



Chapter 7

Telekomunikasi, Internet, dan Teknologi Nirkabel

Kasus video: Kasus 1: Telepresence Bergerak Keluar dari Ruang Angkasa dan Ke Lapangan
Kasus 2: Unified Communications Systems: Kolaborasi Virtual dengan Lotus Sametime



Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

LEARNING OBJECTIVES

- **Identifikasi komponen utama jaringan telekomunikasi dan teknologi jaringan utama. Identifikasi berbagai jenis jaringan.**
- **Jelaskan bagaimana teknologi Internet dan Internet bekerja dan bagaimana mereka mendukung komunikasi dan e-bisnis .**
- **Jelaskan teknologi dan standar utama untuk jaringan nirkabel, komunikasi, dan akses Internet.**
- **Jelaskan identifikasi frekuensi radio dan jaringan sensor nirkabel dan identifikasi mengapa ini adalah teknologi bisnis yang berharga.**

RFID and Wireless Technology Speed Up Production at Continental Tires

- **Masalah: Proses manual yang tidak efisien; lingkungan produksi yang besar**
- **Solusi: Melacak komponen secara real time, mengoptimalkan transportasi, dan memperlancar komunikasi Jaringan Wi-Fi Teknologi RFID Handheld genggam Perangkat lunak pelacakan inventori material Menunjukkan penggunaan teknologi dalam rantai produksi dan pasokan untuk meningkatkan efisiensi dan menurunkan biaya**

- **Tren Jaringan dan Komunikasi**
- **Konvergensi: Jaringan telepon dan jaringan komputer berkumpul ke dalam jaringan digital tunggal dengan menggunakan standar Internet**
- **Broadband: Lebih dari 68% pengguna Internet A.S. memiliki akses broadband**
- **nirkabel: Suara, komunikasi data semakin banyak terjadi di platform broadband nirkabel**

- **Jaringan komputer**

- Dua atau lebih komputer yang terhubung
- Komponen utama dalam jaringan sederhana Komputer
 - ❖ client dan server
 - ❖ Antarmuka jaringan (NIC)
 - ❖ Media koneksi Sistem operasi jaringan
 - ❖ hubs, switch, router
- Jaringan yang didefinisikan perangkat lunak (SDN)
 - ❖ Fungsi switch dan router yang dikelola oleh program pusat

Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

Komponen Jaringan Komputer Sederhana

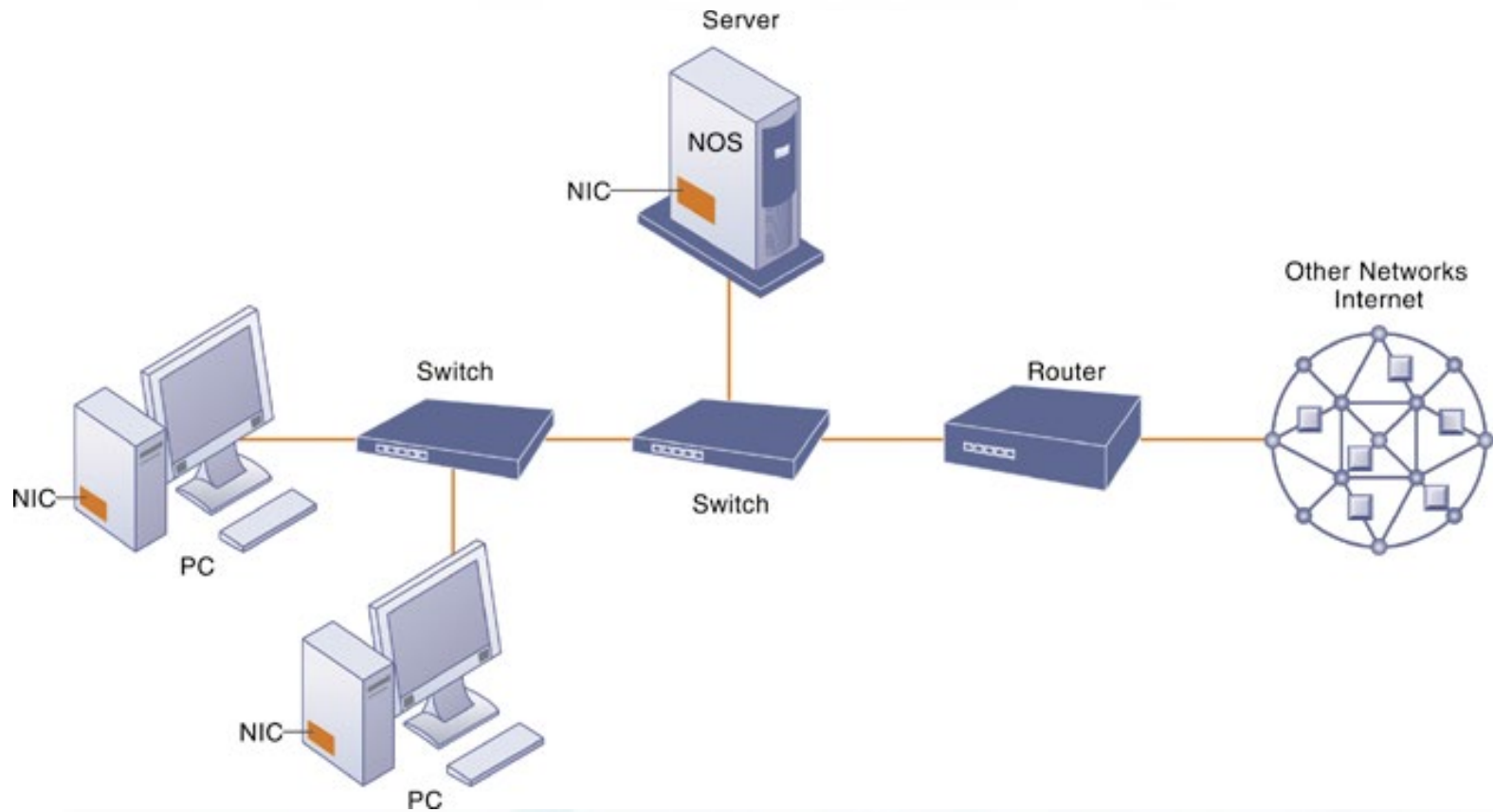


Figure 7-1

Ilustrasi di sini adalah jaringan komputer yang sangat sederhana, terdiri dari komputer, sistem operasi jaringan yang berada pada komputer dedicated server, kabel (kabel) yang menghubungkan perangkat, kartu antarmuka jaringan (NIC), switch, dan router.



Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

Telekomunikasi dan Jaringan di Dunia Bisnis Hari Ini

- Jaringan di perusahaan besar
 - Ratusan jaringan area lokal (LAN) terhubung dengan jaringan perusahaan secara keseluruhan
 - Berbagai server yang powerful
- Situs web
- Intranet perusahaan, ekstranet
- Sistem backend
 - LAN nirkabel seluler (jaringan Wi-Fi)
- Sistem konferensi video
- Jaringan telepon
- Ponsel nirkabel

