OPEN VOTING CONSORTIUM

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David Beirne
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Dear Mr. Beirne:

I've read the paper you released April 14th, *Open Source: Understanding Its Application in the Voting Industry*[1]. This is a significant statement, and I am recommending it to many people. I've also read your press release about it, and I will try to distribute my response similarly. I am suggesting that the we move to new voting technology and a new system for development and maintenance of the software – open source software.

There are parts of your paper I can fully endorse, and there are other parts that could use clarification. A few things you have written are incorrect or misleading. Most importantly, you raise some very good questions. I offer answers to those questions, and I also offer some clarifications and corrections.

You acknowledge that **"open source should be recognized as a potential product substitute for proprietary software systems."** In many instances, open source has proven to work well in unregulated markets. But how can it work in a highly regulated market such as the voting systems industry?

Open Source Models

Strictly speaking, open source refers to a licensing arrangement. While the open source model often involves a purely volunteer group of collaborators, other models are possible. Your paper does not adequately explore other models that have worked, or other models that could work in the future. For example, you list some of the popular projects on SourceForge.net but fail to mention OpenOffice, one of the most important open source products, which has been created and maintained by Sun Microsystems.

Open Voting Consortium (OVC) started a project on SourceForge in 2003. The software for our April 2004 demo was kept there. Due to problems we had with the site, we abandoned SourceForge shortly after that (our code is now maintained at FOSS Factory).

You ask how an open source voting project could deal with necessary changes to the code, assuming one could ever get certified. OVC is designed to do exactly that. If we reach a point where we have sufficient backing and membership to get our product certified, we would also handle changes and new certifications. I think we would agree that without a structure surrounding and supporting the open source voting software, the software itself would be worthless.

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1   http://www.electiontech.org/documents/opensourcefinalonline.pdf

We plan to have regularly scheduled releases – perhaps every two years. Development would be continuous and done in parallel with field testing, as with other open source projects. At these regular intervals, the system would be submitted for certification. So, any new requirement would go into the hopper and could be expected to be in the next scheduled release.

The OVC idea would mean that users of the open voting technology and providers of the open voting technology would all be members of our consortium. We gained our first governmental membership last year: Johnson County, Kansas.

Two years ago, at a Caltech-MIT workshop[2], I extended an invitation to all the vendors to join OVC (three of your four ETC members were represented there, ES&S not there). I renew that invitation now. Your members could sell the hardware and services that go along with our system. The software would be collectively created, certified, and maintained in our consortium model.

Market Failure

You say that we should let the market decide. However, you continually ignore an important reality: Namely, that the voting system industry is an example of a failed market. We are not going to correct this market failure without some very basic changes.

Whether stated in this way or not, Election Technology Council was organized to address market failure. Your 2007 paper[3] about the "broken" regulatory process is really about market failure. You wrote some about preventing market failure, but did not acknowledge that it already occurred.

Voting system industry market failure has been due to the proliferation over the past 45 years of voting technologies that pose significant public risks. Regulation has grown in an attempt to mitigate these risks – grown to a point where a customer might want a new system but the market cannot provide it.

The DRE idea has been a seed for market failure. Industry needs to abandon this idea. For millenia, a vote has been represented by a tangible, physical object (a "ballot") that the voter casts. This is a sound idea, and should continue to be embraced.

The lever voting machine was a notable departure from this idea – direct record, no ballot. The DRE (Direct Record Electronic) machine was seen as a logical evolution into the computer age of the direct record idea embodied in the lever machine. The lever machine was a pretty good idea and endured for over a century.

The DRE idea is a bad idea – not a good analogy to levers. Here's why: if, just before voting begins, you set up a lever machine for the election and invite people to verify that it is recording votes properly, testers can gain reasonable assurance that it will work the same way while voting is actually going on. If you do the same thing with a DRE, testers have

2   http://www.openvotingconsortium.org/ad/Agenda.pdf
3   http://www.electiontech.org/ETC-BROKEN.pdf

absolutely no valid reason to believe the machine will record votes properly, even if it seems to work perfectly while testing. Only people with little understanding of computers could possibly find such a demonstration convincing. Whether intentional or by accident, erroneous outcomes are possible voting on DREs.

In recent years, this issue with computerized paperless DRE machines has been widely recognized. The correct response would have been to scrap the DRE notion entirely. Instead, it was decided that a "paper trail" printing mechanism would be added. While this is not entirely the fault of industry, it should never have been done. It is like adding tractor wheels to a submarine – an expensive kludge at best.

