CPET 581 E-Commerce & Business Technologies

E-Commerce Infrastructure

Lecture Note 2 of 2

References:
*Chapter 3. E-Commerce Infrastructure: The Internet, Web, and Mobile Platform of text book: *e-Commerce: Business*, Technology, and Society, 8th edition, 2012, by K. C. Laudon and C. G. Traver, publisher Pearson Education Inc.,

Paul I-Hai Lin, Professor
http://www.etcs.ipfw.edu/~lin
A Specialty Course for
M.S. in Technology IT/Advanced Computer Applications Program
Purdue University Fort Wayne Campus

Topics

- Internet Network Architecture
- Wireless Internet Access Network Technologies
- Internet 2 100 Gigabit Network
- High-Speed Optical Standards
- Internet Service Providers (ISPs) – Service Choices
- Network Categories and Topologies
- Routing Internet Messages, Documents, Graphics, etc.,
- IP Multicasting
- Wireless Internet Access Network Technologies
- Telephone-base Wireless Internet Access

1

Internet Network Architecture

- Backbone
  - High-bandwidth fiber-optic cable networks
  - Private networks owned by a variety of NSPs
  - Bandwidth: 155 Mbps–2.5 Gbps
  - Built-in redundancy
- Internet eXchange Points (IXP)
  - Hubs where backbones intersect with regional and local networks, and backbone owners connect with one another
- Campus Area Networks
  - LANs operating within a single organization that leases Internet access directly from regional or national carrier
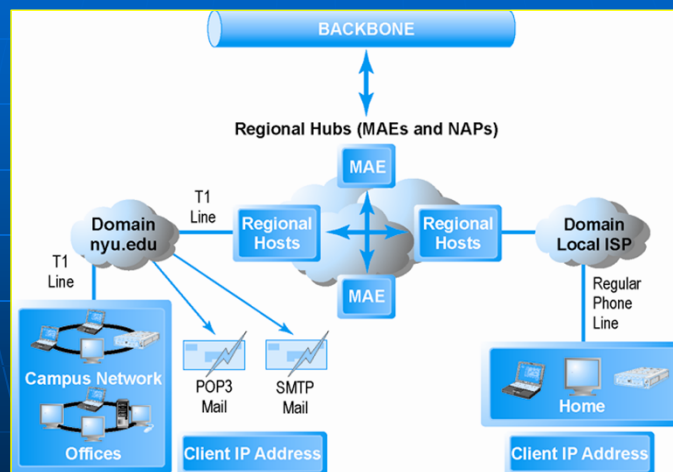
Internet Network Architecture

- Figure 3.12, Page 140

2

Internet2 100 Gigabit Network

- Internet2 Network, http://www.internet2.edu/network/

Internet2 Planned 100 Gigabit Infrastructure Topology (DRAFT)
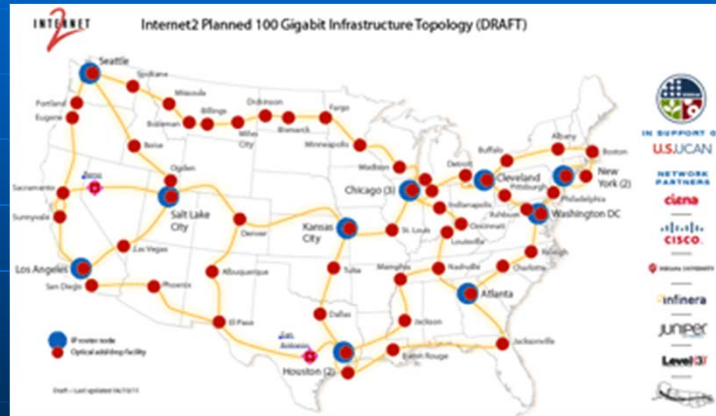
High-Speed Optical Bandwidth Standards

- TI   1.544 Mbps
- T3   43,231Mbps
- OC-3   155 Mbps
- OC-12   622 Mbps
- OC-48   2.5 Gbps
- OC-192   9.6 Gbps

