BLOCKCHAIN SOLUTIONS FOR GAMING

COMMERCIAL WHITEPAPER v2.0 DRAFT



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FunFair Technologies

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Table of Contents

1 Abstract **2**

2 Introduction **2**

3 Business Case **3**

4 Technology **7**

4.1 Protocol and Platform 7

4.2 Fate Channels 10

4.3 Fun Token 13

4.4 FunPass 15

4.5 Provable Fairness 16

4.6 Comparison with other Technologies 17

5 Key Benefits **19**

5.1 For Players 19

5.2 For Operators 20

5.3 For Affiliates 21

5.4 For Developers 22

5.5 For Regulators 22

6 Company **23**

6.1 Overview 23

6.2 Token Presale 23

6.3 Team 24

6.4 A Strategy for Success 26

6.5 Direct To Consumer 27

6.6 Milestones 27

7 Risks **28**

8 Notes **35**

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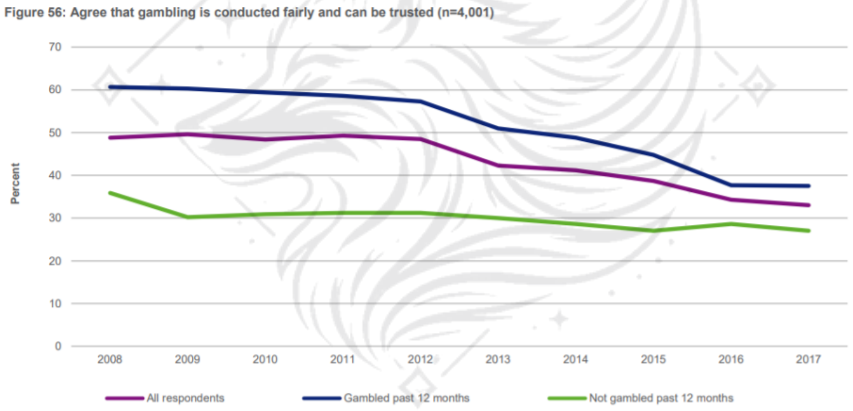
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1 Abstract

FunFair's goal is a world of truly fair, decentralised online gaming powered by blockchain technology. To get there, we have built a robust protocol for trustless and decentralised casino gaming. To help establish it, we have also built the first plug-and-play casino platform which empowers a new generation of casinos, affiliates and developers. Leveraging the transparency and security of the blockchain, the FunFair protocol and platform are the foundation for a pioneering gaming ecosystem which links all participants in real time. A fairer, more user-friendly experience for players and a more efficient tool for the industry, our innovative casino technology is set to revolutionise online gaming.

2 Introduction

According to the UK Gambling Commission, trust in gaming and overall public attitudes to gaming are in decline[i]. By delivering unprecedented transparency and player protection through decentralised, provably fair technology, FunFair is set to reverse these trends.



Graphic from UK Gambling Commission Annual report "Gambling participation in 2017: behaviour, awareness and attitudes" February 2018

FunFair's blockchain gaming solution offers fast, low cost, user friendly and provably fair games while delivering the high quality of mobile-friendly entertainment and production values that today's gamers demand.

Our casino gaming protocol and technology platform enable one of the first commercially viable blockchain applications and have been designed to run at mass market scale. Built on the Ethereum blockchain, Funfair's protocol employs a combination of smart contracts, proprietary Fate Channels and the FUN utility token[ii] to power a global network of completely transparent, secure casinos.

FunFair's Fate Channels, an advanced version of state channel technology, allow player and operator to transact in real time with far lower gas costs than other blockchain applications. This unique approach to off-chain scaling enables an almost limitless numbers of players, bets and wins, as well as real time provably fair random number generation.

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The platform features FunFair's own high-quality 3D games built to HTML5 and WebGL standards, with games from independent developers to be added as the platform progresses. The platform's open architecture, designed by developers for developers, aims to create the leading marketplace for blockchain casino game content.

Having completed the pioneering FunPass ID verification process, players can access any FunFair-powered casino with one click. Games are fun, fast and provably fair, with random numbers and game code easily verifiable at the click of a button. There's no need to deposit in order to play, with funds – in the form of FUN tokens - for each gaming session sent to a secure, transparent escrow on the blockchain rather than a casino's account. For the first time, winnings are paid instantly, irrespective of size.

For the new breed of operators, white labels and affiliates, our technology offers faster integration, dramatically lower costs, an end to payments and game fraud and access to a growing audience of premium value, crypto-savvy players. With the evolution of our revolutionary Fate Channels technology, the FunFair protocol will enable a new age of fairer, more efficient, more secure and more user-friendly gaming.

FunFair Technologies was founded in 2017 by gaming veterans Jez San OBE, Jeremy Longley and Oliver Hopton. Just 15 months after a Token Presale which generated $26 million in contributions, the FunFair platform went live with the launch of its first casino. FunFair now has over 50 staff including blockchain engineers, game developers and executives from leading B2B and B2C global gaming companies. With the launch of more FunFair-powered casinos later this year, we will cement our position as the global leader in blockchain gaming technology.

3 Business Case

According to H2 Gambling Capital[iii], global online gaming revenues were worth an estimated $43 billion in 2017, making up 10% of all global gaming revenues (offline and online combined). H2 predicts that by 2022, the global online gaming market will be worth €65 billion. With over 6 million adults gaming around the world and estimates of greater than 10 million for 2020, the gaming market overall is growing rapidly, with the online segment of the market expected to accelerate faster than that of traditional casinos.

By 2017, mobile play accounted for an estimated 37% of online gaming revenues, over triple the 2010 mobile user base of 11.5%. H2 predicts that mobile use will continue to rise, reaching 49% by 2022. However, the major mobile platforms which dominate the market have heavily restricted "real-money" gaming apps from listing on their app stores or have banned them outright. Mobile adoption has, in fact, been a significant barrier to growth as gaming operators stick to the old "native app" model, despite the leading app stores consistent and universal ban.

Despite continued growth the online gaming industry faces a range of problems, for which FunFair's technology offers a unique set of solutions.

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Problem #1: Growing doubts over the integrity of online casinos

Consumer concerns over the fairness of games and integrity of online casinos have existed since the outset of internet gaming. Although the number of untrustworthy operators is relatively small, high profile cases of cheating[iv], a lack of transparency in game software (run from Remote Gaming Servers) and unreliable cashout processes has fed a growing perception that online gaming is unfair.

Solution: Provably fair blockchain gaming

The ability of players to easily verify that a game has run fairly, without interference and according to its agreed set of rules, is a key component of blockchain-based gaming technology. Using advanced state channel technology, FunFair goes one step further by guaranteeing cheatproof games, in addition to providing a means of verifying their integrity.

Problem #2: Player funds are not always secure

All current online casinos (and even 'Bitcoin casinos') require players to deposit funds with them before they can play. In many top tier jurisdictions, player funds are not fully protected if the casino becomes insolvent[v], nor are casinos required to prove their ability to payout large wins[vi]. The risks involved in giving up custody of funds and having faith that casinos will pay out in the event of large wins are not lost on consumers, with 1 in 5 worried about safety of funds in an Australian regulator survey[vii].

Solution: No deposits, and wagers held by independent blockchain escrow

The ability to play games using funds directly from their crypto wallet enables players on the FunFair platform to retain control over their funds at all times. Player and casino are both required to send funds for each gaming session to a smart contract escrow, eliminating the possibility that a casino misappropriates player funds, leaves a shortfall in the event of insolvency or is unable (or unwilling) to promptly pay out a win of any size.

Problem #3: Consumers want faster, easier gaming

Currently, it is compulsory for players in many gaming jurisdictions to complete a verification process for each casino they join. Lengthy verification, registration and payment processes are common causes of incomplete registration, failure to convert (deposit funds and play for real money) and single logins (where a player never returns after their initial visit).

Solution: FunPass and FUN token

By verifying their identity and age *once only*, players can obtain a FunPass which gives them access to any casino on the FunFair platform (subject to local jurisdictional requirements). By using the FUN token to place bets, there's no need to register a traditional payment method either. The FUN token also eliminates the widespread issue of failed deposits (i.e. the many instances that are not the fault of the player such as a bank declining a gaming transaction). By doing away with traditional registration forms, the submission of identity documents for each casino and the old payment process, we anticipate significant improvements to player acquisition, conversion and retention.

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Problem #4: Payouts are neither fast nor guaranteed

A leading global survey of online gamers found that the timely payout of wins was second only to fairness in their list of concerns[viii], and a key factor in choosing which casino to play at. While control over every payout request enables casinos to identify fraud, manage cash flow and plan for possible big wins (as they do not automatically hold sufficient cash in reserve and no real time checks take place), the cashout process – submitting a request, waiting for approval, enduring frequent delays and occasionally refusals - creates a dissatisfactory user experience which can lead gamers to play elsewhere.

Solution: Instant, guaranteed payouts

By combining the FUN token with Fate Channel smart contracts, the FunFair protocol enables instant payout back to the player's cryptocurrency wallet. When playing a game on the FunFair platform, players will have peace of mind that the biggest possible win has been sent in advance by the casino to the Fate Channel smart contract, and they'll be paid instantly once the game session is closed. For the first time ever then, players will receive winnings instantly, without any human discretion, and regardless of the size of win.

Problem #5: Complexity and cost in running an online casino

Launching an online casino in a mainstream gaming jurisdiction involves long setup periods, high initial costs, rigorous licencing applications and a laundry list of ongoing operational needs. Modern casino technology cannot be operated without banks of technical engineers, fraud prevention officers, payments staff to name a few. Monthly costs include technology licencing fees, server hosting costs, credit card processor fees and chargebacks, not to mention extensive marketing budgets to compete in a crowded market. These technical, financial and legal demands mean that few have the expertise and capital to launch and profitably operate a licenced internet casino.

