



Bee Token

The Future of the Decentralized Sharing Economy

beetoken.com

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Abstract

Beenest is the first decentralized home-sharing network built on top of a set of Bee Protocols that connects hosts with guests without taking any commissions. The Beenest dApp and the Bee Protocols are powered by the ERC-20 utility token called the BEE token. The Bee Protocols are open Ethereum protocols that can power other future sharing economy dApps. These protocols provide the Beenest network with three essential systems:

1. A secure payment system that allows two authenticated P2P entities to send and receive money that gets held in Bee Tokens until after a successful exchange of services between the two entities.
2. A decentralized arbitration system that resolves user disputes , providing positive incentives to grow a network of genuine arbiters and negative incentives to deter scammers.
3. A reputation system that couples a valid identity, which is obtained by a trusted digital fingerprint protocol on the Ethereum blockchain, with a rating determined by transparent, immutable review and scoring interchange between P2P entities (such as guests and hosts).

This whitepaper expounds upon the Beenest platform and the Bee Protocols. We aim to offer transparency into our token metrics and a future roadmap of development and expansion. We will discuss how Beenest creates and preserves value for hosts, guests, arbiters, and developers within a decentralized autonomous organization and how our decentralized model offers distinct advantages over the predominant, centralized home sharing model.

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Background

Bitcoin's emergence in January 2009 created a paradigm shift encouraging decentralization through the introduction of a global distributed open ledger. The concept behind Bitcoin proved to many there was no longer a need for central banks, beginning the movement towards "decentralization." This movement was accelerated in 2015 with the launch of the Ethereum Blockchain and the introduction of smart contracts, which enables any developer to create a new genre of decentralized applications, commonly referred to as "dApps." These dApps use the power of the blockchain to allow for secure and trustless asset transfer within the Ethereum network, eliminating the need for centralized middlemen from many business models.

In Q4 2017, Bitcoin and Ethereum hit all-time highs (1 BTC surpassing \$18,000 USD), pushing the overall market capitalization of cryptocurrencies to hundreds of billions of dollars. Cryptocurrency is becoming mainstream, enjoying an ever-increasing adoption rate from investors worldwide.

Simultaneously, peer-to-peer sharing economy applications, typified by Uber and Airbnb, have achieved meteoric success in the past few years. However, these platforms extract high commission fees from their users in order to to run. Airbnb's astronomic growth from \$0 to \$31 billion is only enjoyed by a select few -- the founders and VCs. Without any interest in the company, very little, if any, of the appreciation value goes back to the guests and hosts. These are the same guests and hosts who form the backbone of this two-sided marketplace. At Bee Token, we believe that these invaluable contributors, as first-class participants in the network, deserve to be rewarded for the platform's growth through increased utility value of their tokens.

Thanks to Ethereum smart contracts, it is now possible to build a truly decentralized and automated sharing economy platform. This will be done with no middlemen and thus 0% commission, meanwhile sharing the wealth with the users in a two-sided marketplace.

Millennials and Generation X-ers who are investing heavily in cryptocurrencies are also fueling the sharing economy, specifically the home sharing industry.

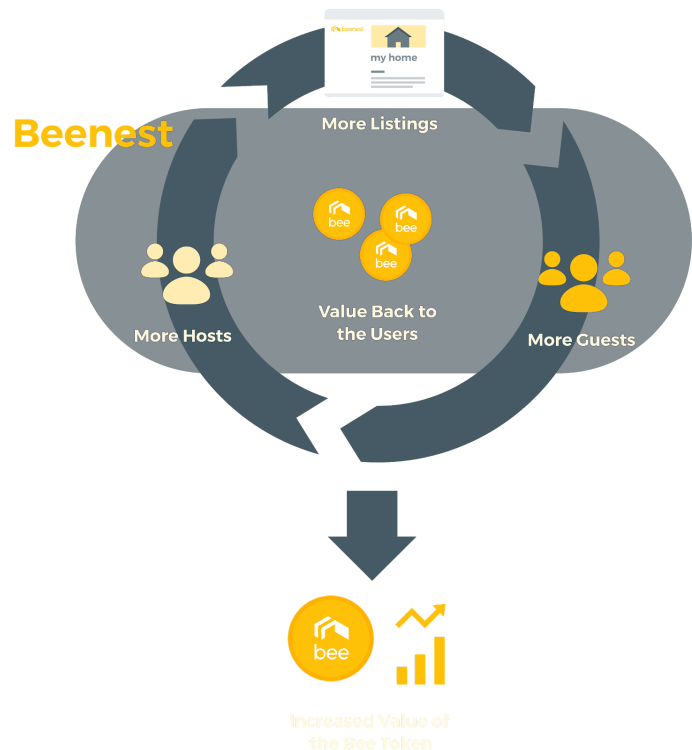
Given the growing acceptance of the sharing economy and increased usage of digital currencies, Beenest's launch comes at a growth inflection point for our target market.

Value Propositions

I. Aligning Incentives

In its current climate, the sharing economy is plagued with misaligned incentives with the most common example being that as a company grows, the user base is left dissatisfied. A well known example is that of Uber drivers. Intermediaries like Uber increasingly extract value from users as their network grows. Drivers today earn far less compared with early years, yet costs per rider have not significantly decreased. When market demand increases for a good or service, network participants should benefit when new equilibrium prices are reached. Instead, companies arbitrage these shifts to capitalize on value added by their community. The majority of that value is captured by founders and venture capitalists, and shareholders are excessively rewarded in the event of an IPO or acquisition. Though these earliest investors receive handsome rewards, early drivers on the platform have only been met with decreased earnings for the initial value they added to Uber.

Through decentralization, Beenest is able to disrupt the currently available sharing economy models. At the same time, tokenization creates benefits for early adopters and token holders, thereby aligning user incentives toward further growth of the Bee network. We can accelerate user participation by giving everyone in the network the opportunity to earn tokens through referral programs and arbitration. Additionally, Beenest corrects for market saturation by continuously incentivizing guests and hosts to contribute to the network by utilizing the Bee Token.



Tokenization creates benefits for early adopters and token holders, thereby aligning user incentives toward further growth of the Bee network.

