Using Blockchain Technology for GST Implementation in India

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Abstract: Blockchain is a developing technology that has transformed the way in which people used to interact, transact, trust, collaborate with each other. Blockchain technology has provided us a platform which is secure as well as transparent, that we have tried to achieve for a very long time. This paper we discuss how this distributed ledger technology can be used in implementing Goods and Service Tax (GST) and making it more secure and transparent. In this paper, we have proposed a model of the tax collection system in which all those involved would be able to participate to prevent any frauds.

Keywords: **Blockchain, GST, Trust, Distributed Ledger Technology.**

I. INTRODUCTION

GST system in India makes the tax collection and distribution simpler than before. In this system, the tax is levied on all services as well as goods. The consumer pays for Central GST and State GST. These are distributed as the name suggest i.e. CGST for the center and SGST for the state. The goods moving from one state to another attracts Integrated GST [9]. The GST was introduced in India on April 1st, 2017 with the one hundred and one constitutional amendment. After 2 years of its implementation, all taxpayers have come across the Tax return issues and the inability of the servers to handle large E-way bill requests.

Blockchain is a distributed ledger technology which has made revolutionary changes in the way which people transact. Blockchain technology was first introduced in 2009 in a white paper by an anonymous group called Santoshi Nakamoto. The idea behind this was to develop a system that was secure as well as transparent [2]. The Blockchain idea came into existence to decentralize the system i.e. designing a platform where there is no middleman. It can be termed as the true P2P platform where all parties involved knows about any changes that are made to the system. Let us understand this with the help of an example, there exists a company which needs a third party for customer service, the terms of the contract can be agreed upon using the Blockchain technology. The technology was introduced with a digital currency called bitcoin. Since then there have been many advancements in this field and has increased its areas of application. There are several ongoing researches to use the distributed ledger technology in the fields other than finance.

II. BLOCKCHAIN 1.0

Blockchain technology has grown over the years. there have been many new features added to the blockchain and now can be used for various different tasks. There are different blockchain models depending upon the user permission.

In Private Blockchain each and every user has the permission to use the ledger i.e. only a limited people can use and access this kind of Blockchain. This kind must suit the needs of the organization where information is to be shared but at the same time, the security of data is also needed. In this, the user can specify rules regarding the transactions like who can only read or who can only write or who can both read as well as modify the transaction.

In Public Blockchain, anyone can be part of the network and access the ledger freely without any restrictions. This type of Blockchain is decentralized and is distributed. The main difference between the public and private Blockchain is that private is cost-effective than public and is less transparent as compared to public Blockchain.

This type of Blockchain lies somewhere between the public and private Blockchain. Such a Blockchain gets some public Blockchain features as well as some of the private Blockchain features. Mainly it is up to the owner that which transaction in the ledger gets the public or private access. For example, a factory owner may choose to keep the financial transactions public whereas the operational transactions as private. It may also be in a way that some users get the limited access and some get the full access to the Blockchain.

In Blockchain number of transactions are joined together and a complex problem is solved to get the valid hash value for the block, a number of zeros at the beginning of the desired hash decides the difficulty of the problem. The miner is first able to find and verify that hash value gets to add the block in the blockchain (This is also known as Proof of Work). The problems like double cash spend are solved with the use of consensus models to verify the transactions.
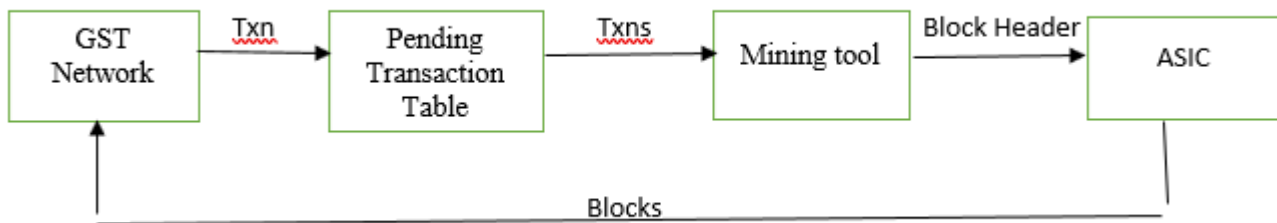
Fig. 2.1: Block Validation Process.

