

Chapter 1

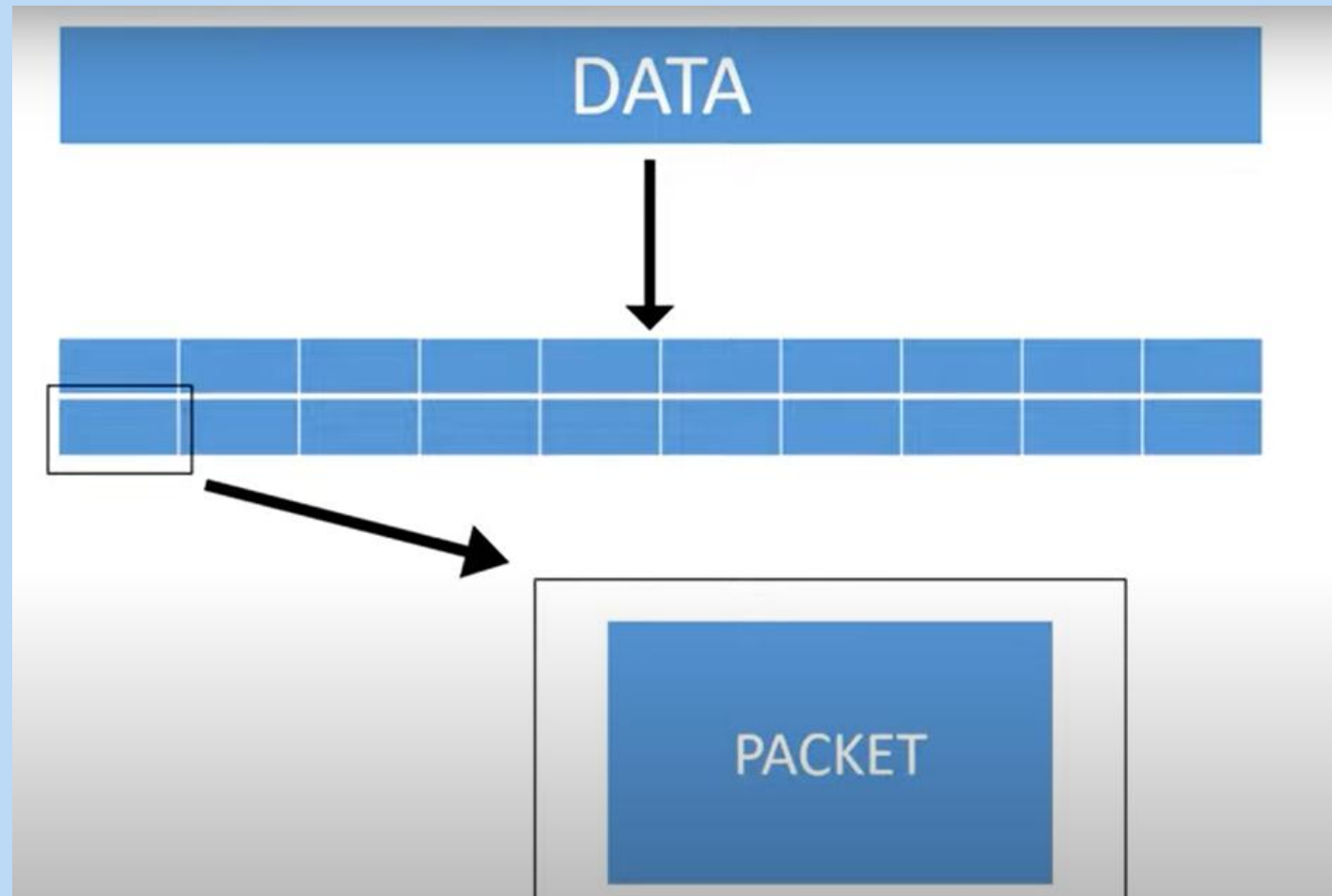
Basics in Website Design

What is internet?

- The internet is a global network of computers and other devices that are connected together to share information and communicate with each other. It allows people all over the world to connect with each other, access information, and share resources.
- The internet is made up of many different technologies, including routers, switches, servers, and cables, which work together to ensure that data can travel from one device to another quickly and efficiently.
- Through the internet, people can send emails, access websites, stream videos, play games, and much more.
- The internet has become an essential part of modern life, connecting people and businesses across the world and transforming the way we communicate and share information.

