LICT Advanced Blockchain Internship

Letter of Credit on Blockchain

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Problem Definition

As per the World Trade Organization, in 2019 $19.48 trillion worth of merchandise exports were transported around the world across sea, air, rail, road, and up to 80% of this global trade requires financing. Trade finance involves complex cross-border trading with multiple parties such as importers, exporters, banks, financiers, insurers, export credit agencies, and service providers. In such a fragmented environment, many organizations might be doing business with each other for the very first time. As there is no central or intermediary party which can administer the whole process, coordination is cumbersome and investment risks are very high. It's quite unfortunate that even though trade financing and letters of credit (LoCs) have been integral to doing business for decades, the supporting documentation and paperwork nonetheless have many process inefficiencies that increase costs, risks, and delays for all participants. In such cases, an LoC is usually used as a method of payment in international trade, mostly to minimize the overall risk to businesses. A great deal of LoC is concerned with reconciling divergent histories and facts. Inconsistencies are inevitable given the duplication of complex processes. This leads to further costly reconciliation and dispute-resolution, which is itself error-prone and costly. Multiple views of the same transactions are a source of potentially serious risk.

Proposal

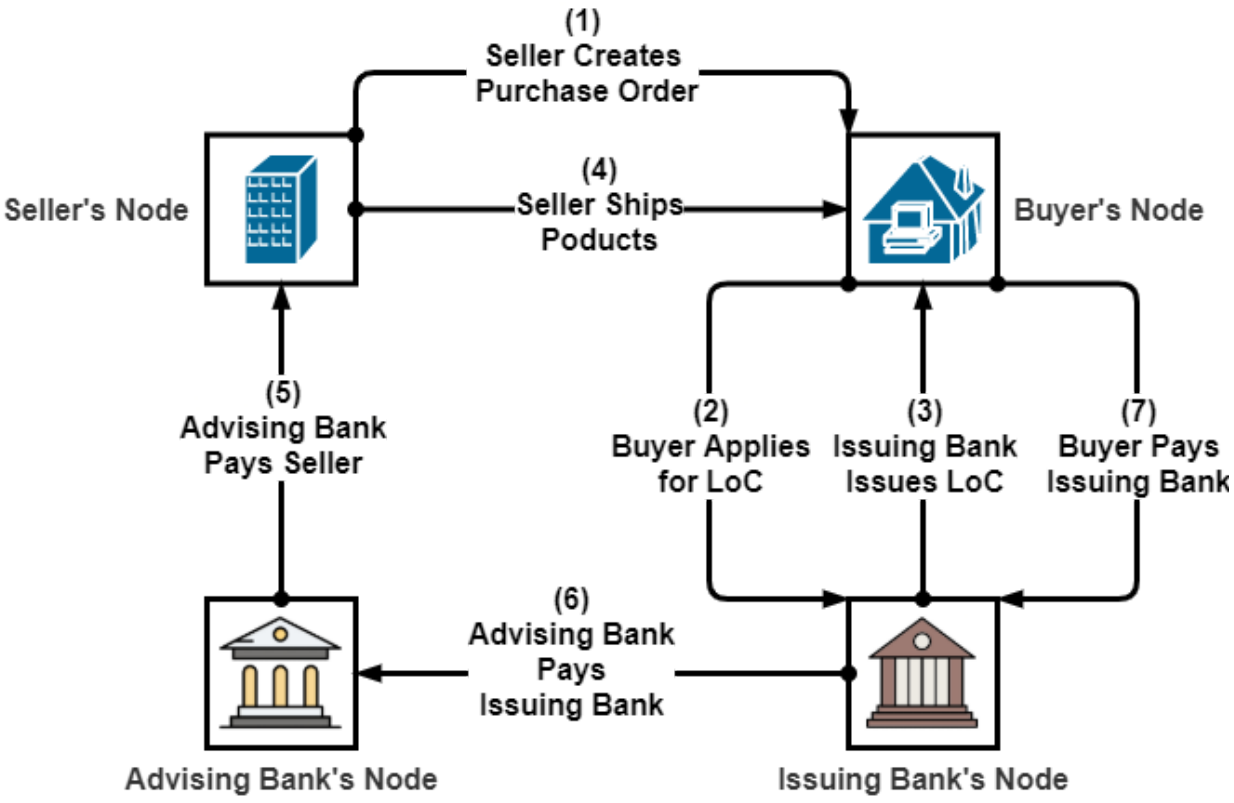
My proposal is to design a LoC transaction system on a DLT which stores all the facts and figures of the contract on a need-to-know basis and also does not reveal the internal business model of any organization. I have chosen Corda as it is the most suitable framework to acquire all the aforementioned targets. In Corda, each organisation maintains a ledger which records the firm's legal agreements and positions with counterparties. Corda provides the network protocol for nodes to exchange messages about possible state transitions and each node verifies for itself if such a state transition is acceptable from a business point of view. Corda does not share data all across the network, only the parties involved and a notary service will get to know about the data. It does not reveal the internal business model of an organization to others. Corda provides non-repudiation, meaning an inarguable history of the shared facts, which is very useful in reconciliation and dispute-resolution.