In version 2.0 of the blockchain decentralizes more complicated transactions i.e. non-financial transactions. It uses smart contracts along with the functionality of blockchain 1.0. It uses a code to fulfill the agreement.

Smart contracts are the computer programs that all parties agree upon. A contract is a transaction in which one promises others to do something in return to something. In this, there is minimum human interaction with the system. Having minimum interaction minimizes the trust factor of the transaction or a contract. The complete automation allows the terms of the contract to self-execute without any outside interference. This might look very simple but is very complicated as in case of financial transaction a computer may easily verify but it is very difficult for a computer program to verify any incident of the physical world. This problem can be used by using some data analyzing tool to check the correctness of the information. A smart contract would help in situations like when a person wants his property to be inherited by a certain person on his death, the smart contract would verify data in the govt. repository and on confirmation of death the property will automatically be transferred to the person mentioned in the contract. Such properties which are being purchased or sold on the blockchain are called smart property. These can be physical like a car, house, etc. as well as intangible like shares, health data, etc. These smart properties have a private key and whosoever has access to that private key is the owner of the property. To sell a property on blockchain one need to create a token that would have all information about the property and once sold the token is transferred to the buyer.

III. GST COLLECTION USING BLOCKCHAIN

Blockchain has been known for its distributive and transparent functionality. It has not yet been used in the governance but it can play an important role in providing people information without having the risk of the information being tempered. In this paper, we are going to use Blockchain for GST collection. Various taxpayers would interact with the tax collecting authority through blockchain. We will be using proof of work mechanism to add a block to the blockchain.

The participants in the GST collection system includes the consumers, manufacturers, sellers, wholesalers, and governments (State as well as center). The various government authorities will play a greater role in giving the miner license to miners. Various manufacturers would be the source of all goods that come to the market and must be recognized as the source in the Blockchain. Once goods move from the manufacturer to a different seller and finally to the consumer, the good must be tagged with a token so that it is tracked to the consumer and the returns are easy to be processed [1]. The miners responsible for verifying and adding a block to the blockchain should be either government authority or large manufacturer. Remaining sellers and customers should be normal nodes which only perform normal transactions

The GST collection system begins from the manufacturer to the consumers. It tracks the goods moving from the manufacturer to the consumer and check that the tax is paid only once. The transaction data will contain the buyer and seller information (including the place, time, item purchased, price, etc.). This will also stop all unauthorized seller to sell or buyer to buy goods as the transaction would be termed unauthorized due to invalid or incorrect information i.e. invalid private key associated with the goods [1]. This would also help the users to avoid any fraudulent transaction. The issuance of waybill will be done automatically for goods moving from one place to another and having price Rs. 50,000 and above. It will be mandatory for the transport units to be registered in the system with their Fast tag ID so that each time they carry goods above Rs. 50,000 a waybill is assigned to the fast Tag ID. This will help the transportation to move without any disruption. At each level, the tax is paid by the buyer and the return is claimed by the seller. This process is automated with the help of a smart contract which executes itself when it finds the tax for the same product is paid twice.

