

WHITEPAPER

Version 1.0
29th June 2017

Abstract

“Despite the digitalisation of several important aspects of modern life, elections are still largely conducted offline, on paper. Since the turn of the century, e-voting has been considered a promising and eventually inevitable development, which could speed up, simplify and reduce the cost of elections, and might even lead to higher voter turnouts and the development of stronger democracies”.^[1]

Boulé is a new remote voting technology based on the blockchain.

In the future hopefully not too far, we will be able to use internet and express our opinion on any kind of ballot simply using our phone in a totally safe and secure way.

Time has passed since the first election took place in the ancient Greece and it is now time to start creating a new voting system that will change the face of our democracies forever.

Imagine a world where we can express the right to vote from everywhere, in a safer way than the old system currently adopted, without the obligation to be physically in the place that hosts the election: you will just vote from home using your phone or computer.

Placing your vote will be cheaper, easier and much more ongoing.

The blockchain is the long-awaited technology that can bring digitisation in the greatest expression of our society which most of all requires safe and reliable protocols that are not and manipulable by third parties.

Boulé is the name of the first democratic assembly of the history: born in the ancient Greece in VI b.c. as a direct expression of the citizens from the Atheniense Polis.^[2]

[1] European Parliament Think Tank about blockchain to vote
http://www.europarl.europa.eu/RegData/etudes/ATAG/2016/581918/EPRS_ATA%282016%29581918_EN.pdf

[2] History of Boulé in Ancient Greece
[https://en.wikipedia.org/wiki/Boule_\(ancient_Greece\)](https://en.wikipedia.org/wiki/Boule_(ancient_Greece))

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1. Context

1.1 Social Issues.

We live in a complex world where concerns created by traditional and social media often lead to populist elections, that remind us of times when the fear of the unknown slowed the growth and the inevitable flow of innovations.

Furthermore, never like today, we are always more citizens of the world and choices that are adopted from other countries, even geographically very far from us, could affect our lives as well (just think about the global warming as an example).

Our constantly increasing mobility often is an obstacle to our right to exercise our rights in the society we live in, that is mainly the right to vote. ^[3]

In fact, statistics show that the number of voters is gradually narrowing and actually we are facing an increasing abstention in such important moments that would require the greatest community participation.

In addition, a new generation is coming in many countries that will soon have the right to vote for the first time. This generation has never seen the old analog world, it grew up with digital payment systems, the ability to buy online almost every product they need in few minutes and have it delivered to their home, they are used to instant communication through messaging platform and they can access all the information and contents using social and entertainment online platforms.

1.2 Technology Contribution.

We are a completely different society, where the feeling of micro-power gets over decisions.

What we have seen so far about technology's power, linked to shared values, has created the first direct democracies after the crisis in 2008, or the Arab revolution in 2010, where the right to associate and express ideas given by social media brought the overturning of national institutions in North Africa.

Any revolution brings with it consequences in a short term but as historically established, it confirms the main focus on the individual as part of a free community, democratic and including minorities power. For this reason, making the way to vote easier is a crucial point to succeed and to affirm freedom in the world we are living.



social media during the 2011 Egyptian Revolution.
Source: Wikimedia Commons

[3] Maltese National Party discussing about Remote Voting
<https://www.timesofmalta.com/articles/view/20170603/opinion/Remote-voting.649780>

2. Blockchain as Turning Point

It would be useless to explain here how the blockchain works, as you probably are well informed if you are reading this. ^[4]

Instead, we will focus on problems inherent the tradition voting system compared to a decentralised system.

Exactly as for financial transactions, nodes of the chain validate first, the identity of voters and afterwards, their vote.

Like any blockchain transaction, it will be validated by all nodes and will guarantee the anonymity of the vote.

One of the major concerns that prevent the introduction of the digital vote is the computer manipulation on the agenda by other countries or groups of powers other than the national institutions. ^[5]

For this reason, several security protocols have to be activated to ensure the solidness of the voting system and the volunteer of the elector.