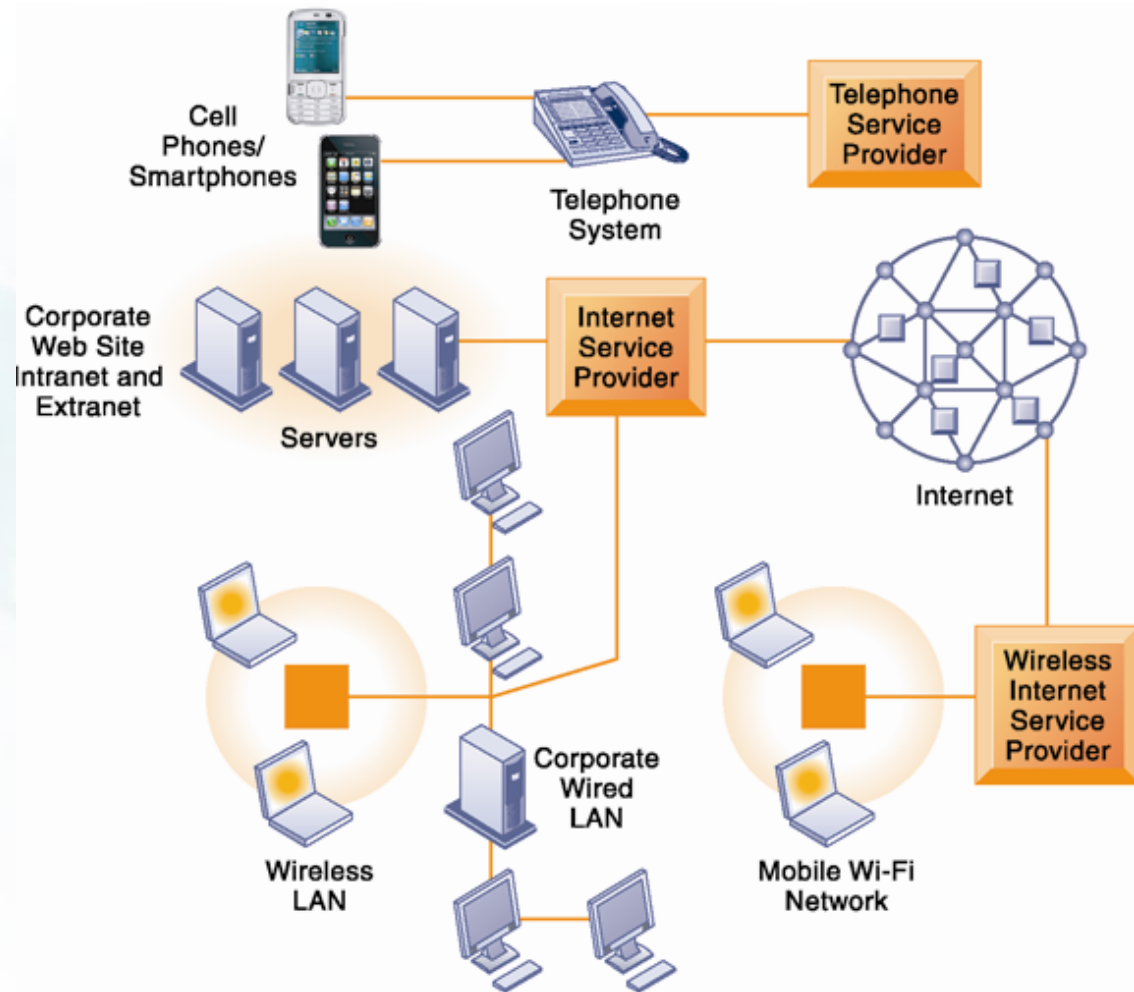
Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

Infrastruktur Jaringan Perusahaan

Infrastruktur jaringan korporat hari ini adalah kumpulan berbagai jaringan dari jaringan telepon umum, ke Internet, ke jaringan area lokal perusahaan yang menghubungkan kelompok kerja, departemen, atau rantai kantor.

Figure 7-2





➤ Teknologi jaringan digital kunci Komputasi

client / server Model komputasi

- terdistribusi Klien terhubung
- melalui jaringan yang dikendalikan oleh komputer server
- jaringan Server menetapkan aturan komunikasi untuk jaringan dan menyediakan setiap klien dengan alamat sehingga orang lain dapat menemukannya di jaringan
- Sebagian besar telah menggantikan komputasi mainframe
- terpusat Internet: implementasi terbesar dari komputasi client / server



Telekomunikasi dan Jaringan di Dunia Bisnis Hari Ini

– Teknologi jaringan digital. Packet switching

- Metode mengiris pesan digital menjadi paket (paket), mengirim paket sepanjang jalur komunikasi yang berbeda saat tersedia, dan kemudian memasang kembali paket di tempat tujuan.
- Jaringan circuit-switched sebelumnya mensyaratkan perakitan rangkaian titik-ke-titik yang lengkap
- **Packet beralih lebih efisien menggunakan kapasitas komunikasi jaringan**

Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

Packet-Switched Networks dan Packet Communications

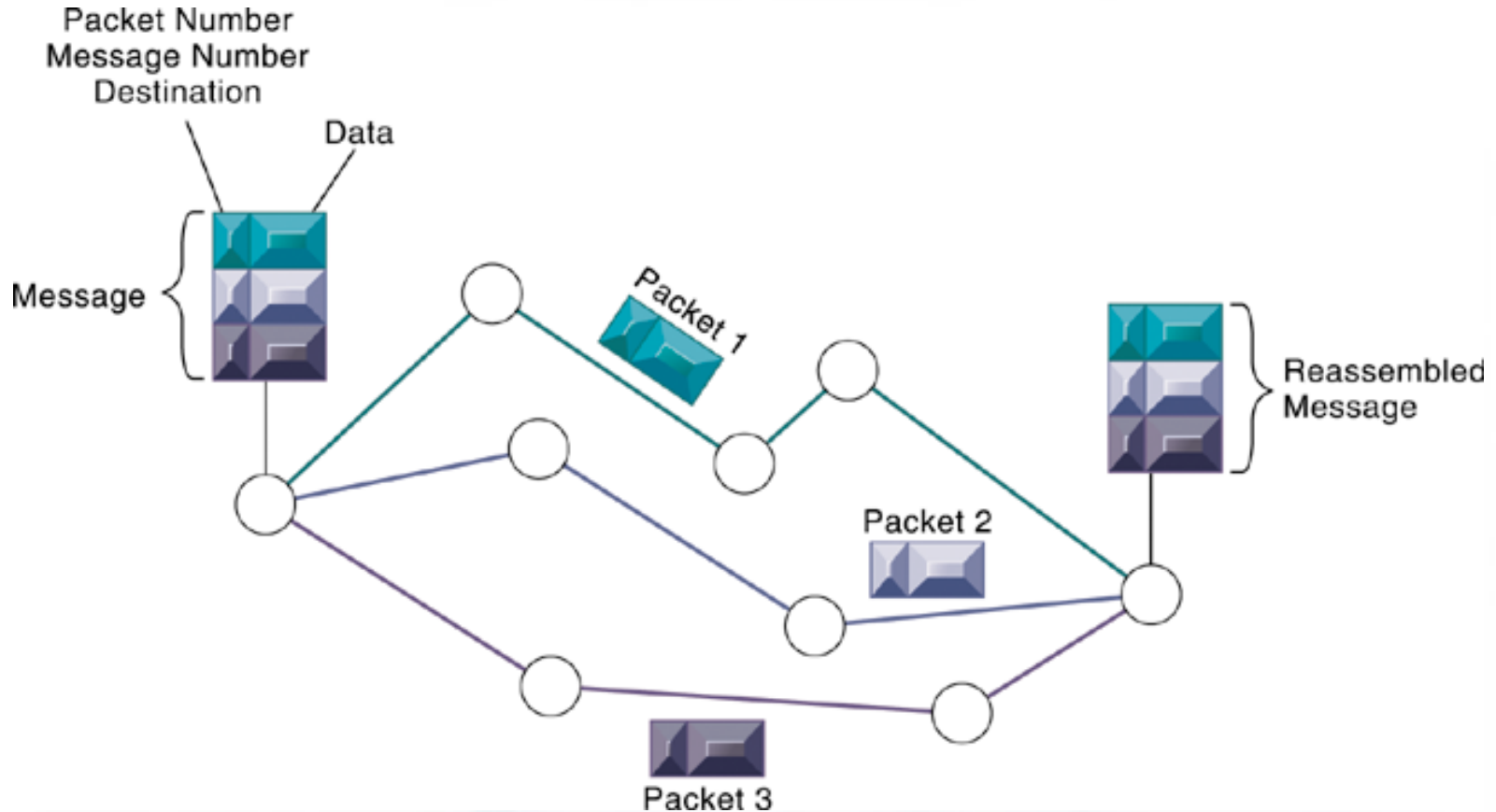


Figure 7-3

Data dikelompokkan ke dalam paket kecil, yang ditransmisikan secara independen melalui berbagai saluran komunikasi dan dipasang kembali di tempat tujuan akhir.



Telekomunikasi dan Jaringan di Dunia Bisnis Hari Ini

– Teknologi jaringan digital kunci (lanjutan)

- TCP / IP dan konektivitas
- Protokol: aturan yang mengatur transmisi informasi antara dua titik
- Protokol Kontrol Transmisi / Protokol Internet (TCP / IP) Standar umum di seluruh dunia adalah dasar untuk Internet
 - Model referensi Departemen Pertahanan untuk TCP / IP
 - » Empat lapisan
 - » Lapisan aplikasi
 - » Lapisan aplikasi
 - » Lapisan internet
 - » Lapisan antarmuka jaringan

