



# votem

voting for a mobile world

## **Introducing the VAST Token**

Enabling citizens around the world to easily vote online with a level of verifiability, accessibility, security, and transparency that does not exist today.

# VAST Token Summary

The VAST Token and related CastIron Platform enables citizens, organizations, and governments around the world to easily manage or participate in online voting with the highest possible level of verifiability, accessibility, security, and transparency. The VAST Token and related Platform improves the efficacy of voting by ensuring the integrity of the voting process, the confidentiality of the voters' choices, and validity of the results - for both private and public-sector elections.

## VAST Token

The VAST Token is an EIP-20 compliant digital token issued by Votem Corp. and is named after the four critical elements of a voting system (Verifiability, Accessibility, Security, Transparency). These tokens will allow an individual or organization secure access to the CastIron platform and its features to successfully operate elections and ancillary activities.

## CastIron Platform

Our mobile voting platform, CastIron™, provides the application functionality for running elections. It combines advanced mobile capabilities and a private blockchain

framework, with public sidechains for additional verification, using voter anonymizing technological schemas and mathematical proofs of verifiability, all enabled by VAST Tokens.

## Proof of Vote - End-to-End Verifiable (E2E-VIV) Voting Protocol

Votem's Proof of Vote public protocol aims to provide irrefutable evidence of the result of a valid vote that was cast and tallied as intended and substantiated by user and third party validation for the benefit of both the voter and the elections administrative body and their interested parties.

More information on the VAST Token Sale can be obtained at [www.votem.io](http://www.votem.io)



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# A Crisis of Trust

*“Watching so many brave citizens literally risk their lives to exercise their voting rights made a powerful impression on me. I also had the opportunity to live in Cambodia, where corruption is rampant and real political transparency is non-existent...Having witnessed firsthand the challenges that places like Cambodia and Iraq pose to a transparent political and election process, I understand the value proposition of Votem’s blockchain-based mobile voting platform.”*

- US Army officer, reflecting on his experience serving abroad.

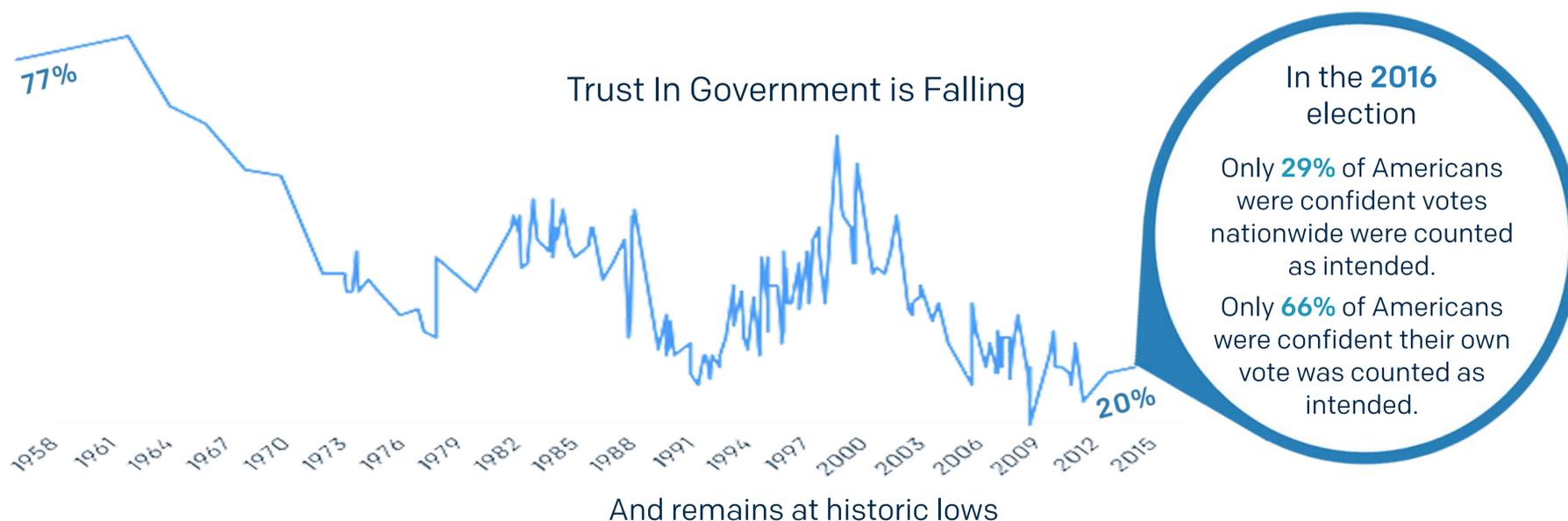
## Despite the proliferation of neutral election observers

and the advancement of certain voting technologies, there is still no globally accepted way to verify electronic voting as 100% accurate. This has significant ramifications for both public and private elections of all kinds, ranging from union or school board elections to civic contests that determine the direction of a nation. On the public side alone, 2017 has borne witness to some of the worst democratic crises of the 21st century. In Venezuela, the President has [claimed victory in a “sham” election](#) announcing election results that were different than the actual tally. In an unprecedented move, the elections company that provided the machines for the election publicly stated that the announced results were not the true results calculated by the machines. Meanwhile, in Kenya, improper reporting in the country’s Presidential election forced their [Supreme Court to completely annul the results](#) and call for an entirely new contest. In both countries, an authority’s inability to verify election results has led to massive protests and even violence.

