BIKECOIN BUSINESS WHITE PAPER

A decentralised platform for premium bike sharing

www.bikecoin.me

Support by Volata Cycles Inc

BIKECOIN ECOSYSTEM

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Abstract

Bike sharing is not a new business, but it is about to undergo a dramatic leap into the 21st century. The transformation in bike sharing will focus on “smart bikes” that have an electronic dashboard, navigational aids, integrated communications systems and which are protected by sophisticated anti-theft systems. These bikes will be part of the Internet of Things and their movements will be recorded on a blockchain.

The 1st generation of bike sharing took the form of fleets of bikes provided by public transit authorities in larger European cities, housed in racks around city centers. Various means were employed to dispense keys to unlock the bikes and to ensure they were returned after each ride. Theft was a common occurrence.

The 2nd generation of bike sharing is prevalent in the world now, characterised by large Chinese companies that operate bicycle fleets in many cities. They use very inexpensive bikes and dockless systems that are unlocked using smart phones. Social problems such as abandonment and vandalism are common.

BikeCoin is the first 3rd generation bike sharing system. It is a decentralised blockchain-based service which enables any number of fleet operators and service providers to interact in whichever business model they prefer. The BikeCoin platform also supports P2P sharing between owners and riders, just like AirBnb. BikeCoin is the first bike
sharing platform which provides network
effects benefiting fleet operators, service providers and riders.
BikeCoin overcomes many of the issues that have plagued other bike sharing schemes. It breaks down ownership barriers, allows bikes to contribute positively to the urban transit mix, promotes use of premium bikes and responsible ridership, eliminates abandonment, and supports the ecological and social goals of a sharing economy.

BikeCoin is partnering premium bike supplier Volata Cycles to introduce sharing of smart bikes. There will be two distinct divisions o f the business: a technology division which is implementing a decentralised blockchain platform, and a services division which will operate a fleet of smart bicycles. Along with mining rewards, used to incentivise partners who provide computing resources, bike sharing fleet operations will jumpstart the BikeCoin economy.

BikeCoin transactions will be enabled using the BKC utility token. There is a strong set of use cases for the token, including purchase of rides, purchase of maintenance services, incentives for responsible ridership, discounts for merchandise purchases and automated distribution of revenue shares using smart contracts.

The company is holding a token sale to enable interested parties to support and participate in the emergence of this 3rd generation bike sharing system, built on blockchain.

1. Problem Statement

1.1 Lack of Bicycle Manufacturing Innovation

In the past century, other than new materials, there have been relatively few innovations on the classic 2-wheeled pedal bike, invented by J.K. Starling as the 'safety bicycle' and with pneumatic tires added by Dunlop. After the war, the cruiser with freewheel gearing and coaster brakes was replaced by the English racer (really a touring bike). And by the 1980s the market offered a range of models including Italian racing cycles such as Colnago, BMX (motocross) and mountain (off road) bikes.

The last major technological improvement in standard bicycles was indexed shifting, which began to replace the less accurate friction shifting in the 80s. Indexing makes shifting accurate, but the feature also gives a rider the ability to shift under load or to shift without pedaling. These capabilities are a big deal for riders.

Since the 80s we've seen more enhancements, including the Shimano Freehub, direct-pull brakes, compact cranksets, clipless pedal systems and a few other things, but they're not fundamental changes - just minor refinements. In the past 20 years, we've seen the introduction of carbon frames, carbon belt drives, internal gear hubs, hub dynamos (with a small electrical generator built into the wheel hub) and super-bright lights.

But there's nothing smart about these new bikes. The bikes don't have anti-theft mechanisms, don't communicate with the rider and are not part of an intelligent network. Whatever health tech the rider cares to use, like Fitbit and other medical sensors, these are still worn on the wrist. And unlike modern automobiles, the bike has no way to assist you with navigation. Getting to your destination requires a handheld Global Positioning System (GPS) device or mobile phone, and a shockproof mount.

One of the complications in bicycle innovation is that most enhancements are implemented as attachments. So the bike owner is always making a tradeoff between features, convenience and the possibility of theft if the new add-on is stolen. Bikes can easily become cluttered with pumps, water bottles, locks and and GPS devices, so much that the elegance and beauty of the classic frame is lost.

1.2 Poor Urban Planning

Adding to the woes of urban cycling is poor city planning. The transportation sector accounts for more than 14% of greenhouse gas emissions globally, and accounts for 28% of these emissions in the United States. Yet, even though there is a widespread recognition of ecological and health benefits of cycling, particularly as a mode of transport in crowded urban centers - progress has been slow. There is always a trade-off. Creating safe streets for people walking and biking requires narrower travel lanes, slower vehicle speeds, more physical protection, more sidewalks and bike lanes.

Underlying these challenges is the fact that bicycles have tended to be personal assets and the business model of cycling is sales to individual riders. This is despite a long and quixotic history of attempts to introduce bike sharing schemes in cities. Most of the problems with these schemes arise due to the high value of bikes, the need to lock them to racks, and the various operational challenges of loan and return. We refer to these as 1st Generation Bike Sharing schemes.

But things are beginning to change in places like Copenhagen, Singapore and Portland Oregon. In the past decade, urban planners have implemented policies particularly focused on making cycling more attractive. These include 'green wave' lanes for bike traffic, bikeways that connect city parks and multi-modal support such as the ability to take bikes on busses and trains.

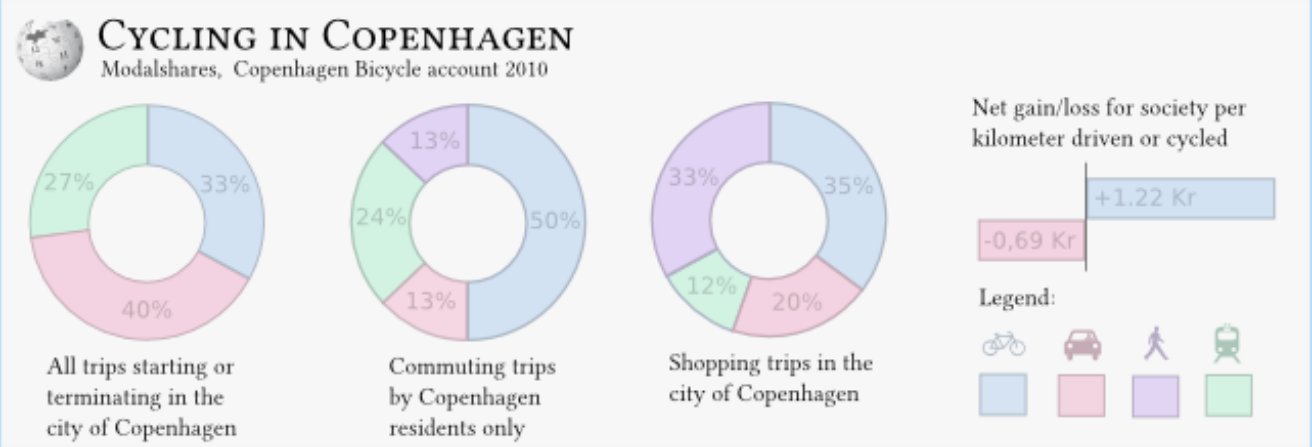


Figure: Charts of modal shares for traffic in Copenhagen showing high bike ridership.

1.3 Flawed Bike Sharing Business Model

In the past 3 years, we have seen the introduction in major cities of so-called “dockless” sharing schemes in which bikes are wheel-locked rather than secured to a rack. The operators of these new services leverage technology to overcome many of the barriers to bike usage in cities - especially cost, availability and theft. It is a phenomenon made possible by low cost manufacturing in China and miniaturisation: components which are small enough to be built into a bicycle frame so they are theft-proof. In this paper, we will describe the phenomenon of cheap Chinese bikes being offered through dockless sharing schemes as “2nd Generation Bike Sharing”. Here’s how it works.

Mobike, the Chinese company recognised as one of the first innovators in the dockless share bike market, has a fleet of seven million bikes and serves 160 cities around the world. And there are many competitors, including Ofo, which touts more than 25 million daily transactions on its service and has a 2020 plan to have a fleet of 20 million bikes in 20 countries. Are they fully utilised? That is not so clear.

The way that these companies avoided using racks is by employing clever technology that allows riders to lock and unlock the bikes by themselves. A payment system runs as an app on the rider’s mobile phone, identifies the bike using a QR code and bluetooth communications allows the app to unlock the bike.

Figure: flawed bike sharing business model

Here's how the 2nd Generation Bike Sharing systems work:

- *All the bikes are GPS enabled so that their locations are known and tracked.*
- *The user finds a bike (aided by a map on their smartphone), unlocks the smart lock of the desired bike by scanning the visible QR code (with the phone app).*
- *After completion of the ride, the user parks the bike and manually locks the bike. It is now available to another rider.*

This works, but the business process is flawed in two respects: (a) it is based on one-way rides where the rider takes no responsibility for bike return, and (b) it is a centralised model of business in which the bike supplier is also the service operator and has to manage their entire fleet.

Because of the focus on one-way rides, such as from a train station to home or work, social problems of theft and abandonment are commonplace. Bikes are thrown into canals, left on busy highways, and abandoned in remote locations. Even if a bike costs less than USD 50 to manufacture, operating costs include paying employees to haul bikes back to busy intersections, find abandoned bikes, fight theft, and comply with new regulations sprouting up because city officials are annoyed at hordes of cheap bikes blocking sidewalks. So 2nd Generation Bike Sharing has a huge social cost.

In addition, bike-sharing has no real economies of scale. Fleet costs don't become less as the market grows, and each operator has to launch competing city-by-city services. New riders in the system do not add any value to other riders nor to a network of independent service providers. In short, there are no network effects between operators or riders. 2nd Generation Bike Sharing is too centralised.

1.4 Economic Challenge Of Bike Sharing

By necessity, Mobike, Ofo and other sharing operators use very inexpensive commodity bikes - bicycles which the riding public is unlikely to steal. They overcome the theft problem by providing what are almost 'disposable' bikes, and keeping prices low.

Indeed, the price of one-way urban bike rentals is so low that it's difficult for operators like Mobike and Ofo to make a profit. It can take up to 6-months for a commodity bike to earn back its manufacturing cost, and this does not factor in rising operating costs, which necessarily include paying employees to run the operations reported above. Many operators are pricing below cost simply because they raised a lot of venture capital and they hope to starve out less wealthy competitors.

Bikes used in 2nd Generation Bike Sharing cost as little as USD 50 to build, and they have none of the elegance and high-performance features of premium bikes. It will be very difficult for these operators to add features such as navigational support. Simply put, this model of business cannot support premium bicycles, which can easily cost over USD 1,000 to build.

1.5 The Challenge Of Sharing Premium Bikes

Bicycle sales is a growth market. The global bicycle market is worth tens of billions and is expected to grow by 4% during the period 2018-2022. We'll share more stats in Section 2.5 Customers and Revenue. But for now, simply note that this huge market is mostly dominated by bike ownership - sharing economics is only starting to take hold.

Increased awareness about personal health and environmental benefits are major factors underlying the popularity of cycling. Cycling is increasingly an urban activity, and riders see cycling as a means to avoid being caught up in traffic jams. It has been shown that, in cities where cycling accounts for an increasing share of urban transport, bike sales increased significantly. So what is good for the environment and personal well-being is also profitable for bike companies.

High-end bicycles are benefiting most from these trends. Premium bikes are preferred by sports enthusiasts due to the quality of the frames as well as having superior components. Technical advances such as integrated anti-theft systems, battery charging systems and super-bright lights are increasing sales. The next stage of growth will add intelligence and communications capability to premium bikes.

Because buyers are less sensitive to price, premium bikes will be the first bicycles to integrate intelligent sensors and communications functionality similar to Fitbit devices. These devices can communicate with riders, provide alarm systems for medical emergencies and integrate with urban green wave cycle lanes. In other words, these bikes will become part of the 'Internet of Things' (IoT).

