

# Distributed System Cryptocurrency and Data Transfer

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## Abstract

The dependency on technology has increased with the increase in population. Technology plays a crucial role in facilitating, organizing and securing people's life nowadays. The Internet has penetrated every face of present-day lifestyles. Yet another ubiquitous use of digital technology today is evident in transferring money and speeding cross border payments that are done through digital transactions. This paper investigates transferring money and data through banks and companies by using the Blockchain concept through decentralized distributed system. The present research also peruses several contexts in which this technology has already been implemented successfully and demonstrates the advantages of replacing the paper money with digital money. Using cryptocurrency will facilitate people's life by reducing time, securing the process of money transfer, and increasing data integrity. The primary benefit of this content analysis is that it addresses an innovative subject, in a new light and using timely recent research references drawn from 2018-2020. Thus, our study is a contemporary and conclusive source for all present and future endeavours being undertaken in the domain of using blockchain for e-transactions.

## Key words:

Blockchain; Cryptocurrency; Decentralized; Security; Integrity; e-transactions

## 1. Introduction

There has been a phenomenal increase in the use of the Internet and networks. since the network can have a single point of failure the implementation for the new networks topology has deviated towards the distributed system because it is a larger connected network that shares resources distributed among nodes. Each node is a computer that holds something to be shared through the network which could be the data, program or hardware equipment [1],[2].

Transferring money through digital aids has become a safer, quicker, and immutable method at present. Digital money Transfer requires the use of Blockchain Cryptocurrency. Blockchain is considered to be a significant milestone in the world of IT. Transferring this technique to a more digital world would help in maintaining robustness and security. Figure 1 shows that the usage of Blockchain can be done from anywhere. It will secure the channel and use the decentralization to facilitate usage thus accelerating the pace and the outreach of digital transaction [3],[4].

The technique used to store data and manipulate it in Blockchain depends on complicated encryption method which cannot be deciphered or hacked. A digital ledger a group of global accounts in which each account has specific information that needs distributed system platform to work through. This distributed system consists of decentralized nodes connected from peer-to-peer where no node has more privilege than the other nodes. The word Blockchain consists of the combination of two separate words *block* and *chain*. The word *block* refers to the information about any transaction in one consistent block, while the word *chain* refers to how the data is linked together after it is recalled from devices across the internet. [1], [5], [6]

The blockchain data is spread through all nodes in a continuous and consistent way this helps in maintaining continuous verification throughout different and multiple nodes with each transaction. Fig.1. below illustrates the Blockchain network. The reason for impregnable security achieved through Blockchain is the absence of a centralized network of computers [28]. This ensures that the "blocks" are spread far and wide making it impossible for hackers to alter the data in the Blockchain without getting exposed and having the faulty data rectified. Blockchain technology depends on using *proof of work*, proof of location by encrypting user's identity by using public keys as a layer of security. Blockchain has already been tested in countries like Japan, Canada, Dubai, India and Chinese banks, Estonia and several other countries [29]. The technique is also being used successfully in some government institutes across the world. Thus, the wide acceptance and the usage of the Blockchain technology establish its efficacy and reliability in digital money transfer [7], [8].

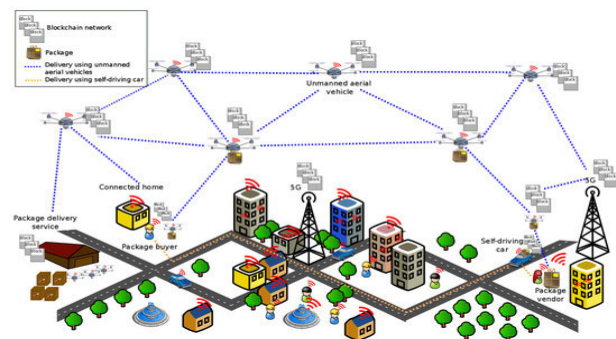


Fig.1 Blockchain Network [7]

More than 600 digital coins cryptocurrency has been launched since 2009. Cryptocurrency to Blockchain is like email to the Internet. It is one of the functions that can be used when implementing Blockchain. The main contention against the use of Cryptocurrency is that is used in shady and criminal dealings such as gun trade and other illegal transactions. However, even though it faces such bad criticism, cryptocurrency is often recommended by the economic for its reliance, its ability to always fight against inflation as well as its ability to remain a transparent currency which takes a neutral stance from governments [9].

