

# Understanding the Evolution of the Internet: Web 1.0 to Web3.0, Web3 and Web 3+

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## Abstract:

The Internet has undergone numerous changes since its emergence in 1969 and has now become an indispensable aspect of modern life. With the introduction of the World Wide Web by Tim Berners-Lee, the Internet has transformed into a tool for sharing and accessing vast amounts of information. As the Internet evolves towards its third iteration, Web3+ offers a decentralized solution that empowers users and returns control over the Internet to them. With the rise of cryptocurrency and blockchain, Web3+ focuses on data ownership and protection, making the Internet more secure and fair for everyone. In this article, we will explore the differences between Web 1.0, Web 2.0, Web 3.0, Web3, and Web3+ and how they shape the future of the Internet.

## Keywords:

Web3.0, Web3, Web3+, Decentralization, Privacy, Protection, Trustless, Immutable, Independence, Interoperability

## 29.1 Introduction

The Internet, a network of interconnected computer systems that spans the globe, first emerged in 1969 and has undergone numerous technological and infrastructural changes since that time. Initially developed to share information, the Internet has since evolved into an indispensable aspect of modern life. The introduction of the World Wide Web by Tim Berners-Lee has been a significant factor in transforming the Internet into a tool for sharing and accessing vast amounts of information, including text pages, digital images, videos, and audio.

Sir Tim Berners-Lee is credited with inventing the World Wide Web or Web 1.0 in 1989. A graduate of Oxford University, Sir Tim invented the Web while at CERN, the European Particle Physics Laboratory. He wrote the first web client and server in 1990. He co-founded Inrupt.com, which utilizes, promotes, and assists in developing the open-source Solid platform. From a social perspective, Solid represents a shift from current data-control and monopolistic issues plaguing the World Wide Web towards Web 3.0, where users are empowered by their control over large amounts of private, shared, and public data<sup>3</sup>.

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<sup>2</sup> The article is written with the help of ChatGPT to enhance the writing style. ChatGPT also assisted the author in verification of some information.

<sup>3</sup> Solid aspires to give individuals control over their data by challenging traditional principles regarding the functioning of the web. It constitutes a technical advancement at the web layer, incorporating features that were not part of the original specifications such as a universal access control, global single sign-on, and a universal data API, enabling any application to store data in any storage location. Sir Tim is also the Director of the World Wide Web Consortium (W3C), a Web standards organization established in 1994, which aims to optimize the potential of the Web by developing interoperable technologies in the form of specifications, guidelines, software, and tools. Additionally, he serves as a Director of the World Wide Web Foundation, which was founded in 2009 to coordinate efforts to advance the potential of the Web for the benefit of humanity.

As the Internet evolves towards its third iteration or Web3.0, there has been much discussion and confusion surrounding the distinction between Web3.0 and Web 3. While the terms are frequently used interchangeably, they actually refer to distinct concepts. Web3 is a decentralized version of the Web that utilizes blockchain technology, while web 3.0 refers to Tim Berners-Lee's vision of a linked or semantic web. The Semantic Web is a concept introduced by Tim Berners-Lee that extends the World Wide Web to allow machines to understand the meaning and context of information on the Web. It aims to create a web of interconnected data, where data is machine-readable and can be easily linked, shared, and analyzed by computers and software agents. Our definition of Web3+ encompasses all possible implementations of Web3, including both blockchain technology and cryptocurrency. In this way, we are able to encompass the full range of possibilities for the future of Web3. Table 29.1 is a classification of the definitions.

**Table 29.1: Classification of Web 1.0, Web 2.0, Web 3.0, Web3 and Web3+**

Concept	Definition
Web 1.0	The original World Wide Web invented by Tim Berners-Lee in 1989.
Web 2.0	A term used to describe the shift from static web pages to dynamic and interactive web applications.
Web 3.0	Tim Berners-Lee's vision of a linked or semantic web, where data is machine-readable and interconnected.
Web3	A decentralized version of the Web that utilizes blockchain technology.
Web3+	Encompasses all possible implementations of Web3, including both blockchain technology and cryptocurrency.

The Semantic Web represents a more intelligent and structured web, where data has meaning and relationships, making it easier for computers to understand and process. This allows for more advanced applications such as personalized recommendations, data integration and analysis, and knowledge management<sup>4</sup>. With the emergence of cryptocurrency and blockchain, data ownership and protection have become the focus. In the discussions that follow, Web3 shall be a generic term that includes Web3+, unless we are specifically talking about the differences between Web3 and Web3+. An expanded definition and classification of Web1.0 to Web3+ including Web 2.x+ are given in a recent paper by Zheng and Lee (Zheng and Lee, 2023).

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<sup>4</sup> The technologies used in the Semantic Web include RDF, OWL, and SPARQL. These are very specific and technical concepts. RDF (Resource Description Framework) is a standard model for representing information on the web. It's a data model that describes resources, relationships between resources, and their attributes. The RDF format allows for the representation of metadata about a resource and enables interoperability and sharing of data between applications.

OWL (Web Ontology Language) is a language for creating and expressing knowledge representation in RDF. It provides a rich set of constructs for modeling complex relationships between resources, such as inheritance, classification, and restriction. OWL is used for creating ontologies, which are formal descriptions of a set of concepts within a domain, and their relationships.

SPARQL is a query language and protocol for RDF. It is used to retrieve information from RDF data sources, allowing developers to extract, manipulate and analyze RDF data. SPARQL provides a flexible way to query RDF data, including graph pattern matching, optional relationships, and aggregation

The evolution of the Internet has led to the emergence of Web3, a decentralized solution that empowers users and returns control over the Internet to them. With billions of internet users worldwide, the need for a better internet that protects privacy and data ownership has become increasingly pressing. The current centralized Internet is dominated by a few tech giants who control access rights, but Web3 offers a decentralized alternative that stores data across multiple nodes, making it immutable and secure. In the Web3 era, virtual economies and decentralized autonomous organizations (DAOs) based on blockchain smart contracts will become a fairer and sustainable alternative to the corporate system.

As reported by Hootsuite, in October 2022, 5.48 billion people were using the Internet, making up 68.6% of the world's population. This number continues to grow by around 4% each year. While the Internet provides convenience, it also takes away our privacy and control over our personal data. A handful of Internet companies have a monopoly on the market, dictating how we access information.

So, people have started seeking a better alternative, and Web3 has emerged as the most promising solution. Unlike the current centralized Internet, Web3 values decentralization, transferring control from corporations to the users who collectively own and manage the Internet.

In the Web3 era, data will be decentralized and securely stored across multiple nodes, providing immutability and inviolability. People will be granted the liberty to express themselves with protection for their privacy and security. A virtual economy is taking shape and will offer a sustainable platform for individuals to work, learn, and socialize, transcending the limitations of both time and space. Decentralized autonomous organizations (DAOs) constructed based on blockchain smart contracts are gradually evolving as a viable alternative to traditional corporate structures. It is a type of organization that operates on the blockchain network and is managed by smart contracts, rather than centralized management. A DAO is run by its members, who have voting rights and make decisions through a consensus mechanism, which is usually based on blockchain technology. This allows for a transparent and secure way of conducting operations, as all transactions are recorded on a public ledger. The aim of a DAO is to align the interests of its members and promote fairness, making it a decentralized alternative to traditional organizations. These DAOs harness the collective wisdom of their members and the benefits of crowdfunding to align the interests of individuals with those of organizations and guarantee fairness.

Web3 aspires to address many fundamental problems plaguing the current Internet. Before we delve deeper into the essence of Web3, it is necessary to examine the evolution of the Internet. The phases of the Internet defined by Eshita have been widely accepted in the technology industry. "Web1.0: Read-Only" refers to the early days of the Internet, where users could only access information and read online content but could not actively participate or contribute. "Web 2.0: Read-Write" saw the rise of social media and user-generated content, allowing users to interact with each other and contribute to online communities. "Web3.0: Read-Write-Own" represents the current trend towards a more decentralized and empowering Internet, where users have complete control over their data and online presence.

The idea behind Web3 is to return the power of the Internet to the users, who collectively own and operate it. Web3 is built on decentralized technology, such as blockchain, and prioritizes privacy, security, and ownership. Growing concerns over data privacy and the monopolistic power of some internet giants are driving this shift towards a more decentralized and user-centric Internet. The transition from Web1.0 (Read-Only) to Web2.0 (Read-Write) and finally to Web3 (Read-Write-Own) reflects the evolution of the Internet from a passive to a more active and empowering platform for users.

