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Blockchain Based Transaction Management System

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Abstract: ***The technology that supports bitcoin, known as blockchain, is still in its development. Blockchain technology has the potential to improve existing corporate procedures to make them more collaborative, transparent, secure, and effective.. The banking sector is among the first to take advantage of this technology's disruptive potential. One of the most intricate bank payment systems in the entire globe is the Indian banking system. The current infrastructure that the Indian banking system uses is centralized and based on the real-time gross settlement system. This centralized architecture causes transactions to process slowly and result in wasting. Additionally, it costs a lot for security and recovery considerations. Systems for real-time gross contracts should indeed meet high expectations for speed, stability, and security. The primary objective is to develop a system that provides security, confidentiality, and a decentralized money lending mechanism rather than converting old system to the blockchain platform. Here, a novel strategy that encourages a decentralized system and services built on the Ethereum blockchain is progressed. The system enables a number of services using distributed ledger technology, including loan checking, money transfer, and money deposit, among others.***

Keywords: Blockchain, Ethereum, Hardhat, Metamask, Smart Contract, Solidity.

I. INTRODUCTION

As a top technology layer for financial applications, blockchain has emerged. However, in recent years, researchers and professionals' focus has shifted to the use of Blockchain technologies in other fields. Due to its potential to guarantee data integrity and public accessibility of data streams, blockchain technology is a revolutionary invention. Additionally, its decentralized infrastructure removes and lowers the problems linked to present centralized techniques, including confidence issues, fraud, corruption, and information tampering. Centralized systems are more inclined to fail because a single source of failure could render the system useless as a whole. Bitcoin appears to be the best choice for resolving these prevalent problems. The major limitations present are the Blockchain's scalability, pricing issues, and the dearth of use cases with obvious cost/benefit analyses. Furthermore, the reference models primarily concentrate on the business processes modeling and the Technology Design Process of a Blockchain-based approach instead of the standardized process to design, develop, and certify the entire Blockchain solution at the Strategic level.

A new block of records can be added to a distributed ledger called blockchain, but previous records cannot be removed since the blockchain uses an append-only architecture. To ensure the accuracy of the database, each block in the blockchain is approved by a unique entity protected using encryption. Additionally, blockchain distributed ledgers that are unchangeable and prevent fraud can be used to record all significant amounts of record-keeping transactions and procedures.When a transaction is registered in the blockchain, all the details of the transaction are recorded, confirmed, and settled across all nodes in a matter of seconds due to the distributed ledger, which allows data to be replicated and stored instantly on each node. Each transaction is open to everyone and does not require third-party verification because it is transparently and permanently recorded. Blockchain has many advantages for managing transactions. Processes are streamlined, settlement times are shortened, expenses are decreased, workflows are digitized, operational risks from fraud and human error are reduced, they are made programmable, and they are easier to manage and trade.

II. LITERATURE SURVEY

The objective of this piece is to illustrate a peer-to-peer blockchain exchange/transaction in order to highlight the differences between the established network and the new banking technology. The paper considers various associations with transactions before coming to a conclusion about the highly favored transaction system[3]. This paper intends to present a Blockchain-based app that is analogous to the Google Pay app. The major goal of the paper is to develop an application that would allow transactions between centralized systems to be made across a decentralized network[2].The main goal of the suggested solution is to safeguard the blockchain system by employing various approaches.

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The suggested concept employs a system that is based on financial transactions and makes use of RFID technology.[1]. The paper demonstrates that various application possibilities are continuously being looked into. Blockchain is based on and allows for the implementation of the idea of Decentralized Applications (DApps). This increases the apps' transparency, distribution, and flexibility. This article describes our experience creating a DApp using Ethereum, the most well known blockchain-based platforms[4].

III. REQUIREMENTS

The technology required for the development of the project was Ethereum Blockchain,Web 3.0, Meta-Mask wallet concept, Smart contract, React Js**.** The languages for the development of the front-end part i.e. website that we used are HTML(Hyper Text Markup Language), CSS- Tailwind CSS, Javascript and Solidity in smart contract. A programmable blockchain called Ethereum operates on the Eth cryptocurrency, which serves as the system's operating money. Eth is used to pay for costs involved with processed or preserved information. With the aid of dapps, or Dapps, Ethereum provides its users with a complete atmosphere to develop their own functionality.

