



White Paper v 0.8



# VINchain

**DECENTRALIZED      VEHICLE  
HISTORY**

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February 9<sup>th</sup>, 2018



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# The Problem

The problem is captured and explained by Nobel prize winning economist George Akerlof in his 1970 paper, "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism". In the paper he describes the mechanics of markets where one party (the sellers) know significantly more about the product than the other party (the buyers). This is also known as "markets with asymmetric information".

The used car market is an example of this. When selling a car, the seller typically knows significantly more about the vehicle than the buyer. This is a problem for the buyer as it opens them up to potential fraud. To hedge against the risk of buying a so-called 'bad' car, they reduce the price they're willing to pay for the vehicle. This could lead to the entire used car market to disappear.

## Here's how it happens:

- A buyer cannot fully distinguish a good car from a bad one, so they lower the amount they are willing to pay for the vehicle to compensate for possible unknown risks. This reduces the average price of the vehicle.

- This leads to higher priced 'good' cars to leave the market, deteriorating the overall quality of the secondary market.
- The repercussion is a further reduction in price of available vehicles. As a result, 'medium' quality cars are also pushed out of the market.
- If the cycle continues the quality of available cars will continue to deteriorate until the buyers pull out of the market completely. This is due to the perception that all second-hand vehicles are of poor quality.
- As a result, this will lead to the complete disappearance of the market, and can only be stopped by introducing more symmetrical information. This is the nature of markets with asymmetric information.

## The Solution: VINchain

A survey conducted among market participants indicated a need for access to reliable, secure, and transparent historic operational vehicle data.

The VINchain project fills this need and solves the problem of asymmetrical information in the used car market by creating a decentralized, immutable, transparent, secure, and reliable vehicle lifecycle repository.

VINchain is a decentralized blockchain database that records all relevant information pertaining to vehicles. For each vehicle, a blockchain passport is issued which will be stored in a distributed registry. VINchain is also capable of producing reports that can be ordered immediately by buyers, sellers, and other market participants.

Information about the vehicle is accumulated in the databases of all system participants (manufacturers, insurance companies, service stations, banks and leasing companies, dealers, etc.) during the entire period of its use.

The blockchain-passport of the vehicle is connected to the vehicle identification number (VIN) and placed in the VINchain blockchain system.

This information is transparent and accessible to everyone with access to the system.

To protect the accuracy of information, the blockchain technology and data hashing through the SHA-256 cryptographic algorithm (sha 2 family) is used. This guarantees reliability and security of data.

Every day hundreds of thousands of used cars are sold around the world, and each buyer wants reliable information about the technical condition of the car. This is an important safety, security, and financial issue.

Unfortunately, there is no single database of vehicles. Though there are commercial databases, they do not solve this problem as their information is stored centrally and there is a risk of inaccuracy. Commercial databases are closed and do not exchange information. As a result, the buyer of the car risks their own safety and financial loss.

The VINchain project plans to attract international consulting agencies to the system audit, which will produce a detailed report of the reliability of the information provided by VINchain.

The mechanics of the VINchain system work as follows:

- A request for data is received
- The entire chain is searched for relevant data
- Reports are created and provided in a structured form
- Members of the relevant registry receives a fee for providing information

Buyers and sellers of used vehicles will both benefit from the removal of information asymmetry on the used car market. Knowing all of the information available on a given vehicle will create trust in the process and the buyer will potentially be willing to pay more. For the seller, disclosing the

complete history of the vehicle may increase the value of the car at the time of sale.

If buyers know the full operational history of the vehicle, they have a guarantee that the vehicle retains a certain level of value. The same cannot be said about a vehicle with no report.

This concept can be demonstrated with the following example: A buyer has to choose between two identical vehicles: one with a full operational history report, and one without. In this scenario, the buyer is likely to choose the vehicle with the full operational report over the other even in cases that the report indicates past damage and/or repairs. This is due to the report providing an accurate reflection of the vehicle's history.

Every market participant has the right to know the true history of a vehicle being sold. The VINchain project will fill this niche to the benefit of all.

In the future, this technology can be scaled to segments of the fixed asset market such as yachts, construction machinery and real estate.

# Project Goals

Change the global market of used cars by making it honest, transparent, reliable, with equal access to information for each participant.

# Project Objectives

- 1** Create a block with different levels of access and information protection. Data security access level should meet the needs of government agencies.
- 2** Unite participants in the automotive industry, such as manufacturers, insurance companies, dealers, service stations, and developers of navigation systems into a single ecosystem for data exchange purposes.
- 3** Create an infrastructure and provide direct access to the database for each market participant.

# VINchain Team

Everyone in our team is an expert in their respective roles, with extensive experience in the automotive industry. Each of us is capable of achieving our stated goals.



## Alex Miles

Alex Miles is a technology enthusiast and blockchain expert who graduated with honors from Florida International University – a top ten business school – while studying management information systems. He was hired at [ABetterBid Car Auctions LLC](#), where he quickly rose through the ranks to the Head of Business Development role. He quickly gathered achievements by leading a team of skilled specialists executing content strategy, expanding operations globally and implementing Bitcoin purchasing. After garnering experience with the blockchain, he became an evangelist of the technology and its applications. His passion for its potential led to the idea of applying the blockchain to solve problems in automobile purchasing, based on what he had studied extensively at ABetterBid. He is disrupting the automobile market and making roads safer for all by launching transparent vehicle history built

on the blockchain. Alex now aims to evolve the auto industry and cryptocurrency space as Chief Executive Officer of the Miami-based company, [VINchain](#).



### **Stacy Denver**

Increased monthly sales by 150% in 2012-2013 as the Head of Sales at ABetterBid Car Auctions LLC.



### **Alexey Listopad**

Project marketing and design specialist. Brought nine huge projects to the US market as the Head of Marketing at A Better Bid Car Auctions LLC. Created 'Logistic Club' when he was 19 years old.



### **Andrey Krainik**

The founder of EasyExport.us, an Inc. 500 top 10 company with an annual turnover of more than \$45 million.



### **Jurgis Plikaitis**

Expert in online US vehicle auctions. Serial entrepreneur. \$500 million total turnover of established companies.



### **Sergei Shostyr**

More than 10 years' experience in the field of design and creating efficient and effective user experience flows. Over 1000 completed projects.



### **Anastasiya Kazakova**

Graduated from BSU in the summer of 2017. As a student worked on the development and promotion of startup projects in the US.



### **Gordon Hansen**

Gained significant marketing experience at Epicurex LLC company, where he became VP of sales in 2014.



### **Antonina Binetskaya**

Oversees daily operations for the business unit, coordinates the development of key performance goals and direct reports. Experienced in business process analysis, business process improvements, risk management, project and program management, as well as SCRUM / Agile.



## **Pavel Yeschenko**

Software engineer with more than 5 years of well-rounded experience. Skilled in facilitating and managing teams. Able to provide customized, client-driven solutions that improve operations and processes, enhancing business productivity and profitability. Adept at data structuring, problem solving, and end-to-end coding.



## **Michael Zhalevich**

Created tournament management systems for online gaming platforms, and integrated systems into games. Implemented various performance optimizations. Created and implemented a process for releases with zero downtime. Integrated with many internal services. Developed various projects on the Magento platform, handled integration with external APIs and payments systems, and optimized for high performance.



### Alexandr Onyskiv

Over 10 years of overall experience in IT fields, analysis, design and development in both Java-based and Ruby-based web and enterprise applications.



### Vladislav Vasilchuk

System analyst with 11 years of experience in engineering and business processes automation. Accumulated experience from integrating more than 15 IT systems as Project Manager.



### Eugene Koval

Project Manager with 6 years' experience in the development and integration of software, including transportation management software, warehouse management software, enterprise resource planning software, cross-platform integration, database integration, and web & mobile application development.



### Ivan Usovich

An expert in implementing cutting-edge technologies and solutions, full-stack developer with many years' experience as a team lead.



## Ethan Clark

Over years of experience creating and executing search engine optimization (SEO) strategy in automotive, blockchain, and construction industry fields in the USA.