In conclusion, the phases of the Internet as defined by Eshita provide a useful framework for understanding the evolution and current state of the Internet. The trend towards Web3, with its focus on decentralization and empowering users, is gaining traction and could have a profound impact on how we interact and use the Internet.

## **29.2 The Evolution Of The Internet: Web1.0-Web2.0-Web3.0**

### **Web 1.0**

According to Wikipedia<sup>5</sup>, Tim Berners-Lee of the European Organization for Nuclear Research (CERN) invented the World Wide Web in 1989, now defined as the Web1.0. It is a system of information consisting of interlinked hypertexts accessible via the Internet. It is often referred to as the "Read-Only Web" due to its limited interactivity and functionality. The websites of this era were primarily information-based, consisting of static content and devoid of any interactive or design elements. The interaction was limited to hyperlinking and the ability to send text-based emails, with images unable to be uploaded or attached.

The World Wide Web was available to the public in 1991. Since then, it has been an essential tool for searching for information. Web 1.0 is mainly a one-way transmission of information by professional writers and journalists on static web pages. The activities of Internet users during this period were primarily about browsing web pages for information, with little commentary or content creation. Web 1.0 ran roughly from 1990 to 2004. Web 1.0 was primarily a content delivery network, providing users with access to information on websites where they passively consumed materials without the option of providing feedback in the form of comments, reviews, or other types of user-generated content. Despite the limited scope of Web 1.0 as a content delivery network (CDN), it still played a significant role in the growth of the Internet as it was a popular platform for hosting personal websites, usually through ISPs or free web hosting providers. This era was also marked by a charging model where users had to pay for each page they viewed, including directories that enabled them to find specific information. Netscape<sup>6</sup> and Yahoo<sup>7</sup> are representative of this period.

### **Web 2.0**

Darcy DiNucci (1999)<sup>8</sup> coined the term. A few internet companies controlled the content in Web1.0, so people began to question the credibility of information and seek opportunities to share content. In 2004, with the first Web 2.0 conference<sup>9</sup> started by Tim O'Reilly and the advent of social media platforms, Web 2.0 emerged. Web 2.0, commonly referred to as the second generation of the World Wide Web, has since become the dominant form of the Web. This iteration of the Web is characterized by increased user interaction, enabling the production of user-generated content and facilitating greater interactivity and usability for end-users.

The advent of Web 2.0 has given rise to numerous social media platforms, such as Facebook, Twitter, and YouTube, that allow users to upload content and receive feedback from other users. The widespread adoption of mobile devices, such as iPhones and Android smartphones, has also contributed to the popularity of Web 2.0 through the use of apps such as WhatsApp, Instagram, Uber, and Paytm.

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<sup>5</sup> World Wide Web, [https://en.wikipedia.org/wiki/World\\_Wide\\_Web](https://en.wikipedia.org/wiki/World_Wide_Web)

<sup>6</sup> Netscape is a browser service provider.

<sup>7</sup> Yahoo provides a web portal and related services, and advertising platform.

<sup>8</sup> Fragmented Future, [http://darcy.com/fragmented\\_future.pdf](http://darcy.com/fragmented_future.pdf)

<sup>9</sup> , [https://en.wikipedia.org/wiki/Web\\_2.0\\_Summit](https://en.wikipedia.org/wiki/Web_2.0_Summit)

The growth in the number of users and the increase in user-generated content has led to the transformation of the Web from a mode of communication and information gathering to a platform for software applications and e-commerce. As a result, Web 2.0 has become known as the "web as a platform".

It is the Internet where we are now. Internet technology companies offered better software and services than open protocols. Users started to move away from open protocols such as the World Wide Web to centralized service platforms that could provide free services. Since Web 2.0 companies can own and share user-generated content, they empower users to interact with each other by posting, liking, commenting, and other actions. Users are both creators and consumers of content in the era.

### **Web 3.0, Web3 and Web3+**

Tim Berners-Lee, the father of the World Wide Web, first expressed his vision of the Semantic Web in 1999<sup>10</sup>. He hopes the Web can analyze all the data on the Web. Tim Berners-Lee described the Semantic Web as a component of Web 3.0 in 2006<sup>11</sup>. Web 3.0, also referred to as the Semantic Web or the Read-Write-Execute web, is the next generation of the World Wide Web. It seeks to leverage artificial intelligence to make the Internet more intelligent, focusing on linking data across different platforms. This effort is guided by the World Wide Web Consortium (W3C) standards.

The term "Semantic Web" was first coined by Tim Berners-Lee, who envisioned a future where machines could communicate seamlessly, creating "intelligent agents" to handle various aspects of daily life. Currently, online platforms operate as information silos, with data uploaded on one platform not automatically updating on another. The goal of the Semantic Web is to create interconnectivity between these platforms, reducing the need for redundant information uploads.

Tim Berners-Lee and Ching-man Au Yeung (2009) proposed the creation of decentralized social networks that would allow users to control their data. The paper emphasizes giving users privacy and allowing them to decide whom to share information with. It also proposes storing information on a server or local computer that the user trusts, giving the user ownership of the data. It also mentions using URIs as the users' internet identity, connecting data to applications. However, Tim Berners-Lee's proposal lacked an incentive for all parties and was not adopted by the Web 2.0 Internet giants. Also, while the idea of extending the exchange of information to the ownership of data, the idea does not cover the possibility of exchanging value across the World Wide Web. There was a lack of new technology that empowers users to exchange data or value freely without the interference or control of a trusted third party. Users will still have to rely on a platform or a third party if an exchange of value occurs.

According to Lo Swee Won, Wang Yu, David Lee Kuo Chuen (2021), the concept of blockchain first appeared in 2008 in a white paper<sup>12</sup> published by Satoshi Nakamoto. which proposed that value could be transmitted directly from peer to peer without relying on uncontrollable trusted third parties. Before Bitcoin, it had never been realized because without a trusted central authority to oversee transactions, and there was no practical way to thwart three acts by malicious users: spending without authorization, spending without having enough balance, and double-spending. Bitcoin and blockchain laid the groundwork for the creation of Ethereum with smart contracts.

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<sup>10</sup> [https://en.wikipedia.org/wiki/Semantic\\_Web#cite\\_note-22](https://en.wikipedia.org/wiki/Semantic_Web#cite_note-22)

<sup>11</sup> <https://www.nytimes.com/2006/05/23/technology/23iht-web.html>

<sup>12</sup> Bitcoin: A Peer-to-Peer Electronic Cash System, <https://bitcoin.org/bitcoin.pdf>

Shortly after launching Ethereum in 2014, co-founder Dr Gavin Wood offered a different definition of Web 3.0<sup>13</sup> to Tim Berners - Lee. He advocated using blockchain to record public information, protect personal privacy and eliminate the need for trusted third parties with smart contracts. This is the first design to combine blockchain with the Internet and is the definition of Web 3.0 accepted by the crypto industry. Industry builders and the media use the acronym "Web3" for convenience.

Tim Berners-Lee's and Gavin Wood's visions for a better Internet have many similarities, but the means to achieve them are fundamentally different<sup>14</sup>. Web3 aims to restore control over personal data from Web 2.0 corporations to the users through decentralized storage, blockchain technology, and community-based self-sovereign identity. The user will have the ultimate authority on who has access to their data. The implementation of Web3, which aims to empower users with data ownership, has been facilitated by the utilization of cryptocurrency wallets such as MetaMask. These wallets serve as a means for users to store their keys and secure their digital identities. Users have complete control by logging in to various blockchain applications through their crypto wallet. They control who has access to their data, a marked difference from the centralized control exercised by Web 2.0 giants. This approach to accessing and managing data is comparable to using a Facebook account, with the crucial distinction that users retain full ownership and control over their information.

The semantic Web, also referred to as Web 3.0, aims to improve efficiency and intelligence by connecting data across websites. In contrast, the decentralized Web 3.0, also defined as Web3 uses distributed ledger technology or blockchain, and prioritizes security and user control by giving them ownership of their data and identity. Our definition of Web3+ encompasses all possible implementations of Web3, including both blockchain technology and cryptocurrency. In this way, we are able to encompass the full range of possibilities for the future of Web3.

