



# STOCKS.BET WHITEPAPER

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THE WORLD'S FIRST DAPP TO BET ON THE PRICE OF STOCKS

DRAFT VERSION 0.02



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# ABSTRACT

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STOCKS.BET is the ultimate combination of betting, blockchain technology, cryptocurrencies and stocks. It is an Ethereum Smart Contract based DApp for betting on the price of listed stocks (like Apple, Microsoft and other) and win from everyone who bets against you. STOCKS.BET is an interesting tool for all traders who like to bet on the price movement of Stocks. Users bet with ETH on one of the listed stocks to have the highest gain in first minute of trade. All bets are placed in the blockchain, allowing users to see the total number of bets, the total bet amount for each stock, and the Payoff odds deriving from them. This allows users who follow the crowd to pick a winner easily. However, the Payoff-odds can also be used to bet on an underdog for very large wins. Compared to mainstream betting sites and centralized exchanges, STOCKS.BET holds many advantages as it does not require users to signup and deposit funds to an entity.

As the development is open source and the funds are secured by the Ethereum Smart contracts, STOCKS.BET enables a completely trustless peer-to-peer betting environment. The prices are pulled from AlphaVantage.co API using Oraclize and it is done in a way to avoid manipulation. With a user-friendly interface, STOCKS.BET is a groundbreaking platform and has the potential to attract a large set of the trading population in the crypto and stock exchange market.

This product unites the crypto and stock exchange market.

The platform's tokens named STBT. They are issued to the crowdsale contributors. STBT token holders will earn all of the profits generated by STOCKS.BET directly in the form of ETH. STOCKS.BET profits are generated from the takeout, a small cut taken from the betting pool of all stock's rallies before paying out the winner. The current takeout rate is 5% which is minimal compared to the usual 15%-25% in standard betting (<http://www.latimes.com/sports/more/lasp-horse-racing-newsletter-20171006-htmstory.html>).

At the end of each quarter, a smart contract will issue the dividends based on the proportion of STBT tokens held by a wallet during a particular time period. For example, a wallet holding 10% of the total STBT token supply will receive 10% of all the profits generated by STOCKS.BET. As the bets are always placed between the users and bankroll does not pay the winners, STOCKS.BET bankroll balance will always remain positive. As the platform gains popularity, STOCKS.BET will allow users to bet using STBT tokens which can unlock advanced features and enjoy a smaller takeout. STBT holders will be able to vote on takeout rate, game rules, and features.



# INTRODUCTION

STOCKS.BET provides a user-friendly interface to interact with the betting smart contract that handles all operations in a secure way, including collecting bets, monitoring prices, calculating winners, and rewarding. The betting system used by STOCKS.BET is called Parimutuel Betting, and it is popular in many sports where participants finish in ranking order.

In Parimutuel Betting, all wagered amounts are placed together in a pool, the house takes a cut from the pool, then the payout is shared among everyone who bets on the winner in proportion to the amount they bet.

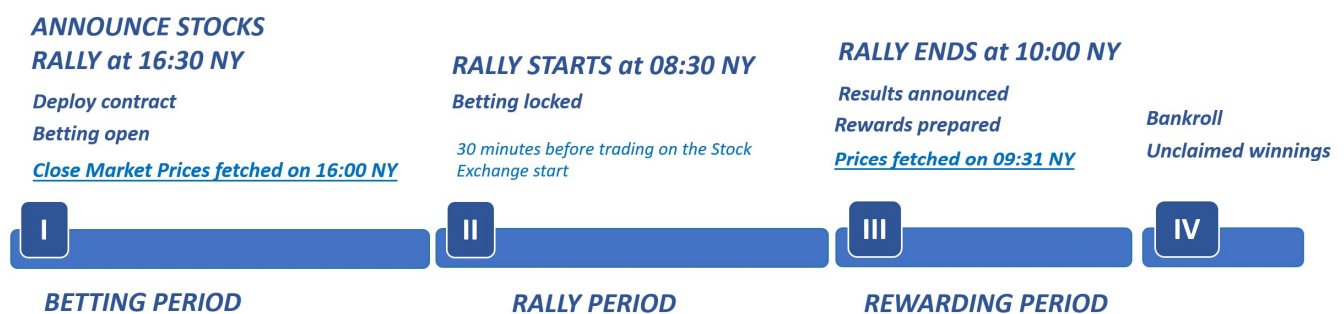
STOCKS.BET uses this betting system where users bet on the price of stocks by choosing a winner among multiple stocks. A winner is a stock that has the highest price increase % among all the other competing stocks in a specific time period. STOCKS.BET implements this purely on the blockchain without any interaction with the outside world except to fetch the prices from AlphaVantage.co API using Oraclize.

