A
Project Report
On
"Decentralized Marketplace"

(CE351 – Software Group Project III)

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October, 2019

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CERTIFICATE

This is to certify that the report entitled "**Decentralized Marketplace**" is a bonafied work carried out by Yash Makadia (17CE053), Aashay Pandya (17CE062), Akash Patel (17CE068), Akash Saparia (D18CE146) under the guidance and supervision of **Prof. Trusha Patel & Prof. Vinay Viradia** for the subject **Software Group Project III (CE351)** of 6th Semester of Bachelor of Technology in **Computer Engineering** at Chandubhai S. Patel Institute of Technology (CSPIT), Faculty of Technology & Engineering (FTE) – CHARUSAT, Gujarat.

To the best of my knowledge and belief, this work embodies the work of candidate themselves, has duly been completed, and fulfills the requirement of the ordinance relating to the B.Tech. Degree of the University and is up to the standard in respect of content, presentation and language for being referred by the examiner(s).

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DECLARATION BY THE CANDIDATES

We hereby declare that the project report entitled "**Decentralized Marketplace**" submitted by us to Chandubhai S. Patel Institute of Technology, Changa in partial fulfilment of the requirement for the award of the degree of **B.Tech** in Computer Engineering, from U & P U. Patel Department of Computer Engineering, CSPIT/FTE, is a record of bonafide CE351 Software Group Project III (project work) carried out by us under the guidance of **Prof. Trusha Patel ,Prof. Vinay Viradia, Prof. Chintan Bhatt & Prof. Dhruti Pandya**. We further declare that the work carried out and documented in this project report has not been submitted anywhere else either in part or in full and it is the original work, for the award of any other degree or diploma in this institute or any other institute or university.

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ABSTRACT

The SGP Project titled “Decentralized Marketplace” by ‘Double Vision’ team is a web-based software made by using Blockchain Technology. It is mainly used by farmers to sell the crops, and the buyer can buy the crops directly without any help of intermediates. The buyer and the seller both can sell and buy the crops. It has one main feature to add product by just adding a product name and product price. Farmers have to make a meta mask account after that they can add the products and price. And they can also act as a buyer from his/her account can buy any product using his/her ether. As soon as the buyer buys the product, the ownership of that product transfers from seller to buyer. This web portal is created using ‘Ganache’ for monitoring blockchain, ‘Truffle’ to connect the blockchain to smart contract, ‘Metamask’ as a user’s digital wallet and ‘Remix’ to deploy the smart contract on the server, which gives better performance and security required by the system.

ACKNOWLEDGEMENT

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We would like to express our gratitude towards our parents & faculties of CHARUSAT UNIVERSITY for their kind co-operation and encouragement which help us in completion of this project.

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CHAPTER 1.0

INTRODUCTION

1.1 PROJECT SUMMARY

Decentralized Marketplace is a web-based user-friendly software. Our software uses Blockchain technology that will improve traceability of crops and deliver better outcomes. With a Blockchain ledger, status of crops can be known from planting to delivery. With Blockchain, the whole process can be simplified to a single distributed ledger. With features like traceability and auditability, farmers can directly sell crops or food to restaurants or individuals without the need for intermediaries.

1.2 PURPOSE

Farmers have complicated ecosystems with seasonal financing structures, careful timing and a lot of moving parts. After the food leaves the farm for the market, it becomes a part of the vast supply chain involving a lot of intermediaries. Farmers were not paid as they should have deserved to get. So farmers should be able to deliver their crops to restaurants or individuals directly. With the help of Blockchain Technology this problem can be solved so that farmers can sell their crops directly to buyers without any intermediaries.

1.3 OBJECTIVE

The sellers usually have an agent who ensures that the goods are delivered safely and buyers have an agent to recommend payment and audit the delivery. The Involvement of multiple agents adds high costs to the system and makes the entire process time-consuming. With the blockchain, the whole process can be simplified to a single distributed ledger. Buyers can directly Interact with the supplier or farmers that speeds up the process and reduces the time to settle a payment. So farmers can receive a larger share of sales directly with a blockchain based solution. With the features like traceability and auditability, farmers can directly sell crops or food to the restaurant or Individuals without the need for Intermediaries.

1.4 SCOPE

In Decentralized Marketplace farmers or suppliers can add the product and price of it directly. And the buyer can buy the product. Farmers and buyers have to create a meta mask account and then they can buy and sell the products by using their currency (or ether). It works on local hosts and it uses Ganache to deploy smart contracts.

CHAPTER 2.0

PROJECT MANAGEMENT

2.1 PROJECT PLANNING

2.1.1 Project Development Approach and Justification

This Web based Software will be useful to Farmers and Buyers. Farmers can add their product information like product name and product price. So buyers can buy the products from them without any need of any intermediaries. It works on the local system so Admin can check the activity of users and also block them. It is highly secure due to Blockchain Technology.