Solution: FunFair casino solution

Launching a decentralised casino on the FunFair platform can be done in weeks instead of months, with far lower associated costs than traditional casino operations who must invest heavily in centralised infrastructure. Our solution uses a native cryptocurrency, smart contract-powered payments and a range of KYC and fraud prevention measures that together make most employee roles obsolete.

Problem #6: Many casinos must innovate to survive

The online gaming space has become increasingly competitive, with the trend towards consolidation creating commercial goliaths[ix]. Consumers are more promiscuous than ever, moving from site to site with ease in search of promotional offers. Casinos must therefore look for new and innovative ways to acquire new players and retain them longer.

Solution: FunFair casinos meet demands of new crypto audience

Our enterprise solution will ensure that FunFair operators and white labels are first to market in the race for the new generation of blockchain gamers. The explosion in awareness of Bitcoin and blockchain has created a new, wealthy audience of crypto-savvy consumers – including a ready-made gaming audience of over 60,000 FUN token holders[x] - with valuable market share up for grabs. The novelty of blockchain combined with the

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headline player benefits unique to the Funfair platform will differentiate FunFair casinos from igaming, cryptocasino and blockchain casino rivals.

Problem #7: Existing blockchain casinos are not fit for purpose

The first generation of blockchain-based casinos are neither fun, fast, secure nor truly fair. At best, they offer a degree of verifiable fairness which only enables players to check if a game was fair, rather than guarantee it at the outset. Many suffer from long wait times between games and prohibitive 'gas' network costs, rendering them unsuitable for real-time, real money gaming. Projects such as Edgeless, CasinoCoin and Cashbet have not made full use of smart contracts or state channels and continue to be oriented in the casino's favour.

Solution: Fate Channels protocol

FunFair's advanced state channel solution - Fate Channels - enables instant, provably fair gaming at almost negligible cost to the player. Our games feature the same level of quality and usability as incumbent iGaming casino technology but with greater transparency, security and player protection.

Problem #8: Affiliate revenues under threat

Casino gaming remains the most important vertical for iGaming affiliates[xi]. Yet worsening contract terms operators, disputes over player values, increased competition and the subsequent rise of super affiliates such as Oddschecker are all threatening the viability of many small and medium sized affiliates. This competitive landscape highlights the need for affiliates to carve their own niche, diversify verticals, keep abreast of emerging consumer trends and find their own cost savings.

Solution: FunFair affiliate platform and operator

Our use of smart contracts means that for the first time ever, affiliates will receive revenue[xii] in real time. Coupled with an independent source of trusted real-time data, the FunFair platform delivers a truly ground-breaking affiliate solution. Our technology also enables affiliates to quickly and cheaply launch a white label casino, as leading poker affiliate RakeTheRake is set to do. The creation of new revenue streams by simply harnessing an affiliate's brand and expertise, without the financial and operational challenges associated with traditional casino technology, will be a game changer for the affiliate sector.

Problem #9: Game developers reticent to adopt blockchain technology

Despite it's the clear benefits, game developers have been slow to explore blockchain technology. Accurate up to date guides and best practices in an area of nascent technology are difficult to find, while the intense demand and shortage of talent makes blockchain expertise expensive to recruit. Most problematic however is the lack of viable consumer-facing platforms which can distribute their content.

Solution: FunFair developer partnerships

The FunFair platform includes the first open developer marketplace for real-money casino game content, in contrast to the in-house route taken by most incumbent gaming technology providers. Developers also receive end-to-end technical, commercial and

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regulatory support from the FunFair team to guarantee rapid integration of smart contract technology and subsequent distribution of game content to all operators on the FunFair platform.

Problem #10: Regulation is costly and difficult to enforce

A typical regulator's mandate involves ensuring fair games, preventing illegal activity and protecting the vulnerable. However, their reliance on operator-provided data and outsourced technical auditors makes achieving those goals time intensive, costly, open to exploitation and requiring a degree of trust in the operator.

Solution: FunFair blockchain protocol

The unique combination of provably fair games, escrowed instant payouts and FunPass KYC found only on the FunFair platform will create a new generation of operators with the highest standards of integrity, transparency and social responsibility. Players will be able to apply limits, timeouts and self-exclusions to all casinos on the FunFair platform, while the Fate Channel-powered dispute resolution process, combined with the platform's other benefits, will reduce complaints and speed up remaining disputes.

4 Technology

4.1 Protocol & Platform

4.1.1 Overview

FunFair's gaming technology protocol leverages the transparency, security and efficiency of the blockchain to power a unique iGaming ecosystem which connects casinos with players, affiliates and developers in real time.

The protocol has been built to effortlessly support a near limitless number of trustless, transparent, 'game server'-less, decentralised online casinos, operated by individuals and organizations of all sizes.

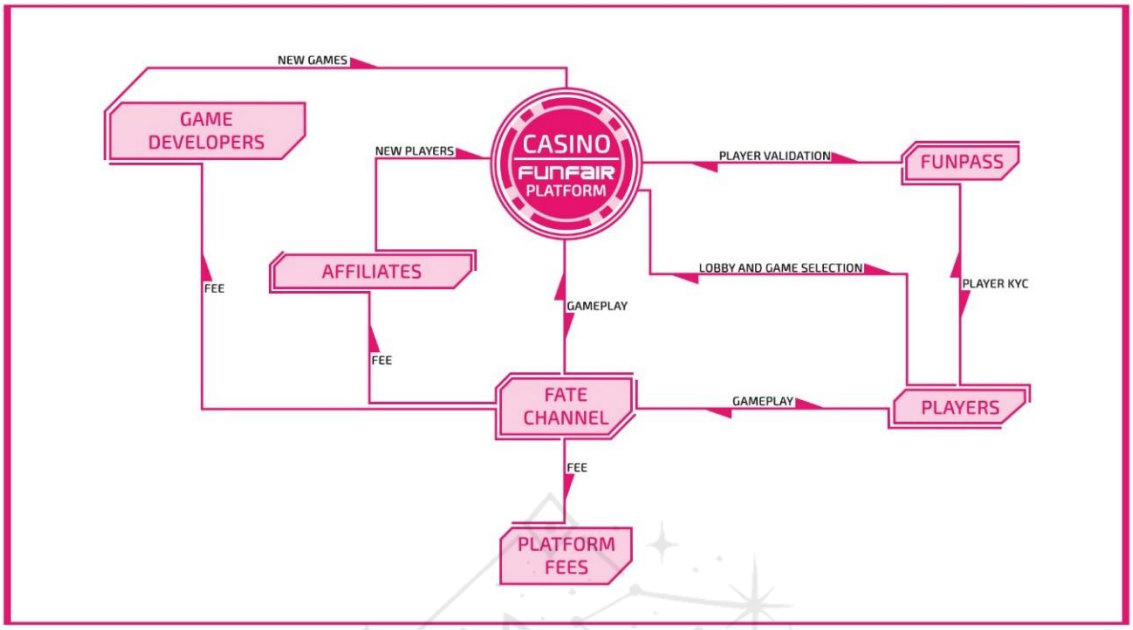
The FunFair platform runs on top of the protocol, to support a new generation of regulated casinos that will deliver a wide range of provably fair game content from an open developer marketplace.

For operator and affiliate partners, FunFair is not just next-generation casino software but a complete enterprise solution with payments, security and databases all administered on the blockchain.

FunFair casinos feature:

- Provably fair HTML5 games from the FunFair developer marketplace
- Next-gen cryptocurrency payments
- Remote Gaming Server-less, peer-to-peer software and databases
- Admin backend including player management, bonusing, reporting and analysis
- FunPass tool

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The FunFair platform

4.1.2 Technology layers

The FunFair protocol employs a combination of Ethereum smart contracts, a native ERC-20 standard cryptocurrency and advanced state channels to deliver real time, decentralised casino gaming.

Ethereum

To deliver decentralised, provably fair gaming, the FunFair solution requires both a blockchain and smart contracts. As the leading platform with market share, powerful features, an excellent long-term scalability plan and a network effect conferred by the most mature ecosystem of developers and research, Ethereum was the obvious choice as our technology's base layer.

The win/loss settlement of each session played on every FunFair-powered casino will be immutably and publicly recorded on the Ethereum blockchain, while the mechanics of every casino game are encoded within smart contracts using the Ethereum protocol. Details of the games played themselves will be logged on both player and operator devices.

Although Ethereum currently offers the best balance of ecosystem value, performance and decentralisation, we closely follow the development of other promising blockchains and protocols and would consider supporting other blockchains either simultaneously or a migration if there was a clear benefit to doing so. The protocol and platform we've designed isn't locked into Ethereum and could be ported onto any suitable smart contract platform.

Fate Channels

FunFair's advanced state channels are an essential component in delivering faster, fairer, more secure and lower cost gaming than other blockchain applications. By performing

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off-chain execution of smart contracts, this 'second layer' scaling technology reduces delays and costs when playing blockchain games, while delivering real time provably fair random number generation and cheatproof gaming with automated dispute resolution.

FUN token

Every aspect of the FunFair protocol is powered by the FUN utility token. FUN is an ERC-20 standard cryptocurrency which offers instant, encrypted payments without the need for a trusted intermediary (e.g. a bank). The FUN token contains novel enhancements to the original ERC-20 standard that enable the enhanced security and performance of Fate Channel technology, which are necessary to deliver high performance trustless gaming.

From player wagers to casino licence fees, developer rewards and the revenue affiliates receive for referring players, all participants in the FunFair ecosystem will transact in a frictionless and transparent way using FUN. By developing our own token instead of using ETH or another cryptocurrency, we have achieved significant improvements in speed and security.

4.1.3 How it works

Funfair operators will complete the setup of their casino in a fraction of the time that traditional iGaming casino solutions require. They will have their own brand, bankroll, gaming license(s) and independent Fate Channel server. Operators will have access to a wide range of high quality, audited game content from an open, global developer marketplace where developers licence their games to the platform in return for FUN token rewards. To ensure a sufficient variety of games at launch, the platform will be seeded with content from FunFair's game studio. However, content from other game studios is currently in development and will be added to the platform soon.

