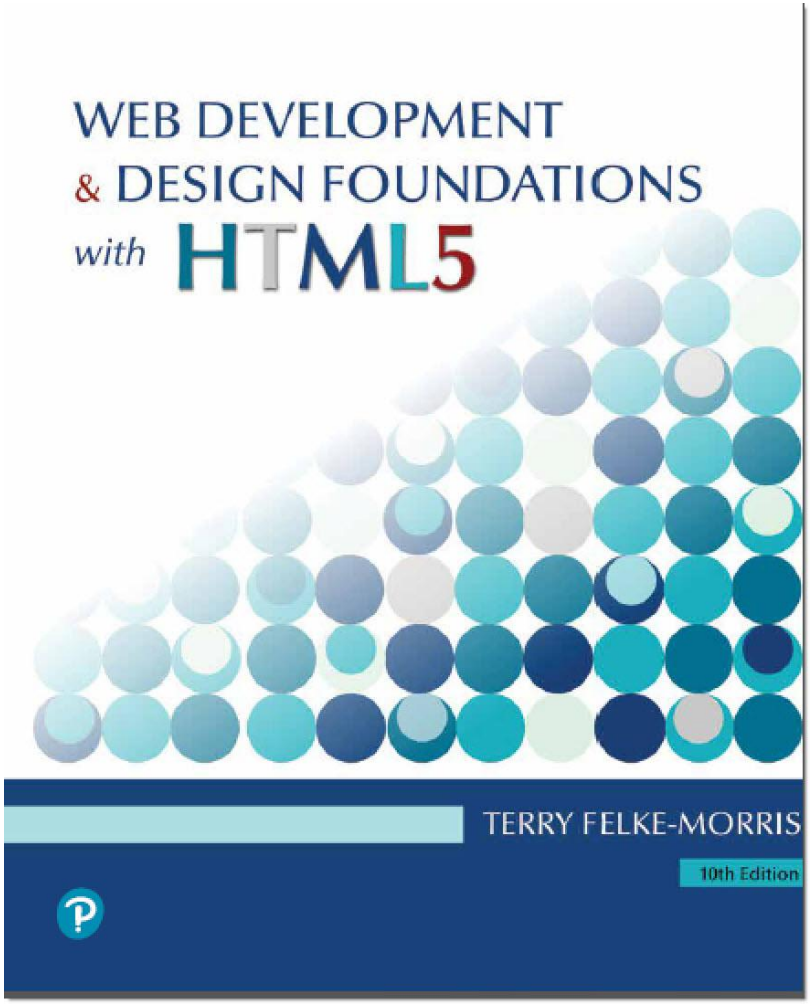
Web Development & Design Foundations with HTML5

Tenth Edition



Chapter 1

Introduction to the Internet and World Wide Web

Learning Outcomes (1 of 2)

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

Learning Outcomes (2 of 2)

- Identify networking protocols
- Define URIs and domain names
- Describe HTML, XHTML, and HTML5

