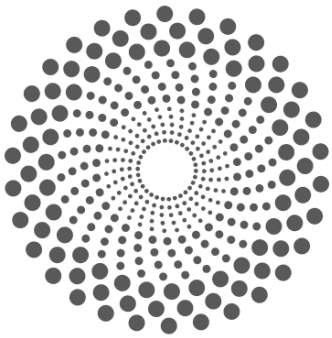


EVAIO

A decentralized Electric Vehicle Application Platform

The evaio team
www.evaio.info

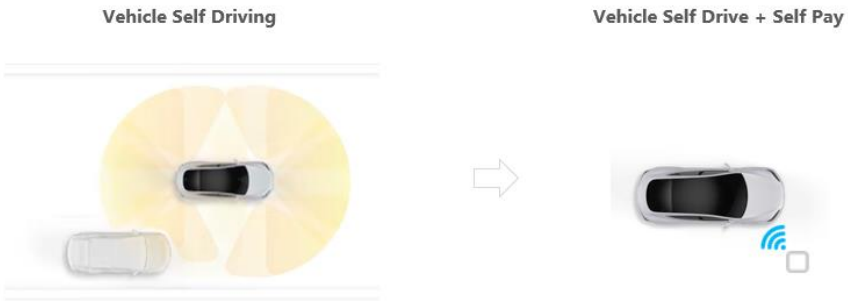
1.Background

The rise of Tesla has constituted in a paradigm shift within the automobile industry. Wireless internet providers have allowed for major car manufactures to install applications within their vehicles operating system that is dependent on the continuous connection with mobile internet. These applications in return provide for the usage of the interface to become more open and user-friendly. Car manufacturer Byton has designed for a 49-inch screen to successfully being installed in its latest concept model. That being said, it is possible for 3rd party developers to design vehicle applications aiming at improving the riding experience in years to come. These improvements can be constructed and maintained in a decentralized system.

Last year Elon Musk mentioned in his next 10 years master plan that after true self-driving is approved by regulators, you will be able to summon your car from pretty much anywhere, when you approach your car, the door opens by itself, once it picks you up, you don't have to drive, your car is 10X safer than manual via massive fleet deep learning, on your car you will be able to sleep, read or do anything else getting to your destination. You will also be able to add your car to a shared fleet and have it generated income for you while you're at work.

After many years of data collecting and continuous improvements on the Level 4 autopilot, Tesla is determined to achieve the true level of Self-Driving, level 5, hence Tesla's short-term goal. Once Self-Driving is established, commuting by car will be experienced to be more liberating. We will have more time to get work done, or just relax with some entertainment while we travel to our destination. However, in order for us to utilize the time we travel more productively, further development of APPs and DAPPs is required.

2.Opportunities



Many Electric car manufacturers are still coping with various problems, some of those problems have been solved, while other problems maintain. For example, many EV buyers

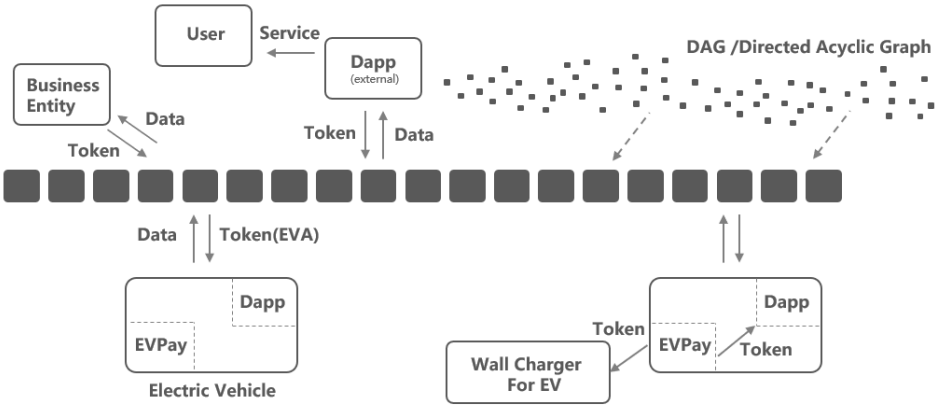
will install a charger in their parking spaces, ensuring that they can charge their vehicle once arriving at home or work. However, even though plenty of chargers are installed by other EV drivers, they are unable to use another people's home charger. A trusted payment solution which requires no human supervision, between the charger and the car would allow for an opportunity in which both parties benefit.

The connection between the charger and the vehicle has already established a Peer-2-Peer network. By transforming this P2P network to be utilized through the Blockchain technology, this network could be made more efficiently and could process the distribution of the profit made by contributing to the EVAIO system in a more efficient yet less time-consuming manner.

EVAIO uses blockchain technology to create a trusted and secured payment system for vehicles, which can solve the payment issue mentioned above. It also allows unmanned vehicles to be able to trade with the chargers independent of human activities surrounding the transaction. In exchange for contributing data, the vehicle's account will receive tokens in reward. EVAIO allows vehicles to become self-paid entities with wallets as indicated in the above chart, which will stimulate consumption around activities that are related to driving. At the same time, EVAIO is a public chain that supports the development of decentralized applications for electric vehicles, including developments in the entertainment systems, communication possibilities, and shared mobility, all of which contributes to a more pleasant riding experience.

3. EVAIO Highlights

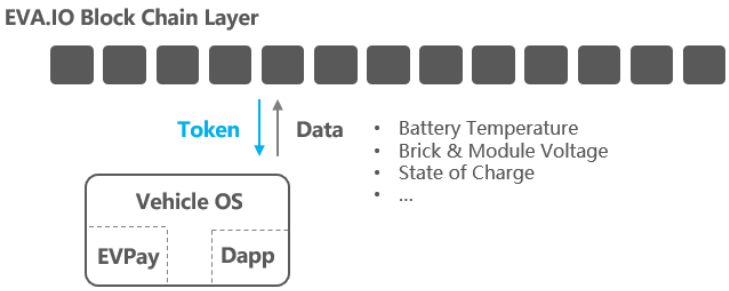
a) Integrated DAG & Blockchain structure
b) Token rewarded when driving
c) Provide Unmanned Self-driving vehicle payment solutions
d) Shadow token and Futures Contract to stabilize the price
e) DPOS algorithm to select Block producers, DAG peers, and Mainchain Witnesses.
f) Electric Vehicle DAPPs platform that is free to use.