2.1.2 Roles and Responsibilities

The name of our SGP team is ‘Double Vision’. The roles and responsibilities of the team members are as follows:

Akash Patel: Manage the project and workflow. Creating smart contract , leading the backend. Preparing Documents and Diagrams

Yash Makadia: Creating and selling product module, implementing web frontends. Preparing Documents and Diagrams

Akash Saparia: Requirement gathering, Testing . Preparing Documents and Diagrams

Aashay Pandya: Creating buy product module, assisting in requirement gathering. Preparing Documents and Diagrams

2.2 PROJECT SCHEDULING

GANTT CHART

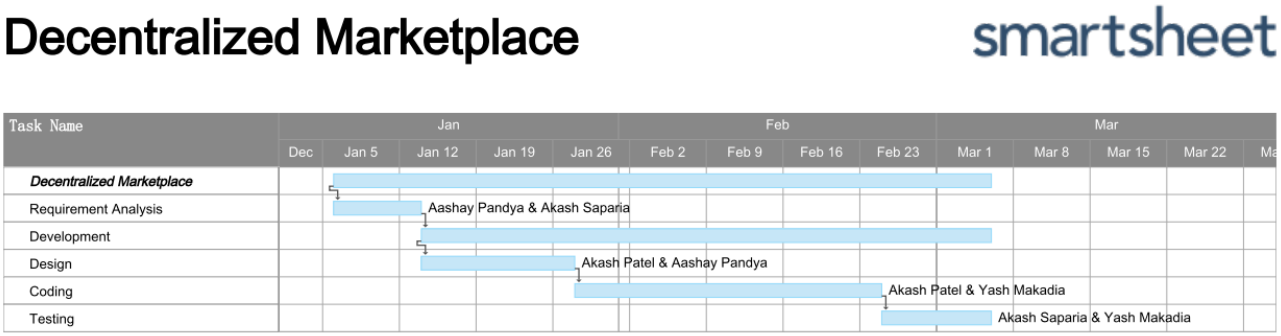

Fig. 2.1 Gantt Chart

CHAPTER 3.0

SYSTEM REQUIREMENTS STUDY

3.1 USER CHARACTERISTICS

The type and responsibilities of the user that will interact and use our DECENRTALIZED MARKET PLACE portal are as given below:

Table 3.1 User responsibilities

SR.NO	USER	RESPONSIBILITIES
1	Admin	Managing details & Wallet of Farmer, block any Farmer Account & Wallet
2	Farmer	Sale products
3	Merchant or Buyers	Buy products

3.2 HARDWARE AND SOFTWARE REQUIREMENTS

3.2.1 SOFTWARE REQUIREMENT:

- **Supported Operating System:**
  - ✓ Windows 8.1(32-bit/64 –bit), Windows 8(32-bit/64-bit)
  - ✓ Windows 7(32-bit/64-bit)

- **Supported Browser:**
    - ✓ Mozilla Firefox
    - ✓ Google Chrome
    - ✓ Microsoft Internet Explorer

Meta mask Wallet

3.2.2 HARDWARE REQUIREMENT:

- Processor used: Intel Pentium (MIN)
- Intel CORE i3

Ram :256 MB(MIN)

3.3 ASSUMPTIONS AND DEPENDENCIES

- The farmer and merchants must know the basic knowledge about the smart device and internet.
- Farmers must have own account in Meta Mask wallet.

4.0 SYSTEM ANALYSIS

4.1 STUDY OF CURRENT SYSTEM

- Current system is a bit complicated one.
- In the current system farmers tend to sell their products through different intermediates, by which they do not get the amount that they should receive.
- The intermediates try to take almost all the amount and the farmers don't get what they deserve, in fact they are left with nothing.
- Most of the agricultural products in India are sold by farmers in the private sector to moneylenders (to whom the farmer may be indebted) or to the village traders.
- Longer the supply chain, lesser the benefit (quality, price) for end stakeholders.
- Multiple handling (Farmer →APMC → Local Mandi → Retailer → Consumer) leads to higher wastage.
- The merchants, retailers, wholesalers and any other intermediaries are mainly responsible for not allowing the farmers to get their amount.
- The amount that the merchants get from the consumers, are further divided amongst others and as a result, farmers are left with nothing.

4.2 PROBLEMS AND WEAKNESS OF CURRENT SYSTEM

Problems:

- Farmers don't have any storage facilities or infrastructure to store their products in a long run which is available with the middle men.
- They are in a hurry to sell their products since most of them are indebted to moneylender and they want to get rid of them.
- Inadequate transport and communication facilities.
- Farmers are unaware about the price of the product or market trend.

- Absence of proper standardization or grading of products. Say for an example: An apple of inferior and superior quality is not identifiable by farmers in such a way that the consumers would believe the rating.
- They can't market their products to any other parts of the world other than the closer-by cities from their farm land.

Weakness:

- Insufficient investment, particularly in infrastructure.
- Farmers are not able to fight for their rights; the current system does not allow the farmers to get the proper knowledge of the pay that they should ask for.
- The moneylenders to whom the farmers are indebted, take more pay than usual, farmers don’t have that much power to ask for their money.
- This are some of the weaknesses which farmers face in the current system.

4.3 REQUIREMENTS OF CURRENT SYSTEM

- Current system doesn’t focus on the farmers.
- Current system needs some kind of technique through which famers can easily get to know about prices of their crops and products, the pay which they should get on products which are having different qualities.
- Rather farmers should directly contact the consumers to sell their products in such a way that no intermediaries come in between them.
- Having this kind of system will definitely help farmers earn more.

4.3.1 Functional Requirements

- This specification is used to specify the requirements for the initial implementation of the system and update the system in future. The software requirement specification bridges the gap between client/user and the system developer. This is the document that describes the user needs accurately.

1. Login through metamask account.

- There is no manual login available, through metamask a public key will be generated which will automatically login into the portal.

2. Real Time transaction updated.

3. Sell any product at a desirable price.

4. Buy product from any seller.

5. Proof of work (A blockchain term which implies that the transaction is completed and the specified amount has been transferred to sellers metamask account through his/her public key).

4.3.2 Non-Functional Requirements

1. Portability (a system or its element can be launched on one environment or another).

2. Compatibility (a system can co-exist with another system in the same environment).

3. Security

4. Usability (How easy is it for a customer to use the system).

4.4 FEASIBILITY STUDY

1) Does the system contribute to the overall objectives of the organization?

