Blockchain Technology for Web 3.0

Abstract:

Many of us know that blockchain is a technology behind the bitcoin, bitcoin uses the blockchain to track the transactions, but Block chain has many more use cases. To understand how, one need to understand what is Blockchain? So, to Answer it with, Blockchain is a decentralized blocks of data that are connected to one another forming a distributed network. Every block has a data, its own fingerprint called hash [unique across the network] and the hash of its next node. the data stored on the blocks are immutable or cannot be tampered and trying to tamper a data on block can lead to an invalid block as data change leads to hash value change making it invalid from the linking node. The blocks that store the data allows us to use the Blockchain technology in healthcare to store the patient's record, or to storing user public and private documents like marks cards, or one can store documents related to the assets they own and many more. But the decentralized nature of Blockchain Technology revolutionizes the internet by giving birth to Web 3.0. As we are in the era of Web 2.0 where the user data is owned by companies like Facebook, Amazon, Google, YouTube, and some of the AI based tech giants. They have complete control over the user data, with the Web 3.0, users are the owner of their data and have all the right to control it. As we go along this term paper, we will discuss the use cases, advantages and disadvantages involved with Web 3.0.

History of Web 3.0:

Internet was invented around 1990. When the internet was first invented, we just had the static pages, and these web pages were referred as "the read only web". Users had no options to interact with internet. As this was the very first version is referred as WEB1.0. There were very few applications. Additionally, Users struggled to find valuable content as there were no algorithm to search through the pages.

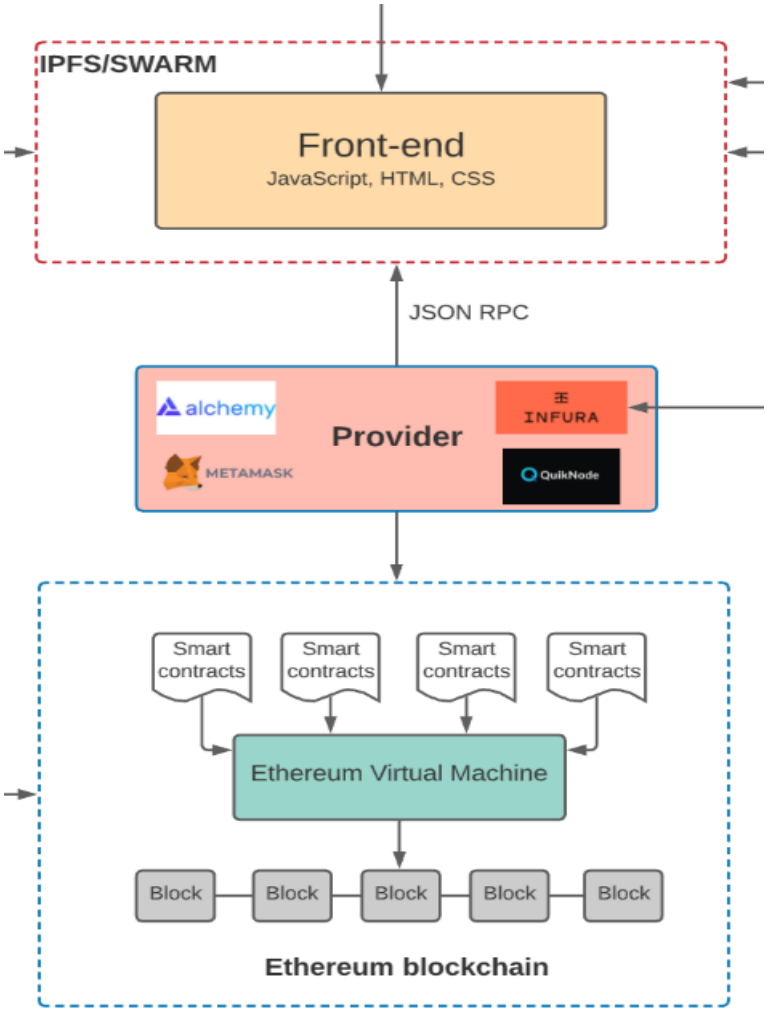
With evolution with the scripting frameworks, Internet revolutionized as WEB2.0, in 2004, first application using the scripting language was release and resolved most of the problems associated with WEB1.0, allowed uses to interact and search through the internet, and these web pages were referred as "the read-write web". When users started writing data on to internet this opened door to many social media applications and these applications started gathering the user data and selling it for targeted advertisement. Currently, the user data is highly centralized with big technologies like Meta, YouTube, Google, and twitter now owns most of the user data and use for advertisements and personal gains.

With evolving blockchain technology, AI and ML, the WEB 3.0 is being researched and developed. Blockchain technology helps to encrypt and protect the user data posted to internet and thereby prevents the large companies from using it for their gains. The decentralization nature of blockchain allows user to connected with their data and own it. So the Web 3.0 is termed as "the read-write-own web".

How Web 3.0 Works?