[4] History of the blockchain and cryptocurrencies

https://www.linkedin.com/pulse/besotted-blockchain-part-3-inevitability-ari-fa-khan?lipi=urn%3Ali%3Apage%3Ad_flagship3_profile_view_base%3BxnJxF-ZLLQLy1Tgzgo%2B1MUG%3D%3D

[5] Main concerns about voting online

<http://www.telegraph.co.uk/technology/2017/06/07/still-cant-vote-online/>

3. Concerns about the Remote Voting Technology

3.1 Ddos central server attacks, stolen data and electoral frauds.

This is one of the biggest innovation about blockchain; the technology runs in a distributed network of people instead than into a central server.

This means that is impossible to attack only one centre to hack the system.

The more nodes are linked with the chain, the most the technology is reliable.

3.2 Voter anonymity.

Transactions on the blockchain are verifiable but completely anonymous.

It is impossible to link the transaction ID to the identity of the person that has made the transaction.

It is also impossible to complete the transaction in the name of someone else due to the mandatory biometric login and due to the cryptographic login key.

3.3 External Interferences during an election by another nation.

No one can control the majority of the network due to the high cost of computational power to control new nodes.

Once the smart contract with electoral rules is set up, it can't be changed or modified.

3.4 Stolen identity and forced vote.

As we said before, only the authorised elector can vote through his own account.

The vote is changeable by the elector since the last second of poll time, so even a forced vote can be easily changed from any device by passing the biometric process.

For sure there are other threats we are underestimating or forgot to write in this session.

We aim to open a dialogue with all the early supporters that want to join our mission of empowering democracy using the blockchain.

4. Security System

4.1 Biometrical Recognition Access.

Of course, any theoretical analysis would be incomplete without feedback from a working version of such a system; we hope that soon such a feedback will be available.

The recognition system involves validating the identity of the actuator through a blockchain with a special transaction.

The express of the vote will provide a second blockchain transaction.

Regarding the identity of the receiver, the first security system requires biometric identification through facial recognition.

Subsequently, the voter must enter a personal encrypted password.

You will also be required to receive official recognition numbers from the Nation's country, such as photo and ID card, or digital residence code, or access to the official digital profile in the countries where it is expected.

4.2 Validation process

The vote will be issued by the elector through an encrypted transaction on the blockchain and will be validated by the chain blocks, remaining forever in the transactions record so they can control the truth without being able to trace back to the elector who has expressed it.

Disclaimer: this is a simplified exposition of the technical process. Refer to the proof-of-stake consensus Cryptographic validation process in its latest version Consensus by bet. ^[6]

4.3 Online and Offline Voting Integration

You will be able to vote on multiple days, but only up to 4 days prior the offline election day.

This serves to update voter lists and prevent the digital and paper double-digit phenomenon.

Once you have reached 100% of online voters, or a percentage close to 100%, the voting system will only be digital and you will be able to vote until the expira-

tion of the time-frame granted.

This is the system already used by the Estonian Government for their Remote Centralised Voting System in order to avoid double votes during the conversion period between the start of online consultation and the fully digitalised votes adoption.

Other security systems, such as proximity check, dual confirmation of expressed vote, the possibility of signalling a coercive vote, and others to be discussed with the early supporters community once the pre-sale ICO will be finished.

[6] What Proof of Stake means

<http://www.coindesk.com/ethereums-big-switch-the-new-roadmap-to-proof-of-stake/>

5. eVoting in the world

5.1 Before the Blockchain

Since 1995, Internet was used for several elections and experimentation.

The most advanced country for internet vote is Estonia.

We are summarising all the elections and country that have experimented or that have already approved internet elections.

The first known use of the term CyberVote was in 1995 when Australia ran a web-based vote regarding the French nuclear testing in the Pacific region.

In September 2000, the European Commission launched the CyberVote project with the aim of demonstrating “fully verifiable online elections guaranteeing absolute privacy of the votes and using fixed and mobile Internet terminals”.

Trials were performed in Sweden, France, and Germany.

In 2005 Estonia became the first country to offer Internet voting nationally in local elections. 9,317 people voted online.

In 2007 Estonia held its and the world's first National Internet election. Voting was available from February 26th to 28th. A total of 30,275 citizens used Internet voting.