Stocks Rally is published or announced when a contract is deployed.

A Stocks Rally is a period of sustained increases in the prices of stocks, bonds or indexes. This type of price movement can happen during either a bull or a bear market, when it is known as either a bull market rally or a bear market rally respectively. However, a rally will generally follow a period of flat or declining prices.

All the variables are set at this time such as the three sequential periods explained below. No one can interfere or influence the contract once a contract is deployed and a Stocks Rally is made public.

FIG 1. Timeline of a Rally in STOCKS.BET



**BETTING PERIOD** - It is the time period following the announcement of a Stocks Rally during which users can place their bets using the STOCKS.BET DApp in a Metamask™ (<https://metamask.io/>) compatible browser such as Google Chrome™, Firefox® or an application from Ethereum foundation such as Mist or Geth.

Price of each stock is fetched from the exchanges at the end of trade day and displayed on the betting page as “Market close price”.

During this period, users can see in real time all the information about placed bets such as the wagered amount and the number of bets on each stock. Win odds are calculated and updated as bets are placed. Win odds are explained with algebraic representation in the below section.

**RALLY PERIOD** - At the beginning of this period, the contract is locked for further betting. Any transactions trying to place a bet would fail, not deducting the corresponding balance from the user’s wallet.

**REWARDING PERIOD** - At the end of the Rally period, prices are fetched again from the exchanges and displayed on the website as “Market open price plus 1 min”. The price increase % from the “Market close price” to “Market open price plus 1 min” is used to decide the winner. The winning stock is announced in the web interface. Users can use the function “Check Reward” to view their winnings and use the “Claim” function to execute a transaction without sending any ETH and include only the gas (or transaction fee). This triggers the smart contract to send their winnings in the form of ETH. Users have a set period (currently 30 days, subject to change with a notice) to claim their winnings.

All unclaimed winnings go to the bankroll and are included in the dividend that goes to the STBT token holders.

Algebraic summary:

In a Rally with a set of N stocks listed for betting, with a total bet pool of each stock  $W_1, W_2, \dots, W_n$ , the total pool of money on the event is:

$$W_T = \sum_{i=1}^n W_i.$$

After takeout a commission rate of “r” from the pool, the amount remaining to be distributed between the successful bettors is  $W_R = W_T(1 - r)$ . Those who bet on the successful outcome m will receive a payout of  $W_R / W_m$  for every ETH they bet on it.



# THE DAPP

The web interface (<http://stocks.bet/app>) enables users to browse through past games, check their results, and claim their accumulated rewards. The interface presents information about current Stocks Rally and rallies archive. Users will be able to betting in current Rally, view the status of it and claim their rewards from completed stock's rallies.

All the terms of the Stocks Rally and Betting are transparent for the public to verify anytime, thanks to the nature of the Blockchain and Ethereum.

