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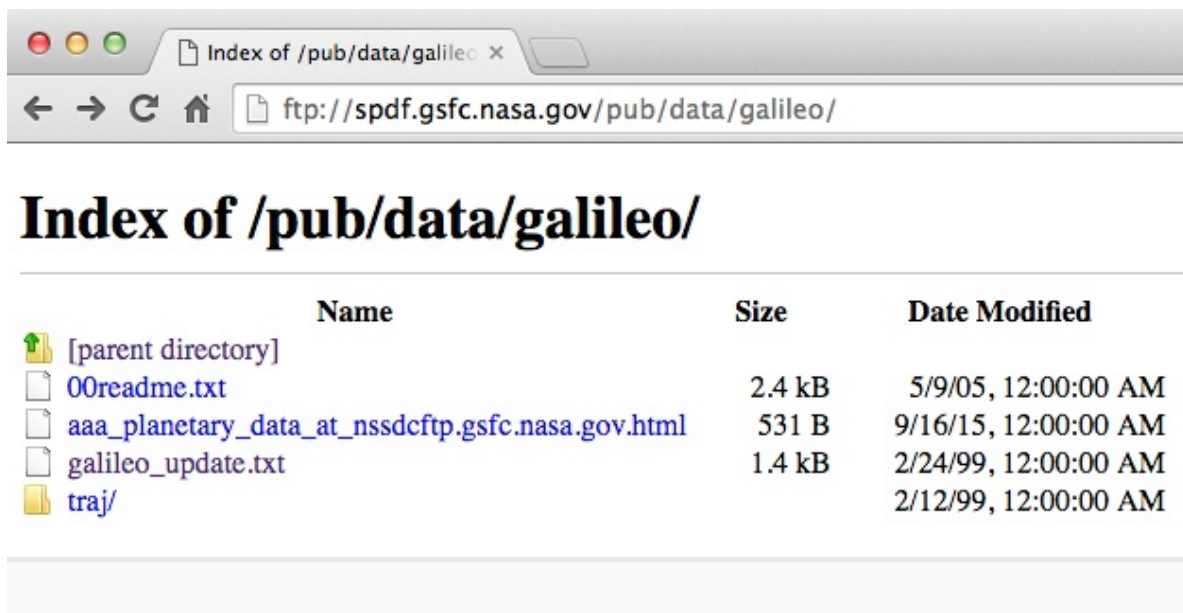
1.1 Web history

Internet and web

Computers of the 1940s and 1950s were mostly solitary machines, but in the 1960s computer networks evolved. A computer network allows computers to communicate information with each other. The **internet** began as four networked computers in 1969. Today, the internet is the largest and most popular computer network, spanning the entire globe.

Early versions of the internet looked and acted similar to today, but in a much simpler way. Documents were plain text: no images, no formatting, and no interaction. **FTP (File Transfer Protocol)** was an early way for transferring files over the internet. Users used FTP programs to connect to servers, look at listings of available documents, and download documents of interest.

Figure 1.1.1: NASA public FTP site.

[Feedback?](#)

In the early 1990s, Tim Berners-Lee was working at a Swiss research institute named CERN and developed a more convenient way for computers to communicate files over the internet.

Berners-Lee named his creation the **World Wide Web**, or simply "the **web**". The web involved three things:

1. Text files, known as HTML files, containing *links* to other text files.
2. A program, known as a browser, for viewing HTML files.
3. A set of rules, known as the HTTP protocol, for transferring HTML files among computers.

PARTICIPATION ACTIVITY

1.1.1: The web uses HTML files, web browsers, and HTTP to provide a more convenient way for computers to communicate on the web.

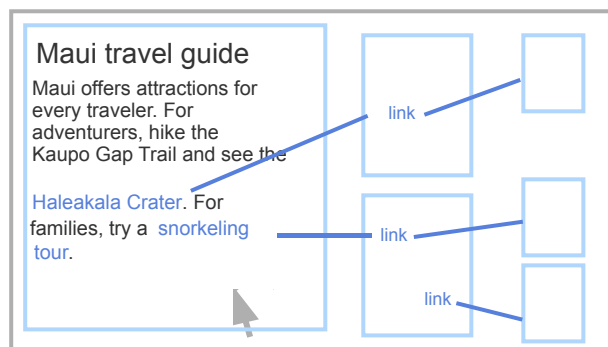


1 2 3 ◀ ✓ 2x speed

FTP:

```
>login
>get file 1
...
>get file 2
```

HTTP:



Clicking a link in a file opens the file being linked to. Files can contain multiple links.

