

DEVELOPMENT OF BLOCKCHAIN BASED LETTERS OF CREDIT NETWORK

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ABSTRACT

This project is to track Letters of Credit (LC) from the point of application to the point of settlement. An LC can also be called as a draft, documentary credit, or banker's commercial credit is a guarantee from a buyer to pay a seller according to certain terms and time periods. Banks will cover the entire amount or the remaining portion of the purchase if the buyer cannot pay. When parties who do not trust each other are involved in international trade, banking channels are used to make payments. In such situations, LCs are a common payment method. The issuing bank issues a Letter of Credit to a confirming bank, which pays the exporter in accordance with its terms.

Due to its complex financial and administrative operations, the LC process is usually inefficient and time-consuming. Our main aim of the project is to overcome this limitation of LC by using blockchain technology. It is reported that global finance companies which do not follow this technology require 7 to 10 days of time for verification and authorization of an international trade transaction. But by using this Letter of credit with blockchain technology, it takes only 2.5 hours and this process is very secure.

Keywords: Blockchain, Hyperledger Fabric, Letters of Credit

1. INTRODUCTION

Conventional Letter of Credit is a slow procedure because the process of document exchange takes place via post, email, etc. which will take nearly 10 days of time and also the process is not secure. So, here we are introducing Blockchain technology in Letter of Credit which provides all parties a common distributed ledger system as the underlying framework for recording, reviewing and verifying documents. So, this process is very secure and the time taken is just 2.5 hours.

A blockchain is a network of decentralized nodes that stores data. It is a great technology to protect personal data in the system. This technology helps us to share analytical data and keep it safe and confidential. It is the perfect tool to keep all the relevant documents safe in one place. Blockchain can be represented as a decentralized peer-to-peer (P2P) network of personal computers called nodes. This network store and record historical or transactional data.

So in our project, we are going to build and deploy the business network (Letter of Credit network) using blockchain on local Hyperledger fabric which will introduce privacy in the Blockchain ledger. Since blockchain ledgers are immutable and information regarding transactions could not be deleted or tampered with.

2. EXISTING METHOD

Undoubtedly, banks and financial institutions are the foundation of international trade, without which international trade would not work. An example of this is the issuance and advice of so-called Letters of Credit (LC) by financial institutions. LC is a document issued by the Buyer's (Issuing) Bank guaranteeing that the Buyer's (Applicant's) obligations to the Seller (Beneficiary) will be performed in accordance with the schedule and mutually agreed terms. If the buyer is unable or unwilling to pay for the goods or services, the issuing bank is responsible for paying the full or remaining amount.

