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Block-Chain Technology and its Application in NGO

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Abstract: ***A growing stream of research finds several relations between economic growth and corruption. Government implement various strategies to diminished corruption and also technology often plays an dominant role to face it. Among various technologies alteration, Block-chain technology that becomes an effective and efficient way to resolving issues related to corruption. This paper represents a brief knowledge related to Block-Chain technology as it is a kind of distributed database, public ledger of all transactions that have been executed and shared among participating parties. Each and every transaction in the public ledger is verified by a majority of the participants in the system. The possible risk related to current scenario and give brief idea for resolving that problem with the help of block chain technology. Non-Governmental Organization (NGOs) which aim is to tackle some of society's issues. NGO faces difficulty in terms of maintaining and gaining the support from donors, funds. In recent decades there have been examples of corruption misconduct scandals impacting the public image and reputation of NGOs. It is clear that public trust in NGOs is affected adversely by such event. Doubts arise in terms of***
Where donation ends up? Who is leading the organization? Is donated money are used in proper direction? So as a part of it, a need is raised to solve such issues for the society. For the above stated problem regarding management of funds in NGOs, we propose a solution by using Block-Chain technology among various technologies alteration available. Block-Chain offers the way to eliminate the doubts by providing data security, immutability, transparency. So, Block Technology can offer the NGO industry to regain the trust of public.

Keywords: Block-Chain, Distributed system, smart contract, NGOs, Ledger, Security, Transparency.

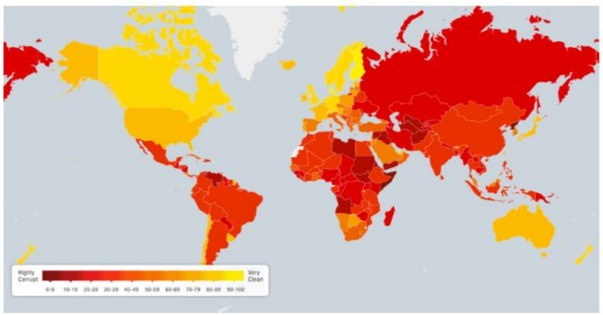
I. INTRODUCTION

"Block" describes transaction data, which are then organized in a "chain" that links to other blocks of data. This synchronized manner make it easy to find if anyone has changed any part of the chain, which helps the system to protect against illegal and unauthorized transactions. A block chain is an electronic ledger of records that is shared among all the participants. This technology addresses every transaction's authenticity by confirming the parties involved, the time and date of transaction as well as the contents of particular transaction. If a transaction contains fraud detail due to corruption , it is not validated due to the protocol and, therefore, transaction cannot considered as a valid transaction. As such, the block chain technology should be an effective tool to remove corruptions from having a transparent view on every transaction.

II. RESEARCH

A. Relation Between Corruption and Economoic Growth

Here the discussion between corruption and economical growth for the countries is given. Generally the corruption belongs to the low economic growth for the particular country. Each country wants their high economic growth so they make strategy to decrease their corruption which is one the most factor affecting to growth of the country. High corruption cause slow down the development of that country. High corruption damage economic growth as follows(1)It directly affects to the foreign investment(2)it leads to diverting the public resource for private gain(3)breakdown the trust towards the government(4)directly affect to development of the country because government cannot collect enough tax. Following figure shows the corruption level of the countries among the world.



Corruption level among the countries

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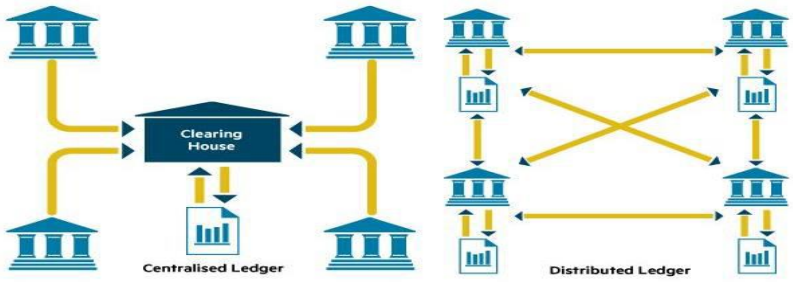
B. Technology Against Corruption

Due to negative impact of the corruption on society, Most of the countries are trying to root out the corruption. Countries are looking forward for introducing anti-corruption strategy and technology to detect and protect corruption. Out of various measures and research approaches technology becomes the effective tool to fight against corruption. Different types of technology provide various type of method to reduce certain risk. This paper shows how Block chain Technology is useful to detect and prevent corruption and also introduce some application through Block chain technology.

