MANAGEMENT INFORMATION SYSTEM

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COURSE OUTLINES

- Course Title
  - Management Information Systems
- Grading Policy
  - Exam → 80%
  - Tutorial / Assignment → 20%
- Textbook and Reference Materials
  - Course Manual for Management Information Systems CIS302, University of Ibadan Distance Learning Centre
  - Management Information Systems (Managing The Digital Firm) by Kenneth C. Laudon(New York University), Jane P. Laudon(Azimuth Information Systems), Twelfth Edition
  - Management Information Systems, Sixth Edition, by Effy Oz
- Course Duration
  - 12 Weeks

Telecommunications, the Internet, and Wireless Technology

LEARNING OUTCOMES

When you have studied this session, you should be able to:

- Understand the principal components of telecommunications networks and key networking technologies
- Define the main telecommunications transmission media and types of networks
- Recognize the internet technology and how do they support communication and e-business
- Understand the principal technologies and standards for wireless networking

CONTENTS

- Telecommunications and Networking in Today's Business World
- Communications Networks
- The Global Internet
- The Wireless Revolution

TELECOMMUNICATIONS AND NETWORKING IN TODAY'S BUSINESS WORLD

- In a business, can't do without networks
- Communicate rapidly with customers, suppliers, and Employees
- Use computers and e-mail, the Internet, cell phones, and mobile computers
- Networking and the Internet

NETWORKING AND COMMUNICATION TRENDS

- Telephone networks: voice communication
- Computer networks: data traffic
- Telecommunications: data transmission, Internet access, cellular telephone service, and television programming as well as voice service
- More powerful (faster), more portable (smaller and mobile), and less expensive
- High-speed **broadband** connections

WHAT IS A COMPUTER NETWORK?

- Two or more connected computers
- Hardware, software, and transmission components used in a simple network
- **Network interface card (NIC)**
  - The connection medium for linking network components
- **Network operating system (NOS)**
  - A switch or a hub acting as a connection point between the computers

