



A TRANSPARENT SPORTS BETTING AND GAMBLING PLATFORM BASED ON
SMART CONTRACTS ON THE ETHEREUM BLOCKCHAIN THAT RETURNS
100% OF PROFITS TO THE BETKOIN HOUSE CREDIT HOLDERS.

VERSION 0.5.2

ABSTRACT

Betkoin is a transparent, smart contract based sports betting platform and online casino. Employing the Ethereum blockchain based smart contracts, Betkoin is aiming for mass adoption. Unlike other decentralized gambling platforms which primarily use Ether and Bitcoin for transactions, Betkoin makes use of specialized ERC20 tokens – Betcoins to facilitate bets on the platform as well as buy credits in the house, known as Betkoin house credits.

The Betkoin sports betting platform will make use of a trusted setup wherein the Betkoin addresses will provide betting lines and outcomes. All transactions will be transparent and verifiable on the blockchain. This transparency will make it impossible for malicious or predatory activity to take place from the outset. All payouts, credit distributions, lottery winnings, house buy-ins, would be completely decentralized and determined on-chain.

A whole host of gambling based casino games will also be available on the Betkoin platform – making use of off-chain state channels that are finally verifiable on-chain. The

speed and scalability would combine the user experience of a high-end gambling platform while bringing the transparency and auditability of the blockchain.

This paper discusses the functioning of the Betkoin user-owned house model, state channel based casino games, decentralized houses and business prospects for the platform.

TABLE OF CONTENTS

1.0 ABBREVIATIONS AND DEFINITIONS	4
2.0 INTRODUCTION	5
2.1 About Betkoin	5
2.2 Problems and Solutions	5
2.3 Market Analysis	8
2.4 Limitations	9
3.0 Betkoins	10
4.0 SPORTS BETTING	11
4.1 Betkoin API	11
4.2 Results & Verification	11
5.0 CASINO	12
5.1 State Channels	12
5.2 Other Games	13
6.0 MULTI-PLATFORM USABILITY	14
7.0 FUTURE POTENTIAL	15
8.0 RISKS INVOLVED	16
8.1 Server Downtime	16
8.2 Trusted Data Providers	16
8.3 Ethereum Blockchain Dependence	17
9.0 REFERENCES	18

1.0 ABBREVIATIONS AND DEFINITIONS

Betkoin Exchange	Decentralized exchange for Betkoin tokens and Betkoin House Credits
Betkoins	ERC-20 Token used for placing bets on the Betkoin platform.

2.0 INTRODUCTION

2.1 About Betkoin

Betskoin is a transparent profit sharing sportsbook and gambling platform employing decentralized Smart Contracts on the Ethereum blockchain.

Betskoin aims to provide a long-term solution to allow users from around the world to establish credit in the houses, that provide sports betting and gambling games while leveraging the blockchain to provide transparency, verifiability and constant uptime, unlike other regular online casinos.

Betskoin will start out with a single house operated by the Betskoin platform and in due time open doors to traditional casino operators to establish houses on the platform. This essentially allows traditional casino operators to leverage blockchain technology to provide the next generation of gambling games and sports betting to their existing user base.

2.2 Problems and Solutions

Problem: High profit-generating gambling platforms owned by a single group/entity with limited transparency running on dated technology stacks.

Traditional online casinos/sports betting platforms available in the current market, work in a completely centralized manner and operating profits are distributed between selected individual(s)/group(s).

Although this may not pose as much of a problem at the moment, with the coming shift from centralization and tightly controlled models to a decentralized future, the current model has a high-risk of being outdated in the coming years. Betskoin's vision aims to make full use of the opportunity that presents itself with the upcoming shift to

decentralization – where Betkoin house credit holders will have a say in how the platform moves forward with a decentralized governance model and receive profits generated by the platform for each session.

With the current push for disruptive blockchain based solutions among all industries and the obvious fit for gambling based solutions, there are a few platforms that have been conceptualized and at times have even been implemented over the last year. However, regardless of what stage existing platforms are at this point in time, there are a few fundamental issues that do exist with a majority of them.

Problem: Blockchain based casinos providing slow, costly blockchain dependent games without layer-2 solutions, sports betting platforms in their infancy/concept stages and profit sharing gambling platforms with a single house model.