## Sergei Pakhomov

Extensive experience managing databases with 338+ million record entries. Currently managing a team of nine.

# VINchain Advisors



## **Matt Carpenter**

Serves as Chief Financial Officer of Audi of America and Audi Canada. Matt has a breadth of experience managing in the automotive industry. He started his career path with Ford Motor Company in Michigan where he worked for 5 years as a Zone Manager. In 2007 he began his journey with Audi of America as a Business Management Consultant at Pied Piper Management Company LLC. In 2007 he started to work directly for Audi of America. He began as a Vehicle Merchandising Manager before in 2011 receiving a promotion to General Manager of Vehicle Sales. Due to his outstanding work, in 2016 Matt was awarded the position of Chief Financial Officer of Audi of America and Audi Canada.



## **Mark Taylor**

Currently works at PureCars where he is responsible for acquiring and managing strategic partnerships with automotive manufacturers (OEMs). Prior to PureCars, Mark spent over 15 years with AutoNation, the largest Automotive Retailer in the US. He carried out P&L

responsibility for a budget of roughly \$35M annually that drove top line revenues in excess of \$3 Billion per annum.



### **Konstantine Perzhukou**

A Software Implementation Advisor with more than 7 years of well-rounded experience, Konstantine oversaw 25 successful projects in enterprise software development and implementation.



### **Roger Crook**

An entrepreneur, disruptor and independent strategic advisor in FinTech, LogisticsTech and Logistics including blockchain/cryptocurrencies. He was formerly a Member of the Board of Management, Deutsche Post AG (DeutschePost DHL a Dax 30 listed company) and Global Chief Executive Officer, DHL Global Forwarding & Road Freight Division from 2011 until 2015. The division had revenues of around €15 billion, with approximately 45,000 employees while operating in over 200 countries and territories. Roger has extensive business experience in China where he's conducted business throughout the last 25 years.



## Hillik Nissani

A seasoned senior executive and advisor with a proven track record of over 25 years across five continents in growing B2B and B2C companies. He is a growth expert and serves as a board and advisory board member in several EU and Israeli high-tech and blockchain companies (such as STOX.com), advising on strategy, marketing, operations and human capital management. His abundant working experience includes serving as Vice President managing 888.com's high liquidity business unit with revenues of close to \$100M, and functioning as easy-forex Chief Marketing Officer where he managed sales and marketing budgets of tens of millions annually.



## Ryan Scott

An entrepreneur, social impact investor, humanist, philanthropist and online marketing pioneer, legendary for developing and patenting the double opt-in email methodology. After selling NetCreations in 2001 for \$111 million, he became an angel investor alongside Sequoia Capital, Mark Cuban, News Corp, CBS Corporation, Elon Musk, and Burda Media, in a number of companies such as Inside, Tesla, CrowdFunder, Tiltify, Lottery.com, Earth Class Mail, Principle Power, Signum Biosciences, Greener World

Media, Sierra Nevada Solar, and Cool Earth Solar. Ryan's most significant personal investment since 2011 has been Causecast, the world's most innovative workplace giving, volunteering and social impact platform. His vision is to create a world in which corporations compete with each other to create the most positive social impact.



### **Richard Patterson**

Serial entrepreneur & innovator with more than 35 years' experience of founding, managing and growing successful businesses. He has designed, negotiated and sold multi-million dollar deals to major organizations across the globe for over 19 years. Responsible for the innovation of key technologies and market positions that lead to millions of dollars of revenues and dominant niche market positions for Sun Microsystems, Apple Computer Inc. & Dell.

# How It Works

When requested, the information corresponding to the specific VIN number will be searched, selected, and pulled into a report in the blockchain. Each record will have information about data provider, date, VIN and use of the car.

## Basic Usage and Client Economics

VINchain intends to implement a token to smooth the processing of car information queries on the VINchain system. An end-user will pay VIN tokens in exchange for all information related to a VIN number that is available on-chain. The information queries are designed to rely on extremely simple token economics for the client-facing aspects of the payment system.

In order to have a successful token system it is necessary to leverage simple economics. Widespread adoption of any system comes most easily when the process is simple enough for end-users to easily understand and trust it. For a user that wishes to retrieve information from the VINchain system, the transactional costs will always be in VIN tokens. In addition, it is a long-term goal of the project to leverage the economic control of having a usage coin in order to reach a stable token price relative to traditional state-backed currencies. Market volatility should be linked to the fluctuation of car history data and not speculation. The VINchain token will primarily be a usage or

utility token leveraged to create a stable transaction rate, and to allow fluid fee payments and profit distributions for all information providers.

Unlike traditional vehicle history options, it will be possible for certified mechanics and other participants in the chain of control to submit car information that would previously have been overlooked due to lack of insurance reporting. As more information providers are verified, VINchain will allow for more widely crowdsourced information on vehicle histories.

## Information Provider Economics

When a user exchanges a token for information on a vehicle, all active participants in the network are compensated with part of the token. Initially token allocation will primarily be linked to events. An event is anything specific that has happened to a vehicle. Events include things like change of ownership and accidents. Every time a user is provided with information on a vehicle they are given the option to indicate whether the information is useful. We believe that a binary decision on value or utility allows for a more user-friendly experience, while generating even more data.

Long-term algorithms will be designed to find similarities in useful information in order to accurately determine fee allocation for information providers. To achieve this, a modular oracle element needs to be established off chain to report on the value of an event at any time. As previously stated this will

initially value all events equally until a large enough store of data has been established and an effective algorithm has been determined.

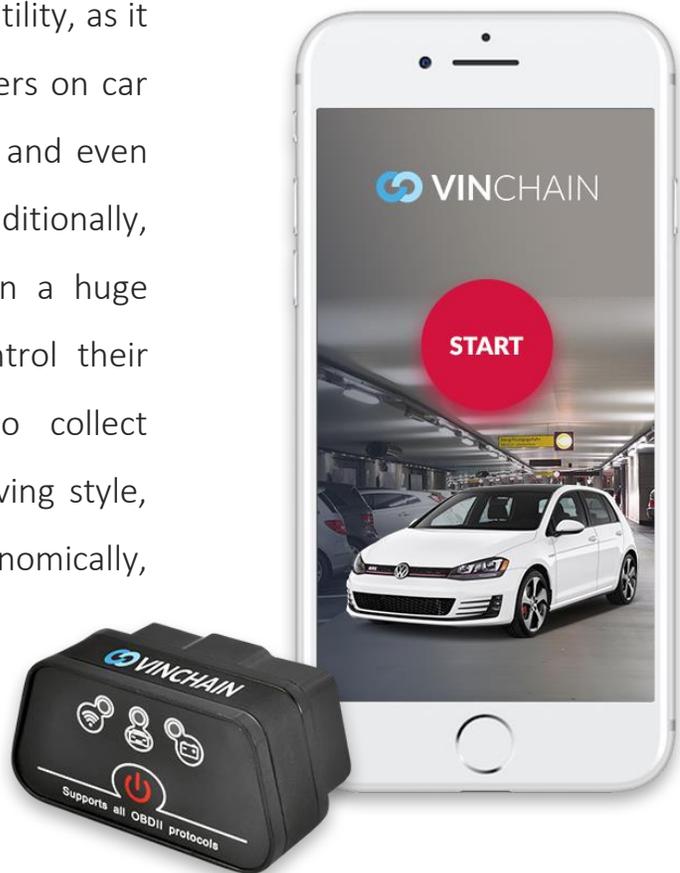
Once events are weighted dynamically using an algorithm that determines their usefulness, individual information providers will be compensated proportionally to the value of information they. Until then, a similar proportion will be used for all events. Only the first provider will be compensated.