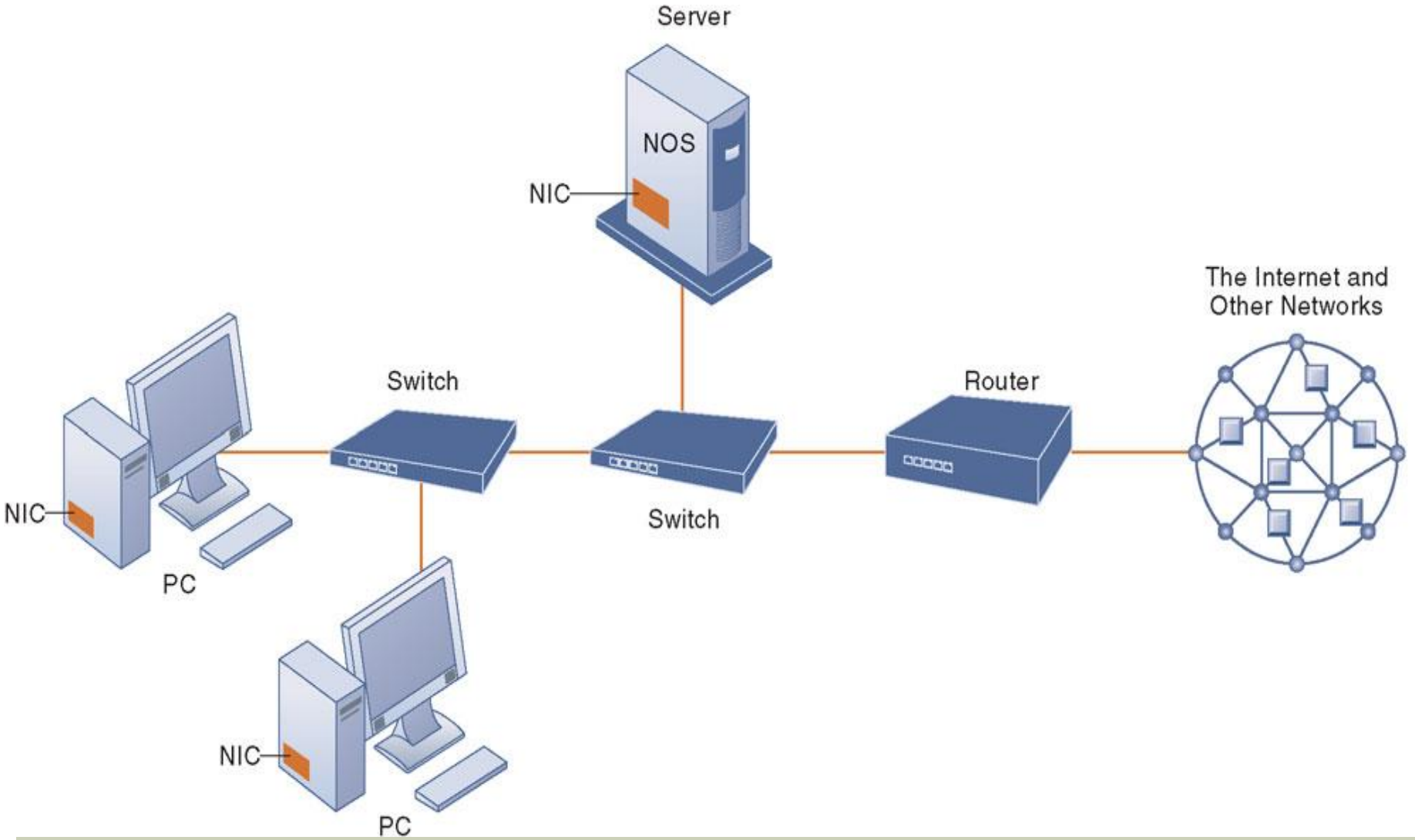

Figure: Components of a simple computer network

NETWORKS IN LARGE COMPANIES

- More complex, larger scale corporate-wide networks
- A mobile sales force using cell phones and smartphones,
- Mobile employees linking to the company Web site,
- Internal company networks using mobile wireless local area networks (Wi-Fi networks), and
- A videoconferencing system
- A separate telephone network
- Everything from ordinary telephone service and corporate data networks to Internet service, wireless Internet, and cell phones

