

Free Software for Free (and fair) elections? State of play in Belgium

Presented by David Glaude
In Brussels at 14th RMLL
On 2013-07-09

Is it time to celebrate?

The last local elections in Belgium we saw the use of a new hybrid voting system running publicly released voting software on Linux.

- Can electronic voting meet democratic requirements?
- Is the use of free software a necessary and sufficient condition?

Once upon a time...

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- Studied computer science... here at Brussels Free University
- Former activist of AEL (Association Electronique Libre) <http://www.ael.be/>
- Former member of FFII (Foundation for a Free Information Infrastructure) <http://ffii.org/>
- Former WebMaster of PourEVA (Pour une Ethique du Vote Automatisé) <http://www.poueva.be/>

Trigger : 21/05/1995 Saint-Gilles (Brussels), two elections the same day. One on paper and the other electronically. <http://www.poueva.be/spip.php?article209>

Activated : PourEVA web site was lacking behind and not up to date.

Disclaimer

- Opinions expressed are solely my own and do not express the views or opinions of my employer.
- My opinion could be different from the PourEVA collective position.
- Errors, translation errors (from French to English), creative spelling and grammar are mine.

PourEVA

Pour une Ethique du Vote Automatisé

- PourEVA est une association de fait, indépendante de tout parti politique, regroupant des citoyens qui contestent le système du vote automatisé tel qu'il se pratique actuellement en Belgique.
- Ils refusent ce système car il prive les électeurs de toute possibilité de contrôler les élections auxquelles ils sont appelés à participer.
- Les membres de l'association sont tous animés par un objectif commun : le retour à un système de vote et de dépouillement démocratique.
- L'association PourEVA compte un taux exceptionnellement élevé d'informaticiens, particulièrement sensibilisés aux dangers que représente le système de vote et de dépouillement utilisé actuellement.
- Ref : <http://www.poueva.be/spip.php?article8>

RMLL & eVoting

- 8th RMLL : « Vote électronique et logiciel libre » **Pierre Muller & Benoît Sibaud**, 60 minutes <http://www.ordinateurs-de-vote.org/IMG/pdf/rmll2007.pdf>
- 9th RMLL : « Ethique et vote électronique » **Chantal Enguehard**, 40 minutes <http://2009.rmll.info/Ethique-et-vote-electronique.html>
- ...
- 14th RMLL : « Free Software for Free (and fair) elections? State of play in Belgium » **David Glaude**, 20 minutes

Invited to share the talk with me (but not available) :

- **Jason Kitcat** (UK) <http://www.jasonkitcat.com/writings/e-voting/> ceased the development of GNU.FREE (Free Referenda & Elections Electronically)
- **Margaret McGaley** (Ireland) <http://evoting.cs.may.ie> of Irish Citizens for Trustworthy Evoting => demise of the Nedap/Powervote system. She now want to build an open source optical scanning solution.

Free Software

A program is free software if the program's users have the four essential freedoms:

- The freedom to run the program, for any purpose (freedom 0).
- The freedom to study how the program works, and change it so it does your computing as you wish (freedom 1).
- The freedom to redistribute copies so you can help your neighbor (freedom 2).
- The freedom to distribute copies of your modified versions to others (freedom 3).

Ref : <http://www.gnu.org/philosophy/free-sw.en.html>

Free & Fair election requirement

Democratic election are not well defined :

- Universal
- Equal
- Free
- Secret
- Direct suffrage

Citizen requirements :

- On election day, power must be in the hands of the citizen.
- Effective and efficient control of the election result.
- An understanding of the election process.
- Handling of the vote must be transparent (chain of custody)

Problems

- Implicit requirement (use to be obvious)
- The Vote Secrecy is the biggest problem (how to audit)

Various problems

- What software is running on the voting/counting computer ? (Trusted Platform Module)
- How do you audit the code ? (Correctness, formal verification, ...)
- How do you know if the program running is the same as the code ? (**Reflections on Trusting Trust***Ken Thompson <http://cm.bell-labs.com/who/ken/trust.html>*)
- What about the OS, drivers, ...
- What if the security procedures are not respected ?
- How can you do an external audit, while respecting the secret of the vote ?
- Who and why do you need to trust ?

Free Software is not the solution to ALL these problems

Evoting is a solution looking for a problem to solve

Position of April on electronic voting

« the use of free software is not sufficient to
make electronic voting acceptable »