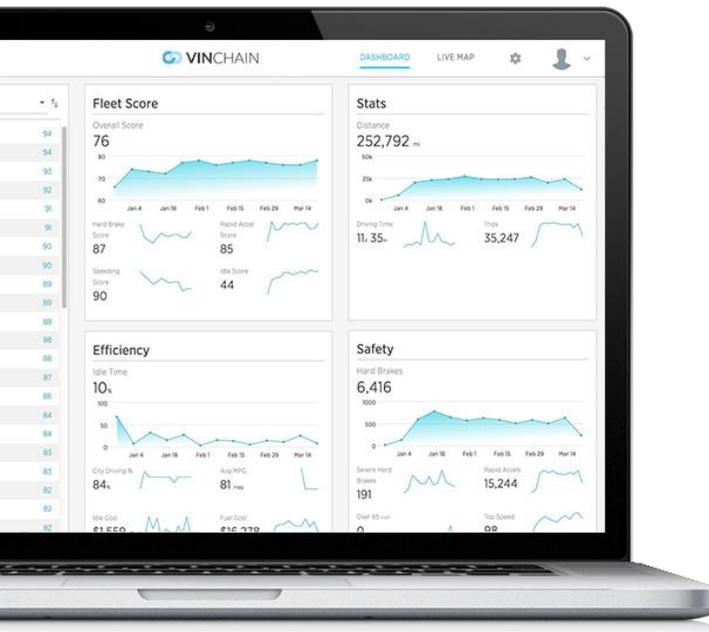
An additional transaction fee will be levied for each information query.

# VINchain App

During the process of development, a **mobile application and website** will be created for dealers, insurance companies, and manufacturers, in addition to a **flexible API**.

**The application** will have extensive utility, as it will provide users with the best offers on car maintenance, discounts on service, and even assist in refueling and washing. Additionally, the app will help find a vehicle in a huge parking lot, or even remotely control their vehicle! The application will also collect statistics pertaining to personal driving style, tell the user how to drive more economically, and offer discounts on insurance premiums! Keeping all of this collected information on the blockchain will confirm its reliability and allow owners to increase the value of their car at the time of sale!





The website will be a portal for companies to create an ideal marketplace that will contain all relevant information pertaining to any vehicle, including usage statistics and history reports. The site will also give users the ability to interact with all of the participants of the VINchain ecosystem.

By having access to this information, contractors will be able to send customers only those offers that are relevant and genuinely interesting to them. Dealers will be able to better analyze vehicles they are considering to acquire, with access to full, genuine, verifiable history reports. Because users are prompted by maintenance reminders, the system will also increase the amount of vehicle maintenance service requests.

### These tools will enable you to do the following:

- 1 Use a wide range of opportunities to analyze consumer data and behavior in order to leverage sales activities, get comprehensive customer satisfaction reports, engage new customers, and improve the loyalty of existing ones.
- 2 Get predictive data of the next dealer visit in order to raise the effectiveness of timing of the vehicle service proposal.

- 3 Drive the content in the application to improve consumer communication and increase spare parts sales.

## Control of Information Transmitted by Users

In order to create a system with full transparency users (vehicle drivers) will be able to control the following:

- Determine the category of information they share
- Adjust the frequency at which the information is collected
- Choose which offers and discounts are interesting and relevant to them and their needs



## Functions of the Mobile Application for Users

- **Earn Tokens**

Users will earn tokens through normal, everyday use of their car. Received tokens can be exchanged for discounts and used to pay for services. Excessive tokens can be sold on an exchange.

- **Remotely control of vehicle**

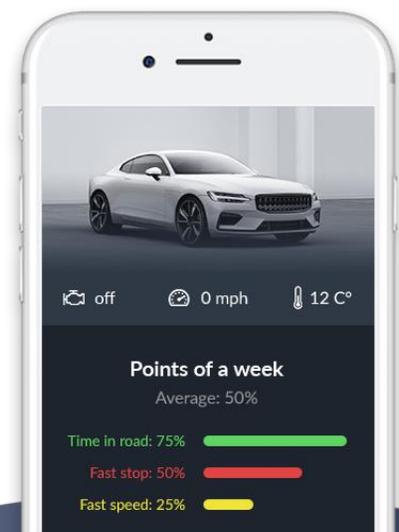
The application allows users to remotely control their car. The remote function will feature functions such as remote engine start, opening and closing of doors, and triggering burglar alarms.

- **Geolocation services**

In order to provide an all-inclusive application, navigation will be included into the app.

- **Driving style analysis and statistics**

Never before has the information about a user's driving style been used to save them money! By analyzing driving style and preferences, the app will allow us to offer you a wealth of benefits, including cheaper insurance options, discounted car repair shops, and more!



- **Roadside assistance**

If a user has been in an accident, or their car has broken down, the application will suggest nearby vehicle towing services that accept VINchain tokens as a form of payment.

- **Car diagnostics**

Each time the user enters their car they will receive a report on the working condition of all the systems of the vehicle, in order to reassure the user that everything is ready for safe travel.

- **Reminders about upcoming service**

The app automatically reminds the user when it is time for their vehicle's next service. If the user registers in advance, they will be eligible to receive discounts from our partners!

- **Register for and analyze dealer services, prices, locations, and discounts**

When registering for a dealer's service the user will be able to analyze the offers of all nearby dealers, then select the best price and location!

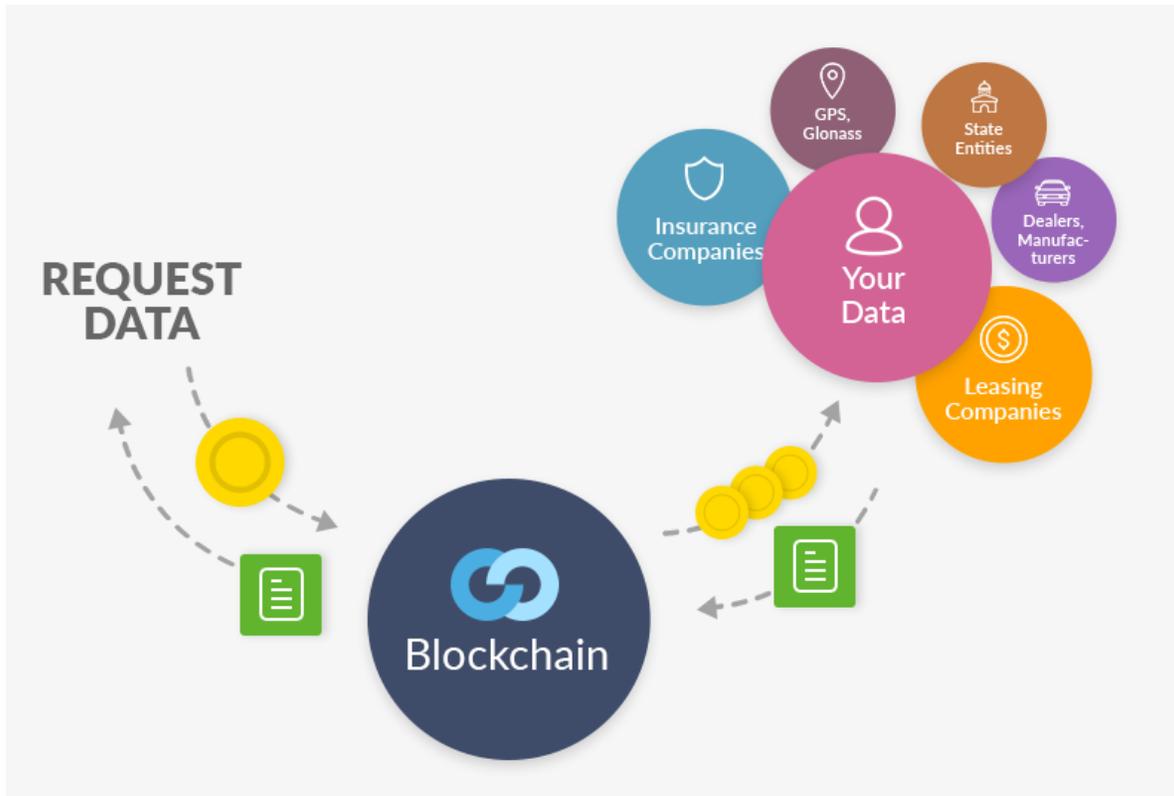
- **Nearest service stations, fuel stations, car washes, and insurance companies**

With geolocation access, the app will indicate the most relevant services in the user's area.

