DIGITAL GOVERNANCE STANDARDS INSTITUTE
INSTITUT DES NORMES DE GOUVERNANCE NUMÉRIQUE

Sequent

Secure, Verifiable and Transparent

Online Voting Elections

Agenda

1. Introduction
2. DGSI Overview
    a. Why Is the DGSI Online Voting Standard Important for You?
    b. Who Was Involved?
    c. Standard Development Process and Chapters
3. Exercise - Distilling The Chapters into Themes
4. The Four Broad Themes
5. What Should You Do Next?
6. An Introduction to Sequent

Introduction

Rob Herold & Sequent

A Little Bit About Us..

1. Based in London
    a. Married to Candice with 3 children in postgraduate studies
2. Previous Director of Operations and Sales at Scytl Canada
    a. 2022 - Account Manager - over 40 OME
    b. 2018 - Managed Delivery Team - over 100 OME
3. VP of Sales North America at Sequent
4. DIY

212
Successfully used in Election events

3.2M
Voters cast their vote using the platform

6
Implemented in countries worldwide

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DGSI Overview

Importance, Contributors, and Process

Global Standards and Compliance

1. The Future of Voting: End-to-End Verifiable Internet Voting, U.S. Vote Foundation, **2015**
2. The Council of Europe Recommendations For e-Voting, **2017**
3. Election Canada - Online Voting: A Path Forward for Federal Election, **2017**
4. NIST Voting Systems Standards and Security Recommendations, **2020**
5. Quebec Internet Voting Study & Recommendations, **2022**
6. Germany BSI Recommendations (Federal Office of Information Security), **2024**
7. **Canada Digital Governance Standards Institute, Online Voting Standards, 2024**

Why is the DGSI Online Voting Standard Important ?

1. **A “North Star”** for online voting implementation to achieve:
    a. Secure voting
    b. Transparent election process
    c. Ensure innovation and continuous improvement
2. Establish optional **minimum technical requirements** for OVS
3. **Provide evaluation criteria** for RFPs
4. **Provide best practices** for election administrators
5. Provide a common frame of reference for **inter-municipal collaboration**

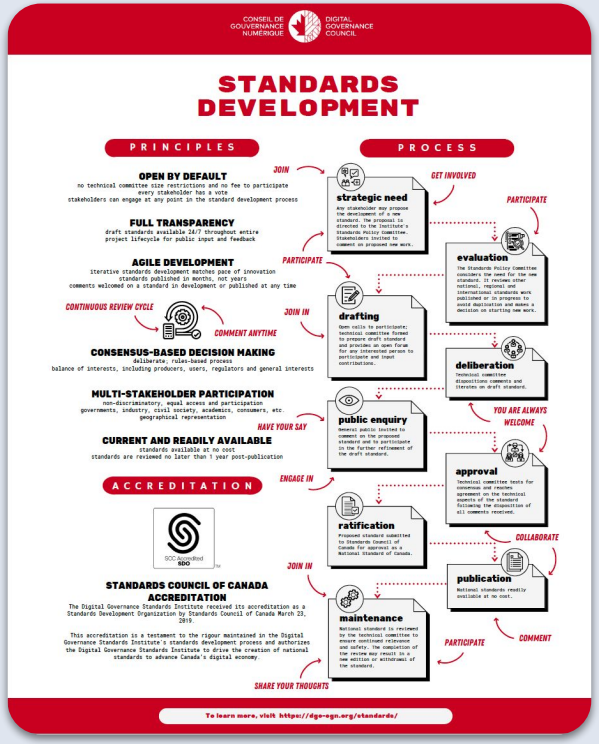
Who Was Involved in the Technical Committee ?

Over **100 stakeholders participated** or were consulted including:

1. **DGSI:** Digital Governance Standards Institute
2. Three **(3) Canadian Academic** Institutions
3. Five **(5) Ontario Municipalities** and one **(1) Canadian Territory**
4. Five **(5) Vendors** including Sequent
5. Was publically reviewed and commented by the **AMCTO community**

DGSI OVS Standard Development Process

1. Standards Policy Committee approved development - **Dec. 2020**
2. Kickoff - **May 2021**
3. Public review - **Dec. 2023**
4. Publication - **Dec. 2024 (estimated)**
5. Annual maintenance - 1 Yr after publication
6. Life cycle is 5 years



Elements Are Described in 8 Chapters 4 Through 11

Ch 4. Security of systems and data

Ch 5. Voter identity and vote authentication

Ch 6. Testing and auditability

Ch 7. Access to online voting services and voter election information

Ch 8. Secrecy of the vote

Ch 9. Ballot design and accessibility

Ch 10. Bandwidth and network capacity

Ch 11. Election Management / Administration

Exercise Time

Let’s distill these into themes!

