

Website design and development



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Learn about the Website

1.

Website

- What is a Website?
- The basic components of a Website
- Static website and Dynamic website
- How a website works

2.

Domain name

- What is a Domain name?
- Types of Domain name
- The structure of domain name
- How domain names are organized and managed
- URL, and structure of URL

3.

Domain Name System

- What is a Domain Name System?
- The structure of a Domain Name System
- How a Domain Name System works
- What is Communication protocol?
- Communication protocols on the website

4.

Web technologies

- Types of web servers
- Online website builders
- HTML
- CSS
- JS



Website

What is Website?

A website, also known as a web page or web network, is a collection of information pages that contain various forms of images, text, video, audio, etc., stored on a web server. Users can remotely access it via the internet.



Website

The basic components of a Website

The basic components of a website include:
domain name, web hosting, source code.

a. Source code:

Also known as the website source code. That is the content and functions displayed for users to see, read, and access. Depending on the function and requirements of the website, the source code can have many or few commands, complex or simple.

```
products: storage.products.map((product) =>
  <div key={product.id} className="col">
    <React.Fragment>
      <div className="py-5">
        <div className="d-flex flex-column align-items-center" style={{ gap: "10px" }}>
          <Title name={product.name}>
            {product.name}
          </Title>
          <ProductCardImage product={product}>
            {product.image}
          </ProductCardImage>
          <ProductCardText product={product}>
            {(product.description || product.name).split(" ").slice(0, 2).join(" ") + "..."}
          </ProductCardText>
        </div>
      </div>
    </React.Fragment>
  
```

b. Web hosting:

If a website is a house, hosting is the land to build that house. It stores the Source Code, images, videos, content... of the website.

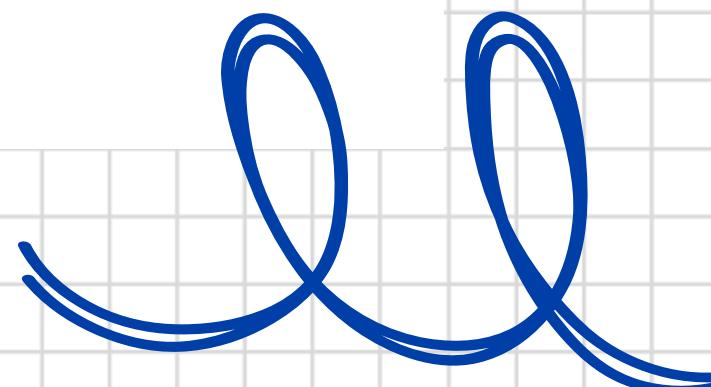
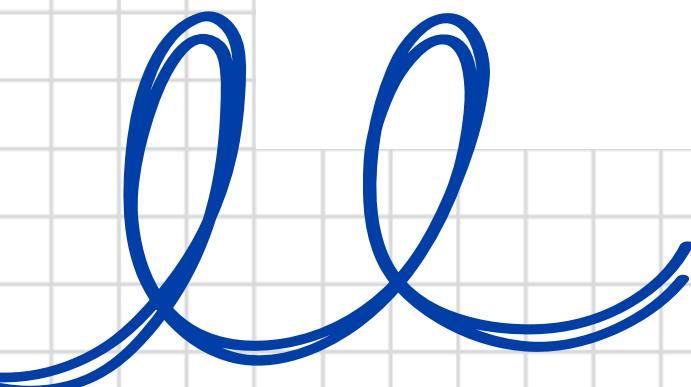
Hosting is a service that provides storage space for a website on a server. This server is connected to the Internet and allows users to access the website from anywhere.



c. Domain name:

Once you have the land and the house, you need an address so that others can find and access it. So you need a domain name.

To access a website, you will type that website address into the address bar of your web browser. Now you can access this website.



Static website and Dynamic website

a. Static website:

A “static” website can be a blog or a news site with pre-built content and images. The end user can only read and navigate the page through links and cannot change the displayed content. It can be understood that a “static” website is simply a text, we can only read it and cannot manipulate it.

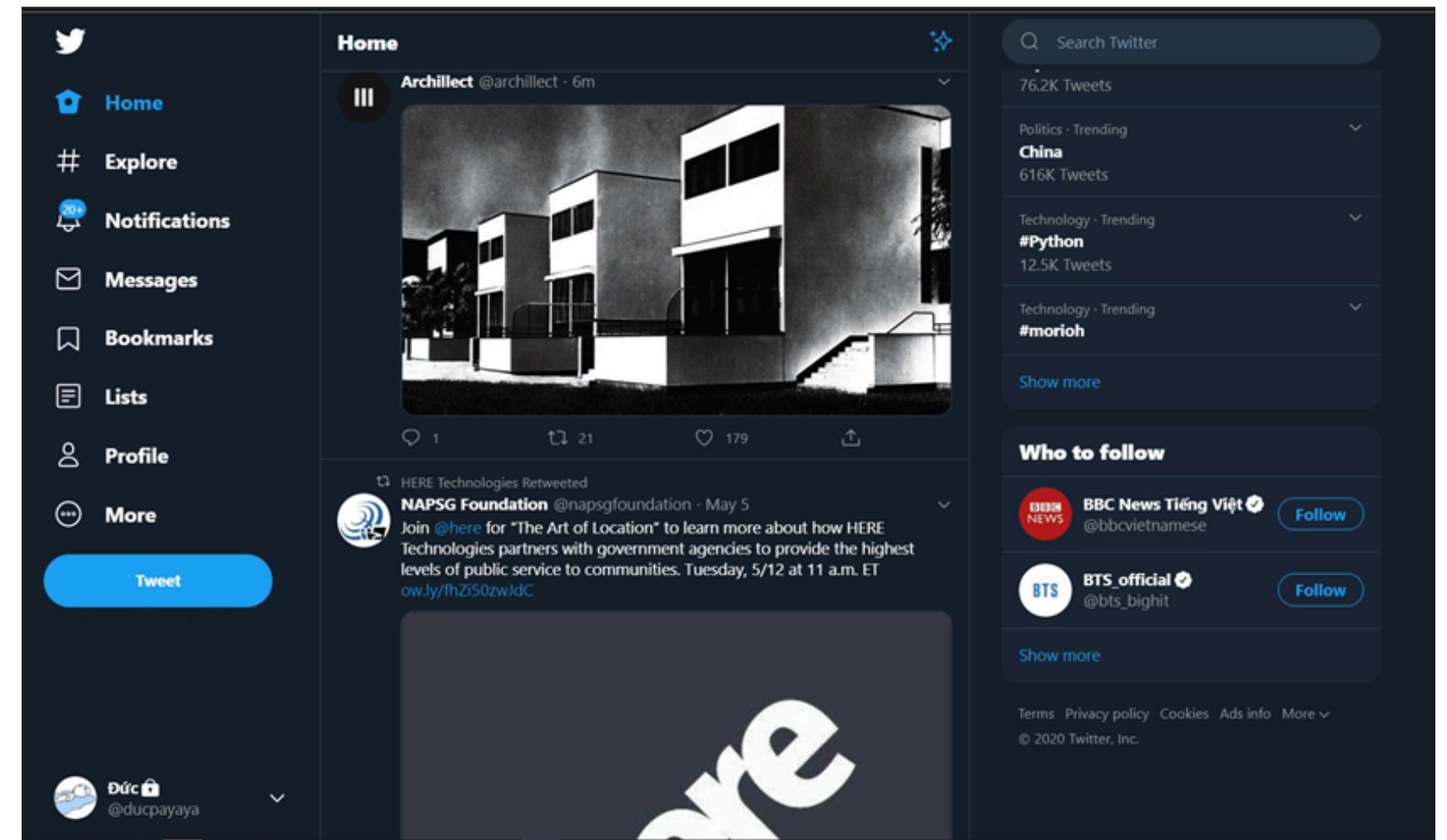
A website is considered “static” if it only contains HTML documents, CSS code and does not contain JavaScript code to handle interactions.

The screenshot shows a web browser window with the URL <http://huybaconguyen.bethost8.com/backup/cuocsong1/>. The page title is "Thư viện cuộc sống". On the left, there's a sidebar with a "Menu chính" section containing links like Trang chủ, Lời ngỏ, Câu chuyện cuộc sống, Văn hóa dân gian, Kinh nghiệm chia sẻ, Thế giới đồ dày, Những tâm lòng nhân ái, Góc vui cười, Album ảnh, and Diễn đàn. Below that is a "Tài nguyên" section with links to Báo dân trí, VNExpress, Tài liệu Joomla, Quản trị, and Diễn đàn. The main content area has a heading "CẨU CHUYỆN CUỘC SỐNG" and a sub-heading "Ngày thứ 017: Cái gì quý giá nhất". It features a small image of a green sprout growing from soil. The text discusses a story where a monk named Chú Nhện found a seedling and planted it, leading to many more plants over time. It ends with a quote from the Buddha and a response from Chú Nhện.

