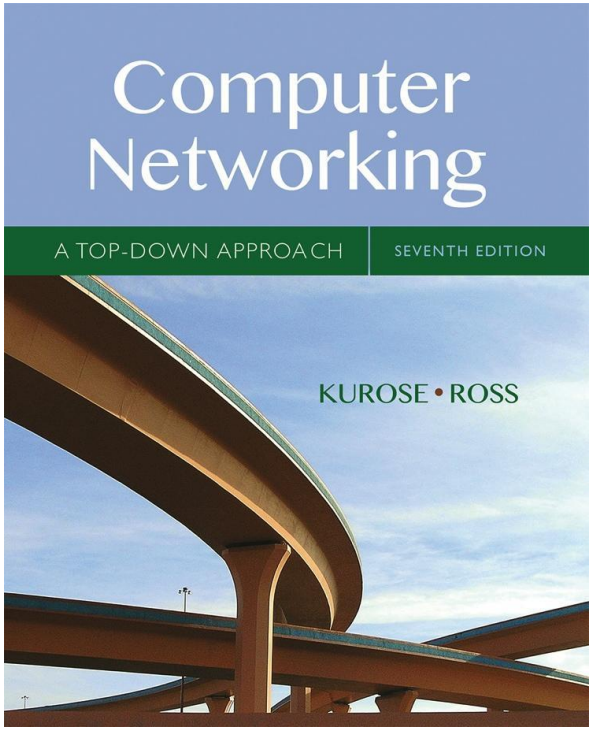
COMPUTER NETWORKS

Computer Networks and the Internet

Team Networks
Department of Computer Science and Engineering

Text Book



Computer Networking: A Top-Down Approach
Jim Kurose, Keith Ross
Pearson, 2017
7th Edition

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CELEBRATING 50 YEARS

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Unit – 1 Computer Networks and the Internet

1.1 Introduction to Computer Networks

1.2 What is the Internet?

- A nuts-and-bolts and Services description, Protocol

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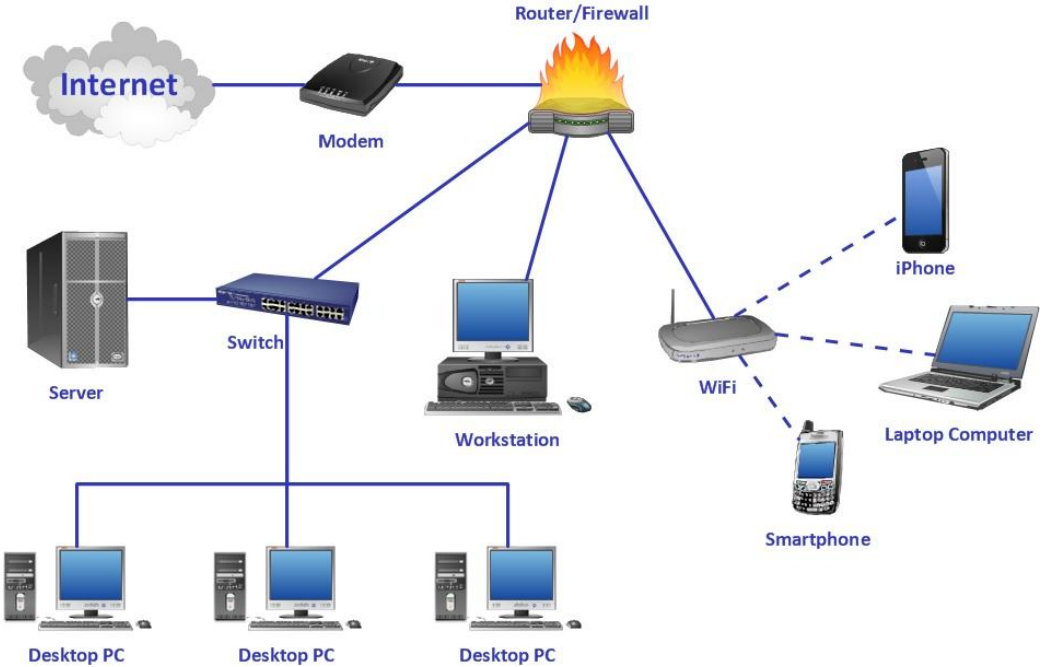
Introduction to Computer Networks



- Two or more devices connected together.
- Communicate with each other, share data or resources

What is the Internet?

