WEB DEVELOPMENT & DESIGN FOUNDATIONS WITH HTML5

Chapter 1
Key Concepts

LEARNING OUTCOMES

In this chapter, you will learn how to

- Describe the evolution of the Internet and the Web
- Explain the need for web standards
- Describe Universal Design
- Identify benefits of accessible web design
- Identify reliable resources of information on the Web
- Identify ethical use of the Web
- Describe the purpose of web browsers and web servers
- Identify networking protocols
- Define URIs and domain names
- Describe HTML, XHTML, and HTML5
- Describe popular trends in the use of the Web

REASONS FOR INTERNET GROWTH IN THE 1990S

- Removal of the ban on commercial activity
- Development of the World Wide Web by Tim Berners-Lee at CERN
- Development of Mosaic, the first graphics-based web browser at NCSA
- Personal computers were increasingly available and affordable
- Online service providers offered low-cost connections to the Internet

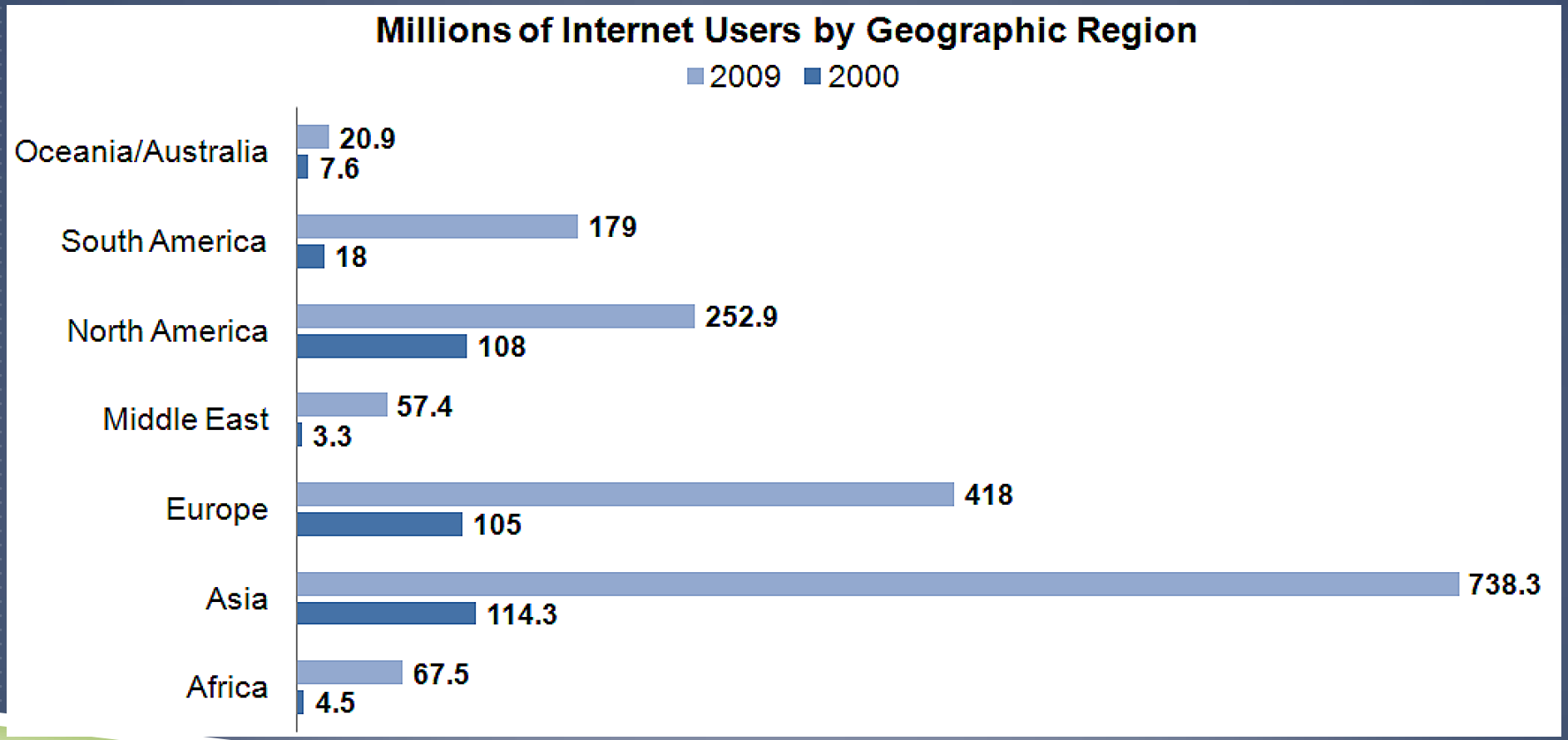
THE WORLD WIDE WEB

The graphical user interface to information stored on computers connected to the Internet.