Static website and Dynamic website

b. Dynamic website:

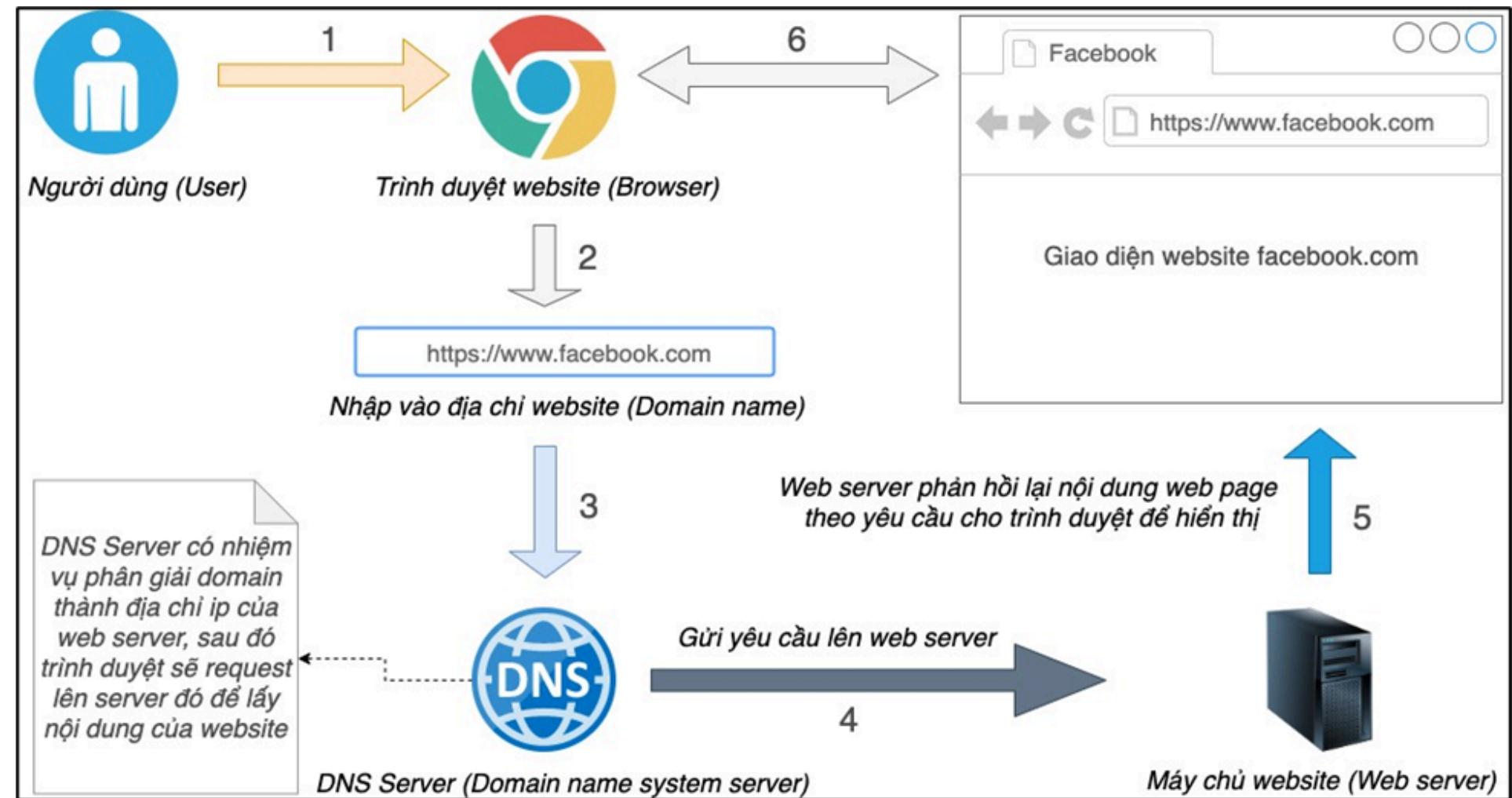
Dynamic websites are very popular nowadays. Shopping websites like Tiki, Lazada or Social Media sites like Facebook, Twitter are all dynamic websites. It is shown when users interact with an icon on the website, for example, clicking Like, Subscribe, comment or post status. Dynamic websites are updated instantly, users do not have to reload the page to update the content.



How a website works?

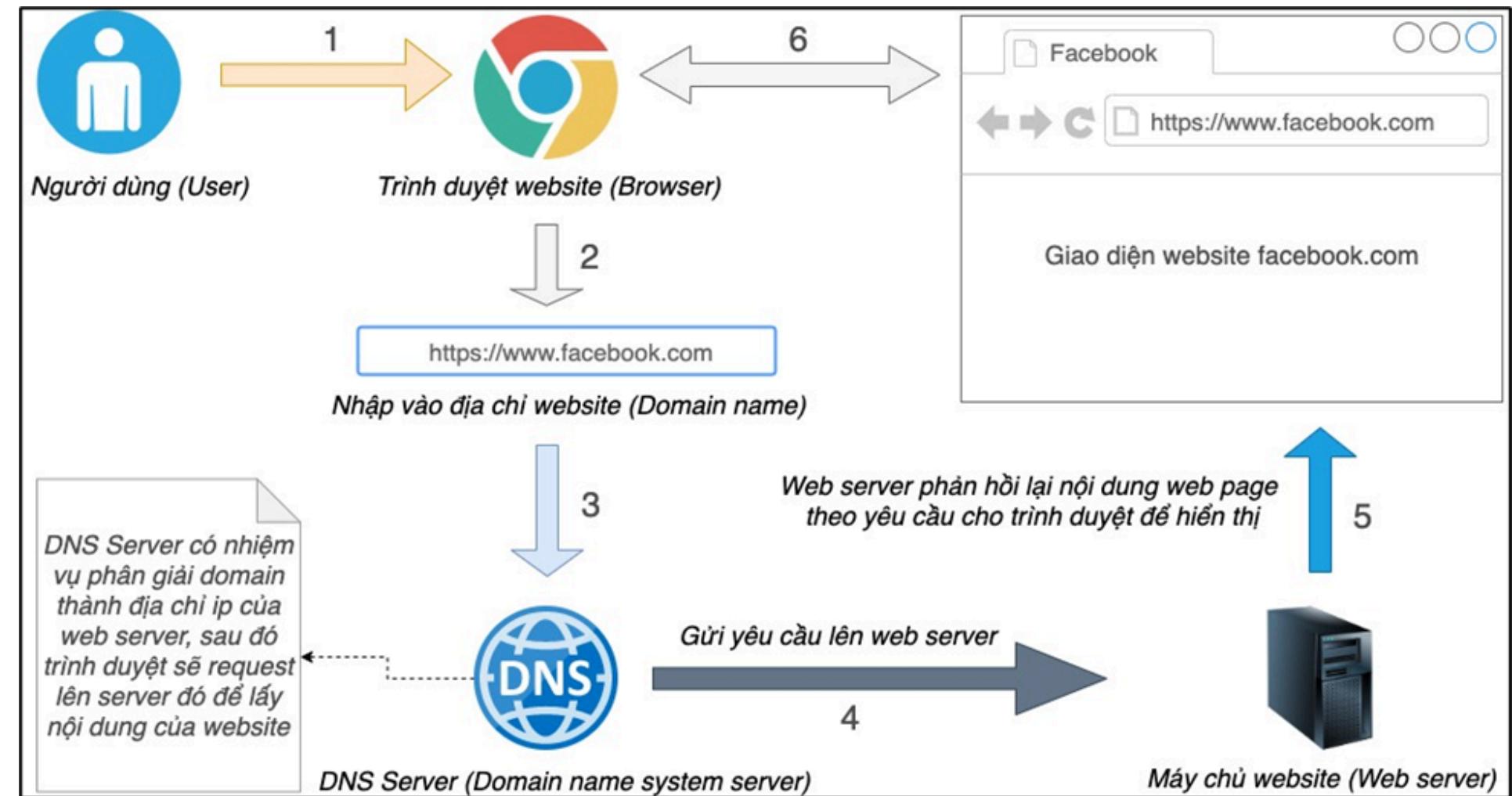
• First, the user will open the website browser, in the picture I assume the user uses the chrome browser.

• The user enters a website address in the address bar, for example <https://facebook.com>.