ISP Service Levels and Bandwidth Choices (speed to desktop)

- Telephone modem   30-56 Kbps
- DSL   768 Kbps-7 Mbps
- Cable Modem   1 Mbps – 20 Mbps
- FiOS   15 Mbps – 50 Mbps
- Satellite   768 Kbps- 5 Mbps
- T1   1.54 Mbps
- T3   45 Mbps

Categories of Network

- Local Area Network (LAN)
  - Data rates: 2 Mbps, ..., 10 Mbps, 100 Mbps, Gigabits
- Metropolitan Area Network (MAN)
  - City wide coverage
  - Free WiFi Hotspots in Fort Wayne, http://www.openwifispots.com/city_free_wifi_wireless_hotspot-Fort_Wayne_IN.aspx#41.076945,-85.133966,14
  - Austin Wireless City, http://www.austinwirelesscity.org/
  - Hong Kong Government Wi-Fi Progamme, http://www.gov.hk/en/theme/wifi/program/index.htm
  - Taipei expands coverage of free wireless service, http://www.taipeitimes.com/News/taiwan/archives/2011/10/01/2003514656
    - 2,000 access points, min 512kbps connection speed
  - Digital Taichung – Wireless City, http://english.taichung.gov.tw/internet/english/docDetail.aspx?uid=3943&docid=11896
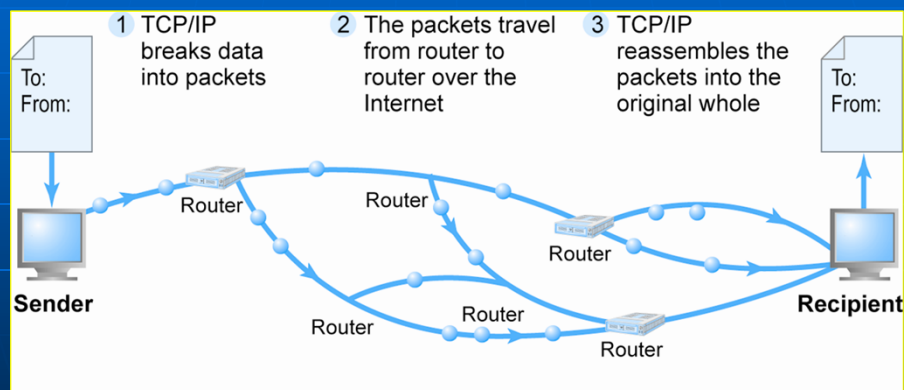
Categories of Network

- Wide Area Network (WAN):
  - Long distance transmission of data, voice, image, and video information
  - Enterprise network (owned by a single company)
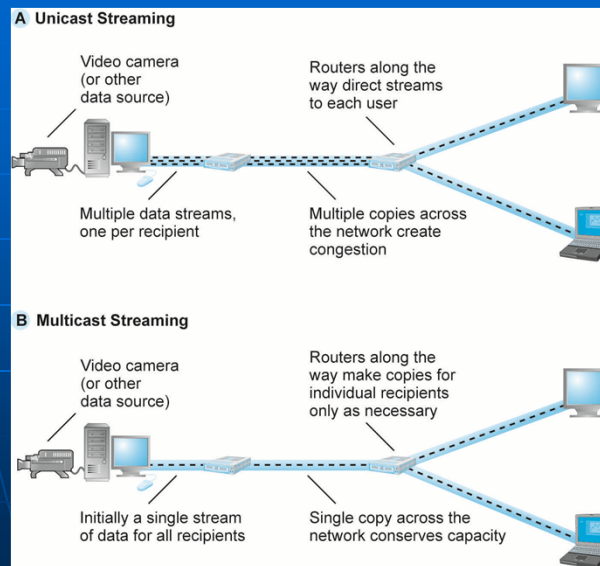- Storage Area Network (SAN)

