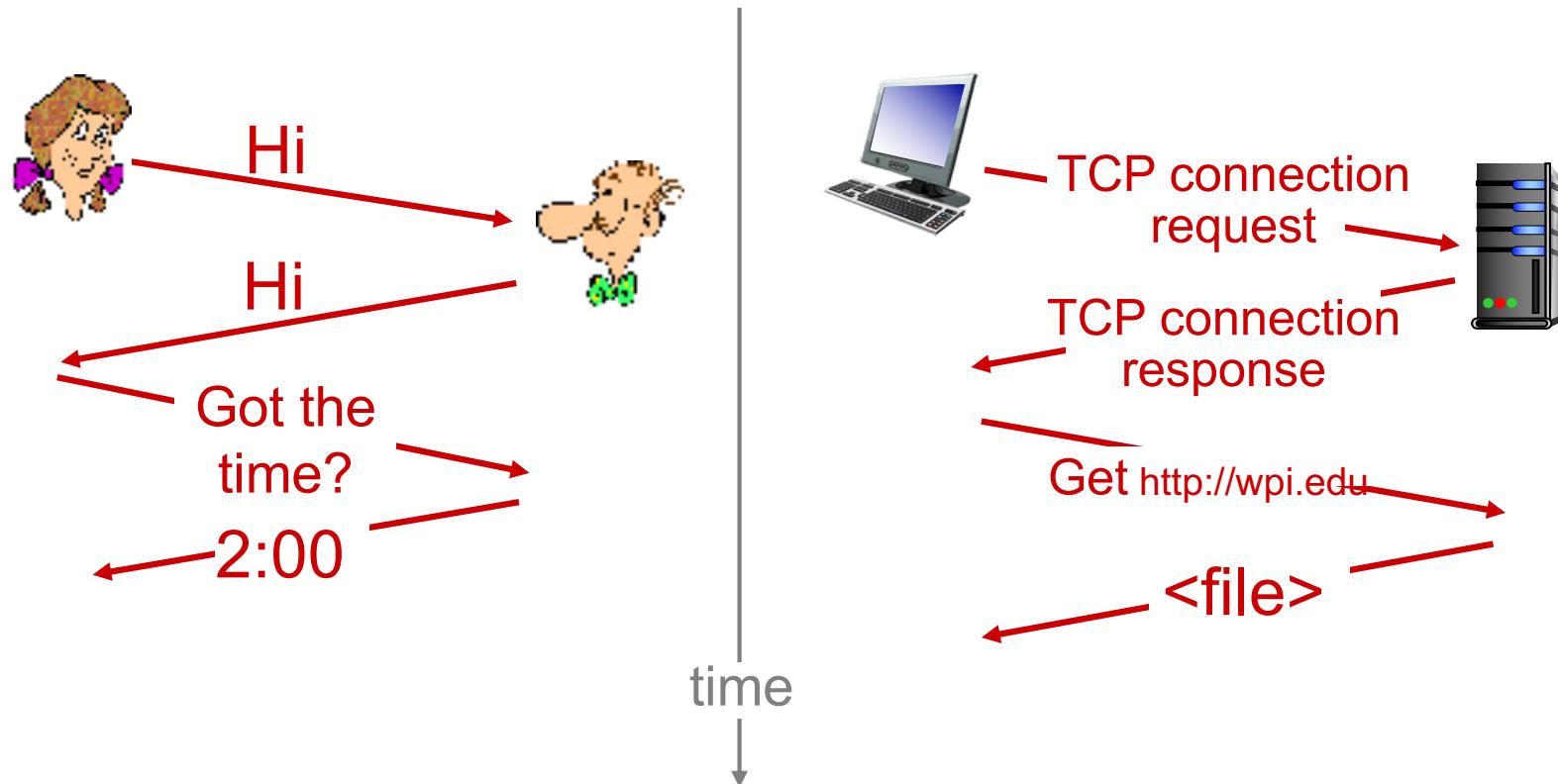
- ❖ machines rather than humans
- ❖ all communication activity in Internet governed by protocols

*protocols define format, order
of msgs sent and received
among network entities,
and actions taken on msg
transmission, receipt*

What's a protocol?



a human protocol and a computer network protocol:



Q: other human protocols?