The Electronic Ballot Printer (EBP) has practically all of the advantages of the DRE, but adheres to the age-old idea that a vote should be represented on a tangible, physical thing (a ballot) that can be counted and recounted by hand, if necessary. Industry should embrace the EBP and abandon the DRE.

Government often steps in to address market failure, and clumsy attempts have already been made to address voting system market failure.

I believe that you and your members would prefer to see industry – rather than government – address this market failure. I agree that industry correction would be preferable.

Open Source v. Disclosed Source

You do a fairly good job explaining what open source software is and how is differs from disclosed source. However, a few things you wrote need clarification or correction.

You quote Hippel saying, open source software is "software that is made available freely to all." This is not a useful description. There is a great deal of software that is freely available to all but only in binary form – no source code provided. This is not open source. Your ad hoc reconciled description is okay, if not complete[4].

With open source, the source code (instructions for the computer that programmers write) is freely available, along with permissions to do things with the code, like distribute it to others and change the code as you see fit. You quote the list of criteria given by the Open Source Initiative (OSI). This is good.

You describe the General Public License (GPL) developed by Richard Stallman. A key feature of the GPL is that if you modify the code, this new version needs to remain free and open source, carrying the GPL license with it.

Berkeley System Distribution (BSD)[5] is the other major version of open source license.

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4   You wrote that it's "an environment in which the software source code is available for inspection, analysis, and programming enhancements through a communal effort."
5   Strictly speaking, "BSD" only refers to the original Berkeley System Distribution license. Any other "BSD" software is really BSD-style or BSD-like, or BSD-compatible, etc.

With a BSD-style license, you can do most anything with the code, including using it in a closed source proprietary product (unlike GPL). BSD is almost as permissive as public domain. With public domain source code, there is no license at all. The author(s) of public domain software may be unknown or the code may have been explicitly released into the public domain by the author(s).

You cite OVC as an advocacy group and claim that we, "are encouraging a disclosed software model rather than a true open source requirement." This is incorrect.

While OVC has sponsored legislation that would require voting machine source disclosure, true open source for voting systems has always been our ultimate goal. Legislators hearing our case, have understood this even when it was not explicitly stated[6]. The source code we have developed has all been released GPL. In our discussion group (6 years of archived discussion available online), this point has been made many times. Open source invites many eyes on the code. "Mere publishing of source code, however, does not create this kind of community,"[7] as Apache founder Brian Behlendorf put it.

One of our major successes last year was to get a policy adopted by the New York State Board of Elections to underwrite testing of open source voting software. The policy is quite explicitly for open source, not disclosed source[8]. Your paper does not mention the NY State policy at all.

Australia's eVACS: A Poor Example

There are some lessons to be learned from the eVACS example, but not the one you try to make. You try to say that they decided to restrict the code, because they could not make money with it as open source.

In early 2003, I investigated the eVACS system with great interest since I wanted to create an open source system for the U.S. Here are a few things I learned:

- eVACS was initiated by state legislature (ACT, a small state in Australia)
- The request for proposals did not specify open source
- Software Improvements, who won the bid was not a voting system vendor
- Software Improvements was not an open source company either, but used the claim that they would open the code as a selling point to help win the bid
- The system was never open source, although initially advertised as GPL. I downloaded everything they had available and found important parts missing. I asked the people at Software Improvements about getting the missing pieces and they refused. Only a few pieces of obsolete code were ever made available.
- The project was grossly underfunded and Software Improvements was unhappy about that and did not want others to take advantage of their work.

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6   See this account of a 2006 hearing, where Assemblyman Villines says, "it would lead to open source" (in reference to source disclosure): http://www.openvotingconsortium.org/blog/2006-apr-26/no_opposition
7   http://gnosis.python-hosting.com/voting-project/November.2007/0079.html
8   http://www.openvotingconsortium.org/blog/2008-feb-27/ny_state_board_of_elections_passes_resolution_favoring_open_sou

- The voting machine software was designed to run on standard PCs . They used horizontally mounted CRTs mounted in cardboard stands in the voting booths.
- To this day, ACT touts the open source aspect, saying it uses "Linux open source software to ensure appropriate transparency"[9]
- The overall quality of the system was horrible[10]
- There was never any serious proposal given by ACT or Software Improvements about how the software could evolve in an open source model

In this case, "open source" was merely a sales gimmick. It helped Software Improvements win the bid. That's it. It is interesting that ACT allowed Software Improvements to do what they want with the software. ACT could have maintained strict ownership of the code. Bottom line, this was not a serious attempt to build a new voting system – it was just a small contract given for a pilot project.