Routing Internet Message: TCP/IP and Packet Switching

- Figure 3.5, Page 130

1. TCP/IP breaks data into packets
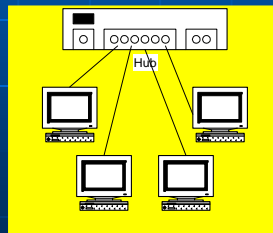2. The packets travel from router to router over the Internet
3. TCP/IP reassembles the packets into the original whole

To: From:

Sender   Router   Router   Router   Router   Router   Router   Recipient

IP Multicasting

Figure 3.17, Page 161

Network Topology (Star)

- Hub/Switch (central controller) acts as a exchange controller which relays the data to other connected devices
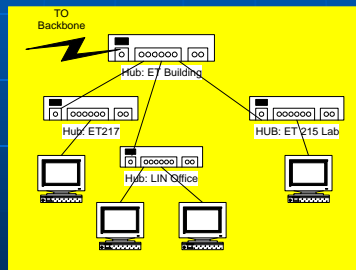- Each device has a dedicated point-to-point link only to a central controller

6

Network Topology (Tree)

- A variation of star
- Nodes in a tree are linked to a central hub that controls the traffic to the network

---

Wireless Internet Access Technology

- WiFi (IEEE 802.11 a/b/g/n)
  - 300 ft/11-70 Mbps
- WiMax (IEEE 802.16)
  - 30 miles/50-70 Mbps
- Bluetooth (wireless Personal Area Network)
  - 1-30 meters/1-3 Mbps
- Ultra-Wideband (UWB) – wireless personal area network:
  - 30 ft/5-10 Mbps
  - Intel UWB technology, http://www.intel.com/technology/comms/uwb/download/Ultra-Wideband.pdf
  - WiMedia Alliance, http://www.wimedia.org/en/index.asp
- ZigBee (wireless personal area network)
  - 30 ft/250 Kbps

Wi-Fi Networks

Figure 3.16, Page 158

How Google Works

Figure 3.22, Page 173
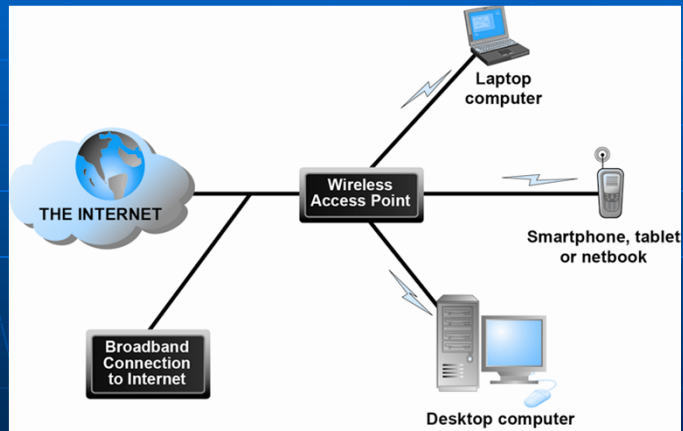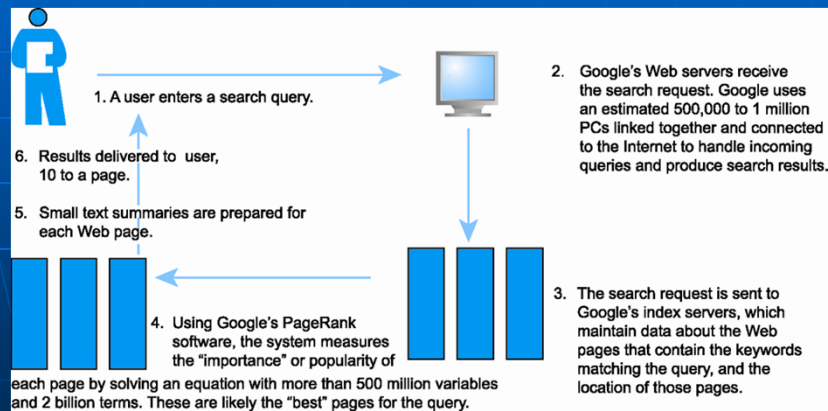
Summary

CPET 581 E-Commerce & Business
Technology, Paul I. Lin