All taxpayers are currently stressed about the procedures and rates of GST and want a simple procedure and rationalized rates. The use of blockchain for the collection of taxes and their management would make the procedure simpler as every sale or purchases done by the user would reflect in his account and all claims will be done automatically.
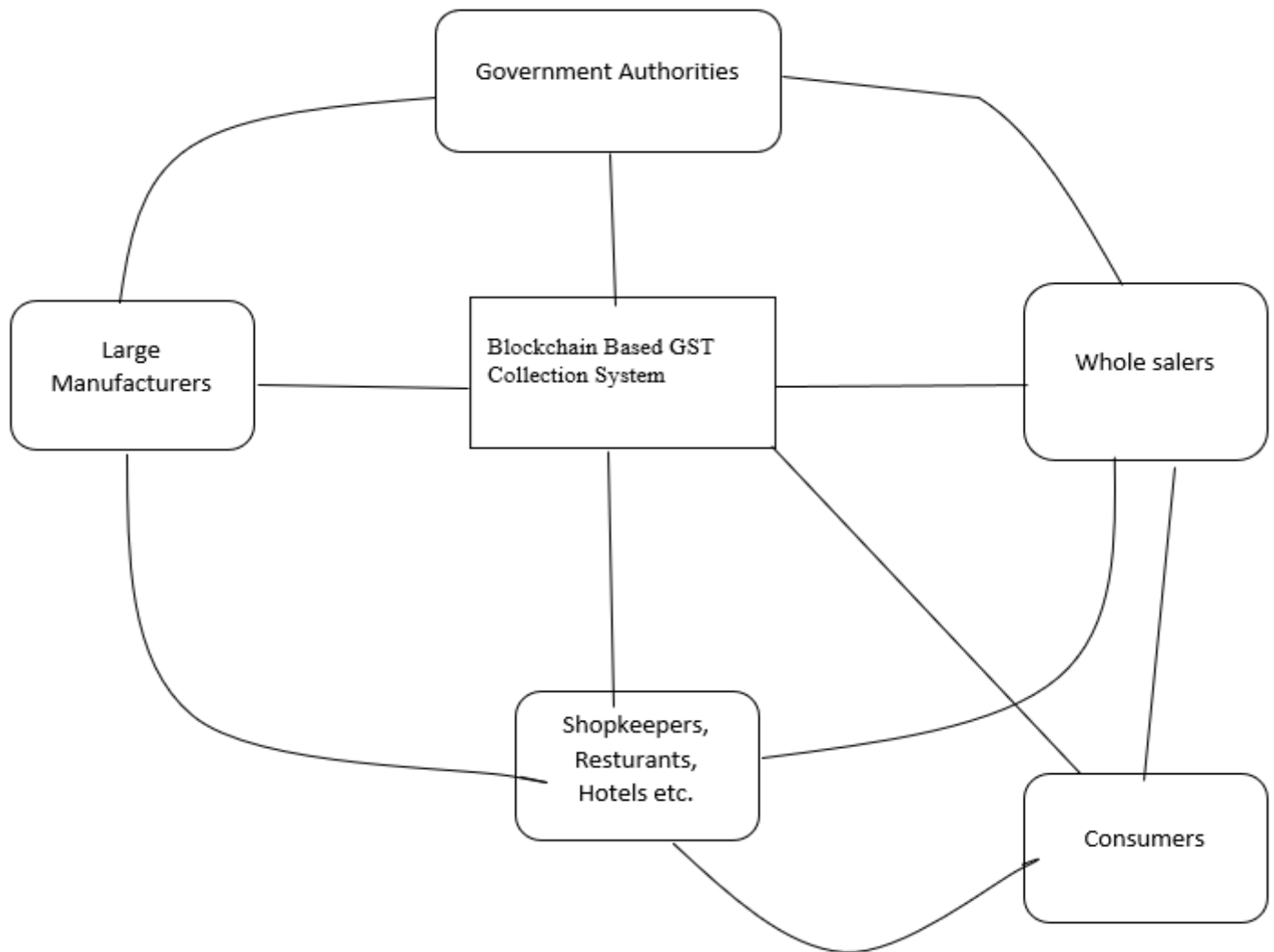
Fig.3.1: System Structure

IV. RESULTS

In this paper, we suggest improving the GST collection system by the use of Blockchain technology to make it a secure, fast and transparent system.

