Food Supply Chain Using Blockchain Technology

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Abstract: Blockchains are incredibly popular nowadays.According to recent survey it has become 49% more famous than the previous year. Blockchain is not a centralized network, it is a distributed ledger.One interesting thing about blockchainis , that once a data is recorded into the block, it is impossible to change or delete the data. Instead of changing or deleting the data ,a new block is added with reference to the block indicating that the data corresponding to that block is altered. The Blockchain can adequately addresses the recent concerns looked by the country division utilizing a solidified flowed figure out. Blockchain is used to ensure any trade done either in thing or organization applications are ensured about and taken care of in a file that can be gotten to by almost anyone.

Keywords: Trackaility System,QR Code, Blockchain,Decentralized System,Token.

1. Introduction

Agriculture is expected to experience some innovation transition in the future. The various stages of the supply chain, such as quality, nutrition, safety information, and product data, are tracked from time to time through innovation. Because of its irreversible and decentralised existence, the Blockchain ensures the same in various fields, like agriculture.Agriculture is a process that involves a number of exercises and changes that agriculturists must go through in order to deliver their products to customers. They can run into issues like Nourishment Security data, nourishment supply chain, and edit quality while doing so. Protecting the appropriate amount of data for each arrangement is extremely important; this will ensure integrity and accountability to avoid different partners from the block being hoodwinked in at any rate. Ready to apply technological concepts winning in later times on the off chance that it can address a complete solution with set destinations in intellect.

2. Literature Survey

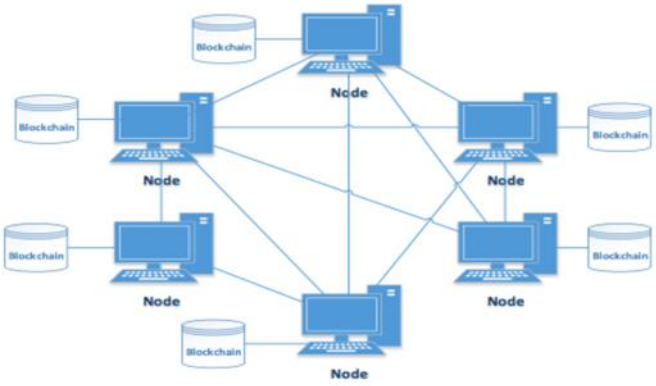
Feng Tian [2] has proposed an inventory network discernibility framework for food handling dependent on HACCP, blockchain and Internet of Things at administration framework and administration the board.[5] has proposed the Proof-of-Concept of rancher to-shopper food detectability on blockchain for nearby networks.[9] has proposed the working and proficiency of the Sea food production network the executives utilizing blockchain on sixth july 2020 global meeting on cutting edge processing and correspondence framework.

S.Tonnissen and F.Teuteberg [10] has proposed Investigating the effect of blockchain innovation for activities and store network the board.

Sounder Kumara, Thesis Advisor/Co-Advisor, and Mohan and Tharun [3] have built Improve Food Supply Chain Traceability Using Blockchain with committed members. Terry Harrison, member of the committee Janis Terpenny is a member of the Committee.

3. Blockchain Fundamaentals

A blockchain could be a dispersed framework that empowers anybody to upload programs to and take off the programs to self-execute, where the current and all previous states of each programme are still openly visible, andwhich carries an extremelystrong. cryptoeconomically protected guarantee that programmes running on the chain will continue to execute in exactly the way that the blockchain convention suggests ” Blockchain allows everyone to conduct a safe and transparent transaction that no one can alterhim or her unless there's a require. of exchange.In olden days ,People used to record the information in notebooks and gradually started to store information digitally.The data can be stored and acessed in different ways.It can be stored in a centralized network or decentralized network or distributed network. Blockchain is a distributed network, therefore it stores the data in a distributed manner.Usage of block chain remives the usage of the thirtparty like brokers.It stores the data in blocks, once a block is created it cant be removed.Blockchain is famous for its immutabilty,if someone is trying to change a block then the remaining blocks in the network will know that, so hacking becomes impossible due to its immutability.It can be used in various fields like Iot,BankingSectors, Landregistering System,Artificial Intelingence,etc…



BLOCKCHAIN COMPONENTS

Data part:

It is the part where the data is stored. The data may be anything , depending on the field in which it is used. If it is a financial transaction, it contain the data of the sender and receiver and the transaction amount.

Hash part:

It includes the current block's hash value. Every person's hash value is the same as their fingerprint. It is the block's only way of being identified.

Pre hash part:

It holds the previous block's hash value. The block chain's unique feature is that each block is linked to every other block in the network. It is simple to access the previous block's data since the block contains the hash value of the previous block.