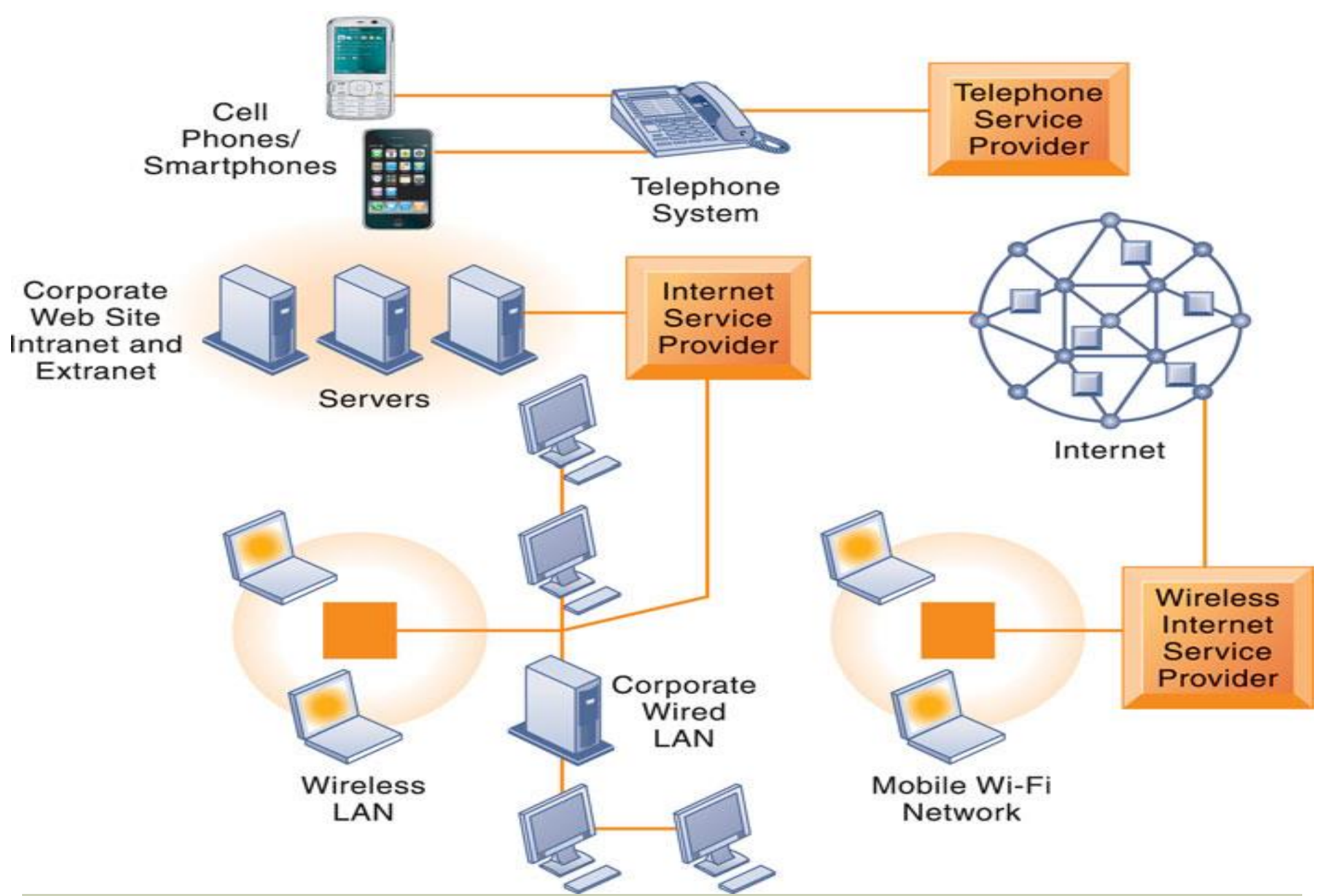

Figure: Corporate network infrastructure

KEY DIGITAL NETWORKING TECHNOLOGIES

- Based on three key technologies:
  - client/server computing,
  - the use of packet switching, and
  - the development of widely used communications standards

CLIENT/SERVER COMPUTING

- A distributed computing model
- Located within small, inexpensive client computers
- Linked to one another through a network that is controlled by a network server computer
- The Internet is the largest implementation of client/server computing

PACKET SWITCHING

- A method of slicing digital messages into parcels called packets
- Sending the packets along different communication paths
- Reassembling the packets once they arrive at their destinations
- More efficient use of the communications capacity of a network

PACKET SWITCHING (CONT.)

