

(REVIEW ARTICLE)



## Challenges of web development

Varinder Kaur Attri <sup>1</sup>, Purva Pathania <sup>2</sup> and Simran <sup>2</sup>

<sup>1</sup> Dr. Varinder Kaur Attri, Guru Nanak Dev University, Engineering and Technology, GNDU RC Jalandhar, Jalandhar, Punjab, India.

<sup>2</sup> Guru Nanak Dev University, Engineering and Technology, GNDU RC Jalandhar, Jalandhar, Punjab, India.

World Journal of Advanced Engineering Technology and Sciences, 2025, 14(01), 199-201

Publication history: Received on 19 December 2024; revised on 27 January 2025; accepted on 30 January 2025

Article DOI: <https://doi.org/10.30574/wjaets.2025.14.1.0029>

### Abstract

Web development is a keystone of the digital era, enabling businesses, organizations, and individuals to establish a global presence. It plays a central role in managing both the back-end and front-end development of websites and web applications. This paper examines the critical challenges of web development, including the growing demand for responsive and cross-platform applications. And the need to ensure robust security and privacy in the face of evolving cyber threats. It also examines challenges related to scalability, performance optimization, and maintaining usability and accessibility for diverse user groups. The increasing reliance on responsive design, cloud integration and real-time data processing adds layers of complexity for developers. By highlighting these challenges, the paper aims to provide a comprehensive understanding of the hurdles in web development.

**Keywords:** Web Development; Back-End; Front-End; Cross-Platform; Responsive Design; Cybersecurity; Cloud Integration

### 1. Introduction

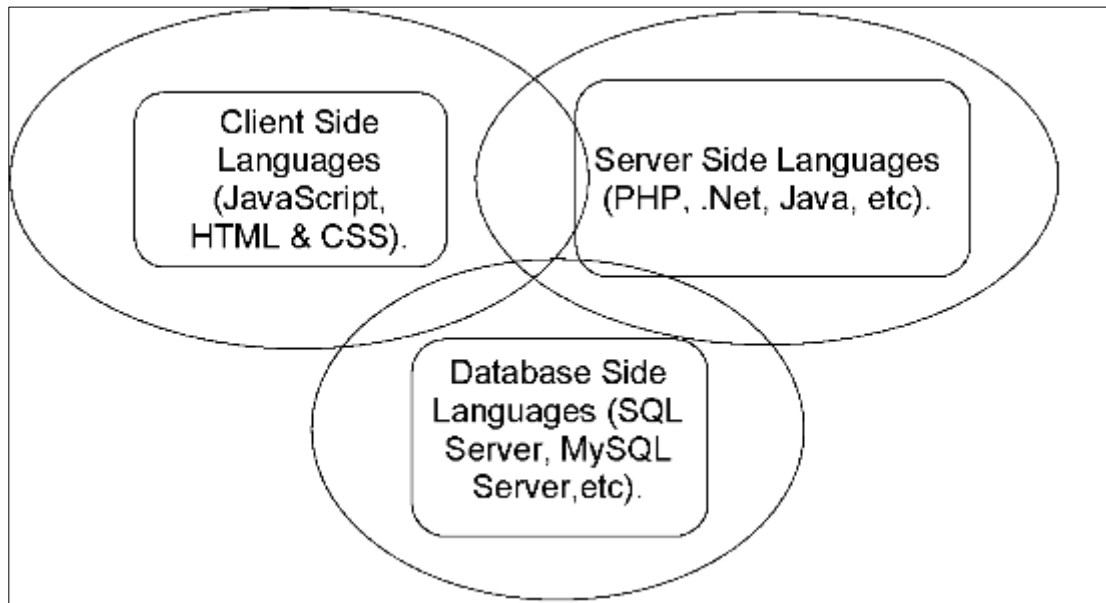
Web Development refers to the creating, building, and maintaining of websites [1]. It includes aspects such as web design, web publishing, web programming, and database management [1]. The web development industry categorizes developers into two primary roles: Front-End Developers, specializing in client-side technologies, and Back-End Developers, focusing on server-side functionalities [2]. Front-end developers are required to have knowledge of HTML (Hyper Text Markup Language), CSS (Cascading Style Sheet) and Programming Language i.e. JavaScript [3]. Backend developers are responsible for implementing the server-side logic of web applications, utilizing programming languages such as PHP, .NET, and Java [4]. These languages enable developers to handle data processing, database interactions, and the overall functionality that supports the client-side interface [4].

