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# Digitizing Invoice and Managing GST Payment using Blockchain Smart Contract

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**ABSTRACT:** This Goods and Service Tax (GST) is an indirect taxation system imposed on the supply of goods and services. GST is calculated on the total cost (cost of product + profit) and is paid by every user in transaction system. The GST amount is paid to the Central and State Government respectively. The amount may vary depending upon the product. According to the percentage the GST amount is calculated and given to respective government. The difference here is depending upon the tax liability of the user, refunds are calculated and returned back to the user. The refunding system usually takes a duration of 30 days from filing a GST refund form. The period may alter depending upon the refund amount to be calculated. Usually, the amount is high and can create financial burden to users and business in return so in order to compute the GST we have proposed a system where multiple users are brought onto a single system. Using smart contract, we can do needful calculation of taxes and adjust the amount to be refunded to the user and Government. We are also providing security to the invoices created at the seller side using encryption algorithm which are used for financial transactions.

**KEYWORDS:** Blockchain, Smart Contract, Goods and Services Tax.

## I.INTRODUCTION

In the earlier indirect tax regime, there were many indirect taxes levied by both the state and the centre. States mainly collected taxes in the form of Value Added Tax (VAT). Every state had a different set of rules and regulations. Inter-state sale of goods was taxed by the centre. CST (Central State Tax) was applicable in case of inter-state sale of goods. The indirect taxes such as the entertainment tax, and local tax were levied together by state and centre. These led to a lot of overlapping of taxes levied by both the state and the centre.

For example, when goods were manufactured and sold, excise duty was charged by the centre. Over and above the excise duty, VAT was also charged by the state. It led to a tax on tax effect, also known as the cascading effect of taxes. During the pre-GST regime, every purchaser, including the final consumer paid tax on tax. This condition of tax on tax is known as the cascading effect of taxes.

**GST has removed the cascading effect.** Tax is calculated only on the value-addition at each stage of the transfer of ownership.

The indirect tax system under GST will integrate the country with a uniform tax rate. It will improve the collection of taxes as well as boost the development of the Indian economy by removing the indirect tax barriers between states.

GST is known as the Goods and Services Tax. It is an indirect tax which has replaced many indirect taxes in India such as the excise duty, VAT, services tax, etc. The Goods and Service Tax Act was passed in the Parliament on 29th March 2017 and came into effect on 1st July 2017.

In other words, Goods and Service Tax (GST) is levied on the supply of goods and services. Goods and Services Tax Law in India is a **comprehensive, multi-stage, destination-based tax** that is levied on every **value addition**. GST is a single domestic indirect tax law for the entire country.

Under the GST regime, the tax is levied at every point of sale. In the case of intra-state sales, Central GST and State GST are charged. All the inter-state sales are chargeable to the Integrated GST.

The collected amount needs to be then submitted to the government bodies by these them. GST system is mainly classified into two broad components; the state GST (SGST)/union territory (UGST) and a central GST (CGST). Goods and services are divided into five different tax slabs for collection of tax - 0%, 5%, 12%, 18% and 28%. However, certain products such as petroleum products, alcoholic drinks, electricity are not taxed under GST and instead are taxed

separately by the individual state governments, as per the previous tax regime. The tax rates, rules and regulations are governed by the GST Council which consists of the finance ministers of central and all the states.

The Current GST SYSTEM may be explained using following example:

In the business world or in our day to day life whenever we purchase certain things, a GST Invoice is issued by the seller. We (the buyer) pay that bill along with the GST. The information about collected GST is uploaded by the seller to a GST portal that is [gst.gov.in](http://gst.gov.in) and the seller pays this entire collected amount to the government through the portal. Sometimes the seller is actually working as a production house that's why he is purchasing multiple raw materials for his product. Whenever they are purchasing the raw materials, the seller also pays a certain GST to the suppliers. That way there is a kind of loop. Everyone in this loop, they collect a certain amount of GST and this entire amount of GST goes to the government. Now the government has to make this huge calculation like which part of the GST needs to be refunded back to the intermediaries of this production chain, and which part would be finally, collected and get it distributed among the central government and the state/ut governments.