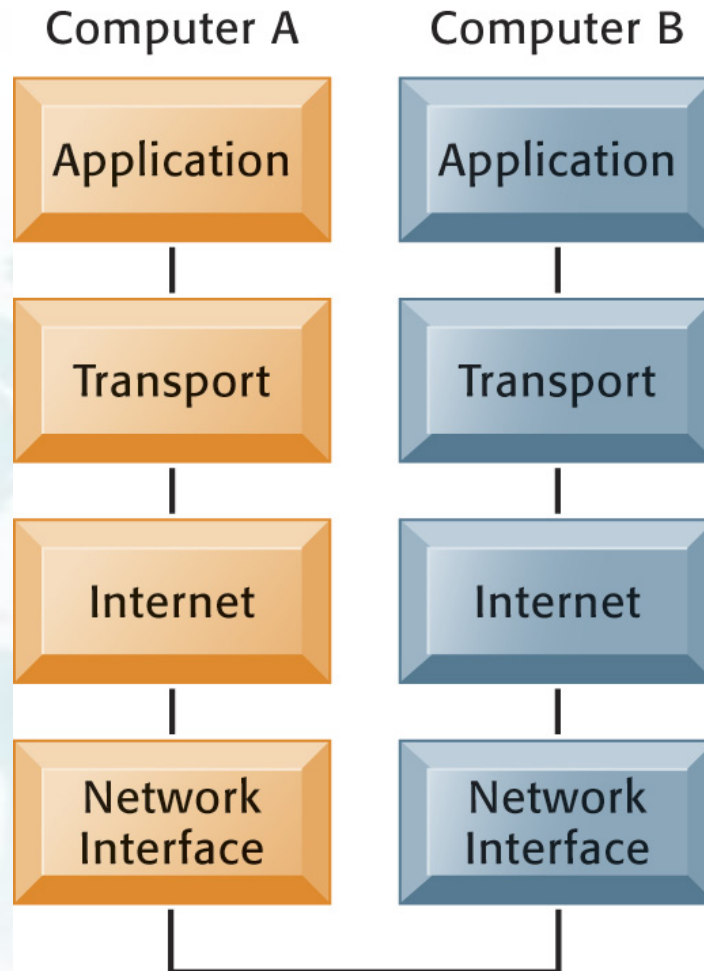
Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

Model Referensi Protokol Kontrol Transmisi / Protokol Internet (TCP / IP)

Angka ini menggambarkan empat lapisan model referensi TCP / IP untuk komunikasi.

Figure 7-4





Jaringan Komunikasi

- Sinyal: Digital versus analog
- Modem: menerjemahkan sinyal digital menjadi bentuk analog (dan vica versa)
 - Jenis jaringan
 - Jaringan area lokal (LAN)
 - Ethernet
 - Client/server vs. peer-to-peer
 - Jaringan wide-area (WAN)
 - Metropolitan-area networks (MANs)
- Jaringan area kampus (CANs)



Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

Fungsi Modem

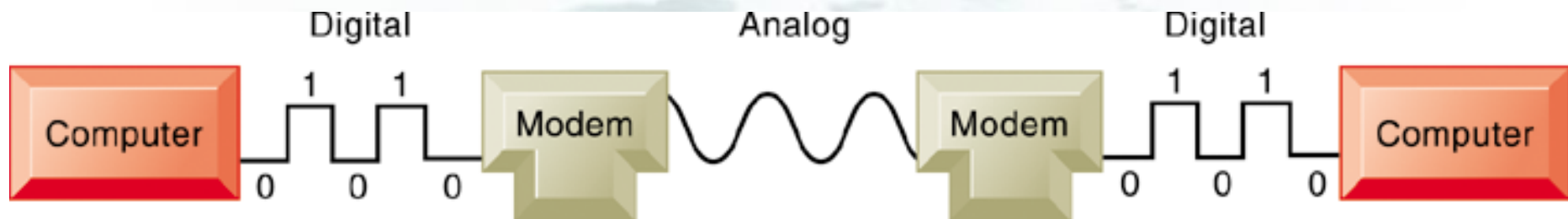


Figure 7-5

Modem adalah perangkat yang menerjemahkan sinyal digital menjadi bentuk analog (dan sebaliknya) sehingga komputer dapat mengirimkan data melalui jaringan analog seperti jaringan telepon dan kabel.



Jaringan Komunikasi

- **Media transmisi fisik**
 - **Kawat twisted pair (CAT5)**
 - **Kawat koaksial**
 - **Kabel serat optik**
 - **Media dan perangkat transmisi nirkabel**
 - **Satelit**
 - **Sistem seluler**
- **Kecepatan transmisi**
- **Bit per detik (bps)**
- **Hertz Bandwidth**
- **Kecepatan transmisi**



Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

Internet Global

- **Internet**
- **Jaringan paling luas di dunia**
 - **Penyedia layanan internet (ISP)**
 - **Menyediakan koneksi**
 - **Jenis koneksi internet**
 - **Dial-up: 56.6 Kbps**
 - **Digital subscriber line (DSL/FIOS): 385 Kbps–40 Mbps**
 - **Koneksi Internet kabel: 1-50 Mbps**
 - **Satelit**
 - **T1/T3 lines: 1.54–45 Mbps**



Internet Global

- **Pengalamatan dan arsitektur internet**
 - **Alamat IP**
- **Sistem nama domain (DNS)**
 - **Mengonversi alamat IP menjadi nama domain**
 - **Struktur hirarkis**
 - **Domain tingkat atas**
- **Arsitektur dan tata kelola internet**
 - **Tidak ada manajemen formal: IAB, ICANN, W3C**
 - **Internet masa depan: IPv6 dan Internet2**

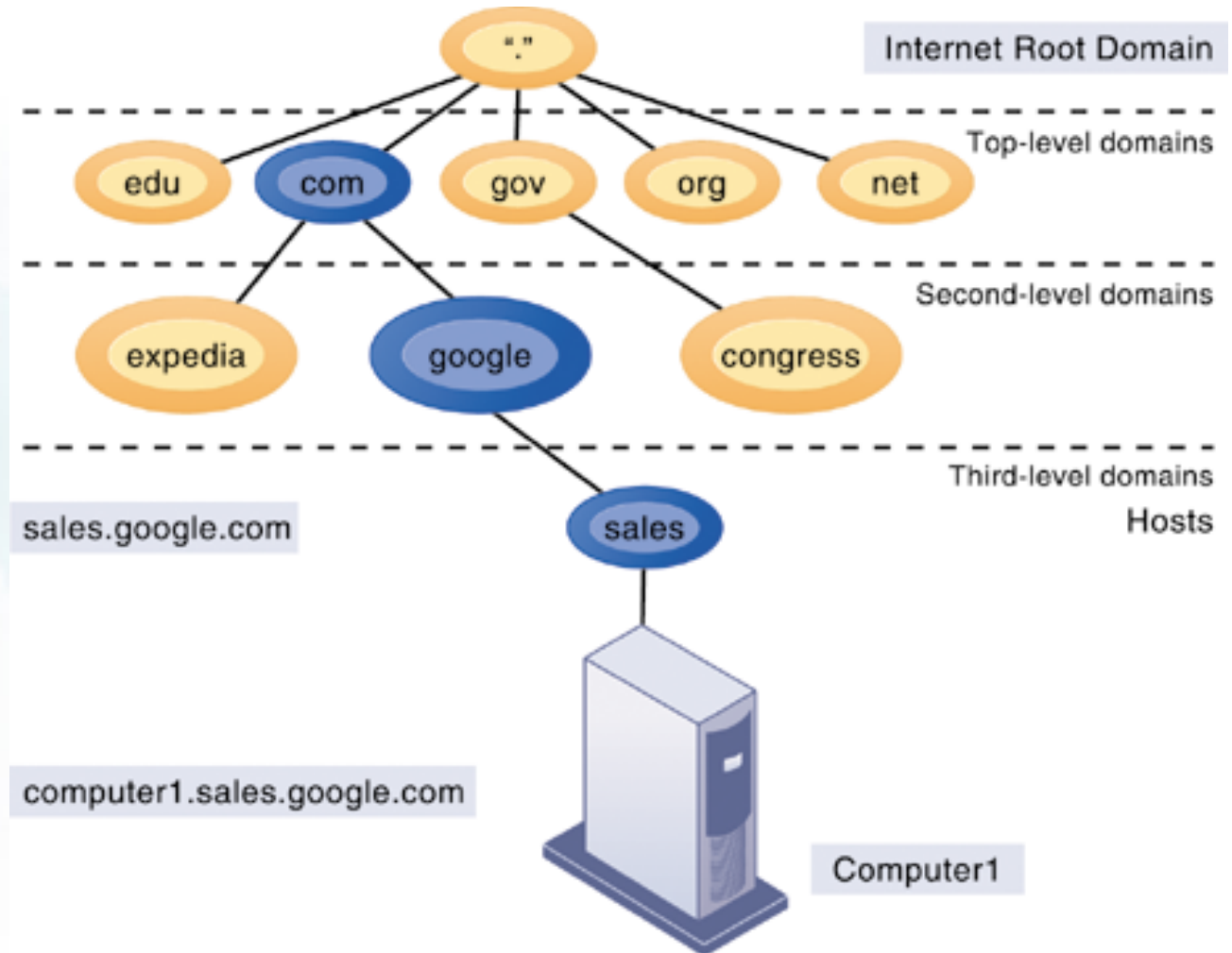
Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

Sistem Nama Domain

Domain Name System adalah sistem hirarkis dengan domain akar, domain tingkat atas, domain tingkat kedua, dan komputer host di tingkat ketiga.

