

# Introduction

COMPSCI 453 **Computer Networks**

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- Overview. What *is* the Internet? What *is* a protocol?
- Network edge
- Network core
- Performance: loss, delay, throughput
- Protocol layers, service models
- Security
- History

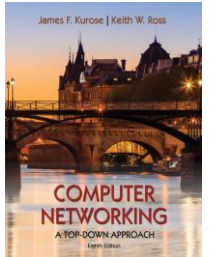
Class textbook:

*Computer Networking: A Top-Down Approach (8<sup>th</sup> ed.)*

J.F. Kurose, K.W. Ross

Pearson, 2020

[http://gaia.cs.umass.edu/kurose\\_ross](http://gaia.cs.umass.edu/kurose_ross)



# Chapter 1: introduction

## *Chapter goal:*

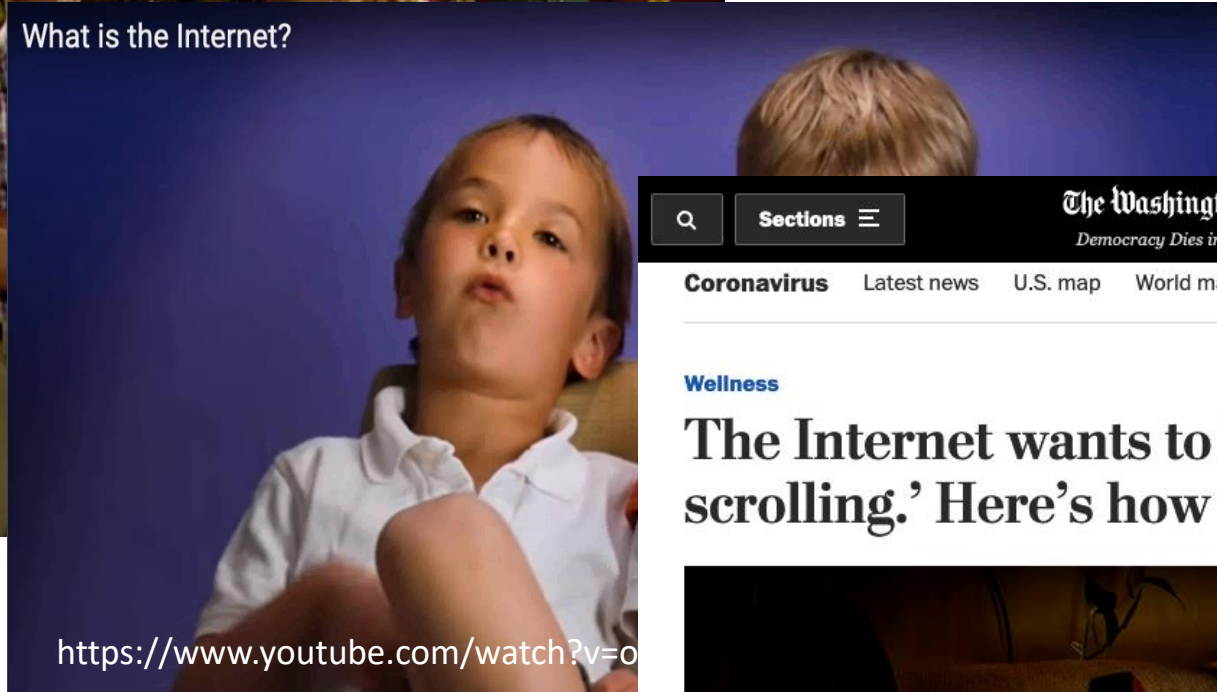
- Get “feel,” “big picture,” introduction to terminology
  - more depth, detail *later* in course



## *Overview/roadmap:*

- What *is* the Internet? What *is* a protocol?
- **Network edge:** hosts, access network, physical media
- **Network core:** packet/circuit switching, internet structure
- **Performance:** loss, delay, throughput
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# What *is* the Internet?

