



BLOCKCHANGE

BLOCKCHAIN TECHNOLOGIES FOR SOCIAL CHANGE

CASE STUDY:

Seeking Ways to Prevent Electoral Fraud using Blockchain in Sierra Leone

Raul Zambrano, Andrew Young, and Stefaan Verhulst

OCTOBER 2018

 **GOVLAB**

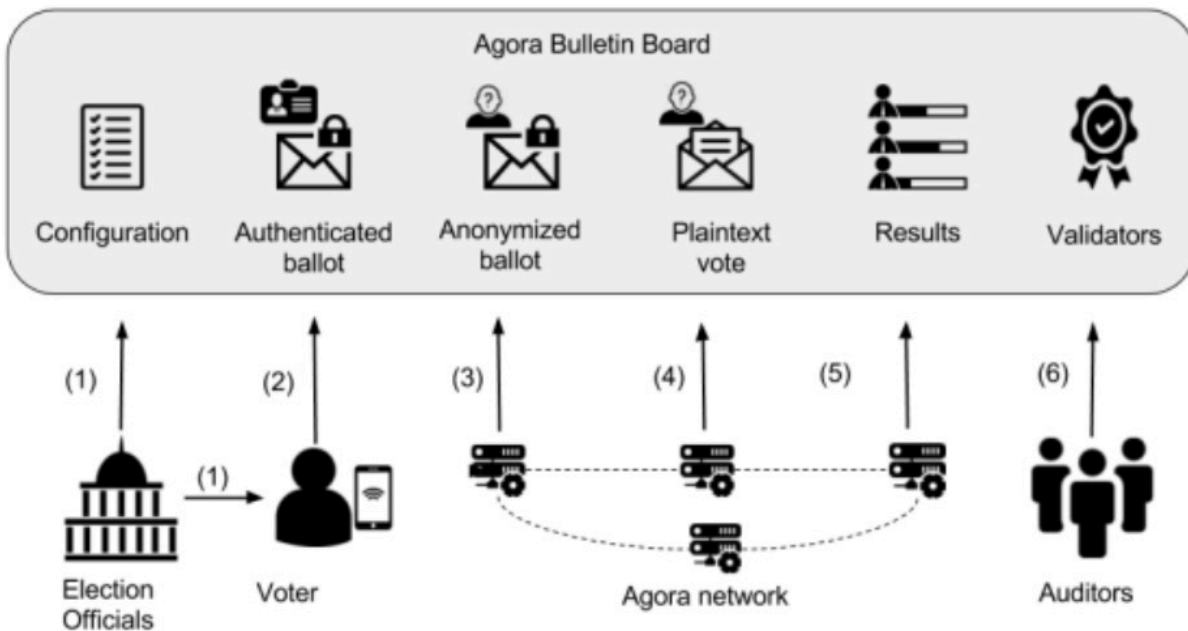
PROJECT DESCRIPTION

Problem Definition

Sierra Leone, ranked one of the fifty Least Developed Countries (LDCs) in the world, faces a wide range of development challenges.¹ Beyond the tragic impacts of the recent Ebola epidemic, the country is also still reckoning with a history characterized by conflict, high unemployment, a lack of infrastructure, corruption, and generally weak governance.²

Despite these many challenges, Sierra Leone has held recurring democratic elections since the beginning of the century. These elections have not been without challenges—fears of violence³ and electoral corruption⁴ are prevalent—but the fact that they are held at all can be seen as a remarkable accomplishment.

Electoral processes are managed by the National Electoral Commission (NEC), an entity deemed to be independent from all other branches of government. NEC’s director and commissioners are nominated by the President of the country and approved by the national legislature.⁵ As with all elections, a trusted identity management is



critical across the electoral process (registration, identification and post-election monitoring). In Sierra Leone, only registered citizens are authorized to vote. Voters must show a form of legal ID at polling stations, which can include national ID cards, passports and drivers' licenses. Paper ballots duly registered and authenticated are used in the voting process. Votes are cast into a semi-transparent ballot box visible to all voters, poll officers and national and international observers. Once the polls are closed, votes are reconciled, sorted and counted manually. Ballots are then forwarded to Poll Center Managers, who in turn forward them to NEC District Electoral Officers for final counting and aggregation.

Since 2012, NEC has deployed a digital database that is used to manage the electoral process and tally votes. The database was upgraded before the 2018 contest.⁶

“As with all elections, a trusted identity management is critical across the electoral process.”

Blockchain Use

In 2018, Agora, a Swiss blockchain startup launched in 2015 with the goal of supporting electoral processes around the globe, deployed its blockchain voting platform to support the first round of Sierra Leone's presidential elections. After obtaining the green light from the NEC, Agora staff manually digitized ballots cast in 250 of Sierra Leone's 446 electoral wards, rapidly generated final tallies for those districts and published them five days before the official results were released. Ballots were not only digitized but also anonymized, encrypted and stored into a blockchain before the actual counting was completed.