Some of the key features of IoT for bicycles:

- *CPU and App dashboard at the handlebar stem, for easy viewing*
- *Control the App using remote buttons at the handle grip, for easy operation*
- *Rear wheel locking device which is remote controlled, eg- via bluetooth*
- *Unique machine-readable asset identifier, eg- QR code or SIM chip*
- *GPS-based anti-theft system, optionally with motion detection alarm system*
- *GPS telemetry for bike tracking, uses App dashboard for realtime navigation*
- *Speedometer, Odometer and compilation of trip data (depends on app)*

But although the future of premium bikes is bright, it is difficult to integrate them into the sharing economy. Bike sharing for premium bicycles faces a challenge that is not present with commodity bikes - the operator needs a safe place for storage of bikes when not in use. With premium bikes, even if the smart lock is engaged and the wheel is locked, someone may be inclined to place the bike in a vehicle or truck and carry it away. This would never happen with a commodity bike - the value of stealing a Mobike or Ofo isn't worth the risk of getting caught.

Where is it safe to park a premium bicycle: a commuter train station, or a shopping center? Must the premium bike be locked to a rack? Could there be a business model where custodians keep the premium bikes safely stored at night?

To resolve this issue, the operator of a premium bike sharing service would need to work with service partners acting as custodians. Such partners might include hotels, resorts, share offices and local councils. This would be a fleet model of business, with different operators in each city, using software for inventory tracking and metering of rentals. The service would need to focus on round-trip rides, to encourage responsible use of bikes and their return to the service provider after use.

This is what we will propose as a solution: responsible ridership focused on round-trip rides, and a decentralised business model which allows different fleet operators to share a technology platform and thereby enjoy network effects.

2. Our Solution

The transition to a sustainable means of urban transportation is a priority. Bicycles are an increasing part of the urban transport mix and can address most of the issues such as traffic congestion, resource consumption, pollution, parking, etc. All over the world bicycle commuting is becoming more popular. The shared use of premium bicycles will allow riders to participate in this urban transformation, without a high up-front cost.

Our proposed solution is a 3rd Generation Bike Sharing scheme. It is based on blockchain technology rather than the traditional client server architecture used by most web applications. We make this choice because blockchain technology does not require users to trust a single authority and it is community driven.

As explained in the problem statement, the operator of a service sharing premium bikes would need to collaborate with service partners who act as custodians for the physical assets (ie-bikes). And we expect there will be many operators sharing the platform, perhaps one per city, each with their own service partner relationships. The fleet operation could potentially support various business models such as: 'free-to-use', 'paid-by-hour', and 'group tours'.

These collaborations would be enhanced by some of the core features of blockchain which are not found in client server systems: transparency, immutability and auditability. For example, a blockchain's inherent capabilities as a 'single source of truth' allow for trustless verification of payment distributions. Blockchain also allows the community participants - particularly network operators - to make their own choices regarding how their business operates, such as pricing decisions

BikeCoin technology incorporates many exciting innovations, but for the cycling world, our project will introduce two main innovations, which will further promote premium cycling using smart bikes in the urban environment:

- *A reference specification for smart bicycles which includes as required features: (a) bike computer, (b) GPS tracking, and (c) an anti-theft system with alarm. Optional features include: integrated lights and a horn. Any manufacturer or assembler can easily supply bikes meeting this specification.*

- *A services platform built on the Ethereum public blockchain which supports decentralised fleet operations for premium bike sharing. Any bikes meeting the reference specification will be able to be utilised to deliver electronic vehicle fleet services on the platform.*

With BikeCoin, bicycles become electronic vehicles, providing riders with advanced informational, safety and social features. And premium bicycles can now join the sharing economy. In the following pages, we explain how we will achieve our goals.

2.1 Overview

As mentioned above, we are introducing a distributed bike fleet services platform built on the Ethereum public blockchain. This will be a fully decentralised platform that supports transfers of ownership and rental transactions using tokens. There will be no central authority.

On top of this blockchain layer we will launch at least two BikeCoin Decentralised Applications (DApp), one for fleet services and one for P2P bike sharing. These DApps can be used by the market participants to provide or receive services.

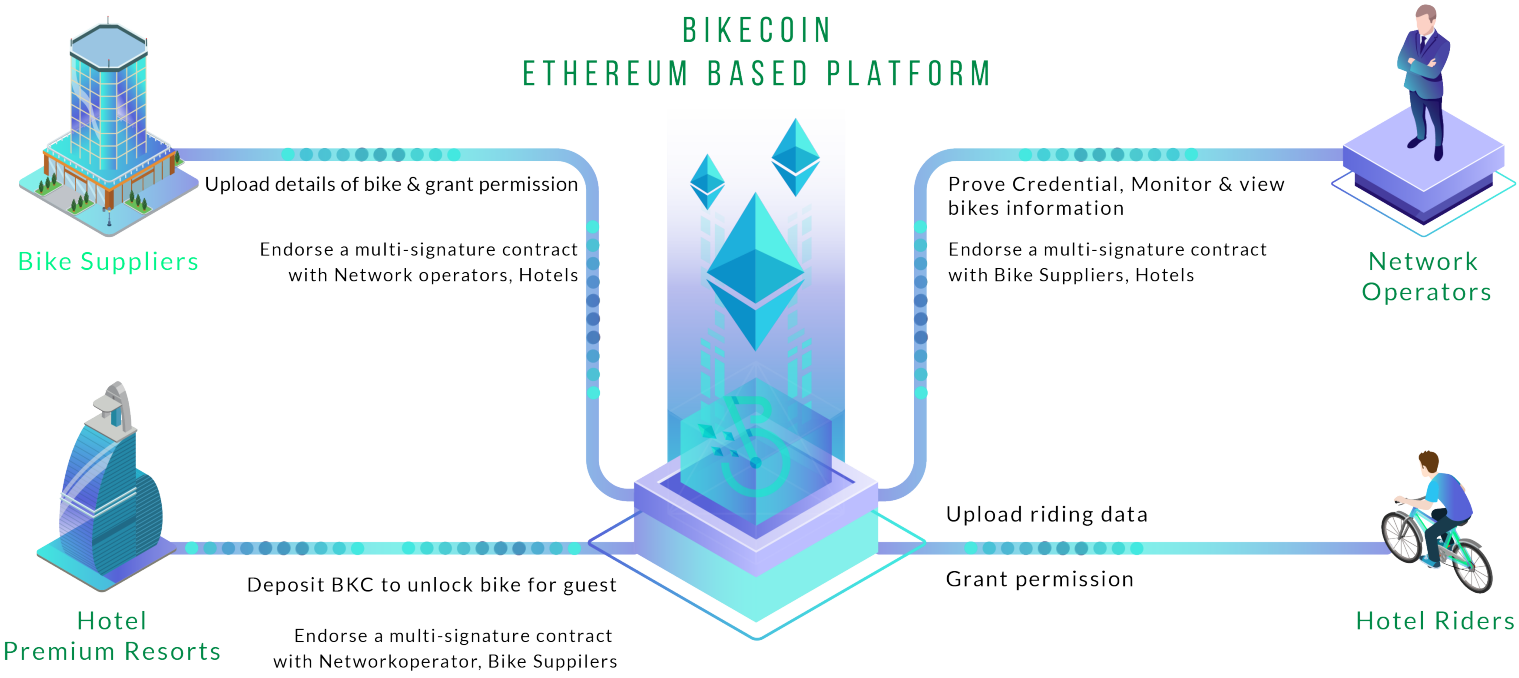


Figure: the 3rd generation bike-sharing ecosystem

Our 3rd Generation Bike Sharing solution provides the following rider benefits:

Existing Capability	Planned Capability
• Navigation system with realtime directions	• Crash detection
• Performance tracking	• Maintenance identification & remote diagnosis
• Remote status monitoring with geo-location	• Social and brand activity
• Anti-theft and alarm system	
• Battery management system	

Actors

Our platform will have four main market participants or actors, as listed in the table below. In some markets, the Network Operator may also play the role of a Bike Supplier, ie- owning their own fleet. In the case of P2P bike sharing, a Bike Supplier deals directly with Rider and no Network Operator or Service Provider is involved.

Actor	Primary Activities
Rider End consumer	• Uses a DApp to contract services from a Service Provider, paying via tokens. -- or -- • Visits a Service Provider's premises and contracts the service using tokens or fiat as a means of payment.
Service Provider Hotel, Resort or Co-Working Space	• Acts as custodian of bikes. • Uses the platform services to loan or rent bicycles. • Receives payment from riders and uses the platform services to distribute revenue to other participants.
Network Operator Distribution partner operating in a city or other specific territory	• Receives bicycles from a Supplier. • Secures insurance for bikes and riders. • Uses the platform services to operate a fleet of bicycles. • Provides bicycles to the Service Providers and performs maintenance services as needed.
Bike Supplier Manufacturer, assembler or capitalist	• Owns one or more bikes. • Upgrades bikes to meet the minimum specifications. • Supplies bikes to either the Network Operator, Service Provider or (in the case of P2P sharing) directly to the Riders.

Other parties, such as equipment manufacturers or insurers are considered as 3rd-parties. They do not have a direct role in bike sharing transactions and are not required to accept payment in tokens.

2.2 Development

The technical design for the blockchain platform is completed and the team is working on creating a Minimum Viable Product (MVP). The MVP is expected to be release in 3rd quarter 2018. Please see Section 2.6 Roadmap for further details.

2.3 Architecture

We are developing a reference specification for bicycles to interoperate with the BikeCoin platform, so that potential bicycle suppliers can modify their designs or make upgrades to meet the requirements. We will also be providing a release of firmware that manufacturers or IoT vendors can use to integrate bike CPUs, smart locks and location monitoring solutions. These open source packages will allow any bike assembler or manufacturer to become a supplier for rental bike fleets.

We are also creating a services platform which supports decentralised fleet operations for premium bike sharing. This will allow developers to build their own DApps which can be used to manage rental bike fleets.

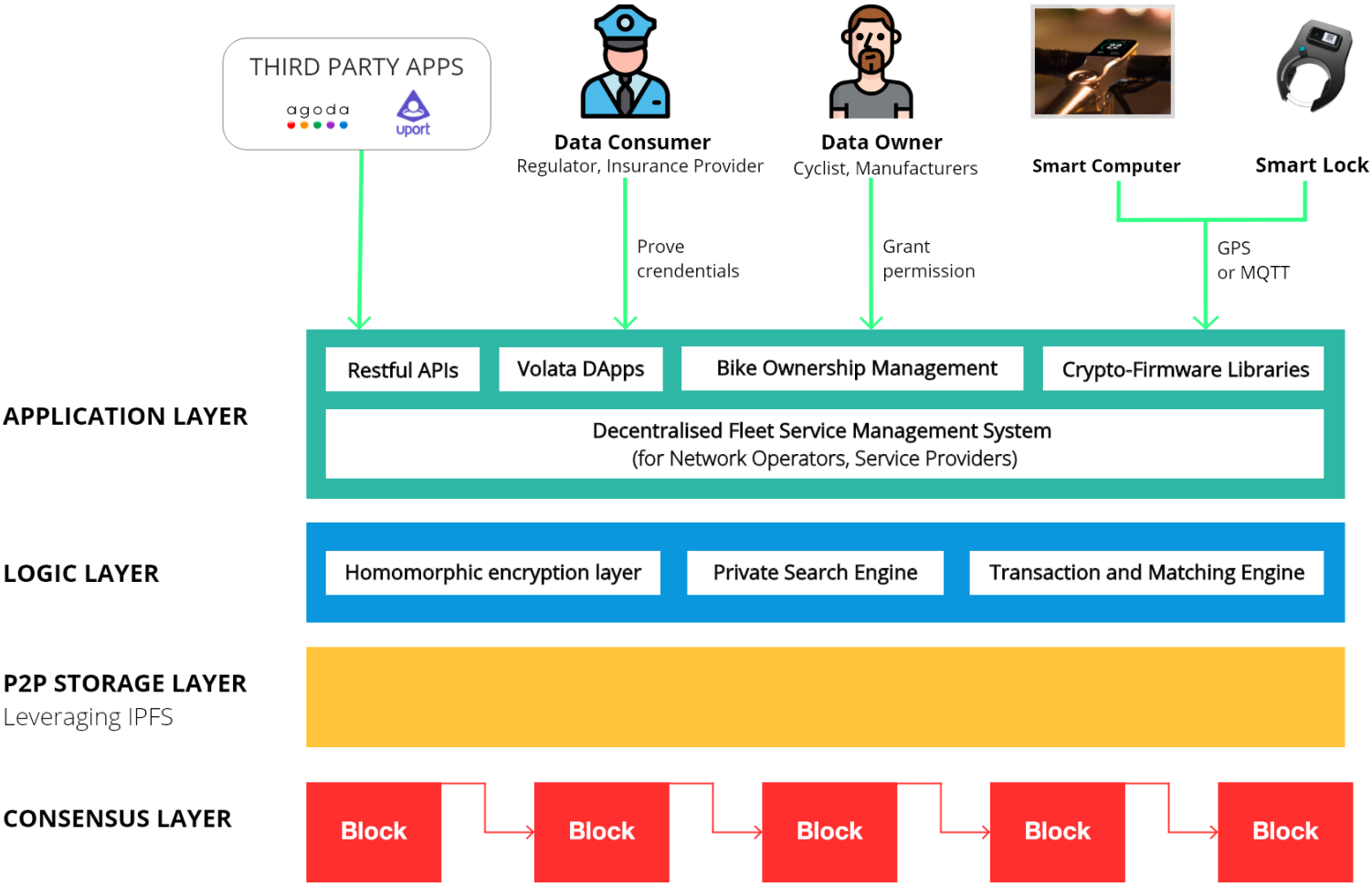


Figure: High-level System Architecture of BikeCoin

Our platform includes a number of technologies which will help DApp developers to quickly deploy decentralised and highly scalable services of their own. Here are some of the key technologies adopted and implemented in the platform. Note that not all of these will be introduced at once. See section 2.6 Roadmap for the schedule.

