WORKING MECHANISM OF BROWSER

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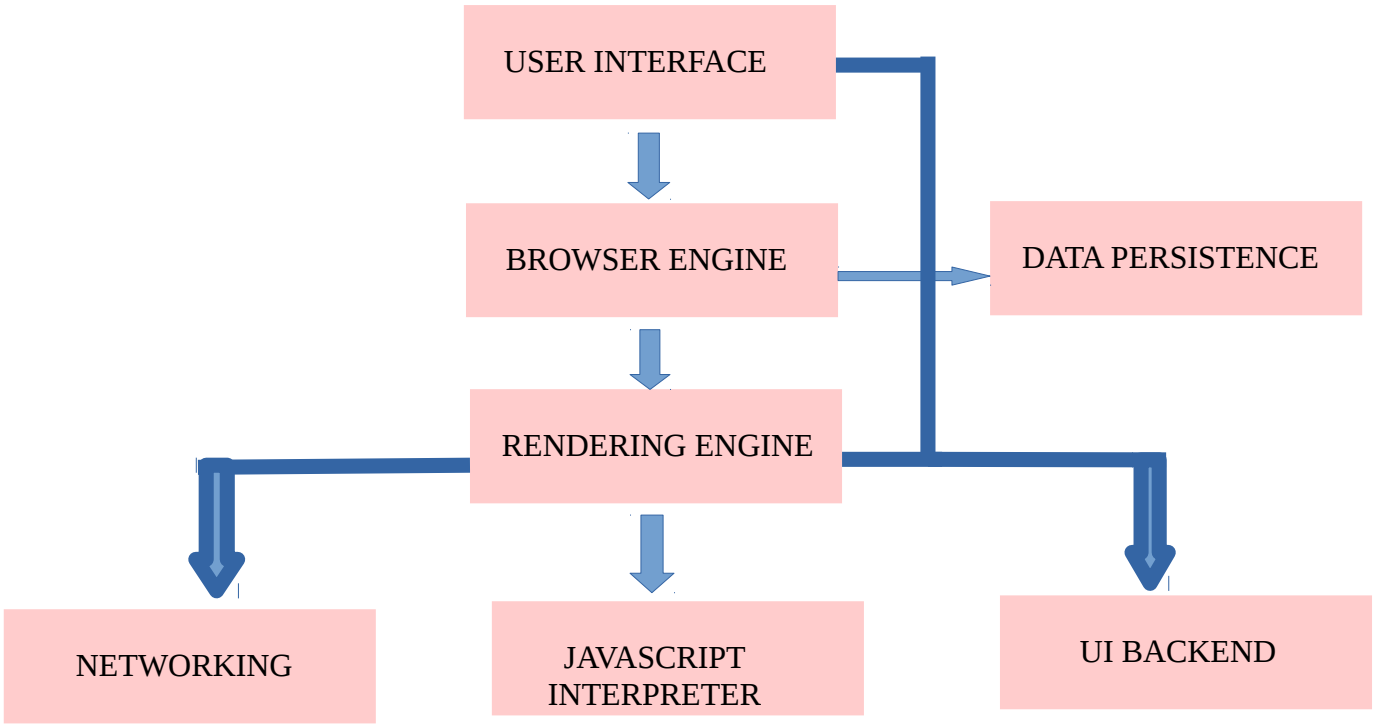
1. What is browser ?

A browser is an application program that provides us to look at and interact with all the information provided on world wide web. Browser works on client – server basis. Here web browser act as a client whick make request to web server on behalf of browser user. In turn webserver sends the requested information back to the browser and dispays the information in user's device using rendring engine. Rendering engine is one of the major components of browser which we will discuss later in this article. Browser also display images and videos.

Now we look into architecture of browser.

ARCHITECTURE OF BROWSER :



Browser has 7 main components , they are

- User interface
- Browser engine
- Rendering engine
- Networking
- Javascript interpreter
- Ui backend
- Data persistence

Now let’s see each component in detail.

1. USER INTERFACE :

The user interface is the place where User interacts with the browser. It includes the address bar, back and next buttons, home button, refresh and stop, bookmark option, etc.

2. BROWSER ENGINE :

The browser engine works as a bridge between the User interface and the rendering engine. According to the inputs from various user interfaces, it queries and manipulates the rendering engine.

3. RENDERING ENGINE :

As we seen before in the introduction part, the main role of rendering engine is to get the requested web page by user and display it on screen. This engine takes HTML and CSS files as input and displays its interpretation of both . HTML is used to markup our content and CSS is used to style and animate our content. So rendering engine combine these documents and it is responsible for displaying the visual representation of the web page.

4. NETWORKING :

As the user request a web page, the browser search for the requested web page. To recieve the webpage the browser should communicate with the network and asking the network to provide necessary images and documents that make up a page. In some cases network failure also occurs where the network fails to fetch the image or document.

5. JAVASCRIPT INTERPRETER :

The main function of this interpreter is to parse and execute the javascript code that is embedded in a website. Once the interpreted resuts are found they are forwarded to the rendering engine. And as we discuss before rendering engine will display it on user interface.

6. UI BACKEND :

UI backend is used for drawing basic widgets like combo boxes and windows. It uses operating system user interface methods.

7. DATA PERSISTENCE :

Persistence is nothing but continuing a course of action. In the same way the browser persistently stores various type of data locally. Example : cookies.

PROCESS INVOLVED IN RENDERING ENGINE :

1. **GET RESOURCES :** First the networking layer will start sending the contents of the requested documents to the rendering engine in chunks.

2. **PARSING HTML TO CONSTRUCT DOM :** The rendering engine parses the chunks of HTML document and convert the elements to DOM nodes in a tree called **the content tree** or **the DOM tree**.

3. **RENDER TREE CONSTRUCTION :** While the DOM tree is being constructed, the browser constructs another tree, **the render tree**. This tree is of visual elements in the order in which they will be displayed. It is the visual representation of the document. The purpose of this tree is to enable painting the contents in their correct order.

4. **LAYOUT :** After the construction of the render tree, it goes through a **layout process** of the render tree. When the renderer is created, its position and size values are not assigned. The process of calculating these values is called layout or reflow. This means giving each node the exact coordinates where it should appear on the screen.

5. **PAINTING :** It is the final step in rendering engine. The render tree is traversed and the renderer's "paint()" method is called to display content on the screen. Painting uses the UI backend layer.