- **Loyalty programs discounts**

The application stores usage history of loyalty discounts from all our partners!

The process of rewarding users with tokens, receiving and confirming information:



As part of data management, we are developing a special website for dealers, auto manufacturers (OEMs), companies that analyze data to improve road safety, and insurance companies.

This website will allow users to analyze a large amount of data and compile custom reports on the use of a vehicle. Artificial Intelligence creates incredible opportunities for reading and analyzing data coming from different sources. The system will help increase sales growth, reduce costs for mechanics and increase efficiency. We will collect information about customers' preferences and provide recommendations in real time.

#### Opportunities for OEMs and companies analyzing data for improving traffic safety:

- Build long-term relationships with customers and clients
- Increase sales of original spare parts
- Data analysis to improve warranty programs
- Segmentation of customers and facilitation of the most appropriate recommendations
- Car telemetry analysis
- Timely service offers and discounts for each customer
- Reduce the cost of storing spare parts in warehouses without affecting the sales process and service time

- Recommendations for more frequent service for customers with an aggressive driving style
- Endless potential in the implementation of data

We would love to hear your feedback and suggestions! Write to us and we'll happily make the website more convenient for your needs!

## Possibilities regarding artificial intelligence and machine learning

Since we will collect vehicle data from a large number of sources, and offer various services and cars for purchase in our application, we will be able to analyze the user's interest, driving style, choice of service stations, and use of discounts. Using this data, we can help to increase revenue by offering drivers from different categories specific sets of products and services, including appropriate accessories, new cars, and assistance with future service visits.

With the help of data analysis by artificial intelligence and machine learning, marketing data will be available in a structured form which is convenient for use and analysis. This will help to create similar segments of users, analyze their use of tokens to obtain discounts and payments, and obtain reliable data on the use of the car which cannot be changed or modified.

## Opportunities for insurance companies

According to McKinsey & Company, between 5 and 10 percent of all claims worldwide are fraudulent. Dishonest insured customers commit fraudulent accidents, having agreed in advance with repair shops to eventually receive compensation. According to the FBI, spending on non-health insurers exceeds \$40 billion per annum. Appeals and claims management forms 39% of total insurance costs. Most insurance companies use secret methods to manage claims. These factors often lead to inefficiency in transaction costs.

Analyzing the user's driving style, history of breakage, and frequency of accidents, insurance companies will be able to provide personalized insurance terms!

We are developing a special scoring system that will allow us to assess the risk of the occurrence of an insured event, as well as provide the API of the system for the implementation of data for insurance companies. Due to this, insurance companies will be able to provide a discount on the basis of their analysis directly to the client in their application!

The use of blockchain technology will help alleviate fraud. By obtaining a VINchain vehicle report data can be found in real time.

Moreover, such requests can be paid for with VIN tokens. Insurance companies in turn will be rewarded for adding data on insured events!

Due to this, insurance companies will be able to reduce the processing costs of claims.

## Opportunities for manufacturers of spare parts

- 1 Increase transparency in monitoring spare parts warranties.
- 2 Reduction of refunds for fraudulent purposes.

## Opportunities for dealers

- Dealers, who are working with us in regards to information about car maintenance will earn VIN tokens. These tokens will allow dealers to order vehicle reports (that are confirmed by the blockchain system) provided by our partners, or sell these tokens on the exchange and receive additional revenue!
- By utilizing the website, dealers will gain additional leads in addition to a novel channel of communication with clients.
- The use of a vehicle history report based on VINchain information will replace outdated and expensive reports from Carfax. This saves money and improves the user confidence in the analyzed information, encouraging the user to increase the resale value of the car.

# Reducing the cost of maintaining additional infrastructure

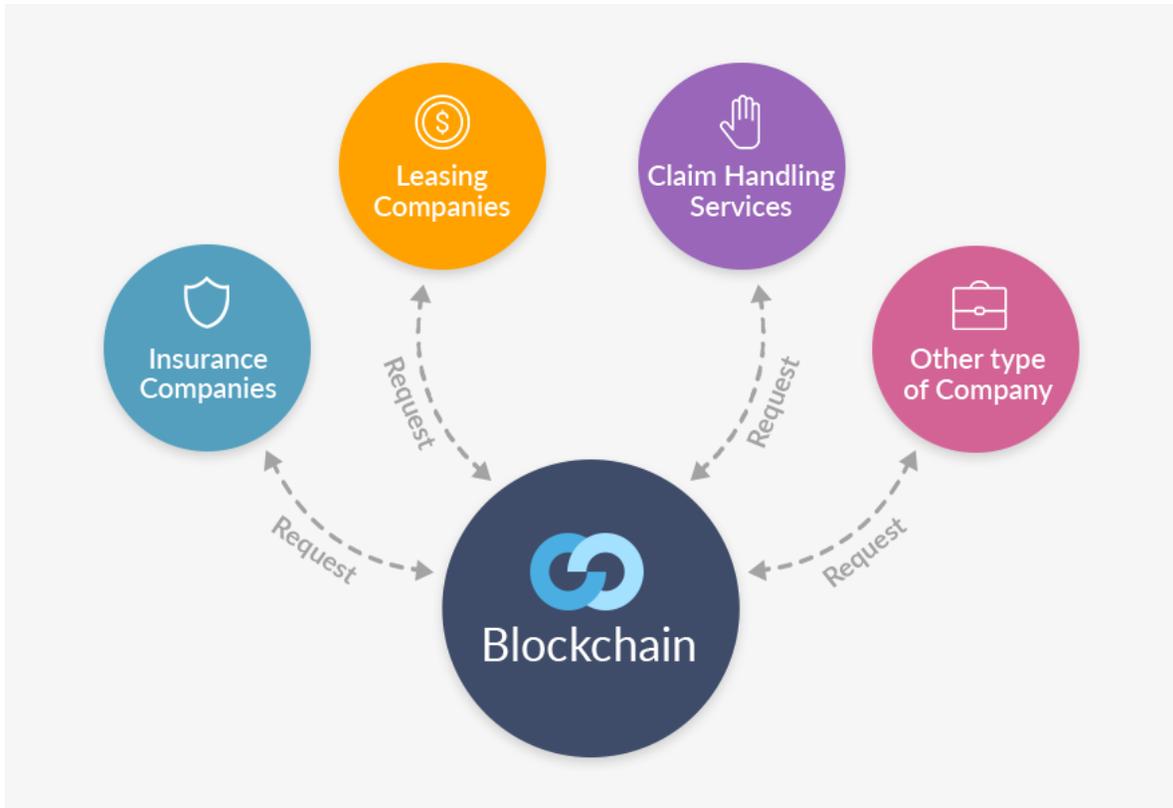
- Due to constant connection with the Internet through the user's smartphone and updated updates received from the car, the user does not need to call the dealer to analyze errors or update software. In the era of digital technology and dependence on software, this is a very important aspect of reducing costs along with the number of necessary professionals.
- We will also offer permanent additional services, such as updating maps and other functions of the car.

## Opportunities for auto-classified sites

With the click of a button a seller will be able to provide a completely transparent history report for their car, confirmed by VINchain. This is extremely convenient for both buyers and sellers! Even more importantly, users will be able to choose the report provider that is most attractive to them.

## Flexible API

The massive amount of data received and analyzed can be utilized in a variety of ways. With this in mind, we are developing a flexible API. Write to us to find out more!



Such a huge amount of data brings up the question of data storage security. The VINchain blockchain system will effortlessly cope with this task! Each data request will be trackable, and users will be able to trace down a party initiating the request, a number of requests, and a content of the request. The artificial intelligence will be able to determine hacker attacks based on requests.

