Karspace Whitepaper, version 0.1

by Kargain World

1. Executive summary

Karspace is a peer-to-peer platform whose goal is to enable both professional and occasional participants of automobile markets to transact amongst themselves with more trust and honesty and significantly reduced transaction costs.

This whitepaper is organized as follows. First, we discuss the industry Karspace is aiming to disrupt and what elements the initial implementation of the project will entail at a high level. Then, we turn to the question why using public blockchain technology could be desirable to attain the goals of Karspace. Finally, we sketch the eventual implementation of the project.

2. Why Kargain?

Last year saw a record volume of new light automobile sales at 96.5 million units, 31% more units sold than in 2010. The European sales amounted to 17.6 million new light automobiles, or 19% of the global total.

However, even more impressive than the market for new automobiles is the one for used ones. For example, last year, in France, 5.6 million used light automobiles changed hands compared to 2.5 million new automobiles. Almost in every country, the number of used automobiles sold is around double of the new ones.

The sheer size of the used automobile market and the outdated nature of administering and controlling the sales and other automobile-related events make it vital and attractive to create a platform that would rationalize and streamline the procedures.

In general, there are two types of actors on the automobile market: individual buyers and professional participants. The latter include:

- Manufacturers;

- Official dealers;
- Car trading agents;
- Collectors;
- automobile recyclers;
- Repair salons and mechanics;
- automobile part sellers;
- Renting companies;
- Transporters;
- Insurers.

In the secondary automobile market, transactions are made among these actors. If we look at the offers posted online, we may notice that those made by professionals greatly outnumber those by individuals. This allows us to identify the principal audience of our platform. We are talking particularly about official dealers who buy and sell secondary automobiles and car trading agents who prepare automobiles for being resold.

In 90% of cases buyers search for secondary cars to buy online. Thus, a number of platforms for posting offers have emerged, with hundreds of thousands of offers handled annually by some of them.

This has certainly improved the state of the secondary automobile market, giving consumers access to a lot more automobiles.

But this improvement still leaves a lot to be desired. There is still a lot of fraud and other organized practices (often at a large scale) that have made the public be wary of the secondary automobile market.

In other words, despite a higher access to secondary automobiles in the current market, establishing low-friction contacts between buyers and sellers remains challenging. And potential risks may come from both sides of the transaction, not just from the seller side.

There are thus still major hurdles for free exchanges and for integrating the local markets into a global one.

The main difficulties faced by the participants in the secondary automobile market are:

- Fake listings;

- False information in the listings;
- The information about automobiles being dispersed among various actors such as the repair salons, les garages, official dealers and manufacturers;
- Impossibility to detect concealed defects;
- Tracing the full history of a automobile;
- Fear of not having a sufficient recourse in the case of a dispute;
- Insufficient familiarity with the applicable legislation in each country and the language barriers for improving it;
- Fear of fraud and lack of trust driven by difficulty identifying the market participants, including companies.

Various existing platforms give more choice to the market participants but they fall short of sufficiently protecting them and rending the market transparent. Those platforms are clearly mostly interested in maximizing the traffic to their web-sites in order to maximize the ad revenues but they close their eyes to obvious problems.

Let us also try to look at the other e-commerce contexts and see whether the digital solutions used there are used in the world of automobile sales. Most of them clearly aren't.

As today cars are a daily necessity for many, almost every family possesses at least one car. Hence, there is a lot of infrastructure developed for the consumer needs. However, the B2B sector still remains largely in the Henry Ford era in this sense.

It is the year of 2020, almost all the information is becoming digital, so:

- Where are the digital interfaces that would allow verifying the state of a automobile?
- Why do people have to keep the purchase documents for the duration of ownership and transfer piles of paper with the automobile history to the new owners at the time of resale? As if we were talking about genealogical trees.
- Why, with all the ways of paying electronically, do people still have to cross entire countries with massive sums in cash to physically close the transaction on the spot?
- With all the automobiles bought and sold, why is it still so hard for foreigners to get insurance for buying a automobile in a country and bringing it home?

- Why are people losing time registering automobiles where there is always some bureaucratic obstacle like a missing document or a small error in filling out the forms?

It is about time that we changed this sorry situation and integrated the modern tools to modernize the automobile market. The solutions are already there, they already work, and there is no need to reinvent the wheel.

3. The Kargain vision

Karspace is a sister platform to the centralized Kargain.com. The goal of both is to help moralize and internationalize the automobile market, track and make safer the exchanges and boost the liquidity on it. Another major objective is to finally create a globalized market of automobiles that will be transparent and safe to participate in. It is not normal, for instance, that someone living in Barcelona finds it easier to buy a used automobile anywhere in Spain than in some city in France that may actually be closer to Barcelona geographically and may have a better range of choices available to her.