- A massive network of networks.
- A computer network that interconnects billions of computing devices throughout the world.
- Traditional devices – PCs, Workstations, Servers – web pages, emails, etc.
- Internet “things” – laptops, PDAs, TVs, gaming consoles, home security systems, home appliances, watches, cars, traffic control systems, etc.,

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)

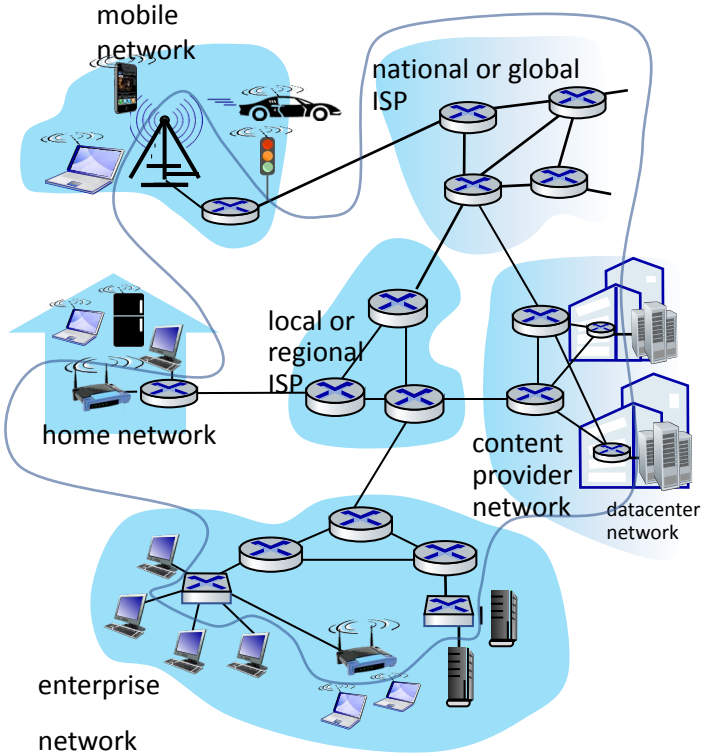
- *routers, switches*

Communication links

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

Networks

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



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"Fun" Inter-connected Devices

Amazon Echo

Internet refrigerator

IP picture frame

Tweet-a-watt: monitor energy use

Web-enabled toaster + weather forecaster

Security Camera

Slingbox: remote control cable TV

AR *devices*

Internet phones

sensorized, bed mattress

Fitbit

Others?

There will be 41 Billion IoT devices by 2027*

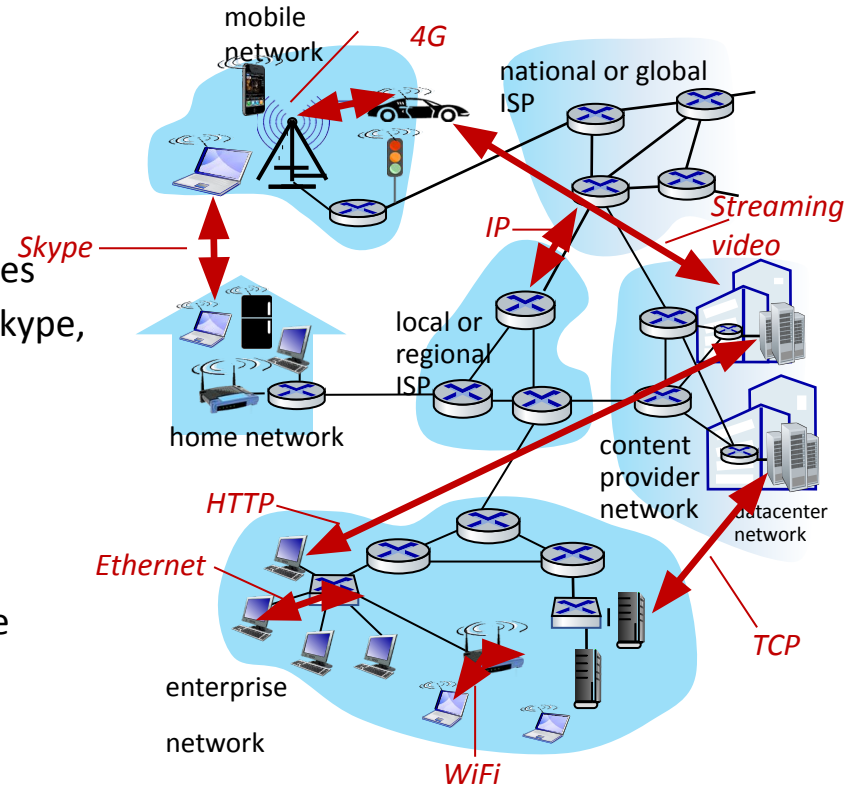
* https://www.businessinsider.com/internet-of-things-report?IR=T

