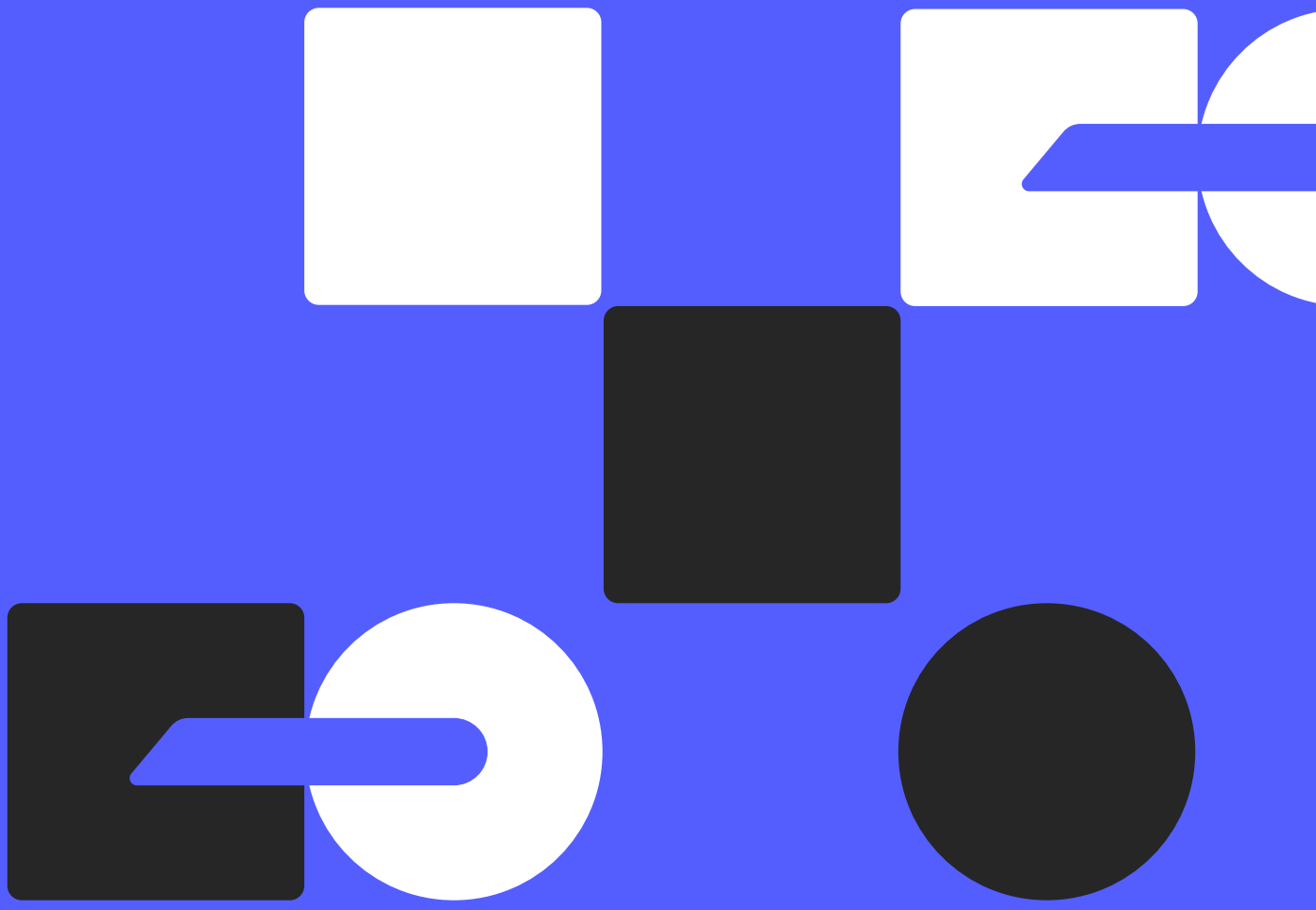
horizon state

Ensuring every voice counts



It is time that the way society collectively makes decisions met the expectations set by the rest of our modern world. Horizon State has built technology whereby constituencies can be engaged with immediacy, and results are tamperproof. Our blockchain voting system has been open to a national constituency and in use since February 2017.

