

Development and Deployment of a Blockchain Based Cross Border Fund Transfer System using Hyperledger Fabric

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Abstract—For financial institutions operating borders, this project is set out to streamline through Hyperledger Fabric based solution. In easier terms, this system ensures access to full data details and also allows integration with other new bodies within the sector, whether they are in-house or not. One of its highlights is helping banking institutions be able to conduct immediate money transfers worldwide without any go-between-intermediaries involved such as correspondent bank' systems. This technological platform promotes openness in banking by letting its users access real-time information about their own funds. Blockchains help solve problems related to such things as cyber security as well as availability in financial markets because we use it the blockchain for everything we do.

Index Terms—Blockchain, Hyperledger Fabric, Cross Border, Fund Transfer, Bank, Forex.

I. INTRODUCTION

The global economy is becoming more interconnected, which means there's a growing need for faster and more secure financial transactions across borders. Traditional banks are okay, but they often struggle to keep up with the demands of modern international business - they're slow, expensive, and not always transparent. That's where blockchain technology comes in, specifically platforms like Hyperledger Fabric. Fabric uses a distributed ledger system that keeps transactions safe and transparent without needing a central authority. This means how we store and access financial data is being completely transformed. Hyperledger fabric is one of the most popular used in the financial fields because it only allows the approved clients into the network. By this feature along with precise architecture and robust structure makes it easier for the enterprise to be used in this sector. The use of Hyperledger Fabric is mainly based on the small scales which helps to automate difficult tasks and increase the efficiency which reduces the time in resolving the bigger problems.

The main feature of Hyperledger Fabric is due to its peer-to-peer network structure which not only reduce the cost but also increase the rate of speed of international transfers. The structure of the Hyperledger Fabric is decentralized where the transactions can be done in one step rather than a series of checkpoints. By this the speed of the transactions can be reduced from months to few days. The motive to introduce

Hyperledger Fabric to the market is to make the global finance to be more translucent. This helps the authorized parties to monitor the transactions without any problems and reduces uncertainty. The system is built with high security measures which makes it more trust worthy and used by most of the financial operations. The use of Hyperledger Fabric has been more compatible for different financial systems which makes the transactions from different regions of the world easier and more reliable. This will help the smaller business and banks to make use of this feature and make the financial sector to grow more in different regions of the world.

Some of the major challenges which should also be focused on while using this feature helps to improve in the future developments. Regulations, integrating the existing systems and standardizing different blockchain networks are some of the features that needs to be pointed out and need to be integrated. But the use of Hyperledger Fabric will try to replace all this feature and make the financial operations smoother. When different organizations know about the Hyperledger Fabric and its advantages in the sector, it will be a boost in the global financial market and in the number of transactions that may be done without any limitations. This will also bring efficiency, transparency and availability of international financial system that keeps the different regions of the globe connected. This might take some time to be fully established but will definitely a major improvement in the global financial sector.

II. LITERATURE SURVEY

Hyperledger Fabric known as a permissioned blockchain setup, has transformed how blockchains work by bringing in better speed more choices, and stronger privacy rules. It's different from old blockchains that sort then do tasks because it does tasks, sorts, and checks them in order. This fresh way solves problems big databases have by sharing the data with all users, getting rid of the need for one main computer to handle the data sharing. While blockchain networks have lots of good points, people still wonder if they're as quick as our usual computer systems when lots of users are involved. To help clear this up, experts have used something called Stochastic Reward Nets (SRN) to mimic the Practical Byzantine Fault

Tolerance (PFBFT), a way of agreeing on things in the system, to figure out the usual time it takes for networks with even 100 users to agree. They're looking into how well blockchain networks can grow and how they react to different setups, which gives us good info on how they perform when they get big. Hyperledger Fabric has become popular as a blockchain technology you need permission to use. It helps because it has a ledger no one can change and strong security. But people still worry about how well it works and if everyone can use it. Studies look at how fast Fabric can run. They find problems and try to make things like block size and rules better. People want to make Fabric work well when we use it for real. Blockchain is good for sending money between countries and keeping track of who owns property. But it's hard because there's no world-wide rules everyone agrees on. Even so, some private blockchain projects work well on a small level. They make sending money faster and cheaper because you don't need middlemen. As everything gets better, people trying to solve problems want to make sure smart contracts are safe to use and make sending stuff faster even when there are rules about block time and things going wrong with endorsements.

