USA-Vote
A Proposal for Universal Voting

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http://www.universalvoting.com/USA-Vote-whitepaper.pdf

The Problem

We watched the 2000 and 2004 Presidential elections, the controversy they generated, and the doubt they created about the validity of vote counting in the United States. A lot of people who care about democracy in America wondered if there is a better way.

The House Judiciary Committee issued a critical report on the voting problems in Ohio in 2004[1], which were repeated in many other states. The Government Accounting Office issued a report detailing problems with existing electronic voting systems[2].

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[1] http://www.universalvoting.com/Conyers-Judiciary-Ohio-0105.pdf
[2] http://www.universalvoting.com/ GAO-Voting-Reliability.pdf

Clearly, there is a serious problem. It is more than sour-grapes from the partisan losing side, and less than the fantasies of conspiracy theorists. But it is real.

Is there a way of conducting elections that would eliminate the problems of transparency, universal access, lack of clear, consistent standards, and trusted security that showed themselves in 2000 and 2004? We solve bigger problems than this all the time; science, commerce, medicine and the military manage intricate logistical problems every day, and over time their systems become close enough to perfect that everyone relies on them.

In 21st Century America, there's no excuse for voting systems based on 19th Century assumptions. Democracy is a vitally important idea, but it rests on a few fragile pillars; the consent of the governed, as expressed in fair, universal elections, is one of them. If we believe in what America stands for in the world, better ways to vote must be a strong national priority.

And it seems that everything these days claims national security significance; in the case of voting, this is certainly true. Our current antiquated system literally invites outside manipulation by the highly-motivated terrorist, foreign power, criminal or hacker.

Universal Voting by ATM

We think it's worthwhile to explore how the current national ATM network in use at banks every day could be used to conduct elections, instead of the ragtag proprietary combination of paper, punchcards, scanners, and electronic voting we have now.

With a program we've dubbed Universal Voting, once every two years, tens of thousands of ATMs around the nation would perform temporary double duty as polling stations for a few days. More than 100 million ATM transactions take place every day in America; several hundred million dollars in $20 bills efficiently change hands. Customers and banks have

complete confidence in this system; errors are rare, and problems are solved quickly and efficiently. Banks, and the transaction management networks that interconnect them (like Cirrus, Star and Plus) trust the system so much that they dispense a torrent of real live cash, every day, 24 hours a day.

All the central hardware, software, security and backend systems needed for a sophisticated voting system in America already exists. The huge costs of building a separate infrastructure, cited by some as a bar to a fair voting system, simply don't need to be expended. The national ATM network took 20 years to build and billions of dollars to finance, by hundreds of banks; it's constantly being renewed, replaced, maintained, scrubbed. It's a big profit center for banks, key to their cost control and automation, central to the productivity and their bottom line.

Some of the best security minds in the world watch those ATMs, the central computers, their networks and wires, like hawks every single minute, alert to the tiniest glitch. People young and old, able and handicapped, rich and poor, across all racial lines, in all language groups, use ATMs -- Americans know and trust them. Why shouldn't voters, and the government, take advantage of some of that in-depth long-term investment?

With Universal Voting, the last-minute crush of lines at polling stations would disappear; everyone gets a receipt; the distribution of polling places between suburbs and cities is greatly improved; everyone has confidence in the results; voting systems are not in the hands of one or two vendors in a state but are spread out nationally among many banks and ATM manufacturers. Those huge budgets for buying new voting equipment, running new networks, writing and certifying new software, can be re-directed.

Who's in Charge

We propose that a trusted national public sector organization, such as the United States Postal Service, set the standards, collect the votes, help local districts to administer voter registration, run the main computers that count

the votes and report the results. Every registered voter would receive a one-time USA-Vote card from the Post Office with a secret PIN, that works just like a bank ATM card. Once used, the PIN could not be used again.

Special ATMs at Post Offices would plug the gaps in the ATM network for rural and inner city communities, and the people behind the Post Office counter would handle questions about the cards. Government, in a shared federal-state-local association, would pay the banks per verified vote, the same $1.50 - $2.50 that consumers now pay for special ATM transactions.

