BLOCKCHAIN VOTING

ESSENTIAL INSIGHTS FOR ASSOCIATION EXECUTIVES

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EXECUTIVE SUMMARY

In the last two election cycles, only 66% of Americans were confident that their own vote was counted as intended and less than 33% of all Americans were confident that votes nationwide were counted as intended.[1] This crisis of trust and confidence in public elections has implications for associations.

Trust and confidence in electoral processes are fundamental to the success of associations and other nonprofit organizations. Member trust that has been built up through years or decades can quickly devolve in the wake of a poorly run election. Application of future-facing technologies, such as online voting, strong member authentication methodologies like biometrics, and secure and publicly verifiable technology like blockchain, is a proactive strategy to strengthen member engagement and trust.

This white paper provides key information to help association executives understand how electoral systems and processes are evolving through the application of blockchain and how they can be used to maintain and improve trust, as well as engagement, among their members and stakeholders.

BLOCKCHAIN PRIMER

Blockchain is not new. Rather, 10 years after its introduction, it's a technology whose time has finally come. While most well-known for its application in cryptocurrencies like Bitcoin, blockchain is on the cusp of fundamentally revolutionizing supply chains, healthcare, elections, real estate and more.

A recent survey by Deloitte of 1,400 executives stated that "Blockchain is ready for prime time."

> "But in 2019, something unmistakable appears to be happening. What has emerged is a shared recognition that blockchain is real—and that it can serve as a pragmatic solution to business problems across industries and use cases. This is not some far-flung vision held by long-standing believers in the technology. Even leaders wary of tech-based solutions have come to see the larger, transformational importance of the technology."[2]

But what exactly is blockchain, and how does it work?

> A blockchain is a decentralized database, shared across a network of computers (called "nodes") that can only be altered after approval from all nodes in the network. Once information is created in a blockchain, it is very difficult to change.

Each 'block' within a blockchain contains (1) data (like a ballot or financial transaction), (2) the hash, or a digital fingerprint of the block which includes a date and time stamp, and (3) the hash of the previous block.

Different types of data can be stored within blocks, such as the sender, receiver, and transaction amount in the case of a financial transaction. A block's hash, which is generated based on the data within that block, changes if _any_ of its data is altered.

For instance, a digital representation of "War & Peace" can be represented as follows:

a948904f2f0f479b8f8197694b30184b0d2ed1c1cd2a1ec0fb85d299a192a447

Any change to the original data will generate a new hash. For instance, if someone decided to delete just one comma from Tolstoy's 587,287-word masterpiece, it would show up, because the hash would change.

New Hash:

40115cc2aecc43ea86a7e54be6f7257abff7b43959cd728f06c0c7423039166r

Original War & Peace Hash:

a948904f2f0f479b8f8197694b30184b0d2ed1c1cd2a1ec0fb85d299a192a447

Not only is there a completely new Hash, the now newly changed hash breaks the chain!

The next block in the chain still has the old hash, so to restore the chain, a hacker would have to recalculate the whole chain from the beginning, and "get approval" from all the other nodes to do so. A very difficult task indeed which is what makes Blockchain immutable and secure.

Blockchains are extremely secure because each block contains its own hash and the hash of the previous block, so changing one hash will make the rest of the blockchain invalid.

BLOCKCHAIN FOR VOTING

In the arena of elections, blockchain is poised to dramatically improve transparency, multiply the efficiency of countless transactions worldwide, and, most importantly, re-engage voters.

Through the application of blockchain, we can create a voting process that is independently and easily verifiable by external trusted parties such as auditors and strategic partners, as well as by each individual voter. With blockchain, verifying that a person's vote was cast and counted can be as easy as tracking a shipment ordered from a favorite e-commerce site.

Blockchains differ from traditional distributed databases by allowing network participants to independently and cryptographically verify the integrity of transactions before they are accepted, creating an immutable record of those transactions without having to rely on a trusted third party. In other words, blockchain allows every transaction (like votes) to be independently verified/audited, in real-time, before it's made permanent.

While blockchain does not serve as a panacea for all the concerns raised by remote voting, in combination with procedural, organizational, and technical support structures, its inherent transparency, fault-tolerance, and irreversibility does fill many of the security shortcomings of traditional e-voting. Blockchain introduces desirable characteristics to the voting process such as verifiability, auditability, reduced cost, and data integrity.