III. METHODOLOGY

A. Hyperledger Architecture -

Blockchain technology works as a network of connected nodes. This system handles transactions, keeps a record of data and current states, and runs special programs called chaincode. These chaincode operations are important because they define the transactions in the network. A key feature is the endorsement process. Only transactions that are approved or "endorsed" can be finalized and affect the network's state. This ensures consensus and security in the system. The system consists of the network which has different chaincode. One among is the system chaincode which handles all the administrative tasks and controls all the sensitive data related to the blockchain. This particular chaincode will provide the flexibility and can change the functionalities according to the scenarios. In this we have created a simple network environment which includes all the necessary parts for the user registration, data queries and updates. In this framework we will be demonstrating how the network interacts with other features and implement the smart contract it will use. This contract will provide different ledger which serves as a different purpose of this application. The process to develop this application was to let users to search and modify the assets which are stores in the ledger. The whole application was designed and written using the JavaScript which can be changed easily according to the queries and updates. This approach will help the application to run in a smoother way and easily understandable by the user to interact with the blockchain network.

B. CBFT Network Architecture -

We will also be using Docker composer another system architecture which helps to connect different parts of the application. A certificate authority (CA) checks the transactions

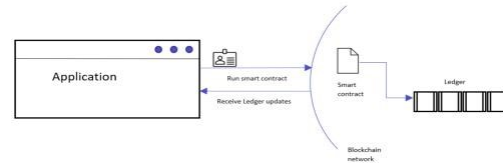


Fig. 1. Architecture of Hyperledger.

and is placed in an orderly manner. In the network the peer resembles the individual bank system which is involved in the blockchain transactions. CouchDB is used to store, retrieve and manage the data which is related to the Hyperledger Fabric. The blockchain and the application is communicated via the command line interface (CLI). The Hyperledger Fabric will increase the financial transactions and raise the fund transfers in different regions. This allows the transactions more in real-time which makes it more reliable and time efficient. This platform will provide transparency and accountability by enabling fund tracking and transaction visibility, which prevents any threats and to increase more security in the transactions. Different challenges in the system such as the Standardization, Integrability and cooperation with the different financial institutions and sectors. Since the transactions has been increased, the availability and affordability will be the major issues which requires future development.

IV. RESULTS AND DISCUSSION

In recent years, the growth of the Hyperledger Fabric has been enormous making the transfers over the cross-borders more effective than the old banking methods. By it execute-order-validate method, it makes the transaction execution form validation which makes it faster in processing of the transaction and reduces the time complexity. The smart contracts which make the transactions automatically will not only increase the efficiency but also maintain the security of the application without any existing of the middleman. Since the system is decentralized at any point if a single point doesn't execute, then that point will be replaced not the whole system making it more reliable. Some of the major benefits of using this will help to maintain low cost, transparency, more transactions and proper security measures for the transactions. These improvements will help in the international fund transfers to different regions of the world more efficiently and in real-time for any business requirements. The results which are obtained are promising but also there is a need for the development of the application in wider scale which can reach to different regions of the world making it more reachable to the users. The use of this application will boost the number of financial transactions which provides efficiency, reliability and security for the traditional banking methods.