III. THE BLOCK-CHAIN TECHNOLOGY

A. What is Block- Chain technology ?

Block chain is database information distributed over a huge network of computers rather than stored information at a single server. So Block chain refers to decentralization instead of centralization. It was first introduced by Nakamoto (2008). In first practical application is the most popular electric currency known as Bit-coin.



Block chain as Distributed Ledger

Block chain consists of (1)Ethereum (2)smart contract(3)Distributed-ledger(4)chain of block (6)Wallet.

Ethereum is a platform for implementing block chain. Ethereum allows us to execute code EVM (Ethereum virtual machine) that called smart contract. Smart contracts are nothing but an agreement and can be written in solidity language. A ledger is a kind of database where confirmed transactions are recorded. When there is no central authority to access ledger called pubic ledger and if there is central authority to access ledger called private ledger. In private ledger if we want access any ledger then we needs permission of authority.

Chain means each node is connected in a manner as linked-list data structure. Each node contains the following values(1)index(2)previoushash(3)current hash(4)transaction. Index identify particular node uniquely , previous hash contains the hash value of previous node , current hash stores the hash value of that node , transaction stores the number of transaction successfully done by that node.

B. Nature of Block-Chain

1) *Decentralized:* The decentralized nature of block chain network changes the databases of the entire transaction records from closed and centralized. The failure of a single node or damage due to fraud does not affect the entire network. This leads to avoids the single point of failure and ensures the high reliability of the applications which built on the block-chain technology.
2) *Immutability:* Block chain network uses the one-way hash function which is a mathematical function that takes a string as input and converts it into a fixed-length binary sequence. The output bears no apparent relationship to the input. The process is hard to reverse because, given just the output, the input is impossible to determine.
3) *Reliability:* Block chain network makes the trustable decentralized too. Unlike the centralized trust we take for granted, such as central governments issuing currencies and commercial banks, Block-chain network acts as new trust bearer with decentralized ledgers.
4) *Transparency:* As all nodes are able to see the data so the chances of falsify is become none. Each node is able to see transaction, no. of transaction done by any node so it helps to brings transparency over the network.

C. How does Block-Chain work

In Block-chain technology there are number of nodes that are connected with each other and create a huge network. First user request for a transaction and that is representing by a block. then block is broadcasting to all nodes means user in network for verification of the detail of transaction. Once the verification of that node is done after that block has been appended to the chain and transaction is done successfully.

D. Key Benefits of Block-Chain Technology

The three distinct advantages of the block-chain system, namely distributed architecture, immutability and transparency may help combat corruption and fraud occurring in the public sectors. Block chain could be used to carry out many functions of traditional regulator and assure the public that the politicians are not squandering around the taxpayer money. Government and financial institutions can use the technology as a means of combating financial crime such as money laundering and tracking any fund transferred for criminal activities such as drugs trade or terrorism. With the use of the technology, every transaction can be recorded without manipulation, making the ultimate destination transparent. Block-chain technology provide transparency over the transaction and it is hard to change some details or hack that network. Hash value is most important part for this technology as it detects if someone try to intercept the transaction and also prevent unauthenticated users. Hash value is generated by the input given by the user it is very difficult to get the algorithm to create that hash value. By do changes in single character the hash of that detail is totally changed. As detail from above each node have the hash value of previous node. If some hacker wants to become part of block chain then he should have hash value of the previous node where he wants to add his node. Example: let chain of block is A-B-C-D-E, suppose F is hacker and wants to become a part of chain between B and C .As all node are in block chain C have hash value of B and D have hash value of C. so if F interrupts the chain between B and C then F should have the hash value of B and hash value of F should have to store in block C. So if F wants to intercept the chain then all nodes check the status and it unmatched so F is not able to break that chain. By this way block chain prevent unauthorized users.

