

The Internet

The Internet or "the network of networks" is a public network that connects computers and computer networks around the world through a common protocol (IP).

All connected computers and networks mutually exchange information and use various services. Hence, the Internet is not solely the WWW, or pages and content available from a browser. In fact, the WWW is just one of the services that the Internet offers to its users although it is the most commonly used service.

Other available services:

- File transfer - the file transfer from one computer to another.
- E-mail (electronic mail) – it is the oldest Internet service, and it enables the exchange of digital messages between two or more people.
- Instant messaging (IM) – it enables the exchange of electronic messages between two or more people in real time. Such as chat rooms (MSN, Skype, etc.) that also support nowadays video/ audio/ photo communication exchange.

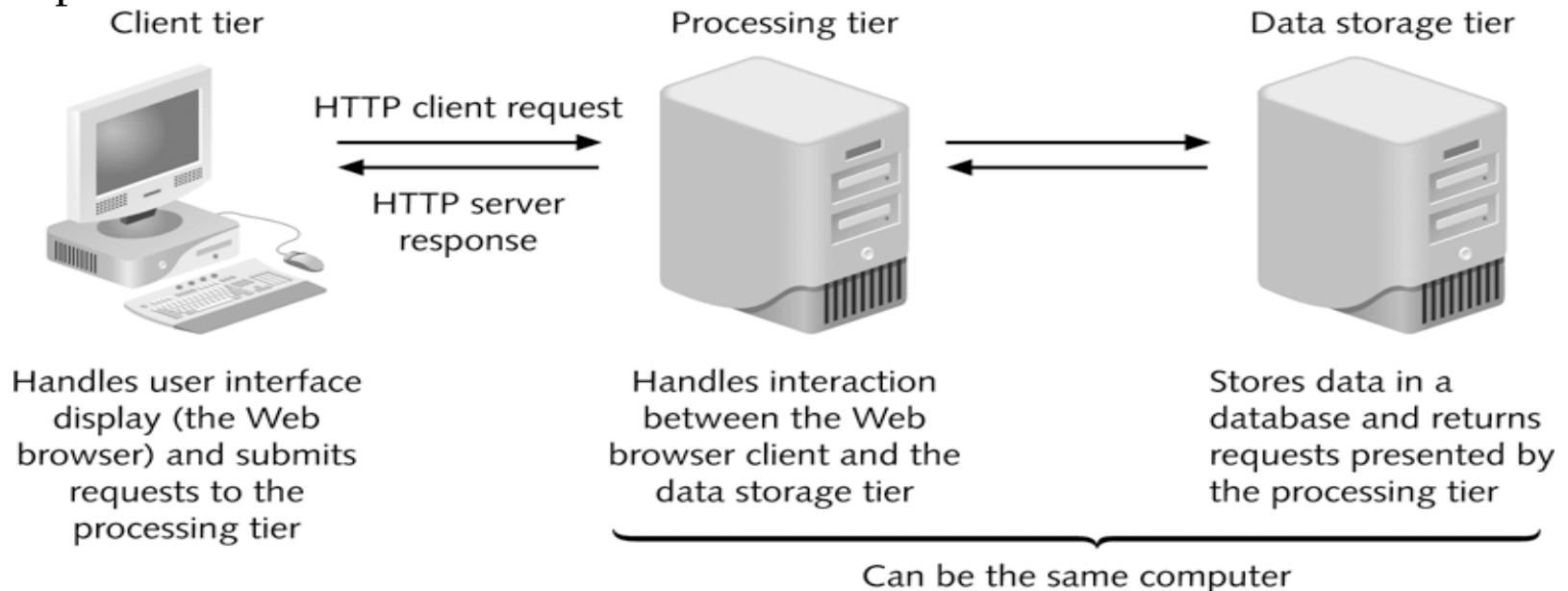
- The Internet is not just a single network but a global system of interconnected networks that communicate through standard Internet Protocol (IP).
- It enables millions of private, public, academic, business, and government networks to share information, resources, and services efficiently.
- Besides browsing websites, the Internet supports a variety of functions such as cloud storage, remote access, online learning, and Internet of Things (IoT) communication.
- It has become essential for communication, education, entertainment, research, and e-commerce around the world.

- **Other Available Services (Additional Examples):**
- **Video Conferencing** – allows users to hold live meetings with audio and video (e.g., Zoom, Google Meet, Teams).
- **Online Gaming** – enables multiplayer games over the Internet, connecting players globally.
- **Cloud Computing** – provides remote servers to store, manage, and process data instead of using local computers.
- **Social Networking** – platforms like Facebook, X (Twitter), and Instagram allow people to connect, share media, and communicate instantly.
- **E-commerce Services** – online platforms such as Amazon and eBay enable buying and selling goods or services through the Internet.
- **Search Engines** – such as Google or Bing, help users find information quickly across billions of web.

Client/Server Architecture

The Internet is probably the best-known example of a **client/ server** relationship. The difference between a client and a server is big. Here we have two computers/ programs where the client sends requests to a server, and the server processes requests and returns the results to the client. A server is typically a remote computer not visible to the user.

- A system consisting of a client and a server is known as a **two-tier system**
- A **three-tier**, or multi-tier, client/server system consists of three distinct pieces:



- **Client:** A computer or device that requests information or services (for example, your browser when you open a website).
- **Server:** A powerful computer that stores data and provides services or resources to clients upon request (for example, the web server that hosts a website).
- When a client sends a request (such as opening a webpage, downloading a file, or sending an email), the server processes this request and sends the response back to the client.
- This process happens through Internet protocols like HTTP, FTP, or SMTP

- **Web server:** is the computer/ server whose entire content is visible on a website in a web browser. Web servers are constantly connected to the Internet. We access them through URL. Therefore, if we enter, for example, `www.google.com` in a web browser, we are accessing the Google server.
- **Web browser:** enables browsing through websites. Its mechanisms display the content, retrieved from the server, in a correct and understandable way. As such it is an intermediary between the user and the server. (e.g. Google Chrome, Firefox, Internet Explorer, etc.).
- A **webpage** is a single HTML document.
- A **web site** is a collection of web pages. Web sites may be dynamic and interactive or static. Designing a good website requires more than just putting together a few pages.
- A **Web application** is a program that runs in whole or in part on one or more web servers which is run by users through a web site.

Search engine: allow us to search in the Internet for information, images and other types of files stored in various locations available throughout the network.

Search engines work according to certain algorithms that show the user relevant requested search results. At first, information from the various websites is collected and stored and then analyzed to organize and save them in the database for future use. When a user enters an inquiry into the search engine, the database is organized by an index and the user is presented with results that match best the entered search terms. Therefore, it is important to understand that by using the search engine one does not search the entire Internet but the search engine's database. Therefore, we might get different results each time we use different web engines. This information is important from a website owner's view, who wants to make sure that the website is represented in various search engines once he created it. Otherwise, it will only be possible to access the website when a user enters the exact address in the web browser address bar. Currently, the most known search engine is "Google."

Examples of search engines:

- Google – the most popular and accurate search engine.
- Bing – Microsoft's search engine, integrated with Windows.
- Yahoo! – one of the oldest web directories and search engines.
- DuckDuckGo – focuses on privacy and doesn't track users.

Key functions include:

- Finding websites, images, videos, and news.
- Suggesting related topics or queries.
- Ranking results based on relevance, popularity, and freshness.