How was the internet created?

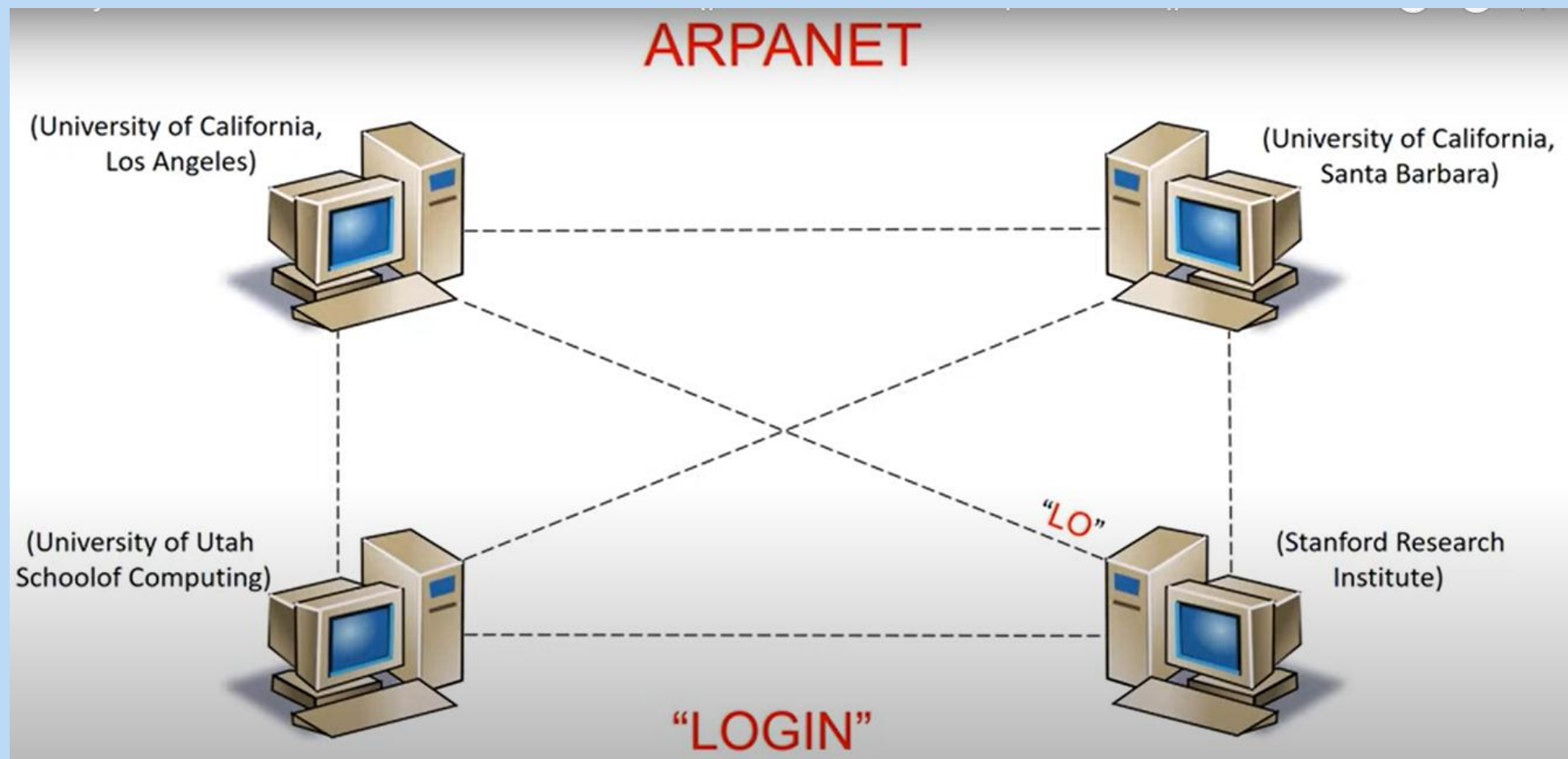
- The internet was created because people needed a way for computers to talk to each other without being interrupted. Before the internet, computers used a slow method called circuit switching, where all the data had to be sent at once. If something went wrong during the transfer, the whole thing would fail.
- So, scientists came up with a new way called packet switching. With packet switching, data is broken into smaller pieces called packets, and each packet is sent separately. If something goes wrong, only that packet is affected, not the whole transfer. Once all the packets arrive, they are put back together to create the original message. This is how the internet works!