How Much Does it Cost

If we, the taxpayers through a competitively-bid contract, paid an average of $2 per vote, that would amount to about $240 million to handle the big turnout experienced in November, 2004. That's much less than the federal government alone now spends on the quadrennial national election; if all the state, local and county costs are added in, the cost of a big federal election like 2004 is over $650 million.

So we can both save money and do the job better. With a common-sense use of technology, nothing new to be invented and most of the capital costs already covered, we can have universal voting in America, for every election. And we can have it soon.

Current Solutions

We asked ourselves -- how would a world-class business that deals with the general public, like a big bank, an airline, or a mass retailer, solve a problem like universal voting if it were central to their business?

Is there some network, some infrastructure, some business model out there that would help government see this problem in a new light? Transparent,

accountable, verifiable, secure, efficient, cost-effective, fast and completely trusted voting is central to government's reason for existing. It is at the core of government's "business model".

Beginning in the early 90s, many companies started these problems with dedicated touchscreen and other electronic voting systems. They have done important pioneering work, and their successes as well as their challenges provide valuable insight.

But the standalone, dedicated voting machines of today address this big problem in a bottom-up way; they can conduct a citywide, countywide or statewide election, but they are expensive, often lack full, transparent accountability, are based in widely varying standards. There is no nationwide integration; every state has to buy its own machines, and every system is incompatible with every other. There are no common standards; every machine and every network has to be audited individually, often only by the vendors themselves.

Today, the media does the national count for us, aggregating the results from all the state organizations; the private sector makes all the equipment and software, runs all the networks. There are no standards for how voters are registered, how votes are counted, how totals are reported, how results are audited and verified, how voters know what they voted for.

This patchwork system has taught us to accept the inevitability of high error rates. 1% is accepted as unavoidable, and much higher error and fraud rates are possible (but not ultimately knowable).

Voting is a National Security Issue

With sufficient time and resources, a terrorist organization could manipulate a few of America's key precincts, counties or state results and influence our elections. In the most automated districts, we would have no way of knowing that this hacking had been done, by whom or how, and would be forced to accept and certify the results. If Al-Qaeda could tip a US election,

so could any other organization, domestic or international. There are a thousand potential points of penetration to this polyglot system; it's a security expert's nightmare, and a hacker's dream.

If the banking, airline, retail, shipping or financial securities industry, with billions of critical transactions per day, were to experience anything close to a 1% error rate, their customer service capability would collapse inside of 24 hours, entire companies would go out of business inside of a week, and the US economy would implode. Yet somehow this error rate has become acceptable in the way we elect governors, senators, congressmen and presidents.

One of the pillars of democracy, and a key to our national security, is treated as if errors don't really matter.

How it Works

An election ballot is not the same as an ATM transaction, in many ways. It is more complex; it involves more choices, more screens, more verification points, more lengthy receipts to print, more data to transmit, more in-depth security and auditing capability. Not all ATMs would be adaptable to voting; for example, the low-cost simple consoles one now finds in convenience stores probably would not work well.

But most bank ATMs have enough buttons, or already use touchscreens with programmable buttons. With creativity they could be certified and remotely programmed for voting. Many ATMs have color screens, audio capability, and are fitted to allow degrees of handicapped access. They have printers for customers, and internal journal printers, with world-class security at the hardware level using encrypted PIN pads. Government would pay each bank a fee for collecting, tabulating and auditing each vote, issuing and tracking the one-time PINs, and sending their batch count to a national network run by a trusted public entity like the US Postal Service, which already has massive and ably-managed information technology resources.

People would be issued one-time magstripe cards when they register -- by mail, in person at a post office. Then they could use any certified ATM to vote. The card would be voided after that, and worth nothing if stolen. Post Offices could instantly qualify, register and issue people ATM-vote cards, with PIN. Anyone with the right ATM could vote anywhere, any time.

And if I can get $100 with my California-based Bank of America card while I'm visiting South Florida, where there is no Bank of America -- why can't I also vote from anywhere in the country? With this system, I could literally vote anywhere in the world, within the specified time window, provided the ATM I chose was USA-Vote certified.