Voter trust is fundamental to a sound democratic process and, without it, election results have little to no value to those participating. All too often, like in the cases of Venezuela and Kenya, these institutions and individuals have proven to be untrustworthy. As a result, voter confidence in the democratic process is plummeting, which presents a tremendous civic problem.

**A process that is independently and easily verifiable, by elections management bodies and individually by each voter, is the only true solution to push democratic decision-making towards greater dependability, accuracy, and accountability.**

At Votem, we have dedicated ourselves to creating a remote electronic voting system, engineered from the ground up, to exceed the safeguards and verifiability of in-person, paper-based elections. Only with this kind of system can online voting adoption accelerate in the face of hacking and privacy concerns.



Survey Conducted Aug. 27-Oct 4, 2015. Trend Sources: Pew Research Center, National Elections Studies, Gallup, ABC, Washington Post, NY Times, CNN Polls  
Massachusetts Institute of Technology - Department of Political Science, 2016 Survey of the Performance of American Elections

# Global Market Challenges

Mobile transactions are long past the point of global adoption. With nearly 2 billion smartphones in use worldwide, a significant and growing portion of banking, payments, shopping, and even filing taxes, takes place digitally. But voting remains stubbornly stuck in the past - dependent on a combination of paper, human assistance, and non-networked hardware. This is not for a lack of effort nor investment. Dozens of companies and entrepreneurs have tried to introduce online voting over the past decade, but the number of online votes cast is paltry compared to traditional votes cast using traditional methods.

The barriers to mass adoption of online voting include the following:

## Elections are a mission-critical process

With a high penalty for failure, few election-management bodies want to take any risks or try new approaches, including new technologies. In voting, the integrity of the process is inseparable from the result - so any concerns about process inevitably cause hesitations for election management bodies, given that their function is dependent on being seen as running a fair, transparent, and reliable system.

## Elections are complex

Setting up and running a statutory election is significantly more complex than most people think and goes far beyond the basic "one person, one vote" idea at the core of most elections. For instance, in just [one election in one county](#) in the US., \$42.51mm was spent supporting 4,988 precincts, 4,523 polling places, 306 candidates, 142 offices, 58 local measures, 2 county measures, 17 state measures, and 607 ballot groups. That means the voting platform needs to be able to deliver the precise ballot to each authenticated voter based on their precinct, tabulate the results in the right methodology, and report the results accurately.

## Elections are highly regulated

In every city, county, state, and country, public elections are governed by a patchwork of legislation that define simple processes from voter identification to how, when, and where elections can be operated. The same is true even for private organizations such as large associations and labor unions.

## Elections are devoid of global standards

Because elections are "local" to a particular jurisdiction, no true global standards for voting exist. This is one of the primary reasons why there is no large truly global player in the market; it's too difficult to accommodate all of the unique country and local requirements with a single global platform.

In an effort to overcome these obstacles to greater adoption of online voting, Votem's business strategy, in concert with its technical approach is to build a global community of interested parties in acquiring and using our Tokens and to leverage and extend the CastIron Platform.

# Platform Design Goals - V.A.S.T.

There are four critical elements of a voting system, electronic or otherwise, that must be in place in order to ensure a fair and free election that engenders trust in voters - Verifiability, Accessibility, Security, and Transparency. These goals are consistent with the U.S. Voluntary Voting System Guidelines (VVSG) and the European Union's Committee of Experts on Legal, Operational and Technical Standards for e-voting (CAHVE) CM/Rec(2017)5.



## Verifiability

Through a combination of digital receipts and public bulletins, sufficient verification data is published such that voters can ensure that their vote was irrefutably cast as intended, subsequently counted as cast, that no ballots were lost or modified, and that votes were properly counted, all without sacrificing voter anonymity. This notion of End-to-End Verifiability (E2E-VIV), when coupled with blockchain, creates an irrefutable digital chain of custody providing cryptographic proof that electoral integrity was preserved and counts are correct. In short, with the appropriate application of blockchain technology, you do not have to blindly trust in a blackbox process where votes are counted out of sight and hope for accuracy. You can instantly verify it.