Those who want to run a FunFair casino but don't have their own gaming licence, technical expertise or bankroll can do so as a white label. This involves a partnership with an existing FunFair operator who creates and runs a new, branded casino on their behalf (where permitted by applicable regulatory authorities). White labels effectively act as 'super affiliates', not only bringing in player traffic but also promoting and marketing their own brand.

The user experience at FunFair-powered casinos will be radically different to any existing blockchain or iGaming offering. After a player has completed the FunPass process, they can start to play games at any casino that supports the FunFair technology, thus eliminating the onerous registration, deposit and login/logout processes found with traditional casinos.

Initially, players will need to use a crypto-enabled browser or browser plugin such as MetaMask but future iterations will enable FunFair casinos to be played using mainstream browsers.

Once their Ethereum address is funded with FUN tokens, players will play fast, fun and provably fair casino games with funds sent direct from their cryptocurrency wallet. Casino operators never take custody of player funds. At the beginning of a game session, the player sends a FUN bankroll to the Fate Channel smart contract, while the casino sends enough FUN to cover any potential payout. Both player and casino bankrolls are held in escrow by the Fate Channel smart contract until the game session has finished and is

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closed, at which point the appropriate FUN balances are instantly sent to both parties' addresses.

Unlike any existing casino, FunFair wagers, payouts, network fees, developer rewards and affiliate revenue are all determined and executed in real time, and visible on the Ethereum blockchain.

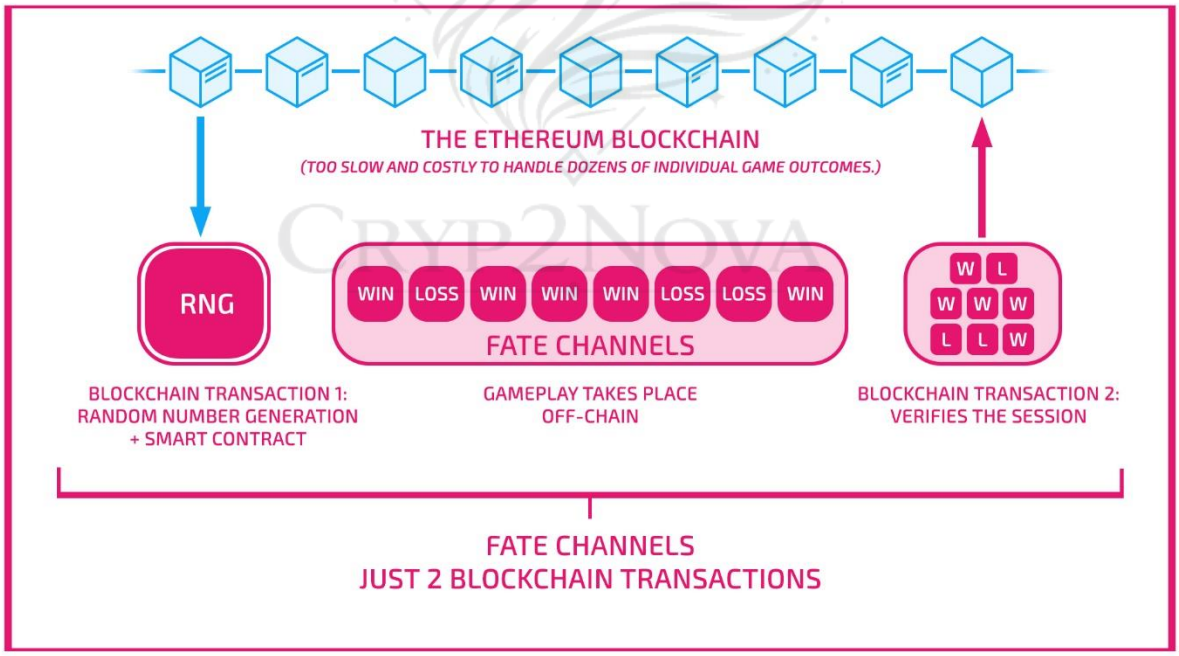
4.2 Fate Channels

Blockchain-based applications which require fast interactions between untrusted parties have so far failed to solve the challenges of scaling, speed and high gas costs.

Online casino games that are prohibitively expensive to play and include delays of a minute or more between clicks and games, cannot meet the requirements of the mass market, or hope to disrupt the incumbent iGaming sector.

Because Ethereum gas costs and processing times are currently problematic (and will continue to be prohibitively expensive until a scaling solution such as sharding is implemented), we needed to devise a solution that supports bets and interactions at a fraction of the current cost of other blockchain gaming applications.

We have created a long-term solution for transaction cost problems with a unique implementation of state channel technology, developed specifically for online gaming. We call this technology Fate Channels. By enabling real-time gaming that is not only cheaper but fairer, more secure and more scalable, Fate Channels are the engineering innovation at the heart of the FunFair protocol and a core feature of the platform.



Fate Channels

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4.2.1 Definition

A Fate Channel is a state channel opened for the duration of a gaming session, supporting custom gaming messages between the FunFair client and server. The only transactions on the blockchain occur at the beginning and end of the user session, rather than before and after each hand of each game. Because a gaming session is instant and can include hundreds of bets, the costs are an order of magnitude lower, and performance is higher and the games more enjoyable than the competition.

This is the first time that generalised state channels have been deployed in the real world. FunFair's are more advanced than historic 'payment channels' as they allow the entire smart contract to be executed off-chain, not just the payments. This is a key requirement both for making applications run fast and to be cheatproof, as every game step (known as a state change) is double checked and automatically signed by both player and casino before the state can progress. This ensures robust, fair gameplay and correct outcomes, and also ensures the games are responsive and enjoyable to use on traditionally slow blockchains.

It is widely accepted that the current generation of blockchains (like Bitcoin, Ethereum, EOS and NEO) do not support the generation of on-chain random numbers or games that use random numbers, because of the chance that a miner (or validator / block producer) can influence the final outcome and collude with either the player or casino - perhaps to avoid committing a losing or winning bet transaction onto the chain. This problem precludes all forms of on-chain randomness including the use of oracles which also have further attack surfaces.

We believe off-chain randomness and off-chain gameplay using state channels to be a safe and reliable random number generation technique which contributes significantly to the assurance of cheatproof and trustless gaming on the blockchain.

There are new and as yet unreleased blockchain technology platforms under development that have more reliable on-chain random number generation capability that may alleviate the issue of unsafe randomness with blockchains (DFinity, Cardano and Ethereum 2.0 being the obvious examples). These use threshold signatures to allow a group of participants to jointly create randomness and may be the first time that random numbers can be relied upon in an on-chain blockchain application. None of these blockchains are currently live, so we will review the situation when they launch and are commercially usable. The blockchains that have on-chain robust randomness will certainly be of interest to us when they are live.

4.2.2 Benefits

The benefits of this innovative state channel solution go far beyond a dramatic reduction in gas costs. Fate Channels also offer:

- Cheatproof, provably fair games with automated dispute resolution
- Virtually limitless scaling due to Turing-complete off-chain smart contract execution
- Faster gaming and payments which enable a frictionless user experience

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- In-built, decentralised and provably fair random number generation without the need for a slow, inefficient and insecure centralised oracle
- Asymmetric escrow lockups which require a casino to send its maximum liability (e.g. Jackpot win worth 100x the player's wager) before a game can begin
- Faster opening and closing of channels as only one blockchain transaction is needed (versus the two found with competitor solutions)

4.2.3 Dispute resolution

Using advanced techniques to verify each step of the gaming process, Fate Channels enable cheatproof games that are superior to incumbent 'provably fair' technology. Each off-chain transaction is authenticated and signed by both player and casino before the state can progress. Any cheating attempt is automatically detected by the other party who will then activate 'dispute resolution'. Either party may automatically send a 'dispute' to the blockchain to allow the authoritative blockchain and appropriate smart contract to complete the gaming session correctly, while also punishing the cheater financially if their attempt was a result of deliberate cheating. This combination of technology and crypto-economics delivers an unprecedented level of fairness and robustness which exceeds any system created to date.

4.2.4 Current and future versions of Fate Channels

The current implementation of Fate Channels is designed to facilitate reliable, cheatproof play between two untrusted parties - usually a player and a casino. The funds are held in an independent escrow, and neither party has custody of the funds while the game is in session. Deposits from both parties are held in escrow during any number of games and the funds are settled when the game session finishes (or is terminated abruptly or timed out). At present, a new channel is opened each time a new game is started, then any number of games of that type can be played off-chain. At the end of the game session, the funds are settled to both parties and the game ends. If the player wishes to play a different game, a new channel is opened for that game. We keep each game separate to ensure the game developer and affiliate are paid their share of net gaming revenue fairly at the close of the game.

A future version of Fate Channels may support the player being able to switch games without having to close the channel. This is ongoing research because we want to find the best way to protect the game developers' and affiliates' revenue. In addition, other future features include sharing bankrolls across casinos or players. Yet again, features like this require substantial research to be sure we implement it correctly and create a robust and trustless environment.

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4.3 FUN Token

4.3.1 Overview

FUN is the native cryptocurrency of the FunFair ecosystem. It powers every aspect of the protocol and platform actions, including betting, paying out players, paying licence fees and compensating stakeholders. FUN was designed to deliver the secure, frictionless gaming experience that will help drive mass adoption of blockchain technology.

Players may acquire FUN tokens to be used for games on the FunFair platform from a wide range of third party, independent cryptocurrency exchanges. Examples of centralised exchanges, many of which offer fiat currency on and off ramps, include Binance, BitFinex and OkEx. Examples of the new breed of decentralised exchanges include IDEX and AirSwap. FunFair has no bias towards either centralized or decentralized exchanges, nor would we recommend any particular exchange. We urge players to perform their own due diligence before choosing the most appropriate exchange for their needs.

4.3.2 FUN issuance

The FUN token is an ERC-20 cryptocurrency on the Ethereum blockchain. It is 'premined', which means that all tokens were created in one event and no more will ever be created. Approximately 17 billion FUN tokens were created in the Token Presale on 22 June 2017 and distributed to purchasers, founders, advisors and FunFair's cold storage address (where they were to be held for a planned Phase 2 token sale for the general public). For full details on the 2017 Token Presale, see section 6.2 below.

4.3.3 Platform transaction fees

Small transactions fees in the form of FUN tokens are taken from each game played and sent to a FunFair-controlled cold storage address for longer term deployment. This removes the tokens from circulation until their optimal use has been determined.

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4.3.4 Staking Pools

As many casino games offer high payout odds (e.g. 250/1 for a Royal Flush in video poker) and casinos on the FunFair platform will all be required to send enough FUN tokens to the Fate Channel escrow to cover any potential payout, these conditions will naturally lead to the creation of staking pools. The exact mechanism of, and indeed the permitted third-party participants to, these pools is the subject of ongoing technical and legal research.

4.3.5 How FUN is used

The FUN token is intrinsic to the ecosystem and the fundamental method of interacting with FunFair smart contracts. A cryptocurrency that has been optimised for gaming, the FUN token serves a number of purposes:

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- FUN is the sole token used to purchase in-game credits (e.g. spins and chips) and therefore the sole means of playing casino games powered by FunFair technology
- Operators finance their casinos solely with FUN, accept wagers with FUN and pay platform licensing fees with FUN
- White label casino owners receive their share of net gaming revenue in FUN
- Subject to agreed commercials, affiliates receive CPA or revenue share payments in FUN
- Game developers in the game creation marketplace are paid in FUN
- Fees throughout the system will be charged in FUN
- FUN may be used for in-game purchases in future freemium products, or the purchase of future physical products

4.3.6 Benefits

Fast

With only one blockchain transaction needed to open a game session (in contrast to the usual two found with other state channel solutions) and instant wagering once the session has begun, FUN is the perfect blockchain gaming token.

Decentralised

As a fully decentralised cryptocurrency administered on the Ethereum blockchain, FUN requires no third party (e.g. bank), and thus eliminates counterparty risk. A player's funds are always theirs.

Transparent

Although ownership of individual FUN tokens is anonymous, the Ethereum blockchain provides a complete, secure ledger of transaction data whose authenticity is guaranteed – enabling more efficient reporting and auditing.

Certainty

The FUN token is governed by a transparent set of immutable rules; FUN cannot be mined, every token that will ever exist was created in one event and no more will ever be issued. By creating certainty about the token's past, present and future circulation, FUN avoids the issues of other tokens (where more will be mined and the maximum has not been stated) which have contributed to price volatility and hampered the progress of adoption by merchants, institutions and other commercial participants.

Secure

Part of the Fate Channel technology is embedded within the FUN token smart contracts, such that when FUN is combined with Fate Channels, the funds can be better protected by restricting how and where they will be used. In the event that a casino server is compromised (hacked), it will be significantly more difficult to steal funds, even if the attacker has access to private keys. Unlike Ether or other cryptocurrencies, FUN tokens can only be sent to the Fate Channel and not directly to the hacker's account. The hacker would most likely have to win the FUN tokens fair and square.

Frictionless

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Fate Channels open and close with just one transaction whereas state channels which use ETH or other tokens often require two or more transactions (which can also be dependent on each other) which could mean the difference between minutes and seconds to open the channel. Other payment channels that don't have this optimisation will be slower to use, which degrades the user experience and will make the casino less profitable.

4.3.7 Coin volatility

As Fun is a crypto asset widely available on a number of public exchanges, its value at any given time is driven by market forces. Initially we expect ecosystem participants to adapt to market value changes, but in the long term we will be researching how best to employ stable coins together with the FUN token to deliver greater certainty of value for platform participants.

4.3.8 The Future of FUN

Although platform participants will initially bring their own FUN tokens obtained from the Token Presale or third-party exchanges, we believe frictionless blockchain gaming and mass adoption can best be driven by the ability to buy FUN using fiat currencies. Working with payment processors and other financial partners, we expect to enable this critical entry point to crypto gaming in the near future.

4.4 FunPass

FunPass is a universal verification tool that allows players to verify age, ID and other information to enable access to all casinos on the FunFair platform. FunPass speeds up the registration process for players, a well-known pain point for all iGaming operators, and enables them to seamlessly move between all FunFair-powered casinos.

Following successful registration, which takes just a few seconds, a player's Ethereum wallet is tagged on the blockchain with an approval for the FunPass. Personally-identifiable data is held only in a private database on the FunPass server - in a GDPR compliant way – along with one-way knowledge of their Ethereum wallet address. If a user in the future wishes to be forgotten, their data can be deleted from the FunPass database and this removes all trace of their personally identifiable data including knowledge of their Ethereum address. None of this data is stored on the blockchain. Once removed from the FunPass server, there remains no personally identifiable data on the blockchain. An Ethereum address, on its own, cannot be used to lookup a person's identity without there being a corresponding entry in the FunPass database.

By removing the need for operators to use third party verification services such as Experian (as this will now be carried out once by the FunFair platform), FunPass also reduces overheads associated with KYC requirements for operators, while enabling the new breed of responsible, licenced FunFair casinos to more easily comply with local regulations.

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At a time when the ability to set deposit and wagering limits is viewed by players as the most useful account management tool[xiii], future iterations of the FunPass will also enable players to apply their limits to all casinos across the FunFair platform.

In the future, FunPass will also have the capacity to link into national self-exclusion databases, as it has access to a database of approved player wallets across all operators, making the process far more consistent and closing various loopholes.

4.5 Provable fairness

4.5.1 Definition

Provably fair games include a mechanism which allows the player to confirm the fairness of the game process. Most current blockchain casinos claim to offer provably fair games, but in fact offer *verifiably* fair games which enable the player to see if cheating has occurred. The FunFair protocol facilitates true provably fair random numbers and games which prevent cheating from occurring at all.

4.5.2 Current blockchain implementations

Historically, developers have generated random numbers using the blockchain or third-party oracles. There are risks and trust issues in using random numbers produced or revealed on the blockchain itself. These are usually not fair because the 'miner' (or validator / block producer), has advance knowledge of the random number before the block is mined, allowing the miner to censor the bet if they wish to favour the player or casino. The resulting situation, where miners are incentivised to help player or casino win, inevitably and unacceptably results in collusion and a total failure of fairness.

Our protocol uses Fate Channels to generate random numbers off-chain, preventing miners from being able to see random numbers before the outcome is determined.

There are blockchains in development which have built in random number generation using advanced methods (like BLS - threshold signatures where a group contribute to the random generation and cannot be known in advance). These will help with random number generation and at a future time we may decide to embrace and support such blockchains. However, at present, no existing blockchain (Bitcoin, Ethereum, EOS, NEO) offers secure on-chain random number generation, and as such our Fate Channel solution is the only method of delivering *genuinely* provably fair gaming.

4.5.2 Our provably fair random numbers

In a traditional online casino, random numbers are generated purely by the casino's Remote Gaming Server (RGS). The player not only has to trust that they're random, but also that they're being used in the correct order. Even if the random number generator (RNG) has been reviewed by external auditors, casinos can employ sophisticated methods to manipulate the RNG to favour their own prop players. Furthermore, analysis of the random numbers would not enable auditors to ensure each random number was used in the right game.

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Our technology generates random numbers by combining both the player and casino's random numbers, generated locally on their respective devices in real time. Outcomes are provably random, guaranteed to be within the correct sequence and thus cannot be used out of order, eliminating the possibility of fraud.

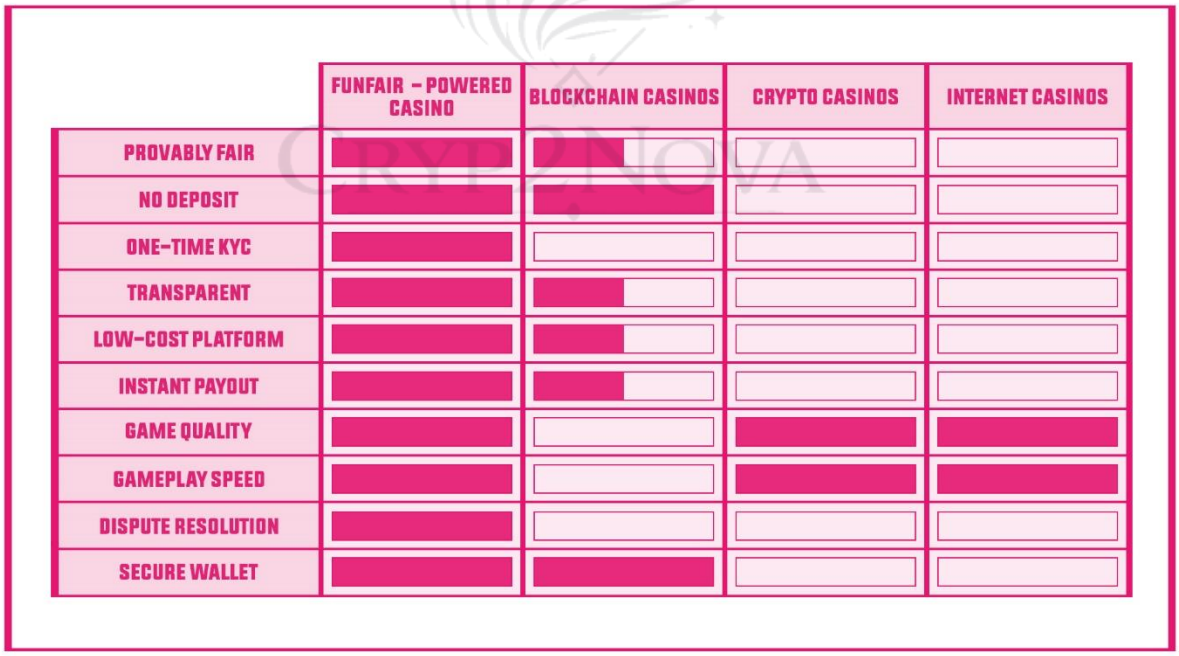
4.5.3 Our provably fair game outcomes

In a traditional online casino, game rules are opaque, executed solely on the RGS. The game software decides if the player has won or lost, and all outcomes are entirely decided on the casino side.

