



Web 3.0 in Finance

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Abstract

Recently blockchain, cryptocurrency and web 3.0 are in their emerging phase. These technologies have the potential to revolutionize the standard traditional means of operations in several industries. Most importantly it is the finance industry undergoing constant change due to blockchain. In this paper we have discussed the several applications of web 3.0 like smart contracts, defi etc in finance. Further we have discussed the advantages and risks associated with each application. An account of the problems related to web 3.0 has also been covered in this paper.

Keywords: Smart contracts, Web 3.0, Defi, Blockchain, Metaverse, Artificial Intelligence

Introduction

In the 90's the first version of the web was created by Tim Berner Lee. From then to know the web has undergone immense change and growth. It started with Web 1.0 and now we are looking at the development of Web 3.0. Web 3.0 is the latest version of the web which aims towards shifting the true control in the hands of the users and making the web more transparent.

Blockchain is a shared distributed ledger having immutable records which records transaction and stores information about business assets. The information is recorded only once thus removes the duplication of effort and the risk of fraud. Web 3.0 is third edition of web entirely based on blockchain, machine learning and IoT.

Web 1.0:

Web 1.0 was the first and only readable format of the web. It was also called as the Static Web. It contained basic HTML and there was no interaction possible between the website and the users. Web was a medium to store and display information to users.

Web 2.0:

Web 2.0 is the evolution of Web 1.0. It is said to be the writable form of the web. Technologies like JavaScript, CSS3 made businesses more interactive. It increased the interactivity between the users and webpages; thus, webpages became more striking as well as engaging. Web 2.0 is said to be the foundation of the social media world.

Web 3.0:

Over the years tech giants started collecting and storing data of its users. The availability of such massive amounts of data led to its misuse. Issues like financial frauds or identity thefts started arising which led to huge losses. Thus, the creation of a decentralized web became a necessity. To build this decentralized web blockchain is being used. This shifted the control of the data from a centralized organization to users. Blockchain will control the process of data collection and its storing. All the data will be collected using IoT and artificial intelligence. It will then be converted to information which prohibits its duplication or hacking. Web 3.0 is called as the readable and writable form of the web.



Key Features of Web 3.0

Decentralization and Blockchain:

In Web 2.0 data was stored in fixed locations on a large server maintained by Google or Meta. HTTP requests containing unique web address were used to access this information stored on a single server. In Web 3.0 information can be stored in multiple locations and hence is said to be decentralized. Decentralization is enabled by blockchain technology.

Cryptocurrency Enabled:

In Web 3.0 the government issued currencies will be replaced by cryptocurrencies like Bitcoin, Ethereum etc.

Artificial Intelligence:

AI helps computers understand information in an efficient manner. Deep learning algorithms will train artificial intelligence to differentiate between different types of data as well as assign them with a meaning. Thus, search engines would understand the content before recommending it to the users and hence create a more well-rounded experience for the users. A group of people may be biased and purposely give an undeserving restaurant good review to raise their ratings. AI can identify good and bad data hence provide us with more reliable information.

Semantic Web:

Semantics are said to be the emotions or the meaning of a phrase. "I love blockchain" and "I <3 blockchain" are two phrases with different syntax but same emotions. Thus, they are said to have same semantics. Semantics will teach the computer meanings which in turn will help AI to create algorithms for better usage of data.

3-D Graphics:

Web3 might make it easier to interact with three-dimensional virtual worlds or the metaverse while also reinventing graphical technologies. 3-D graphics aid in creating captivating worlds for gaming and engaging websites for industries. Web 3.0 and Metaverse support each other. By using 3-D graphics 2-D webpages can be converted into a 3-D space where users can walk around and interact with each other as well as the web pages.

Ubiquitous:

It refers to the idea of being present at multiple places at the same time. This feature is included in Web 2.0 as well. For example, if we post a picture on Instagram, it becomes available everywhere

Smart Contracts:

Smart contracts are programmable, self-executing contracts that represent a deal between two or more parties. The terms of the bond are written as protocols which are stored on distributed ledgers of blockchain network. There can be any number of conditions required to execute the contract. These contracts are different from regular contracts as they do not use any paper or any third part witness. They are computer coded and contain conditional statements. When the defined conditions are met the contract executes.

How Smart contracts work:

Let us consider an example of a lease agreement. Once the agreement has been drafted you pay the rent in cryptocurrencies. A digital key is generated which is held by the contract. This key is delivered on a certain fixed date. If this entry does not reach on time the money is refunded. If the key arrives before the funds then the key is held by the blockchain till the funds arrive. Ideally the funds and the key are supposed to arrive at the same time. The conditional commands verify the transaction. Once the transaction is verified the document is sealed and neither party can access it without alerting the other party

Features of smart contracts:

- Smart contracts validate independently
- They tamper resistant
- Provide faster resolution than traditional methods hence increase efficiency
- Usage of smart contracts is free
- The parties involved in the contract are verified using digital cryptographic signatures
- All documents are encrypted on a shared ledger so that they cannot be lost
- Save time as all the processes are automated.
- Removes the possibility of human error

Examples of blockchain based smart contracts**NXT:**

It is a public platform which allows its users to create smart contracts by providing them with its ready to use templates. Smart contracts created on this platform cannot be manipulated according to our requirements.

