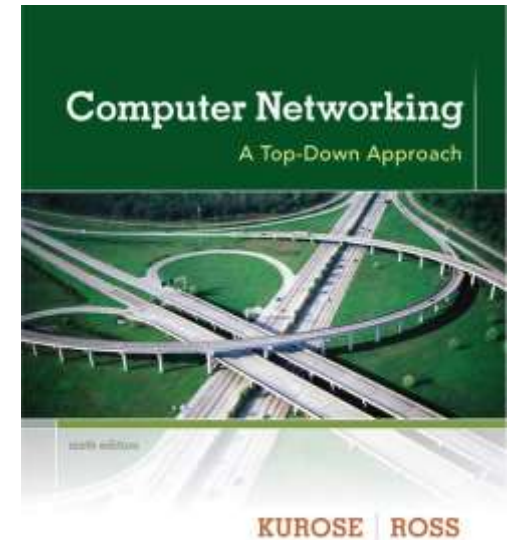


Introduction to Network

~~ITGS215~~

Chapter 1
Introduction

Lecture 1



*Computer
Networking: A Top
Down Approach*
6th edition
Jim Kurose, Keith Ross
Addison-Wesley
March 2012

2021_2020

Chapter 1: introduction

overview:

- ❖ what's the Internet?
- ❖ what's a protocol?
- ❖ network edge; hosts, access net, physical media
- ❖ network core: packet/circuit switching, Internet structure
- ❖ performance: loss, delay, throughput
- ❖ security
- ❖ protocol layers, service models

Chapter 1: roadmap

1.1 *what is the Internet?*

1.2 network edge

- end systems, access networks, links

1.3 network core

- packet switching, circuit switching, network structure

1.4 delay, loss, throughput in networks

1.5 protocol layers, service models

1.6 networks under attack: security

What's the Internet:

❖ The Internet is a computer network that interconnects hundreds of millions of computing devices throughout the world.

❖ all of these computing devices are called :
hosts or end systems

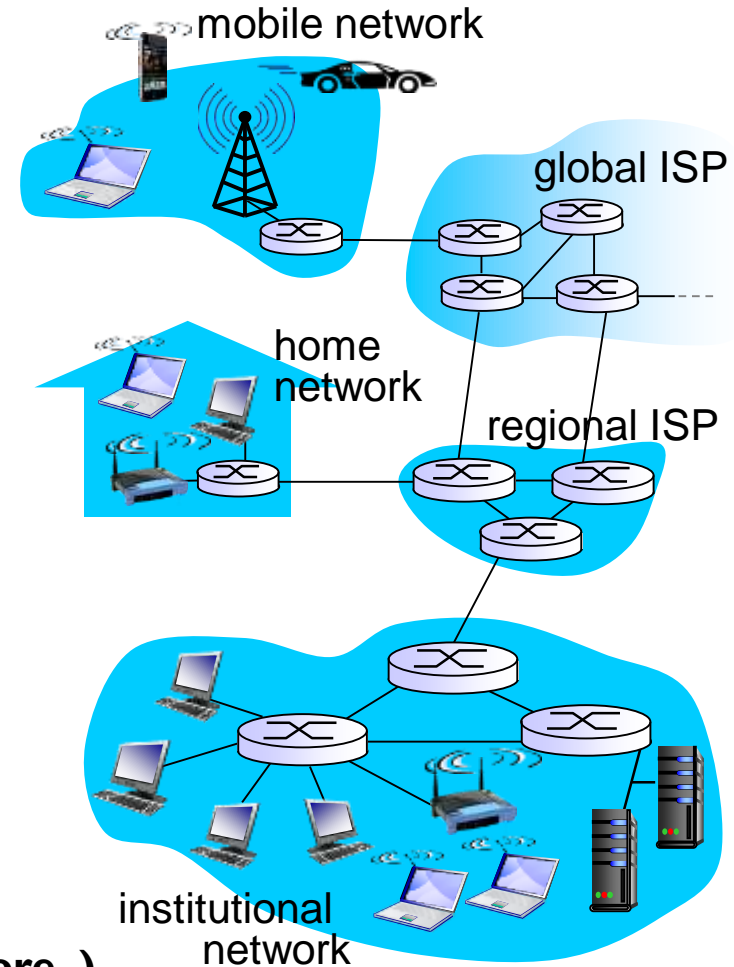
keep in mind:
hosts = end systems



❖ **Internet applications** run on end systems.