The most remarkable thing about eVACS is that it's an example of the government commissioning the development of voting system software. This has been talked about in the U.S.[11] but examples are rare. Oklahoma developed and maintains its own election management system[12]. Election administration is a governmental function, so it should not be surprising to see government developing software for this purpose.

Beyond that, eVACS represents an example of using standard PCs for voting machines. I also like the horizontal mounting of the display screen in the voting booth. I used this idea in our voting booth design[13].

Intellectual Property of the Voting Industry

You make the claim that, "The involvement of the government in requiring the willful disclosure of all proprietary software to the general public calls into view the specter of intellectual property rights and the potential for a government taking in violation of the United States Constitution ." You are arguing against a scenario that no one is promoting.

Since you brought it up, let's look at Article I, Sec. 8 of the Constitution: ***"To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries;"***
The relevant phrase is, "to promote The Progress of Science...." It is a stretch of the imagination to say anything in the voting industry involves progress in science. Voting technology is applied – no new science involved. A proprietary method used in a voting machine is merely different from another proprietary method used by another manufacturer. Simplicity should be preferred over technical virtuosity. We're not advancing any sciences here. It's all applied. Nonetheless, it is common practice for companies to use intellectual property claims to carve out their niche. So, we get that.

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9   http://www.elections.act.gov.au/elections/evacs.html
10 http://midgard.cs.ucdavis.edu/~niu/projects/final-report.pdf
11 California Secretary of State Debra Bowen said, "it could have been done" in reference to the state commissioning it's own voting software. See http://www.openvotingconsortium.org/blog/2008-apr-07/bowen_urges_los_angeles_to_go_for_open_source_voting
12 http://www.eac.gov/News/meetings/060304/pres5-060304
13 See this YouTube video of our system in use http://www.youtube.com/watch?v=q8CSKdMTARY

The case industry makes for keeping inner workings of vote tabulation processes as trade secrets is not compelling. The People have a right to demand transparency in election administration as a matter of policy.

Even in Secretary McPherson's 2006 paper[14], you can find a quote from prominent computer scientist and lawyer, Michael Shamos, where he says, "all voting system software should be disclosed to the public."

How Opening the Code Affects Voting System Security

At the 2007 hearing where Professor Matt Bishop of UC Davis presented the findings of the California Secretary of State's Top-to-Bottom Review, Chris Reynolds, a panelist and SoS staffer, asked if keeping the code secret provided at least one layer of security for the system. Professor Bishop replied that it did, but was a "paper thin layer" and should not be relied upon.

It has become a basic tenet of computer security that one should assume your attacker has your source code. Indeed, with the potential of an insider cheating, that should always be assumed. System security is maintained in layers. These layers have almost nothing to do with having or not having the source code for the software.

A recent example in Kentucky of insider cheating[15] was no where near so sophisticated that source code access would be relevant.

The open source web server software, Apache, is considered the most secure and now running on 106 million servers[16], compared to 67 million running the Microsoft offering. PostgreSQL has been hailed as the most secure database software – also open source. The security of open source is good because it is peer reviewed by programmers all over the world. The voting industry should take advantage of this free assistance.

Summary

People have been discussing for many years the potential creation of public software to be used in election administration. I've personally been promoting this idea for more than eight years. The earliest mention of the idea that I know of goes back more than 20 years. Ronnie Dugger wrote about this toward the end of his article[17] in The New Yorker:

> *Some citizens believe that vote counting software should be in the public domain, available to all parties and candidates, for whatever checks they wish to make on it. "I'm not for a public process being handled by private companies that won't let us see what's going on," says Susan Kesim, a young executive of a computer-security firm in Indiana. "Public-domain software -it's open. I want to see that it*

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14 This paper was called for by CA Assembly Concurrent Resolution 242 of 2004, sponsored by OVC http://www.sos.ca.gov/elections/open_source_report.pdf

15 Schneier points out that cheaters did not make use of any of the documented vulnerabilities of the machine http://www.schneier.com/blog/archives/2009/03/election_fraud.html

16 http://news.netcraft.com/

17 Annals of Democracy, NOV 7, 1988 http://www.csl.sri.com/users/neumann/dugger.html

added one to the total, because that's the process of voting."