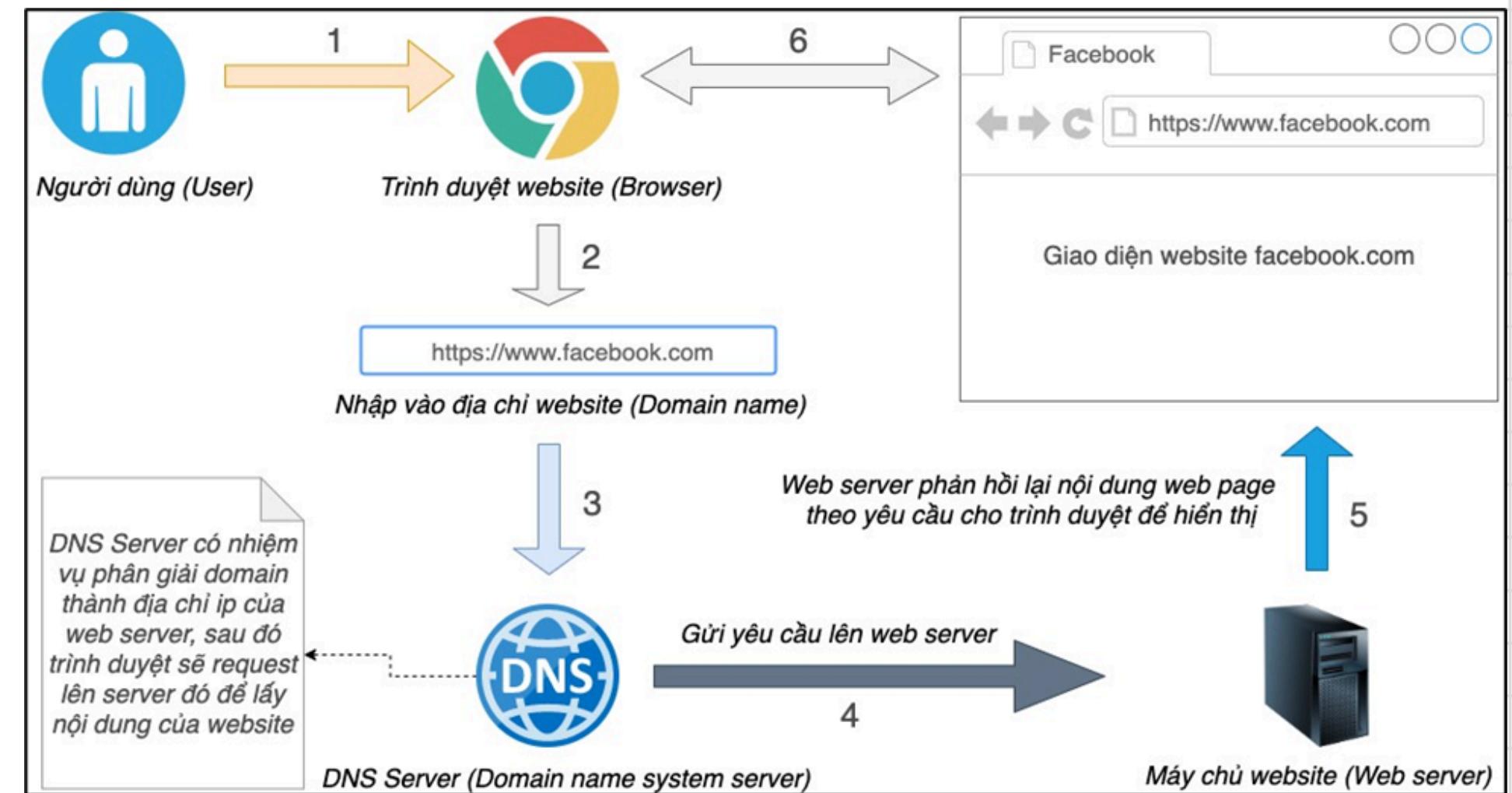
How a website works?

The browser will send a request to the DNS Server (Domain name system server). The DNS server is responsible for resolving the domain into the IP of the server containing the resources (Source code) of the website corresponding to that domain.



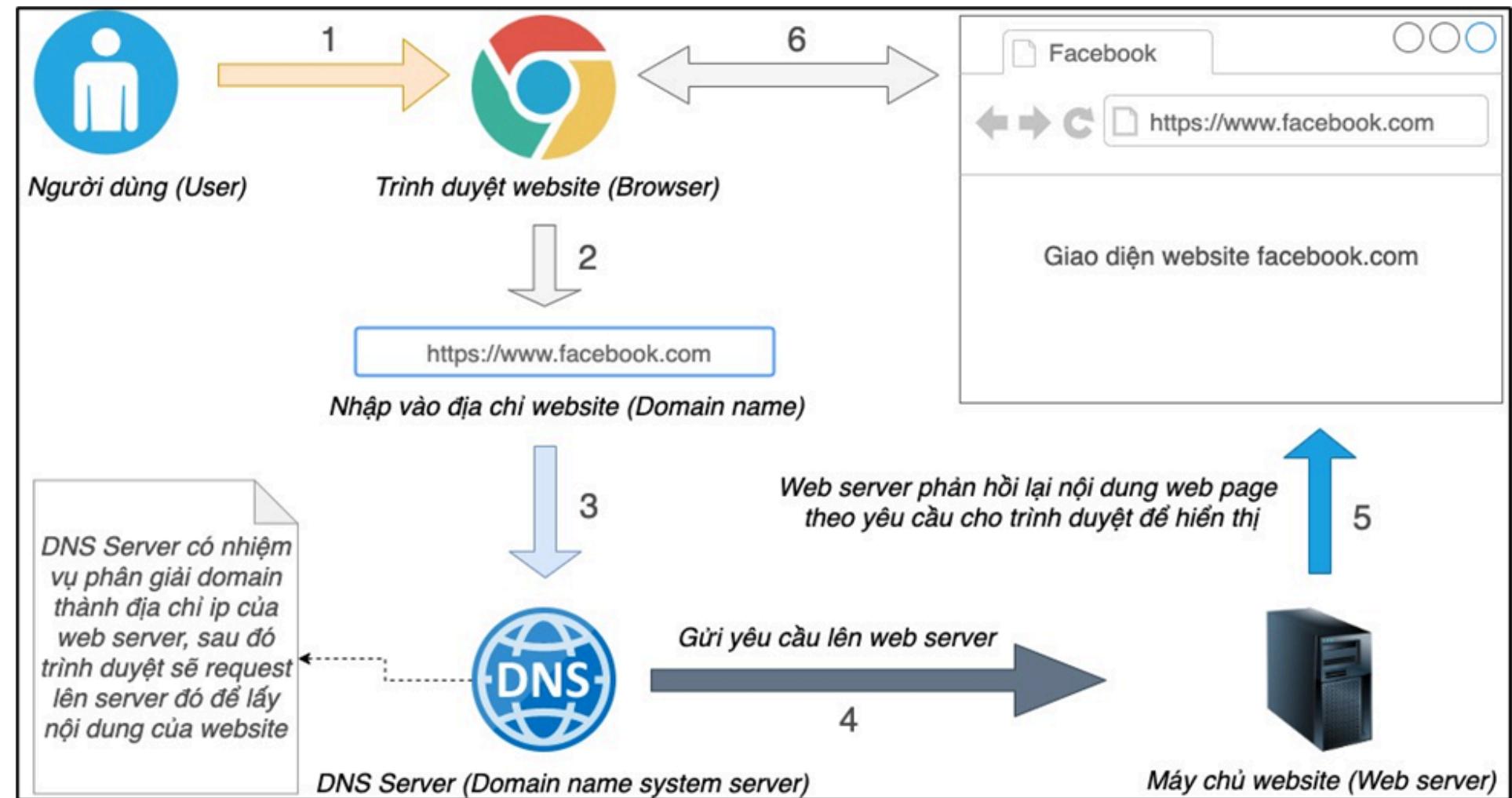
How a website works?

- After receiving the IP, the browser will continue to send a request to access the website's information to the web server via the received IP.
- When the web server receives a request to access website content from the browser, the server will immediately process the information and return the website content according to the request (The server will send back a set of files including HTML/CSS, multimedia files, such as images, videos, ... if any).



How a website works?

After receiving the resource that the web server responds to, the browser will render it into the website interface that we see on the screen.



Learn about the Domain Names

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05

What is a domain name?

06

Types of domain names?

07

Domain name structure ?

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How domain names are organized and managed?

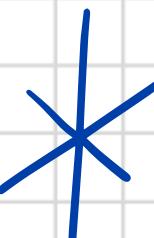
09

What is a URL? URL structure?

What is a domain name?



Domain names can be compared to home addresses in the online world. When a person wants to visit a specific website, instead of entering a long string of numbers called an IP address (a bit like geographic coordinates), they use a domain name - an easy-to-remember string of characters, like a name assigned to that website. Domain names help identify and locate websites on the internet, making finding and accessing them easier and more convenient.





Types of domain names?



Top-Level Domain - TLD

TLD is the last part of a domain name

Example:

- .com
- .net
- .ogr
- .edu
- .gov
- .vn
- .jp
- .uk

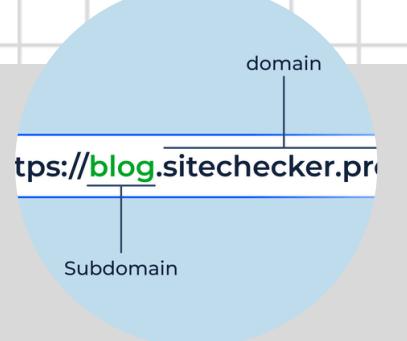
Second-Level Domain - SLD

- Second-level domains come before the TLD and typically represent the name of an organization, business, or individual.
- Example: In "abc.com", "abc" is the second-level domain name.



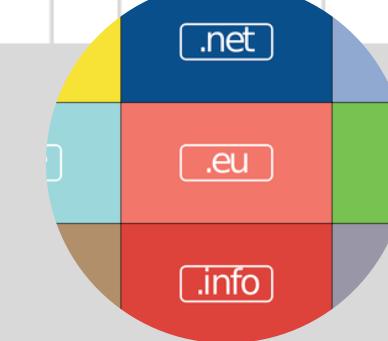
Third-Level Domain

- Third-level domains come before second-level domains, often used to separate different parts of a website.
- Example: In "mail.google.com", "mail" is the third-level domain name, used to differentiate Google's email service.



