

A man in a dark blue pinstriped suit, white shirt, and purple tie is leaning over a white car. He is looking down at a silver laptop that is open on the car's surface. The background is a blurred cityscape with blue buildings and green trees.

Smart Cities, Car Rentals and Blockchain

The Car Rental business has existed for decades. The basic workflow essentially involves a customer reserving or booking a car through a channel such as the Web or telephone, and taking temporary possession of the allotted car from the designated pick-up location, at the chosen date and time. The rental management process ties together various activities comprising car inspection reports, selling an insurance policy for the rental duration, as well as contract management between the owner and the customer. The entire process, while familiar to most, has inherent operational inefficiencies built in due to the nature of activities. For instance, speeding violations during the car rental period involve multiple agencies cooperating with each other and can take weeks to close. New-age technologies like Blockchain can help reduce the process time and increase the efficiency in the entire value chain.

Operational Inefficiencies

The entire process, as followed currently, has inherent inefficiencies built in due to the nature of activities. Some examples are given below.

- **Contract issuance:** Paperwork involved in pre-delivery and post-return car inspections, temporary transfer of ownership, insurance, all delay the rental process
- **Information sharing:** Information sharing between the rental company, insurer, traffic system, road transport authorities, can get delayed
- **Penalty tracking:** Speeding or parking violations, insurance contract violations during the rental period require the paper trail to be followed, which can delay the entire settlement process significantly

Proposed Solution

Here's how blockchain can help in the entire value chain:

1. Increase process efficiency: Blockchain allows information sharing transparently through consensus – seamlessly, efficiently and in real-time. Because this information cannot be repudiated, the overall trust in the system is high, leading to increased process efficiency.
2. Timestamped audit trail: Blockchain does not store the transaction data but instead a timestamped hash of carefully curated transaction data. This can enable a complete audit trail of transactions that are timestamped and cryptographically secured.
3. Realize cost savings: Blockchain can reduce manual efforts and increase automation using smart contracts

Various Government and Private Agencies in the smart city form a consortium using a permissioned Blockchain network. Since all parties can verify by consensus, what goes into the system, and have access to the same immutable information, the trust factor in the setup is extremely high.

In a smart city, government agencies typically install and support a mechanism for procuring real-time data from various sources across the entire city. Here, it is assumed that the rental car, the relevant city infrastructure comprising traffic monitoring systems, parking meters, toll gates, etc. support RFID data exchange.

Using current Blockchain technologies, it is possible to build segregation between general information meant for consumption by all participants and data that needs to be exchanged only between two entities. For instance, the agency operating parking meters may not access a renter's insurance policy details.

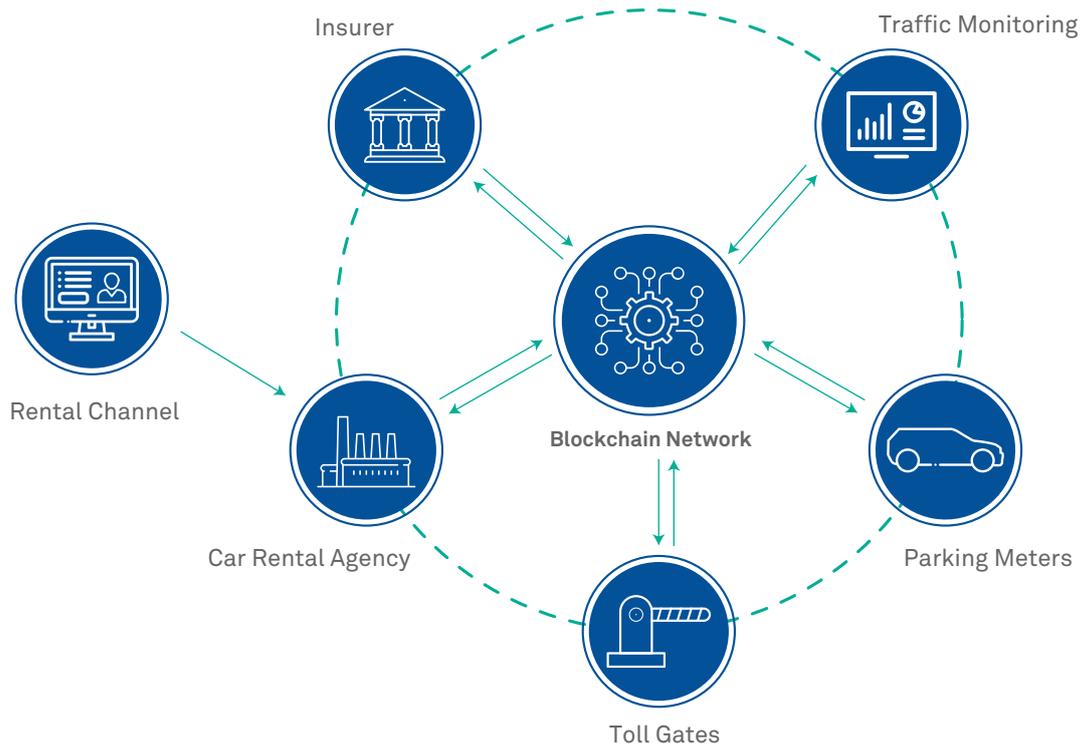


Figure 1: Blockchain Consortium of Government & Private Agencies

Basic Process Flow



Using the rental channel, a customer makes a booking for a car, specifying the date, time, rental duration and the car pick-up and drop-off points



On the day and time of the booking, the customer inspects the car, examines the insurance policy and commences their rental. The system is built such that these transactions are captured in real-time; the system associates the customer with the car in the back-end.



The customer drives around the smart city. Since the car is RFID-enabled, the traffic monitoring system is able to detect over-speeding; parking meters are able to capture the duration for which the car was parked; tollgates

are able to record entry and exit points and compute applicable toll charges. All of this information is relayed to members of the blockchain network in real-time.



The blockchain records only the metadata of information it receives; it relays the transactional data along with the block ID to the owning agency. For instance, after recording that a speeding violation occurred, the blockchain relays the actual violation data to the Traffic Monitoring system along with the corresponding block ID.



Once the customer returns the car, the system calculates the dues from the information available in the blockchain network and charges the customer accordingly.

Benefits



Conclusions

Because all consortium members have access to the same data, agree to use an established consensus mechanism within the blockchain and are able to access specific private data intended only for the transaction participants, the trust factor in the system is very high.

Stringent laws govern data sharing and the solution must adhere to applicable regulations. After addressing these needs, the entire setup allows data sharing seamlessly in real-time. Thus, using blockchain can significantly increase the efficiency in the entire value chain.



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