



# Vehicle Management System Using BlockChain

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Raja Boopathi S & Sudhan Manoharan  
Chennai - India

## ABSTRACT

Managing a vehicle is important for a successful journey. Being, it managing important data about vehicles such as owner details, owner history, parts damage, service history, or making a carbon-free environment by eliminating polluting vehicles, a system is required for it. Also, vehicle theft is increasing at a larger scale and we don't have any proper source to track the vehicle other than CCTV footage. As an owner of the vehicle, one is unable to track the vehicle. To solve this problem, we are providing a system using Blockchain network termed as 'TransitChain' to manage vehicles including owner data, accident tracker, parts damage, service history and avoid theft by blocking the sale of vehicles in the aftermarket using Vehicle Identification Provider.

## CHALLENGES

In 2013, 165,690 vehicles are stolen for every 1.2 billion people that accounts for 12.9% of the total population only in INDIA and the numbers lead to shocking results for other countries.

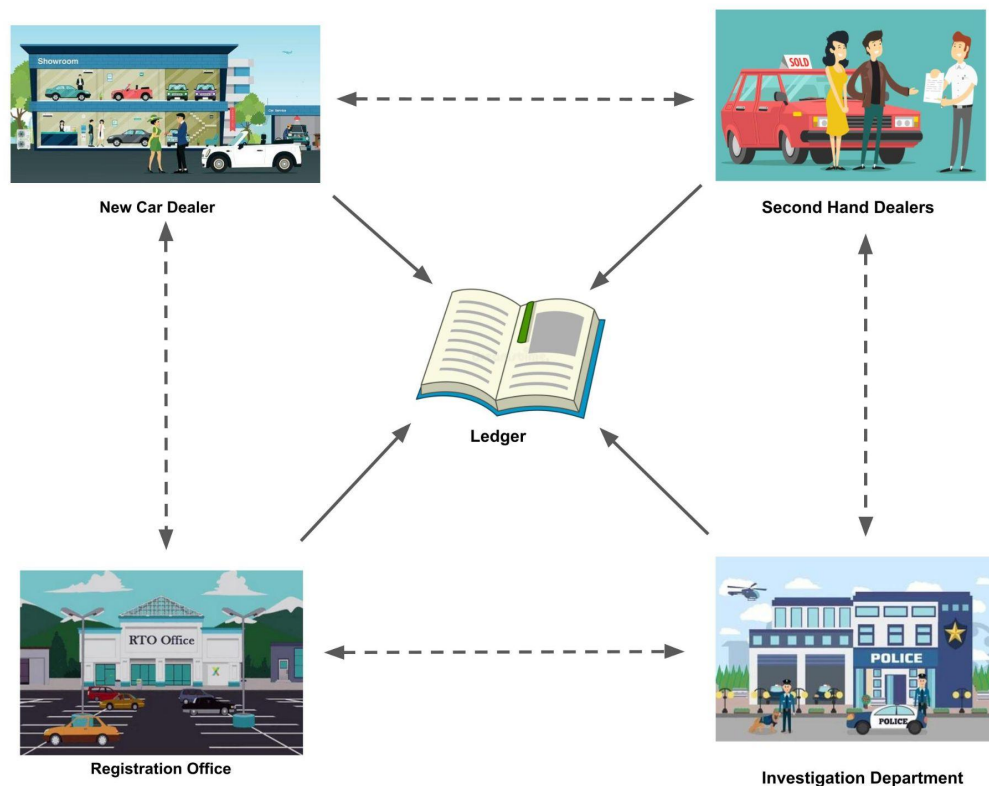
1. Track - We are unable to track the vehicle if it is stolen. The stealer has full freedom to sell the vehicle in the aftermarket by providing false information.
2. Transparency - Data regarding vehicles is not stored rather not tracked. In case of resale, the buyer wouldn't know the actual history of the owner, accidental details, parts damage, or whether the vehicle is maintained properly. As of today, everything is word of mouth and the buyer has no credible information to verify it.
3. Platform - A platform to block the theft vehicles in the aftermarket is not available today.

## METHODOLOGY

Vehicle Management system(VMS) implemented using Hyperledger Fabric. Initially, registration offices of the government, service centers of vehicle manufacturers, vehicle theft investigation departments, second-hand vehicle sellers should be registered in the blockchain network in order to communicate between them. The flow starts from here, when the vehicle is first sent for registration, the owner details and basic details about the vehicle are added into VMS by the registration office. MSP(Membership Service Provider) verifies the credentials of the registration office and the basic details about the vehicle are added into the ledger using smart contracts. In case of any accident/damage/service/inspection to the vehicle, the necessary details are recorded to

VMS by service centers. Service centers verify their credentials in the blockchain network and add the stamp of existing original vehicle data with their details. The reason for registration offices and service centers updating the ledgers is to help second-hand buyers during resale. The buyers are also registered into our blockchain network for credibility so that they have the ability to view the detailed record about the vehicle in VMS. Earlier, the information about vehicles was just word of mouth where buyers fall in a grey area. But now the buyer has a clear picture of the vehicle and the information is transparent across users.

### TransitChain



This blockchain network can serve as a backbone for an application which we are going to develop to sell second-hand vehicles. When the vehicle is stolen, the ledger is updated with the information and shared across to identities. Since VMS has all the data about the stolen vehicle, it is not eligible for resale. The aim of this application is to reduce the theft of vehicles that are immediately moved to resale in the aftermarkets.

## SmartContracts

Self-Executing smart contract contains the terms and condition which comes to an agreement between entities. Transactions are easily trackable and irreversible using smart contract.

### Features added:

- Register basic details about the vehicle such as owner, registration number, registered date and time, insurance, registration certificate details in the blockchain system.
- Audit of the service history & accident history of the vehicle
- Tracking the financial details about vehicles such as loans whether paid fully / unpaid
- Check the Fitness Certificate(FC) and insurance of vehicles.
- Organizing the complete vehicle information in a single entity.
- Check whether the vehicle is theft proven.
- Built-in a decentralized platform as no one can tamper with the data or change the data.
- We can easily eliminate the polluted /unfit vehicles making the environment carbon-free.
- We can share the data of vehicles to vendors/agents involved in resale like OLX/CARS24 platform. Since, the complete information about a vehicle is known by our system, one can easily track the second/third... hand car purchase in a clear picture and answer their questions When, Where, Whom
- Futuristic as all kinds of the vehicle including EV(Electric Vehicle) can be added in the scope
- Government can also earn money by sharing information about vehicles to trusted platforms like OLX/CARS24.

## TECHNOLOGY STACK

**Programming Language :** JavaScript, Typescript, Shell Script.

**Framework :** Angular 10, Nodejs, Hyperledger Fabric, Docker, Kubernetes.

**Monitoring :** Prometheus & Grafana

**Database :** MongoDB, Couch DB

**Cloud :** Azure

**Tools :** Github, Swagger, Postman.