



MIMOS Develops Private Enterprise Blockchain Applications Module

The advancements of Blockchain, though still young, have the potential to be revolutionary in the future. Technologically, Blockchain is a digital ledger that is gaining a lot of attention and traction recently.

 By Philip Chan

A French consultancy estimated that consumers could save up to US\$16 billion annually in banking and insurance fees through blockchain-based applications. Judging by its success and increased usage, it seems that Blockchain is poised to rule the digital world of the near future.

In keeping abreast with latest digital evolution, MIMOS Berhad has conducted research on the private blockchain technology and developed its own application integration module for enterprises based on the Hyperledger Fabric Chaincode.

The newly developed MIMOS application integration module comprises the Automatic Blockchain Configuration and Deployment system (ABCD) and the Distributed Enhanced-code Function Generator (DEFG).

Using this system, MIMOS has implemented a number of blockchain applications and operational applications including a palm oil traceability system, contactless payment, halal traceability, document trusted repository and the ITSM (IT management service) issue ticket tracking.

Presenting details on MIMOS' research and development on Blockchain

technology webinar entitled Private Blockchain Technology, Hyperledger Fabric Chaincode Development, Encik Ahmad Zuhairi Ismail, MIMOS Head of Blockchain Technologies Lab, said his company's Hyperledger Fabric or R3 Corda system is more suitable for implementation in the enterprise environment.

Ahmad Zuhairi said Blockchain technology is a structure that stores transactional records, also known as the block, of the public in several databases or in private, known as the "chain," in a network connected through peer-to-peer nodes.



Ahmad Zuhairi Ismail
Head of Blockchain Technologies Lab

“Typically, this storage is referred to as a ‘digital ledger.’ Every transaction in this ledger is authorized by the digital signature of the owner, which authenticates the transaction and safeguard it from tampering. Hence, the information that the digital ledger contains is highly secured.”

“These blocks are distributed across multiple computers in the participating nodes in the network so that they have multiple copies of the data across the network. Whatever data regarding an asset is stored in the growing chain of blocks and will remain unalterable,” he explained.

The special characteristics of a Blockchain are:

1. Immutability – once the data is written into the blockchain, it stays there and cannot be changed. Whatever changes later will be considered as a new record, while the previous record will remain unchanged. Only the new record will be added with a new value.
2. Traceability – data is traceable since the new data can never be changed. Data can always be traced back with the new data.

3. Provenance – users can always go and check back with the data values up to the origin of the data itself.
4. Consensus – transactions are done with the mutual consensus of users resulting in smoother, safer, and faster transactions. Once a data is written and agreed upon, it cannot be changed and shall be considered final.
5. Distributed – once a data is written, it is stored in a distributed manner and also written on multiple nodes inside the network.
6. Highly Secure - it uses a digital signature feature to conduct fraud-free transactions making it impossible to corrupt or change the data of an individual by the other users without a specific digital signature.

Blockchain applications offer invaluable solutions to problems associated with a normal system that is owned by a single company. Its special features of immutability, traceability, and high security prevent data tampering and any dispute claims of changed data. To overcome these problems, it suitably fulfils audit compliance with utmost data security. The final data will be the trusted data, thus dispelling any disputes,” assured Ahmad Zuhairi.

MIMOS BLOCKCHAIN PROJECTS

Ahmad Zuhairi gave a thorough insight into the successful implementation of the MIMOS HyperLedger Fabric system related to several projects commissioned by the company.



Palm Oil Traceability

For palm oil traceability, tracking of the collection of data for the traceability was undertaken from the source of

origin starting from location plantation of the palm oil fruits, followed by point of collection centre, to destination of mill and refinery right till the distribution of the end product or the consumers. The blockchain tracking and traceability functions are important requirements to meet the international standard and practice of sustainable compliance for Malaysia’s exports to the global market.

Contactless Payment Tracking

This contactless payment tracking that adopted the MIMOS Blockchain system was undertaken in collaboration with a third party e-wallet provider. The latter’s data was connected to MIMOS’ Blockchain server to enable all the transactions to be stored and tracked in the blockchain. This e-wallet system runs on a mobile interface where parents can create a wallet and assign the wallet to the students. The students are then given a contactless flexible card to be used at the school co-operative or café to pay for whatever they purchase. The parents will immediately receive notification of any purchase transactions made by the student. The parents can also flexibly allocate a certain amount allowed for their children’s spending on a daily or weekly basis. Each of these transactions are connected and stored into the blockchain for traceability.