Technology used :

1) *Ethereum:* It is a blockchain-based decentralized open-source platform. Applications that run a program exactly as they were written, without the risk of fraud, outside interference, restriction, or delay. A cryptocurrency called ether is created by ethereum miners and utilized as payment for calculations made to secure the network.
2) *Hardhat:* Developers can test, compile, deploy, and debug dApps that are built on the Ethereum blockchain in this environment. As a result, it makes it easier for programmers and developers to handle many of the responsibilities involved in creating dApps and smart contracts. Hardhat gives developers new, practical features in addition to the right tools they need to control this process.
3) *Smart Contracts:* High-level programme codes known as "smart contracts" are converted into EVM bytecode before being posted on the Ethereum blockchain for execution. Solidity, a language library similar to C and JavaScript, is a language for creating smart contracts.
4) *Solidity:* Smart contracts can be implemented using Solidity, a high level object-oriented (contract-oriented) programming language. Python, C++, and JavaScript, which use the Ethereum Virtual Machine (EVM), have a significant influence on it.

IV. METHODOLOGY

Firstly we have to install React - Vite ,A front-end tool of the future, Vite is geared at performance and quickness. It is split into two primary parts: a development server that offers a variety of features above native ES modules, such as pre-bundling, quick Hot Module Replacement (HMR), integration for typescript and Jsx, and dynamic import. By installing Vite you can easily use react js with the online Jsx library . Basically we required react for frontend and node js for backend.

Node js helps us to write backend functionality or operations. It contains npm packages which we have to install in our project . After installing the react we also have to install npm packages. To use npm packages we must have to install npm and set its path. By using “npm init” we can create our server project in VS Code . It will install all the packages. We have deployed the Smart Contract on Ethereum Network which is written in solidity language. There are so many languages available to write smart contracts and solidity language is used by professionals. For testing purposes we use the testing network there are so many networks available we can use any one of these they all are free of cost . Here we use Goerli Testing Network to get testing ethereum. When we deploy our smart contract into any of these networks at that time we have to pay somegas limit for that we use this dummy ethereum.

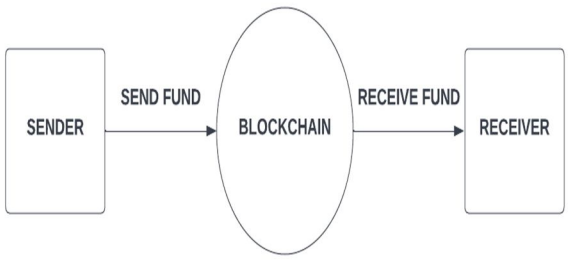


Fig 1.1

After writing a smart contract we have to connect to our metamask wallet . MetaMask is a global community of

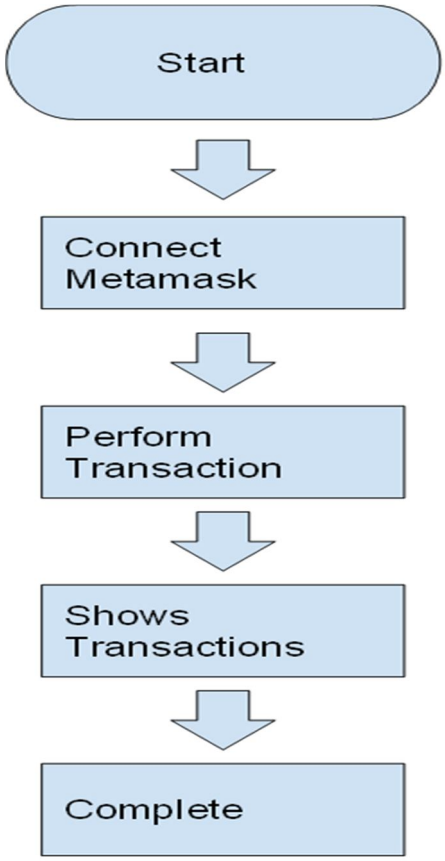


Fig 1.2

designers and developers committed to using blockchain technology to improve the world. in order for us to be able to see our ethereum coins there. They will ask for one private key when creating an account on Metamask, which we have kept secure. In order to finish the transactions, we must insert private keys. Addresses for the sender and recipient were needed for the payment. For doing transactions users must connect with its metamask wallet . By clicking on the connect button the user connects with its metamask wallet . After that he is able to do transactions via sender address and receivers address. Project folder has the server and client to subfolder the addresses and amount of ethereum we are taking from the frontend part then it will go to metamask wallet and perform transaction.After performing transaction the history of the transaction.