Exercise - Group the Chapters Into (4) Themes

Ch 4. Security of systems and data

Ch 5. Voter identity and vote authentication

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The Four Broad Themes

A suggested perspective

Four (4) Broad Themes - A Possible Perspective

Security and Performance

Chapters 4 & 10

Authentication and Auditability

Chapters 5 & 6

User Access and Data Protection

Chapters 7 & 8

Election Admin and Usability

Chapters 9 & 11

1. Security and System Performance

The theme focuses on protecting the integrity and security of the voting system while ensuring it can handle peak usage during the election. It covers both safeguarding the system from external and internal threats and guaranteeing reliable, continuous operation

1. Ensure the holistic security of the online voting service by addressing:
    a. Online voting security (e.g. TRA)
    b. Voter security (e.g. vote selections are managed in “volatile” memory)
    c. Online voting provider (OVP) security (e.g. 3rd party penetration testing - 12 months)
2. Ensure the online voting service remains functional throughout the voting period throughout any outages. (e.g. NSW iVote surge outage in 2021; Over 50 Ontario munis in 2018)

2. Authentication and Auditability

The theme emphasizes ensuring that only eligible voters can participate in the election, with each vote being properly authenticated and counted. It also highlights the importance of testing and audit processes to maintain transparency and trust in the election outcome

1. Ensure only eligible voters can vote, only one time and that an attacker will not be able to cast a ballot instead of the voters
    a. Strong voter authentication (e.g., OTP option)
    b. Voter eligibility (e.g., digital signatures)
    c. Secure mail delivery
    d. Voter strike-off
2. Ensure transparency through testing and auditability of the online voting system through
    a. Logic and accuracy testing
    b. Auditability (e.g. immutable logs)
    c. Documentation (e.g. source code)

3. User Access and Data Protection

The theme addresses secure access to the voting system and protecting voter data. It includes permissions for election administrators and measures to maintain voter privacy, ensuring no link between voters and their choices

1. Ensure secure access and management of voter data and election results:
    a. Access and users (e.g. role based permissions, immutable logs)
    b. Election results (e.g. independently verifiable cryptographic proof)
    c. Data retention (e.g. deleted at the instruction of the municipality in accordance with the Act.)
2. Ensure privacy, anonymity, integrity, and secrecy of voter information:
    a. Vote integrity - ensure no linking of votes to individuals
    b. Guarantee secrecy from casting, to tabulation of votes
    c. Provide confirmation of successful vote submission without enabling proof of vote choice to others (e.g. ballot tracker)

4. Election Management and Usability

The theme focuses on managing the election process and ensuring a smooth voting experience for all users, including those with disabilities. It covers both the logistical aspects of administering an election and making the voting interface accessible and user-friendly

1. Ensure proper management, staffing, and security for online voting:
    a. Staffing and Personnel
    b. Risk Assessment and Security (e.g. Security Categorization (ITSG-33), Physical security)
2. Ensure usability and accessibility for all voters, including those with disabilities:
    a. Compliant with WCAG 2.0 AA standards at a minimum (e.g. AODA as of 2024...)
    b. Consistent experience across all devices and screens (e.g. “responsive”)
    c. Multilingual support as required by legislation

What Is Next?

A practical guide

What Should You Do Next?

1. Get familiar with the OVS standard https://dgc-cgn.org/standards/all-published/
2. Evaluate what is essential for you for the 2026 cycle
3. Build a roadmap to meet the remaining requirements
4. Consider collaborating with other municipalities for group procurement and delivery (e.g. evaluation, sharing audit, etc.)
5. Learn about relevant technologies from vendors (e.g. E2E verifiable solutions)
6. Get started now ☝

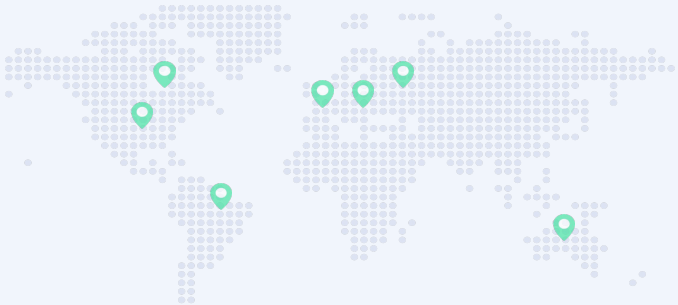
Navigating by the “North Star” - May 29th at 11 a.m.

