The Internet: Information Technology Infrastructure for the Digital Firm
Objectives

1. How does the Internet work? What are its major capabilities and benefits to business?

2. What is the World Wide Web? How can organizations benefit from using the Web and Web technology?

3. What wireless technologies can be used for accessing the Web? What are the principal Wireless Web applications?
4. What are the principal technologies for supporting electronic commerce and electronic business?

5. What management problems are raised by Internet computing and technologies for digital integration? How can businesses solve these problems?
Perhaps the most well-known and the largest implementation of internetworking, linking hundreds of thousands of individual networks all over the world.
What is the Internet?

Internet Service Provider (ISP)

- Commercial organization with a permanent connection to Internet
- Sells temporary connections to subscribers
What is the Internet?

Information Appliance

- Device customized to perform few specialized computing tasks with minimal user effort
Client/server computing on the Internet

Figure 9-1
Communication on the Internet

- Electronic Mail (E-Mail): Person to person messaging; document sharing

- Social Networks: Sharing and interaction

- Newsgroups: Discussion groups on electronic bulletin boards
Communication on the Internet

- **Chatting:** Live, interactive conversations over a public network

- **Instant Messaging:** Chat service that allows participants to create their own private chat channels
Communication on the Internet

- **World Wide Web**: Retrieve, format, and display information using hypertext links
- **Telnet**: Logging on to one computer system and doing work on another
- **FTP**: Transferring files from computer to computer
Communication on the Internet

Components of an Internet Address

- **Domain Name**: The name identifying a unique node on the Internet
- **Internet Protocol (IP) Address**: Four-part numeric address including a unique computer location on the Internet
- **Domain Name System (DNS)**: A hierarchical system of servers maintaining databases enabling the conversion of domain names to their IP addresses
Analysis of an Internet address
Communication on the Internet

- **Internet Telephony**: Technologies that use the Internet Protocol’s packet-switched connections for voice service

- **Voice over IP (VoIP)**: Facilities for managing the delivery of voice information using the Internet Protocol (IP)
How IP telephony works

Figure 9-3
Communication on the Internet

- **Virtual Private Network (VPN):** A secure connection between two points across a public network to transmit corporate data. Provides a low-cost alternative to a private network.
A virtual private network (VPN) using the Internet

Figure 9-4
IP Virtual Private Networks Provide New Services and Savings

- What are the management benefits of using VPNs?
- How do VPNs provide value for the organization?
- What management, organization, and technology issues should be addressed when deciding to use an Internet-based VPN?
Next-Generation Networks and Internet2

Internet2 and Next Generation Networks

- Research networks with new protocols and transmission speeds
- Provide infrastructures for supporting high bandwidth Internet applications
The World Wide Web

Overview

• Based on a standard hypertext language called hypertext markup language (HTML)

• Combines text, hypermedia, graphics, and sound

• Handles all types of digital communication

• Uses graphical user interfaces for easy viewing
Overview

- Hypertext Transport Protocol: The communications standard used to transfer pages on the Web. Defines how messages are formatted and transmitted.

- Uniform Resource Locator (URL): The address of a specific resource on the Internet
  
  – http://www.megacorp.com/content/features/082610.html
The World Wide Web

Overview

• **Home Page**: A World Wide Web text and graphical screen display that welcomes the user and explains the organization that has established the page.

• **Webserver**: software for locating and managing stored Web pages.
Searching for Information on the Web

- **Search Engine**: A tool for locating specific sites or information on Internet

- **Search-based Advertising**: Payment to a search service to display a sponsored link to a company’s Web site as a way of advertising that company

- **Shopping Bot**: Software with varying levels of built-in intelligence to help electronic commerce shoppers locate and evaluate products or services
How a Search Engine Works

1. User enters query

2. Google’s Web servers receive the request. Google uses an estimated 450,000 PCs linked together and connected to the Internet to handle incoming requests and produce the results.

3. Request is sent to Google’s index servers that describe which pages contain the keywords matching the query and where those pages are stored on the document servers.

4. Using the PageRank software, the system measures the “importance” or popularity of each page by solving an equation with more than 500 million variables and two billion terms. These are likely the “best” pages for the query.

5. Small text summaries are prepared for each Web page.

6. Results delivered to user, 10 to a page.
Searching for Information on the Web

• “Push” technology: Method of obtaining relevant information on networks by having a computer broadcast directly to the user based on prespecified interests

• Multicasting: Transmission of data to a selected group of recipients
What is the Social Web?

- Enables people to collaborate, share information, and create new services and content online.

- **Web 2.0 technologies:**
  - cloud computing,
  - software mashups,
  - blogs,
  - RSS,
  - wikis, and
  - social networks.
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: 802.11a, 802.11b, 802.11g, 802.11n
    - Used for wireless LAN and wireless Internet access
    - Use access points: device with radio receiver/transmitter for connecting wireless devices to a wired 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 forward the data to the wired network.

Figure 6-16
Web Servers and Electronic Commerce Servers

- **Hit**: Entry into Web server’s log file generated by each request to the server for a file

- **Electronic commerce server software**: Provides functions essential for running e-commerce Web sites
Support Technology for Electronic Commerce and Electronic Business

Customer Tracking and Personalization Tools

• Collecting and storing data on the behavior of online customers, and combining that data with data already stored in the company’s back office systems (Collaborative Filtering)

• Analyzing the data to better understand the behavior of online customers

• Identifying customer preferences and trends
Website visitor tracking

The shopper clicks on the home page. The store can tell that the shopper arrived from the Yahoo portal at 2:30 P.M. (which might help determine staffing for customer service centers) and how long she lingered on the home page (which might indicate trouble navigating the site).

Click 1

The shopper clicks on blouses, clicks to select a woman’s white blouse, then clicks to view the same item in pink. The shopper clicks to select this item in a size 10 in pink and clicks to place it in her shopping cart. This information can help the store determine which sizes and colors are most popular.

Click 2
Click 3
Click 4
Click 5

From the shopping cart page, the shopper clicks to close the browser to leave the Web site without purchasing the blouse. This action could indicate the shopper changed her mind or that she had a problem with the Web site’s checkout and payment process. Such behavior might signal that the Web site was not well designed.

Click 6

Figure 9-8
Web Content Management Tools

- Software to facilitate the collection, assembly, and management of content on Web site, intranet, or extranet
Web Site Performance Monitoring Tools

- Software tools for monitoring the time to download Web pages, perform Web transactions, identify broken links between Web pages, and pinpoint other Web site problems and bottlenecks
Web Hosting Services

- Company with large Web server computers to maintain Web sites of fee-paying subscribers
The Challenge of Managing Internet Computing and Digital Integration

- Loss of management control
- Connectivity and application integration challenges
- Organizational change requirements
- Hidden costs
- Scalability, reliability, and security
Some Solutions

- Managing the change
- Education and training
- Data administration disciplines
- Planning for connectivity and application integration
Can Worldspan Fly with Online Travel?

1. Evaluate Worldspan using the value chain and competitive forces models.

2. What is the relationship of information systems to Worldspan’s business model? Why did Worldspan have to change its business model?
Chapter 9 Case Study

Can Worldspan Fly with Online Travel?

3. How did information systems and technology support Worldspan’s new business model? What is the role of the Internet?

4. Do you think Worldspan’s strategy has been successful? Why or why not?

5. Do you believe Worldspan will be successful in the future? Explain your answer.