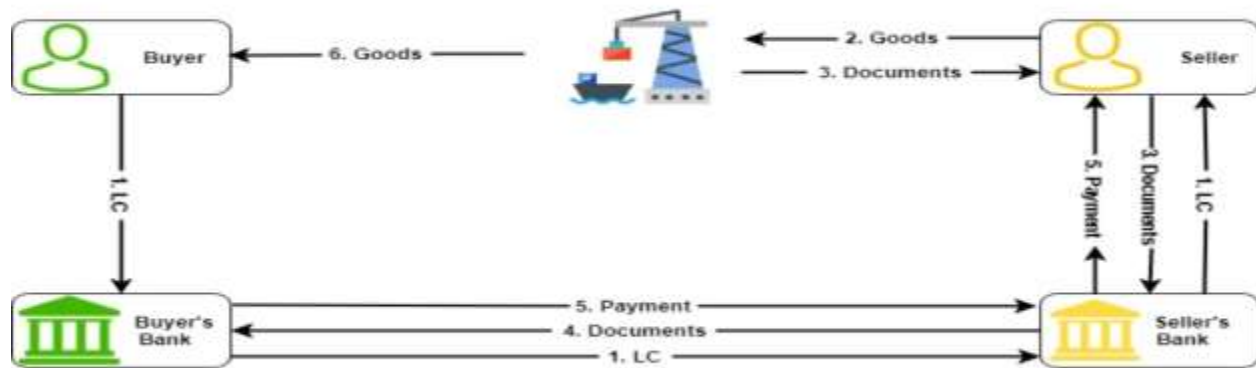


Fig -1: Conventional LC procedure

2.1 Problems with Conventional LC

When it comes to payment and delivery terms, there are different types of letters of credit, such as At Sight, Back-to-Back, and Deferred and each type have its own complexities and costs. Almost all LC processes involve at least two banks (the issuing/buyer's bank and the advisory/seller's bank) in addition to the buyer and the seller themselves (there are other parties such as confirming banks and designated banks). Traditional LC processes require a large number of physical documents and messages to be exchanged between parties by post, fax, or at best email. This method of communication slows down business processes, introduces unnecessary manual work, and reduces visibility. If all goes well, it will take 7 to 10 days to exchange the documents.

3. PROPOSED METHOD

The proposed method is Blockchain-Enabled LC which is having mainly 2 advantages.

1. Blockchain-Enabled LC is Faster

Blockchain technology facilitates LC procedures by making them faster and simpler. Enabling the LC process with blockchain technology reduces the document exchange process from 7-10 days to just a few hours. Blockchain makes this possible by providing a common distributed ledger system for all parties as the underlying framework for document recordkeeping, review, and verification. The impact of this reduction in time on international trade is enormous, lowering operating costs and lowering prices for consumers.



Fig -2: Blockchain-Enabled LC

2. Blockchain-Enabled LC is Securer

Blockchain-enabled letters of credit are safer, more transparent, and thus more trustworthy for counterparties. The decentralized nature of blockchain databases makes data and contract manipulation almost impossible. Once the information has been submitted to the system, it is impossible to edit or change the content of that document without leaving traces and notifying other parties. Blockchain-enabled LCs therefore greatly reduce the likelihood of fraud in international trade.

4. DESIGN METHODOLOGY

4.1 Design Flow

This describes the flow of the proposed model. First, you need to create a business network (Letter of Credit network) and deploy it to your local Hyperledger Fabric network via the IBM Blockchain Platform for VS Code. These business networks are executed when conditions are met.

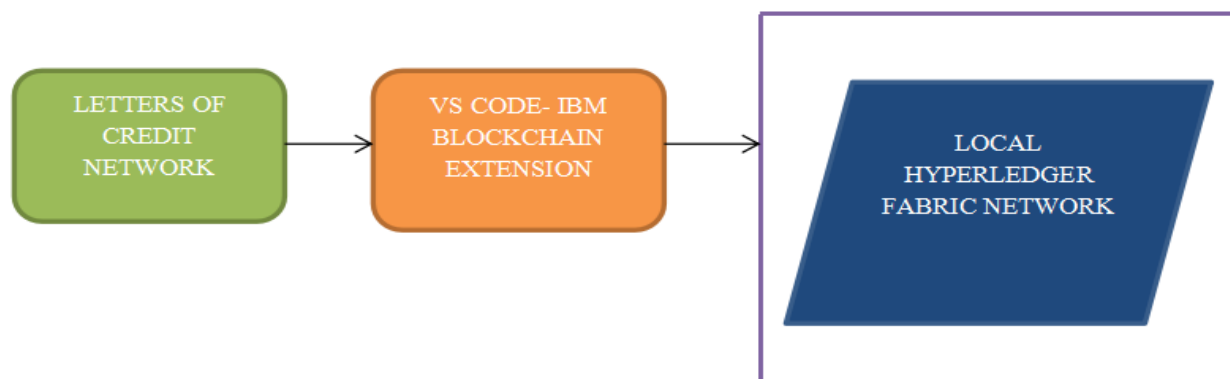


Fig -3: Flow Chart

4.2 Steps for Implementation

1. Blockchain installations such as Docker, Docker Compose, Hyperledger Composer, etc. as required.
2. Destroy a previous set up
3. Hyperledger Fabric Start-up
4. Creating PeerAdmin card
5. Creating and deploying business network
6. Creating Business Network Archive File (BNA)
7. Install and Deploy BNA file
8. Testing our business network in Hyperledger composer playground
9. Generating a REST API server
10. Generating an Angular application which uses the REST API

5. RESULTS

We have tested the network in Hyperledger composer playground which is a web user interface to model and test our network but it is not optimal. So, we have generated a REST API server to interact with our business network by

submitting the transactions using get and post method and also used the angular application which uses the REST API. So here are some screenshots regarding the status of transactions.