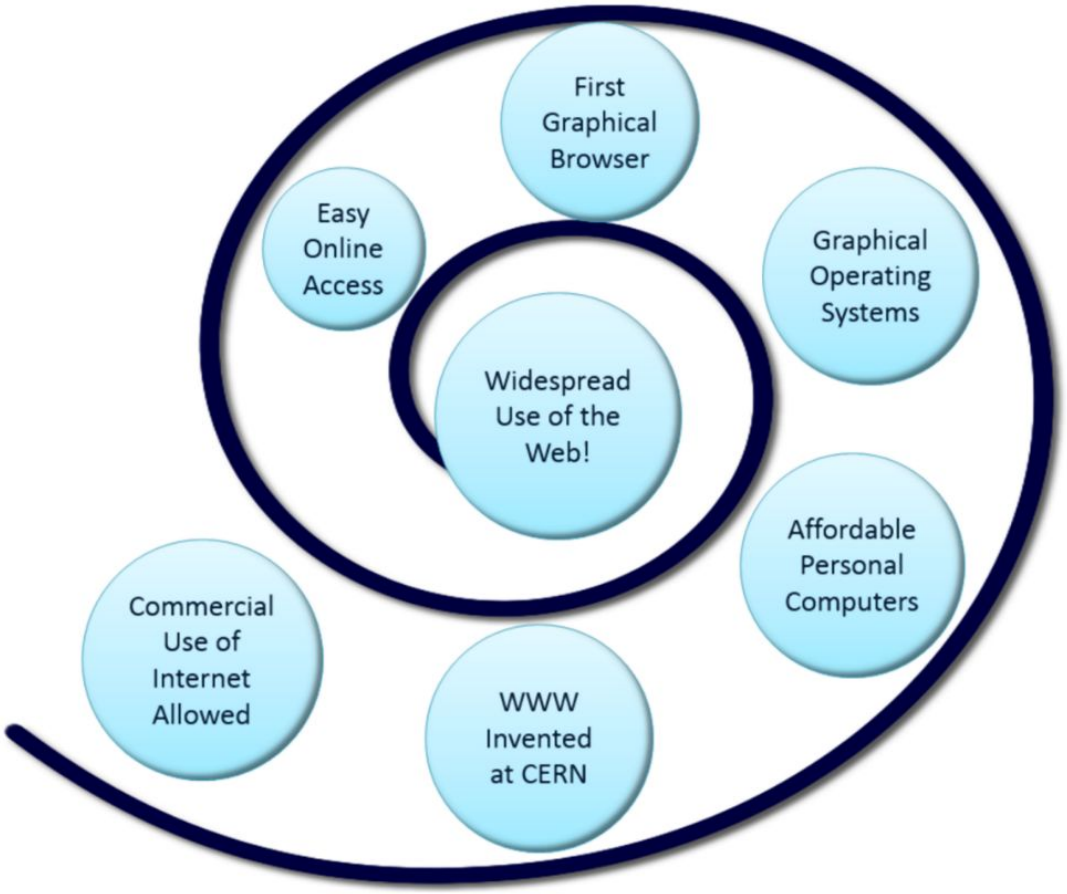
Internet

The interconnected network of computer networks that spans the globe.

Reasons for Internet Growth in the 1990s

- 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

Figure 1.1 Convergence of Technologies



The World Wide Web

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

Internet Standards & Coordination (1 of 2)

IETF – Internet Engineering Task Force

The principal body engaged in the development of new Internet protocol standard specifications.

RFC – Requests for Comments
A formal document from the IETF that is drafted by a committee and subsequently reviewed by interested parties

IAB – Internet Architecture Board
Provides guidance and broad direction to the IETF.
Responsible for publications for RFCs.

Internet Standards & Coordination (2 of 2)

- 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.

Growth of the Internet

Year	Percentage of Global Population Using the Internet
1995	0.4%
2000	5.8%
2005	15.7%
2010	28.10%
2015	45%
2018	55.1%
2019	56.1%
2023	62%

Source: http://www.internetworldstats.com/emarketing.htm

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 2.1

- Web Content Accessibility Guidelines http://www.w3.org/WAI/WCAG20/quickref/

Universal Design for the Web

Universal Design

strategy for making products, environments, operational systems, and services welcoming and usable to the most diverse range of people possible