The CBFT Application will use the Hyperledger fabric to make the cross-border transactions much easier and robust. This allows adding new material, verification of the materials and querying the blockchain data without any existing of

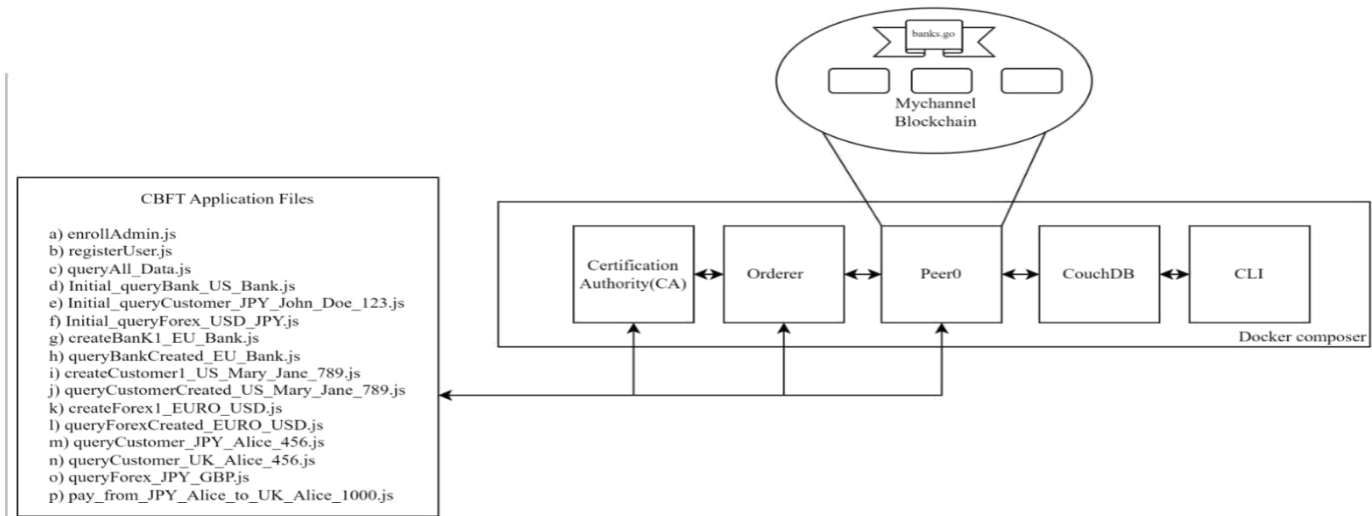


Fig. 2. CBFT Network Architecture.

a middleman. The design and approach of the Hyperledger Fabric will be suitable for the use cases as well. In the network of the blockchain which contains major features such as the Certificate Authority, CouchDB, peers and command line in-terface which makes overall a reliable to use application. This also includes affordability, reliability and secure transactions which makes it more translucent. In this application we will be not including the middleman which makes it more secure and reduce the risk of any sensitive data to be altered or processed by the middleman. This application points out the traditional cross-border transfer problems by providing the use of decentralized network that boosts up the transactions and reduces the cost. Some of the challenges that may occur during this process are the scalability, faster transactions, compatibility of the system and so on. The main reason why this application is so diverse is due to its cost-effectiveness, reduces the time complexity and provides security to the trans-actions that may be done inside the blockchain network. By tackling most of the issues such as the cross-border payment issues, expanding the scalability to handle more transactions at the same time and implementing more features to make the application more efficient and reliable to the users.

V. CONCLUSION

In summary we have discussed about how the Hyperledger Fabric will change the scenario in the blockchain network by providing the cross-border fund transfers much easier and having the potential to boost the international financial transac-tions. The system uses the decentralized network which allows the transparency of the transaction more in real-time and is not reliable on any of the features. Some of the major features includes providing robust mechanism for better security, real-

time transactions and smart contract integration. The main rea-son to use these features is to make this application more cost-effective and to avoid any risk during the financial transactions. The platform provides some belief to the users making up to the inefficiencies of the cross-border payments and improving the features for the future development of this platform. This project explains about the blockchain technology in finance, where the users can easily access the web interface and make their transactions in more secure way. Hyperledger Fabric-based approach provides a overall view into the future of secure and efficient international fund transfers.

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