Mining:

Mining is the concept of digging or creating bitcoins through the process of creating blocks by solving or decrypting the hash vale.The main purpose of mining is to make sure that the hash value of the block and the transaction history remains unchanged.Miners are nodes who verify the transaction by decrypting.The first miner solving the problem and veryfying the transaction will be rewarded with bitcoins.There are two commonly used terms in mining,

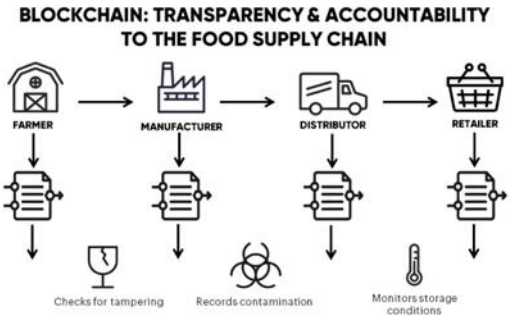
Proof of work:

It is a difficult process and have low probablity of success .It consumes more time and money, as it is a trial and error method.if a Block has to be accepted by all the other nodes in the network,the miner has to do proof of work. Bitcoin uses hashcash method as proof of work.Proof of work involves more and more computational power as the miner have to solve highly complex problems.The first miner who solves the problem will be rewarded,after that no miner will try to solve that same problem.once a problem is solved ,all the remaining miners in the network will get a message that tha work has been completed by a miner and they will agree with the work.once the prrof of work is done the block will be created.Some of the most commonly used proof of work algorithms are Scrypt, Blake 256, CryptoNight ,Heft1, Quark,SHA

4. Proposed Methodology

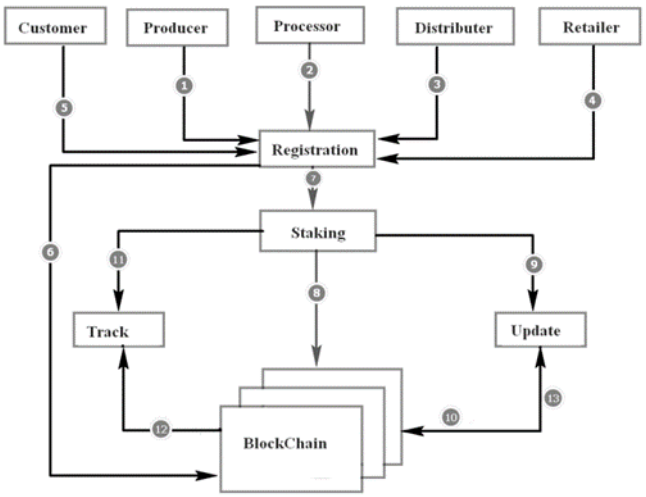
Farm to Fork farming using blockchain

We made use of public blockchain such as Ethereum blockchain in agriculture to overcome the problems understood from the writing overview, Besides, this will ensure a tall standard convention is being connected in an entire process of farming. Farm to fork developing might be a plan of incorporating cultivating measure through the use of advancement, blockchain can be utilized to make a snippet of data with the essential data needed to complete a significant trade to look after straightforwardness. Here we will build pieces containing an alternate arrangement of information available to a particular class of customers for each trade, along these lines giving information on what is important that particular put together of developing. For example, a maker may in a manner of speaking require maker information, a provider needs just stockpile information and a customer needs just the fundamental thing unobtrusive components with its dietary and expiry subtleties. Ready to mechanize the entire handle remembered for all phases of developing right from the planting of seeds until offering the thing to a customer.



5. Alogorthm: Transaction Blockchain

1. Build a smartcontract for Carrot using Ethereum Blockchain.
2. Deploy an custom token by implemeting iERC20.
3. The user must register and stake some ethers by buying some tokens.
4. At the point when the item is sold from a maker to processor an exchange is made when maker update the supplychain.
5. When the processor is done processing the product,a transaction is created when distributerupdate the supplychain.
6. When the distributerstarts distributing the product,a transaction is created when distributerupdate the supplychain.
7. The Retailer updates the supplychain after receiving the product from distributer.
8. After all the vendors is done with successfully updating the supplychain, then the customer can track the suplychain.
9. All the attributes of distribution stage will bestored in central repository and fewer attributeswill be sent to next users supplychain while the track request is initiated.
10. No transactions will be initiated as the data is read form the blockchain.



Working:

1. Once the registration process is completed, the users in the network is required to stake some ether into the system by buying some custom iERC20 tokens.