These applications include:

(electronic mail, Web surfing, distributed games, television over the Internet, remote login, and much more..)

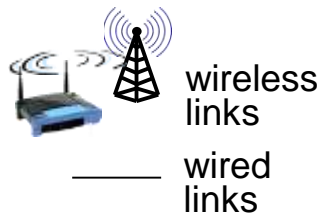


What's the Internet:

- ❖ End systems are connected together by a network of **communication links** and **packet switches**.

- ❖ *communication links*

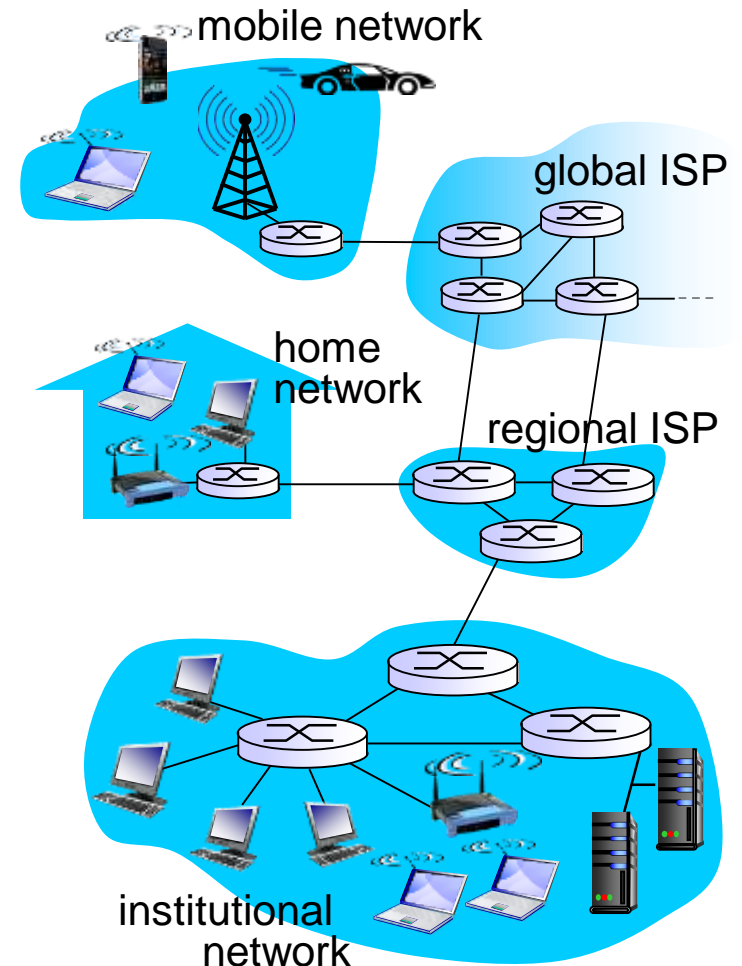
- fiber, copper, radio, satellite



- Different links can transmit data at different rates, with the transmission rate of a link measured in bits/second.

