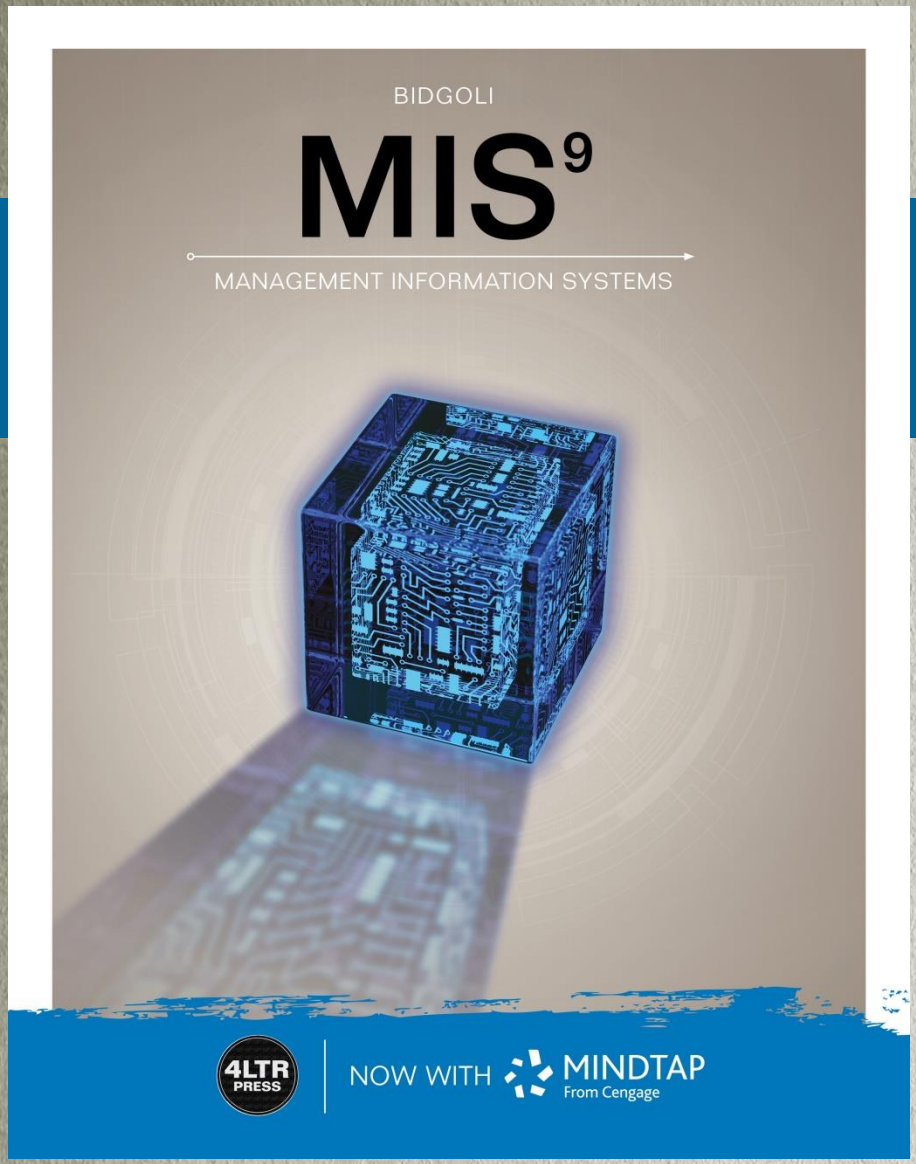


7

The Internet, Intranets, and Extranets

Learning Objectives (1 of 2)

- Describe the makeup of the Internet and the World Wide Web
- Discuss navigational tools, search engines, and directories
- Describe common Internet services
- Summarize widely used Web applications
- Explain the purpose of intranets

Learning Objectives (2 of 2)