Full Stack developers possess versatile expertise, capable of handling both front-end and back-end tasks seamlessly. Additionally, many Back-end developers are expected to acquire front-end development skills, while Front-end developers often need to familiarize themselves with back-end processes [2]. But this places an additional burden on developers to acquire a broader skill set. To become a Full Stack developer, one must gain proficiency in three key areas: Client-Side Languages (e.g., JavaScript, HTML, CSS), Server-Side Languages (e.g., PHP, .NET, Java, Ruby), and Database Management (e.g., SQL, MySQL, Oracle) [2]. In last, Once you finish writing the code and organizing the files that make up your website, you need to put it all online so people can find it [5].

\* Corresponding author: Purva Pathania.

### 1.1. Challenges

- **Bugs & Broken Codes:** One of the most common challenges in full stack web development is dealing with bugs and broken codes [6]. Oftentimes, incomplete scoping of project requirements leads to rushed development efforts, resulting in missing semicolons or misplaced blocks of code [6].
- **Stuck with Complicated New Technologies:** Learning new technologies in web development can be challenging due to the rapid pace of technological advancements and the vast array of tools available [7].



**Figure 1** WEB DEVELOPMENT

Developers often face difficulties in selecting the appropriate technologies for their projects, as the multitude of options can lead to confusion and decision fatigue [7]. Additionally, the constant evolution of frameworks and languages requires continuous learning and adaptation, which can be overwhelming for many professionals [7].

- **Premature Optimization:** This approach can lead to unnecessary complexity and may divert attention from more pressing development tasks. Donald Knuth famously stated, "Premature optimization is the root of all evil," highlighting the potential drawbacks of optimizing code without clear evidence of performance issues [8].
- **Too much or Less Abstraction:** Balancing abstraction levels in code presents challenges for developers, requiring careful consideration to avoid pitfalls such as reduced readability, increased cognitive load, performance overheads, and maintenance difficulties [9]. Moreover, the complexity of navigating new technologies, particularly in areas like database storage, underscores the need for effective stack developers. A recent survey highlights that increasing complexity and the rapid adoption of emerging technologies are significant concerns for IT teams, leading to notable skills gaps [10].
- **Compatibility Issues:** Different technologies may have varying syntax, libraries, and APIs. Ensuring compatibility between these components can be difficult, especially if they were developed independently without considering integration [2].
- **Data Interoperability:** When merging technologies, data often needs to be shared between different components. Incompatible data formats, data types, and protocols can make it challenging to transfer and process data seamlessly [2].
- **Maintenance & Support:** Maintenance of a website is like "*Behind The Scenes(BTS)*" of your website. Once you make your website live, major challenges begin [11]. Several issues like unresponsive web pages, security issues, low leading speeds, and performance problems occur after the launch [11].
- **Security:** Web security is one of the most pressing challenges faced by web developers owing to the increasing cases of cyber-attacks in the digital world. Some common cyber-attacks prominently deployed are access control, cross-site scripting, link injections, authentication breakdowns, and security misconfigurations [12]. Critical information and data are shared on web applications, ensuring high-security levels for keeping the data safe becomes imperative [12].