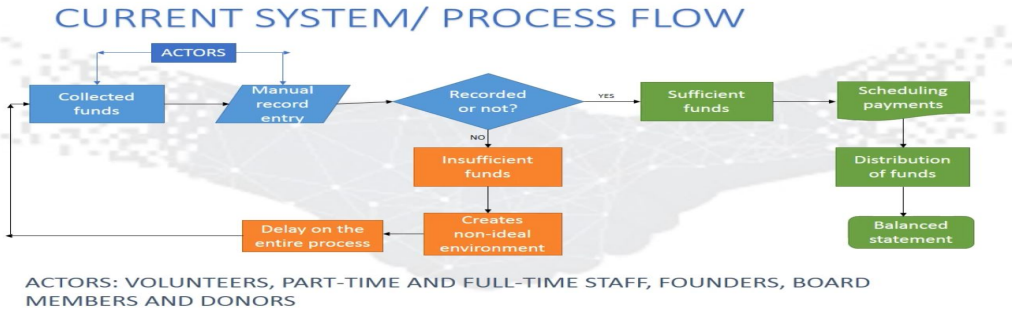
E. How Block-Chain becomes secure ?

Block-chain technology refers the hash value to uniquely identify one block over the chain of block. EXAMPLE There is a method called proofOfwork which is responsible for that. In this method we can set some indexes of hash value of the blocks. Like we can set hash value as it followed by first four '0000', so now our hash value becomes '0000kjdvvb.....'. Now, let assume if someone tries to change data of blocks and try to increase their value of coins or number of coins then the data is being modified so, as data is changed it directly related to hash value. Hence, hash value for modified data changed and it is not match with our condition as above. So that modified data is not allowed by the block chain and also changing in any attributes of block also make changes in hash value and any block should not be accepted until it fulfil the condition of proofOfwork method.

IV. BLOCK-CHAIN TCHNOLOGY FOR NGO

A. Problems of NGO

Nowadays due to corruption, trust towards the NGOs of people is become diminished. There is also Limited technical capabilities, lack of credibility, lack of single point user and poor strategic planning etc. So by Generally several type of question arise in people mind that (1) How NGO use their money ?(2)Where their money is actually used in ?(3)Is their money is being corrupted by someone ?(4)Who is responsible for securely transaction of their money from NGOs ? While they donate their money to any Non-Governmental Organization. Diagram shows the current flow system of NGO. As per the diagram related current scenario in NGO, Actors are Donors who donates money to the NGO in several ways as per requirement of NGO. Nowadays, whole system is being handled manually so it checks whether the fund is sufficient or not. If the fund is sufficient as per requirements then it will accepted. After that whatever the payment is scheduled, distributions of fund and making of statement for balance is being done manually as it is centralized system. There is also possibilities of funds to become non-sufficient. At that time the process is goes under a loop causes many problems and harm the environment of the system.



We clearly see that there will be chances of the record being not sufficient. So it should not accepted and creates non ideal environment which causes delay in process. Here also chances of fraud because the records the manually generated and it can be fake as the system is centralized.

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B. Implementation of Block-Chain for NGO

To overcome such type of problems related to NGO this illustrates paper represents an idea as follows.

1) *Overall Idea About System:* To overcome problems of NGO by implementing block-chain technology as back end. The Aim of the technology is to provide security and transparency to NGO. As Block-Chain technology is Decentralized means there is no central authority .Node js is used to implement a node and smart contracts written in solidity and crypto currency (NGO coin) are made up in programming language either in python or in JavaScript.