In fact, blockchain, if used properly, provides the following benefits that support improved voter satisfaction and confidence in election outcomes:

- Immutability – past results cannot be changed;
- Integrity – present results cannot be hacked;
- data transparency – every "node" with access can see the results;
- permission-based – only authenticated parties have access;
- audit trail – every vote can be irrefutably traced to its source; and
- anonymity – ballots cannot be traced back to the voter.

This is how voting on Blockchain works:

Step 1: Once a voter is authenticated, the appropriate digital ballot is presented to them through the device of their choice – desktop, tablet, mobile.

Step 2: The voter casts her ballot which is sent to all computers in the network. Each computer in the network, called 'nodes', check the details of the ballot to make sure that the voter and the vote are valid. At this point, the identity of the voter is permanently disconnected from the vote.

Step 3: If each node determines that the vote is valid, the ballot is accepted and added to a block. Each block contains a unique code called a hash. It also contains the hash of the previous block in the chain. The block is added to the blockchain. The hash codes connect the blocks together in a specific order.

Step 4: The votes are then "shuffled" in a digital ballot box to double ensure anonymity and presented to a separate computer for tallying and counting the votes.

Step 5: Digital receipts in the form of QR codes (and hashes) are presented to the voter and the elections administrator to provide proof that nothing changed from the ballot that was cast to the ballot that was counted so the voter can now feel confident that their vote was counted exactly as they intended.

The combination of mobile or e-voting <u>and</u> blockchain is a promising approach to reduce the level of blind trust required of voters without sacrificing all the desired security properties like voter anonymity. Blockchain mobile voting affords the convenience and flexibility of voting at any time with the strong potential to improve trust and voter access for individuals while providing vastly superior privacy, transparency, administrative efficiency (reduced spoiled ballots, ballot errors, rejected ballots, counting errors, expedited tabulation), and overall equality of the voting process.[3,4]

IMPROVING MEMBER ENGAGEMENT

The U.S. Census Bureau surveyed 47,593,000 Americans on why they did not vote in 2014 and found 54% of respondents referred to their inability to make it to the polls as the primary reason. This number has only grown over the past four years as our lives become more hectic and mobile.

What about your association? Do you know why your members don't vote? To tackle this question, leaders of associations should be guided by the demographics and needs of the member bases they serve.

For instance:

- 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 increased language accessibility and voter assistance; and,

- future members whose needs may include things not yet considered.

Using new technologies to address members' voting-related needs can lead to increased member engagement in the essential activity of voting in association elections:

> *In 2017, the Ohio State Bar Association (OSBA) worked with Votem to launch its inaugural online election for the office of president-elect. Reports Mary Amos Augsburger, OSBA Executive Director, "We watched as engagement soared and the OSBA realized an increase in voter turnout of over 400%!"*

Increased engagement in association elections means results are more representative of your members' opinions and desires which can provide association leaders with enhanced clarity around important issues. A more inclusive, accessible voting process can also lead to improved member satisfaction with the organization, which can have positive ripple effects for other association activities.

CONCLUSION

As your association considers ways to best serve your members and increase member engagement, a fruitful area of focus can be your election systems and processes.

Moving your association elections "online" can be a scary thought due to the number of hacks we read about in the news almost every week. But it makes strategic sense in light of our current context – a world where mobile transactions are long past the point of ubiquity and global adoption and your members are increasingly connected and technologically inclined.

The good news is it is possible to implement voting systems and methods that:

- are built for the future, while honoring past methods that are still relevant;

- prudently embrace technological change rather than fear it;

- incorporate *real-time* auditing and verification by trusted parties; and

- earn the trust of participants rather than demand it.

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About Votem®. Votem Corp was founded to bring positive change in the world by fostering and restoring trust, access, and transparency in elections. Their platform – CastIron® – is a blockchain-based mobile voting system that enables citizens and association members around the world to easily vote online with unprecedented verifiability, accessibility, security, and transparency.

For inquiries, please contact CEO, Pete Martin (pmartin@votem.com).

SOURCES:

1. Massachusetts Institute of Technology – Department of Political Science 2016 Survey of the Performance of American Elections

2. Deloitte's 2019 Global Blockchain Survey - https://www2.deloitte.com/insights/us/en/topics/understanding-blockchain-potential/global-blockchain-survey.html?id=us:2el:3dp:di5041:awa:cons:060219

3. Elections BC. (2014.) Independent Panel on Internet Voting: Recommendations Report to the Legislative Assembly of British Columbi1

4. Goodman, N. J., Pammett, J. H., & DeBardeleben, J. (2010). A Comparative Assessment of Electronic Voting. Ottawa, ON: Elections Canada.