With staff located in polling stations distributed across 250 electoral districts, Agora manually recorded all ballots into its blockchain platform.⁷ Collected data was saved in an exportable format (CSV) and then imported into Agora's permissioned blockchain and stored as a key-value pair. Data was also anonymized using an encryption process. The CSV data was also hashed via a Merkle tree after being previously compiled into separate data blocks representing the various electoral districts involved in the pilot. The top hash of each block was recorded in an Ethereum blockchain as a smart contract. Comparing hashes of the two blockchains can be used to ensure votes have not been altered.⁸

“After obtaining the green light from the NEC, Agora staff manually digitized ballots cast in 250 of Sierra Leone's 446 electoral wards, rapidly generated final tallies for those districts and published them five days before the official results were released.”

Blockchain Value Proposition

At its core, Agora sought to provide a proof of concept for how blockchain can help validate vote tallies in national or regional elections. Blockchain essentially provided voters with a transactional digital identity used exclusively for authenticating their identity for the voting process. While that ID was not directly used or accessed by individual voters, it ensured the security of cast ballots on the “backend.” The initial idea was to test the technology through an on-the-ground pilot project, with the goal of eventually scaling the initiative in collaboration with the NEC for future elections.

“The initial idea was to test the technology through an on-the-ground pilot project, with the goal of eventually scaling the initiative in collaboration with the NEC for future elections.”

PROJECT ANALYSIS

Risks and Challenges

While the pilot showcased the potential of blockchain as part of the electoral process, it also raised a series of policy and political issues, particularly after NEC publicly disavowed some claims made by the media on the actual role the technology played in the process. These involved statements that seemed to imply that voting itself occurred on a blockchain, rather than the more accurate observation that blockchain was simply used to record vote tallies.

While an agreement between NEC and Agora was signed, it is also evident that Agora did not play a significant, direct role in the actual voting process. By definition, international electoral observers are not supposed to count votes. Rather, they must ensure the tallying process, undertaken by officially authorized personnel, is transparent and accurate. Having a parallel tallying process might be contentious for many, especially if electoral results for some districts are reported well ahead of official tallies. Countries like Sierra Leone, where elections are very competitive and where violence might occur, are likely more reluctant to allow third parties to do their own vote tallies, regardless of their political perspective.

The media-fueled controversy about Agora's involvement in Sierra Leone revealed risks related to the high level of attention (and at times hype) surrounding

blockchain. Amid headlines trumpeting the world's first "blockchain election," the NEC took issue with misleading overstatements about the role of Agora and how closely it worked together with the government. After press attention focused on Agora reached a crescendo, the NEC spoke out, not only making it clear that Agora was not a central component of the voting process, but also minimizing its role as a tool for post-hoc vote tallying and monitoring. While at least somewhat out of Agora's control, the publicity battle waged after the election speaks to some of the communications and public relations risks that face blockchain and identity projects. These risks, as much as more commonly considered ones surrounding privacy or information handling, need to be considered by any institutions or organization seeking to implement blockchain projects, especially in the public domain.

A related challenge, briefly touched on above, stems from the perceived redundancy of Agora's vote tallying processes. This suggests a lack of integration with the legacy system. Rather than a collaborative enterprise from Agora and NEC, the pilot became a parallel and seemingly independent exercise that some saw not only as competition but also as potentially delegitimizing NEC's vote tallying process.

Next Steps and Opportunities for Scaling

As a vote tallying proof of concept, and according to analyses shared by Agora, the company's role as an international observer of the 2018 Sierra Leone presidential election was a success. Agora's results – which were made openly accessible online – were both consistent with NEC's official election count and were completed five days before NEC made the official results public. Agora, which polled 525,547 fewer votes in the Western Area than the NEC, managed to yield percentage votes for the All People's Congress (APC), Sierra Leone People's Party (SLPP), National Grand Coalition (NGC) and other categories that were only decimals off from the NEC's official results, according to an Agora source. For example, the official APC percent votes determined by the NEC was 54.74%, and the Agora's percent votes yielded for the same category was 54.71%— only a 0.03% difference.

But while the technology succeeded in its core function, the controversy with the NEC likely diminishes any likelihood of future use of Agora in Sierra Leonean elections. More broadly, Agora could face some difficulties as it seeks to scale and replicate this work elsewhere due to the negative publicity generated after the election.

“While the technology succeeded in its core function, the controversy with the NEC likely diminishes any likelihood of future use of Agora in Sierra Leonean elections.”