In 2007 Australian Defence Force and Defence civilian personnel deployed on operations in Iraq, Afghanistan, Timor Leste and the Solomon Islands had the opportunity to vote via the Defence Restricted Network with an Australian Electoral Commission and Defence Department joint pilot project.

5.2 After the Blockchain ^[7]

In the 2009 Estonian local municipal elections, 104,415 people voted over the Internet. This means that roughly 9.5% of the people with the right to vote gave their vote over the Internet and in the 2011 parliamentary elections between 24th February and March 2nd, 140,846 people cast their votes online. 96% of the electronic votes were cast in Estonia and 4% by Estonian citizens residing in 106 foreign countries.

In the 2014 European Parliament elections in Estonia, 31.3% of all participating voters gave their vote over the Internet.

In January 2007 France's UMP party held a national presidential primary using both remote electronic voting and with 750 polling stations using touch screen electronic voting over the Internet. The election resulted in over 230,000 votes representing a near 70% turnout.

Elections in France utilised remote Internet voting for the first time in 2003 when French citizens living in the United States elected their representatives to the Assembly of French Citizens Abroad. Over 60% of voters chose to vote using the Internet rather than paper.

In April 2011 Gujarat became the first Indian state to experiment with Internet voting.

Lithuania is planning national online voting, with a target of 20% of votes cast online by 2020.

Romania first implemented electronic voting systems in 2003, on a limited basis, to extend voting capabilities to soldiers and others serving in Iraq, and other theatres of war.

In 2014, during its first party congress, the Spanish political party Podemos, conducted 3 elections using Agora Voting open source software to vote via the Internet on a series of documents which would determine the political principles of the party (112070 voters), the resolutions the party will adopt (38279 voters), and the people that would fill the positions defined by this structure (107488 voters). After the municipal elections carried out in May 2015 several city may-

ors have announced their plans to carry out public consultation processes using electronic voting.

Several Switzerland cantons (Geneva, Neuchâtel and Zürich) have developed Internet voting test projects to allow citizens to vote via the Internet.

In 2009 and 2011, the 110,000 Swiss voters living abroad had the option of voting using the Internet through a new pilot project introduced in September 2008. Up until the vote on February 9, 2014, internet voting was only open to expatriates who lived in the countries in the Wassenaar Arrangement because of their communication standards. After this vote in 2014, Internet voting has opened to all expatriates of Switzerland.

On February 27th, 2017, Swiss Post announced that it was offering a public demonstration version of its e-voting system. The Swiss Post solution has been used in Fribourg and will be used in Neuchâtel.

[7] Voting System Task Force in San Francisco

http://sfgov.org/ccsfgsa/sites/default/files/Voting%20Systems%20Task%20Force/FinalVSTFReport__5789.pdf

6. Boulé Voting Technology

Here we describe the process we have designed to vote on the blockchain.

Disclaimer: Consider that this is just a first concept of the technology that is willing to be discussed and probably updated by the time.

Once the poll is open, every registered user will be notified about the poll availability.

The voter must be registered with their ID cards and biometric recognition in order to access to the voting dashboard.

Then they will find the electoral survey with the poll options. Every candidate or vote choice will be randomly disposed in order to do not advantage the first candidate screen.

The vote can be changed anytime during the poll period, with no changement limit. Last expressed vote will be the official recorded one to impact the electoral result.

It won't be possible to know the partial result since the poll is open, it will be possible only to estimate the voting affluence.

No one can links elector to the vote expressed, nor boulé foundation does. Vote organisers and institutions will purchase the service by using the Boulé token, that will be distributed to the electors in order to access the electoral survey and submit their votes.

It would also be possible to gift a token to the electors that vote online as an incentive to use the digital technology. This choice is up to the vote organiser. Boulé Foundation will receive the token used to vote in a buyback process.

7. Project Roadmap

To finance the development of the platform and make sure to get in touch with the appropriate advisors to implement the project, we will launch a Pre-sale Token campaign in summer 2017.

The bonus, timing and value of the token are described in the next chapter.