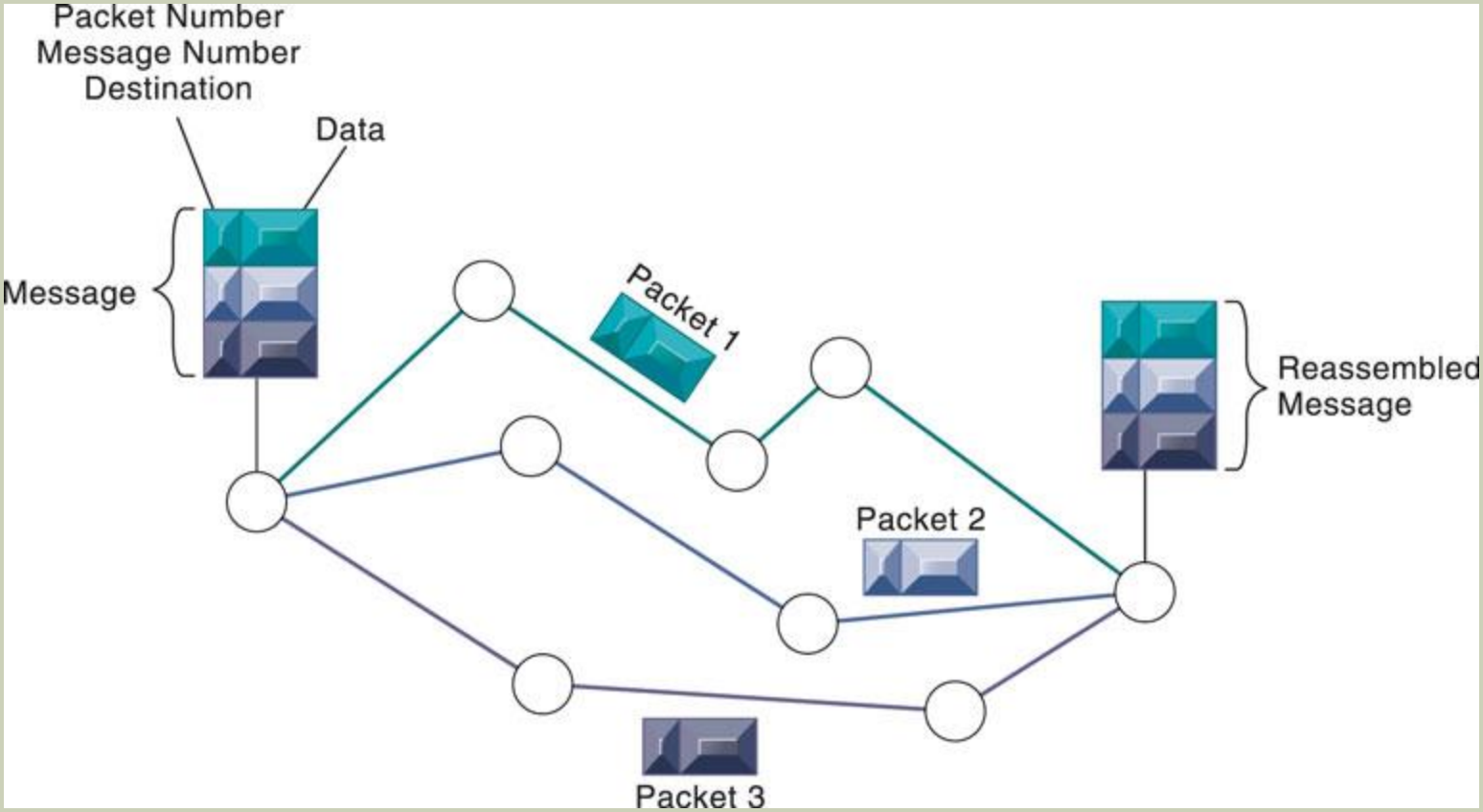

Figure: Packed-switched networks and packet communications

TCP/IP AND CONNECTIVITY

- Diverse hardware and software components need to work together to transmit information
- **Protocol:** a set of rules and procedures governing transmission of information between two points in a network
- **Transmission Control Protocol/Internet Protocol (TCP/IP)**
  - **TCP** establishes a connection between the computers, sequences the transfer of packets, and acknowledges the packets sent
  - **IP** is responsible for the delivery of packets and includes the disassembling and reassembling of packets during transmission

TCP/IP AND CONNECTIVITY (CONT.)

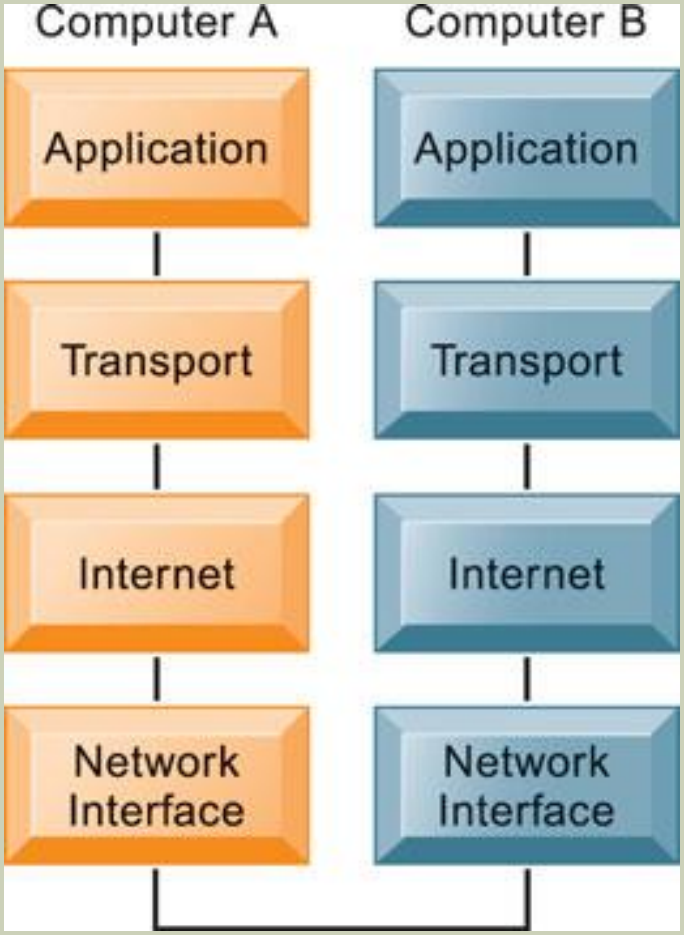

Figure: TCP/IP reference model

TCP/IP AND CONNECTIVITY (CONT.)

