International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 10 Oct. 2022, pp: 16-21 www.ijaem.net ISSN: 2395-5252

"Advanced Security Enhancment in Bankingsystem Using Block Chaintechnology"

Miss. Supriya Pawar[1] miss. Pratiksha Shinde[2] Mr. Harish Barapatre[3]

[1]PG Scholar, ARMIET, University of Mumbai, [2]PG Scholar, ARMIET, University of Mumbai, [3]Assistant Professor, YTIET, University of Mumbai,

Date of Submission: 25-08-2022 Date of Acceptance: 05-09-2022

ABSTRACT- In public cloud storage system protecting the data and controlling the data accessis a challenging issue. People's lives have been transformed by the rise of digitaltechnology. In today's environment, the banking sector is vulnerable to fraud andcyber-attacks. Because today's banking system is based on centralised databases, anattacker can easily breach any of these databases, compromising all of the bank'scustomers' information and data. The vulnerability of today's banking system canbe lessened by re-building it on top of block chain technology, which will eliminatethe centralised database architecture and decentralise data over the block chain, minimisingthe risk of a database being hacked. Because block chain transactions arevalidated by each and every node in the chain, transactions will become more andmore safe, making the overall financial system faster and more secure.

Keywords: Secure Hash Algorithm (SHA), Blockchain Technology, DistributedDatabase, Cryptocurrency, Consensus, Security and Protection.

I. INTRODUCTION

Traditional databases are maintained by a single organization, and that organizationhas complete control of the database, including the ability to tamper with thestored data, to censor otherwise valid changes to the data, or to add data fraudulently.For most use cases, this is not a problem since the organization which maintainsthe database does so for its own benefit, and therefore has no motive to falsifythe databases contents; however, there are other use cases, such as a financial network,where the data being stored is too sensitive and the motive to manipulate it istoo enticing to allow any single organization to have total control over the database.Even if it could be guaranteed that the responsible organization would never enact afraudulent change to the database (an assumption which, for many people, is alreadytoo much to ask), there is still the possibility that a hacker could break in and manipulatethe database to their own ends. The most obvious way to ensure that no singleentity can manipulate the database is to make the database public, and allow anyoneto store a redundant copy of the database. In this way, everyone can be assured thattheir copy of the database is intact, simply by comparing it with everyone else. Thisis sufficient as long as the database is static; however, if changes must be made tothe database after it has been distributed, a problem of consensus arises: which ofthe entities keeping a copy of the database decides which changes are allowed andwhat order those changes occurred in? If any of the entities can make changes at anytime, the redundant copies of the database will quickly get out of sync, and there willbe no consensus as to which copy is correct. If all of the entities agree on a certainone who makes changes first, and the others all copy from it, then that one has thepower to censor changes it doesn't like. Furthermore, if that one entity disappears,the database is stuck until all of the others can organize to choose a replacement.All of the entities may agree to take turns making changes and all the others copychanges from the one whose turn it is, but this opens the question of who decideswho gets a turn when.The banking system in today's world is open to threats of fraud and cyber-attacks.The motivation of the system is to develop centralized database, and secure bankingsystem.The proposed a banking system using block chain Technology. The transactionsover the block chain technology

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 10 Oct. 2022, pp: 16-21 www.ijaem.net ISSN: 2395-5252

are verified by each and every node of the chain, itwill make the transactions more and more secure thus making the overall bankingsystem faster and secure.

II. OVERVIEW SYSTEM

Figure -1 :BANKING SYSTEM

In the proposed system, the traditional system followed by banks which consists of a centralized database will be removed. The data will be largely distributed over the block chain which will make the banking systems decentralized. This willnot only make the data secure but also will remove the power decentralization. Theabove-mentioned transaction system has two benefits. Firstly, it will make the transactionsfaster by removing the intermediate processes employed in the normal transactionsand secondly it will become nearly impossible for an individual to hack thesystem as it will require a huge amount of processing power which no one has.

III. BLOCK CHAIN TECHNOLOGY

Blockchain has been a buzzword for the past few years and it's really no surprise given how it's changing the dynamic of many industries. Blockchain technology is expected to revolutionise the way we do business, not only in the banking industry but across sectors such as healthcare, government, retail and more.In essence, a blockchain is a distributed ledger of records or public databases that are openly shared among disparate users and that creates an unchangeable record of their transactions. These transactions are cryptographically secured to ensure they remain tamper-proof.Blockchain has great potential to overhaul the way the banking industry works and make it more transparent, efficient, secure and cost-effective.Here are several ways blockchain technology will change the future of the banking system:

1. By Expediting International Transfers: Blockchain has the potential to make international transfers and monetary transactions faster and more cost-effective, as well as more transparent and secure. Currently, when transferring money from one country to another, transactions can take multiple days and involve a variety of third parties.These parties each take their cut from the transaction. This means that by the time the money reaches its destination, the sender may have lost a significant amount of money. For both international businesses and consumers, blockchain technology enables faster and simpler peer-to-peer transactions that are more effective for both international businesses and consumers, for example through a Bitcoin wallet.Blockchain is essentially a digital ledger that provides an unalterable record of transactions between two parties. Computers on a network validate each transaction before it's added to the blockchain and cannot be changed or tampered with once completed.

2. By Increasing Security & Reducing Fraud: Blockchain can also help to eliminate fraud as it creates a clear audit trail. It also has multiple redundancies; therefore, it is almost impossible to alter any information once it has been uploaded on this network.

3. By Reducing Costs for Banks and Customers: Blockchain has the capability to significantly reduce the cost of banking services and improve the quality of products.Today, financial institutions are looking for ways to implement this technology in order to solve the problems of speed and cost. Some tasks can be automated when using blockchain. The blockchain is a distributed database that is secure, transparent, and can be easily implemented. These characteristics make it possible to automate some processes related to banking activities (for example, payments or issuing loans).

4. By Reducing Human Error

Various reports show that human errors in accounting, record-keeping and reconciliation are one of the leading causes of fraud. In terms of security operations as well, it is often an innocent human error or simple negligence that has escalated into massive cyber security issues. Blockchain has an automated method of recording transactions that

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 10 Oct. 2022, pp: 16-21 www.ijaem.net ISSN: 2395-5252

cannot be altered later. By using this technology, many manual processes will be phased out, thereby reducing human errors, improving efficiency and mitigating the impact of cyber threats.

5. By Making Lending Easier for Lenders and Borrowers: Lending is an integral part of banking. It is essential for both corporate and retail customers to maintain their liquidity or the ability to pay for their cash requirements. In addition to this, lending is also one of the revenue drivers for banks. This means that it is important for banks to do this right.With blockchain technology, lending will gradually become easier as there will be instant settlement of transactions. This can help in avoiding problems such as double spending and defaulting. Blockchain can also reduce the time taken to open a bank account from days to minutes.

6. By Potentially Eliminating Middlemen & Commissions

Blockchain allows people to trade directly with each other, using a record of transactions kept in a shared ledger. This eliminates the need for middlemen, like stock exchanges and banks.If banks are cut out of the loop, it's inevitable that their share prices could suffer. But it's not so clear-cut for middlemen like stock exchanges, which provide essential services for trading shares.They may still have a role to play in providing liquidity and security to blockchain-based financial systems, but the days of cashing in on broker fees are likely over soon with the advent of blockchain technology.

7. Through Multiple Use Cases: Blockchain can be used for anything from voting to business contracts. It is a recording system that has no centralized authority, which makes it practically impossible to hack into and tamper with.The information kept in a blockchain system is shared across a vast network of computers, and the data cannot be altered unless the majority of computers in the network agree that it should be changed.

Blockchain technology is slowly but surely making its way to the banking and financial services industry. It is also capable of transforming the overall security of the banking sector. From remittances to securities trading to cross-border payments, blockchain technology is poised to make a huge impact on the way international transactions are carried out and digital assets are kept secure.

IV. RELATED WORK

Our study adds to a better understanding of where the most and least attention is focused [1], allowing academics, practitioners, and combinations of the two to identify gaps and possibilities. The findings indicate that the study topic is a relatively new subject. It confirms the disparity between the depth and volume of research provided by industry and academics, with the former leading the way. Our analysis also discovered that the use-cases that require the greatest investigation are: 1) Central Bank-issued Digital Currency (CBDC), 2) Regulatory Compliance, and 3) Central Bank-operated Payment Clearing and Settlement Systems (PCS); relative minimal participation in the areas of4) Assets Transfer/Ownership, and 5) Audit Trail. [1].

This paper proposes a blockchain baseddistributed banking (BDB) scheme to address this problem, which makesuse of blockchain technology's inherent properties to record and track immutabletransactions. BDB provides distributed financial transaction processing,but its design qualities, simplicity, and computing efficiency set it apartfrom cryptocurrencies. We create a BDB prototype utilising smart contractsand undertake tests to demonstrate BDB's efficacy and performance. To emphasisethe key differences and showcase the BDB's greater computing efficiency,we compare our prototype to the Ethereum coin.[2].

Blockchain Technology is a peer-to-peer networkthat may be used to solve the challenge of keeping track of and documentingtransactions in a financial system. Transparency, robustness, auditability,and security are all features of blockchain. This study seeks to implementthese features in a distributed banking system based on blockchain, whichwill be comparable to existing methods. It will also cover the constraints ofblockchain implementation as well as its future potential. [3].

This is an important topic because thedigital economy is becoming an increasingly important part of modern life.The information is processed and then passed through the databases of banksand payment systems, where it is potentially accessible to the attacker.This articleexamines the security mechanisms of distributed databases, proposes asolution based on Blockchain technology to maintain the uniqueness of informationin them without the use of tokens, and makes recommendations forincorporating Blockchain technology into modern banking systems. [5].

V. RESEARCH GAP AND PROBLEM STATEMENT

The above review of literature revealed that a peer-to-peer version of electronic cash, Impact of cryptocurrencies and blockchain technologies, Potential use of the blockchain

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 10 Oct. 2022, pp: 16-21 www.ijaem.net ISSN: 2395-5252

technology to enable governments, blockchain technology research and development. None of the above studies not focused on Block-chain technology in banking sector, advantages and challenges of block-chain technology in Banking sector. The scope of the study is based on the block-chain technology in banking industry global and what are the various factors included in the banking industry, it has been studied. Out of all those various factors of block-chain technology the present study extensively focuses on how the banking industry is managing and its advantages of block chain technology in banking and challenges while implementing the block chain technology in banking sector.

VI. PROPOSED SYSTEM

In the proposed system, the traditional architecture followed by banks which consistsof a centralized database will be removed. The data will be largely distributedover the block chain which will make the banking systems decentralized. This willnot only make the data secure but also will remove the power decentralization. Theabove-mentioned transaction system has two benefits. Firstly, it will make the transactionsfaster by removing the intermediate processes employed in the normal transactionsand secondly it will become nearly impossible for an individual to hack thesystem as it will require a huge amount of processing power which no one has.The blockchain is sequence of blocks which hold the information about transactionsbetween nodes of a network. Block Header consists of Block version, Merkle tree,Time Stamp, n Bit, Nonce, and Parent Block Hash.

1. Block version consist of validation rules to be followed by block.
2. Hash values of transactions are calculated by Merkle tree.
3. Current time is saved in time stamp.
4. Target Threshold of a legitimate block hash in n-Bit.
5. A varied accessory parameter is called Nonce, a 4- Byte (32 bits) field whosevalues is adjusted by miners during hash calculation.
6. Parent Block Hash indicates the pervious block hash value, where block i-1 isexecuted, block i is under execution and block i+1 is yet to be executed.

Figure-2. show Transaction Counter stores the number of transactions that are completedby the block.A Blockchain is a sort of spreadsheet containing data about exchanges.Every exchange creates a hash. A hash is a series of numbers and letters. Exchangesare entered in the request wherein they occurred. The hash depends on the exchangeas well as the past exchange's hash. Indeed, even a little change in an exchangemakes a totally new hash. The hubs check to ensure an exchange has not beenchanged by examining the hash. Each block alludes to the past block and togethermakes the Blockchain.

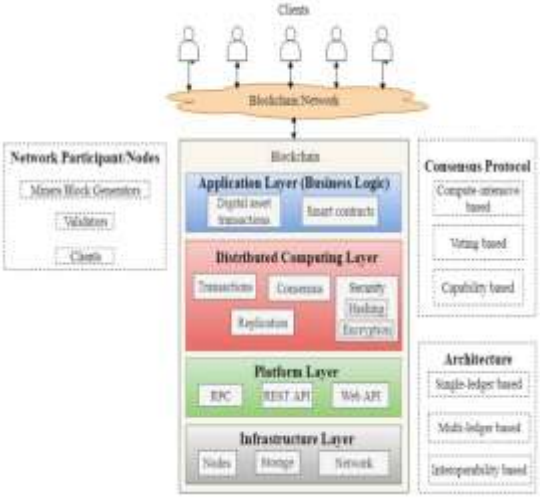

Figure -2: Core Components of Block Chain

These are the core blockchain architecture components:

1. Node - user or computer within the blockchain architecture (each has an independentcopy of the whole blockchain ledger)
2. Transaction - smallest building block of a blockchain system (records, information,etc.) that serves as the purpose of blockchain
3. Block - a data structure used for keeping a set of transactions which is distributedto all nodes in the network.
4. Chain - a sequence of blocks in a specific order.
5. Miners - specific nodes which perform the block verification process beforeadding anything to the blockchain structure.
6. Consensus (consensus protocol) - a set of rules and arrangements to carry outblockchain operations Any new record or transaction within the blockchainimplies the building of a new block. Each record is then proven and digitallysigned to ensure its genuineness. Before this block is added to the network, itshould be verified by the majority of nodes in the system.

VII. RESULT ANALYSIS

The simulation was performed to test the performance of the existing and proposedwork by considering the blocks size 10, 20, 30, 40 where the Delay and throughputwas calculated, and the comparison was done for existing as well as for the

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 10 Oct. 2022, pp: 16-21 www.ijaem.net ISSN: 2395-5252

proposedsystem. Following are graphs which mention variations with existing and proposedsystem.

1. Delay (MS): Delay is the time taken by a node to create a new block andvalidate it in a blockchain. Time taken by the miners to create the blocks and validatethem is higher in the existing system than in the proposed system. This is becausethe existing system requires human interference. Here the delay is calculated in milliseconds.

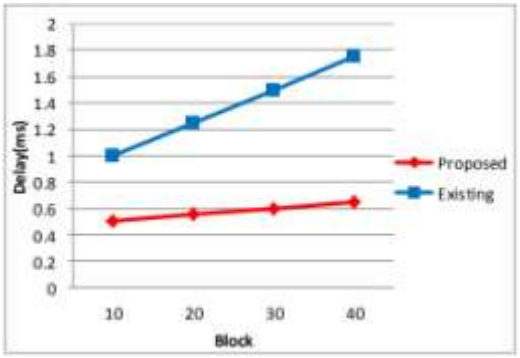

Figure 3: Delay Comparison for Validating Block in Blockchain.

Fig shows a comparison of delay with respect to the existing and proposedmodel, which stated that the performance of proposed is appreciated.

2. Throughput: Throughput is measure of rate of validation of blocks by nodesin a network. In the existing system, humans are miners which take more time, becausethey have to solve the given mathematical problem to validate and create anew block. In proposed system, nodes take lesser time than the existing system.

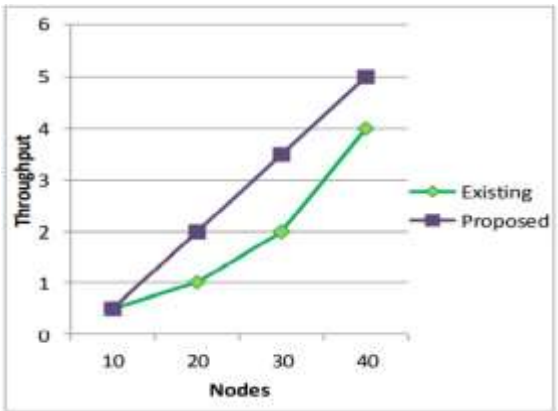

Figure 4: Throughput comparison in the Blockchain

Fig shows a comparison of throughput with respect to the existing and proposedmodel, which stated that the performance of proposed is appreciated.

CONCLUSION

In this paper, the proposed system designed to the technology presented is aimed to deliver safedata and a reliable financial system. The data will be disseminated in significant partthroughout the block chain, which will decentralise banking systems. This not onlysecures the data it also removes the decentralisation of authority. By implementinga block chain in banking system distribution, one may eliminate fraudulent databasemodification sources. We use SHA-256 algorithm,too.The hash algorithm is themost renowned of Secure hash for creating the hash value for a specific block whichis further used for validating the same block.

REFERENCES:

[1]. Natalia Dashkevich, Steve Counsell, And Giuseppe Destefanis,"BlockchainApplication for Central Banks: A Systematic Mapping Study",IEEE Access,Volume 8, 2020.

[2]. Wenjun Fan, Sang-Yoon Chang, Shawn Emery and Xiaobo Zhou,"BlockchainbasedDistributed Banking for Permissioned and Accountable Financial TransactionProcessing",IEEE,2020.

[3]. Nikita Rajeshkumar Bagrecha,Ishaq Mustafa Polishwala,Pragya Abhai Mehrotra,Rishabh Sharma,Dr. B.S.Thakare," Decentralised Blockchain Technology:Application in Banking Sector",International Conference for EmergingTechnology (INCET), IEEE,2020.

[4]. R. Arjun, K. R. Suprabha,"Innovation and Challenges of Blockchain in Banking:A Scientometric View", International Journal of Interactive Multimedia andArtificial Intelligence,Vol. 6,2020.

[5]. Natalia A. Popova,Natalia G. Butakova,"Research of a Possibility of UsingBlockchain Technology without Tokens to Protect Banking Transactions",IEEE,2019.

[6]. Seybou Sakho, Zhang Jianbiao, Firdaous Essaf,Khalid Badiss,"ImprovingBanking Transactions Using Blockchain Technology", IEEE 5th InternationalConference on Computer and Communications,2019.

[7]. Sheetal Sinha,Kumkum,Ruchika Bathla," Implementation of Blockchain in FinancialSector to Improve Scalability", 4th International Conference on InformationSystems and Computer Networks (ISCON),IEEE,2019.
[8]. Mouad Zouina,Benaceur Outtaj ,"Towards a distributed token-based paymentsystem using blockchain technology",IEEE,2019.
[9]. Antony Vigil,Prakarsh Pathak,Shubham Upadhyay,DeepankarSingh,VaibhavGarg, "Blockchain Over Transaction System",Proceedings of the InternationalConference on Communication and Electronics Systems (ICCES), IEEE,2018.
[10]. Xin Wang, Xiaomin Xu, Lance Feagan, Sheng Huang,Limei Jiao,WeiZhao,"Inter-Bank Payment System on Enterprise Blockchain Platform",IEEE11th International Conference on Cloud Computing,2018.
[11]. XiaojunZhai,ChongyangZhang,"A Cash Flow Blockchain Based Privacy-Preserving",IEEE,2018.
[12]. Christian Esposito,Alfredo De Santis,GennyTortora,HenryChang,Kim-Kwang,Raymond Choo,"Blockchain: A Panacea for Healthcare Cloud-BasedData Security and Privacy",IEEE Cloud Computing,2018.
[13]. Marko H¨olbl, Marko Kompara, Aida Kami˘sali and Lili NemecZlatolas,"ASystematic Review of the Use of Blockchain in Healthcare",Symmetry , 10October 2018.
[14]. Kejiao Li, Hui Li, Hanxu Hou, Kedan Li and Yongle Chen,"Proof of Vote: AHigh-Performance Consensus Protocol Based on Vote Mechanism and ConsortiumBlockchain", researchgate,2017.