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Thr3ebay: E-commerce Dapp using Blockchain

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Abstract: ***Blockchain has the potential to shake the foundation of e-commerce by enabling exchange relations that are trustless and operate without dedicated intermediaries or even central authorities in the case of permissionless blockchains. Furthermore, the exchange of information and value between companies and consumers might change considerably by enabling unified access to immutable data along the entire supply chain.***

In this paper, we build a Dapp called Thr3ebay which offers buyers and sellers a secure and transparent platform where transactions are conducted directly between participants, without the need for intermediaries. The platform also provides a user-friendly interface for managing wallets and identities, making it easy for users to buy and sell products on the blockchain. We then examine the potential benefits of building a Web3 e-commerce platform, such as increased security, transparency, and trust, as well as the challenges in terms of scalability, user adoption, and interoperability. Key feature of the Thr3ebay Dapp is its integration with various web3 technologies, including IPFS for decentralized file storage, and the Third-web SDK for user authentication and wallet management. The P2P Decentralized app has also developed a custom front-end for the platform using React, making it easy for users to interact with the marketplace. The purpose of building a Web3 e-commerce app is to create a more secure, transparent, and democratic platform for buying and selling goods and services online, while also providing greater trust and confidence for buyers and sellers

I. INTRODUCTION

Blockchain-based technologies are predicted as major disruptors for numerous business applications and processes, which bears huge implications for e-commerce. Given the ability of blockchain and related technologies to create so-called “trustless systems” with idiosyncratic properties, various business models and established processes that have emerged over the years to ensure trust, reliability and enforceability in business-to-consumer (B2C), business-to-business (B2B), business-to-government (B2G) and consumer-to-consumer (C2C) relations need to be questioned and potentially adjusted. Blockchain has the potential to shake the foundation of e-commerce by enabling exchange relations that are trustless and operate without dedicated intermediaries or even central authorities in the case of permissionless blockchains. Furthermore, the exchange of information and value between companies and consumers might change considerably by enabling unified access to immutable data along the entire supply chain.

Decentralized peer-to-peer (P2P) applications have gained significant attention in recent years due to their potential to create a more secure and transparent system for online transactions, without relying on intermediaries. The purpose of this research project is to introduce and analyze the development of a decentralized P2P app, built on Web3 technology, which enables secure and direct communication and exchange of data and assets between users. They provide a more secure and transparent platform for communication and transactions, as every transaction is recorded on a decentralized ledger that is immutable and tamper-proof. This eliminates the need for intermediaries, reducing transaction fees and ensuring greater privacy and security for users. Smart contracts can be programmed to automatically execute transactions once certain conditions are met, such as the receipt of payment.

