

Chap-04, Telecommunications, the Internet, Intranets & Extranets

Principles and Learning Objectives

- Effective communications are essential to organizational success.
- The Internet is like many other technologies—it provides a wide range of services, some of which are effective and practical for use today, others are still evolving, and still others will fade away from lack of use.
- World Wide Web: *a major subset of the Internet*, originally developed as a document-management system, is a menu-based system that is easy to use for personal and business applications.
- Because the Internet and the World Wide Web are becoming more universally used and accepted for business, management, service, and speed, privacy and security issues must continually be addressed and resolved.

An Overview of Telecommunications and Networks

- Telecommunications:** electronic transmission of signals for communications (“Tele” = “distance”)
- Telecommunications medium:** anything that carries an electronic signal and interfaces between a sending device and a receiving device

Transmission Media:

Guided Media. Twisted Pair, Coaxial Cable, Fiber Optic Cable

Wireless Media. Microwave, Cellular, Infrared

Telecommunications Devices:

Data Modems, FAX Modems, Multiplexers, PBX Systems

•Carriers and Services

- Local exchange carrier (LEC):** a public telephone company in the United States that provides service to homes and businesses within its defined geographical area
- Competitive local exchange carrier (CLEC):** a company that is allowed to compete with the LECs, such as a wireless, satellite, or cable service provider
- Long-distance carrier:** a traditional long-distance phone provider, such as AT&T, Sprint, or MCI

•Networks

–**Computer network:** the communications media, devices, and software needed to connect two or more computer systems or devices

–**Network nodes:** the computers and devices on the networks

Basic Processing Strategies

–**Centralized processing:** all processing occurs in a single location or facility

–**Decentralized processing:** processing devices are placed at various remote locations

–**Distributed processing:** computers are placed at remote locations but connected to each other via a network

Terminal-to-Host, File Server, and Client/Server Systems

•Connecting computers in distributed information processing:

–**Terminal-to-host:** the application and database reside on one host computer, and the user interacts with the application and data using a “dumb” terminal

–**File server:** the application and database reside on one host computer, called the file server

–**Client/server:** multiple computer platforms are dedicated to special functions, such as database management, printing, communications, and program execution

Network Types

- Personal area network (PAN)

- Local area network (LAN)
- Metropolitan area network (MAN)
- Wide area network (WAN)
- International network

Communications Software and Protocols

- **Communications software:** software that provides a number of important functions in a network, such as error checking and data security
 - Network operating system (NOS)
 - Network management software
- **Communications protocol:** a standard rules that controls a telecommunications connection

Use and Functioning of the Internet

- Internet:** a collection of interconnected networks, all freely exchanging information. "Anarchy". Used for communication (eMail), File transfer (FTP), World Wide Web (WWW),
- ARPANET**
 - The ancestor of the Internet
 - A project started by the U.S. Department of Defense (DoD) in 1969
- Internet Protocol (IP):** communication standard that enables traffic to be routed from one network to another as needed.
- How the Internet Works**
 - The Internet transmits data from one computer (called a *host*) to another
 - If the receiving computer is on a network to which the first computer is directly connected, it can send the message directly
 - If the receiving computer is not on a network to which the sending computer is connected, the sending computer relays the message to another computer that can forward it
 - Data is passed in chunks called packets
- Internet Protocol (IP):** communications standard that enables traffic to be routed from one network to another as needed
- Transmission Control Protocol (TCP):** widely used transport-layer protocol that is used in combination with IP by most Internet applications. (**TCP/IP**)
- Uniform Resource Locator (URL):** an address on the Internet for each host computer (server)
 - Example: <http://www.PhilaU.edu/library>
 - http:// = HyperText Transport Protocol (ftp:// = File transfer protocol)
 - www = World Wide Web
 - PhilaU.edu = Domain
 - /library = a folder within the domain (/library.htm = a file within the domain)

Accessing the Internet

- Connect via a LAN server. (Method used at Philadelphia University.)
 - Connect via Serial Line Internet Protocol (SLIP)/Point-to-Point Protocol (PPP)
 - Connect via an online service. (ISP: aol, verizon, hotmail etc) Dialup, Cable, DSL...
 - Other ways to connect: Cell Phones, Personal Digital Assistants (PDA's) etc....
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- Internet service provider (ISP):** any company that provides individuals or organizations with access to the Internet
 - Most charge a monthly fee
 - Many ISPs and online services offer broadband (High speed) Internet access through digital subscriber lines (DSLs), cable, or satellite transmission

The World Wide Web *a major subset of the Internet* Introduced during the early 1990's

•**The Web, WWW or W3**

- A menu-based system that uses the client/server model ("Web Servers")
- Organizes Internet resources throughout the world into a series of menu pages, or screens, that appear on your computer
- Hypermedia:** tools that connect the data on Web pages, allowing users to access topics in whatever order they want
- Hypertext Markup Language (HTML):** the standard description language for Web pages
[To see HTML: While at any website, click "View" on menu bar & scroll down to "Source"]
- HTML tags:** codes that let the browser know how to format the text on a Web page and whether images, sound, and other elements should be inserted
- XML (Extensible Markup Language)**

- The purpose of HTML is to help build web pages and display data on web pages.
- The purpose of XML is to describe data and information . Not how to display data
- XML can be used to send complex message that include different files.

