



Free vote

Even if all of the doubts around electronic voting were overcome, says Richard Hillesley, free software would underpin any credible solution

The **FREE e-democracy project**, founded by Jason Kitcat, supported by the Free Software Foundation and based in Brighton, England, is dedicated to the creation of the GNU.FREE Internet Voting System, to advocating the use of free software as the best, most secure and open solution for e-democracy, and to promoting “the use of technology to strengthen democracy within a holistic understanding of the current malaise. That’s to say, Internet voting alone isn’t going to solve turnout problems.” The GNU.FREE electronic voting software has been used to conduct elections in various organisations, trade unions, educational and commercial establishments around the world, but is designed with the aim of being the best alternative for online voting in general elections.

Online voting has never been used for a public election in the UK, and has many obvious shortcomings, but is seen by politicians as a means of enticing the disaffected young to vote without the inconvenience of strolling down to a polling booth. On 5 February 2002, local government minister Nick Raynsford announced a list of councils that are to test new methods of voting by telephone, digital television and the Internet at the May 2002 local elections.

Selected wards in a handful of councils will conduct experiments with various methods of voting. Wards in Liverpool and Sheffield will run trials of voting through digital TV and mobile phone text messages. St Albans, Swindon, Crewe and Nantwich will test Internet voting from council-run information kiosks, local libraries,

and from home. Chester, Rugby and Broxbourne, and the London boroughs of Camden and Wandsworth will trial electronic counting.

“This marks an important first step towards e-voting across the country,” says Raynsford. “The pilots will be crucial in building public confidence and testing technical robustness to ensure that the integrity of the poll is maintained. We are particularly keen to engage younger voters and feel these new innovations will help. Our aim is to learn from these pilots so we can confidently modernise our voting arrangements, making the most of new technology so that voting is more accessible for everyone, but at the same secure and efficient. We propose an ever more extensive programme of pilots at future local elections to open up the possibility of an e-enabled general election some time after 2006.”

The global village

In *The Gutenberg Galaxy*, published in 1962, three decades before the inception of the World Wide Web, Marshall McLuhan wrote that “the new electronic interdependence recreates the world in the image of a global village”. The global village was an idea that caught the imagination of ‘60s radicals – a dream of a better future, where the sharing of global media would shrink cultural and material differences and bring the world together in a common purpose for the betterment of all, a theme that was at the heart of projects such as

the Whole Earth Catalog, which was a brilliant evocation of what could be achieved with pooled resources.

The World Wide Web can be seen as a projection of this ideal, an instant medium and a global village where we can speak and share our vision with our fellow citizens on the opposite side of the globe, without the interference of spokesmen or intermediaries. The Internet is a democratising force breaking down the cultural, racial and religious boundaries that divide us all. The evolution of free software and of Linux is an eloquent illustration of the possibilities, software created by citizens of each and every nation, creed and colour, across the Internet with a community of purpose. This remains the ideal, that the Internet should be a medium for free and open exchange of ideas around the world. As such the Internet reflects one of the benevolent aspects of globalisation.

Globalisation also has its many critics, as illustrated by the demonstrations in Seattle, Genoa and other places where the leaders of the G7 and the World Trade Organisation have congregated. Media, financial and military power has increasingly been concentrated into fewer and fewer hands. Multinational conglomerates, increasingly beyond the control of national governments, elected or otherwise, switch their assets without interference, often beyond taxation, buying influence and control, and subverting the natural order where it suits. In a world where 51 of the richest 100 economic entities are corporations rather than national governments, representative democracies often have little power to influence events in their own countries. A twitch in Wall Street can have more effect on your well-being than all your parliamentary representative's best endeavours. Guy Debord, the French Situationist and author of *The Society of the Spectacle*, had another view of McLuhan's famous phrase. "The Sage of Toronto," he wrote, "spent several decades marvelling at the numerous freedoms created by a 'global village' instantly and effortlessly accessible to all. Villages, unlike towns, have always been ruled by conformism, isolation, petty surveillance, boredom and repetitive malicious gossip about the same families. Which is a precise enough description of the global spectacle's present vulgarity." Ultimately, globalisation presents as much of a threat to democracy as it does to any other political system.