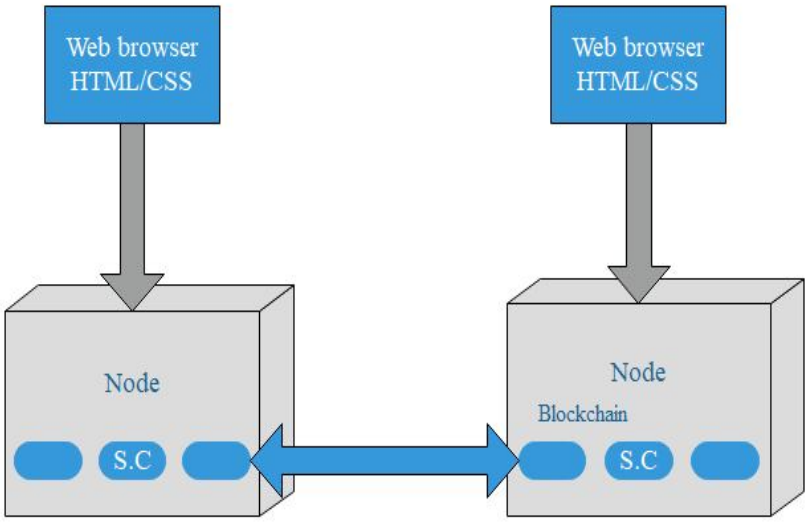
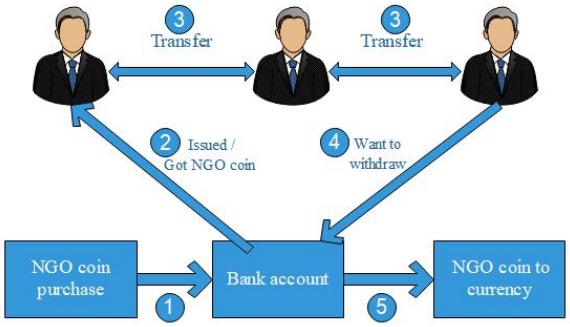


Figure illustrates the collaboration among front –end with back-end and also represent interaction between two nodes of two different user logged in from front-end. It has been seen that, there is chain of block is generated and smart contract is nothing but the agreement is also shown.

Two types of users can login after filling require details. After Login there will be Dashboard provide information like balance of NGO coin, no. of wallet using by user, no. of bank account using by user, payments received by user, all transactions done by user and also shows recent transactions done by user. A Public ledger in which confirmed transactions are recorded. Each node has a copy of ledger. Transactions contain information like amount of NGO coin to be send, hash key of sender and receiver. User can also able to see the transactions filter by type such as NGO coin issued, NGO coin transferred, NGO coin received , NGO coin redeemed in addition with the issued date of NGO coin, date of transactions. User is not allowed to make change in this critical information like amount of transactions. If someone is going to add fake information by changing value of amount then it directly affect the hash key of that particular node which becomes totally different as it was. Following node that contains the hash key of previous node, but hash key is changed so it generates an error in all nodes followed by the changed node.

2) Types of Users" A portal considered as front end which supports two types of user accounts which are 1)NGOs 2)Vendors/Suppliers. On behalf of NGO, representative of NGO can sign up to portal with official email along with few requirements for verification and approval process. Vendors and Suppliers that work with NGO can sign up with their email. Portal will set up a unique address for them on Ethereum Block-chain for do and receive NGO coins.

3) NGO coin: NGO coin is a crypto currency made up in python on platform on Ethereum. Vendors and NGOs accounts will have access to NGO coin wallet on portal with they can easily and instantly send and receive NGO coins anywhere and anytime in the world. Each Wallet have their unique address on Ethereum block chain. There will be a private key which use to protect the address of wallet and each wallet has that key. From the wallet, NGOs and vendors can purchase NGO coins using bank transfers or credit/debit cards in US dollars. The value of one NGO coin is equivalent to 1 US dollar. After completing the banking process deposited money will be converted to the equivalent NGO coins and will be reflected in the balance of wallet. NGOs and Vendors now can easily do sufficient transactions. If they need more NGO coins then have to follow same process as above and if want their money back then simply make a withdraw request in order to get their money back.



NGO coin process flow.

V. CONCLUSION

Nowadays, Block-Chain is a relatively new technology and almost every day new up gradation and new innovations are taking place due to certain changes in block-chain technology. By choosing Ethereum platform for developing NGO coin as Ethereum is most trending and widely used bloc-chain platform today with an active support for developers and innovators. We have seen that, by implementing system as given we can reduce possible risk and frauds related to NGO. As the transaction becomes secure and transparent donors feel free to donate their money to NGO because they get information about where and how their money is going to be used. Donors get their trust back towards NGO by doing transaction which is implementing by block-chain. So, the system can offer the NGO industry to regain the trust of public.

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