Figure 7-6



Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

Internet Network Architecture

The Internet backbone connects to regional networks, which in turn provide access to Internet service providers, large firms, and government institutions. Network access points (NAPs) and metropolitan area exchanges (MAEs) are hubs where the backbone intersects regional and local networks and where backbone owners connect with one another.

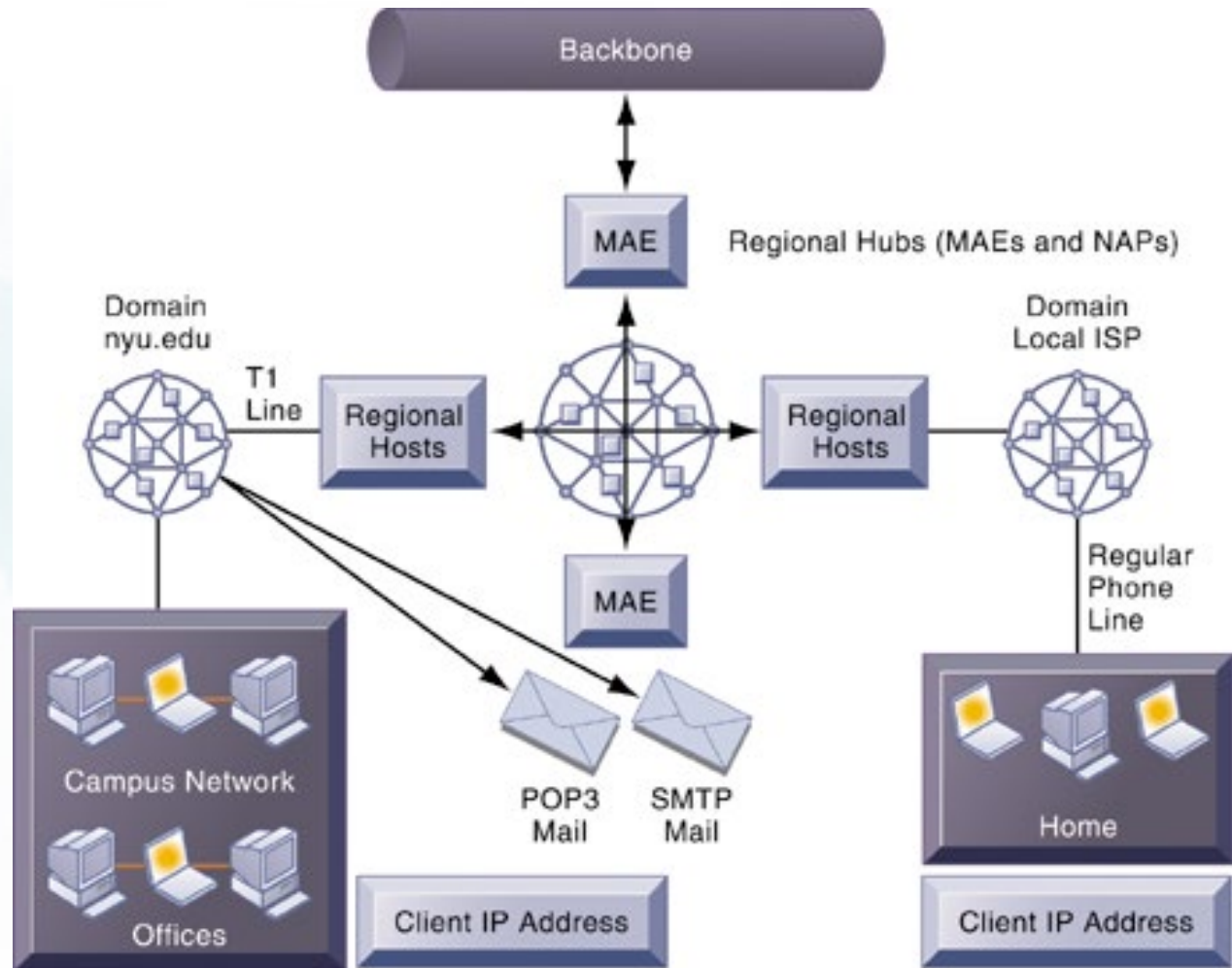


Figure 7-7



Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

Interactive Session: Organizations

The Battle over Net Neutrality

Read the Interactive Session and discuss the following questions

- What is network neutrality? Why has the Internet operated under net neutrality up to this point in time?
- Who's in favor of network neutrality? Who's opposed? Why?
- What would be the impacts on individual users, businesses, and government if Internet providers switched to a tiered service model?
- Are you in favor of legislation enforcing network neutrality? Why or why not?



The Global Internet

- **Internet services**
 - E-mail
 - Chatting and instant messaging
 - Electronic discussion groups / newsgroups
 - Telnet
 - File Transfer Protocol (FTP)
 - World Wide Web

Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

Client/Server Computing on the Internet

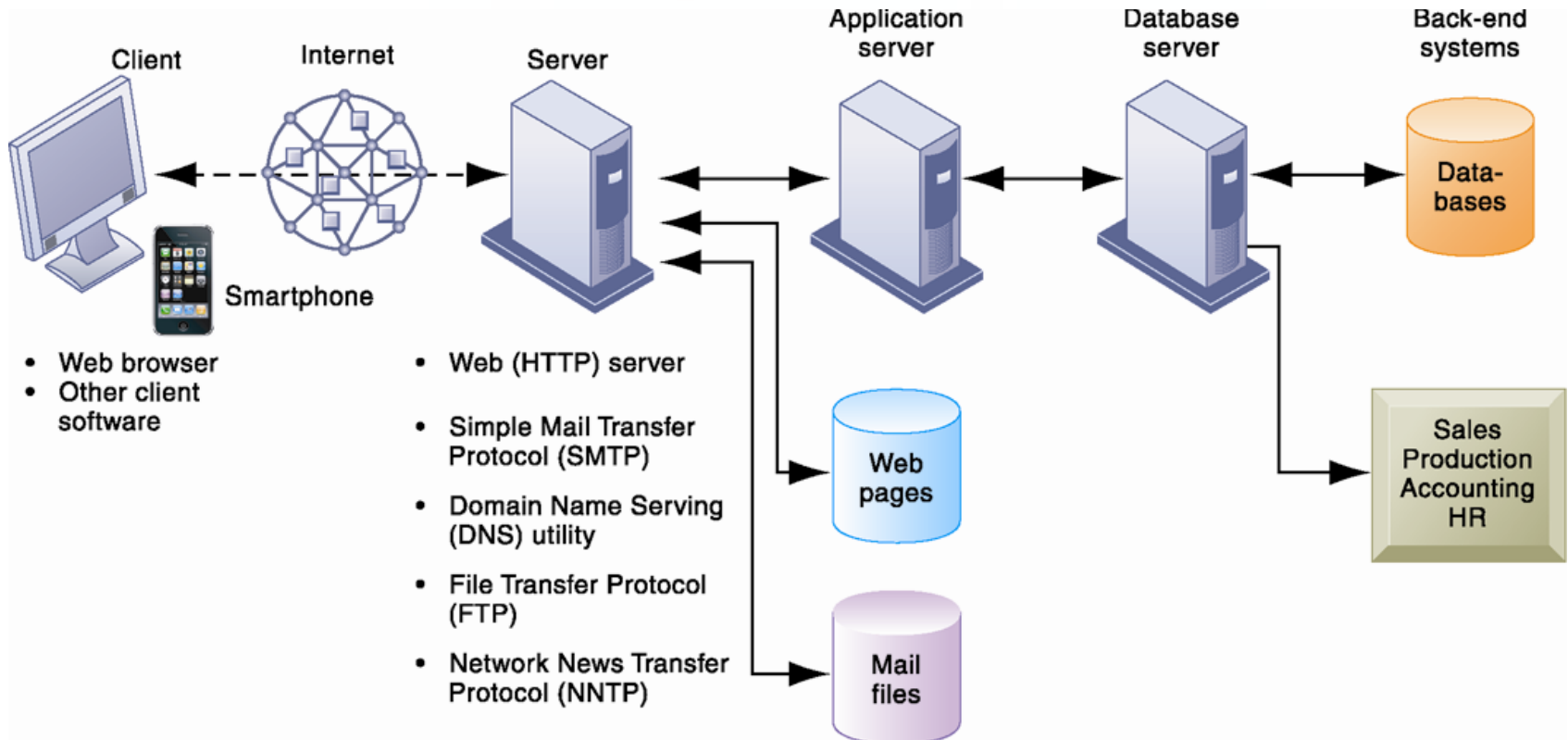


Figure 7-8

Client computers running Web browser and other software can access an array of services on servers over the Internet. These services may all run on a single server or on multiple specialized servers.



Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

The Global Internet

– **Voice over IP (VoIP)**

- Digital voice communication using IP, packet switching
- Providers
 - Cable providers
 - Google, Skype

– **Unified communications**

- Communications systems that integrate voice, data, e-mail, conferencing

– **Virtual private network (VPN)**

- Secure, encrypted, private network run over Internet
 - PPTP
 - Tunneling

Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

How Voice over IP Works

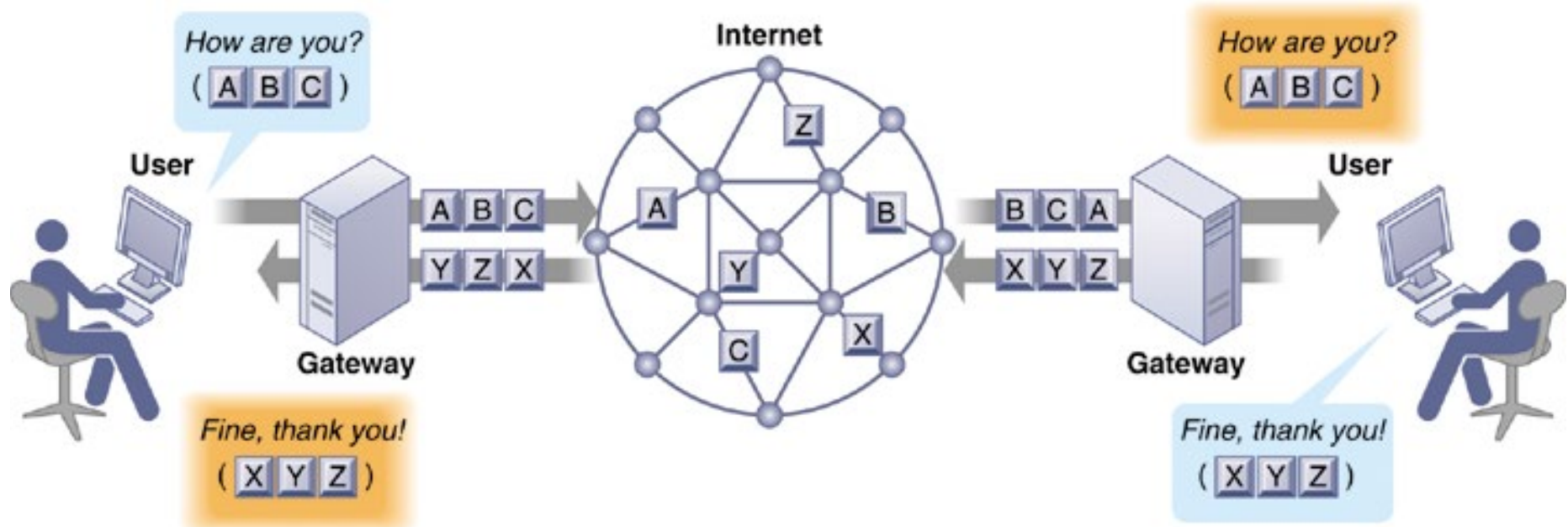


Figure 7-9

A VoIP phone call digitizes and breaks up a voice message into data packets that may travel along different routes before being reassembled at the final destination. A processor nearest the call's destination, called a gateway, arranges the packets in the proper order and directs them to the telephone number of the receiver or the IP address of the receiving computer.

Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

A Virtual Private Network Using the Internet

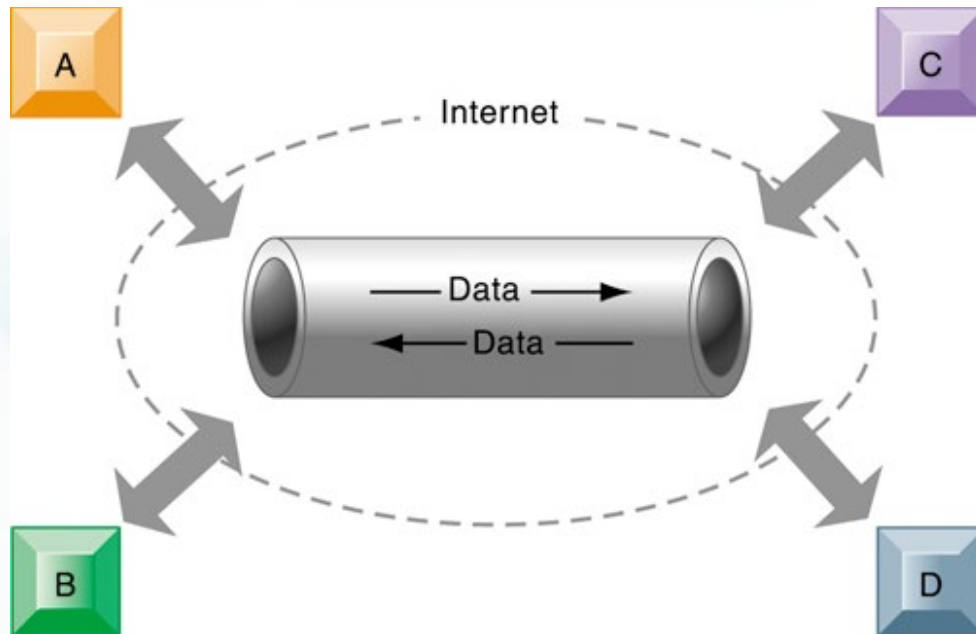


Figure 7-10

This VPN is a private network of computers linked using a secure “tunnel” connection over the Internet. It protects data transmitted over the public Internet by encoding the data and “wrapping” them within the Internet Protocol (IP). By adding a wrapper around a network message to hide its content, organizations can create a private connection that travels through the public Internet.



Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

Interactive Session: Management

Monitoring Employees on Networks—Unethical or Good Business?

Read the Interactive Session and discuss the following questions

- Should managers monitor employee e-mail and Internet usage? Why or why not?
- Describe an effective e-mail and Web use policy for a company.
- Should managers inform employees that their Web behavior is being monitored? Or should managers monitor secretly? Why or why not?



The Global Internet

- **The Web**

- **Hypertext Markup Language (HTML)**
- **Hypertext Transfer Protocol (HTTP):**
 - Communications standard used for transferring Web pages
- **Uniform resource locators (URLs):**
 - Addresses of Web pages
 - <http://www.megacorp.com/content/features/082602.html>
- **Web servers**
 - Software for locating and managing Web pages



The Global Internet

- **Search engines**
 - Started as simpler programs using keyword indexes
 - Google improved indexing and created page ranking system
- **Mobile search: 20% of all searches in 2012**
- **Search engine marketing**
 - Major source of Internet advertising revenue
- **Search engine optimization (SEO)**
 - Adjusting Web site and traffic to improve rankings in search engine results



Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

Top U.S. Web Search Engines

Google is the most popular search engine on the Web, handling 84 percent of all Web searches.

