Blockchain Framework

CoCo Framework

Coco (Confidential Consortium) is an open source blockchain framework designed by Microsoft. Microsoft announced the 'Coco' in August 2017 in their whitepaper 'Coco Framework Technical Overview'. The source code of the Coco framework is planned to publish in Github by 2018. Coco is not just a standalone blockchain protocol like Bitcoin or Ethereum rather it provides a plat- form for building trusted networks using any of the existing protocols. Of course, Coco is designed to be compatible with any existing protocols such as Ethereum.

Specialties of CoCo

blockchain In their whitepaper, Microsoft points out some of the problems with existing systems and how Coco solve the issues.The main drawbacks they pointout of existing systems are

Low transaction throughput

The average processing rate of the public Ethereum network is only 20 trans- actions per second, which is far behind to meet the requirement in an enterprise environment. Other blockchain networks also fail to meet the enterprise level transaction rate.

High latency

The average latency of a public Ethereum network is about 10-20 seconds and it is 10-15 minutes in bitcoin network. Such high latency will create a bottle- neck effect in a business environment.

Lack of confidentiality

In a public blockchain networks, everyone is allowed to see every transaction. This is definitely not a welcome thing in the business environment where the competitors may also be the part of the network.

Lack of effective governance

Public blockchain networks are often self-governed or collectively governed by the users. The model is not suitable for many environments, especially for business level networks.

Low computational efficiency

As the network grows, the computational power required for mining also grows. Thus the energy required is very huge. The annual energy consumption of the bitcoin network is about 15 TWh !!!. Many attempts were made to overcome these issues and new blockchain plat- forms like Fabric, Corda etc. also came into existence. But some of these are designed only to meet the requirements of a particular business domain. Some others provided an enterprise level control and security by employing complex algorithms but compromises on performance.Furthermore, whenever a new protocol is introduced to accommodate a feature, the user has to leave behind the technology that he expertise. And it will take some time to understand and work with the new system.

Benefits of CoCo

According to Microsoft, the COCO framework eliminates most of the drawbacks of the existing systems and it offer

• Acceptable throughput and latency for meeting enterprise needs

• Richer, flexible yet simpler confidentiality models

• Network policy management and distributed governance

• Facilitate non-deterministic transactions

• Reduced energy consumption Coco achieves these performance indices through the use of Trusted Execution Environments (TEEs) like Intel's SGX or Windows Virtual Secure Mode (VSM).

This approach enables Coco to create a trusted networks of nodes and the dis- tributed ledgers are run top of these. The introduction of Microsoft coco framework is expected to make a big leap. As said earlier, the Coco is not a standalone blockchain protocol. Actually, it provides a foundation for building blockchain networks on top of it. Thus with Coco, it is possible to develop blockchains in any protocol and can integrate different blockchain technologies into a single project to satisfy different enterprise needs. And coco provides many additional features to ease and en- hance the development process. In conclusion, from the information available so far, Coco has the potential to be the cradle of blockchain based enterprise applications

Tierion

The importance and vicinity of Blockchain are increasing on daily basis. More existing platforms and services are shifting towards the Blockchain technolo- gy by perceiving the advancement it makes. Consequently, different tools and associated services are also emerging in the background. Tierion is such an associated platform which can be used to create a verifiable database of any data on Blockchain. Or it is a Proof engine for data verification. Developers use Tierion to check integrity and timestamp of data or file or any process. The platform offers API and Developer tools to anchor data into a distributed ledger.

The capabilities of Tierion can be utilized by financial institutions, Insurance firms, etc. for safeguarding their critical data from unauthorized modifications. With Tierion, they can track each and every modification being made to the property titles, contracts, digital assets etc. Chain point, an open source protocol and distributed service developed to anchor data into the Bitcoin and Ethereum Blockchain, is the backbone of Tierion. The company is presently working with the Blockchain development projects of Philips and Microsoft to expand the application of it to ore areas.

Features of Tierion

Following are some of the features of Tierion which makes it an advanced tool for data verification.

Digital Receipts: The digital receipts issued by Tierion is a timestamp proof of a transaction took place.

Audit Trail: Tierion generates audit trials for data which are cryptographically verifiable. The trial will track a data from the origin onwards.

Immutable Records: Properly tracked data guarantees the immutable record keeping.

Secure Customer Data: They create verifiable customer data and reduce KYC and compliance cost.

Hash API: With Tierion 'Hash API' developers can anchor records with mini- mum cost.

Data Collection: Tierion is also used collect data. from the web and mobile applications

Integrate with other Apps: Zapier helps Tierion to integrate with other apps such as Gmail, Twitter, SalesForce etc.