At the end of the pre-sale period, we will open a discussion table with all the project's supporters to understand how we can improve our vision to activate the smart contract of the voting system.

Once we are ready, we will launch the ICO to enlarge the user base and find other evangelists which can test our services such as non-profit associations, small local communities, and scholar institutions.

Starting from Q3 2018 we will start looking for partners to commercialise the voting system, carrying out security tests on low-impact voting.

In Q2 of 2019, we aim to launch the first votes of national or political relevance in order to reach full activity in 2020, a date set by many world governments for the launch of fully digitised voting systems.^[8]



[8] UK would vote online by 2020

<http://www.telegraph.co.uk/technology/2017/06/07/still-cant-vote-online/>

8. Pre-sale ICO



8.1 Initial Coin Offering Purpose

As the great ambition of the project and the need for a fair number of transactions to validate the network before using it for electoral purposes, this project lends itself to spreading through the publication of an ICO.

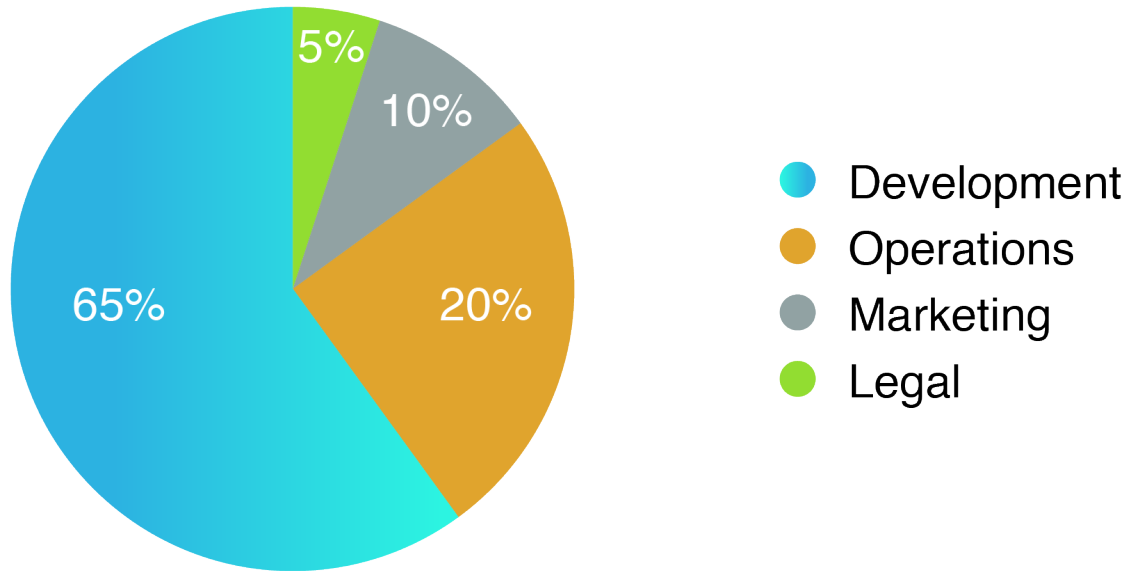
Initial Token Buyers will give life to this project and will get advantages from long-term benefits from their possession.

Boulé does not intend to be a mere financial speculation operation, although we are aware that these operations take place at each launch of an ICO.

Our intent is to collect from the community of cryptocurrencies as many supporters as possible who see the long-term benefits of this project in order to make stronger our democracies and to encourage a direct contact between citizens and representatives on decisions to be taken in a collective interest.

8.2 Breakdown of Profits

The funds raised will be broken down as follows*:



65% for technical development of the platform and integration with pre-existing electoral systems