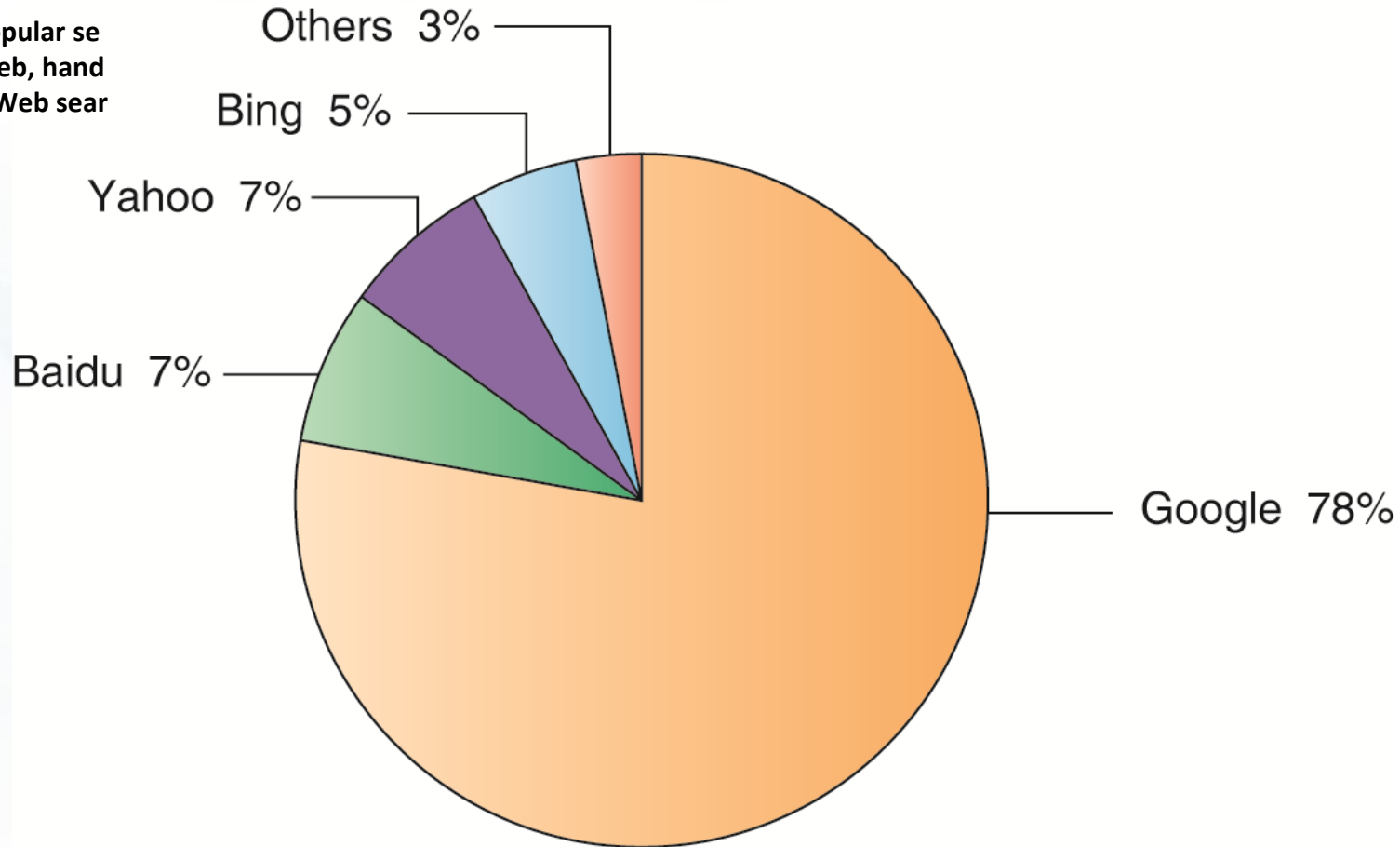


Figure 7-11



The Global Internet

- **Social search**
 - Google +1, Facebook Like
- **Semantic search**
 - Anticipating what users are looking for rather than simply returning millions of links
- **Intelligent agent shopping bots**
 - Use intelligent agent software for searching Internet for shopping information

Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

How Google Works

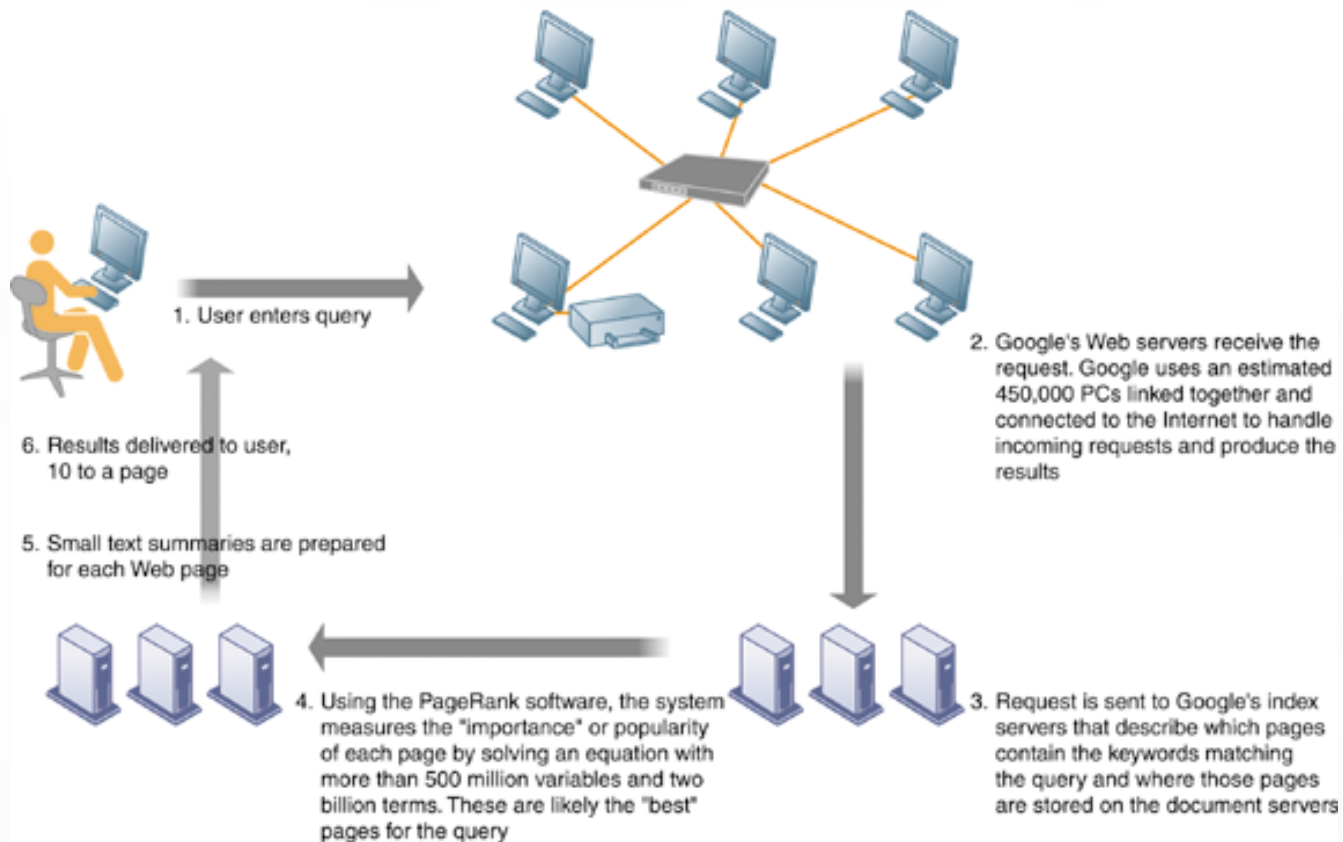


Figure 7-12

The Google search engine is continuously crawling the Web, indexing the content of each page, calculating its popularity, and storing the pages so that it can respond quickly to user requests to see a page. The entire process takes about one-half second.



The Global Internet

- **Web 2.0**
 - **Second-generation services**
 - **Enabling collaboration, sharing information, and creating new services online**
 - **Features**
 - Interactivity
 - Real-time user control
 - Social participation (sharing)
 - User-generated content



The Global Internet

– Web 2.0 services and tools

- **Blogs:** chronological, informal Web sites created by individuals
 - RSS (Really Simple Syndication): syndicates Web content so aggregator software can pull content for use in another setting or viewing later
 - Blogosphere
 - Microblogging
- **Wikis:** collaborative Web sites where visitors can add, delete, or modify content on the site
- **Social networking sites:** enable users to build communities of friends and share information



The Global Internet

- **Web 3.0: The “Semantic Web”**
 - A collaborative effort led by W3C to add layer of meaning to the existing Web
 - Goal is to reduce human effort in searching for and processing information
 - Making Web more “intelligent” and intuitive
 - Increased communication and synchronization with computing devices, communities
 - “Web of things”
 - Increased cloud computing, mobile computing



The Wireless Revolution

- **Cellular systems**
 - **Competing standards**
 - CDMA: United States only
 - GSM: Rest of world, AT&T, T-Mobile
 - **Third-generation (3G) networks**
 - 144 Kbps
 - Suitable for e-mail access, Web browsing
 - **Fourth-generation (4G) networks**
 - Up to 100 Mbps
 - Suitable for Internet video



The Wireless Revolution

- **Wireless computer networks and Internet access**
 - **Bluetooth (802.15)**
 - Links up to 8 devices in 10-m area using low-power, radio-based communication
 - Useful for personal networking (PANs)
 - **Wi-Fi (802.11)**
 - Set of standards: 802.11
 - Used for wireless LAN and wireless Internet access
 - Use access points: device with radio receiver/transmitter for connecting wireless devices to a wired LAN