Some Problems

Like every plausible idea, this one has flaws that appear when you peel back a couple of layers. We believe these problems can be solved, and that solving them is far easier than solving the problems with the current voting system.

1: We would need a **national voter registry**. Now, the voter rolls are in every conceivable form, from paper in bound volumes to microfiche to computer records; they are held by thousands of different public entities. Assembling all of this into a national voter registry is a big task.

2: **Getting the cards into everyone's hands**. For people with a current mailing address this is easy. But people move...and some people have no single address. Allowing a Post Office to accept voter's registration and issue a card, as well as to serve as a polling place, begins to solve this.

3: There will be **legitimate privacy concerns** over assembling a single national database of voters. And over issuing cards to everyone, even if they're only for one-time use, for voting only.

4: **Potential theft or mis-direction of voter cards** -- what happens if someone else receives and opens my USA-Vote card envelope and takes my card? Can they use my PIN to vote? How do we resolve conflicts over who is who, and who has a valid card? Banks and credit card companies resolve this potentially expensive problem by sending cards and PINs separately, by having toll-free numbers to call and activating the cards upon receipt; some combination of such techniques will be needed. Voters and banking customers are similar in many ways, but not in all.

5: How do we provide **security and privacy at ATMs**? There are instances of PIN theft by camera, of intimidation and crime at ATMs, of theft of ATMs themselves. The poll workers and monitors who serve in fixed locations now might need to be deployed to the qualified ATMs in their precincts, and fitted with data-capable celphones so they could answer questions. Bank personnel inside might also play an assisting role; perhaps hours of universal voting would be restricted to daylight or business hours in some places. Polling stations and ATM sites are similar in many ways, but not all.

6: How to determine the **cost of casting, counting, verifying, printing, and possibly recounting a vote**? And how this translates into vote processing rates that cover costs, allow for growth and new investment, and a reasonable profit for the commercial participants? These are complex transactions, both at the user interface and at the database back-end. On a ballot that contains federal, state and local candidates, issues and initiatives, how do we apportion the cost among the various levels of government?

7: **National standards for vote-certified ATMs**: there are dozens of ATM types which could be certified for universal voting, in that they have a certain number of buttons, a certain type of screen, an adaptable touchscreen. Setting the standards for certifiable ATMs, certifying and testing them nationally, ensuring inspection and compliance, is a big job.

8: **Software customization, installation, maintenance, universal access**: for each ATM type, and for each ballot, software needs to be written that makes the choices easily viewable, preferably in multiple languages; makes

the choices clear and verifies them; moves efficiently from screen to screen, back and forward through a sequence. Templates can be developed, and some part of the display software can be data-driven, effectively writing itself; but each ballot and each ATM type needs to be tested and verified, and some custom assembly will almost always be required.

9: The **existing manufacturers of voting hardware and software** -- what about the current voting machine companies, which make the cards, readers, scanners, touchscreens, etc.? Does universal voting put them out of business, voiding investments made over many years? What about all the existing contracts signed between these companies and their public sector customers? We don't want people to lose their jobs or companies to lose their investments needlessly. The fact is, many of today's voting technology companies (such as Diebold, NCR, A&S) are already deep into the ATM business as well, so they would welcome this change as a new business opportunity. Custom voting machines was always a problematic sideline for them. Other specialized smaller vendors now active in the industry could be given a preferred opportunity to bid on new national contracts, based on their ability to perform some of the many conversion and upgrade tasks. Universal voting would create many new business opportunities for the creative entrepreneur, like adding video, explanations of ballot measures, multiple languages, contributions to special funds like disaster relief, medical research, any of which could generate additional revenue.

10: What about **people who can't make it to ATMs or polling places**? In some places, these people are accommodated by mail, and that could continue. In others places, people with home computers could be set up to vote over the Internet. This would require installing a USB or keyboard-level card reader and PIN pad, which costs about $25 wholesale today. For customers who need the equipment, costs could be subsidized by existing voter access funds. Over the Internet, not only the elderly, disabled or handicapped could be served better -- those who prefer a different language could be served better. Sorting out the nest of issues this raises, the cross-cutting funds and priorities, the security wrinkles, is a challenge.