INTERNET STANDARDS & COORDINATION

- The Internet Society
  - A professional organization that provides leadership in addressing issues related to the future of the Internet
  - **IETF--** Internet Engineering Task Force
    - RFC – Requests for Comments
  - **IAB** – Internet Architecture Board

GROWTH OF THE INTERNET



http://www.internetworldstats.com/stats.htm

INTERNET STANDARDS & COORDINATION

- ICANN - The Internet Corporation for Assigned Numbers & Names
  - Non-profit organization
  - Main function is to coordinate the assignment of:
    - Internet domain names
    - IP address numbers
    - Protocol parameters
    - Protocol port numbers.

INTRANET & EXTRANETS

- Intranet
  - A private network contained within an organization or business used to share information and resources among coworkers.
- Extranet
  - A private network that securely shares part of an organization's information or operations with external partners

WEB STANDARDS AND THE W3C CONSORTIUM

- W3C – World Wide Web Consortium
  - Develops recommendations and prototype technologies related to the Web
  - Produces specifications, called Recommendations, in an effort to standardize web technologies
  - WAI – Web Accessibility Initiative

WEB ACCESSIBILITY

- Accessible Website
  - provides accommodations for individuals with visual, auditory, physical, and neurological disabilities
- WAI
  - W3C's Web Accessibility Initiative
  - http://www.w3.org/WAI
- WCAG
  - Web Content Accessibility Guidelines http://www.w3.org/WAI/WCAG20/quickref/

WEB ACCESSIBILITY & THE LAW

- Americans with Disabilities Act (ADA)
  - Prohibits discrimination against people with disabilities
- Section 508 of the Rehabilitation Act
  - Requires that government agencies must give individuals with disabilities access to information technology that is comparable to the access available to others
  - http://www.section508.gov

UNIVERSAL DESIGN FOR THE WEB

- **Universal Design**
  - the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design

http://www.ncsu.edu/www/ncsu/design/sod5/cud/about_ud/about_ud.htm

RELIABILITY & INFORMATION ON THE WEB

- Questions to Ask:
  - Is the organization credible?
  - How recent is the information?
  - Are there links to additional resources?
  - Is it Wikipedia?

CHECKPOINT 1.1

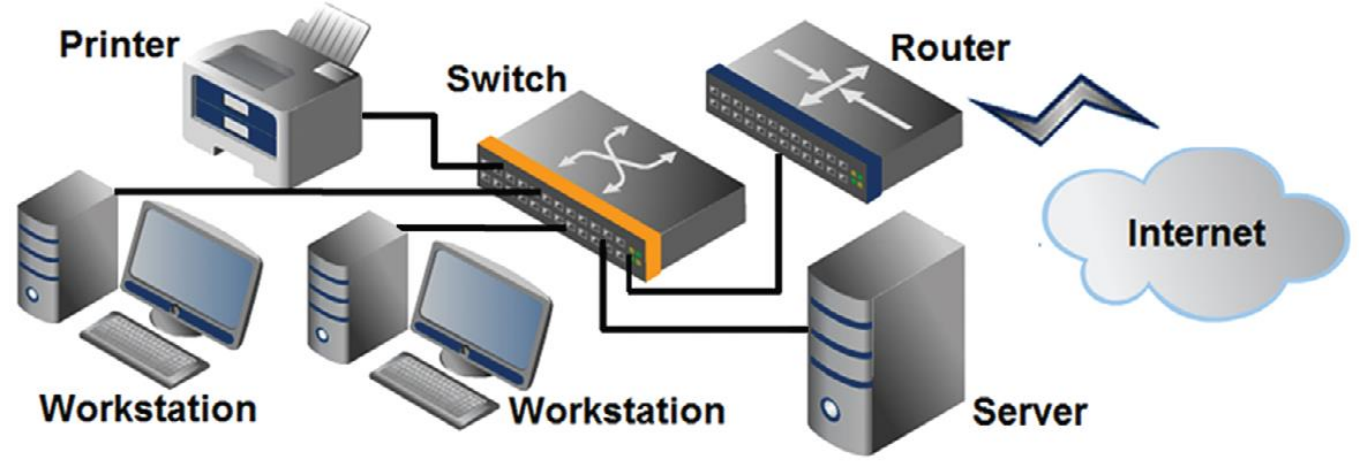
1. *Describe the difference between the Internet and the Web.*

