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The next frontier-On-Line Voting
Dec 8,2000
By Nancy Roberts

Today's voting system and mechanisms have been called into question in public forums as well as State and Federal Courts. Three major areas of concern have surfaced:

- 1) Only Valid registered voters listed on the voting rolls,
- 2) Undeniable Voter intent discernment,
- 3) Timely, accurate, auditable tabulation of results.

Each state legislature has established individual voting regulations that include registration of voters, voter verification, monitoring of voter process, ballot handling, protection, tabulation and recount. Other than the outcry of the citizenry that this process had got to change, it does not appear that a move has been initiated to synchronize the laws and processes to ensure equal treatment for all in the federal election process.

10 states have centralized voter sites, some as in the case of Wisconsin, allow registration up to and including election day, Virginia, North Carolina, Florida and other allow registration on-line, through the local Department of Motor Vehicles (DMV), and most have a mail-in process to increase absentee and elderly registration.

Depending on the location, local funding, and computer availability, a voter cast their ballot using one of several processes, optical scanners, punch card readers, and hand written ballots. Each has a its own tabulation requirements and established error percentage. The variability of the process alone, discounting the exit polls and media tainting of an unobstructed voting environment, places the fragile democracy we hold so dear at risk.

We must ask our selves why in this age of technological advance and budget surpluses a right and responsibility tied so closely to the foundation of our nation is not given top priority for modernization. Is it time for the leap to voting on-line for the new millennium?

Registration: Every valid, eligible voter should have the opportunity to register in a method as error-free as possible. Numerous states have been called to task for their failure to complete the registration process for scores of legitimate voters who attempted to register through DMV offices. Somewhere in the process between the voter completing the forms at DMV, the delivery of applications to voter registration, validation of applications, and mailing identification cards to voters, the process broke down.

Voter Identification Cards are required by each voter to be allowed to vote at the election. Voters should have followed up on the process if voter ID cards were not received. However, the responsibility lies with both the voter and the

registration officials. On-line registration could greatly improve the registration process and provide a centralized database that could then be compared to state records to eliminate duplicates, deceased, ineligible voters.

Regrettably many state laws will not allow digital signatures. President Clinton signed the digital signature bill into law 30 June 2000, using both a quill pen and a digital signature (smartcard). This bill is purported not to overpower state laws but to give them the opportunity to include digital signatures in the technology upgrades.

Cyber Threats: The Internet was not conceived to support the burden of the Critical Infrastructure that has been placed on it. It was initiated as a tool for education and military entities to share information with their peers. That said the Internet has become the vehicle of choice as the foundation for the exponential growth of e-connectivity.

Voting on-line brings with it the threats to the foundation of information security that threatens the Internet daily: confidentiality, integrity, and authentication. Malicious code is increasing in its complexity and destructive capabilities. International threat to this vital conduit has been verbalized on all fronts. The "Melissa" showed the first major bout of worm destruction and the "ILOVEYOU" worm encircled the globe following the sunrise, wrecking havoc in almost every country in less than 72-hours. Current transaction monitoring and auditing programs would need to be improved to eliminate the possibility for improprieties.

Process: Electronic voting would prevent the "chad" wars that have been erupting in Florida, a click to select and a second to verify the vote would ensure that the voters intent had been recorded. A selection for "intent not to vote" would eliminate the possibility that a click had not been recorded. The California Internet Voting Task Force advised a slow evolutionary road to voting on-line.¹

As a precursor to on-line voting they recommended starting with computerized voting at polling places. This would allow time to develop the processes for extensive monitoring, accessibility to all voters, and centralized registration databases. This would also provide instantaneous tabulation of votes placed. Eliminating the guess work of projecting a winner based on results from percentages of precincts without tabulating all the votes that caused the Media to announce winner/loser/winner in several states.

The goal would be to move all voting processes on-line, continuing to provide computerized polling place voting as an option.

The Gartner Group predicted that all states would offer on-line voting by 2004². Noting that the digital signature bill would provide a key ingredient for

¹ Mathews, William. "Take it Slow." 4 September 2000. URL: <http://www.fcw.com>

² Shewmake, Brad. "Analysts predict Internet voting to be standard by 2004." 11 April 2000. URL <http://www.nwfusion.com/news/2000/0411voting.htm>.

authentication, prevention of system outages, fraud, and attacks from hackers remain obstacles. The threats of electronic ballot-stuffing or tampering with voter registration records were specifically identified.

Security: On-line voting systems would have to be hardened, physically, operationally, and electronically.

Polling places are housed in a myriad of locations today, school lunchrooms, libraries, community centers to mention a few. Migrating to computerized polling places would require only minor increases in security over what is in place today. Voting systems, equivalent to small, independent networks, would be rolled in and setup much the same as the ballot machines are today.

The move to on-line voting would require a more secure environment external connectivity either direct connect to the voting central office or using Internet infrastructure. The information would need to be encrypted prior to transfer, have transaction processing controls to prevent tampering, as well as malicious code safeguards.

Economics: The cost of upgrading voting infrastructure would place a tremendous burden on state and local governments. Areas with sparse populations currently lack funding for the overhaul required to implement centralized databases. The additional requirements for replacement of the existing ballot tabulation equipment with computers would be beyond the capability of the local constituents. A joint project with Federal, State, and Local governments would be required to design and fund an interoperable voting system.

An additional economic impact would be created by the need for advanced training. Voting officials as well as support personnel would require training to support the computerized voting systems. In the 2000 election, senior citizens provided a large percentage of support at the local polling places. Voters could need assistance at the voting machine. Trouble shooting problems with local voting networks could become complex and time-sensitive.

Summary: The events transpiring during the 2000 Election and the mix of reports from State election processes, should force the nation to re-evaluate the validity of our current electoral process and accelerate the transition to a secure electronic voting process. Although, electronic voting will greatly increase the speed of tabulating votes as well as validation of registration status, it will also bring increased internal and external threats. The scrutiny under which the 2000 Elections has been placed will increase as the complexity of the voting system increases to meet the challenge of on-line voting.

A Federal, State, and Local planning committee should immediately be commissioned to start work on this vital process.

References:

1. Poulsen, Kevin. "Internet Voting may eliminate handling chad and butterfly ballots, but what about the vote-bots?." 14 November 2000. URL: <http://www.securityfocus.com/templates/article.html?id=114>.
2. Costello, Sam. "Clinton signs digital signature bill." 3 July 2000. URL: <http://www.fcw.com>.
3. Sliwa, Carol; Copeland, Lee; Tennant, Don. "Voter system in disarray across U.S." Computer World. Vol 34. No. 46. 13 November 2000.
4. Sinrod, Eric J. "Upside Counsel: Is voting headed online?" Upside Today, the Tech Insider. 18 Nov 2000. URL: http://www.upside.com/texis/mvm/print-it?id=3a1596361&t=/texis/mvm/upside_counsel.
5. Gittlen, Sandra. "Today's focus: Is online voting inevitable?" 21 November 2000. (email communications) NW on E-commerce for the Enterprise. Network World Fusion Focus.
6. Global Internet Projects. "The Reliability and Security of the Internet." May 2000. URL: <http://www.gip.org/publications/papers/gipwp0500.asp>.

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