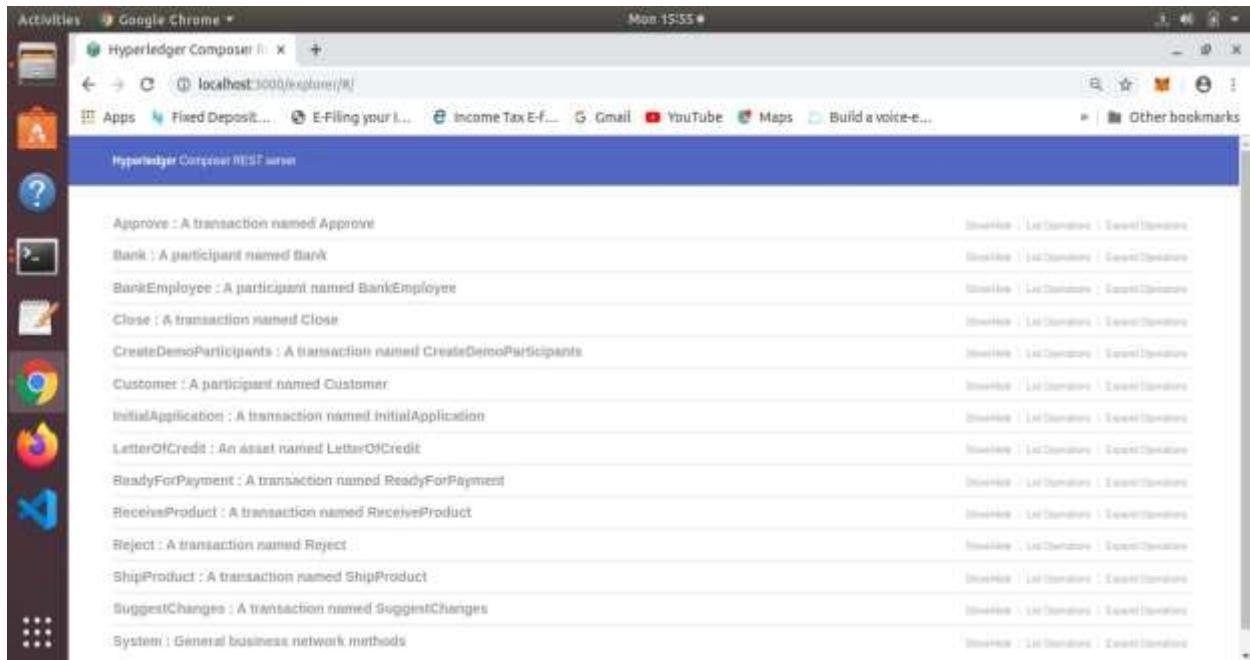


Fig -4: REST Server at localhost 3000

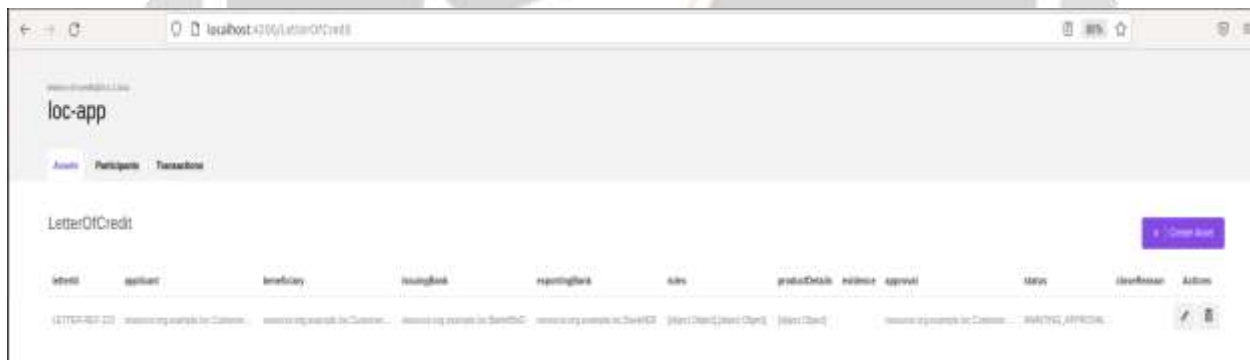


Fig -5: Awaiting Approval



Fig -6: Approved



Fig -7: Shipped

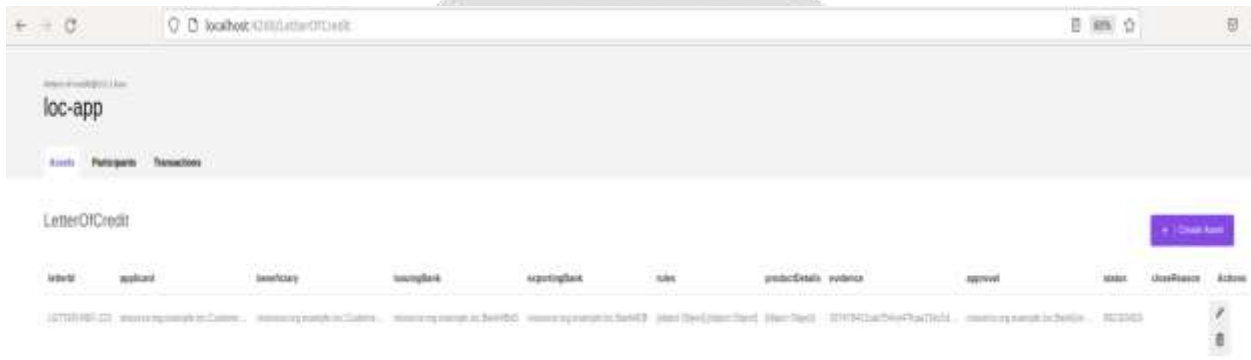


Fig -8: Received



Fig -9: Ready For Payment

