Blockchain: Open Source Platforms-A Review

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Abstract

Blockchain is a revolution in systems of record. It has much more to it than just crypto currencies in because of its flexible nature. It can be applied to any activity that requires a database, and to tackle data management issues, especially around privacy, security and authentication, blockchain software brings to bear tools, and it follows that. Nowadays, the fastest-growing skill is blockchain who is leaving behind the skills like Tensor Flow and Machine Learning as well as led to an increase in demand for developers of blockchain. Ethereum, BigchainDB, HydraChain and Corda are some of the examples of blockchain platforms. Whereas, Ethereum is considered as one of the best open-source blockchain platforms, which helps in running smart contract and gives distinctive tools for programming to create them. This paper highlights the best open-source blockchain platforms which are used in testing of applications and for security purpose.

Keywords: Blockchain, Ethereum, HydraChain and Open Source platforms.

1 Introduction

Blockchain is a period stepped adjustment of unchanging archives of data that is overseen by a cluster of PCs; instead of any single element. It may likewise be seen as a public record [24]. It consists of a sequence of blocks. Various cryptographic standards are used to secure and bound each block of information with the other, in this way framing a chain. Blockchain network has no central expert or authority[19]. It's increasingly similar to a democratized framework with a universal and unchanging record, with the information open for the general public's viewing pleasure[12]. Anything fabricated utilizing blockchain innovation is extremely straightforward from its nature, and everyone associated with it is responsible for their activities [6]. Blockchain innovation can upgrade the fundamental administrations that are basic in exchange money [20]. It is more strong and secure than the restrictive, by its tendency [14]. It has brought together centralised models which is at present utilized in the biological exchange system [8]. At its centre, blockchain depends on a decentralized, digitalised and disseminated record model. Blockchain innovation makes a suitable, decentralized record of exchanges – the appropriated record – which permits the substitution of a single ace database [22]. It keeps a permanent record of all things considered, back to the starting purpose of an exchange. It is also called the provenance, which is needed in exchange fund, permitting budgetary establishments to survey all exchange steps and decrease the risk of misrepresentation [3].

As Blockchain innovation re-engineers our advanced framework, it likewise reformulates the security condition [21]. A fundamental interpretation of blockchain is that it tends to be applied to any action that needs a database and to handle data management issues, it follows that blockchain software brings to bear tools, especially around protection, security and validation [17]. Not to make any changes in information is the most fundamental property of one of dispersed record innovation's. Adjustment and falsification are not possible in case when a log is made of transaction or an activity[19]. It offers an unheard-of degree of straightforwardness and finally, security. Moreover, network administrators never approach to clients password, which means there is no path for them to control or make a change in clients' information. Instead,

they get just a preview of the identities of individual clients because of the utilization of private key authentication [5].

Blockchain is notable for supporting digital types of money, for example, Ethereum and Bitcoin, however, it can possibly change different businesses, including logistics and supply chain, healthcare, financial, insurance and substantially more [7]. To offer inventive arrangements and approaches to ventures and new companies, these well-known companies like IBM and Samsung are likewise adopting this innovation [18]. Blockchain is by all accounts the quickest developing expertise on the platform, deserting the abilities like Tensor Flow and Machine Learning [13]. It has prompted an expanding interest for blockchain developers [1].

2   Open Source Blockchain Platform

Blockchain platforms permit an improvement of blockchain-based applications. It can either be private or public. Ethereum, BigchainDB, Hydrachain, Corda, Hyperledger and Multichain are a few names that are used to built blockchain systems, permitting individuals to create and have applications on the blockchain. The development of dApp advancement is the reason behind the number of blockchain platforms coming day by day [18]. The selection of best platform depends on some different aspects of the blockchain. Some of the parameters need to consider is Type of network, Usage of language, Cost, Activities and Consensus method.
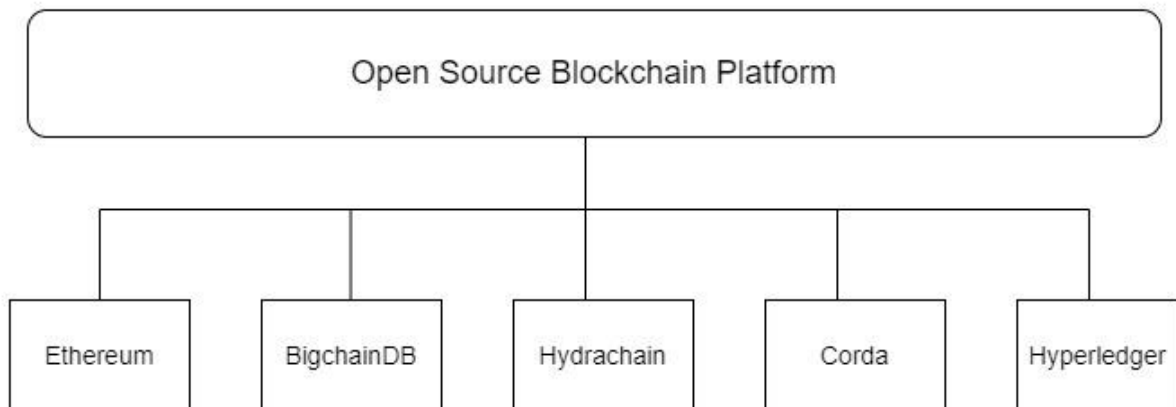