II. Lower Transaction Fees

Centralized home sharing platforms rely on multiple intermediaries to conduct their transactions. Each intermediary adds a cost that hosts and guests end up paying for. In these centralized platforms, transaction fees can range from 10% to 22%, broken down as follows:

- **Platform Fees (3% - 15%)** - Centralized home sharing platforms charge a commission to use their platform, which is incurred by hosts and guests.
- **Financial Institutions Fees (3%)** - Financial institutions such as Visa and Mastercard charge flat fees for managing transactions.
- **Foreign Transaction Fees (3%)** - A transaction usually requires different denominations. As a result, foreign transaction fees are charged for transactions made outside the country where the user credit/debit card was issued.
- **Currency Conversion Fees (1%)** - Currency Conversion Fees are the result of the Dynamic Currency Conversion (DCC), a fee charged to see the transaction cost in your preferred currency denomination. DCC rates tend to be worse than traditional rates, but some platforms are known to charge the currency conversion fee unbeknownst to the user.

Beenest simply charges 0% commissions to hosts and guests utilizing BEE, thanks to smart contracts automating transactions that bypass commission-based platforms, financial institutions, and currency denominations. As the Bee token is used for all transactions, there are no foreign transaction fees or currency conversion fees, and all savings are passed back to the hosts and guests holding the token.

Beenest charges 0% commissions to hosts and guests utilizing BEE, thanks to smart contracts automating transactions that bypass commission-based platforms, financial institutions, and currency denominations.

Beenest only takes a tiny cost for “gas” (a few cents per transaction), in addition to a nominal insurance fee to help cover host liabilities. Beenest also welcomes newcomers into the ecosystem by allowing the use of fiat but for a small commission:

- 1% commission for BTC, ETH (or other utility ERC20 tokens)
- 3.99% commission for fiat

This commission is charged for guests when they chose a pay-in method other than BEE, and for hosts who prefer to get paid-out in other than BEE.

III. Increased Security & Trust

Beenest provides a seamless user experience based on trust and security through the blockchain. By using its in-house Bee Token, the Beenest platform provides its hosts and guests with privacy, security, and freedom.

In order to use Beenest, users have to first sign up and go through a basic KYC (know your customer) process to ensure that users are real and authenticated. Beenest can seamlessly integrate with 3rd party authentication platforms and correlates identities with a weighted reputation score on the Bee reputation protocol.

Beenest handles updating the reputation scores in the protocol and pulls the scores whenever needed, e.g. in the case of a conflict. Higher scores mean better credibility, and ranges are bucketed as Lowest, Low, Neutral, High, Highest.

- **Lowest (0):** the user signed up but didn't provide a wallet address
 - will not allow users to host or book a place but can browse the website
- **Low (1-5):** the user authenticated by providing a wallet address along with basic KYC authentication: name, email, address, birthday, ...
 - will allow users to book but not host
 - will drive up cancellation fees for hosts and guests with Low rep score
- **Neutral (6-10):** in addition to fulfilling Low requirements, the user uploaded a valid proof of identification (US Driver's License, Passport, Home Ownership)
 - will allow users to book and host
- **High (11-20):** in addition to fulfilling Neutral requirements, user has either booked or hosted
 - will drive down security deposit price for guests
 - will drive down cancellation fee
- **Highest (21-100):** in addition to fulfilling High requirements, user has given a review to a host or guest
 - users can set lower cancellation fees/security deposits
 - users can bypass cancellation thresholds

Transparent Reviews

Reviews are meant to represent an honest critique of a user's experience with a service or product with the intention of informing a larger audience. However, the problem with all centralized platforms is that these same platforms have the ability to modify and delete data at will. Feedback credibility can become skewed with no paper trail while honest opinions can sometimes be misrepresented.

In the class action lawsuit of [Boris Y. Levitt vs. Yelp! Inc¹](#), the Ninth U.S. Circuit Court of Appeals ruled that Yelp! Inc. has the legal right to manipulate their data. Yelp! Inc. has set the legal precedence of data manipulation which raises serious questions whether interactions with centralized platforms can be truly genuine. There are also multiple precedences of modified reviews concerning Airbnb.²

Beenest encourages guests and hosts to review each other after the checkout date. Reviews are stored on the blockchain through the Bee reputation protocol and linked to the host/guest identities. To ensure privacy and keep gas costs at a minimum, reviews are encrypted and stored off-chain with only a hash of the review being posted on the blockchain. This ensures immutability and prevents post-hoc modification of any review.

Before being posted, the reviews go through a filter that uses ML and pattern detection to flag profanity or racist reviews. In those cases the reviews will not be posted, and the reviewer's reputation score gets a bump down. In extreme cases, the reviewer will get banned from using Beenest.

¹ <https://cdn.ca9.uscourts.gov/datastore/opinions/2014/09/02/11-17676.pdf>

² <https://www.tnooz.com/article/airbnb-as-an-easy-target-curious-tale-of-disappearing-negative-review/>
<https://www.airbnhell.com/airbnb-deletes-negative-reviews/>
<http://thebnblife.com/why-are-there-so-few-bad-reviews-in-airbnb/>

Bee Protocols (P-A-R)

Payment-Arbitration-Reputation

While the Ethereum platform is still in its infancy, new second layer protocols are pushing it to become more suitable for building complex sharing economy applications like Beenest. The Bee Protocols will greatly benefit Ethereum by providing solutions for trustless decentralized payments and the inherent problems of any network: conflicts and malicious users.

These protocols are designed so that existing centralized sharing economy applications like Couchsurfing or Airbnb can hook into our protocols to tokenize their offerings if they choose -- giving them access to a larger and untapped market of crypto-enthusiasts. These three protocols can be remembered by the acronym "P-A-R": Payment, Arbitration, and Reputation.

1. **Payment Protocol** - send and receive tokens held until fulfillment of service
2. **Arbitration Protocol** - solve disputes through trustless voting
3. **Reputation Protocol** - manage reputation scores for all P2P entities

The 3 Bee Protocols are mutually beneficial and thus follow Metcalfe's Law. Metcalfe's law states that a network increases its value and utility as the number of shared nodes in the network increases. Given that the P-A-R Protocols are meant to be used as a bundle, the value of all the protocols increases quadratically with the number of dApps built on top of them, the same way Ethereum value increases as the number of shared protocols increase.