Table of Contents

Motivation

We live in a world where the smartphones in our pockets have more computing power than NASA had to get us to the moon, yet the way we govern our societies remains the equivalent of a pocket calculator.

Existing models for collaborative decision making once served our growing democracies well, yet today they are increasingly slow, expensive, and ineffectual. Public trust in their outcomes is eroding and results in voter apathy. Campaign promises are regularly broken, and major decisions are taken without consultation or transparency. Our society is hurtling into the future, but our democratic processes are stuck in the past, failing to advance at the same pace.

Democracy is much more than our electorates, our representative models, or our boards and management teams. Democracy is the opportunity to participate in the decision-making processes which relate to the shared matters which affect us. Democracy is about reaching consensus on how to best use our shared resources.

We need better shared decision-making tools and processes in almost every facet of our community lives. We need them to be transparent and trusted, allowing deliberation and inclusion, removing barriers rather than stacking them up. Technical, legislative and budgetary obstacles have prevented us from achieving this thus far, but they do not have to hinder us.

Thanks to distributed ledger technology (DLT) we can create systems that directly engage and empower constituencies, employing mechanisms enabling them to vote smartly and efficiently, giving them confidence that their voices will be heard, and allowing them to see, first hand, the results of their voting activities.

Horizon State has built this, looking toward brighter horizons, to a place where our countries and organizations conduct themselves with accountability and efficiency, a place where voices can be heard securely and simply. Our technology platform is open to a global audience and is designed to underpin the process of opinion and vote solicitation everywhere, from the smallest councils in national public service, to multinational enterprises.

It is time for our democratic processes to meet the expectations set by every other part of modern life.

1.0 Vision & Capabilities

Introduction to Horizon State

Horizon State has built a token-based blockchain voting and decision-making platform that delivers unprecedented trust through the integrity and post-unforgeable attributes of DLT. Horizon State delivers a secure digital ballot box, wherein results are immutable and voter identities are protected. Votes cast can be counted transparently, in real-time, by anyone in the world. These counts can happen in perpetuity, as results are permanently retained on the blockchain and are immutable. More than that - Horizon State allows voters to verify that their own vote is accounted for, while maintaining their anonymity.

The platform encourages participation, facilitates deliberation, and creates opportunity for informed decision-making on its decentralized decision-making platform. It is a method to engage constituents on matters that affect them with immediacy. It is a framework where representatives can collaborate with their constituency with unprecedented efficiency. It is a method for families, communities, staff, and indeed entire citizenships to inclusively participate in the decision-making processes that govern their lives.

Our product is already being used commercially by MiVote, an Australian political movement featured in the Financial Review[1], The Guardian[2], Fast Company[3], ABC[4], and on Triple J[5]. Our platform has facilitated the casting of thousands of votes to the blockchain since February 2017.

Horizon State now introduces this product to the rest of the world.

This paper presents the platform that Horizon State has built, lays out the token model, and discusses its challenges, and use cases.

1. (2017, April 12). MiVote wants to bring remote control politicians to the Senate | afr.com. Retrieved September 3, 2017, from http://www.afr.com/news/politics/mivote-wants-to-bring-remote-control-politicians-to-the-senate-20170411-gvicfe
2. (2017, April 14). MiVote aims to shake up democratic process with a click and a tap .... Retrieved September 3, 2017, from https://www.theguardian.com/australia-news/2017/apr/14/mivote-aims-to-shake-up-democratic-process-with-a-click-and-a-tap
3. (2016, September 7). Can Direct Democracy Be Revived Through New Voting Apps?. Retrieved September 3, 2017, from https://www.fastcompany.com/3063379/can-direct-democracy-be-revived-through-new-voting-apps
4. (2017, March 3). MiVote: A Senator in your Smartphone? - Download This Show - ABC .... Retrieved September 3, 2017, from http://www.abc.net.au/radionational/programs/downloadthisshow/mivote/8318392
5. (2017, February 11). MiVote: Can your phone save democracy? - Hack - triple j - ABC. Retrieved September 3, 2017, from http://www.abc.net.au/triplej/programs/hack/mivote-launches-online-direct-democracy-voting-platform/8261112

Voting, the Blockchain & Decision Tokens

The blockchain lends itself perfectly to casting votes. It is an immutable public ledger, trustless, and inspectable by all. A vote cast to the blockchain is unforgeable and the voting results recorded on it are undisputable.