This entire adjustment of GST is done by the government employees who are connected with this tax department. The government tax department has to manually do this entire calculation or with the help of certain software like Tally. After doing the calculation they may adjust the amount of GST at individual production stages, and the entire final amount which is being collected gets distributed among the state governments and the central government. GST is a multi-staged tax which is imposed at every step in the production process, but is meant to be refunded to all parties in the various stages of production other than the final consumer and as a destination based tax, as it is collected from point of consumption and not point of origin like previous taxes. This refund process generally takes around 30 days and needs to be tracked by each stakeholder which is a tedious and painstaking process.

The use of a decentralized Blockchain system in this production chain, to overcome this issue can be a key to solving the centralized GST system issue. The designed system includes generation of Smart Contract that does the needful calculation of taxes and adjusts the amount of tax to be paid back to the user and to the government, thus speeding up the traditional process of GST refund.

## **II.OBJECTIVES**

Using a decentralized Blockchain system to overcome these issues can be a key to solve the centralized GST system issue. The designed system includes generation of Smart Contract that does the needful calculation of taxes and adjusts the amount of tax to be paid back to the user and to the government, thus speeding up the traditional process of GST refund. Thus, implying the goal to minimize the work of GST officers and making the procedure faster.

## **III. LITERATURE REVIEW**

The authors Rishabh Ranka, Niranjana Sharma, Naman Talati, Ms. Nitika Rai in this paper a number of existing literature on GST and use of Blockchain technology is studied. The Goods and Services Tax (GST) came into existence on July 1, 2017 in India. GST is paid by the users in the transaction system where the total cost of the product and profit is added and based on the total amount, the tax is calculated. We are aiming to create a web application for computing and levying GST by using Blockchain Technology. The blockchain technology securely hosts the public transactions where multiple customers/ vendors/suppliers are all users are brought together in a single system. The Smart Contract do all the required calculations of taxes and balance the amount of tax to be paid back to the user and to the Government. According to 2020 The IT module under GSTN is not capable of handling huge transactions which occur inside the centralized GST system. A successful GST system works only because of its strong I.T. fundamentals. It is very difficult for handling this amount of big data which has multiple field attributes and which carry out transactions and refunding on the basis of GST. Blockchain is a new type of database which holds all the historical information in digital blocks and is generated in a crypto digital ledger. By using Solidity Programming Language we can create a Smart Contract which helps to derive and design tax invoices which would reduce major issues like filing returns and claiming ITC (Input Tax Credit) etc. this would make tax calculation and refunding process easy.

The authors Milla Sephiana Setyowati, Niken Desila Utami, Arfah Habib Saragih and Adang Hendrawan in this research paper evaluates how blockchain technology can be applied to a GST system, particularly for electronic invoices (e-Invoice). A qualitative approach was used in this study to analyze blockchain technology models that could be applied in a GST system. Data is considered to be protected if it is distributed to the nodes in the blockchain technology network which includes the Tax Invoice Serial Number (TISN). A TISN system which is based on blockchain technology will produce a faster and more efficient system. The application of blockchain technology in the



GST system can have implications for optimizing the electronic GST system, improving the user experience of taxpayers using the GST electronic system, assisting the analysis of the national economy by making the data related to the GST clear and auditable, and enhancing the transparency of GST transactions. There may be very broad implications for implementing block chain technology in GST system, this implications would not only be for taxation sector but also for national economy.

The authors Van-Cam NGUYEN§, Hoai-Luan PHAM, Thi-Hong TRAN, Huu-Thuan HUYNH§, Yasuhiko NAKASHIMA in this paper presents a system which digitizes invoice and automatically calculates GST by using Blockchain smart contract. The implementation of smart contract in Remix Integrated Development Environment (IDE) is based on the Ethereum platform. The Experimental results of this new system saves the cost for authenticating transactions and also protects the data from hacker's attacks due to property of the Blockchain technology. This authenticating procedure for transactions is still complicated, and the current GOODS AND SERVICES TAX (GST) administration system works as centralized server, it consists of high-risk attacks from hackers. Therefore, only a few countries use this digital technology to calculate and manage the GST payment despite of their benefits. By combining decentralized storage network (DSN) with the smart contract (SC), a new model based on Blockchain technology is proposed to authenticate the transaction, calculate GOODS AND SERVICES TAX and approve GST payment. This system also decreases the risk of data loss attacks and improves the trust in implementing GST payment.