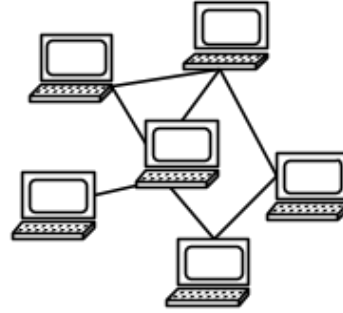
Captions ^

1. FTP is commonly used to transfer files by logging into a computer containing the files and typing commands to get the desired files.
2. HTTP is a protocol for transferring HTML files among computers. Files can contain links to other files.
3. Clicking a link in a file opens the file being linked to. Files can contain multiple links.

[Feedback?](#)

The web was originally called the World Wide Web, or WWW, because Berners-Lee envisioned a large collection of globally distributed webpages linking to each other. A **webpage** or **web page** is a document that is viewed in a web browser. A collection of related webpages are organized into a **website**. A **web server** is a program that serves webpages to web browsers.

Figure 1.1.2: The web's name comes from the interconnections of computers being like the interconnections of a spider's web.



Source: Spider web ([Steve Gibson](#) / Public Domain), computer network (zyBooks)

[Feedback?](#)

Introduction of HTML

HyperText markup language (HTML) is the standard markup language for web documents. **Hypertext** is text that has links to other text (and today to images, videos, and more). Document **markup** is special markings in the document that provide additional information about links, formatting, and images. HTML also permits adding metadata like search engine keywords, author information, and language.

Figure 1.1.3: One of the first webpages.

World Wide Web

The WorldWideWeb (W3) is a wide-area [hypermedia](#) information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an [executive summary](#) of the project, [Mailing lists](#) , [Policy](#) , November's [W3 news](#) , [Frequently Asked Questions](#) .

[What's out there?](#)

Pointers to the world's online information, [subjects](#) , [W3 servers](#), etc.

[Help](#)

on the browser you are using

[Software Products](#)

A list of W3 project components and their current state. (e.g. [Line Mode](#) ,X11 [Viola](#) , [NeXTStep](#) , [Servers](#) , [Tools](#) , [Mail robot](#) , [Library](#))

[Technical](#)

Details of protocols, formats, program internals etc

[Bibliography](#)

Paper documentation on W3 and references.

[People](#)

A list of some people involved in the project.

[History](#)

A summary of the history of the project.

[How can I help ?](#)

If you would like to support the web..

[Getting code](#)

Getting the code by [anonymous FTP](#) , etc.

[Feedback?](#)

Hypertext history

Tim Berners-Lee's ideas of creating linking webpages was founded on previous work on hypertext:

- 1945: Engineer Vannevar Bush writes the essay "As We May Think" that describes Memex, a theoretical machine for building and following links between documents.
- 1965: Ted Nelson coins the term HyperText in a paper on how to deal with information that was complex, changing, and uncertain.
- 1968: Doug Engelbart demonstrates an implementation of hyperlinks with a mouse in the oN-Line System (NLS).
- 1987: Apple releases HyperCard, software for the Macintosh that enables programming hypertext applications.

PARTICIPATION ACTIVITY

1.1.2: The web.



If unable to drag and drop, refresh the page.

Early 1990s

The period when the web was first developed.

People/companies began obtaining personal computers throughout the 1980s, and networks were growing. Connecting those computers intelligently was becoming important.

Correct

HTML

The language used for a text file that describes a webpage.

The HyperText Markup Language has text with links (hypertext) to other files on the web.

Correct

webpage

Web document that is viewed in a web browser.

Correct

A webpage may link to other webpages.

website

Collection of related webpages.

A website may be composed of any number of webpages.

Correct

web server

A program that serves webpages to browsers.

Popular web servers today include Apache, IIS, and nginx.

Correct

HTTP

The protocol for transferring files among computers via the web.

Short for HyperText Transfer Protocol. A protocol is a set of rules.

Correct

browser

A program for viewing webpages.

A browser displays HTML files in a formatted way.

Correct

Reset

[Feedback?](#)

Web vs. internet

Today, much of the internet traffic is web traffic. People thus have a hard time distinguishing the internet (the interconnection of computers communicating using a set of rules), and the web (which is just one particular use of the internet). Besides transferring webpages from one computer to another, the internet also transmits email, music, video, and other types of data.

Table 1.1.1: Number of websites and internet users per year.

The number of websites has grown at a dramatically fast rate.