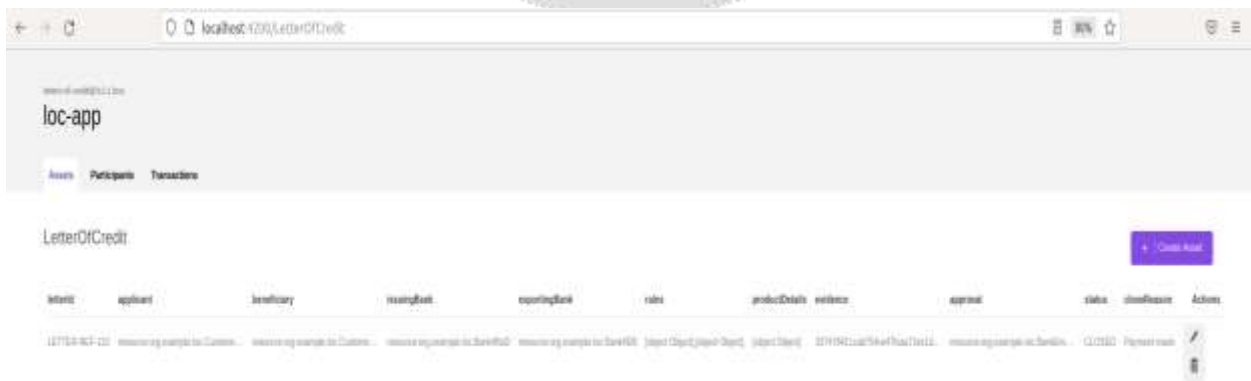


Fig -10: Closed

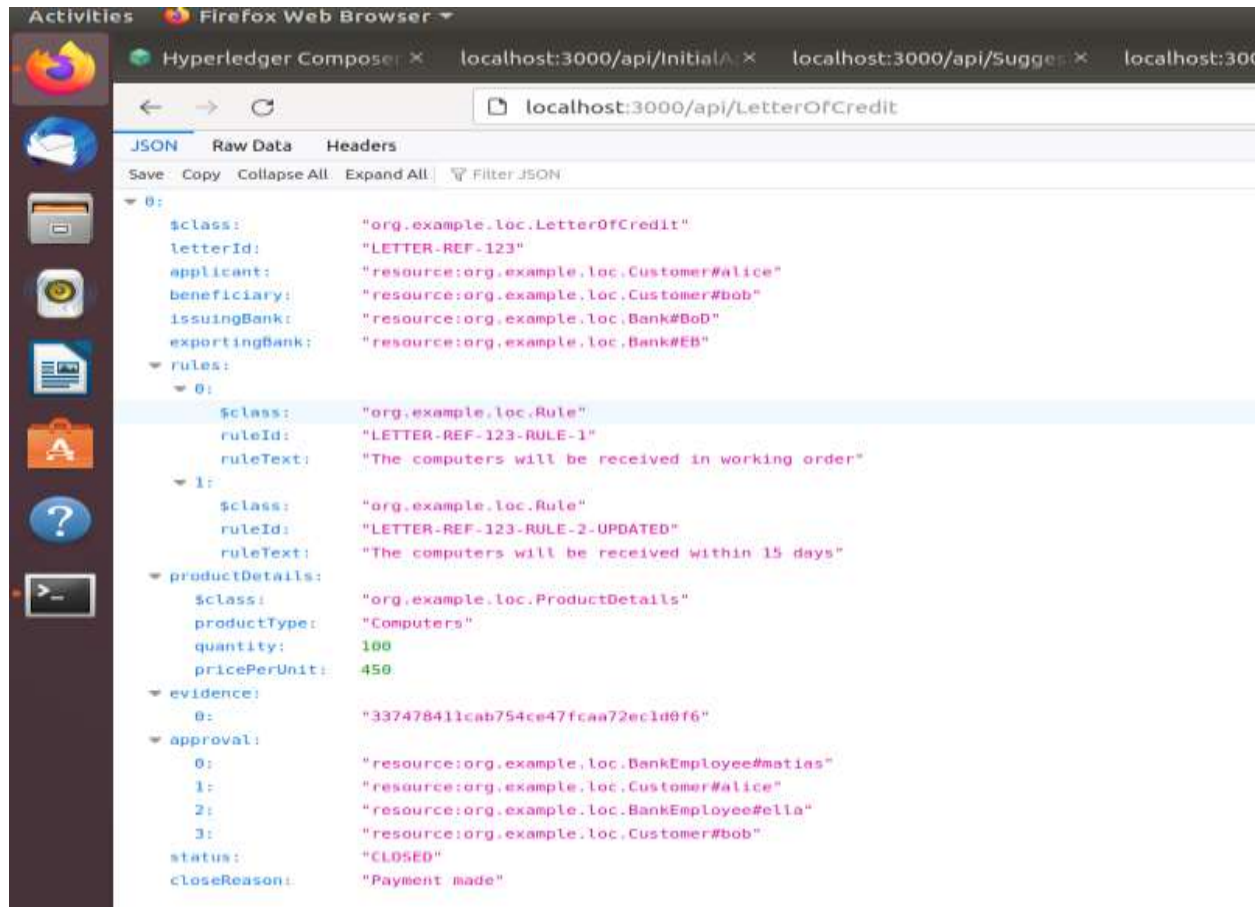


Fig -11: Final Letter of Credit Asset

6. CONCLUSION

Finally, a business network model has been developed, packaged as a .bna file, and then deployed to a local Hyperledger Fabric. We also set up a Composer REST server and angular application which communicate with the business network through the REST server running on port 3000. In future, the network will be deployed into the cloud which would become extra secure against the attack of hackers.

7. REFERENCES

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