SantoshiCoin -- A BlockChain Application

Description

The project is a digital currency transaction platform, which leveraged the concept of BlockChain, and decentralized data management.
The application focuses on the EcoSystem architecture, design of BlockChain, consensus algorithms, and the transaction process handling.

ROLES & DUTY

System Admin
Enterprise Admin
Trader
Miner
Cashier

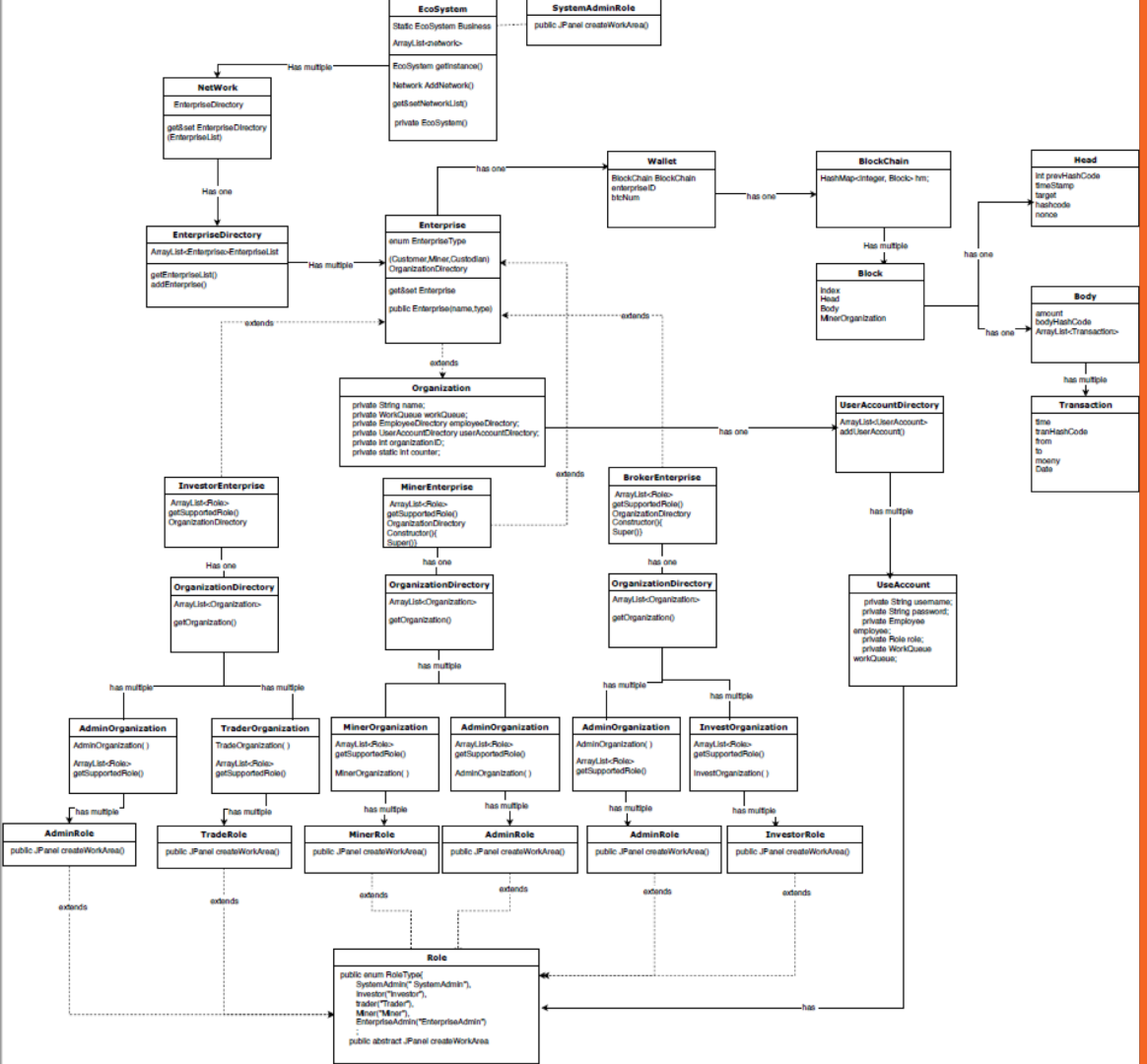
System Admin: manage networks, enterprises, and enterprise admins

Enterprise Admin: manage organizations, employees, and user accounts

Trader: request, or send coins to another trader. Buy or sell cash with cashiers.