- Explain the purpose of extranets
- Summarize the trends of the Web 2.0 and Web 3.0 eras and Internet2
- Describe the Internet of Everything

The Internet and the World Wide Web (1 of 4)

- Internet: worldwide collection of millions of computers and networks of all sizes
  - Network of networks
  - Started in 1969 as a project by the U.S. Department of Defense called Advanced Research Projects Agency Network (ARPANET)
  - Evolved into the national Science Foundation Network (NSFNET) in 1987

The Internet and the World Wide Web (2 of 4)

- Internet backbone: foundation network linked with fiber-optic cables that can support high bandwidth
  - Made up of many interconnected government, academic, commercial, and other high-capacity data routers
  - Private companies operate their own Internet backbones that interconnect at network access points (NAPs)

The Internet and the World Wide Web (3 of 4)

- The World Wide Web (i.e., WWW or the Web) changed the Internet in 1989
  - Introduced a graphical interface to text-based Internet
  - Organizes information by using hypermedia
    - Documents include embedded references to audio, text, images, video, and other documents
  - Hypertext: embedded references in hypermedia documents

The Internet and the World Wide Web (4 of 4)

- Server or Web server
  - Any computer that stores hypermedia documents and makes them available to other computers on the Internet
- Exciting feature of the Web
  - Hypermedia can be stored anywhere in the world, so users can jump from a site in the U.S. to a site in France in a few milliseconds

The Domain Name System (1 of 2)

- Domain names
  - Unique identifiers of computer or network addresses on the Internet
- Internet Protocol (IP) address
  - Assigned by the Internet Corporation for Assigned Names and Numbers (ICANN)
- Domain Name System (DNS)
  - Protocol that converts domain names into IP addresses when information is transferred from one network to another

The Domain Name System (2 of 2)

- Domain names are used to identify a Web page in uniform resource locators (URLs)
  - Refer to the address of a document or site
  - Have a suffix that indicates the top-level domain (TLD)
  - Denotes the type of organization or country the address specifies
  - Divided: top-level domains (gTLDs) and country code top-level domains (ccTLDs)

Table 7.1 Generic Top-Level Domains

gLTD	Purpose
.com	Commercial organizations (such as Microsoft)
.edu	Educational institutions (such as California State University)
.int	International organizations (such as the United Nations)
.mil	U.S. military organizations (such as the U.S. Army)
.gov	U.S. government organizations (such as the Internal Revenue Service)
.net	Backbone, regional, and commercial networks (e.g., the National Science Foundation's Internet Network Information Center)
.org	Other organizations, such as research and nonprofit organizations (e.g., the Internet Town Hall)

Types of Internet Connections

- Connection methods
  - Dial-up modems
  - Cable modems
  - Digital Subscriber Line (DSL)
    - Symmetric DSL (SDSL)
    - Asymmetric DSL (ADSL)
    - Very High-Speed DSL (VDSL)

Navigational Tools, Search Engines, and Directories

- Navigational tools
  - Used to travel from Web site to Web site
- Search engines
  - Enable users to retrieve information from the Internet by using keywords
- Directories
  - Indexes of information based on keywords embedded in documents; allow search engines to find required information

Navigational Tools

- Graphical Web browsers: Microsoft Internet Explorer (IE), Mozilla Firefox, Google Chrome, Apple Safari, and Opera
  - Consist of menu options
    - Viewing browsing history
    - Bookmarking favorite Web sites
    - Setting viewing preferences
    - Navigation buttons

Search Engines and Directories (1 of 4)

- Crawling the Web
  - Search engines use software called crawlers, spiders, and bots to search the Web continuously for new data
  - Gathered data is sent back to the search engine's data center to ensure that it has the most current information on the Web

Search Engines and Directories (2 of 4)

- Indexing
  - Housed at server farms, search engines use keywords to index data coming in from crawlers
  - Each keyword has an index entry that is linked to all Web pages containing that keyword

Search Engines and Directories (3 of 4)