(_buyTokens)

2. Initially, theproducer update the production details on the blockchain by specifiying the 6 digit batch number.

(_ChainProducerUpdate)

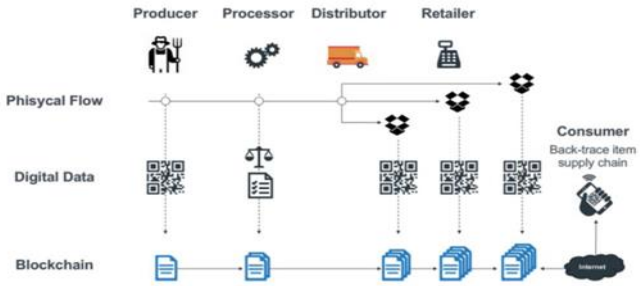
3. After receiving the products from the producer, the processor starts processing the product and enter the processing data into the blockchain for that particular batch. (ChainProcessorUpdate)

4. After receiving the products from the processor , the distributer starts distributing the product and enter the distributing data into the blockchain for that particular batch after distribution. (ChainDistributerUpdate)

5. After receiving the products from the distributer, the retailer update the supplychain ad the updation process ends for that particular batch. (ChainRetailerUpdate)

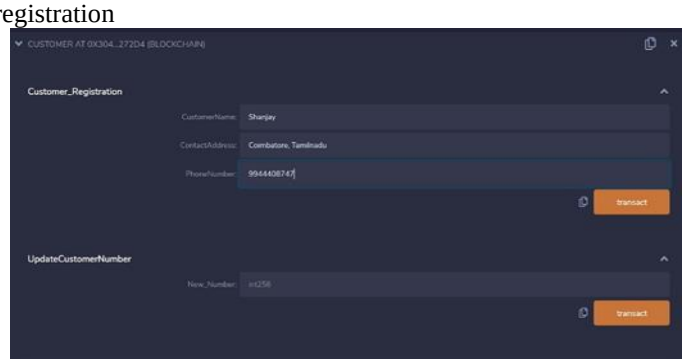
6. Customer scans the micro QR code on the carrot for getting the 6 digit code.
7. The 6 digit code represents the specific batch number of the particular carrot on which it is produced.
8. The customer is now able to track the supplychain with that 6 digit code. (_TrackCustomerChain)
9. The same 6 digit code will be used by the rest of the vendors to track the supplychain.

Example : (_TrackProcessorChain)



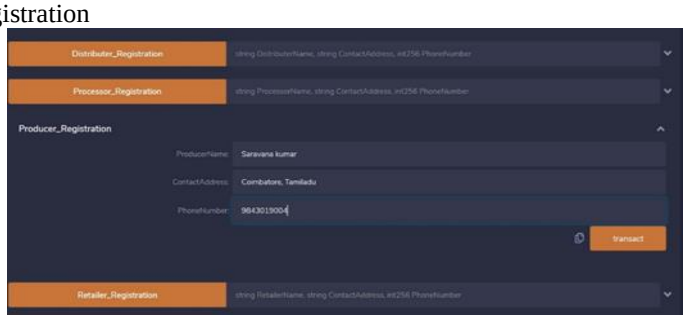
6. Result

Module 1: Customer registration



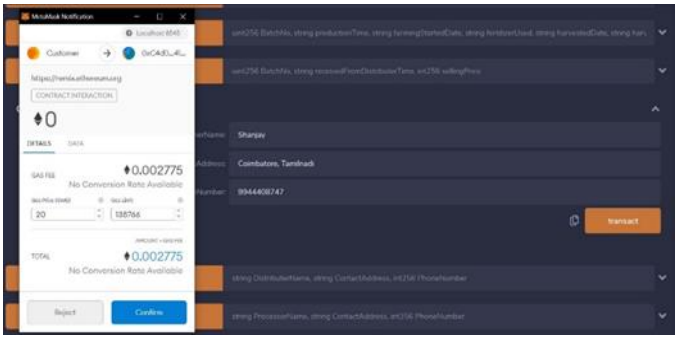
It depicts the customer registration page. Customer can register to our system using their name and contact address and their phone number. This information is store into blockchain. After registration, if again the same customer enter into this system it won't ask again the registration process, instead it allows the customer to update their phone number if needed. The customer entering his/her personal details to register into the system

Module 2: Vendor registration



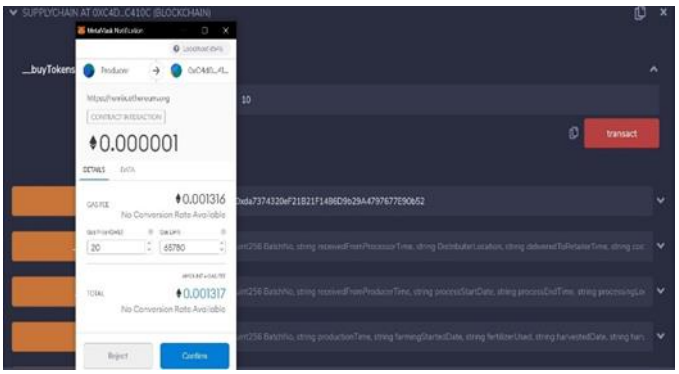
It depicts the vendor registration page. vendor can register to our system using their name and contact address and their phone number. The vendor can select their role by selecting any of the following type producer, processor, distributer and retailer. All type of Role in vendor registration involves same process. This information is store into blockchain. After registration, if again the same vendor enter into this system it won't ask again the registration process, instead it allows the vedor to update their phone number if needed. The producer entering his/her personal details to register into the system.