"Maybe a private foundation should do it," Frederick Weingarten has suggested. "Maybe if there was a consensus among the states, the federal government could write its own software and certify it through the National Bureau of Standards or the F.E.C. say, `This we guarantee is accurate and untamperable.' "

Penelope Bonsall, the director of the F.E.C. Clearinghouse, said of the public-software concept, "It's a public policy question; it's too broad for us to consider. It would have to compete with private interests. I don't know who would fund it. I just don't see how you would eliminate private efforts in this area."

I believe we are building toward a consensus, slowly but surely. Your paper represents the first time the voting industry has published something taking a serious look at open source.

Currently, more than a few markets are experiencing failure – banking, energy, health care, automotive – where failures are costing society trillions of dollars concomitant with massive government intervention, While market failure in the voting system industry involves orders of magnitude fewer dollars, it is no less important.

Election administration is a governmental function. The U.S. Government did not design the voting industry to be a profit center for a few companies. Government has every right and every reason to specify how the voting process should be done. Calling efforts to mandate or encourage (with incentives) open source "unfair," is incongruous. If the voting industry cannot get its act together to correct this market failure condition on its own, it should not be surprised to see the government step in – they could even abolish the voting industry altogether.

We can make this correction without further government intervention if we halt the proliferation of voting technologies and move toward a good, uniform, and open system.

Sincerely,

Alan Dechert

Cc: **Debra Bowen,** California Secretary of State
Evan Goldberg, Chief Deputy Secretary of State
Lowell Finley, Deputy Secretary of State
Diane Feinstein and **Barbara Boxer,** my representatives in the U.S. Senate
Tom McClintock, my representative in the U.S. House of Representatives
Dave Cox, my representative in the California State Senate
Roger Niello, my representative in the California State Assembly
Steven L. Weir, President, California Association of Clerks and Election Officials
Dean C. Logan, Registrar-Recorder/County Clerk, Los Angeles County
Don Knabe, President, and members of the Los Angeles Co. Board of Supervisors

David Chiu, President, and members of the San Francisco Board of Supervisors
Dennis Hererra, City Attorney, San Francisco
John Arntz, Director of Elections, San Francisco
Joe Phair, President, San Francisco Elections Commission
Meg Whitman, Candidate for Governor of California
Steve Poizner, California State Insurance Commissioner, Candidate for Governor of California
Tom Campbell, Candidate for Governor of California
Gavin Newsom, Mayor of San Francisco, Candidate for Governor of California
Jerry Brown, California Attorney General, potential Candidate for Governor of California
John P. Holdren, Assistant to the President for Science and Technology
Lynne Rosenthal, Manager, Software and Systems Division, NIST
Andrew Regenscheid, Computer Security Division, NIST
Patrick D. Gallagher, TGDC Chair, Deputy Director, NIST
Leon Panetta, CIA Director
Gineen Beach, Chair, U.S. Election Assistance Commission
Thomas Hicks, Senior Elections Counsel, U.S. House Administration Committee
Charles E. Schumer, Chairman, U.S. Senate Rules Committee
Anna Eshoo, Member of the U.S. House of Representatives
Zoe Lofgren, Member of the U.S. House of Representatives
LaShawn Y. Warren, Oversight Counsel, Committee on the Judiciary, U.S. House
Kanya A. Bennett, Counsel, Committee on the Judiciary, U.S. House
Barb Johnson, District Director for Congressman George Miller
Lisa Pinto, District Director for Congressman Henry Waxman
Dan Bernal, District Director for Speaker Nancy Pelosi
Michelle Shafer and **Ed Smith,** Sequoia Voting Systems
Ian Piper, Premier Election Solutions (Diebold)
Ken Carbullido, Senior VP, Election Systems and Software
Marcus Macneill, Vice President, Hart InterCivic
Peggy Nighswonger, President, National Association of State Election Directors
Pedro A. Cortés, President, National Association of Secretaries of State
R. Doug Lewis, Executive Director, The Election Center
Bill Cowles, Pres., International Assoc. of Clerks, Recorders, Election Officials & Treasurers
Beverly Kaufman, Pres., National Assoc. of County Recorders, Election Officials and Clerks
Jennifer Brunner, Ohio Secretary of State
Douglas Kellner, Chair, New York State Board of Elections
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Ellen Theisen, Voters Unite!
Sheila Parks, Center for Hand-Counted Paper Ballots
Brian Fox, The Okori Group
Brian Behlendorf, Apache Founder
David Webber, Open Voting Solutions
Brent Turner, Open Voting Foundation