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Open Source, Open Democracy

Enhancing Transparency in US Voting Systems Technology

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Democracy must be built through open societies that share information. When there is information, there is enlightenment. When there is debate, there are solutions. When there is no sharing of power, no rule of law, no accountability, there is abuse, corruption, subjugation, and indignation. —Atifete Jahjaga, former president of Kosovo, The Hill, June 14, 2012

Introduction

On January 6, 2021, the US Capitol Building was overrun by protestors seeking to disrupt a joint session of Congress from counting the Electoral College votes to confirm the victory of president-elect Joseph R. Biden.¹ While 20 percent of the rioters were motivated by their loyalty to former president Donald J. Trump, another 20 percent cited their suspicion of the 2020 presidential election results as a primary motivator in storming the US Capitol.² Many say that these suspicions are based on unfounded right-wing conspiracies created to incite civil war and overthrow American democracy.³ However, an intellectually honest appraisal shows that many of these concerns came from a lack of transparency in the Dominion Voting Systems and, more broadly, the expansion of electronic voting in our elections.

Electronic voting and ballot processing are here to stay in US elections along all levels of governance for the foreseeable future.⁴ In the nineteenth century, citizens nationwide voted by inscribing the names of the candidates they wanted to vote for on scraps of paper and dropping them into insecure ballot boxes on Election Day.⁵ By the mid-twentieth century, IBM Corporation developed punch card voting systems that proved more productive when collecting votes, yet less transparent should recounts become necessary, as observed in the 2000 presidential election.⁶ The drawn-out Florida recount led to Congress passing the Help America Vote Act (HAVA) of 2002, which created stricter standards for voting apparatuses and thus spurred the widespread practice of electronic voting.⁷

The regulatory body currently tasked with ensuring election integrity on the federal level is the US Election Assistance Commission (EAC), an independent agency charged with ensuring HAVA compliance through various means, including vetting the adoption of voluntary voting system guidelines, maintaining the national mail voter registration forms, and auditing the usage of HAVA funds.⁸ However, the EAC's election security measures are limited to internal analyses of election technological security. They do not necessarily compel voting machine manufacturers to make their operating systems available for the public's viewing.⁹

In any partnership or professional union, legitimate compliance with the agreement is contingent upon both parties' *informed* consent.¹⁰ Within a democracy, citizens must be able to make informed choices about their government, representatives, and laws, which affect every aspect of day-to-day life. Without total transparency in the electoral process, American voters may not have access to accurate information about how their votes are counted or whether the process is truly fair. This lack of information can corrode informed consent, ultimately eroding trust between the paternalistic federal government and its citizens and further propagating conspiracies regarding the legitimacy of future elections.

On August 25, 2023, senior information operations specialist Aaron Rodericks at the social media platform X (formerly known as Twitter) announced an international hiring initiative to protect “the integrity of elections and civic events” during the next election cycle.¹¹ X is in lockstep with other organizations preparing to fight against “election deniers” by limiting local officials’ discretion to certify election results and produce information to preempt disinformation before Election Day.¹²

Despite the tumultuous election season ahead, there is still time to change course. With a year before the next presidential election, Congress ought to pass legislation that mandates voter machine manufacturers and similar private companies that substantially contribute to democratic customs in the United States to make their software available to the general public. Doing so will show Americans that our electoral system is not negatively influenced by technology with a built-in bias, substantially reducing the likelihood of unsubstantiated conspiracy theories plaguing subsequent election cycles and twenty-first-century public squares.

Analysis

Two moving parts need to be considered when authoring legislation regulating open-source voting machine software produced by private manufacturers: the justifications for not opening their source code and whether or not the software methodology is proprietary.

