REPORT ON

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WHAT HAPPENS WHEN YOU TYPE GOOGLE.COM IN YOUR WEB BROWSER ?

When you type **google.com** into your web browser and press enter, a complex series of events takes place behind the scenes to retrieve and display the Google homepage. Here's a detailed explanation covering the entire process from DNS resolution to the final rendering of the webpage.

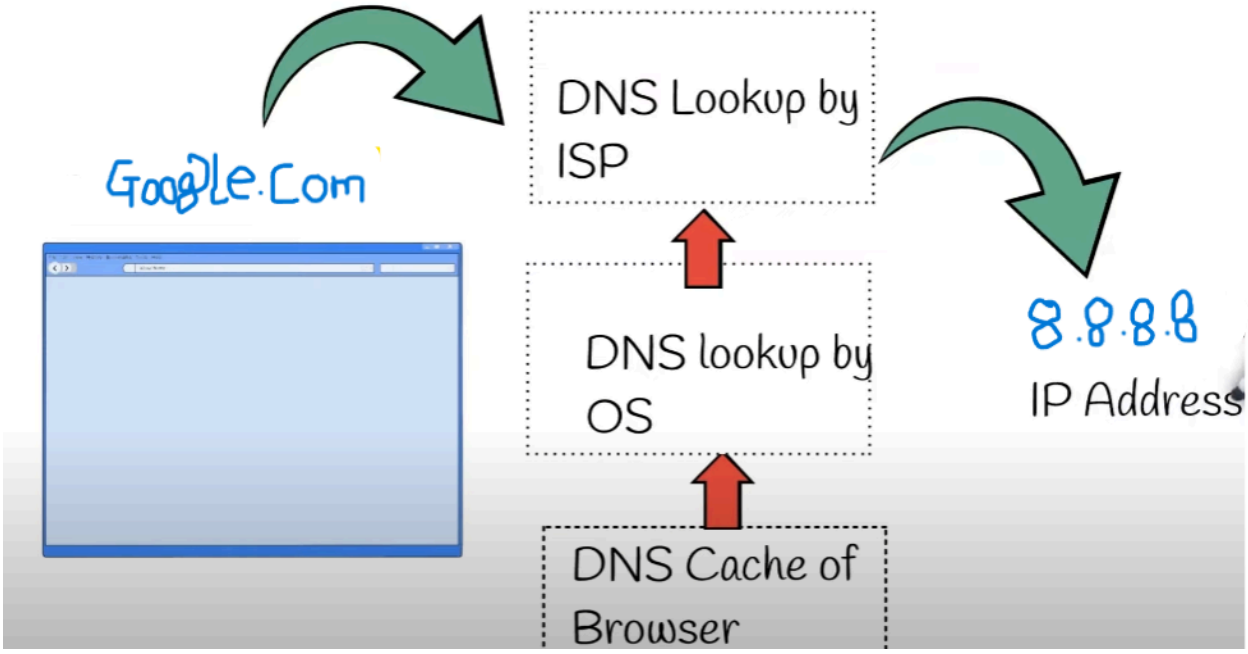
1. **DNS Resolution**

Domain Name System (DNS) is like the internet's phonebook. It translates human-readable domain names (like `google.com`) into IP addresses (like `8.8.8.8`).

Local Cache Check: The browser first checks its own cache to see if it has recently looked up `google.com`.

OS Cache Check: If not found, the operating system's DNS cache is checked.