Platforms that have been built on the Ethereum Blockchain face the same problems that all decentralized platforms built on Ethereum face right now. Games that are traditionally played at a quick pace, are slowed down due to the slow block times for RNG and transactions on the blockchain in general. Although this would not be a problem in the future with the scheduled upgrades to the Ethereum network that will greatly improve its capacity, games right now are painfully slow and don't replicate any regular online casino in terms of speed and experience. This poses a significant roadblock in convincing the masses to switch to a blockchain based platform.

Betskoin being based on Ethereum blockchain faces the same problem at the moment as these platforms, but it looks to tackle it by using off-chain state channels for RNG and game moves after channel creation. This greatly improves the speed of games and offers the experience of any other high-end online casino to the end-user while being finally verifiable on-chain. State channels also lead to greatly reduced gas costs since transactions do not happen on-chain.

Sports betting platforms on the other hand, pose a different problem in achieving consensus on events. The task although seemingly straightforward, turns out to be a

complex action to implement whilst keeping methods of gambling the system to a low and reducing malicious entities from pushing the wrong outcomes to the network.

Keeping a 50% majority consensus could lead a single entity/group to simply purchase 50% of tokens in the network and push the wrong results.

Increasing the consensus requirement, to say 75%, could lead malicious parties to constantly hold 26% or more of tokens in the network and push incorrect outcomes making it impossible to reach a 75% consensus.

The decentralized crowdsourced outcome reporting problem is definitely a hard one to tackle and one which currently has two platforms actively working on solving it– Augur and Gnosis. They still have ways to go before being ready for use at this point in time. However, in the future APIs provided by the two platforms would be a great resource for betting platforms to link with, and provide accurate outcomes in, a decentralized manner.

For now, Betkoin looks to tackle this overarching issue by providing centralized oracles for each house on the platform. The blockchain helps provide the transparency and verifiability to make sure the houses do not try to cheat players by pushing incorrect results to the platform. With multiple houses that spring up on the platform, users would have a variety of different outcome and line providers to choose from. This also opens doors to bringing in traditional sports betting platforms to adopt the technology provided by the Betkoin platform and in turn increase the platform's user base as a whole.

Apart from the two problems mentioned above, platforms that do have profit sharing models at the moment seem to offer it in a closed manner – with a single house splitting profits of their offered games among users holding a dividend sharing token.

Initially, the sportsbook will make use of lines and outcomes supplied by addresses owned by Betkoin.

The ERC-20 standard token provided by Betkoin will be used for all purposes within the platform, unlike other smart contract based gambling platforms that allow bets in Ether.

2.3 Market Analysis

Since the majority of the running block chain based gambling platforms have been implemented only within the last year, there aren't any data sources providing usage statistics of the emerging market as of yet. However, statistics for online casinos are available and would portray an acceptable representation of our target audience and future growth potential.

(Ref #4) The market for online casinos as a whole was \$35.97 billion USD in 2014 and is estimated to reach \$66.59 billion USD by 2020, at a CAGR of 10.81%. Additionally, the use of mobile devices for online gambling purposes is increasing with market growth for this industry being very geographically specific.

More than 80 nations have legalized online gambling and Europe has the largest online gambling market in the world which accounts for some 47% of the entire world. (<http://www.egba.eu/facts-and-figures/market-reality>) Importantly, this is something which is just going to increase, as countries like the Netherlands adopt new online gambling regulations which facilitate and promote growth. Additionally, in the Asia Pacific region, the online gambling sector has not grown much, as there has been no scope, a fact which promotes both a disadvantage and a significant opportunity to be explored.

Since the online gambling market allows players to use virtual money, it has reduced the burden and risk of carrying cash as in the case of real gambling activities, and since this can be done in the comfort of one's home, many people are now resorting to online gambling. Something which highlights that there is greater and greater opportunity for this market to grow and expand in the near future as governments move to regulate practices and enable safe, healthy growth in a market which is still in its infancy.

2.4 Limitations

Obtaining correct and verifiable results/outcomes for sporting events in a completely decentralized system would require a significantly larger engineering effort, while also opening doors up to a number of security and integrity concerns.