- Yes, the system contributes to the overall objectives of the organization.

2) Can the system be implemented using the current technology and within the given cost and schedule constraints?

- Yes, the system can be implemented using the current technology and within the given cost and schedule constraints.

3) Can the system be integrated with other systems which are already in place?

- No, Because there is digital system currently available.

4.5 Activity Diagram

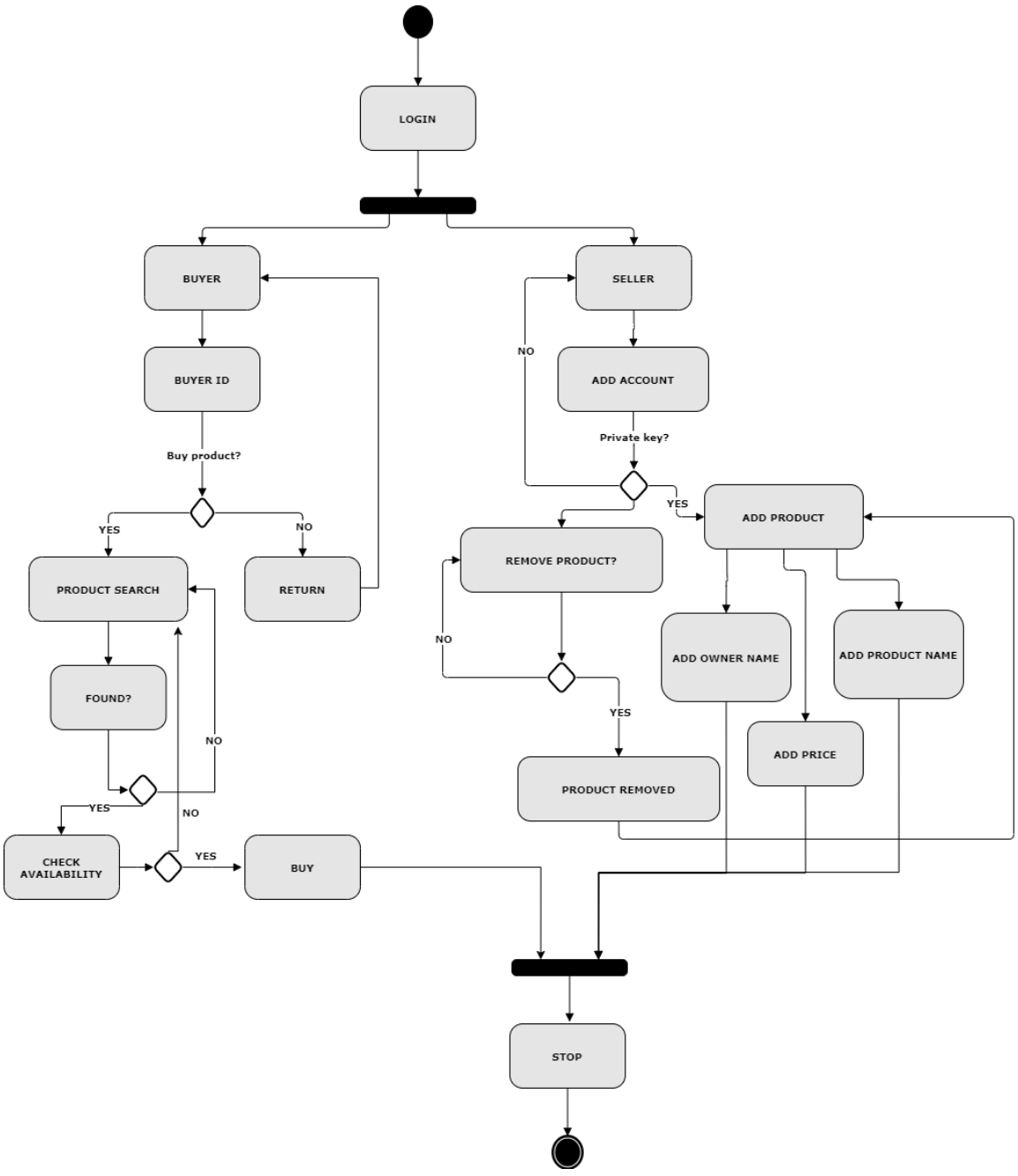

Fig 4.1 Activity Diagram

For OO Approach

4.6 Sequence Diagram

1. Seller

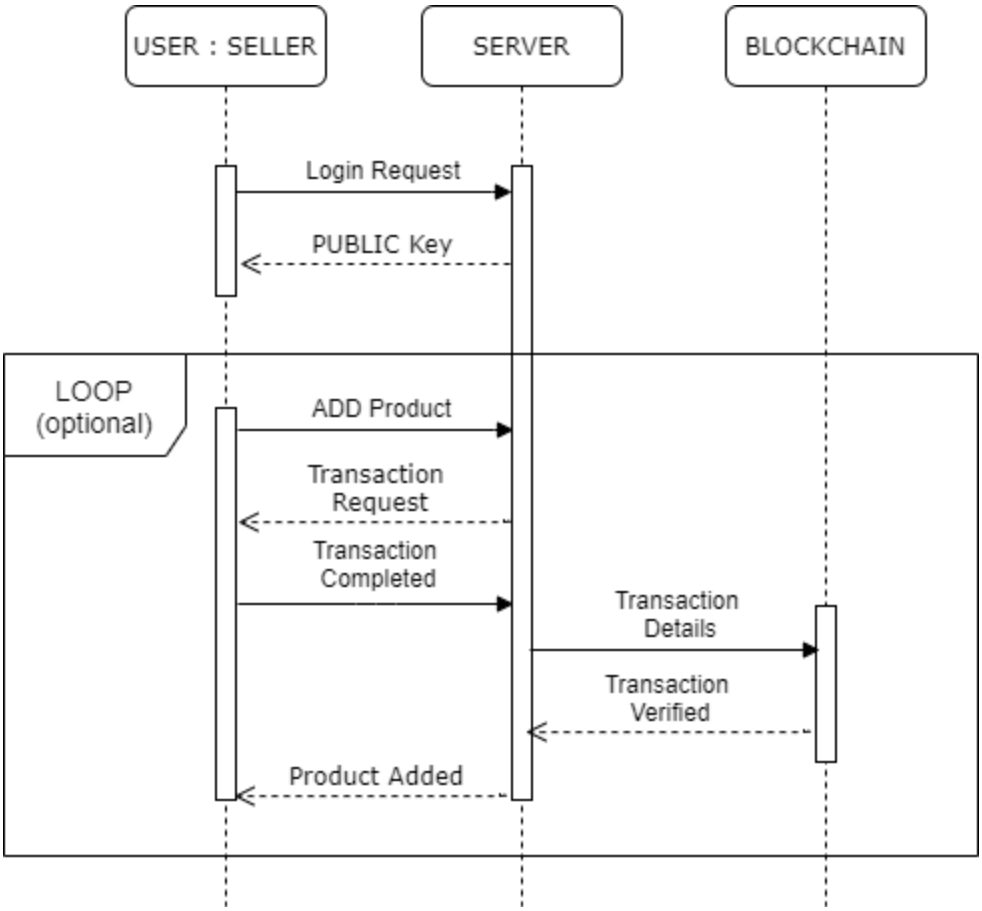

Fig 4.2 Sequence Diagram for seller

2. Buyer