Ethereum:

It is platform which facilitates building of advanced contracts and also supports customization. It employs a high-level, Turing-complete, stack-based bytecode programming language. These contracts run on the Ethereum Virtual Machine (EVM).

Sila:

It uses API's for incorporating real life payment facilities like KYC's and digital payments.

Smart Contracts in Financial Institutions**Trade Clearing:**

Normally trade clearing is a very tedious and labour-intensive process as it involves several parties. Occurrence of errors is also common which may delay the results. Smart contracts help in avoiding these kinds of human errors due to automation and creates an efficient trade clearance system.

Improved Security:

Traditionally people have to participate in opaque markets which keep their money locked in for a large period. With smart contracts the markets become extremely transparent. These contracts can also help optimize the KYC process. The original process is quite long and requires a lot of time. Smart contracts can verify the identity of a person through the records maintained on the blockchain easily.

Minimized entry barriers for SMBs:

Banks tend to have a time consuming and tedious process to create a new account. Smart contracts lower the entry conditions thus making the whole process easier.

Versatile Tokenization:

Tokenization allows institutions to reduce risks due to market volatility. Variations of tokens are generated which are transactional fractions of major currencies.

Efficient auditing:

Maintaining records is essential for the process of auditing. The traditional process of maintaining records involves a lot of paperwork, documentation and is time consuming. Smart contracts support advanced book-keeping tools and make the process easier.

Increased speed:

It increases the speed of banking process and trade by removing the need for manual processes.

Efficient Insurance Processing:

The smart contracts can automatically process the insurance in case of the occurrence the events specified in the contract.

Limitations:

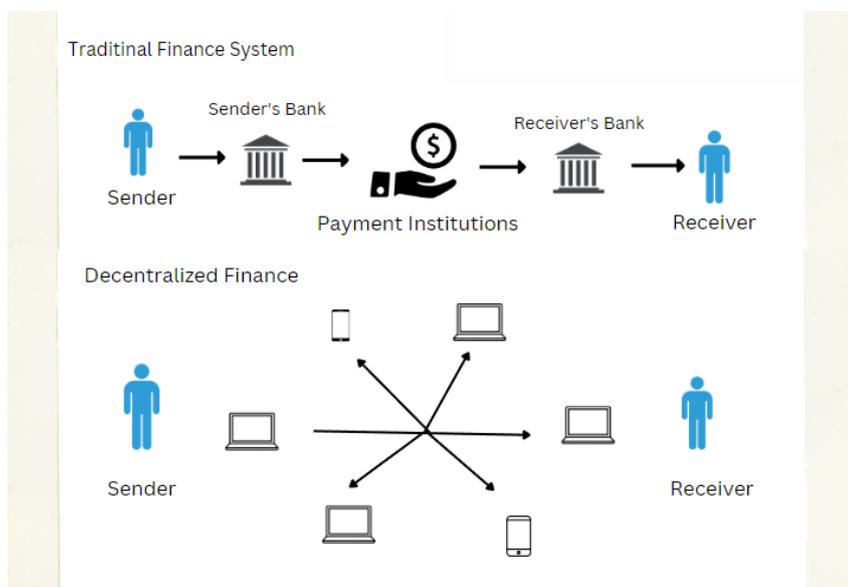
If there is an error in the code of the contract, the contract would still continue to execute. Once an agreement has been entered into, we won't have the means to get out of it

In traditional methods of signing agreements there are provisions like extension of due dates, reduction in the rent etc. Since the terms of the contract cannot be amended later, such provisions are not available in smart contracts. In case of genuine emergencies smart contracts could put a person in trouble.

DeFi:

All banking, lending, borrowing and trading systems are governed by centralized body of authorities. In the US the SEC creates rules and regulations for various financial operations which are to followed by all financial entities in the country. The SEC is replaced by the Ministry of Finance in India. Common people have to go through financial intermediaries to access loans, trades or mortgages. These intermediaries benefit from every single transaction by charging commissions and interest rates.

Decentralized finance (Defi), a new type of financial system which is supported by Web 3.0, based on secure distributed ledgers similar to those used by cryptocurrencies. Defi eliminates the need of intermediate organization to carry out financial transactions. These financial transactions are logged and validated by softwares in distributed databases. Due to the databases being distributed makes data accessible from multiple locations, allows gathering of data from multiple locations and verifies the data using majority review process.