Getting to market early maximizes our potential to succeed, but requires us to use authorized addresses to provide outcomes to the contract – which would bring an aspect of centralization to the platform. This approach means users would have to rely on Betkoin to provide accurate outcomes for games, all other aspects of sports betting – i.e. payouts, bets created, house hedges etc. are all decentralized, transparent and verifiable – which is a large improvement over existing centralized online gambling platforms operating today.

For gambling games like roulette that rely on instant results and game moves to meet the user experience expectations while making sure outcomes are verifiable on the blockchain, Betkoin makes use of state channels between the house and users utilizing a REST API to communicate between the user and the house. Current competitive implementations rely on an oracle to act as an RNG to call back results into a contract, taking much too long in terms of user experience, which consequently will decrease the possibility of achieving mass adoption. By using state channels that work completely off-chain and are finally verifiable on-chain – we are able to sidestep this limitation and improve the timeliness and quality of the service.

However, with the planned updates to the Ethereum blockchain such as sharding, which would increase Ethereum's capacity in terms of transactions per second – Betkoin will eventually restructure all gambling game contracts to work based on completely on-chain solutions.

3.0 Betkoins

Betkoin uses its own ERC-20 standard token, Betkoins - for all transactions on the platform. Unlike other platforms in the space that make use of Ether and Bitcoin for gambling, Betkoins are used for gambling along with other use cases such as purchasing Betkoin house credits, buying out custom houses, purchasing lottery tickets and more. Ether will only be accepted by the Betkoin contracts at the time of the ICO and will be used to fund and run the platform for the foreseeable future.

4.0 SPORTS BETTING

The initial offering at launch by Betkoin is a sport betting platform with multiple sports offerings such as; Football, Cricket, Horse Racing, Tennis, Greyhound Racing and more.

All games, bets and outcomes on the platform will be saved on Smart Contracts.

However, since there are issues with creating a completely decentralized sports betting platform in terms of having the right outcomes pushed to the contract and reducing the possibilities of different attacks and methods to game the system, Betkoin will be pushing the games and outcomes onto the contract using trusted addresses. Although this brings in an aspect of centralization to the platform, all games, odds and outcomes being pushed in would be transparent and verifiable on the blockchain. Users would be able to immediately view incorrect outcomes on the blockchain and report them, if any such occurrences were to happen.

4.1 Betkoin API

The Betkoin API will be used primarily to retrieve sports betting metadata. The API will deliver metadata required by the front-end such as team names, league names, event names etc., without bloating the smart contract with data that does not require decentralization and also helping to reduce gas fees. Games on the Smart Contracts would be identifiable by their IDs.

4.2 Results & Verification

All odds and outcomes obtained by the Betkoin backend come from multiple sports betting feeds and line providers. This approach reduces the chances of error while pushing odds and outcomes to the contract. To verify any of the results, users will be able to view the outcomes straight from the Betkoin front-end or it's API and verifies the results pushed into the smart contract manually on the Ethereum blockchain. If any outcome is found to be in error users would be able to call for a correction and receive a refund.

5.0 CASINO

In addition to the sports betting platform that will be available on launch, Betkoin will launch a decentralized casino based on smart contracts and state channels. TeenPatti will be available at launch and will be followed by a series of other casino games such as BlackJack, Roulette, Poker etc., which will be developed in line with our vision of mass adoption.

5.1 State Channels

With the current state of the Ethereum blockchain – relying on an on-chain oracle connected to a trusted source to act as an RNG i.e. random.org or WolframAlpha , users have to wait for a callback from a query which could take a minute or more due to being on-chain. Furthermore, Ethereum’s current limitations in terms of transactions per second dramatically disrupt the user experience by creating these delays which in turn would disenfranchise a large portion of our target potential users, traditional online gamblers, who are unaware of how blockchain gambling works.

This led the Betkoin team to use an alternative method to act as an RNG and settling games on-chain between the house and the user – state channels. State channels make use of the blockchain to initially deposit funds into the channel contract for both house and player before making the game available to play for the player off-chain using a turn-based system. The user and house exchange details for a turn using signed messages which enable final verification on-chain.