While globalisation has reduced the effective control of representative democracies over the forces at work within their own societies, politicians, puzzled by declining turnout in local and national elections throughout the developed world, are looking around for alternatives to stir the interest of voters. Robin Cook, currently the Leader of the House of Commons in the UK, told the *Guardian* newspaper in February that Britain would become one of the first countries to introduce online voting for general elections and that "new technology could be used to entice the under-40s back to the polling booths." Cook described the current system of voting by pen and paper as "astonishingly quaint ... I suspect for anybody under 40, polling day is the only point in the year when they actually see a pencil stub, and that's probably why it's tied to a piece of string, because it's so rare and they might pocket it as a souvenir."

Superficially, the attractions of using modern technology as part of the electoral process are obvious. In UK elections all votes are still entered and counted by hand. In theory, a machine-recorded vote will be more reliably assessed and less susceptible to error, and counts will take a fraction of the time required for counting ballots by traditional means. In fact, the embarrassment of the US experience in Florida during the last presidential election, where votes were recorded on punch cards and counted by machine, has shown that this is not necessarily the case. The result of the crucial Florida election, and thereby the presidential election itself, is still a matter of bitter dispute and controversy. Online voting makes even more sophisticated demands on the system, with all the familiar problems of authorisation, authentication and security common to any transaction on the Internet, and some more besides. For instance,

having guaranteed security and authentication, how can the secrecy of the ballot be guaranteed? The beauty, and simplicity of purpose, of the current voting system where you are isolated within a polling booth, is that it gives some guarantee of anonymity, secrecy, and freedom from coercion. Remote online voting can guarantee none of these things. The FREE e-democracy project exists to discuss and tackle some of these issues.

Licensed to vote

The FREE project has recorded over 10,000 downloads of GNU.FREE. The aims of the project are to provide a free software online voting system that is secure, private, scalable and reliable. Being free software ensures that GNU.FREE is open, and does what it says it does. Commercial voting systems give no such assurance, and the integrity of the software can not be guaranteed. GNU.FREE is written in Java and is totally cross-platform, and the software is licensed under the GPL, which assures that the code can be scrutinised, an important consideration when installing software for public elections, because it simplifies the task of finding and cor-

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recting problems. FREE stands for Free Referenda and Elections Electronically, "and also represents the freedom that the General Public Licence, democracy and the Internet are all about."

GNU.FREE was originally developed as part of a joint project at the University of Warwick Department of Computer Science and the Warwick Business School. The project was examining the impact of the information revolution on activism and the political process. During his researches, Kitcat became convinced that the commercial systems currently on the market were inadequate to the specific demands of public election, particularly from the point of view of authentication and security, which remain the primary considerations for any electronic voting system, and determined that an open system released under the GPL was the only acceptable solution.

The GNU.FREE suite includes a client, an Electoral Roll Server, and Regional Servers. During the process of voting the client logs in to the Electoral Roll Server, and is authenticated as a registered voter who has not previously made a vote. The vote is made, time-stamped, and saved through the appropriate Regional Server. For the user this is a relatively simple process. At the technological level each step is encrypted. A session key is encrypted using RSA and the server's public key. The message body is encrypted using Blowfish and the session key. Each step is validated using the encrypted keys, and assures against fraud in the voting process. Free software ensures the kind of validation of these processes that any

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government should require for secure voting, trusted staff can ensure the integrity of the system above and beyond the limits of commercial software.

The non-profit Organisation for the Advancement of Structured Information Standards (OASIS) is publishing an XML schema which will be the standard for people to vote online in general elections. Speaking at the XML & Web Services 2002 conference in London, Anwar Choudhury, director of strategy at the e-envoy's office, under whose auspices the schema is being drawn up, warned that the schema is not enough on its own for governments to introduce online voting. This, he said, would require a national security infrastructure, which “could be a PKI, or it could be something else – it would depend on the country involved.” The government claims that the OASIS schema will be a model for other governments. The young person of whom Raynsford and Cook complain, who cannot forsake the inconvenience of strolling down to the polling booth, will have to go to considerable lengths to ensure his or her mobile phone complies with the minimum requirements for online voting, be it PKI or a smart card. The effort may be greater than the walk down the road.