FIG 2. Screenshot Stocks Betting DApp


**Your reward in this betting: 0.46796 ETH** [Reward Claim](#) Select betting: 2018-02-22 ▾

**Your bets count: 2**  
MSFT: 0.2 ETH, GOOG: 0.1 ETH

### MICROSOFT, MSFT 0.2 POOL TOTAL (ETH)

<b>Market close price   \$91.49</b> fix moment   2018-02-21 16:00 NY	<b>\$91.91   Market open price plus 1 min</b> 2018-02-22 09:31:00   fix moment
Pool Total (ETH)   0.2	<b>0.5 ODDS (PROFIT FOR 1 ETH)</b>
Number of bets   1	

### GOOGLE, GOOG 0.1 POOL TOTAL (ETH)

<b>Market close price   \$1111.34</b> fix moment   2018-02-21 16:00 NY	 <b>\$1119.37   Market open price plus 1 min</b> 2018-02-22 09:31:00   fix moment
Pool Total (ETH)   0.1	<b>2 ODDS (PROFIT FOR 1 ETH)</b>
Number of bets   1	

### APPLE, AAPL 0 POOL TOTAL (ETH)

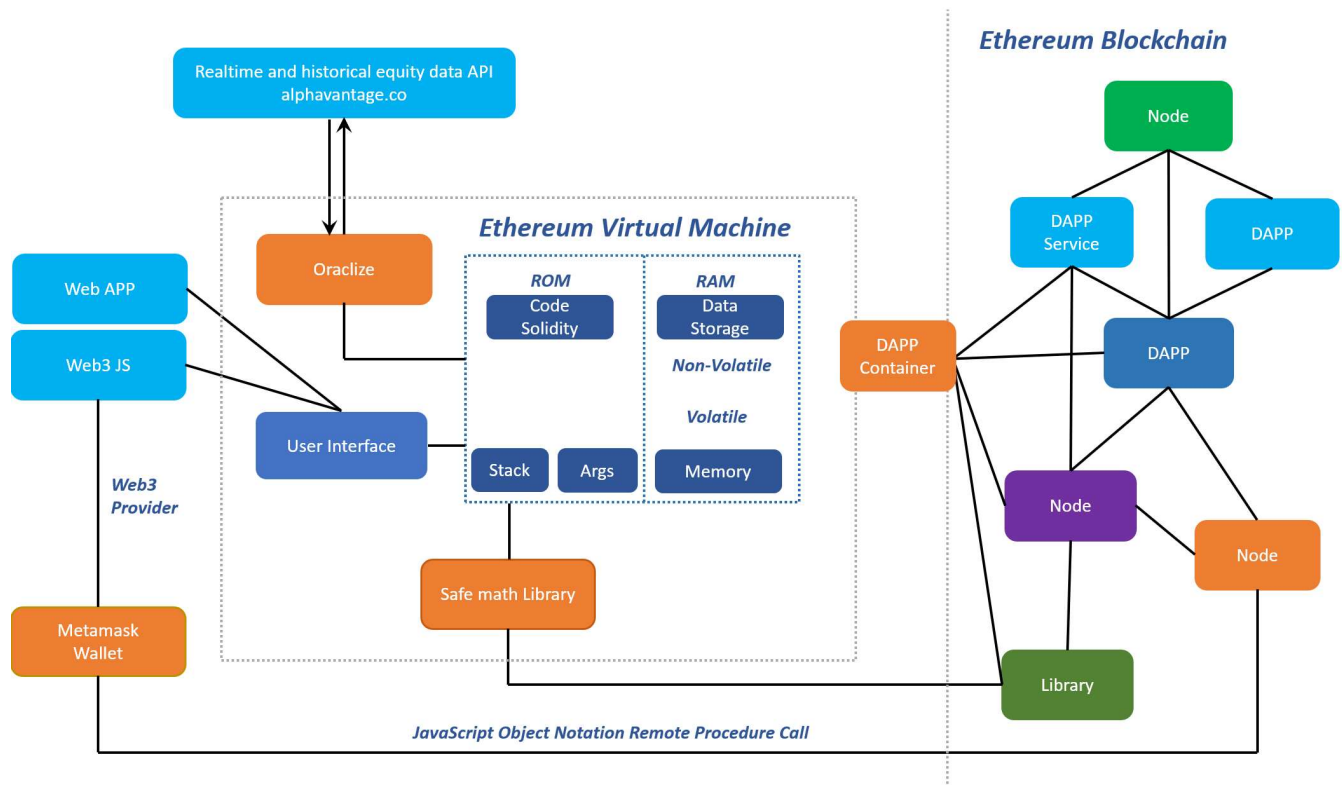
<b>Market close price   \$171.07</b> fix moment   2018-02-21 16:00 NY	<b>\$171.85   Market open price plus 1 min</b> 2018-02-22 09:31:00   fix moment
Pool Total (ETH)   0	<b>0 ODDS (PROFIT FOR 1 ETH)</b>
Number of bets   0	