4. Create a currency based on data

The usage of an electric vehicle generates data, that data might vary from the drivers' habits to the usage of APPs and DAPPs in the vehicle. The data generated can be used to later improve the services that these car manufacturers provide, as well as promote product iteration. Even though the vehicle owner is the one that generates the data, he is never the direct beneficiary from this data collection.

Tesla was the first and only car manufacturer that had their vehicles updated through OTA. However, the data that was generated remained confined to the vehicle itself. With the EVAIO operations, we found a possibility in which the car-generated data can be sold immediately at a large group of car dealers. By utilizing the blockchain technology we will not only create a cryptocurrency, but we will install back the trust between car manufacturers and those who generate the data that they buy, making the cycle less complicated. Every vehicle owner that is connected to the EVAIO system can directly transmit their generated data in a secure manner and get tokens in return immediately. The tokens that are distributed also possess an equity value to the EVAIO platform as well, meaning that the token is made up in a way that it becomes a combination of a currency and equity simultaneously, this will enable the early token holders to get a huge return for their investment.



As shown on the chart above, EVAIO is designed to enable users to activate automatic data transmission to the Blockchain. In return, they get EVA tokens. The information transmitted to the block is all encrypted and stored and closed off for access. EVAIO allows any third-parties, such as vehicle manufacturers, service providers, DAPPs developers, and other business entities, to access certain portions of the collected data after paying in form of EVA tokens and agreed upon by the EVA community. The based value of EVA tokens is formed depending on the value and amount of data that is generated. Even if no other application on EVAIO is developed, the potential data trade will still support the minimum value of EVA, therefore the price of EVA tokens will never reach the zero mark.

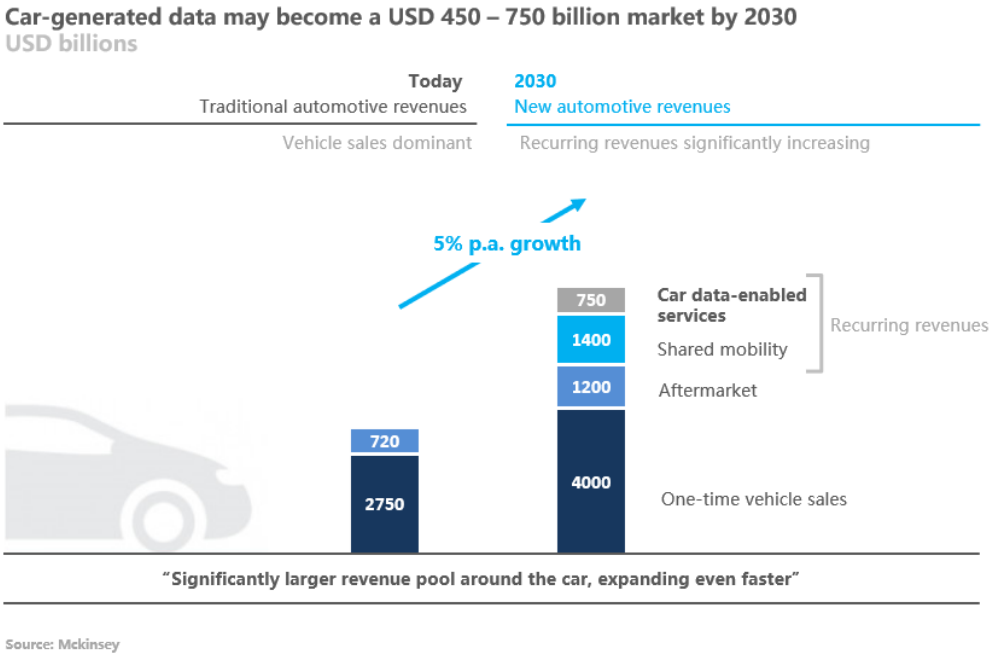
In order for the EVA tokens to be stored, we will create a multi-cryptocurrency wallet that could hold other cryptocurrencies as well. During the process of collecting data, the tokens that are rewarded are automatically transferred to the wallet that is connected to the vehicle. Meanwhile, the token represents EVAIO system's equity and divided, with an increase in the number of users and subsequently an increase in the amount of money that is represented by the token, it will attract more third-party to design personalized applications, that will promote the consumption of those applications, which will activate EVAIO's ecosystem. When unmanned vehicles become part of daily life, cars will become not only a means of transport but also a place to work and for leisure. The EVA tokens will, therefore, consist of three inherent characteristics being data value, service value and equity, all performing at the same time.

5. Valuable data

The question as to what is valuable data might differ to each vehicle. As you can imagine, data collection on the Tesla Model S is quite different from any other traditional vehicle. The data collected on the battery management system alone has provided useful information that could be used in improving its performance. There are many sensors deployed on

battery modules and bricks that reads the battery cell voltage and temperature, this data is transmitted to the BMS to analyze, one important task performed by the BMS is to control contractors and cut off or restore the power supply to the vehicle. The Battery temperature is crucial to the lifespan of the battery. The various temperature gradients will lead to a different performance of the battery cells during charging and discharging. Battery overheating can have a long-term effect, it will result in a discrepancy of cell longevity, which accelerates the degradation of battery pack performance, and finally reduces the quality of the vehicle. This kind of information has allowed Tesla to understand the performance of their vehicles, and helped in improving their product.

Tesla has over the years collected over 2 billion kilometers of autopilot data. After analyzing the data, Tesla concluded that they have to improve the autopilot application in their vehicles. Meanwhile, Google has collected nearly 3.5 million miles of data, to support their own self-driving project. According to Mc Kinsey & Company, car-generated data may become a 450 to 750 billion USD market by 2030. EVAIO will, therefore, have a lot to offer car manufacturers that need data to improve their vehicles and driving experiences of their customers.