The History of each and every transaction we have to show on the webpage for that purpose we are using etherscan A block explorer for the Ethereum blockchain is called Etherscan. Users may quickly search for and view transactions and blocks thanks to it. Moreover, it offers details about each transaction and block, including the date and hash. Etherscan can be compared to the Ethereum equivalent of Google. After transaction we are fetching the previous transaction by connecting metamask with etherscan. To connect etherscan and metamask we have to copy our metamask wallet account address and paste it into the etherscan ro get all transactions.

V. RESULTS AND DISCUSSION

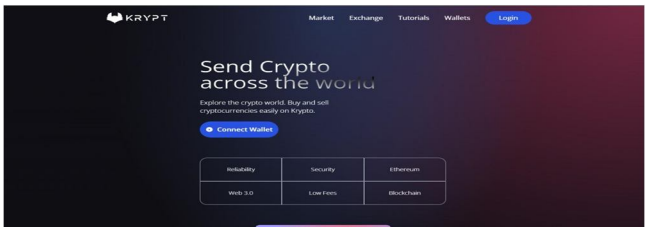


Fig 1.3

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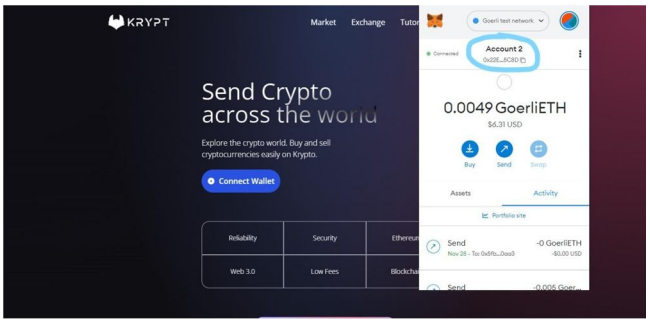


Fig 1.4

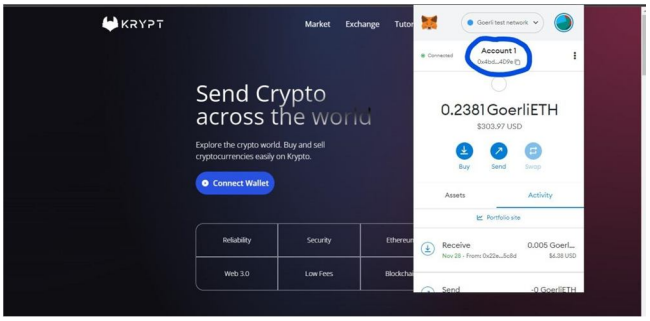


Fig 1.5

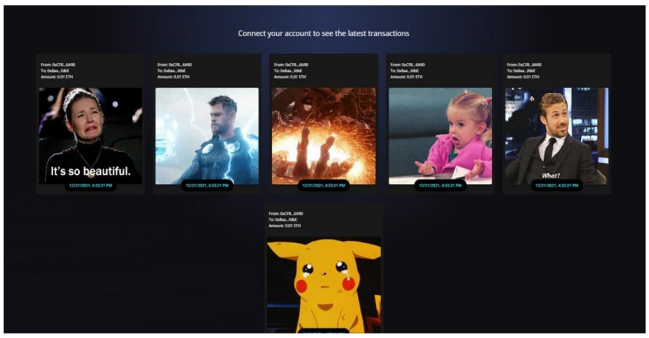


Fig 1.6

The above transaction project provides us with an efficient, reliable and secure transaction with the transaction history . The bottom part of our web page shows all the previously done transactions with the gif video . We can also visit the Etherscan website which stores all the transaction history of a user when we use the Ethereum network. We use here the Goerli Test Ethereum network for testing purposes. When we deploy our website into a live network, we switch on to the main ethereum we can see in metamask. There are multiple networks which show us the actual money we have.

VI. FUTURE SCOPE

Cybersecurity is where blockchain technology is primarily going in the future. Despite the Blockchain system being open and distributed, the data is still secure and verifiable. Data is encrypted using cryptography to eliminate security flaws like unauthorized data tampering. It is currently one of the techniques that businesses talk about the most, and the employment in this area is fueling a growth in the IT sector. Hence, for those with the necessary abilities and understanding, blockchain technology offers enormous prospects.

The validation and traceability of multicomponent transactions that call for verification and traceability can benefit from it. Additionally, it offers safe transactions, lowers compliance costs, and expedites data transfer processing. Additionally, it aids with contract management and product origin audits. It offers a variety of work descriptions to suit your interests and qualifications thanks to the wide range of applications available.

