

Democracy at Risk: The 2004 Election in Ohio

Section VIII

Transparent Aggregation of Voting Results Using the Internet



TRANSPARENT AGGREGATION OF VOTING RESULTS USING THE INTERNET

Juan M. Jover, Ph.D.

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SUMMARY

A method is proposed to transparently compile and aggregate the voting results from all voting stations and accurately determine who won an election using the internet.

THREE PHASES OF VOTING

Voting can be divided into three phases:

1. Eligibility

This phase refers to all the procedures and equipment needed to determine who is eligible to vote including, among others, voter registration and voting location assignment.

2. Casting the vote

This phase refers to recording confidentially and accurately the intentions of each voter. This can be done in person or by mail. Recording the votes is accomplished through a set of procedures and voting equipment such as optical scanners, punchcards, etc.

3. Aggregation

After the votes have been counted on each voting station, an aggregation phase begins in which the votes from the different voting stations are aggregated into precincts and used to determine who won an election.

THE ISSUES IN AGGREGATING THE VOTES

Lots of attention has been paid to the first two phases. Eligibility is well covered in State and Federal laws and new laws are being proposed to cover registration of voters by third parties, voter identification, and provisional ballots.

The second phase, casting the vote, has received also lots of attention since 2000, especially in determining the intention of the voter and allowing Voter Verified Paper Ballots.

In contrast, little attention has been placed in Aggregation, a critical phase of the voting process. Aggregation refers to adding the results from the different voting stations to determine the winner for each race. The two main issues in aggregation are:

- Ensuring that the results from each voting station are accurately input into a tabulating computer.
- Ensuring that the tabulating computer properly adds the results from the appropriate voting stations for each race.

While the software required to perform these calculations is relatively simple, it is very possible to commit errors that will affect the results of a race because:

- Many tabulating computers are not used exclusively for this task and therefore are subject to viruses being introduced in them while performing other tasks (like browsing the internet).
- Many tabulating computers are connected to the internet to transmit their results and therefore hackers could change the results of the tabulation.

Problems with tabulating computers in the last presidential election have been reported (e.g., Conyers Report 1/5/05).

Only one piece of legislation (S450 and companion HR939) has been proposed in the 109th Congress to resolve some of the issues with aggregation. This law proposes:

- Certain data to be compiled on each Federal election
- This data to be disclosed no later than six months after the election.

This proposal would not solve the issues with Aggregation, and leaves vulnerable one of the three phases of voting.

A new method is proposed to aggregate results in an election. Because it is done transparently it provides a high degree of accuracy in the tabulation of the results and because of its design it can bring an additional level of scrutiny to the whole election results.

PROPOSED METHOD OF AGGREGATING RESULTS IN ELECTIONS

- At the closing of voting, observers shall preliminarily certify the results for each voting machine. The data collected shall include, among others, the number of votes per candidate, spoiled votes, number and type of voting machine, as well as demographics of the precinct. Each observer keeps a copy of the preliminary certification for each machine.

- A selected person (usually the presiding officer of the precinct) transmits this information to a central headquarters (this can be done via computer or automated telephone input system). A password protects that only authorized people enter the data.
- The information is automatically displayed in an official election website, listing all data per machine (indicating the name of the person submitting the data and time/date stamp).
- The observers of the election check on the official election website that the information displayed matches the counts that they preliminarily certified. This allows detection of any errors that may have occurred during transmission and posting of the information.
- The central computer displaying the website aggregates the results to show who won the election.
- The information in the website is downloadable by anyone, including the press and academic institutions. By downloading the information, third parties can verify that the information is aggregated accurately. The information should be in a standard format and should be available for download as soon as entered. Each download should have a time stamp in plain text and encrypted per the most advanced security methods available.

Therefore, this system solved the two problems with Aggregation:

- Accurate transmission of the election data, and
- Accurate tabulation of the results

IMPLICATIONS OF THIS PROPOSED METHOD

To ensure a fair and accurate election, the three phases of voting need to be examined. The proposed method allows for detection and correction of any errors that may occur in the Aggregation phase of voting and therefore it needs to be implemented to protect our elections.

Implication #1: This method provides an additional advantage: the downloaded data can be analyzed with powerful statistical methods to understand the profiles of the electorate and determine whether there is any anomaly with the election results.

Implication #2: A mandatory manual recount should occur before certification of the results if anomalies are uncovered by the statistical analysis.

Implication #3: A consistent data format and which data to report must be determined by a commission of experts.

Implication #4: The website program used in federal elections could be distributed to all states to ensure uniformity in reporting, which is very important for performing statistical analysis.

QUESTIONS & ANSWERS

How can you be certain that the aggregation is done correctly?

The basis of this system is that observers can check that the data counts introduced per machine are accurately reported on the official election website. Then anybody who downloads the data can ensure that the aggregation (tabulation) of the results is done correctly.

Is it secure to use the internet for this?

Yes. In this proposal the internet is used to post results and do the aggregation. Observers can check that the data on the website is the same that they certified for each voting station; if this is not the case, they can file an incident report online in the same website.

What if somebody hacks the system?

If a hacker changes the results reported per machine, the observers of the election would catch it.

Hackers could also modify the totals to change the winner of a race, but the third parties who download the data and review the reporting of the final results independently would catch this.

What if somebody enters the wrong data for a voting station?

The observers would catch the error and the data would be reentered, flagging the fact that it has been reentered with information of the person authorized to do so and the date/time stamp.

Can the internet handle all these requests for downloads?

It is well understood by internet experts, how to design a system that will allow all the downloads expected on election night.

Are there any additional advantages of using this system?

Yes. This system will allow third parties to perform statistical analysis of the data immediately after results per voting station are reported. This will allow a wealth of information to understand how the electorate voted and would allow a method to determine anomalies that would require a manual recount of the results in certain voting stations.

Is the system proposed here necessary to ensure accurate elections?

Absolutely. Many systems are needed to ensure accurate elections, but without the system proposed here we can never be certain of an accurate tabulation of the results of an election and therefore be certain about who won the election.