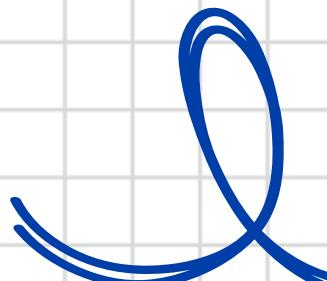
Subdomain

- Subdomains are extensions of the main domain, helping to categorize different content or services on the same website.
- For example, "blog.example.com" could be the subdomain used to provide blog content.



Internationalized Domain Name

- This domain name allows the use of special characters or letters from many different languages (such as Chinese, Vietnamese, Russian).
- For example: "tenmien.vn".



Domain name structure ?

Structural ingredients	Concept	Example
1.Protocol	This is the first part of a website's URL, indicating how the browser and web server will communicate with each other. The most common protocol is HTTP or HTTPS.	<u>https://www.google.com</u>
2.Subdomain	Third-level domains, or subdomains, come before second-level domains. It is used to refer to different parts of a website or service.	<u>www</u> . in <u>www.example.com</u> or <u>mail</u> . in <u>mail.google.com</u>
3.Second-Level Domain - SLD	The second-level domain name is the most important part, containing the brand name or main keyword, representing the organization or individual that owns the website.	In <u>example.com</u> , the "example" part is the second-level domain name.
4.Top-Level Domain - TLD	The top-level domain is located at the end of the domain name, after the period, and indicates the type of organization or country the website represents.	.com, .org, .net, .gov, or country code like .vn (Vietnam), .jp (Japan).

In short, the domain name structure consists of many parts:

- Subdomain (optional),
- Second level domain name (main part),
- Top-level domain name, which identifies a website and its type of activity.

How domain names are organized and managed?

Summary:

- ICANN and IANA operate the global domain name system.
- Registry manages TLDs.
- Registrars provides domain name registration services to users.
- Each country has its own ccTLD management organization.
- DNS ensures the resolution of domain names to IP addresses.
- Policies like UDRP and WHOIS protect the rights of domain users.

Domain names are organized and managed according to a global hierarchy, and this process is governed by many international, national, and regional organizations to ensure uniformity and effective management. Here's how domains are organized and managed:

- **ICANN** (*Internet Corporation for Assigned Names and Numbers*)
- **IANA** (*Internet Assigned Numbers Authority*)
- **Top-Level Domain Registry Operators**
- **Domain Registrars**
- **Management of national domain names**
- **Domain Name System**

- A URL (Uniform Resource Locator) is a unique address used to identify a resource (e.g. web page, file) on the Internet. It contains all the information necessary for a web browser to find and access that resource. The URL usually appears in your browser's address bar when you visit a website.
- URLs are structured in a hierarchy and have many different components. Here are the main parts of the URL:

1. Protocol/Scheme
2. Domain Name
3. Port
4. Path
5. Query Parameters
6. Fragment

Distinguishing between URL and Domain Name:

- URL is the full address leading to a specific resource (including protocol, path).
- The domain name is just the main address of the website, usually the part between http:// and the URL. For example, in the URL https://www.example.com/path, the domain name is example.com.

What is a URL? URL structure?

What is DNS?

The Domain Name System (DNS) is the phonebook of the Internet. Humans access information online through domain names, like youtube.com or facebook.com.

Web browsers interact through Internet Protocol (IP) addresses. DNS translates domain names to IP addresses so browsers can load Internet resources.



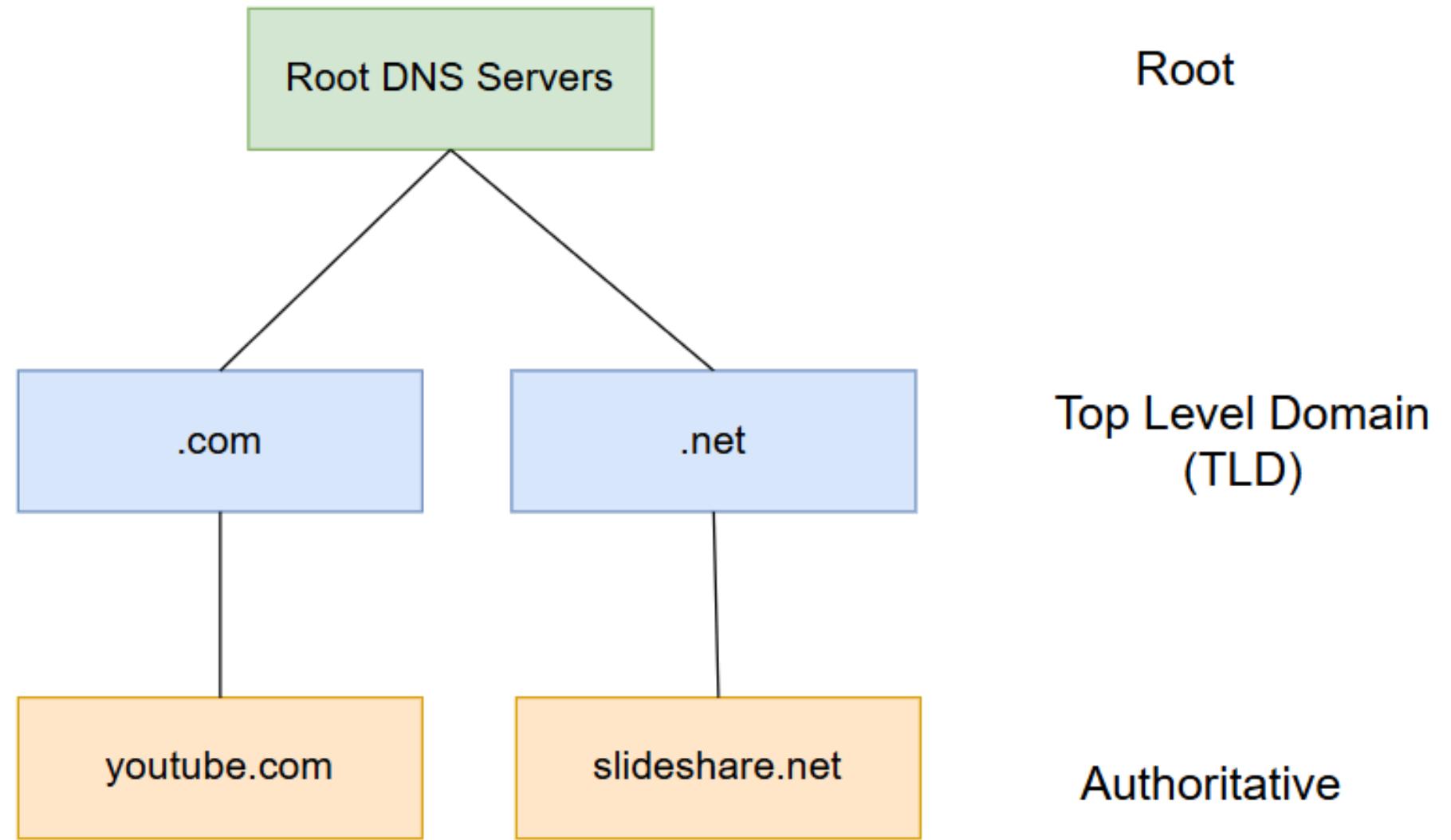
Structure of the DNS System

DNS Resolver: The client-side component that queries DNS servers.

Root Servers: Direct traffic to the correct top-level domain (TLD) servers.

