A KEY SOLUTION TO VEHICLE PURCHASE PROCESS USING BLOCKCHAIN TECHNOLOGY

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Abstract

Much of everyday shopping such as groceries, clothes, household or vehicle involve human presence in the relavent department. Vehicle sale and purchase depends on dealer's reliability in terms of how precise or accurate the car fax report is. The emission report and vehicle's history of repair helps client in making the right decision regarding the purchase. The process of vehicle purchase, payment, getting it insurred and registered at DMV is a long and tedious work. We present a Blockchain technology based Smart Contractor solution, that will provide all this tedious work on behalf of a person. We present two step approach to the vehicle purchase process, converting the existing business flow of purchase process into Blockchain ledger and design a Smart Contractor.

Introduction

Blockchain is record keeping technology mainly used in crypto currency like "bitcoin". Blockchain technology is said to be the new internet. It is named after person or group of people called "Satoshi Nakamoto". It is also known as the creation of backbone for a new type of internet. It is a distributed and decentralized ledger that is public and follows both integrity and authenticity. It is set of blocks that has digital information stored in a chain fashion in a database. There are three main parts in a block: first part consists of information regarding transaction that includes time stamp and digital information that could be dollar amount in case of digital currency transaction or known fact in case of record keeping, second part includes the owner's information such as name and bank of transaction party in case of digital currency transaction or name of record holder in case of record transaction. But this information will be in the form of digital signature to protect Personally Identifiable Information (PII), third part consists of a hash that is calculated based on first two part's data and hash of previous block. This hash will be chained to the next block and so it becomes Blockchain.
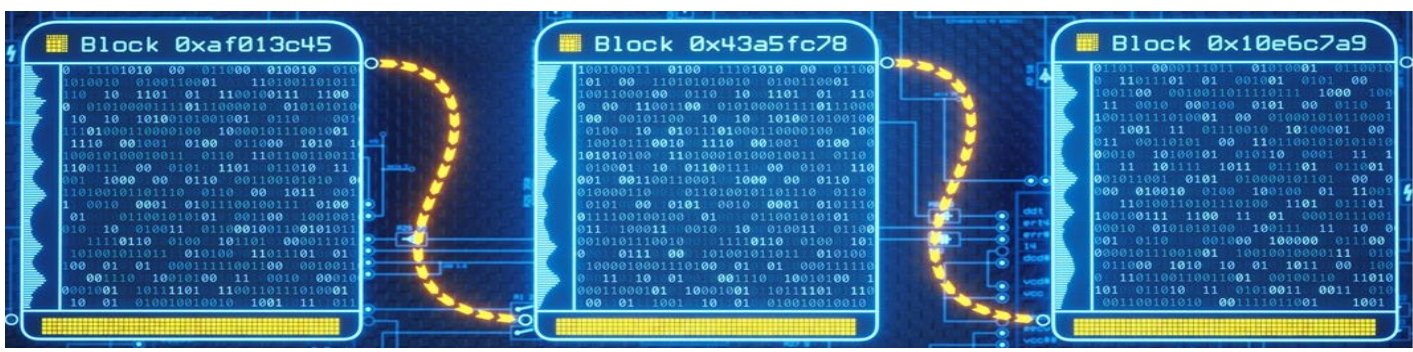