Chainpoint

It contains all the information needed to verify the data without intermediaries. Chainpoint is the main component of Tierion which creates the timestamp proof of a Blockchain transaction. The initial version of Chainpoint was introduced in June 2015, and later versions Chainpoint 2.0 and 3.0 released in August 2016 and August 17 respectively. The ultimate proof from a Chainpoint or a 'chainproof' is a trail of operation cryptographically linking your data to one or more Blockchain Chainpoint Proof Creation Steps

Following steps are involved in Chainpoint proof creation.

• The user submits the hashed data to a Chainpoint.

• Chainpoint returns a hash_id (UUID) with a timestamp to the user.

• Chainpoint combine the submitted hash with UUID to obtain a new hash.

• The same hash is combined with a 'NIST Beacon' and a new hash is created

• The new hash is sent to aggregation service.

• Aggregation service aggregates the hashes into Merkle trees.

• Then the Merkle root of the Merkle tree is sent to the Chainpoint calendar. (Various Chainpoint servers are kept in agreement to create a Chainpoint calendar. In fact, Chainpoint calendar is a Blockchain.)

• Calendar data is organized as blocks, and they are stored in a normal database called CockroachDB.Calendar blocks are then anchored to Bitcoin or Ethereum Blockchain.

• Now the Chainpoint starts to monitors the Blockchain. On each anchoring, if the transaction receives an adequate number of 'Validation', validated blocks are added to the calendar.

• Each validated blocks contains data to create the final Chainpoint proof.

• To finalize the proof, Chainpoint appends the partial proof with final data. And the final proof is created.

Benefits of Tierion

The major benefit of Tierion is that it eliminates the role of the third party in data verification. Anyone with the proof issued by Tierion can verify the entire transac- tion path of a data. It has a highly scalable architecture and better performance standard. The time stamp accuracy is achieved with Network Time

Protocol (NTP) and National Institute of Standard and Technology (NIST) server. Immediate anchoring is another feature, Chainpoint anchors the data whenever a new hash is submitted to Chainpoint service. And indeed it is a cost-effective solution.

BigchainDB

The BigchainDB is a scalable distributed database which can be used for the blockchain technology. In a normal case, blockchain itself is the data- base. As in the case of bitcoin and many blockchain applications the blocks is providing the storage facility too. There are no additional databases. But the BigchainDB provides an alternative to this method. The BigchainDB will work as a distributed database with all characteristics of a blockchain

The BigchainDB was first introduced as a distributed database and later the characteristic of blockchain technology has added to it. Now BigchainDB has the features of both traditional blockchain (like bitcoin) and the distributed database and it supports both private and public networks. BigchainDB is a NoSQL(Non-SQL) database which provides a storage mechanism and data retrieval models other than the tabular relations used in relational databases. The commonly used NoSQL types are Key-value stores, Document database, Wide column stores and Graph stores. Each of these NoSQL databases adopts different methods of data storage. The developer can select any of the above models according to the requirement and use case.

Why BigchainDB?

Normal blockchain networks like bitcoin suffer from several problems like low throughput, high latency, low storage capacity etc. In a bitcoin network, the latency before a single confirmed write is about 10 minutes and through- put is only a few transactions per second. The storage capacity is also not promising as it is still pegging at a few dozen GB. But in BigchainDB the throughput is about 1 million writes per second and latency is also sig- nificantly lower. The storage capacity of BigchainDB is that of a distributed database. Which means the capacity will increase as the number of nodes increases.

The BigchainDB has the following features.

 • Decentralized control:-No central server for managing the database

• Immutability:-Once a change is made to the database it is immutable.

• Creation & Movement of Digital assets:- Digital assets can be created or manage the BigchainDB

Models in BigchainDB Three models namely Transaction model, Block model, and Vote model are the backbone of BigchainDB. These models give it the advantages of Blockchain as well as the normal database.

Transaction Models in BigchainDB The basic component of BigchainDB is transactions. Every data stored in it will the details of the individual transaction.

 Two types of transaction models are used in BigchainDB

1) Creation Transaction 2) Transfer Transaction

The "Creation Transaction" is used to initialize the details of an asset in the blockchain and the "Transfer Transaction" is used to transfer ownership of the asset. A transaction in a JSON document will have the following structure Id: Is the primary key. It will be the hash value of that particular transaction, Version: It is the version number of that transaction model, Fulfillments: Each fulfillment is a pointer to the unspent assets. It will point to the ownership of an asset, Conditions: List of conditions that should be fulfilled by the transfer transactions, Operation: String representation of the operation to be performed, Timestamp: Transaction creation time in UTC. Provided by the user, Hash: It is the hash value of the serialized payload, Payload: It can be any JSON document. For a transfer transaction, it will be empty. All the transactions in the BigchainDB will be stored in the above mentioned structure only.