English Text	HTML	XML
MNGT 3070 Introduction to MIS 3 semester hours Professor Smith	<TITLE>Course Number</TITLE> <BODY> Introduction to MIS 3 semester hours Professor Smith </BODY>	<Department and course="MNGT 3070"> <COURSE TITLE>Introduction to MIS<COURSE TITLE> <HOURS UNIT="Semester">3</NUMBER OF HOURS> <INSTRUCTOR>Professor Smith</INSTRUCTOR>

Above Figure compares HTML and XML. Notice that HTML only describes where an item appears on a page, whereas XML describes what the item is. For example, HTML shows only that "Introduction to MIS" appears on line 1, where XML shows that "Introduction to MIS" is the Course Title.

- Web browser:** software that creates a unique, hypermedia-based menu on a computer screen, providing a graphical interface to the Web
 - The menu consists of graphics, titles, and text with hypertext links
- Search Engine:** a Web search tool (different types described in our Information Literacy Lab)
 - Examples: Yahoo.com, Google.com
 - Most search engines are free
 - Searches can use words, such as AND and OR, to refine the search

Web Programming Languages

- Java**
 - An object-oriented programming language from Sun Microsystems based on C++
 - Allows small programs (applets) to be embedded within an HTML document

Web Services

- Standards and tools that streamline and simplify communication among Web sites for *business and personal purposes*
- Can also be used to develop new systems to send and receive secure messages between healthcare facilities, doctors, and patients, while maintaining patient privacy

Internet and Telecommunications Services

- E-mail and instant messaging**
- Instant messaging:** a method that allows two or more individuals to communicate online
- Internet cell phones and handheld computers**
- Career information and job searching**
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Internet and Telecommunications Services (cont'd)

- **Web log (blog):** a Web site that people can create and use to write about their observations, experiences, and feelings on a wide range of topics
- **Chat rooms:** enable two or more people to engage in interactive “conversations” over the Internet
- **Internet phone and videoconferencing services**
- **Content streaming:** a method for transferring multimedia files over the Internet so that the data stream of voice and pictures plays more or less continuously without a break, or very few of them
- **Shopping on the Web**
- **Web auctions**
- **Music, radio, and video on the Internet**

Intranets and Extranets

• **Intranet**

- Internal corporate network built using Internet and World Wide Web standards and products
- Used by employees to gain access to corporate information
- Slashes the need for paper

• **Extranet**

- A network based on Web technologies that links selected resources of a company’s intranet with its customers, suppliers, or other business partners

- **Virtual private network (VPN):** a secure connection between two points across the Internet

Net Issues

• **Management issues**

- No centralized governing body controls the Internet

• **Service and speed issues**

- Web server computers can be overwhelmed by the amount of “hits” (requests for pages)
- More and more Web sites have video, audio clips, or other features that require faster Internet speeds

• **Privacy**

- **Spyware:** hidden files, information trackers secretly install from some visited Internet sites
- **Cookie:** a text file that an Internet company can place on the hard disk of a computer system

• **Fraud**

- Phishing and Identity theft

• **Security with encryption and firewalls**

- **Cryptography:** encoding & decoding messages
- **Digital signature:** encryption technique to verify a sender for online financial transactions
- **Firewall:** a device that sits between an internal network and the Internet, limiting access into and out of a network based on access policies

Summary

- Telecommunications is the electronic transmission of signals for communications
- A computer network consists of the communications media, devices, and software needed to connect two or more computer systems or devices
- Network types: personal area network (PAN), local area network (LAN), metropolitan area network (MAN), wide area network (WAN), and international network
- The Internet is a collection of interconnected networks, all freely exchanging information
- Internet Protocol (IP): communication standard enabling traffic to be routed among networks as needed
- Uniform Resource Locator (URL) is an assigned address on the Internet for each computer. An intranet is an internal corporate network built using Internet and World Wide Web standards and protocols
- An extranet is a network based on Web technologies that links selected resources of a company’s intranet with its customers, suppliers, or other business partners