2. *Explain three events that contributed to the commercialization and exponential growth of the Internet.*

3. Is the concept of universal design important to web developers? Explain your answer.

NETWORK OVERVIEW

- **Network**
  two or more computers connected together for the purpose of communicating and sharing resources

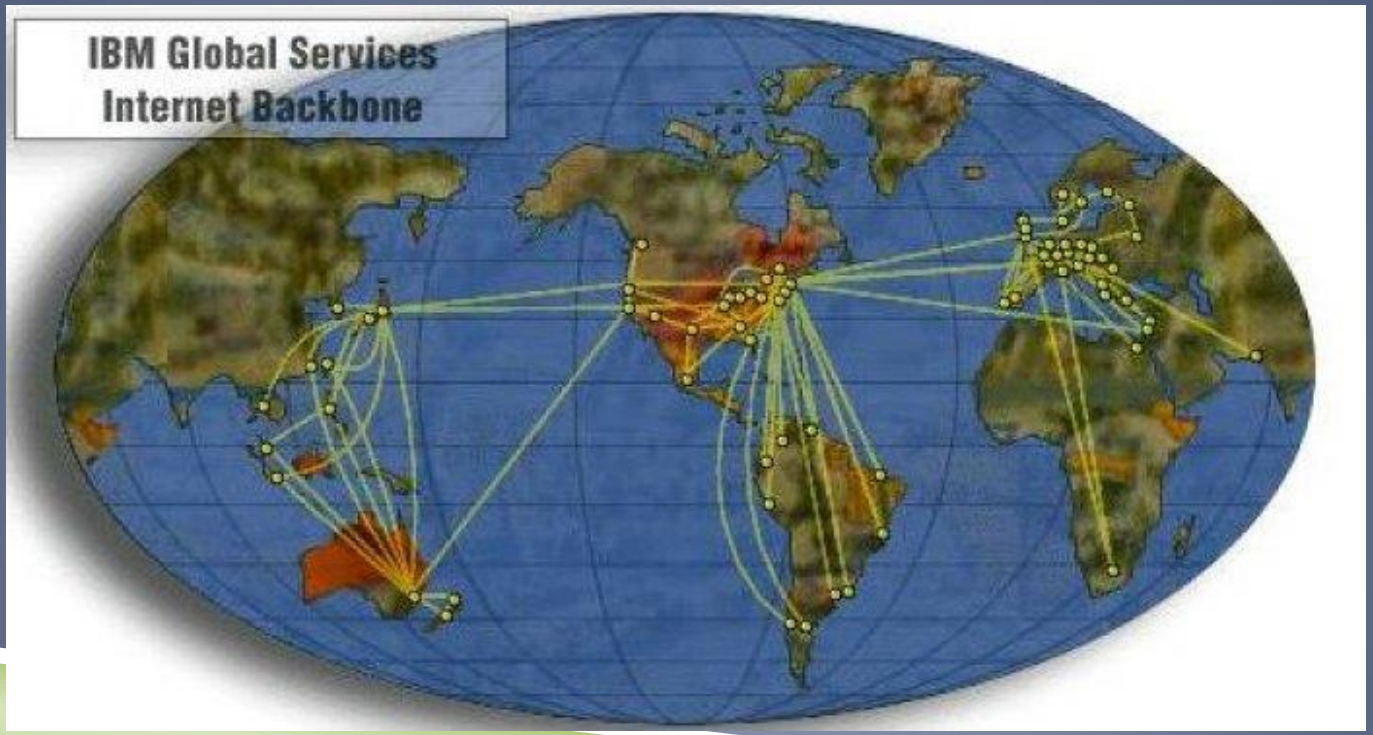


NETWORKS

- LAN – Local Area Network
  - Usually confined to a single building or group of buildings
- WAN – Wide Area Network
  - Usually uses some form of public or commercial communications network to connect computers is widely dispersed geographical areas.