Fig. 1 Open Source Blockchain Platform

3   Ethereum

It is a platform for blockchain proposed in 2013 by Vitalik Buterin which helps in running smart contract and gives distinctive programming tools to make them. As it is a distributed public blockchain system that empowers developers to construct and deploy different sorts of next-generation decentralised applications without any problem[9]. Ethereum helps in issuing and designing cryptographic forms of money and tradeable computerized tokens. Even own democratic autonomous association is created by utilizing the ethereum blockchain, which mainly concentrates on running the programme code for any application that is decentralized [6].

To run a smart contract, it considers as a decentralized platform. The Smart contract includes such applications that run precisely as programmed with no chance of restriction, scam or outsider interference [23]. Such type of applications runs on a specially fabricated blockchain, a hugely surprising shared worldwide framework that can move an incentive around and depicts the property ownership. But, in more straightforward terms, Ethereum is intended to be a definitive software foundation of things to come. The

case of decentralization and dAPPs, it will become typical in future, and at that point, Ethereum must be its upfront, while the first application of blockchain innovation is Bitcoin which is still just a currency [7]. It carries with it the entire extent of what could be conceivable in blockchain innovation.

Etherum is a software platform that helps multiple developers in coding where complex codes are required for Blockchain application development. The core innovation of Etherum is EVM machine which entirely runs on the Etherum network[10]. Various developers predominantly use this tool as it helps to build and deploy lucid decentralized applications.

The top benefits of using Etherum are-
a. No third-party can alter your data
b. No possibilities of Corruption
c. Secured using cryptography
d. No chances of App going down

Apart from these tools, developers also prefer EOS. IO, Parity, and Multichain for developing Blockchain solutions. After Bitcoin, on the off chance that there is something that has made a buzz in the market, at that point, it is Ethereum [[4]]. It is one of the profoundly open-source and effective blockchains which likewise frames the base for the advancement of different applications.

Key highlights of Ethereum are :
- Strongly followed in Github.
- Gives the Ethereum wallet
- Open for free use
- Streamlines smart contract improvement.
- Proof-of-work based framework
- Aides in following ownership for monetary forms.
- Supports distinctive command-line tools like C++
  and Python
- Empowers engineers to hold and ensure their crypto-resources.

Advantages

1. Any outsider can't refresh or make any improvements to the information

2. Gives high security. Applications are secured against any hacking assaults or deceitful exercises in Ethereum.

3. Applications never go down due to zero downtime.

4   BigchainDB

It is an open-source dispersed record framework which is intended for putting away substantial informational collections and empowering its designers to convey different blockchain Proofs-of-concept and applications. It depends on a production-ready database which is the significant thing about BigchainDB. It makes it genuinely engaging for deployment in production with no compelling reason to wait for the remainder of the blockchain platforms to catch up [16]. The network can be permissioned, private or public, as per the access authorizations that entities have over the framework. On account of an open BigchainDB, any of the members can approach the system or can send their code and associate it to the database organization. A consortium or any administering body manages a permissioned version whereby every individual from the consortium is liable for dealing with their own node in the system [6]. It is likewise an open-source blockchain platform [4].

Key highlights of BigChainDB USP's are:

- It can deploy a decentralized framework utilizing different production-ready advances.
- Custom resources
- It is assembled by utilizing a league of business prepared DB nodes, as MongoDB occurrences, that store changeless data about resources in a synchronized way.
- Powerful query functionality.
- Supports custom digital resources and helps in setting up get to consents at an exchange level.
- No in-built currency
- Fast exchange processing
- Public and private network
- Low idleness.

Advantages

1. Accessible as open source

2. Consents can be set at the exchange level to authorize particular access.

3. Profoundly customisable.

4. No single point of control or failure.

5 Hydrachain

It is an expansion of the Ethereum blockchain stage that helps in sending and creating distinctive permissioned dispersed records [6]. It is profoundly good with the Ethereum convention. Furthermore, it gives the infrastructure to develop a different smart contract in the high-level language, i.e. Python, which can undoubtedly be utilized again. It is open-source, which helps to reduce development time and upgrade investigating capabilities as it supports numerous tools. It likewise expands the execution of local contracts. It additionally gives an elevated level of customization in many aspects like various parts of the framework can effortlessly be arranged to accomplish client needs. It is a collaborative activity of brain bot and Ethereum advances [4]. It is utilized to make a private record which is helpful for the venture despite the fact that it is not much well known yet is routinely refreshed at Github. This platform helps to make a Permissioned network which joins to the distributed ledgers [2]. The application of this product is set up for the monetary business, and also private chain arranged.