Technology	Benefits
Ethereum ERC20	Our own token provides a 'medium of exchange' for consumers and merchants using the platform.
Ethereum ERC721	This digital asset token proves the ownership of each bicycle, and supports blockchain-based ownership transfers. Each bicycle also has another smart contract, to support distribution of rental earnings to the various parties among cooperating merchants.
Off-Chain Scaling Solution	Our off-chain scaling mechanism uses the Ethereum codebase to execute smart contracts faster and more flexibly. This implementation includes a storage layer leveraging IPFS.
Raiden or micro-Raiden	This implementation will automate payment processing for a decentralised bike fleet and P2P sharing applications by providing high-speed token transfer transaction processing off-chain, using payment channels. These transactions will later be settled on the Ethereum public blockchain (using ERC20 tokens).
Zero Knowledge Proof (ZKP)	We use our own innovative ZKP algorithm to assure user and transaction privacy (protecting the blockchain addresses of the users and user data). As part of our ZKP implementation we will provide the ability to search for data and for selective disclosure.

As shown in the diagram below, the BikeCoin system architecture will have the ability to support multiple protocols using our intermediate layer with multi-blockchain interoperability. This is to encourage more developers to use the platform and thereby promote network effects. For example, NEO is preferred to Ethereum in China and so a NEO implementation of BikeCoin could be used by China developers.

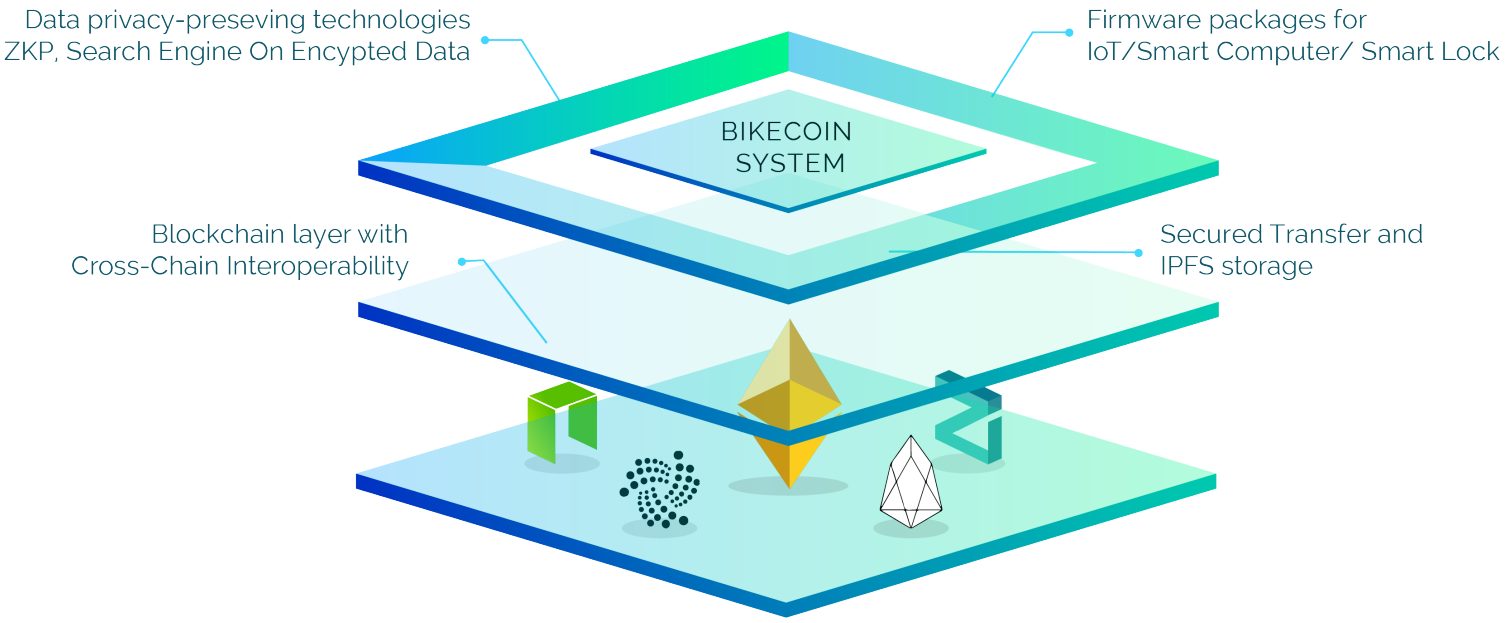


Figure: multi-blockchain interoperability.

For more details on the architecture, refer to the Technical Whitepaper.

2.4 Interoperability

BikeCoin provides a complete blockchain-based platform for managing all data collected from the bicycles and riders. We are creating a web-based interface running as a Decentralised Application (DApp), which the user will access to see relevant information and manage their data privacy settings. The platform interoperability allows bike suppliers, network operators, service providers and riders to intercommunicate in a frictionless way, to access simultaneously to different types of information, both in realtime and remotely.

Network operators authenticate and can see information on their own bike fleet. These network operators are able to share usage and maintenance data with suppliers, while at the same time providing availability, booking and transaction support data to bike sharing service providers. In turn, service providers can manage their own transactions. This would include monitoring bikes hired to paying riders via the BikeCoin app, as well as transactions conducted at their service counters, such as when they accept cash payments.

For individual owners who hire out their own bikes via BikeCoin, the DApp service gives them a way to verify riders, monitor rides and ensure fee collection, without being present during the transaction. Owners will also be able to rate riders using our blockchain-based ratings system.

Third-parties such as bicycle equipment manufacturers and insurance companies can use the DApp service to monitor fleet activity and obtain data on specific incidents. Confidentiality is assured and all data will have auditable integrity because it is based on the blockchain.

2.5 Customers & Revenue

Customer Demographics

Premium cyclists are health conscious, environmentally conscious and socially conscious (eg- parking their bikes properly, following local ordinances). Some use bikes primarily to go to and from work and some use bikes for recreation or athletic exercise. Premium bikes, like premium cars, are a status symbol. Owners of premium bikes tend to outspend their peers on cycling accessories, including clothing.

Cycling is both segment- and gender-neutral, appealing to the widest number of user groups,

across all ages and genders. Due to the relatively higher expense, buyers of premium bikes tend to be 30 years old and above. Women buyers are not grossly underrepresented, but are the fastest increasing segment.

Generationally, millennials (roughly ages 18-35) bicycle in the same proportion as GenX persons (roughly 36-50), but they show a greater desire to bike. This insight was revealed in a study by the US Transportation Research and Education Center (TREC). The reason millennials don't bike now is that the majority don't own a bike. So, since multiple studies confirm that millennials are early adopters of new modes of commerce, such as car sharing, flat sharing, and ride hailing, there is a huge opportunity for millenials to start enjoying cycling with premium share bikes.

Market Size Of The Sharing Economy

The total size of the sharing economy is difficult to estimate because most of the platform providers are private. But we're certainly talking about hundreds of billions of dollars in valuation, just among the 4 top firms: Uber, Didi Chuxing (known as the Chinese Uber), AirBnB and WeWork. And by last year, more than 50 million users enjoyed sharing economy services in the US alone.

In its March 2017 funding round, "Airbnb was valued at about $31 billion, roughly the same as Marriott International after its acquisition of Starwood Hotels and Resorts Worldwide. In New York City, meanwhile, the Uber fleet is nearly three times larger than the number of yellow taxis". A settlement between Waymo and Uber in January 2018 valued Uber at USD 72 billion.

Addressable Market

Premium bicycles have yet to enter the sharing economy. But the valuation of bike sharing companies for one-way rides is increasing similar to peers in other sharing economy segments. Chinese bike sharing firm Ofo recently raised USD 866m in new venture funding on a multi-billion dollar valuation. The following month, market leader Mobike was sold for USD 2.7 billion. And these are only the companies offering 2nd Generation Bike Sharing.

Persistence Market Research reports: "As sharing and rental services are currently gaining higher traction in the global bicycle market, stakeholders are increasingly striving to adapt to this trend. Moreover, a large number of corporate firms embracing cycling as a sustainable alternative to commute will be a significant factor impacting the sales of bicycles in next few years."

Persistence Market Research continues: “At a moderate CAGR of 4.2%, the global market for bicycle will attain the revenue approaching US$ 80 Bn during 2018-2026. The market was valued at around US$ 55 Bn in 2017 and holds optimistic growth prospects over the assessment period.”

The report goes on to state: “Evolving consumer demographics in developing economies will predominantly drive sales of mid-range bicycles, followed by premium priced cycles.” Based on this, we estimate the addressable market for premium shared bicycles in the period 2018 - 2026 to be worth at least USD 5 billion. As an early entrant (if not the first entrant) in 3rd Generation Bike Sharing, we expect BikeCoin to be a dominant player - with at least a 20% market share. That means that our obtainable market is at least USD 1 billion, making BikeCoin a potential unicorn company.