INTERNET INFRASTRUCTURE

- **Internet Backbone**
  A high capacity communication link that carries data gathered from smaller links that interconnect with it.



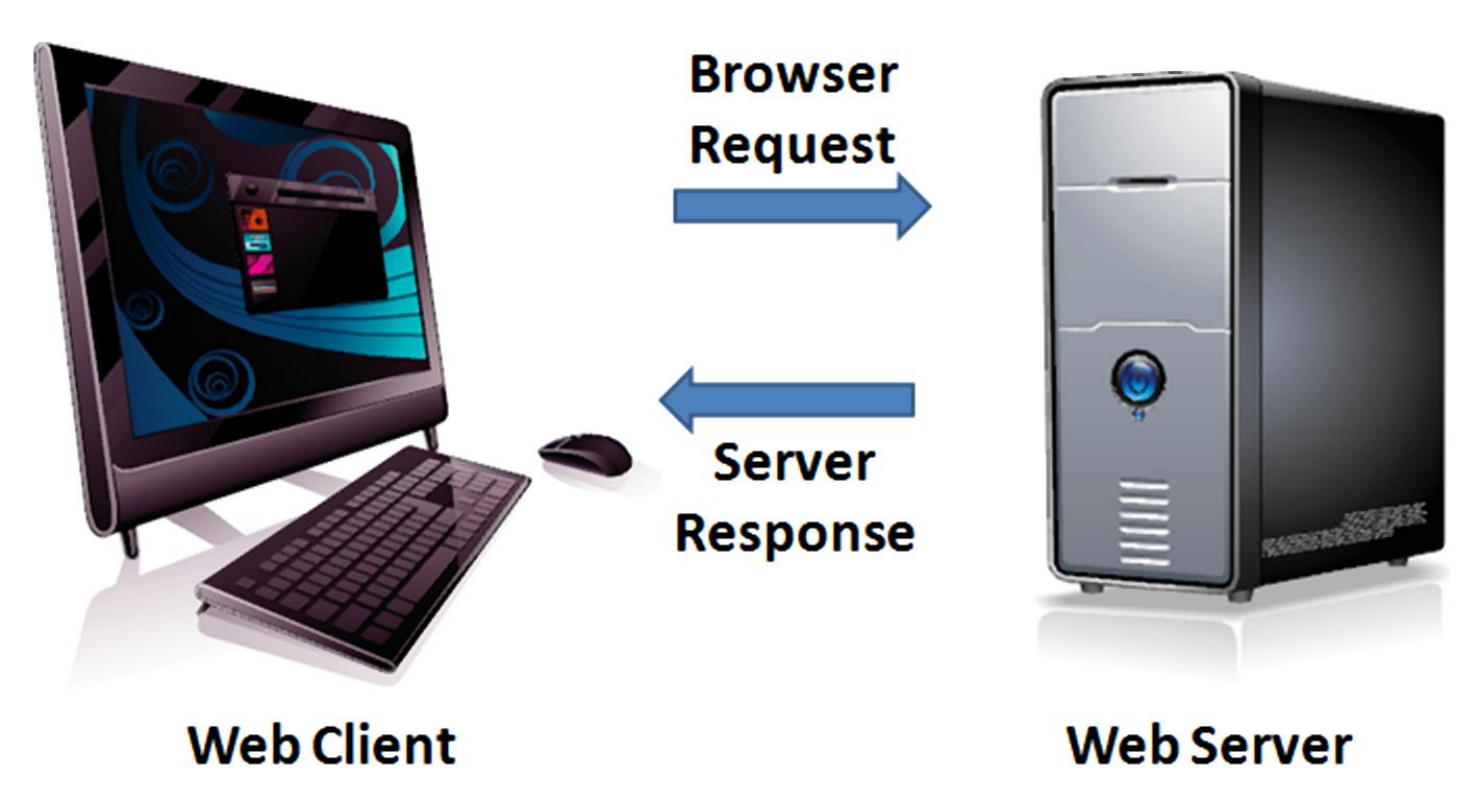
Source: http://www.alamo.edu/sac/library/faculty/deosdade/wwwtest2.htm