Web 3.0 uses the solid pod to store user data and assign unique WebIDs for user identity. This Solid Pod serves as a centralized repository for the user's personal data. Each Solid user has their individual Solid Pod, which is stored on a decentralized network of servers. The data stored in a user's Solid Pod is unique to that individual and is not copied or replicated in any other Solid Pods. The data stored in a Solid Pod can be amended or updated by its owner. A hacker can potentially amend a person's data stored in a Solid Pod if they can gain unauthorized access to the user's account. It may not be possible to determine conclusively that a particular change was made by a hacker, as opposed to the user themselves or someone else with legitimate access to the data. Meanwhile, in the blockchain-based web3, users store their data immutable and securely in a cryptocurrency wallet accessible through private keys.

Both approaches employ different technologies for data security. Web 3.0 uses technologies like RDF, SPARQL, OWL, and SKOS for data interchange, while Web3 relies on blockchain technology. Data in Web3 is secured due to its decentralized nature and difficulty in modifying or deleting data stored across multiple nodes. In contrast, data in the solid pod is stored at a single pod and can be altered more easily. Additionally, the keys stored in crypto wallets give users access to decentralized data stored on the blockchain.

Tim Berners-Lee is still doubtful if blockchain and cryptocurrency will be the solution. So, the two definitions of Web 3.0 are fundamentally different. We only focus on the Web3 proposed

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<sup>13</sup> DApps: What Web 3.0 Looks Like, <https://gavwood.com/dappsweb3.html>

<sup>14</sup> Web3 Vd Web3.0: How ar they different. <https://www.leewayhertz.com/web3-vs-web3-0/#:~:text=keep%20and%20manage,-Difference%20between%20web3%20and%20web%203.0,data%20and%20identity%20to%20users.>

by Gavin Wood in this article, which is widely discussed by the crypto industry. 2021 has seen a surge of interest and discussion about Web3, fuelled by investment companies and the cryptocurrency bull market.

### Web3 and Web3+ Technology

In fact, whenever Web3 is mentioned, it is more about underlying crypto technology and infrastructure than the Web itself. Ethereum.org argues that Web3 uses blockchains, cryptocurrencies, and NFTs to give power back to the users in the form of ownership.<sup>15</sup>

Not Boring Capital's Packy McCormick describes Web3, an internet owned by the users and builders, orchestrated with tokens.<sup>16</sup>

Sam Gilbert, the Affiliated Researcher from the Bennett Institute for Public Policy at the University of Cambridge, defines Web3 as the next iteration of the Web's technical, legal, and payments infrastructure.<sup>17</sup>

Yao Qian, Director of the Science and Technology Supervision Bureau of the CSRC, described We3 as an Internet infrastructure owned and trusted by users and builders, a secure and trusted Internet stored value, a new economic system built and shared by users and builders, and a three-dimensional intelligent holographic Internet.<sup>18</sup> Table 2 shows the characteristics of Web3 and Web3+ technology.

**Table 29.2: Characteristics of Web3 and Web3+ Technology**

Decentralization	Ownership is shared between builders and users, and data storage is decentralized.
Privacy Protection	Users have a right to privacy. The application's access to user information requires authorization.
Permissionless	Everyone can participate in Web3 equally and will not be excluded.
Trustless	Blockchain-based consensus mechanism.
Immutable	Data recorded on the blockchain cannot be modified and is trustworthy.
Independence	Each node can carry out its activities independently, without influence and control from third parties.
Interoperability	Different protocols and blockchains can be used to make innovations.
Native Tokens*	Users use native tokens for spending and incentives rather than traditional currencies and payment systems.

\* Web3 does not have tokens or coins, but Web3+ will incorporate them.

According to grayscale<sup>19</sup>, the Web 2.0 mobile internet changed how, where, when, and why we used the Internet. This changed the products, services, and companies we used, changing business models, culture, and politics. The Web 3 Metaverse has the potential to do the same. Web3+ encompasses the complete spectrum of Web3 implementations, including both blockchain technology and cryptocurrency. This enables us to fully realize the potential of Web3's future

<sup>15</sup> Introduction to Web3, <https://ethereum.org/en/web3/>

<sup>16</sup> Own the Internet, <https://www.notboring.co/p/own-the-internet>

<sup>17</sup> Policymakers, web3, and the metaverse, <https://www.bennettinstitute.cam.ac.uk/blog/policymakers-web3-and-metaverse/>

<sup>18</sup> Web3.0 渐行渐近的新一代互联网 <https://wallstreetcn.com/articles/3654655>

<sup>19</sup> [https://grayscale.com/wp-content/uploads/2021/11/Grayscale\\_Metaverse\\_Report\\_Nov2021.pdf](https://grayscale.com/wp-content/uploads/2021/11/Grayscale_Metaverse_Report_Nov2021.pdf)

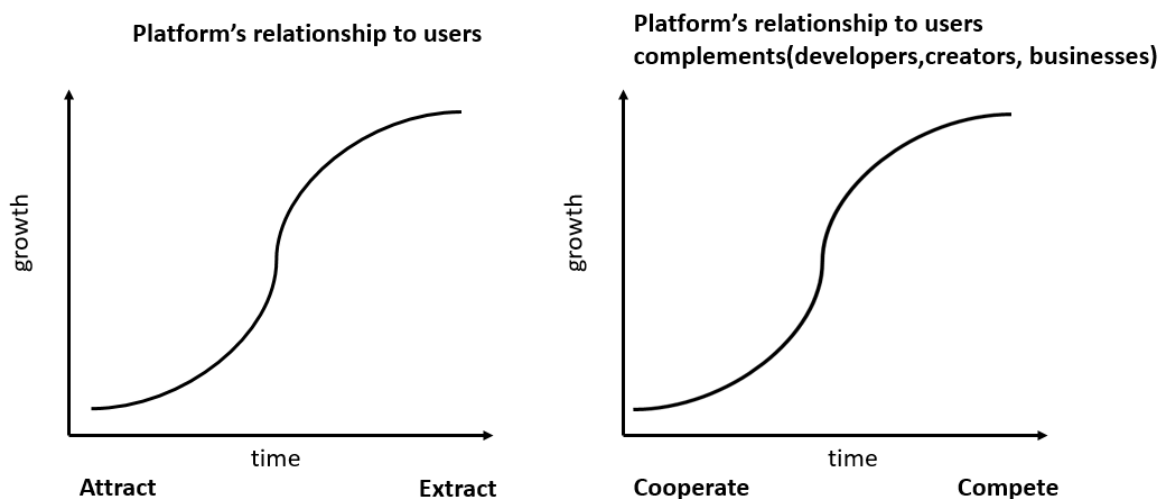
## 29.3 Why Web3+?

In the Web 2.0 era, users have sacrificed many of their rights for the sake of convenience. Companies use algorithms to exploit personal data and generate profits through targeted advertising and content. The risk of spreading false information is a real concern, and users are left without a share in the profits and a loss of privacy. Content creators are also at risk, facing the possibility of having their works deleted or blocked, making it difficult for them to profit from their creations. The centralization of servers makes them easy targets for attack. The isolation of platforms requires users to continuously create new identities, leaving them without ownership of their online presence. Moreover, the domination of companies stifles innovation and hinders the growth of start-ups. These giants have the resources to dominate the market, forcing smaller companies to either be absorbed or struggle to survive.

The growth of companies is also not conducive to innovation. These giants will use resources to suppress start-ups and change how the market plays out. Smaller companies will either choose to be acquired or struggle against the giants.

Chris Dixon <sup>20</sup> uses the following diagram to foreshadow the irreconcilable contradictions between the platform, its users, and ecological players during its life cycle.

**Figure 29.1: Platform Relations with Users and Users' Partners**



Source: Chris Dixon. Retrieve from <https://future.com/why-web3-matters/>

In the initial growth phase, centralized platforms bring on personnel and associates to offer top-notch services and incentivize users with subsidies. As their market dominance grows, the platform gains greater control over users and complements. At the top of the S-curve, the relationship between the centralized platform and the eco-participants changes from positive to zero-sum. The easiest way for them to grow at this point is to monetize user data and compete with the complements for profits. This change from cooperation to competition acts as bait for the complements. Some entrepreneurs, developers, and investors are considering better solutions.