# ARCHITECTURE

STOCKS.BET is a Decentralized Application built completely inside the Ethereum blockchain (<https://ethereum.org>). The entire DApp lives inside the Ethereum Virtual Machine (EVM) (<http://ethdocs.org/en/latest/introduction/what-is-ethereum.html#ethereum-virtual-machine>). The EVM has two types of components, the volatile and non-volatile. STOCKS.BET DApp contains the code, data, stack, arguments, and memory. Since the EVM lives inside the Ethereum network, any read or write of data or operation has to go through the blockchain. In the following sections, the workflow and implementation of the smart contract are discussed in detailed. While it uses the architecture of the development done so far for the beta, a scaling solution towards the release of a full suite of stock price betting is being meticulously worked on by the team.

FIG 3. STOCKS.BET Architecture



## Frontend

HTML, CSS and JS stack.

The UI interacts with the blockchain using any type of web3 provider. The frontend code has been tested to work with some of the frequently used web3 providers such as Metamask™ browser extension on Google Chrome™ or Firefox® browsers and Mist from Ethereum foundation. Ethereum web3 JavaScript framework is the framework that are used to interact with the frontend.

## Backend

The backend component consists of the core logic behind the DApp, which is a smart contract in the Ethereum world. The smart contracts for STOCKS.BET have been written in Solidity language. Node.js and Truffle framework is used for the administration and management of the contract and the frontend. The DApp structure of Truffle is followed.

Apart from the core logic, there are also additional libraries and services used by the DApp:

- 1) Oraclize (<http://docs.oraclize.it>) Oraclize is the leading oracle service for smart contracts and blockchain applications, serving thousands of requests for day every day on Ethereum, Bitcoin and Rootstock.
- 2) OpenZeppelin (<https://openzeppelin.org>) OpenZeppelin is an open framework of reusable and secure smart contracts in the Solidity language.
- 3) Arachnid/solidity-stringutils by Nick Johnson, String & slice utility library for Solidity contracts. (<https://github.com/OpenZeppelin/zeppelin-solidity/tree/master/contracts/math>)



## Safety

If the contract fails for any reason, one being an issue with fetching the price from the exchange, there are safety mechanisms in place to cancel the Rally and issue a full refund to all the bettors after the gas costs for the transaction. It can be publicly verified in the open source smart contract code that no one including the contract owner will be able to take control of the funds by breaking the contract. The only action that a contract owner can take to unlock the funds for anyone is to make them available for all bettors to withdraw them. This works in a similar way with the “*Claim Reward*” function as explained in the previous section. More technical details about its implementation are available in the following section.