On the FunFair platform, the game is run simultaneously on the player's device and on the casino's device. Both parties discover, at the same time, who has won and there can be no dispute. In fact, the Fate Channel's built-in dispute resolution allows either party to dispute the game by sending a partial game to the blockchain for an authoritative execution with robust outcome. Since this should disrupt all attempts to cheat (both the random numbers, and actual game outcomes are protected) this should discourage cheating attempts since they will be futile and the cheating party will be financially and reputationally punished.

4.6 Comparison with other technologies

FunFair-powered casinos will be superior to their internet, crypto and blockchain casino rivals in a variety of ways. The table below illustrates the degree to which rival technologies have succeeded in offering all the features and benefits now available on the FunFair platform.



FunFair-powered casino advantages: Full = Success. Half = Limited success. Empty = Failure

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In addition to the more obvious features that distinguish FunFair from other technologies, the following comparisons can also help to show the far-reaching impact FunFair will have.

Generalised definitions of the above categories:

- FunFair-powered casino: Utilise Fate Channels and smart contracts on the Ethereum blockchain. Examples include *CasinoFair.*
- Blockchain casinos: Utilise smart contracts on respective blockchains. Examples include *Etheroll* and *Edgeless.*
- Crypto casinos: Based on Remote Game Serves (RGS) and utilise cryptocurrency as a means of deposit and withdrawal via operator held wallet. Examples include *BitStars* and *Bitcasino.*
- Internet casinos: Based on RGS and utilise fiat currency as a means of deposit and withdrawal via operator held wallet. Examples include *William Hill* and *Ladbrokes.*

4.6.1 Where are games run from?

In incumbent internet casinos, the game is 100% run remotely. No game is executed - nor outcome decided - on the player's own device. The operator's server is known as a Remote Gaming Server (RGS).

The player's device runs a 'dumb terminal', a representation of the game. Yet all of the gameplay, the outcomes and the random elements come solely from the RGS. The player's device does not execute the game or contribute in any way to the outcome. The player is merely viewing the results of the game that has been executed remotely.

On the FunFair platform, games are run both locally on the player's device and simultaneously on the casino's server, which guarantees fairness. The two devices – player and casino - run in lock-step and are able to check each other at each step (internal transaction) to ensure veracity and prevent cheating.

The blockchain is used to provide the authoritative source of the games. All games are created, and outcomes are decided using smart contracts, executed in real time using a Fate Channel which provides a cheatproof game and settles payments between the player and casino independently.

The above description is a simplified version of where the game is actually run. The reality is that although the game is executed on (and random numbers are chosen by) player and operator devices, the smart contracts that decide the game outcomes are usually executed remotely by whatever Ethereum node was being used by the player's internet browser. For instance, if the player was using the MetaMask plugin for their web browser, their connection to the Ethereum network will be remote and most likely it would be using Infura, so the smart contract may execute on Infura's servers. In the event of a dispute, the disputed element of the smart contract would be pushed onto the main chain and would be executed by multiple Ethereum miners in parallel, who would use consensus algorithms to agree the outcome. Similarly, the operator may choose to run its own Ethereum node or may use someone else's (like Infura or a third party).

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4.6.2 How decentralised is the FunFair protocol?

The FunFair protocol is principally open source. FUN token smart contracts, game rules encoded in smart contracts and Fate Channel smart contracts are all open source. The games themselves are not open source and are copyrighted to their respective owners. These do not form part of the FunFair protocol and platform.

The FUN token itself is as decentralised as every token built to the ERC-20 standard. A fixed supply of FUN was created publicly and transparently on the blockchain on the day of issuance and has since been actively traded on open markets independently from any control by FunFair.

FunFair games require no central Remote Gaming Server, instead being run entirely by decentralised smart contracts. Games are run simultaneously on both the player's own device and the operator's Fate Channel server, to ensure fairness.

Fate Channels are run by a multitude of casino operators, each one acting independently in a similar manner to Ethereum blockchain miners. A casino's Fate Channel server is not reliant on and does not communicate with any other operator servers, and only with the FunFair platform to process KYC procedures.

5 Key Benefits

As the FunFair protocol and platform underpin an entire decentralised gaming ecosystem, it offers far reaching benefits for a wide range of individuals and organisations, beginning with the end user.

5.1 For Players

According to the UK Gambling Commission, an operator's fair and trustworthy reputation is the number one motivator for players when choosing a casino, and yet just 37% of those who gambled online in the last 12 months believe gaming is fair and can be trusted[xiv]. Despite offering many other advantages over both traditional online casinos and their crypto cousins, the FunFair platform's core mission will always be to deliver fair, secure and transparent gaming.

Fair, secure and transparent

With games whose fairness is simple to verify and payments managed by smart contracts, not casinos, FunFair's technology gives players the ultimate peace of mind.

Convenience

Operators have long understood that reducing friction at the points of registration and deposit has a direct and significant impact on acquisition and conversion. FunFair's killer combination of one-time, universal identity verification and next generation crypto payments will rewrite the rules of convenient, user-friendly gaming.

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Entertainment

Casinos on the FunFair platform offer a user experience that's as fast and smooth as any traditional casino, along with a wider variety of game content from the developer marketplace.

5.2 For Operators

In 2018, gaming operators face rising operational costs due to changes in taxation and the regulatory landscape. For existing operators to remain competitive and new operators to grab market share, they must develop innovative, differentiating products while meeting ever-increasing standards in social responsibility. FunFair's provably fair, low cost, mobile-friendly platform can position operators to successfully tackle all of these challenges.

Fair, secure and transparent

By guaranteeing that games are fair and enabling players themselves to verify that outcomes are truly random and games have not been tampered with, FunFair's casino technology will increase player trust in the casinos they use. Our hypothesis, which we expect to be confirmed by the first FunFair-powered casinos later this year, is that increased trust positively impacts loyalty and retention, reduces churn and ultimately drives greater profitability.

Efficient

With software powered by decentralised smart contracts, the cost of remote gaming servers is eliminated. Traditional database costs will be slashed too as transactions and customer data are stored on the blockchain. Smart contracts-powered payments will see an end to many internal and third-party costs such as card fees and chargebacks, while the FunPass will reduce the considerable cost of complying with KYC and AML regulations. It is conceivable that FunFair-powered casinos can, in the near future, run with no technical, security or payments teams whatsoever.

Simple setup

By removing the need to work with payments providers, data centres and other infrastructure partners, our streamlined enterprise solution can enable the launch of a new casino within days rather than months.

People or organisations who wish to create a white label casino (run by an existing FunFair operator who shares a percentage of the revenue) will experience an even faster setup process.

New audience

The marked increase in public awareness of Bitcoin in 2017 has driven a massive expansion in the number of people who have interacted with cryptocurrencies or blockchain technology. With over 35 million addresses and 240 million transactions since the Ethereum blockchain was launched, cryptocurrencies are here to stay[xv]. The attributes of crypto enthusiasts also fit the VIP demographics operators seek most; male, 18-40, high net worth and tech savvy. That audience includes a ready-made global community of over

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60,000 FUN token holders[xvi] who have already demonstrated a deep commitment to the FunFair platform and its values.

FunFair operators will be the first movers and best equipped to establish dominance in this new market, using technology as potentially transformative as the internet was for gaming.

5.3 For Affiliates

In an increasingly competitive space, blockchain-powered games offer affiliates a unique opportunity to diversify their portfolio, differentiate from other affiliates, target the fast-growing cryptocurrency audience and reactivate lapsed customer databases. But by enabling anyone to run a casino with minimal setup and lower overheads, the positive disruption of the traditional gaming affiliate model may be the most revolutionary impact of the FunFair platform.

Affiliates as operators

FunFair-powered casinos are simpler and cheaper to run, which means affiliates can now be operators too. Our complete enterprise solution eliminates most risks and challenges faced by traditional iGaming operators, enabling affiliates to leverage their brand, database and marketing expertise for a greater share of the profits. Our partnership with poker affiliate powerhouse RakeTheRake is the first example of how FunFair technology will empower a new generation of casino operator.

With far shorter integration times than current industry benchmarks, lower headcount and minimal server requirements, the FunFair solution empowers those who were previously not able to host a casino, to do so.

Decentralised gaming technology removes the need for costly remote gaming servers and eliminates many other database costs. Enhanced security and automated, trustless transactions prevent game and payment related fraud, enabling payments, support and security teams to be streamlined while reducing the risks that may dissuade affiliates from choosing a less predictable revenue model.

New audience

By using the FunFair platform, both new affiliate-operators and existing affiliates will be able to access a new global audience who enjoy gambling and come with significant crypto-wealth. Those interested in blockchain technology and cryptocurrencies are twice as likely to be male than female, and millennial than older demographics[xvii], making them an ideal long term audience proposition. Access to the FunFair platform also comes with a ready-made community of motivated FUN token holders waiting on the release of the first FunFair-powered casinos.

Fairness, efficiency and better payments

Fairer, safer gaming will be the key driver of acquisition on the FunFair platform, attracting new players to online gaming and persuading existing gamers to give blockchain games a try. But it's not only the players who benefit. Affiliates can be certain that game data is authentic, and that payments from operators will be received on time, every time.

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With no need for third party payment providers, blockchain technology streamlines the payments process between players, casinos and affiliates. Affiliates who continue to perform their usual role for operators within the FunFair ecosystem are paid in FUN tokens, with revenue calculated in a transparent way by blockchain-powered smart contracts and distributed as soon as games are finished.

Blockchain data's accuracy is guaranteed, which eliminates human error and disputes, while the single source of player and game data enables simpler, faster and lower cost access to reporting.

5.4 For Developers

Blockchain innovation and the growing global network of crypto developers and applications brings fascinating challenges and a wealth of opportunities.

Innovation

Working with blockchain technology like Ethereum, and smart contract-enabling programming languages like Solidity is challenging, exciting and fast-paced. Joining forces with the world leader in crypto gaming technology will also position developers for a future where blockchain experience will be invaluable.

Opportunity

FunFair's platform includes a marketplace for developers to distribute fun, provably fair game content to the growing global crypto gaming audience. In a pioneering new revenue model, developers will be paid instantly in FUN tokens at the end of every session.

Fair and open

By building games on blockchain technology, developers will help make gaming fairer for millions of players across the globe and build their reputation as a responsible games supplier. FunFair's transparent, automated platform also bridges the gaps between developers, casinos and players, providing an accurate source of real time data.

5.5 For Regulators

Thanks to the blockchain's inherent transparency and security, our technology makes gaming fairer and safer for the public while delivering operational efficiencies for regulators. With unprecedented levels of player protection, the FunFair platform will spawn a new generation of more socially responsible operators.

Fair and open

'Provably fair' technology is unique to blockchain gaming and enables players to verify that game outcomes were truly random, accurate and fair. Instant, guaranteed payments automated by smart contracts prevent an array of issues, not least casinos unfairly withholding funds (against which UK regulators acted in 2017)[xviii].

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Safe and Secure

The FunPass KYC tool can verify information such as age, identity and source of funds, effectively combating criminal activity and protecting children and vulnerable people from harm. Tamperproof software and innovations such as smart contracts can eliminate most types of payments and game-related fraud or operator malfeasance.

Efficient

Decentralised blockchain technology provides a secure source of accurate, real-time, immutable data which can reduce time, human error and cost in auditing gaming market activity. FunFair's automated, real time dispute resolution functionality can revolutionise the dispute process, reverse the trend of rising consumer complaints[xix] and slash the reported 46 days[xx] on average that it takes for a dispute to be resolved.

6 Company

6.1 Overview

FunFair Technologies was founded in 2017 by Jez San OBE, Jeremy Longley and Oliver Hopton to bring unprecedented transparency to online gaming, using blockchain technology.

A Showcase platform, featuring a number of prototype casino games using Fate Channels on a test Ethereum network, was released in June 2017 ahead of a Token Presale, the proceeds of which enabled the company to rapidly expand its operations. Registered in Singapore with offices in London and Dublin, FunFair has now expanded to over 50 staff including former executives from William Hill, Pokerstars, bwin.party and Oddschecker with over 100 years of combined iGaming experience.

A limited public closed beta test version of the platform was released on Mainnet in May 2018[xxi], followed by the public launch of the platform itself in September. The first casino – CasinoFair – operated by TTM BV, part of the FunFair group, launched simultaneously. A second casino from market leading poker affiliate RakeTheRake is expected to launch in Q4 2018, while work continues to bring further casinos onto the platform as soon afterwards as possible.

6.2 Token Presale

In June 2017, FunFair announced a Phase 1 Token Presale aimed primarily at institutional buyers, ahead of a proposed public Phase 2 Token Sale later that year. Proceeds from the Presale would be used to fund development of the platform, marketing & PR, and business development.

The token presale commenced on 22 June 2017 and closed four hours later once the soft and hard caps had been reached. Approximately $26 million was generated with over 80% of tokens sold to institutional purchasers. The presale was restricted geographically to address regulatory concerns.

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By employing ICO innovations such as the funfund.eth ENS, gas-efficient Multi-Mint Technology and a soft/hard cap format, the award-winning presale was free from fraud and had no negative impact on the performance of the Ethereum blockchain.

In October 2017, FunFair announced that due to a number of regulatory, commercial and legal considerations, the planned Phase 2 Token Sale proposed in the original whitepaper would no longer take place. Of the 11.173B tokens retained in the Phase 1 Presale for the Phase 2 Sale, 6.173B (55%) were viewed as surplus to requirements and therefore burned, permanently removing them from circulation. The remaining 4.7B (45%) tokens were held in cold storage for future sale to institutions or large token buyers. FunFair has committed to restrict future token sales to a maximum of 1B per year for four years, and an additional 0.7B tokens for the fifth and final year. To date FunFair has sold less than ¼ of its allocation of tokens in the first year. FunFair has also committed to minimising use of the cold storage reserves unless commercial or financial needs require it.

6.3 Team

FunFair technologies is one of the largest and fastest growing Ethereum-based development companies in the world, run by people with a proven record of innovation, operational excellence and commercial success . Our team includes blockchain engineers, game developers, gaming sector veterans, marketing personnel, regulatory experts and a visionary tech entrepreneur, all united by a passion to deliver fun, fair and transparent gaming for the mass market.

To view full details of the current FunFair team, please visit https://funfair.io/how-it-works/our-team/.

Jez San OBE – Founder, CEO

Jez was inspired to become a computer game developer in the 1970s, and after playing the first ever massively multiplayer game Multi-User Dungeon (MUD) he founded one of the earliest British games developers, Argonaut in 1982, creating multiple multi-million-selling video games including Star Fox, Croc, and Harry Potter. Jez was a pioneer in the field of real-time 3D computer graphics and his first game, StarGlider, was one of the earliest 3D games ever published. He co-invented the Super FX graphics RISC processor for Nintendo, the first custom chip to render 3D computer graphics in a game system. Jez has maintained an active role in computer games and online gaming, including work with console game developers Ninja Theory, mobile developer Origin8 and until recently PKR.com, a leading 3D online poker room.

Jez is also an angel investor and some of his investments have included the artificial intelligence pioneer DeepMind Technologies (acquired by Google in 2014) and the cryptocurrency exchange Kraken. In 2002, Jez was made an Officer of the Most Excellent Order of the British Empire for services to computer games.

Jeremy Longley – Founder, CTO

Jeremy is a highly experienced, versatile, passionate, analytical leader with over 15 years' experience managing technology teams. In 2005 he co-founded the online gaming site

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PKR.com with Jez San and served as its CTO, leading a team of over 100 technical employees to develop an award-winning fully 3D game environment. PKR developed a range of 2D and 3D casino games, including iOS, Android and HTML5 products as well as a customization avatar system. Jeremy has also led development of a full in-site account management and cashier system, and systems integration with third-party providers including PlayTech, OpenBet and Ladbrokes/GBE as well as extensive back office and business intelligence functionality.

Oliver Hopton - Founder, Developer

Oliver is an experience developer and team lead with over 15 years' experience building gaming products. He spent 10 years working at online poker room PKR as Software Development Manager working on a huge variety of administration tools and integrations with 3rd party gaming content and providers. Heavily involved in technical compliance for gaming license applications in Guernsey, the UK, France, Italy and Denmark. He then spent 18 months as CTO of EveryFan, responsible for architecting and building a UK facing sports betting product.

Professional Advisors

As we are inventing software at the bleeding edge of gaming innovation, while aiming to positively disrupt a fast-changing global industry with a complex regulatory landscape, it is essential that we do so in the context of advice from a variety of expert professional advisers, a selection of whom is listed below:

Name	Type	Notes
Harris Hagan LLP	Legal	Provide advice relating to United Kingdom Gambling Law.
Kevin de Haan QC	Legal	Provide advice relating to UK and International gambling legislation.
Ifrah Law LLP	Legal	Provide advice pertaining to US law.
Bird & Bird LLP	Legal	Providing general legal advice.
Wiggin LLP	Legal	Provide general advice pertaining to global gambling law.
WH Partners	Legal	Provide advice on gambling and blockchain law and regulations in Malta.
Isolas LLP	Legal	Provide advice on gambling and FinTech laws and regulation in Gibraltar.
BDO LLP	Financial	Provide general accounting services and advice on compliance with UK and international tax law.
RHT Taylor Wessing LLP	Legal	Provide advice pertaining to Singaporean securities and corporate law.

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Gowlings WLG LLP	Legal	Provide general advice around securities and anti-money laundering legislation.
OMM LLP	Legal	Providing legal advice around US securities law.

6.4 A strategy for success

We aim to empower a new generation of operators with fair, secure, efficient and user-friendly gaming through the deployment of our plug and play decentralised casino platform.

We will deliver that vision by focusing on a number of key strategic areas; raising consumer awareness, increasing the number of operators, building the utility of the FUN protocol and driving B2B revenues.

Progress in those areas, leading to successful adoption of the FunFair protocol, will be best achieved by communicating a compelling proposition for players, educating the public, trade and government bodies on the benefits of our technology, and advancing research and product development.

Ecosystem partners such as affiliate-turned-operator RakeTheRake and games providers Spike Games and Big Wave Games will also contribute to FunFair's success. Partners from the blockchain sector will be particularly important. Our work with digital identity platform Yoti, identity data intelligence firms GB Group Plc and Accuris, decentralised token marketplace AirSwap and Ethereum wallet browser extension Metamask will further enhance the FunFair offering.

A fundamental pillar of our strategic approach is an understanding of how our emerging technology is impacted by – and can benefit - the complex, fragmented and evolving regulatory environments within global gaming.

We believe in progressive regulation and its role in enabling fairer, safer gaming for consumers. Given the direction of travel for many gambling regulatory regimes with an increased focus on fairness and player protection, it is no surprise that many regulators, such as the Malta Gaming Authority, have already shown a willingness to explore how blockchain might help them achieve their licensing objectives.

Funfair will continue to seek licensure in a number of top tier regulatory jurisdictions and will continue to work with regulators, particularly (but not exclusively) with those who have stated their desire to establish blockchain-friendly frameworks by either introducing new legislation, amending existing legislation or running regulatory sandbox projects.

All of FunFair's senior management team have lengthy experience with working in regulated markets at leading gaming operators and are uniquely placed to guide FunFair's strategy in a way that is compatible with applicable law, wherever it wishes to offer its services.

Our strategic plan also features an initial learning phase which enables us to analyse the technological, commercial and practical impacts of the platform via a Direct To Consumer proposition, before scaling the network with smaller and larger operators.

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6.5 Direct To Consumer

In September 2018, TTM BV, a wholly owned subsidiary of the FunFair Group, launched a fully licenced casino on the FunFair platform. TTM BV is run as a separate business unit within the Group with its own board of directors and operational team and is supplied with the Funfair platform on an arm's length basis to ensure it operates on the same terms as all other third-party operator partners. A corporate government policy framework is also in place to ensure it will not otherwise receive any preferential treatment by dint of it being inside the FunFair group.

Although FunFair will remain first and foremost a B2B blockchain technology provider, this independent venture will be used to accelerate our learnings about the platform and token ecosystem, giving us valuable insight into the life of an operator and player behaviour, and enabling rapid product improvements. The gaming licence held by this new company will also enable us to provide the platform as a white label solution to brand owners without requiring them to hold their own licence.

6.6 Milestones

In the 12 months since the Token Presale, the FunFair Team has rapidly scaled up its operations to complete milestones stated in the original whitepaper – Fate Channels iterations, new games, beta release and more. For a more detailed history and an up to date version of our Roadmap, please visit https://funfair.io/latest/roadmap/.

Milestones completed

- April 2017: First off chain scaling for gaming applications demonstrated
- June 2017: First version of working games on Fate Channels in Show Case prototype form on testnet (non-gambling)
- June 2017: Whitepaper release & Token Presale
- December 2017: Further versions of Fate Channels released on testnet (non-gambling)
- April 2018: Partnership with Spike Games announced
- June 2018: Showcase release, Treasures from the Crypto slot release, Beta release
- July 2018: Fate of Thrones slot release, Big Wave Gaming partnership, FunDice release, RakeTheRake operator partnership
- September 2018: Granted Curacao Online Gambling Licence
- September 2018: FunPass beta release
- September 2018: v2.0 White Paper released
- September 2018: First brand launch, CasinoFair

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7. Risks

The purchase of tokens involves a high degree of risk. You should consider carefully the risks described below, together with all of the other information contained in FunFair's terms and conditions before deciding to purchase FUN. The following risks entail circumstances under which, our business, financial condition, results of operations and prospects could suffer.

Risks associated with the purchase of FUN

FunFair may not successfully develop, market and launch the Funfair platform

Although a limited public closed beta version of the platform was released for testing in May 2018, the FunFair technology platform has not yet been fully developed by the Company and it will require additional funding, as well as developer and management expertise, time and effort in order to develop and successfully launch the FunFair platform. The Company may have to make changes to the specifications of the FunFair technology platform or FUN tokens for any number of legitimate reasons or the Company may be unable to develop the FunFair technology platform in a way that realizes those specifications or any form of a functioning platform. It is possible that the Funfair platform may not ever be released and there may never be an operational FUN Token. Furthermore, despite good faith efforts to develop and launch the FunFair platform and subsequently to develop and maintain the FunFair technology platform, it is still possible that the FunFair platform will experience malfunctions or otherwise fail to be adequately developed or maintained, which may negatively impact FunFair and FUN tokens. Startups often experience unexpected problems in the areas of product development, marketing, financing, and general management, among others, which frequently cannot be solved. Similarly, casinos may fail to adopt the FunFair platform for any reason.

If the Company is not successful in its efforts to demonstrate to users the utility and value of the FunFair platform, there may be little demand for the platform and thus less use for FUN. As a result, the price of FUN could drop, potentially to zero.

FunFair may be forced to cease operations or take actions that result in a Dissolution Event.

It is possible that, due to any number of reasons, including, but not limited to, an unfavorable fluctuation in the value of cryptographic and fiat currencies, the inability by the Company to establish a launch of the FunFair platform and the FUN tokens' utility, the failure of commercial relationships, regulatory action, or intellectual property ownership challenges, the Company may no longer be viable to operate and the Company may dissolve or take actions that result in a Dissolution Event.

The tax treatment of FUN is uncertain and there may be adverse tax consequences for purchasers.

The tax characterization of the FUN tokens is uncertain, and each purchaser must seek its own tax advice in connection with a purchase or transaction involving FUN for the jurisdiction(s) relevant to the purchaser.

Risks associated with the FUN tokens and the FunFair technology platform

The FunFair technology platform may not be widely adopted and may have limited users.

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It is possible that the FunFair technology platform will not be used by a large number of individuals, companies and other entities or that there will be limited public interest in the creation and development of a blockchain-based online gaming platform. Such a lack of use or interest could negatively impact the development of the FunFair platform and therefore the potential utility of FUN tokens.

Alternative platforms may be established that compete with or are more widely used than the FunFair technology platform.

It is possible that alternative platforms could be established that utilize the same or similar technology underlying the FunFair technology platform and attempt to facilitate online gaming platforms that are materially similar to the FunFair platform. The FunFair platform may compete with these alternative platforms, which could negatively impact the FunFair platform and the FUN tokens.

The open-source structure of the FunFair technology platform means that the FunFair technology platform may be susceptible to developments by users or contributors that could damage the FunFair technology platform or the Company's reputation and could affect the utilization of the FunFair technology platform and the FUN tokens.

The FunFair platform will operate based primarily on an open-source technology maintained by the Company and other contributors. The open-source nature of the FunFair technology platform means that it may be difficult for the Company or contributors to maintain or develop the FunFair technology platform and the Company may not have adequate resources to address emerging issues or malicious programs that develop within the FunFair technology platform adequately or in a timely manner. Third parties not affiliated with the Company may introduce weaknesses or bugs into the core infrastructure elements of the FunFair technology platform and open-source code which may negatively impact the FunFair technology platform. Such events may result in a loss of trust in the security and operation of the FunFair technology platform and a decline in user activity and could negatively impact the market price of the FUN tokens.

The FunFair technology platform may be the target of malicious cyberattacks or may contain exploitable flaws in its underlying code, which may result in security breaches and the loss or theft of FUN tokens. If the FunFair technology platform's security is compromised or if the FunFair technology platform is subjected to attacks that frustrate or thwart our users' ability to access the FunFair platform or their FUN tokens, then users may cut back on or stop using the FunFair platform altogether, which could seriously curtail the utilization of the FUN tokens and cause a decline in the market price of the FUN tokens.

Risks related to blockchain technologies and digital assets

The regulatory regime governing the blockchain technologies, cryptocurrencies, tokens and token offerings such as the FunFair platform and the FUN tokens is uncertain, and new regulations or policies may materially adversely affect the development of the FunFair platform and the utility of the FUN tokens.

Regulation of tokens (including the FUN tokens) and token offerings, cryptocurrencies, blockchain technologies, and cryptocurrency exchanges currently is undeveloped and likely to rapidly evolve, varies significantly among international, federal, state and local jurisdictions and is subject to significant uncertainty and variability. Various legislative

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and executive bodies Singapore, the E.U, the United States and in other countries may, in the future, adopt laws, regulations, guidance, or other actions, which may severely impact the development and growth of the FunFair platform and the adoption and utility of the FUN tokens. Failure by the Company or certain users of the FunFair platform to comply with any laws, rules and regulations, some of which may not exist yet or are subject to interpretation and may be subject to change, could result in a variety of adverse consequences, including civil penalties and fines.

The regulation of non-currency use of blockchain assets is also uncertain. The CFTC has publicly taken the position that certain blockchain assets are commodities, and the SEC has issued a public report stating U.S. federal securities laws require treating some blockchain assets as securities. To the extent that a government or quasi-governmental agency exerts regulatory authority over a blockchain network or asset, the FunFair platform and the FUN tokens may be materially and adversely affected.

Blockchain networks also face an uncertain regulatory landscape in many non-U.S. jurisdictions such as the European Union, China and Russia. Various non-U.S. jurisdictions may, in the near future, adopt laws, regulations or directives that affect the FunFair platform. Such laws, regulations or directives may conflict with those of the U.S. or may directly and negatively impact our business. The effect of any future regulatory change is impossible to predict, but such change could be substantial and materially adverse to the development and growth of the FunFair platform and the adoption and utility of the FUN tokens.

New or changing laws and regulations or interpretations of existing laws and regulations, in the U.S. and other jurisdictions, may materially and adversely impact the value of the currency in which the FUN tokens may be exchanged, the liquidity of the FUN tokens, the ability to access marketplaces or exchanges on which to trade the FUN tokens, and the structure, rights and transferability of FUN tokens.

This Issuance of FUN tokens May Constitute the Issuance of a "Security" Under U.S. Federal Securities Laws

The FUN token is a utility token that has a specific consumptive use – i.e., it allows participants in the FunFair platform (i.e. through an online casino using FunFair technology) to receive and pay value for online gaming services on a distributed network with significant advantages over current online gaming services. Due to the nature of the FUN Token, we do not think it should be considered a "security" as that term is defined in the Securities Act.

We believe that the FUN Token should not be considered a "security" under U.S. federal securities laws. Nevertheless, initial sales were restricted from U.S. buyers. As noted by the SEC, the issuance of tokens represents a new paradigm and the application of the federal securities laws to this new paradigm is very fact specific. If the FUN Token were deemed to be a security under U.S. federal securities laws then, prior to the sale of FUN tokens to U.S. purchasers, we may be required to register with the U.S. SEC. Doing so might have negative impacts on the FUN Token in other jurisdictions.

Purchasers of FUN will have no control and the Company may only have limited control once the launch of the FunFair platform occurs.

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The FunFair platform is comprised of open-source technologies that depend on a network of computers to run certain software programs to process transactions. Because of this less centralized model, the Company has limited control over the FUN tokens and the FunFair platform once launched. In addition, token holders are not and will not be entitled, to vote or receive dividends or be deemed the holder of capital stock of the Company for any purpose, nor will anything be construed to confer on the token holder any of the rights of a stockholder of the Company or any right to vote for the election of directors or upon any matter submitted to stockholders at any meeting thereof, or to give or withhold consent to any corporate action or to receive notice of meetings, or to receive subscription rights or otherwise.