Go To Market Strategy

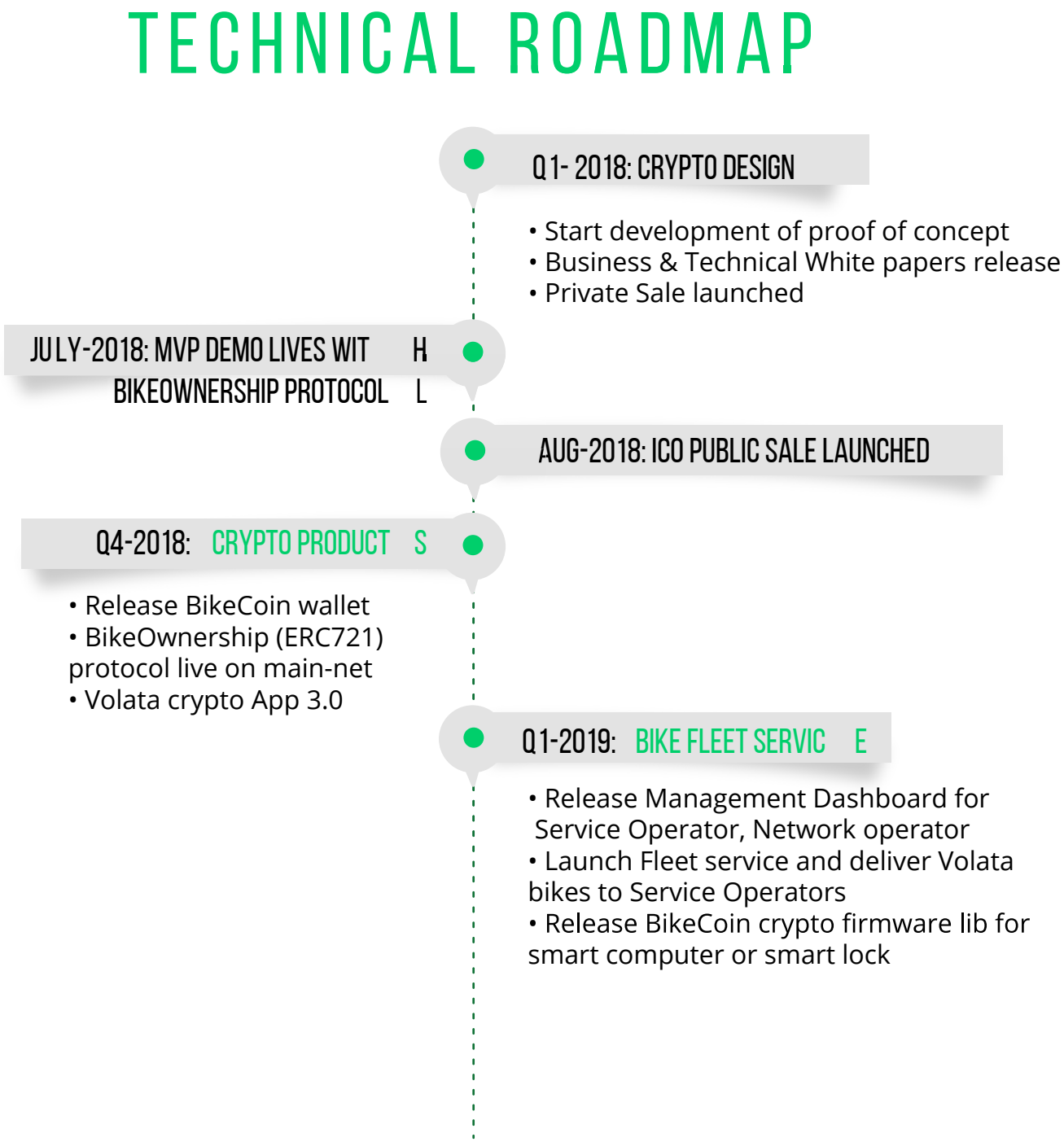
We will initially focus on the San Francisco Bay Area as it is the home to Volata and many innovative bike companies such as Breezer and Fisher, plus it is the heartland of new technology startups with a vibrant blockchain economy. And then we will introduce services in other North American cities with a bike-friendly culture, such as Boston, Portland and Montreal.

But, according to the same research by Persistence: “Europe and South East Asia Pacific will also retain the key market positions, whereas North American market is anticipated to experience sluggish growth during 2018-2026.” So our subsequent market rollouts will be in prominent European cities favorable to cycling such as Milan (the home of Italian bike-making), Amsterdam, Berlin and Copenhagen. Copenhagen consistently ranks as the most-bicycle friendly city in the world.

Next in priority, we will introduce services in prominent and bike-friendly Asian cities such as Singapore , Tokyo and Seoul. All of these choices are dictated not only by the urban transport mix, but also by rider demographics and disposable income, as we expect bike sharing to be synergistic with ownership of premium bikes. We also want to ensure that our riders are responsible and tech-savvy.

2.6 Roadmap

Following is the technical roadmap of the BikeCoin project. We aim to launch fleet services in 1st Quarter of 2019 and open the platform in stages for other developers. For the marketing roadmap, please see section 4.3 Token Sale and Distribution.



Q2-2019: OPENING ECOSYSTEM

• APIs for integrating bicycle manufacturer's inventory system/ ERP
• Release peer-to-peer rental service.
• Release Credit Rating system
• Integrating with DApps such as https://www.originprotocol.com,
• APIs for wearable devices to push performance data into BikeCoin ecosystem

Q3-2019: OPENING ECOSYSTEM

• Release built-in smart locks/ smart computer hardware integrating with BikeCoin crypto firmware library
• Integrating with other sharing-economy DApps and Identity DApps
• APIs for wearable devices to push performance data into BikeCoin ecosystem

Q4-2019: AD VANCED ECOSYSTEM

• Research & develop others private-pre-serving technologies:
Secure multi-party computation
Trusted Execution Environment

2020: AD VANCED ECOSYSTEM

• Cross-chain transfer data and integrate with other blockchains NEO, Zilliqa, ESO
• Collaborate with other IoT chains, other vehicle blockchain-based system such as Carchain (BMW, Toyota..)

3. Applications

BikeCoin will partner with Volata Cycles, a California-based bike-tech company that makes premium high-tech bicycles, to launch a pilot 3rd Generation Bike Sharing scheme with its own bike fleet. Volata specialises in producing smart bikes, with integrated digital features and standout Italian design.

The BikeCoin Pilot Scheme (BCPS) will function as a proof-of-concept that we hope will attract more partners as bike suppliers, network operators and service providers. As explained in the marketing roadmap, BCPS will be launched initially in North America.

Volata will be the first bike company to adopt the BikeCoin blockchain platform. To enable BCPS, BikeCoin will work closely with Volata Cycles on integration of their bike firmware with the platform and will release DApps for two market segments: fleet services and P2P bike sharing. These are described in the subsections below. But first let us explain why we choose Volata.

3.1 Volata Fleet Supply

Volata makes a complete bicycle, designed and engineered to provide each user with all the hardware and software features needed for safe and enjoyable commuting or recreational riding. Volata seamlessly integrates digital features into the bicycle, including: a built-in computer for navigation and to record performance data, GPS tracking for geolocation, automated lights, horn and an anti-theft system. These features are not accessories - they are built into the frame. Volata is a smart bike which builds upon prior innovations in dockless sharing, so that it can be the first of a new generation of premium bikes to join the sharing economy.

Volata's hardware is state of the art, using a belt instead of a chain, and an internally geared-hub instead of the traditional derailleurs. This benefits the riders with indexed shifting for hills and push-button ease of use around town. It translates into a huge reduction in maintenance costs, which is especially important to fleet operations. Smart bikes require an electrical system. Volata bicycles include a hub dynamo (with a small electrical generator built into the wheel hub) to power the CPU alarm system and integrated lights. The bicycle connects to the internet (via GSM) and to the rider's smartphone (via Bluetooth NFC).

Figure: Thanks to a front dynamo hub, the battery never needs to be charged

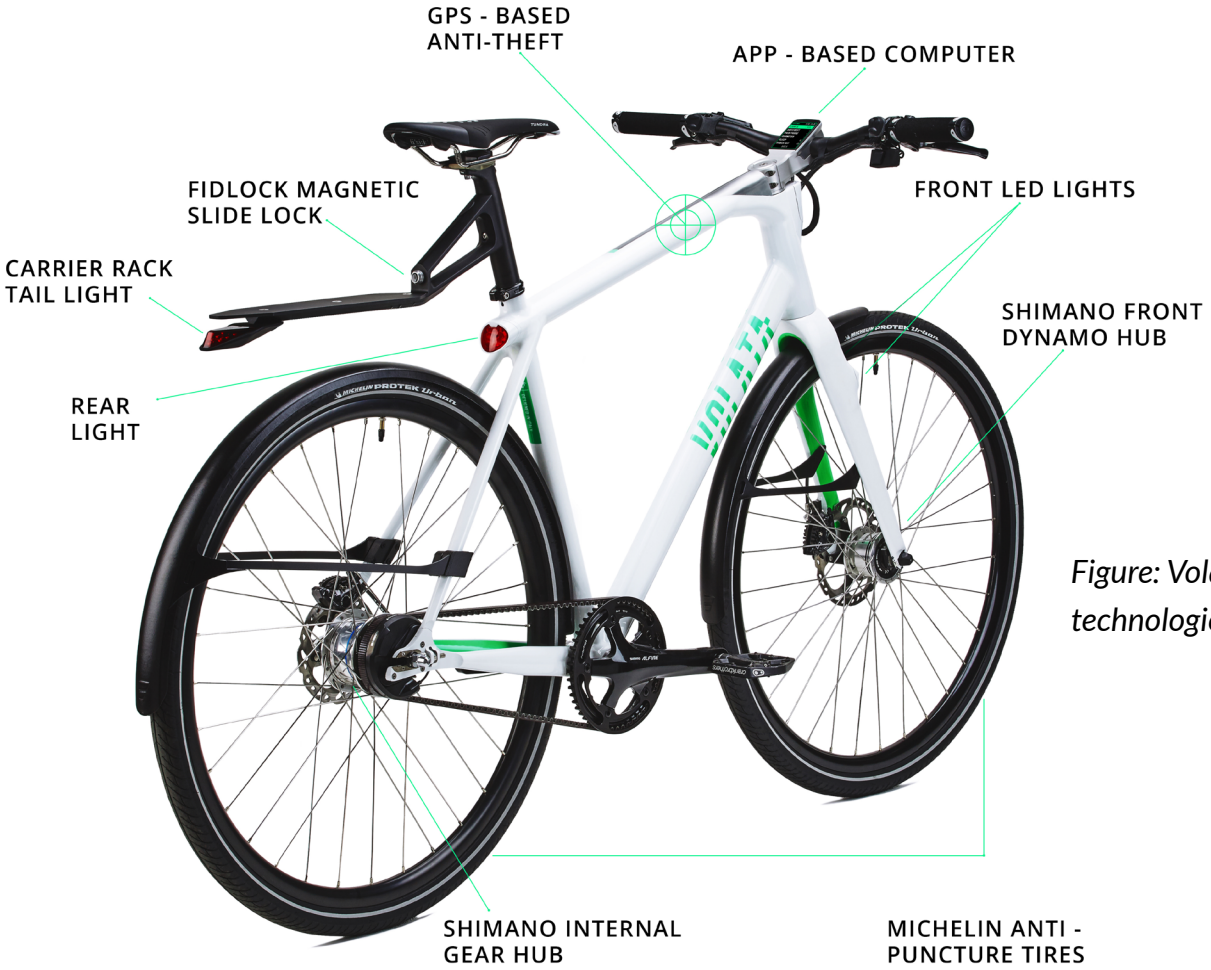


Figure: Volata bicycle technologies

Volata leverages the electrical system to provide an electronic dashboard. Using our BikeCoin DApp, the rider can: receive navigational updates (eg- turn left in 500m), check speedometer and odometer, review fitness activity (eg- pedal RPMs), and more. When the rider parks the bike, the anti-theft system can detect motion, set off an alarm or simply locate the bike if someone has stolen it. When the rider returns the bike to the service provider or owner's location, the GSM system will know that the ride is finished.