The two components of the future Kargain ecosystem are related but can be used independently, and are indeed intended to be used independently, at least in the beginning.

The first component (Kargain.com) will, at least initially, be completely centralized. We are talking about a website with a database that will allow anyone to post and respond to offers to sell used automobiles. Individuals will be able to use the Kargain centralized offer services for free, while professional market participants will have to pay a monthly subscription fee. This component is currently under development and is expected to become available for use soon.

It is, however, the second component (Karspace) that is the primary subject of this document. It will run on top of a smart-contract-focused blockchain platform. We have not yet chosen a concrete one because the project is at the conceptual stage. We discuss the vision behind Karspace and provide a high-level description of its potential implementation in the following sections.

But before we move on, we need to briefly address the relationship between the centralized and decentralized platforms and the potential synergies between the two. First, someone will be perfectly able to use either only the centralized component, or only the decentralized one, or both of them. Someone who does not want to pay for subscription and use the experimental functionalities of Karspace can just use Kargain.com if she would like to have an alternative to the currently available web-sites for publishing sale offers. Someone can also freely use those other web-sites to publish her offers or respond to those of others but also experiment with Karspace and the possibilities it offers. Finally, someone can use both the Kargain.com and Karspace platforms.

The key advantage of this approach is that at least in the beginning, Kargain.com will likely be used significantly less than the competing platforms because of the latter's network effects. At the same time, their users can also benefit from using Karspace. Moreover, we are not planning to induce Karspace users in the future to switch to Kargain.com. The vision behind Karspace also centers on opening up the automobile markets and globalizing them. Restricting this platform to interactions with just one centralized online sale offers platform would fly in the face of it.

4. Why blockchain tech for Karspace

The question that one may well have at this point is why we did not just decide to try to decentralize all the aspects of the used automobile markets. Why create a semi-open ecosystem with a centralized Kargain.com and a Karspace platform?

The answer is that our approach is grounded in our multi-year observations of the emerging blockchain space that led us to realize the need to avoid two equally dangerous extremes.

On the one hand, blockchain technology and the related tools are probably not yet mature enough, either technically and economically, to attempt to put all the aspects of an ecosystem like Kargain on the blockchain. The most battle-tested public blockchain protocols like Bitcoin and Ethereum are too slow and costly to use at a

scale for all the envisageable transactions, whereas their promising newcomer competitors are probably too new to entrust significant amounts of value to them.

At the same time, it is important to also avoid the opposite error of using the term “blockchain” as a sort of gimmick or PR trick and use blockchain technology for purely cosmetic purposes or using a watered-down permissioned version of that revolutionary tech that may be little better than a corporate replicated database.

With these pitfalls to be avoided in mind, our approach to Karspace will involve creating an optional paid-subscription service that will include the following blockchain-powered services:

- Registration of title transfers and other important events with respect to automobiles;
- Identity and reputation;
- Possibility to make a deposit and reserve a automobile without the need for traveling with cash.

Let us consider those components one by one.

4.1 Blockchain registration of important automobile-related events

Why register automobile title transfers and other important automobile-related events on the blockchain? It is true that, currently, in most countries title transfers are subject to government registration. Furthermore, almost every automobile in the world has a standardized automobile identification number, or VIN, under which it is registered. Each automobile then carries a special plate with its VIN. The VIN, in particular, encodes the manufacturer, the model of the car and its year of production.

However, government registration of VIN-tied automobile transfers is costly and, more importantly, it does not completely prevent car theft as car thieves can, for instance, strip a stolen car of its valuable parts, buy the totaled car at the auction and rebuild it with the original parts. They can also steal the VIN plate from another automobile and put it on a rather similar stolen one. As most buyers do not check the VINs in detail, the thieves can sell the car with a fake VIN and disappear before their mischief is discovered.

Major automobile-related events like title transfers and automobile or VIN thefts can be easily and rapidly registered on an immutable public blockchain ledger. This will

go a long way towards making car theft essentially impractical. It is also possible to go beyond registering just those events and allow not just automobile owners but also other automobile market participants to register important automobile-related events on-chain. Those could in the beginning include major repairs and defects found during automobile inspections. In the future, if the blockchain technology becomes highly-scalable and widely-used, even the data from the increasingly numerous censors could also be stored on-chain. The ultimate vision is to collect the essential information about every automobile in a transparent and tamper-proof way on the same platform.

The way that we envisage this being done is that each automobile users will choose to track on-chain will have its unique (probably ERC-721-compliant) token (NFT). NFTs have a JSON file with metadata attached to them that can be updated and may have various attributes. Among them could be the name of the current owner, the current owner's public address, the automobile's VIN number, manufacturer, inspection results, a URL of a photo of the automobile, and potentially even the hash of a verified photo of the automobile to increase trust.

