



## Web Browsers

**For Prelims:** [Web Browsers](#), [www \(World Wide Web\)](#), HTML, CSS, and JavaScript, Virtual Reality (VR) and Augmented Reality (AR).

**For Mains:** Web Browsers, Developments and their applications and effects in everyday life.

**Source:** [TH](#)

### Why in News?

Web browsers are our digital passports to the vast universe of the internet, making it easy for us to explore and **access web pages with just a click.**

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### What are Web Browsers?

- **About:**

- The web browser is an application software to explore [www \(World Wide Web\)](#). It provides an **interface between the server and the client and requests to the server** for web documents and services.
- It works as a compiler to render HTML (Hypertext Markup Language) which is used to design a webpage.
- Whenever we search for anything on the internet, the browser loads a web page written in **HTML, including text, links, images**, and other items such as stylesheet and JavaScript functions.
  - Google Chrome, Microsoft Edge, Mozilla Firefox, and Safari are examples of web browsers.
- **Origin:**
  - In the nascent days of the internet, browsing was a **text-based venture until Tim Berners-Lee** introduced the **World Wide Web in 1990**, alongside the inaugural web browser, 'WorldWideWeb'.
  - The transformative **Mosaic browser in 1993** brought images into the web landscape, **revolutionizing user interaction**.
  - Netscape Navigator's advent further **enhanced browsing by introducing bookmarks and user-friendly features**, sparking the 'Browser Wars' between it and Internet Explorer.
- **The Evolutionary Leaps:**
  - The monotony of **Internet Explorer's dominance was broken by Mozilla Firefox** in 2004-2005, propelling innovation with tabbed browsing and add-ons, setting new standards.
  - Google's Chrome, with its speed and minimalism, emerged in 2008, triggering a revitalization of the browser market.
  - Other contenders such as Apple's Safari and Microsoft Edge (a successor to Internet Explorer) evolved, providing diverse options tailored to user preferences.
- **Anatomy of Web Browsers:**
  - **Request and Response:** Initiating a website visit **triggers a sequence of digital communication**, akin to dispatching and receiving messages via a network of servers.
  - **Deconstructing the Response:** Webpage information **arrives in files encoded in HTML, CSS (Cascading Style Sheets), and JavaScript**, each playing a pivotal role in constructing the final web page.
    - **HTML** provides the **architectural blueprint of a webpage**. Similar to the skeletal framework of a building, made with iron bars, bricks, and cement, **HTML defines the structure of the page**, outlining elements like headings, paragraphs, images, and links.
    - **CSS** is considered to be the **interior designer of the digital world**. This information **imparts style and aesthetics to the HTML structure** by controlling attributes like **colour schemes, fonts, spacing, and positioning**.
    - **JavaScript** is the **dynamic engine, making web pages interactive and responsive**. Analogous to the electrical system in a building, JavaScript breathes life into static content. It allows interactive elements like pop-ups, forms, animations, and real-time updates, creating an engaging user experience.
  - **Rendering:** The browser assembles the webpage by decoding HTML structure, applying CSS for aesthetics, and executing JavaScript for interactivity, all within seconds.
  - **Data Management:** [Cookies](#) store browsing data for seamless navigation, while the cache retains frequently accessed files, accelerating page loading times.
  - **Security Measures:** Browsers employ encryption protocols like HTTPS and warning systems to shield and alert users against potential threats.

## What is the Future of Browsing?

- As technology hurtles forward, web browsers evolve in tandem. They are embracing **cutting-edge technologies like WebAssembly**, a format that enables near-native performance within the browser environment.
- Support for [Virtual Reality \(VR\)](#) and [Augmented Reality \(AR\)](#) experiences is also on the horizon, promising immersive online interactions.
- Additionally, privacy features are being bolstered, providing users with greater control over their

digital footprint.

- Web browsers are the unsung heroes of our digital endeavours, translating code into the dynamic web pages that form the backbone of our online experiences.
- By unravelling the intricate tapestry of processes that underlie their operation, we gain a newfound appreciation for the seamless magic they conjure with every click.

## UPSC Civil Services Examination Previous Year's Question (PYQs)

### **Prelims:**

**Q. Consider the following statements: (2019)**

**A digital signature is**

1. an electronic record that identifies the certifying authority issuing it
2. used to serve as a proof of identity of an individual to access information or server on Internet
3. an electronic method of signing an electronic document and ensuring that the original content is unchanged

**Which of the statements given above is/are correct?**

- (a) 1 only  
(b) 2 and 3 only  
(c) 3 only  
(d) 1, 2 and 3

**Ans: (c)**

- Digital signature is not a record, and the identification of certifying authority is ascertained from the digital certificate, not digital signature. Hence, statement 1 is not correct.
- A digital signature is used to authenticate the identity of the sender of a message or the signer of a document, and not to serve as a proof of users' authenticity to access a website or information on the Internet. Hence, statement 2 is not correct.
- A digital signature is an electronic form of a signature that allows the recipient to trust the fact that a known sender sent the message and it was not altered in transit. Hence, statement 3 is correct. Therefore, option (c) is the correct answer.

### **Mains:**

**Q: Discuss different types of cyber crimes and measures required to be taken to fight the menace. (2020)**

**Q: Discuss the advantages and security implications of cloud hosting of servers vis-a-vis in house machine based hosting for government businesses. (2015)**

**Q: What is a digital signature? What does its authentication mean? Give various salient built-in features of a digital signature. (2013)**