

Telecommunications and Networking

- 1. What Is a Computer Network?
- 2. Network Fundamentals
- 3. The Internet and the World Wide Web
- 4. Network Applications



- 1. Compare and contrast the major types of networks.
- 2. Describe the wireline communications media and transmission technologies.
- 3. Describe the most common methods for accessing the Internet.
- 4. Explain the impact that networks have had on business and everyday life for each of the six major categories of network applications.

OPENING



Get Rid of E-Mail? Seriously?



- 1. Is it feasible for your university to eliminate e-mail? Why or why not? Would you support such a policy at your school? Why or why not?
- Describe the advantages and disadvantages of eliminating e-mail from an organization. Provide specific examples to support your answers.

4.1 What Is a Computer Network?

- Computer Network
- Bandwidth
- Broadband
- Local Area Networks
- Wide Area Networks
- Enterprise Networks

Figure 4.1: Ethernet Local Area Network (LAN)

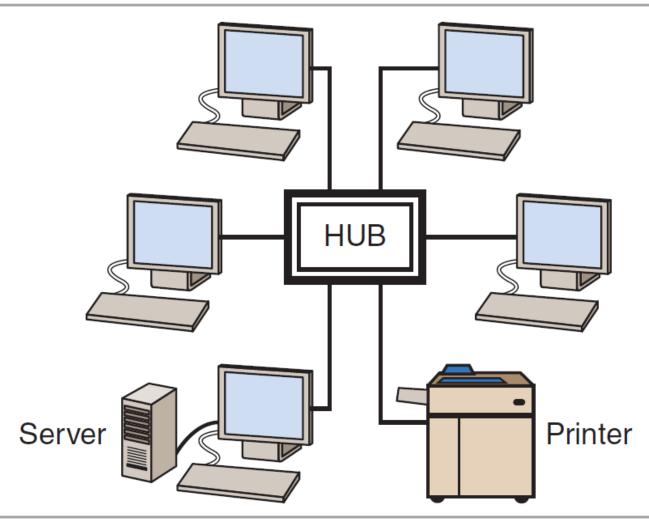
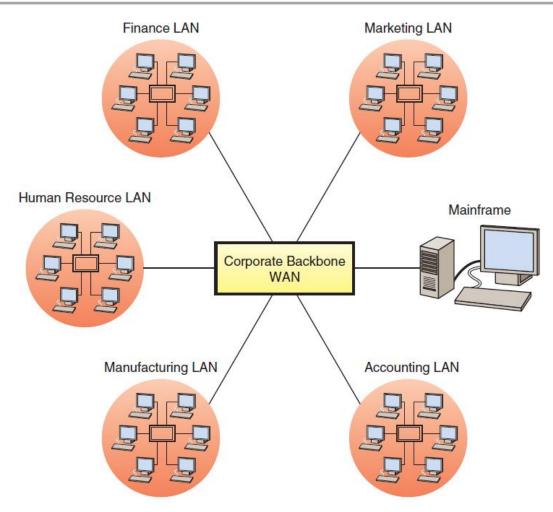


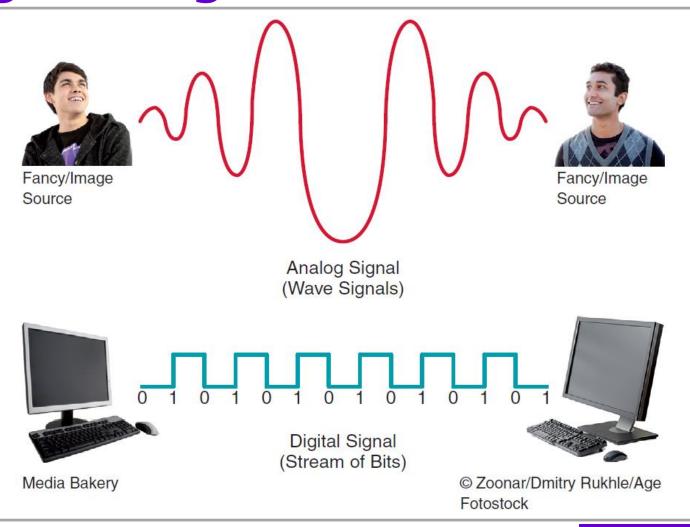
Figure 4.1: Ethernet Local Area Network (LAN)