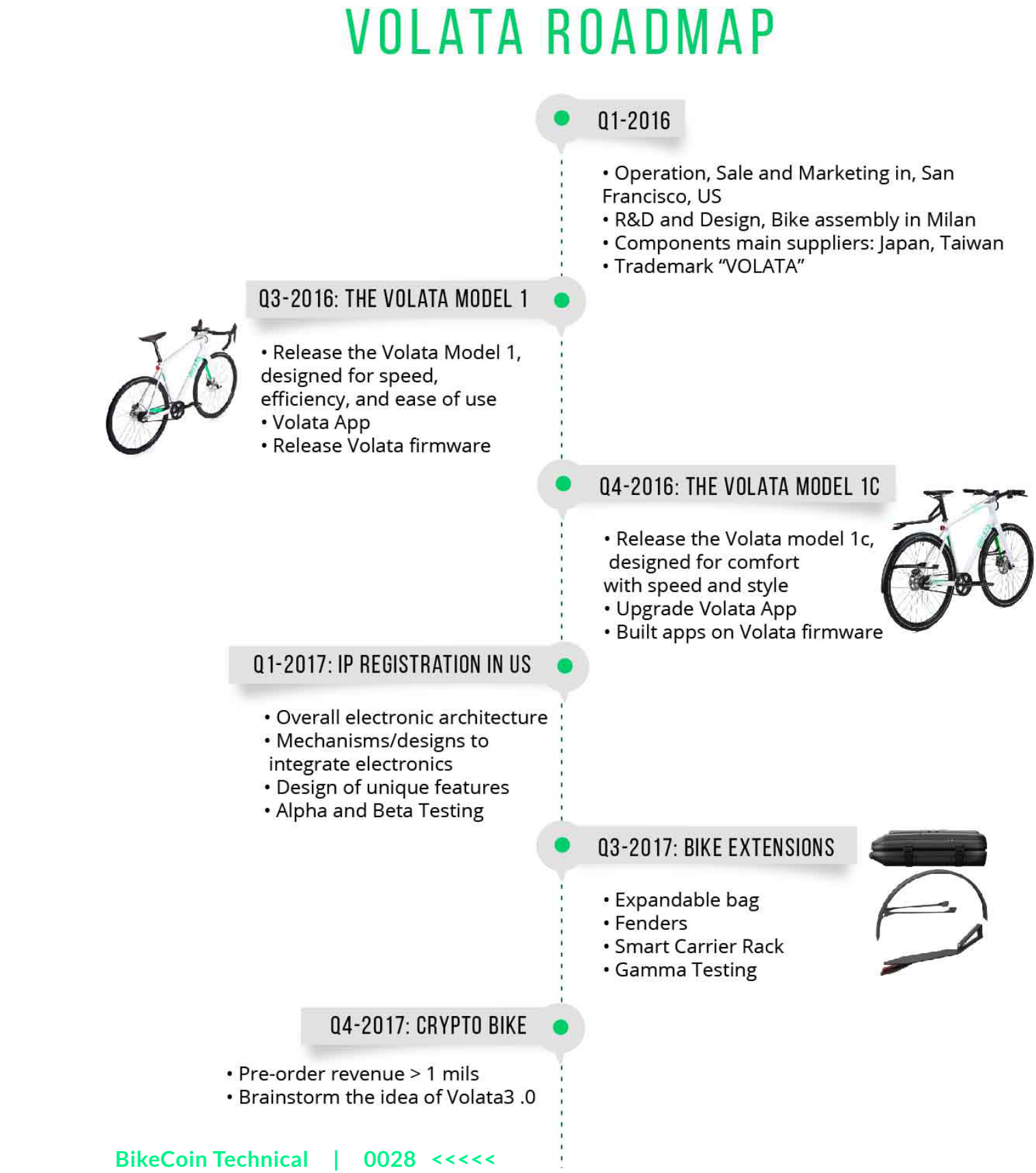
Building on this network interface, the Volata bike will have 3 onboard accelerometers and be able to detect when there is a strong shock or accidental impact and it can directly communicate with emergency services, the closest hospital, or a family member. This safety feature will be implemented in a future version of the Volata bikes.

Volata is a vertically integrated production, retail and servicing company. It began as an urban specialist shop that builds custom bikes, similar to Mission Bikes of San Francisco and Priority Bicycles of New York. What differentiates Volata is the focus on smart bicycle technology and IoT. From its headquarters in the San Francisco Bay Area, Volata sells directly to customers over the Internet, offering delivery worldwide.

We believe that retails sales will complement the bike sharing model, where potential buyers will use rental to try-before-buying. Below diagram is a timeline of progress of Volata Cycles over the past two years.

3.2 BikeCoin Fleet Services

Our most important partners in the establishment of BikeCoin Fleet Service are the network operators. These are companies which acquire smart bike fleets and then put them to work in urban locations where riders can easily engage the service. Network operators share revenue with hotels, resorts, co-working spaces and town councils, which provide a custodial function and promote responsible ridership.



A decentralised fleet operation will make it possible for different network operators in different cities to leverage a common platform. They can strike up relationships with service providers and set pricing according to local market conditions. This overcomes one of the major flaws in the current dockless bike sharing market - centralised control. In addition, there will be network effects as suppliers work with multiple network operators and riders realise that they can use the same platform to hire rides from different service providers in different cities.

From the network operator's perspective, BikeCoin Fleet Services are a Decentralised App (DApp). The service provider also uses a DApp to conduct rental business on the platform. For this model, the rider does not require a DApp, need not understand crypto, and enjoys the convenience of making payment in fiat currencies.

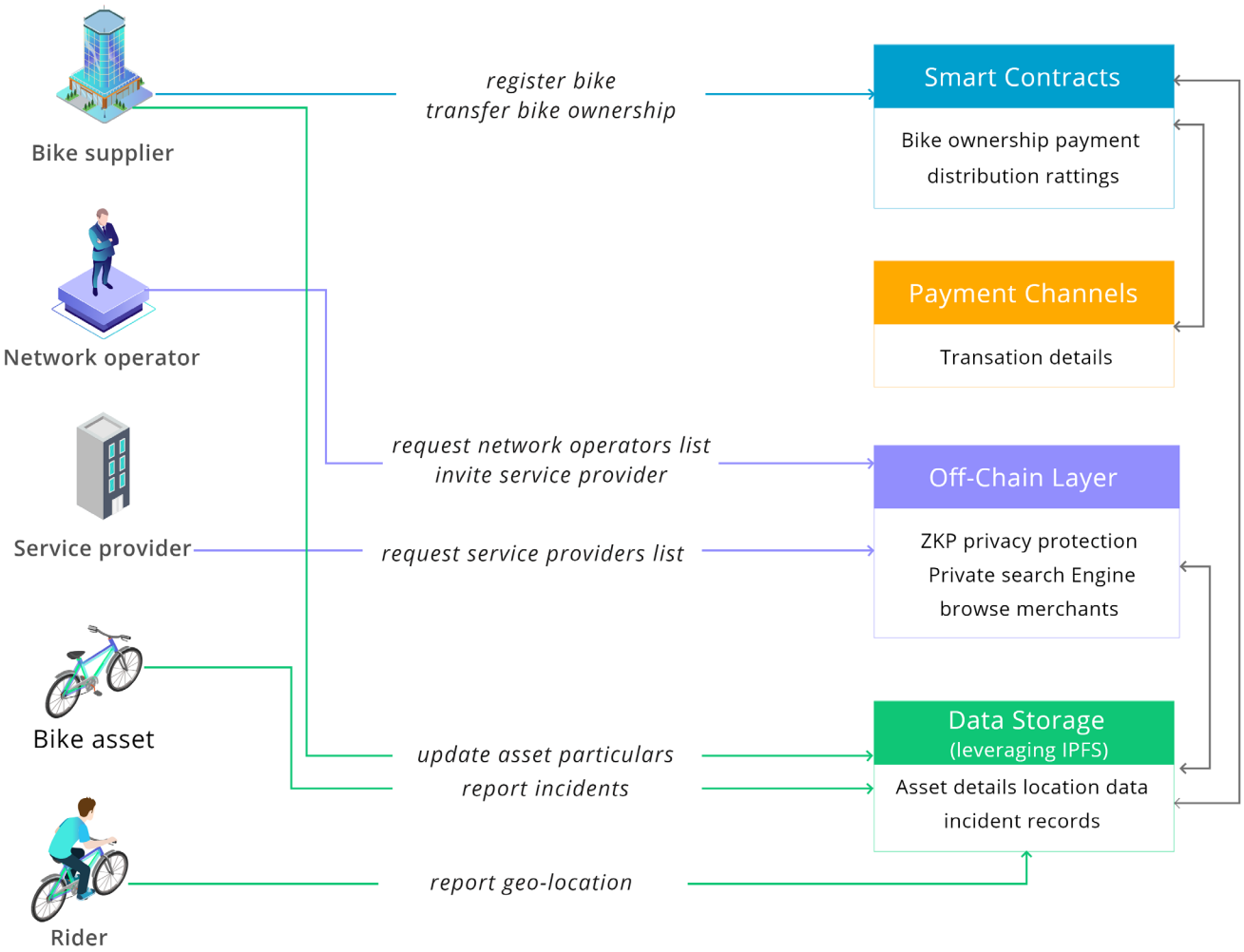


Figure: Asset Management & Partnering Features in Fleet Service

This entity diagram shows how various actors in the BikeCoin Fleet Services ecosystem manage the bike assets and establish relationships. On the left are icons for each of the actors. On the right are the main technology components of the project. The connectors show procedures that the actors perform using the technology stack.

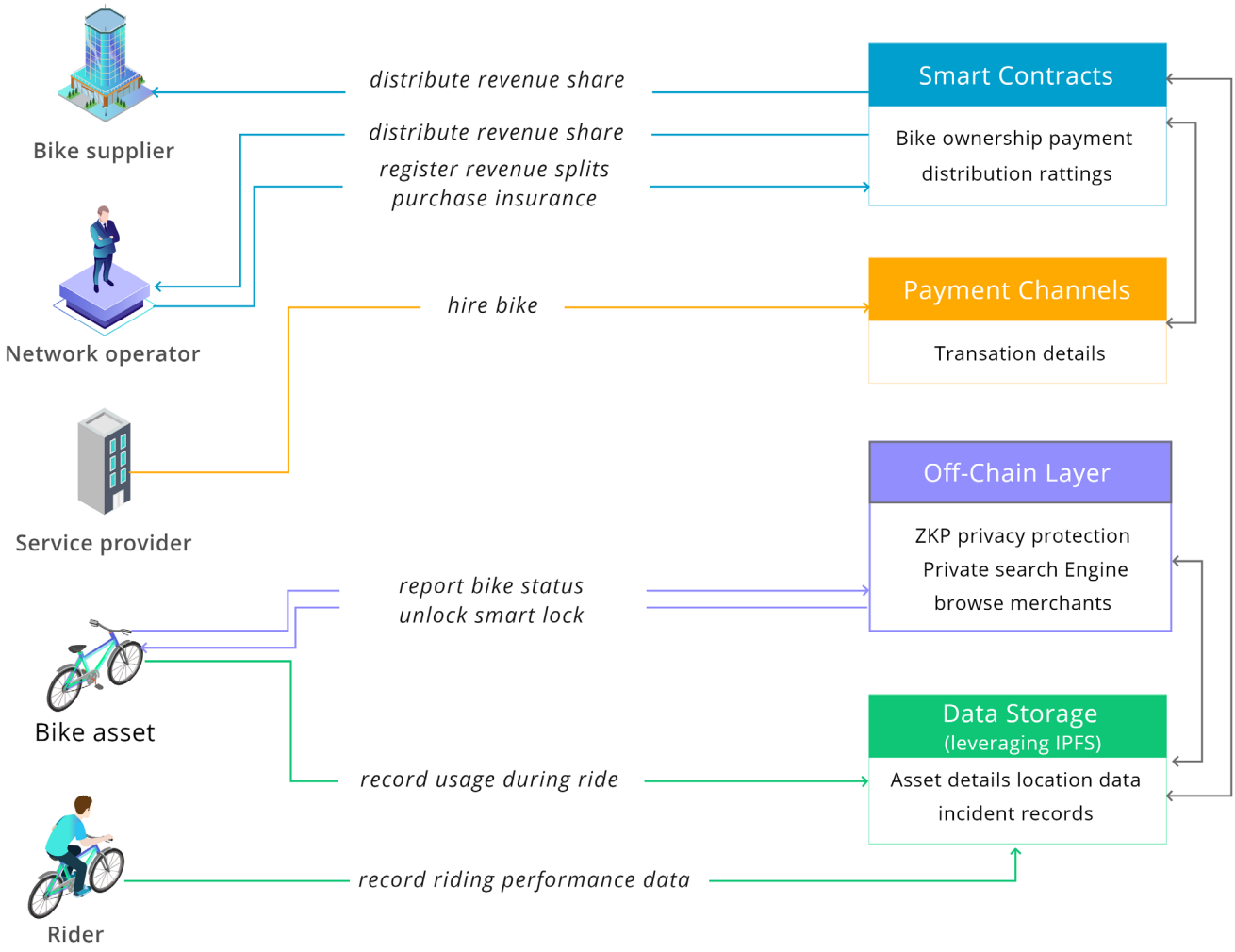


Figure: Transaction Support Features in Fleet Service

This entity diagram shows how various actors in the BikeCoin Fleet Services ecosystem transact on the blockchain. The essential part is that the service provider collects payment from a rider, eg- at the concierge desk in a hotel lobby, and later distributes revenue share to the network operator and bike supplier.