## Accessibility

The [U.S. Census Bureau](#) surveyed [47,593,000 Americans](#) on why they did not vote in 2014 and 53% of respondents stated their "inability to make it to the polls" as the primary reason. Several other national surveys, including [one we conducted in the summer of 2016](#), were consistent with these results. Votem is guided by the dynamics of the voting public we serve including seniors whose needs include accessibility and readability of materials; people with disabilities who have a reasonable expectation of fair and respectful service that enables a private, independent, and secure voting experience; busy professionals who seek options for voting that match their mobile lifestyles;

citizens with an array of cultural and ethnic backgrounds who depend on language accessibility and voter assistance; ...and future voters whose needs may include things not yet considered.



## Security

Security is arguably the greatest risk for any elections system. It represents the integrity of the vote, the confidentiality of the voters' choices, and the sanctity of the most fundamentally democratic basis for decision making. Allegations of hacking rocked the 2016 U.S. Presidential Election and persist with increased fears of tampering by foreign state actors. Votem's Platform guarantees that [Cast Vote Records](#) are completely immune to alteration.



## Transparency

It is not enough that our platform correctly tallies votes such that the correctness of the election can be publicly verified; by bringing elections online the standard for transparency is also raised. A global community, from cryptography experts to certification bodies to the general public, will externally vet, scrutinize, strengthen, and ultimately leverage our protocol and documentation. Transparency extends beyond the elections process itself as a core tenet of Votem's work; this is truly a commitment to open and auditable software, platforms and processes, not just transparency as verifiable elections.

# Votem's Comprehensive Solution

Votem positions itself between the tech-savvy blockchain entrepreneurs who don't understand the intricacies of running elections and the traditional election systems manufacturers who rely heavily on traditional voting methods. Our approach is rooted in a deep understanding of both voter behavior and the demands of election officials and legislators.

There are 4 (four) key components of our solution, which VAST Token Holders get to take advantage of, which includes the following:

CastIron Platform - **Application**

## CastIron Mobile Voting Platform

This is the application layer that provides the Election Management System (EMS) and related functionality to support online elections.

Proof of Vote - **Protocol**

## "Proof of Vote" Protocol

This openly vetted protocol provides the detailed method for conducting end-to-end verifiable elections using distributed ledger technology.

VAST Token - **Access**

## VAST Token

The Token provides role-based access to the CastIron software platform.

Public  
Sidechains

Private  
Blockchain

Trusted  
Nodes

## Blockchain

Our protocol and application run on a private blockchain framework, with public sidechains for additional verification, creating auditable vote records that can be validated in real time.

*"Votem is far and above the competition in terms of creating a trusted blockchain voting solution. We think that within a few elections, some precincts will be calculating votes on systems built by Votem and her competitors, and that recording property transactions into blockchains will be commonplace within the century."*

– P.H. Madore, Cryptocoinsnews:

# CastIron™ Mobile Voting Platform

## 100% Verifiable



Political parties, advocacy groups, and election watchdog orgs independently validate votes, and voters can confirm their votes were correctly counted, ensuring trust and preventing election corruption.

## Fault-Tolerant



Cast vote records are stored across a distributed network, creating a fault-tolerant system resistant to tampering and machine failure so that elections can be up and running 100% of the allotted time.

## Unalterable



Election data is stored immutably and more strongly reinforced with every vote cast, enabling secure elections free from fear of hacking and vote manipulation.

## Auditable



Cast vote records are validated in real time and create an irreversible real-time audit log providing multiple levels of auditability.

## CastIron™ Mobile Voting Platform

The CastIron mobile voting platform is the blockchain-based election management system (EMS) that provides the application functionality for running elections. Access to CastIron is secured through a VAST Token which unlocks various features of the Platform.

CastIron was designed to be a single functional application platform that can handle the variety of ballot styles and tallying methods globally with support for multi-language and local jurisdictional support. Its extensibility allows for VAST Token holders to extend the Platform for languages, local laws, etc. as part of the Votem community and ecosystem.

The Platform implements the Proof of Vote Protocol using

- (a) private / public distributed ledger framework
- (b) voter anonymizing technological schemas
- (c) advanced mobile technology.

It is Votem's intent to secure the appropriate U.S. and international elections certification standards allowing the VAST community to realize the benefits of leveraging a fully-compliant voting platform. Details of the CastIron components are further explained in the following sections.