Secret ballot

The current system of voting, putting a cross against a name in a simple booth, where no-one can see what you are doing, and inserting your vote through a slot into a locked box, may be “astonishingly quaint”, in Robin Cook's words, but was designed to eradicate or at least minimise the possibilities of corruption and coercion that existed before the introduction of the secret ballot. No-one can force you to vote for one party or another, because no-one can see who you voted for. The count is supervised by the Electoral Commission, and in theory, your vote is secure. There are logistical problems in getting

the voter to the polling booth and the sealed box to the count, but once these are surmounted the secret ballot has some guarantees of authenticity and transparency.

At first glance, online voting would appear to share most of these advantages, with the additional benefit of portability. You can vote from wherever you are, at the time and place of your choosing. But there are significant problems that are difficult to monitor.

A computer system for online voting, by its very nature, adds many factors into the equation between the voter and the count, and always has the possibility of catastrophic failure, or outside interference. Internet security has an indifferent and inconsistent record. Some operating systems have proved to be more vulnerable than others, but no operating system has proved immune. It is almost impossible to prove that the voter holding a mobile phone or tapping into a keyboard is who they say they are, and that they are not voting under duress. A voting system requires remote clients and a centralised server where a database of votes is stored and counted, and the more paranoid critics have pointed out that any system that exchanges data over the public Internet is open to subversion not only by malignant individuals, but by criminal organisations and foreign states. These may be unlikely scenarios, but cannot be totally ignored.

Moreover, computer systems are subject to failure, as shown in the last US presidential election, and any system used for public elections would have to be as solid as any mission-critical system currently in existence, with fail-safe, fault tolerance and in-built redundancy, and with the code open to inspection and evaluation, which makes a free software system the only possible solution. The user has to have absolute trust in the integrity of the software, that the software does what it says it is doing, no more and no less, that the voter is guaranteed absolute secrecy and that his or her vote is reliably counted.

Any suspicion of failure of the hardware or software components of the system would almost certainly necessitate a re-election, as there would be no guarantee that the votes had been properly recorded or counted. The traditional ballot keeps the paper votes as a record. Computer failure is the equivalent of the burning down of the counting hall and the destruction of the voting slips at a traditional count.

Bruce Schneier, the author of the Blowfish encryption algorithm, has suggested that the essential attributes required of an online voting system are “anonymity, scalability, speed, audit, and accuracy – direct mapping from intent to counted vote”, and contends that “in the rush to improve the first four attributes, accuracy has been sacrificed [...] All of these technologies involve translating the voter's intent in some way; some of them involve multiple translations. And at each translation step, errors accumulate.” This is what happened in the Florida elections, where machines failed, votes were lost, and punched cards were miscounted and/or improperly read, resulting in errors that eventually proved to be unrecoverable.

Schneier also suggests that any electronic voting

We know who you are

The next time you vote in a UK election, take notice of the number on your voting slip that is cross referenced to your place on the voting register and uniquely identifies you as the person that has cast the vote. This number is intended to ensure that fraud does not occur, and is not commonly referenced, but there is always the possibility that it can be misused to trace the way that individuals have voted.

While such practices are illegal in most voting systems around the world, UK law states that votes must be traceable back to each voter in case there is a requirement for judicial review. It is remarkable how little interest has been shown in this disavowal of the principle of the secret ballot, which is a basic tenet of democracy.

The suspicion will always be there that minority parties might at some point have been subject to scanning of votes by government agencies. This may not be likely, but other countries have managed to preserve the integrity of the ballot without compromising the principle that the vote of each individual is both private and secret.

The Florida keys

“...the UK government should not be rushing in where wiser counsel fears to tread”

Voting procedures are often subject to accusations of corruption or failure. Few have been as embarrassing as the events in Florida during the last presidential elections, which provided a vivid illustration of the fallibilities of electronic voting systems.