It has been over 18 months since the implementation of the GST in India and the distress can be seen among all the taxpayers as the system was implemented very quickly and was not clearly capable of handling the transactions as we have seen over a long period of 18 months. The system has crashed many times due to a large number of transactions.
The settlement of claims takes more than a month in ordinary cases and sometimes even more. The time and cost of implementing are higher in the current scenario as a large workforce is required to fulfill the requests and managing of information of such a large population like that of India.

Some of the tasks of the existing system can be easily automated with the Blockchain. Smart contracts execute itself when the conditions required are met. For example, in the case of tax returns, the preconditions would be that the tax paid twice for the same item and the seller gets the claim. This is secure and easy to verify the claim as no changes can be made without the majority of the nodes coming to a consensus.
There are various problems in the existing system and all these problems can be solved easily with the help of blockchain. The issue of time consumption in verifying any transaction will be reduced as it could be verified by 51% of the participants rather than a single entity.
This system would be able to track all the products to the point they are vanished or are consumed. In this way, the number of tax evaders will definitely be reduced. The problem of tax not being utilized by the govt. properly or is being used can be surveilled by the people themselves. The transparency would help people knowing the exact tax paid by them and also help in detect or avoid frauds. Currently, the government is the central authority audits the data but with the help of blockchain, all the participants can audit the data.

To check the feasibility of the system we implemented some transactions using JavaScript for the backend and angular and HTML in the front end. In the system each node had a public and a private key associated with it and to send money to some

other node is public address is required. To make the transactions secure and intangible, the transactions are signed with the private key of the sender.

Fig 4.1: Blocks in Blockchain.

On clicking on the block, we can see the transactions in the block we can see the transactions in the block. This helps to monitor the transactions in the system and makes it easy to check the claims for refund of the transaction.

Fig4.2: Transaction in block

V. CONCLUSION

In this paper, we have proposed a system that uses blockchain to implement the GST collection. This system will keep data collected secure and transparent. Also makes it simpler to the users in filling and claiming returns. With the help of this model, the tax can be audited by all the participants of the blockchain. In future the use of the Ethereum protocol to implement smart contract can be done. That would help in automating the claim process filling of the IT returns and generating E-Way Bills etc.

REFERENCES
[1] Jen-Hung Tseng 1, Yen-Chih Liao 2, Bin Chong 3 and Shih-wei Liao 2, "Governance on the Drug Supply Chain via Gcoin Blockchain" Int. J. Environ. Res. Public Health 2018, 15, 1055.
[2] Renming Qi, Chen Feng, Zheng Liu, and Nezih Mrad "Blockchain-PoweredInternetofThings, E-GovernanceandE-Democracy", Advances in 21st century Human Settlement, Chapter 17, 509-520.
[3] Chris Elsden1, Arthi Manohar1, Jo Briggs1, Mike Harding2, Chris Speed3, John Vines1," Making Sense of Blockchain Applications: A Typology for HCI", CHI 2018, April 21–26, 2018, Montréal, QC, Canada,
[4] https://www.thecryptorealtygroup.com/whats-a-smart-contract/, last accessed on 07-06-2019.
[5] Tomaso Aste1, Paolo Tasca and T Di Matteo ," Blockchain Technologies: foreseeable impact on industry and society". Computer, 50(9), pp.18-28.
[6] Farinaz Sabz Ali Pour, Unal Tatar, Dr. Adrian Gheorghe," AGENT-BASED MODEL OF SAND SUPPLY GOVERNANCE EMPLOYING BLOCKCHAIN TECHNOLOGY", SpringSim-ANSS 2018, April 15-18.
[7] Steve Huckle * and Martin White, "Socialism and the Blockchain", Future Internet 2016, 8, 49.
[8] http://induced.info/?s=GST+Return+Filing++How+to+File+GST+Returns+Online, last accessed on 07-06-2019.
[9] https://www.ey.com/in/en/services/ey-goods-and-services-tax-gst, last accessed on 07-06-2019.
[10] Durgesh Bharwal, Rajat Kumar Behera, Abhaya Kumar Sahoo, "Blockchain: A Primer",CSI Communications Knowlage Digest for IT community, Feburary 2017.