1. **Application layer:** enables client application programs to access the other layers and defines the protocols that applications use to exchange data. E.g, Hypertext Transfer Protocol (HTTP), which is used to transfer Web page files.
2. **Transport layer:** responsible for providing the Application layer with communication and packet services. E.g, TCP
3. **Internet layer:** responsible for addressing, routing, and packaging data packets called IP datagrams. E.g, IP
4. **Network Interface layer:** responsible for placing packets on and receiving them from the network medium, which could be any networking technology.

COMMUNICATIONS NETWORKS

SIGNALS: DIGITAL VS. ANALOG

- An *analog signal:*
  - a continuous waveform
  - passes through a communications medium
  - used for voice communication
- A *digital signal:*
  - a discrete, binary waveform
  - communicate information as strings of two discrete states: one bit and zero bits
  - represented as on-off electrical pulses

COMMUNICATIONS NETWORKS (CONT.)

- Modem: modulator-demodulator
- Cable modems connect the computer to the Internet using a cable network

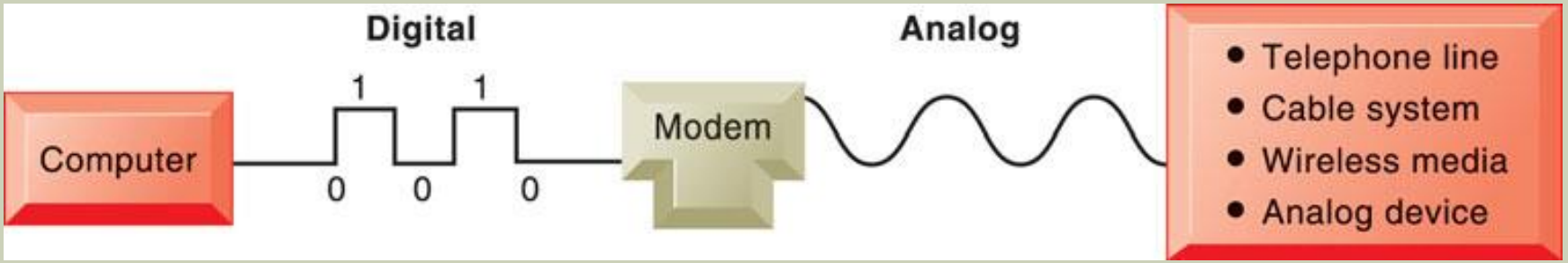

Figure: Functions of the modem

TYPES OF NETWORKS

Local Area Networks (LAN)

- Designed to connect personal computers and other digital devices within a half-mile or 500-meter radius
- A few computers in a small office, all the computers in one building, or all the computers in several buildings in close proximity.
- Providing users with access to shared computing resources in the network, including software programs and data files
- LAN operating systems: Windows, Linux, and Novell

TYPES OF NETWORKS (CONT.)

Metropolitan and Wide Area Networks

- **Wide area networks (WANs)** span broad geographical distances—entire regions, states, continents, or the entire globe
- The most universal and powerful WAN: the Internet
- **Metropolitan area networks (MANs)** span a metropolitan area, usually a city and its major suburbs
- Its geographic scope falls between a WAN and a LAN

TYPES OF NETWORKS (CONT.)