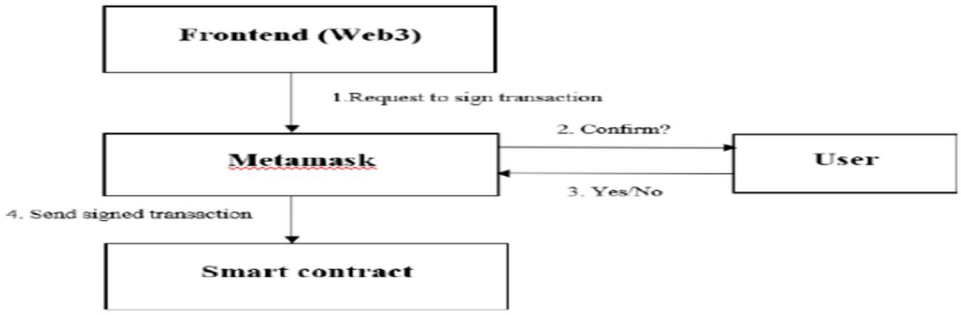


Fig. 3. Working of Smart contract

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II. OBJECTIVES

1) *Decentralization:* The marketplace aims to eliminate the need for centralized authorities such as banks, payment processors, and marketplaces. It allows buyers and sellers to transact directly without intermediaries, thereby reducing transaction fees and enhancing transparency.
2) Security: The blockchain technology used in web3 e-commerce marketplaces ensures that transactions are secure and tamper-proof. This makes it difficult for hackers to gain access to sensitive data or steal funds.
3) *Transparency:* Transactions on the blockchain are transparent, which means that everyone can see the details of a transaction. This enhances trust between buyers and sellers as they can verify the authenticity of products, the legitimacy of sellers, and the history of transactions.
4) *Cryptocurrency payments:* Web3 e-commerce marketplaces allow payments in cryptocurrencies such as Bitcoin, Ethereum, and others. This enables users to avoid traditional banking fees and the hassle of converting currencies.
5) *Smart contracts:* Smart contracts are self-executing contracts with the terms of the agreement directly written into lines of code. This eliminates the need for intermediaries such as lawyers, which reduces the cost and time required to complete transactions.

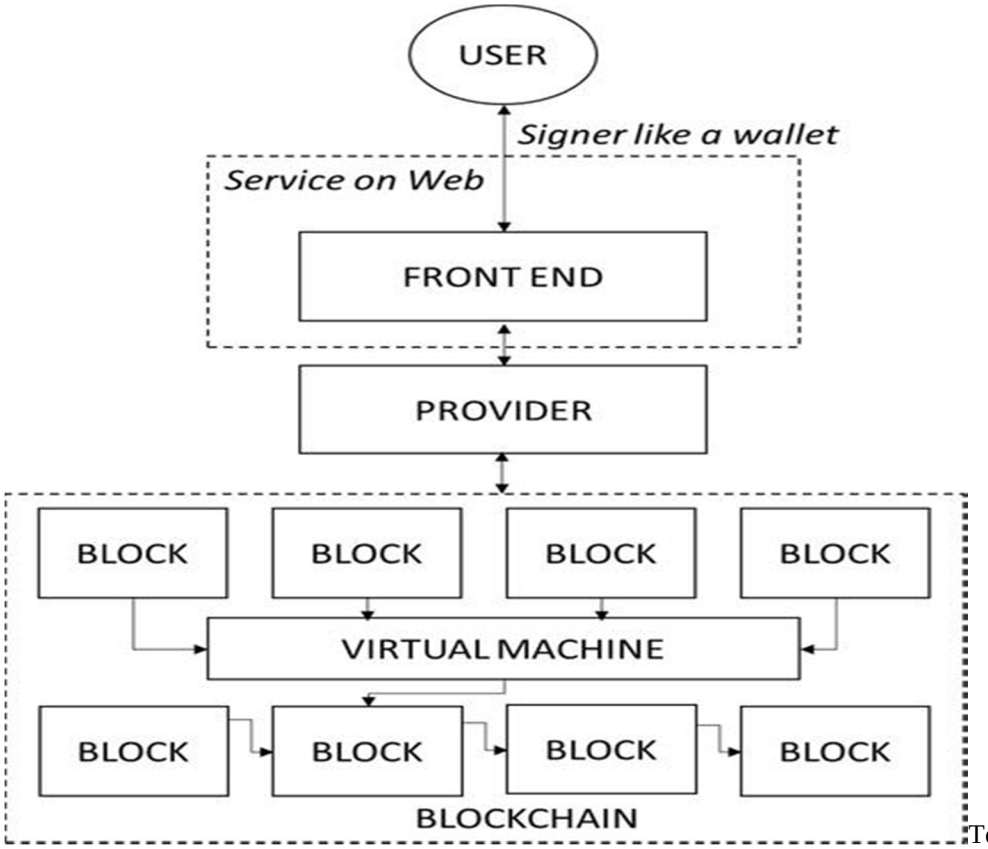
Overall, web3 e-commerce marketplaces aim to provide a secure, transparent, and decentralized platform for buyers and sellers to transact freely without intermediaries.