Horizon State is a blockchain-based platform and ecosystem that enables efficient vote casting and decision-making processes. The platform operates through the use of Decision Tokens (HST). These are used for running the decision and voting processes by providing the 'gas' for voting and other services within the ecosystem.

Increase Participation by Increasing Engagement

Voting, in essence, is the final act in the personal decision making process. The overall voter journey entails gaining knowledge and understanding of the issue under deliberation, developing an opinion, opting to participate and thereby influence the outcome, and only then casting a vote.

Many elections today experience low participation and high levels of voter apathy[6]. This may be due to individuals feeling a sense of distance from the issues, that the process of voting is too arduous, or cannot really see their own vote making much difference in the overall scheme. This is true across the spectrum of voter engagements, from general elections and local councils, all the way to shareholders assemblies.

Horizon State's voting platform was developed to overcome obstacles to voter engagement and opinion solicitation. The medium of participation is not limited to computers or handheld devices.

The Horizon State Ecosystem

A truly great service enables synergy by being open and inclusive. Horizon State's philosophy aligns with this by having removed the boundaries that hinder communication, interaction and cooperation. The platform allows partner developers to deploy a variety of products and services to the ecosystem that will further aid the processes of decision making and voting, all of which will use the Decision Tokens as the fuel for this ecosystem.

Horizon State provides an extensible, pluggable platform for decision-making tools, processes and applications. There are a number of decision-making systems used all around us, each of which has different requirements: general elections, postal votes, union elections, and shareholders' meetings, to name a few. In addition, Horizon State's platform provides the public an opportunity to build dApps (Decentralised Applications) on top of the platform. Those dApps can provide services for organizations using Horizon State to facilitate decision-making processes, improve deliberation and participation, or provide customized registration and authentication modules.

Some possible examples of such dApps could be:

- Content delivery by population slices
- Smart contracts for unique voting mechanisms
- Statistical modelling tools
- Sophisticated simulators and what-if analysis
- Smart surveys
- Smart voting agents
- Power BI dashboard integration
- Prediction tools

6. (2017, May 15). U.S. trails most developed countries in voter turnout | Pew Research .... Retrieved September 3, 2017, from http://www.pewresearch.org/fact-tank/2017/05/15/u-s-voter-turnout-trails-most-developed-countries/

Benefits Realization

Local councils, boards of directors, societies, non-profit organizations, unions, political parties and governments share common requirements when requesting opinions from people. High participation rates will mean that decisions made will encompass most of the constituency's input. Low cost processes promote inclusion and deliberation. Transparency and trust in the vote reduce doubts, litigation, and contention.

Horizon State addresses these needs by providing unforgeable, fully-transparent voting processes, at a fraction of the cost per vote of traditional voting mechanisms. Horizon State's platform offers a range of features to each of the different types of users involved:

User Group	Features	Benefits
Organizations *Businesses, councils, non for profit organizations, etc.*	Horizon State provides a secure, efficient and trustworthy fully-transparent means of voting	• Auditability • Trust of constituency • Reduced costs • Reduced lead times • Faster turnaround
Voters *Citizens, party members, shareholders, etc.*	Horizon State provides tools for an immersive voting process, adjusting to the user's preferred methods of consuming information and voting	Increased participation through enhanced engagement, which promotes voting
Representatives	Horizon State offers tools and a platform for continuous decision making, voter consultation, fundraising and analytics	Increased engagement and deliberation strengthen the ties between a representative and their constituency, elevating trust and openness
Service Developers/ Providers	Horizon State is an extensible platform, where software developers and service providers can create new services and expand the ecosystem	Ability to create new services on top of the platform

MVP Released

In early 2017, Horizon State's blockchain-based voting solution was launched for Australia's MiVote membership, using it to participate in the country's decision-making process. The MiVote movement has run a total of 4 nationally-inclusive polls of September 2017, committing thousands of votes to the Ethereum public blockchain through our product.