4.2 Network Fundamentals

- Analog and Digital Signals
- Modem
- Communications Media and Channels
- Network Protocols
- Types of Network Processing

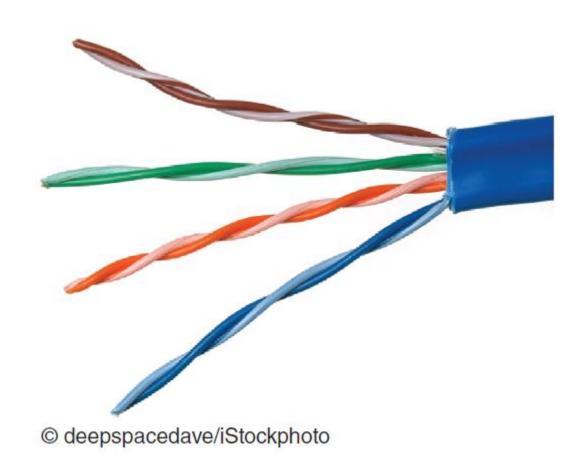
Figure 4.3: Analog and Digital Signals



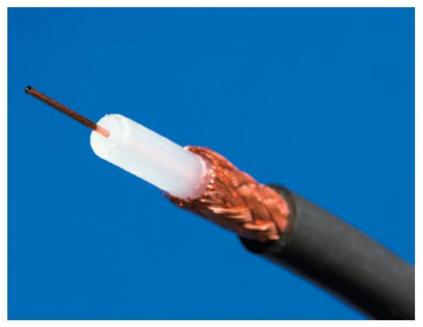
Communications Media and Channels

- Twisted-Pair Wire
- Coaxial Cable
- Fiber Optics

Communications Media: Twisted-Pair Wire



Communications Media: Coaxial Cable



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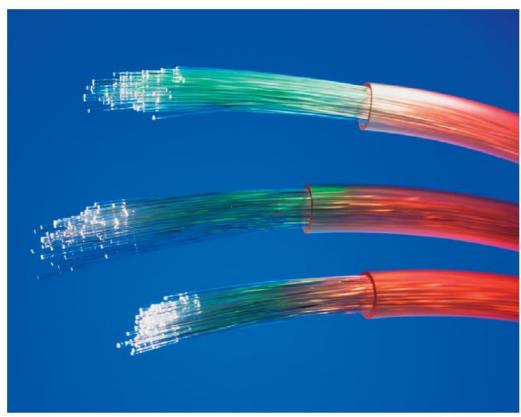
Cross-section view



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How coaxial cable looks to us

Communications Media: Fiber Optics



Philip Hatson/Science Source

Cross-section view



Chris Knapton/Science Source

How fiber-optic cable looks to us

Table 4.1: Advantages and Disadvantages of Wireline Communications Channels

Channel	Advantages	Disadvantages
Twisted-pair wire	Inexpensive	Slow (low bandwidth)
	Widely available	Subject to interference
	Easy to work with	Easily tapped (low security)
Coaxial cable	Higher bandwidth than twisted-pair	Relatively expensive and inflexible
		Easily tapped (low to medium security)
	Less susceptible to electromagnetic interference	Somewhat difficult to work with
Fiber-optic cable	Very high bandwidth	Difficult to work with (difficult to splice)
	Relatively inexpensive	
	Difficult to tap (good security)	

