E-commerce stores are continuously growing in popularity as everyday new businesses are launched on the digital web. In fact, from 2014, there has been an approximated 300% increase in sales generated from E-commerce worldwide. However, majority of the web apps available are launched on centralized servers which reduces transparency and trust between the buyers and sellers. DApps (Decentralized Applications) can be used as an alternative solution to combat the shortcomings of centralized web apps.

DApps are a software application that utilizes blockchain technology to run on a decentralized peer-to-peer network. One of the most popular distributed ledger technologies in the DApp market is Ethereum. DApps can essentially integrate smart contract deployment with front-end development (HTML, CSS, JavaScript, etc.). Since smart contracts are open source (i.e., users have access to the code and can see how it works), DApps are much more transparent and, parties have more trust interacting with one another which is a major advantaged over centralized applications. In addition, DApps eliminates the need to trust a third party to enforce the contract as parties can rely on the code written in the smart contract to withhold the agreement. Since DApps are on the blockchain and the blockchain is composed of hundreds of thousands of computers worldwide, it is practically impossible for DApps to go offline/fail, since all the computers need to crash simultaneously. This feature also prevents DApps from censorships, meaning no central authority (e.g., governments) can stop a smart contract from executing a task that is has been programmed to do.

To combat the shortcomings of centralized web applications with the benefits provided by DApp, our team has decided to develop and deploy a marketplace to sell digital artwork on the Ethereum Testnets. The Ethereum network provides development tools that shorten programming times and enables users to deploy projects more efficiently. We used Truffle Suite as our development environment to first make and test our smart contract (using solidity) and later with the help of Ganache, deployed the smart contract to the Ethereum Testnets. Ganache was used to generate 10 different accounts, each containing public keys, private keys, and 100 Ethereum. By broadcasting items on the immutable distributed ledger, each party will have a copy of the ledger, which increases transparency and trust between the parties involved. In addition, by using MetaMask (Ethereum cryptocurrency wallet), we removed the requirement of needing personal information to verify identity, and thus increased privacy for the users.

Our DApp, OFF-GRID STUDIOS, is a limited-time marketplace for selling artworks. The web UI of our DApp displays the name, description, price (units in ETH), owner, wallet address of the user, and a buy option for each artwork. If the item has not been purchased, the owner field will display an empty address (address of all zeros) otherwise, the public address of the buyer will be displayed. After purchasing the item, the buy option will display a message indicating that the item has been sold. Each item has an expiry time in which after, the buy option will be deactivated, and user can no longer purchase the item. All requirements of our DApp have been programmed using solidity in our smart contract. User can utilize their Ethereum crypto wallets to purchase any items available on the website as long as it obeys the smart contract requirements.

The information provided on our website UI is powered by our smart contract at the backend and our HTML and JavaScript files on the frontend. Our solidity code ensures that all the users requests (i.e., buying items) are processed according to the agreements set out in our smart contract. When a customer decides to purchase an item, the smart contract confirms that the user has enough currency in their wallet to meet the items price in addition to the gas price. Also, the smart contract ensures that the item has not been previously purchased (i.e., contains empty address) and the timer is not yet expired. When all the contract requirements are met, the smart contract then executes its end of the deal and transfer the item to the buyer.

Please view the detailed setup instructions and tutorial video for all details on how to launch and maneuver through our DApp Marketplace, OFF-GRID STUDIOS.

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