### 29.3.1 Ownership

<sup>20</sup> Why Web3 matters, <https://future.com/why-web3-matters/>



NFT, or non-fungible token is a digital asset stored on the blockchain. The term "token" and its creation through smart contracts make Web3+ distinct and unique. Because of its non-fungible nature, it can be used as a digital certificate to confirm the ownership of users. Artwork, music, film, television, and even real-world assets such as real estate can be tokenized as NFT to ensure the ownership is public, verifiable, and immutable. Of course, Web3+ may also has native coins and/or fungible tokens as a vehicle for transfer of value.

Game developers have the authority to regulate their games, alter characters and ban player accounts. If the developer goes bankrupt, the characters and equipment players have invested time and effort in will be lost as players only have a temporary right to use them, not ownership. In contrast, Web3 games give players control of their characters and equipment as NFTs, which the game developer cannot modify or revoke.

The transferability of characters and equipment between games is a vital aspect of gaming, especially in a rapidly changing market. With blockchain technology, players can securely transfer their virtual assets to other games. This opens up new revenue streams as they can sell their in-game assets to other players. Players can also move their assets to new games without fear of loss if the original game requires updates or the developer shuts down. Blockchain technology in gaming offers unprecedented security and ownership, making it a thrilling time for players and investors.

### **29.3.2 Privacy**

It is a well-known fact that companies read user data for financial gain and that people give up their privacy for the convenience of the service. Web3 aims to protect users' privacy. Web3's applications prioritize user privacy and security, as they must first obtain permission before accessing personal data. The technology allows users to create anonymous addresses, making it nearly impossible for third parties to identify them. Web3's blockchain also protects the privacy of users' assets, as transactions can be conducted privately using privacy coins like Zcash<sup>21</sup>, concealing the amount and recipient of transfers. Zero-knowledge-proof technology enables users to prove their eligibility as investors without revealing their account balances. This level of privacy and security starkly contrasts traditional financial institutions, where users' property and personal information may be vulnerable to being viewed by account managers.

### **29.3.3 Censorship Resistance**

With the rise of Web3, users can regain control over their digital presence and assets. Unlike traditional Web 2.0 companies, the Web3 ecosystem operates in a decentralized, community-driven environment where users are free from the constraints of platform-imposed rules and regulations. In contrast to centralized social media platforms, such as Twitter, Facebook, and YouTube, where content can be censored, and removed or an account can be shut down without warning, Web3's decentralized platform ensures that users' content and identities are protected. With the use of NFTs and decentralized storage solutions, such as Arweave<sup>22</sup>, users can ensure the persistence of their digital assets and presence.

Web3 represents a shift from the centralized and regulated Web 2.0 platforms to a more open, secure, and user-driven digital landscape. With its blockchain technology, Web3 eliminates the risk of single points of failure and offers enhanced security and privacy for users' digital assets.

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<sup>21</sup> Zcash is a cryptocurrency that emphasizes privacy and anonymity. It uses zero-knowledge proof technology to allow nodes to verify transactions without revealing sensitive information.

<sup>22</sup> Arweave is a decentralized storage network that aims to offer indefinite storage of data.

In the Web3 ecosystem, validators are incentivized to maintain the integrity of the network through consensus mechanisms. This decentralized network of validators, spread across the world, ensures the security and stability of the Web3 platform. Additionally, smart contracts on the blockchain provide a tamper-proof and transparent mechanism for executing transactions and agreements, creating a secure and trustless environment for users.

#### **29.3.4 Decentralized Identity**

Different regions have different types of ID cards, making it difficult to verify the legitimacy of non-conventional ID cards. ID cards can easily be used for illegal purposes if lost or stolen. World Bank <sup>23</sup>states that 1 billion people do not have basic identity documents as of 2018.

Internet users have to create a new account for each traditional application. Actions taken on one app cannot be automatically synced to another app. Some applications allow users to sign in with a generic account, such as Google Account<sup>24</sup> but collect user data.

In Web3, users can sign transactions with one private key<sup>25</sup> and prove they are the right users in multiple protocols. Users can use a decentralized identity such as a wallet address, or domain name services to log in to various protocols. The decentralized identities of Web3 are anonymous and permissionless. Users can create multiple decentralized identities. The immutability of transaction history in the decentralized identity system of Web3 provides a clear record of a user's actions and interactions on the platform. This information can be used to build reputation, which can be leveraged to unlock new opportunities. For instance, users with a strong reputation on the platform may have access to gated applications that are restricted to only the most trusted users.

Moreover, the reputation system on Web3 can also act as a mechanism for unexpected airdrops and rewards. Users who build a positive reputation by consistently following best practices and contributing to the protocols may be eligible for bonuses, such as airdrops, participating projects and applications.

In conclusion, the decentralized identity system of Web3, combined with the unmodifiable transaction history, provides a secure and transparent way for users to build a reputation, access new opportunities, and receive rewards on the platform.

#### **29.3.4 Decentralized Autonomous Organization**

A Decentralized Autonomous Organization (DAO) is a revolutionary organizational model that embodies the decentralized spirit of Web3. DAOs are run by smart contracts that enforce voting results, providing a transparent and fair system for decision-making. This new governance model is truly democratic, as all users and contributors are also investors and owners in the organization. The alignment of interests between all parties creates a highly motivated community where talent can flourish, and bureaucracy is minimized. The flat structure of DAOs enables talented individuals to shine and makes it easier for them to

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<sup>23</sup> Why ID matters for development, <https://id4d.worldbank.org/guide/why-id-matters-development#:~:text=As%20of%202018%2C%20the%20ID4D,not%20have%20basic%20identity%20documents>

<sup>24</sup> An account with Google is used for access, authentication, and authorization to certain Google services and to sign on to third-party websites.

<sup>25</sup> A private key consists of an enormous, randomly generated number with hundreds of digits to sign prove ownership and transactions.

contribute to the organization's success. With the rise of Web3 and DAOs, traditional centralized organizations are facing a new era of competition and disruption.

### **29.3.5 Interoperability And Composability Lead To Innovation**

The interoperability and composability of the blockchain open up endless possibilities for innovation in Web3 products. Each Web3 open-source product is a Lego block that can be used and redeveloped.

For example, Huddle01<sup>26</sup> is a decentralized Zoom, providing live streaming via Livepeer and meeting recordings on IPFS; Klima DAO <sup>27</sup>introduces DeFi to low carbon, issuing green bonds to buy carbon credits and boosting the carbon price as incentives for companies to invest in more environmentally friendly projects; Mirror<sup>28</sup> is a decentralized writing and fundraising platform, tokenizes content as NFTs that are permanently stored in the Arweave.

The blockchain technology that powers Web3 is designed to run 24/7, providing a reliable and robust infrastructure for a wide range of applications and use cases. This platform is also accessible to developers worldwide, who can collaborate and contribute to creating new and innovative products. The open and decentralized nature of Web3 creates a vibrant ecosystem where ideas can be shared, developed, and brought to market faster.

The flywheel of Web3 innovation is gathering momentum, with developers and users working together to bring new and meaningful products to market. This collaboration drives rapid advancements in finance, gaming, and social media. The decentralized model of Web3 allows for creating new business models and user experiences that are not possible on traditional centralized platforms.

In the future, Web3 will continue to make a massive impact, as the decentralized platform and its growing community of developers and users drive innovation forward. The Web3 platform has the potential to revolutionize many aspects of our digital lives and create a more equitable and open world for everyone.

### **29.3.6 Cryptocurrencies Make Web3 A Reality**

Despite the widespread adoption of digital financial tools, many people worldwide still do not have access to traditional banking services. The traditional financial system can hinder economic opportunity and growth for these individuals.

All stablecoins or stable tokens need a cryptocurrency-powered infrastructure to function. A stablecoin is native to the blockchain, while a smart contract creates a stable token in the contract account. In the latter, the stable tokens reside on a cryptocurrency blockchain. Examples are USDT and USDC. Suppose the coin resides in a permissioned public blockchain or a private blockchain. In that case, social scalability is a significant problem, with many difficulties crossing borders. Cryptocurrencies offer a solution to this problem, as they allow for the free circulation of currencies without the need for trusted third parties in other jurisdictions. This decentralization creates a more inclusive financial system not beholden to the whims of governments or other centralized entities. For example, in regions where traditional financial services are restricted, such as through economic sanctions, cryptocurrencies can provide a lifeline for individuals and businesses.