\* Not available for all VINchain devices

## Confirming data in partner reports

One of the most important areas of our team's work is the improvement of car history reports. There are many services that provide reports on the history of vehicles. By joining the VINchain community the user will get the most complete and reliable biography of a vehicle, and we will confirm the information with each of our partners.

# Technical Breakdown

## Secure user authorization

The vinSSL certificate technology used in the VINchain service is a decentralized digital key management system based on Blockchain VINchain. This certificate allows safe and password-free logging into the VINchain service for any user. In this case, a blockchain engine is used as a decentralized store of trusted hash sums for SSL certificates. In order to generate the certificate, a confirmation of central control is not required. Generation and modification of the certificate are executed by the user. The vinSSL blockchain architecture effectively and safely solves the problem of revoking the

compromised certificate and its quick replacement, in contrast to the CRL and the OCSP protocols, which are vulnerable to MITM attack.

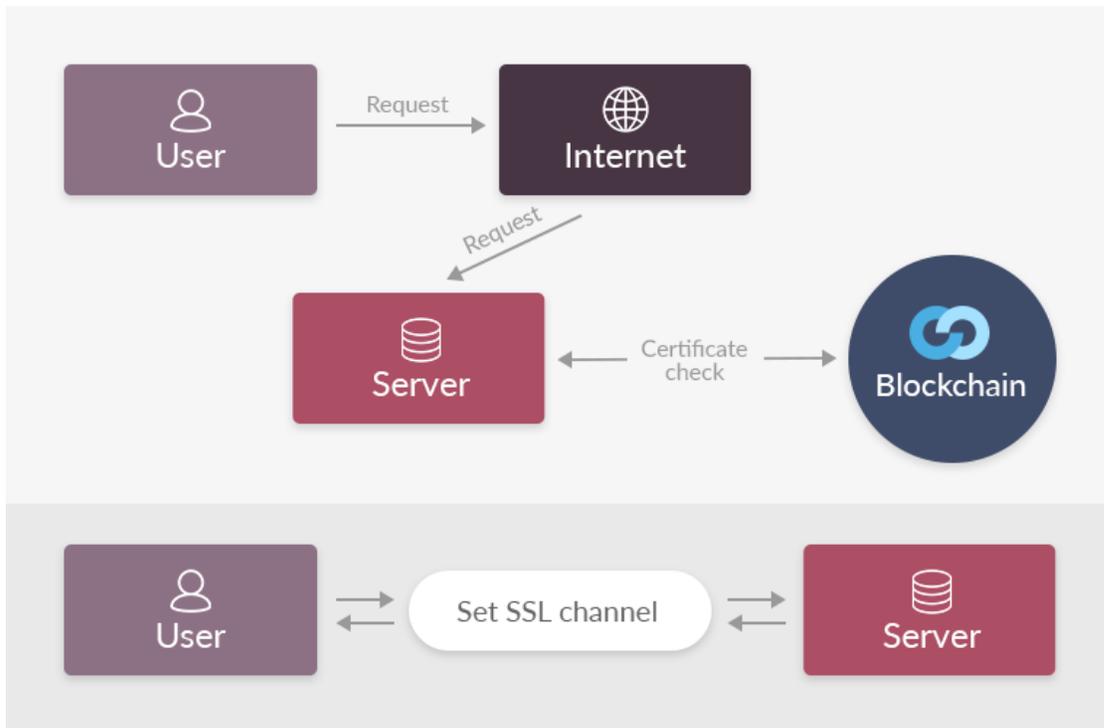
## Procedure for preventing attacks through blockchain (vinSSL)

1. The user sends an SSL certificate to the client to the VINchain server.
2. The VINchain server verifies an authenticity of the received certificate by comparing it with the original signature stored in the distributed network.
3. A secure SSL session is set only if the certificate is authentic (replacement is not possible).

## Stages of using the vinSSL certificate

1. Run the program to create (or update) a private SSL certificate.
2. Publish or update the digital signature in the certificate.
3. Upload the certificate to the browser (the certificate is valid for 5 years).
4. Now when you visit the VINchain service, login to the account will be completed without specifying username and password.
5. If the account on the site does not exist, it will be created automatically based on the data specified in the certificate.