Blockchain technology has variety of applications such as banking, health, IoT and more to come. We present an application of Blockchain technology by bringing the process of vehicle purchase into the Blockchain technology. Our proposed approach will show the concept of Smart Contractor who will work as an agent and make the entire vehicle purchase process not only fast, smooth and easy. But it will ensure authenticity of documents and integrity of vehicle information such as "car fax" and "all previous purchase history". Further more all the transactions such as purchase of vehicle, insurrance and registration will be performed by Smart Contractor also. We will present two approaches, one will show the Blockchain ledger where vehicle information including price, car fax report and previous purhcase history is stored in distributed ledger across multiple nodes using Blockchain technology, second approach will show the Smart Contractor that will search a vehicle, verify the information such as emission, car fax report and previous history, getting it insurred and register it at DMV.
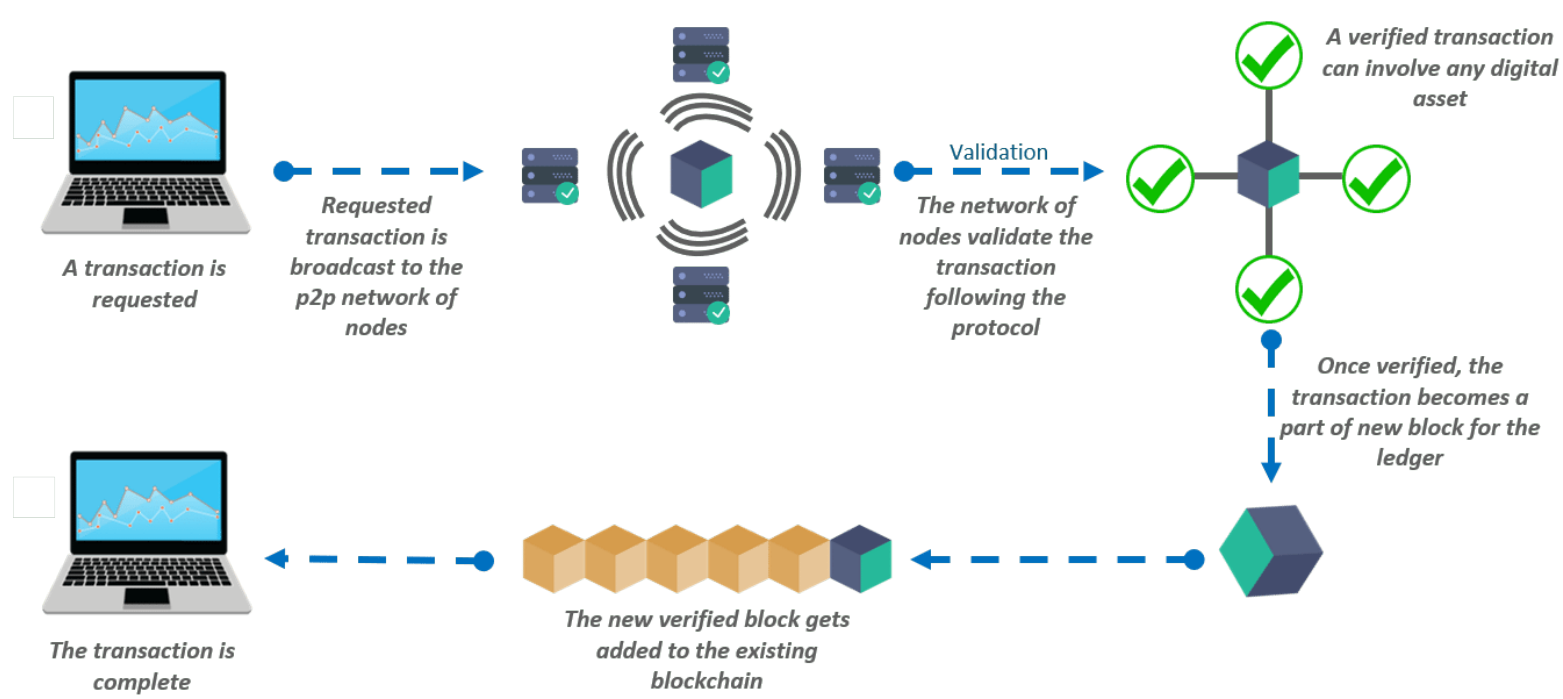

Approach

A. Blockchain Ledger

First we are proposing a benchmark for Blockchain ledger where all the DMV records will be stored in Blockchain as transactions. Vehicle's car fax and previous purchase history will be stored in Blockchain as transactions. DMV records of a person will include past history of vehicles as well as points history. This will ensure the appropriate insurance coverage when Smart Contractor gets the vehicle insured.
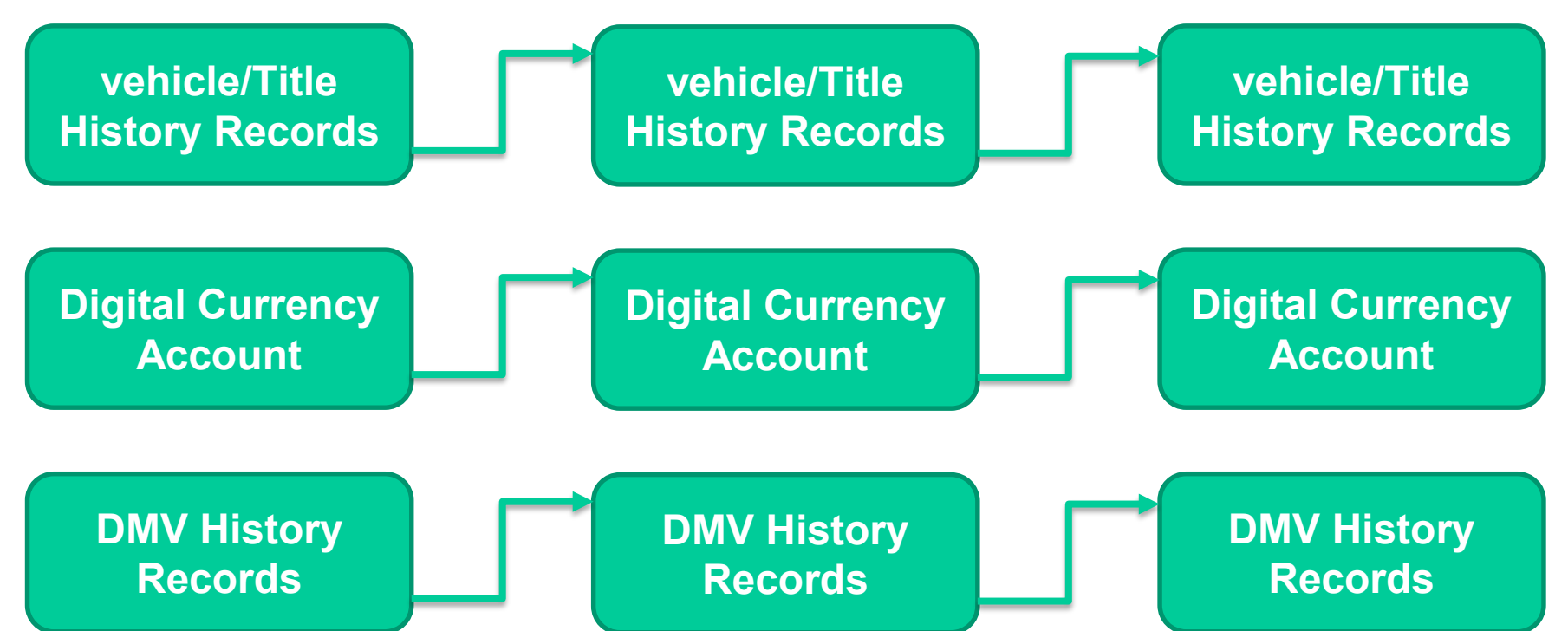