Module 3: Transaction



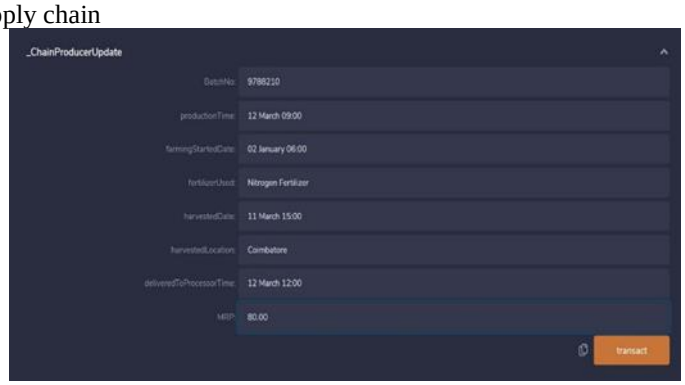
Customer and vendor proceeds with the transaction of ether to register profile. Fig.Customer proceeds with the transaction of ether to register profile. As user profile is written into the Blockchain, ether crypto currency must be spent by the user.

Module 4: Staking



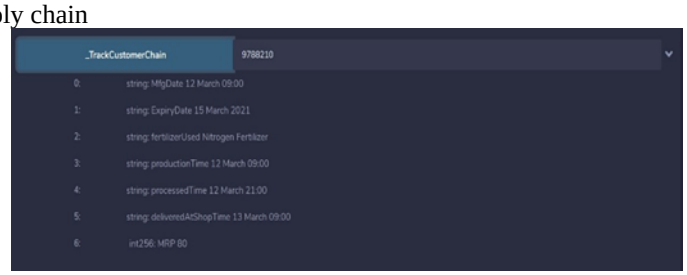
In order to be an active participant in the supply chain network, every user must stake some crypto currency via buying 100 custom tokens defined in the system. The tokens are used to develop trust between the participants in the supplychain. The value of the token is set by the administrator while deploying the contract to the Ethereum blockchain.Processor staking 1000 gwei by buying 10 Foodi Tokens.

Module 5: Update supply chain



Once the vendor is done with the registration and the staking process, then the smart contract allows the vendor to update their corresponding supply chain data into the Blockchain. fig 6.5, Producer updating his/her Production data into the Blockchain.

Module 6: Track supply chain



Once the supply chain data is entered into the Blockchain, then the users can Track the supply chain by using the barcode number. The smart contract retrieves only the required data to the corresponding user from the Ethereum Blockchain. Customer tracking the Supply chain by retrieving the data stored in Blockchain.

7. Conclusion

Blockchain might be a spread data sharing structure, it extraordinarily well might be used in security applications, for case, keeping cash, it incredibly well might be used in development creating to automate whole activities and to record each exchange sidestepping from any trick or misdirection. It tends to be stretched out to refresh comprehensive home exchange with way better reach and direct data upkeep. Scaled down scale QR code will convey way better methodologies for get to actuate the basic information. The exchange requires mining, which needs a development of customers to assert the exchange. Blockchain can be associated with every one of the dispersed exchanges empowering to store and get to the information in a circled climate, this will incite reducing the overall twofold overseeing rate to an ideal level of exactness.Agribusiness in Creating Environment, for case, India anticipate a basic work inside the normal monetary progression of the country.A bundle of focus customs can be encouraged into the commonplace exchange, which is capable empower the whole strategy in this manner making a rancher get enlistment to this turn of events and get typical with the exchange part a package less intricate way. With a package of focus set of recognized principles from the administering body of a country, the spread of this advancement can be quick.As India addresses roughly 65% of the majority, genuine execution will guarantee inside a reach out of 12 to 18 months the setting of the developing exchange will wear another and make undeniably nearly see. The Rate of Black-advancing and abundance exploitative can be irrefutably diminished in a fundamental manner, the proposed thought can additionally be executed as private execution, which is capable be powerfully convincing for private transporters, and they will have satisfying get to this regular storeroom without government mediations. This may additionally be stretched out in a wide reach out of ways inciting the movement of an amount to stack including cross arrange get to in an impacting way.

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