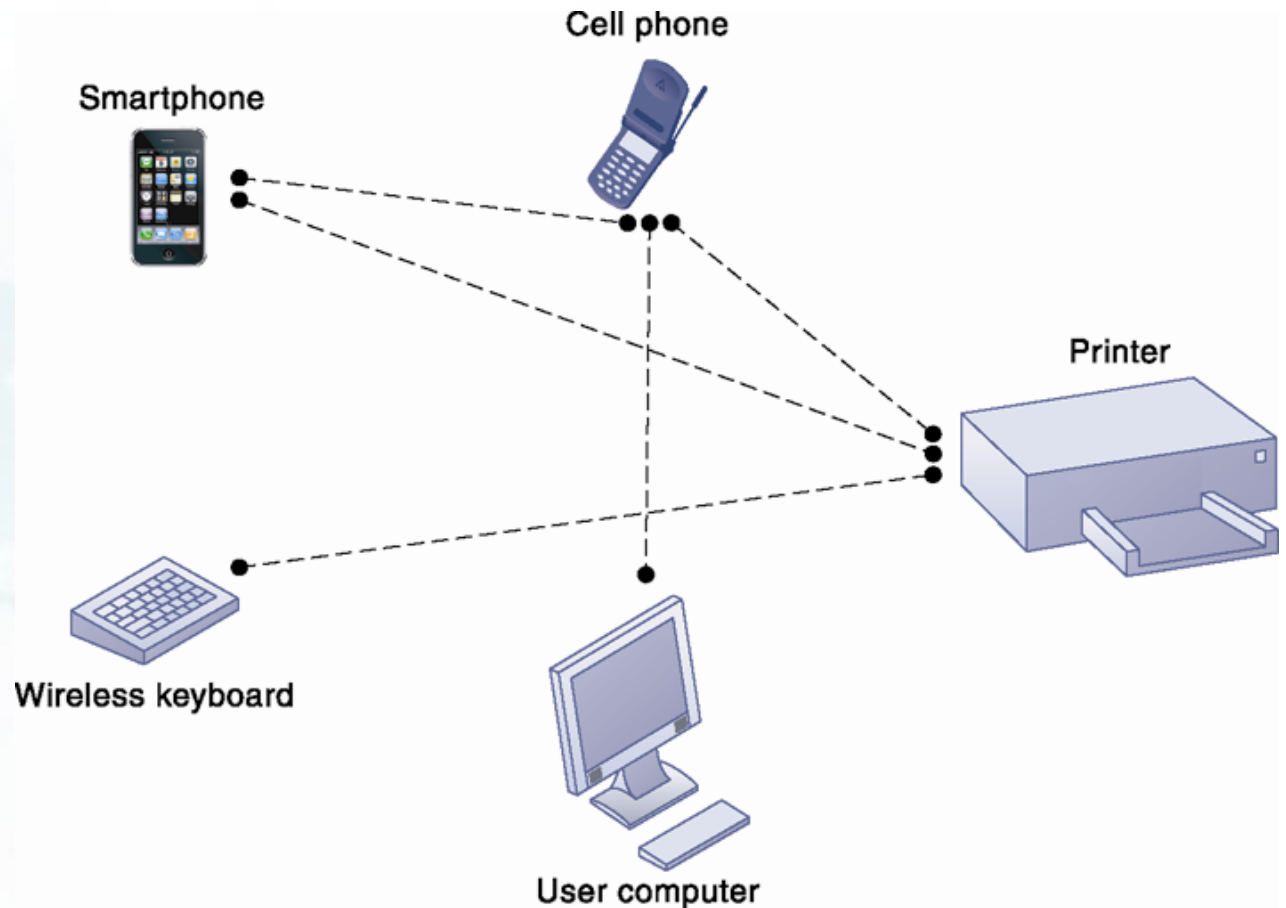
Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

A Bluetooth Network (PAN)

Bluetooth enables a variety of devices, including cell phones, PDAs, wireless keyboards and mice, PCs, and printers, to interact wirelessly with each other within a small 30-foot (10-meter) area. In addition to the links shown, Bluetooth can be used to network similar devices to send data from one PC to another, for example.

Figure 6-15



Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

An 802.11 Wireless LAN

Mobile laptop computers equipped with wireless network interface cards link to the wired LAN by communicating with the access point. The access point uses radio waves to transmit network signals from the wired network to the client adapters, which convert them into data that the mobile device can understand. The client adapter then transmits the data from the mobile device back to the access point, which forwards the data to the wired network.

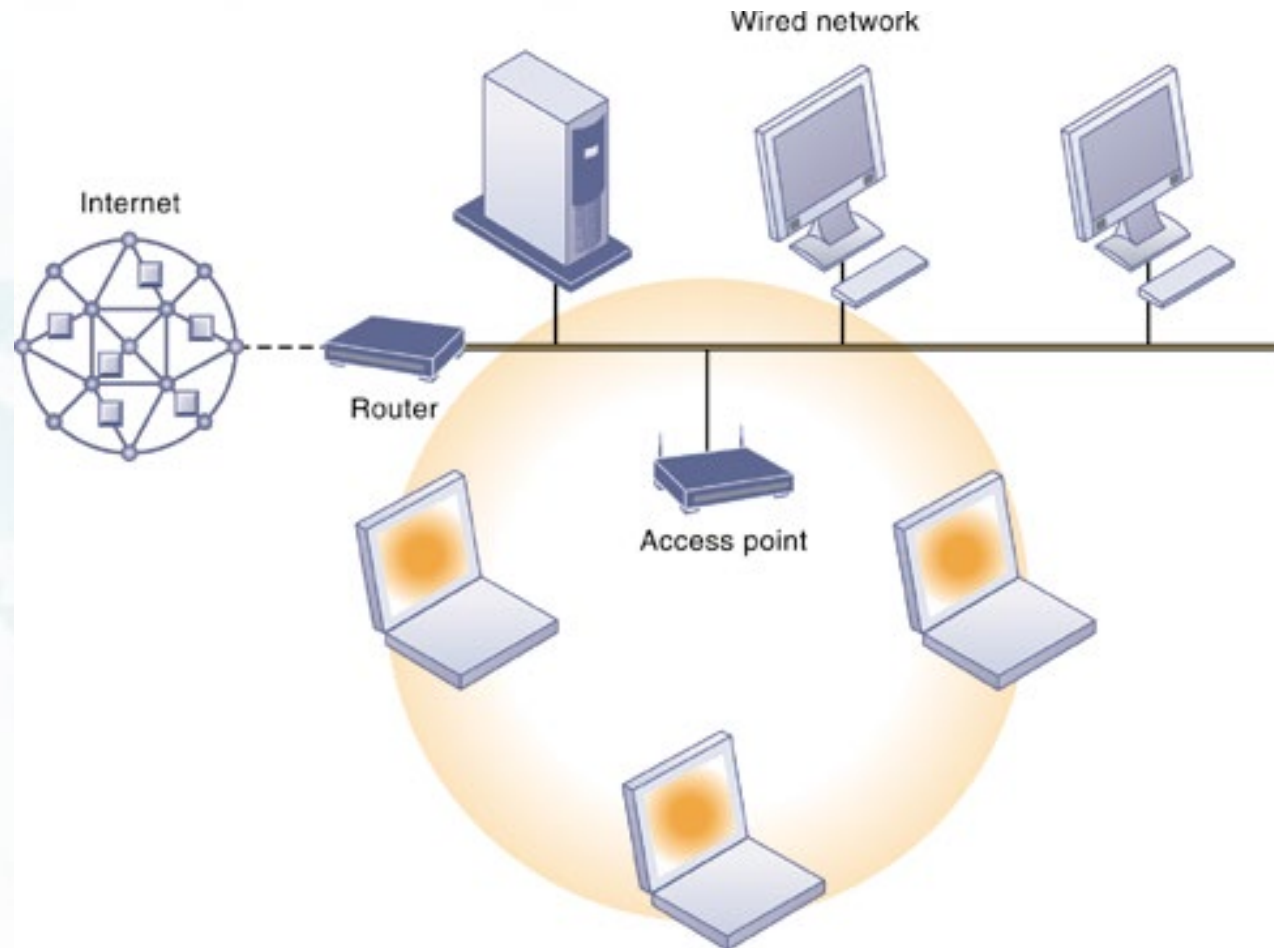


Figure 7-14



The Wireless Revolution

- **Wireless computer networks and Internet access**
 - **Wi-Fi (cont.)**
 - Hotspots: one or more access points in public place to provide maximum wireless coverage for a specific area
 - Weak security features
 - **WiMax (802.16)**
 - Wireless access range of 31 miles
 - Require WiMax antennas



The Wireless Revolution

- **Radio frequency identification (RFID)**
 - **RFID tags:**
 - Tiny tags with embedded microchips contain data about an item and location
 - Transmit radio signals over short distances to RFID readers
 - **RFID readers:**
 - Send data over network to computer for processing
 - **Active RFID:**
 - Tags have batteries
 - Data can be rewritten
 - Range is hundreds of feet



Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

The Wireless Revolution

- **RFID (cont.)**
 - **Passive RFID:**
 - Range is shorter
 - Smaller, less expensive
 - Powered by radio frequency energy
 - **Common uses:**
 - Automated toll-collection
 - Tracking goods in a supply chain
 - **Requires companies to have special hardware and software**
 - **Reduction in cost of tags making RFID viable for many firms**

Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

How RFID Works

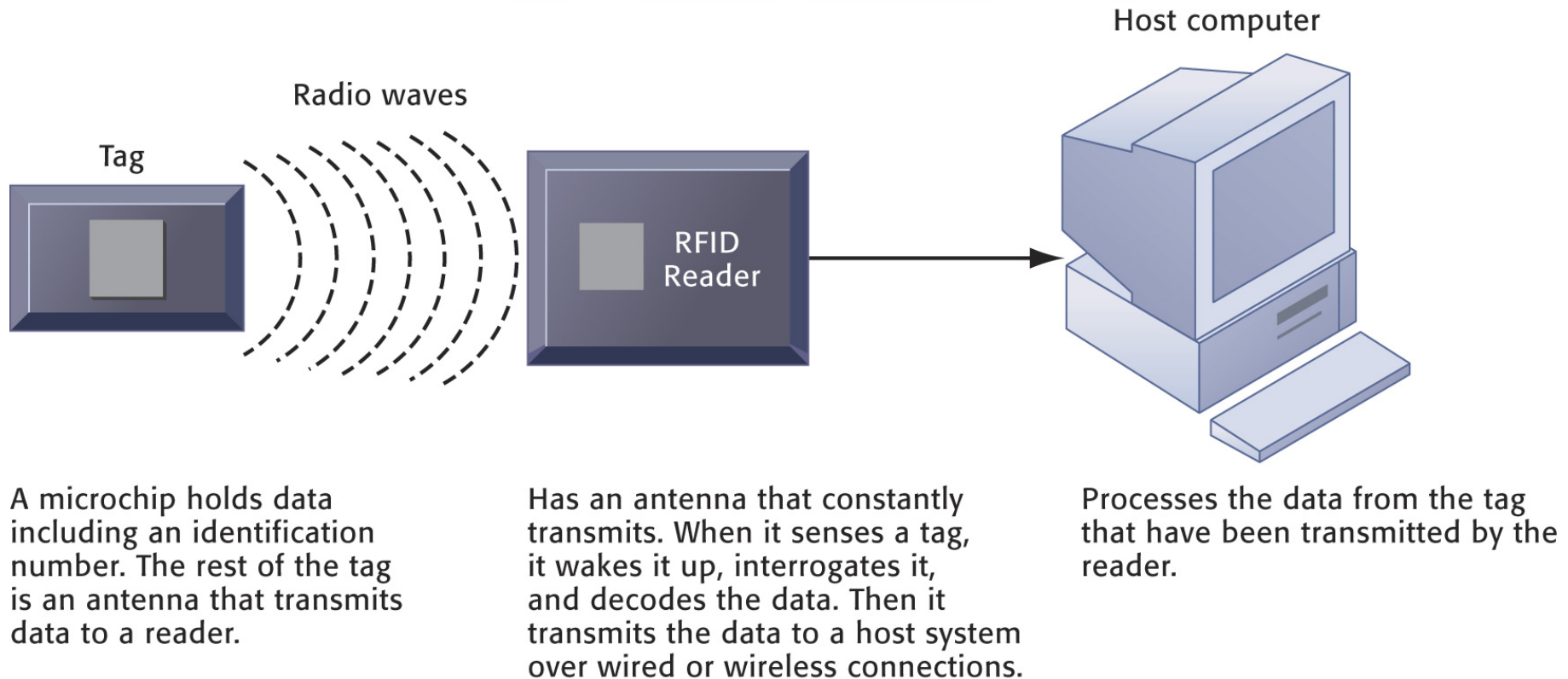


Figure 7-15

RFID uses low-powered radio transmitters to read data stored in a tag at distances ranging from 1 inch to 100 feet. The reader captures the data from the tag and sends them over a network to a host computer for processing.



The Wireless Revolution

- **Wireless sensor networks (WSNs)**
 - Networks of hundreds or thousands of interconnected wireless devices embedded into physical environment to provide measurements of many points over large spaces
 - Used to monitor building security, detect hazardous substances in air, monitor environmental changes, traffic, or military activity
 - Devices have built-in processing, storage, and radio frequency sensors and antennas
 - Require low-power, long-lasting batteries and ability to endure in the field without maintenance



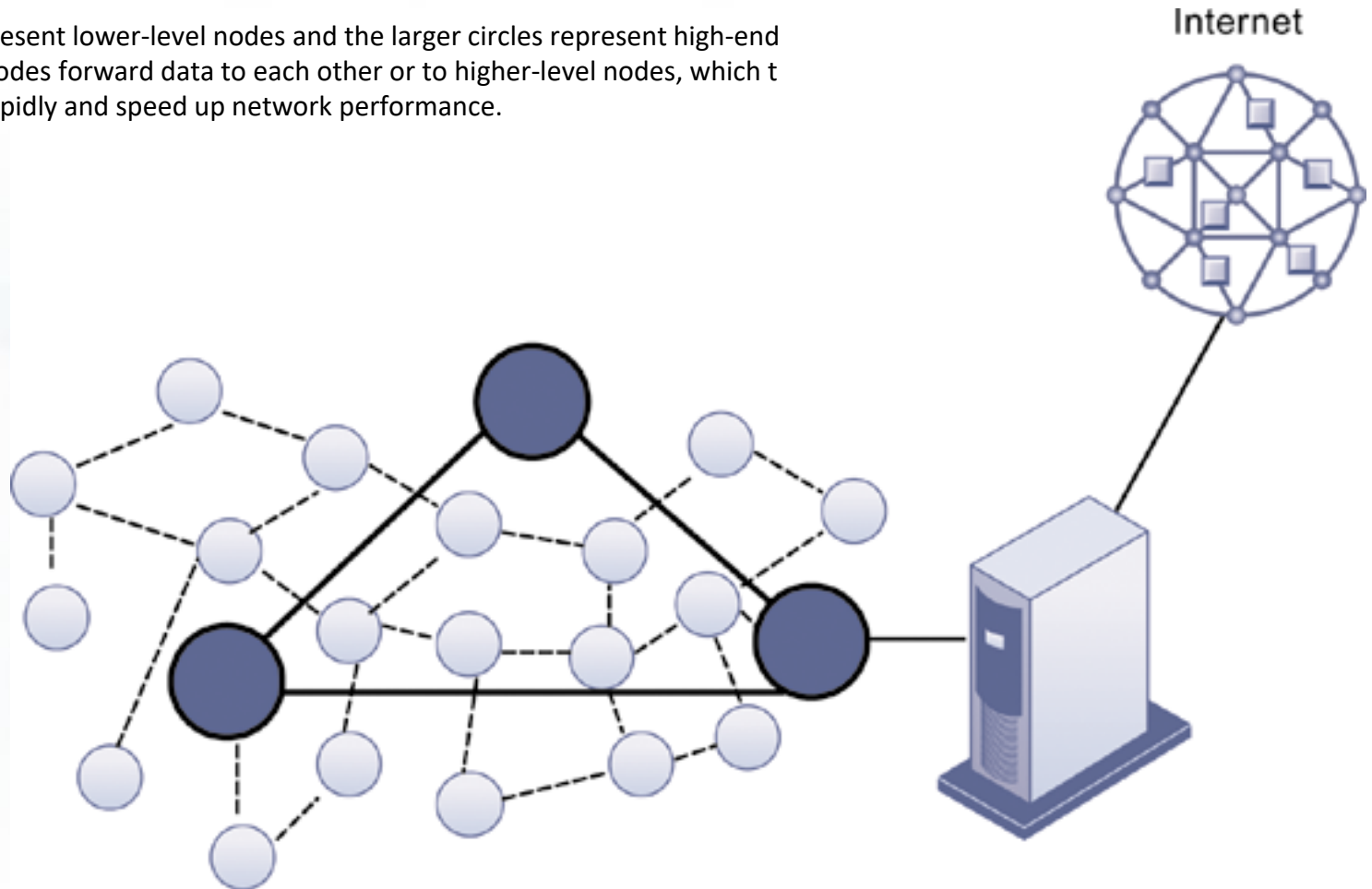
Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology

A Wireless Sensor Network


The small circles represent lower-level nodes and the larger circles represent high-end nodes. Lower-level nodes forward data to each other or to higher-level nodes, which transmit data more rapidly and speed up network performance.

Figure 7-16



Management Information Systems

Chapter 7: Telecommunications, the Internet, and Wireless Technology



This work is protected by United States copyright laws and is provided solely for the use of instructors in teaching their courses and assessing student learning. Dissemination or sale of any part of this work (including on the World Wide Web) will destroy the integrity of the work and is not permitted. The work and materials from it should never be made available to students except by instructors using the accompanying text in their classes. All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials.