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Toward the Implementation of Online Voting

Background

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Potential Uses of the My Number System

・Optimization has stalled, with many administrative procedures functioning as they did prior to the introduction of the My Number system.
・More moves are being made toward the digitization of administrative procedures, for reasons such as growing demand for contactless procedures due to the COVID-19 situation.
・The My Number system has great potential. There is a need for further discussion (which will require a basic design that is technically feasible) about broadening its use and avoiding being left behind from other countries.

Use of the My Number System for Online Voting

・The My Number system would be well-suited to use in national elections, which are administered primarily by the national government.
・Any technology used for voting would need to meet several requirements, including voter identity verification and ballot secrecy.
・Discussions will be held on the subject of online voting, the implementation of which has thus far stalled, as an example of the digitization of administrative procedures.

Why this is essential as the first step toward digital governance:

An initiative that would leverage new technology to deliver capabilities that were not possible with paper voting is something that needs to happen in order to facilitate the move toward digital governance.

Current Voting-Related Issues

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Voter-Side Issues	☐ Low voter turnout due to decreasing interest in politics ☑ Significant obstacles facing the elderly and other people who experience mobility-related difficulties ☐ Constituency-to-constituency disparities in vote value ☑ Complexity of procedures
Administrative Issues	☑ Inefficiency of many manual procedures ☑ Miscalculation of vote totals due to human error ☑ Weak protections against falsification of votes

Why do elections (and voting) need the “My Number” system?
Elections are an event for citizens, and moving elections online will require an online citizenship management system. This is why it will be necessary to use My Number, which is an identification system for citizens and residents of the country.

About Online Voting

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What is online voting?

Online voting is a system in which votes are cast over the internet, using devices such as computers and/or smartphones.

- ✔ Optimizes administrative procedures
- ✔ Makes voting more efficient

What is electronic voting?

Electronic voting is a system in which votes are cast at designated polling stations using electronic devices such as touchscreens.

- ✔ Optimizes administrative procedures

*Current laws prohibit the connection between voting devices to the internet

Overseas Online Election Trends

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●U.S.A.

In the U.S., four states allow voting via websites intended primarily for voters residing outside of the country: Arizona, Colorado, Minnesota, and North Dakota. West Virginia offered a mobile voting app that used blockchain technology. Voting by email or fax is also possible in 19 states. On the other hand, while the option of voting by smartphone was made available to some residents of the state of Washington, the move has not resulted in an increase in voter turnout.

●Switzerland

Online voting has been available to voters in Switzerland in over 300 elections and national referendums since 2003, a development spearheaded by the country's cantonal governments. The Swiss federal government initially pushed to make online voting available in at least 66 percent of the country's 26 cantons in the October 2019 federal parliamentary elections. However, due to security concerns and a steep increase in systems development costs, the plan to allow online voting in the 2019 federal parliamentary elections was shelved across the country, including in the cantons that had previously allowed online voting.

●Russia

In Russia, plans are in place to make blockchain-based voting available in two territories in 2020. Under this plan, the state-owned telecom company Rostelecom will oversee the project, while the other will be overseen by the Moscow Department of Information Technology (DIT), which has experience in deploying blockchain voting systems. The Rostelecom system was used in the Russian lower house by-elections in the oblasts of Kursk and Yaroslavl on September 13th. Rostelecom had previously provided blockchain voting services for a vote in July, during which a vulnerability allowing personal identification to be retrieved from a poorly protected service file was discovered. Personal information obtained this way was later sold on the dark web.

Overseas Online Election Trends

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●Estonia: The Leader in Digital Governance

Estonia is the only country to have made online voting available to all of its citizens in a national election. With just an Estonian ID card and a computer with an internet connection, an Estonian citizen can participate in an election from anywhere in the world. Voters simply download and install voting software from the election website, enter the number listed on their ID card and their password, and choose their candidates. To protect against vote-buying and coercion, the system allows voters to change their votes within a set period of time, even after they have cast a ballot. The Estonian government has stated that approximately 30 percent of the country's 1.3 million people have used the electronic voting system, cutting election-related labor hours by 11,000 per election.