- Searching
  - Search engine:
    - Uses the index created during the indexing step to look up the search term
    - Identifies all Web pages linked to the term if the term exists in the index
    - Varies in intelligence

Search Engines and Directories (4 of 4)

- Automated or crawler-based directory
  - Creates indexes of search terms and collects these terms automatically by using crawlers
- Human-powered directory
  - Requires keywords to be manually submitted for a Web page to be listed in a search engine's results
  - Relies on users to supply data

Internet Services

- Made possible by the TCP suite of protocols
  - TCP/IP provides useful e-mail protocols
    - Simple Message Transfer Protocol (SMTP)
    - Post Office Protocol (POP)
  - Popular services
    - E-mail, newsgroups, discussion groups, Internet Relay Chat (IRC), instant messaging, and Internet telephony

E-Mail

- Widely used services on the Internet
  - Main types
    - Web-based e-mail
    - Client-based e-mail
  - E-mail programs
    - Folders for organizing e-mails
    - Address book and distribution groups
    - Spell checkers and delivery notifications

Newsgroups and Discussion Groups

- Discussion groups
  - Formed for people to exchange opinions and ideas on a specific topic
  - Group members post messages or articles that others in the group can read
- Newsgroups
  - General in nature and can cover any topic
  - Allow people to get together for fun or for business purposes

Instant Messaging (1 of 2)

- Internet Relay Chat (IRC)
  - Enables users in chat rooms to exchange text messages with people in other locations in real time
- Instant messaging (IM)
  - Service for communicating with others via a private “chat room” on the Internet
  - Applications: Windows Messenger, Yahoo! Messenger, and Google Chat

Instant Messaging (2 of 2)

- Snapchat
  - New type of messaging offered by a mobile app
  - Users combine pictures, videos, text, and drawings into “Snaps” that are sent to other users
  - Snaps self-destruct in a matter of seconds and can be undeleted and brought back to life

Internet Telephony (1 of 2)

- Using the Internet to exchange spoken conversations
  - Voice over Internet Protocol (VoIP)
    - Requires a high-speed Internet connection and a microphone or headset
    - Used to route traffic starting and ending at conventional public switched telephone network (PSTN) phones

Internet Telephony (2 of 2)

- Drawback
  - Lack of call quality
- Advantages
  - Absence of busy lines
  - Receiving voicemails on the computer
  - Ability to:
    - Screen callers and forward calls from anywhere in the world
    - Direct calls to the correct departments and take automated orders

Web Applications

- Several service industries use the Internet and its supporting technologies
  - Offer services and products to a wide range of customers at more competitive prices and with increased convenience

Tourism and Travel

- Industry has benefited from e-commerce Web applications
- Travel Web sites:
  - Allow customers to book tickets for plane trips and cruises and make reservations for hotels and rental cars
    - Examples: Expedia.com, Travel.com, Travelocity.com, Priceline.com, Hotels.com, Yahoo! Travel, and Google.com/flights/

Publishing

- Major publishers in the U.S. and Europe have Web sites that offer:
  - Descriptions of forthcoming books
  - Sample chapters
  - Online ordering
  - Search features
  - Books that can be read online free for 90 days
  - Purchase options for e-book versions

Higher Education

- University Web sites offer:
  - Information about departments, programs, faculty, and academic resources
  - Virtual tours of the campus
  - Online degree programs
    - Help colleges and universities facing an enrollment decline
  - Professional certificate programs

Real Estate (1 of 2)

- Real-estate Web sites:
  - Provide up-to-date listings of homes
  - Allow buyers to review neighborhoods, schools, and real estate prices
  - Help customers find realtors and brokerage firms and learn home-buying tips
  - Provide virtual tours of houses on sale

Real Estate (2 of 2)

- Services include:
  - Appraisals
  - Neighborhood and school profiles
  - Financing options
  - Home-improvement advice
- Major real-estate Web sites
  - Remax, Century 21, Prudential, ERA, and Zillow