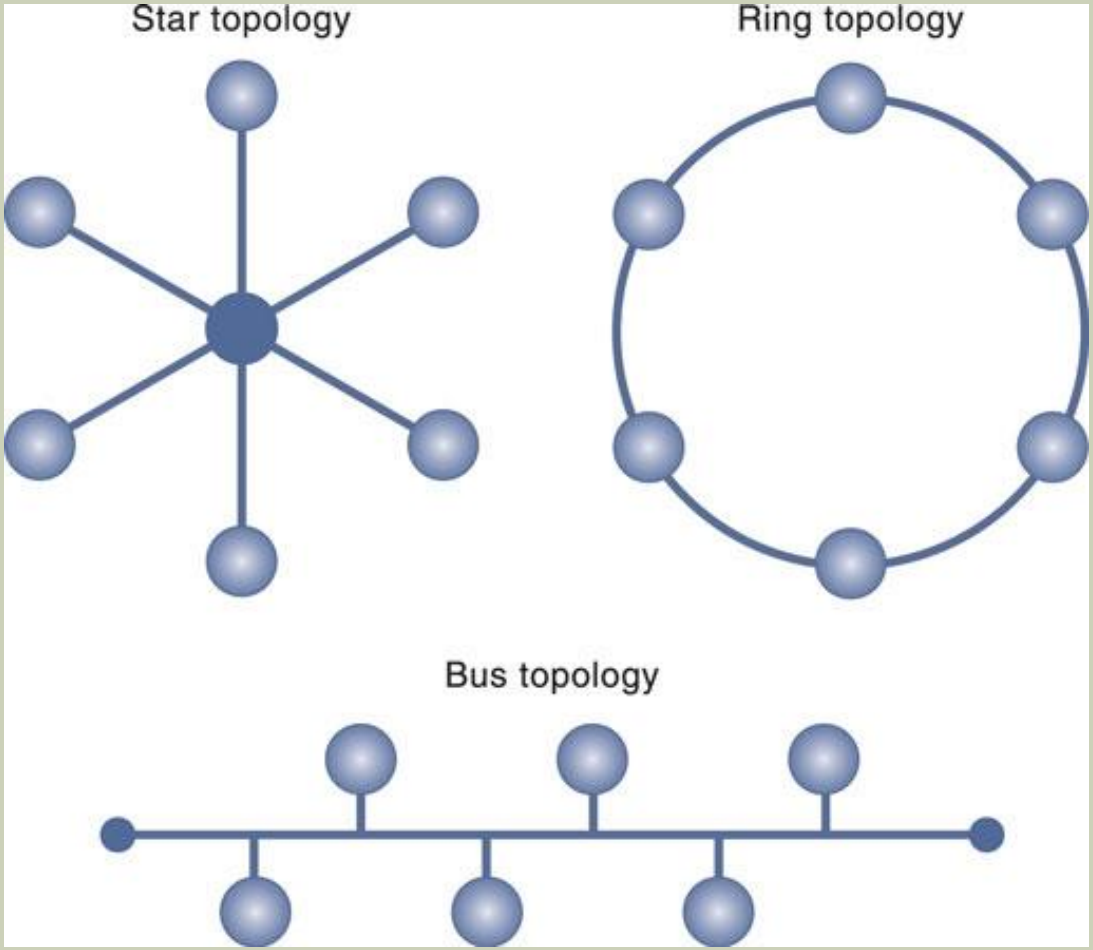

Figure: Network topologies

PHYSICAL TRANSMISSION MEDIA

Twisted Wire

- Strands of copper wire twisted in pairs
- For analog communication as well as digital communication
- CAT5, can obtain speeds up to 1 Gbps

Coaxial Cable

- Thickly insulated copper wire
- Can transmit a larger volume of data
- Speeds up to 1 Gbps

Fiber Optics and Optical Networks

- Bound strands of clear glass fiber
- Rates varying from 500 kilobits to several trillion bits per second
- Faster, lighter, and more durable than wire media
- More expensive than other physical transmission media and harder to install

WIRELESS TRANSMISSION MEDIA

Microwave:

- Both terrestrial and celestial, transmit high-frequency radio signals through the atmosphere
- High-volume, long-distance, point-to-point communication
- Communication satellites use microwave transmission

Cellular:

- Use radio waves to communicate with radio antennas (towers) placed within adjacent geographic areas called cells
- From a **cell phone** to a local cell pass from antenna to antenna—cell to cell

THE GLOBAL INTERNET

- Become an indispensable personal and business tool
- what exactly is the Internet?
- How does it work, and
- What does Internet technology have to offer for business?

WHAT IS THE INTERNET?

- The world's most extensive, public communication system
- The world's largest implementation of client/server computing
- Internetworking
- Linking millions of individual networks all over the world
- An **Internet service provider (ISP):** a commercial organization with a permanent connection to the Internet that sells temporary connections to retail subscribers

THE DOMAIN NAME SYSTEM

- Converts domain names (English-like name corresponds to the unique 32-bit numeric IP address) to IP addresses