2.0 Decision Making & Blockchain

Deployment on the Ethereum Blockchain

Robust Network: A secure vote is the most critical component of Horizon State's technology, which is why we have chosen DLT to achieve this. Beyond DLT being our technology of choice, our commercial product sits atop of Ethereum due to its network size and subsequent vote security[7].

Industry support and awareness: The Ethereum Enterprise Alliance has greatly impacted the development of commercial blockchain technology. Paired with the largest community of developers in the world of blockchain, the Ethereum ecosystem offers the most extensive pool of resources from which to draw.

ERC20 token standard: Standardized functions enable seamless issuance, distribution, and control of Decision Tokens in a formal, uncomplicated manner. Conforming to ERC20 standards affords us flexibility for token applications and agreements. This flexibility enables and promotes interoperability of our dApps both within our own ecosystem and externally to 3rd party applications.

7. (2017, May 21). Ethereum is Now the Most Secure Public Blockchain, Overtaking Bitcoin. Retrieved September 3, 2017, from http://www.trustnodes.com/2017/05/21/ethereum-now-secure-public-blockchain-overtaking-bitcoin

Features Tackling The Big Issues

Trust, Confidence and Security

There is an inherent element of trust when a secret vote is cast. The voter has to trust that their vote's chain of custody is unbroken from the moment they cast it to the moment results are published. Today, this trust must encompass many intermediaries: centralized, opaque data stores held by private enterprises; automatic or manual vote counters; volunteers, paid election officials, etc.

In the U.S., where electronic voting machines are prolific, it has been demonstrated that they can be compromised with relative ease. In 2005, it was shown that it was possible to hack into a Diebold voting machine to change tallies[8] in the time it takes to cast a vote[9], while in 2017 DefCon hackers broke into U.S. voting machines.[10] Whitehat hackers showed it was possible to alter individual votes, inject malicious code into election servers, and potentially exfiltrate voter's identities and ballots, in addition to documenting numerous electronic procedure contraventions by election officials during the 2013 Estonian elections.[11]

Blockchain technology provides us with web 3.0: a decentralized, democratized, and trustless means to deploy and consume services. This is possible largely due to the power of smart contracts, which Horizon State uses to deliver a medium for vote submission and collaborated decision-making processes. These processes are delivered in a way that eliminates the requirement for a trusted intermediary. Utilizing blockchain technology, we are able to store an irreversible and immutable record of votes. As a result, opportunities for vote tampering is reduced, and the chain of custody is protected.

Horizon State's use of blockchain technology addresses security of the vote, and indeed of broader kinds of participatory commitments. Because data stored on the blockchain itself is tamper-proof, once the voter has voted and checked that their vote was registered, there is no way to alter it. Where voter anonymity is a requirement, the system ensures that the voter's identity is not tied to the vote in any way that is meaningful to anyone other than the voter, who can check that their vote was entered and counted correctly.

Anonymized Voting - Real Implementation

The MVP used by MiVote entailed the separation of the voter profile from the vote itself, while ensuring that each user of the Horizon State system only had the opportunity to vote once. The votes, cast as transactions to Ethereum's public blockchain, contain no voter identity information. Their association to the voter is anonymized and hashed to ensure voters cannot double-vote, but still allows users to verify their own votes.

8. (2006, May 11). Major Vulnerability Found in Diebold Election Machines - Schneier on .... Retrieved September 3, 2017, from https://www.schneier.com/blog/archives/2006/05/election_machin_1.html
9. (2016, August 5). How to Hack an Election in 7 Minutes - POLITICO Magazine. Retrieved September 3, 2017, from http://www.politico.com/magazine/story/2016/08/2016-elections-russia-hack-how-to-hack-an-election-in-seven-minutes-214144
10. (2017, July 29). These Hackers Reveal How Easy It Is To Hack US Voting Machines. Retrieved September 3, 2017, from https://www.forbes.com/sites/thomasbrewster/2017/07/29/def-con-hacking-election-voting-machines/
11. (n.d.). Security Analysis of the Estonian Internet Voting ... - J. Alex Halderman. Retrieved September 3, 2017, from https://jhalderm.com/pub/papers/ivoting-ccs14.pdf

Unencumbered Access

The process of planning and executing geographically-centralized or postal votes for communities and nations is long - and infrequent as a result. On the other hand, the gathering of opinions and casting of votes by using modern content delivery systems, responsive web interfaces, and mobile apps, enables efficient setup and distribution models. Paired with blockchain, a robust solution finally exists for sensitive decision-making processes and secure vote submissions that need not be wedded to long and expensive methods of orchestration. There is no longer any reason that companies and governments cannot engage their constituents as frequently as is required for better collective outcomes.