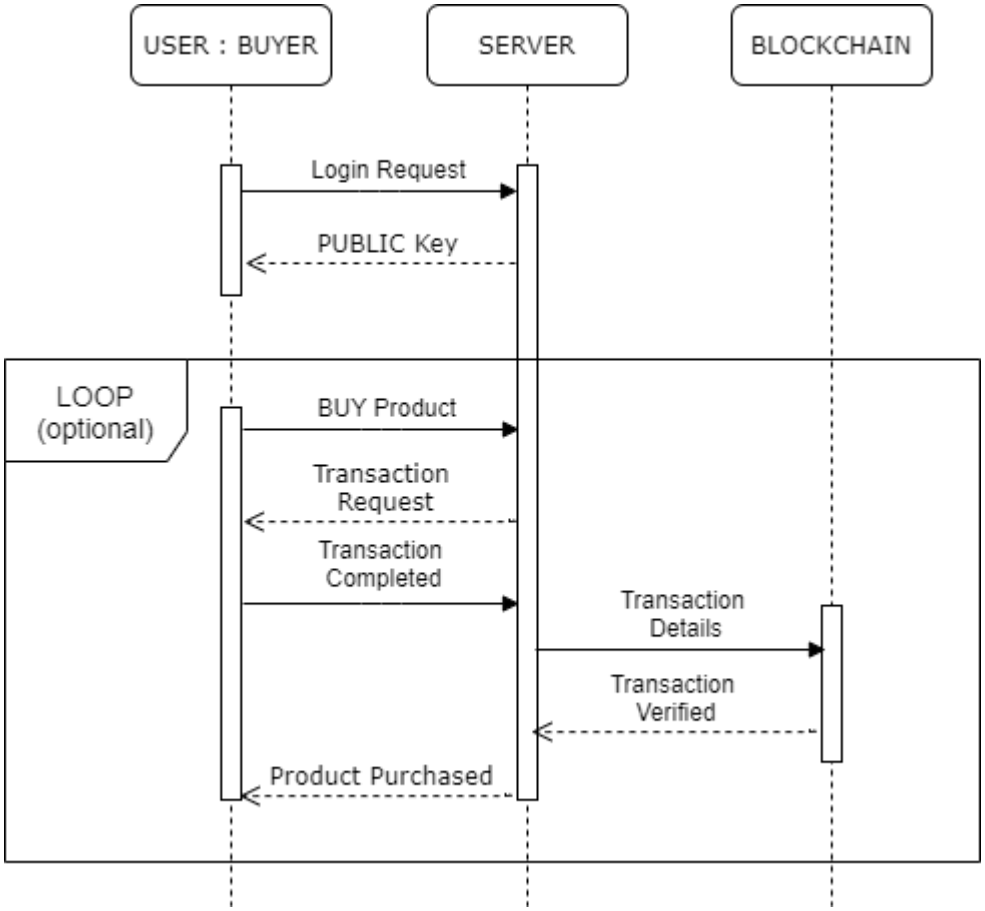

Fig 4.3 Sequence Diagram for buyer

For Conventional Approach

4.7 Context Diagram (Level 0 DFD)

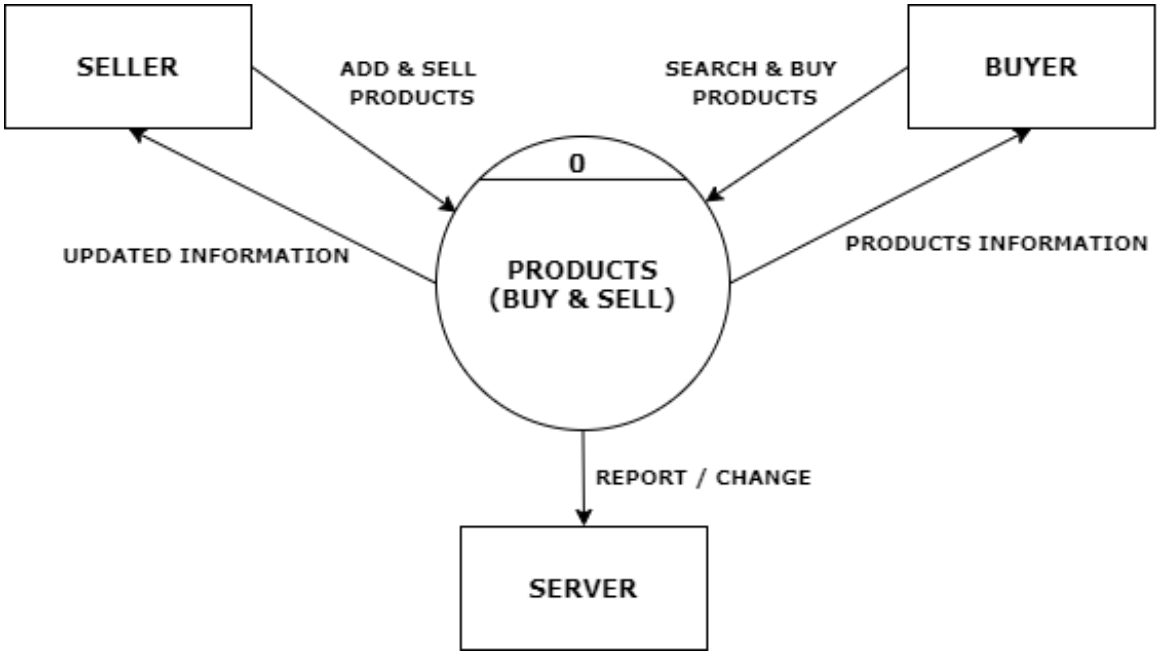

Fig 4.4 Level 0 DFD

4.8 Data Flow Diagram (Level 1 & 2)

DFD Level 1

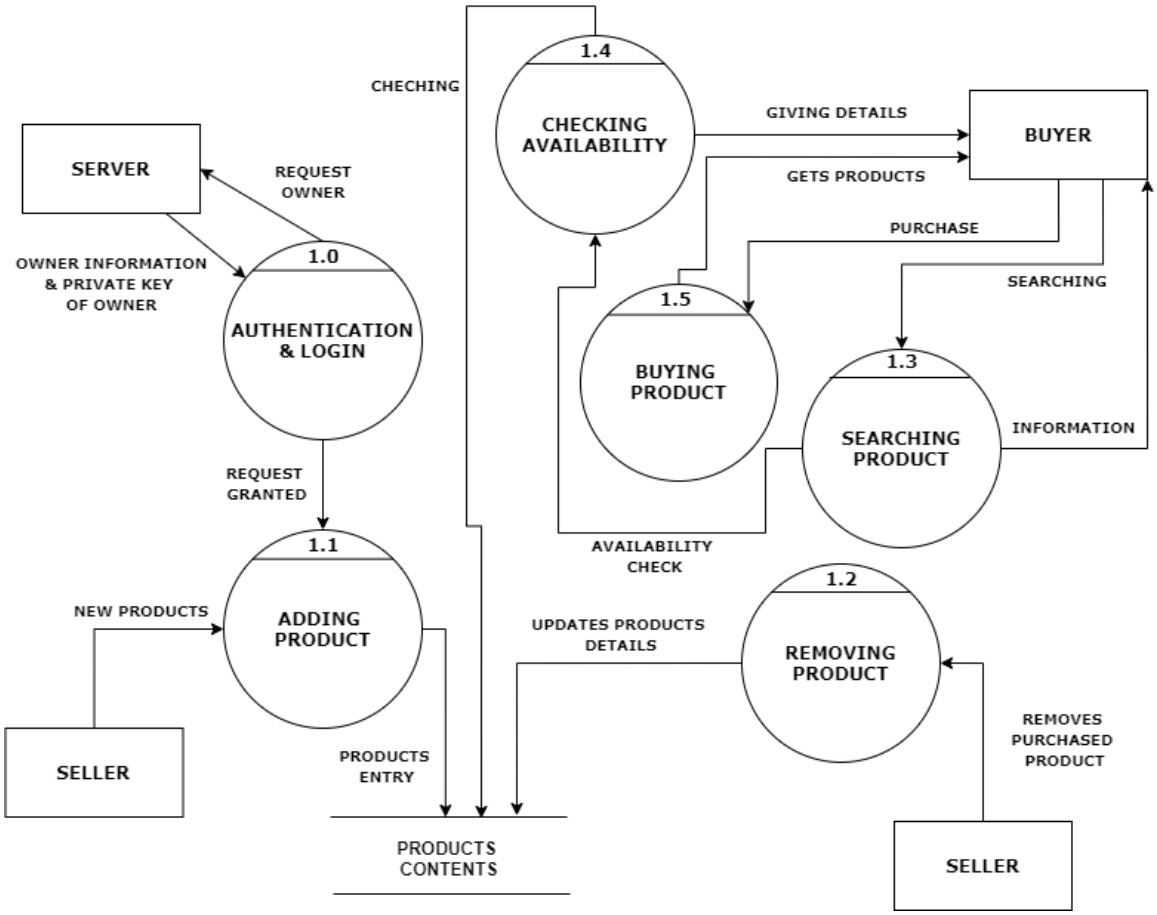

Fig 4.5 Level 1 DFD

DFD Level 2 (Adding the products)