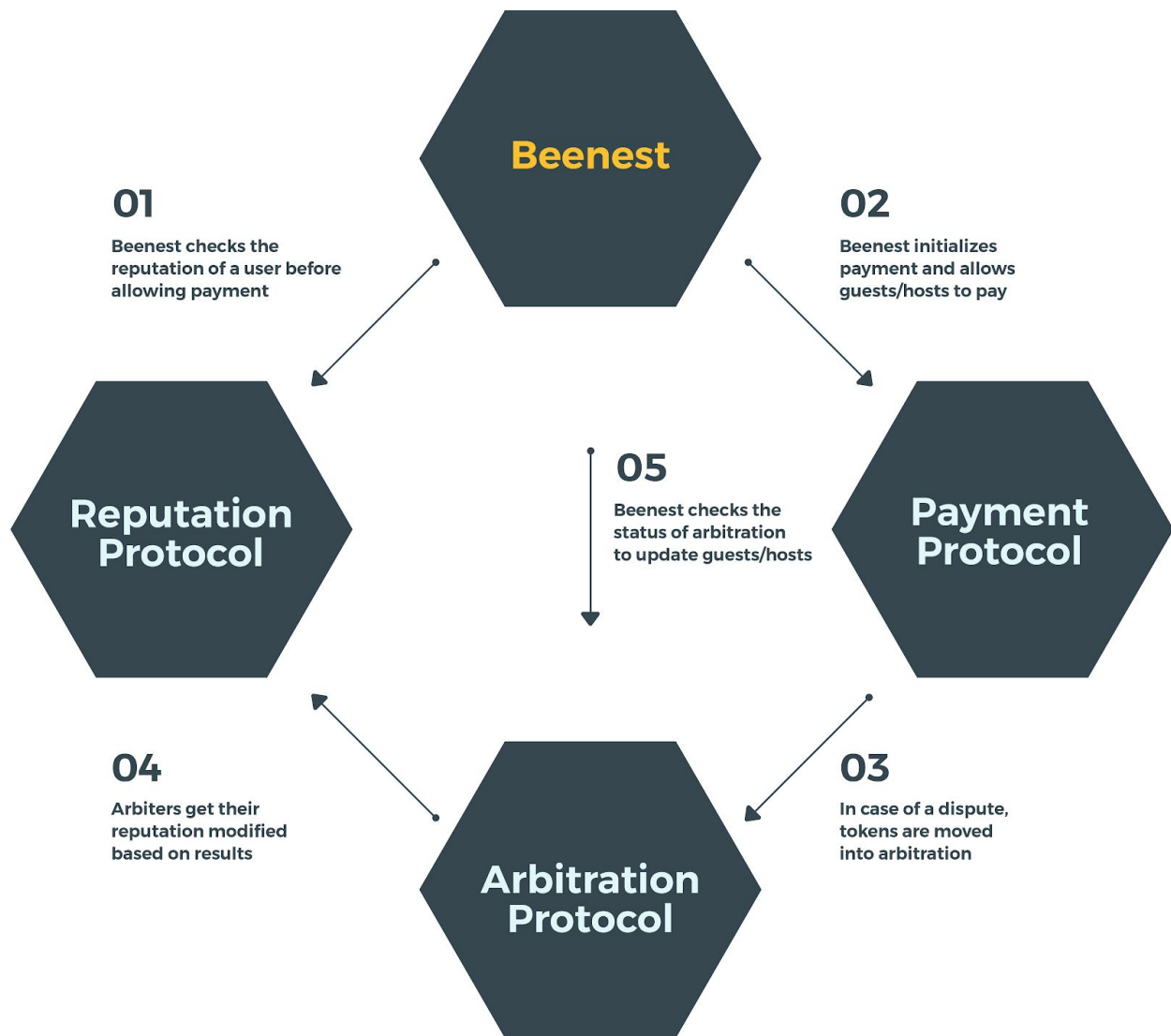
Metcalfe's Law:

$$V \propto N^2$$

- V: Value/Utility of a network
- N: Total # of dApps/users using 1 protocol

$$V = \sum V_i \propto (\sum N_i)^2$$

- Value of individual protocol = square sum of all dApps/users



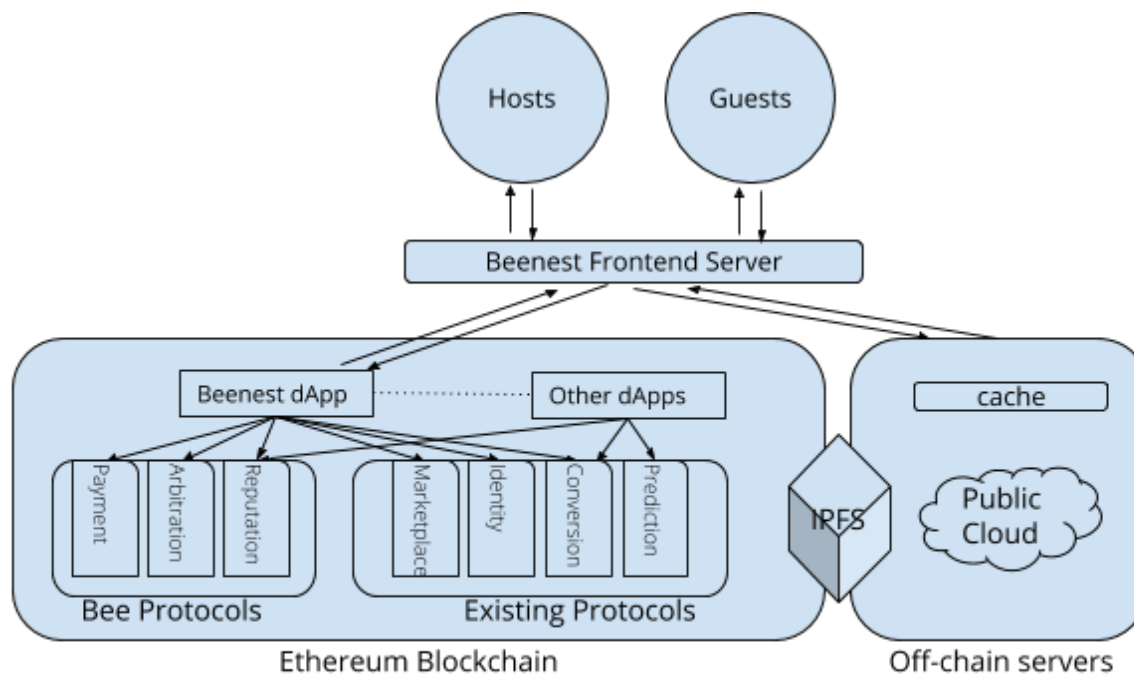
Benefits of using the BEE P-A-R Protocols as a bundle:

- **Faster Development Cycle** - Companies will be able to increase efficiency and launch products faster, pre-empting competition and increasing market share.
- **Reduced Integration Costs** - By bundling our 3rd party integrations into our protocols, developers reduce integration time while getting extensive functionality.
- **Faster Network Bootstrapping** - Using the Bee Protocols means having access to users, their payment history, arbitration history, and reputation scores across all dApps built on the Ethereum platform. This helps companies determine who are the good actors, overcoming the "cold start" problem when bootstrapping a new network.