Year	Websites	Internet users	Major websites launched
2018	1,630,322,579	3,896,000,000	

2017	1,766,926,408	3,650,000,000	
2016	1,045,534,808	3,417,000,000	
2015	863,105,652	3,185,996,155	
2014	968,882,453	2,925,249,355	
2013	672,985,183	2,756,198,420	
2012	697,089,489	2,518,453,530	
2011	346,004,403	2,282,955,130	Twitch
2010	206,956,723	2,045,865,660	Pinterest, Instagram
2009	238,027,855	1,766,206,240	
2008	172,338,726	1,571,601,630	Dropbox
2007	121,892,559	1,373,327,790	Tumblr
2006	85,507,314	1,160,335,280	Twitter
2005	64,780,617	1,027,580,990	YouTube, Reddit
2004	51,611,646	910,060,180	Thefacebook, Flickr
2003	40,912,332	778,555,680	WordPress, LinkedIn
2002	38,760,373	662,663,600	
2001	29,254,370	500,609,240	Wikipedia
2000	17,087,182	413,425,190	
1999	3,177,453	280,866,670	PayPal
1998	2,410,067	188,023,930	Google
1997	1,117,255	120,758,310	eBay, Netflix
1996	257,601	77,433,860	
1995	23,500	44,838,900	Altavista, Amazon
1994	2,738	25,454,590	Yahoo!
1993	130	14,161,570	
1992	10		

8/1/91

1

Source: [InternetLiveStats, 2018.](#) and [Statista](#)[Feedback?](#)**PARTICIPATION
ACTIVITY**

1.1.3: Websites per year.



Refer to the above table.

1) When was the first website published?

- ☒ 1991
☐ 2001

CorrectThe first website was developed by Tim Berners-Lee and can be viewed [here](#).

2) When was Yahoo created?

- ☒ 1994
☐ 2001

Correct

Yahoo was created by a pair of Stanford graduate students, who created a list of websites that they liked.



3) How many websites existed in 2001?

- ☐ Thousands
☒ 30 million

Correct

Within just 10 years of the web's creation, tens of millions of websites had been developed. Searching those sites became more important.



4) How many websites existed in 2011?

- ☒ 350 million
☐ 350 trillion

Correct

And those 350 million websites are used by over 2 billion users, which is nearly one third the planet's population.



5) In what year did the number of internet users surpass 3 billion?

- ☐ 2005
☒ 2015

Correct

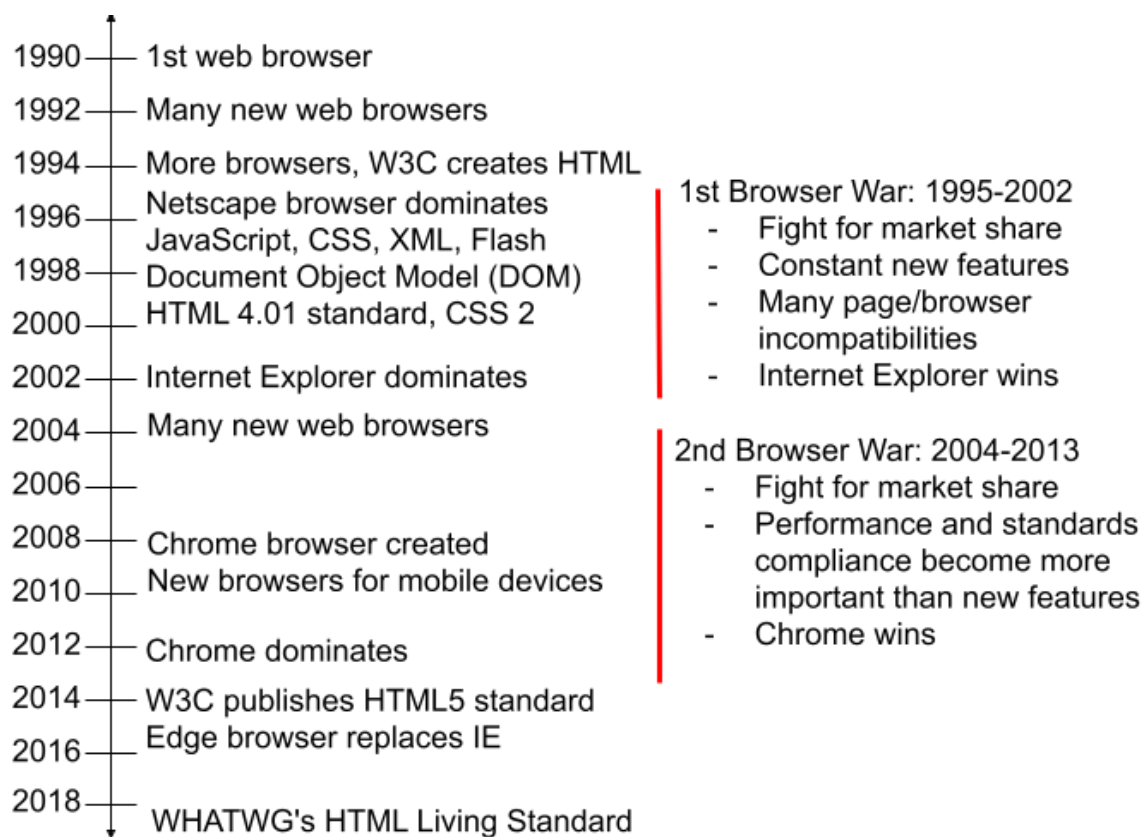
Approximately 43% of the world's population had internet access in 2015, and the percent continues to climb every year.