Many allegations were made about the elections in Florida in 2000. The national result was close. Gore had a slight majority of the vote. Bush had a majority of delegates, and the final outcome hinged on the election in Florida. There appear to have been different voting methods in use in different parts of the state, but the controversy centred on the use of Vote-O-Matic punch-card voting systems. The voter punches a hole through the card to register a vote, and the count is performed by computer. Although voting machines were claimed to be more reliable than hand counting, significant errors crept in, caused

by slipping card feeds and the notorious ‘hanging chads’, where tiny scraps of punched-out vote holes did not fully detach from the vote card, which meant that the vote was not registered. Once recounts were initiated it was obvious that there were significant errors in the count, and that the majority of lost votes were Democratic votes for Gore.

These machines were not the only source of controversy in the Florida election. BBC journalist Greg Palast broke the story of Governor Jeb Bush and Secretary of State Katherine Harris overseeing a pre-election ‘purge-and-block’ programme to remove more than 50,000 legitimate voters, half of them African Americans and almost all Democrats, from the electoral roll. Palast also reported that in the mostly white counties, machines were set to reject wrongly marked ballots to re-vote; in mostly black

counties, the machines ate the bad ballots and did not count them. The recounts were terminated by a court with a Republican majority, and George W Bush is now the President of the United States.

The degree of trust given to the ‘precision’ of electronic equipment is of concern. Automated counting machines have proved unreliable, yet are used by a third of the US voting population. The vote-counting equipment comes from a variety of private companies using proprietary, closed source software that offers precious few guarantees, despite the fact that organisations such as Computer Professionals for Social Responsibility (CPSR), who have studied such vote counting systems for long periods of time, are on record as saying that the system “has inherent accuracy limitations” and that “careful manual counting of Vote-O-Matic ballots

should always be more accurate than machine counts.”

The UK government’s proposals for introducing technology into the voting system go much further than these, and have much fewer guarantees. The government is using closed source software brought in from another country, and the questions are not being asked. Voting by text messaging on mobile phones is using SMS which drops out, and votes are lost. There are massive questions about authentication, validation, security and privacy, but few of the people who are interested are qualified to ask them. Any informed and independent study of the issues that arise from online voting comes to the conclusion that there are still too many questions that remain to be asked, and that the UK government should not be rushing in where wiser counsel fears to tread.

Key links

The FREE
e-democracy Project
www.free-project.org

The Bell election
industry newsletter
www.thebell.net

Internet voting
technology alliance
www.ivta.org

Rebecca Mercuri’s
e-voting page
www.notablessoftware.com/evote.html

Bruce Schneier
www.counterpane.com

Electoral Reform
Society
www.electoral-reform.org.uk

system requires a paper audit for each vote cast so that, in the event of systems failure, a true backup exists and each vote can be hand counted and verified. He goes so far as to suggest that the best method would be a touch screen terminal that produces a print-out which is then verified by the voter and placed into a sealed ballot box, a duplication of the current system that precludes remote online voting entirely.

The arguments in favour of online voting are mostly about convenience. The count is simplified and is conducted electronically with more or less instantaneous returns. The voter can register his or her vote at the time and place that suits. These arguments depend on some broad assumptions. Each voter is expected to have the means and the technical literacy to take advantage, a solution that the poor and uneducated will often be denied. The greatest problems of online voting revolve around the issues of authentication and security, and these issues have not yet been resolved. “Remote authentication is something we’ve not gotten right yet,” says Schneier. “And no, biometrics don’t solve this problem.” Most experts in the field would argue that the British government is being precipitate in promising remote online voting for the 2006 election, which doesn’t preclude looking further into the future.

