

Chapter 1

The Emergence of Web 3 and Its Core Building Blocks: Understanding the Third Iteration of the Internet

Shailey Singh

BUK technology, USA & Symbiosis International University (Deemed), India

ABSTRACT

This chapter delves into the core building blocks of Web3, the transformative phase of the internet characterized by decentralized and user-centric digital ecosystems. It explores the ethos of Web3, emphasizing openness, transparency, trustlessness, and user empowerment. The chapter examines blockchain technology for secure transactions, smart contracts revolutionizing agreements, and cryptocurrencies facilitating peer-to-peer value transfer. It discusses decentralized finance (DeFi) as a transformative building block and explores decentralized applications (DApps) and non-fungible tokens (NFTs) for creating user-centric platforms. The importance of interoperability along with governance mechanisms like decentralized autonomous organizations (DAOs) is highlighted. The chapter concludes by envisioning the interconnectedness between Web3 and the metaverse, where virtual and physical realities merge. Overall, it provides a comprehensive overview of Web3's emergence and its transformative impact on decentralization, transparency, and user empowerment.

INTRODUCTION

The internet has undergone several transformative phases since its inception, revolutionizing the way we access information, connect with others, and participate in digital interactions. From its guarded beginnings as a tool exclusively available to governments and military projects, the internet has gradually transitioned into an accessible platform that empowers individuals across the globe. Today the web has become an indispensable resource in various aspects of our lives, ranging from education and employment to government services, commerce, healthcare, recreation, and beyond (Powell & Clarke, 2002). It

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serves as a vast network of interconnected hypertext documents that are accessed through the multiple devices. By utilizing a web browser, users can seamlessly explore web pages that feature diverse content, including text, images, videos, and other multimedia elements. With the incorporation of cutting-edge technology over the last three decades, the internet has redefined how humans utilize the internet to organize, communicate, and collaborate with one another (Musiał & Kazienko 2013).

With time, the internet has evolved creating new paradigm shifts. This chapter explores the emergence of web 3 and its core building blocks. The first section takes the reader through the journey of web evolution, examining the challenges of web 2 and how web 3 addresses these challenges. The later sections discuss the fundamental concepts of web 3, its guiding principles, and the technological enablers. This will help readers gain insights into the potential impact of web 3 on various aspects of our lives, economy, and the internet ecosystem as a whole. By the end of this chapter, readers will be equipped with a solid understanding of web 3, enabling them to navigate the evolving digital landscape and leverage its concepts for personal and professional pursuits.

THE EMERGENCE OF WEB 3

World Wide Web

Sir Tim Berners-Lee, invented the world wide web in 1989, at CERN (The European Organisation for Nuclear Research) in Geneva, Switzerland. While working at CERN, he was realized the hurdles which the scientists encountered in sharing, communicating and collaborating. Different computer systems and networks had their own isolated methods of storing and accessing data, making it difficult to share information across different platforms. Berners-Lee envisioned a solution that would enable seamless communication and information exchange across different computer systems. He proposed a system of interlinked documents that could be accessed through a network, creating a web of information that anyone could access and contribute to. This concept laid the foundation for the world wide web. Berners-Lee actively participated in directing the development of web standards (Bizner, Health & lee, 2011) including markup languages used to construct web pages. While in 1989, this work was intended to improve the CERN communication system and was intended for the usage of the scientific community, but Berners-Lee soon realized the idea could be applied globally and would benefit majority public at large. He open-sourced the web giving birth to the World Wide Web (Lee et.al, 2010).

Web 1

The initial phase of the internet, often referred to as web 1, introduced static web pages that provided limited user involvement. It was essentially a “read-only” web, where information was readily available, but interaction and participation were limited. Web 1 provided a gateway of access to vast amounts of information, revolutionizing the way we consumed knowledge and expanding the horizons of human potential (Jacksi & Abass, 2019). One of the most significant opportunities created by web 1 was the democratization of information. Prior to the widespread adoption of the internet, accessing knowledge often required significant resources and effort. Libraries, books, and physical archives were the primary sources of information, limiting access to a select few. However, with the advent of web 1, a wealth of information became available to anyone with an internet connection (Beniiche, et al., 2022).

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