## VinSSL operation scheme

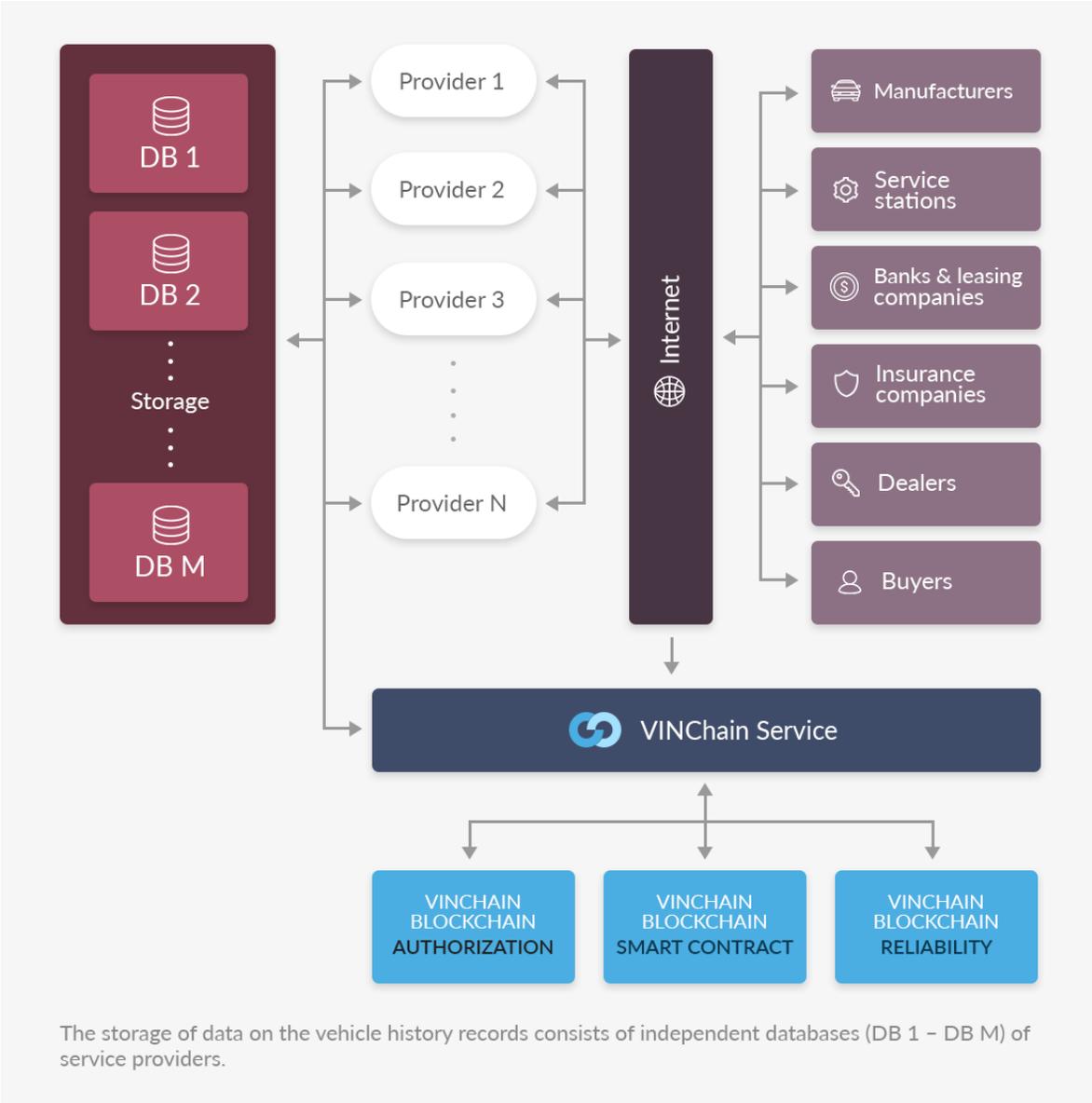


## How to work with the VINchain service

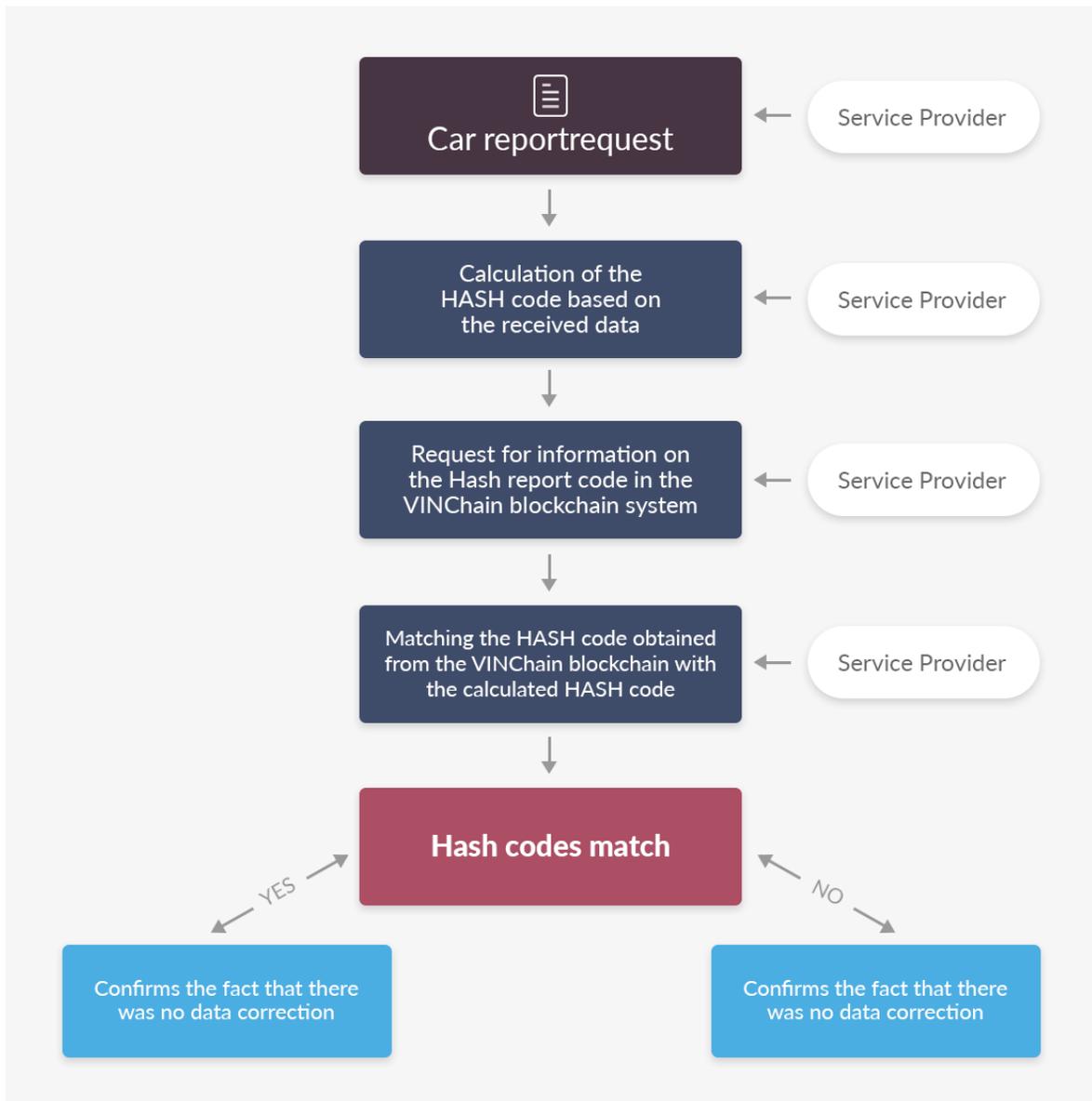
After authorization, the service provider performs a request for a report by accessing the VINchain service via the API interface. Upon receipt of the request the VINchain service performs a search for information using the VIN-code of the car in the databases of VINchain service providers. Each record will contain specific details on the information provider, date, VIN number, accident reports, change in ownership information, and any other data on the use of the car. In addition, each record in the report will have two fixed hashes. Once the user submits an information request, they receive a preliminary check report to conform the availability of data on the specific

vehicle. The user then makes a payment using VIN tokens to receive a full access to all available information. When VIN tokens have been successfully transferred from the user to the VINchain system wallet, the report is transferred to the user, and the VIN tokens are distributed to relevant service providers.

### Scheme of interaction:



## Verification of the reliability of the information in the reports:



Information in the database of each service provider of the VINchain system is continuously hashed using the cryptographic algorithm SHA-256\* and is

recorded to the database. In order to confirm the invariability of the information stored in the database of each service provider, the VINchain service places the records hashes in the VINchain blockchain according to the rules with the use of the timestamp of the record.

The user receives a vehicle report connected to the VIN number. The report contains all the information from all databases of all service providers in the VINchain system. To each line of the report, the VINchain system presents two hashes to the user: the first hash is generated by the VINChain system when data is provided, the second hash is requested from the VINchain blockchain.

**Occurrence of the hash 1 to the record in the report:**

When generating a request for a VIN number, the VINchain system parses information from the service provider databases, then performs hashing of each record along with the entire report using the SHA-256 crypto algorithm. Hash 1 is the result of processing the report lines hash and is provided with the mark "Hash at the request date".

**Occurrence of the hash 2 to the record in the report:**

When generating a request for a VIN number, the VINchain system performs a search for NVS records by the VIN number in the VINchain blockchain. Each NVS record in the VINchain blockchain carries information on the time of record hash creation, connection with VIN code of the car and placement of the record in the blockchain. Hash 2 is the result of processing the report lines

hash requested from VINchain blockchain and is provided with the mark "Hash from the VINchain blockchain".

Verification of the reliability of the information received is carried out as follows: If the hash of the provided record is identical to the hash of the record stored in the VINchain blockchain, the information was not changed; if the hashes are different, the information provided is compromised \*\*.

\*\* By default, the members of the service are not allowed to change the already entered data on the car, whatever it is, but with the help of cryptography and blockchain technology, we provide a guaranteed confirmation of the invariability of the information.

\* The SHA-2 hash functions were developed by the US National Security Agency and published by the National Institute of Standards and Technologies in the Federal Information Processing Standard FIPS PUB 180-2 in August 2002. This standard also included the hash function SHA-1, developed in 1995. In February 2004, SHA-224 was added to the FIPS PUB 180-2. In October 2008, a new edition of the standard was issued – FIPS PUB 180-3. In March 2012, the latest version of FIPS PUB 180-4 was issued, which included SHA-512/256 and SHA-512/224 functions based on SHA-512 (since SHA-512 works faster on 64-bit architectures than SHA-256).

In July 2006, the standard RFC 4634 "Secure Hash Algorithms of the USA (SHA and HMAC-SHA)", describing SHA-1 and the SHA-2 family, was issued.

In July 2006, the standard RFC 4634 "Secure Hash Algorithms of the USA (SHA and HMAC-SHA)", describing SHA-1 and the SHA-2 family, was issued.

The National Security Agency issued a patent for SHA-2 under a royalty-free license on behalf of the state.

Hash functions of the SHA-2 family were built on the basis of the Merkle–Damgard structure.

The initial message after the addition is divided into blocks, each block by 16 words. The algorithm passes each message block through a loop with 64 or 80 iterations (rounds). At each iteration, two words are converted, the rest of the words set the conversion function. The results of processing each block are summed, and this result is the value of the hash function. Initialization of the internal state is the result of processing the previous block. It is not possible to process blocks and to sum results independently.

Algorithms of the SHA-2 family (SHA-22, SHA-256, SHA-384, SHA-512, SHA-512/256 and SHA-512/224) are allowed by the US law for use in some government applications, including use within other cryptographic algorithms and protocols, to protect information that does not have the stamp of secrecy. The standard also allows the use of SHA-2 by private and commercial companies.

