# Complete vehicle registration process using blockchain technology

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**Abstract -** *There are various entities related to the motor vehicles such as manufacturer, dealer, buyer, registration authority, insurance company. According to the norms, all the entities must collaborate for the successful registration of the vehicles. However, current system might get encountered with errors due to input of wrong or incomplete information and also some other consequences such as data manipulation which might be a threat to the system. The vehicle registration process is maintained by Regional Transport Office (RTO). RTO also maintains collection of road tax, license, emission certificate, no objection certificate. Maintaining process related to vehicles by the conventional method might obscure the path of making a system more reliable and complete. The current system face the problem of fraud detection i.e. if a fraud occurred, it is difficult to trace back as different entities such as manufacturer, dealer, RTO and insurance company works in their own terms. By bringing blockchain technology into the scenario helps us to get a more reliable solution as blockchain technology being a distributed ledger technology and also being more promising in data security and privacy helps for carving a more reliable and efficient system. By the means of the proposed paper, it is an approach to solve problems underlying in the vehicle registration system and also bind all the different agencies related to vehicles under one portal and get them connected through blockchain technology. Binding them under one portal will make system more reliable as all of them would be in the chain and with blockchain every transaction log along with the timestamp would be available.*

***Key Words***: **Blockchain, vehicle registration, manufacturer, dealer, RTO, buyer**

## 1. INTRODUCTION

In recent times, motor vehicle industry have saw a huge increment in the sales of vehicle. According to the norms, the sold vehicle must be registered by the Regional Transport Office (RTO). With the proper documentation, the RTO authority registers the vehicle.

Being with the time, the graph of motor vehicles have always saw a positive rate in its sales. Registering more number of vehicles with the conventional process wouldn't help to serve the purpose of maintaining the real time database.

The conventional process have often been with the path of obstacles as it always needs to deal with moving from desk to desk to get the registration work accomplished as different entities such as manufacturer, dealers, insurance company, RTO works independently. As dealer gives the invoice of the sold vehicle, which is further given to insurance company to get insurance of the car and alongwith the insurance letter given by the company is being required by the RTO to register the car. This process might be prone to error by submitting false information at any stage or else someone may try to manipulate the data for their own personal interest. RTO maintains the centralized database for registering the vehicle and often have to deal with computational loads. Talking in the time of technology advancements, computational load can be easily tackled with decentralized system which is offered by blockchain technology. However, there are other pertaining problems too, such as poor collaboration between different entities have provoked to induce errors at certain stage which are found hard to trace back. Despite of authorization and authentication at every phase of vehicle i.e. manufacturer, dealer and buyer many times it is found hard to trace where the fraud occurred. Bringing all the different entities under one system linked through blockchain technology can help to build a more secured and reliable system. For every transaction made right from where the vehicle is manufactured to whom it is registered, each and every transaction gets recorded in the block and merits of blockchain technology is that

data is immutable and also can be secured with hash function. That's where the point of using blockchain makes it more imminent as in the proposed system, now every log/transaction helps us to get knowledge that who did the transaction and at what time.

## 2. LITERATURE REVIEW

Blockchain has been an overwhelming topic during the last few years. It has been in market due to its property of never getting the block destroyed and keeping the history from the staring of the system. Many application of blockchain are brought into practice to overcome the difficulties. Some of the application can be crypto currency, e-commerce and many others.

[01]Gaurav Nagla, proposed a reliable ledger platform to keep the record of vehicles. It stores past information of vehicles such as collision information, financial information, transfer of ownership, repairs and life of vehicle. The conventional system used can easily temper the data, unauthorized and inadvertent changes can be done. To overcome this problems, the author proposed the use of blockchain technology. The system uses the blockchain to create a chain consisting of different blocks to stores the individual vehicle data. The created node gets added at the end of the chain and is traversable. The interface unit is been also develop to access the node for viewing and adding new node to the chain. The distributed ledger platform proposed by the author is decentralized. The authorised nodes can only create a new node for the blockchain. And the change in the chain is reflected over each other connected nodes. The contract are created during the transfer of ownership of a vehicle. This contract contains information of seller's electronic signature, buyer electronic signature, and transaction terms which determines that the transaction terms such as payment is been done successfully. This contract is added to the distributed ledger and therefore the new block of vehicle is created under new owner name.