B. Smart Contractor

Second part of our approach is proposing a Smart Contractor. This works as an agent, which will search for vehicle of your interest. Once decided this will initiate the purchase process by first verifying the documents such as vehicle's car fax and previous purchase history, bargain or dealer's authenticity and credibility verification. Smart Contractor will further help the client in payment transaction that will use the digital currency account and will happen on the fly with out any bank trips or writing check involvement. Once the transaction is successful, the Smart Contractor will log that transaction in Blockchain for future ledger purposes. It will then go ahead and get the vehicle insurred upon client's preference and choice of insurance company. Again the transaction will be recoreded in Blockchain to update the ledger. Then the Smart Contractor will register the vehicle at DMV and will report to you in case of any hold on your record. Finally Smart Contractor will email/postal mail all the documents to you as well as update the ledger in Blockchain with a successful transaction by adding a new block with all the transactions during the vehicle purchase.
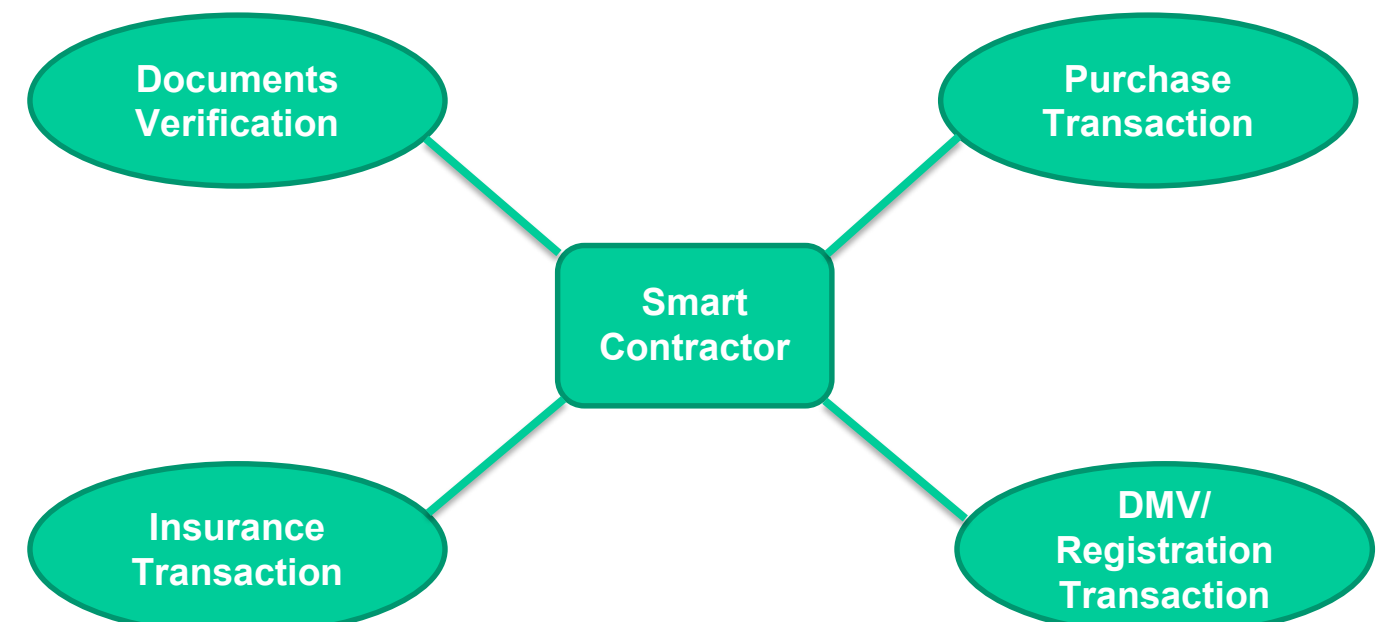
Motivation