## Economic Functions

**T** : The current request price; current plans are to have this usage fee cost 1 VIN tokens

$N_X$  : The value ranking of event  $x$  attached to a specific VIN number

$X$  : The event identification number; the system generates these internally

$\sum N$  : The sum of all value rankings of all events attached to a specific VIN number

$F$  : The network maintenance fee, each transaction incurs a fee to support future VINchain costs

$$\text{Payout}_x = \frac{(T-F) \cdot N_x}{\sum N}$$

## Data Storage and Access

Every time the end-user makes a request, they pay  $T$  [Pg 39, under 'Economic Functions'] and have their front end populated with an easily navigable visualization of the event set for the requested VIN. Events are stored off chain to tackle scalability issues and on chain functionality is reserved for (a)

value transfer, (b) data confirmation and (c) event payout information. One of the advantages of car event history is that reported events should never be deleted or updated which allows for optimized read-access upon payment.

In order to validate information and provide it rapidly we will be implementing a file system for VINchain event storage that leverages Self-Certified Filesystems as well as Block Exchanges; currently the most reliable file system with these features is ipfs. It is likely that ipfs or a modified version will be used.

It is unimportant to provide the ability to model changes over time as car events should not change after the fact. The fact that data modification is significantly less important than data verification in our system means a more efficient file system alternative could be forked from ipfs development. Since every data provider is incentivized to provide data (through data request payouts) we can easily require node hosting in order to collect payout rewards. This allows for distributed data storage without the need to pay gas fees or storage costs for the prohibitively large data sets that car histories require. The BitSwap Ledger strategy is used to ensure that maintained nodes share car data efficiently but end-user data requests are always prioritized. While the system will benefit from deduplication it will also benefit from data redundancy so even if individuals stop providing data those car history events will still be available.

Car event data stored in ipfs will be comprised of date, mileage, source, and comments.

## Blockchain & Smart Contract Requirements

Since we're leveraging ipfs, much of the complexity in data queries will be handled off chain. We still need to handle all (a) value transfer, (b) data confirmation and (c) event payout information on chain.

Blockchain technology is founded on principles of value transfer. Using the most widely accepted smart contract system as an example in order to facilitate value transfer all that's needed is a basic ERC20 token. Beyond this the only function that is needed is one that allows the end-user to 1) exchange token for a cryptographic key and checksum, 2) capable of unlocking and validating the ipfs information on a specific VIN number. We use the cryptographic key in order to prevent users accessing the ipfs data without payment, and we use the checksum in order to ensure that the end user receives valid data. The very first time a vehicle event is provided to the system, the account providing it is attached to the corresponding VIN numbers using a basic key value lookup system within the smart contract. An initial value ranking is also assigned. Each VIN key is attached to an array of car event structures.

When an end-user exchanges a token for a cryptographic key, the system iterates through all vehicle events attached to the supplied VIN. If the event

provider is currently connected to the system, they are compensated for the data they have supplied using the aforementioned payout function. If they are not, the data is still available due to ipfs data redundancy, and the associated reward is forfeit to the VINchain system.

```
struct carEvent {  
    Int carEventId;  
    address eventProvider;  
    Int valueRankink;  
}  
vin => carEvent []
```

## Usage in B2B

### Car manufacturers will be able to:

- Receive and analyze the statistics on vehicle operation, and develop marketing and production plans based on research.
- Decide on warranty service or refuse it, based on data from the VINchain platform.

## Car dealers will be able to:

- Accurately determine the market value of a vehicle.
- Provide full information about a vehicle when selling it. From a medium- term perspective, this is a winning strategy for building loyalty among consumers.

## Insurance companies will be able to:

- Use the data from the blockchain before making insurance payments, as well as identifying fabricated accidents, and protect themselves from scammers.
- Insure the vehicle based on its actual state, and predict "bad" insurance and identify "bad" cars.

## Banks and leasing companies will be able to:

- Accurately determine the market value of the car.

## Service stations will be able to:

- Carry out an inspection and detect hidden defects more accurately based on data from the VINchain platform.
- Improve the quality of services provided.

# Usage in B2C

Before purchasing a vehicle, buyers want to know its condition. VINchain's partners will be focused on working with buyers.

In order for the reports to be available to the mass consumer, we focus on the average market price of \$15 per report.

## Sample Report

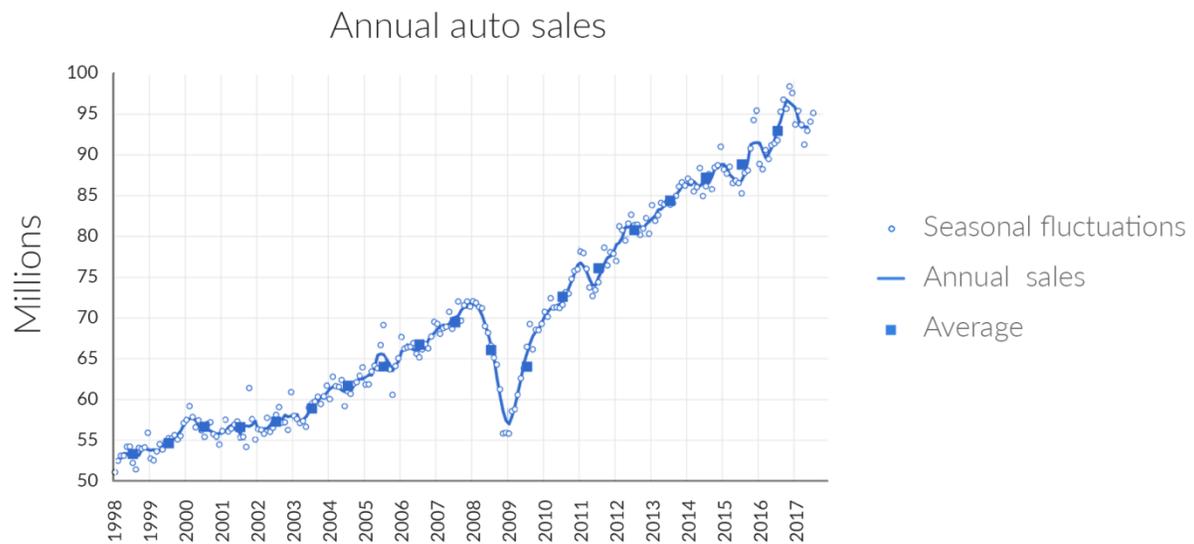
A VINchain vehicle history report with 100% real data can be obtained [here](#).

See a sample VINchain sourced vehicle history report for: [2012 BENTLEY CONTINENTAL GT](#)



# Market Review

95 million cars were sold in 2016, sales grow every year and manufacturers constantly increase production.



The market for all cars in the world in 2016 totaled 1.38 billion units. With the cost of a history report at \$15, the total volume of VINchain's market is \$20 billion.