---

## 2. Conclusion

In conclusion, building successful and user-friendly websites and web applications requires a harmonious integration of front-end and back-end development. Front-end development focuses on creating user-facing elements, addressing challenges such as cross-browser compatibility, responsive design, performance optimization, accessibility, security, and crafting detailed user interfaces. To offer an effective and seamless web experience, both front-end and back-end technologies must collaborate. A variety of issues and obstacles that are crucial to the success of 2900 web applications are presented by back-end web development. To keep up with the changing requirements of the digital ecosystem, back-end engineers must adopt new technologies and regularly upgrade their abilities. The ability to successfully combine technologies is crucial for developing reliable and effective software systems, but doing so requires careful planning, open communication, and technical knowledge of the relevant technologies.

---

## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

---

## References

- [1] GeeksforGeeks, "Web Development," [Online]. Available: <https://www.geeksforgeeks.org/web-development/>. [Accessed: 26-Jan-2025].
- [2] OpenAI, ChatGPT (January 2025 version). Available: <https://chat.openai.com/>, Accessed: Jan. 25, 2025.
- [3] H. Shah and T. R. Soomro, "Node.js Challenges in Implementation," Global Journal of Computer Science and Technology: E Network, Web & Security, vol. 17, no. 2, June 2017. Global Journals Inc. (USA), Online ISSN: 0975-4172, Print ISSN: 0975-4350.
- [4] Wikipedia contributors. "Web development." Wikipedia, The Free Encyclopedia, 12 Jan. 2025
- [5] MDN Web Docs, "Introduction to Web Development," [Online]. Available: [https://developer.mozilla.org/en-US/docs/Learn/Getting\\_started\\_with\\_the\\_web](https://developer.mozilla.org/en-US/docs/Learn/Getting_started_with_the_web). [Accessed: 26-Jan-2025].
- [6] K. Iqbal and V. Hatkar, "Full Stack Web Development: Vision, Challenges and Future Scope," International Journal of Scientific Research in Engineering and Management (IJSREM), vol. 8, no. 4, Apr. 2024, DOI: 10.55041/IJSEM 30338.
- [7] Reddit, "What are the most important challenges in web development?" [Online]. Available: [https://www.reddit.com/r/webdev/comments/13mvgzj/what\\_are\\_the\\_most\\_important\\_challenges\\_in\\_web/?utm\\_source=chatgpt.com](https://www.reddit.com/r/webdev/comments/13mvgzj/what_are_the_most_important_challenges_in_web/?utm_source=chatgpt.com). [Accessed: 26-Jan-2025].
- [8] Stackify, "Why Premature Optimization is the Root of All Evil," [Online]. Available: <https://stackify.com/premature-optimization-evil/>. [Accessed: 26-Jan-2025].
- [9] Mccricardo, "Balancing Abstraction in Code," [Online]. Available: [en.wikipedia.org/wiki/Web\\_development.action/?utm\\_source=chatgpt.com](https://en.wikipedia.org/wiki/Web_development.action/?utm_source=chatgpt.com). [Accessed: 26-Jan-2025].
- [10] BusinessWire, "A rise in database complexity and the drive for faster development is leading to significant skills gaps for IT teams in 2024," [Online]. Available: [https://www.businesswire.com/news/home/20240123819144/en/A-rise-in-database-complexity-and-the-drive-for-faster-development-is-leading-to-significant-skills-gaps-for-IT-teams-in-2024?utm\\_source=chatgpt.com](https://www.businesswire.com/news/home/20240123819144/en/A-rise-in-database-complexity-and-the-drive-for-faster-development-is-leading-to-significant-skills-gaps-for-IT-teams-in-2024?utm_source=chatgpt.com). [Accessed: 26-Jan-2025].
- [11] Simform, "Top 9 Challenges in Web Development and How to Overcome Them," [Online]. Available: <http://simform.com/blog/web-development-challenges/>. [Accessed: 26-Jan-2025].
- [12] Turing.com, "Web Application Development: Everything You Need to Know," [Online]. Available: <https://www.turing.com/kb/web-app-development-everything-you-need-to-know>. [Accessed: 26-Jan-2025] <https://mccricardo.com/balancing-abstr>