THE CLIENT/SERVER MODEL

- Client/Server can describe a relationship between two computer programs – the "**client**" and the "**server**".
- Client
  - requests some type of service (such as a file or database access) from the server.
- Server
  - fulfills the request and transmits the results to the client over a network

THE INTERNET CLIENT/SERVER MODEL

- Client – Web Browser
- Server – Web Server



WEB CLIENT

- Connected to the Internet when needed
- Usually runs web browser (client) software (*such as Internet Explorer or Firefox)*
- Uses HTTP (Hypertext Transfer Protocol)
- Requests web pages from server
- Receives web pages and files from server

WEB SERVER

- Continually connected to the Internet
- Runs web server software
  (such as Apache or Internet Information Server)
- Uses HTTP (Hypertext Transfer Protocol)
- Receives request for the web page
- Responds to request and transmits status code, web page, and associated files

MIME TYPE

- Multi-Purpose Internet Mail Extension
  - a set of rules that allow multimedia documents to be exchanged among many different computer systems

INTERNET PROTOCOLS

- Protocols
  - Rules that describe the methods used for clients and servers to communicate with each other over a network.
- There is no *single* protocol that makes the Internet and Web work.
- A number of protocols with specific functions are needed.

FTP
FILE TRANSFER PROTOCOL

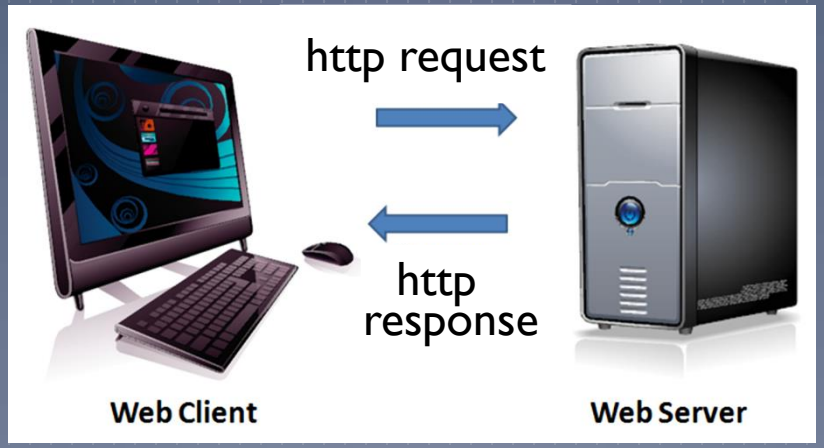
- A set of rules that allow files to be exchanged between computers on the Internet.
- Web developers commonly use FTP to transfer web page files from their computers to web servers.
- FTP is also used to download programs and files from other servers to individual computers.

E-MAIL PROTOCOLS

- Sending E-mail
  - SMTP Simple Mail Transfer Protocol
- Receiving E-mail
  - POP (POP3) Post Office Protocol
  - IMAP Internet Mail Access Protocol

HTTP - HYPERTEXT TRANSFER PROTOCOL

- A set of rules for exchanging files such as text, graphic images, sound, video, and other multimedia files on the Web.



- Web browsers send HTTP requests for web pages and their associated files.
- Web servers send HTTP responses back to the web browsers.

TCP/IP

TRANSMISSION CONTROL PROTOCOL/INTERNET PROTOCOL

- TCP/IP has been adopted as the official communication protocol of the Internet.
- TCP and IP have different functions that work together to ensure reliable communication over the Internet.

TCP
TRANSMISSION CONTROL PROTOCOL

- Purpose is to ensure the integrity of communication
- Breaks files and messages into individual units called packets

IP
INTERNET PROTOCOL

- A set of rules that controls how data is sent between computers on the Internet.
- IP routes a packet to the correct destination address.
- The packet gets successively forwarded to the next closest router (a hardware device designed to move network traffic) until it reaches its destination.

http://visualroute.visualware.com/

http://www.tracert.com/cgi-bin/trace.pl

IP ADDRESS

- Each device connected to the Internet has a unique numeric IP address.
- These addresses consist of a set of four groups of numbers, called octets.