Miner: Validate and write transactions to ledger. Mine a new block and add it to the most current blockchain

Cashier: Set sell or buy prices, approve transactions with traders



Object model

Approaches/How-to

Search Newest BlockChain API: loop through all enterprises and looking for the longest BlockChain, if two BlockChain has a same length, check who has longer transaction array list, then return the found blockchain.

Show All Transaction API: another API who extends searchNewestBlockChainAPI, will first search for newest blockchain, then loop through every block, and every transaction array list.

Transaction Model

Peer 2 Peer Transaction

- Make a request or send SantoshiCoin is executed by a trader and 2 traders get involved
- SantoshiCoin transaction must be verified by 3 miners before written to ledger

Cash Transaction

- Traders can select any cashier to sell or buy coins on listed price
- Cash Flow is between trader and Cashier, and yet, transactions need to validated by miners

P2P Transaction

Users either send or request coins to/from another user

Miner will validate the transaction by checking if the coin sender has enough coins

The system will search for newest blockchain and update current user's blockchain

If requesting, the other user could approve it, or decline it

Then miner will write this transaction to the most current block in the chain

Cash Exchange

As a Cashier,you should post your expectations to the market...

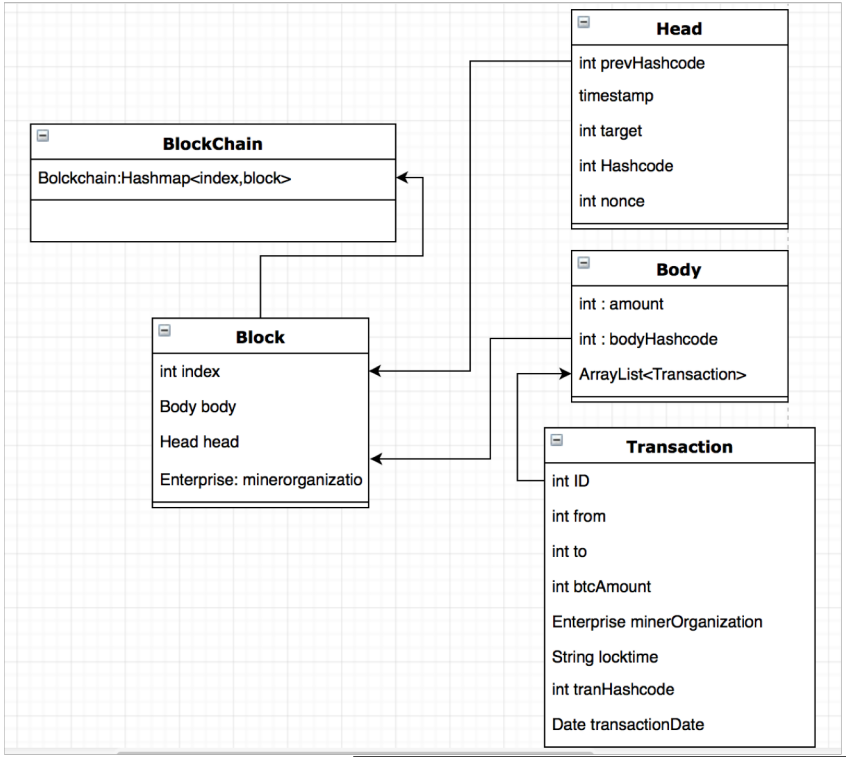
Cashier should deal with the requestand cash is supposed to be paid.

Then miner will write this transaction to the most current block in the chain.

If a trader is willing to make a transaction,he gonna make a request

Miner will validate the transaction by checking if the coin sender has enough coins

BlockChain Design



Structure

- In this project, the structure of blockchain is simulated by HashMap, the key is the index and the Block store in the value of the HashMap.
- Inside the block, there are head to store the attribute and body to store the transactions.