Key highlights of Hydrachain are:
- It is the most compatible software with Ethereum convention and also follows it.
- It supports instant finality to process it initiates
- It depends on responsible and enlisted validators that approve and propose the request for various exchanges.
- It is also good with an API.
- It supports simple deployment [2]. A test system can set up with nearly zero configuration.
- Also, it is well known for its adaptability feature.

Advantages

1. Accessible as open source.

2. Adequately adaptable to help various connected chains in a similar procedure

3. Distinctive consulting choices and support plans are given according to client necessities.

4.The elevated level of transaction security [6].

6   Corda

It is one of the preferable open-source blockchain platforms for developing and building different permissioned distributed record framework. It was made by the R3 consortium, which involves the biggest banks and permits them to deal with all the legitimate understandings between parties. It tends to be utilized by differing organizations like money related establishments to maintain a mutual record of the considerable number of exchanges, thus eliminating the requirement for all the included gatherings to continually keep a mind their books after they communicate with one another [15]. Corda support savvy contracts, coordinate the meaning of Bakshi, Clack and Braine. The smart contract joins business information and business rationale with related legitimate writing so as to guarantee that the budgetary concessions on the platform are established securely in law and can be upheld.

It is one of the essential issues for which it creates. Like other blockchain platforms, it likewise gives unchangeable records of information and safe storage of data. A noteworthy aspect regarding Corda is that it empowers to create interoperable blockchain systems that can execute in severe protection [22]. Right now, it is likely the leading dispersed record platform that has a pluggable agreement.

Highlights of Corda are :
- The whole exchange history on the Corda record is encoded and is imparted distinctly to the required.
- It is incredibly agile
- It is an adaptable platform which can expand itself to meet all business needs.
- All the various forms of Corda can interoperate with one another without much of a stretch on the Corda system.
- It is an open-source platform that can convey an appropriate blockchain for any business.
- It is sponsored by a strong network of specialists who are continually taking a shot at its upgrades, highlights, functionalities and many more.

Advantages
1. Its source code is accessible on GitHub under an Apache 2 permit due to open source
2. A profoundly adaptable and agile platform.
3. Effectively expandable to address client requirements.
4. Supported by a specialist network of designers.

7   Hyperledger

It is one of the most recently created Blockchain platform in the year 2016 by Linux foundation. Its goal is to help the utilization of Blockchain advancements across various businesses[4]. It is designed for private networks. It is an open-source network concentrated on building up a set-up of stable structures, apparatuses and libraries for big business grade blockchain arrangements. The members inside this system ought to be approved and ought to have believability in the funding to participate in the blockchain. It behaves as an unbiased home for different circulated record structures including Hyperledger Fabric, Indy and Sawtooth[25].

Highlights of Hyperledger are :
- Production prepared for undertakings.
- 180+ teaming up ventures

- Improved level of trust
- The higher level of privacy
- Query capability
- Flexibility

Advantages

- Modular Architecture
- To build a private blockchain
- Scalability, Performance and Level of trust
- Rich support of network
- Security of digital keys and sensitive data

Table 1 Comparison between various open source blockchain platforms

Features/ Platform	Ethereum	BigchainDB	Hydrachain	Corda	Hyperledger
Type of ledger	Permissionless	Permissioned or Private network	Permissioned	Permissioned	Enterprise
Purpose	B2C businesses	Best privacy and permission support system	Compatible with an API level and contract level protocols	Financial Service Industry	B2B businesses
Industry Focus	Cross-industry	Multi-industry application	Financial Services	Banking, Financial Services	Cross-industry
Crypto Currency used	Ether	No native crypto currency	Ether	No native crypto currency	Can be built using chain codes
Limitations	Open Financial System access	Data oriented solution	In presence of pending transaction only a new block gets created	No global broadcast of transaction across network	Complex architecture
Supported Language	Python, C++, GO	JavaScript and Python	Python	Kotlin, Java	Golang, Java

8   Conclusion and Future scope

In this paper, the various open-source blockchain platforms are covered which can be used in the testing of applications and for security purpose. Moreover, their features and advantages are also discussed

in detail. There is an ascent in professions in blockchain innovation, and blockchain has massively changed the essence of the innovation business. In the journey of a developer, these open source platforms are beneficial according to their requirement. A comparison is also provided between various open-source platforms based on some characteristics of blockchain for the purpose of this study. I have covered only five open source blockchain platform with their six features. There is a lot of existing Blockchain platforms. In future, some other open source platforms can be studied and compared which is not covered in this paper by considering different attributes of blockchain like consensus mechanism, design architecture and many more.

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