ENDNOTES

- 1 UN-OHRLLS. “The Least Developed Countries: Things to KNOW, Things to DO.” Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States, 2012. <http://www.un-ohrlls.org/UserFiles/File/LATEST%20IPoA.pdf>
- 2 The World Bank. “The World Bank In Sierra Leone” The World Bank, April 19, 2018. <http://www.worldbank.org/en/country/sierraleone/overview>
- 3 Cooper Inveen and Ruth Maclean, “Sierra Leone: Violence fears as tense election reaches runoff,” The Guardian, March 21, 2018, <https://www.theguardian.com/world/2018/mar/21/sierra-leone-political-violence-tribal-rhetoric-rival-parties-face-runoff>
- 4 “Five issues that will dominate Sierra Leone’s election,” News24, February 25, 2018, <https://www.news24.com/Africa/News/five-issues-that-will-dominate-sierra-leones-election-20180225>
- 5 NEC. “Procedures for Polling and Counting.” National Electoral Commission, 2018. <http://necsl2018.org/procedures-for-polling-and-counting/>
- 6 NEC. “Procedures for Polling and Counting.” National Electoral Commission, 2018. <http://necsl2018.org/procedures-for-polling-and-counting/>
- 7 Tamba Lamin. “Setting the record straight about Agora’s Blockchain Elections Misleading headlines on the internet.” Medium, March 17, 2018. <https://medium.com/@tlamin/setting-the-record-straight-about-agoras-blockchain-elections-misleading-headlines-on-the-internet-afcf20c7a3b7>
- 8 Agora Blockchain. “Agora Official Statement Regarding Sierra Leone Election.” Reddit, April 2018. https://www.reddit.com/r/agora/comments/85qskj/agora_official_statement_regarding_sierra_leone/

REFERENCES

- Agora. (2018, March 08). Swiss-based Agora powers world's first ever blockchain elections in Sierra Leone. Agora Press Release. https://agora.vote/pdf/Agora_Press-release_SL2018.pdf.
- Agora. (n.d.). Bringing our voting systems into the 21st century, White Paper. https://agora.vote/Agora_Whitepaper_v0.1.pdf.
- Agora Research Team. (2018, March 20). Agora Official Statement Regarding Sierra Leone Election. <https://medium.com/agorablockchain/agora-official-statement-regarding-sierra-leone-election-7730d2d9de4e>.
- CoinDesk. (2018, March 26). The Sierra Leone Vote: What We Got Wrong. <https://www.coindesk.com/blockchain-vote-election-sierra-leone-got-wrong/>.
- Duffin, A. (2018, March 21). Blockchain Election in Sierra Leone? Not Quite. <https://cryptoslate.com/sierra-leone-blockchain-election/>.
- Finnan, D. (2018, March 23). Sierra Leone's electoral commission distances itself from use of blockchain during polls. <http://en.rfi.fr/africa/20180319-sierra-leones-electoral-commission-distances-itself-use-blockchain-during-polls>.
- Gordon, S. (2018, March 22). Sierra Leone and the Blockchain Election That Wasn't. Bitcoin Magazine. <https://bitcoinmagazine.com/articles/sierra-leone-and-blockchain-election-wasnt/>.
- Houser, K. (2018, April 02). Hold up: What actually happened in Sierra Leone's "blockchain" election? <https://futurism.com/sierra-leone-election-blockchain-agora/>.
- Lamin, T. (2018, March 17). Setting the record straight about Agora's Blockchain Elections Misleading headlines on the internet. <https://medium.com/@tlamin/setting-the-record-straight-about-agoras-blockchain-elections-misleading-headlines-on-the-internet-afcf20c7a3b7>.
- Lukasiewicz, J. (2018, February 22). What is Agora? Spreading Free and Fair Elections Through Blockchain. <https://medium.com/agorablockchain/what-is-agora-f58631d7d6a3>.
- Lukasiewicz, J. (2018, February 27). Are non-blockchain Electronic Voting Machines critically flawed? <https://medium.com/agorablockchain/are-non-blockchain-electronic-voting-machines-critically-flawed-8662e77cd495>.

- Melendez, S. (2018, March 28). Why You Could Soon Be Voting In A Blockchain-Powered Election. <https://www.fastcompany.com/40547127/voting-blockchain-startup-demo-turns-controversial-in-sierra-leone>.
- NEC. (2018). Procedures for Polling and Counting. National Electoral Commission. <http://necsl2018.org/procedures-for-polling-and-counting/>.
- Pollock, D. (2018, March 29). Who Created the Story of Sierra Leone’s Blockchain Election? <https://cointelegraph.com/news/sierra-leones-fake-blockchain-election-hasnt-damaged-the-technologys-reputation>.
- Southurst, J. (2018, March 22). Sierra Leone Election Denial a Reminder to Look Closer at Blockchain Claims. Bitsonline. <https://www.bitsonline.com/sierra-leone-election-denial-blockchain/>.
- Sputnik. CEO of Swiss Company Explains Prospects of Using Blockchain in Elections. (2018, March 17). <https://sputniknews.com/analysis/201803171062613638-blockchain-election-sierra-leone/>.



This work is licensed under a
Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License