20% for management and operations

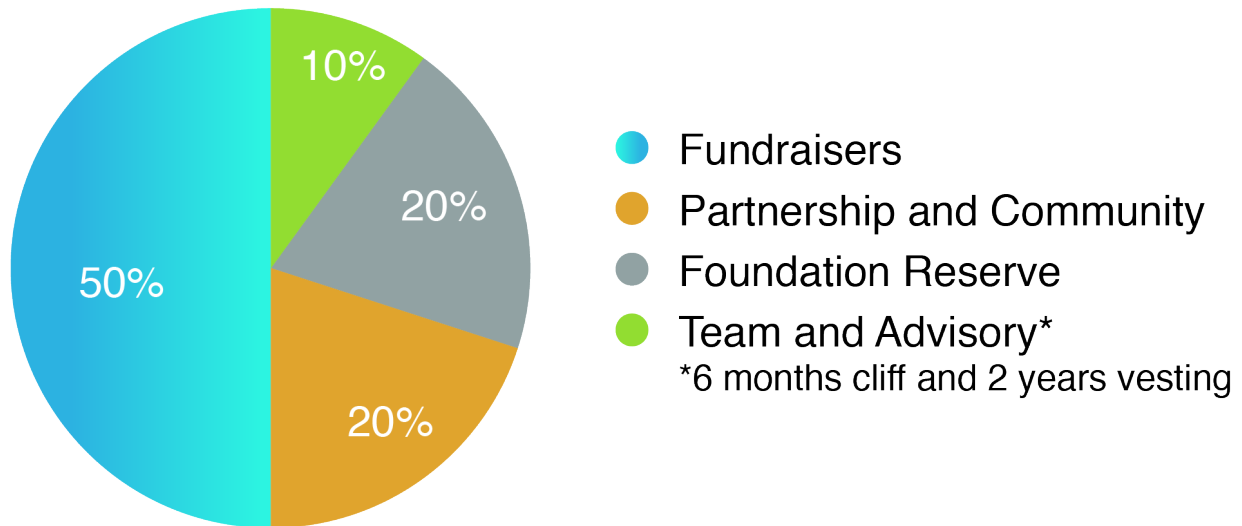
10% for marketing and promotions

5% for legal expenses

*These numbers are on a projection and may change depending on the amount raised from the crowd sale.

8.3 Token Distribution

The distribution of tokens will be as follows:



50% to the fundraisers
20% for partnership and community
20% as reserve
10% to the team and the advisors

Advisors will have 6 months cliff while the Founders will have 6 months cliff and 2 years vesting on their token.

This will warrant the good will in succeeding this project by the starting group. It will be set in the next Smart Contract related to the ICO

8.4 Pre-sale Mode

The total amount of token is capped and no more token will be created after the ICO period.

Cap is setup at 300.000 ETH and 10% of the total token will be sold during the presale in a capped first-come first served scheme.

The minimum ceiling to reach in pre-sale is 300 ETH. If this minimum is not

reached, all funds will be given back to the funders except the transaction gas fees.

When the cap is reached, it won't allowed to send transactions anymore.

We believe in the future uprise of ethereum due to his still to be fully expressed potential, so a portion of revenues will be stored in ETH as a foundation asset.

DURATION AND BONUS

Token exchange value



1 ether = 1000 BOU

Exchange value after the ICO

Pre-sale bonus



1 ether = 2000 BOU

Pre-sale first 24h



1 ether = 1400 BOU

Pre-sale after first day

Total ETH to raise

300.000

Pre-sale ETH cap

10.000

9. Conclusion

We have had long discussions about the consequences of remote voting technology and even if there are some unknown aspects, we are strongly positive about how this technology will impact our democracies. ^[8]

The main asset we see is the fast and cheap process available for free consultations like a referendum.

It will be possible to make several polls in order to strengthen citizens sense of participation.

Votes can be anticipated by an easy information campaign using the same voting device in order to empower electors knowledge about the decision they are expressing.

Voters could vote even if they are in mobility, day and night and participation will spread.

We will vote more and feel more committed to institutions that lack of popular commitment.

It will be easier for citizens to express their intentions in an official validate way.

For any doubt, suggestions and feedback please get in touch with us at ***support@boule.one***

[8] <http://www.cityam.com/266101/estonia-canada-and-australia-vote-online-so-why-cant-we>

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<https://www.timesofmalta.com/articles/view/20170603/opinion/Remote-voting.649780>

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[8] Estonia, Canada and Australia vote online, so why can't we?
<http://www.cityam.com/266101/estonia-canada-and-australia-vote-online-so-why-cant-we>