## Avoiding manipulation

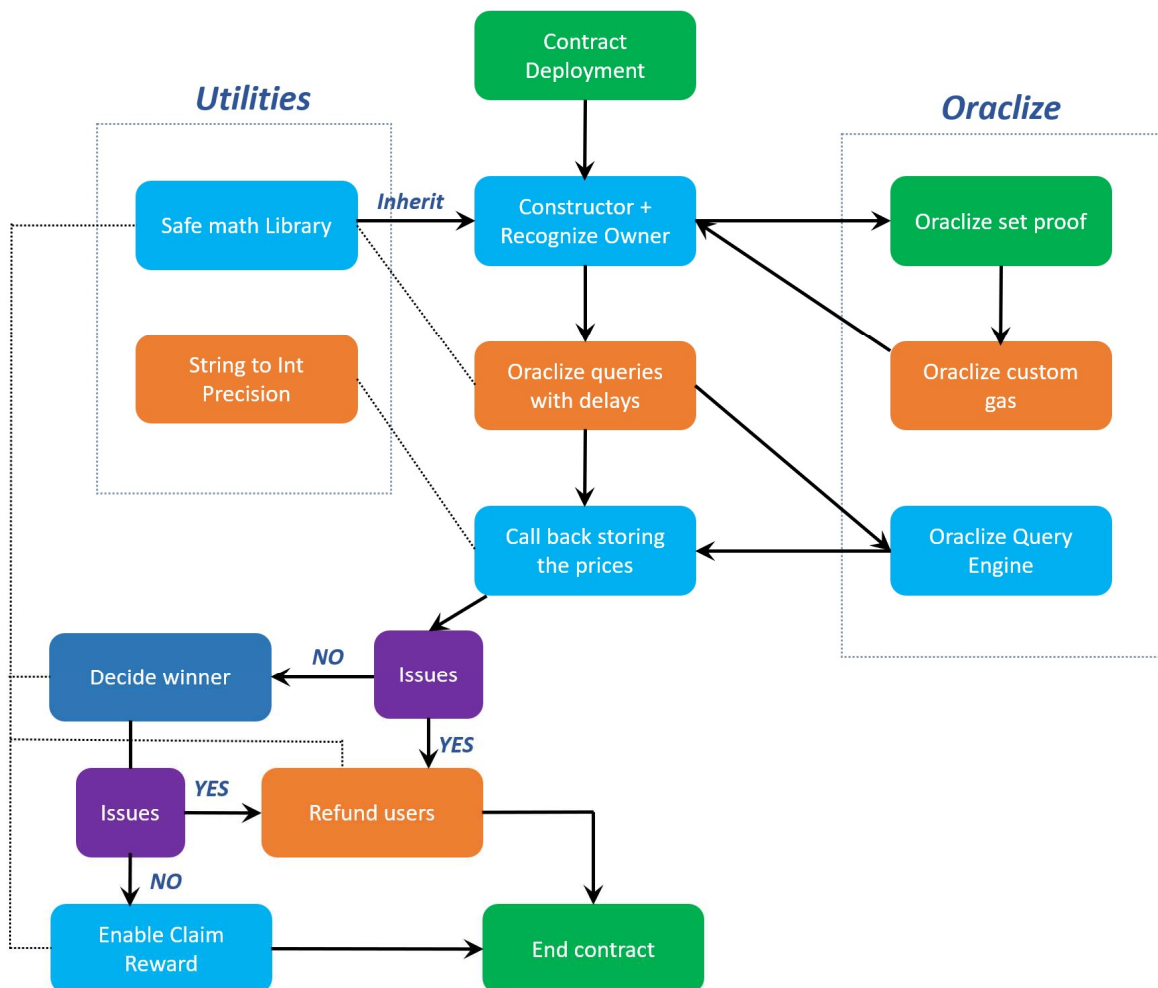
The prices fetched from the exchanges using API calls through Oraclize (<http://www.oraclize.it>) plays a critical role in determining the winner. Hence, the best techniques and algorithms are used to avoid any manipulation. For this purpose, the prices fetched from multiple exchanges will be aggregated instead of using one source. The trading volume of the stock in exchange will be taken into account. The time at which the price from the exchanges is pulled will be randomized within a specific short time period to avoid possible price manipulation in exchange orders. In the beta, prices are pulled from the AlphaVantage™ API (<https://www.alphavantage.co>).



# WORKFLOW

STOCKS.BET is designed with a simple and straightforward workflow to minimize any security risks. By using the appropriate and absolutely necessary functionality, the complexity of the application has been masked by the optimal betting algorithm.

FIG 4. Contract Workflow





# ROADMAP

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DEC 2017

**Create Smart Contract (completed)**

2017- FEB 2018

**Create beta DApp (completed)**

Q1 2018

**Crowdsale process, Code audit**

Q1 2018 - Q4 2018

**Listing on Cryptocurrency Exchanges**

Q2 2018

**MainNet launch with daily bets, UI enhancements, Dividends contract**

Q3 2018

**Voting portal, Betting Contracts with more stocks**

Q4 2018

**Mobile App, Status.im integration**

Q4 2018

**Additional language support**



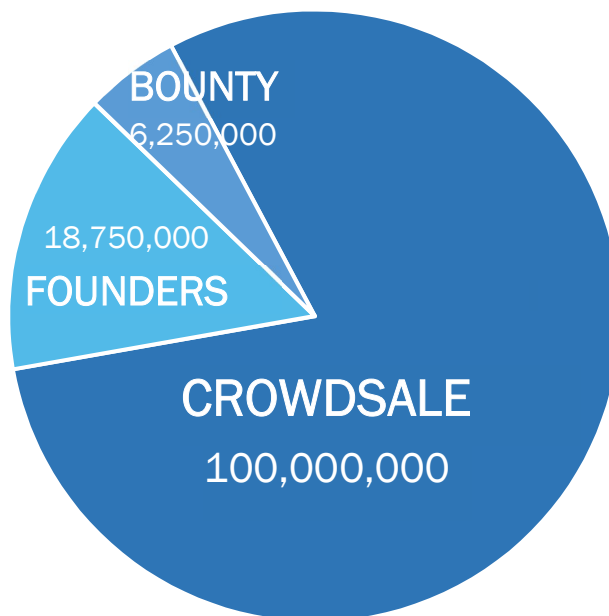
# CROWDSALE STBT TOKEN

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**Dates will be announced later.**

STBT is an ERC 20 standard token created with a strictly limited supply issued to the crowdsale contributors. The holders of STBT tokens will be able to claim all of the profits made by STOCKS.BET in form of ETH during the dividend payout period every quarter. STOCKS.BET profit is generated from the takeout taken from the betting pool of each Stocks Rally before a payout is prepared for the winners. The current takeout rate is at 5%. STBT holders will receive ETH at the end of every quarter from the Bankroll in proportion to the amount of STBT tokens they hold for a fixed time period. During the dividend payout period, tokens will be locked and not available to transfer between wallets. This is very similar to the dividend issuance in the Etheroll project, an innovative and popular dicing DApp. As the platform scales, a monthly dividend issuance mechanism will be rolled out. STBT token holders will also take part in voting to make decisions such as adjusting the takeout rate, adding new features, etc. STBT tokens will be used for betting as the platform gains adoption and users will enjoy discounted takeout rates in the stock's rallies where STBT tokens are used. STBT tokens will also unlock advanced features for the bettors.

FIG 5. STBT Token Distribution



Token Symbol	STBT
Type	Ethereum ERC 20 Standard
Contract Address	Will be made available in the website before crowdsale begins
Total Fixed Supply	125,000,000 STBT tokens minted
Crowdsale Hard Cap	100,000,000 STBT tokens
Crowdsale Soft Cap	2,500,000 STBT tokens
Founders Token	18,750,000 (Vested over 2 years)

If we sold STBT tokens less than 2,500,000, there is no sufficient interest from the crowdsale, STOCKS.BET will refund all the ETH collected from the crowdsale upon community consensus.

Founders' tokens are time-locked with an Ethereum Smart Contract and released in three trenches every six months.

All unsold tokens are burnt either a week from the time the hard cap is reached or a week after the end of the crowdsale period, whichever occurs first. In this case, Founders' tokens will also be burnt to maintain the distribution rate of 15% to the founders. There will not be any mintage of STBT tokens in the future. Tokens will appear in the wallet within a week from the crowdsale contribution.