Source: Mckinsey

6. Who owns the data?

The infamous Facebook data scandals indicate that data privacy, thrown up by the scandal, strikes at the heart of Facebook's business model. Facebook's income relies on data generated by its 1.4 billion users. Every time a user engages in activities on the platform they share a bit of information about themselves. That same information is the product that Facebook is selling to advertisers who aim at specific customers. Even though the users are the ones that generated the data, they are not the one directly profiting from it.

We know that the companies producing electric vehicles have sent the data generated from those vehicles to their database so they are able to analyze it. It is also confirmed that some governments have legally required manufacturers to periodically transmit their data to governmental databases. We can without a doubt say that data is money, but who is entitled to that money? The vehicles that generate the data are owned by individuals, they are the ones driving, shouldn't they have a share of the profit? OTA makes car-generated data transmission a reality, EVAIO will make vehicle owners benefit from selling data directly.

7. Data classification

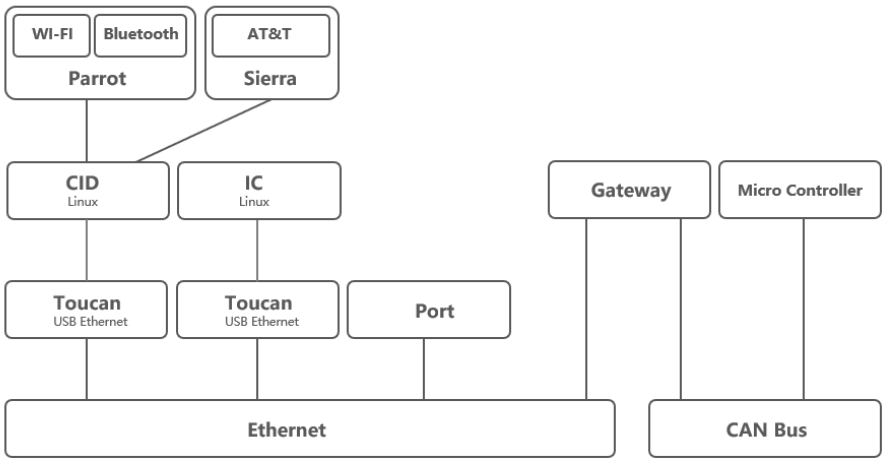
The EVAIO users have the control in selecting the kind of data that they are willing to share. A classification system in place which offers 3 levels that the user can choose from: Sensitive, non-sensitive and, confidential. This data classifications also helps to indicate the value of the subjects of data, which makes the token system more accurate. In order to ensure the confidentiality of the data provided, for by the EVA community, this data will be stored in the blockchain. The data that is collected will be evaluated before it is confirmed and put into the blockchain. What data ultimately get sold is voted upon by the EVAIO community.

The EVAIO user can select the following kinds of data to be collected:

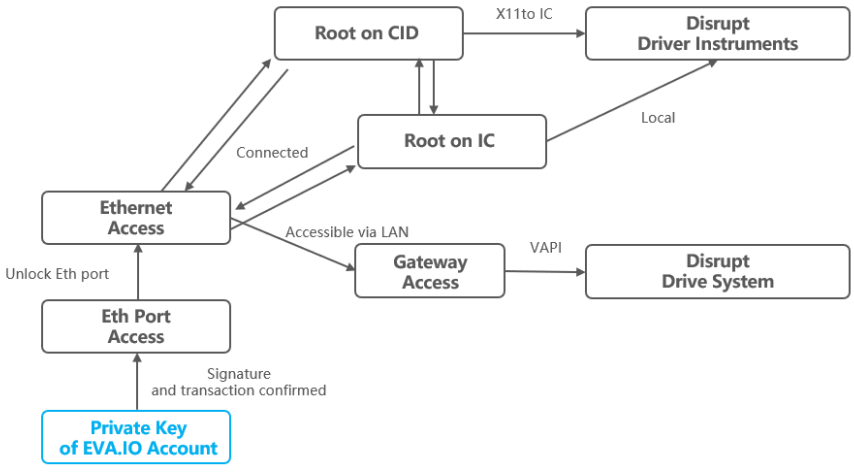
A) SOC/ State of Charge
B) Battery capacity
C) Range (miles)
D) Battery model and brick temperature
E) Energy consumption
F) Cell/module consistency

8. Vehicle safety

When speaking of self-driving, several safety issues come to mind. EVAIO accesses the generated data through a private key. A hash function will be used to generate the address of vehicles' EVAIO account. This serves as an extra layer of data protection when the vehicle is connected to internet. Vehicle data can be divided into two general parts, data from Vehicle ethernet and CAN bus data, EVAIO threats both datasets separately when handling the security of the vehicles. Taking another look at Tesla Model S as shown in below chart, central information display is connected with in-vehicle Ethernet, while in order to communicate with the micro controllers of CAN bus, all the data in the DBC format must be transmitted via a specially designed gateway.



When the vehicle is updated via OTA, data transmission becomes more frequent, resulting an increasing possibility of the vehicle being hacked. The below chart shows a special way to access the gateway and finally disrupt the vehicle drive system. To prevent from that from transpiring, when the car-generated data is transmitted to EVAIO, it will need to insert the private key first, ensuring the transaction is signed by a unique private key and verified by the nodes. Unlesss the transaction is proved to be valid, there is no access to the data. this structure provides an extra layer of data protection for the vehicle. This is how a 3rd pary can trade the car-generated data in a trusted and secure environment. A box will be installed in the vehicle to avoid interruption with the cars' computer and connected network. This will allow for the user to be in full control of the data that is generated, sent and received as he or she is the owner of the car and therefor the owner of the data he or she provides. Once the car is getting sold or damaged beyond repair the box can be removed and the content deleted so that information is not made public. A combination with a cell phone is established via a secured app whereby the owner of the box can see and confirm his payments before making the transactions.