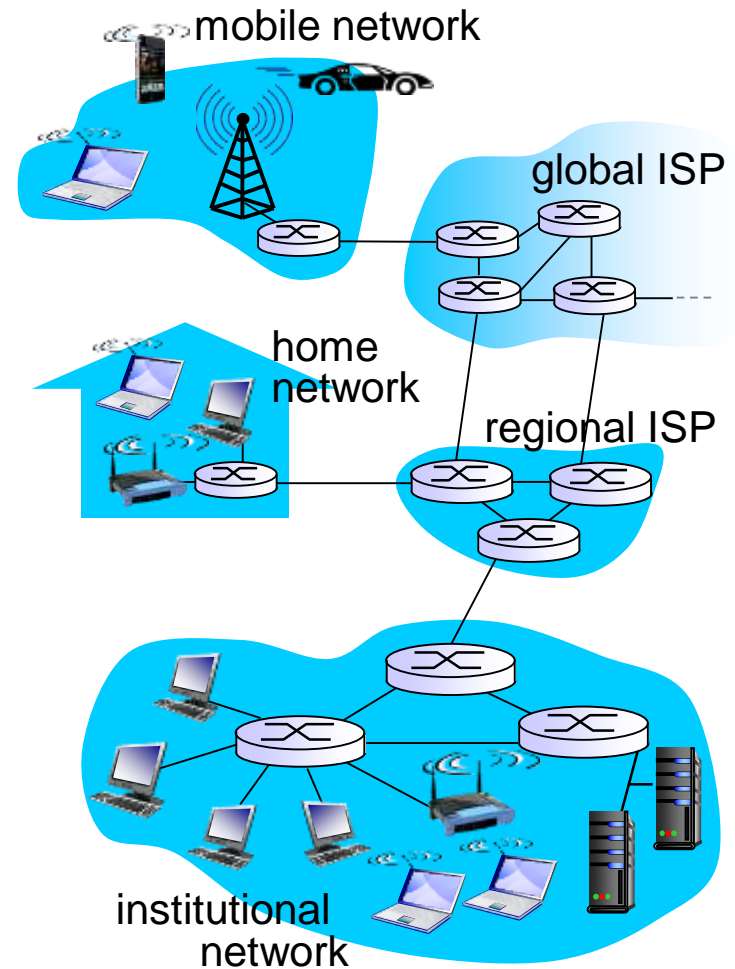
Keep in mind

- **transmission rate:**
bandwidth



What's the Internet:

- ❖ *Packet switches*: forward packets (chunks of data):
 - When one end system has data to send to another end system.
 - A **packet switch** takes a packet arriving on one of its incoming communication links and forwards that packet on one of its outgoing **communication links**.



What's the Internet:

Packet switches come in many shapes:

two most prominent types are: (*routers* and *link-layer switches*)

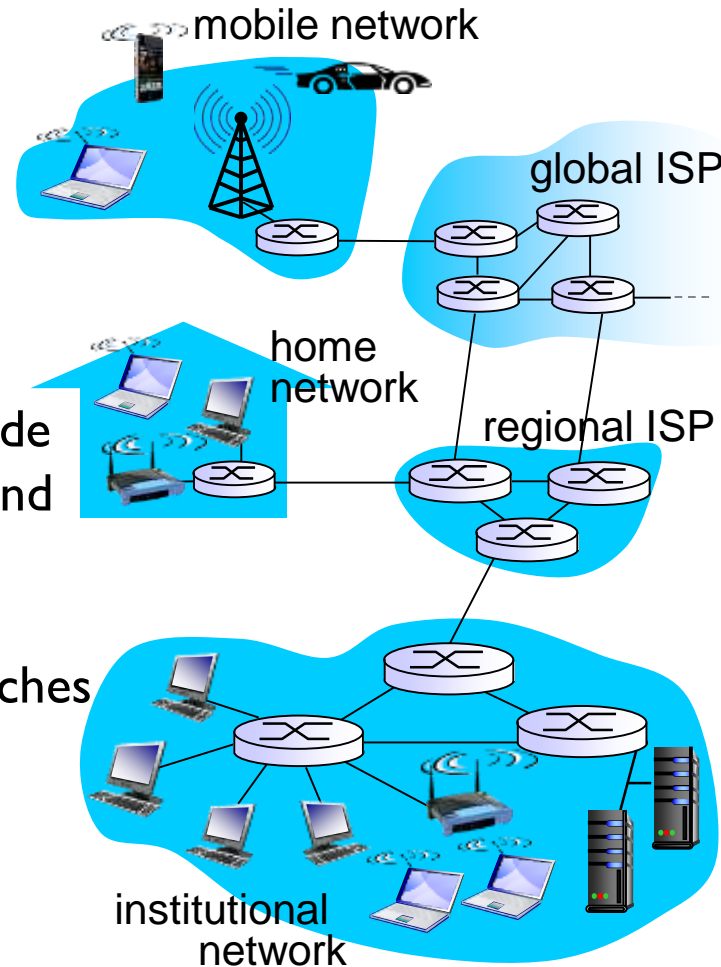
- Both types of **Packet switches** forward packets toward their ultimate destinations.
- **Link-layer switches** are typically used in access networks.
- routers are typically used in the network core.
- The sequence of communication links and packet switches traversed by a packet from the sending end system to the receiving end system is known as a **route or path** through the network.