2 february 2008

<http://april.org/association/positions/vote-electronique.html>

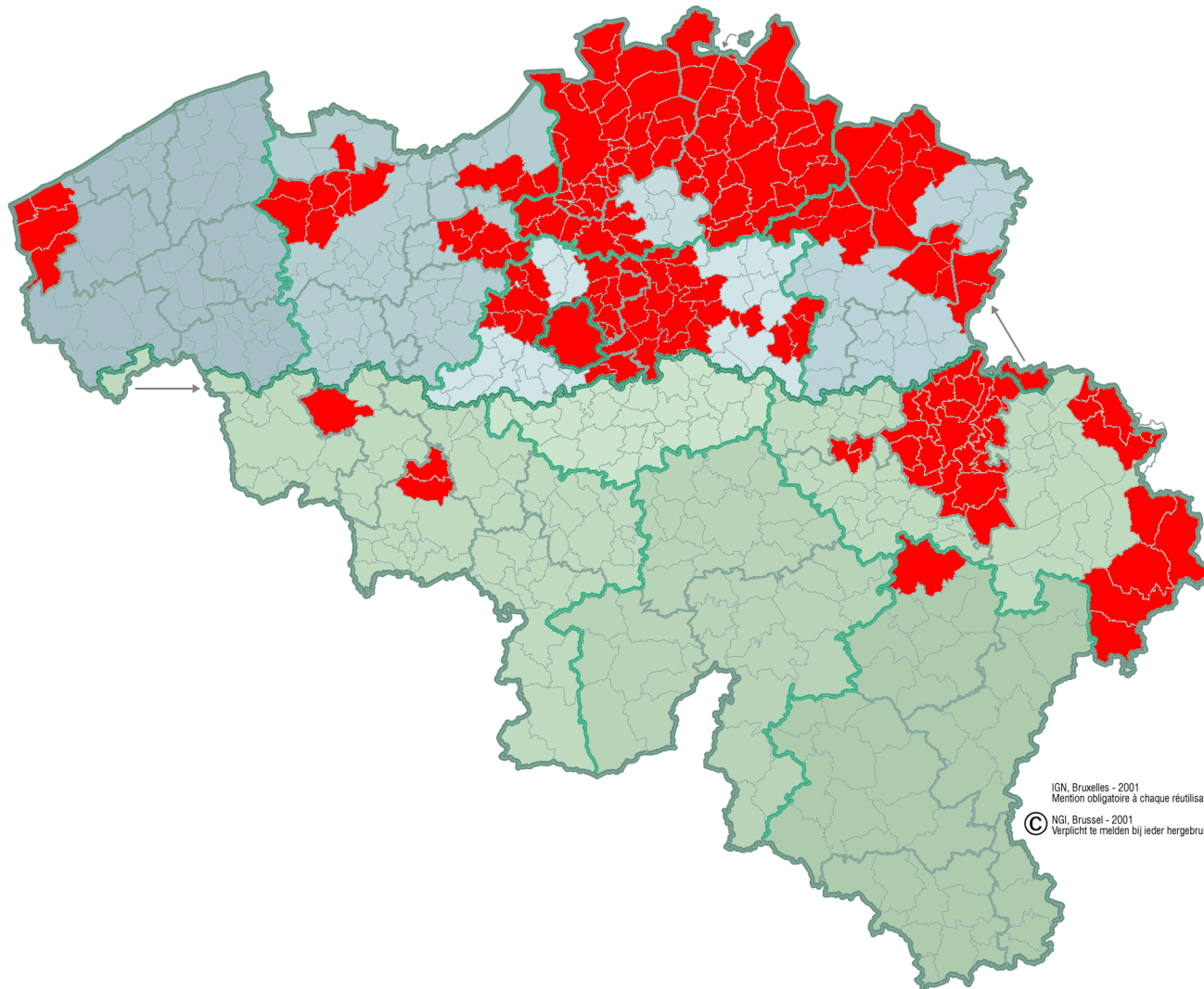
April is the reference french national
association to promote and defend free
software.

History of eVoting in Belgium 1/2

<http://www.poueva.be/spip.php?article768>

- 1991 Test of two systems (in two localities)
- 1994 Partial deployment of the magnetic card system
- 1999 Extension to 44% + College of Experts
- 2000-2003 Test of optical reading : « reliable & mature »
- 2003 Random bit inversion produces 4096 additional votes (cosmic ray?)
- 2003 Experiment of magnetic card + ticket in Waarschoot & Verlaine. Paper and computer results do not match ! => Computer result where used (with the support of the College of Experts) despite explicit rules in the law (+ attempt to keep this issue confidential)
- 2007 First OSCE/ODIHR election assessment mission => how to observe eVoting ?
- ...

Belgium between 1999 and 2011



College of Experts

- Active since 1999 (in response to PourEVA?)
- Members selected by the various Belgian Parliaments
- Mostly civil servants working in parliament (not mandatory)
- Start working 40 days before the election
- Has access to source code (before election) and certification report
- Produce a report (not necessary public) 15 days after the election
- Bound by secrecy
- Not released of their normal duty, no payment except transport

- Composition : <http://www.poueva.be/spip.php?article745>
- Report : <http://www.poueva.be/spip.php?rubrique19>

Request access to the code

Minister of interior explicitly refused access document (source code) on 24 decembre 1997

Legal procedure based on Belgian equivalent of Freedom of Information Act (FOIA) went up to Conseil d'Etat and appeal court.