The Bee P-A-R Protocols follow the best engineering practices that ensure they are generic, cost efficient, and seamless:

- **Generic** - The Bee protocols are designed to be useful and reusable in order to be interpolated for further sharing economy and marketplace dApps such as rentals, ridesharing, and e-commerce.
- **Cost Efficient** - Protocols need to be cost efficient by optimizing the use of gas. In addition, dApps should be given the option to utilize cheaper alternatives for expensive on-chain transactions, by offloading heavy and complex computations to traditional cloud-based solutions. This introduces centralization and is a reasonable stopgap solution while looking for a long term scalable blockchain solution.
- **Seamless** - We believe that early dApps need to be usable by the general population through a seamless user experience that handles Ethereum's current and future limitations while masking the overall complexity of the blockchain.

All Bee code is public and open source to allow improvements, but also to define a set of best practices to inspire a future generation of sharing economy dApps to emerge: a decentralized Craigslist, eBay, Uber, and more that we haven't dreamed of yet.



Beenest architecture diagram - The blockchain is always the source of truth, however UX will always load from a cloud backend that's always updated with latest bookings, but also does off chain syncs.

Beenest is built on top of the pillars of the Bee protocols and other existing second layer Ethereum protocols. An early implementation of an Ethereum dApp must understand the limitations of Ethereum so it properly switches between on-chain/off-chain use of the blockchain.

In addition to the Bee Protocols, we are going to be partnering with other strategic protocols:

1. **Conversions** - Flexible pay-in and pay-out conversion between BEE, BTC, ETH, and fiat.
2. **KYC & Identity** - It's important that all users of Beenest go through identity verification.
3. **Marketplace** - Integrating with strategic marketplace protocols would allow for decentralized listings and bookings.
4. **Auditing** - All of our smart contracts and protocols will be audited by 3rd parties.

We now go into more details of each of the Bee P-A-R Protocols.

I. Payment

Payment lives at the core of the Bee Protocols and allows demand-entities to pay supply-entities after the supply entity delivers the proper goods or services to the demand entity, or after some predefined time in the future.

Beenest uses the Bee payment protocol to allow guests to pay hosts for bookings. Both guests and hosts send Bee tokens to the payment smart contract. When the booking checkout date passes, and no conflicts arise, the contract dispatches the tokens to the appropriate addresses. In case of a conflict, the entire sum of tokens gets held in a third arbitration address that the dApp provides. In case of cancellation after the determined cancellation cut-off time, a fee will be moved from the canceling entity to the other entity.

If a host cancels a day before the booking, they lose their cancellation tokens, and the guest takes them. This is unlike other platforms that do not pay the guests in case of cancellation. On these platforms, this no-fault cancellation serves only to punish guests.

The payment contract keeps track of all the payments in progress (keyed by a payment ID), as well as any payments that went to arbitration. Once the dispatch is done, the payment contract will drop the in-progress payment. Similarly, it will drop the arbitration payments once the arbitration protocol signals to the payment protocol that it is done.

II. Arbitration

Every system of payment that requires trust (i.e. exchange of physical goods and services) needs a third party to mitigate misbehavior. The arbitration protocol acts as the hub for dispute resolution. Participants stake BEE tokens to the arbitration protocol contract in order to participate in the arbitration network. The stake amount is based on the current USD value of BEE and corresponding absentee rates aimed at maintaining an arbiter absentee rate of <5%.

Stakes from each participant ensures:

- A potential reward for arbiters that participate in arbitration. This will encourage an active pool of arbiters to contribute to the arbitration system
- A punishment for arbiters who fail to render a timely decision
- Supply and demand entities do not request arbitration frivolously

Arbitration begins when a dispute arises and the payment contract sends its funds to arbitration. Supply and demand entities must stake a flat arbitration fee to create an arbitration contract.

Arbiters can signup on Beenest to join the arbiter pool by staking tokens to the arbitration protocol. All arbiters have reputation scores that fluctuate based on decisions made. When a dispute is initiated, a panel of at least 5 arbiters will be selected from the arbiter pool. The likelihood that an individual arbiter is selected to join an arbitration panel is calculated using the following formula:

$$\left(\frac{\text{\# of Bee Tokens staked by arbiter}}{\text{total \# of Bee Tokens staked by all arbiters}} \right) * \left(\frac{1 - \text{arbiter appeals rate}}{1 - \text{average arbiter appeals rate}} \right)$$

- **Number of Bee Tokens staked by arbiter:** indicates the commitment level of arbiters to ensure a timely decision. Higher numbers increase the probability of the arbiter to be selected in arbitration cases, or conversely, determines the consequence if an arbiter fails to render a decision. These tokens are returned after arbitration is over. If an arbiter fails to make a timely decision, the staked tokens will be sent to the Bee token reserve.
- **Arbiter appeals rate:** the rate in which the arbiter's decision resulted in the dissatisfaction of one or both parties. Beenest aims to provide a platform where both parties have the opportunity to have their voices heard which renders a fairer decision. The appeal rate ensures that arbiters who consistently provide inadequate decisions are penalized and removed from the arbitration system. To account for arbiters that

have a lack of history on the platform, new arbiters are randomly selected for 10 cases until a history is built to indicate the quality of their decisions.

Arbiters are not penalized for incorrect decisions. They only lose their stake if they fail to render a decision within a time limit. Arbiters vote on a scale from 1-5 specifying the percentage (corresponding to 0%, 25%, 50%, 75%, 100%, respectively) of the disputed amount the plaintiff should be paid. Once a decision is made, the contract gives an aggregate of the majority voters' reward offering to the winning party, and the rest goes to the losing party. Either party will have a chance to appeal, halting payments and restarting the process, but will have to stake a larger amount (at least 2x) to compensate arbiters and prevent frivolous appeal by the losing party.

The final verdict will be the median dispute amount of the arbiter vote. In addition to an amount, arbiters must leave feedback that leads to their decision. This is to ensure that the plaintiff has a clear idea of the thought process that leads up to that decision. If enough arbiters fail to provide an adequate decision leading up to their decision, the plaintiff will have the right to appeal. If this happens the appeal rate for each arbiter that failed to render an adequate decision will go up, hurting their chances to participate in future jurisdiction.

All parties are paid once the dispute is resolved. Participating arbiters are paid at a market rate aimed at ensuring a timely allocation of arbiters (e.g. Uber surge pricing). All arbiter's stakes then automatically re-enter the arbitration pool, and the arbiters' once again become eligible to judge a future dispute.