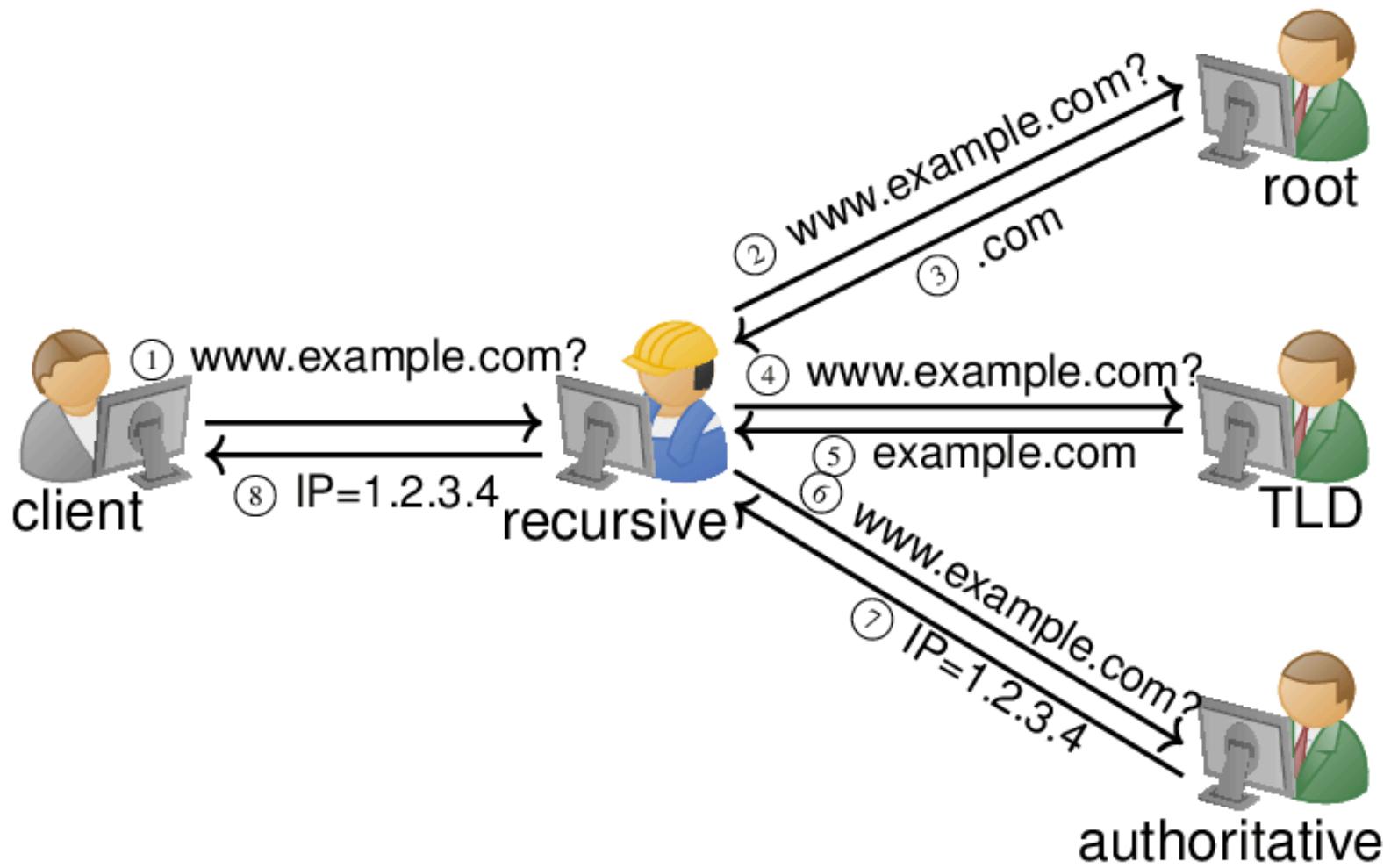
TLD Servers: Manage domains like .com, .org, .net, etc., and provide details about specific domain registrars.

Authoritative Name Servers: Contain the actual mapping of domain names to IP addresses.



How DNS Works?

1. User enters 'example.com' into the browser, and the query is sent to the DNS recursive resolver.
2. The resolver queries the DNS root server (".").
3. The root server responds with the address of the .com TLD server.
4. The resolver queries the .com TLD server.
5. The TLD server responds with the IP address of the domain's authoritative name server.
6. The resolver queries the authoritative name server for example.com.
7. The IP address is returned to the resolver, which sends it to the browser.

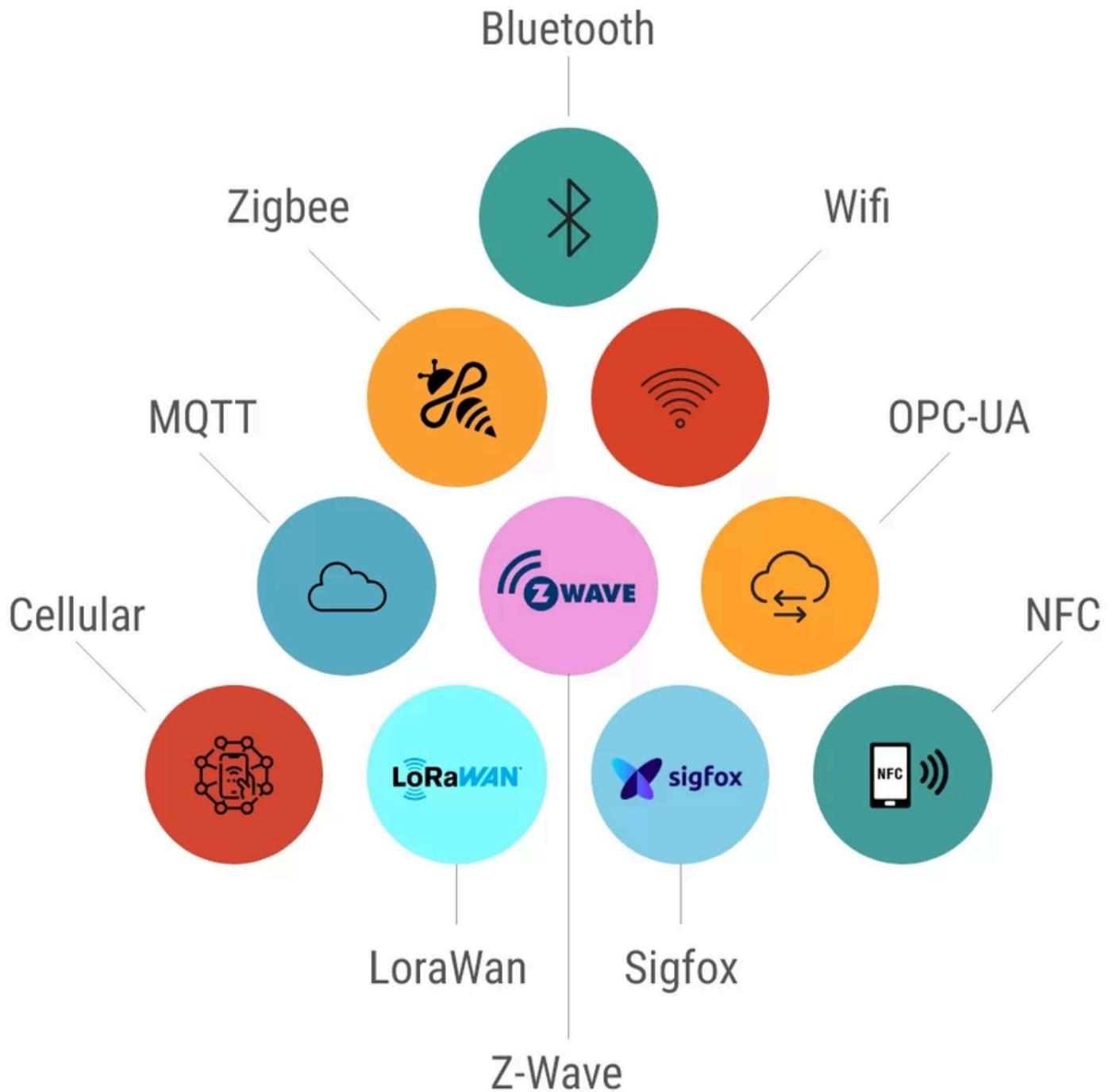


What is Communication protocol?

A communication protocol is a set of rules and conventions that allows devices and systems to exchange data over a network.

These protocols define how data is transmitted and received between different devices, ensuring smooth communication.

They specify the format, timing, error handling, and methods of data transmission to enable reliable and efficient data exchange.



Communication Protocols in Web

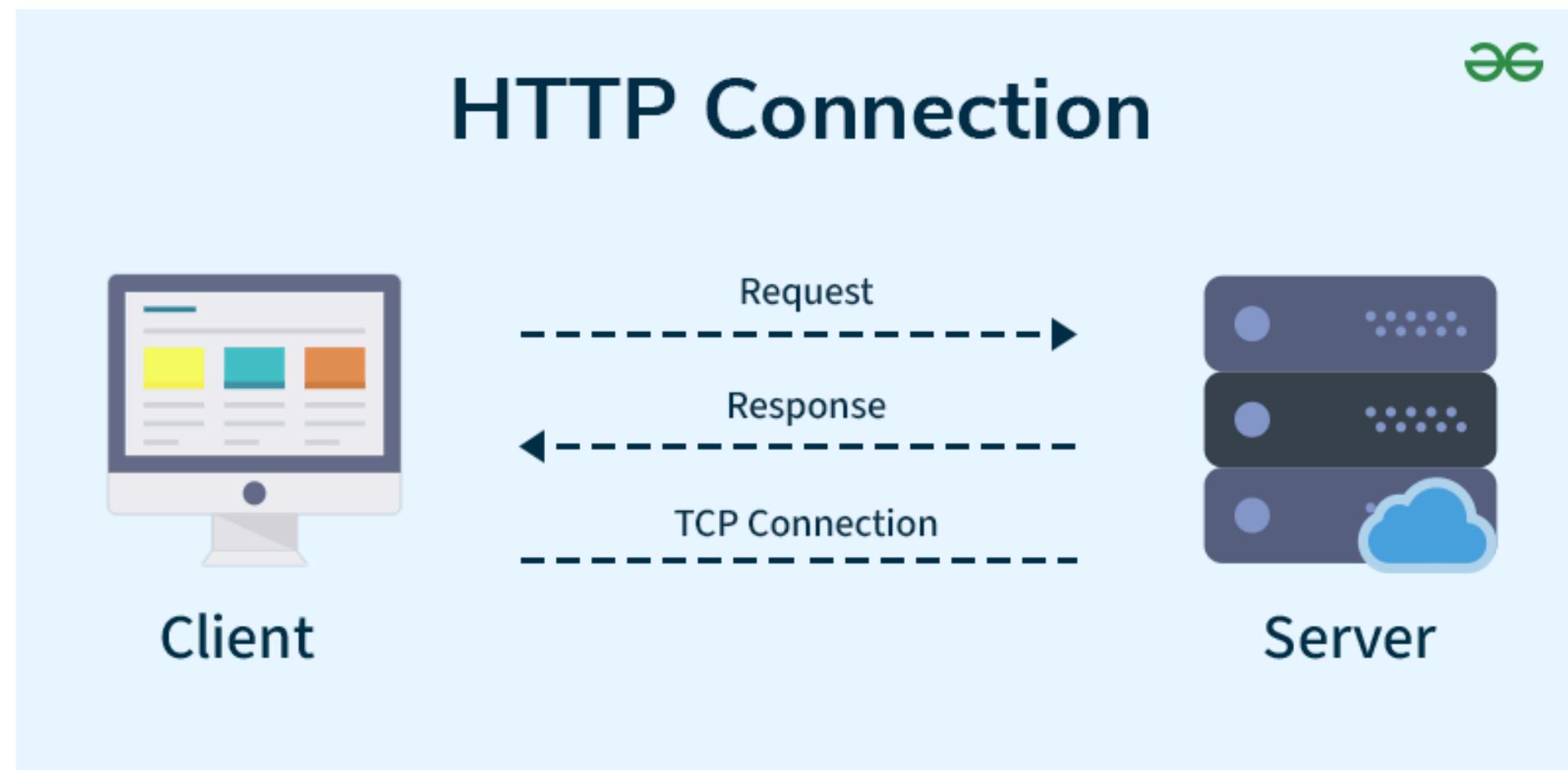
a. HTTP (Hypertext Transfer Protocol)