  .com Commercial organizations/businesses

  .edu Educational institutions

  .gov U.S. government agencies

  .mil U.S. military

  .net Network computers

  .org Nonprofit organizations and foundations

  .biz Business firms

  .info Information providers

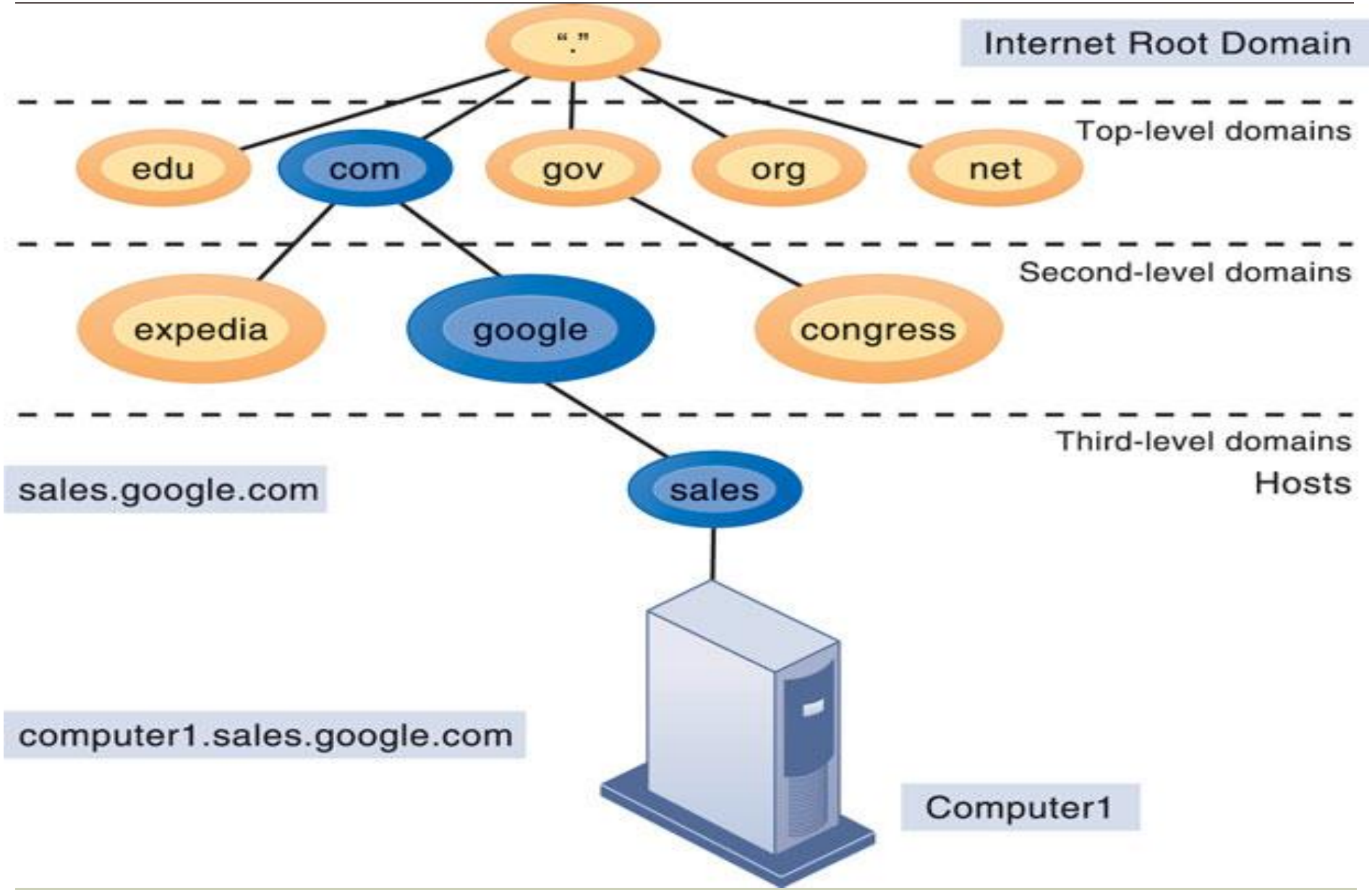

Figure: The domain name system

INTERNET SERVICES AND COMMUNICATION TOOLS

- Based on client/server technology
- The data, including e-mail messages and Web pages, are stored on servers.
- A client uses the Internet to request information from a particular Web server on a distant computer.
- The server sends the requested information back to the client over the Internet.

MAJOR INTERNET SERVICES

CAPABILITY	FUNCTIONS SUPPORTED
E-mail	Person-to-person messaging; document sharing
Chatting and instant messaging	Interactive conversations
Newsgroups	Discussion groups on electronic bulletin boards
Telnet	Logging on to one computer system and doing work on another
File Transfer Protocol (FTP)	Transferring files from computer to computer
World Wide Web	Retrieving, formatting, and displaying information (including text, audio, graphics, and video) using hypertext links

VIRTUAL PRIVATE NETWORKS

- Secure, encrypted, private network
- Configured within a public network to take advantage of the economies of scale and management facilities of large networks
- Lower cost than the same capabilities offered by traditional non-Internet providers
- Combining voice and data networks

VIRTUAL PRIVATE NETWORKS (CONT.)