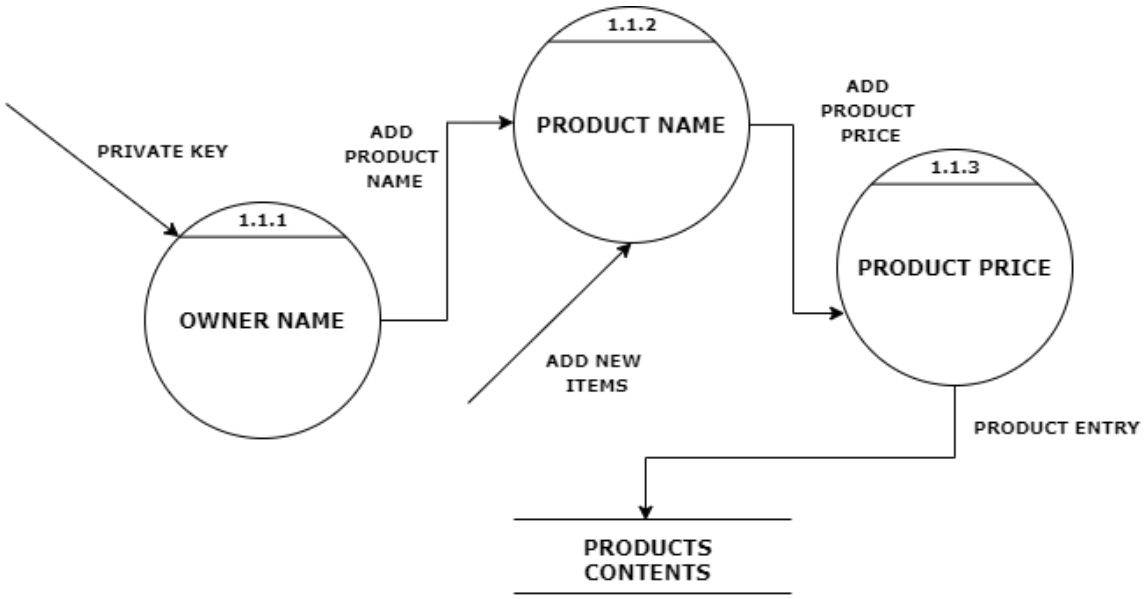

Fig 4.6 Level 2 DFD

4.9 Data Modelling

4.9.1 ER Diagram

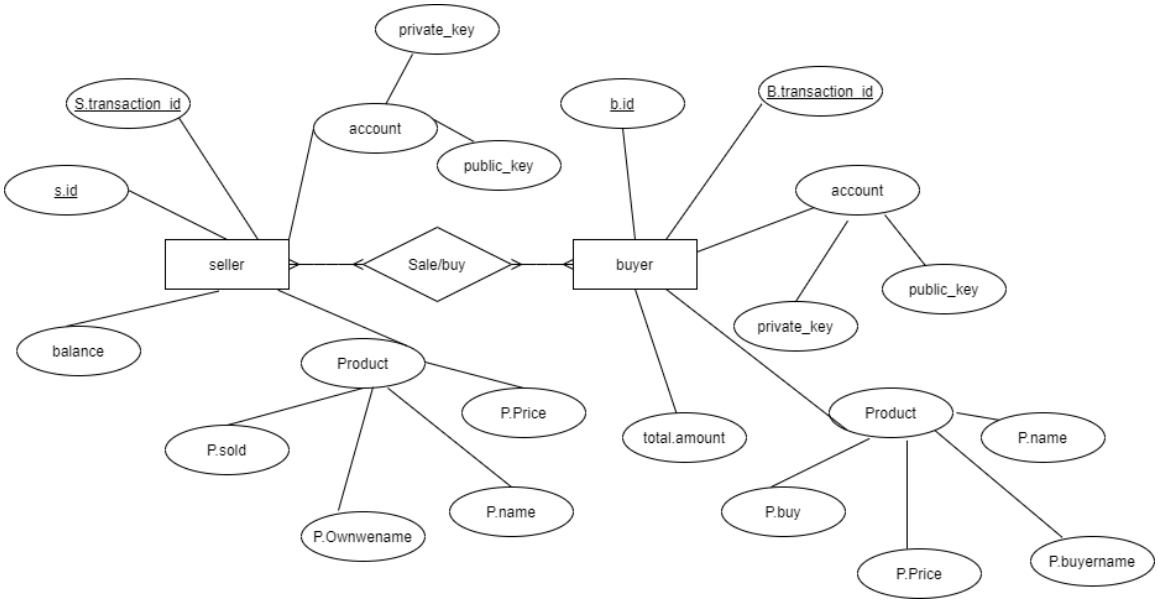

Fig 4.7 ER Diagram

CHAPTER 5.0

SYSTEM DESIGN

5.1 HOME PAGE

Here famers can add the product and product price. If the buyer wants to buy it can click on Buy button down below. Information related to crops and price are all shown.