Definition: HTTP is a stateless protocol used for transferring hypertext (web pages) from web servers to browsers.

It enables communication between clients (browsers) and web servers, allowing users to view websites.

Port: HTTP uses port 80 by default.

Security: HTTP does not encrypt data, making it vulnerable to interception or attacks (such as man-in-the-middle attacks).



Communication Protocols in Web

b. HTTPS (Hypertext Transfer Protocol Secure)

Definition: HTTPS is the secure version of HTTP, using encryption (SSL/TLS) to secure data transferred between a browser and server.

It provides encrypted communication and secure identification of the web server.

Port: HTTPS uses port 443 by default.

Security: HTTPS encrypts all data, protecting sensitive information such as passwords, payment details, and personal data from being intercepted.

Certificate: HTTPS requires an SSL/TLS certificate for data encryption.



Http



Https

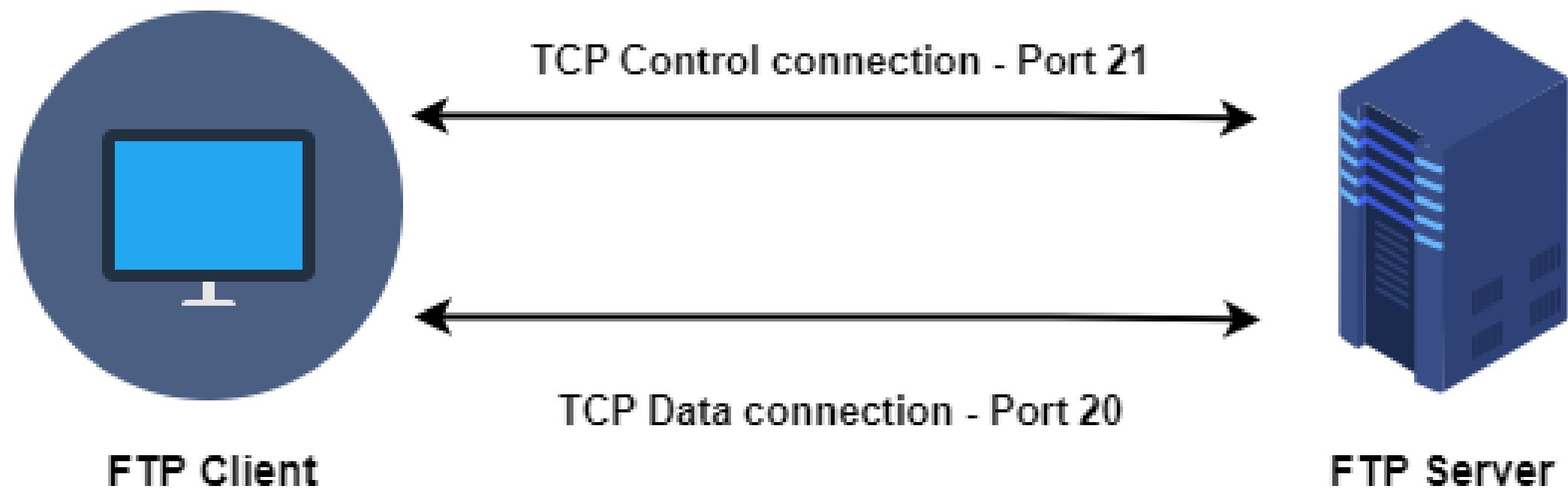
Communication Protocols in Web

c. FTP (File Transfer Protocol)

Definition: FTP is a protocol used for transferring files between a client and a server over a network.

It allows users to upload, download, and manage files on a remote server.

Port: FTP commonly uses port 21 for command communication and port 20 for data transfer.



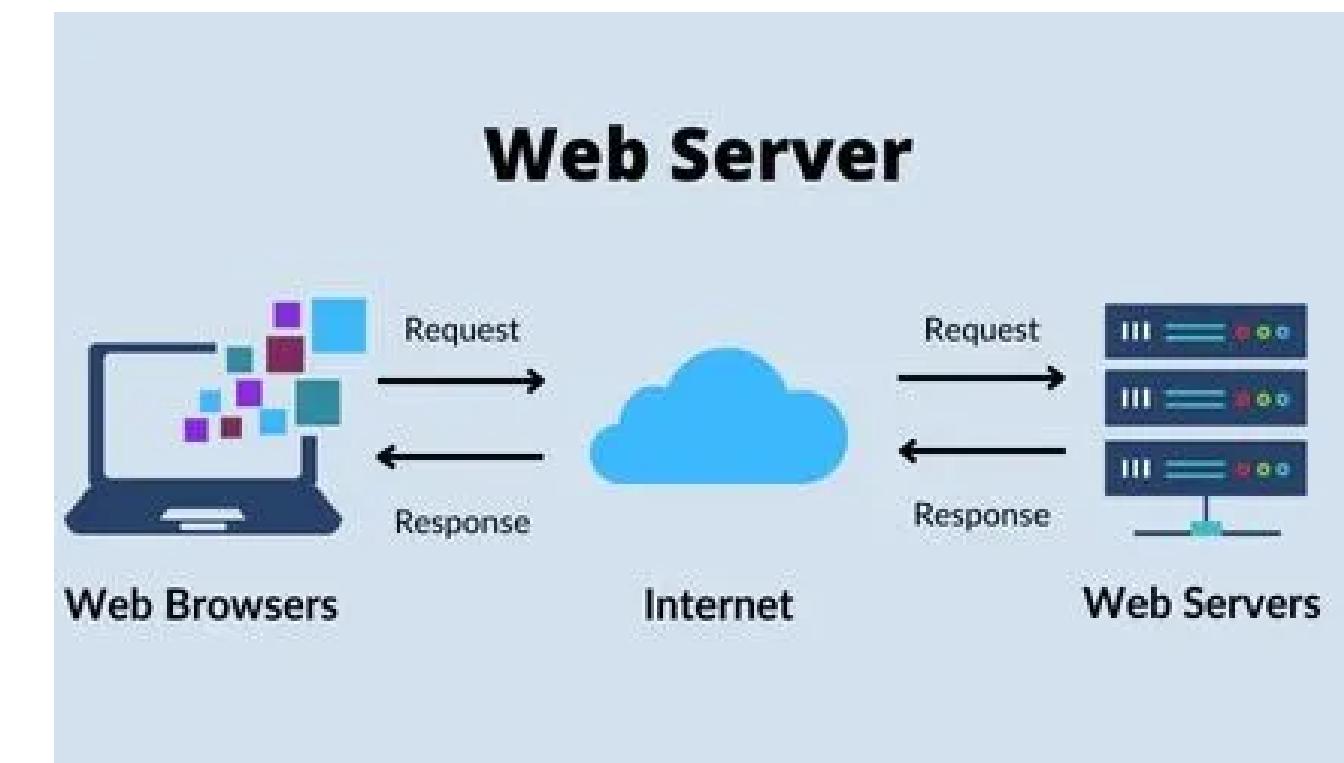
Web technologies

Types of web servers

a. Web server:

A web server is a system that uses HTTP and other protocols like SMTP and FTP to handle client requests on the web. Its primary role is to store, process, and deliver website content to users, enabling web browsing, email, and file transfers.

Web server hardware connects to the internet for data exchange, while web server software manages user access to hosted files. It operates on a client/server model, and all website hosts require web server software.



b. Mail server:

An email server is a specialized computer system that manages the sending, receiving, and storage of email messages. It ensures emails are delivered from the sender to the recipient and any bounced emails are captured using SMTP.

