



Trustworthy voting

► Routes to market for trustworthy voting systems

Academic: *Professor Steve Schneider*

The successful deployment of an end-to-end verifiable electronic voting system in a state-wide statutory political election – a worldwide first – paves the way for greater democratic participation in elections and accessible voting for everyone.

Governments around the world are investing in electronic voting but experiences in the USA and the UK have shown that there are major obstacles to be overcome to ensure that systems are secure and widely used. Using funding from the EPSRC and the IAA, this project set out to develop a generic model for electronic voting, supported by the necessary business infrastructure, which would be usable in real large-scale elections.

Led by Professor Steve Schneider, the research team then worked with the Victorian Electoral Commission in Australia to provide a platform for the State of Victoria election which took place in November 2014.

Based on the principles of open source software, which enables independent examination of the code, the verifiable voting system allows voters to check that their votes have been accurately recorded, while encrypting receipts so that votes remain completely secret. This protects against fraud and fosters greater trust in the electoral process.

The system features a printed ballot form with the candidates listed in a randomised order. The voter makes their selection and then destroys the list of candidates, retaining and casting their marked preference list for verifiable tallying. Voters are given a receipt they can actually understand and recognise their vote, instead of a receipt of unintelligible encryptions. 80 per cent of sampled voters stated that they would tell others about the system.

With voting compulsory in Australia, the election authorities are obliged to make every effort to enable citizens to vote, so better accessibility for blind, partially sighted and motor-impaired voters was a key requirement. Elections also need to cater for the broad range of 20 languages spoken by Victoria's citizens, as well as expatriate Australians living in other countries around the world. In addition, since Victorian elections are based on the single transferable vote, the ballot is very complex, with voters required to rank a list of around 40 candidates in their preferred order.

Surrey's verifiable voting system was able to meet each of these needs and provide a chain of links all the way from the initial casting of the vote right through to the tallying, reassuring voters that their vote was cast as they intended. By incorporating an audio interface, the system enabled blind and partially sighted voters to cast a fully secret vote in a verifiable way.

The system was deployed for the last two weeks of November 2014 for 'early voting' at 24 voting centres in Victoria, where it was offered to particular target groups of voters (the blind, partially sighted and motor-impaired). It was also made available to all voters at the Australia Centre in London.

In this controlled deployment, the verifiable voting system ran perfectly, with no need for rebooting throughout the two-week period. A total of 1,121 votes were cast, with a very low level of spoilt ballots (1.9 per cent, compared with spoils that have been as high as 10 per cent for paper voting). A survey of voters in the London election found that 75 per cent preferred the electronic system to paper voting.

Craig Burton of the Victorian Electoral Commission says: "The deployment went smoothly and our evaluation found the electors accepted the new verification measures without any issues, making good use of the new security facilities. In addition, for the first time, the Commission had interest and support from information security specialists who had previously been critics of our e-voting. The approach of the solution and its capability are such that it will remain appropriate and would scale for the foreseeable future".

In separate tests, the system proved to be capable of handling a million votes, and was able to respond to individual voters within ten seconds and to accept 800 votes within a ten-second period.

Following the success of the verifiable voting system at the Victorian election, Professor



Prof Steve Schneider demonstrates the system

Schneider and his team are looking at opportunities to commercialise and roll-out the system.

Professor Schneider comments: "The original EPSRC research project was concerned with the principles of verifiable voting systems, but the opportunity to develop our design to a real-world implementation for a real election was too good to miss. The IAA provided funding for us to develop generic open-source election code, forming a platform that provides a basis for systems for particular elections. We used the platform to underpin the system commissioned for the Victorian State election. The IAA funding was critical to us achieving the world's first verifiable voting system used in a state-wide election."



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1.9%, compared with 4.3% for paper voting

