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De-fi Based Payment Gateway System

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Abstract: ***By using Decentralized Finance based payment gateway system, users are able to pay for a product only when it reaches their home. The payment is stored in a temporary pool until the product is delivered. This approach offers a number of benefits for both consumers and businesses. For consumers, the ability to pay only when the product is received can provide greater peace of mind and reduce the risk of fraud or scams. It also allows users to avoid paying upfront for a product that they have not yet received or had the opportunity to inspect. For businesses, this approach can improve cash flow and reduce the risk of non- payment. By holding the payment in a temporary pool until the product is delivered, businesses can ensure that they are paid for the goods or services they provide. This can be particularly useful for small businesses or those operating in sectors with a high risk of nonpayment. Also by the Ethereum and the Etherscan API, this system can promote efficiency in charitable giving by enabling fund donors to verify and track the use of their donations.***
Index Terms: Chainlink Oracle, De-Fi, DPGS, Vercel, Etherium, Web2 to Web3

I. INTRODUCTION

Decentralized finance (DeFi) has taken the world by storm in recent years, offering a new way for individuals and businesses to engage in financial transactions without the need for traditional intermediaries such as banks. Decentralized finance or DeFi is a monetary system that is built on public blockchains. The components of open finance consist of protocols, digital assets, dApps (decentralized applications), and smart contracts, which are built on blockchain. Our payment gateway system is a pioneering platform within the DeFi space, specifically designed to help charity donors track and manage their funds in a secure, transparent, and efficient manner. By using blockchain technology and smart contracts, our system allows users to make payments and engage in financial transactions with confidence. Transactions are recorded on a Decentralized ledger, making them secure and immutable. And with the use of smart contracts, users can be assured that their payments will be executed according to predetermined conditions without the need for manual intervention

II. LITERATURE REVIEW

A. Traditional Finance System vs Defi

Operations of DeFi are not managed by institutions and employees. Their role is played by algorithms written in code or via smart contracts in the DeFi environment. Once a smart contract is deployed to the blockchain, DeFi apps run without any human intervention whereas in traditional finance, there are intermediaries like banks that manage the financial operations. One of the prominent DeFi features that clearly defines the differences between DeFi and traditional banking apps is that the former comes with the power of code transparency. This makes it possible for anyone to audit, which develops a trust with users because everyone has the opportunity of understanding the contract's functionality. And since the transactions are pseudonymous, the privacy questions never emerge. However in traditional finance, the monetary operations are managed by intermediaries so security breaches may arise. dApps development, another type of blockchain application used in the DeFi environment, has been designed to act globally from day one. Irrespective of which geographic location you belong to, the access to DeFi networks and services are the same.Whereas in case of traditional finance system , the services offered by financial institutions are restricted to their localities. For instance, you can only open a bank account in the country where the bank operates Anybody can create decentralized finance applications and use them. Unlike present–day finance, there are no accounts or gatekeepers on this front and the users interact directly with smart contracts from DeFi crypto wallets.

B. Benefits of DeFi

Traditional banks are administrative in nature and expensive to run. The process for transactions takes time and has removed numerous individuals out of the financial framework because of their 3 rigid rules and requirements. DeFi came to settle a large number of these issues. Some of its key benefits are listed below:

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C. Permission-less

One of the key benefits of decentralized finance (DeFi) is that it is permissionless. This means that anyone can access DeFi applications and services without having to obtain approval from a centralized authority. This openness and accessibility are few of the main attractions of DeFi, as it allows anyone with an internet connection to participate in the thriving ecosystem. In addition, permission-less DeFi platforms are often more secure than their centralized counterparts, as they are not vulnerable to single points of failure. This makes them ideal for storing value and participating in financial transactions. Consequently, the permissionless nature of DeFi is a major selling point for those looking to get involved in the world of decentralized finance.

D. Interoperability

With decentralized accounts, developers can freely expand on top of existing protocols, customize interfaces, and integrate third-party apps. Because of this sort of adaptability, DeFi conventions are often known as 'Money Legos.' New decentralized money applications can be built by consolidating other DeFi products. For instance, stablecoins, decentralized trades, and forecast markets can be joined to frame a completely new and significantly more progressed DeFi finance market size and centers.

