Improving California’s 1% Manual Tally Procedures

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Outline

- Motivation
- California’s Tallying Process
- Methodology
- Findings
  - Security
  - Transparency
  - Efficiency

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Checking the Math

• If we can’t get the access and oversight support we need, what then? Audit.
  • By “audit”, we compare two sets of software-independent records
    – 38 states keep independent records
    – Only 17 actually count them

High-Level: What to Audit?

• Post-election auditing lit. has exploded
• Brennan Center / Samuelson Clinic convened a blue ribbon panel
• Examined:
  – Fixed-percentage audits
  – Margin-dependent audits (tiered and non-)
  – Polling audits
• Margin-dependent audits with a floor.
Low-Level: How to Audit?

- CA has had manual tallies since 1965.
- Very little is prescribed by election law
  - Tally must compare ballots in 1% of precincts
  - Must be randomly chosen and completed before the canvass is over (28 cal. days)
  - Must include all types of ballots
- We set out with a group of researchers to improve the security, efficiency and transparency of CA’s manual count.
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How Does the Tally Work?

- Precincts chosen randomly
- Materials are retrieved, verified, sorted
- Typically four people perform tally: Caller, Witness and two Talliers
- Use a tally sheet and announce “10’s”
- Hand tally is compared to electronic
- Discrepancies must be reconciled
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Methodology

- Examine existing procedures for the tally
- Worked with San Mateo in-depth
- Iteratively developed new procedures
- San Mateo used our interim procedures
- Observed tally process in San Mateo as well as Alameda and Marin.
- Revised and generalized procedures such that any CA county can use them.

Findings: Security

- Selection and tally must take place after ballots are counted
- Tally should take place soon after selection and seals verified
- Counting must be blind (not too blind)
- Certain procedures need expert review when revised
- Tally process should be resistant to insider attacks
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Findings: Transparency

- Provide public notice of the tally
- Publish tally procedures
- Publish useful data, digital & hardcopy
- Ensure clear lines of communication for observers

Findings: Efficiency

- Randomness w/ dice can be inefficient
- Electronic results need to be fine-grained
- Adverse effects of good team demeanor
- Pre-fill tally sheets
- Consider using RFIDs to ease pressure on chain-of-custody.
Dice Binning Calculator for Post-Election Audits

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To increase the transparency of the 1% manual tally process, a few California counties have begun to use 10-sided dice to produce publishably verifiable random numbers (see Cordero, Wagner and Dill 2006). Unfortunately, using 10-sided dice to 1) select from only a few precincts or 2) to select from many precincts can require a lot of re-rolling of the dice. To increase the efficiency of the process, Cordero et al. suggest “ bribery” the dice rolls so that each precinct has a range of corresponding values, of equal width, that allow a higher percentage of dice rolls to “hit.” This calculator implements this idea. It can also output the binning data in a form that is easily pasteable into a spreadsheet. Please click here for source code and licensing information.

**Settings**

Number of dice: 2
Number of precincts: 13
(By default, it starts with 2 dice and 13 precincts.)

Calculate

**Results**

- Range is 100. (This is the quantity of random numbers 2 dice can produce.)
- Rounded Interval is 7. (This is the number of random numbers per bin.)
- Interval modulus is 9 (% of rolls). (This is the number of random numbers that will require a re-roll.)

Paste these bins into a spreadsheet

Roll 00-06, pick precinct 1
Roll 07-13, pick precinct 2
Roll 14-20, pick precinct 3
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General Procedures for CA

May your votes be cast and counted as you intended.

Questions?