Transparency

Traditional methods of voting do not provide much clarity into a constituent's vote, whether it has been accurately cast or actually counted. Our platform enables any individual to tally the number of votes and which way those votes went, while the voting process takes place. This record of votes can now exist in perpetuity, will and can be recounted with precisely the same number of votes and precisely the same outcome every time into the future for sake of posterity. Additionally, voters can independently verify that their vote was submitted and was tallied.

Cost

In a typical democratic system with various methods of vote solicitation (plebiscites, referendums, and elections), Horizon State's blockchain solution can reduce the cost of voting by at least a factor of 10. As a real-world example, Australia conducted a non-compulsory postal vote on September 12, 2017, costing taxpayers over $120 million dollars.[12] Considering the 15.7 million eligible and active voters in Australia, this equates to a cost of $7.70 per vote. Meanwhile the cost of a federal election has risen to $227 million, or $15 per vote.[13]

Horizon State's MVP blockchain voting solution fares significantly better when compared to traditional voting systems.

12. (2017, August 8). Government to spend at least $120m on postal plebiscite - ABC News .... Retrieved September 3, 2017, from http://www.abc.net.au/news/2017-08-08/government-to-spend-at-least-$120m-on-postal/8787384

13. (n.d.). Election could cost $227 million : Election Watch - Australia 2016. Retrieved September 3, 2017, from http://electionwatch.unimelb.edu.au/australia-2016/articles/2016-federal-election-to-cost-$227-million

3.0 A New World

The Continuum of Voting

Decisions are rarely binary in nature, but our current models often enforce binary choices. Horizon State's platform provides the flexibility for non-binary voting to accommodate the different needs of different platform users. The requirement for some decision-making processes will require votes that are split between two or more options, assigning weights proportional to the voter's feelings. Other user needs include the requirement to delegate votes to trusted proxies.

Horizon State caters to these scenarios, and others, aligning the vote process with the values and laws of the organization running a constituent engagement and collaborative decision-making process.

Democracy-as-a-Platform

Democracy and collaborative decision making have many flavors. Each country, institution, union or organization may have their own interpretation of democracy, and their own rules to exercise it. In Switzerland, for example, there are 26 Cantons, each with its own processes and regulations. There is no one democracy to rule them all. Around the world we see direct and representative democracies, presidential and parliamentary, authoritarian and participatory, equal and weighted votes - the list goes on.

Horizon State's mission is to enable democracy and participation that are in line with the various needs of different users. The platform is therefore not opinionated, and unlike other alternatives, does not try and shoehorn the different methods of practice into a single box. We have taken a different approach - one that provides the user with the tools to mold their own flavor of the decision-making processes.

Through Horizon State's platform and the capabilities inherent with the development of smart contracts used in the platform, a customer setting up their votes can configure the ways the vote works in an efficient way, using mostly a graphical interface.

Compliance and Regulatory Requirements

Different jurisdictions have different laws, compliance mechanisms, and regulatory requirements. Horizon State enables users to define a voting flow that adheres to their processes. With some types of public works, for example, the law requires notification of the issue to be debated, then a period of public submissions, followed by deliberation before a vote.

In cases like this, the user will be able to configure their campaign to align with this flow, and provide irrefutable proofs throughout the process to ensure that protocol was followed.

4.0 Market Opportunity

New users including political independents, and non-governmental organizations currently use the Horizon State platform. Each system user needs to obtain HST tokens to commit constituent votes to the blockchain.

While we have focused the production release on immediate and secure vote solicitation, our technology is applicable to many types of organizations and many forms of democratic processes. HST can be used for the running the voting process and for the broader purpose of collaborative decision making in many shapes and sizes. This includes vote and opinion solicitation, information delivery, and constituent deliberation.

Immediate Relevance

Our platform tackles the big issues discussed today: lack of security and confidence in the process and system, lack of transparency, and high cost of running voting processes.