Employment

- Sites offer comprehensive services to job seekers, including:
  - Expert advice and tools for managing one's career
  - Resume assistance, including posting and distributing resumes
  - Job search tutorials and salary calculators
  - Announcements of job fairs and career tests

Financial Institutions (1 of 2)

- Offer online banking services
- Use e-mails to communicate with customers and send account statements and financial reports
  - Helps reduce the time and costs of communicating via phone

Financial Institutions (2 of 2)

- Online banking services
  - Accessing customer service by e-mail around the clock
  - Viewing current and old transactions
  - Online mortgage applications
  - Interactive tools
  - Finding loan and credit card information
  - Paying bills and credit card accounts
  - Transferring funds and viewing digital copies of checks

Software Distribution

- Vendors distribute software, drivers, and patches on the Internet
  - Fast and easy to download
- Large programs cannot be distributed via the Internet
- Provides an inexpensive, convenient, and fast way to sell software

Health Care

- Web sites store patient records on the Internet
  - Patient information is accessible from one central location
  - Have potential problems involving information privacy, accuracy, and currency
- Other uses
  - Telemedicine and telepresence surgery

Politics (1 of 2)

- Political candidates use Web sites in campaigns, which are helpful tools for:
  - Announcing candidates' platforms
  - Publicizing voting records
  - Posting notices of appearances and debates
  - Raising campaign funds

Politics (2 of 2)

- Internet has helped:
  - Empower voters
  - Revitalize the democratic process
  - Provide the possibility of legislators to vote on bills via online systems

Intranets (1 of 2)

- Network within an organization
  - Uses Internet protocols and technologies for collecting, storing, and disseminating useful information that supports business activities
- Used by employees for internal purposes
  - Companies also allow trusted business partners to access their intranets

Intranets (2 of 2)

- Use Internet technologies to solve organizational problems that have been solved in the past
- Different from a LAN
  - Set up behind a firewall
    - Defining and limiting access is important for security reasons