https://www.dol.gov/odep/topics/UniversalDesign.htm

Universal Design for the Web

Reliability & Information on the Web

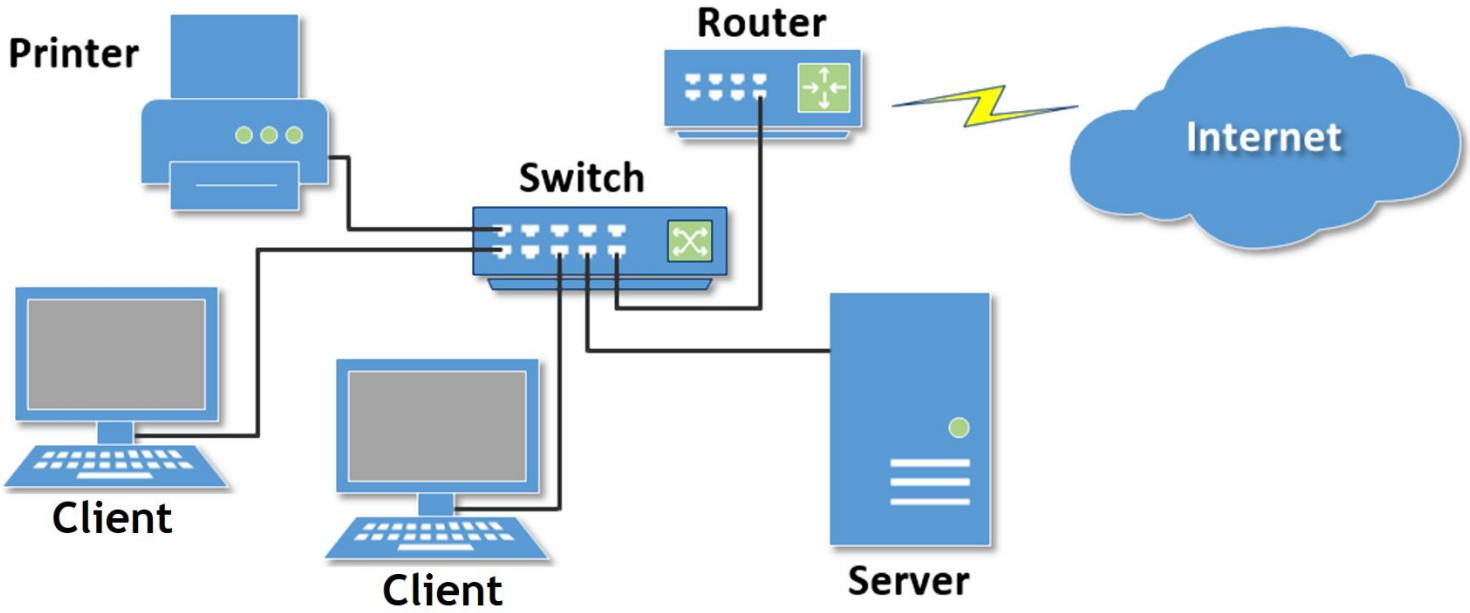
Questions to Ask:

- Is the organization credible?
- How recent is the information?
- Are there links to additional resources?
- Is it Wikipedia?
  If so, further research is needed.

Network Overview

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

Figure 1.4 Common components of a network



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.