Some examples where Horizon State platform can be utilized to offer game changing value proposition:

Scenario	Issue	Recent Examples
Federal Elections[14 15]	High cost per person/vote	The cost of federal elections in Australia has risen to $227 million, or $15 per vote. This will expand beyond $300 million by 2021.
Census[16]	High cost per person/vote	2011 budget allocation per country, • New Zealand - $90,332,087 @ $20.41 per person • Canada - $630,373,000 @ $18.25 per person • United Kingdom - £482,100,000 @ £8.66 per person
Election Integrity	Security, confidence and trust	Allegations of election authority's system being hacked to manipulate the elections results in Kenya[17]

14. (n.d.). Election could cost $227 million : Election Watch - Australia 2016. Retrieved September 3, 2017, from http://electionwatch.unimelb.edu.au/australia-2016/articles/2016-federal-election-to-cost-$227-million

15. (2017, August 31). Australian Marriage Equality Vote: Everything You Need To Know .... Retrieved September 3, 2017, from https://www.lifehacker.com.au/2017/08/australian-same-sex-marriage-vote-everything-you-need-to-know/

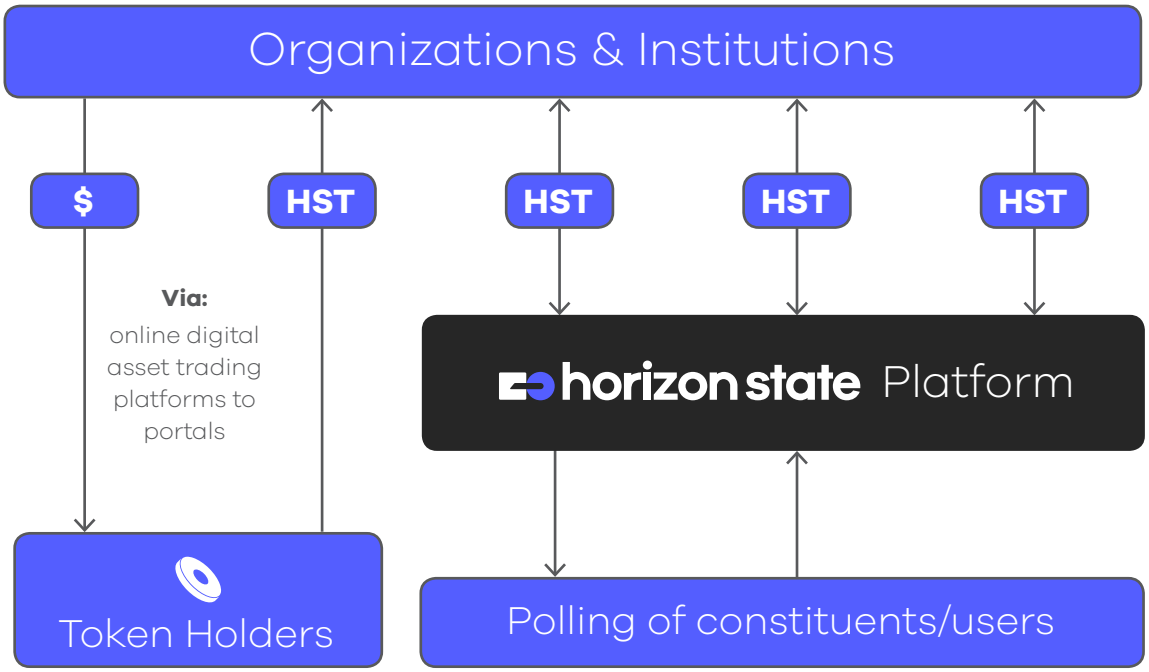
16. (2009, October 27). 25_ECE rev - UNSD - the United Nations. Retrieved September 3, 2017, from http://unstats.un.org/unsd/censuskb20/Attachment459.aspx?AttachmentType=1

17. (2017, August 10). Kenya election system was hacked, Raila Odinga alleges - CNN. Retrieved September 3, 2017, from http://www.cnn.com/2017/08/09/africa/kenya-election/index.html

Horizon State has developed a technology solution to offer the next-generation platform for data collection systems (Census) and election systems at a lower cost per vote.