Exhibit 7.3 Simple Intranet Architecture

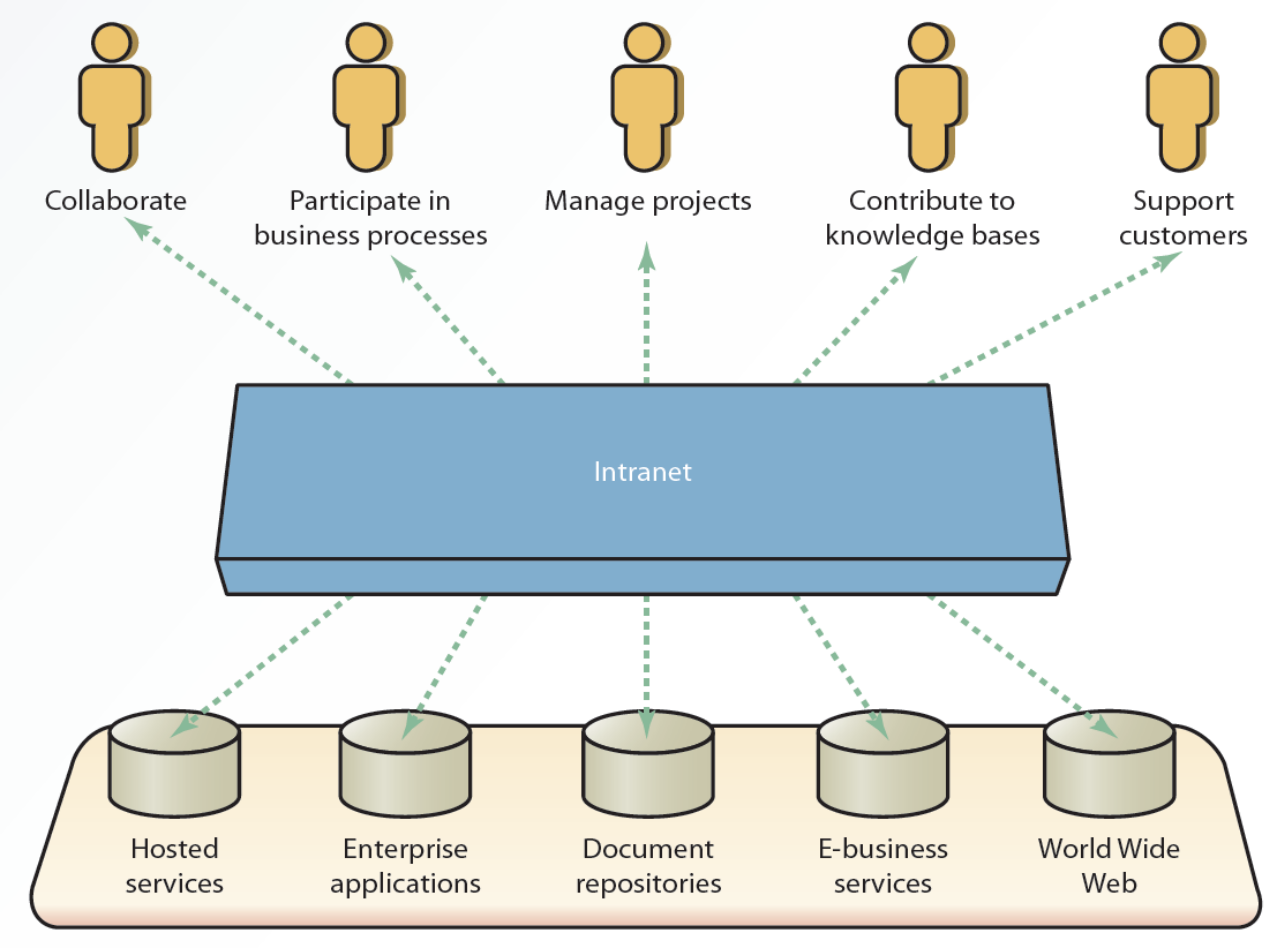


Table 7.2 The Internet vs. Intranets

Key Feature	Internet	Intranet
User	Anybody	Approved users only
Geographical scope	Unlimited	Limited or unlimited
Speed	Slower than an intranet	Faster than the Internet
Security	Less than an intranet's	More than the Internet's; user access more restricted

Applications of an Intranet

- Information availability
  - Human resources management
  - Sales and marketing
  - Production and operations
  - Accounting and finance
  - Strategy based on events or needs

