



ASSET TRACKING SYSTEM USING BLOCKCHAIN

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Abstract: Now a days the usage of E-Commerce increased rapidly. At this point the delivery of products is so crucial and the transfer of product's/assets from owner to consumer there is a chance of manipulating products. To deliver products to the consumer safely the global networks uses the modern supply chains they are manufactures, suppliers, logistics, and retailers. As of now they used the paper based model and disjoint system that lacks the information and tracking the product is also consuming process. We proposed a new tracking system and secure transfer of product in this paper through blockchain's supply chain management system. In this paper we use the distributed public ledger and with the Blockchain we decreased the errors, avoiding product delays, eliminating fraud activities.

Index Terms - Smart Contract, Blockchain, Traceability, Supply Chain, Distributed Ledger Technology.

1. INTRODUCTION

Blockchain technology is a public ledger of all transactions, it relies upon the shared record of transactions across to peer to peer network of computers. Blockchain enhances the decentralization, transparency and equality. Blockchain is considering as a distributed database it will be organized a list of blocks is in ordered, where the fixed blocks are immutable.

Ethereum blockchain supports the programming on the chain, it is called as smart contract. Ethereum is also decentralized open source blockchain. it uses the solidity language which can meet the needs of many functions. Smart contract is a transaction protocol which is automatically executed according to the terms of contract or an agreement. It allows programmers to write apps that can run on many people computers.

In blockchain related supply chain, provenance tracking become easy because the accessing of information is uses the embedded sensors and RFID tags and also record keeping uses same method. This type of accurate provenance tracking can be helpful in detecting the fraud activities in any part of the supply chain.

Meta Mask is a wallet used to create, store the accounts. Meta mask allows us to run the Ethereum DApps in your browser without running a full Ethereum node. Open the Ethereum node and run the smart contract on that node. In this meta mask will manages your eth wallet and do transactions through DApps.

Ganache is allowed us to create a private Ethereum blockchain, in that private blockchain we can run our tests and execute commands and inspects state while controlling the chain operations.it provides advanced mining controls and built in explorer.

2. RELATED WORK

“Agri-food chain traceability system using RFID and Blockchain”: From this paper, we observed the positive and also negative impact of RFID. blockchain technology on supply chain for agriculture food. The system proposed in the paper provides food safety and traceability in all the aspects of the supply chain.

The main focus of our research is product information traceability. The main idea is to store the information about the product in the blockchain. There are other fewer designs for functions involved in operations of supply chain. Based on the existing research, this paper will design a best management system in the supply chain business based on blockchain and other related technologies to meet the needs of various participants in the supply chain.

Existing System:

In existing system, tracking of products is very difficult and there is no trusted system. There is a chance of manipulating products and we don't know where they have gone. In this, sometimes we can receive fault products or different products there is a possibility it will be done by the owner itself.

Proposed System:

In this paper, we proposed a new tracking system and secure transfer of product through blockchain's supply chain management system and also, we use the distributed public ledger and with the Blockchain. We decreased the errors, avoiding product delays, eliminating fraud activities. The ownership of the product will be transferred to one player to another player and each and every player checks the product so we can eliminate the errors and fraud activities.

3. METHODOLOGY

In the assets of any type can be transferred from one to location to another through the use of account created in blockchain network. Here we created a local test network using Ganache and we are using that local test network. Ganache one of blockchain test network used to test your blockchain before being deployed to main network Ethereum.

The different prerequisites for this project to run are:

- Curl
- Git
- Node.js
- Npm
- Truffle
- Ganache

Create an account in truffle hd wallet provider site and create a project and copy its key and place it in asset tracker smart contract. Using meta mask create custom RPC and name it as Ganache, place Ganache RPC to URL and save and connect to this Ganache. Import accounts from Ganache to metamask. For this project we have 6 players and each with option to transfer and view [Players are owner, manufacturer, stockholder, wholesaler, retailer and consumer] each are assigned an account as stated in meta mask. For every transfer of Asset from one player to another we need to have address of player and we place that address in one block and product ID i.e., UUID in another column and select form account in metamask and when we click transfer again metamask popup for confirmation and on successful deduction of gas the asset is said to be transferred from one account to another. We create products based on first account through which this contract is linked to network. By giving productid and clicking on view we get the Asset current and previous location along with time and date of transfers. We use 'Now', a keyword in our contract to store/compute time and date of asset transfer.