Evolution of Internet

- The internet evolved from packet switching, allowing computers to connect through a network called ARPANET(Advanced Research Projects Agency Network).
- Then, the World Wide Web (WWW) was developed, which is an internet-based global information system that allows people to view web pages containing text, images, videos, and other multimedia and navigate between them by using hyperlinks.

Evolution of Internet



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Evolution of Internet

- Here is a timeline of the important events in the history of the internet:
 - 1965: First two computers are connected via packet switching at MIT.
 - 1969: ARPANET, the first widely used computer network, is launched.
 - 1971: Email is developed, allowing electronic messages to be sent between computers.
 - 1973: Nodes in Norway and Great Britain are connected to ARPANET, making it a global network.
 - 1974: The first ISP, Internet Service Provider, is launched. The initial design for TCP is published.
 - 1981: The National Science Foundation establishes CSNET, a network for computer scientists at research universities.
 - 1982: ARPANET computers switch to the TCP/IP protocols.

- 1983: The Domain Name System (DNS) establishes the naming conventions for websites, such as .com, .org, .edu, and .gov.
- 1988: IRC, Internet Relay Chat, was launched, a precursor (ancestor) of our current instant messaging apps.
- 1990: Tim Berners-Lee develops HTML, which has a huge impact on how people interact with the internet.
- 1991: The World Wide Web is introduced to the public.
- 1993: The first browser accessible for the general user, Mosaic, is launched. The White House and the United Nations create web pages.
- 1995: Commercial businesses begin operating on the internet, including eBay and Amazon.
- 1996: Hotmail, the first web-based email service, is launched.
- 1998: Google goes online, revolutionizing the way users locate resources on the internet.
- 2004: Web 2.0 becomes popular, which refers to websites that are user-driven and interactive. Facebook launches.
- 2005: YouTube and Reddit launch.
- 2010: The internet records 400 million active users for the first time.

WWW

- The World Wide Web (WWW) (Also known as w3 and the Web) is a global information system that operates on the Internet.
- It is a system of interlinked hypertext documents contained on the internet. With the help of a web browser, you can access web pages that may contain text, images, videos, and other multimedia, and navigate between them by using hyperlinks.
- The main purpose behind the development of the World Wide Web was to create a platform for sharing and accessing vast amounts of information on a global scale which would allow collaborators in remote sites to share their ideas and all aspects of a common project.
- In simple terms, the web is the most popular Internet service, which can access a higher variety of data like text, image, audio, video, and many more service on the internet. It has revolutionized the way we share and access information, and has made it possible for people from all over the world to collaborate on projects and ideas.

WWW's features

The World Wide Web has several features that make it a powerful tool for accessing and sharing information:

1. **Hypertext Technology:** The WWW is built on Hypertext technology, which makes it easy to access linked documents on the Internet and navigate between them.
2. **Efficient Connection:** Each time you access a new document through a link, a connection is made with the web server that the document is on, and once the appropriate document is retrieved, the connection is broken. This makes the WWW efficient and fast.
3. **Browser Interface:** The interface for the WWW is a browser, which allows users to search, traverse, and use many types of information at numerous sites and in multiple forms.

4. **Operating System Compatibility:** The WWW is accessible on multiple operating systems, including Apple, UNIX, Macintosh, DOS, and Windows.
5. **Hypertext Transfer Protocol:** The WWW has a protocol called Hypertext Transfer Protocol (HTTP), which acts as an interface between a Web Client Software like Netscape Navigator. HTTP helps to facilitate the transfer of data between web servers and clients.
6. **URLs:** To access different types of information on the Internet, you use different kinds of URLs. Most URLs begin with http:// , which indicates a file at an actual web site. If you want to get to a file on the Web using FTP, you would use a URL that looks like ftp://name_of_site/directory/f1_name.