## CastIron Platform Consists of:

### (a) Blockchain Platform

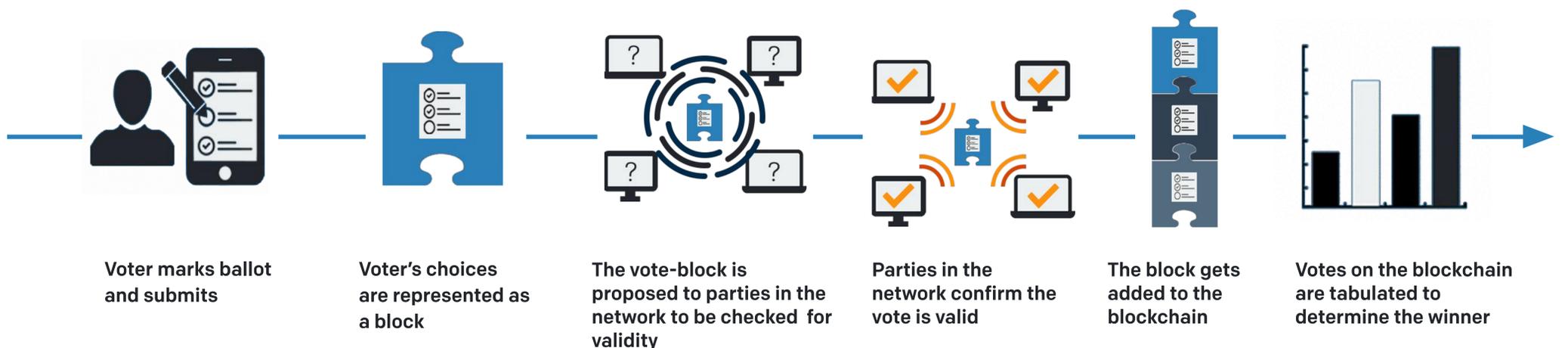
According to a [recent report](#) from Technology Analyst firm, Gartner, the long-term "winning" blockchain platform hasn't been introduced yet, and there are pro's and con's to all of the existing blockchain platforms including Ethereum and HyperLedger. Consequently, our blockchain framework approach is rooted in pragmatism.

Our current blockchain leverages the [Tendermint framework](#). However, voting systems have stringent performance, cost, scale, and privacy requirements, and existing blockchain platforms do not provide strong guarantees along any of these dimensions. Consequently, we will adopt a unique, hybrid blockchain architecture.

Our architecture will be designed to provide us with the flexibility required to accommodate a large spectrum of user needs. The base layer of this architecture is based on a public blockchain, currently targeting Ethereum, which serves as the substrate on which our utility tokens are issued and used to initiate elections. This enables CastIron to tap into the existing frameworks for managing utility tokens, as well as the vast ecosystem that has been built around EIP-20 (ERC-20) tokens.

# CastIron™ Mobile Voting Platform

## Voting on the Blockchain



The flexibility of the architecture stems from how the voting process itself takes place, either directly on-chain or off-chain, depending on the requirements of a given election. At the discretion of the voting authority, elections can be held directly on the underlying public blockchain if the scale and cost metrics suit the application needs. The use of the recent zkSNARK primitive in Ethereum will provide us with the basic building blocks for certain privacy guarantees.

We plan to handle election scenarios with demanding requirements by coupling a private blockchain onto the base layer. In such applications, every election is initiated on the public blockchain, and creates an initial branchpoint, a genesis block, for a corresponding, dedicated private blockchain. The maintenance of this private blockchain can then be performed in full compliance with the election authority's requirements, no matter how complex they may be. The vote tallies are then posted back onto the public blockchain at the conclusion of the election. The resulting private blockchain can be made public if desired.

### (b) Voter Anonymizing Schemas

In order to conduct fair elections free from fear of tampering or voter-coercion, ballots must be protected from inspection by untrusted parties and voter anonymity must be ensured. To make these protections the bedrock of our mobile voting platform, Votem is developing an end-to-end voting protocol (see our Protocol Paper, to be published) fundamentally leveraging encryption schemes like ElGamal, threshold encryption, and mixnet technologies.

Votem is going above and beyond currently developed anonymization schemes in order to make our protocol flexible in its ability to handle the complex requirements of elections, incorporating write-ins, efficient tallying, and universal verifiability.

*"Votem has made important milestones in creating a trusted blockchain voting system."*

- Angela Scott-Briggs,  
TechBullion

# CastIron™ Mobile Voting Platform

*"Blockchain based voting systems would be essentially as cheating proof as you can create a system."*

*- Naval Ravikant, Founder & Executive chairman of  
AngelList and partner of MetaStable Capital*

## (c) Advanced Mobile Technology

Votem is developing native applications and a desktop experience that enable people to vote from any device anywhere. One of Votem's current mobile applications was used in the 2016 U.S. Presidential Election by Washington DC's Board of Elections. The app supported more than 400,000 registered voters and was easily downloadable from the iOS and Android app stores.

