ARCHITECTURE

OVERVIEW

1. Participants

The blockchain network will have the following participants:

Manufacturers (manufacturerID, name, address, contactNumber)

Distributors (distributorID, name, address, contactNumber)

Customers (customerID,name, address, contactNumber)

Transporter(transportedID , name, address, contactNumber)

2. Assets

The blockchain network will have the following assets:

Medicine: Medicine will have following attributes:

a. medicineID.

b. medicineName

c. manufactureDate

d. expiryDate

e. manufacturer

f. owner

Box: Box will have following attributes:

a. shipmentID

b. trackingCode

d. originAddress

e. destinationAddress

f. currentAddress

g. status (DELIVERED/ ONTHEWAY)

h. parentContract

I. previousBoxID

j. medicinesContained[]

k. quantityProvided[]

Shipment: Shipment will have the following attributes:

a. shipmentID

b. boxIDArray []

c. routeName

d. reachedDestination (i.e TRUE/FALSE)

e. owner –-> the transporter which owns the shipment

Contract: Contract will have following attributes:

a. contractID.

b. medicinesID (contains array of medicines to be included in the contract)

c. quantity(contains array of quantity of medicine included in the contract)

d. status (it’s paymentstatus i.e PAID/UNPAID)

e. completionStatus(the status of contract i.e it's REJECTED/PARTIAL/FULL)

e. price (total price of the contract)

f. seller

g. buyer

3. Transaction

The blockchain network will have the following transactions:

a) createContract: to create a contract between buyer and seller addressing the price, medicines contained and the quantities of the medicine with the payment status, completionStatusand contractID.

b) createBox: to create a box that contains the shipmentID in which it's going to be shipped, it's trackingCode, originAddress, destinationAddress and currentAddress. It contains the parentContract which the box is related to and the boxID of the previous box which it follows to complete the contract. It also contains the array of medicines with their quantity it contains and the status of the box i.e delivered or ontheway.

c) createShipment: create a shipment containing the boxID, the routeName and the shipmentID.

d) createMedicine: create the medicine which contains details as MedicineID , it's Name, its manufacturedate and expiry date and the manufacturer and owner.

e) updateContract: contains the contract and updates the new status of the payment and also the fulfillment of the contract.

f) updateBox: update currentAddress of the box.

g) updateBoxStatus: update status of the box from ontheway to delivered once it's delievered.

h) updateShipmentStatus: this will change status of reachedDestination from FALSE to TRUE once it reaches the destination.

i) deleteShipment: delete the shipment once reachedDestination value is TRUE

j) updateMedicine: to update the owner of the medicine when it is bought, containing the medicine and it's new owner.

4. Permissions

Manufacturer can create the following transactions:

a. createMedicine.

b. updateMedicine. (it will only invoke if the participant invoking this transaction is the owner of the medicine, only previous owner can change the new owner of the medicine)

c. createContract. (can only add the medicines which manufacturer owns in the contract)

d. updateContract

e. createBox

Distributor can create the following transactions:

a. updateMedicine. (it will only invoke if the participant invoking this transaction is the owner of themedicine, only previous owner can change the new owner of the medicine)

b. createContract. (can only add the medicines which distributor owns in the contract)

c. updateContract

d. createBox

e. updateBoxStatus

Transporter can create the following transactions:

a. createShipment

b. updateShipmentStatus

c. deleteShipment

d. updateBox

Customer will have the read access to all the transactions.

5. Conclusion

This is the architecture which represents technical details of implemented blockchain code.

6. Other Technical Details

1)Nomenclature is strictly followed as per mentioned in architecture.

2)Files present in our implementation

a)model.cto //participants, assets and transactions are defined

b)script.js //transaction logics are defined

c)permission.acl //permissions are defined

d)query,qry //queries are written

7. Events for maintaining log in transactions

Event error : Show error whenever occurred.

Event createContractEvent: When contract asset is created.

Event createBoxEvent: When box asset is created.

Event createShipmentEvent: When shipment asset is created.

Event createMedicineEvent: When medicine asset is created.

Event updateContractEvent: When contract is updated.

Event updateBoxEvent: When box is updated.

Event updateBoxStatusEvent: when boxstatus is updated.

Event updateShipmentStatusEvent: When shipmentStatus is updated.

Event deleteShipmentEvent: When shipment is deleted.

Event updateMedicineEvent: When medicine is updated.