Maps of the Internet Backbone

http://www.google.com/search?q=global+internet+backbone+map+images

Client – Web Browser Server – Web Server

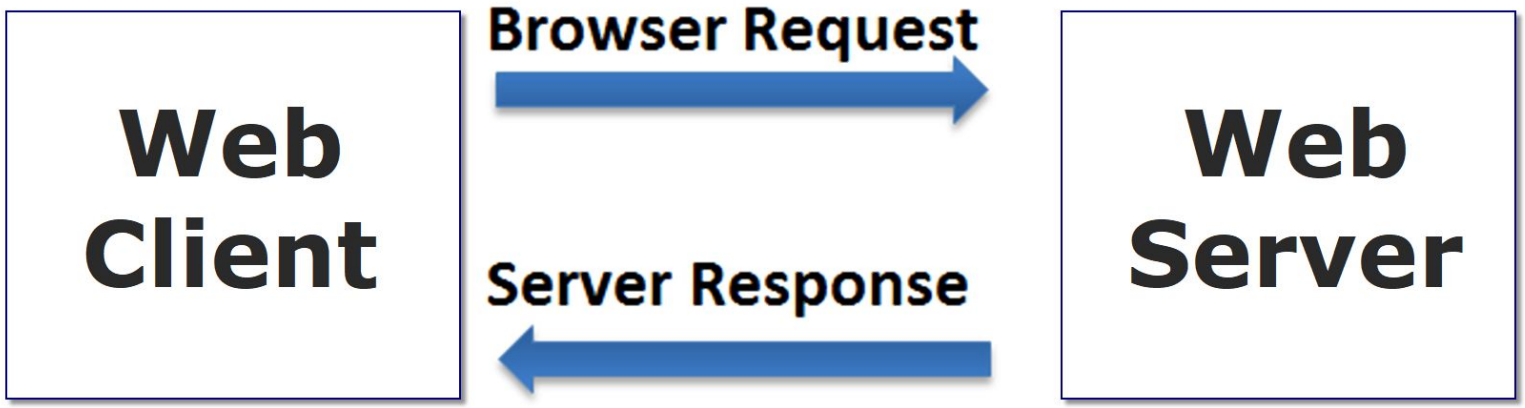


Figure 1.5 Web client and web server

Web Client

Connected to the Internet when needed

Usually runs web browser (client) software
(*such as Microsoft Edge or Google Chrome*)

Uses HTTP (Hypertext Transfer Protocol) or HTTPS

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) or HTTPS

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

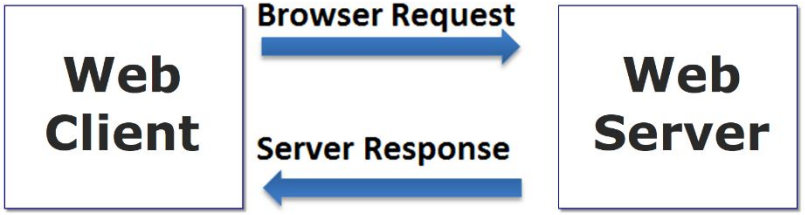
- SMTP Simple Mail Transfer Protocol

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 and the requested files back to the web browsers.

HTTPS – Hypertext Transfer Protocol Secure

Combines HTTP with a security and encryption protocol

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

Figure 1.6 TCP packet

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://www.monitis.com/traceroute/

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.

216.58.194.46 will get you Google!

An IP address may correspond to a domain name.

IPv4 vs IPv6

- Internet Protocol version 4 – uses 32 bit addressing.
- Usually written in dotted decimal notation.

- Internet Protocol version 6 – uses 128 bit addressing.
- Usually written in Hexadecimal notation.

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: 216.58.194.46

Uniform Resource Identifier

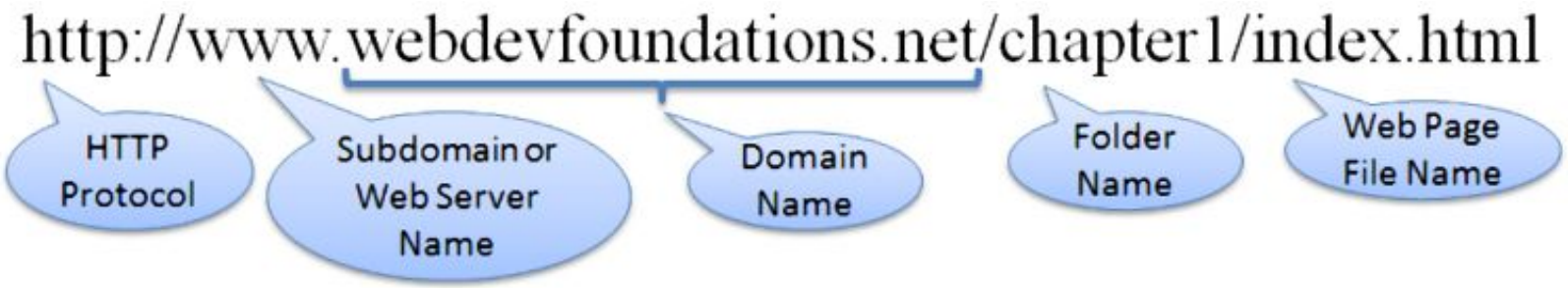
URI – Uniform Resource Identifier

- 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.

Figure 1.8 URL Describing a file within a folder



TLD Top-Level Domain Name

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

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

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.