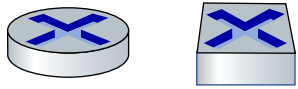


# The Internet: a “nuts and bolts” view



Billions of connected computing *devices*:

- *hosts* = end systems
- running *network apps* at Internet's “edge”



*Packet switches*: forward packets (chunks of data)

- *routers, switches*

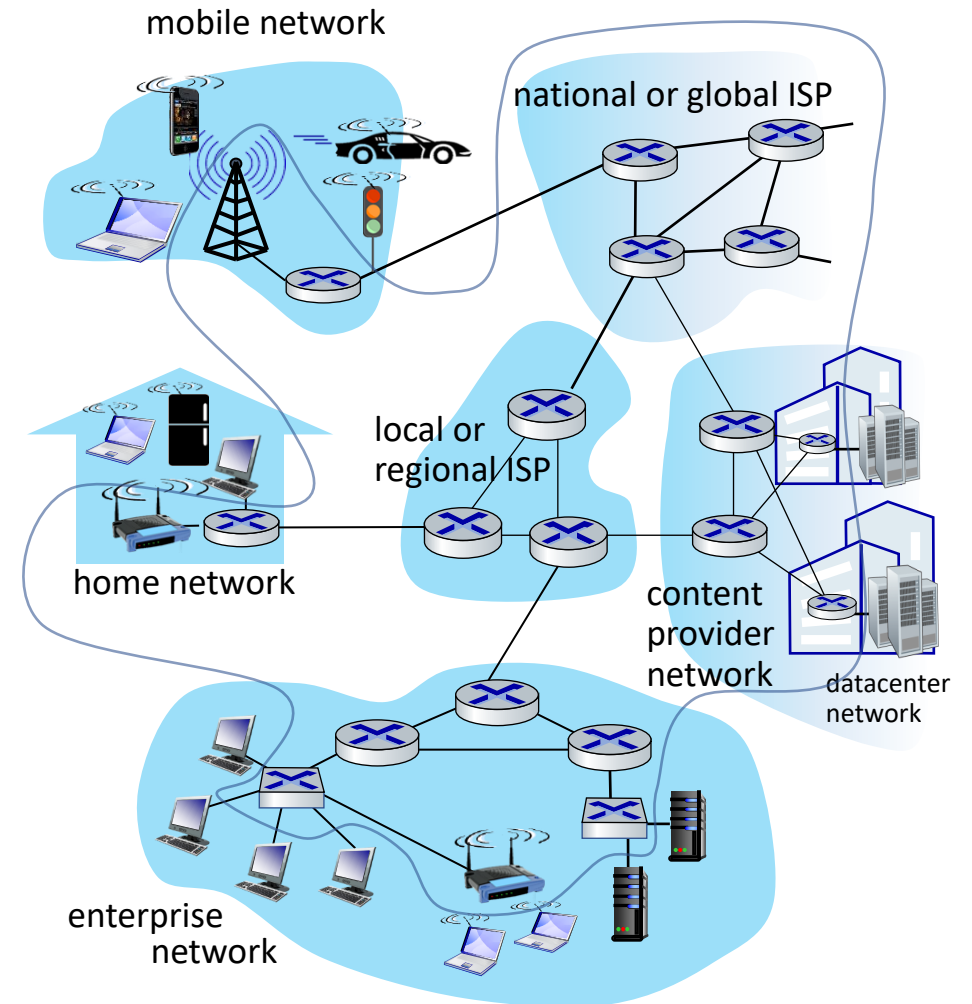
*Communication links*

- fiber, copper, radio, satellite
- transmission rate: *bandwidth*



*Networks*

- collection of devices, routers, links: managed by an organization





# “Fun” Internet-connected devices



Amazon Echo



Internet refrigerator



IP picture frame



Pacemaker & Monitor



Tweet-a-watt:  
monitor energy use