In fact, in late 2016, our application was evaluated by the U.S. Department of Homeland Security (DHS) and no security vulnerabilities were found. Votem is currently a member of the U.S. Department of Homeland Security Election Infrastructure Subsector Coordinating Council which is a collaborative effort across all voting systems vendors and government agencies to coordinate Election Infrastructure Subsector Coordinating Council efforts around any attacks on U.S. elections infrastructure.

We developed our protocol with the assumption that both mobile devices and desktop browsers contain viruses, malware and other compromising software. The sanctity of the cast vote record is paramount so we've work hard to develop a solution that addresses this significant risk. Our Proof of Vote Protocol White Paper, summarized in the following section, describes the technology used on the end-points for ensuring the accuracy of a cast ballot.



## International Compliance & Certification

We want to make our Platform as broadly available as possible so it's crucial that our platform meets the U.S. Election Assistance Commission's (EAC) latest security and voting system requirements (VVSG 2.0) because without this certification, or the similar standards internationally, we cannot legally sell and subsequently implement our voting platform into the overwhelming majority of the cities, counties, and states in the U.S. and Canada. These jurisdictions have very strict standards for system functionality, software, hardware, security, telecommunications, accessibility, and quality. Votem is a registered vendor with the Elections Assistance Commission which authors the referenced Voluntary Voting Systems Guidelines (VVSG). In addition, we can take a global leadership position by certifying our system to the recently published European Union's standard known as the Committee of Experts on Legal, Operational and Technical Standards for e-voting (CAHVE) CM/Rec(2017)5 and Votem would be the only voting systems vendor to hold both certifications.

These standards are some of the most rigorous voting system requirements in the world and acquiring certification for an end-to-end voting system like ours in the U.S. can take from 9 months to many years and cost upwards of millions of dollars. Votem is already a registered vendor with the Elections Assistance Commission and our certification efforts are underway. Our efforts to certify the CastIron platform will put us in a position to provide VAST token holders with a Platform that is compliant with these legal standards.

# Proof of Vote Protocol

*“My husband is active duty so I live across the country, and I am also pregnant and due on election day so it was very helpful to be able to vote online [on Votem’s platform]! Otherwise I likely would not have been able to vote.”*

- Montana Voter

## End-to-End Verifiable Voting Protocol

Votem’s Proof of Vote public protocol, under development for early release in January 2018, aims to serve as a blueprint for VAST enabled voting applications like CastIron that embody the underlying guiding principle of verifiability, accessibility, security, and transparency. It will detail distributed key generation and management, mixed network shuffling, zero knowledge proof implementations and how all of these and other technologies fit together in the context of a cryptographically sound and verifiable voting schema.

We believe that any protocol we design for elections must earn complete trust from the elections community, voters, candidates, and administrators alike. To ensure the utmost confidence in elections, we are developing the following verifiable proofs of the critical steps for our voting protocol, which will allow independent validators and voters to verify the outcome and security of elections run on VAST enabled voting applications.

**Proof Of Valid Origin** - verify and validate the origin of the ballot to ensure compliance with regulations.

**Proof Of Valid Voter** - verify and validate that the voter was valid and authenticated.

**Proof of Valid Ballot** - verify and validate the contents of the ballot (Cast Vote Record) itself are cast as intended.

**Proof of Valid Vote** - verify using a signed ballot fingerprint, that the ballot has not been tampered with and it is contained in a valid ballot style.

**Proof of Mixing** - verify and validate that the proper steps have been taken to preserve voter anonymity.

**Proof of Valid Tally** - verify and validate that the Cast Vote Record was counted as cast.

**More information on our protocol and proofs can be found in our [Protocol Paper](#) under development for release in early 2018.**

# The VAST Token



## Run Fully Verifiable and Secure Elections

The VAST Token is an EIP-20 (formerly ERC-20) compliant digital token issued by Votem Corp and is named after the four critical elements of a voting system (Verifiability, Accessibility, Security, Transparency). The VAST Token, akin to a perpetual software license, is designed to improve the efficacy of voting events for both private and public elections by allowing an individual or organization secure access to the CastIron platform and its features to successfully operate elections.