Advantages of WWW

- 1)**Easy accessibility:** The WWW is accessible to anyone with an internet connection and a browser, making it easy to access information from anywhere in the world.
- 2)**Wide range of information:** The WWW contains a vast amount of information on virtually every topic, making it a valuable resource for research, learning, and entertainment.
- 3)**Easy navigation:** The use of hyperlinks on the WWW makes it easy to navigate between different pages and websites, allowing users to quickly find the information they need.
- 4)**Universal access:** The WWW is designed to be accessible to anyone, regardless of their location or the device they are using, making it a powerful tool for global communication and collaboration.

Advantages of WWW

5)Interactive content: The WWW allows for the creation of interactive content, such as videos, animations, and games, which can engage and entertain users in new ways.

6)User-generated content: The WWW enables users to create and publish their own content, such as blog posts, videos, and social media updates, allowing for greater participation and collaboration in online communities.

7)Cost-effective: The WWW is a relatively low-cost way to share information and promote products and services, making it an important tool for businesses and organizations of all sizes.

8)Real-time communication: The use of instant messaging, chat rooms, and video conferencing on the WWW enables real-time communication between individuals and groups, regardless of their location.

Components of web

- URL (Uniform Resource Locator): It is a web address that specifies the location of a resource (such as a webpage, image, or video) on the internet. A URL consists of several components, including the protocol (such as HTTP or HTTPS), the domain name or IP address of the server hosting the resource, and the path to the resource on the server.
- HTTP (Hypertext Transfer Protocol): It is the protocol used for transferring data over the World Wide Web. It defines the rules for how web clients (such as web browsers) and web servers communicate with each other. HTTP is responsible for requesting resources from web servers and transmitting the response data back to the client.
- HTML (Hypertext Markup Language): It is the standard markup language used to create web pages. HTML defines the structure and content of a webpage, including headings, paragraphs, images, links, and other elements. Web browsers use HTML to render web pages and display them to users.

Comparision between internet and www

Basis for comparision	Internet	WWW
Definition	A huge network which is a collection of several networks.	A system of interconnected hypertext documents and resources accessed via the internet
Invention	Late 1960's	1989
Nature	Physical infrastructure	Software oriented
Protocols used	IP (Internet Protocol)	HTTP (Hypertext Transfer Protocol)
Identefication	Thorough IP address	Through URL (Uniform Resource Locator)
1st version	APRANET(Advanced Research Projects Agency Network)	NSFNET(National Science Foundation Network)
Dependency	Independent existance	Existence depends on the internet
Users/website	Over 4.9 billion users (as of 2021)	Over 1.8 billion websites (as of 2021)
Accessiability	Through various software and devices	through internet browser

Web Standards

Web standards are defined as **guidelines** developed by the **World Wide Web Consortium W3C** to **promote consistency** in design code used to built website. This standard exist as long technical document called specification, which details exactly how the technology should work.

- web standards is a set of standardized "**best practices**" for building websites.
- Web Standard are created by standard bodies. W3C is best known standard bodies.

Why we need standards?

Benefits of Web Standards:

There are many benefits in designing website that meet webstandards, some of them are:

- I. Faster downloading times
- II. Lower maintenance costs
- III. Less time consuming to update
- IV. More accesible to wider range of user, including people with disabilities
- V. Lower bandwidth cost
- VI. More search engine friendly
- VII. More adaptable to future technology

Web standards..

The most common W3C standards

- HTML (Hyper Text Markup Language)
- XML (Extensible Markup Language)
- XHTML (Extensible Hypertext Markup Language)
- CSS (Cascading Style Sheet)
- WCAG (Web Content Accessibility Guidelines)

Five important and revolutionary ideas were produced that would lead standards to where they are today.

- i. Decentralization
- ii. Nondiscrimination
- iii. Bottom-up design
- iv. Universality
- v. Consensus(agreement)

Web Protocols

❖ A web protocol refers to the **set of rules and procedure** that govern the communication between web servers and clients. Protocols are used to enable communication and data transfer between devices connected to the Internet. Web protocols are essential to the functioning of the internet and enable users to access and share information online. They ensure that data is transmitted efficiently, securely, and reliably.