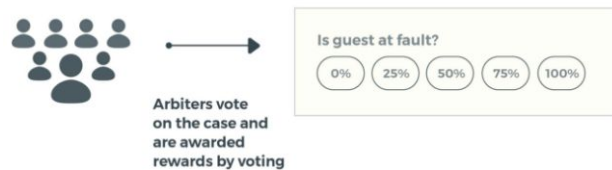
01 Dispute Occurs



02 Escalate to Arbitration



03 Arbiters Cast Vote



04 Arbitration Results



III. Reputation

The reputation protocol computes and maintains reputation scores of verified entities, globally on the Ethereum blockchain. Any existing and upcoming sharing economy dApps can fetch the reputation of any entity, with a short breakdown on how the score was calculated. As an analogy, the reputation score is similar to credit score, and fetching the reputation score is similar to a credit pull. Unlike credit scores, the reputation score is backed by transparent algorithms defined in smart contracts and accessible to the masses.

A reputation score is an integer between 0 and 100, that number being the average of multiple reputation scores. The protocol keeps track of reputation score for the entity, and is able to continuously update that score in multiple marketplaces for multiple uses.

For example, Joe has a reputation score of 70 with the following breakdown:

- Score as a guest: 70
- Score as a host: 80
- Score as an arbiter: 60
- Score as a seller: 75
- Score as a buyer: 65

Beenest updates the reputation score based on how hosts and guests act on the platform. Good hosts with high reviews and no cancellations have higher scores than those with lower reviews and many cancellations. In addition to the score, Beenest also adds a hash of the review provided for guest and host entities as explanation whenever the reputation score is updated. For example, a host getting a 5-star review gets a bump in their reputation score. Beenest can use the reputation score later on to determine the order by which listings display in search results, i.e. hosts with highest reputation scores can have their rental bumped to the top of the search results

In addition to hosts/guests, the Bee arbitration protocol also updates reputation score of arbiters.

Cryptoeconomics

The Bee token is used within the Bee network to incentivize good behavior and punish malicious behavior. This creates network effects by aligning token holders' goals and attracting early adopters through referrals. Token holders also have decentralized governance over the protocols, allowing for continuous deployments of backward-compatible improvements to the ecosystem.

Token Holders Incentives

The following stakeholders (hosts & property managers, guests, arbiters, and 3rd party developers) in the Bee ecosystem are incentivized to use BEE for the following reasons:

I. Hosts & Property Managers

- Increased Revenue:
 - **Payment Protocol** - Hosts and property managers profit more per booking on Beenest as opposed to Airbnb which averages ~20% commission. On average, a host getting booked for 5 nights at \$200/night will end up earning \$1000 on Beenest compared to \$800 on Airbnb. This can result in up to \$15,000 of missed earning per year.

II. Guests

- Increased Value:
 - **Network Effects** - As more guests use the platform, the increased transaction volume creates network effects thus naturally increasing the value and

usefulness of the Beenest platform. This will benefit the guests by enabling them to book more properties using the same amount of utility tokens.

- Decreased Costs:
 - **Payment Protocol** - Because hosts and property managers will not be charged commission fees, they will be able to decrease rates per night for guests while achieving similar profit margins. Guests will benefit by experiencing lower costs while traveling.
 - **Reputation Protocol** - If guests have better reputation scores, they do not require a high security deposit.
- Time Savings:
 - **Arbitration Protocol** - Guests will no longer have to wait long periods of time for their canceled bookings to be refunded to them. With our arbitration protocol, refunds are guaranteed to be processed in a timely manner.

III. Arbiters

- Increased Value:
 - **Arbitration Protocol** - Arbiters can acquire extra tokens by participating in arbitration cases; the more Bee tokens staked, the greater the expected return.

IV. Third Party Developers

- Increased Revenue:
 - **Protocols** - Teams can quickly build applications around the sharing economy using Bee Protocols and gain greater market share than competitors who would spend more time developing their product from scratch.
- Decreased Costs:
 - **Protocols** - Teams do not need to hire solidity / Ethereum developers who will have to write smart contracts (Ethereum developers on average are paid 1.5X more than regular full-stack developers)
- Time Savings:
 - **Protocols** - Do not need to create and audit smart contracts from scratch and worry about the security of smart contracts.

In addition, Beenest plans to implement a referral program to incentivize user acquisition of hosts, guests, and arbiters. Users referring hosts who post a listing that results in a booking will receive BEE tokens.

Token Value

As the number of users (guests, hosts, 3rd party devs, arbiters) increases so does the transaction volume, which increases the amount of staked tokens in the protocols. This means the number of Bee tokens in circulation (not staked in the protocols) goes down with user adoption, which decreases the total supply.

1. **Number of Payments:** throughout any booking on our platform, a certain amount of Bee tokens (booking cost, security deposit, cancellation fees) is held in the payment protocol until the checkout date.
2. **Number of Arbitration Cases:** arbiters stake more tokens to be picked more often for judging by the arbitration protocol.
3. **Reputation Score Compensation:** users with poor or no reputation can build trust with other users by staking tokens on their transactions.
4. **Sponsored Listings:** we'll allow hosts with high reputation to promote their listings for a fee in BEE.

$$V(\text{token}) \propto (\sum N(\text{users}))^2$$

Why Tokenize

The Bee Token acts as fuel for the 3 Bee Protocols. These protocols benefit from a distributed database, where rules for governing participants are not uniform and rules for transactions don't change frequently.

Creating an in-house Bee Token that interacts with the Beenest platform allows the network to have aligned goals and incentives, prepares a platform to be agnostic to a singular cryptocurrency or digital token, and allows better management of the side chain.

1. **Aligned Goals and Incentives** - Using ETH directly would align participants in the Ethereum network on the value of smart contracts, rather than the value of a sharing economy, which we achieve by having BEE.
2. **Platform Agnostic** - Beenest believes in the potential of blockchain technology and cryptocurrency. By creating the Bee Token, Beenest is created on an infrastructure that allows it to be flexible in the future of cryptocurrency or digital tokens whether that

means the continuing growth of Ethereum or an introduction of the latest cryptocurrency.

- 3. Side Chain Management** - Sidechaining is a mechanism that allows tokens from one blockchain to be securely used within a completely separate blockchain but moved back to the original chain if necessary.

Due to the changing economics of cryptocurrency, side chain allows a better economic management of our platform. Bee Token can focus on providing greater value to its participants in terms of user experience rather than the changing nature of a cryptocurrency.

Summary

In summary, the Bee Token takes advantage of the changing behaviors of millennials and the recent popularity of cryptocurrencies and also the inherent misalignment of incentives that existing centralized sharing economies create. Our three protocols, the “**P-A-R**” protocols (**P**ayment, **A**rbitration, and **R**eputation protocols) used in tandem will help dApps and 3rd parties to increase revenues, decrease costs, and save time. All in all, the Bee Token seeks to eliminate inefficiencies through the power of smart contracts, which enables organizations to operate with a completely new business model that distributes value to all supporters in a more equitable fashion.

