BLOCKCHAIN TECHNOLOGY & APPLICATIONS (CIS6390)
Project Report
Title: D-Commerce

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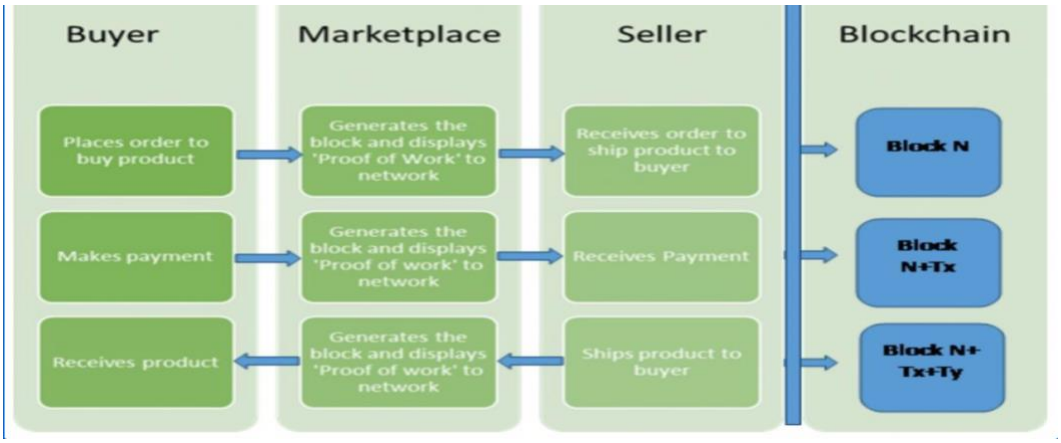
Video Demo to D-commerce: https://youtu.be/IvO0RJkbxD8

What System Intends to do?
D-commerce implements a peer-to-peer network which offers transaction, coordination and collaboration based on distributed node systems, by means of data encryption, time stamping, and consensus. It presents solutions to the problems of insecure data storage that are common in centralized systems. D-commerce is a simple way to perform the e-commerce transaction on a Blockchain. It intends to perform simple buy and sell operations respecting the privacy of users with cryptocurrency(ether). A simple and easy website with reactjs is used for user interaction. The main idea of this project is to simulate how blockchain technology can be used for a decentralized market place and have a wide future scope to be a robust ecommerce dapp.

System implementation and tests performed?
In this project we have created an Ethereum powered smart contract which allows users of an application to be a buyer or a seller using solidity programming language. An ecommerce solution is presented similar to a marketplace without any central organization or servers accessing user data or using any insecure payment methods. A user needs a valid Metamask account with sufficient balance to buy the product and any user can list his product to sell. There is no need for any email signup or login or any information to be shared by the user. All the transactions will be done through smart contracts powered by metamask thus no need for any third party payment gateways to access user information.
To perform the test on a smart contract we used the test file and ran multiple tests with entries with error or partially correct values on the truffle console to check if our smart contract is robust. Also Ganache is used to test the network on a local blockchain with multiple accounts provided by ganache-cli.

Development environment:
We used Visual Studio code as our IDE, for frontend design we used Javascript, ReactJS, HTML5, Bootstrap, and CSS3. Web3.js is used to make users talk with the smart contract. Truffle environment is used to migrate the smart-contract to Blockchain. Mocha, Chai were used for testing smart contract in Javascript.Metamask account will be used by the user to use the application and use its functions. It allows users to run Ethereum dapps right in the browser through a web extension.

Software architecture:



The system has 3 components: Buyer, Seller and smart-contract (marketplace). The buyer can see the listing and buy any product which is available. The smart contract checks if the buyer is genuine, he has the sufficient ether in balance to buy the item and also he is not the same person as the seller of the item. Though he may sell some other product on D-commerce but cannot buy the same product he sells.
The seller can be any metamask account holder on the blockchain network who can list his product with price and details to it. If his product is purchased the smart contract will let the ether in his account and change the ownership of the product instantly.

References:

- Blockchain as E-Commerce Platform in Indonesia- Ismanto, H Suwito AR, A N Fajar, Sfenrianto, S Bachtiar,Information Systems Management Department, Universitas Bina Nusantara, Indonesia, Master of Information Systems Management, Universitas Bina Nusantara,Indonesia:https://www.researchgate.net/publication/335494262_Blockchain_as_E-Commerce_Platform_in_Indonesia.

- Research on Blockchain Application for E-Commerce,Finance and Energy - Xingxiang Zhou*, Dong Wang State Grid Power Finance and E-Commerce Laboratory, State Grid Electronic Commerce Co., Ltd.

    - Beijing,China:https://www.researchgate.net/publication/334328673_Research_on_Blockchain_Application_for_E-Commerce_Finance_and_Energy.

- Serban, C., Chen, Y., Zhang, W. *et al.* The concept of decentralized and secure electronic marketplace. *Electron Commerce Res* 8, 79–101 (2008). https://doi.org/10.1007/s10660-008-9014-0:
- https://medium.com/haloblock/deploy-your-own-smart-contract-with-truffle-and-ganache-cli-beginner-tutorial-c46bce0bd01e.
- https://web3js.readthedocs.io/en/v1.3.0/getting-started.html#adding-web3-js.
- Starter Kit from : www.dappuniversity.com: https://www.dappuniversity.com/articles/ethereum-dapp-react-tutorial