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<sup>26</sup> <https://www.huddle01.com/>

<sup>27</sup> <https://docs.klimadao.finance/>

<sup>28</sup> <https://mirror.xyz/>

Furthermore, cryptocurrencies offer a level of financial freedom that is impossible in traditional systems. With cryptocurrencies, users can transact freely without worrying about government restrictions or bank policies. This creates a new level of financial freedom and opens up opportunities for individuals and businesses worldwide.

In conclusion, the decentralization of cryptocurrencies is a step toward a more inclusive and free financial system where all individuals can access the financial tools they need to achieve economic success.

Seeing all the problems, Tim Berners-Lee led the SOLID <sup>29</sup>project in 2015, letting users securely store their data in decentralized data stores with improved privacy. Tim Berners-Lee launched The Contract for the Web<sup>30</sup> in 2019 to save the Web from political manipulation, fake news, privacy violations, and other malign forces that threaten to plunge the world into a “digital dystopia.” More than 150 companies, including Google, Microsoft, and Facebook, backed this project. However, Tim Berners-Lee called for Facebook to cease the dissemination of targeted political advertisements after the contract was signed. The absence of a compelling incentive makes it challenging for these massive internet companies to transform themselves, and they often sign the contract merely for image enhancement purposes.

The consensus based on cryptocurrencies would make Tim Berners-Lee's ideal possible. Cryptocurrency is an essential part of the coordination between the parties. The more the organization grows, the more valuable the token will be.

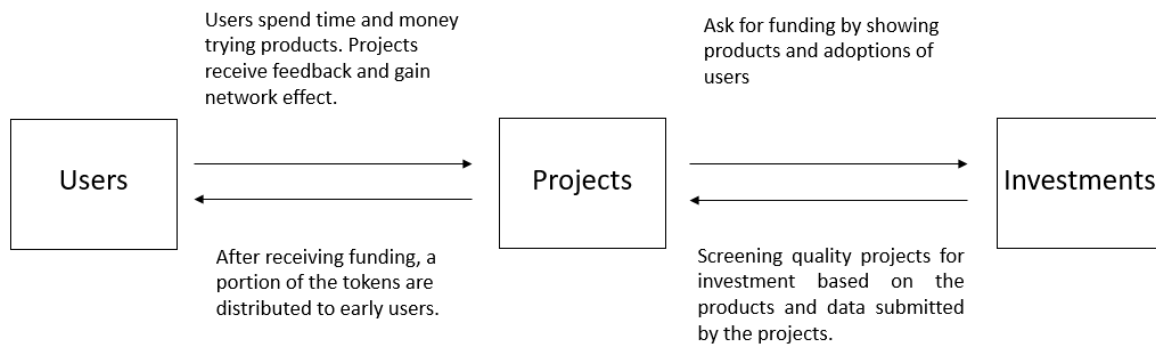
The cryptocurrencies also provided an airdrop mechanism unique to Web3+. When a Web3+ project is launched, there is no money to subsidize users to use the product. Users spend their own time and money to experience the product. Based on users' feedback, the project upgrades the product before raising funds. After checking the products and data submitted by the project, investment institutions find good potential projects. Once the project has received funding, tokens are issued to reward early users. Early users can use the token to participate in DAO governance. Entrepreneurs and investors looking for better Internet will support this blockchain-based solution, which coordinates all parties at a lower cost. The development of Web3+ no longer depends on the reforms of the Web 2.0 giants. Web3+ projects can directly reform Web 2.0 companies.

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<sup>29</sup> Solid (web decentralization project), [https://en.wikipedia.org/wiki/Solid\\_\(web\\_decentralization\\_project\)](https://en.wikipedia.org/wiki/Solid_(web_decentralization_project))

<sup>30</sup> Tim Berners-Lee unveils global plan to save the web, <https://www.theguardian.com/technology/2019/nov/24/tim-berners-lee-unveils-global-plan-to-save-the-internet>

**Figure 29.2: "The Airdrop Mechanism of Web3+: A Solution for Decentralized Governance and Investment in the Future Web"**



In the Web3 world, people can earn a living through the skills they enjoy and excel in, working with like-minded partners to create refreshing products and enjoy more fulfilling and meaningful lives freely and equally.

Next, let us look at some of the classic applications and use cases that Web3 has brought to us.

## 29.4 Web3 Use Case

### 29.4.1 Lens Protocol

Web 2.0 social networks such as Facebook, Twitter, and YouTube read data from centralized databases. Each of these social platforms owns and controls the profile, network of relationships, and content of its users. As a result, each social platform competes with others for users' attention, leading to a fierce zero-sum game.

According to Lens Protocol's documents<sup>31</sup>, it aims to solve these problems with existing social media networks. As a Web3 social graph, Lens Protocol connects creators to the community, creating a fully interoperable, user-owned social media network.

Lens Protocol gives users ownership through NFT. Only whitelisted addresses can mint profile NFTs, effectively preventing Sybil Attacks. Every single address can have one or more profile NFTs. The difference between Lens Protocol's profile NFTs and other decentralized on-chain identities is that they can post content. A user's profile NFT contains all the content they have created, including posts, retweets, comments, and other forms of content. In addition, profile NFTs have a Follow module. Each Follow NFT has a unique Token ID, which is incremented according to the order. Using the Token ID, DAO can easily filter out early supporters and give them additional benefits.

Users can use their data on any application built on Lens Protocol. Content creators no longer worry about losing their content or followers, as they are content owners through NFT. In addition, Lens Protocol is modular, allowing new features to be added as needed. Moreover, each application built on Lens Protocol can collaborate to facilitate the development of the entire ecosystem and is no longer just a zero-sum game. As a result, developers can focus on designing meaningful social experiences rather than just user growth.

<sup>31</sup> <https://docs.lens.xyz/docs>

There are already several applications within the Lens ecosystem worthy of our attention. Lenster<sup>32</sup>, a decentralized social media, can potentially be a competitor to Twitter in the future; Lenstube<sup>33</sup> offers decentralized, open-source video sharing, and TeaParty<sup>34</sup> is a social credit protocol that offers an innovative way of promoting advertising. However, Lens Protocol is still in the early stages of development, and users still need to be more active. Some applications built on Lens Protocol offer similar functionality.

### 29.4.2 Safe

Traditional banks need to be more transparent and sometimes even freeze depositors' funds. Although people can use crypto wallets to take charge of their assets, the funds in the wallet can be hazardous if the seed phrase is not kept well. It is also unsafe if the treasury of a DAO or organization is in the hands of an employee. The employee could run away with the money, or the funds could be permanently lost because the seed phrase was leaked.

Safe<sup>35</sup> is a smart contract wallet that operates on multiple blockchains and requires a specified number of signatures before a transaction will be executed. Assuming a business has three partners, it can be set up so that funds in the wallet require two or three signatures to transact. By having multiple signatures, the funds can be protected from being misappropriated by individuals. Table 3 shows the comparison between Safe with other digital asset storage systems.

**Table 29.3: "Comparison of Safe Smart Contract Wallet with Other Digital Asset Storage Systems"**

#### Compare Storage Solutions

	Safe	Software Wallet	Hardware Wallet	Centralised Exchange
Muti-Signature	√	X	X	X
DeFi Integrations	√	√	X	X
Privacy	√	√	√	X
Collecibles(NFTs)	√	√	X	X
Gasless Signatures	√	-	-	-
Open-Source	√	√	X	X
Formaly Verified	√	X	X	X

*Source: Safe. Retrieve from <https://help.gnosis-safe.io/en/articles/3876456-what-is-gnosis-safe>*

Safe, which started as an internal tool, has evolved into a programmable ownership platform to provide secure management of digital assets, data, and identity for DAOs, institutional investors, and retail investors alike.

<sup>32</sup> <https://twitter.com/lensterxyz>

<sup>33</sup> <https://twitter.com/lenstubexyz>

<sup>34</sup> <https://twitter.com/teapartylife>

<sup>35</sup> <https://help.gnosis-safe.io/en/articles/3876456-what-is-gnosis-safe>

In addition, several applications and tools are built on top of Safe. For example, Coinshift<sup>36</sup> is an asset management protocol powered by Safe and Superfluid, a streaming payments protocol; Utopia<sup>37</sup> is a tool of DAO to streamline operations and payroll and consolidate financial reports; Linen Wallet<sup>38</sup> is a self-custodian wallet that does not require users to remember seed phrases. Safe is more than just an infrastructure for Web3. It builds an ecosystem for financial management.

