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Blockchain Implementation in the Financial Industry to Enhance Scalability

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ABSTRACT: A virtual ledger of any transactions or contracts that need to be separately documented is what the term "block chain" refers to. It is an encrypted database that preserves information statistics. The fact that this virtual ledger is dispersed among a large number of computers and is not always guaranteed to be stored in a single location is one of the core characteristics of Blockchain. Blockchain technology, which underpins bitcoin transactions, has already started to upend the financial services industry. Investigating how blockchain technology will affect the financial sector is the goal of this study. There's no doubt that the globe is curious to learn how this fascinating technology will affect or shape the direction of banking. Blockchain offers a decentralized and transparent network infrastructure, enhances the security of data storage and transformation, and significantly lowers operational costs. Blockchain is a tremendously appealing and in-demand solution as a result of these unique qualities, particularly in a niche industry like banking.

KEYWORDS: Financial industry, Scalability, Distributed ledger, Smart contracts, Peer-to-peer network

I. INTRODUCTION

A distributed digital ledger, or blockchain, allows transactions to be recorded and verified electronically across a network of computers in the absence of a central ledger. Data is shielded from fraud and hackers via cryptography [1]. Blockchain is dubbed "the new internet" and is predicted to revolutionize enterprises in a number of industries, but most notably the financial sector. "Satoshi Nakamoto" created it in 2008. A blockchain assists in recording all transactions so that they cannot be changed later on, maintaining the data's security. For transactions between them, entities now keep records in their own traditional ledgers. Sometimes this results in the transport or exchange of a large volume of data between entities, increasing their time and expense. Additionally, it increases the inefficiency, expense, and vulnerability of any asset transfers.

These flaws can be fixed with the aid of blockchain technology's duplicated shared ledger concept [2]. Through event-triggered processes, the usage of blockchain-based smart contracts can improve efficiency. Without various go-betweens, the majority of credit and budgetary companies are unable to complete their tasks, and their interest drives up the cost of these organizations' administrations. Blockchain implementation will enable the removal of unnecessary arbiters and result in less priced services for customers and banks. The key areas where banks and other financial institutions will likely implement blockchain innovation: protection for Loans and Credits, Payment, and Client Identification Framework [4].

II. RELATED WORK

A. **Blockchain working:** By enhancing transparency, blockchain technology has the ability to transform our systems of trade, identity, and governance. A distributed, immutable ledger, commonly referred to as a blockchain, contains a record of each transaction that takes place. This ledger is shared among all parties and stored in several places, eliminating a single point of failure and enhancing transparency. It is virtually impossible to go back and alter the historical records once a transaction has been agreed upon and linked using cryptography.

The majority of nodes in the blockchain network must run algorithms to validate and verify the information before adding a new transaction or making modifications to the blockchain. A new block is added to the chain if the majority of nodes concur that the data and signature are authentic.

The blockchain may function as a decentralized ledger without the need for a centralized authority thanks to this distributed consensus mechanism. Blockchain provides immediate, direct engagement with data because it does not require a central authority.

Blockchain technology is divided into two categories:

1. **Public Blockchain** – A public blockchain network, also known as a permissionless blockchain network, is entirely openended, allowing anyone motivated to engage in it to do so without obtaining anyone's consent[9]. The key distinction between a public and private blockchain network is this. In the permission-less network, everyone can participate, carry out the consent protocol, and maintain the shared open public ledger.

2. **Private Blockchain** - Membership in a non-public blockchain network requires an invitation. Both the network starter and the community starter's rules and requirements must be used to establish the invitation. The permission blockchain community restricts participant access and only accepts the most productive types of participants it is necessary for the network.

B. **Blockchain IS NOT a form of virtual money:**

The technology behind cryptocurrencies is the blockchain. The distributed ledger that records the network's activity makes the blockchain the age. This technology makes it possible to transact and makes it possible to move prices and records.The tokens used in these networks to send fees and pay for these transactions are known as cryptocurrencies. They can be viewed as a tool for blockchain technology, occasionally acting as a helper or application feature. In other situations, they might be utilized to digitize an asset's cost. Cryptocurrencies are a component of the ecosystem in which blockchains function as the idea generator[10]. They go hand in hand, and transactions on a blockchain frequently require cryptocurrency. But without the blockchain, we might not have a way to record and transfer such transactions.

III. METHODOLOGY

A. **Smart Contract:**

Smart contracts can be used with blockchain technology in the banking sector to automate and streamline transaction processes, boost productivity, and cut costs.

Here's how it works:
Creation of smart contracts: Smart contracts are self-executing contracts that are created by writing the details of the agreement between the buyer and seller straight into lines of code. Blockchain technology is used to develop smart contracts that can automatically carry out banking transactions when specific criteria are satisfied.

Execution of transactions: The transaction can occur on the blockchain after a smart contract has been formed. The parties to the transaction will provide their information and concur with the smart contract's terms. When the terms of the contract are fulfilled, the smart contract will automatically carry out the transaction and send the money from one side to the other.

Security: A high level of security may be offered by using smart contracts and blockchain technology in banking transactions. The distributed ledger on which blockchain transactions are kept makes it nearly impossible to tamper with the transaction data. Additionally, the danger of fraud is decreased because smart contracts are self-executing and do not require a mediator or intermediary.

Transparency: Banking transactions are transparent thanks to blockchain technology. Real-time transaction tracking allows all parties involved to monitor its status, and since the transaction is stored on the blockchain, it can always be audited.

Overall, employing smart contracts and blockchain technology in banking transactions can have a number of advantages, including efficiency, security, and transparency. To ensure the security and dependability of the smart contracts, it is crucial to make sure they are properly developed, tested, and audited.

B. **Consensus:**

Smart contracts and consensus procedures are both crucial elements of blockchain technology in the Banking sector. In a decentralized blockchain network, consensus procedures are employed to make sure that all nodes concur on the ledger's present state. There are other methods for reaching consensus, including Delegated Proof of Stake (DPoS), Proof of Work (PoW), and Proof of Stake (PoS). With the help of these techniques, nodes in the network can validate transactions and add new blocks to the blockchain in an anonymous and safe way.

On the other hand, smart contracts are self-executing digital contracts that are kept on a blockchain. They have policies and guidelines that control how parties can trade goods or information. The smart contract automatically executes without the need for middlemen when specific criteria are met.

Consensus methods are employed in the banking sector to guarantee the ledger's integrity and thwart fraud, while smart contracts can automate and streamline a variety of financial procedures, including loan approvals, trade settlements, and asset transfers. A bank, for instance, might use a smart contract to swiftly authorize a loan if specific criteria are satisfied, like as the borrower's income and credit score.

In conclusion, the combination of consensus mechanisms and smart contracts can transform blockchain technology into a potent instrument for the banking sector, enabling safe, open, and effective operations and transactions.

IV. PROPOSED SYSTEM

Blockchain is a technology that is growing in such a great way that it will have enormous effects on many different industries and businesses in addition to financial services. On the previous global financial system, trillions of dollars are exchanged daily while serving billions of individuals and groups. This era has a number of issues because it is still heavily dependent on paper and has a virtual look, despite both factors.

Motive increased costs and delays while also making it considerably simpler for fraud and crime to disable it. The benefits of blockchain outweigh the financial employer's opposition to trade, thus it is still desirable. Unlike traditional frameworks, blockchain is dynamic enough to become a leader in implementation in a competitive market environment. The best benefit of a blockchain is that every event has a report that is kept in a public ledger and is accessible to anyone. It is a ledger that is heavily shared between specific users, creating a shared database that is duplicated to those users and who can access it only when they have the access rights for it.

A. **Blockchain's possible adoption in the financial industry:**

a). On-chain resolution:

An innovative system that uses a distributed ledger is called blockchain. It has the potential to reduce fraud rates in the global banking system and it is also by offering on-chain settlement. Blockchain can be utilized in the banking sector of the financial industry, specifically to give banks a platform to prevent fraud and offer on-chain settlement to users, which also speeds up processing. DLT has the ability to offer an Ethereum blockchain platform. The confirmation of the transaction will not require the user to rely on a centralized system.

b). Minimal transfer fees:

For sending a specific quantity of money for international transactions, the user will have a transparent cost model. The old method has several intermediaries, which contributes to its expensive transfer fees. The centralized system must be used by the banks to confirm the transactions. Verifying the transactions is a laborious operation that takes time. The platform that has been suggested would feature a transparent cost mechanism for cross-border money transfers that will make it simple for users and need them to pay only a small fee.

c). Always available:

The platform is available 24/7 from any location in the world. When more than 75% of the distributed network's nodes have verified the transaction, the procedure is finished, and the user on the other end receives the money. The nodes will be charged a set fee for block creation and verification.

d). Transparency:

Currently, the bank system modifies the conversion rate without notifying the users, leading to excessive transaction costs. The platform suggested will have a straightforward conversion rate that the user can easily see for sending money abroad. Additionally, the user will be able to search through his ledger and view the transaction history and conversion rate.
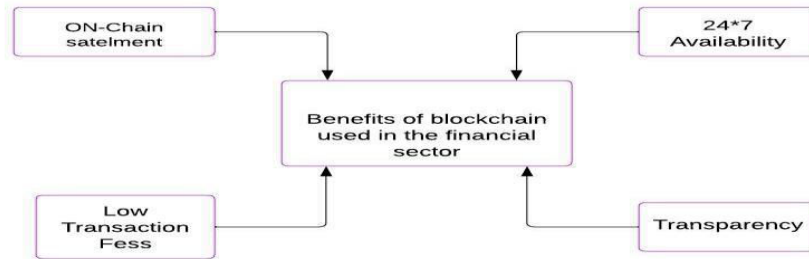

Fig 1: Benefits of Blockchain

B. Proposed platform operation:

Each bank that has enrolled on this blockchain platform is required to maintain the ledger by uploading client data in an encrypted format that ensures the security of the users' data. By Each bank that registers with this platform will have access to the same ledger for client information and transaction history. DLT will offer a full transparency model and 24 hour availability to the customer so they can send money abroad. As each node in the network verifies the transaction and stores the transaction history in the blockchain database, this will also shorten the processing time for the transaction. The issue of double spending that exists in the centralized system will also be solved by this distributed ledger. This platform also offers on-chain settlement at a very low transaction cost.
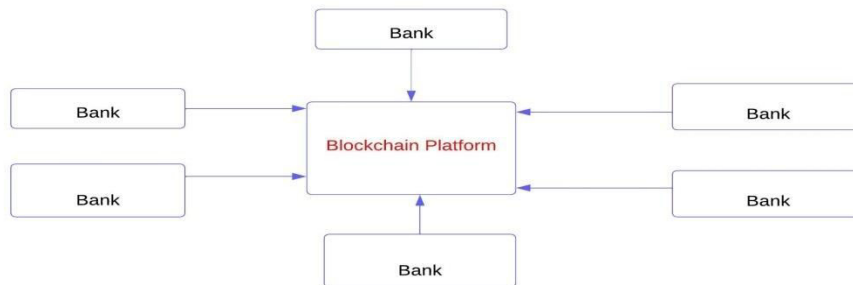

Fig 2: Benefits of Using Block chain

The platform will offer various capabilities above the centralized system if a user wishes to transmit money to another user. The blockchain platform will allow interactions between the banks registered there. The only banks to which the user can send money are those that are registered on the platform that will house all other users' data in the distributed ledger.

The user that sends money using this platform will have transparency for the fee-free transaction. After more than 75% of nodes have verified the transaction, the user on the receiving side will receive the monies. However, they can send money internationally without going to a bank because the platform is readily available.

The transaction must go through a consensus process that will be handled by network nodes. The platform will have an advantage over the centralized system in that transactions made through it cannot be changed, which lowers the rate of conversion fraud.

C. **Advantage of the suggested platform:**

The advantage of this platform is that it will only have one database for customer data, which would streamline the KYC procedure for each bank. Due to the automation of the money transfer process, the transaction's turnaround time will be shortened, which will be advantageous for users sending money to any location in the world.
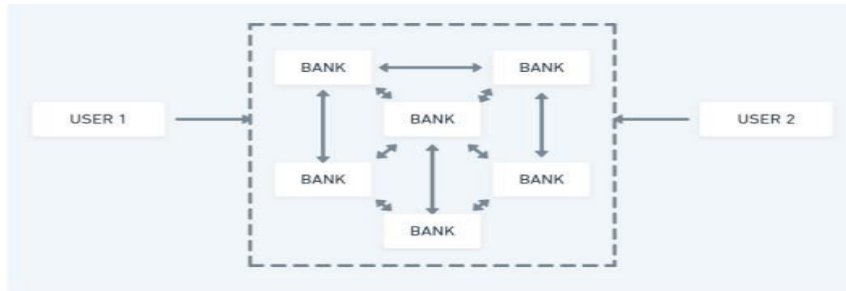

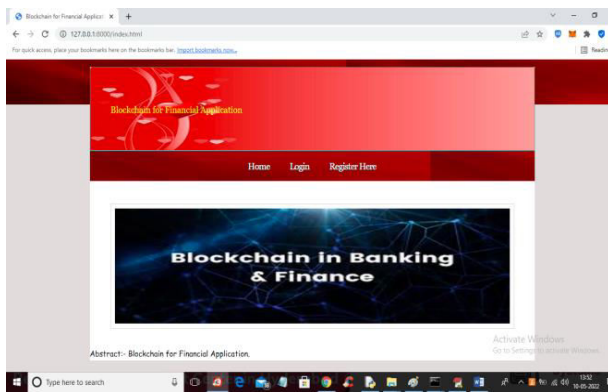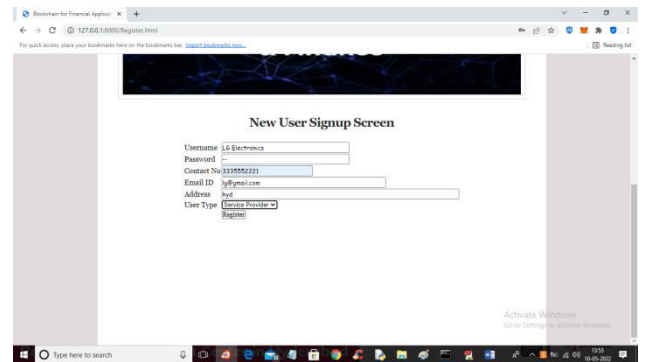Fig 3. Transaction Made through proposed platform

V. RESULTS AND OBSERVATION

Fig 4: Home Page

Fig 5: User Signup page
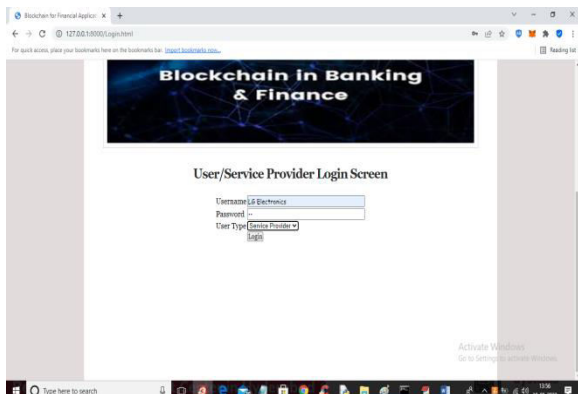
Fig 6: User Login page
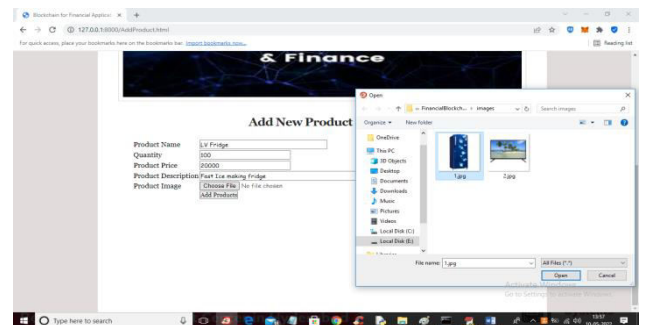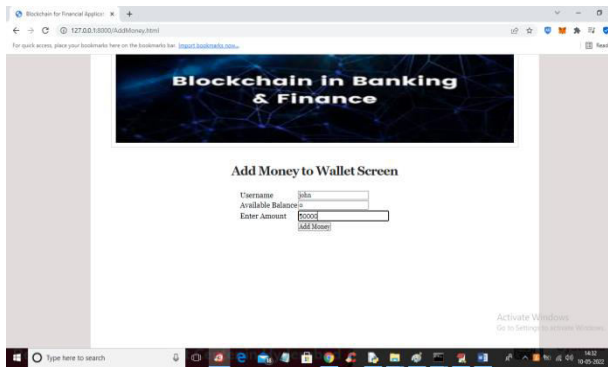

Fig 7: Add product to blockchain network

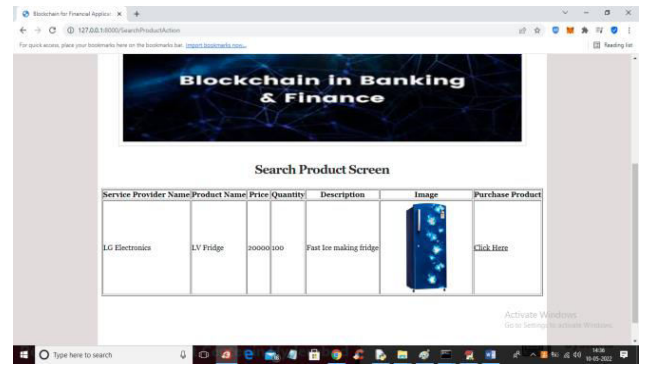Fig 8: Add Money to the user Wallet

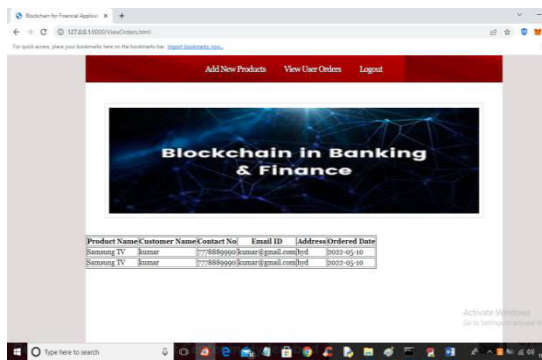Fig 10: Search the product from User

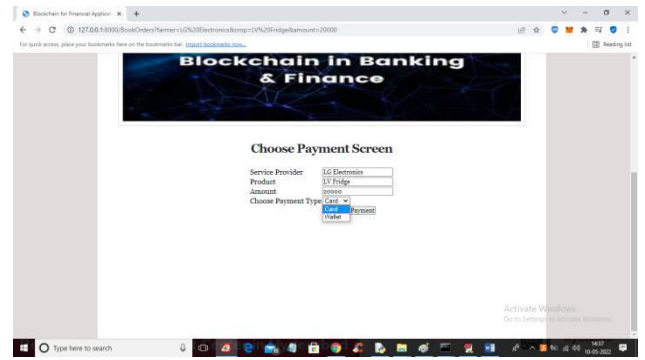Fig 9: Order booked details

Fig 11: choose payment from User

VI. CONCLUSION AND FUTURE WORK

In conclusion, Blockchain technology has the potential to completely change the banking sector by providing a safe and transparent platform for business dealings. Blockchain technology can be used in banking to raise efficiency, increase transparency, reduce transaction costs, and improve security. Blockchain can help banks cut out middlemen, reduce errors, and offer clients quicker and more affordable services.

Blockchain also gives banks the tools they need to thwart fraud and money laundering while maintaining regulatory compliance. Before blockchain is widely used in the financial sector, however, a few issues must be solved. Regulation-related challenges, scalability issues, and system interoperability are a few of these roadblocks. Furthermore, a large investment in infrastructure and technology is required for the deployment of blockchain.

Despite these difficulties, blockchain technology has a lot to offer the financial sector. Blockchain technology has the potential to change the banking industry by bringing customers more dependable and effective financial services. In order to remain competitive and meet the changing needs of clients in the digital age, banks must research and invest in blockchain technology.

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