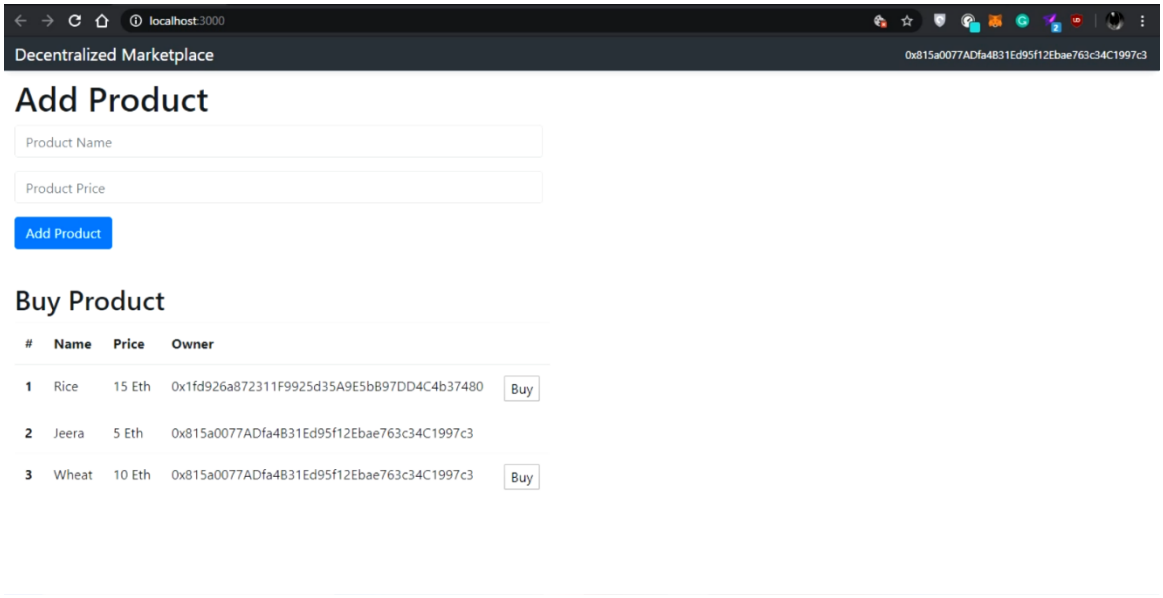

Fig 5.1 Homepage

5.2 GANACHE

Ganache is used for setting up a personal Ethereum Blockchain for testing your Solidity contracts. It gives us accounts and balances at local host.

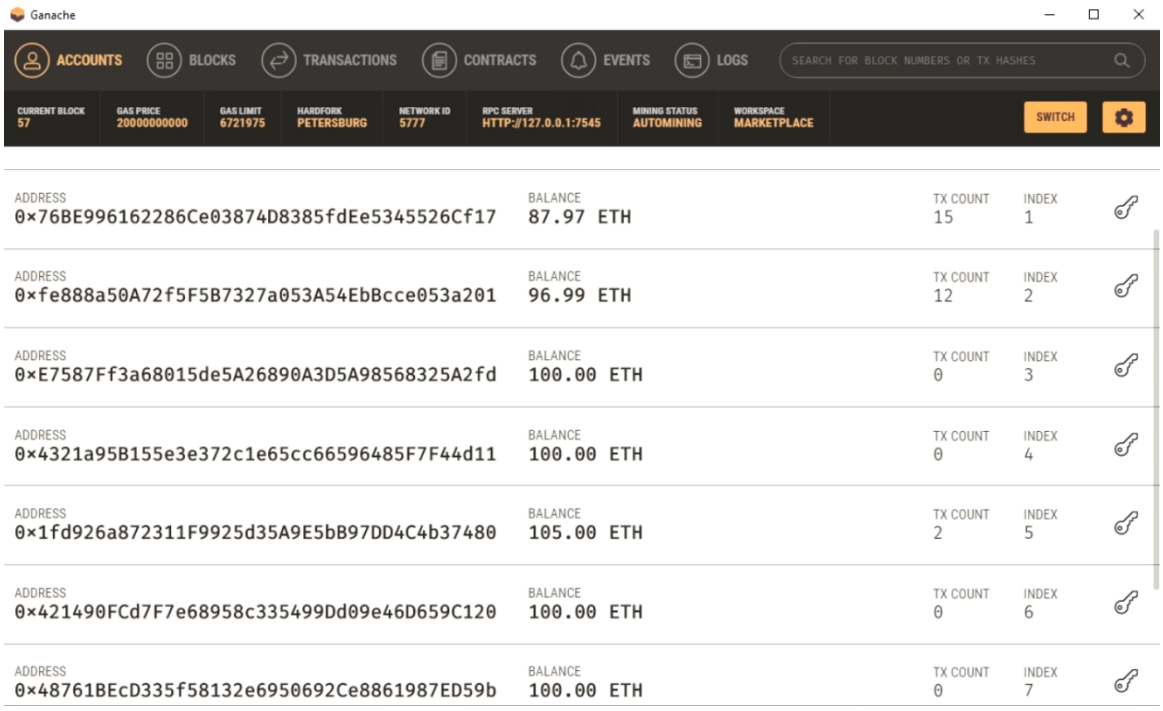

Fig 5.2 Ganache

5.2.1 Simple Block

We have used Truffle which connects our Ganache to smart contracts and solidty.

A block stores following info;

Fig 5.3 Block 64

5.3 Meta Mask

It is like a Crypto wallet and gateway to our app.