Vaccine Traceability System

MIMOS is currently working on the ongoing vaccine traceability system project in collaboration with MOSTI and Ministry of Health. A list of vaccines for Covid-19 would be submitted by MOSTI Minister. This project involves the tracking and tracing of the vaccination exercise for all Malaysians to be undertaken nationwide. Its aims to establish the creation of a Digital Health Certificate in compliance with international standards for every citizen as evidence of their vaccination for the convenience and benefit of their interstate and national cross-border travels.

ITSM Ticket and SLA Tracking

Another project that has been done in MIMOS is the IT Service Management (ITSM) ticket tracking. It is important

to track the tickets because there is a Service Level Agreement (SLA) tracking which is being closely monitored. This is to ensure that there is commitment to resolve the issue should the ticket have any problems. It is important that the open and resolved time is tracked and confirmed to prevent any data tampering. By using this blockchain, the data can be confirmed to be secured and remain undisputed when the SLA report is submitted at the end of the year.

Hyperledger Fabric Blockchain

In outlining the superiority of MIMOS Blockchain technology, Ahmad Zuhairi explained that various applications and solutions were employed in the Hyperledger Fabric system which primarily consist of a few different types of nodes.



He said the critical component is the peer node and is the hub of the blockchain. It stores the chaincode, data and the blockchain, as well as the block-to-block in the peer. Additionally, there is also the orderer node that processes the nodes to be written into the peers in the blockchain. The MSP, a membership service provider, registers the blockchain users, the organisation and registered members.

All these nodes are connected to the channels, either through a multiple channel or single channel depending on the business model and requirements.

The channel will be connected to the peers. And, the client applications can either be a web-based application or a mobile application to be interfaced to the user.

The MIMOS Blockchain technology driven by its Hyperledger Fabric Integration System is easily deployed and implemented through the following applications and solutions:

1. **Blockchain Application Integration Module (BAIM)** – This is the middleware created as the bridge between the application and the hyperledger fabric. Without this middleware the use application will need to call the blockchain API, which is in the SDK format (hyperledger fabric SDK) in order to talk to the blockchain. It is not a just simple calling but the need to understand what's the flow and calling because of the complex process to write into the blockchain. This complexity is being hidden by the BAIM middleware. The application developer can call a REST API that is provided by BAIM using a normal web socket and the complexity will be handled by the middleware API in order to call or write or read from the hyperledger fabric blockchain.
2. Another MIMOS-created solution is called the ABCD, a traditional method whereby a blockchain engineer will have to obtain information from the apps owner on the kind of blockchain required. This will be translated into the configuration file manually in order to create the blockchain. With the ABCD system, the application owner can then experiment with the configuration of his choice to choose two peers for two organisations or

more. This system will create the blockchain network and enable the speedy running of the network.

3. The DEFG is one of the module inside the ABCD system. This module reads an existing database that's already running, and will be useful for interacting, connecting and putting data into the blockchain. The DEFG module can read the current database structure and generate the chaincode and put it into the blockchain. With the chaincode completion, the blockchain can operate immediately.
4. **Chaincode Development** - Chaincode is the running in the nodes in the blockchain. It defines the assets and related transactions of the assets. It describes the attributes to store and track on the asset and the operation needed to be done with the asset. This is the business logic for the hyperledger which is known as a smart contract. Any writing or reading from the ledger from the blockchain from the chain of block will have to go through teaching code.

At the simplest level, a blockchain immutably records transactions which update states in a ledger. A smart contract programmatically accesses two distinct pieces of the ledger – a blockchain, which immutably records the history of all transactions, and a world state that holds a cache of the current value of these states, as it's the current value of an object that is usually required.

Smart contracts primarily put, get and delete states in the world state, and can also query the immutable blockchain record of transactions.

ABOUT BLOCKCHAIN

There are two types of Blockchains -- public permissionless blockchain and private permission blockchain.

The public permissionless blockchain is normally a large network blockchain where anybody can join the blockchain network. They need not identify themselves and can join anonymously. It uses a complex computational puzzle to verify the validity of data to be inserted into the blockchain. This computational puzzle is known as proof of work or mining of writing into the public chain cycle takes longer time and lots of resources.



On the other hand, the permission private blockchain only allows registered and permitted participants. Identity of persons and organisations are known. It doesn't require mining or proof of work puzzle by participants for data to be written, making it more efficient by using consensus algorithm.

The Bitcoin and Ethereum network is very popular in terms of cryptocurrency and token, while the Hyperledger Fabric or 3R Corda is more applicable in the enterprise implementation environment.

➤ For collaborations and opportunities in the Blockchain Technology, contact MIMOS Berhad at **+603 – 8995 5000** or email to **info@mimos.my**.

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