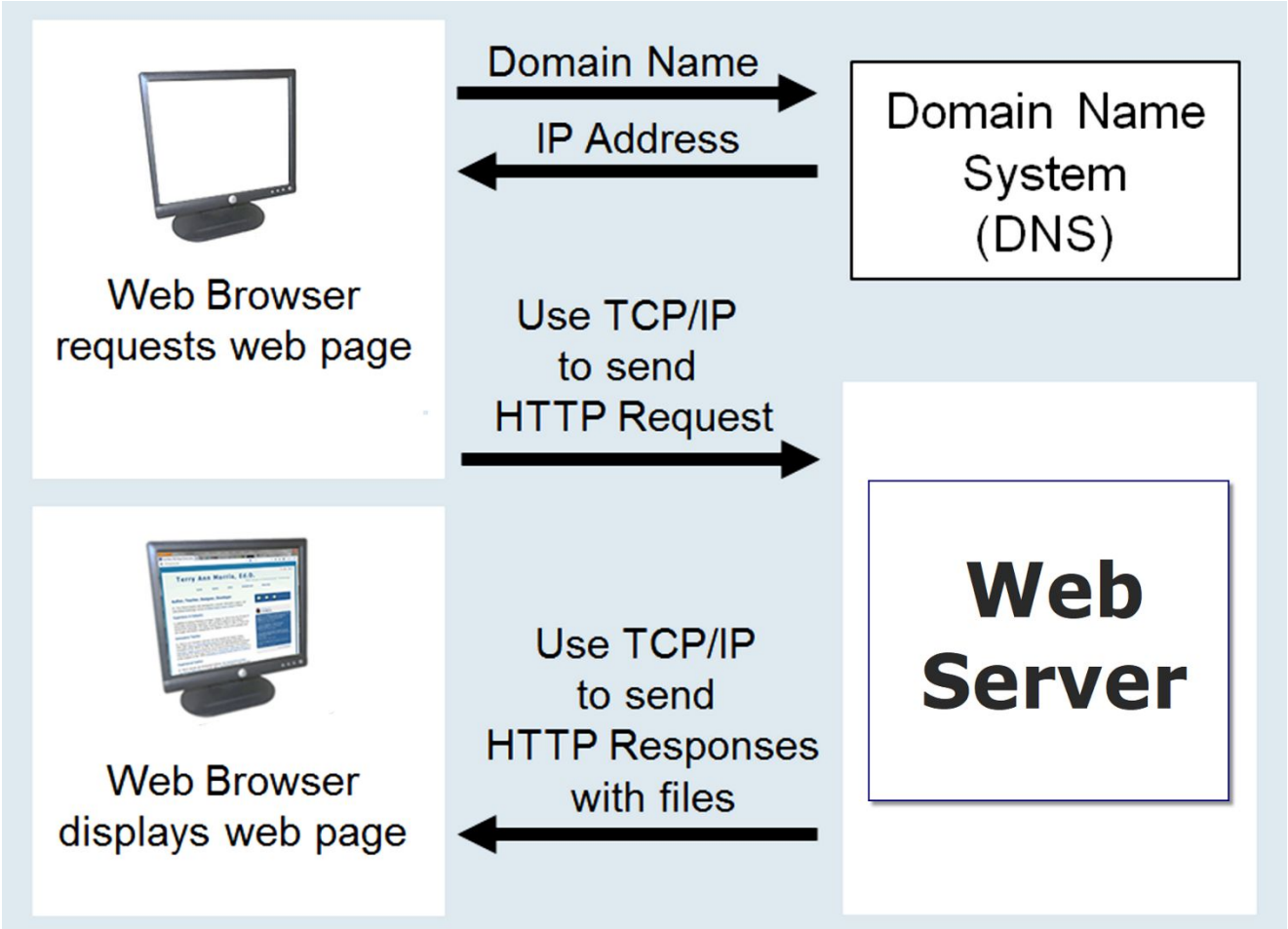
Examples:

- .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.

Figure 1.9 Accessing a web page



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 HTML4 and XHTML
- https://www.w3.org/TR/html5/
- It's already been updated!
- HTML 5.1
  - https://www.w3.org/TR/html51/
- HTML 5.2
  - https://www.w3.org/TR/html52/

Popular Uses of the Internet

E-Commerce

Mobile Access

Blogs

Wikis

Social Networking

RSS

Podcasts

Cloud Computing