Appendix

A. Anticipated Timeline

Q3-Q4 2017

- Whitepaper release
- R&D for Beenest architecture and Bee Protocol specs
- Alpha prototype launch on testnet
- Partner with auditing firms to audit our contracts
- Finalize partnerships with listing providers in San Francisco

Q1-Q2 2018

- MVP launch in San Francisco focusing on crypto community and hacker houses
- Beenest integrates with a third party identity verification and KYC platform
- Beenest supports payment and payout options in BEE tokens only
- Bee Protocols launch on testnet and audited by 3rd parties

Q3-Q4 2018

- Further expansion of hosts and guests in San Francisco with more A/B testing
- Expand the arbiter pool with arbiters from all over the world
- Bee Protocols go live on ethereum mainnet, and starts integration with 2-5 dApps
- Launch iOS and Android Apps
- Beenest integrates with a third party decentralized KYC protocol
- Beenest integrates with a third party currency conversion protocols to allow payment and payout in ETH and all ERC20 Tokens, as well as BTC and fiat
- Beenest integrates with a third party marketplace protocol to allow decentralized listings

2019

- Beenest further expands to 2-5 more US cities
- Facilitate integration of 5-10 sharing economy dApps with Bee Protocols
- Implement governance model for future protocol improvements
- Beta test more automation features (e.g. smart contract-driven Lockbox)

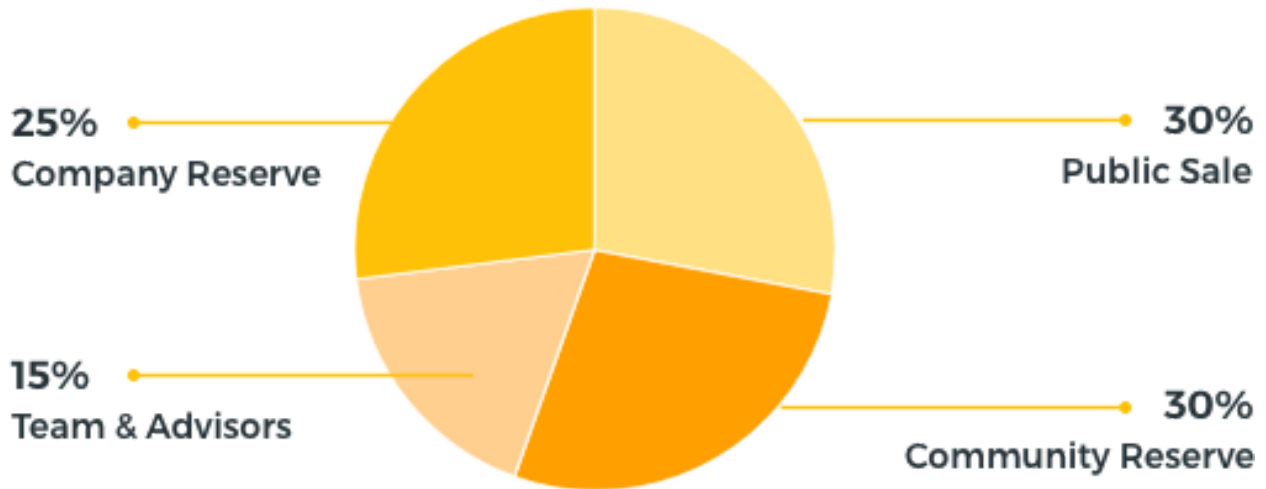
2020+

- Beenest further expands in key cities worldwide
- Bee Protocols supports a wide range of sharing economy dApps on the Ethereum blockchain

B. Token Sale

Total Supply: 500 million Bee Tokens

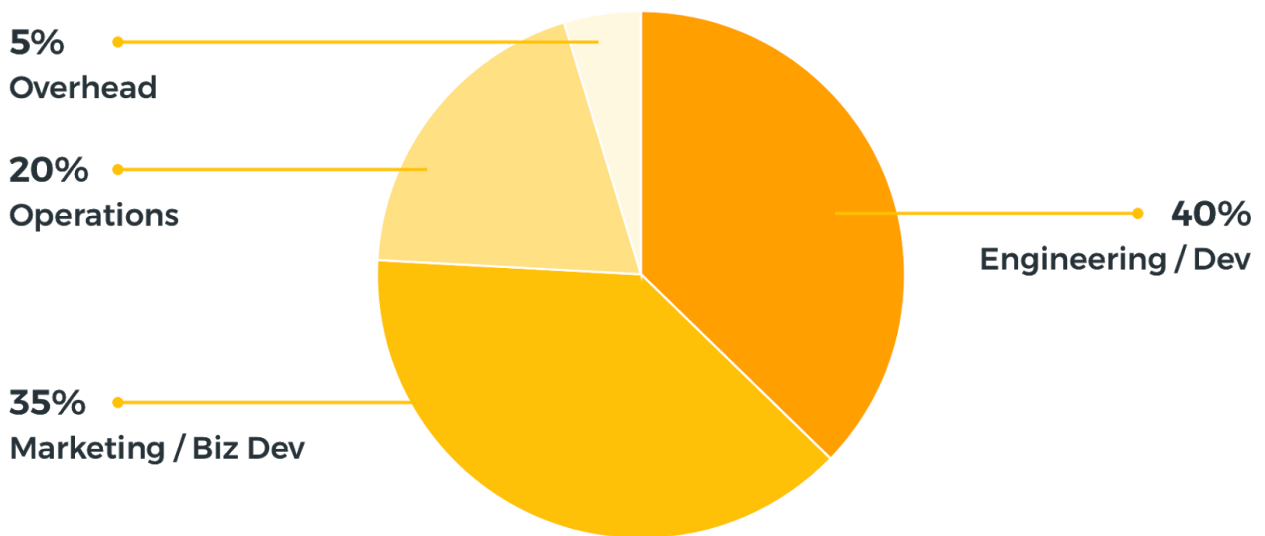
Target Sale Amount: \$15M



The Bee Token team will be on a 2-year vesting schedule. The team will receive $\frac{1}{4}$ of their allocation 6 months after the end of the Public Sale. Every month thereafter, the team will receive $\frac{1}{24}$ of their allocation until the 2-year vesting schedule is finished.

No one is exempt from this vesting schedule including cofounders and advisors. For information on Presale, join our Telegram channel: <https://t.me/beetoken>

Below is the breakdown of the funds after the token sale.