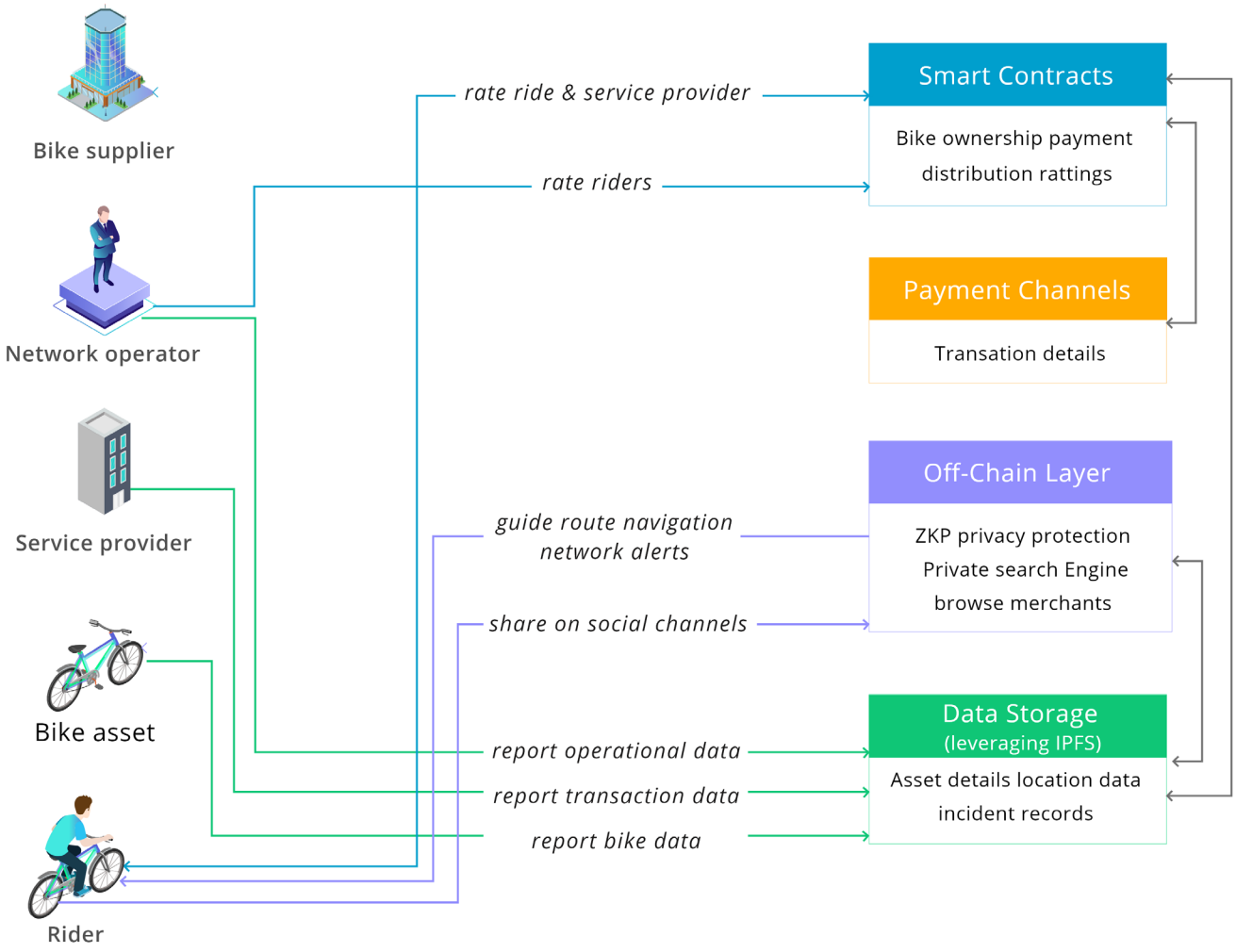


Figure: Data Sharing Features in Fleet Service

Remember, BikeCoin is an IoT network. This entity diagram shows how various actors in the BikeCoin Fleet Services ecosystem share data on the blockchain. The essential part is that the rider reports their ride satisfaction, and the other actors report operational, transactional and usage data. This data can later be shared (without compromising privacy) for a holistic view of fleet bike sharing.

3.3 BikeCoin Decentralised P2P Services

BikeCoin also supports Peer-To-Peer (P2P) services where the rider hires a bike directly from an owner. This is similar to how AirBnB operates, but it is blockchain-based. The owner lists their bike(s) and the rider uses a BikeCoin P2P DApp to select a bike meeting their preference for location, features, availability and price. This works as a fully decentralised platform which can support any number of owners, bikes and riders.

Like the fleet services, BikeCoin P2P service is only available for round-trip rides. It is not a competitor for one-way rides such as the 2nd Generation Bike Sharing services. This is because the bikes have a high value, must be returned to the owner's designated location, and because BikeCoin promotes responsible ridership.

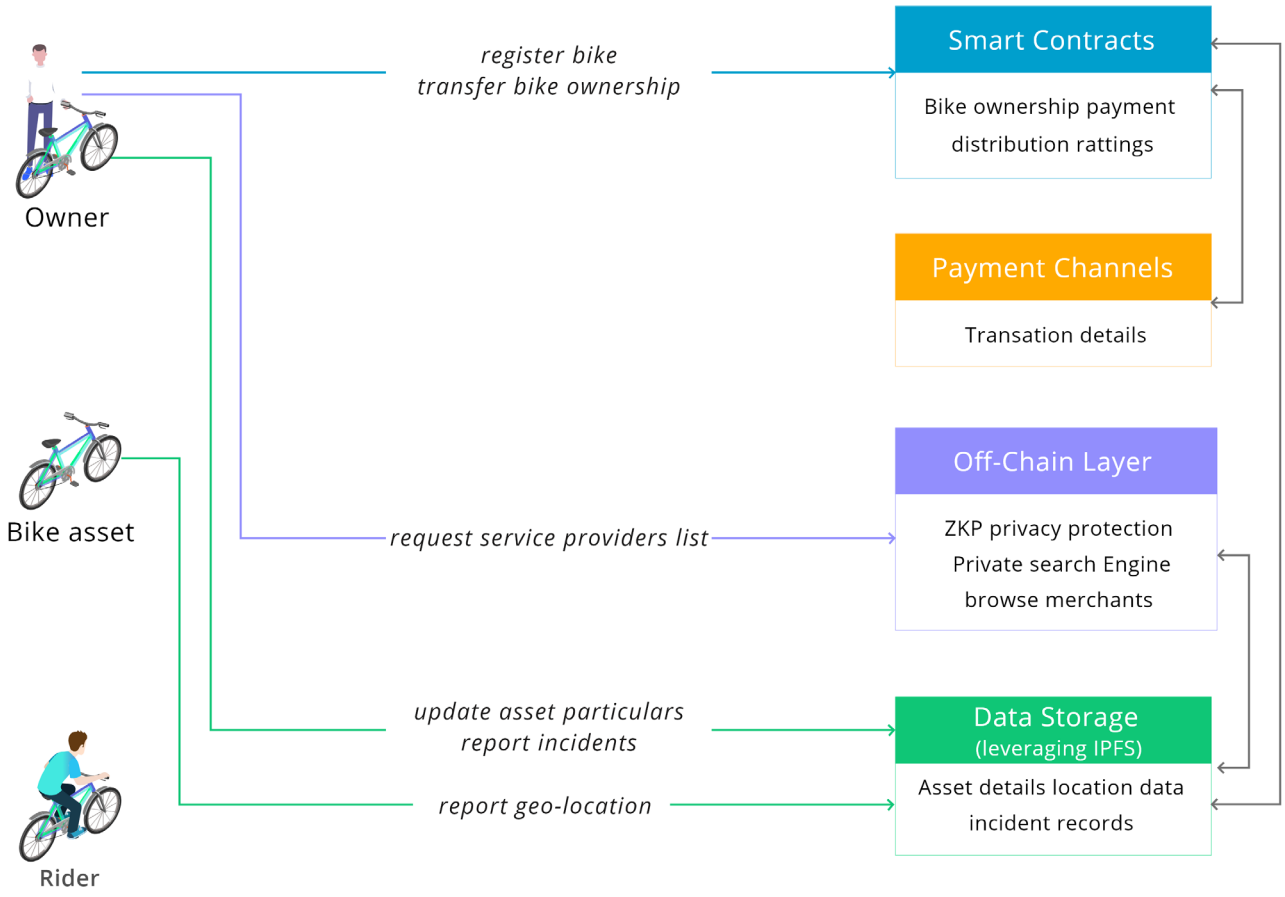


Figure: Asset Management & Partnering Features in the P2P service

This entity diagram shows how various actors in the BikeCoin P2P Services ecosystem manage the bike assets and establish relationships. On the left are icons for each of the actors. As you will note, many of the actors in the fleet service are not present. On the right are the main technology components of the project. The connectors show procedures that the actors perform using the technology stack.

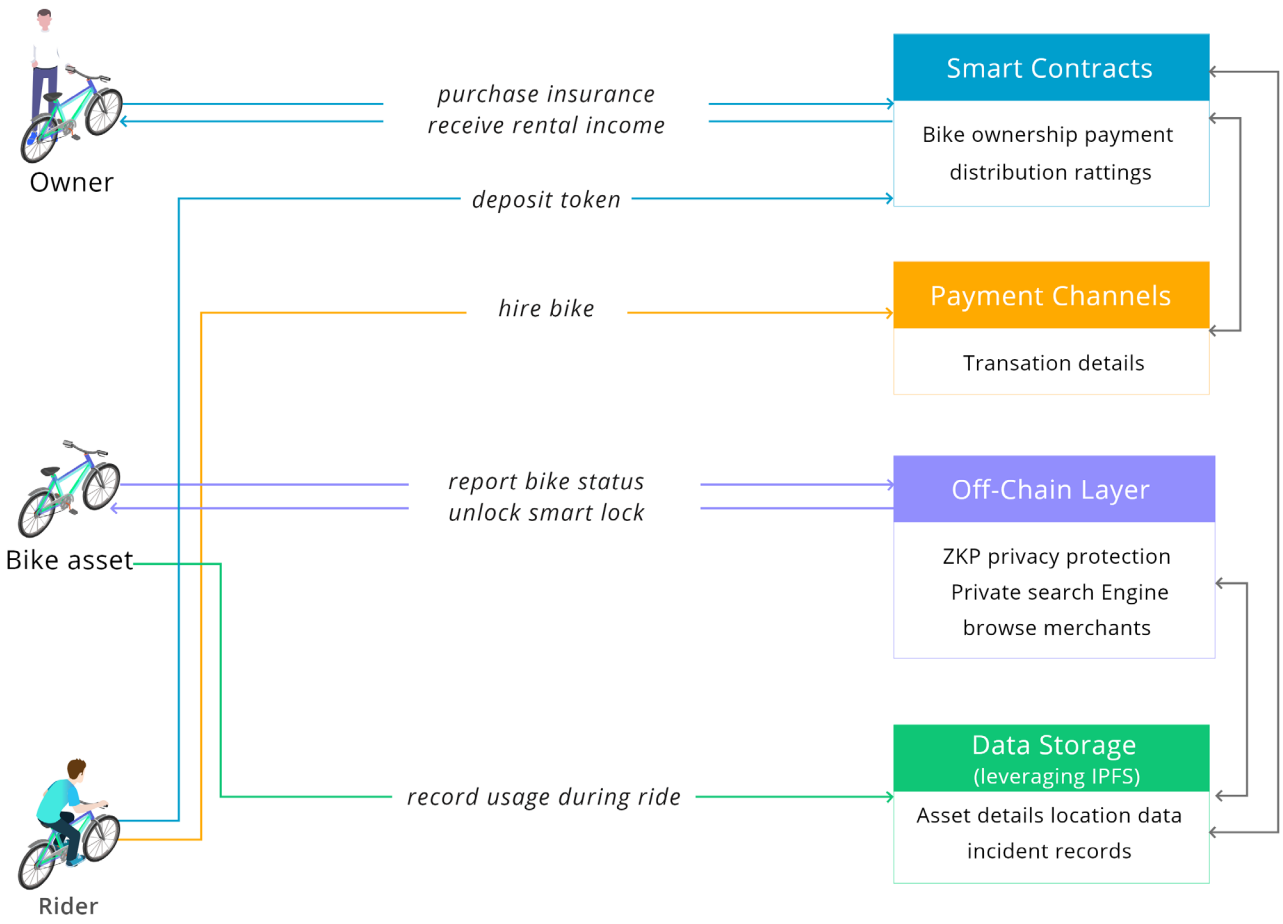


Figure: Transaction Support Features in the P2P service

This entity diagram shows how various actors in the BikeCoin P2P Services ecosystem transact on the blockchain. The essential part is that the rider is using a DApp and is able to pay tokens directly to the bicycle owner (via the payment channels).