Stirring up apathy

On August 16, 1819 a mass meeting at St. Peter’s Fields in Manchester, calling for “Universal Suffrage” and “Vote By Ballot”, was charged by troops, who killed 11 and wounded 400 others. This event, the Peterloo Massacre, which inspired Shelley’s *Mask of Anarchy* and led to the founding of the *Manchester Guardian*, was one of many occasions on which people died for our right to vote. The

campaign for the right of representation can be dated back to the Peasants’ Revolt, and was eventually won in slow steps through the 19th and 20th centuries. The vote was conceded to all males over 21 as late as 1918, and to women in 1928. Eighteen-year-olds, who had been old enough to fight and die in their millions during two world wars, were given the vote in 1967. For centuries the right to vote was a rallying cry for a better future. Many fought and died for the right to vote, believing that equal representation would make for a better world. Yet, less than a century after the suffragettes won the right for women to vote in parliamentary elections, turnout is falling amid claims that more people voted for the ephemera of television, such as *Pop Idol* and *Big Brother*, than voted for the winning party in the last election.

Have people stopped caring? Many politicians would have us believe that this is so. The young are “apathetic”. The politicians have to reach them with new buzzwords, change their hairstyles, wear baseball caps and cool designer clothes. The young will vote if they can do so on their mobile phones. ‘Who wants to vote in a dusty polling booth when they can vote direct from the rave?’ – or so the logic goes. Anecdotal evidence suggests otherwise. Tony Benn’s response to the suggestion that people were apathetic about politics was to reply that “people feel that the government is apathetic about them.” Many young people who don’t vote will nevertheless give considerable energies to single-issue non-governmental organisations. While the politicians blame the voters, the evidence suggests a greater malaise. People do care about political issues but do not feel engaged in the political process. When people are asked why they do not vote they will give a wide variety of answers, but a good few will reply “none of the above”, for the simple reason

that their views are not represented in parliament. A parliamentary select committee recently asked singer-songwriter Billy Bragg how best to get the young involved in politics. He replied: "Bring back conscription. That'll do it." It seems unlikely that online voting would have the same galvanising effect.

Our current two-party, first-past-the-post system gives parties landslide victories with a minority of the vote. This results in an increasingly narrow hegemony of views where the policy differences between the major parties are hard to find, and many serious issues, such as the environment, lack proper representation. The system is bedevilled with inertia, and voters feel powerless to effect a change, giving a peculiar truth to an aphorism from an earlier time – "Whoever you vote for, the government gets in". The tragedy is that the sector of the population that is least likely to vote is that which is most in need of representation, the poorest third, and the poorest third is the most likely to respond that "it makes no difference". In voting terms the so-called underclass has become expendable, which is why many pundits, including the Electoral Reform Society, believe that proportional representation would allow a more genuine and diverse reflection of the voters' views, and give a reason to vote. E-votes alone are not likely to attract these sections of society into the fold.

The image of democracy

Internet voting will certainly be useful for those without direct access to the polling booth on election day, but is unlikely to resolve the greater issue of falling turnout. The Internet is a democratising force and works well for the dissemination of ideas and information, but may present too many problems to be an immediate solution for national elections. For more localised elections, trade union ballots, student elections and boardroom polls, where labour-intensive supervision and counting of votes is not practical, GNU.FREE, as an open and free solution, where the logic and code is transparent, is the best alternative available. For the greater health of democracy it might be better for politicians to question their own priorities rather than those of the voters. Marshall McLuhan made a prescient remark in the June, 1971 issue of *Macleans*. "Politics", he predicted, "will eventually be replaced by imagery. The politician will be only too happy to abdicate in favour of his image, because the image will be much more powerful than he will ever be". This statement probably appeared extravagant or absurd at the time, but now seems commonplace.

During the John Moore Lecture at the Cheltenham Festival of Literature, campaigning broadcaster and journalist George Monbiot observed a "very weird phenomenon over the last few years, where this great advance of globalisation, of communication technologies, of interconnectedness (we're always being told we live in a global village) has been accompanied by this extraordinary parochialism whereby it becomes almost impossible to discuss even serious ideas unless there is a supermodel fronting them." This is, perhaps, the problem that politicians should be trying to come to terms with. Voters might be more responsive to honesty and integrity than they are to a transparent image in Gucci loafers.

Nevertheless, if electronic voting is to be offered as a solution to voter disaffection, the only acceptable implementation is a free software system, such as GNU.FREE, because it offers the scrutiny of the code and the transparency required of a secret ballot. Any other option – proprietary, closed source, and probably emanating from another country – will probably end in tears.