III. PROBLEM STATEMENT

Although e-commerce is experiencing tremendous growth and success, it has its limitations. The problems are mostly since most platforms rely on centralized financial institutions or payment gateways for operations like transactions. Such a centralized approach to undertaking e-commerce related financial activities is not just less secure but also less reliable. In a web3-based e-commerce setup, all vital information, including transactional data, can be stored directly onto a blockchain. This could eliminate most of the problems that exist within the current e-commerce system. Thus, Blockchain Based e-commerce can be considered disruptive with transformative outcomes for the e-commerce industry.

IV. METHODOLOGY

A. *System Design*



To

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Build a Decentralized E-commerce Dapp using blockchain you'll need a some proficiency in javascript, Metamask , some tech stacks required to build the dapp .
In this project we used Reactjs, Tailwind CSS for Front-end. Nextjs, Thirdweb frameworks SDK, webhooks, API etc, IPFS for the backend. And Code editor like VS code.
Here, We'll break the entire process into 5 manageable Steps:

1) Project setup: Install and Setup Tailwind CSS with Next.js

You can create a new Next application using the command below.

```
npx create-next-app gfg
```

Step 2: Install Tailwind

Once your next project is created, open the project's root directory and install the tailwind dependencies with the following command.

```
npm install -D tailwindcss postcss autoprefixer
```

Step 3: Create Tailwind config file

Run the following command to create a tailwind config file, this file can be used to extend the tailwind's functionality.

```
npx tailwindcss init -p
```

a) Create an E-commerce Header
Once Installation and Setup of all Libraries and framework is done now is time to create a header component using react Let's call it Header.tsx Connect wallet Button is a Button that executes a function on a smart contract from the connected wallet when clicked.

b) Creating Pages:
An E-commerce Dapp contain Various pages like Home page, Product page, list page, Inventory Page etc.

c) Initial Thirdweb framework Setup:
When it comes to Web3 development, this is one of the most important steps.
Thirdweb framework provides collection of 100+ React hooks and UI components for your web3 apps, for any EVM-compatible blockchain.
Connect to user's wallets, interact with smart contracts, sign messages, and utilize common standards such as tokens, NFTs, marketplaces; all with built-in caching, RPC URLs, IPFS gateways, and more.
To get started, install the required dependencies into your React project.
npm install @thirdweb-dev/react @thirdweb-dev/sdk ethers@^5
The React SDK of Thirdweb uses React Query under the hood to expose a collection of query and mutation hooks, each with built-in caching, query invalidation, query retries, and more.
Each hook (except for wallet/network management) wraps some functionality of the TypeScript SDK, which are made available as either a query hook to read data, or as a mutation hook to write transactions to the blockchain.
When mutations are called (when a user executes a transaction), query invalidation is automatically triggered to update the relevant queries that depend on the data that was changed. For example, when minting a new NFT, queries that view information about NFTs are re-fetched to load the new NFT automatically.

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d) Smart contracts:

In this project , Instead Of Building the same Smart Contracts used by other web3 marketplaces we decided to use Smart Contract webhooks Provided by Thirdweb

Smart Contract used in this project are : Market Place Smart Contract-

A Marketplace is a contract where you can buy and sell NFTs, such as OpenSea.

The Marketplace contract allows users to list NFTs for direct sale or auction. Other users can place offers/bids or buy the NFTs for the specified amount in the listing.

The marketplace can be configured to only allow certain users to list NFTs for sale, or allow any user to list NFTs for sale.

You could use the Marketplace contract to:

- Sell your NFTs on your marketplace
- Create auctions where the highest bidder, after a certain period, wins the NFT
- Create an open marketplace where any user can list NFTs for sale, like OpenSea.

V. CONCLUSION

Web3 is the decentralized version of the web that promises to address the flaws in legacy web versions, like web1 and web2. With AR and VR becoming more popular as experience-enhancing technologies and NFTs continuing to boom, new standards in e-commerce may be expected with a wider range of options for customers. Modern brands want to be there for customers no matter where they shop- online, in-store, or via social media. With the connectivity web3 provides, omnichannel strategies will be even more efficient as brands can link all their sales channels and operational systems to provide seamless e-commerce experiences for their customers. Web3's inherent quality, decentralization, allows brands to run their apps without a single point of failure and benefit from blockchain's robust technology stack. Web3 will undoubtedly provide the best e-commerce experience possible for consumers and brands.