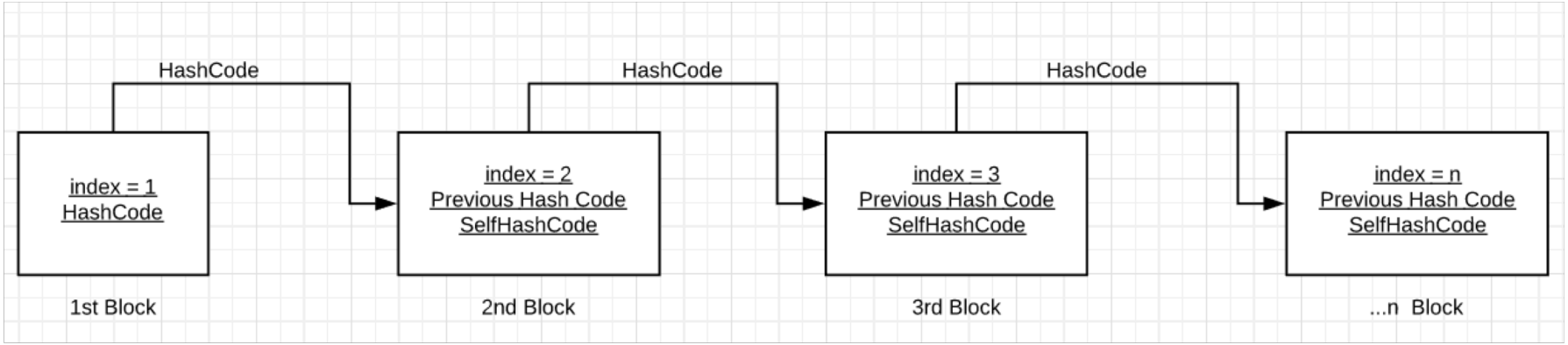
Technology of Decentralize

Consensus Algorithm

- Unlike the centralized system, there is no dominator in this system.
- A consensus algorithm has been published to keep the reliability.

Mining New Blocks

- The randomly added blocks raised the safety of this system.
- The transactions will be added to the most recently blocks if it was validated after the block generated.