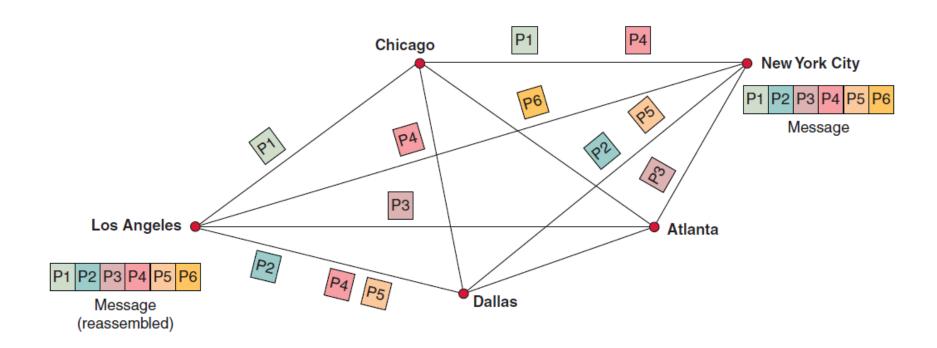
Network Protocols

- Ethernet
- Transmission Control Protocol / Internet Protocol (TCP/IP)

Transmission Control Protocol / Internet Protocol

- Three Basic Functions of TCP
- Packets & Packet Switching
- Four Layers of the TCP/IP Reference Model

Figure 4.8: Packet Switching



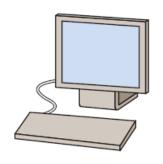
Three Basic Functions of the TCP

- 1. Manages the movement of data packets between computers by establishing a connection between the computers
- 2. Sequences the transfer of packets
- 3. Acknowledges the packets that have been transmitted

Four Layers of the TCP/IP Reference Model

- 1. Application Layer
- 2. Transport Layer
- 3. Internet Layer
- 4. Network Interface Layer

Figure 4.7: The Four Layers of TCP/IP Reference Model





Email: Sending a Message via SMPT (Simple Mail Transfer Protocol)	Application	Email: Message received
Break Message into packets and determine order	Transport	Packets reordered and replaced (if lost)
Assign sending and receiving IP addresses and apply to each packet	Internet	Packets routed through internal network to desired IP address
Determine path across network/ Internet to intended destination	Network Interface	Receipt of packets

Types of Network Processing

- Distributed Processing
- Client/Server Computing
- Peer-to-Peer Processing

'S ABOUT BUSINESS 4.1

Internet Access in Cuba

- 1. Describe the advantages and disadvantages of the global Internet to Cuban citizens.
- 2. Describe the advantages and disadvantages of the global Internet to the Cuban government.



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4.3 The Internet and the World Wide Web

- Internet versus WWW
- Accessing the Internet
- The Future of the Internet
- The World Wide Web

Accessing the Internet

- Connecting via an Online Service
- Connecting via Other Means
 - Internet kiosks
 - Smart phones and iPads
 - Cybercafes
- Addresses on the Internet

Figure 4.9: Internet (backbone in white)

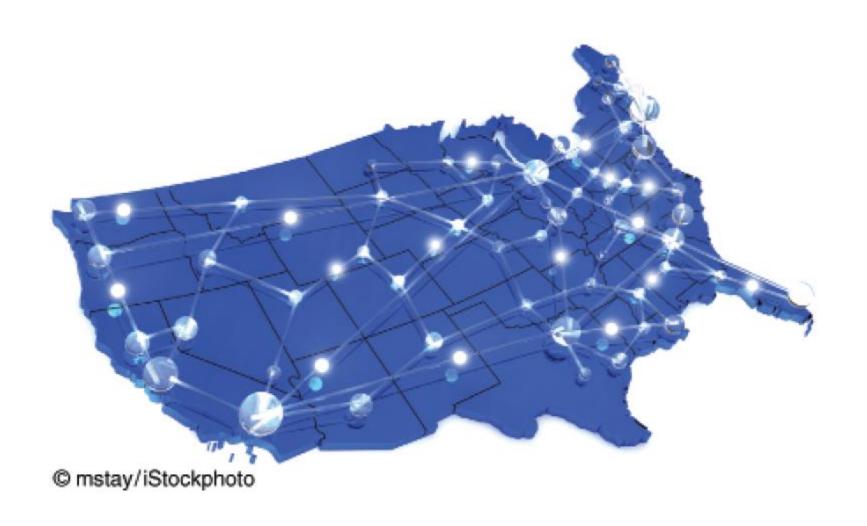


Table 4.2: Internet Connection Methods

Service	Description
Dial-up	Still used in the United States where broadband is not available
DSL	Broadband access via telephone companies
Cable modem	Access over your cable TV coaxial cable. Can have degraded performance if many of your neighbors are accessing the Internet at once
Satellite	Access where cable and DSL are not available
Wireless	Very convenient, and WiMAX will increase the use of broadband wireless
Fiber-to-the-home (FTTH)	Expensive and usually placed only in new housing developments