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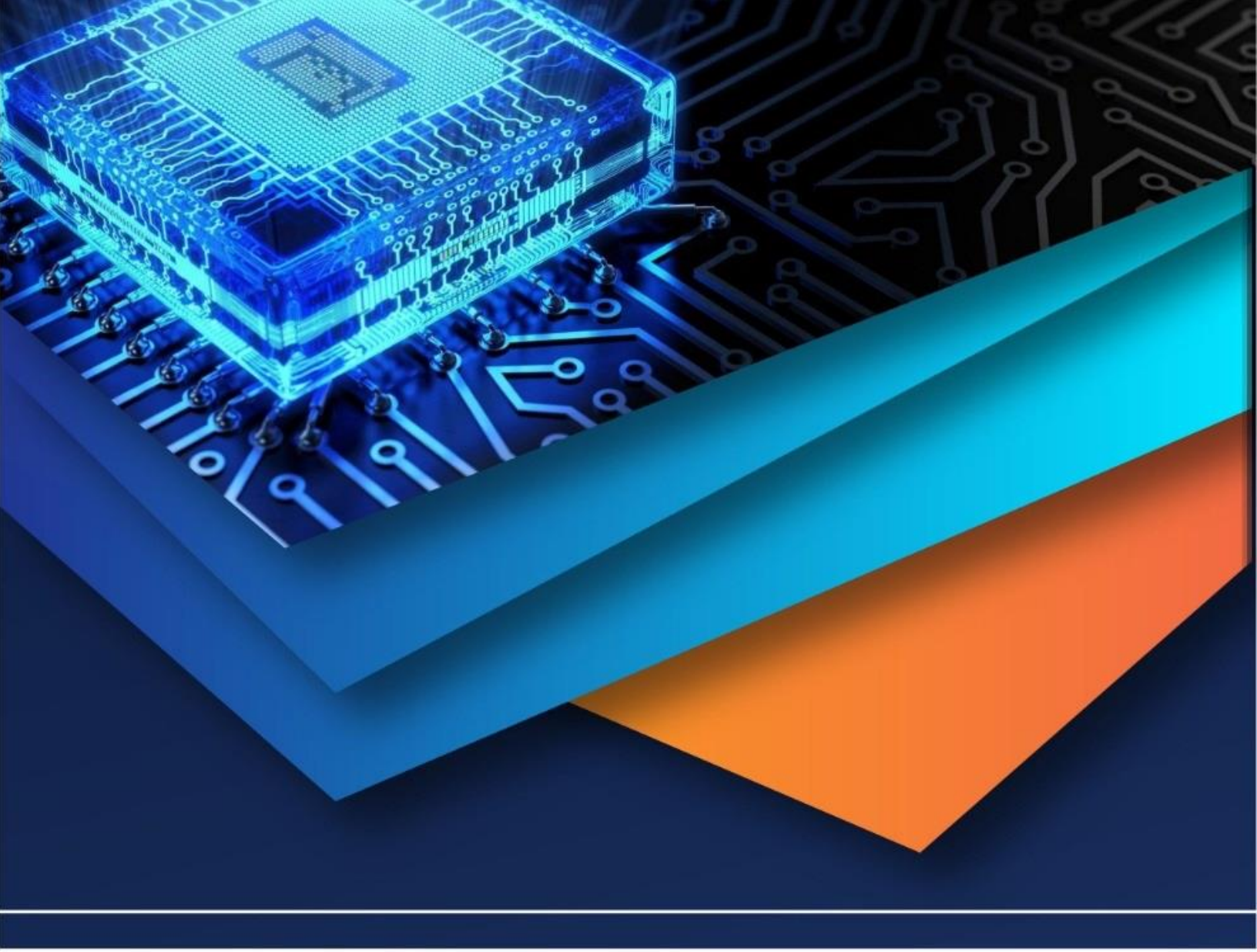
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