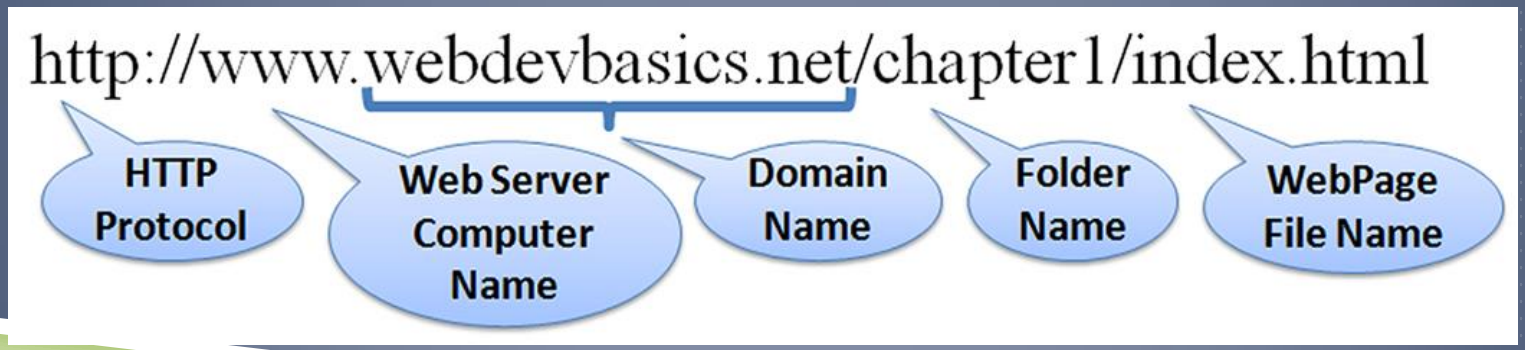
  74.125.95.104 will get you Google!
- An IP address may correspond to a domain name.

DOMAIN NAME

- Locates an organization or other entity on the Internet
- Domain Name System
  - Divides the Internet into logical groups and understandable names
  - Associates unique computer IP Addresses with the text-based domain names you type into a web browser
  - Browser: http://google.com
  - IP Address: 74.125.95.104

UNIFORM RESOURCE IDENTIFIER

- **URI – Uniform Resource Identifier**
  - identifies a resource on the Internet
- **URL – Uniform Resource Locator**
  - a type of URI which represents the network location of a resource such as a web page, a graphic file, or an MP3 file.



TLD
TOP-LEVEL DOMAIN NAME

- A top-level domain (TLD) identifies the right-most part of the domain name.

