#SFOpenVoting

San Francisco's free software voting system

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Why a free software voting system?

- What is a voting system?

- Why is free software (especially) important here?

- What software exists already?

- What are we doing in San Francisco?

Why use software for elections?

Dear San Francisco Voter,   September 13, 2016
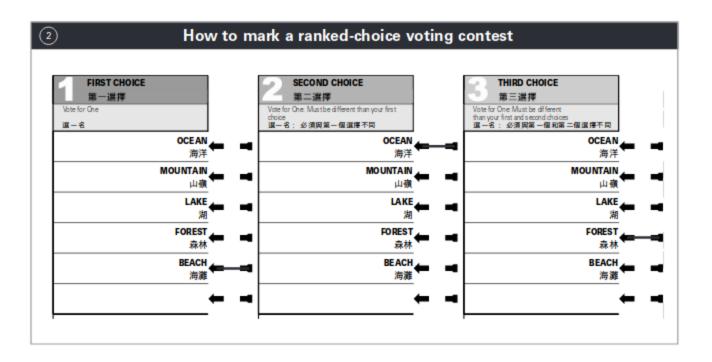
Big Ballots Are Back
While we've experienced them before, and successfully met the challenges they bring, all of us must prepare again to handle and vote another large, multi-card ballot.

This election, voters living in the odd-numbered Supervisorial districts will receive five ballot cards. Voters living in the even-numbered Supervisorial districts have it a bit easier since they will receive four-card ballots.

November 2016 election

- 3 federal offices (President+VP, Senate, House)
- 3 state offices (Assembly, Senate, Judge)
- 4 city/regional offices
- 17 statewide propositions (51 through 67)
- 25 city/regional propositions (A through X and RR)
- 4-page double-sided ballot, 5 pages in some districts
- 414k votes -> ~1.8M ballot cards

Ranked choice voting

- Board of Supervisors (30k-40k voters per district)
- Mayor (~200k voters)
- Requires algorithm to compute result

Reasons to use software

- Managing large amounts of data
    - 50+ contests w/ ~400k votes each
    - Ranked-choice elimination rounds
- Inputting all that data
- Reducing voter error
    - Warn against / prevent invalid votes
- Accessibility features

Types of voting systems

- Hand-counted paper ballots

- Paper ballots with optical scan

- Direct recording (levers)

- Direct recording electronic (DRE)
  - With or without voter-verified paper audit trail (VVPAT)

DREs without paper trail are bad

- Even if the software is free and open! (Which it isn't)

- No way to audit the results

- Still used in NJ, DE, SC, GA, LA
  - VA decertified theirs in 2017
  - GA-6 and NJ-Gov elections used these
  - Coalition for Good Governance sued Georgia over DREs (Curling v. Kemp)

- Banned in many countries, unconstitutional in Germany

Using software safely

- Use paper ballots
- Audit everything
  - CA: 1% audit
  - Emerging: Risk-Limiting Audit (RLA)
- Publish data
  - SF: detailed ranked-choice data
  - Future: images of every ballot scanned

What we use in San Francisco

- Proprietary system by Dominion (now Sequoia)

- Hand-marked paper ballots optically scanned at the precinct

- DREs with paper trail for accessible voting

- Vote-by-mail ballots scanned at City Hall

Voting system hardware

- Accessible voting device

- Precinct ballot scanner

- Central ballot scanner for vote-by-mail

Voting system software

- Ballot layout

- Ballot scanning and interpretation

- Ballot adjudication

- Tabulation
  - Non-trivial for ranked-choice elections

- Results reporting

- Audit assistance

Problems with proprietary systems

- Expensive (SF: $10M up front + $1.1M/year)

- Source code kept secret from public and city govt

- Making changes is hard / impossible

- Small market: 3 major vendors

- Vendor lock-in

- Security issues

Free software is important here

- Election software is critical infrastructure

- Trust in election integrity is important

- Antiquated voting tech is a problem
    - Often too expensive to replace

Practical advantages of free software

- Cheaper over time and across jurisdictions

- Innovation and adaptation easier and cheaper

- Investment for the common good
  - Developing jurisdiction spends more, others save
  - Need state/federal funding

Other free software efforts

Prime III / One4All

- Used in New Hampshire since 2016

- Prime III is GPLv3; One4All is NH's augmented version

- Accessible voting using COTS hardware

- Prints ballots; does not count votes

- QR code scanner to print pre-filled ballot from phone

ColoradoRLA

- Software facilitating risk-limiting audits

- Built in 2017 by FreeAndFair for Colorado under AGPLv3

- Statistical method to verify optical scan accuracy

Risk limiting audits

- Software interpretation of ballot linked to ballot ID

- Small # of ballot IDs randomly selected

- Physical ballots located and compared to interpretation

- Repeat until probability of winner being wrong is low enough

Other projects

- Travis County, TX: STAR-Vote
  - Design for a full voting system
  - "with a view toward ultimately" releasing as free software
  - Abandoned in 2017
- Los Angeles County, CA: VSAP
  - Full "voter-centered" redesign
  - Being developed, parts submitted for certification
  - Conflicting statements about free licensing
  - "open source stack/platform", "publicly owned code"

San Francisco's project

SF project goals

- Free software from the start (GPLv3)

- Commercial, off-the-shelf (COTS) hardware

- Openly licensed documentation (CC-BY-SA)

- Cheap and easy to reuse

- Set a model for state, country

SF project history

- 2005 - Activists first introduce idea
- 2008 - BoS creates Voting Systems Task Force (VSTF)
- 2011 - VSTF recommends open source
- 2014 - Unanimous Board of Supervisors Resolution
- 2015 - Unanimous Elections Commission Resolution
- 2016 - Mayor & BoS budget $300K for planning phase
- 2017 - Commission forms Technical Advisory Committee
- 2017 - Planning RFP issued; consulting firm Slalom selected

(Some) Supporters

ELECTRONIC FRONTIER FOUNDATION
DEFENDING YOUR RIGHTS IN THE DIGITAL WORLD

COMMON CAUSE
Holding Power Accountable

(GitHub)

CODE FOR SAN FRANCISCO

(Open Source Initiative)

(SF Tech Dems)

SAN FRANCISCO DEMOCRATIC PARTY

Harvey Milk
LGBT DEMOCRATIC CLUB

VerifiedVoting

FairVote
FOR A MORE PERFECT UNION

National Election Defense Coalition

Press coverage

Current status

- OSVTAC meeting monthly, developing recommendations

- Procuring interim system (likely proprietary)

- Budget season is in full swing

- OSVTAC recommended funding for:
  - Hiring a project lead
  - Developing the first iteration

Proposed first iteration

- Focus on vote-by-mail ballots (63% in 2016)
  - Scanner hardware+software
  - Software for layout encoding, tabulation, results reporting
  - (+batch management, auditing)
- ~6 devices instead of ~600
- Controlled conditions, highly trained operators
- Easier to phase in than precinct scanners, accessible devices

Recent events

- Slalom report published

- Commission voted to request $4M from the city

- CA Clean Money Campaign pushing for state matching funds
  - 2:1 match, up to $8M

How you can help

- In SF: ask Mayor & BoS to support funding

- In CA: ask Assembly & Senate to support matching funds

- Provide tech feedback to OSVTAC: https://osvtac.github.io
  - Recommendations on Github, open to PRs

- Spread the word

- Build interest in your community / pass a resolution

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SF Open Source Voting Technical Advisory Committee

- https://osvtac.github.io

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