9. Positive impact on the car industry

From the Volkswagen emission to the Subaru mileage cheating scandal, we can all agree that we can't blindly trust the data presented to us by automobile manufacturers or interested third party claims. By making use of Blockchain technology we ensure the reliability of the data that we provide. The data we sell is valuable to every service provider in the car industry. Different manufacturers operate in different DBC formats, EVO.IO stores all data in a unique format, the data shared is encrypted making the data more reliable. This will rule out the possibility of claims made on the basis of false information and therefore bring back trust to the car industry.

Even if Subaru or Volkswagen had developed a similar blockchain system, that system could not be completely trusted, based on its centralized nature. EVAIO, on the other hand, is run by its community, making the information more trustworthy. EVAIO will establish itself in the industry as a trust-establisher.

10. EVPAY, A cross-cryptocurrency payment tool

Once the data that is collected from an electric vehicle that is connected to the EVA community is transferred to the EVA database, that vehicle will directly be rewarded with EVA tokens. Each of the vehicles connected to the EVA system will have a unique wallet, EVPAY. EVPAY operates as like the PayPal system we know; the difference lies in the fact that EVPAY is designed especially for vehicle payments. To ensure that EVPAY can achieve its expected performance, three obstacles need to be addressed, being: the speed in which the transactions take place, ensure cross-currency payment issues, and a healthy growth of fluctuations. The issues mentioned above are addressed later in this Whitepaper.

1. Integrated DAG and Blockchain structure to ensure the transaction speed.
2. Integrate a cross-currency option in the wallet, making sure that all cryptocurrencies can be stored and used in the vehicles' wallet.
3. Introduce the shadow token EVAX, and construct the Futures Contract to stabilize the price and growth of EVA.

The above-mentioned solutions will be described in greater detail further in the Whitepaper.

Another reason as to why cryptocurrencies are not widely accepted as a payment method, is the fact that there is no decentralized system currently in place that engages both sellers and customers in one business model. EVAIO will incorporate both parties equally in its business model, directly solving the earlier mentioned problem.

The steps that are mentioned below form the key strategy that EVAIO plans to execute, to ensure user activity on its platform and bring third-party service providers in the EVPAY system, and eventually enable your car to not only self-drive but also to self-pay.

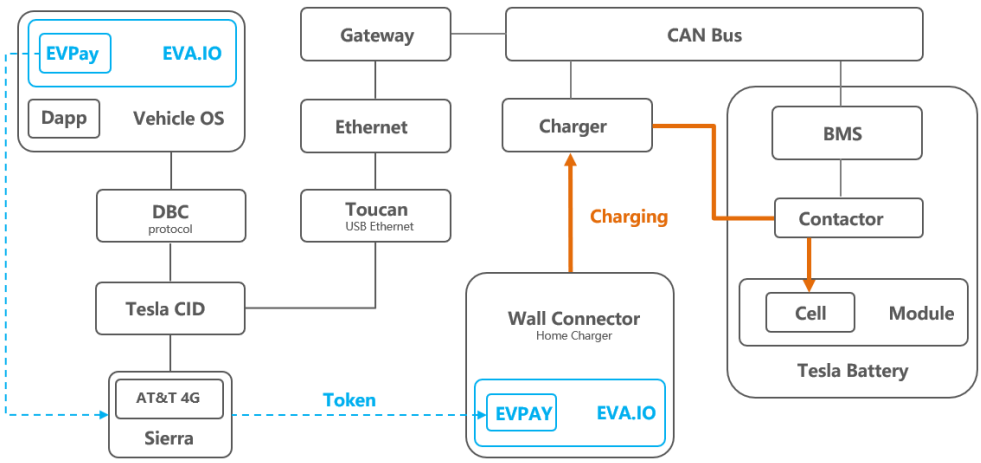
1. The value of the EVAIO token is based on the value of the car-generated data.

2. Launch the Main Net and enable transactions.
3. Test the Drive- Mining function in a small number of vehicles including a Tesla Model S.
4. EVAIO will then support the development of the service application in EVPAY, the construction of a decentralized vehicle home charger sharing system, and enable the token to circulate in the vehicle and charger EVPAY systems.
5. Establish a guaranteed fixed-pay payment for the owners of the connected chargers.
6. Cooperation with electric vehicle manufacturers.
7. The installment of the EVA application in electric vehicles.
8. Open the API for third-party vehicle service providers to connect with EVPAY.
9. EVAIO will support further development in vehicle DAPPs
10. Ensure widespread acceptance of the EVA Token in shops and gas stations.

11. Decentralized vehicle home charger sharing system

The first EVPAY application that will be developed is the vehicle private charger-sharing system. The development of this application will be done by a third party with the support of the EVAIO foundation. The created chargers will be constantly updated, both the hardware and software, enabling the application to connect with the internet and thus to the EVAIO payment system. The charger will have its own unique wallet, allowing the charger to receive the payments from other users. This decentralized system will allow charger owners to run their own “gas station”, and provide for a source of income. It will increase the physical density of electric vehicle chargers and finally accelerate the worlds’ transition to sustainable energy.

The following chart and the steps will illustrate how we intend to design the charger system based on the Tesla Model S and a home charger (Wall Connector).



1. A home charger which is called Wall Connector by Tesla will be upgraded on both hardware and software to enable connection with internet, an EVPAY will also be added to

the charger. By doing this the charger will be able to receive the expected cryptocurrency for charging.

2. The vehicle will communicate with vehicle home charger to confirm its availability.
3. BMS (battery management system) determine the State of Charge and transfer the charging request data to the CAN bus
4. The Vehicle EVPAY which is connected with Tesla CID get the data from CAN Bus through the gateway.
5. Vehicle EVPAY sends the cryptocurrency that the vehicle home charger owner expected such as EVA or BTC to the charger through a 4G module.
6. The Vehicle home charger starts charging once the transaction is confirmed and approved by EVAIO peers in a second.
7. When the Level 5 vehicle self-driving is achieved, a Snake charger as shown in below images which might be the replacement of the current Vehicle home charger, will automatically find the location and plug in for charging.

by utilizing this decentralized vehicle charger sharing system, it confirms the payment abilities of EVAIO. furthermore, EVAIO will open APIs to third parties, allowing more auto-

based express services to existing in EVPAY, which can be used to pay for car washes, parking fees, and so on.