11: How about **overseas voters and troops serving abroad**? For now, this

should be done the same way as now, largely with paper ballots by mail, but there's no technical reason that it couldn't be done through ATMs as well. ATMs are ubiquitous internationally, and they connect to many of the same interchange networks as we do in the US, or are denominated as VISA cards. From the standpoint of the network, a vote cast on a certified ATM in Dubai or Sweden or Thailand is the same as one cast in San Francisco or Houston. Fascinating questions like international polling assistance, how to collect US voter printouts from foreign banks, and additional security, would need to be addressed to determine if the cost-benefit equation for international ATM voting pencils out.

12: **Custom, habit and tradition**: some people just plain like the old-fashioned community polling place. Some folks just love volunteering to sit and meet their neighbors, and get them to vote. It's an American tradition, and flying the flag in the school gymnasium or the local Lions club on election day is a wonderful thing. Pushing everything out to ATMs on the streets and in the malls would seem sterile to some, hacking yet another tradition out of community life in America. It could make it seem like voting is less locally controlled, and more centrally controlled by a faceless government. So it's advisable to maintain some traditional polling places; to supplement the commercial ATMs with equipment in a familiar, friendly Post Office; to phase in the program over a couple of election cycles while people get used to universal voting and its many advantages.

A Related Opportunity

Once a universal, secure means of handling complex transactions is put in place, monitored by a trusted third-party public entity like the US Postal Service, this capability could be of immense value to businesses of all kinds. And this could help fund the cost for government.

Polling for television ratings, consumer products and issues, political parties, market research for new products, could all provide additional revenue opportunities for the USA-Vote platform. These new business opportunities would create more incentives for banks to upgrade their infrastructure, for

ATM makers to develop and deploy certifiable ATMs in more locations, creating more jobs for the software and security companies, and for companies that issue custom ATM cards. All of this new activity would drive down the net cost to the government for using the platform for elections, as new revenue sources develop. Developing the business formula for determining rates charged by banks, and by the Postal Service, for such extended transactions, for setting up a competitive market that maximized innovation and opportunity for small business, would be a fascinating challenge.

Caveat

There is no easy, immediate, one-size-fits-all solution. Anything we do with voting will solve some problems, but will also identify new ones. Any plan will have to be designed to change, to be adaptive, as we learn what works and what doesn't. It will take time.

Trying to solve every problem out to the last digit is not possible; there are always exceptions that defy a universal solution. The perfect should not be the enemy of the possible.

A single perfect solution is not immediately possible; that is no reason to forego action. The current voting system is so dramatically imperfect that many big improvements will be easy to engineer in a first phase, within two years. Refinements, approaching the last digit of universal access, transparency and security, will likely be made over several election cycles.

About the Author

I live on the North Shore of O'ahu, Hawai'i in a small town called Haleiwa.

Through the 80s and 90s, I ran a company called North Communications, based in Los Angeles, with offices around the USA, in Europe and Australia. Today I head up Greenstar, a company that invests in solar-powered

community centers for small villages in the developing world
(http://www.greenstar.org).

North Communications pioneered touchscreen technologies -- hardware, software, networking, security -- and had many firsts. The first real-time government transactional network (Tulare County 1987); the first secure public access to federal data systems, including Social Security and Medicare records (1988), the first court-filing system (LA County, 1989), the first Web-connected system (Superbowl 1992), the first statewide job-finding system (Hawaii, 1990).

We took on some knotty questions about security, confidentiality, public access, user interfaces, real-time network operations, backup and recovery, troubleshooting, and standards compatibility at a time when such ideas were evolving quickly. The confluence of all of these ideas, and building large-scale integrated systems to answer the challenges, was fresh.

You can see some of what North Communications did on my website: http://www.mediasense.com/northcommunications/

One of our biggest clients was the US Postal Service. Among our technology allies and partners were IBM, GTE (now Verizon), Xerox, Oracle, Computer Sciences Corp. Key people from some of these groups are still part of my circle, and we're interested in taking on the new, clear challenges of voting in the 21st Century.

We're kicking these ideas around now, and this document offers them for comment by the technology, political, banking, public interest and business communities.

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