Security Camera



Slingbox: remote  
control cable TV



Web-enabled toaster +  
weather forecaster



AR devices



cars



bikes



scooters



Internet phones



Gaming devices



sensorized,  
bed  
mattress

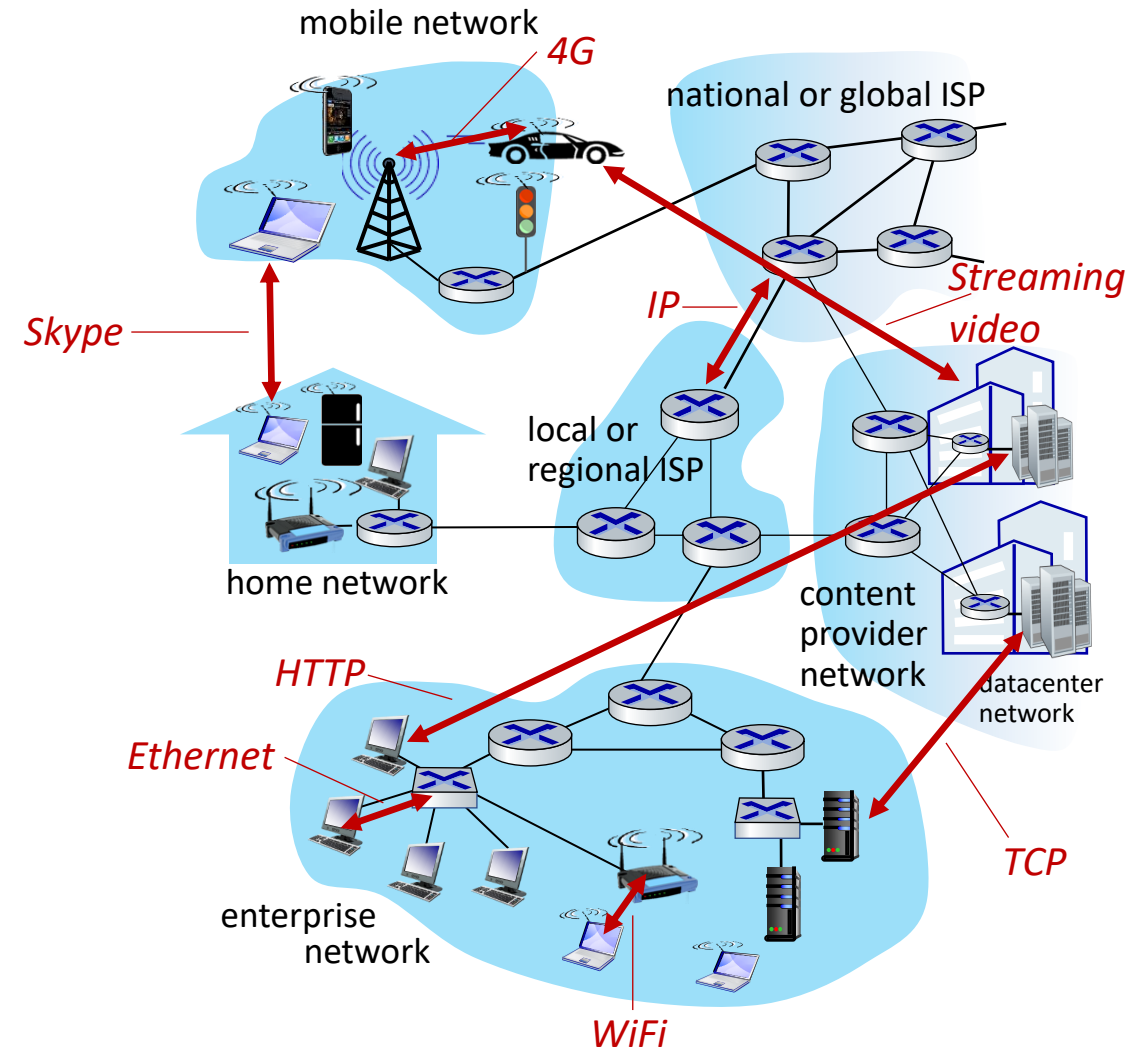


Fitbit

*Others?*

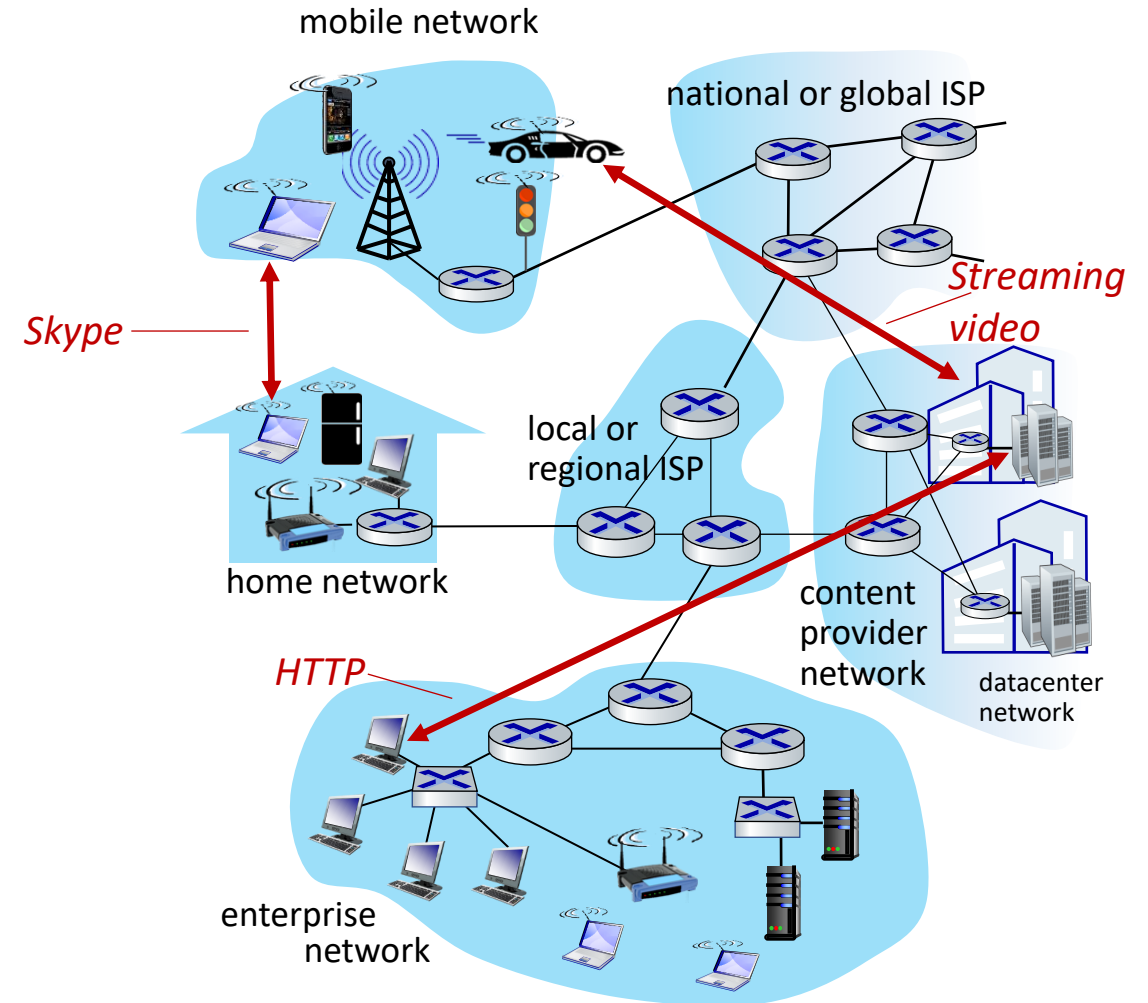
# The Internet: a “nuts and bolts” view

- *Internet: “network of networks”*
  - Interconnected ISPs
- *protocols* are everywhere
  - control sending, receiving of messages
  - e.g., HTTP (Web), streaming video, Skype, TCP, IP, WiFi, 4G, Ethernet
- *Internet standards*
  - RFC: Request for Comments
  - IETF: Internet Engineering Task Force



# The Internet: a “services” view

- *Infrastructure* that provides services to applications:
  - Web, streaming video, multimedia teleconferencing, email, games, e-commerce, social media, inter-connected appliances, ...
- provides *programming interface* to distributed applications:
  - “hooks” allowing sending/receiving apps to “connect” to, use Internet transport service
  - provides service options, analogous to postal service



# What's a protocol?

## *Human protocols:*

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

Rules for:

- ... specific messages sent
- ... specific actions taken  
when message received,  
or other events