### 29.4.3 Decentraland

The IPO of Roblox<sup>39</sup> and the rebranding of Facebook to Meta have made the 'metaverse' a hot topic. With improvements in infrastructure such as 5G, blockchain, VR, AR, and XR, we see the potential of the metaverse to become a reality. As the epidemic began, people worked from home and went out less, which increased the need for new online social activities.

Decentraland is the leader of the decentralized metaverse. Based on Decentraland's documents<sup>40</sup>, users can build, explore, and monetize the content and applications created on Decentraland. Creators own all virtual assets invented on Decentraland. The landowner can decide what is built on the land. Users can create static landscapes, real estate, or dynamic interactive systems such as games, courses, and concerts. The land is a non-fungible, transferable, scarce digital asset that can be purchased through the digital currency MANA. MANA can also be used to buy digital goods and services on Decentraland.

Decentraland is the first decentralized metaverse with a rich ecosystem that can be considered a 3D version of Taobao, Tik Tok, Vanke, etc. The following Table 4 is summarised based on AMA records of Decentraland with the Biteye community<sup>41</sup>.

**Table 29.4: "Overview of Decentraland: The Current Leader of the Decentralized Metaverse"**

Usage Scenarios	Presentation	Cases
Clothes	Decentraland gives designers a chance to stand out. As long as the products designed are popular, they can gain financial value by selling NFT. In the real world, designers may pay vast amounts of money to the platform to showcase their products.	Trendy brand RTFKT is famous for its virtual shoes. Can you imagine a pair of virtual shoes that can sell for tens of thousands of dollars?
Food	The metaverse is not just a virtual world. It is a way of life. It can facilitate services in our real life and broaden the scenario of using cryptocurrency.	A US-based team sells pizzas in the store of Decentraland and delivers them offline to buyers.

<sup>36</sup> <https://docs.coinshift.xyz/>

<sup>37</sup> <https://www.utopialabs.com/>

<sup>38</sup> <https://linen.app/>

<sup>39</sup> Roblox is an online game creation system and game platform. Its stocks are considered as the first stock related to metaverse.

<sup>40</sup> <https://docs.decentraland.org/player/>

<sup>41</sup> 元宇宙项目 AMA 系列之 Decentraland 文字实录, <https://link.medium.com/xcyV8ljeUvb>

Living	Players and creators can build virtual villas and flats on their land for use or sale.	The famous DJ 3LAU already has a villa of his own on Decentraland.
Travel	Traditional luxury cars such as Masarati and virtual car brands hold car shows or NFT car auctions.	Virtual cars can be used for travel in the metaverse.
Entertainment	Players can participate in crypto World Cups, fashion shows, entertainment venues, and bars. They can also play blockchain games and travel in a metaverse replicating the real landscape.	Renowned singer Paris Hilton played a concert at the inaugural Metaverse Festival.
Purchase	Decentraland offers a much more exciting shopping experience than 2D online shopping, a prototype for the future of metaverse e-commerce. The traditional auction giant Sotheby and the blockchain's famous gallery MP have hosted events on it.	Coca-Cola's first NFT piece was presented and sold on Decentraland.
Learning	Distance learning is the most common way for people to experience the metaverse. It allows people to receive a quality education all over the world.	Several courses in VR are offered on Decentraland.
Work	It doesn't matter where the users come from. As long as they share the same mission, they can work together. More and more companies are allowing their employees to work from home comfortably to save time on their commute. Decentraland even offers in-work positions such as virtual designers, tour guides and more.	Players can hold summits or internal team meetings on Decentraland.

Decentraland's next step will focus on growing mobile users, enhancing the VR immersive experience, lowering the barrier to login, and optimizing network performance. According to Grand View Research <sup>42</sup>, the global metaverse market is estimated to be \$38.85 billion in 2021, with an estimated compound annual growth rate of 39.4% from 2022 to 2030. Decentraland is a project worth experiencing and participating in.

#### 29.4.4 Axie Infinity

Gaming is a track that easily attracts users from Web 2.0 to Web3, as gamers are more receptive to new things and tired of centralized control.

Axie Infinity<sup>43</sup> is the most well-known blockchain game where players can adopt pets called Axie to fight for rewards and build kingdoms for the Axie they own. According to Axie Infinity's documents, virtual pets and lands can be traded on Ronin, an Ethereum sidechain. Players can choose to play against bots or other players. They can use the same account on different devices, such as Android and Apple.

<sup>42</sup> Metaverse Market Size, Share & Trends Analysis Report, <https://www.grandviewresearch.com/industry-analysis/metaverse-market-report>

<sup>43</sup> <https://whitepaper.axieinfinity.com/>



Axie Infinity has two fungible tokens, Axie Infinity Shards (AXS) and Smooth Love Potion (SLP), both of which can be used to raise pets. AXS is the governance token.

Axie Infinity makes the “Play to Earn<sup>44</sup>” model popular, enabling players to own and trade items acquired in the game. Those skilled in the game can spend time and effort to earn real financial rewards. The process of working as a gamer is relatively easy and enjoyable compared to other jobs. This “Play to Earn” model provided an additional source of income for people in developing countries and regions during the epidemic. It is an innovative way to match global resources and build social networks.

It is worth noting that while "Play to Earn" is an effective way to attract new players, this subsidy model is not sustainable. The next boom in blockchain gaming should be about providing a better gaming experience. After improving the user experience, blockchain gaming will fundamentally revolutionize the gaming industry. Blockchain games are more than just financial games.

### 29.4.5 Arpeggi

Wilton Gorske<sup>45</sup> sums up the need for artists seeking collaboration in the traditional music industry.

- Earn a high degree of trust for sharing unpublished works
- Pirate or pay to sample, remix, or reference other artists’ sounds
- Navigate opaque rights registries to track down multiple rights holders and ask for permission
- Receive legal clearances for the use of other artists’ work

Arpeggi <sup>46</sup>is a transparent, open-source collaborative Web3 music creation platform that aims to solve the above problems. With the help of Arpeggi, an artist's contribution is recorded on blockchain.

How does Arpeggi do it?

**Table 29.5: "The Solution of Arpeggi to Solve the Challenge of Collaboration in Traditional Music Industry"**

Sound Library	When a sound or song is uploaded to Arpeggi, the ARP protocol issues an NFT to the contributor to prove their ownership of the sound. Other artists can reuse every sound registered with Arpeggi.
Arpeggi Studio	It is a web-based version of a digital sound workstation where artists can compose, and launch music NFT.

Arpeggi has transformed 's music platform by collaboratively combining creation and consumption. Listeners can re-compose their favorite songs and share music that can be reused. While most Web3 projects currently focus on the creator economy, Arpeggi is

<sup>44</sup> “Play to Earn” is a model that allows players to play games while earning money by selling game equipment acquired from the competition.

<sup>45</sup> [https://mirror.xyz/arpeggi.eth/jkpMgDfGdKZGyM\\_PX0CNy5xmIqLOlwCkE5IIwOS8GnE](https://mirror.xyz/arpeggi.eth/jkpMgDfGdKZGyM_PX0CNy5xmIqLOlwCkE5IIwOS8GnE)

<sup>46</sup> <https://docs.arpeggi.io/faq/>

changing how music is created. The relationship between musicians starts with creating music rather than building relationships first. It is time to make the process of creating music open again.

## 29.5 Web3 Risks And Limitations

Web3 is still at an early stage of development. Some areas need improvements, and there are risks too.

### 29.5.1 Regulation is Tightening

Only El Salvador<sup>47</sup> and the Central African Republic<sup>48</sup> recognize Bitcoin as a legal tender. In April 2022, the Japan Virtual Currency Exchange Association (JVCEA) introduced the "Travel Rule" as part of its self-regulatory guidelines for crypto asset transfers conducted by its member exchanges on behalf of end customers. The Travel Rule aims to increase transparency and prevent illicit activities, such as money laundering and financing of terrorism, in the crypto industry.

Under the Travel Rule, JVCEA member exchanges are required to collect and verify the identity of both the sender and the recipient of crypto transactions, as well as the purpose of the transaction. The exchanges must also maintain records of this information for at least five years.