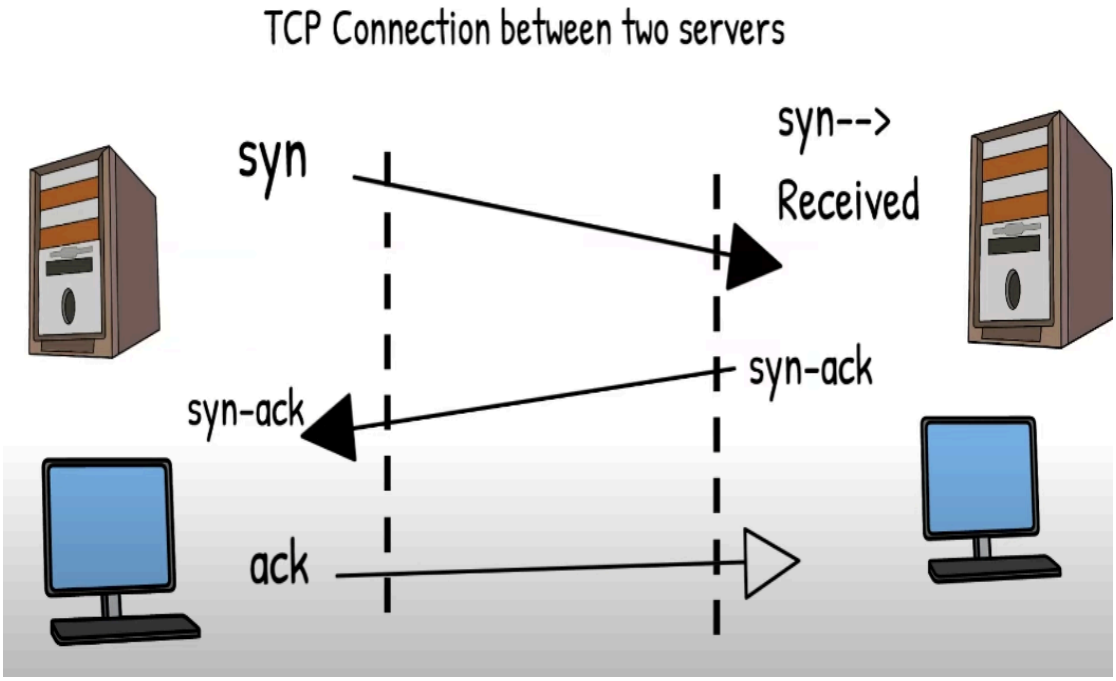
ISP's DNS Server: If the router doesn't have the information, it forwards the request to the ISP's DNS server.



2. Establishing a TCP Connection

Three-Way Handshake: The browser establishes a TCP connection with the Google server using a three-way handshake:

- SYN: The browser sends a TCP SYN (synchronize) packet to the server.
- SYN-ACK: The server responds with a SYN-ACK (synchronize-acknowledge) packet.
- ACK: The browser sends an ACK (acknowledge) packet back to the server, establishing a connection.

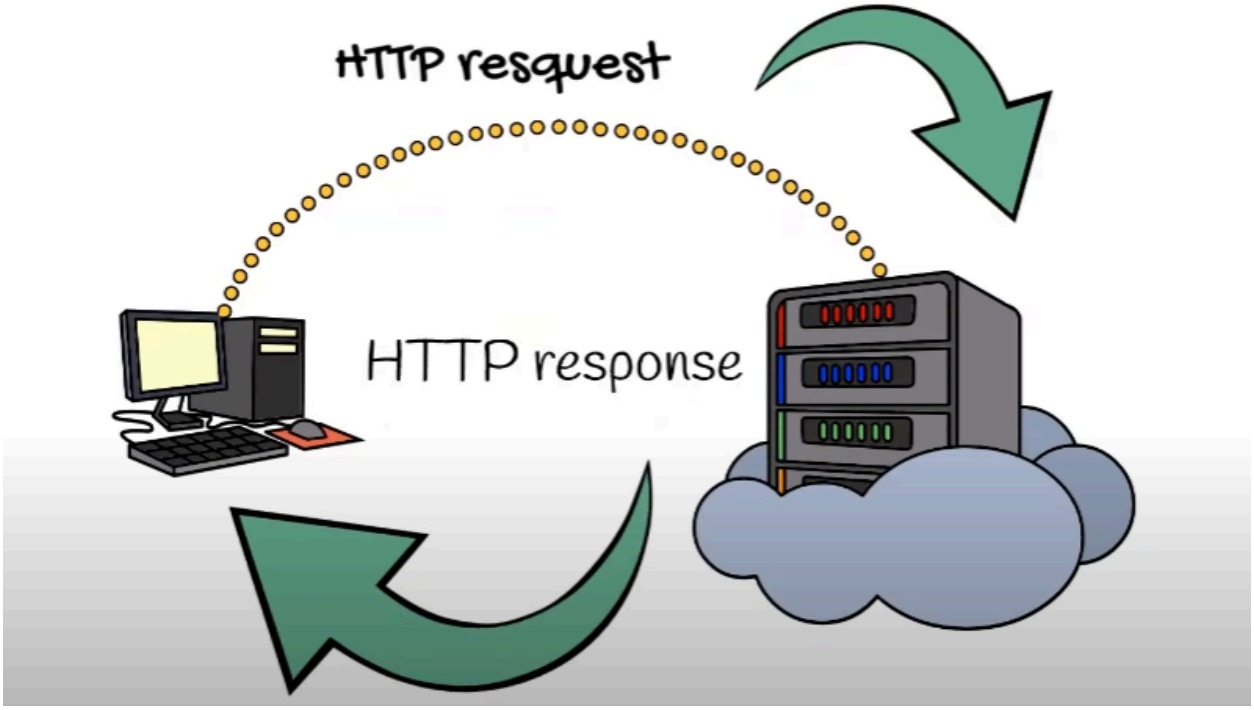


3. Sending the HTTP Request

- *HTTP GET Reques*t: The browser sends an HTTP GET request to the Google server, requesting the homepage (usually /).