Chapter I: roadmap

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I.2 network edge

- end systems, access networks, links

A closer look at network structure:

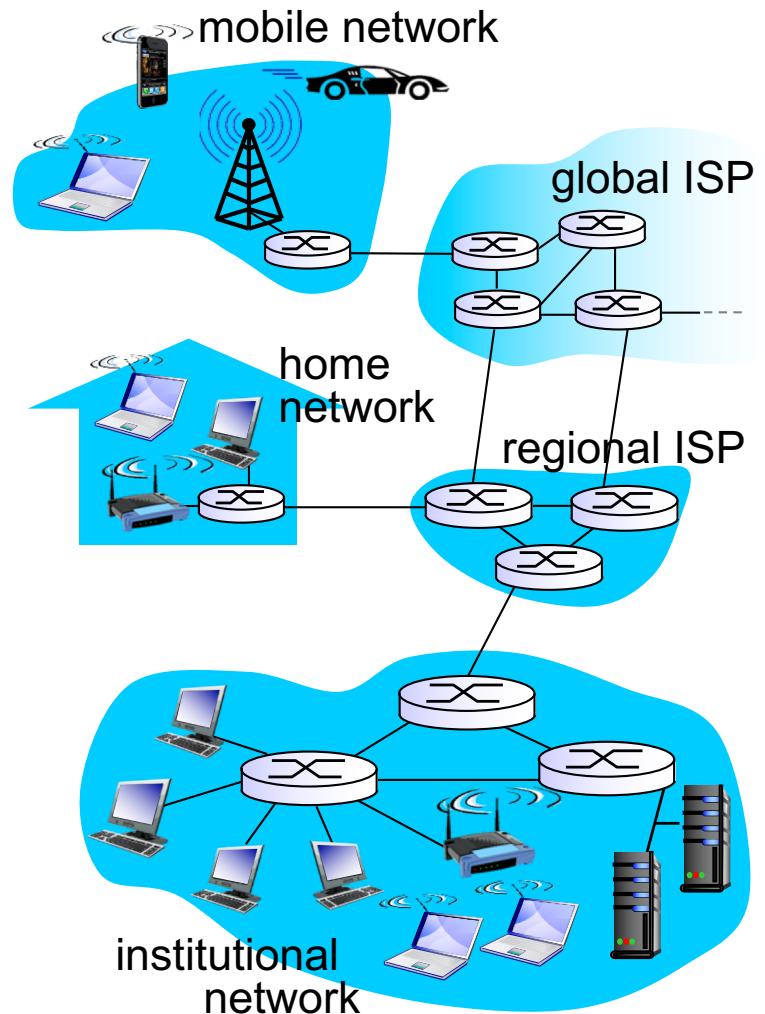
❖ *network edge:*

- hosts: clients and servers
- servers often in data centers

❖ *access networks, physical media: wired, wireless communication links*

❖ *network core:*

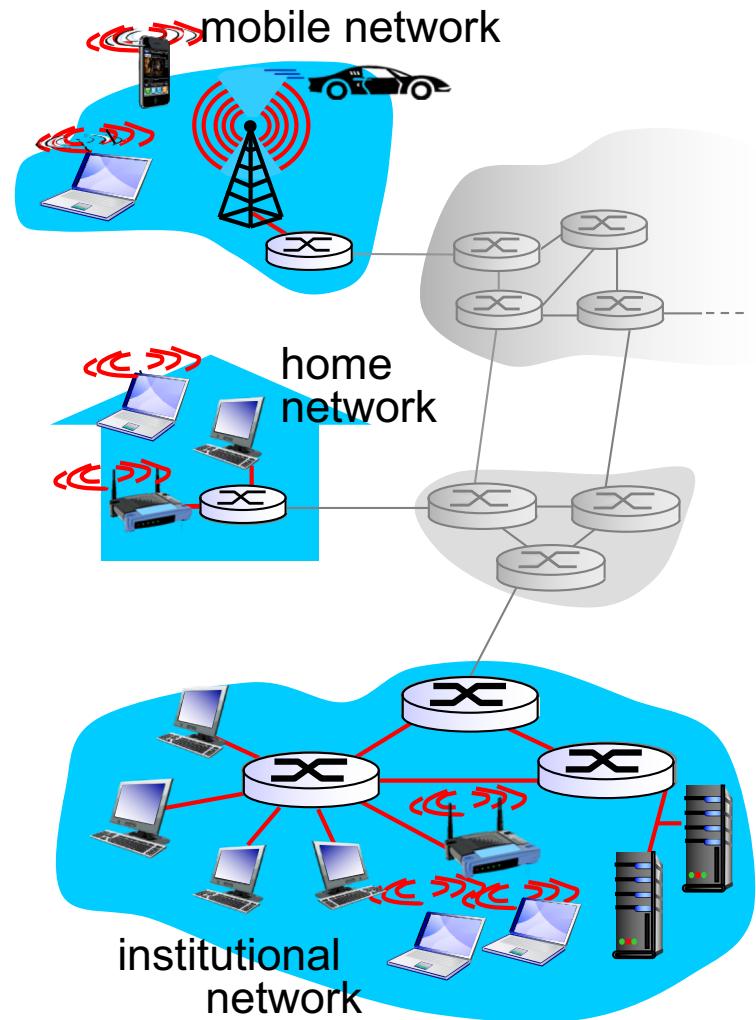
- interconnected routers
- network of networks