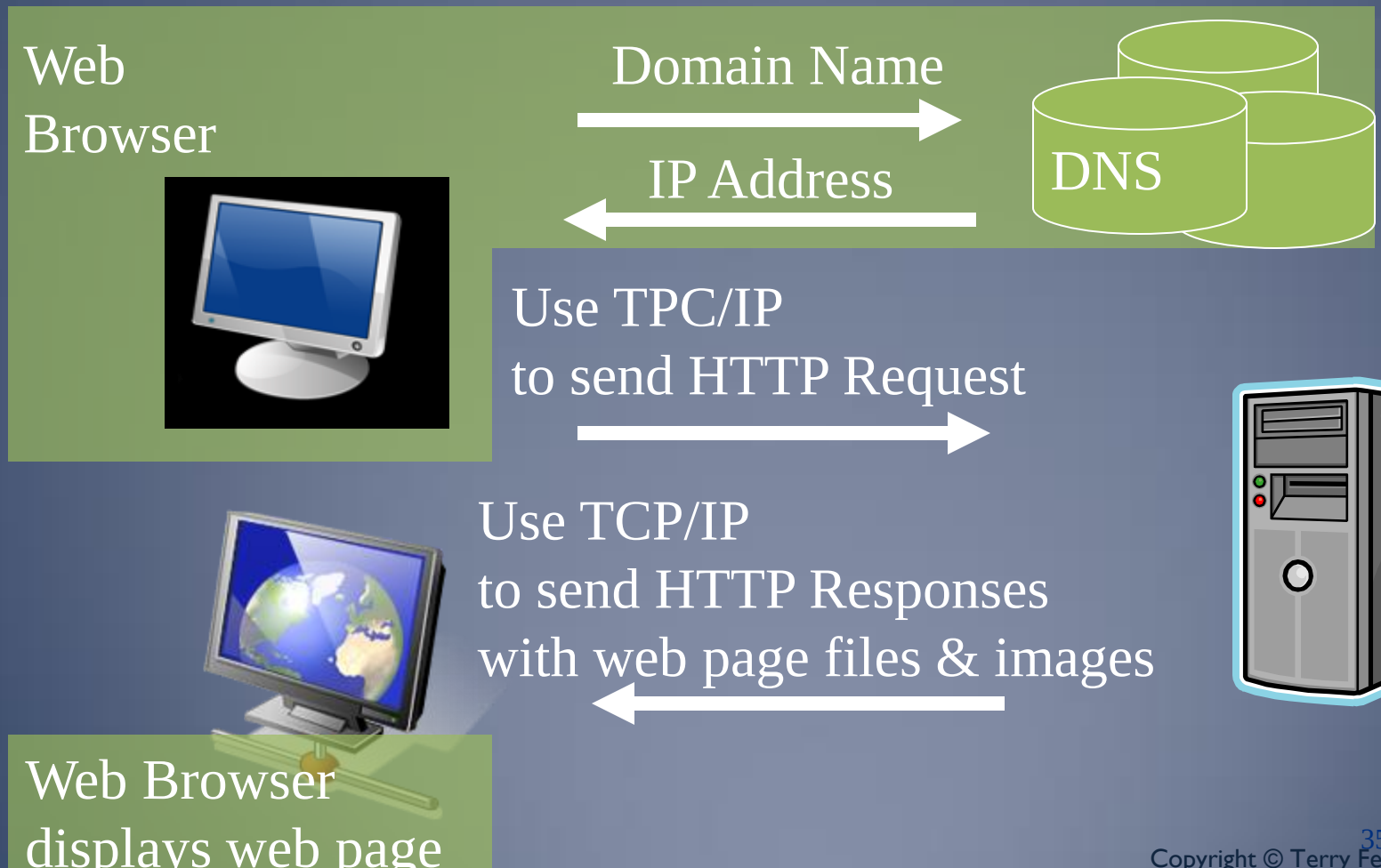
- Current generic TLDs:
  .com, .org, .net, .mil, .gov, .edu, .int, .aero, .asia, .cat, .jobs, .name, .biz, .mobi, .museum, .info, .coop, .post, .pro, .tel, .travel, .xxx

COUNTY CODE TLDS

- Two character codes originally intended to indicate the geographical location (country) of the web site.
- In practice, it is fairly easy to obtain a domain name with a country code TLD that is not local to the registrant.
- Examples:
  - .tv, .ws, .au, .jp, .uk
  - See http://www.iana.org/cctld/cctld-whois.htm

DOMAIN NAME SYSTEM

- The Domain Name System (DNS) associates Domain Names with IP addresses.



MARKUP LANGUAGES

- SGML – Standard Generalized Markup Language
  - A standard for specifying a markup language or tag set
- HTML – Hypertext Markup Language
  - The set of markup symbols or codes placed in a file intended for display on a web browser.

MARKUP LANGUAGES (2)

- XML – eXtensible Markup Language
  - A text-based language designed to describe, deliver, and exchange structured information.
  - It is not intended to replace HTML –
    it is intended to extend the power of HTML by separating data from presentation.

MARKUP LANGUAGES (3)

- XHTML – eXtensible Hypertext Markup Language
  - Developed by the W3C as the reformulation of HTML 4.0 as an application of XML.
  - It combines the formatting strengths of HTML 4.0 and the data structure and extensibility strengths of XML.

MARKUP LANGUAGES (4)

- HTML 5
  - The next version of HTML 4 and XHTML
  - http://www.w3.org/html/

CHECKPOINT 1.2

1. *Describe the components of the client/server model as applied to the Internet.*

2. *Identify two protocols used on the Internet to convey information that use the Internet but do not use the Web.*

3. *Explain the similarities and differences between a URL and a domain name.*

POPULAR USES OF THE INTERNET

- Continued importance of E-Commerce
- Mobile Access
- Blogs
- Wikis
- Social Networking
- RSS
- Podcasts
- Web 2.0

SUMMARY

- This chapter provided a brief overview of Internet, Web, and introductory networking concepts.