What's the Internet:

Internet: "network of networks"

Interconnected ISPs

- End systems access the Internet through **Internet Service Providers (ISPs)**.
- **(ISPs)** including local cable or telephone companies; university ISPs; and ISPs that provide WiFi access in airports, hotels, coffee shops, and other public places.
- Each ISP is in itself a network of packet switches and communication links.



What's a protocol?

protocols control sending, receiving of msgs.
e.g., TCP, IP, HTTP, 802.11

human protocols:

- ❖ “what's the time?”
 - ❖ “I have a question”
 - ❖ introductions
- ... specific msgs sent
- ... specific actions taken
when msgs received, or
other events

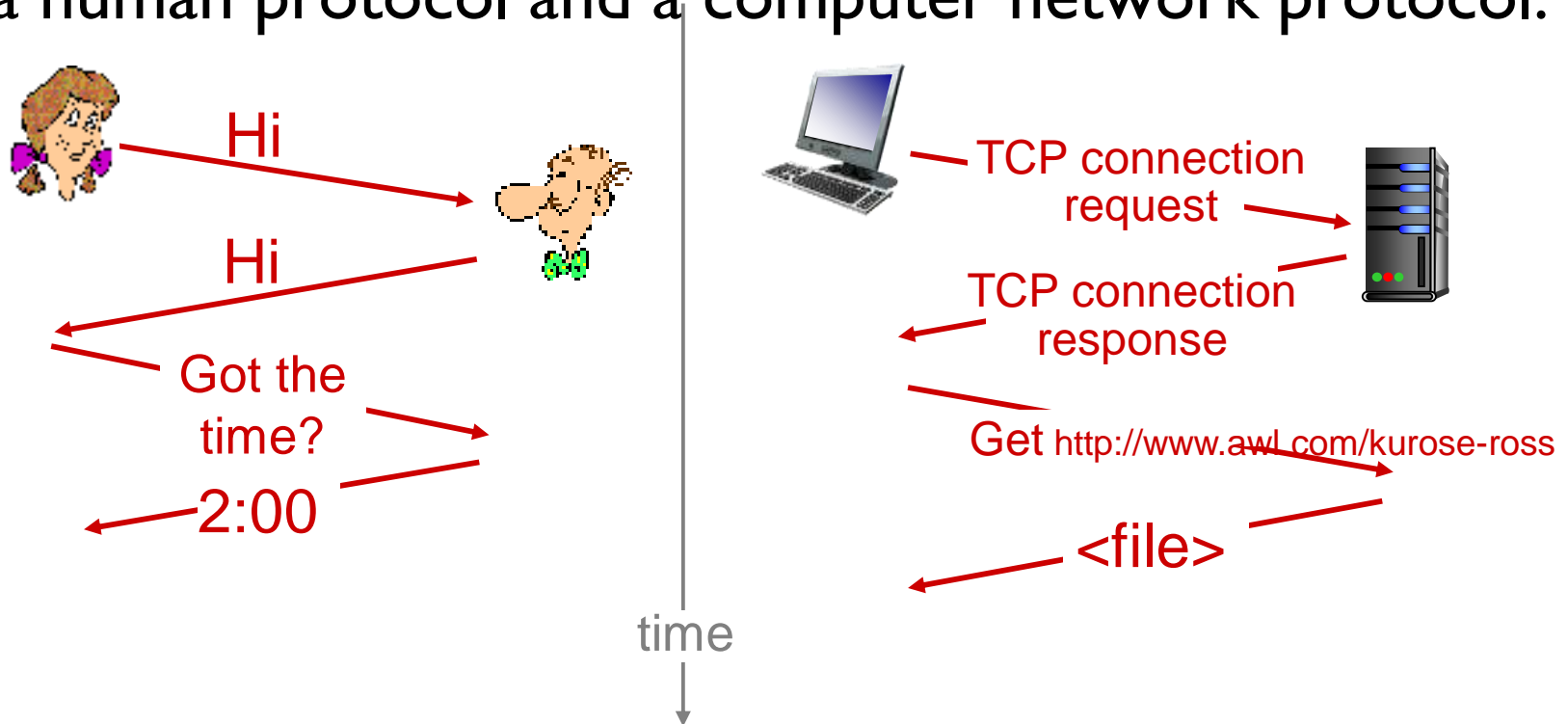
network protocols:

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

What's a protocol?

protocols control sending, receiving of msgs.

a human protocol and a computer network protocol:

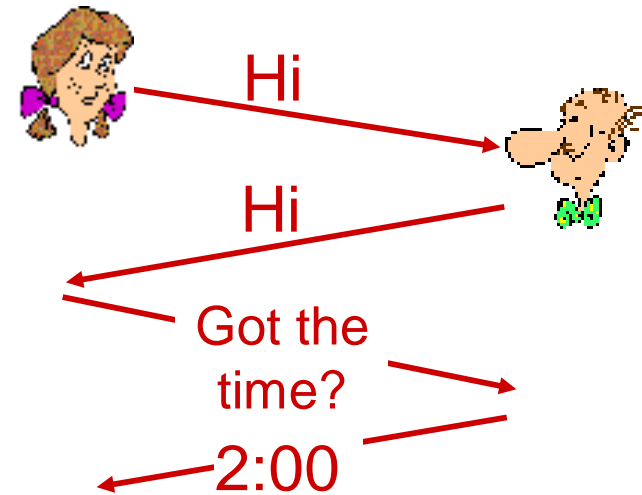


Q: other human protocols?

What's a protocol?

Consider what you do when you want to ask someone for the time of day:

- (the first “Hi” in Figure) to initiate communication with someone else.
- The typical response to a “Hi” is a returned “Hi” message.
- a cordial “Hi” response as an indication that one can proceed and ask for the time of day.



A different response to the initial “Hi” (such as “Don’t bother me!” or “I don’t speak English,” or some unprintable reply)

In this case, the human protocol would be not to ask for the time of day.

❖ As an example of a computer network protocol when you make a request to a Web server:

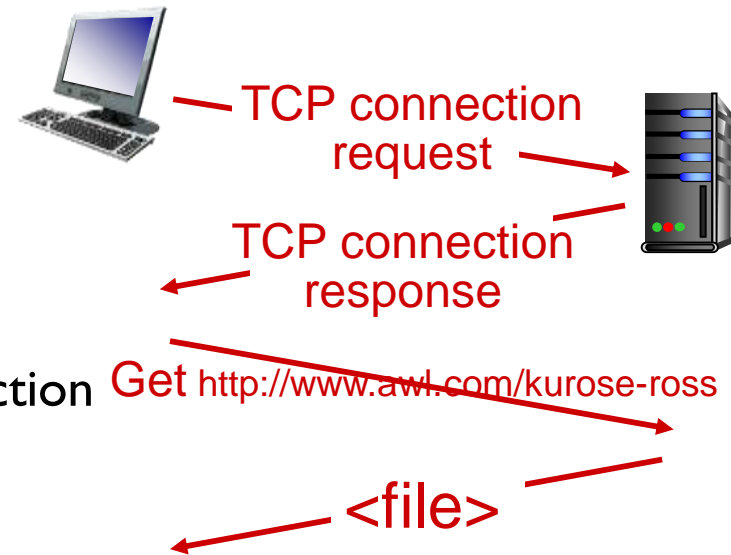
- First, your computer will send a connection request message to the Web server and wait for a reply

- The Web server will eventually receive your connection request message and return a connection reply message.

“ Knowing that it is now OK to request the Web document”.

your computer then sends the name of the Web page it wants to fetch from that Web server.

Finally, the Web server returns the Web page (file) to your computer.



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