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

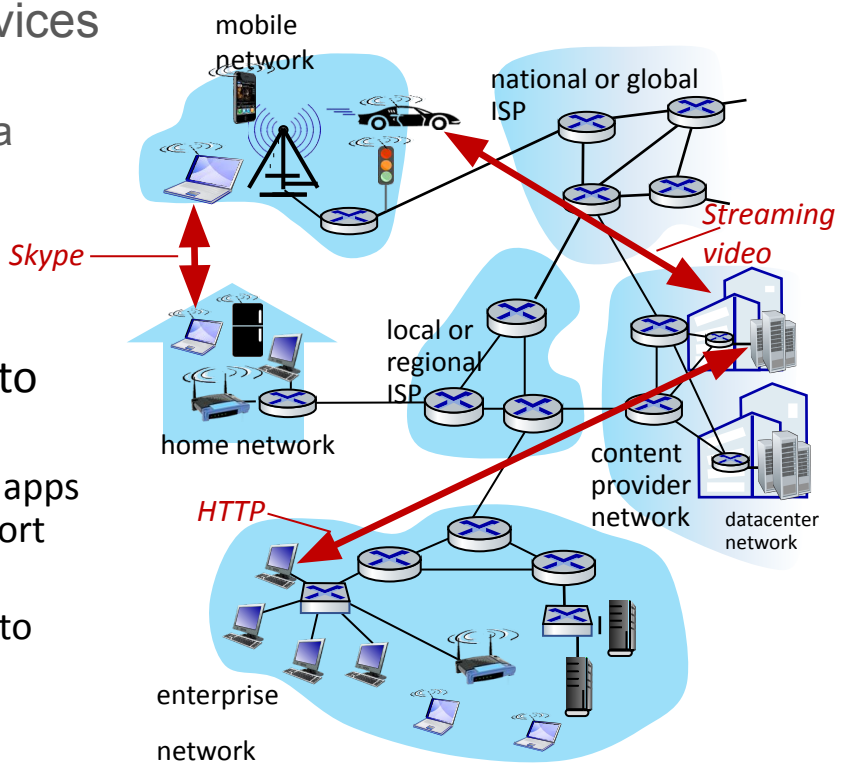
- *Internet standards*
  - RFC: Request for Comments
  - IETF: Internet Engineering Task Force



The Internet: A "Service" 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 is a Protocol?

Human protocols:

- "what's the time?"
- "I have a question"
- introductions

… specific messages sent

… specific actions taken when message received, or other events

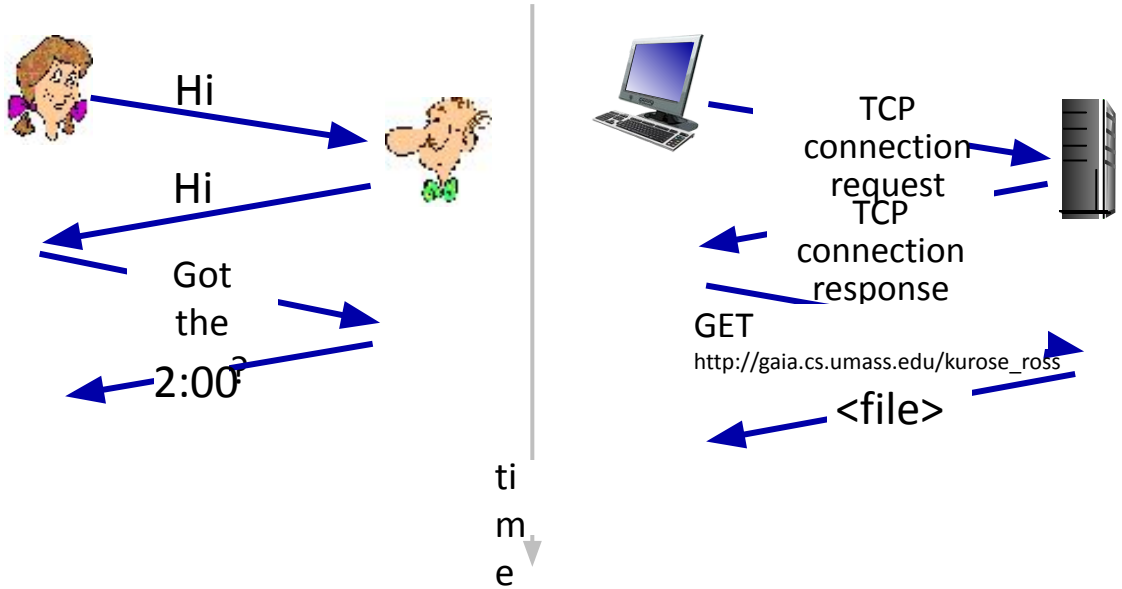
Network protocols:

- 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 msg transmission, receipt.

What's a Protocol?

A human protocol and a computer network protocol:



Q: other human protocols?

THANK YOU

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