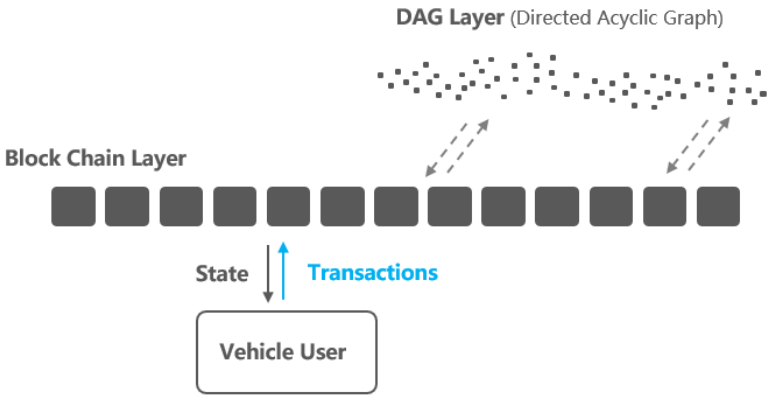
As a public chain, EVAIO can support many future developments of decentralized car applications. One example is decentralized car radio applications. Since the car radio system is user-based content, decentralized car radios will bring more variety of content. The token system is great in redistributing the profit generated by content, the token will be a natural incentive for the content creator to encourage them to keep providing content and get money, it will make the business model more attractive, and at the same time, it will shorten the process of content trade.

Another application we intend to create is a chat, this chat can be used by drivers that are active in the EVA community. The driver can use the chat as long as they drive hands-free. The chat will include a group chat function, based on the distance between the drivers. Users of the chat are rewarded EVA tokens based on their input, this essentially has an advertisement value. A business model constructed in this manner would prove to be more viable than the traditional business models we know of due to the fact that there is no centralized third-party interference, the content contributor is directly rewarded.

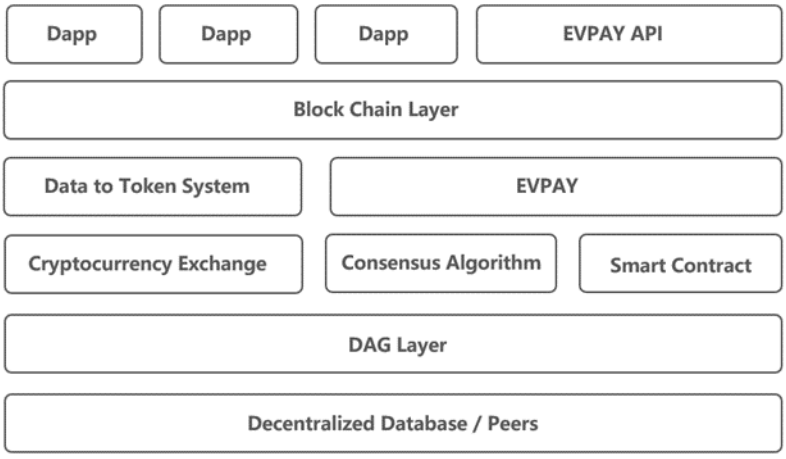
Once level 5 Self-Driving is achieved, we will see an increase in the development of car applications in various forms. This will simultaneously increase the interest in our business model and therefore increase our value.

12. Integrated DAG layer and Blockchain technology

Bitcoin introduced the blockchain technology to the world, making it a widespread used phenomenon. IOTA later introduced the DAG structure, as an additional layer of storage and protection. Both the DAG structure and blockchain have their own unique advantages. EVAIO introduces a new idea, both technologies will be integrated into its functioning tackling the current scalability problem. The structure is illustrated in the chart below.



Using this structure, the DAG layer performs the high-speed transactions needed for the vehicle IoT payments. The blockchain layer is used to process the smart contract transactions, summarize the DAG transactions and issuing EVA tokens and perform the cross-currency conversion tasks. When a transaction is submitted to EVAIO, the blockchain does not verify or confirm the transaction, instead, it will analyze the type of transaction, send the high-frequency transactions to the DAG-layer and therefore only deals with the smart contracts. All the smart contracts that are processed by the blockchain are first coded and transferred to the assigned operating environment. Finally, the tasks that need to be performed are executed by the blockchain nodes.



By making use of an integrated structure, as illustrated above, the DAG layer is better suited to perform the high-speed payment part of EVPAY rather than the blockchain, in order to ensure that there is no delay in the confirmation process. The blockchain layer and the smart contracts that are stored and processed by it, ensure that EVAIO can be used as a

distributed database platform for DAPP developments, and therefore carry more extensive applications for vehicle services to increase the use and value of EVPAY.

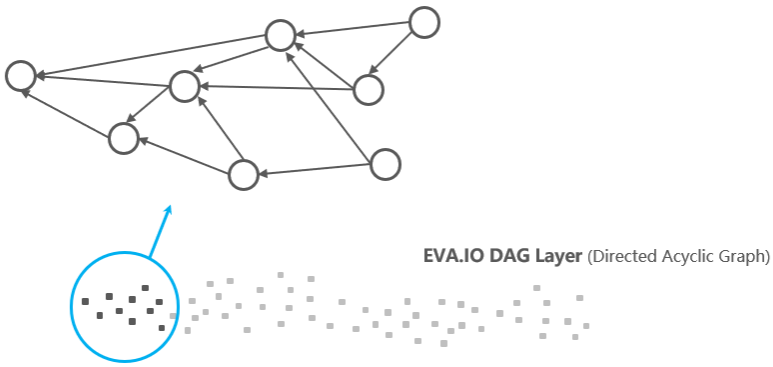
The DPOS algorithm allows the token owner to participate to a greater extent to the management of the blockchain, it mainly reduces the number of nodes to increase to the transaction speed. The EVA block producers are elected by token holders to ensure that the whole process is completed as transparent as possible. However, by solely utilizing the EOS approach it still leaves too much power in the hands of a selected group of people, similar to the political systems we know of. The most important reason for our use of the integrated DAG and blockchain architecture is to ensure that our system remains decentralized. We have assigned the roles as follows to ensure that EVAIO remains decentralized during its operations: The block producer is like a finance director, DAG Peers is more like accounting, DAG witnesses like a third-party auditing agency; all three roles have their own responsibilities. Of course, the selection of these roles in EVAIO is determined by the DPOS algorithm.