Learn about relevant technologies from vendors (e.g. E2E verifiable solutions)

Get started now ☝️

Company Overview

- Mainly operates in Canada,US and Europe.
- Over 10 years of experience delivering online elections worldwide.
- Field-tested, state-of-the-art cryptographic technology, led by Dr. Joseph Kiniry (Galois, US) and Prof. Douglas Wikstrom (KTH University, Sweden)
- A veteran leadership team with hands-on experience delivering online voting solutions
- Frequently tested solution - last pen test was carried out by CWG (Cyber Wall Global) in Feb 2024.



Global Reference Clients

Municipalities

- Haldimand County, ON
- City of Madrid, Spain
- City of Helsinki, Finland
- City of Lugo, Spain

Private Organizations

- Tl'azt'en Nation, BC
- Ontario English Catholic Teachers' Association, Canada
- Unifor (111) Canada
- Allied Pilots Association - American Airlines

Universites

- University of Münster, Germany
- University of Freiburg, Germany
- FH Dortmund, Germany
- University of Rostock, Germany

OLV Solution Description

Approach, Process and Technology

The Lack of Confidence Problem

Technology

Outdated technology and improper cryptographic implementation leads to potential system vulnerability (e.g., MIT report)

Verifiability

Non end-to-end verifiable systems don't allow the election results verification, thus can be easily contested

Transparency

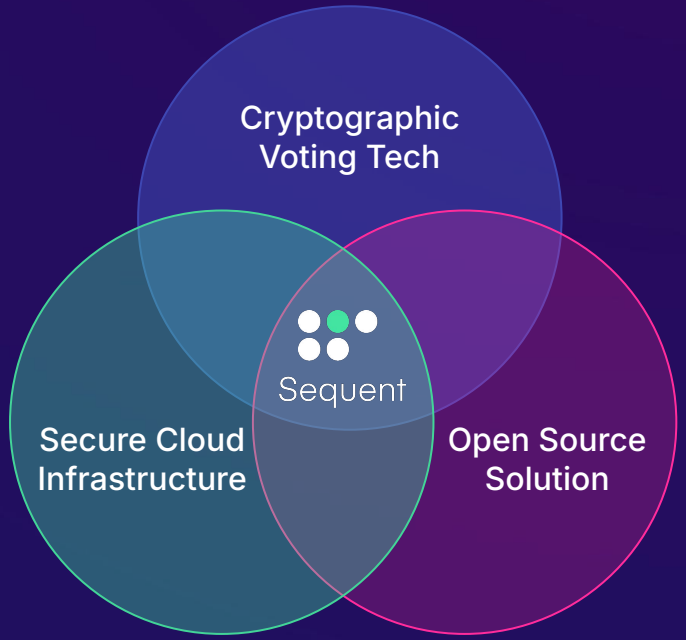
"Black box" voting systems can't be publicly reviewed and tested, thus leading to a lack of trust in the public

Availability

Scalability & performance issues caused by improper cloud and architecture implementation preventing voters from casting their ballot

Sequent Unique Approach to Ensure Online Election

Integrity, Transparency & Reliability

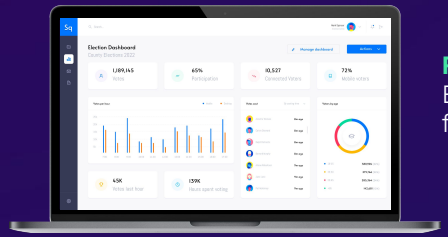


Benefits

- Secure by Design
- Strong Voter Authentication
- E2E Verifiable Election Results
- Publicly Vetted & Trusted System
- Scalable & Fast Performance

Sequent

Next-generation online voting platform purposely-built to ensure the highest level of confidence in online elections for election managers, voters, auditors and the academic community