[Feedback?](#)**Browser wars and HTML standardization**

A **web browser** is a program that downloads an HTML document from a web server, displays the document to the user with the appropriate formatting, and allows the user to interact with the document, such as clicking hyperlinks to access other documents. A web browser uses HTML to understand the structure and semantics, or meaning, of the document.

Early in browser history, browser developers competed for users by trying to provide the best web browsing experience. Ex: Browser developers added enhancements allowing greater interactivity in web documents. These enhancements only worked within specific browsers, so many documents could not be viewed properly on all browsers.

Figure 1.1.4: Web browser timeline.



[Feedback?](#)

The frequent webpage and browser incompatibility headaches pushed the industry to value standardization. The **World Wide Web Consortium (W3C)** is the international standards organization that traditionally has controlled a number of web standards, including HTML. HTML5 was the latest HTML standard released by the W3C in 2014.

In 2019, the W3C relinquished HTML standards publishing to the **Web Hypertext Application Technology Working Group (WHATWG)**, an organization that develops a variety of web standards and whose members include the major browser vendors. WHATWG produces the **HTML Living Standard**, a continually evolving standard without version numbers that replaces HTML5.

A webpage that conforms to the HTML Living Standard will look and act the same way in most modern web browsers. With standardization, browser developers now compete on browser speed, standards compliance, and browser features rather than on the basis of proprietary extensions.

W3C vs. WHATWG

The W3C and WHATWG organizations have had a somewhat stormy relationship over the years. For some time, W3C and WHATWG even published competing HTML standards. However, the two organizations are now agreed that WHATWG will be setting the HTML standard. The term "HTML5" is likely to be synonymous with "HTML Living Standard" for some time.

PARTICIPATION ACTIVITY

1.1.4: Significant points in web history.



If unable to drag and drop, refresh the page.

1945

The idea for generating links from within one document to other documents.

Vannevar Bush described the memory extension device, Memex, a system for building and following links between documents.

Correct

1965

The term HyperText invented.

Ted Nelson introduced the term HyperText in a paper on how to deal with information that was complex, changing, and uncertain.

Correct

1990

First web browser is created.

Tim Berners-Lee created and demonstrated a browser that works over the internet.

Correct

1994**The World Wide Web Consortium (W3C) created.**

The W3C is the official body that once developed and published HTML standards. The W3C is still in charge of the CSS standard.

Correct**1995****HTML 2.0 standard published.**

HTML 2.0 was the first really official standard. Despite the standard, in the rush to beat the competition, browser developers kept adding new and incompatible features. Many websites only worked completely with one specific browser.

Correct**2014****HTML5 standard published.**

Work on HTML5 started in 2008. HTML5 is synonymous with modern web standards.

Correct**2019****WHATWG controls the HTML standard.**

W3C makes suggestions to WHATWG for new items to include in the HTML Living Standard.

Correct**Reset**[Feedback?](#)

Separation of duties

A significant change that occurred over time was a move to separate document structure, document presentation (how the document is displayed in a browser), and webpage interaction with the user. Document markup was initially used to control both document structure and appearance. Some markup, such as the tag ``, was originally used just to control appearance. Interlacing document structure with presentation and interaction complicates having pages work well across the range of technologies from large screens, to small phones, to printing devices.

A modern webpage is composed of HTML, CSS, and JavaScript.

- HTML defines the structure and content of a webpage.
- CSS specifies the layout and visible appearance.

- JavaScript describes the dynamic behaviors and actions of a webpage.

**PARTICIPATION
ACTIVITY**

1.1.5: Separation of structure, presentation, and interaction.



If unable to drag and drop, refresh the page.

HTML**Specifies document structure**

HTML is used to specify the purpose of each part of a document. Each web browser has a default stylesheet that controls how the page is displayed, but HTML does not specify how the document parts are displayed.

Correct**CSS****Manages document presentation**

CSS consists of a set of style rules about how to display the parts of a document.

Correct**JavaScript****Enables document interaction**

JavaScript is a programming language that can manage any part of the document and interact with external servers to send and receive information. JavaScript sometimes also runs on web servers.

Correct**Reset**[Feedback?](#)

Great example

[CSS Zen Garden](#) is a website where each page consists of exactly the same HTML and text, but different CSS is used to make the pages look totally

different.

Exploring further:

- [Internet history timeline: ARPANET to the World Wide Web](#) (Live Science)
- [The history of the Web](#) (W3C)
- [HTML Living Standard](#) (WHATWG)

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this
section?



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