The transfer of the NFT can only be done by its owner (assuming she controls the private key of her public address). Once the transfer is effected, this is equivalent to the registration of the transfer of title. Ideally, in the future this will be recognized as a legally binding title transfer method but that will probably take some time, given the rigidity of the formal legal systems and practices.

Hopefully, it will also be possible to include into the token factory contract(s) for automobile-related NFTs certain functions that can be triggered by public addresses other than that of the current NFT owner. It may be useful to allow, for instance, for trusted service providers like repair shops to update information about automobiles that they worked upon, like major defects that they have discovered. They could in the future be rewarded in Karspace tokens, if Karspace ends up emitting a utility token (see section 6 on the potential token issuance).

Allowing service providers could significantly increase trust by the would-be buyers in the secondary automobiles that they are offered. Professional third-party services potentially have much better incentives than automobile owners to truthfully report

the issues that may impact the automobile prices, especially if automobile owners are not regular sellers who care a lot about their ongoing reputation.

4.2 User identity and reputation

User identity on Karspace will be governed by an Ethereum standard, probably Uport-led ERC-1056. The high-level idea behind this approach is that a user only releases information about herself to a third party when she signs a transaction with her private key.

The ERC-1056 identity standard is also somewhat similar to the ERC-721 standard for NFTs in that an identity token can have a JSON file with the metadata of a user, a URL to a photo of the user's passport, for instance, or to some other document in the case the user in question is a legal entity. With regard to legal entities, ERC 1056 enables delegation of certain actions to specific Ethereum public addresses to which the identity token refers.

The ERC-1056 standard contract could be further modified to allow a reputation function that could be triggered by another smart contract. As a hypothetical example, suppose that user Bob successfully sells her car and transfers its associated NFT to the buyer. The NFT's smart contract can pick up the successful transfer and send a message to Bob's identity contract, which will, in its turn, augment the user's reputation by a certain amount of points.

The reputation mechanism may be particularly important for the professional participants of automobile markets, as, unlike ordinary buyers and sellers, they transact on a regular basis and need to establish and maintain their trustworthiness in the eyes of other market participants.

4.3 Making purchase deposits

As we mentioned in this paper, at present, many buyers of used automobiles face significant transaction costs related to the need to incentivise sellers to reserve the automobiles they intend to purchase and actually sell them to them on the spot. They often even have to travel with large amounts of cash to settle the transaction simultaneously with the physical control transfer.

This situation could potentially be improved significantly if buyers could quickly put part of the purchase parts into an escrow smart contract. The deposit release to the seller or buyer could be triggered, for instance, by the transfer of the whole or remaining part of the purchase price to the designated public address of the seller, respectively. Another solution (in the case, the purchase price is not paid in cryptocurrency) could involve having a professional arbiter who could have control of the escrow wallet to solve disputes. Still other approaches involving more sophisticated technological tools (such as oracles) could be envisaged.
To avoid the problems caused by fluctuating cryptocurrency prices, stablecoins issued by reputable providers like Circle (USDC) could be used for paying safety deposits and the purchase price.

5. Summary of the proposed implementation

In preparation for writing this whitepaper, we have studied a wide range of the available blockchain platforms and the associated tools in order to decide which of them offer the best balance of scalability and ease of development. As a result, we are currently considering building the initial decentralized components of Kargain in at least three potential ways, although the list is certainly not exhaustive:

- Ethereum and an optimistic rollup-based solution; or
- the Hedera Hashgraph platform; or
- the Flow blockchain by Dapper Labs.

We have not made our final choice since the landscape of the available platforms and their characteristics is changing rapidly at this very moment. We would also like to obtain feedback from the blockchain community, experts and the blockchain platform teams

5.1 Ethereum plus optimistic rollup

Optimistic rollup is a recently developed second-layer scaling technology for Ethereum. Like the currently mostly abandoned Plasma, OR involves most transactions being confirmed outside of the main chain and occasional summary

transactions being sent to the main chain. The OR sidechains are supposed to each have its version of optimized Ethereum Virtual Machine (EVM), called Optimistic VM (OVM). It also involves a mechanism for participants to challenge the transactions made on the second layer using a smart contract on the main chain.

However, the major difference comes from the fact that OR involves publishing on the main chain more information than Plasma. This makes this approach somewhat less scalable but at the same time, compensates for it by allowing users to challenge suspicious transactions more easily. It is also clear that the scalability advantages of OR can only be realized if multiple specialized OVMs are present. That is why, numerous projects (Optimism, Fuel Labs, Celer, Dharma, etc.) are working on their versions of the technology.

