

Blockchain Xdev

Automobile consortium - Connected Car Passport

Blockchain based car passport providing trust on vehicle life cycle data.

Blockchain Xdev

Information Technology and Services

Boulogne-Billancourt, Ile-de-France

1. Project summary

Name of company : Consortium of companies in the automobile industry & insurance - including PSA, Mobivia, COVEA (MAAF, MMA, GMF), Matmut, Crédit Agricole Pacifica, Inter Mutuel Assistance..

Sector : Automobile / Transport / Insurance

Project Period : 2017 - 2019

Mission of the project (1-2 sentences) :

The objective of this mission is to demonstrate how a blockchain based solution can help collaboration within the automobile ecosystem to provide end-users with a easy-to-use digital passport that securely tracks and certifies all data relative to the vehicle (mileage data, maintenance events, resales, etc.). This electronic passport will be used by all service providers and stakeholders as a reliable source of information to build more personalized added value services.

Final Result (in bullet points - 3 max) :

Blockchain Xdev published a white paper and defined the road map to lead the consortium.

The solutions brings value to all stakeholders in the ecosystem :

- Car owners can access an easy to use application to visualize and grant access to all data relative to their vehicle ;
- Buyers and sellers on the second-hand market can rely on certified information to correctly price the vehicle ;
- Service providers can develop customized value-added services thanks to a data marketplace powered by token economics to allow a secure, self-sovereign and rewarding sharing of data between stakeholders.

Xdev technologies : Business Partners Platform

BC technologies : Hyperledger Fabric

Maturity Level : White Paper and Minimum Viable Product

2. Project details

Project Description (3-4 sentences)

The objective of this mission is to demonstrate how a blockchain based solution can help collaboration within the automobile ecosystem to provide end-users with a easy-to-use digital passport that securely tracks and certifies all data relative to the vehicle (mileage data, maintenance events, resales, etc.). This electronic passport will be used by all service providers and stakeholders as a reliable source of information to build more personalized added value services.

We have demonstrated that this solution not only allows to bring more health to existing markets - for example by ensuring the reliability of the residual value of the car on the second-hand market - but it also opens up to new opportunities by building the grounds for a large, secure, and fair market data platform. Information that was previously collected individually in siloes by each market participant, can now be shared in a collaborative approach, allowing to build new services such as pay-as-you-go insurance solutions, or predictive maintenance offers.

The blockchain architecture ensures the security and sovereignty of the data collected, and allows an efficient and fair re-distribution of the value created using tokens.

Context (1-2 paragraph)

In 2018, more than 15% of vehicles circulating in Europe were subject to odometer frauds. This impacts the entire automobile industry negatively. On the second-hand market for example, car re-sellers suffer from price devaluation and car buyers incur higher risk due to this lack of trust. Insurance companies face the same problem to evaluate the risks of breakdowns, and repair agents do not have the correct information to work efficiently.

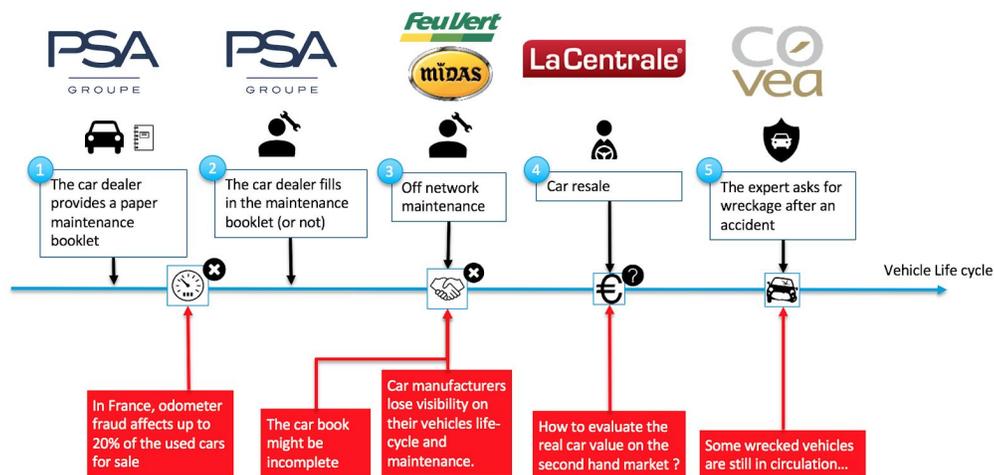
Another example of vehicles fraud that has great economic and societal impacts concerns the rolling wrecks, i.e. vehicles that experienced severe damages and that have been declared as wrecks by an insurance expert, and hence that are no longer allowed to go on the roads. Nevertheless, some wreck vehicles are put back onto the second-hand car market, with the help of corrupt professionals. These rolling wrecks are often the cause of severe accidents, involving injured people, and costing insurance companies and consumers a lot of money.

The lack of reliability and traceability on the vehicle life cycle data also hinders all service providers in the development of new services such as predictive maintenance or personalized insurance. Today's world is a world of data. As the information gets digitized, its use is multiplied across several distinct information systems that take it as a reference to provide value-added services. This directly implies a growing need to reconcile its value in a manner that can be trusted by all the involved stakeholders (i.e. consumers, producers, service providers).

