

WEB 3.0: Role of Blockchain and dApps in its Working

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Abstract— The internet's progress has been continuous, providing us with several opportunities and problems. We have progressed from the read-only internet of web 1.0 to the third version, web 3.0. We begin with a broad overview and description of the internet, followed by a discussion of the necessity for this updated version in today's world. Following that, we have looked at some of the features of this new and the future edition as well as how some of these features play a critical part in the architecture of web 3.0, the main being the role of Blockchains. Then we have shed some light on how various apps operate with Web 3.0 and, ultimately, what the future holds for Web 3.0.

Index Terms— Web 3.0, Blockchain, dApps, Decentralized, Security.

I. INTRODUCTION

In 1989, the internet was first made available to the general public and it could be described as a huge dictionary with hyperlinks to various pages present containing information. The pages were read-only with no interaction whatsoever. This was the Web 1.0 era where the user was the consumer of the product which was the Internet.

The second iteration of the internet, known as Web 2.0, was released in 2004. The web pages were made more interactive than in the previous version thanks to the integration of flash and JavaScript. In this time period, user information was also collected in order to give each user a customised experience. With their dominance over the internet, large corporations like Google, Facebook, and others became the consumers and the user became the product in this situation. This made the internet more of a distributed centralised network with the majority of the control with the dominating companies.

Web 3.0 on the other hand is the incorporation of blockchain with the internet to make it decentralised and more secure. With no proper definition now, Web 3.0 can be seen as a hatchling that needs a lot of nurturing to properly flourish into something amazing.[1]

With the decentralisation and the ownership of content with the creator, web 3.0 could lay a path for a new era of the Internet which is the need of the hour.

About Web 3.0, Tim Berners Lee says: “People keep asking what Web 3.0 is. I think maybe when you've got an overlay of scalable vector graphics - everything rippling and folding and looking misty-on Web 2.0 and access to a semantic Web integrated across a huge space of data, you'll have access to an unbelievable data resource.”

II. NEED FOR WEB 3.0

The internet today is broken by design, with the majority of it under the control of a few major companies, data is overall centralised and the need to rely on a middleman for every tiniest thing is absurd. With no anonymity and all our data up for grab, change is imminent. OpenNet initiative in 2010 had documented Internet filtering by

governments in over forty nations [2].

Web 3.0 is crucial because it enables organisations to expedite processes by removing the intermediary and connecting computers directly. This makes it easier for workers, partners, and customers to communicate and work together, which improves corporate efficiency. One can have a whole different identity on the internet which will not be so easily traceable as it is today.[3] With the smart contracts and ledgers, everything will be open-sourced and the trust issues will reduce greatly. Users will be able to verify each and every contract on the blockchain and decide on their actions.

Modern society faces a serious privacy problem because our data is sold to different businesses so they can target us with adverts that they think would suit us best. We must accept the terms and conditions of certain applications in order to use them, and we are essentially handcuffed in this scenario because those apps are necessities of the standard of current living.

III. FEATURES OF WEB 3.0

Key features that define web 3.0 are:

1. **Semantic web:** one can say that the semantic web is the upgraded version of the current WWW. It's the addition of IoT, Automation, and ML into the web pages describing items of Web-based information and their inter-relationships.[4] The Semantic Web will give Web pages a meaningful content structure, fostering a setting in which software agents can easily perform complex activities for users while roving from page to page.[5]
2. **Artificial Intelligence:** Computers can comprehend information on a par with humans in order to deliver quicker and more accurate results by merging semantic capabilities with natural language processing. By doing this, they develop greater intelligence and enhance consumer satisfaction.
3. **3D-Graphics:** The outdated, text-based HTML standard was created for narrowband networks. Both new formats and new HTML advancements are being considered. For a variety of context usage, including Web 3.0 and video games, we want to propose a multimedia presentation system, format, and use cases. The system is small and supports 2D and 3D graphics with good performance. Use examples include head-up displays in video games, online gaming, and 3D creation for Web 3.0. Museum guides, eCommerce, geospatial contexts, and more are all common examples of this.
4. **Edge computing:** The Edge computing paradigm has experienced significant growth in both academic and professional circles in recent years. By linking cloud computing resources and services to the end-users, it acts as a crucial enabler for several emerging technologies, including 5G, the Internet of Things (IoT), augmented reality, and vehicle-to-vehicle communications. Applications that require low latency, mobility, and location awareness are supported by the edge computing paradigm. Significant research has been done in the field of edge computing, which is examined in terms of recent advances like mobile edge computing, cloudlets, and fog computing. This has allowed academics to gain a deeper understanding of both current solutions and potential future applications. Web 3.0 relies on edge computing.[6]
5. **Blockchain:** Perhaps the main feature and the backbone of web 3.0, blockchain technology encrypts and protects user data. This stops big businesses from having access to and/or using consumers' personal data for their own gain. Decentralised data storage is possible. Users are able to log in securely and anonymously over the internet while maintaining ownership over their data and digital assets.

IV. BLOCKCHAIN AND ITS INCORPORATION IN WEB 3.0

Blockchain is defined as 'a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network. An asset can be tangible (a house, car, cash, land) or intangible (intellectual property, patents, copyrights, branding).'