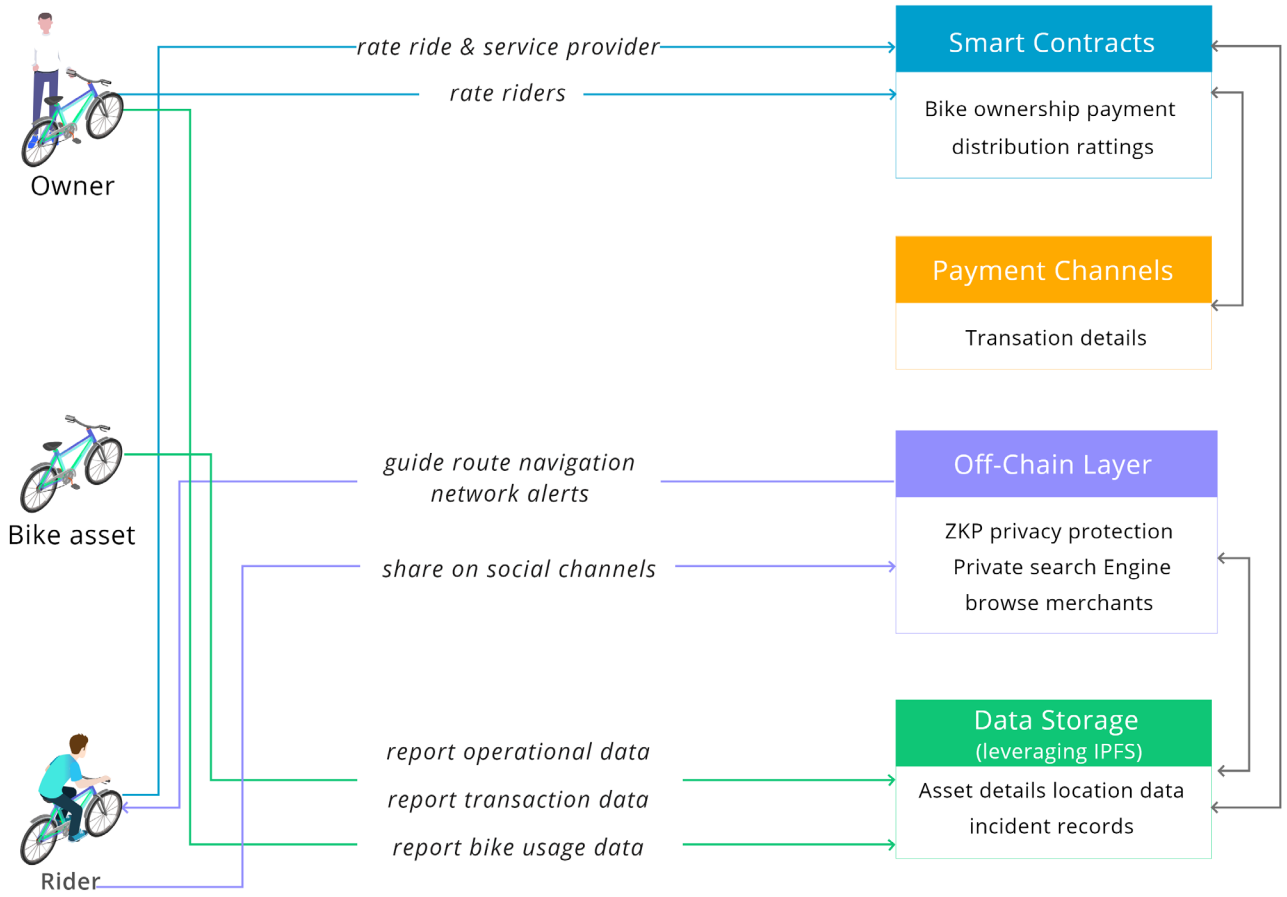


Figure: Data Sharing Features in the P2P service

Remember, BikeCoin is an IoT network. This entity diagram shows how various actors in the BikeCoin P2P Services ecosystem share data on the blockchain. The essential part is that the rider reports their ride satisfaction, and the bike and its owner report operational, transaction-al and usage data. This data can later be shared (without compromising privacy) for a holistic view of P2P bike sharing.

4. Token Model and Distribution

BikeCoin is preparing to launch a token sale to fund development and marketing of the BikeCoin platform, including both the underlying blockchain technology and the operation of a fleet of premium bicycles supplied by Volata Cycles. In a token sale, a project offers to investors units of a new cryptocurrency (their token) in exchange against cryptocurrencies such as bitcoin or ethereum .

Our project's investment unit (symbol: BKC) is a utility token developed using the Ethereum ERC20 token standard. This token fulfills the following currency-related functions:

- *As an accounting unit for service fees and micro-payments*
- *As a medium of exchange within the platform*
- *As a store of value for incentivising and rewarding platform contributors*

The token shall not and cannot be considered as shares or securities in any jurisdiction as they do not give any rights to dividends, interests, profits or to participate in the general meeting of the company. They will not be listed on any regulated stock exchange. The offering of BKC tokens on any trading platform is done in order to allow their use as utility tokens on the platform and are not for speculative purposes. Such offering does not change the legal nature of these tokens, which remain as a simple means for the use of the platform and not security.

Using BKC tokens to make purchases on the platform entitles users to concessions at the discretion of the BikeCoin team, to encourage the use of tokens on the platform. Another primary use of the token is to incentivise individuals who make available their computing resources for the platform.

4.1 Our Tokenomics

Tokens are created by pre-mining prior to the token sale. They are then divided into allocations, in particular for sales (about 40%) and reserves (about 60%), but also to set aside approximately 30% - or half of the reserves - to be used as block rewards for mining activities. The purpose of the block rewards is to incentivise participants who contribute computing resources to the platform.

Investors who purchase our tokens will be able use the tokens in a variety of ways as participants in the BikeCoin economy. They will also be able to exchange them for value on whichever coin exchanges decide to accept the BKC token. The team will use its best efforts to ensure that BKC is accepted by reputable but centralised coin exchanges as well as on the increasingly popular Decentralised Exchanges (DEXes) .

Demand generation is crucial to the success of a token. There will be no liquidity on exchanges unless there is a large and increasing number of participants on the platform. BikeCoin will be investing in the service operation to promote use of the platform, and will be working with partners such as Volata Cycles to drive demand. The sharing economy is a growth industry, and with BikeCoin, for the first time premium bikes can join the multi-billion dollar sharing economy.

The platform is open and other parties may build DApps to leverage the BikeCoin economy or simply rely on the transactional capabilities of the platform.

4.2 Use Cases

Utility tokens, also known as 'access tokens' or 'app tokens', provide users with two things: (a) future access to a blockchain-based service, and (b) a medium of exchange to pay for that service - often at a discount. Our token may also be used to pay for transaction fees, like gas on Ethereum. Utility tokens are also offered as incentives to encourage participants to actively engage in a project. But, unlike equity tokens, they do not represent a share in the business or a right to part of the profits.

Always keep in mind the difference between usefulness and value. Use cases illustrate how a token is made useful to a specific participant in a blockchain platform. It presumes that the service is fully operational and other participants are available to act as counterparties. This is different from the value of the token to an investor.

By purchasing utility tokens during a token sale, investors contribute to funding blockchain projects. Once the service is operating, they can either use their tokens to purchase services, or sell them to other customers of the service. Utility tokens are not designed as investments; however, many investors buy them with the hope that their value will increase as demand for a company's service increases.

In this section we will identify how BikeCoin tokens deliver benefits - so called 'Use Cases' - for each participant in the platform. Utility tokens usually provide different benefits to different participants in a platform. When the benefits are synergistic with one another, a project is said to have a 'thriving ecosystem'.

Participant	Use Cases
Rider End consumer	• Pay for hiring of bicycles. • Receive loyalty discounts for hiring bicycles with token. • Receive loyalty discounts on purchase of bicycles and other cycling merchandise with token. • Receive incentives for sharing data.
Service Provider Hotel, Resort or Co-Working Space	• Receive payments for 'Rider Pays' transactions. • Receive incentives for promoting bike sharing. • Distribute payments for 'Merchant Pays' transactions, ie- share revenue earned from rides hired at the service counter. • Receive incentives for sharing data.
Network Operator Distribution partner operating in a city or other specific territory	• Pay Bike Supplier for purchase of bicycles. • Pay for insurance of bicycles and riders. • Pay for maintenance services. • Provide incentives to promote bike sharing. • Receive payments (ie- revenue share) for hiring of bicycles. • Reward or incentivise third-parties to integrate their DApps into BikeCoin ecosystem (for example: identity, online booking, etc.) • Receive incentives for sharing data.
Bike Supplier Manufacturer, assembler or capitalist	• Receive payments (ie- revenue share) for hiring of bicycles. • Receive payment for purchase of bicycles. • Issue incentive to those who purchase bikes. • Receive incentives for sharing data.

4.3 Token Sale & Distribution

Following are some of the key features of the BikeCoin token sale, distribution and use of proceeds

There will only be one Token Generating Event and we plan to distribute 79% of the issued tokens to the public. Here is how we will do that. We will offer 41% of our tokens for purchase by the public in the token sale, including presale bonuses.

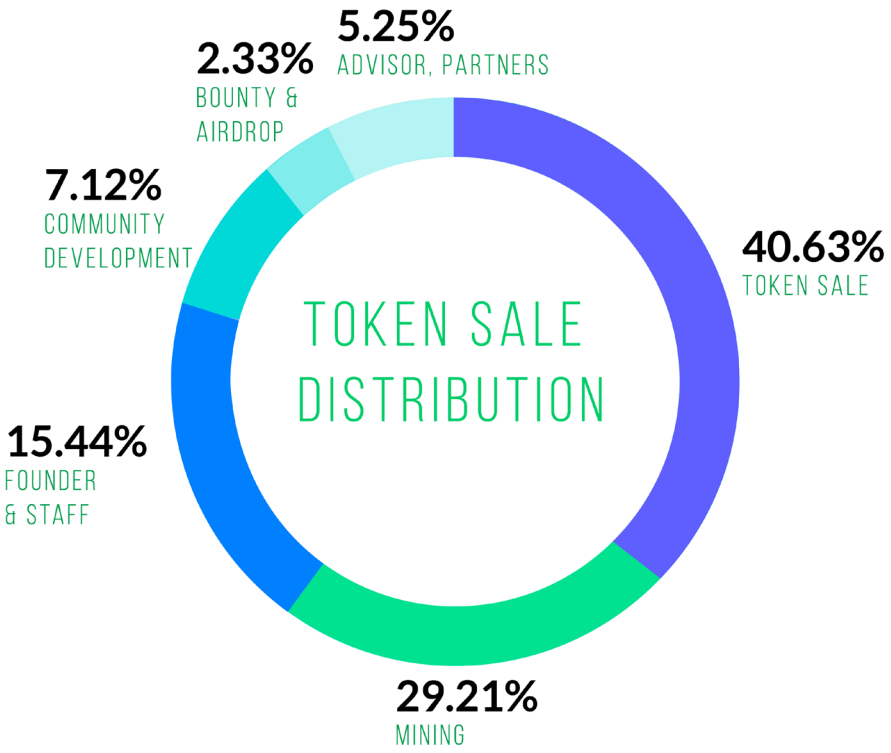
Also, 29% of the pre-mined tokens will be set aside as block rewards for those providing resources used by the platform and acting as validators (shown as 'mining'). Another 7% will be retained as a reserve for community initiatives, business development, standards-promotion, education, and market expansion. Finally, 2% will be set aside for bounties and airdrops, to drive token adoption. This generous distribution will ensure long term growth of BikeCoin platform, and will support development of the ecosystem as a whole.