[02]Cho Cho Htet and May Htet, aimed to develop a secure system for trading system. There is a requirement of more secure environment against the attack, like a 51% attacks. He suggested to use a reliable e-commerce business model with product grading system to get the price of the product based on its quality. He developed a platform where the car owner, buyer, and other agencies like repair services must register themselves. Their record was stored in a public blockchain network. To know the history of a car, buyer can send request to owner and owner sends back the block containing the vehicle information. All of this is recorded as a transaction in blockchain. When the car gets sold the data in the block of specific vehicle is updated and stored back in the new block and added to the chain. The randomly chosen miner were used to mine the block for the developed blockchain. The miner were chosen based on the coins they mined. By using the blockchain it becomes harder for the attackers to attack the system as it gets distributed over different nodes.

[03]Michael and Steven Sprague, provided an idea how implementing hardware security can enhance the security and privacy for the end user and blockchain. First of all the block diagram of any internal structure of computer nodes should be developed. This flow of data should be maintained. The device for authentication should be placed at front so that any user need to be verified before using the system. They said that to rise the security and privacy of the user in blockchain, they need to be verified as a valid buyer or seller on the site. Later they allowed to have a transaction and this transactions are stored safely in the blockchain. This way by adding the layer of security above the blockchain transaction we are able to provide high security to very important data and our privacy.

### 2.1 Existing system:

Undoubtedly blockchain being an emerging technology have been in used in the vehicle industry. The existing system uses blockchain for third party application such as trading system, insurance company or for creating digital identity. Though system is reliable but some crimes related to vehicle such as Duplicate Registration Certificate, Approval of No Objection Certificate on false document by RTO, manipulating invoice for tax

benefits are still a pertaining problems in the field of vehicles as no current system deals with all entities such as manufacturer, dealer, buyer, RTO together under one portal that too connected with blockchain technology.

## 3. PROPOSED SOLUTION

By the means of proposed solution, it is an approach to make vehicle registration system more secure and reliable. The solution tends to solve problems such as generation of false document and manipulating the data related to vehicle in the system by the authorized person for their personal interest. By bringing all the agencies under one portal that is connected through blockchain technology, any changes made by one authorized person would reflect all over the system and it would be easy for us to retrieve the information about who did it and when. So introducing blockchain technology right from the place where vehicle is manufactured, it helps us to maintain all the transaction from manufacturing stage which no other system is currently offering.



Fig 1: working of Blockchain

The above figure depicts how different entities are connected through blockchain and its transaction gets recorded into blockchain.

The vehicle registration system is divided into different modules. Such as

1) Manufacturer Module
2) Dealer Module
3) Buyer Module
4) RTO Module

**Manufacturer Module:**

Manufacturer requests for the valid chassis numbers to the RTO. Using this chassis numbers manufacturer can add new Vehicle manufactured in their industry. Manufacturer can create an assignment to be allotted to the Dealers for which the vehicles are registered to the specific manufacturer. Assignment is allotted to dealer and the transaction history is saved in blocks using blockchain. Blockchain will persist the immutable log of transaction which neither can be deleted nor modified. All transactions made by the particular manufacturer will be viewed in the dashboard.

**Dealer Module:**

Dealer will be able to accept/reject the delivery assignment allotted by manufacturer. By accepting the delivery assignment, dealer will be able to sell vehicles. Dealer can sell the vehicle to the verified buyer which is then registered to the system. All the Transaction made by dealer such as Delivery Accept/Reject or Vehicle Sell will be logged in the Blockchain. Now with the help of proposed system no agency can deny the fact whether the vehicles were allotted to it or not. Hereby, creating more trust and collaboration between manufacturer and dealer.