Here we are creating Dapps which consists of HTML pages, Javascript on the browser end, web3.js library and Ethereum blockchain. Created Dapp has poor scalability and we need more logical process from the front end.

The core functions of this project is

- Authority control
- Tracking

Tracking is a relatively individual function which is used to know the current location of the product.

The process of transaction of a product as follows:

The buyer is buying a product from the seller with certain agreement, in agreement we have set of rules regarding the product. The seller will be transferring the product to buyer through a selected service provider.

4. EXPERIMENTAL RESULTS

MNEMONIC		HD PATH	
spoon month skill below lion expect hire soccer dragon eternal misery garage		m/44'/60'/0'/0'/account_index	
ADDRESS	BALANCE	TX COUNT	INDEX
0x33E3E96F3090f87a510164B984B3c7348c66D68F	99.94 ETH	4	0
ADDRESS	BALANCE	TX COUNT	INDEX
0xc57E96fC761f0e76473b75269c911b1b5dc5953C	99.97 ETH	16	1
ADDRESS	BALANCE	TX COUNT	INDEX
0xb33D7cB7a7b00A3356F1AC7400AF5d273AD93d84	100.00 ETH	2	2
ADDRESS	BALANCE	TX COUNT	INDEX
0x38033165Aff6D8116fc91a4856d570B41CC795bA	100.00 ETH	1	3
ADDRESS	BALANCE	TX COUNT	INDEX
0x1D2FC1fa21ee7f36C7d2E0Ed0E7Babb69f81B5Fd	100.00 ETH	1	4

Fig : 1, Ganache, it is a command line tool and known as TestRPC

```
pragma solidity ^0.5.0;
contract Migrations {
  address public owner;
  uint public last_completed_migration;

  constructor() public {
    owner = msg.sender;
  }

  modifier restricted() {
    if (msg.sender == owner) _;
  }

  function setCompleted(uint completed) public restricted {
    last_completed_migration = completed;
  }
}
```

Fig : 2, Migration Smart Contract

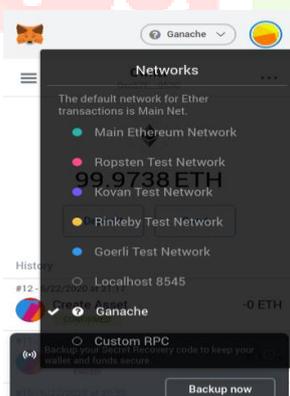


Fig : 3

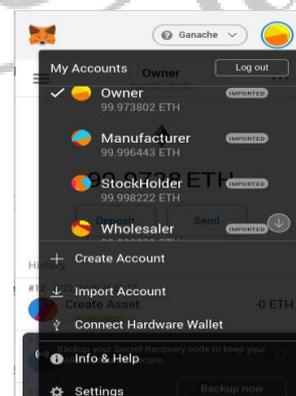


Fig : 4

Fig : 3, these are the different networks and used for creating accounts, TestRPC

Fig : 4, Different participants in metamask used in tracking system.

Account	0x4b0...4d2db (97.9999999999997448 ether)
Gas limit	0xca3...a733c (101.3999999999997278656 ether) 0x147...c160c (100.1999999999997381352 ether)
Value	0x4b0...4d2db (97.999999999999744857 ether) 0x583...40225 (100.1999999999997318897 ether) 0xdd8...92148 (100.1999999999998077795 ether)

Fig : 5

Fig : 5, Ether balance of players.

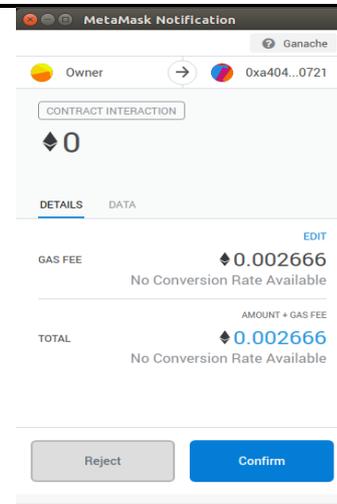


Fig : 6

Fig : 6, Transferring the asset from Owner to manufacturer, similarly asset will transfer in all stages.

5. CONCLUSION

In this proposed model it is efficient for tracking of e commerce products and eliminating fraudulent activities, secure product delivery to user. It is developed on Ethereum decentralized blockchain model. Buyer and seller can form the smart contract based on certain rules to delivery the product safely. In future we can develop better model which is suited to automation with better consensus mechanisms and performance.

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