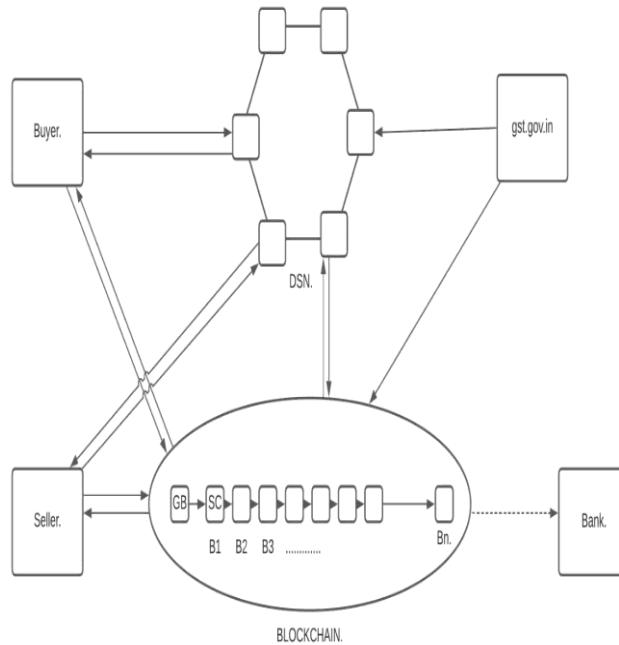
#### **IV. PROPOSED SYSTEM**

Explaining the proposed system with the architecture diagram will help understand it more easily. Starting with the overview of our proposed system shown in fig.: . The system has four entities. They are the GST portal (gst.gov.in), seller, buyer and the bank. To reduce the storage space in Blockchain Network (BCN), the storing of invoices is done in a Decentralized Storage Network (DSN). Then, the DSN will return the hash code, which presents the location of data in the DSN. This hash code will be uploaded to the BCN after that.

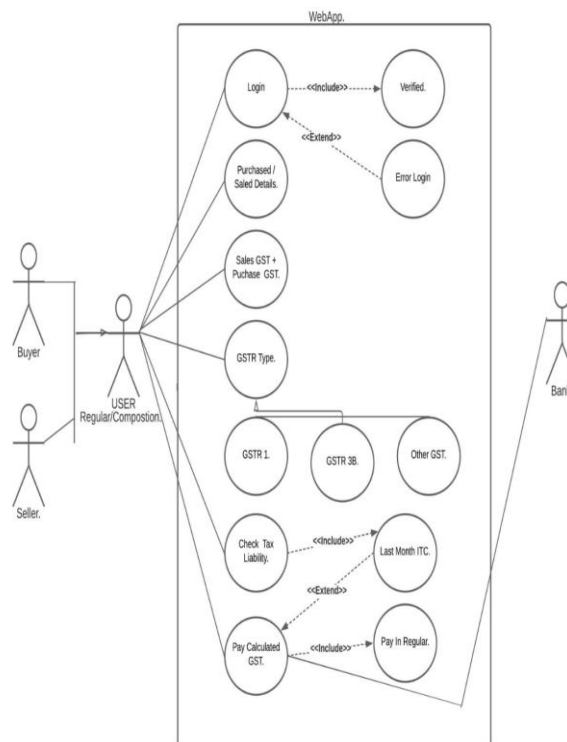
The operation of system can be explained via steps as follows:

- i. After registration of the user in the GST portal, two nodes are created in BCN and DSN respectively.
- ii. The user completes the authentication process and logs in and uploads the Invoice in DSN.
- iii. The user (Seller) records hash code and uploads the information of transaction, i.e. Value Of Goods, hash code, Status, in BCN.
- iv. The Smart Contract (SC) will now give access only to the verified buyer, according to the invoice uploaded.
- v. The buyer now verifies the invoice into SC.
- vi. After both verifications of Seller and Buyer, the SC will calculate the GST considering the factors like ITC (Input Tax Credit), Tax Liability, GSTR type.
- vii. In this process if there is any nonsense knowingly or unknowingly, then we can trace back the information of the transaction.
- viii. After creation of Invoice or Bill through SC, the user is redirected to the payment procedure.