C. Team

The team is composed of former engineers and product managers from Google, Facebook, Uber, and Civic. We bring years of experience in software engineering, entrepreneurship, and business development across many industries.

Jonathan Chou - Co-Founder & CEO

Jonathan is a serial entrepreneur, helping out with family businesses since the age of 15 that were eventually sold to Sun Chemical and 3M. Most recently, Jonathan was a lead at Uber, Security & Fraud division, managing device tampering and preventing account takeovers. Previous to Uber, Jonathan worked at multiple early-stage startups that eventually exited such as Grindr and Dongwei. Jonathan has been passionate about cryptocurrency since 2012 and has a strong interest in applications of technology involving the real-world such as Airbnb and Uber.

Tony Tran - Co-Founder & CTO

Tony is an expert in Machine Learning and Software Development with over a decade worth of work experience. At Uber, Tony helped lead and develop product features and Machine Learning models to prevent fraud. In addition, Tony was an early Engineer at Bizo (acquired by LinkedIn) where he helped design systems to optimize ad targeting. Furthermore, Tony is the founder of the San Francisco Bay Area Machine Learning meetup group.

D. Advisors

Our advisors are industry leading experts within the blockchain and cryptocurrency space.

Yiseul Cho - Partner @ Blockchain Partners Korea

Miko Matsumura - Co-founder @ Evercoin

Kevin Zhou - Co-founder @ Galois Capital

Richard Li - Co-founder @ AlphaBlock Investments

Anastasia Andrianova - Co-founder @ Apero Capital

E. User Acquisition Strategy

1. Official Cryptocurrency Housing Sponsor

Beenest's initial market segment is the cryptocommunity. We will target conferences and events targeting this demographic by sponsoring and engaging in post-conference networking.

This is a quick way to bootstrap our initial network and capitalize on brand recognition as the main home sharing platform on the blockchain.

2. Referral Program

Positive word-of-mouth is the lowest cost and most effective way to generate brand awareness, new leads, and immediate sales.

Beenest plans to implement a referral program to incentivize user acquisition of both hosts and guests. Users referring hosts who post a listing that results in a booking will receive BEE tokens. Likewise, users referring guests that result in a booking will also receive BEE tokens.

3. Ambassador Program

Ambassadors are liaisons between a company and the community. They serve as the voice representing the vision of Bee Token.

Communities are becoming increasingly interested in blockchain technology and smart contracts. Beenest plans to onboard Beenest Ambassadors who are excited about the potential of a decentralized home-sharing platform. By promoting events, organizing hackathons, and volunteering for campaigns, we believe that the ambassador program will be pivotal in order to grow our developer's community.

Beenest Ambassadors handle:

- Planning and hosting Bee/Crypto events/meetups
- Developing marketing and outreach programs
- Collecting feedback and sharing ideas to further promote the Bee Protocols and possible use-case applications

In addition, Beenest Ambassadors are able to obtain tokens through their contributions that further incentivizes them to promote the company and its platform. Lastly, with the rollout of a referral program, Beenest sees the potential of creating a self-reinforcing feedback loop that generates more users and awareness for the company and its platform.

F. Market Growth

As of 2017, the short-term housing market only consists of centralized home sharing platforms lead by Airbnb, HomeAway, and etc. Most operate



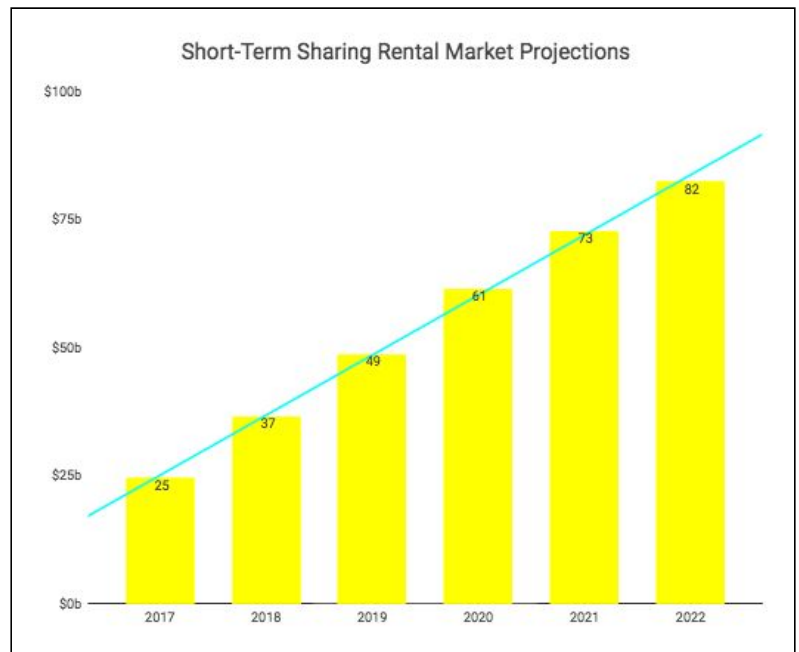
under a similar business model with slight nuances such as country of focus, target audience, or rental time frame. Based upon market research and product fit, the Beenest's most comparable direct competitor is Airbnb.

Global short-term rentals are properties that are either currently available or will be available to host and rent to travellers and tourists. The global short-term rental market is projected to grow at a CAGR of 7% from approximately \$147B in 2017 to \$207B in 2022.

Applicable short-term rentals are properties that are either currently used or will be used to host and rent to travellers and tourists.

All such rental properties are what make up the Airbnb ecosystem.

Based on publicly available Airbnb data, we modeled out the growth of the applicable short-term rental market and expect this market to grow from approximately \$25B in 2017 to \$82B in 2022.



G. Conflict Resolution Use Cases

Case 1: Without Arbitration

- Upon the conclusion of a stay, guests and hosts have the ability to communicate between each other. If there is a dispute they can discuss and agree upon a resolution sensible to both parties.
- An option that allows the transfer of partial or all of the security deposit is available to resolve any issues
 - Guest will have the option to release part or all of the rental amount to the Host
 - Host will have the option to release part or all of the security deposit to the Guest
 - When both parties have stated the amounts to be released from the payment protocol, they must both confirm the agreement for funds to be released.
- Upon the conclusion of the Smart Contract, the dispute is closed and the option to review is available for both parties

Case 2: With Arbitration

- Within a 1 week window (or a reasonable timeframe), either party has the ability to file a dispute and escalate to arbitration
- To present a valid and strong case, the escalating party must include the following:
 - Description of unpleasant/wrongful experience
 - Evidence to support claim (pictures, videos, ...)
 - Cost of Arbitration
- The other party has 3 days to present their case
- The amount in contention is the collective sum of the security deposit between the Host and the Guest.
- Upon the conclusion of a dispute, the losing party has a 72 hour window to appeal, but must stake a larger amount of tokens

Case 3: Extreme Cases

Extreme cases of damage are rare, nevertheless, Beenest promotes the peace of mind and well-being of hosts to ensure a seamless and pleasant experience. In extreme cases, hosts should go through arbitration, then file a claim with Beenest for damages in excess of the security amount providing the following documents:

- a. A police report
- b. Personal liability insurance
- c. Any additional description, pictures, ...