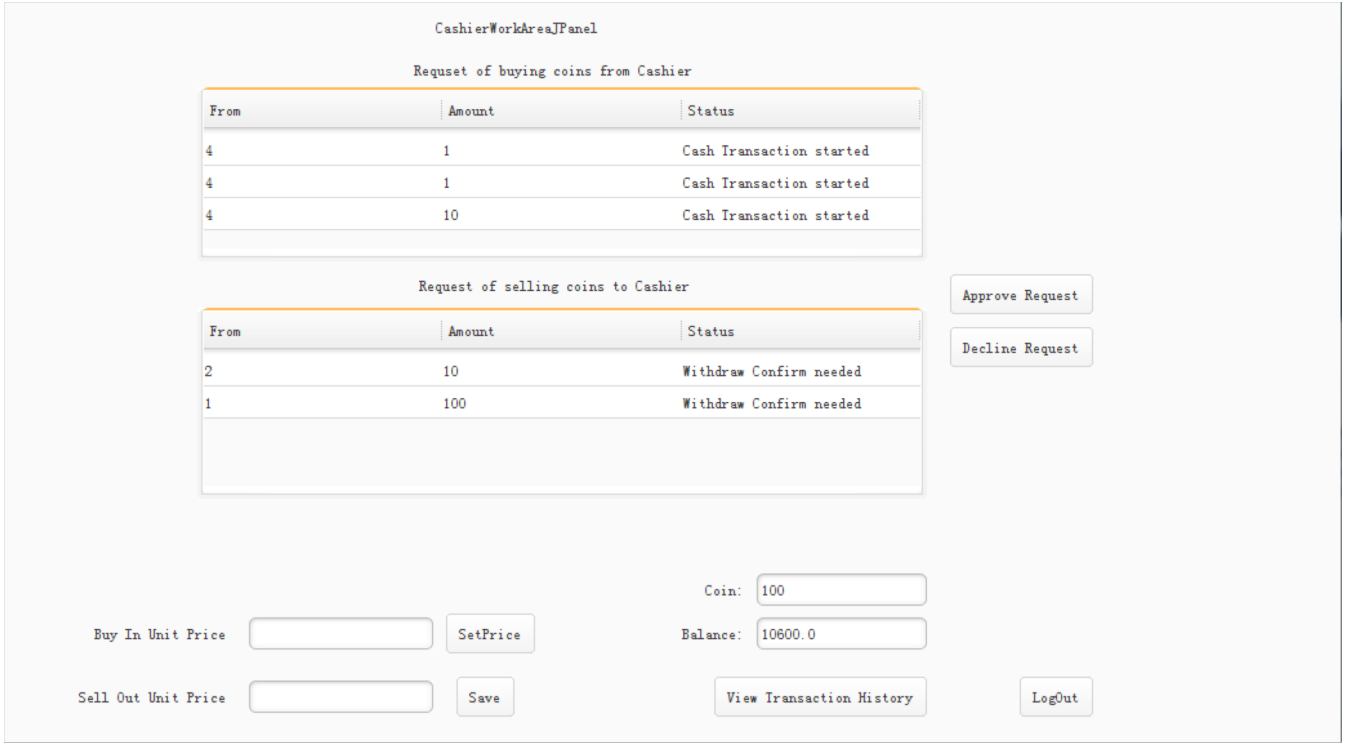


- The Hashcode stored in the head of the Blocks, meanwhile it store the previous Hashcode to make sure that it's the valid next block.
- The block's Hashcode is computed by merging the hashcode of transactions stored in this block's body.
- With the number of block grows, the difficulty of substituting the transactions stored in the previous blocks will sharply increased.
- This structure ensure the safety of the blockchain.

Screen Shots

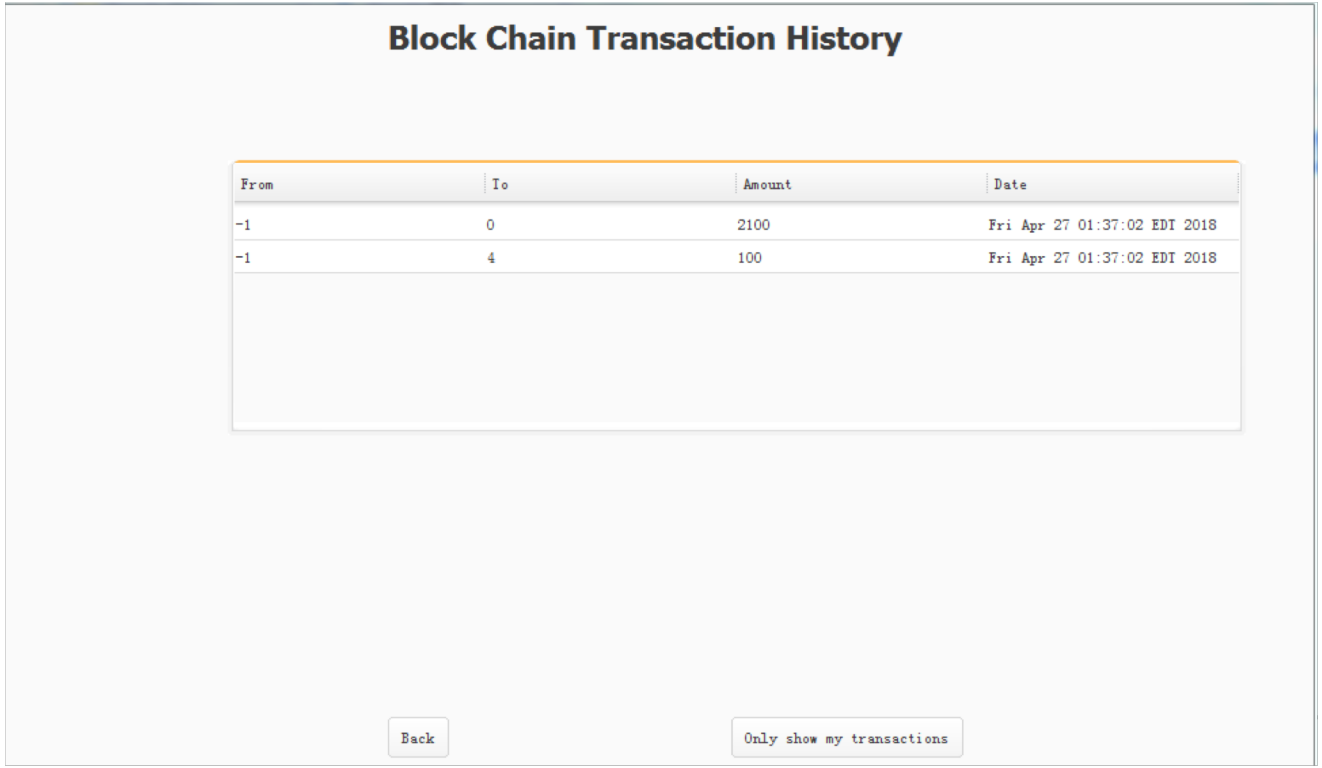
Cash Exchange

Cash Transaction's cash flow is between cashiers and traders.



Transaction History

Transaction history is read from blockchain and accessible for every user.



Validation Progress

Validation Progress is handled by miners and three miners is required for a whole validation progress.