Pain points

The current car log book suffers from the following main weaknesses (c.f. Figure 1):

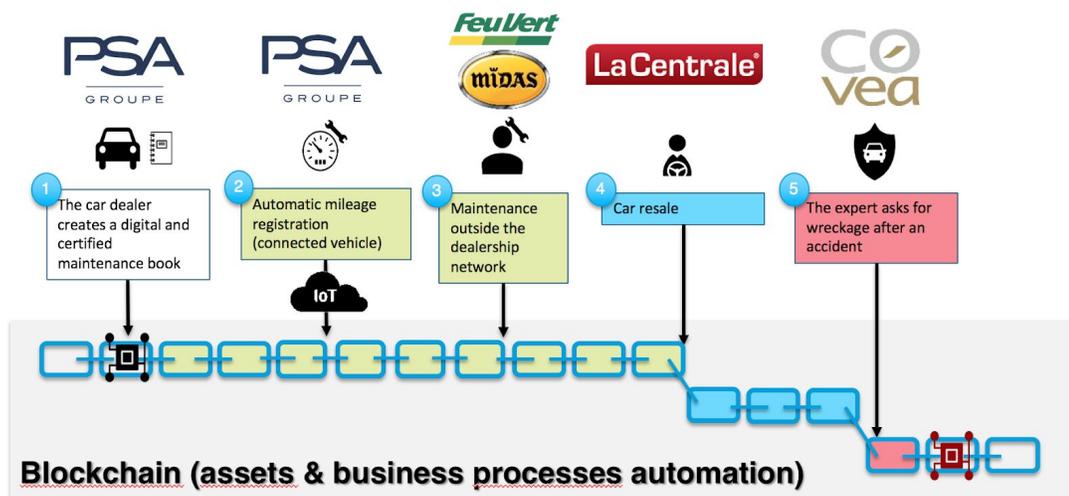
1. Information contained in log books is not digitized
2. Lack of trust on mileages provided by odometers of cars on the second-hand market
3. Lack of trust on the history of the interventions on cars when re-selling
4. The car manufacturer has no visibility on the interventions of independent car repair shops
5. Car log book information is not shared with insurers or other service providers
6. Some cars declared as wreckage can go back on the road



Solution

We strive for a system that manages cars life-cycles over secured car log books shared within a consortium Blockchain (c.f. Figure 2):

1. Car log book sharing: car log books information is secured and can be shared among the consortium composed of the stakeholders such as the car manufacturer, the insurer and other service providers.
2. Shared car life-cycle management: mileage information is pushed automatically by the connected cars to the car log books, preventing odometer fraud. Interventions at car repair shops, even outside the car manufacturer group, can be stored in car log books. Insurance processes for declaring incidents and wreckage are handled within the same system that is shared among the consortium.
3. New services: the consortium that is backing the system can grow by integrating new service providers such as data archiving, data marketplace, new insurance policies based on the shared information etc.



Achievements

Several technical obstacles have been addressed in this project :

- **Network incentives:** Effective collaboration relies on alignment of interest and well designed incentive schemes. We have proposed a dual token economy in order to both incentivize data sharing amongst the stakeholders (through the use of a PCC_token) and enforce fair governance and repartition of costs and benefits amongst the consortium members (through the use of a PCC-Gold token). Both tokens are stables coins pegged to the euro.
- **Oracle:** The system is based on manual input of data into the shared ledger by different members of the ecosystem. Having different sources of information can generate mistrust in the data of the system. If we limit inputs to the most reliable sources of information (Connected cars, experts), we will lose valuable inputs from other sources (external service providers, car owner). In order to maximize data collection, and hence optimize data valuation, we have introduced the notion of quality index attached to each source. All events and measures recorded in the blockchain will always be associated to this quality index.
- **Confidentiality / Dynamic Access Control:** information on a Blockchain is shared and accessible among all its participants. However, some critical data fields are not meant to be shared with all the members. Moreover, these accesses have to be updatable. We have proposed a new on-chain protocol based on cryptography to implement dynamic access control.
- **RGPD compliance:** private information such as the vehicle identification number (i.e. VIN) or the car owner's identity cannot be stored on the Blockchain according to the CNIL (i.e. the chair of French data protection authority). We have hence developed a protocol to match on-chain and off-chain data.
- **Performance / Data market performance:** In order to increase performance of the queries within the data marketplace, we have build the data pipeline using a Lambda architecture, designed to handle massive quantities of data by taking advantage of both batch and stream-processing methods.

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- **Interoperability / Integration** with existing information system: the system has to interact with the IT systems of PSA as well as that of all the other consortium members; in order to retrieve information such as mileages for example.

Results

We have demonstrated that this solution not only allows to bring more health to existing markets - for example by ensuring the reliability of the residual value of the car on the second-hand market - but it also opens up to new opportunities by building the grounds for a large, secure, and fair market data platform. Information that was previously collected individually in siloes by each market participant, can now be shared in a collaborative approach, allowing to build new services such as pay-as-you-go insurance solutions, or predictive maintenance offers. The blockchain architecture ensures the security and sovereignty of the data collected, and allows an efficient and fair re-distribution of the value created using tokens.

After a successful Proof of Concept, we are now officially building the founding members consortium in order to launch a Minimum Viable Product by Q1 2020. Our work has lead to the publication of a white-paper.

Publications

This project led to the publication of several scientific papers:

- Brousmiche, K-L., A. Durand, T. Heno, C. Poulain, A. Dalmieres and E. Ben-Hamida.
“Hybrid Cryptographic Protocol for Secure Vehicle Data Sharing over a Consortium Blockchain”
IEEE Blockchain, Halifax, 2018.
- Brousmiche, K-L., T. Heno, C. Poulain, A. Dalmieres and E. Ben-Hamida.
“Digitizing, Securing and Sharing Vehicles Life-cycle Over a Consortium Blockchain: Lessons Learned”
IFIP International Conference on New Technologies, Mobility and Security, NTMS, Paris, 2018.