EVAIO Blockchain layer allows anyone to write smart contracts and decentralized applications where he or she can create their own rules for ownership, transaction formats, and state transition functions. Our cross-cryptocurrency exchange module and shadow token EVAX using are implemented by using this smart contract as well. The EVAIO virtual machine is Turing-complete. It can encode any computation that can be conceivably carried out.

All transactions that are verified by the DAG layer, are eventually summarized sent to the blockchain layer upon which it is verified by the block producer, added into the current block, and thereby forming the EVAIO blockchain. In EVAIO Blockchain layer, the block producers do not have to use the computing power-based mining to reach a consensus. 15 block producers are chosen by votes cast by token holders, and the selected producers are scheduled in an order agreed by 11 or more producers to produce blocks.

13. EVAIO DAG layer

In a DAG structure, there is no Block or Chain, instead, if you want to issue a transaction, you must work to approve other transactions. Therefore, users who issue a transaction are contributing to the network's security. The nodes check if the approved transactions are not conflicting in any way. If a node detects that a transaction is in conflict with the transaction history, the node will not approve and disregard this transaction. Meaning that the DAG layer does not consist of transactions grouped into blocks and stored in sequential chains, but as a stream of individual transactions linked together as shown in the chart below.



This DAG structure also ensures high scalability of the transactions made. The more activity in the DAG, the faster transactions can be confirmed. That's why EVAIO added a DAG layer to solve the speed problem. EVAIO DAG layer is designed to only process transactions, with the primary target of TPS being above 5000.

We have also included witnesses in our design, the primary function of those witnesses is to participate in the system to verify the transactions in the DAG layer and to later transfer those to the main chain. There will be 9 witnesses that are actively present in the process, these witnesses are participating in the network, and will consist of non-anonymous reputable people or companies who have a long-established reputation. The witnesses participating in this structure are ultimately chosen by votes of the token holders.

The way to build the main chain is to develop an algorithm that, give all parents of a unit, selects one of them as the "best parent". The selection algorithm should be based only on knowledge available to the unit in question, on data contained in the unit itself and all its ancestors. Starting from any tip (a childless unit) of the DAG, we then travel backward in history along with the best parent links. Traveling this way, we build the main chain and eventually arrive at the Genesis unit.

The Markov Chain Monte Carlo (MCMC) algorithm is used to randomly select the peers on our DAG layer to verify a transaction that has just arrived. This algorithm is used to make sure that peers do not know which transaction they will verify, and finally to decrease the possibility that the DAG peers attack the system.

In the EVAIO DAG layer, the number of peers will increase when the amount of transactions increases.
Confirmation time is the time from a unit entering the database to reaching stability. It depends on how often the witnesses post because in order to reach stability we need to accumulate enough witness-authorized units on our DAG Main Chain after a newly added unit. To minimize the confirmation period, the witnesses should post frequently enough.

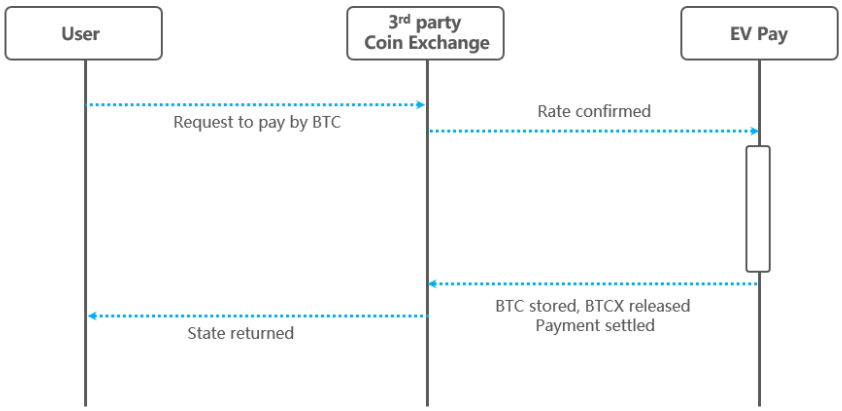
The witnesses that are to be elected by the community need to meet the above-mentioned expectation to ensure correct performance.

14.Cross-cryptocurrency Payment

The number and types of cryptocurrency are increasing. If we would design a system that cannot accept multi-cryptocurrency, it would be disappointed for users. For example, if you are a buyer, you have 10 ETHs, and service or commodity sellers want to receive BTC. We need to allow EVPAY to perform quick redemption in the system without the user's perception and successfully complete the payment; while the BTC and ETH's blockchain architecture determines that they are slow and it might be hard to complete the transactions on BTC and ETH mainchains; therefore, we use the following process to solve the problem of rapid payment across cryptocurrencies.

1. EVPAY Wallet generates shadow tokens for each cryptocurrency, such as BTCX, ETHX.
2. EVPAY and the external Exchange set up an exchange rate inquiry and settlement agreement.
3. EVPAY will use the exchange rate to achieve the desired currency quote in the trading system. If you wish to pay with BTC, you will see the BTC quote.
4. Taking BTC payment as an example, the buyer triggers the smart contract to lock the BTC under the multi-signature mechanism, and the system 1:1 converts the shadow token BTCX.
5. BTCX will be exchanged for ETHX according to the exchange rate and pays the seller to complete the payment. All these transactions are verified and approved by the DAG layer and was finally summarized in the blockchain layer.
6. The external Exchange will simultaneously complete the real transactions of BTC to ETH on their main net.
7. After the exchange is completed, ETHX is replaced with ETH.