Given the cost increase and latest system reliability issues related to the recent Australian census,[18] the Australian government is considering moving to a census once every 10 years.

Horizon State represents cost savings, improved data, and vote collection efficiency, allowing countries to run a census multiple times a year instead of once every 5-10 years, for a fraction of the costs. Moreover, censuses can be run in parts, across specific slices of the population, and many other variations that may improve quality of data, participation, and results.



18. (2016, August 14). Census 2016: A case study in the confluence of failure | ZDNet. Retrieved September 3, 2017, from http://www.zdnet.com/article/census-2016-a-case-study-in-the-confluence-of-failure/

Token Use

Horizon State has engaged governments, large corporations, blue-chip customers, local councils, unions, education facilities, and non-profit organizations to educate them on how to use Decision Tokens on the Horizon State platform.

The cost of federal elections in Australia has risen to $227 million, or $15 per vote.[19] Our analysis of the economic benefits expect Horizon State's blockchain solution to be 10-15 times cheaper per vote.

Horizon State's low cost-per-vote enables users to run a higher number of votes with same or similar budget. This exemplifies the benefit of using HST tokens for voting on the blockchain.

Mechanisms of Supply & Demand

The Decision Tokens are a finite resource - the total amount of tokens ever in existence determined will be a maximum of 48 Million.

HST is used throughout the Horizon State ecosystem to purchase services, such as the casting of votes.

The platform provides users with the ability to white label the Horizon State app, to new module creation.

19. (n.d.). Election could cost $227 million : Election Watch - Australia 2016. Retrieved September 3, 2017, from http://electionwatch.unimelb.edu.au/australia-2016/articles/2016-federal-election-to-cost-$227-million

5.0 Towards Brighter Horizons

The internet heralded a new era of opportunity for the evolution of our engagement, decision making, and democratic tools and processes. Yet, with twenty years of internet technology iteration, a system for internet- based voting that is secure, engaging, and cost-effective has not been possible.

Until now.

Our technology is the first to enable the recording of votes to a digital ballot box for a customer with a public and national membership. DLT now positions organizations and governments to conduct decentralized voting processes that are not only more secure than prior internet voting solutions, paper ballots, and electronic voting machines, but with vastly improved voting metrics as well.

Blockchain plays a critical role in solving the problems that exist with traditional systems: security, immediacy, transparency, and cost. More than that, our technology shifts the constituent engagement paradigm, making the best use of evolving democratic methods and technologies for access.

Horizon State's vision has revolutionized methods for our democratic processes. This includes broadening discussions, promoting engagement, widening access, improving efficiency, and reducing associated costs.

In that light, the platform exists to allow users to devise and design opinion solicitation and voting mechanisms; authentication and eligibility systems; education mediums; and information delivery systems - all inspired by the blockchain technology empowering them to be distributed, unforgeable, and incorruptible.

Real World Use: Our MVP

Achievements

On **August 2016**, Horizon State's team commenced development of the first commercial blockchain voting product.

On **February 10 2017**, Horizon State technology was publicly launched for Australia's MiVote. Their national membership began participating in the decision making process on matters that affect the nation.