Blockchain technology used in the working of Defi and transactions are handled by decentralized apps called dApps. Blockchain records transactions as blocks which are verified by multiple users. Once all the users verify a transaction the block is sealed and encrypted. After this a new block is made which contains the details of the older block. In this way multiple blocks are created which is called as blockchain. Each block has the transaction information, a timestamp and the address of the block before it. Smart contracts also form an integral part of decentralized finance

Defi would benefit people in many ways:

- It is permissionless. Anyone who has access to crypto can make any transaction without having the need to involve an intermediate organization.
- Transactions are in real time which means that the interest rates are changing multiple times in a single minute.
- Transactions are highly transparent and can be monitored by its users at all times.
- Users can have the custody of their asset.

- Most of Defi protocols are made on open source and thus anyone can access them and refer them to make new codes and apps.
- Defi data is encrypted and hence cannot be manipulated
- Smart contracts are easy to program and can execute on infinite number of variables.

Cross chained Bridges

Despite all these benefits, there were certain issues that still needed to be resolved when it came to DeFi. It was not possible to exchange tokens. To overcome this issue the concept of cross chained bridges was created. They lock the asset on one blockchain network and copy it on the other network. These bridges are essentially unidirectional or bidirectional. The need for cross chained bridges emerged when Ethereum networks started to grow. Despite that, Bitcoin networks the largest source of liquidity. This led to establishment of wBTC bridge. This bridge only facilitated the conversion Bitcoin to Ethereum and not vice-versa. There were several other bridges like Multichain Bridge, cBridge etc.

These bridges face several issues like security, complexity of wrapped tokens and hesitancy from blockchain proponents. This led to the creation of cross-chain liquidity networks and decentralized exchanges which try to solve these issues. They facilitate blockchain interoperability which helps different blockchain networks to communicate with each other. This feature of cross-bridges has the potential of revolutionizing the world of Defi

Risks associated with DeFi:

- Price volatility which leads to a forced liquidation. Suppose a person wants to borrow \$400 by depositing \$1000 worth Ethereum. Suppose the loan to value is ratio is 50%. This means that you can borrow up to \$500 by depositing \$1000 worth Ethereum. Hence her loan is approved. But later if the price of Ethereum the person deposited drops to say \$600 then the person is eligible for a loan of \$300 only, whereas they have borrowed \$400. This leads to automatic liquidation of the \$1000 worth Ethereum.
- The security of DeFi projects is dependent on smart contracts. To keep the system transparent most codes for these smart contracts open source, they are available to public for inspection and to hackers for exploitation.
- Rug pull is scheme deployed by frauds to make money. Platforms like Uniswap allow their users to swap tokens by first adding liquidity to them. Once that is done the wallets of the two users are connected and tokens are swapped. The swap rate is decided by the platform itself. Frauds simply list tokens with no utility by adding liquidity to them and swap them for meaningful tokens. Once they have gained sufficient from a platform they disappear. In some cases, people clone tokens which resemble the actual ones and swap them with real ones leaving innocent people in a huge loss.
- Loss of private keys as another big risk involved with DeFi. Since there is no central body governing there is no option of forgot password.
- Platforms reward liquidity providers who add liquidity to the liquidity pool by giving them a certain share of the profit they earn. While it may seem like an advantage it could also result into an impermanent loss if the price ratio of the assets change drastically as compared to when u deposited them.
- Decentralized platforms also are also under the risk of regulatory scrutiny. Since there is no KYC needed the transactions are truly anonymous thus increasing the chances of fraud.
- High gas price due to lack of scalability. The high transaction fee on Ethereum is the reason why most people are not able to access DeFi.
- Defi protocols depend on oracles to feed them data like the price of Ethereum. There is always a risk someone manipulating the oracle protocols and making them inaccurate.
- Even though it is called as decentralized finance it is not truly decentralized due to the existence Admin keys. The existence of Admin keys is necessary for the app developers to make updates as well as for the developers to be able to switch on and off the operations of the app in case of situations beyond control to protect the user funds. It is important to define what kind of access do these developers have into the wallets of the users to ensure the safety of funds. Thus, with the development of Defi we are looking at a new era in the world of finance.

Criticism of Web 3.0 in Finance

- Even though web 3.0 and blockchain makes transactions more secure, there is no single authority governing the system. If some kind of fraud or unexpected event occurs there is no one to be held responsible.
- There is no real necessity or advantage established till now for converting your web applications to web 3.0. It would just mean the loss of their jobs for several people. Even though web 3.0 is a great emerging technology, its best usage is yet to be discovered
- A large portion of the blockchain industry is controlled prominent investors and capitalists. This means that Decentralized Apps are not actually decentralized. These investors can manipulate your Decentralized app easily if they want to
- Building Web.30 based apps is quite complicated and requires in depth knowledge about blockchain network and their implementation.
- There is a serious lack of patents when it comes to Web 3.0. The concept of Metaverse was also discovered with Web 3.0 but Meta has acquired several patents already. The reason behind this difference must be examined.
- While handling investments on Web 3.0 the smallest accounting error can lead to the loss of billions.

Conclusion:

Web 3.0 has the capacity to completely change the finance industry. It is definitely a strong tool but the applications for its optimum usage is yet to be known. A lot of research would be required before we dream about the mass adoption of Web 3.0.

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