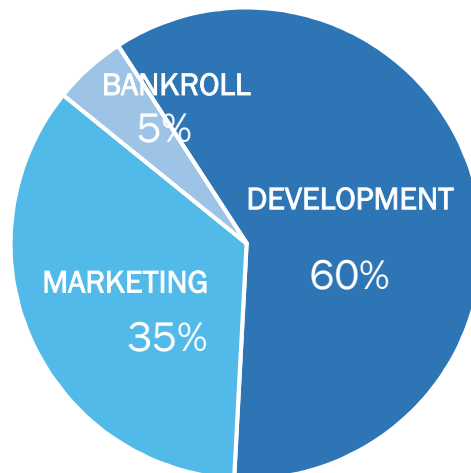
#### Conversion rate

Period	ETH	STBT	Bonus
Phase 1	1 ETH	25,000	100%
Phase 2 - Day 1	1 ETH	18,750	50%
Phase 2 - Week 1	1 ETH	15,000	20%
Phase 2 - Week 2	1 ETH	13,750	10%
Phase 2 - Weeks 3 & 4	1 ETH	12,500	0%

People registered for the Phase 1 in our website are given priority to participate in the Phase 1 sale before it is opened for the public.

To maintain a healthy token price upon listing on exchanges, bonus tokens are unlocked for transfer 30 days after the base tokens are unlocked. If the crowdsale ends in Phase-1, bonus tokens are unlocked along with the base tokens.

FIG 6. Allocation of fund collected in crowdsale



An initial bankroll from the crowdsale will be used to bet on the first few stock's rallies. This liquidity will attract users to try and bet on the Stock prices using the DApp. Bets will be placed equally on all the possible outcomes in a Rally. The profits from the stock's rallies will not be used in order to provide bet liquidity. During the first Quarterly dividend issuance, 100% of the bankroll, including the profit, will be shared with the STBT holders in proportion to the number of tokens they hold.



## THE TEAM

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The core team comprises of three members with experience in Web development, Blockchain development and Financial analysis. IT group share the responsibilities of programming in Solidity (Smart Contracts), web3, Vue.js, HTML, CSS, C#, .NET Core, graphics design. Group of analysts share the responsibilities of Stock Exchange processes, business development and community management. The team prefers to be anonymous for the benefit of the project until there is a need.

Inspired by projects such as Etheroll and Ethorse the team wants to follow a similar path. All the work that is produced so far is done in-house, including the working DApp that is released to the public.

All new features the team has publish to the open source code repository on GitHub (<https://github.com/STOCKSBET>) and it's growing with the team being active almost every day. This credibility proves that the team is fully capable of executing this project. The team will continue to deliver as per the roadmap. The vision is for STOCKS.BET (STBT Token) to be owned and supported by the community. Discussions and inputs are always welcome in the dedicated communication channels. STOCKS.BET welcomes anyone to build their own applications using the STOCKS.BET smart contracts.



## DISCLAIMER

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STBT tokens should not be considered as an investment that provides guaranteed returns or increase in value. It also does not grant any controller ownership, equity, direction, or decision-making of STOCKS.BET platform as a whole. You should not participate in the Crowdsale if you are a Resident or Citizen of the United States of America, including Puerto Rico, Virgin Islands (U.S.) and any other U.S. possession, Singapore, Hong Kong, Peoples Republic of China, or any other jurisdiction in which it is not permissible to participate in token crowd contributions or acting on behalf of any of them. Crowdsale participants and platform users should follow the rules of their jurisdiction to abide by their local security and online gambling laws. As with any other cryptocurrency technology, there are risks of theft, hacking, lack of adoption and technical issues that can make people lose ETH, STBT tokens, or their market value. Since the crowdsale is performed by collecting ETH, STOCKS.BET team may not be able to fund and continue developing the platform if the market value of ETH declines drastically.