Key Terms

- **ARPANET:** A project started by the U.S. Department of Defense (DoD) in 1969 as both an experiment in reliable networking and a means to link DoD and military research contractors, including a large number of universities doing military-funded research
- **Backbone:** One of the Internet's high-speed, long-distance communications links
- **Bot:** A software tool that searches the Web for information, products, prices, and so forth
- **Centralized processing:** The processing alternative in which all processing occurs in a single location or facility
- **Chat room:** A facility that enables two or more people to engage in interactive “conversations” over the Internet
- **Client/Server:** An architecture in which multiple computer platforms are dedicated to special functions, such as database management, printing, communications, and program execution
- **Communications protocol:** A standard set of rules that control a telecommunications connection
- **Communications software:** The software that provides a number of important functions in a network, such as error checking and data security
- **Competitive local exchange carrier (CLEC):** A company that is allowed to compete with the LECs, such as a wireless, satellite, or cable service provider
- **Computer network:** The communications media, devices, and software needed to connect two or more computer systems or devices
- **Content streaming:** A method for transferring multimedia files over the Internet so that the data stream of voice and pictures plays more or less continuously—without a break, or very few of them; enables users to browse large files in real time
- **Cookie:** A text file that an Internet company can place on the hard disk of a computer system to track user movements
- **Cryptography:** The process of converting messages into secret code and changing the encoded message back to regular text
- **Decentralized processing:** The processing alternative in which processing devices are placed at various remote locations
- **Digital signature:** The encryption technique used to verify the identity of a message sender for processing online financial transactions
- **Distributed processing:** The processing alternative in which computers are placed at remote locations but connected to each other via a network
- **Encryption:** The conversion of a message into a secret code
- **Extranet:** A network based on Web technologies that links selected resources of a company's intranet with its customers, suppliers, or other business partners
- **File server:** An architecture in which the application and database reside on the one host computer, called the file server
- **Firewall:** A device that sits between the internal network and the Internet, limiting access into and out of a network based on access policies
- **Home page:** A cover page for a Web site that has graphics, titles, and text
- **HTML tags:** The codes that let the Web browser know how to format text—as a heading, as a list, or as body text—and whether images, sound, and other elements should be inserted
- **Hypermedia:** The tools that connect the data on Web pages, allowing users to access topics in whatever order they want
- **Hypertext Markup Language (HTML):** The standard page description language for Web pages
- **Instant messaging:** A method that allows two or more individuals to communicate online using the Internet
- **International network:** A network that links systems between countries

- **Internet:** A collection of interconnected networks, all freely exchanging information
- **Internet Protocol (IP):** The communications standard that enables traffic to be routed from one network to another as needed
- **Internet service provider (ISP):** Any company that provides individuals or organizations with access to the Internet
- **Intranet:** An internal corporate network built using Internet and World Wide Web standards and products; used by employees to gain access to corporate information
- **Java:** An object-oriented programming language from Sun Microsystems based on C++ that allows small programs (applets) to be embedded within an HTML document
- **Local area network (LAN):** A network that connects computer systems and devices within the same geographic area
- **Local exchange carrier (LEC):** A public telephone company in the United States that provides service to homes and businesses within its defined geographical area, called its local access and transport area (LATA)
- **Long-distance carrier:** A traditional long-distance phone provider, such as AT&T, Sprint, or MCI
- **Metropolitan area network (MAN):** A telecommunications network that connects users and their computers within a geographical area larger than that covered by a LAN, but smaller than that covered by a WAN, such as a city or college campus
- **Network management software:** The software that enables a manager on a networked desktop to monitor the use of individual computers and shared hardware (like printers), scan for viruses, and ensure compliance with software licenses
- **Network operating system (NOS):** The systems software that controls the computer systems and devices on a network and allows them to communicate with each other
- **Personal area network (PAN):** A network that supports the interconnection of information technology within a range of 33 feet or so
- **Point-to-Point Protocol (PPP):** A communications protocol that transmits packets over telephone lines
- **Search engine:** A Web search tool
- **Serial Line Internet Protocol (SLIP):** A communications protocol that transmits packets over telephone lines
- **Telecommunications medium:** Anything that carries an electronic signal and interfaces between a sending device and a receiving device
- **Terminal-to-host:** An architecture in which the application and database reside on one host computer, and the user interacts with the application and data using a “dumb” terminal
- **Transmission Control Protocol (TCP):** A widely used transport-layer protocol that is used in combination with IP by most Internet applications
- **Tunneling:** The process by which VPNs transfer information by encapsulating traffic in IP packets over the Internet
- **Uniform Resource Locator (URL):** An assigned address on the Internet for each computer
- **Virtual private network (VPN):** A secure connection between two points across the Internet
- **Web auction:** An Internet site that matches people who want to sell products and services with people who want to purchase those products and services
- **Web browser:** The software that creates a unique, hypermedia-based menu on a computer screen, providing a graphical interface to the Web
- **Web log (blog):** A Web site that people can create and use to write about their observations, experiences, and feelings on a wide range of topics
- **Web services:** The standards and tools that streamline and simplify communication among Web sites for business and personal purposes
- **Wide area network (WAN):** A network that ties together large geographic regions