When speaking of consumer-related disclosures, requests for specific product information need to be written by the customers—in this case, the federal government. Under the status quo, if any entity wishes to purchase anything from a private vendor, it must publish a request for tender (RFT), a formal document issued by a vendor that outlines the specific requirements, terms, and conditions of a project or contract.¹³ If publishing the system’s code as open source is not listed as a requirement, the vendor is free to use whatever proprietary license it wishes. This introduces another facet: Why would a specific vendor choose a closed license for its software? The answer is contingent on the vendor’s business model.

Considering that Dominion Voting Systems operates on a manufacturing business model, it is necessary to consider that there may be substantial interest in keeping its software under a closed-source license. A voting machine’s software does much

more than apply an operator to a variable. Software developers must consider how to manually input the candidates on a ballot, record votes, handle fault tolerance, error handling, accessible interfaces, and fraud detection algorithms, and consider other ways the software handles extraneous variables.

These features may marginally make Dominion Voting Systems more vulnerable to competitors due to the limitations imposed by open-source licenses. Should the company adopt a GNU General Public License (GPL), its code would be made available to the general public for analysis and usage. However, any modifications to the source code must be reported to the owner of the license, thereby limiting undue economic burdens imposed on the company.¹⁴

Compelling private voting machine vendors to obtain GNU General Public Licenses would allow the EAC to ensure ballots are processed correctly under the status quo and after implementing a national identification system. The federal government must implement the following enhanced security measures to ensure that electronic voting upholds the accuracy of the voting process and the convenience of citizen participation.

Starting with a secure foundation, all registered voters must possess a national identification card, which could be obtained using existing identification documents such as driver's licenses. Currently, thirty-five out of fifty states require voter identification, with the remaining fifteen states and the District of Columbia checking other identifying information, such as signatures, against information on file.¹⁵ While opponents of voter identification cards argue that such requirements impose an undue burden on voters, it is worth noting that automated signature verification applications often conduct signature verification as per EAC recommendations.¹⁶

The core of this system relies on a robust public key infrastructure (PKI) with a national certificate. This certificate would be used to digitally sign each voter's ballot, ensuring their vote's authenticity and uniqueness. Any attempt to vote multiple times would result in modifications to the original vote, with a comprehensive record of all voting activity accessible to the voter at any time. To maintain transparency and security, voters would be promptly alerted via their chosen contact method at registration whenever a modification to their vote is attempted. Any change would require rigorous identity verification, similar to Real ID or passport requirements.

The proposed system would dynamically present voting options based on the voter's registration, preventing attempts to vote in multiple jurisdictions. This feature enhances the accuracy of the electoral process by ensuring that each voter participates only in their designated electoral district. A significant advantage of this national system is its ability to accommodate voters regardless of their physical location. Voters could cast their ballots from any certified polling station in the country, eliminating the need for a specific voting location.

Some may express concerns about the potential for voter suppression or discrimination related to identification requirements. However, the proposed system aims to balance security and accessibility. By accepting various identification documents, including existing driver's licenses, the government can maintain inclusivity while implementing essential security measures to safeguard the democratic process.

While significant strides must be made in ensuring election security through digital means, the first challenge to address remains in analog paper ballots. Challenges persist even if we were to implement a system where each paper ballot is printed with unique codes that identify the voter it is attached to. Paper ballots can be vulnerable to theft during transit to and from the voter, potentially falling into the hands of illegitimate voters. On this basis, it would be wise for Congress to urge the EAC to significantly limit or eliminate physical ballots based on the efficacy of PKI-backed national identification cards.

Conclusion

Safeguarding the integrity of our democracy requires a paradigm shift. The proposed measures strike a delicate balance between security and accessibility. This transformation not only upholds democratic values but also ensures a secure and accessible electoral system for all. It is a journey toward a future where trust between government and citizens is unshakable, transparency prevails, and the legitimacy of our elections is unquestioned. By embracing transparency, debate, and solutions, we can forge a path toward a stronger, more resilient democracy. In this democracy, information empowers, where debate fosters solutions, and where trust and accountability reign supreme. The time for change is now, for democracy thrives when it is truly open and shared.

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