Integrity and high availability are the main motive to this research. On the other hand successful transactions of Blockchain, using authenticity, where records and transactions are unalterable motivated us towards this research to come up with a key solution to vehicle purchase process. Blockchain and Smart Contractor, gives tremendous cost savings by avoiding in person and agent's involvement in the vehicle purchase process solution while keeping it transparent. Another major motivation is the multimode decentralized ledger. This ensures integrity and makes the transaction unalterable.
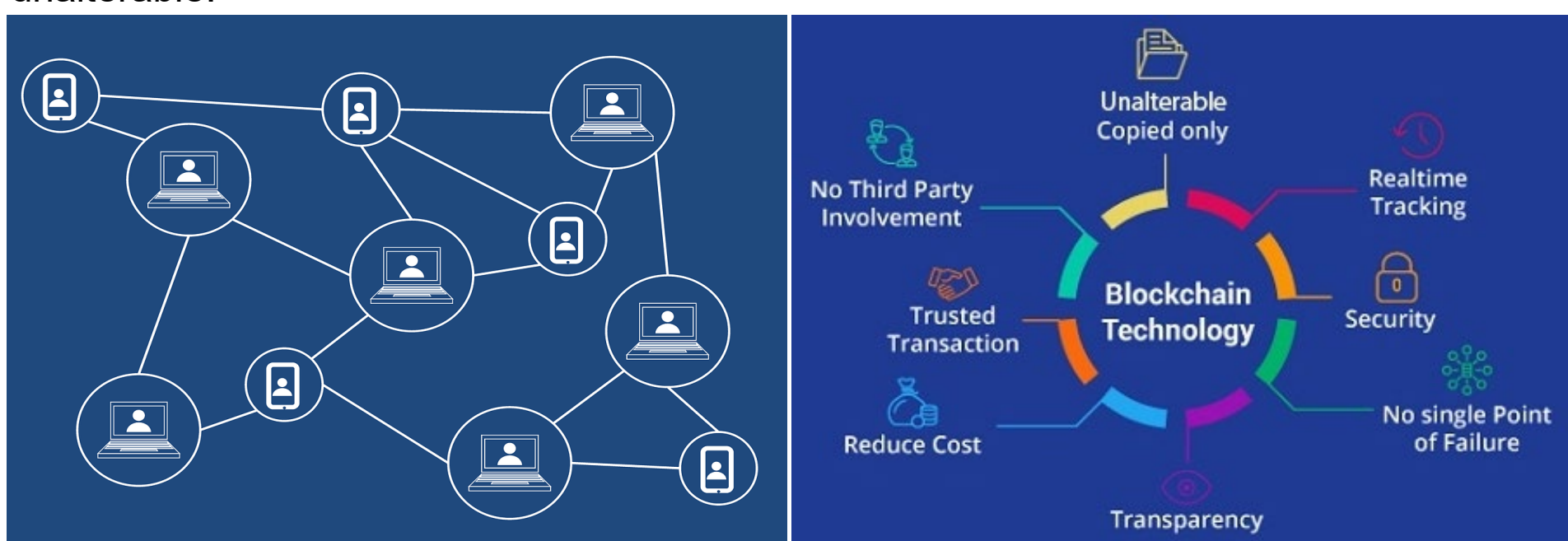
Conclusion/Future Work

The objective of this research to present a two step approach towards a smooth, reliable and secure vehicle purchase process. We discussed two approaches in this research, one to prepare the ledger in Blockchain that will hold records of vehicle's history of prevoius purchases and DMV. Another approach we discussed is the Smart Contractor designing. Which will work as an agent to perform all these necessary steps including documents verification, payment transaction, insurance and dmv registration. We can say this approach will ensure both the integrity and trustworthy transaction with minimum to zero risk of any kind of fraud such as money loss or documents forgery.

Future work includes, designing of Blockchain ledger where all these records can store successfully across multiple nodes as a decentralized ledger. Designing and programming of Smart Contractor and test the proposed approach by performing tests of multiple vehicle purchase in both simulations and real time. Enhance the security of both ledger and Smart Contractor by designing and testing the protocol for storing data in blocks as well as Smart Contractor transaction procedure. Such desgin needs to be tested in simulation using any programming language and once successful, compare the results with real time transaction for accuracy and robustness check.