In order to ensure a 1:1 exchange rate between shadow token and mortgaged token, a smart contract is established. That is to ensure that nobody can unlock the mortgaged tokens. All these transactions will be verified and approved by peers as illustrated in the chart below.



15. Shadow token EVAX and EVA futures contract module

The high degree of volatility in the value of digital assets is an important reason as to why digital transaction payments are not widely used. We recognize that in order to apply digital assets to day-to-day transactions, payment scenarios require the value of digital currencies to be stable; while most current digital assets may be related to the equity, dividends, and usage rights of blockchain products, which makes the current value of token fluctuates all the time, and the seller does not need an equity but pays more attention to how much money he has actually earned today. This restricts the seller from accepting cryptocurrency payments on a larger scale; for this, we create the shadow token EVAX which makes the payment related to USD. EVAX has the following characteristics:

1. EVAX is designed to be equal to the dollar price at any time, 1EVAX=1USD
2. EVAX does not trade alone, nor does it appear alone. It only serves as the shadow value of EVA.
3. The generation of EVAX is triggered by smart contracts based on the value of the mortgaged EVA.
4. The number of EVAX generated = the number EVA mortgaged * the current price of EVA token.
5. EVAIO will collaborate with a third-party company to short EVA in the secondary market while EVA is mortgaged, this ensures the value of the digital asset is always equal to the dollar price represented in the exchange during the delivery period.

Here we take the unmanned charger-sharing system as an example to describe the EVAX generation and transaction process, and how to use the futures contract to stabilize the value of tokens the seller receives.

Alice drives a Tesla Model S looking for a shared private charger; she finds Bob's home charger is available nearby, so she approaches the charger and the vehicle identifies Bob's charging pile and inquires through the BMS. She pays with EVA tokens through the EVPAY. At this time, the EVA price is US$10, and Alice pays 1 EVA token for this charging. The payment triggers a smart contract on the EVAIO and transfers the EVA to a smart contract account. This process is multi-signed to ensure the security of the mortgaged EVA.

The price of Shadow token EVAX is always a constant price of US $1. While the system mortgages EVA, 10 EVAX is paid to Bob from the smart contract account. Then EVAIO verifies the transaction and then triggers an event to inform Bob's charging pile. The charging pile then performs charging. If this is the case, the fluctuation in the price of EVA will actually have a serious impact on exchanges.

If the EVA token drops to $9 after 1 minute, then the EVA transaction is still mortgaged in the system. With a current worth of $9, Bob receives a constant EVAX value of $10. When Bob proposes to convert 10 EVAX in EVPAY. the system can only redeem one EVA worth a total of $9.

The smart contracts will short EVA futures contract in an exchange, When the system mortgages the EVA to EVAX, the EVA futures will guarantee the total value of the EVA collateral + futures contract is at the constant value of 10 USD. This approach ensures that Bob can convert 10 EVAXs into EVA worth $10 at any time, regardless of whether the EVA price goes up or down.

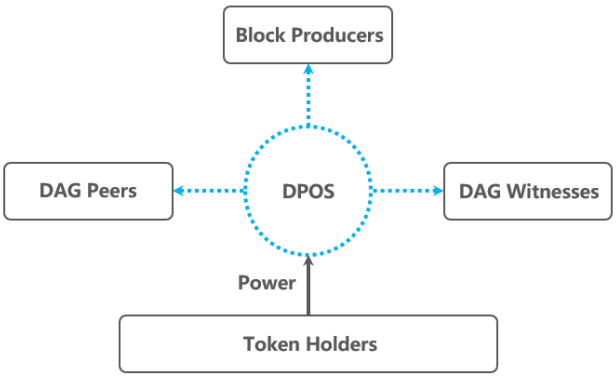
16. Consensus Algorithm (DGOS + MCMC +PBFT)

EVAIO utilizes Delegated Proof of Stake (DPOS) to select 3 roles, Markov Chain Monte Carlo (MCMC) to randomly send the transactions to DAG peers, Practical Byzantine Fault Tolerance (PBFT) for state communication. Under the DPOS algorithm, those who hold EVA tokens may select Block Producers, DAG peers, and DAG witnesses through a voting system.

Anyone may choose to participate in the system, will be given an opportunity to produce blocks, issue transactions and post the main chain, they also have the opportunity to persuade token holders to vote for them.

In general, the DAG peers will issue transactions for end users, the DAG witnesses will post the best child-parent link transactions as the DAG main chain, the witnesses can be understood as regulatory agencies in the DAG layer to ensure that the token is not spent twice, the block producers will verify the summarized transactions and produce blocks in the Blockchain layer.

The 3 roles specified in this model have their separate responsibilities but serve the same purpose, being to make the EVA ledger safe. We call distinction between the different roles : the separation of powers. The powers are directly granted by the token holders as showed in below chart.



The algorithms in EVAIO work in the following procedures:

1. DPOS Algorithm is used to elect 3 roles, Block producers, DAG peers, and Witnesses.
2. The DAG peers are randomly selected by the MCMC algorithm.