Future of the Internet

Experts are concerned that Internet users will experience brownouts from 3 factors:

- increasing number of people working online
- 2. Popularity of Web sites such as YouTube requiring large amounts of bandwidth
- 3. Demand for high-definition television delivered over the Internet

The World Wide Web (WWW)

- World Wide Web
- Internet
- Intranet
- Extranet

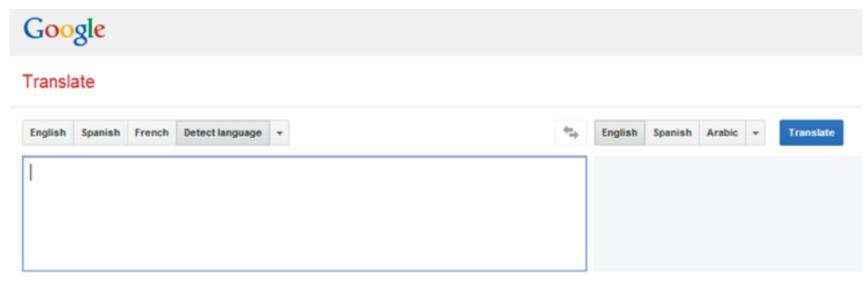
4.4 Network Applications

- Discovery
- Communication
- E-learning and Distance Education
- Virtual Universities
- Telecommuniting

Network Applications: Discovery

- Search Engines and Metasearch Engines
- Publication of Material in Foreign Languages
- Portals

Publication of Materials in Foreign Languages



Type text or a website address or translate a document.

Figure 4.10 Google Translate. (Google and the Google logo are registered trademarks of Google Inc., used with permission)

'S ABOUT BUSINESS 4.2

Just Exactly What Is Quara?

- Is Quora a search engine, a knowledgemanagement system, or both? Provide specific examples to support your answer.
- 2. Is there an inherent problem with Quora itself selecting experts to whom the site sends questions? Support your answer.

Network Applications: Portals

- Commercial portal
- Affinity portal
- Corporate portal
- Industrywide portal

Affinity Portals

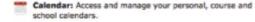


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What's Inside?



E-mail: Send and receive e-mail, and create your own personal address book.



Groups: Create, manage and join group homepages for clubs, affiliations and interests.

and much more...





Network Applications: Communication

- Electronic Mail
- Web-Based Call Centers
- Electronic Chat Rooms
- Voice Communication
 - Voice Over Internet Protocol (VoIP)
- Unified Communications
- Collaboration
- Electronic Teleconferencing

Telecommunication: Teleconferencing/Telepresence



HO Marketwire Photos/Newscom

Figure 4.12 Telepresence system.

Network Applications: Collaboration

- Workgroup
- Workflow
- Virtual Team
- Virtual Collaboration
- Crowdsourcing
- Synchronous versus Asynchronous
- Collaboration Tools

Collaboration Tools

- Microsoft Sharepoint
- Google Drive
- IBM Lotus Quikr
- Jive

Network Applications: E-Learning versus Distance Education

- E-Learning
- Distance Education

Virtual Universities

- University of Phoenix
- California Virtual Campus
- University of Maryland

Network Applications: Telecommuting

- Knowledge workers
- Digital Nomads

'S ABOUT BUSINESS 4.3

Yahoo! CEO Marissa Mayer Bans Telecommuting



- 1. Do you feel that Yahoo! is making the correct decision of banning telecommuting? a. Present the pro side of this issue (i.e., Mayer's side). b. Present the con side of this issue.
- 2. This IT's About Business was written in March 2014. Take a look at www.yahoo.com to see how the company is doing. Also, check on news articles about the ongoing fallout from Mayer's decision.
- 3. Discuss Mayer's internal memo quoted above. Do you agree or disagree with it? Support your answer.