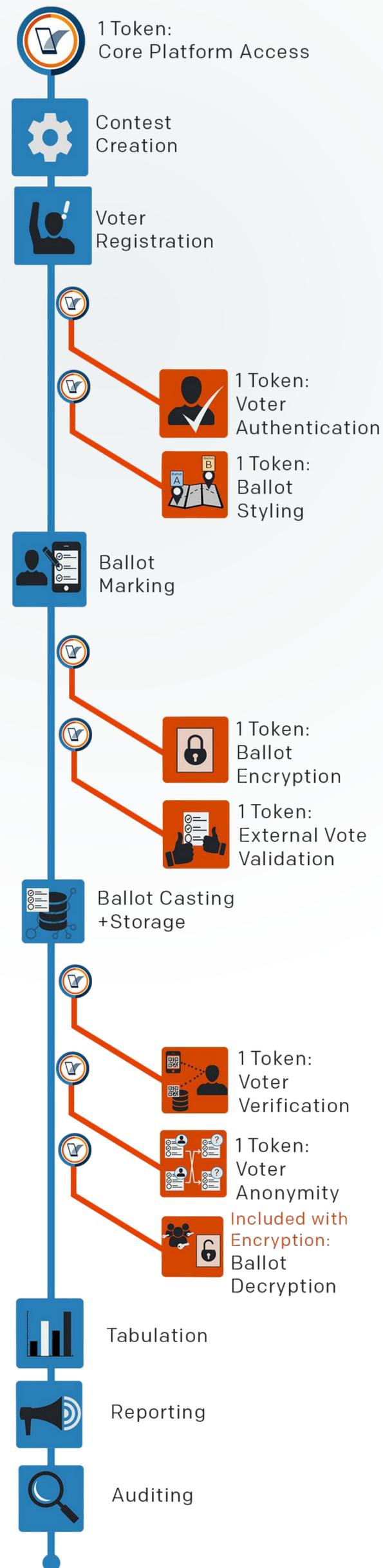
The number of tokens required will be defined by the number of potential voters as well as the verifiability and security features needed. Once tokens are purchased, they can be used for any number of elections, but only for one election at a time. VAST Tokens will support a range of validation requirements and role-based functionality for different elections as not all elections require the same levels of technical complexity nor human validation as others.

## VAST Token Standard Functionality

Upon launch of the Platform and subsequent Token Distribution Event, VAST Tokens will provide access and operate on the "CastIron" blockchain based mobile voting platform. The baseline functionality of the Votem platform, casting and storing votes on the blockchain, will require at least 1 (one) VAST Token per ballot to be processed.

The VAST Token will provide secure and role-based access to the following standard features on the VAST Platform (shown in blue to the right):

- Contest (Election) Creation & Set-Up
- Voter Registration
- Simple Ballot Creation & Marking
- Ballot Submission/Validation/Storage
- Tallying and Results Reporting (with Audit Capabilities)



# VAST Token Functionality

## VAST Token Standard Functionality



### Contest Creation

Election setup is often the most logistically complicated process of an election. Election Management Bodies (EMBs) can use CastIron's election management system to easily establish election definitions with all of the supporting functionality for ballot design and logic (majority wins, ranked choice etc.).



### Voter Registration

Voters register to participate in the election. The type of registration process is determined by the EMB and can be automatic or manual.



### Ballot Marking

Voters can mark their ballots on the device of their choosing. Ballots will be equipped with all the necessary accessibility features to enable all voters, regardless of disability or access to a polling place, to vote.



### Ballot Casting + Storage

A Cast Vote Record is created from the ballot and is securely transmitted and stored on the blockchain voting server which serves as an immutable digital audit trail and record of cast votes.



### Tabulation

Votes are counted according to the requirements for the election. In US elections, they are sent to a separate server for counting, while in other elections anyone could tabulate results.



### Reporting

The results are passed to a number of reporting sites for public release and certification.



### Auditing

EMB or independent third-party auditors can administer Risk Limiting Audits, system audits, and any other regulatory mandated assessment for the election. The blockchain is an immutable record of cast-votes over the course of the election and serves as an audit trail that is accessible to authorized EMBs and Election Validators for certification of results.

## Platform Functionality



### Voter Authentication

Voters are authenticated against the election's legal requirements in order to participate. Biometric, eID, and external authentications (such as against voter registration rolls or the Dept. of Motor Vehicles) are all supported.



### Ballot Styling

The correct ballot is delivered to the voter based on the thousands of potential combinations of national, state, regional, district, county, and city contests.



### Ballot Encryption

The ballot is encrypted before submission, preventing parties from accessing and viewing a voter's choices without authorization.



### External Vote Validation

External validators, like observation organizations and audit firms, may certify the validity of the ballots (i.e. come from valid voter, location, etc.) before they are stored on the blockchain.



### Voter Verification

The voter matches a secure QR-code receipt of their vote to the QR-code representation of the recorded ballot, verifying their vote was recorded as cast. The QR receipt that the voter receives will include no useful information about the voter's selections, only that the ballot was stored, preventing cases of vote-selling or voter-coercion.



### Voter Anonymity

Cast Vote Records are mixed to ensure that it is impossible to trace a voter's selections back to the individual voter. A mathematical proof of mixing is made available.



### Ballot Decryption

Votes can only be decrypted by a preset number of EMB members to prevent dishonest members from decrypting ballots. Once the votes have been properly decrypted, a mathematical proof of decryption is offered to auditors and voters.