4. Server Processing Request

- Processing: The Google server processes the request, fetching the necessary resources (HTML, CSS, JavaScript, images, etc.) from its storage.
- *HTTP Response*: The server sends an HTTP response back to the browser, which includes the status line (e.g., HTTP/1.1 200 OK), headers, and the requested content.

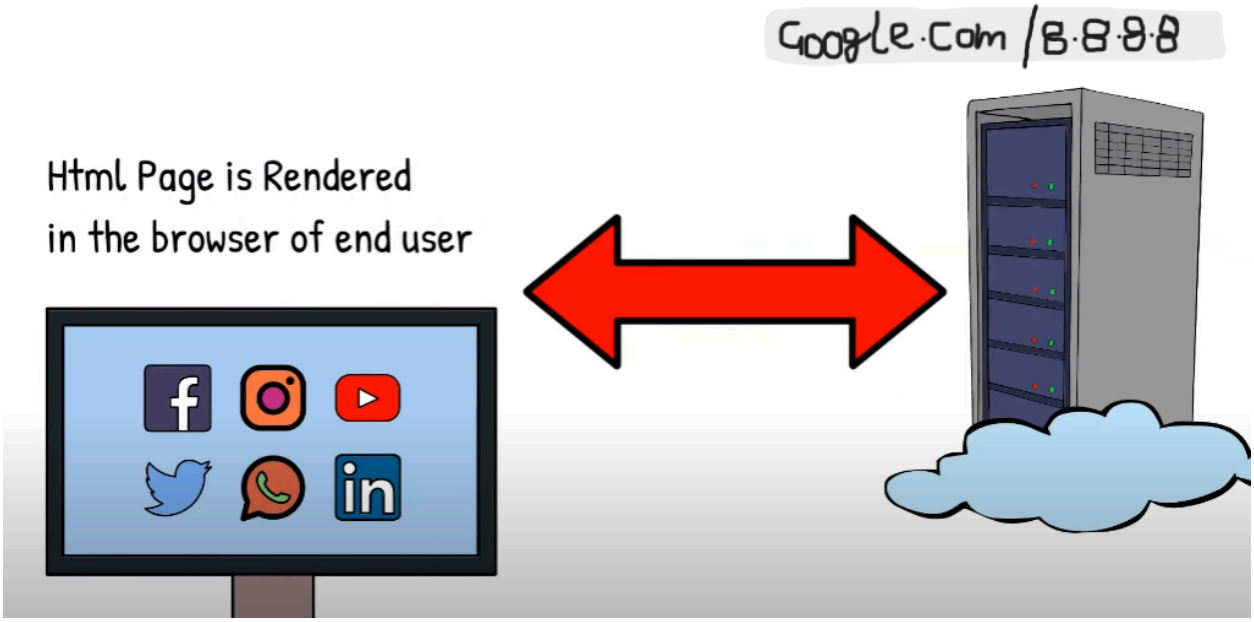


5. Rendering the Webpage

The browser renders the webpage by parsing and executing the received content.

Steps Involved

1. HTML Parsing: The browser parses the HTML document.
2. DOM Construction: A Document Object Model (DOM) tree is constructed from the parsed HTML.
3. CSS Parsing: The browser parses CSS and applies styles to the DOM elements.
4. JavaScript Execution: JavaScript code is executed, potentially modifying the DOM and CSSOM..
5. Layout Calculation: The browser computes the layout of each element.
6. Painting: The browser paints the pixels on the screen to render the final webpage.



Summary

When you type google.com into your browser, the following sequence of events occurs:

1. DNS Resolution to translate google.com into an IP address.
2. TCP Connection Establishment using a three-way handshake.
3. TLS Handshake to secure the connection (if using HTTPS).
4. HTTP Request to the Google server for the homepage.
5. Server Processing and sending back the HTTP response.
6. Rendering the Webpage by parsing HTML, CSS, and JavaScript.
7. Loading Additional Resources and updating the webpage.

This entire process happens in a fraction of a second, providing the user with a seamless experience.