The main idea of web 3.0 is to make the search and browsing faster by securing the user data. Web 2.0 Applications currently have middleware to run the logic and database layer to save the data. Application server and database server are centralized. Unlike WEB2.0 the server and DB are not centralized instead WEB 3.0 leverage the blockchain to build app on decentralized nodes.

The architecture of WEB 3.0 consists of 4 components, namely Ethereum Blockchain, Smart Contracts, Ethereum Virtual Machine (EVM), Front End.



Ethereum Blockchain – it consists of peer-to-peer connected nodes [blocks], anyone can write their data to these nodes. As these nodes are decentralized, they won't be owned by single entity instead distributed over the blockchain.

Smart Contracts – these will be the programs that run on the Ethereum blockchain and has the logic to execute on change of nodes.

Ethereum Virtual Machine (EVM) – these are the machines in which the logic behind state contract gets executed.

Front End – these will be the UI pages to interact with business user.

When the user interacts with the UI of an application, the data used for searching or browsing will gets added to the nodes by hashing and smart contract associated with these nodes will be execute on EVM and returns on the required data.

Use cases of Web - 3.0:

Some Of the famous use cases of Web 3.0 are:

Metaverse - Metaverse was on the headline during 2021 and at the beginning of 2022. Even Facebook rebranded itself as Meta and started investing billions in developing Metaverse. Metaverses is a digital representation of a real world. It is also referred to as a virtual world one can use the AR/VR to feel these virtual worlds and interact with people virtually as they can interact in real life. Web 3.0 proposes the fully decentralized, interoperable metaverse version

Decentralized finance (DeFi) - DeFi exploded in value in mid-2020, offering cryptocurrency users the ability to invest, borrow, lend, trade, and stake crypto assets permissionless. While DeFi faced its fair share of security issues like hacks and scams, the industry offers Web3 the opportunity to onboard potentially billions of users that have been neglected by traditional finance firms such as banks.

Decentralized Autonomous Organizations [DAOs] - Much has been said about the power of decentralized autonomous organizations (DAOs) to create a truly democratized and self-governing organization that will transcend human interference and geographical challenges through the power of smart contracts.

While DAOs have taken some flak due to crypto projects tying it to governance tokens that soon become worthless, the need for DAOs still remain and this innovation could potentially exist as a dominant organizational structure once projects know how to optimally structure it.

Cryptocurrency - Cryptocurrencies like Bitcoin are Web 3.0 applications that create a new world of currency that aims to be separate from the historical world of fiat currency.

Decentralized applications (dApps) - These are applications that are built on top of blockchain and make use of smart contracts to enable service delivery in a programmatic approach that is logged in an immutable ledger.

Existing Application Using We 3.0:

Web 3.0 is already in use and is being developed and researched. Below are some the examples that are already using Web 3.0 –

Siri – Previously Siri use to serve the simple tasks like reminders and directions, with use of web 3.0, sharing information through the linked block allows siri to respond to wide verity of questions form its user.

IDEX – IDEX is a e decentralized platform used for trading crypto tokens, it allows purchasing of other tokens using Ethereum, so one need to have a Ethereum Wallet to trade.

e-Chat is a Secure messenger that uses Decentralized blockchain to help connect people. User can share the information without fear of information theft, this application is available in Play Store and App Store for download.

LBRY – is a decentralized digital library with video and music content, it uses blockchain technology to publish materials.

Advantages of Web – 3.0

1. As the user data will be encrypted using SSH-256 hashing technique, user information is secured and protected, no company can access their data without user permissions.
2. Decentralization allows user to browse all the websites and Government entity won't be able to restrict users from visiting any sites.
3. As the data is distributed across multiple nodes, User can access them all the time and avoids the issues one faces in server failure in WEB 2.0
4. Web 3.0 creates the digital profile for each user and there by one do not have to create a profile for each application.

Disadvantages of Web - 3.0:

1. Not All the device would be compatible to run the WEB 3.0, some of the older devices need to extend and enhance their specification to adopt to the WEB 3.0, so consider the current state of devices only few groups of people will be able to use the WEB 3.0.
2. As Web 3.0 will be the combination of blockchain, AI and ML and it will be the combination of older and newer technologies and making it difficult for people to understand, so people would be hesitant to adopt to Web 3.0.
3. If Web 3.0 gets adopted full-fledged, the application using WEB1.0 won't be able to update to newer technologies there by loosing it viewers.
4. As the WEB 3.0 uses the blockchain technology and nodes are connected in peer-to-peer manner, any change needs to be update to all the nodes or nodes need to be forked if update is rejected.

Conclusion:

In this above study we reviewed how the web technology evolved from Web 1.0 to Web 3.0 over the time, how Web 3.0 works, its use cases, few existing applications and its advantages and disadvantages. In conclusion, Web 3.0 is in the earlier stage of development and research. Web 3.0 with blockchain and decentralized network will help users to own their data and have a complete control over it, there by it reduces the monotony that we have with Web 2.0. As the development on Web 3.0 evolve, the current disadvantages will be addressed over the time.

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