The term "blockchain" refers to a chain of blocks formed when a newly created block is linked to a prior block. Since blockchains are decentralised, no one party or individual has authority over them, and the data contained in the blocks is visible to everyone. It is a peer-to-peer network where every decision is made with consensus and once a decision is made and a block is added to the blockchain then it can't be modified.

The goal of a blockchain is for information to be added and distributed but not edited hence it is also known as Distributed Ledger Technology (DLT).[7] This way the blockchain will serve as the foundation of distributed ledgers, immutable records, and more.

Blockchain is fundamentally changing how data management and storage are currently done. In plain English, blockchain provides a distinct data set or universal state layer that is managed by a group. The potential to create a value settlement layer on the internet is made possible by the unique state layer. The state layer facilitates copy-protected file transmission to support efficient P2P transactions without any middlemen.

Third-generation web networks display interoperability, automation through smart contracts, seamless integration, and censorship-resistant P2P data file storage. Therefore, it is obvious that blockchain would be a significant factor behind the development of Web 3.0.

The establishment of new social infrastructures that adhere to the fundamental principles of the internet is another focus of web 3.0 development. Blockchain eliminates the need for reliable middlemen while also allowing networks to collectively recall previous user interactions or occurrences. Therefore, blockchain is unquestionably a major driver in expanding the opportunities for the internet with greater decentralisation.

V. DAPPS ON WEB 3.0

dApps stand for decentralised apps and they are the applications that we have today but instead of a central server, they run on blockchains or decentralised networks. There is no involvement of any third party.

dApps can eliminate the power of a single business having complete control over its users. Decentralised apps also eliminate the dangers of centralised governments invading user privacy. In dApps, end users have full ownership and control over their data in addition to the power to choose whether to share it with others.

Decentralised apps also include a permissionless design and censorship resistance. As a result, consumers might access any decentralised application's services without facing any bias. Additionally, dApps have a high degree of trustlessness and openness, assuring real decentralisation.

These applications will be intelligent because Web 3.0 will include 3D graphics, allowing developers to fully leverage recent advances in artificial intelligence and machine learning in addition to 3D graphics to create applications that are intelligent and immersive for the end-users.[8]

VI. FUTURE OF WEB 3.0

As time goes on, an increasing number of businesses are choosing decentralisation and moving their websites onto a block. Web 2.0 will eventually become obsolete as web 3.0 takes over and nearly all of the internet switches to a blockchain oriented network.[9]

Some of the reasons why web 3.0 will be dominant and important are:

- **Prioritising decentralisation:** Web 3.0 will work to diversify the Internet's sources in order to prevent hackers, data leaks, and dependence on centralised repositories. Users may be able to own their own data and digital footprints using certified data scarcity and tokenized digital assets. There would be no accountability for data usage on any platform.
- **Enhanced Personalization:** As long as most users continue to value tailored and unique web surfing experiences, Web 3.0 will grow more and more significant in 2022.
- **AI Powered surfing:** As semantics, blockchain, and AI play a significant role in the design of web 3.0, there will be an increased demand for humanised digital search assistants that are significantly more intelligent, omnipresent, and powered by these technologies.
- **Elimination of middlemen:** Eliminating middlemen can help organisations disintermediate, get rid of rent-seeking agents, and transfer value straight to network members like customers and providers. By sharing ownership and governance of these new decentralised intelligence structures, network users will cooperate to address issues that were previously difficult to control. As a result, prices will decrease and object value will rise.
- **Peer-to-peer connectivity will show a rise:** Peer-to-peer connectivity will increase as a result of new Internet developments, but the relationship between members and organisations will always be strong in order to support more flexible peer-to-peer interaction and governance. Peer-to-peer networking will allow for more secure and private data sharing between individuals, organisations, and machines. The byzantine general issue could exist, but it can be solved with the more trustworthy peers in a network.[10]

VII. CONCLUSION

This study focused on the continued growth of computer technology from Web 2.0 to Web 3.0, and the major role that blockchain and its technology will play in its uprising and its need to overcome the loss of democracy in the Web 2.0. Web 3.0 promises to combine Internet data in such a manner that Internet searches will become more focused and tailored in order to gather and present information from many forms of media in a style that is relevant and meets user demands. This transformation will be dependent on careful coding of website material utilising Web 3.0 markup languages, which introduce code into website content that connects bits of data and makes this information available.

Web 3.0 will transform a disorganised group of web materials into a systematic and ordered set of web contents. The essential elements of Web 3.0 include the capacity to use unstructured content on the web more intelligently by deriving meaning from the context in which it is presented. The advent of new technology prompted the adoption of new ideas and inventions to reform old items with current science and technology in order to keep up with the stage of development. Although more development is needed, the community is working at its best to completely decentralize the net and achieve the lost democracy.

The smart applications that will be created on this new version of the internet will cater to the need of many sectors but as they are new, only a niche section of the society is able to create and work on them but that is surely going to change as the Web 3.0 is more familiarized and its features and need is educated amongst the people.

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