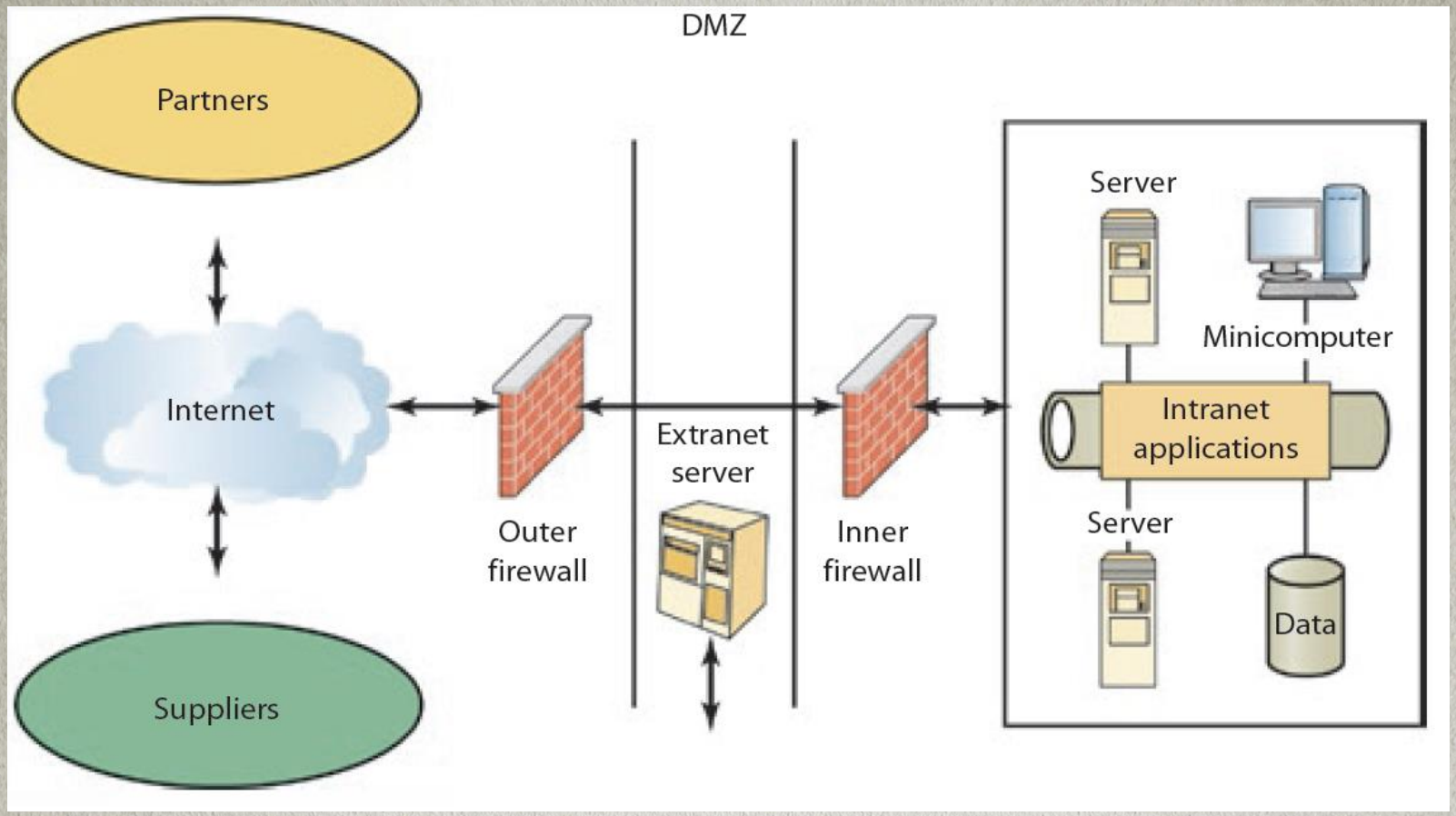
Extranets (1 of 3)

- Secure networks
  - Uses the Internet and Web technologies to connect intranets of business partners
  - Facilitates communication between organizations or between consumers
- Considered to be a type of interorganizational system (IOS)
  - Examples: electronic funds transfer (EFT) and electronic data interchange (EDI)

Extranets (2 of 3)

- Applications
  - Timely order-entry processing
  - Federal Express Tracking System
  - Allow companies to reduce internetworking costs
  - Provide a competitive advantage that leads to increased profits
  - Require a comprehensive security system and management control

Exhibit 7.4 Simple Extranet Architecture



Extranets (3 of 3)

- Advantages
  - Coordination
  - Feedback
  - Consumer satisfaction
  - Cost reduction
  - Expedited communication

Table 7.3 Comparisons

	Internet	Intranet	Extranet
Access	Public	Private	Private
Information	General	Typically confidential	Typically confidential
Users	Everybody	Members of an organization	Groups of closely related companies, users, or organizations

New Trends: The Web 2.0 and Web 3.0 Eras (1 of 3)

- Web 2.0
  - Trend toward Web applications that are more interactive than traditional Web applications
  - Collaboration or e-collaboration is one of the key components
  - Main focus: social networking and collaboration