# VAST Planned Voting Ecosystem

**We are working to create a community of ambassadors to help establish the Proof of Vote Protocol and CastIron Platform as global standards for how votes are cast and tallied. Our community development efforts are focused on identifying, vetting, and securing ecosystem partners by demonstrating the value for ecosystem participants and through proper incentives rewarded through VAST, in the following categories:**

## Independent Third-Party Verification

We are currently working with several professional organizations that audit, monitor, and oversee elections. These trustworthy organizations include the likes of [Democracy International](#), International Federation of Electoral Systems (IFES), and the [Carter Center for Democracy](#). In addition, there are many stakeholder organizations that play a pivotal role in certifying elections like the U.S. Department of Labor for labor unions and accounting firms like those used for the Emmys and Oscars. We will provide these organizations with access to the Tokens, systems, and support to enable and broaden their role in monitoring fair and free elections.

## Voter Identification & Authenticators

Voter identification laws vary widely by jurisdiction and we will work actively with organizations that provide robust general individual authentication services, such as [Civic](#), and other voter registration vendors in use by election management bodies.

## Independent Blockchain Platforms

A critical feature of our planned protocol will be engineering it to work seamlessly with other blockchain platforms as they mature. We'll need to interoperate with other voting protocols and blockchain frameworks in jurisdictions that may have built their own platform, such as those emerging in [South Korea](#), [Ukraine](#), and the [U.A.E.](#)

## Third-Party Election Systems Companies

Solutions have been crafted and acquired over decades leading to very few jurisdictions that have one single vendor that provides all of the services for conducting each election. We recognize that these systems have long lifespans and therefore we are actively working with key election vendors to ensure interoperability with their technologies, from ballot-on-demand printers to tabulators.

## Local Distributors/Agents

Because of the difference in local elections processes and laws around the world, we want to incent users around the world to both use the platform to support elections as a business and extend the platform for languages, laws, election procedures, etc., so a big part of our community development efforts revolve around supporting those individuals and organizations who leverage the CastIron Platform and VAST Tokens for running elections in their jurisdictions.

## Blockchain Governance

Out of the thousands of existing blockchain projects, the most successful are those with a strong system of governance. While mechanisms for change can vary drastically from one organization to another, at the core of any sound governance system should lie a voting mechanism that is verifiable, accessible, secure, and transparent. We will work to partner with any blockchain organization seeking to improve their accountability in governance through implementation of Votem's Proof of Vote Protocol as the basis for collective decision-making.

## Independent VAST Enabled Applications

While CastIron is Votem's specific implementation of the Proof of Vote Protocol to build the network of VAST users, there are many other potential applications to be built on top of this VAST enabled Protocol - alternative voting mechanisms, tallying methods, polling, liquid democratic applications, market research, and proxy voting just to name a few. Our goal is to create an ecosystem through tokenization of the Proof of Vote protocol that allows independent developers to build applications on top of the Platform and further build out the VAST ecosystem. Specifically, we seek to provide the infrastructure and token incentives for said developers to create VAST tokenized applications without limitation.

# VAST Planned Voting Ecosystem

**Successful decentralized network models like Ethereum offer an unprecedented ability to align participants' economic incentives, incent early adoption, and allow for community ownership. With viable token-enabled applications and sound incentives, these networks flip old-model network effects around where participant value is realized upon reaching a critical mass of users.**

**In laying the foundation** for a community-driven and managed blockchain-based voting Platform, Votem will seed ecosystem partners such as third-party election validators and Platform development partners with an initial supply of VAST token supply to motivate early participation on the CastIron Platform. As CastIron matures and flourishes, with many voting events that demonstrate its value to participants, we hope this seeding process will serve as a model for adoption by additional ecosystem partners.

We will provide the infrastructure and will reward Platform Partner developers that enhance the Platform for additional languages, jurisdictional rules, and localization to make the Platform more broadly usable globally or create VAST compatible applications. Like CastIron, any additional platforms integrating with the VAST Ecosystem will use VAST as the primary decentralized mechanism and ensure that participants in these applications and environments are rewarded for their participation.

Furthermore, in an effort to incentivize VAST utilization over time, we are considering distributing additional tokens on a pro-rata basis for operating more elections. For instance, for organizations that successfully run an election, internally or externally, we may contribute 1 token from our reserves for every 5 tokens they used in live voting situations. The VAST Community will collectively work through similar strategies over time but our focus is to maximize the utility value of the Tokens and expand the Platform globally.

**Support for the broadest base of users:** In order to support all of the different roles VAST Token holders may take, Votem will nurture a community to support the efforts of owner-operators to run effective voting events, the sales and marketing efforts of Platform Partners (resellers and value-add developers),

and the growth of the Token into a standard global protocol and platform. For any CastIron implementations, Votem will offer consulting and implementation services to assist in election definition, voter registration management, election administration, reporting, and any other required services.