In which case, Beenest will have a specialized team of conflict resolution experts to ensure the conclusion of a dispute.

H. Protocol Specs

Payment

We define the following payment structure that holds all the above information:

Name	Type	Description
paymentHash	bytes32	[Required] A Keccak256 hash of all present fields. Uniquely identifies 1 payment.
supplyEntityAddress	address	[Required] Address that the supply entity will send/receive tokens from/to.
demandEntityAddress	address	[Required] Address that the demand entity will send/receive tokens from/to.
arbitrationAddress	address	[Required] The address to move all the tokens corresponding to the transaction for arbitration, in case of a dispute.
cost	uint256	[Required] The cost of the good or service in BEE tokens (multiplied by 10^{18}).

securityDeposit	uint256	[Optional] Applies mostly for services. If a security deposit is not needed, default to 0. Otherwise specify the number of tokens to be held as a deposit until the dispatch time, or a dispute.
demandCancellationFee	uint256	[Optional] Number of BEE tokens to be deducted from the demand address, and added to the supply address in case of cancellation before the provided cancellation time.
demandCancelByTimeInS	uint256	[Optional] Cut-off time (POSIX time in seconds) for free cancellations. If the demand entity cancels after this time, they will be charged the provided cancellation fee.
supplyCancellationFee	uint256	[Optional] Number of BEE tokens to be deducted from the supply address, and added to the demand address in case of cancellation before the provided cancellation time.
supplyCancelByTimeInS	uint256	[Optional] Cut-off time (POSIX time in seconds) for free cancellations. If the supply entity cancels after this time, they will be charged the provided cancellation fee.
paymentDispatchTimeInS	uint256	[Recommended] The future time (POSIX time in seconds) in which the contract dispatches the tokens to the supply entity, and returns any deposits/fees. Instantaneous dispatch time is highly discouraged.

Interface

Function	Description
initPayment	Bootstraps a new payment with the data from the Payment structure above. Adds a new mapping from paymentHash to amount of tokens to be held.
cancelPayment	To be called when either the supply entity or the demand entity decides to cancel payment.
pay	To be called by both supply and demand entities to pay the contract. All tokens sent are held until the dispatch time, or a dispute arises.
disputePayment	To be called in case of a conflict. Moves the inProgress payment to inArbitration, and moves all the tokens into the provided arbitration account.
getPaymentStatus	Returns the status of the payment. Something along the lines of: PENDING_DISPATCH_TIME, PENDING_PAYMENT, IN_ARBITRATION, COMPLETED.

Beenest workflow

1. When a booking is initiated from the Beenest web app, the Beenest dApp initializes the payment, passing all the following fields in:
 - a. The addresses of host, guest and arbitration account
 - b. The total booking cost for all the nights
 - c. Security deposits and cancellation fees
 - d. The dispatch time is going to be the checkout time + 72 hours (to leave time for hosts to check for any issues)
2. Beenest then waits until the guest and the host send the tokens from the addresses they initialized above:
 - a. Guest pays all the booking fees + security deposit + cancellation fee + insurance

- b. Host pays the cancellation fee
- 3. The payment contract checks to see that the required amount has been met, and updates the status of the payment to PENDING_DISPATCH_TIME
 - a. In case of a dispute: the payment contract transfer all the tokens to an arbitration account
 - b. In case the dispatch time is hit (guest checkout time + 72 hours), the hosts and guests get paid
 - i. Guest gets back security deposit + cancellation fee
 - ii. Host gets booking amount + cancellation fee

Arbitration

The following is the struct for arbiter:

Name	Type	Description
arbiterAddress	address	Arbiter's address.
stakedAmount	bytes32	The amount that the arbiter wishes to stake.
marketplace	address	Contract address of whitelisted marketplace. Required to update specific marketplace reputation. (Also useful to select for specific types of arbitration)
reputationScore	bytes32	The reputation score (specific score for arbitration).
appealsRate	bytes32	Percentage of judgements repealed (0-100).

Interface

Function	Description
raiseDispute	Triggered by someone using Bee payment protocol.
stake	Potential arbiters stake tokens for the chance to participate in arbitration.
vote	Arbiters vote on a 1-5 scale in favor of plaintiff.
appeal	Restarts the process and adds changes state.
appearInCourt	Arbiters chosen for a particular dispute will need to respond within a specified timeframe, or will lose their stake.

Beenest workflow

1. Upon completion of a payment contract, if either party is unhappy with their rental agreement, all funds from the payment contract are sent to arbitration. Beenest dApp will handle interfacing with both the payment and arbitration protocols.

2. One or both parties must then stake a flat arbitration fee in order to pay arbiters to judge the dispute. Again Beenest handles interfacing with the arbitration protocol.
3. Once arbiters are chosen, the guest and host must submit their claims and evidence.
4. Arbiters then make a decision and the dispute amount is allocated based off an aggregate of the majority decision.
5. Guests and hosts have another chance to challenge the dispute, but are required to re-stake tokens to pay arbiters. Then the workflow follows 2-4 above.
6. All parties are paid after arbitration is finalized.

Reputation

Interface

Function	Description
updateReputationScore	Takes an address for a smart contract specifying an algorithm to compute a new score, and generates a new global reputation score as a weighted average of the existing scores/algorithms.
pullReputationScore	Returns the reputation score (an integer between 0 and 100), with a short breakdown of how it was computed.

Beenest workflow

1. Beenest has a few signals that fire when the reputation needs to be bumped up or down. For instance reputation changes whenever the user provides personal information, books a place, creates a listing, gets reviewed (good or bad) or gives reviews (good or bad). For each of these signals Beenest will send a message to the reputation protocol to update the score.
2. Beenest also would do a periodic reputation score pull to allow users to do certain functions like adding a new listing, or sending a big payment. As reputation score shouldn't significantly change overnight, Beenest will cache the score daily.

I. Useful Links

- Website: thebeetoken.com
- Pitch deck: thebeetoken.com/pitchdeck

No representation or warranty is made as to future performance or such forward-looking statements.