Each block in Blockchain can be described as shown in figure 2 where there is data that each block has to be unique and this data is stamped with the time stamp which shows the specific date and time of transaction. There is also the previous hashing which maintains integrity and prevents tampering of data. The process of hashing cryptography for each block is mainly done for adding more security level to the block [10],[11].

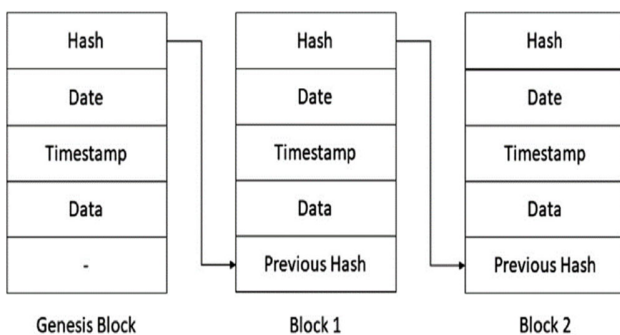


Fig. 2 Using Hash in Blockchain [10]

The world is transiting towards digital payments in which distributed system cryptocurrency is used. It is also becoming a trend to transfer not only money but all kind of data like contract and critical valuable data through the distributed system for more robust, secure, and quicker transaction. This new way saves time, money and effort.

The present study aims to understand the implementation and the usage of money transfer through distributed network by using the Blockchain technique. It will clarify and analyze the cases where Blockchain technology has been implemented by overcoming the possible obstacles. This will help in selecting the best course of action to pursue for implementing distributed network cryptocurrency data transfer. For achieving the stated objective, we employed the research methodology of analyzing the academic papers and investing the related work about the same topic. The advantage of this research paper is that it discusses contemporary academic work done

in this domain. Thus, this study can be a conclusive and effective for further pursuits.

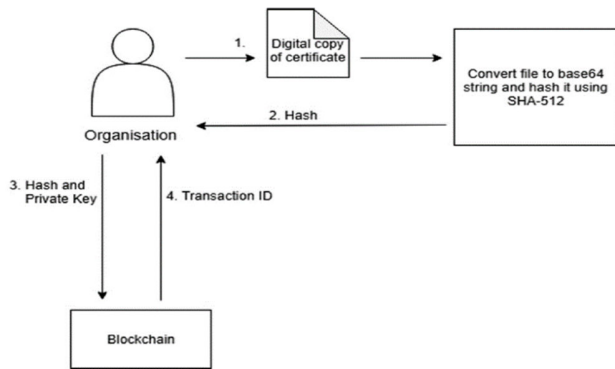
The key challenge in implementing Blockchain cryptocurrency data transfer is that many governments refuse to consider it as the new way since there is no clear set of regulations and rules that are associated with this process. Blockchain can be used in the Internet of Things, IoT, healthcare, public sector, smart contract, political voting, finance, agriculture, and supply-chain. It is a method of encryption and decryption at least maintain security for a particular number of years, without a major overhaul. Through this paper, we have analyzed the effects of Blockchain to cryptocurrency.

Thereafter, the related work along with the case studies on the same topic will facilitate the understanding of how to implement and use money transfer by employing the modern technique. A table of comparison between cases has been demonstrated in the section on Related Work. Discussion section presents the inferences drawn after analyzing the case studies in the context of using Blockchain to cryptocurrency. Finally, the conclusion of the paper will be stated along with the references. One of the major benefits of this research work is that it collates the most recent literature sources in the field since all the used references are from 2018 and above.

## 2. Related Work

As discussed previously, utilizing blockchain cryptocurrency enhances bank efficiency when transferring both money and associated financial data such as Bitcoin. The primary advantage to using cryptocurrency is that it eliminates the middleman since there is no third party involved in the transaction [30]. Besides, it saves time and reduces costly fees. Within the blockchain, information is stored and catalogued in an immutable ledger through a series of interconnected blocks, each with a part of data that shows integrity and authentication for all blockchain users. Using the cryptographic SHA-256 algorithm helps to maintain stringent security for the hashing value. For example, illegal spoofing can be exposed easily because the information is divided among connected blocks. Thus, would-be hackers would need 51% computational power for online computers and to manipulate not only current data but also historical transactions to ensure the hack can go undetected. Otherwise, tracing legal blocks over time can expose the fraud process [12],[13].

Once the process is complete, the organization receives a digital copy of their certification from the authorizing center, which enables them to move forward with encrypting its base 64 files into hashing files by using SHA-512 cryptography. Finally, the organization is then ready to transmit and use the blockchain transactions [14].



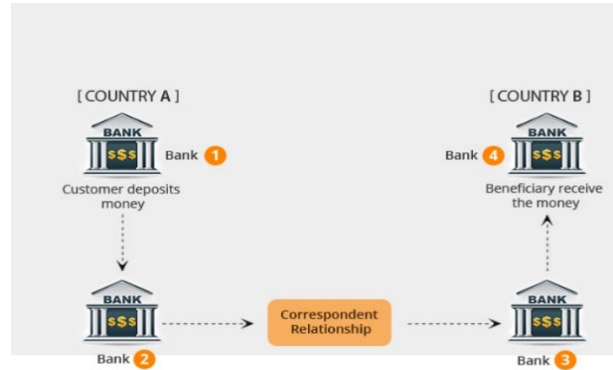
**Fig. 3** Using Blockchain hash cryptography to permit license [14]

**Bankchain-** This word is used to define a chain of banks. As the term explicates, bankchain refers to banks that collaborate to implement the technology of Blockchain. 37 Banks and companies cooperated to share information and deals against hackers and fraud through sharing information by implementing the block division and connecting. 22 Indian banks, public and private with 10 computers and technology companies along with 5 international banks pledged to fulfill the Blockchain implementation. The list contains pioneers and big names like IBM, Microsoft, Intel among State bank of India, and Dubai Islamic bank. Once this cooperation is fully lunched, the traditional way of working will change completely [15].

Figure 4 illustrates the process of transferring money in the past. Bank 1 is where the customer opened his account and deposited money to be used or transferred later, either national or an international payment. At that time, all the banks could not transfer the money internationally. The facility of international transactions was available in only one central bank for which it connected to the central bank in the next country. Bank 2 in this case is the central bank in the same country with bank 1. Bank 2 deals with bank 3 as it is the central bank in the other country where the customer wants to transfer money the to. The money transfer is done from bank 3 to bank 4, where the beneficiary holds his account [16], [17].

The first operator for implementing Blockchain was Primechain Technologies. The organization helped the bankchain to develop programs in many fields by using the Robotics Process Automation, RPA, Machine Learning Languages and concept, ML, predictive since and Artificial

Intelligence. The 10 currently developed projects of bankchain are in many sectors such as State Bank of India (SBI), which is testing money transfer and smart contracts.



**Fig.4** Blockchain in Banks [16]

Through this research paper we present eight case studies that has implemented the blockchain technology and show its succussed as following:

**Case Study 1:** ICICI Bank – Emirates NBD: One of the largest and famous banks in India is the ICICI Bank majoring in private sector banking, it was opened in 1994 by ICICI Limited. ICICI has the largest consolidated assets of Rs. 14.76 trillion at (30/ 9/ 2020). This was the bank's target. To achieve a larger market share, the bank partnered with Emirates NBD, leading banking group in the Middle East. The two organizations became the first to implement the new blockchain technology and execute online blockchain transactions. They Successfully implemented online blockchain transactions, smart contract asset trade, and purchase order, invoice, shipping & insurance among other finance features. The overall results showed effective time management and secure data. In March 2020, ICICI Bank Ltd decided to investment in Yes Bank Ltd with Rs 1,000 crore. The result after implementing these methods was the ICICI bank started to gain world rewards in 2017, then in 2018 and in 2019 respectively [17],[18].

**Case Study 2:** Bajaj Electricals – Yes Bank. Yes, Bank works in the private banking in financial sector in India, headquartered in Mumbai. The bank adapted the blockchain and artificial intelligence the aim was to develop a robust and a more authentication way to transfer money in retail corporate and to its' customers. This method helped the bank to avoid many obstacles and the potential collapses that the financial world goes through. One of its investment is with Bajaj Electricals and Cateina Technologies, Yes Bank also has a partnership with IBM; supports Hyperledger and Bluemix cloud; and works with Fintech which builds software. The bank also supported those two companies in using Blockchain in 2017. [19], [20]

The module of financing the vendor that was started in the supply chain this helped both vendor and the supplier. Both Bajaj Electricals and the Yes bank established a long-lasting engagement using cloud platform that was built by closed-loop implementation. Blockchain maintained integrity with the use of ERP Oracle' modules and authenticated with the only pre-registered parties. This investment results showed cut down in financial payment time to real time, maintain integrity and authentications [21].

**Case Study 3:** Government of Andhra Pradesh: In October 2017, the Government of Andhra Pradesh, in India, decided to implement Blockchain in the finance department, transport and in the ownership sector. More than 66% of the cases in court in Andhra Pradesh are due to land disputes [14]. The aim was to stop ownership tampering and maintain land owning integrity. Blockchain has been implemented in sectors like land register, money transfer and geo-mapping with successful results. Hence, the state government collaborated with ChromaWay to build a public ledger of land records. The first intent was to detect and stop the ransomware attacks. Blockchain helped in achieving a robust system and getting rid of many fraud and attacks. Card, PAN Card and fingerprint were the only proofs that the users needed in this technology. By 2019, the Government of Andhra Pradesh decided to replace money transfer with digital money and Blockchain money transfer [21], [22],[23].

**Case Study 4:** IDRBT Whitepaper -The Reserve Bank of India established IDRBT; The Institute of Development and Research in Banking Technology; it conducted a study about Blockchain and released a whitepaper about the benefits of using Blockchain in the financial sector, digital currency, information sharing and payment method. The aim was to disseminate information about Blockchain and help the other banks to adopt Blockchain. The IDRBT's whitepaper enlisted the processes that the banks must be aware of for converting to Blockchain. The first step in the league was to start with the inner structure of the bank and teach the employees about Blockchain. The next step in was to Know your Customer (KYC) and complete the implementation to the relation between banks. For this purpose, IDRBT issued of a Domestic Trade Finance Letter [24],[25],[26].

**Case Study 5:** Telecom Regulatory Authority of India (TRAI) is an application created in 2018 and uses Blockchain in all the communication feature; register calls; keeps logs; pay for services; block someone among other services. The aim was to use Blockchain to control services. The method used Blockchain to cryptography the data and the distributed ledger. In such a context, only the authorized person got the service he/she asked for. The trigger kept the users' identity confidential and non-repudiated. The result

was a good system that eliminated iterated calls and facilitated services. [26],[27].

**Case Study 6:** Mahindra group and the IBM Mahindra group are one of the leading companies working in the Financial services industry and implementer for the blockchain in money transfer since 2016. Mahindra group aligned with IBM to build a cloud that would support blockchain which would support money transfer between companies as vendors and other companies as buyers. Parties in this chain were required to be well versed about how blockchain worked. [12] Within 3 months, the results could be seen and that IBM and Mahindra group built a test model by Jan 2017. The model was POC; *proof of concept*. The model's functioning included predict success and handle capital finance supply, discounting, and selling invoices through banks and all financial institutions. Mahindra group started using blockchain in all other business sectors after the initial success and became a pioneer in non-banking sector. [26], [27].

**Case study 7:** UIDAI's AADHAAR and Blockchain. It is another massive implementation for the Blockchain for UIDAI's AADHAAR-a demographic and biometric technology project. The main weakness in this project is centralized database. The critical goal of using Blockchain is to overcome the centralization issue. The method used was the Ethereum protocol and the result is documented results that show its success [19], [20],[21], [31], [32].

**Case Study 8:** Niti Aayog and Gujarat Narmada Valley Fertilizers & Chemicals (GNFC) [12]: One of Blockchain advantages is paying digitally and smart contract used in payment reconciliation digitally in which no third party is involved. GNFC and Niti Aayog in June 2018 agreed on Statement of Intent (SOI). Using technology in management fertilizer manufacturing. GNFC turned Gujarat town into a 100% cash-free state. A three-step process of campaigns also helped a lot the steps were:

1. Build the infrastructure of payment.
2. Build an educated team for implementation.
3. Wide the work when the success of this project [19], [21].

Tab. 1 gives a summary for these mentioned case studies. In which year it was published, the aim of it and the method they used to achieve this aim.

**Table 1:** The study cases summary

No	Year	Objective	Method
1	2018	1.Simplifying the complex bank process of transactions and making them fast and more secure 2. Real time monitoring of the bank data and operations 3. Automation of all bank processes and digitizes the paper intensive 4. Expanding the transaction network 5. Having the largest consolidated assets. 6. Gaining more market place.	Using the EdgeVerve Blockchain Framework to build a partnership with Emirates NBD
2	2017	1. Developing a robust authentication way to transfer money 2. Providing a speedy and more secure method 3. eliminating the manual steps and paper trail of bill process and all transaction 4. Automation of payments to its vendors and bill discounting process to minimize the time for processing these payments 5. Implementing in retail corporate and customers and management financial services	Using the Hyperledger Fabric blockchain with a smart contract developed by fintech start up Cateina Technologies.
3	2018	1.Monitoring and tracking land records 2.Stopping ownership tampering and maintaining land owning integrity	Cooperating Andhra Pradesh government and ChromaWay to build a public ledger of land records

4	2018	Studying the benefit of implementing Blockchain in financial sector then getting these benefits to India	-Starting with the inner structure of the bank and teach employees about Blockchain. -Knowing customer and the complete implementation of the relation between banks. -Leading the change by bank
5		Controlling the telecommunication services	Using Hyperledger Fabric Blockchain to cryptography
6		Growing economic field.	Joining with IBM in order to build a cloud that supports blockchain that support money transfer between companies as a vendors and other companies as
7	2018	Providing all Indians users with unique identity numbers based on biometric and demographic information	Ethereum protocol

8	2018	Paying digitally and smart contract used in payment reconciliation digitally	Using Blockchain Technology for fertiliser subsidy management manufacturing. GNFC turned Gujarat town into a 100% cash-free
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### 3. Discussion

Through this paper's analysis and the review of identified case studies, it is evident that the primary motivation of these companies, banks, and institutions was to not only grow but to also garner their share of the financial pie. The cases identified are recent, having employed the technology for the past three years. These case studies indicate that the bank chain proves reliable and stable when implemented in financial industries. Almost all the cases reviewed implemented blockchain functions within the banking sector; the tangible results being economically flourishing and earning more market shares to stabilize the marketplace. Meaning, both small investors and large conglomerates can equally and securely share the profit.

Although, banks have a variety of approaches to explore when utilizing blockchain technology. Some banks choose to join forces with other banks (especially in other countries) to benefit from the blockchain process to transfer money and increase its coverage area. Other banks choose to focus on specific trade sectors such as retail to implement blockchain technology. Another approach used by some banks, focuses on developing its employee and customer knowledge base regarding blockchain technology.

Specifically, cases 1, 2, and 5 implemented blockchain to transfer money between parties and showed success and growth. The method was either to build a designated cloud for the blockchain or use the Ethereum protocol, an open-source decentralized software platform, to implement blockchain and cryptocurrency.

The previously discussed 8 case studies, indicate that the primary reasons behind the success of using the blockchain concept through the decentralized distributed system are allowing full real-time access, timesaving, proper strategic partnerships following clear management strategies, and well-defined security and regulation [17-27] [31].

### 4. Conclusion

The next industrial revolution will be the era of digital coins, distributed systems, and blockchain cryptocurrency. Moreover, it will include governments across the world keeping a close vigil over all kinds of financial transactions in their efforts to track money laundering. In this regard, cryptography is the best alternative. It will not only save time and maintain a high level of security, but also keep the flow of money under control. The case studies discussed in this research exemplify that using cryptocurrency offers increased security, enhanced time management, transparency, and profitability in comparison to the conventional mode of money transfer for both banks and individuals. Using cryptocurrency facilitates convenience by ensuring a faster and safer mechanism to transfer money with increased data integrity.

The primary benefit of this content analysis is that it addresses an innovative subject, in a new light and using timely recent research references drawn from 2018-2020. Thus, our study is a contemporary and conclusive source for all present and future endeavours being undertaken in the domain of using blockchain for e-transactions.

Further research should be conducted to identify specifically how using cryptocurrency benefitted each of the case studies and whether their benefits are sustainable. In addition, future analysis should investigate privacy and regulator perspective within these cases and how that may have impacted the adoption of blockchain technology. Overall, it can be said that there is a significant need for further research in all fields of Cryptocurrency and Data Transfer as well as their impact over time.

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