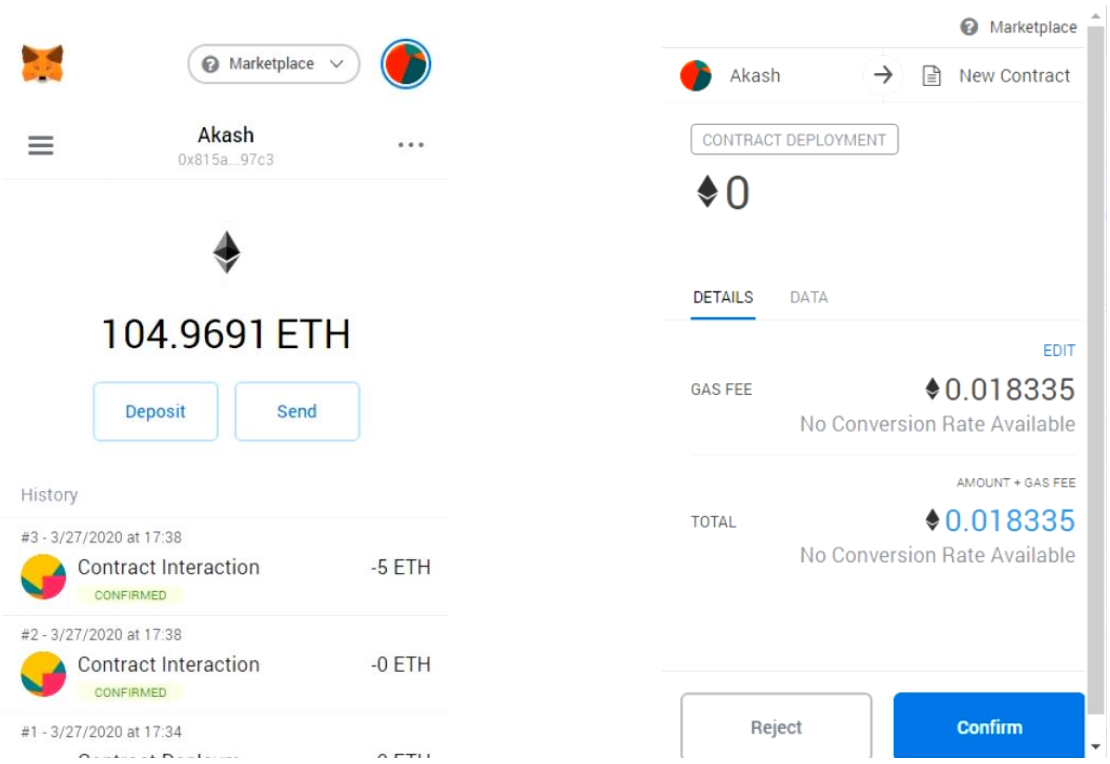

Fig 5.4 Meta Mask Wallet (1)

Meta mask wallet after successful transaction. Image below shows that it is working on Kovan test Network. And It has balance of 2 ether. Account name is ‘Saparia’.

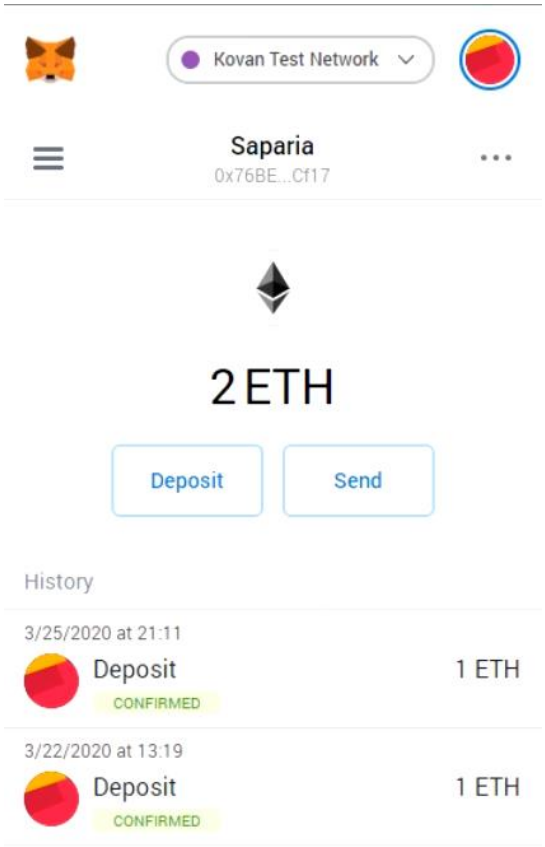

Fig 5.5 Meta Mask Wallet (2)

CHAPTER 6.0

CONCLUSION AND DISCUSSION

6.1 SELF ANALYSIS OF PROJECT VIABILITIES

To bring the whole marketplace in the public network was the biggest challenge for us. It was also a challenge to get the real-time updates on the portal as it would be used by multiple sellers and buyers. This project was originally meant for farmers but as we progressed in the development of the project, we realized that its much bigger purposeful. So, we decided to make a marketplace in general and specialize in individual aspect later on (i.e. future aspects). We were successful in making a decentralized marketplace where any user can sell or buy any product.

6.2 PROBLEMS ENCOUTERED AND POSSIBLE SOLUTIONS

The first problem we encountered was to connect peers to our blockchain network. As of now we have created boot node to automatically connect peers to our blockchain network. Then there was the problem of fake login where any person can create multiple account, this problem was solved by eliminating the login module, we came up with the idea that the public address of the users account would be taken directly from metamask account so the problem of fake login was eliminated by metamask login module and in addition to that there was no login required by the user, so now the user can directly open the portal and start buying or selling. The next big problem was what would happen if two users try to buy the same product at the same time. So, that problem was solved by “proof of work” given by the blockchain technology which checks the transaction details before transferring the ether to the seller.

6.3 SUMMARY OF PROJECT WORK

Decentralized Marketplace is a web portal where a user can sell or buy any product in exchange of ether decided by the seller. This web portal automatically takes the public address of user's metamask account to login into the portal without any manual registration. Here any user can add product in the marketplace for selling in exchange for their desired amount of ether. And when a buyer purchases any product a smart contract is used to transfer the ownership of the product from seller to buyer.

CHAPTER 7.0

LIMITATION AND FUTURE ENHANCEMENT

7.1 LIMITATION

The limitations of Decentralized Marketplace are that it lacks of oversight, however, that might be because there are no governing authorities to monitor transactions, offer assistance, or provide a legal framework.

7.2 FUTURE ENHANCEMENT

We can add a product verification module using digital image processing and data warehouse generated by IOT. We can combine those two aspects and introduce our project to more verified and trustworthy status.

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