Purchasers may lack information for monitoring the value of FUN

The Purchaser may not be able to obtain all information it would want regarding the Company, FUN tokens, or the FunFair platform, on a timely basis or at all. It is possible that the purchaser may not be aware on a timely basis of material adverse changes that have occurred with respect to the FunFair platform. While the Company has made efforts to use open-source development for the FUN tokens, this information may be highly technical by nature. As a result of these difficulties, as well as other uncertainties, a FUN token holder may not have accurate or accessible information about the FunFair platform.

FUN tokens have no history.

The FUN tokens have no history. Past performance of the Company, or any similar token, is not predictive of future results. Each purchase should be evaluated on the basis of the purchaser's desire to use the FUN token for its intended gaming purpose.

If the FunFair platform is unable to satisfy online gaming requirements or needs, security, privacy, and other government and/or industry-specific requirements, its growth could be harmed.

There are a number of online gaming, security, privacy and other government- and industry-specific requirements or concerns, including those that require companies to notify individuals of data security incidents involving certain types of personal data. Security compromises could harm FunFair's reputation, erode user confidence in the effectiveness of its security measures, negatively impact its ability to attract new users, or cause existing users to stop using the FunFair platform. Government enforcement actions against tokens and/or blockchains because of the potential money laundering concerns or enabling of illicit transactions could significantly harm the viability of the FunFair platform and the value of the FUN tokens.

The further development and acceptance of blockchain networks, including the FunFair platform, which are part of a new and rapidly changing industry, are subject to a variety of factors that are difficult to evaluate. The slowing or stopping of the development or acceptance of blockchain networks and blockchain assets would have a material adverse effect on the successful development and adoption of the FunFair platform and the FUN tokens.

The growth of the blockchain industry in general, as well as the blockchain networks with which the FunFair platform will rely and interact, is subject to a high degree of uncertainty. The factors affecting the further development of the cryptocurrency industry, as well as blockchain networks, include, without limitation:

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- Worldwide growth in the adoption and use of Ethereum, and other blockchain technologies;
- Government and quasi-government regulation of Ethereum, and other blockchain assets and their use, or restrictions on or regulation of access to and operation of blockchain networks or similar systems;
- The maintenance and development of the open-source software protocol of the Ethereum networks;
- Changes in consumer demographics and public tastes and preferences;
- The availability and popularity of other forms or methods of buying and selling goods and services, or trading assets including new means of using fiat currencies or existing networks;
- General economic conditions and the regulatory environment relating to cryptocurrencies; or:
- A decline in the popularity or acceptance of Ethereum or other blockchain-based tokens would adversely affect our results of operations.

The slowing or stopping of the development, general acceptance and adoption and usage of blockchain networks and blockchain assets may deter or delay the acceptance and adoption of the FunFair technology platform and the FUN tokens.

The prices of blockchain assets are extremely volatile. Fluctuations in the price of digital assets could materially and adversely affect our business, and the FUN tokens may also be subject to significant price volatility.

The prices of blockchain assets such as Ethereum have historically been subject to dramatic fluctuations and are highly volatile, and the market price of the FUN tokens may also be highly volatile. Several factors may influence the market price of the FUN tokens, including, but not limited to:

- Global blockchain asset supply;
- Global blockchain asset demand, which can be influenced by the growth of retail merchants' and commercial businesses' acceptance of blockchain assets like cryptocurrencies as payment for goods and services, the security of online blockchain asset exchanges and digital wallets that hold blockchain assets, the perception that the use and holding of blockchain assets is safe and secure, and the regulatory restrictions on their use;
- Changes in the software, software requirements or hardware requirements underlying the FunFair platform;
- Changes in the rights, obligations, incentives, or rewards for the various participants in the FunFair platform;
- Interest rates;
- Currency exchange rates, including the rates at which digital assets may be exchanged for fiat currencies;
- Fiat currency withdrawal and deposit policies of blockchain asset exchanges on which the FUN tokens may be traded and liquidity on such exchanges;
- Interruptions in service from or failures of major blockchain asset exchanges on which the FUN tokens may be traded;
- Trading activities of large-scale traders, including private and registered funds, that may directly or indirectly purchase FUN tokens or other blockchain assets;

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- Monetary policies of governments, trade restrictions, currency devaluations and revaluations;
- Regulatory measures, if any, that affect the use of blockchain assets such as the FUN tokens;
- The maintenance and development of the open-source software protocol of the FUN tokens;
- Global or regional political, economic or financial events and situations; or
- Expectations among FunFair platform or other blockchain assets participants that the value of the FUN tokens or other blockchain assets will soon change.

A decrease in the price of a single blockchain asset may cause volatility in the entire blockchain asset industry and may affect other blockchain assets including the FUN tokens. For example, a security breach that affects investor or user confidence in Ethereum may affect the industry as a whole and may also cause the price of the FUN tokens and other blockchain assets to fluctuate.

Disclaimer

The document is a marketing document and is not intended to be legally binding. Nothing in this document shall be deemed to constitute a prospectus of any sort or a solicitation for investment, nor does it in any way pertain to an offering or a solicitation of an offer to buy any securities in any jurisdiction. This document does not constitute an offer to sell, or a solicitation of an offer to buy, an interest in any jurisdiction in which it is unlawful to make such an offer or solicitation. The information in this document does not constitute a recommendation by any person, nor does it constitute advice on the merits of participation in any purchase of Draw tokens or any other cryptographic token or currency. Nor has the information contained in this document been approved by any regulatory agency or governmental authority of any kind.

Potential purchasers should refer to the Funfair Terms and Conditions, as available on the Funfair website from time to time for the terms of the token sales and a non-exhaustive analysis of the risks involved in purchasing FUN Tokens. You will be required to agree to the Funfair Terms and Conditions before purchasing any FUN Tokens.

Participants must make their own independent assessment, after making such investigations as they consider necessary, of the merits of purchasing any FUN tokens. Participants should consult and rely upon their accounting, legal and tax representatives and advisers in order to evaluate the economic, legal and tax consequences of purchasing FUN Tokens.

Certain statements contained in this document may constitute forward-looking statements or speak to future events or plans. Such forward-looking statements or information involve known and unknown risks and uncertainties, which may cause actual events to differ materially.

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This White Paper may be translated into languages other than English. If and to the extent that the terms in the non-English versions of the document conflict with the English language versions of the document, the English language version will control and govern.

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8. Notes

[i] http://www.gamblingcommission.gov.uk/PDF/survey-data/Gambling-participation-in-2017-behaviour-awareness-and-attitudes.pdf p.32
[ii] To be referred to as the 'FUN token' for the remainder of this document
[iii] H2 Capital Feb 2018 http://www.igamingbusiness.com/news/igaming-dashboard-february-2018, with € figures converted to $
[iv] E.g. Ultimate Bet, Absolute Poker and Full Tilt Poker scandals
[v] UK licences require a minimum 'basic level of protection' where funds are not segregated in the event of insolvency. See https://www.gamblingcommission.gov.uk/for-the-public/Your-rights/Protection-of-customer-funds.aspx for more. New Jersey operators are only required to keep funds in a separate account, offering little protection in reality. See https://www.nj.gov/oag/ge/docs/Regulations/MergedRegulations110413.pdf for more.
[vivi] In most cases, they are only required to have enough capital to cover player funds at the daily close of business, rather than a $1m slot jackpot win, for example.
[vii] https://www.liquorandgaming.nsw.gov.au/Documents/gaming-and-wagering/problems-with-gambling/research/4.%20Interactice%20Gambling%20study.pdf p.128
[viii] https://infohub.gambleaware.org/wp-content/uploads/2014/09/Wood-Williams-2009.pdf
[ix] GVC, The Stars Group, Paddy Power Betfair, Kindred Group
[x] Taken from https://etherscan.io/token/0x419d0d8bdd9af5e606ae2232ed285aff190e711b on 21 Sept 2018.
[xi] https://incomeaccess.com/contenthub/wp-content/uploads/2018/03/IA_Survey-Report_FINAL_March-7-2018.pdf
[xii] Gaming affiliates receive payments by agreement with operators when players who they have referred go on to play at FunFair casinos, referred to as 'Affiliate revenue' for the remainder of this document. Affiliate revenue is therefore a single payment (Cost Per Acquisition or 'CPA') or percentage share of net gaming revenue ('revenue share') from each player they refer, and not a feature of the FUN token itself.
[xiii] http://www.gamblingcommission.gov.uk/PDF/survey-data/Gambling-participation-in-2017-behaviour-awareness-and-attitudes.pdf p.27
[xiv] http://www.gamblingcommission.gov.uk/PDF/survey-data/Gambling-participation-in-2017-behaviour-awareness-and-attitudes.pdf p.47
[xv] https://media.consensys.net/blockchain-by-the-numbers-33-stats-on-ethereum-and-consensys-738cb1637cb3
[xvi] Taken from https://etherscan.io/token/0x419d0d8bdd9af5e606ae2232ed285aff190e711b on 21 Sept 2018.
[xvii] https://www.forbes.com/sites/spencerbogart/2017/11/08/7-stats-that-highlight-a-millennial-propensity-for-bitcoin
[xviii] https://www.gov.uk/government/news/cma-launches-enforcement-action-against-gambling-firms
[xix] https://www.gamblingcommission.gov.uk/PDF/Complaints-processes-in-the-gambling-industry.pdf
[xx] https://www.ibas-uk.com/media/1061/ibas-submission-to-gc-consultation-on-remote-technical-standards-january-2017.pdf

[xxi] Although testing took place on Mainnet with FUN tokens, ownership of tokens throughout the test remained with FunFair, while other conditions were also put in place to ensure the test did not fall within the remit of relevant gaming legislation.

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