This move by the JVCEA demonstrates its commitment to promoting responsible and ethical practices in the crypto industry and ensuring its customers' safety. The Travel Rule sets a precedent for other countries and regulatory bodies to follow in their efforts to create a secure and trustworthy crypto ecosystem.

But Japan is not alone, even though it was the earliest adopter. The extent of Web3 regulation varies from country to country. However, some examples include the European Union, Japan, Singapore, Hong Kong, UAE, and the United States. In the EU, the Fifth Anti-Money Laundering Directive (5AMLD) requires cryptocurrency exchanges to comply with anti-money laundering (AML) and counter-terrorism financing (CTF) regulations. In the US, the Securities and Exchange Commission (SEC) has classified some Web3 assets, such as non-fungible tokens (NFTs), as securities and subject to federal securities laws. The United Arab Emirates (UAE) has regulations on Web3. However, the specifics of the rules may vary depending on the specific use case of the technology. The UAE Central Bank has issued guidelines for using cryptocurrencies, including the requirement for cryptocurrency exchanges to register with the Central Bank and comply with AML and CTF regulations. The Dubai International Financial Centre (DIFC) has also established a regulatory framework for fintech companies, including those working with Web3 technology. Hong Kong and Singapore have introduced a licensing regime for virtual asset service providers to enhance the protection of consumers and prevent money laundering and terrorist financing.

It is important to note that the regulatory landscape for Web3 is constantly evolving, and countries may update their regulations as the technology develops. The policy on Web3 is inconsistent and changes from time to time in different countries and by various regulators, presenting opportunities for regulatory arbitrage. But, in the long run, there will be a convergence, leading to global collaboration by regulators in this space after the initial competition for new startups. Most tokens only have governance functions to avoid being

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<sup>47</sup> Bitcoin Now Legal Tender in El Salvador, Marking World First, <https://www.coindesk.com/policy/2021/09/07/bitcoin-now-legal-tender-in-el-salvador-marking-world-first/>

<sup>48</sup> Why the Central African Republic adopted Bitcoin, <https://www.bbc.com/news/world-africa-61565485>

considered stocks, so these tokens do not capture the network value of protocols. The uncertainty of regulations makes investment institutions and talents hesitant to plunge into Web3 at this stage.

### **29.5.2 Built On A Centralized Infrastructure**

Web3, as a decentralized technology, aims to provide users with a more secure, transparent, and equitable online experience. However, despite its decentralized nature, the ecosystem of Web3 is still largely reliant on centralized Web 2.0 structures. For instance, the main sources of Web3 news and media are centralized platforms such as Twitter. At the same time, its communities are primarily built on Discord,<sup>49</sup> and development is carried out on GitHub<sup>50</sup>. Furthermore, centralized entities such as Infura and AWS cloud platform provide critical services such as API and cloud computing.

This dependence on centralized infrastructures undermines the censorship-resistant and system-resilient properties central to the Web3 vision. While there are ongoing efforts to develop decentralized alternatives to these centralized services, they are yet to be widely adopted and utilized by the Web3 community. The continued reliance on centralized Web 2.0 structures highlights the need for further development and deployment of decentralized infrastructure to realize the potential of Web3 fully.

### **29.5.3 High Cost Of Use**

The high cost of using Ethereum is a significant challenge for the Web3 ecosystem. The cost of interacting with the Ethereum network, known as gas fees, can reach up to \$100 to \$200 during peak times, making it unaffordable for many users. Due to the sudden spike in gas prices, this high cost has resulted in the pause of Ethereum's Layer 2 scaling solution, Arbitrum's Odyssey campaign.

The high cost of using Ethereum has severe implications for the growth of Web3 in developing countries, where access to financial resources is limited. This can prevent individuals and businesses in these countries from participating in the Web3 ecosystem and realizing its benefits. Moreover, the high cost can also discourage developers from building on the Ethereum network, which could limit the growth and development of the Web3 ecosystem as a whole.

To address this challenge, the Ethereum community is working on various solutions to reduce gas fees and make the network more accessible to a wider range of users. These solutions include the implementation of layer 2 scaling solutions, the optimization of smart contract code, and the development of alternative payment methods. However, the long-term success of these efforts remains to be seen and will depend on the continued development and adoption of these solutions by the Web3 community.

### **29.5.4 Scalability Needs To Be Improved**

Ethereum, the leading blockchain platform for Web3 applications, has a limited capacity for processing transactions. With only about 12-15 transactions per second, the Ethereum network often experiences congestion, leading to slow and costly transactions. This scalability issue has been a significant challenge for the Ethereum network, as it hinders the growth and adoption of Web3 applications.

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<sup>49</sup> Discord is tool for building communities that enable members to talk over voice, video, and text.

<sup>50</sup> GitHub is an online software source code escrow platform.

To address this challenge, high-performance public chains like Solana have emerged, offering faster transaction speeds of up to 3,000 to 4,000 transactions per second. While this is a significant improvement over Ethereum, Solana has sometimes struggled to reach consensus among its nodes, which has raised questions about its security and reliability.

In comparison, the traditional financial sector has been able to process thousands of transactions per second smoothly over time. For example, Visa can process up to 17,000 transactions per second. This highlights the need for the Web3 ecosystem to continue improving its scalability to meet the demands of a growing user base and a more complex set of applications.

Improving scalability is a complex challenge that requires the integration of innovative technologies, such as sharding and off-chain transactions, as well as optimizing existing protocols. The success of these efforts will be critical for the growth and adoption of the Web3 ecosystem, as it will allow for faster, more secure, and more accessible transactions for users.

### **29.5.5 High Barrier To Use**

There are high barriers for users to use Web3 products. First, users may receive illegal money from money launderers while exchanging fiat and cryptocurrencies. Second, some users may use the self-custody wallet insecurely that lose private keys. In the Web3 world, whoever has the private key owns the account. There needs to be customer service or a better solution to solve this problem. Making Web3 products more accessible to users is the next step in development. A Web3 product will only be successful when it allows users to enjoy the same quality of service without knowing about Web3.

### **29.5.6 Lack Of Proper Web3 Education**

Firstly, the media need to give more coverage to product developments rather than tend to report on eye-catching news such as cryptocurrency spikes and falls. Those outside the crypto community assume it is just a place for speculation and needs to realize the changes that Web3 could bring. Secondly, crypto assets are high-risk products, so there is a need for risk education so that the public can engage with the products in the right mindset and make rational asset allocations. Web3 may not be suitable for all people immediately. It is a gradual process that waits for builders to develop.

### **29.5.7 Governance Needs To Be Improved**

While the governance of DAOs gives the public the right to participate in decision-making, the investors with a large number of tokens in their hands have too much power in the governance process. These people can sometimes directly determine the outcome of a vote. On the other hand, some tokens that only with the governance function can not back up the market value due to limited use scenarios.

### **29.5.8 Exploited by illegal or criminal activities**

According to data from rekt<sup>51</sup>, many Web3 projects have security incidents and make users suffer losses. Some users will post anti-social statements on decentralized publishing

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<sup>51</sup> <https://rekt.news/leaderboard/>

platforms, launder money through coin mixers<sup>52</sup>, receive payments for remote sex work<sup>53</sup>, and so on. While technology is considered neutral, the industry should consider reducing technology's negative impact on society.

## 29.6 Web3 Future Outlook

Despite its rapid growth, Web3 is still in its early stages. In May 2022, a16z<sup>54</sup> predicted that Ethereum has around 7 to 50 million active users, likening the current stage of Web3 to the commercial Internet in 1995, the early days of Facebook and YouTube.

So, what does the future of Web3 look like?

### 29.6.1 Metaverse - Twin Economies

Web3 is the emerging technology redefining the way of life. The metaverse is the way of life brought about by Web3 technology. People can choose to switch between the virtual and the real world. The ideal Web3 metaverse is a shared digital space that any organization or individual does not control. Everyone has digital assets that can be freely exchanged in social or business activities. The physical world can be replicated in the metaverse, giving users a sense of immersion that they cannot distinguish between virtual and real. Conversely, brands, activities, and characters that do not exist in reality can be created in the metaverse. The metaverse is effectively the twin economy, with the virtual world being as much a layer of the new economy. It is equally important as the physical world.