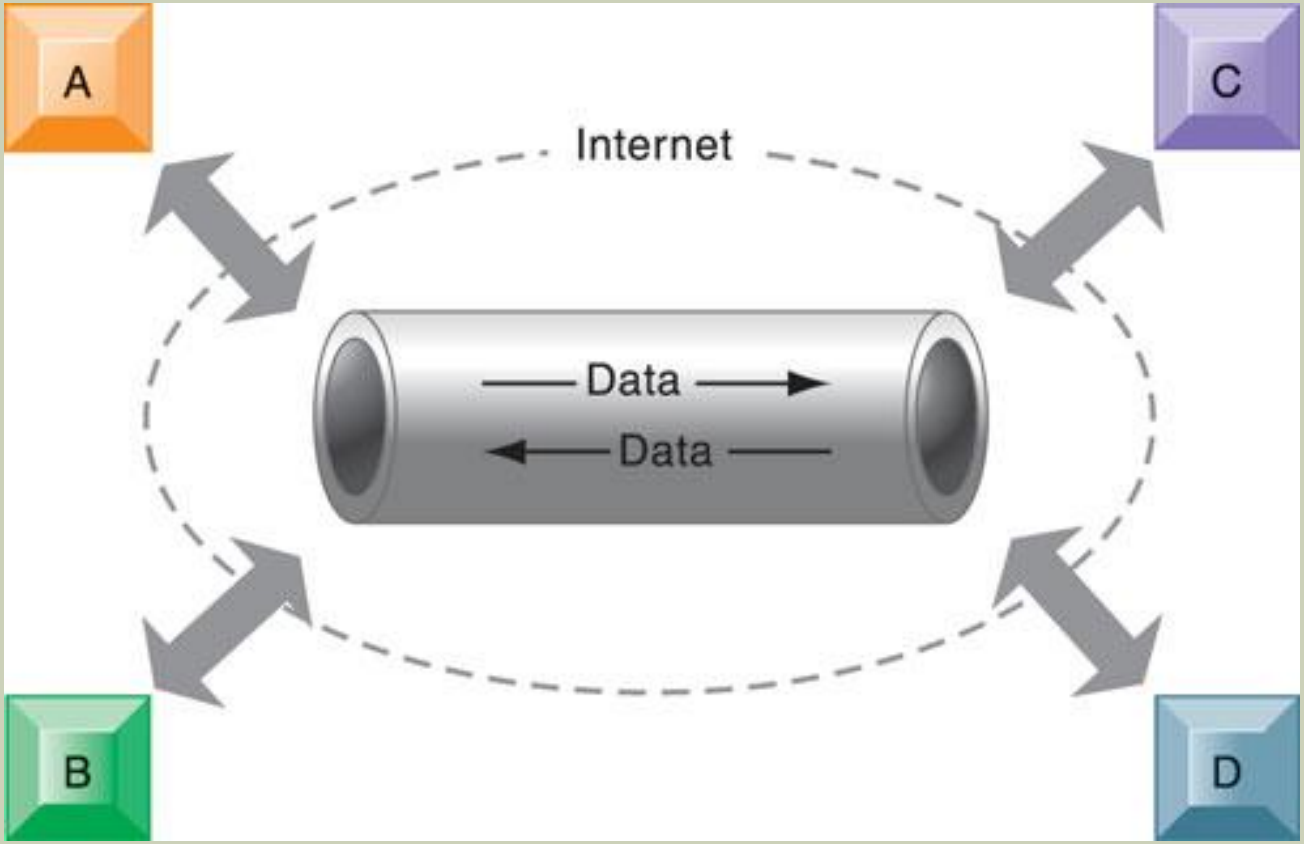

Figure: A virtual private network using the internet

THE WEB

- The most popular Internet service
- Used the Web to download music, to find information for a term paper, or to obtain news and weather reports
- A client/server architecture
- A typical **Web site** is a collection of Web pages linked to a home page.

THE WIRELESS REVOLUTION

- Cell phones, smartphones, and wireless-enabled personal computers
- Global System for Mobile Communication (GSM)
- Code Division Multiple Access (CDMA)
- Bluetooth
- Wi-Fi
- WiMax
- Radio frequency identification (RFID)
- Wireless Sensor Networks

Next Week Lecture: **System Development Life Cycle (SDLC)**

THANK YOU.