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VII. CONCLUSION

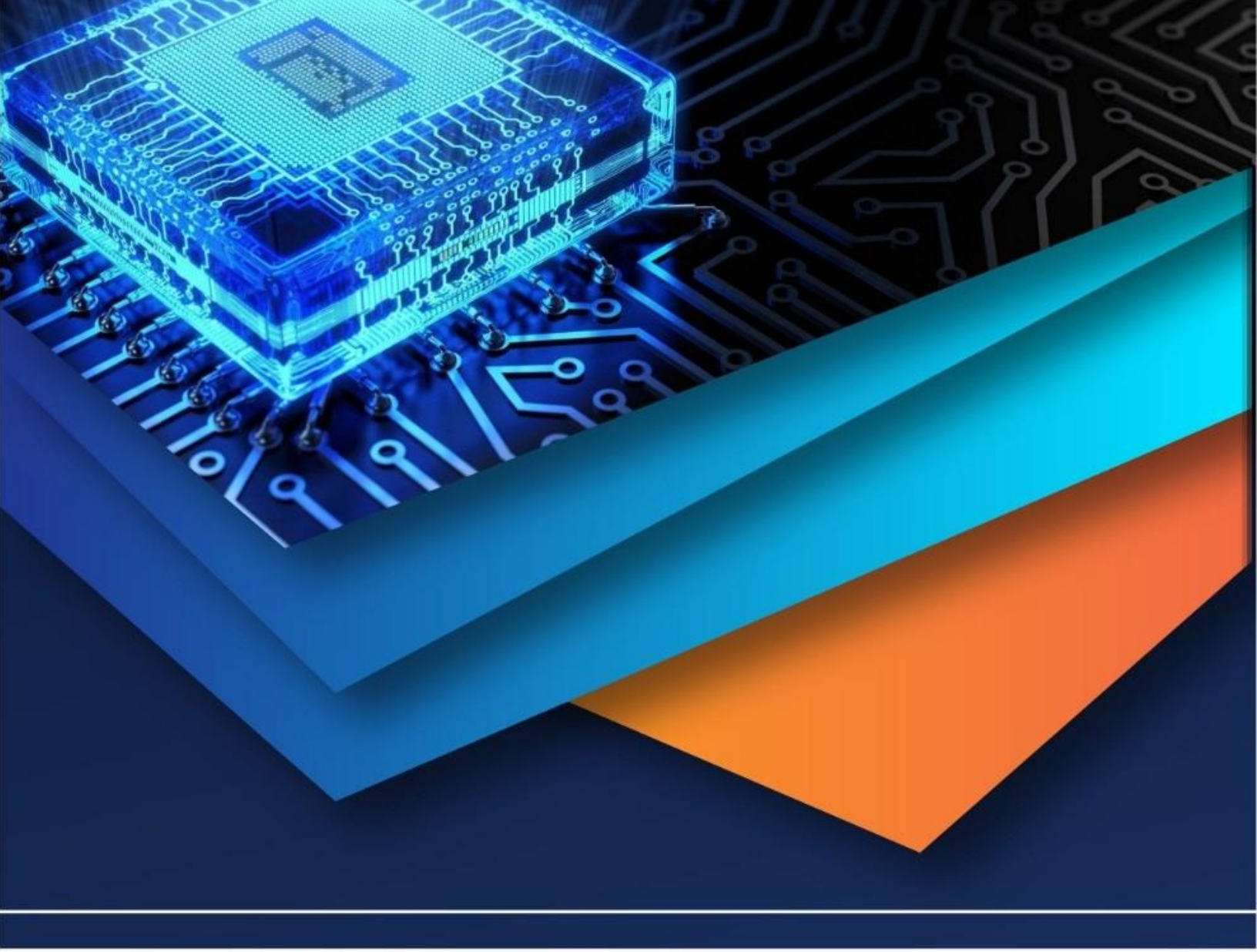
The paper concludes the operation of the transaction system over the outdated that has been developed over the years by a system, which has been established and changed by the given the foundations of blockchain, which has been formed in the earliest date of the time but is capable of serving as an unconditional tool for creating a corruption-free environment and it also saves major issues of centralized control of the system and involving agreement of the overall derived system..

One of the finest answers for the current issue is the blockchain-based transaction system. Every new alteration to the blockchain is made simpler, fundamental issues are solved, and peer-to-peer system sharing is made possible. Also, the ecosystem in which events are managed is made to be readily pushed, and each action has its own unique hash.

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