# AgriFund - Crowdfunding using Blockchain Technology

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***Abstract*—Crowdfunding is a complex system in which funds are collected for a certain cause. There are lots of participants and transactions that need to be managed. Blockchain technology solves all these donatiton transaction related problems by globally decentralizing the whole ecosystem. This offers a reliable, transparent and scalable solution. It maintains the entire trail of transactions that cannot be edited.**

***Keywords—Blockchain, Transactions, Donations, Hyper-ledger, Crowdfunding.***

## I. INTRODUCTION

Blockchain technology is in demand as it can add tremendous value in any kind of financial transaction. There's a common misconception that blockchain can only be used with cryptocurrency. It can be used to maintain a transparent trail of transactions and their modifications. Each transparent and validated transaction is considered as a block, which is associated with hash value of previous block. All blocks are timestamped so they cannot be tampered with.

The main feature of the blockchain is that everything is visible and transparent to everyone which prevents any kind of fraud from happening. Once the entry is stored in the globally accessed ledger, it's nearly impossible to alter or delete the entry from the ledger. On doing so an attacker has to submit the proof of work to all the preceding blocks in the blockchain, for the modified block to be successfully accepted by the fabric in the entire blockchain system. Hence this system protects the donations and farmers. The blockchain carries no transaction cost hence is very cost efficient. Blockchain is an ingenious but easy way to pass information or funds from one point to another in a fully automated and safe manner. Each transaction is a block and all transactions belonging to one category belong to the same blockchain.

This is how a user-friendly blockchain technology provides a platform for easy to use, reliable and transparent transactions for users who otherwise find all these things difficult and hard to believe in case of monetary transactions.

## II. RELATED WORK

The usage of blockchain technology in crowdfunding market is a relatively new topic. There are various use cases of blockchain technology in different areas. And it is now clear that blockchain technology can be used in much more use cases than just the cryptocurrency like new age browsers, financial institutions, etc. Other use cases include supply chain industry, insurance, healthcare, real estate, media industry, peer-to-peer transfers, etc. Hyperledger Composer is an open-source blockchain protocol for business to business and business to customer transactions. Hyperledger Composer differs from traditional Blockchain networks like Bitcoin as it manages the admission of participants, assets and transactions in its core. Hyperledger is build such that it assumes multiple blockchain networks that can communicate with each other rather than assuming only single blockchain network.

## III. BLOCKCHAIN FOR CROWDFUNDING

This project involves setting up a network on the IBM Blockchain Platform and deploying the FabAgriFund smart contract. Next, we setup our application to interact with the network including identities to submit transactions on the smart contract. The application is setup with a Node.js server using the Fabric Node SDK to process requests to the network, and an Angular client to bring up a web interface.
The main steps are:

- Setup a Hyperledger Fabric network on IBM Blockchain Platform
- Install and instantiate smart contract through the IBM Blockchain Platform
- Develop an Node.js server with the Hyperledger Fabric SDK to interact with the deployed network
- Create an Angular frontend for the web app to interface with the network.

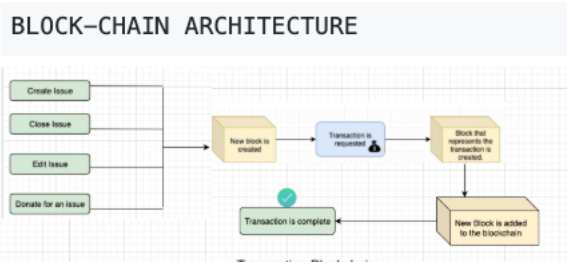



Fig. 1. Transaction Blockchain

## IV. DESIGN

We used IBM Blockchain Platform Extension for VS Code to:

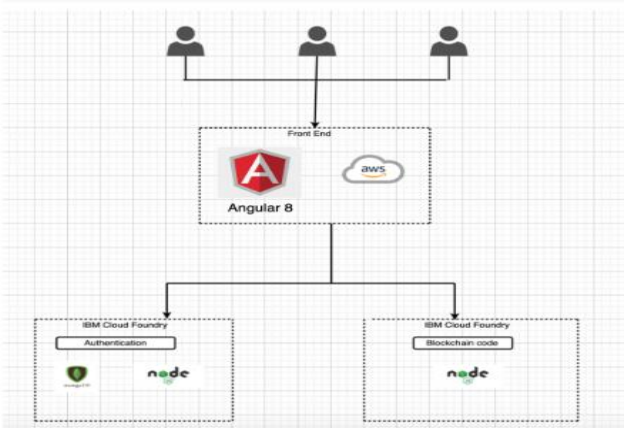
1. The Blockchain Operator sets up the IBM Blockchain Platform service
2. The IBM Blockchain Platform enables to create a Hyperledger Fabric network onto a IBM Kubernetes Service, allowing to install and instantiate the FabAgriFund smart contract on the network
3. The Node.js application server uses the Fabric sdk to interact with the deployed network on IBM Blockchain Platform and creates APIs for a web client
4. The Angular client uses the Node.js application API to interact with the network
5. The User interacts with the FabAgriFund Angular web interface to update and query the blockchain ledger and state

**Components included:**

- IBM Blockchain Platform gives you total control of your blockchain network with a user interface that can simplify and accelerate your journey to deploy and manage blockchain components on the IBM Cloud Kubernetes Service.
- IBM Cloud Kubernetes Service creates a cluster of compute hosts and deploys highly available containers. A Kubernetes cluster lets you securely manage the resources that you need to quickly deploy, update, and scale applications.
- IBM Blockchain Platform Extension for VS Code is designed to assist users in developing, testing, and deploying smart contracts -- including connecting to Hyperledger Fabric environments.

## V . IMPLEMENTATION

We have used IBM blockchain Platform to create and manage blockchain network. We have used Cloud foundry to deploy the project.




The component which forms the main basis of the blockchain are:

1) Assets - Assets will include product.
2) Transaction - This comprises of action such as Offer bid and Close bid.
3) Participants - This will include admin and bidders.

## VI . CONCLUSION

As we have demonstrated in our project, the use of Blockchain in the crowdfunding can not only help in the advancement of the process, but can also significantly help bring improvement to the current online transaction-donation systems in terms of increased security where chances of fraud becomes extremely low. Based on the work that we have done so far in this project, we realized that there are number of additional very important features that we can implement and add to our website. Through the enforcement of farmer identity management and by detecting fraudulent transactions, Blockchain technology significantly reduces the possibility of fraud. In addition to all this, another very important noticeable aspect is that the use of a trusted Blockchain ensures that the attacker cannot add or introduce misbehaving nodes to artificially modify donation amount, which may cause huge loss to farmers. The advantages associated with using Blockchain technology includes immutability, transparency, user compliance, and accountability to keep check.

Considering all these advantages of Blockchain technology, it is very obvious, that in near future, Blockchain technology will become an important part of the crowdfunding industry.

## VII . FUTURE ENHANCEMENTS

Our recent version of Agrifund has used the blockchain functionality for Donations only. We have integrated the actual transaction here in our system. Next we plan on integration a system that tracks the donated amount expenditures. So there is a scope for betterment of the application. We also plan on integrating a system that uses crowd funding to collect donations during times of natural calamities and droughts. We also plan on implementing a system where the donors get back rewards if the farmers utilize the funds and get profit from it.

## ACKNOWLEDGMENT

We sincerely thank Dr. Rakesh Ranjan from Department of Computer Engineering, San Jose State University, for providing the right guidance and better resources for us to complete the project.

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