Vulnerabilities in Estonia's Online Voting System

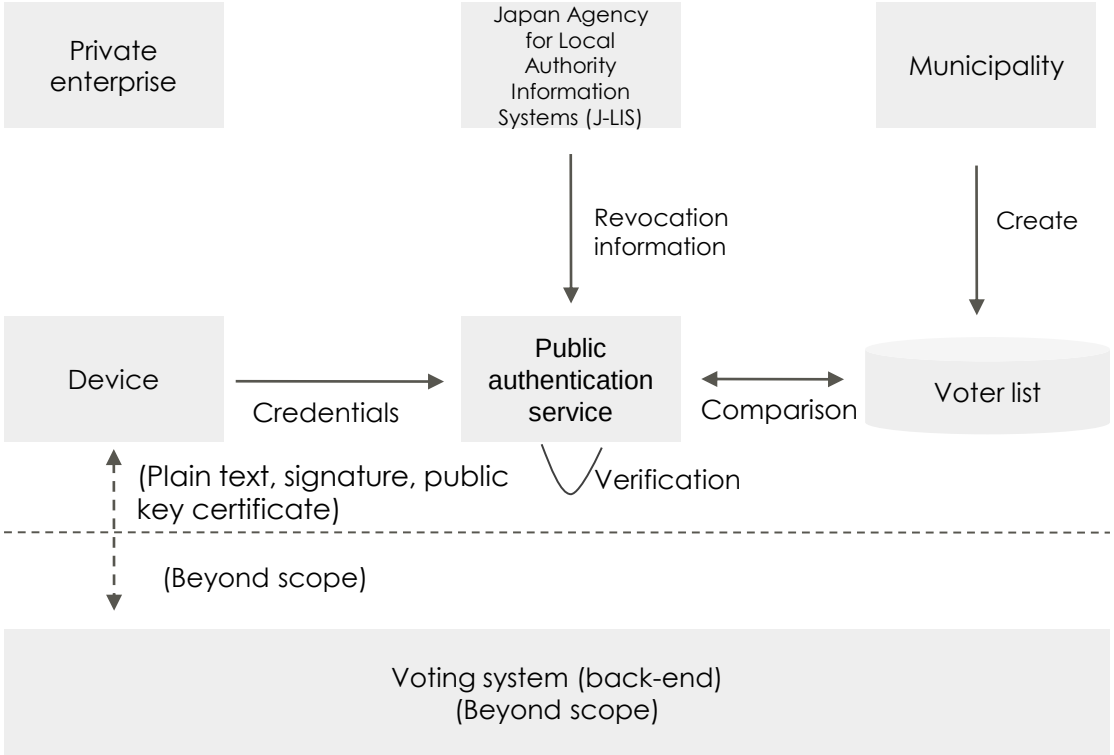
In 2014, to examine the security of Estonia's electronic voting system, a test in which the actual Estonian system and a dummy system with the same architecture were set up in a lab by Alex Halderman, then an associate professor of computer science at the University of Michigan, to ascertain the issues that may occur over the course of the voting process. The test established that election results could be manipulated by hacking voters' computers and infecting the voting system with malware.

While moves are being made to allow online voting in many countries, the number of countries that have successfully adopted online voting and the scope of their respective projects have been limited due to security concerns above all else. In the case of elections in particular, the risks involved are a major obstacle, as the issue is closely related to the country's overall direction, and any rollback would be prohibitively difficult.

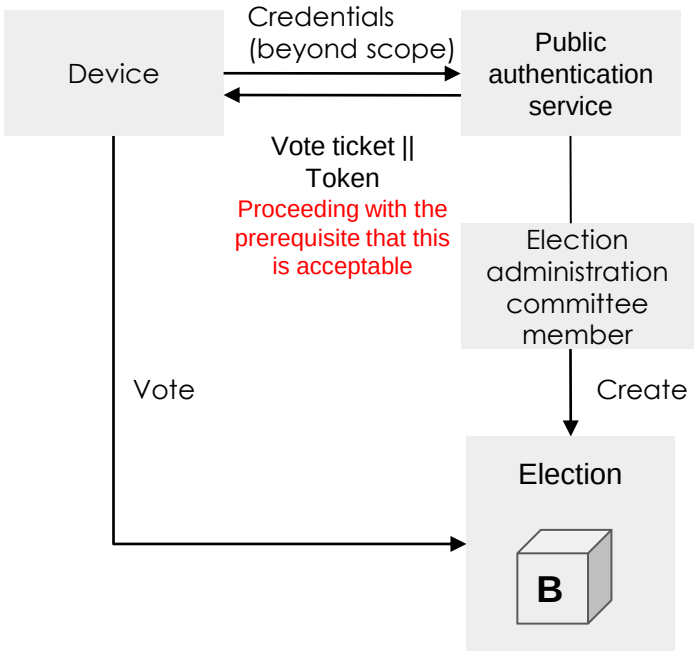
Chart: Feasibility of Electronic Voting and Comparison With Conventional Voting

Feature	Description	Current paper - based voting	Technical feasibility with electronic voting	Technical elements
Ballot secrecy/anonymity	Ensuring that the matter of who voted for which candidates remains a secret throughout the entire voting period	○	○	Zero-knowledge proofs, homomorphic encryption, mixnets, blind signatures
Authentication/judgment of eligibility	Validating voting rights	○	○	Biometric authentication + My Number digital certificate
Identity confirmation	Preventing voting by proxy	×	△	Is this possible with online voting?
One person, one vote	Preventing multiple votes by the same voter	○	○	Coin-based voting using smart contracts
Falsification prevention, reliability	Verifying that ballot boxes are empty	×	○	Contract tx logs
	Verifying that votes have not been falsified	×	○	Dependent on BC’s falsification prevention abilities
Prevention of vote-buying	Preventing vote-buying	×	×	May be impossible under current circumstances.
Impartiality	Ensuring that all eligible voters have the opportunity to vote	△	△	May depend on the issuing authority?
Accuracy/verifiability/transparency	Credibly verifying that votes are properly reflected in results	×	○	Automatic vote-counting systems, example: OpenVote

Target Scope: Authentication



Target Scope: Voting



Target Scope: Vote-Counting