We analyze the trends in the largest markets of the world - the USA and the European Union:

## USA

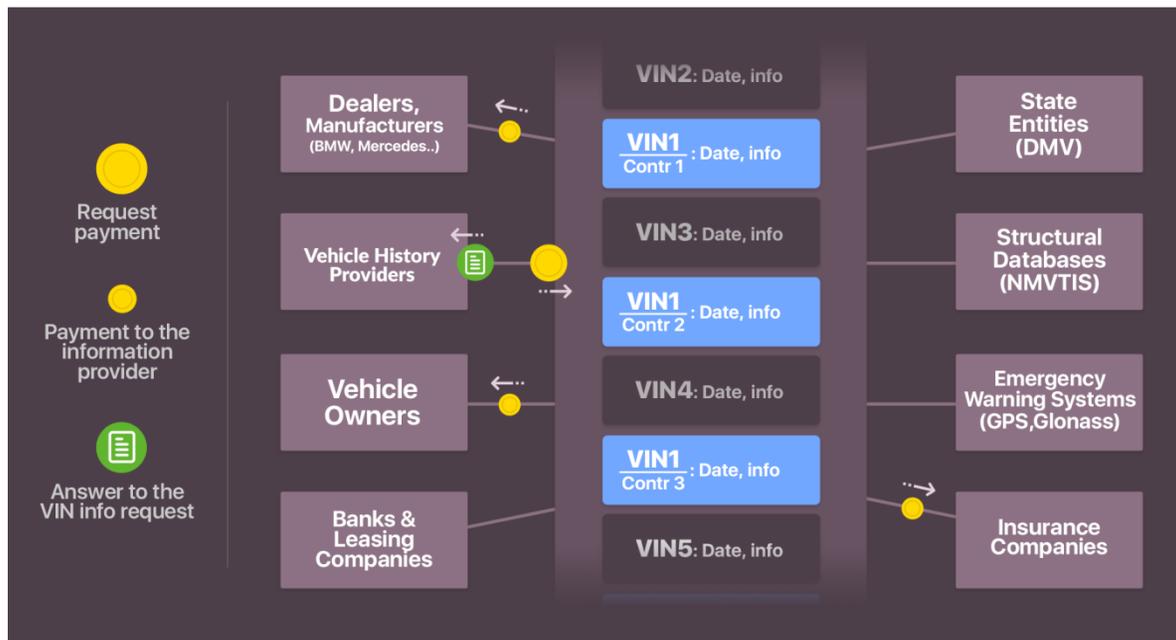
Sometimes dealers do not disclose complete vehicle history. Reports from commercial databases do not always contain comprehensive and reliable information. An alternative solution that a buyer can trust is not currently available in the market. At the same time, state law in some states (including California) prohibits dealers from selling cars without history reports.

## European Union

By May 2018, to improve road safety in the territory of the EU member states, it is necessary to develop a mechanism for documenting odometer readings. This will eliminate fraud with odometer readings and will allow consumers to correctly assess a vehicle's suitability and whether it is fit for a specific purpose. 2018 will be the beginning of a massive use of the vehicle blockchain passport in Europe.

# Business Model

Interaction process between data providers and users:



- Supplier's data evaluation is based on ranking scale
- Each blockchain request is paid for by VIN tokens
- Each report contains data about the car from several suppliers
- Each vendor whose data was used in the report receives payment of service fee in VIN tokens
- VINchain receives a commission from each request

# Road Map

## **February 2017: Concept development**

The founders study the blockchain technologies ability to collect and store information; first concept prototypes are developed.

## **October 2017: White paper and project concept approval**

White paper is published, and feedback is collected from the community. Concept and work flow chart development based on the collected data.

## **November 23, 2017: Start of token pre-sale**

## **December 1 to December 24, 2017: VINchain pre-ICO**

VINchain pre-ICO will be held from December 1 to December 24, 2017.

## **January 2018 - April 2018: Development of MVP**

Creating the first working model (MVP) together with the Emercoin Development Group, following the outlined concepts and technical specifications.

## **January 2018: Alpha version of VINchain report**

We will be working on the alpha version of the VINchain vehicle report so you will see how the reports look like right before the start of our ICO.

We will be making partnership agreements with dealers, insurance companies, banks, and manufacturers.

### **February 2018: Alpha version of VINchain app**

We will work on the development of the alpha version of VINchain mobile application for car owners. It will give car owners an opportunity to earn VINchain tokens and unlock new possibilities to interact with their car remotely.

### **February 1 to April 15, 2018: VINchain ICO**

Start of the VINchain ICO. In 6 to 16 weeks, VIN tokens will be listed on exchanges.

### **March 2018: MVP testing, VINchain blockchain development**

Product testing launched.

### **April 16-23, 2018: tokens distribution**

Once ICO ends, the procedure tokens will be issued to token purchasers.

### **May, 2018: Alpha version of the VINchain blockchain**

### **June 2018: Beta version of VINchain blockchain, VINchain API, VINchain app, and VINchain report**

You will be able to try our improved systems firsthand.

### **3<sup>rd</sup> quarter 2018: Spreading throughout United States, first revenue**

Despite of the amount of collected money, we will focus on the distribution of the system and its establishment in the US. In the case of success of our ICO, we will simultaneously work on the markets of Europe and the CIS.

### **4th quarter of 2018: Spreading throughout Europe**

In the case of a successful ICO, we will simultaneously work on spreading in Europe and CIS markets. In case of an unsuccessful ICO we will still spread our project throughout Europe, but only after we generate initial revenue.

### **January, 2019: VINchain big data analytics for enterprise**

We will analyze all of the collected big data for the enterprise utilization.

### **January, 2019: Continue development in all directions!**

We will be working on the development of all our projects and providing system updates.

# ICO Description

## Why Blockchain?

Blockchain technology has numerous advantages for VINchain:

- Blockchain provides a decentralized platform: It enables a database to be directly shared without a central administrator, blockchain transactions have their own proof of validity and authorization to enforce the constraints.
- High quality data: Data stored and distributed through blockchain is accurate, up to date, and quickly available to all participants
- Process integrity: Due to blockchain's decentralized structure, users can be sure that all transactions are executed exactly as the protocol (smart contract) commands. This removes the need for a centralized administrator or third party.
- Faster transactions: Unlike interbank transactions that can take days for clearing (especially outside business hours), blockchain transactions can be processed in minutes 24 hours a day, 7 days a week.
- Blockchain can store any amount of information regarding vehicle maintenance
- Opportunity to adjust the access levels for different users

- Absolute reliability
- Transparent rewarding system for data suppliers
- Opportunity to work directly with each market player
- Strong resistance to network attacks

## Pre-ICO of tokens

Pre-ICO: December, 1st – 24th 12,500,000 tokens will become available for placement with the sale prohibition during 3 months after the ICO is over.

## Tokens emission and sale on ICO

ICO will be held from February 1st through April 15th, 2018. Several payment methods are available for VINchain tokens:

- Ethereum (ETH) – Preferred currency
- Bitcoin (BTC)
- Litecoin (LTC)
- Dash (DASH)

Available for placement: 600,000,000 tokens.

From April 16 through April 23 of 2018, all purchased tokens will be distributed among token purchasers.

## Hard cap

Maximum investment amount: 23 250 ETH.

## Soft cap

Minimum investment amount: 3 330 ETH.

## Bonuses and discounts for ICO stage



The ICO is conducted in 7 stages. Each stage has a certain amount of ETH that can be collected. Once that amount of ETH is collected, the next wave begins. The earlier stage you step in, the greater the discount you receive. Stage 1 has the maximal discount, and then tapers off with every subsequent stage. The stages and discounts are as follows:

The amount of ETH is collected	Price
0 – 1 290	1 ETH - 28.000 VIN
1 291 – 4 950	1 ETH – 25.000 VIN
4 951 – 8 610	1 ETH – 24.000 VIN
8 611 – 12 270	1 ETH – 23.000 VIN
12 271 – 15 930	1 ETH -22.000 VIN
15 931 - 19 590	1 ETH – 21.000 VIN
19 591 – 23 250	1 ETH – 20.000 VIN

## Distribution Pattern of Tokens:

The distribution pattern of Genesis block in VINchain network will include 1,000,000,000 utility tokens in the following manner:

- 600,000,000 => are distributed among ICO members.
- 250,000,000 => are reserved among founders, consultants and other members of the team with a sale restriction of 2 years.

- 87,500,000 => are reserved with a sale restriction of 2 years.
- 50,000,000 => are reserved for the advisory board. If all tokens will not be distributed it will be burned.
- 12,500,000 => are reserved for early token purchasers with a sale restriction of 3 months after the ICO ends.

## Spending funds from token placement

- Project development
- VINchain product and VINchain network infrastructure development
- Activity expenses
- Accounting expenses
- Study
- Recruitment
- Other administrative goals
- Marketing expenses

- VINchain, VINchain network and VINchain Power Plant development
- Law expenses
- Legal service expenses, organizations setup and their activity, chosen as service providers for VINchain network
- VINchain Power Plant development and developers' platform promotion
- Integration of partner projects