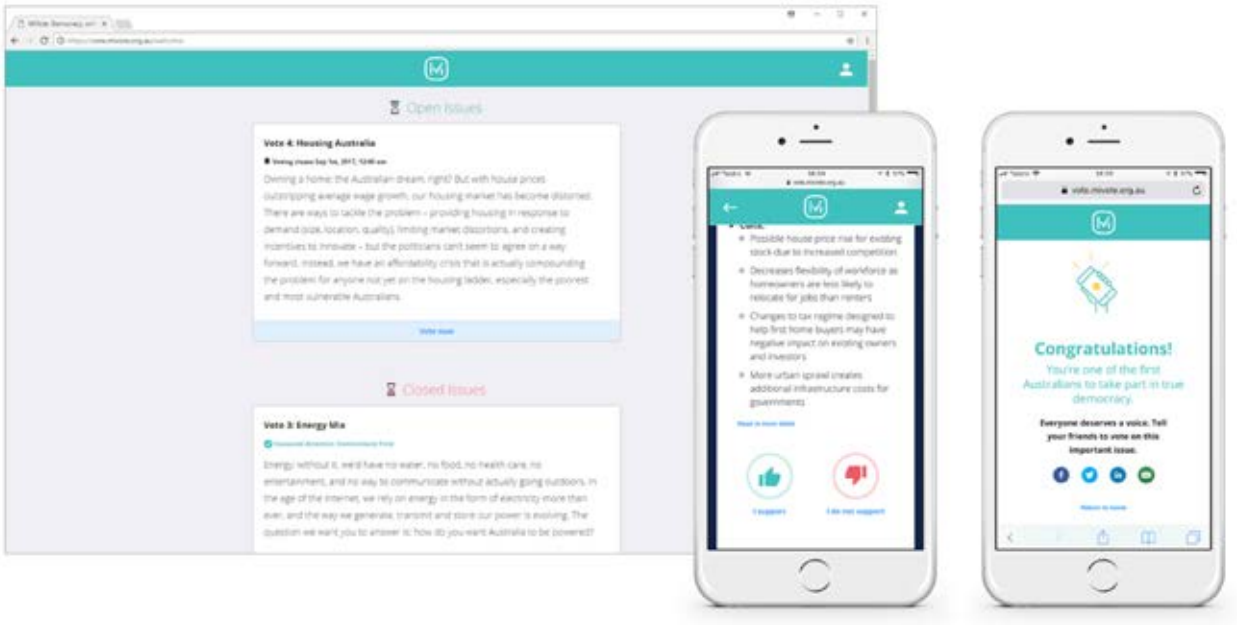
On **March 2017**, distributed ledger voting was enabled. MiVote's second and subsequent campaigns have seen constituent votes cast to the Ethereum public blockchain. The MiVote movement has now run 3 blockchain-enabled, nationally-inclusive polls.

MiVote is currently expanding their movement and different organizations will have different ways of identifying their eligible voters. For votes that relate

to national politics, users will be checked against the Electoral Role. For private organizations, eligibility may be defined by granting access to specific individuals or common domains.

Casting Votes

User votes are cast to the Ethereum public blockchain. Fees are paid for the processing and verification of votes, which take the form of transactions.



Pictured: Horizon State blockchain voting technology in use

Voter Access

The first release of our product was designed specifically for MiVote's needs. The user experience of casting votes as it exists today for non-parliamentary matters aims to achieve frictionless access and broad inclusivity. All Australian residents are permitted to participate. Access to voting entails sending a one-time access code to a unique Australian mobile number, and it is sent with a relationship to a campaign ID, but without identifiable relationship to the voter.

The system requires no knowledge or understanding of blockchain technology to participate. The fees are paid by organizations and institutions who wish to facilitate these activities, and end users interact using a mobile web app - a product similar to experiences they are already familiar with.

Engagement Process

Being a B2B company, initial engagement with a new customer normally happens with high level engagement with either the Co-Founders or our business development team. At this stage everything is bespoke, so the team will scope out requirements and have discussions about what is possible to determine the best way to satisfy their needs.

Internally, we would then take into consideration their throughput requirements, security needs, local circumstances and product customization levels to get an idea on how much it would cost to implement for them. We would then return to the customer and give them a proposal on how the engagement would work and the cost to them in their local currency. If they are happy to proceed, we would take the fee and first purchase HST on their behalf – the HST token being our ecosystem's currency and required for any Horizon State services. Then we would process it according to our token's mechanics – 82% going to the company for the cost of providing the service, 8% is locked forever in a smart contract, 5% for charity and 5% for infrastructure purposes.

Once the product is ready, we would provision it to the customer and they would use it as per their requirements – with the final votes being recorded in the blockchain.

6.0 Team

Executive Team

Jamie Skella

Formerly Director of UX at Tatts Group and the Australian Football League. Jamie devised and directed development of MiVote's blockchain voting MVP.

linkedin.com/in/jamieskella/

Nimo Naamani

Formerly Chief Technology Officer at iPayroll. Entrepreneur and software developer with 20 years of experience building products.

linkedin.com/in/nimonaamani/

Oren Alazraki

20 years of leadership and executive experience in the IT sector, including a number of General Management roles, most recently at Datacom.

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A historic change in our democratic processes has arrived.

horizon state

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