❖ **Different types protocols are:**

- Gopher
- TCP/IP (Transmission Control Protocol / Internet Protocol)
- UDP (User Datagram Protocol)
- HTTP/HTTPS (Hypertext Transfer Protocol /Hypertext Transfer Protocol Secure)
- NNTP (Network News Transfer Protocol)
- Telnet (Teletype Network)
- FTP (File Transfer Protocol)
- SMTP (Simple Mail Transfer Protocol)
- DNS (Domain Name System)

1. **Gopher:** It was popular in the early days of the internet, before the World Wide Web became widely used. It provided a simple and efficient way to navigate and retrieve information from distributed data repositories using a hierarchical structure of menus and submenus, and a text-based interface.
2. **TCP/IP** - It is a set of communication protocols that are used for transmitting data over the internet or other networks. TCP ensures reliable and ordered transmission of data between applications, while IP provides the addressing and routing mechanism to send packets of data across networks.
3. **UDP** - a connectionless protocol used for sending small packets of data. Datagram refers to a self-contained packet of data that is transmitted over the network.
4. **HTTP /HTTPS** - stateless protocol used for transferring hypertext document like webpage between a web server and a web browser. It works in conjunction with HTML to display webpages. A secure version of HTTP that uses encryption to protect sensitive data.
5. **NNTP** - It is used for distributing and retrieving Usenet newsgroup articles. NNTP operates on top of TCP/IP and allows users to read and post messages in newsgroups using newsreader software.
6. **Telnet** - Telnet is a network protocol that provides remote access and management of devices, servers, and computers. It allows users to execute commands and run programs on remote systems using a command-line interface. However, Telnet is not secure and has largely been replaced by more secure protocols such as SSH.
7. **FTP** - a protocol used for transferring files over the internet.
8. **SMTP** - a protocol used for sending and receiving email messages.
9. **DNS** - a protocol used for translating domain names into IP addresses.

Application of web protocols:

- 1.Helps to transform information from one place to another.
- 2.Used to store data.
- 3.With protocols we can transfer files from site to our device.
- 4.Help to make our data secure and safe.

Web Browser

- A browser is a software program that is used to explore, retrieve and display information available in WWW.
- Information can be in many form such as pictures, webpages, videos, and other files that are connected via hyperlinks and categorized with the help of URLs.
- When a user requests some information, the web browser fetches the data from a web server and then displays the webpage on the user's screen.
- It is a client program runs on user device and it contact web server on behalf of user for information requested by user.

Functions of Web Browser:

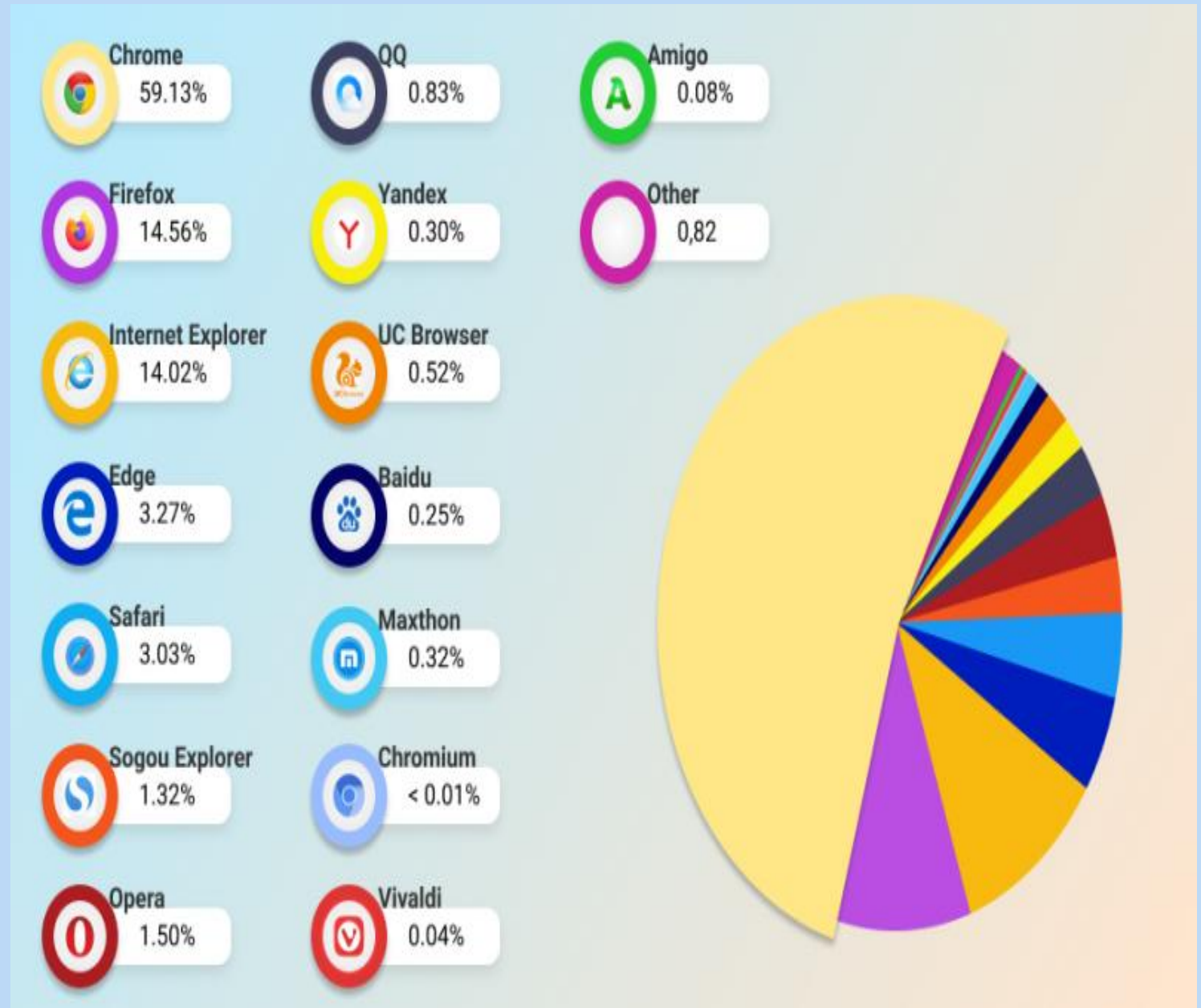
- The main function is to retrieve information from the World Wide Web and making it available for users.
- Visiting any website can be done using a web browser. When a URL is entered in a browser, the web server takes us to that website.
- It makes Internet surfing easy as once we reach a website, we can easily check the hyperlinks and get more and more useful data online.
- When a user visits a website using a browser, the browser stores a copy of the website's resources, such as HTML, CSS, and images, in its cache. This allows the browser to load the website more quickly on subsequent visits, as it can retrieve the resources from the cache instead of downloading them again from the internet.
- Multiple webpages can be opened at the same time on a web browser.
- Options like back, forward, reload, stop reload, home, etc. are available on these web browsers, which make using them easy and convenient.

History of Web Browser

Dates	Event in the History of browser
1990	1st web browser is created by W3C Director Tim Berners-Lee named World Wide Web . Later renamed to Nexus to avoid confusion with actual www.
1992	Text based browser named Lynx was invented, it was not able to display graphical content.
1993	1st graphical UI browser; most popular in the world, named NCSA Mosaic is introduced.
1994	some improvements occurred in Mosaic and came to Netscape Navigator .
1995	Microsoft introduced its 1st web browser named Internet Explorer .
1996	Opera is publically introduced.
2003	Apple's safari browser is introduced.
2004	Firefox was developed by the Mozilla project, which included former Netscape employees.
2007	Mobile safari was released as Apple mobile web browser.
2008	Google chrome is launched
2011	Fast-growing mobile-based browser Opera Mini was released
2015	Microsoft Edge was launched

Types of Web Browser

- Google Chrome
- Mozilla Firefox
- Microsoft Edge
- Safari
- Opera
- Brave
- Vivaldi
- Chromium
- UC Browser
- Torch Browser
- Tor Browser etc.



Features of Web Browser

1. Refresh button
2. Stop button
3. Home Button
4. Web address bar
5. Tabbed browsing
6. Bookmarks

Uses of Web Browser

1. Bookmarking
2. Forward / Backward to next web page
3. Using address bar for navigating to another web page
4. Clicking on a different web page hypertext for navigating
5. Recording the web browsing history
6. Tabbed browsing
7. Using plugin
8. Having a start page such as an internet search engine, or a web portal
9. Downloading web page and its assest such as image or css files etc
10. Controlling web page loading performance
11. Scarping wep page content
12. Taking HTML source code of web pages
13. Controlling Web server IP address
14. Controlling web server security
15. Caching data
16. Displaying local files