For Election Managers:
Easy-to-use SaaS platform for online elections

For Voters:
Accessible web-based voting application

A Modern Solution for Voters & Election Managers

Easy-to-use,
web-based application

Responsive & compatible with a wide range of devices

Multi language - easily switch between languages

Accessible for people with disabilities (WCAG 2.1 AA)

Secure & private voting experience

Traceable & verifiable ballot

Step-by-step admin console

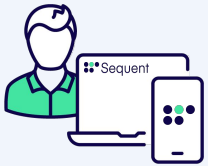
Customizable solution for different election systems

OpenAPI to easily integrate with 3rd party system

End-to-End Verifiable Voting

The gold standard for modern electronic voting systems. Sequent utilizes battled-tested, state-of-the-art cryptography to provides verifiable evidence that votes are cast, recorded and counted correctly.

1



Individual Verifiability

Voters can verify their ballot is **cast-as-intended** on their device

2

Individual Verifiability

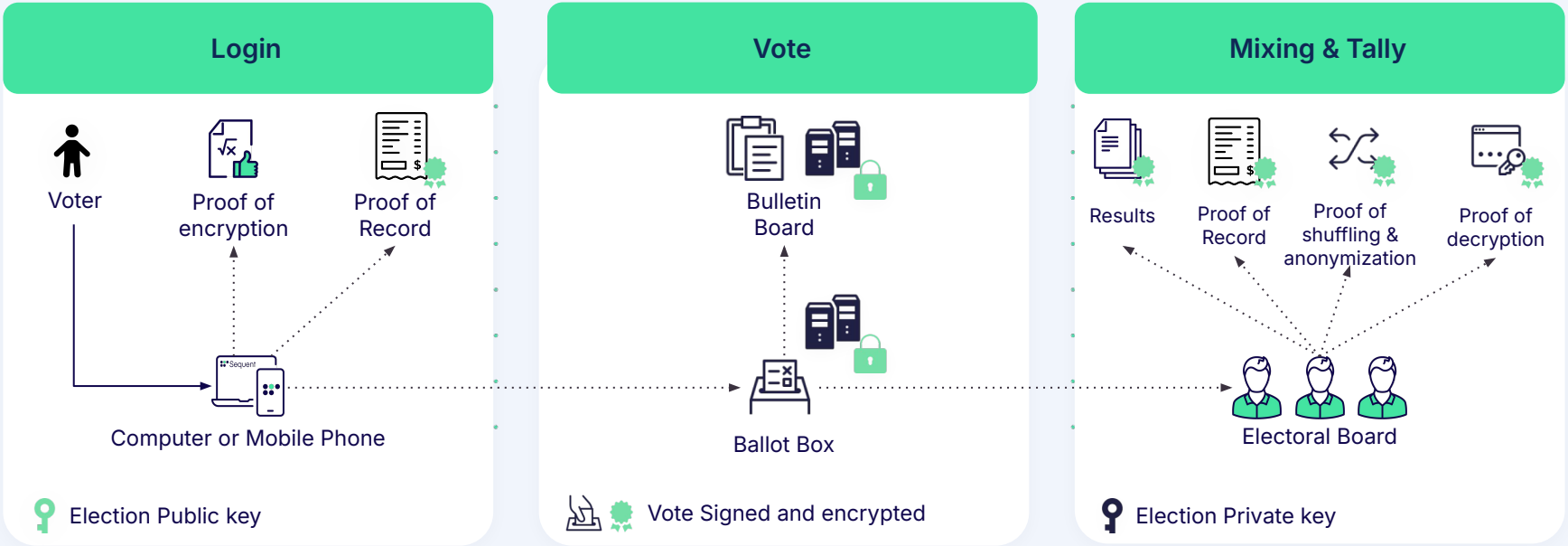
Voters can verify their ballot is **recorded-as-cast** on the election bulletin board

3

Universal Verifiability

Voters & auditors can verify all ballots are **counted-as-recorded** using Sequent election verifier

The Voting Process



Open-Source Online Voting System

Sequent has been developed as an open source system since 2011 and is currently the only commercially available solution for local and national organizations and governments

- Ensuring the complete transparency of the election process
- Harnessing the collective intelligence of specialists worldwide
- Ensuring software free of flaws, vulnerabilities and deficiencies
- Defending the integrity of the internet voting process
- Faster development and feedback loop cycles

Examples: SWISS POST, Microsoft, Linux, android

Thank you

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