The major advantage of using OR is that Kargain would be able to benefit from the massive network effects of the Ethereum ecosystem, easy integrations with other Ethereum-based protocols and DApps, and so on. Ethereum still overwhelmingly dominates the DApp ecosystem, including NFT applications, and this may remain the case, especially if it manages to start rolling out the Serenity upgrade soon without major hiccups.

At the same time, choosing Ethereum carries with it its own risks. OR is not a technology with a proven track record of scalability and security and there is probably no other alternative to it yet for DApps, except for meta-transactions and Raiden that only solve the problem of ERC20 transfers. And switching to Serenity may prove difficult given the need to move over the whole enormous ecosystem to it.

5.2 Hedera Hashgraph

The alternative is to develop all the decentralized elements of the Kargain platform upon the Hedera Hashgraph’s distributed ledger technology. It is a semi-public DLT platform that uses a directed acyclic graph (DAG) distributed data structure instead of a classic blockchain.

It uses a virtual voting-based consensus mechanism which is a version of Practical Byzantine Fault Tolerant (PBFT) consensus optimized for Hashgraph’s DAG. At the initial mainnet stage, its validating nodes are run by the companies that are members of its governing council. The Hedera platform uses the same virtual

machine as Ethereum for powering smart contracts meaning that all the smart contracts developed for Ethereum can be easily ported to Hedera. It also has a dedicated service (Hedera File Service) that allows storing and updating small files on the ledger and removing them from it when they are no longer needed.

But perhaps, the most attractive element is the Hedera Consensus Service (HCS). HCS is a tool that allows to only use Hedera's core network for validating transactions and putting them in a fair order without the need to have them executed by Hedera's virtual machine.

Put differently, Karspace may have most of the computations made within its network of nodes. However, the instructions to be executed will be first sent to the Hedera network for validation in an encrypted form. The Kargain network will receive them back from Hedera and execute them. This massively boosts transaction scalability, as the key obstacle for scalability on blockchains with EVM-style virtual machines is execution of transactions, not consensus over them.

LaunchBadge has already built a working prototype of an NFT-using application using HCS. Karspace will certainly need to rely on the slower services of Hedera to some extent. HCS probably does not allow to handle user reputation in a decentralized way, nor does HCS allow for decentralized storage of automobile NFT metadata or at least their hashes. However, hopefully, it would be possible to integrate the three major services offered by Hedera (HCS, the smart contract service and the file service) in a single Kargain DApp.

Choosing Hedera could also be advantageous for Kargain because there are fewer promising DApps being developed on it than on Ethereum, while the ecosystem has had significant marketing and project-assistance resources.

A potential significant downside of Hedera is its incomplete decentralization at present. Both its governance and consensus are currently handled by a diverse consortium of major companies. It is not the number of companies *per se* that poses a problem as there are probably more of them than important mining pools on Bitcoin or Ethereum. Rather, it is the fact that major companies may be pressured by the threat of government regulation into censoring applications and transactions. However, it is unclear whether this is a major risk for Karspace, given that it is not

aiming at powering grey-zone activities, examples of which would be prediction markets or a decentralized Uber in countries like France and others.

5.3 The Flow blockchain by Dapper Labs

Flow is a blockchain platform under development by Dapper Labs. Dapper Labs was the company behind perhaps the most famous DApp, the Cryptokitties game, that was also the starting point for significant use of NFTs. Having faced the network congestion on Ethereum because of the game's sudden popularity, Dapper decided to develop its own scalable blockchain, optimized particularly for NFT applications.

The main potential advantage of Flow is that it may succeed in separating consensus from computation in a decentralized way. This would significantly boost scalability for DApps like Karspace.

Recently, the Flow project has received a major reputation boost as the Facebook-led Libra project entered into a technology exchange with Dapper Labs, agreeing to use Flow's smart contract language Cadence. In turn, the Flow blockchain will use Libra's Move virtual machine that is the only VM well-suited for Cadence at the moment, according to Dapper.

The potential advantages of using Flow for Karspace include its NFT-optimized character and the aforementioned separation of consensus from execution. In addition to this, as in the case with Hedera, Karspace could gain more visibility and development support working with a somewhat smaller platform than Ethereum.

However, the potential downside is that Flow's approach has so far not even been tried in the testnet form, and could thus carry with it significant technical risks. That said, given that they are planning to adopt Libra's VM, the risks may actually be low, at least from the VM standpoint. Also Libra's involvement is probably going to help the Cadence smart contract language mature fast.

6. Kargain token

In order to create better incentives within the decentralized Kargain ecosystem, we are considering issuing the Kargain token (KRG). However, we have not yet settled on

the nature of the token and other details. They will crystalize, as updated versions of this whitepaper will be published.

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