**Users, Governments, and other Election Administrators unfamiliar with blockchain must still be able to spur demand for VAST:** We recognize that governments and institutional organizations may not be familiar with blockchain nor have the ability to procure election systems through token assets like VAST. To reconcile these "off-Platform" transactions with the VAST ecosystem and to ultimately support and strengthen the VAST ecosystem, Votem will create a programmatic mechanism to acquire the equivalent fiat contract value of VAST tokens on the open market. This mechanism further aligns the demand for the CastIron Platform and Proof of Vote Protocol Implementations with the value of VAST Tokens. Similarly, many of these organizations may need help in administering their elections. Consequently, Votem will always offer ancillary services and hardware leveraging the CastIron Platform and will make them available to VAST Token holders as well.

**VAST & CastIron:** The number of Tokens required within CastIron depends on the complexity of the election, what features are required, the number of expected ballots cast and how many elections they want to run over time.

# VAST Token Economics

$$\text{VAST Required} = \text{fn}(\text{Expected}(\# \text{ of ballots cast}) * \text{Complexity}(\text{Election}))$$

*\*Where complexity is related to the validation features per ballot*

**For instance,** a medium-sized association wants to run their annual election for President-Elect. The current number of association members is 20,000 and they anticipate a turnout of 15%, so they expect to have 3,000 ballots cast. They want each member to validate their own ballot and want their accounting firm to independently audit and verify the election.

In this scenario, they will need four (4) Tokens per ballot; one (1) for each ballot cast, one (1) for voter authentication, one (1) for the voter self-verification, and finally one (1) for the external validation proofs including ballot encryption/decryption.

**An organization will buy enough tokens based on how many validations are needed to run an election. The Tokens are dictated by the following:**

- Token Purchasers will buy VAST from the market.
- These VAST Tokens will be usable for as many elections as they choose; albeit a VAST Token cannot be used for multiple elections simultaneously.

- An Owner-Operator that runs an election every other year would purchase the number of Tokens they would need to run a single election based on the number of estimated voters and features required.
- A Platform Partner would acquire the amount of Tokens needed per number of simultaneous elections (a factor of voters and complexity of features) per election they are supporting on behalf of others.
- Current market dynamics show a wide range in election prices. For simple private elections, price per cast vote can range from \$0.20 - \$0.40 (USD); for more complicated labor union votes, the range could span \$3.50 - \$15.00 (USD); for public elections, the price can reach even higher.

*We watched as engagement soared and the OSBA realized an increase in voter turnout of over 400%! . . . Votem provided us with a thorough and timely election analysis that helped us to quantify the engagement that we'd seen. Votem proved to be a trusted partner, helping us to realize our goal"*

- Mary Amos Augsburger,  
Ohio State Bar Association  
Executive Director

# VAST Token Use Cases

**Votem is always contemplating various ways to ever-more-tightly align the financial value of its tokens with the utility value they hold. As described above and below, any future increase in value of the tokens is contingent on customers purchasing tokens and using them repeatedly over time to run elections - thereby driving efficiencies of scale and cost into the voting processes overseen by those customers.**

## Use Case Examples for VAST Tokens

**#1: Fan Vote:** The Hall of Fame wants to mitigate the risk of interference with its annual induction vote and chooses to use the CastIron platform for its next election. The Hall purchases enough VAST tokens to satisfy the estimated rate of participation in the election. All online votes cast through the Hall's website are independently verified by multiple nodes on CastIron and, as a result, prevent bots or other malicious actors from tampering with the vote count. Given the relative low stakes of the election, the Hall opts for CastIron's basic offering which only requires 1 token per ballot processed.

**#2: Association Vote:** A labor union is hosting an election for the President of its board. The vote is being hosted on the CastIron platform, but the election administrators want to add another level of verifiability in order to assuage the security concerns of some of the members of the union. Along with the inherent security that comes from an election run on CastIron's blockchain, an extra token per ballot provides each union member who casts their vote with a unique QR code.

Members can go online and match their QR code with a list that shows all ballots cast. These anonymous codes allow each member to independently verify that their ballot was recorded as cast without having to identify themselves and without the ability for them to prove how they voted.

**#3: Municipality Vote:** A medium-sized municipality is holding its midterm elections and would like to make the process as secure and verifiable as possible. The municipal board of elections wants to use the CastIron platform on a contract basis with Votem. Votem, in turn, purchases the appropriate number of tokens in order to run the election with the highest level of security. This purchasing strategy allows the elections board to conduct the election in a more traditional, contract-based manner increasing the velocity of the tokens.

*In reflecting on her time as Montana's Secretary of State, Linda McCulloch said that implementing Votem's "new, modern system" which allowed "greater access for all qualified voters" from military voters to voters with disabilities was her greatest accomplishment in office.*



# votem

voting for a mobile world

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