## *Network protocols:*

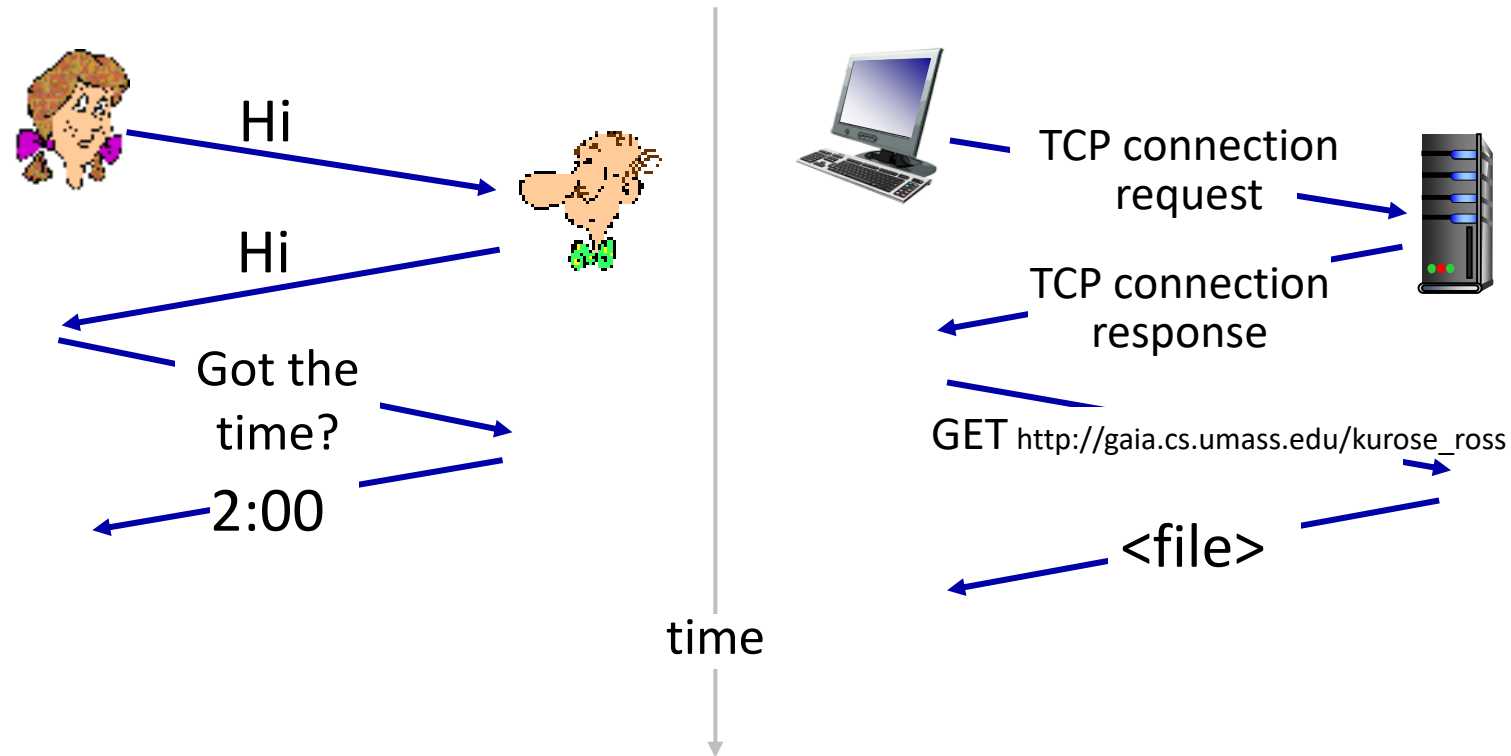
- computers (devices) rather than humans
- all communication activity in Internet  
governed by protocols

*Protocols define the **format, order** of  
**messages sent and received** among  
network entities, and **actions taken**  
on message transmission, receipt*



# What's a protocol?

A human protocol and a computer network protocol:



**Q:** other human protocols?

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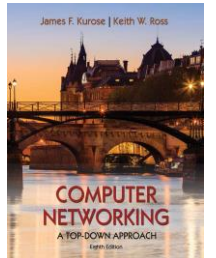
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