It's like a post office: the server collects emails, sorts them based on the recipient's address, and ensures they are delivered securely, similar to how postal workers handle and deliver letters.

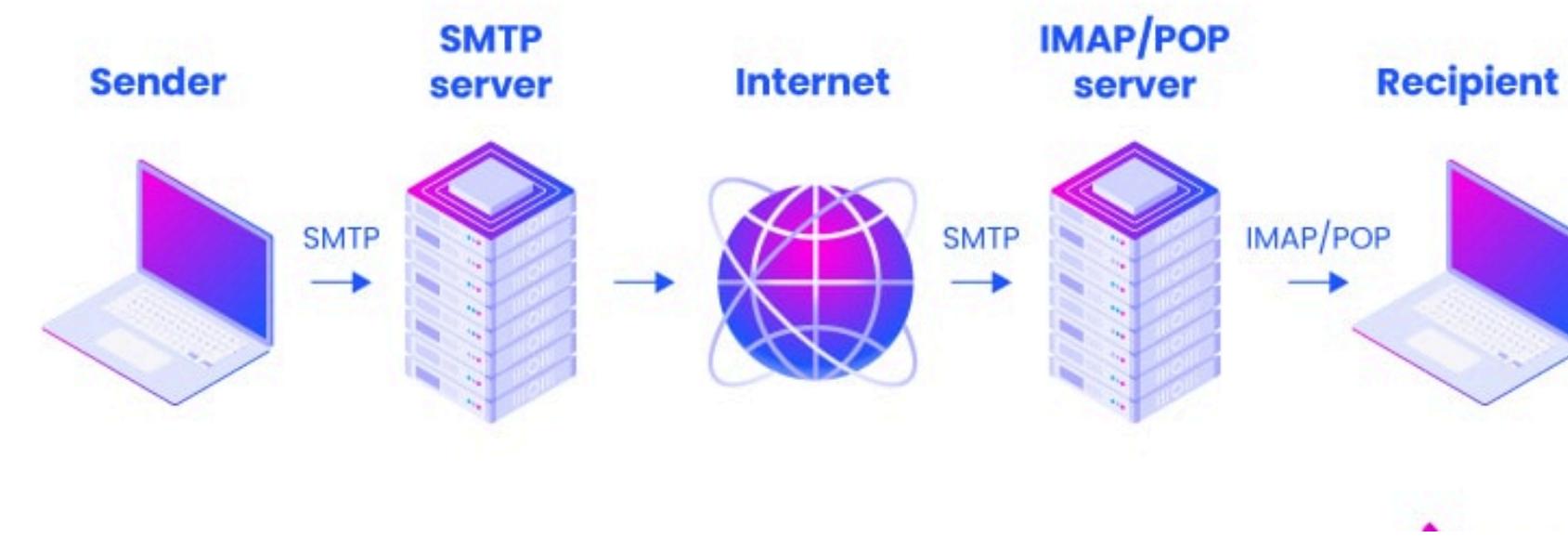


b. Mail server:

How mail server works

Email messages are sent and received using two types of servers: mail transfer agents (MTAs) for outgoing emails and mail delivery agents (MDAs) for incoming emails.

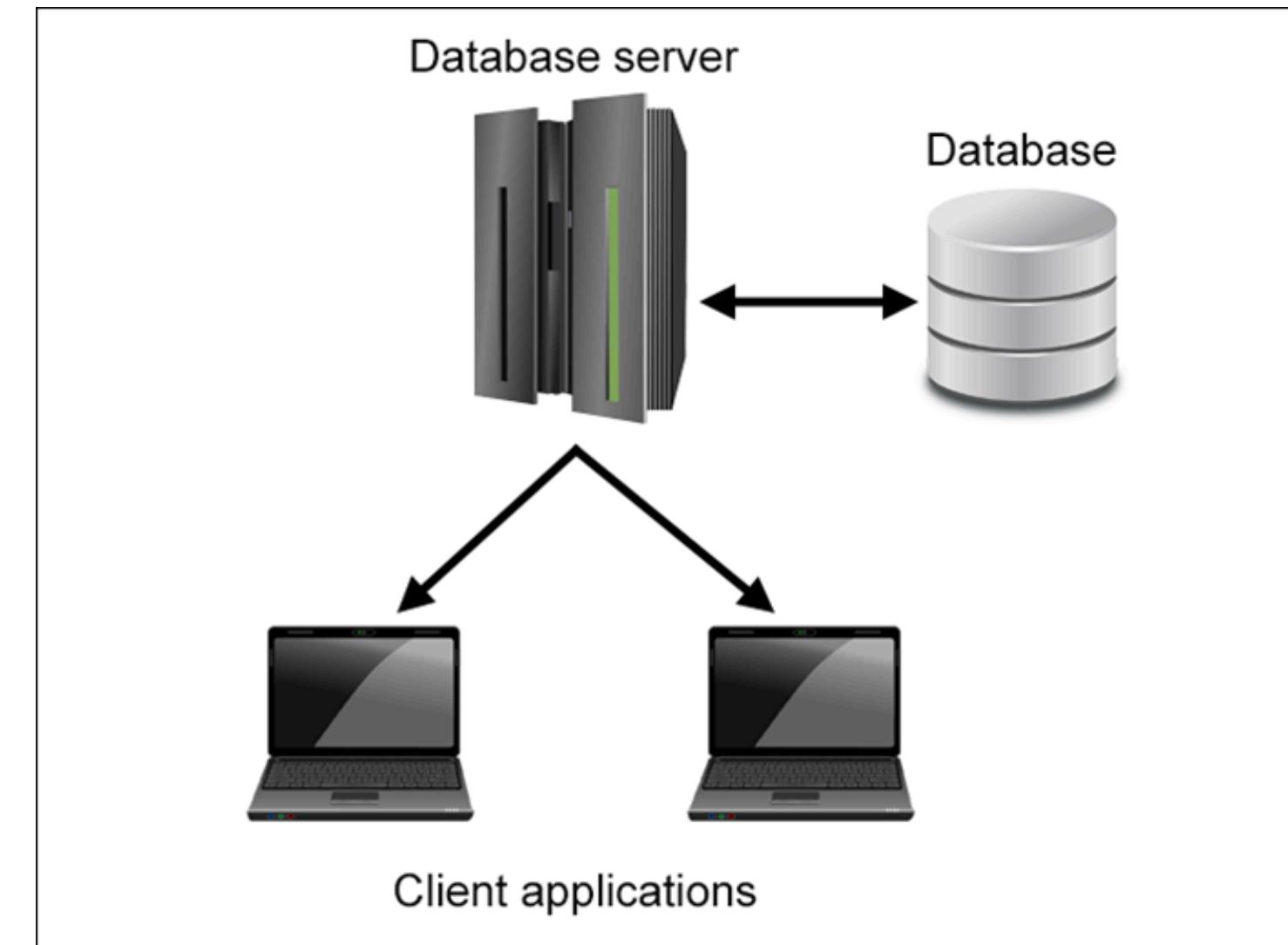
MTAs send messages using protocols like SMTP, which translates the recipient's domain into an IP address and routes the email using MX records. MDAs then use incoming protocols, such as IMAP or POP3, to deliver the email to the recipient's mail client.



c. Database server:

A database server stores web pages, data, and information, using a Database Management System (DBMS) to manage and retrieve records based on client requests.

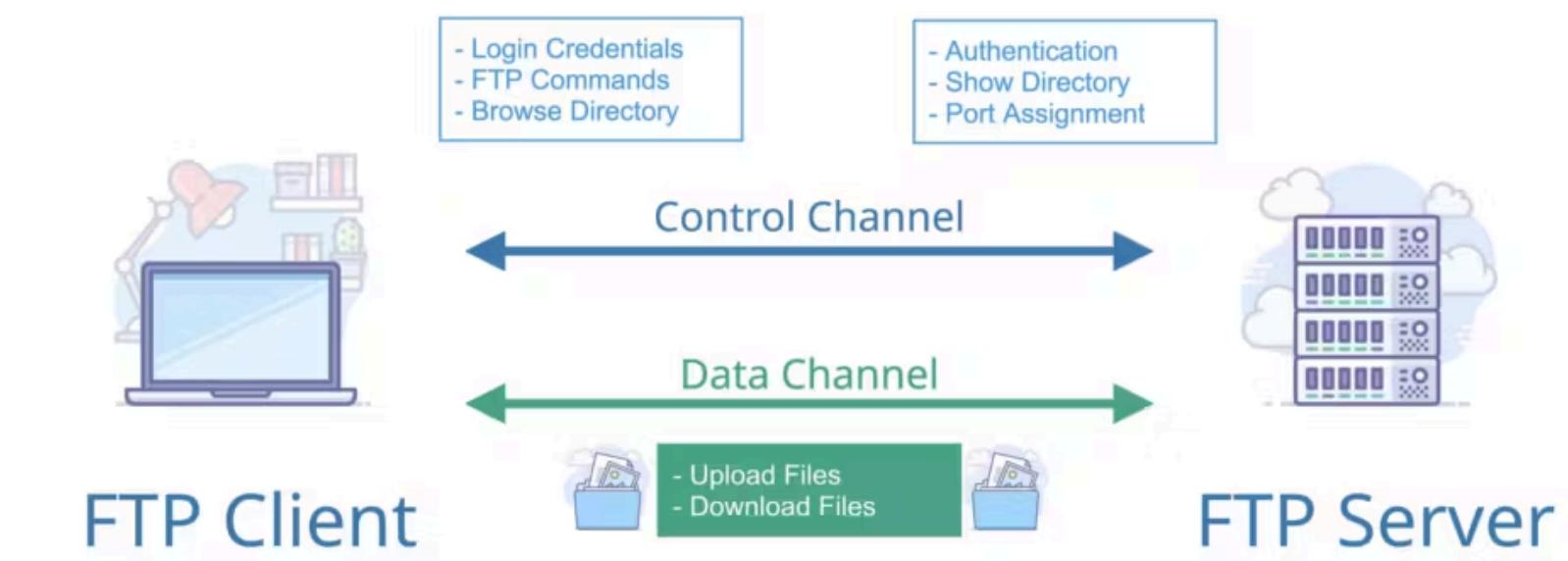
It is often found in a client-server environment, providing the information the client needs.



