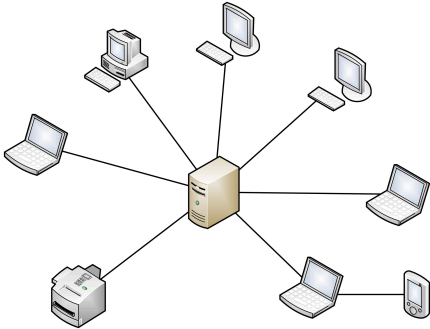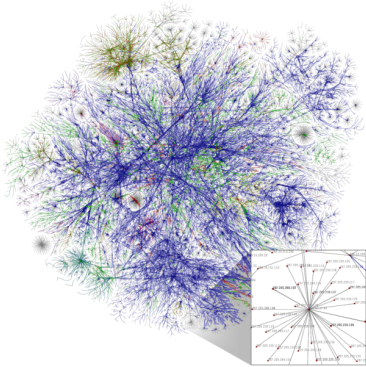# The Internet & Web

Computer Networks

A **computer network** is a collection of computers that can transfer data between each other.

In a basic **client-server** network:

- Computers are connected via a central **server**.
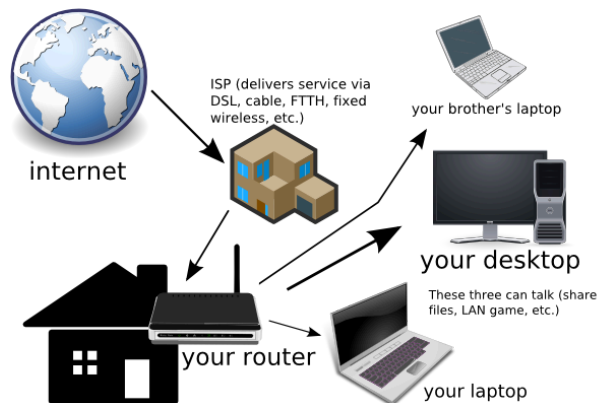- Each computer connected to the server is a **client.**

The Internet

- Networks are linked together to create **internetworks, or internets.**
- One of the first internetworks was ARPANET, which went online in 1969.
- The globally connected internetwork is called **the Internet** (with a capital 'I')

Client-server network diagram	The Internet connections visualization

ISP's & home networks

- Consumers connect to the internet through an **Internet Service Provider (ISP)**.
  - For example: Comcast or Verizon
  - An ISP forms a **wide-area network (WAN)**
- Many homes now have a **local-area network (LAN).**
  - A **modem** connects the LAN to an ISP.
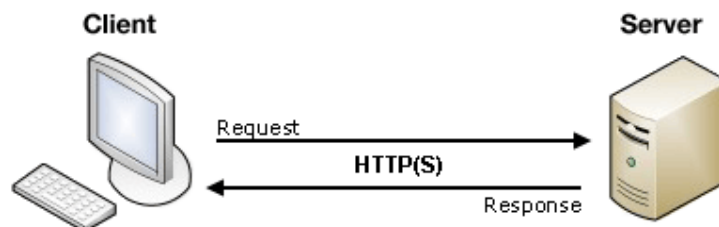 - A **router** directs Internet traffic to and from devices on the LAN.

The WWW

- 'The web' refers to the **World Wide Web (WWW)**
- The WWW went online in 1991.
- Components of the WWW:
  - **Web servers**
  - **Hypertext Transfer Protocol (HTTP)**
  - **Hypertext Markup Language (HTML)**
  - **Web browsers.**

Web Servers and HTTP

- When you attempt to access content on the WWW,
  - your computer (**client**) sends a request over the Internet to a **server** for the website.
  - The server then sends back a **response** with the data you requested.

HTML and Web Browsers

- **Hypertext markup language (HTML)** is the language that specifies the contents of a web page.
- The **web browser** processes HTML and other files and displays the formatted web page.

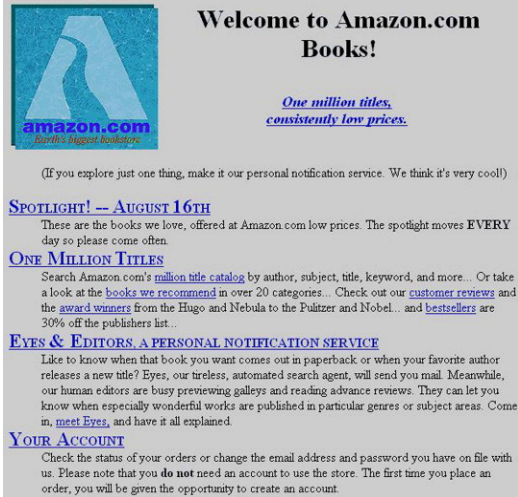| HTML File	Browser	Formatted Web Page

Evolution of the Web

The Static Web

- Prior to ~2000, the internet mostly consisted of **static content.**
  - Content is the same for each user.
  - User cannot interact with or change the content.
  - Content consists mostly of images and links.

The Dynamic Web (Web 2.0)

- Around the year 2000, much of the Web was shifting towards **dynamic content.**
- User can log in for a customizable, personal experience.
  - Amazon product suggestions, facebook profile, etc.
- User can modify or contribute content.
  - Wikipedia, youTube
- Content is interactive, graphical, etc.
  - The Evolution of the Web

Static content	Dynamic content

The Mobile Web & Ubicomp

- With the increased adoption of Internet connected **smartphones and tablets**, the Web went mobile.
- **Ubiquitous computing (Ubicomp)** refers to the concept of computing everywhere and in many forms.

Emergent & future technologies

- The "semantic web"
  - using metadata to provide extra information about web content
  - #hashtags are a form of semantic tagging
- The "internet of things"
  - connecting other items to the web: cars, household appliances, clothing, etc.
- Virtual / augmented reality
  - e.g. oculus rift, google glass.
  - VR / AR technologies provide new ways to interact with the web and with each other via. the web.
- Artificially intelligent (AI) agents
  - entities which can act autonomously on your behalf.
  - AI agents will be able to observe the world and will have 'senses,' such as vision (image recognition), hearing (audio / natural language processing), and more.