### 29.6.2 The Improvement Of The Infrastructure Did Make The Metaverse More Orderly

Vitalik Buterin, Glen Weyl and Puja Ohlhaber published (2022) propose combining non-transferable soul-bound tokens (SBTs) with wallet addresses to encode the network of social relationships in Web3. This is a solution for a decentralized identity DID, an alternative identity for people in the metaverse, regardless of real-world identity such as gender, age, appearance, etc. DIDs are one of the following critical Web3 infrastructures to be built and are an essential part of the metaverse. Each person can have multiple DIDs, which do not necessarily correspond to a single individual. The refinement of DIDs facilitates shaping non-transferable social relationships and building personal reputations. DIDs also provide new property rights and governance solutions, preventing Sybil attacks by airdrop hunters, encouraging authentic participation, and creating more dynamic communities.

### 29.6.3 DAO Keeps Web3 Alive

With the help of tokens backed by smart contracts on the blockchain, everyone is incentivized to enhance the value of the network, rather than to destroy the shared space. In the absence of centralization or effective control, computer code can help manage the shared space. DAO uses the token economy to bring together a group of community members with the same passion for innovating from the bottom up. Yet they are not restricted from innovating themselves. There is no top-down control other than the code, and each member contributes spontaneously, adding value to the shared space or organization.

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<sup>52</sup> Crypto-Mixing Service Tornado Cash Blacklisted by US Treasury, <https://www.coindesk.com/policy/2022/08/08/crypto-mixing-service-tornado-cash-blacklisted-by-us-treasury/>

<sup>53</sup> The Truth About Crypto and Sex Work, <https://www.coindesk.com/layer2/sinweek/2022/08/29/the-truth-about-crypto-and-sex-work/>

<sup>54</sup> The web3 Landscape, <https://a16z.com/wp-content/uploads/2021/10/The-web3-Reading-List.pdf>

We see Bored Ape Yacht Club (BAYC), the world's most influential and expensive NFT project allowing fans to create based on their NFT holdings<sup>55</sup>, blurring the boundaries between fans and creators. In this way, it enables to generate new brands while increasing BAYC's brand exposure; PartyDAO<sup>56</sup>, a decentralized crowdfunding auction that originally was spawned from a Twitter brainstorm on the weekend; MoonDAO<sup>57</sup> attempts to send human into space; Toucan<sup>58</sup> dedicated to using the power of DeFi to reduce the carbon footprint. With global pools of talent, 24/7 working collaboration and flat management structure, DAOs inspire Web3 members to innovate and keep the Web3 community exciting and vibrant.

#### **29.6.4 Web 2.0 And Web3 Merge For Better Development**

Facebook has changed its name to Meta, demonstrating its commitment to the metaverse; Instagram<sup>59</sup> is rolling out NFT to over 100 countries; luxury brands Prada<sup>60</sup> and Tiffany<sup>61</sup> are launching NFT; and Twitter is developing Bluesky<sup>62</sup> to be a decentralized social protocol. We are seeing more and more Web 2.0 companies developing Web3 businesses or participating in Web3-themed events. On the one hand, this is to create a brand and reach out to target customers. On the other hand, the metaverse driven by Web3 technology is a potential growth area for the future. Web 2.0 companies will drive the adoption of Web3 technologies and products in the broader market. The virtual economy will create new manufacturing, tourism, healthcare, transportation, and finance jobs. South Korea, Japan, Singapore, and China use the Web 2.0 and Web3 metaverse to grow their economies.

#### **29.6.5 More Interesting Web3 Applications Impacting Real Life**

As blockchain scalability improves and cross-chain messaging protocols are refined, different blockchains are moving from closed to open. Those protocols combine to bring about new applications. We have seen Centrifuge and MakerDAO<sup>63</sup> integrate real-world assets into DeFi to provide real-world loans; DBS Bank and the Sandbox<sup>64</sup> form a partnership to explore business opportunities in the metaverse by building new services for customers and developing DBS BetterWorld; PlatON is building a decentralized and collaborative AI network by combining blockchain and privacy-preserving computation technologies. Thanks to the open-source, interoperable, and composable nature of Web3 applications, we will see developers developing more products that address existing pain points based on existing applications in the market.

#### **29.6.6 Complementing The Decentralized Web To Make It Better**

The decentralized Web currently operates in two ways. One relies on community donations. For example, Snapshot<sup>65</sup> is a decentralized voting tool that has not issued tokens. It depends on community donations to cover the cost of operation. The other is to combine it with a blockchain protocol to add an incentive layer. Jay Graber, CEO of BlueSky, believes that Dweb

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<sup>55</sup> <https://twitter.com/ljin18/status/1562445072209039361>

<sup>56</sup> This DAO is here to \$PARTY, <https://d.mirror.xyz/FLqkPA3iN4x-p97UhfWwaCx8rBmVo-1yttY20oab4>

<sup>57</sup> <https://twitter.com/OfficialMoonDAO/status/1555587520691322882>

<sup>58</sup> <https://toucan.earth/about>

<sup>59</sup> <https://twitter.com/MetaNewsroom/status/1555197567532732417>

<sup>60</sup> <https://www.prada.com/hk/hk/pradasphere/special-projects/2022/prada-timecapsule.html>

<sup>61</sup> <https://nft.tiffany.com/faq/>

<sup>62</sup> <https://blueskyweb.xyz/>

<sup>63</sup> DeFi 2.0 — First Real World Loan is Financed on Maker, <https://medium.com/centrifuge/defi-2-0-first-real-world-loan-is-financed-on-maker-fbe24675428f>

<sup>64</sup> Asia banking giant DBS jumps into The Sandbox metaverse, <https://forkast.news/asia-banking-giant-dbs-enters-sandbox-metaverse/>

<sup>65</sup> <https://docs.snapshot.org/>

and Web3 are very related.<sup>66</sup> Some public goods which do not have tokens can receive donations from Gitcoin. In turn, these public goods provide a better service to Web3. In the future, community donations and token incentives will co-exist. Undoubtedly, more and more products aspiring to be decentralized will choose the Web3 development path using tokens as an incentive layer to make the business sustainable.

## 29.7 Conclusion

The definition and understanding of Web3 and Web 3.0 are still subjects of ongoing discussions within the technology industry. Our perspective on Web3 incorporates the use of blockchain technology and the integration of smart contracts. While opinions vary on the role of cryptocurrency in Web3, we believe that a blockchain without a coin may not have the necessary incentives to make Web3 a viable and thriving platform. Our definition of Web3+ encompasses all possible implementations of Web3, including both blockchain technology and cryptocurrency. In this way, we are able to encompass the full range of possibilities for the future of Web3.

It should be noted that decentralization can be achieved without cryptocurrency. There is potential for a blended approach that leverages the advantages of both traditional Web 2.0 technology and a blockchain platform that is less decentralized than a completely open, permissionless blockchain with cryptocurrency.

To better understand the available design options, we can categorize different approaches under the broader umbrella of Web 2.x, where x can range from 1 to 9. For example, a design that incorporates the benefits of Web 2.0 technology with a blockchain platform without cryptocurrency or tokens could be referred to as Web 2.5, or 2.4, or 2.6. However, the recent trend in media has been to simply refer to these designs as Webx, without the decimal, which can lead to further confusion.

Further investigation is necessary to clearly distinguish between the various designs and to fully comprehend their potential. For instance, China is promoting a blockchain-based metaverse without the use of cryptocurrency. This highlights the importance of continued exploration of the available options.

Web3 aims to address the shortcomings of Web 2.0 by offering privacy, ownership, and a cost-effective trusted Internet of value based on a decentralized network and blockchain technology. Although blockchain technology is still in its niche phase due to scalability issues and high entry barriers, early adopters have recognized its potential. Countries with strong economies such as the USA, UK, Japan, and Singapore strive to be critical players in the Web3 movement.

The technology and applications of Web3 are crucial components of the decentralized metaverse and a significant breakthrough in uncertain economic times. Ignoring Web3 would result in missing out on a rapidly advancing development. Despite the financial speculation, there is no technological bubble. Every active participant is driving Web3 forward in its growth. The open-source and composable nature of Web3 provides an unparalleled development environment. The open, transparent, equal, and free structure of Web3 will bring about more innovative products to improve our lives beyond what most people could have imagined!

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<sup>66</sup> <https://twitter.com/arcalineia/status/1473347697973157888>

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