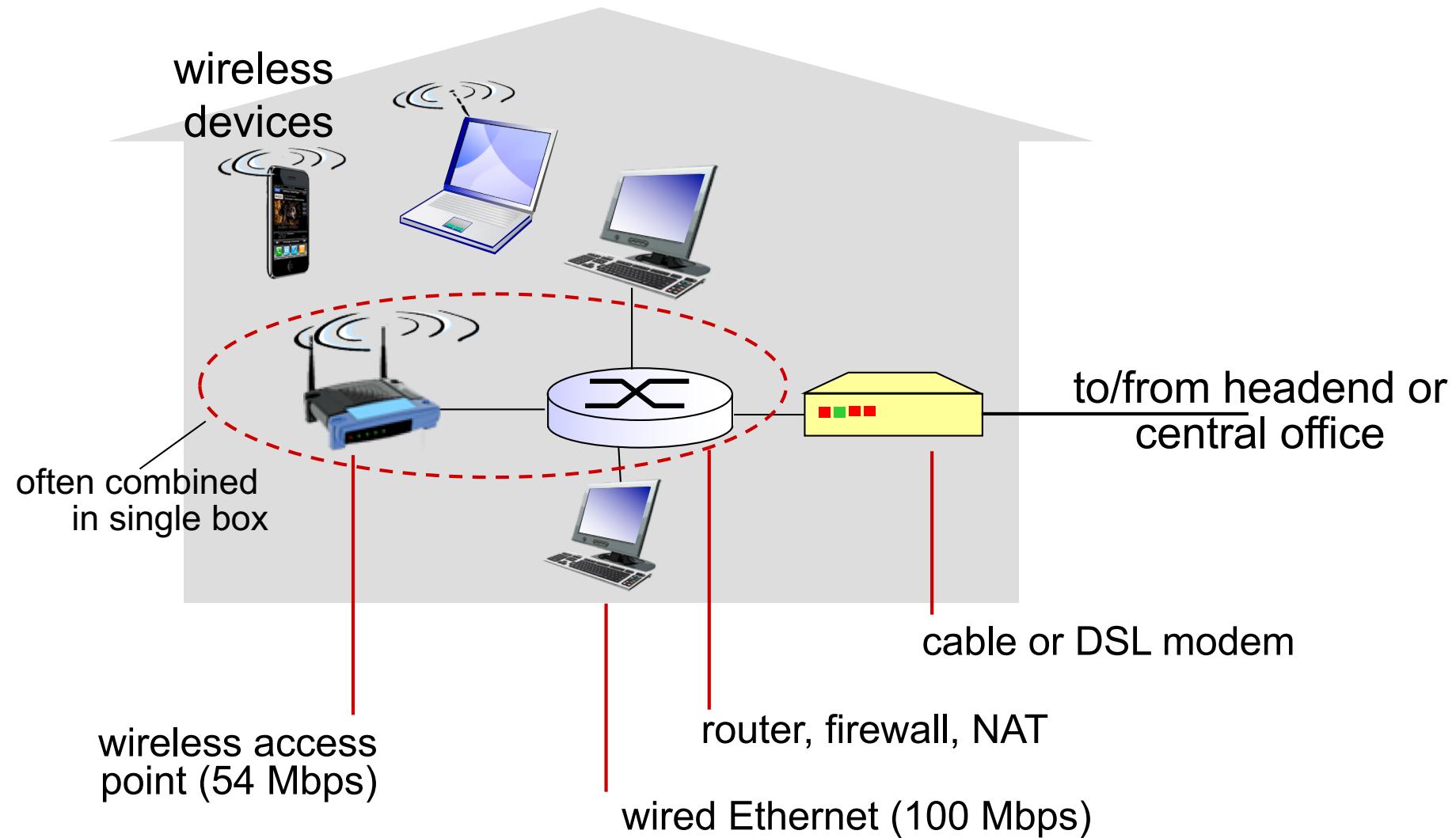
Access networks and physical media

Q: How to connect end systems to edge router?

- ❖ residential access nets
- ❖ institutional access networks (school, company)
- ❖ mobile access networks



Access net: home network



Lecture I: Summary

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❖ Next Lecture

I.3 network core

- packet switching, circuit switching, network structure

Questions?