**Buyer Module:**

First, the verified buyer will be able to buy the vehicle. Buyer would be allocated with unique registered Id for the future purpose. The goal of accommodating all the agencies gets completed as buyer accept the vehicle sold by dealer on the same system that is being used by
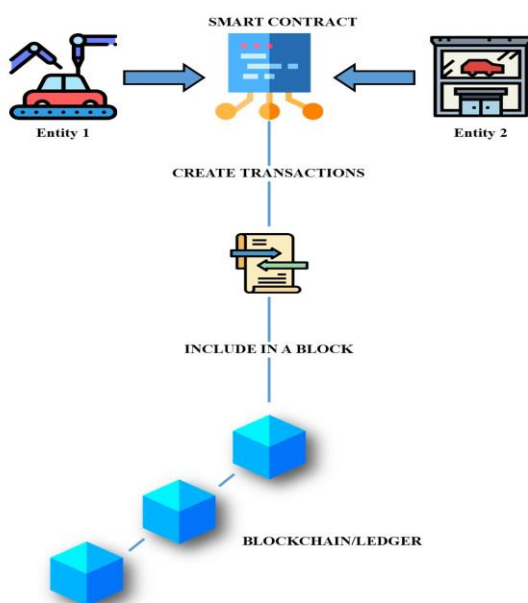
different entities The vehicle will be sold to the buyer and transaction will be recorded in the blockchain. After buying the vehicle, buyer can apply for its registration to the respective RTO belonging to the buyer's location and can obtain the registration no for the Vehicle.

**RTO Module:**

RTO will register the vehicle after verifying vehicle details as well as buyer, dealer and manufacturer details. All the details will be available to the RTO as all entities are available under the same roof and making vehicle registration process more flexible rather than moving place to place. RTO will provide the registration no to the vehicle. This Transaction will be recorded in the blockchain. This would ultimately give identity to vehicle and all its details can be retrieved just by one system.

Further, it can also be extended to insurance company module where insurance company gets the vehicle registered with it for the future claims related to vehicles.
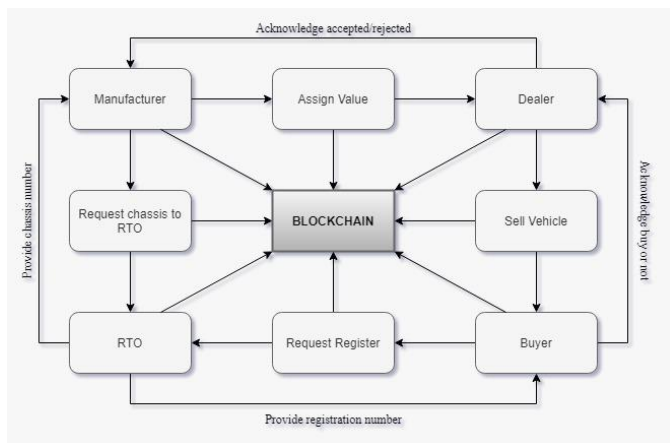


Fig 2. Design and workflow diagram

The above picture depicts the connection of blockchain to every entity i.e. manufacturer, dealer, buyer, RTO. Security layer has been added between every connected entity as acknowledgement is being sent back to the entity who started the transaction.
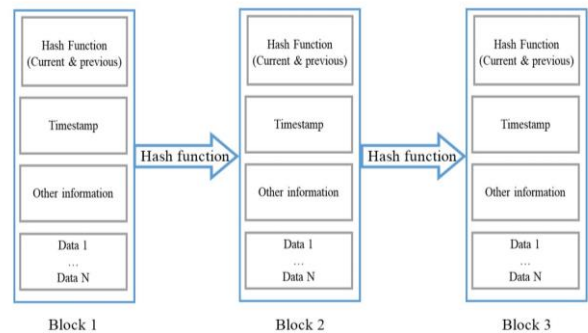
## 3.1 USAGE OF BLOCKCHAIN



Fig 3. Blockchain process

Blockchain is the way for storing the data in an immutable and decentralized in the network. Everyone in the network are allowed to access the blocks. Blocked are used for storing the transactions in the system. For each transaction the new block gets created and is connected with the previous one. The hash value for each block is been created and is stored in the previous one for the traversal in the chain. For each transaction to be complete both parties, seller and buyer, need to provide permissions and hence the digital signature gets implanted on the contract and it is added to the block. This provides dual way authorization for each transaction to be complete without any kind of third party in between.

## 4. CONCLUSION

Blockchain technology and its application will be there for long as the feature provided such as privacy, security, traceability are worth recommending. Thus it be helpful to serve as the base of making system reliable.

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