Cooperative Trade Model Using Blockchain Technology

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Abstract. Cooperative trade is very different from the normal trade [1]. Cooperative trade model is entirely decentralized and doesn't follow hierarchy. The backbone of the model is the trust each of its members put on each other. This trust develops from an immutable set of information that is acquired from the long run of the business. Blockchain technology, or the Distributed Ledger Technology is the upcoming disruptive technology, which was brought into light by Satoshi Nakamoto's paper about Bitcoin [2]. This technology provides a cryptographically protected ledger, which is associated with a decentralized network [3]. This technology makes it possible for entities with no trust on each other to get involved in business. This trust comes from the immutability of all the events that is happening with regard to the ledger and the algorithms and methods followed to reach consensus between each of the network members.

1   Introduction

The cooperative trade improves the purchasing power and financial self-sufficiency and stability of the trader. But the trader should be able to form a cooperative with someone whom he doesn't at all trust. This is exactly what a blockchain solution offers. It provides immutability to data and develops the trust that is naturally not present between them.

2   Challenges

To develop a blockchain solution to the existing cooperative trade without using a cryptocurrency. The network doesn't follow any hierarchy and each participant in the network has the same authority and power. Also the asset should be transferred directly from the trader to the customer and no intermediaries should be present. The application should be able to incorporate any new product for the sales as the cooperative could introduce a new product at any point in time.

3 Business Model and the overall working

The entire network is divided into number of units. This number is not fixed. Anytime a new unit can be added. The important thing about the unit is that, a trader can only access the information of a trader belonging to the same unit. This is implemented to undo the regional disparity in cooperative, if in case it is used in a cooperative spread across a really big geographical area. A participant/ trader can only be part of a single unit at a time. Each unit is a different entity. There is no central authority in each unit. Each trader has equal right and power. The transaction of the asset/product happens from the trader to the customer and the unit has got no role to play here. The unit classification is merely to accommodate the regional disparity. The source of income for each unit comes from the transaction fees that is externally collected for each transaction from the customer. Only the traders of a particular unit gets to see the transaction fee and the price of each product associated with the unit. This transaction fees is not owned by any particular trader but by the unit as-such. It is used for the day-today activities of the unit and is the source of increase in purchasing power of the unit.
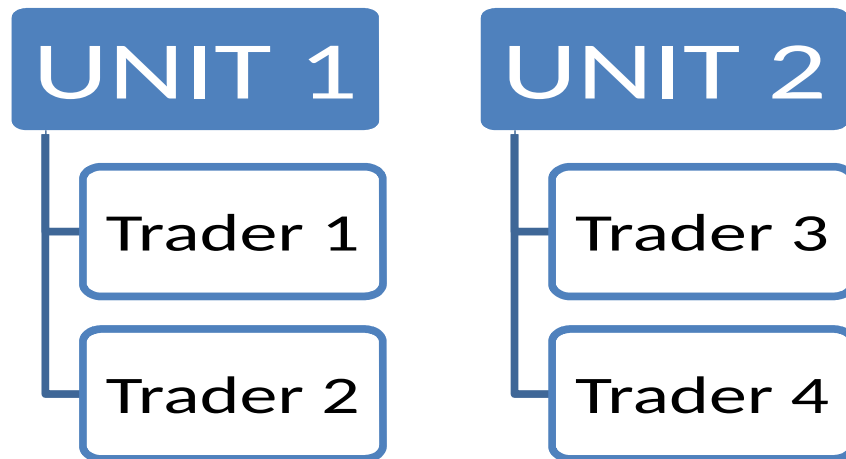
Fig. 1. A basic network with two units and two traders per unit

Product – the asset

Has the following features/ parameters
1. ItemID (String type and unique for each product)
2. ItemName (String type)
3. Unit (String type, shows the unit which is selling the particular product)
4. Price (Double type)
5. DoM (String type, Date of Manufacture)
6. Supplier (Trader type)

Trader- the participant

Has the following parameters
1. TraderID (String type and unique)
2. Unit (String type)
3. Name (String type)

Sales- the transaction

Has the following parameters
1. Item (Product type)
2. Unit (String type)
3. TraderID (String type)
4. Price (Double type)
5. TransactionFee (Double type)

These three entities are connected this way. Each asset is supplied by a participant and it is sold through a transaction. Physically the sales happens through a store owned by the unit. Hence we are not bothered about the buyer.

4   Software and Frameworks used

Hyperledger Fabric is the business blockchain Framework solution for developing blockchain solutions with modular architecture [4]. It is hosted by Linux Foundation and is extensively supported by IBM. It also has the provision of smart contracts in the form of codes in Go programming language. Hyperledger Composer is an application development framework which simplifies the task of making a Hyperledger fabric blockchain applications. Hyperledger Composer has been used throughout to develop the blockchain application and was tested using online Hyperledger Composer playground [5].

5   Conclusion

The developed application is not entirely flawless. It needs addition of more features and parameters for wide adoption. It could also consider the incorporation of the customers as a parameter of the sales. The functionalities of the blockchain could be improved by including the internal sales of products from one unit to another. It is concluded that the application is efficient, secure, reliable, and user-friendly. This application can be easily implemented in a cooperative on a trial basis and based on the problems identified during the trial implementation further improvements in the design and modelling along with the inclusion of new functionalities can be done.

References

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