Project Introduction

The letter of credit on blockchain platform is used to create, issue and manage Letter of Credit, Purchase Order and Bill of Lading in a secure and distributed manner. The core functionalities of this application are:

- Create Purchase Order
- Create & Issue Letter of Credit
- Manage States in Letter of Credit
- Create & Issue Bill of Lading
- Handle Ownership Management of the Bill of Lading

This project addresses the need for a secure digital platform to create and manage trade documents without intervention from other 3rd party organizations.



Technologies Used

The following technologies are used to develop the application -

- **Corda:** Used to build the blockchain network & complete transaction.

- **Spring Boot:** The backend of the web application is built in Spring Boot on JVM. It connects with Node using RPC Client API. The transactions are also written in Java.

- **ReactJS:** The frontend web application is developed with ReactJS. Semantic-UI was used for styling.

User Analysis

The users of the platform include - Exporter(Seller), Importer(Buyer), Advising Bank, Issuing Bank. The actions that can be performed by each party are as follows -

Exporter/Seller: Creates Purchase Order

Importer/Buyer: Applies for Letter of Credit to Issuing Bank

Issuing Bank: Issues Letter of Credit or Rejects Letter of Credit Application

Exporter/Seller: After issuance of the letter of credit, the seller ships the product and creates Bill of Lading. The current owner of the products is still the seller.

Advising Bank: After the shipment, the advising bank pays the seller. The ownership is transferred to the Advising Bank.

Issuing Bank: Then, the Issuing Bank pays the Advising Bank. The ownership is transferred to the Issuing Bank.

Importer/Buyer: Lastly, the Buyer pays the Advising Bank. The ownership is finally transferred to the Buyer.

Problems Addressed

Trade finance involves complex cross-border trading with multiple parties. In such a fragmented environment, many organizations might be doing business with each other for the very first time. As there is no central or intermediary party which can administer the whole process, coordination is cumbersome and investment risks are very high. But this platform solves these issues by providing a tamper-proof, secure platform which is also easily auditable. This platform is also trust-less so even if the parties are doing business for the first time, they won't have to worry about risks and fraudulent activities.

Future Works

Due to lack of time and computation power some features were left out, which will be implemented in the future.

- **Integrating Payment System:** The payments mentioned in this project have to be processed outside this application (off-chain). The application is only used to log the payments. But in the future the payment processing will be implemented in the application.

- **Handling Complex Scenarios:** Other parties like shipping companies, ports, financiers, insurers, export credit agencies, and service providers could have been onboarded in this platform to handle more diverse and complex trading scenarios. In the future these parties will be onboarded on this platform and more complex transaction scenarios will be supported by the CorDapp.