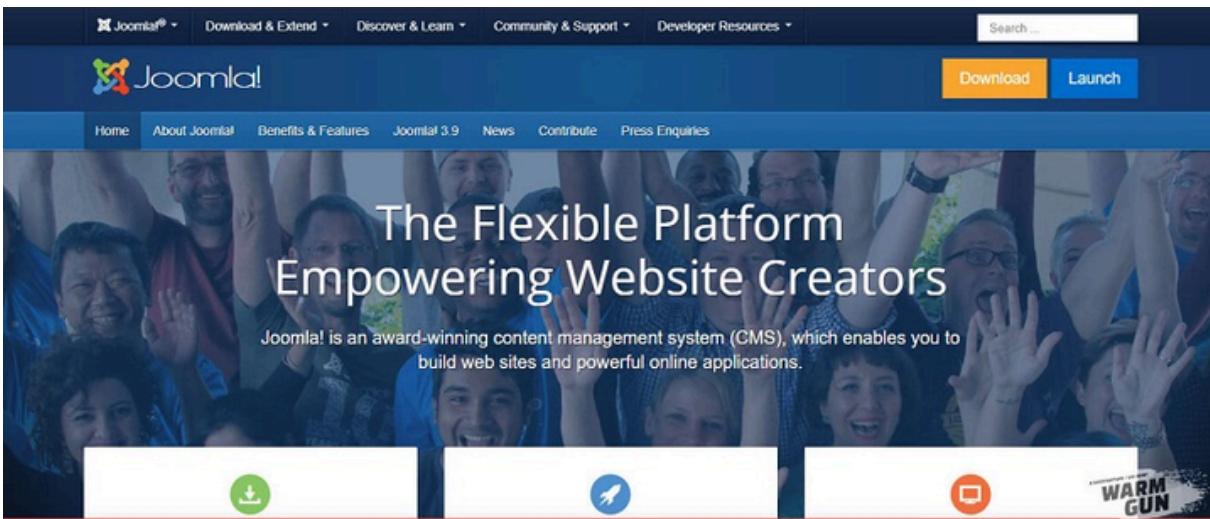
d. FTP server:

An FTP server (File Transfer Protocol server) is a type of software or network service used to store and manage files and directories, allowing users to access and transfer them over the Internet.

The FTP server works by allowing users to connect to the server and access shared directories or files. Users can download or upload files and directories through the FTP data transfer interface.



Online website builders



Online website builders

Advantages:



- Ease of use: The tools all have intuitive interfaces, making it easy for users to create and manage websites.
- Time-saving: Tools often offer design templates and drag-and-drop features.
- Low cost: Many tools offer free versions or affordable service packages.
- Integrations: Tools often integrate features like SEO, analytics, and customer support.
- Mobile support: Most tools offer responsive design, ensuring that the website works well on mobile devices.

Online website builders

Disadvantages:

- Customization Limitations: Tools often have limitations on code customization and advanced features.
- Additional Costs: Some advanced features or options require a paid service plan, which can increase the overall cost.
- Security: Some tools may lack advanced security options or require users to manage security themselves, which can create risks if not done properly.
- Bandwidth Limitations: Bandwidth is the amount of data transferred from the server to the user. Free websites often have a very limited bandwidth limit.

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HTML

HTML (HyperText Markup Language) is a hypertext markup language used in developing web pages.

HTML is not a programming language but a markup language used to define the structure and purpose of web elements, like text, images, and links, using tags. For instance, use the `<p>` tag for paragraphs and the `<h1>` tag for titles.

HTML also serves important functions, including:

- Content Division and Formatting
- Creating Links and Embedding Images
- Creating Layouts
- Defining Page Attributes

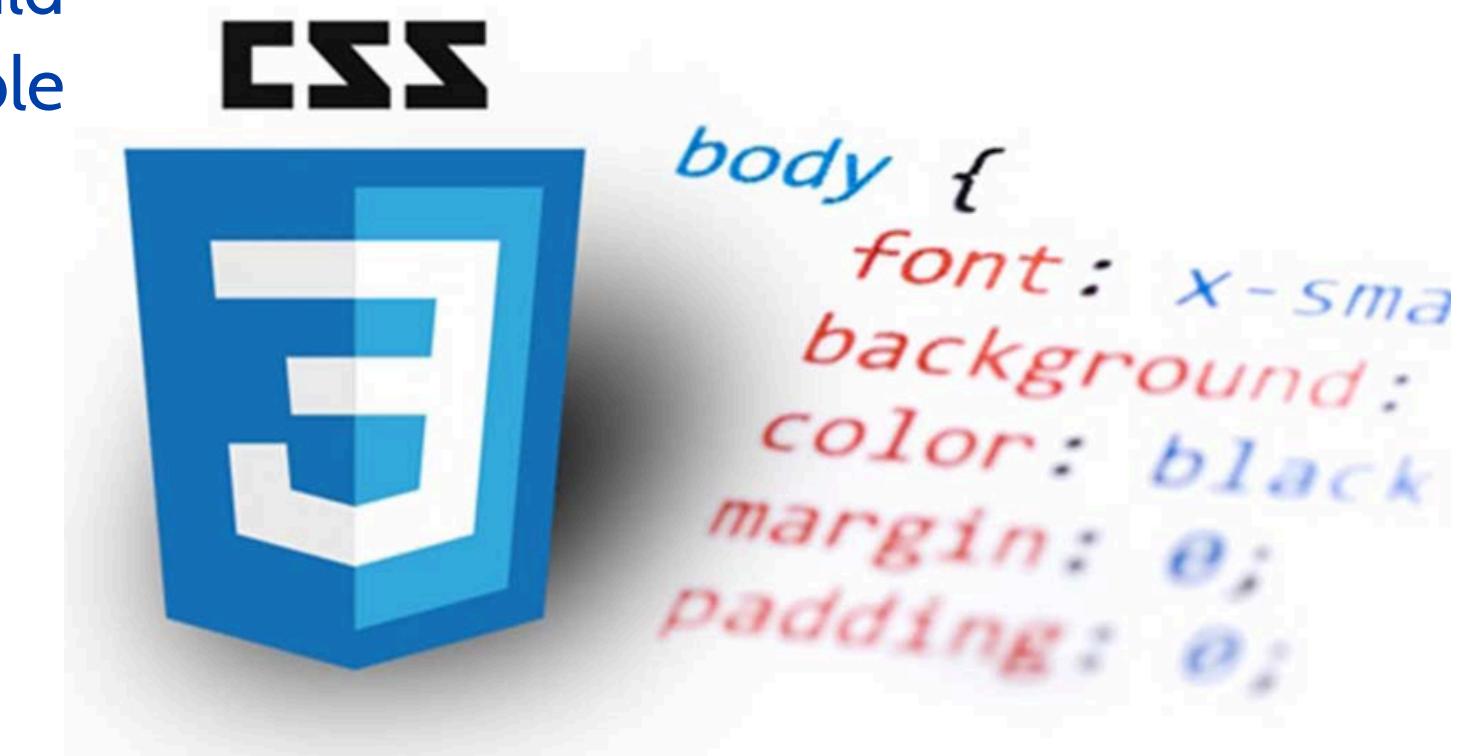


CSS

CSS (Cascading Style Sheets) is a design language used in web design to describe how the presentation, layout, and style of content on a website should appear. CSS helps create professional and readable web pages.

The role of CSS in web development includes:

- Defining Styles and Formatting Content
- Ensuring Device Compatibility
- Creating Layouts, Effects, and Uniqueness
- Controlling Formatting and Reusing Styles
- Reducing Code and Improving Page Load Speed



JS

JavaScript is one of the most popular programming languages today. It was created by Brendan Eich (1995) and has become an important part of modern websites. JavaScript helps to make static websites dynamic, create interactivity and improve server performance.

The role of JS in web development includes:

- Creating Dynamic Layouts
- Building Interactive Content
- Enhancing User Behavior
- Controlling Browser Defaults
- Client-Side Data Processing



JavaScript



THANK YOU