E. Transparency

DeFi empowers a more prominent degree of openness and accessibility. Since most DeFi protocols are based on the blockchain — a public ledger — all exercises are available to the general population. Anybody can see transactions, however, these records are not attached to anybody directly just like the case with traditional banks. All things considered, accounts are pseudo-anonymous, posting only numerical addresses. Users with programming information can likewise access most DeFi products' source code to review or build upon since they're open source. Open-source codes are safer and of better quality than proprietary software, on account of local area connection.

F. Finance Control

With traditional banking, financial institutions have a lot of control over how users can spend their money. They can impose restrictions on what types of transactions users can make, and they can also block access to accounts if they suspect fraudulent activity. However, decentralized finance solutions provide users with more control over their own finances. For example, users can manage their own assets and decide which assets to transact with. This allows them to conduct transactions without having to go through a third party, and it also makes it more difficult for someone to steal their funds. As a result, decentralized finance gives users more control over their own finances and helps to protect them from fraud.

III. SYSTEM DEVELOPMENT

A. Objectives

The main objective of a Decentralized pay-later system is to provide users with an alternative way to pay for goods and services that offers greater control, transparency, and security compared to traditional centralized options. One of the key advantages of Decentralized pay-later systems is that they give users a greater level of control over their finances. Because these systems are built on blockchain technology, they allow users to directly interact with each other and make their own financial decisions without the need for intermediaries. This can give users more freedom and flexibility in managing their money and can reduce their dependence on centralized entities.

Another key objective of Decentralized pay-later systems is to offer increased transparency compared to centralized options. Transactions on the blockchain are recorded on a public ledger that can be viewed by anyone, which can give users confidence that their transactions are being executed fairly[12] and as intended. This transparency can also make it easier for users to track their transactions and better understand their financial situation. A third objective of Decentralized pay-later systems is to improve security compared to centralized options.

Because they are built on blockchain technology, Decentralized pay-later systems are Decentralized and distributed, which makes them more resistant to hacks and attacks. 12 This can give users greater peace of mind and can reduce the risk of their personal and financial information being exposed.

Overall, the objectives of Decentralized pay-later systems are to provide users with an alternative payment option that offers greater control, transparency, and security compared to traditional centralized options. While these systems are still a relatively new and rapidly evolving area, they offer the potential for significant benefits for users

B. Working of DPGS

DPGS provides a way to access financial services without the need for centralized intermediaries. It uses smart contracts to enable peer-to-peer interactions also it makes any web3 platforms to use this implementations on the Ethereum blockchain. There are two major components that allow a financial system to work effectively; the first is the infrastructure needed to operate on and the second is the currency that is needed to operate with ETH. On the other hand, the web3 session is dedicated to the development of decentralized applications (D-APPs) that utilize a decentralized architecture. With web3, we aim to revolutionize the way online platforms function by enabling direct peer-to-peer interactions, enhanced security, and increased transparency. Our gateway system acts as a bridge between the web2 and web3 worlds, facilitating smooth communication and integration between the two. One of the key advantages of our gateway system is its ability to reduce the complexity associated with implementing a decentralized architecture. By providing pre-built modules, streamlined processes, and clear documentation, we empower developers and businesses to easily adopt web3 technologies without having to navigate intricate technical intricacies. This simplification of the architecture not only saves time and resources but also accelerates the adoption of decentralized solutions in various industries.

1) Infrastructure

Ethereum is a DeFi platform used for writing decentralized programs. Through Ethereum, you can create smart contracts that can be used to establish a set of conditions or rules under which an agreement can be made. Once a smart contract has been deployed, it cannot be altered.

2) Currency

In order to create a secure, reliable decentralized finance system, a cryptocurrency is needed that can be used to interact with the various protocols. Generally, DeFi uses the DAI stablecoin as its currency. DAI is a decentralized stablecoin that is pegged against the US Dollar.

C. Hypothesis

1) Decentralized pay-later systems will be more widely adopted by users who value financial independence and control.
2) Decentralized pay-later systems will be more widely accepted by merchants who want to reduce their dependence on traditional payment processors
3) Decentralized pay-later systems will be more popular in countries with less developed financial infrastructure, as they offer a way for people to conduct transactions without relying on traditional financial institutions.
4) Decentralized pay-later systems will have lower transaction fees compared to traditional payment processors, making them more attractive to both users and merchants.
5) Decentralized pay-later systems will be more secure than traditional payment systems, leading to increased adoption by users who are concerned about the security of their personal and financial information.

D. Role-Based Access Models

These models include role-based access control (RBAC) in which permissions are associated with roles, and users are made members of appropriate roles. This greatly simplifes management of permissions. Roles are closely related to the concept of user groups in access control. However, a role brings together a set of users on one side and a set of permissions on the other, whereas user groups are typically defned as a set of users only. The basic concepts of RBAC 16 originated with early multi-user computer systems.

The resurgence of interest in RBAC has been driven by the need for general-purpose customizable facilities for RBAC and the need to manage the administration of RBAC itself. As a consequence RBAC facilities range from simple to complex. This article describes a novel framework of reference models to systematically address the diverse components of RBAC, and their interactions. In our proposed system we want three role-based access models, each one for buyer, seller and delivery boy

1) *Buyer:* The buyer can view and buy the product according to their need. First the fund is released to the temporary pool and after confirming the genuinity of the product, the fund is transacted to the seller from the temporary pool. The buyer can track their payment with the help of our DPGS.
2) *Seller:* The seller wants to accept the payment released from the temporary pool if the product meet its expectation. Also if any dispute happen in between, the seller want to transfer the fund back to the buyer

E. NPM Package Manager

Node Package Manager (NPM) is a command line tool that installs, updates or uninstalls Node.js packages in our application. It is also an online repository for open-source Node.js packages. NPM performs the operation in two modes: global and local. In the global mode, NPM performs operations which affect all the Node.js applications on the computer whereas in the local mode, NPM performs operations for the particular local directory which affects an application in that directory only

IV. PROPOSED SYSTEM

A. DeFi-based Payment Gateway System

In this gateway system,we have two main sessions:web2 to web3 interrogation and metaverse interrogation.Web2 includes the MERN stack in our gateway system.Web3 is a D-APP which uses decentralized architecture to enable web3.The benefit of our gateway system is that we can reduce the complexity of this architecture.

B. Web2 to Web3 Integration

Currently all ecommerce websites are using web2 payment gateway system. Currently the common trend is to implement metaverse to the ecommerce website but that can only be done on web3 layer.Currently there are no reliable payment gateway system in WEB-3, that is where our payment gateway system comes in.Our payment gateway system since it is implemented in blockchain can be used in WEB-3.

C. Metaverse Integration

The possibilities of Web3 are becoming increasingly apparent. This newest iteration of the internet will feature a strong emphasis on decentralized applications, heavy use of machine learning 18 and artificial intelligence and extensive use of blockchain-based technologies.

Additionally, the metaverse provides infrastructure that allows consumers to interact socially and in businessrelated pursuits, make investments and more. Whether excited about the potential widespread use of the metaverse or relieved at the prospect of inexpensive cross-border ethereum transactions, businesses and consumers alike are eagerly anticipating these advancements in technology

V. RESULT

This gateway allows two functionalities for the users. The screenshot below shows the implementation of these two features: The first functionality is the payment gateway for buyers and sellers. The second functionality is the charity dashboard. Additionally, our payment gateway can be integrated into any web3 platform

VI. CONCLUSION

In conclusion by using our payment system the users can pay for any products online with peace of mind as we provide our services efficiently and at a lower risk compared to other payment gateway systems.

The only drawback to this payment gateway system is that the user can only pay by using cryptocurrency, mainly ETH as we use Ethereum blockchain to implement this project. Indian government put tax and levys on transactions on the De-Fi front to regulate it. The Ecomerce and charity websites are just usecases to display the functionalites of our DPGS. For Web3 applications, DPGS is endlesss.

VII. ACKNOWLEDGMENT

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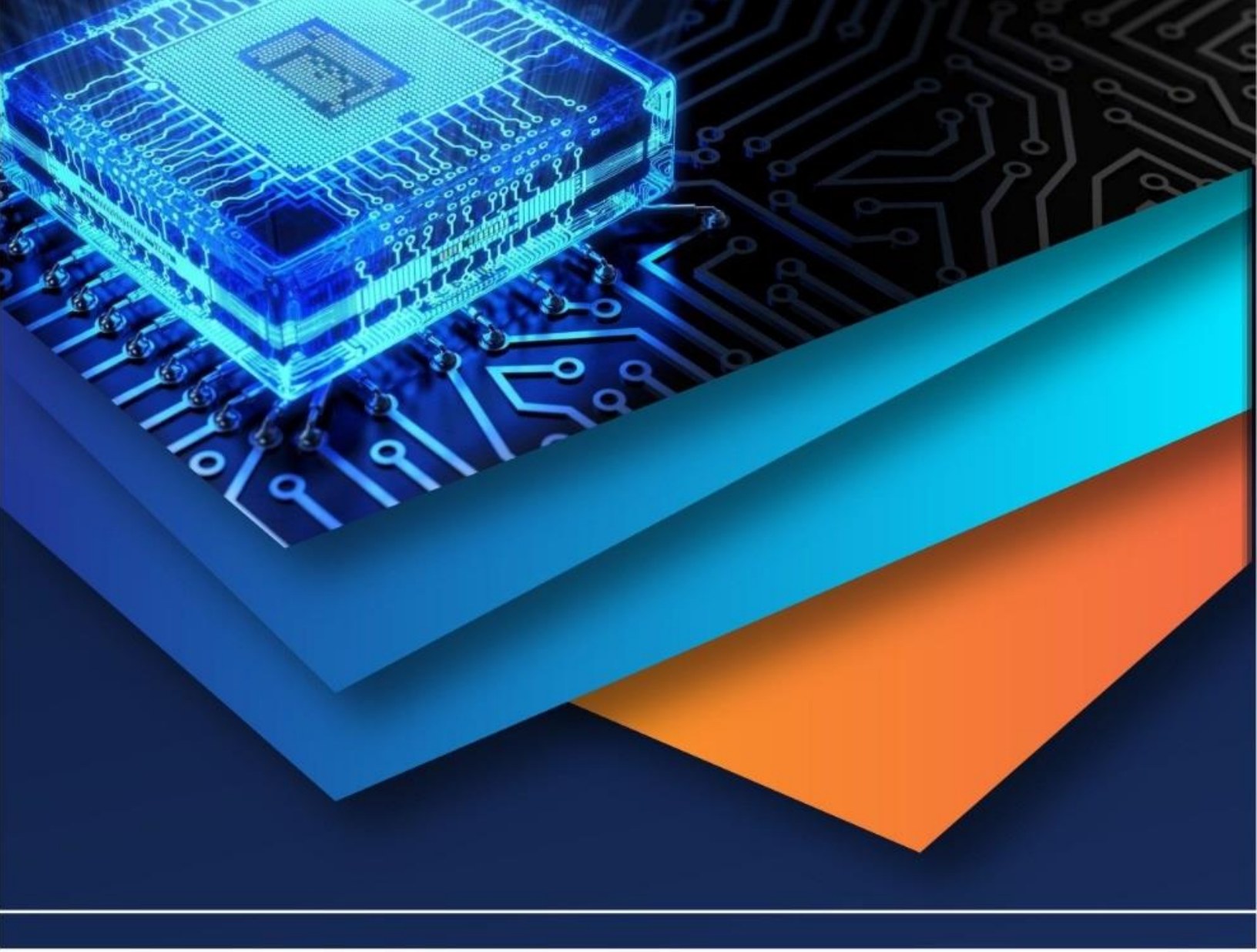
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