Token Sale - Key Facts

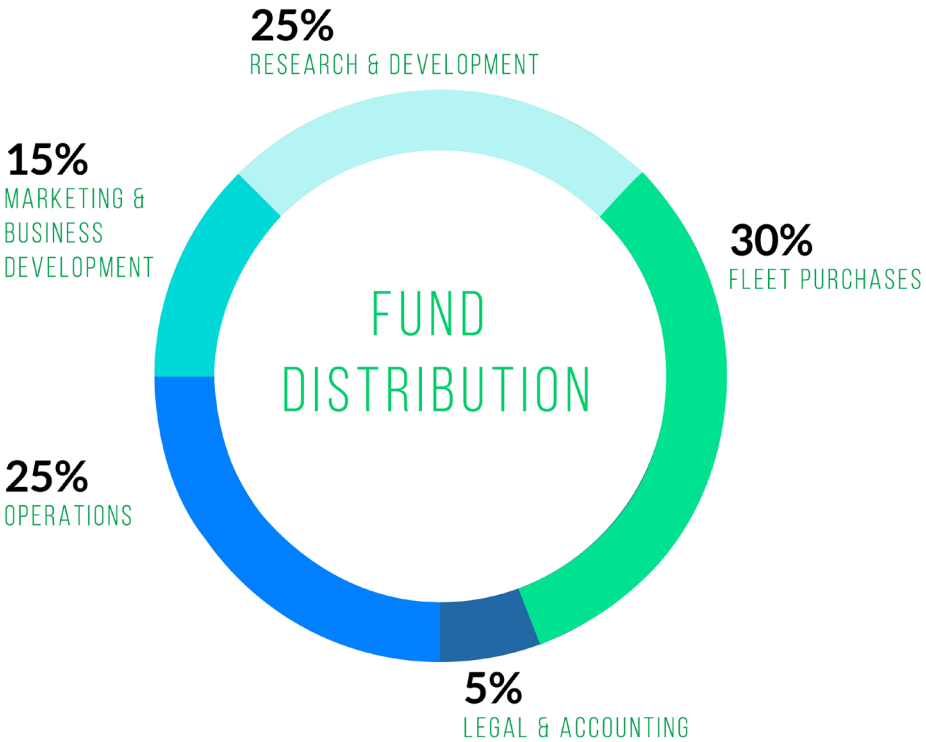
Component	Description
Token Symbol	BKC
Issue Size	800,000,000 *(8 hundred million)*
Schedule	To be confirmed *(refer to website for updates)*
Token Price	1 BKC = 0.08 USD *(token price in Ether will be fixed 72 hours before start of the sale)*
Fundraising Target	USD 26m *(hard cap)*
Minimum Target	USD 2.6m *(soft cap)*

Distribution

Following is the token distribution plan. The team (including founders and seed investors) will get 16% with another 5% going to advisors. That's 21% in total. As explained above, the other 79% is distributed to the public in one way or another.



Ether received during the sale will be held in a multi-signature wallet. The vesting period for the team is 2 years, in equal quarterly installments, subject to a cliff of 1 month. This is to align incentives to our long range plans.



The largest category of expense is for fleet purchases, that is, buying bicycles and other equipment used in the services business. Research, development and operations together make up 50% of the budget. 15% goes for marketing and sales, while the remaining 5% covers legal, tax, and accounting.

BikeCoin has two business divisions, one for the blockchain technology platform and the other for operation of fleet services. Following is the breakdown of costs for each of the divisions, labelled simply as technology and services. As can be seen, all of the R&D is attributed to the technology division while most of the operating and marketing costs are attributed to the services division.

Breakdown of Proceeds	Technology	Services	Total
Fleet Purchases	0.00%	30.00%	30.00%
Research & Development	25.00%	0.00%	25.00%
Operations	5.00%	20.00%	25.00%
Marketing & Business Development	5.00%	10.00%	15.00%
Legal & Accounting	2.00%	3.00%	5.00%
Total contribution	**37.0%**	**63.0%**	**100.0%**

The figures given here are budgetary and subject to discretion of the team. Development costs will increase to the extent we need to: (a) integrate with other technologies and (b) add new functionalities for payment processing. Marketing costs will increase as we promote BikeCoin in new markets such as US, EU and Latin America. The BikeCoin platform will be competing against both non-blockchain and blockchain-based incumbents.

Marketing Roadmap

The following table shows our planned market expansion based on the amount raised in our token sale. This is consistent with our Go To Market strategy explained in section 2.5 above.

Amount Raised (USD)	Market Expansion
10m	North America
15m	Europe
20m	Asia

5. Company and Team

5.1 Corporate Structure

BikeCoin will be incorporated as a Private Limited profit-making corporation. The company will be established in Singapore - a centre of excellence in blockchain development and one of the world's best jurisdictions for token sales.

The company will have two divisions: a technology division focused on blockchain development and a separate services division responsible for fleet operations.

5.2 Management Team

The founding team and key management are all serial entrepreneurs and veterans with diverse experience in the technology, internet, and blockchain industry.

Mr. Martini is innovator, investor, serial entrepreneur with a passion for sustainable transportation. Over his career he covered the positions of Director of R&D as well as Principal Investigator and Program Manager of several U.S. government funded and successfully completed programs for the Department of Energy, Department of Defense, and NASA managing over $10M. He has contributed to the accomplishment of six world records related to energy storage technology, and was in charge of the commercialization of the first-of-its kind high temperature ultracapacitor for oil and gas and geothermal applications. Mr. Martini is a strong believer in bicycles to be the most advanced and efficient mean of transportation . He is author of 17 patents, including 3 from Volata Cycles.

Fabrizio Martini
Co-Founder, President & Chairman

De Santis holds a degree in mechanical engineering from Polytechnic of Milan, one of the top university in Italy. He is a master in bicycle technologies, and he has developed over 20 bicycles models from scratch over his career. De Santis combined in Volata Model 1 and Model 1c all his experience and knowledge to developed the smartest and most advanced bicycle on the market. De Santis deeply interested in both innovative and conventional manufacturing processes and has excellent handling and creativity to solve all type of design or functionality problem. He has over 10 years experience in design and manufacturing of consumer products, FEM and CFD analysis, prototyping of mechanical systems and CNC machines programming.

Mattia DeSantis
Co-Founder & Former Chief Technology Officer

Eric holds a Bachelor's degree with Honours in Computer Science (Intelligent System & Entrepreneurship) from NTU, Singapore. He was a founder and tech-advisor to AEvice Health, an asthma monitoring device and a winner of the SWITCH 2016 pitching competition. Eric has experience working on various blockchain technologies such Bitcoin, Ethereum, Hyperledger, Zero-Knowledge Proof, Homomorphic encryption and other cryptography.He is also an technical advisor for several blockchain startups and is one of founders of the largest Vietnam Blockchain Developer Community. Most recently, Eric was the blockchain lead of Electrify. Asia, which completed a successful token sale raising equivalent of USD 30m.

Eric Bui
Cofounder & Chief Blockchain Architect

Tony Tuan Nguyen has 10 year experience in IT industry with various positions, including web developer, mobile developer, software architect, technical advisor, CTO and CEO. With his passion for cutting-edge technology, he masters in web application, mobile application, clouds computing and now blockchain. With his deep knowledge of healthcare industry and his experience in solutions development like ERP, CRM, Tony is consistently recognized as a trusted leading advisor for his vision, passion and commitment to his customer's missions.

Tuan Nguyen
Blockchain Lead

5.3 Our Advisors

We have assembled a panel of world class industry advisors who are passionate about the industry, the application of blockchain technology and the open source community. They not only help advise on Go-to-Market strategies but also evangelize our platform to help drive adoption among industry leaders.

Dr. William K. NG works in the areas of machine learning, privacy-preserving techniques, query-permissible encrypted databases, blockchain systems, and data security. He contributes to companies and industries as technology consultant on projects involving data analytics, artificial intelligence, data privacy and security, and blockchain In recent years, he was General Chair of the 18th International Conference on Information and Communications Security (2016), Senior Program Committee Member of the 22nd to 17th Pacific-Asia Conference on Knowledge Discovery and Data Mining, General Chair of International Symposium on Cyber Security (CyberSec2013).

Assoc Prof Ng Wee Keong
Technical Advisor

Katie has worked for Tesla Motors for over 8 years covering position from System Engineer to Product Engineer. She has a deep experience in Automotive, Consumer Test & Measurement as well as the Aerospace & Defense industry. Some of her specialties are: system integration and validation, management, team building, project management, embedded systems hardware design, customer relations, customer support, organization, basic internal website maintenance, embedded systems high-level design and support, electronics troubleshooting, embedded systems troubleshooting.

Katie Noble

Product Manager Advisor

Dan Chapman is Curator of the CITRIS Tech Museum, as well as Senior Artist for CITRIS and the Department of Mechanical Engineering at UC Berkeley. He also serves as a Lab Manager in the CITRIS Invention Lab. Daniel is a Senior Artist with extraordinary capabilities to connect Art and Tech.

He embraces the feeling he gets in the pit of his stomach, when he approaches a difficult challenge he may not be able to accomplish. Be it fabrication, exceedingly tight deadline, something outside of my usual field of expertise or just being able to make and construct the image in my mind and making it a reality. The kernel of self doubt that needs to be respected, but not allowed to be in control.

Daniel Chapman

Senior Artist for Volata Design Concept

Roberto is an expert in the financial aspect of the bicycle worldwide sector. He currently serves the position of Finance and operations director at Crank Brothers Inc. - Selle Royal USA Inc. He previously worked for Maschio Gaspardo Spa and for Ferrari Spa. Roberto has a strong experience in budgeting and forecasting, especially for the bicycle sector where he has been working for the last 6 years of his career. He supports Volata in most of the financial related aspects.

Roberto Rossi

Finance and Operations Advisor

Gaspare is an experienced entrepreneur and leader with strong experience as CEO of CrankBrothers, manager of P&L at Selle Royal,Usa Sales Manager (Dell, Michael Page, Sell Royal Usa, crankbrothers), Marketing Manager (crankbrothers) Product and branding strategist (crankbrothers) Additional specialties: Negotiation, Human Resources Management, Branding, Marketing.

Gaspare Licata

Management and Strategy Advisor

Bill Claxton is a seasoned technology entrepreneur. He holds a certificate in BlockChain For Technical Executives and Analysts from B9Lab Academy in the UK and has spoken at various blockchain events. Bill has been active in the IT scene in Singapore for more than 20 years, was an early Bitcoin investor and most recently served as Operations Director of fintech startup KYC Chain.

Bill Claxton

Whitepaper Co-Author

5.4 Our Partners

Volata Cycles

Volata means 'sprint' or 'fly away' in Italian. Volata Cycles is a California-based bike-tech company that makes premium high-tech bicycles, with integrated digital features and stand-out Italian Design. Volata Cycles is on a mission to accelerate the world's transition to sustainable transport by creating bicycles that will convince more and more people to ride everyday.

VOLATA
CYCLES

6. Conclusion

We see the opportunity for BikeCoin to be the dominant platform for 3rd Generation Bike Sharing worldwide, and thereby tap a billion dollar market. Our business combines state-of-the-art blockchain technology, a fully-decentralised economic model, and a service fleet consisting of the absolute best smart bicycles available anywhere.

Our technology implementation provides open source libraries and reference specifications that will enable bicycle and IoT hardware manufacturers to leverage our platform. This multi-layered platform itself affords developers the ability to create their own Decentralised Applications (DApps) and join the tokenised bicycle economy.

In partnership with the innovative bike builder Volata Cycles we will introduce a pilot bike sharing scheme known as BikeCoin Pilot Service (BCPS). BCPS will introduce DApps for fleet operations and P2P bike sharing. We will launch the service initially in North America and then expand to Europe and Southeast Asia, in bicycle friendly cities with tech-savvy riders having a relatively high disposable income.

BikeCoin has a highly qualified technical team, with an excellent track record writing smart contracts and developing blockchain projects that have held successful token sales. Our team also has lots of IoT and asset token development experience. Plus, we have a number of very qualified advisors assisting with various legal, compliance and operational aspects. On top of that, Volata brings its marketing expertise in promotion of the premium cycling experience which riders will never forget!

In the coming months, we will be introducing more partnerships to enliven the BikeCoin ecosystem. Please visit our website and register to stay in touch!