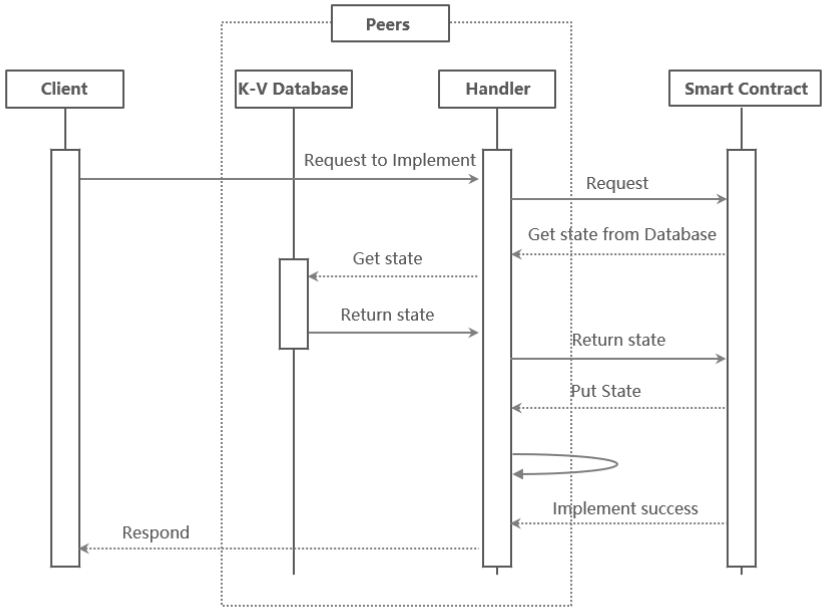
3. The selected DAG peers start to do a light POW algorithm to find the nonce and then issue a transaction in DAG network.
4. The DAG witnesses post the best parent-child link as the Main Chain.
5. PBFT algorithm is used when block producers send messages to each other.
6. The block producers summarize the transactions and create the EVAIO blocks.

This design is more decentralized and has higher scalability compared with a blockchain, also this model allows us to deploy decentralized apps much easier.

17. Smart contracts

EVAIO's smart contracts are divided into two parts, system contracts, and user contracts. System contracts are used to implement system-level functions, and user contracts main purpose is to implement user applications. The contract is compiled into a separate application and runs in an isolated Docker. Compared with Ethereum, the EVAIO smart contract is separated from the bottom account. When you upgrade smart contracts, you do not need to migrate the ledger data to the new contract, while the contract is written in Go, Java, NodeJS.

Below procedure shows how a smart contract transaction is processed between the Blockchain layer and DAG layer.



1. When the DAG peers receive the input (proposal) and request from the client, it will send a message object (with input information, caller information) to the corresponding smart contract.
2. The contract invokes in the ContractBase. By sending getState and putState messages, the contract obtains the account status information from the DAG peer and sends the commit status.

3. The contract sends the final output to the DAG peer. The peer signs the proposal and output (proposal response) and completes the first paragraph of the signature submission.
4. The client then collects the first piece of submitted information, forms a transaction and signs it, sends the transaction to the Blockchain layer, and finally produce the block and send feedback to the DAG peer. The output falls on the ledge and the second submission process is completed.

With the support of smart contracts, cross-currency transactions can be established. The process is as follows:

1. User-initiated asset deposit request and entered digital asset into the system
2. system returns the token to the user's wallet and triggers a joint billing request in EVPay and the digital asset distribution network.
3. The seller is pricing the digital asset as expected.
4. Buyers complete real-time payments in tokens of their own digital assets.
5. Update the mapping relationship between digital assets and tokens in EVPAY.
6. Initiation of redemption acceptance requests for tokens and digital assets triggers cross-chain and cross-network transactions.

18. Scalability

The DAG technology allows the child transactions to approve the parent transactions when the number of transactions increases. Obviously, we need more elected DAG peers to issue transactions for users to ensure system stability. The number of DAG peers is confirmed by the following method.

user think time is T_think,
number of users is U_concurrent
transaction response time is T_response
system throughput is: TPS=U_concurrent / (T_response+T_think)

EVPAY guarantees that the time for each transaction is C_time = Confirmation time,
assuming T_response = a*C_time, then: TPS=U_concurrent / (a*C_time +T_think)
So, C_time = (U_concurrent/TPS - T_think)/a

In the production environment, the system adjusts the C_time to the set value according to the number of concurrent users U_concurrent, T_think and TPS design indicators affecting the user experience, and horizontally expands the DAG bandwidth, storage, memory, and other computing resources to ensure the TPS index, and user experience.

19. Token model and incentive

EVAIO believes that it is important for application developers to offer users free services; users should not have to pay in order to use a decentralized application, which means there will be no transaction fee in the EVAIO platform. That is why a constant incentive plan needs to be designed for Block producers, DAG peers, and DAG witnesses. The EVAIO may be configured to enforce a cap on this incentive plan that the total annual increase in token

supply does not exceed 0.5%, the community will always participate in the final decision making.

In our design, the total market cap of EVA in system is 12billion, car generated data is the basis of token value, therefore 30% of total supply will be stored and rewarded to Car owners and manufacturers spread over a long period of time (more than 20 years), after that the community will discuss and decide whether to increase the token supply or maintain the current level of supply. Bear in mind that every time when a driver gets 10 EVA rewarded, the manufacturer will receive 1 EVA.

In addition, we have set up a decrementing mining mechanism similar to bitcoin. That mechanism is constructed in the following manner.

1. An individual owner could be rewarded with no more than 100 tokens per day when less than 0.5 billion tokens in total are mined.
2. An individual owner could be rewarded with no more than 50 tokens per day when less than 1 billion tokens in total are mined.
3. An individual owner could be rewarded with no more than 25 tokens per day when less than 1.5 billion tokens in total are mined.
4. An individual owner could be rewarded with no more than 15 tokens per day when less than 2 billion tokens in total are mined.
5. An individual owner could be rewarded with no more than 10 tokens per day after 2 billion tokens in total are mined this pattern ends until all tokens are rewarded.

It is unlikely that a driver/ owner receives the above-mentioned 100% mining incentive token limit because mining is related to the mileage and data level of each day. We describe this model of EVAIO as mileage mining.

EVAIO allows each account to consume a percentage of the available capacity proportional to the number of tokens held by developers. If an account holds 1% of the total tokens, then that account has the potential to utilize 1% of the storage capacity as well.

20. Conclusion

We have proposed a new structure by the introduction of EVAIO, integrating both the Blockchain technology as well as a DAG layer. By making use of this structure we can achieve high scalability without compromising the decentralization. The tokens that are to be created on the basis of data. Furthermore, no transactions fees are issued for to consumers making use of the resources that EVAIO provides. The wallet that is created can hold various cryptocurrencies. EVAIO will ensure the value of the tokens by having a shadow token. With EVAIO you will be able to self-pay when self-driving.

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