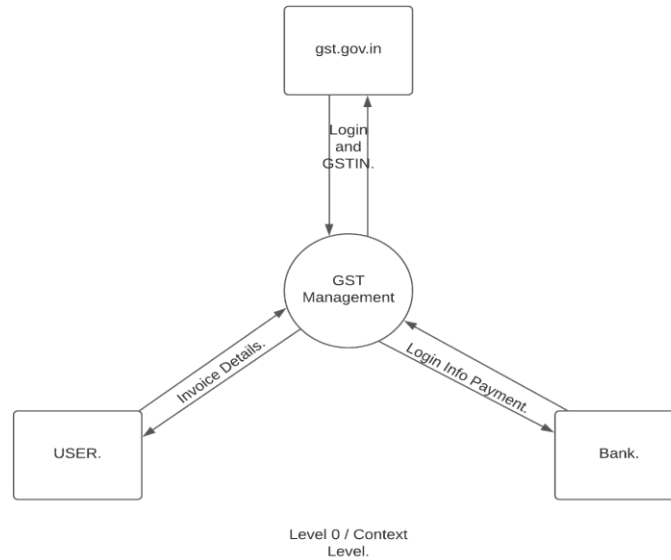
• PROPOSED SYSTEM



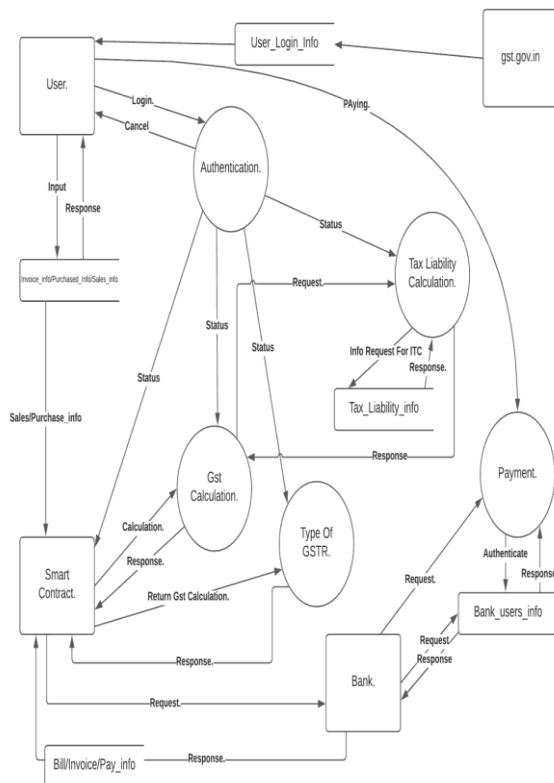
• USE CASE DIAGRAM



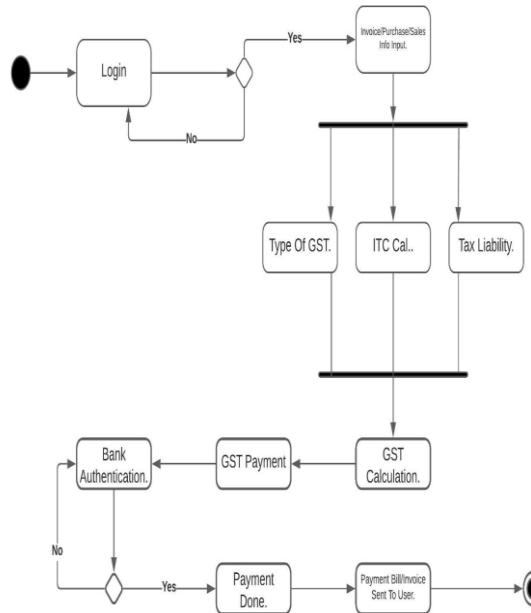
• DATA FLOW DIAGRAM (level 0)



• DATA FLOW DIAGRAM (level 1)



• ACTIVITY DIAGRAM



V.CONCLUSION

We propose a system that digitizes invoice and automatically calculates GST by using Blockchain smart contract. The smart contract has been implemented on the Remix IDE using Solidity language based on Ethereum platform. As the experiential results, the cost for digitizing invoice and calculating GST is low in the new model. And also the new model not only saves the cost for authenticating transactions but also protects the data from hacker’s attacks due to consensus property of the Blockchain technology.

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