New Trends: The Web 2.0 and Web 3.0 Eras (2 of 3)

- Provides personalization that allows users to access the Web more intelligently
- Main focus: intelligent Web applications using artificial intelligence technologies
- Goal: tailor online requests to users' specific search patterns, preferences, and needs

New Trends: The Web 2.0 and Web 3.0 Eras (3 of 3)

- One part of Web 3.0 could be the semantic Web
  - Enable computers to understand what they are displaying and communicate more effectively with one another

Blogs

- Journal or newsletter that is updated frequently and intended for the general public
  - Reflect the authors' personalities and include philosophical reflections and opinions on social or political issues
- Microblogs
  - Newer version of traditional blogs
  - Enable users to create smaller versions of blog posts

Wikis

- Web site that allows users to add, delete, and modify content
  - Unique because an information user can also be an information provider
- Drawback
  - Content accuracy is affected by allowing anyone to modify the content
- Corporate wikis
  - Include tighter security and access controls

Social Networking Sites

- Broad class of Web sites and services
  - Connect with friends, family, and colleagues online
  - Meet people with similar interests
- Popular social networking sites
  - Facebook, Twitter, and LinkedIn
- Used by companies for customer opinions and advertising

Business Application of Social Networks

- Social networks used for promotion
  - Facebook
  - Twitter
  - Pinterest
  - LinkedIn Groups
  - YouTube
  - Yelp, Foursquare, and Level Up

RSS (Really Simple Syndication) Feeds (1 of 2)

- Fast, easy way to distribute Web content in Extensible Markup Language (XML) format
  - Subscription service
  - Deliver new content selected from Web sites via a feed reader to one convenient spot
  - Subset of Standard Generalized Markup Language (SGML)

RSS (Really Simple Syndication) Feeds (2 of 2)

- Extensible Markup Language (XML)
  - Flexible method for creating common formats for information
  - Tags represent the kind of content being posted and transmitted
  - Prevents confusion by defining data with a context
  - Designed to improve interoperability and data sharing between different systems

Podcasting

- Electronic audio file posted on the Web for users to download to their mobile devices or computers
  - Consists of a specific URL and is defined with an XML item tag
  - Collected by an aggregator
    - iTunes or iPodder
  - Users can subscribe to a podcast
    - Increases accessibility

The Internet2

- Collaborative effort involving more than 200 U.S. universities and corporations
  - Goal: develop advanced Internet technologies and applications for higher education and academic research
- Gigapop: local connection point-of-presence that connects a variety of high-performance networks
  - Main function: exchange I2 traffic with a specified bandwidth

The Internet of Everything and Beyond (1 of 3)

- The Internet of Everything (IoE)
  - Web-based development
  - People, processes, data, and things are interconnected via the Internet using various means
    - RFID devices, barcodes, wireless systems, and QR codes
- Internet of things (IoT)
  - Physical objects that are connected to the Internet and to all the other physical objects

The Internet of Everything and Beyond (2 of 3)

- Technology behind the Internet of Everything facilitates:
  - Automated inventory systems in the retail industry
  - Automated and programmable appliances in domestic households
  - Road and bridge systems
  - Helps solve social problems: hunger, water pollution, adverse climate change, and increasing energy costs

The Internet of Everything and Beyond (3 of 3)

- Internet of Me (IoM)
  - Subset Internet that gathers and processes information for a given user from the entire Internet and IoT devices to deliver a personalized experience

Summary (1 of 2)

- The Internet can be used and accessed via navigational tools, search engines, and directories
- TCP/IP provides many useful e-mail protocols
- Web applications can be used with minimum costs
- Intranet is a network within a firm that uses Internet protocols and technologies

Summary (2 of 2)

- Extranets are considered a type of interorganizational system (IOS)
- Recent trends include Web 2.0 and Web 3.0
- Individuals, businesses, and governments benefit from IoE technology