***** IMPLEMENTATION INFO TO BE PROVIDED IN FINAL VERSION *****

On the front-end, all users viewing closed channels would be able to reconstruct the RNG sequence for all their games and verify validity. The advantage of using this system is the speed at which games could be played and its scalability in comparison to a completely on-chain solution with the current state of the Ethereum network. With transactions only happening at the start and end of a channel contract rather than for every move – users

would save significantly in gas fees, which would otherwise cost a significant amount of Ether over time. With future updates that have been proposed to Ethereum such as Casper and sharding – Ethereum would have the capacity to process a magnitude of times larger amount of transactions per second (~15 tx/sec currently to over 10,000+ tx/sec – Ref #3). This would enable Betkoin to eventually switch to a completely decentralized solution for its casino games, whenever the proposed updates are ready.

5.2 Other Games

Over time, other casino games will be added on to the platform based on user demand in the form of smart contracts and state channels while making use of Betkoins for all transactions.

6.0 MULTI-PLATFORM USABILITY

In line with Betkoin's vision of mass market blockchain backed digital casino, betting front-ends will be available across multiple platforms to increase adoption and retention rates. Betkoin will offer both a responsive web front-end as well as native mobile apps for both Android and iOS devices.

With focus on games that are flexible in terms of transaction times – a significant limitation in Ethereum at the moment, sports betting and casino games like TeenPatti and Poker will still be able to be played with a smooth and appealing user-experience.

7.0 FUTURE POTENTIAL

After the completion of the crowdsale, based on the amount raised, Betkoin will be setting up a larger development team looking to add as many casino games onto the platform as possible in line with its vision of mass adoption.

With a vast selection of casino games that will be transparent, auditable and verifiable using the Ethereum blockchain coupled along with a 100% profit payout to Betkoin house credit holders, Betkoin will have a solid base to grow into a leading player in the global online casino market.

With improvements to the current infrastructure of the Ethereum blockchain, Betkoin would also switch to a completely decentralized model for casino games as long as user experience would not be affected.

From a sportsbook perspective, Betkoin will be looking to add all popular sports/esports that cater to regions across the entire world, to establish itself as the leading blockchain based sportsbooks globally.

8.0 RISKS INVOLVED

8.1 Server Downtime

With state channels, Betkoin requires a mode of communication for gambling games to exchange data for each game move. At the time of launch, due to the lack of stable decentralized messaging protocols – Betkoin will have to make use of a REST API hosted on regular cloud infrastructure to act as a mode of communication to conduct off-chain game moves between users and the house. As with any solution that relies on a client-server architecture, downtime could happen due to a number of unforeseen circumstances.

However, with timeouts are embedded into each contract users are able to finalize and close channels themselves after the timeout period, ensuring their funds are not held in limbo while the servers are unable to communicate directly with users.

To mitigate these negative effects and keep uptime at a maximum, Betkoin will make use of high-end cloud infrastructure with multiple instances backed by load balancers along with DDOS protection. All on-chain events will also be watched by separate instances to ensure even if API servers are offline, on-chain transactions such as closing channels could be performed by the house. Once Ethereum's Whisper launches a stable release, all communication between users and the house will be switched to use Whisper rather than the REST API.

8.2 Trusted Data Providers

All sports betting odds, lines and outcomes on the Betkoin platform will be pushed by the addresses owned by Betkoin. Users of the platform would have to rely on Betkoin to push in correct data which otherwise would lead to undesired consequences. To prevent issues from arising in this aspect, Betkoin will make use of data from multiple data providers and verify all data before pushing any data on-chain. However, if any mistake does arise, users would be able to report the bet, call for a correction and receive refunds. In the future, Betkoin will look into implementing decentralized oracles that would be

incentivized to push the right results through a reward system, with punishment for malicious activity.

8.3 Ethereum Blockchain Dependence

Since Betkoin is a platform based on the Ethereum blockchain, it ultimately relies on the state of the Ethereum Network for its long-term success. Any unforeseen incident on the Ethereum Network could negatively affect Betkoin in terms of performance, stability, security etc.

Additionally, Betkoin will also be limited by the limitations of the Ethereum Network, may it be in terms of speed, scale or any other factor. However, with the proposed updates that will drastically improve the state of the Ethereum Network, Betkoin will only be set to improve in terms of offering complete decentralized/on-chain solutions rather than relying on layer 2 solutions like state channels for fast, verifiable gambling games.

9.0 REFERENCES

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