- <http://www.poueva.be/spip.php?article27>
- <http://www.poueva.be/spip.php?article139> 2001 Victory
- <http://www.poueva.be/spip.php?article134> 2003 Victory

Election source code since 2003

- No (or unknown) licence => Not Free Software
- Only some source code, not the OS (MS-DOS), nor the driver
- Hard to verify if it was really used
- Published only AFTER the election
- In some occasion with all comments removed
- Some parts in an exotic language requiring a specific compiler
- Many global variables
- Not always valid C code => automated quality tests difficult
- Only the code, not the documentation/design
- FUTURE : Code publication mandatory by law

<http://www.poueva.be/spip.php?mot17>

Independent analysis of the code

« Both 2003 and 2004 versions of Digivote contain major errors that compromise the anonymity of the voting procedure. »

- Memory locations that contain the vote are not zeroed
Fixed at next election
- Poor randomisation of the vote in the electronic ballot box

College of Experts disagree

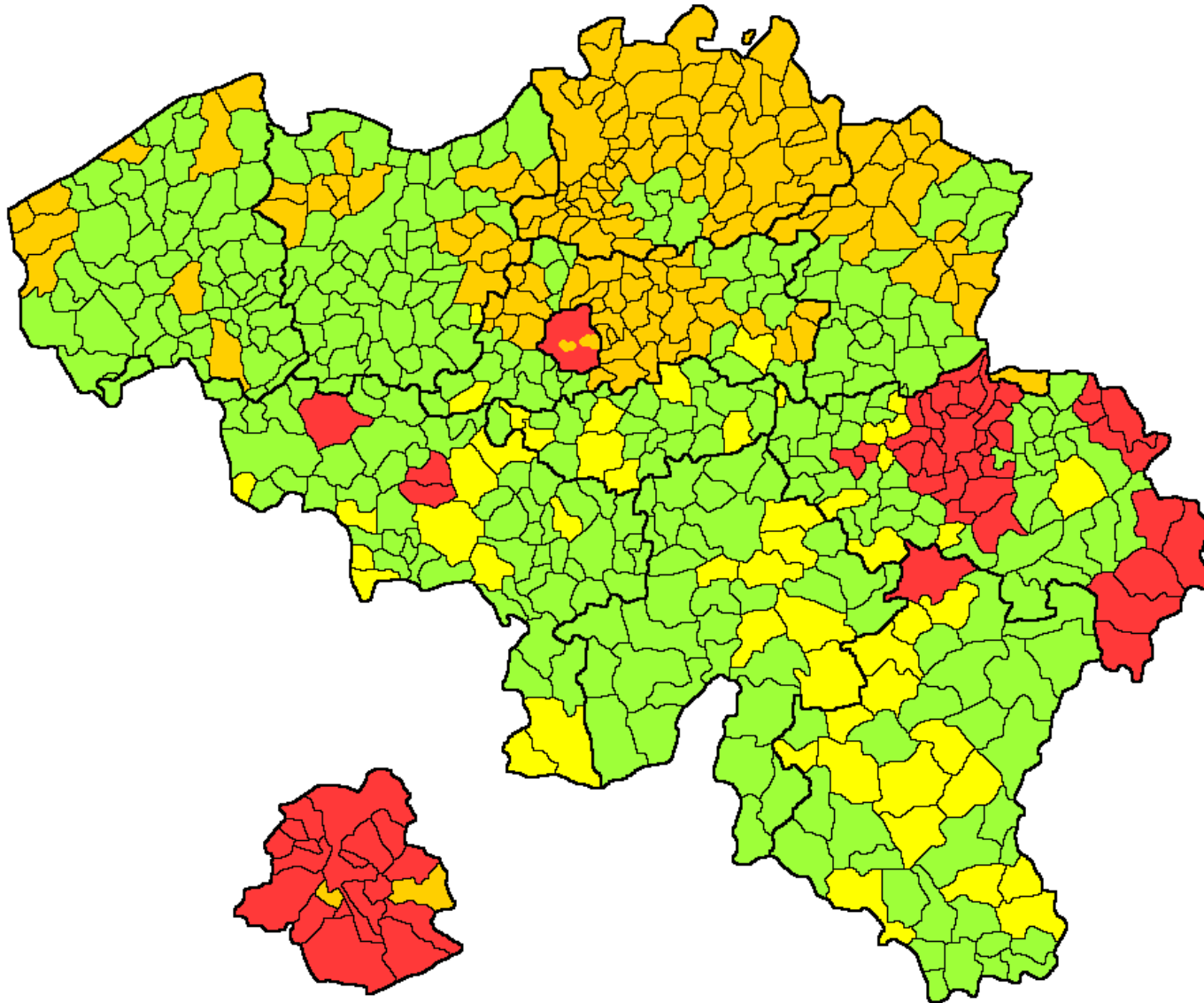
<http://www.poueva.be/spip.php?article12>

History of eVoting in Belgium 2/2

<http://www.poueva.be/spip.php?article768>

- ...
- 2008/01: The future of electronic voting in Belgium (aka BeVoting)
<http://www.poueva.be/spip.php?article512>
- 2008/03: The Council of Europe analyse the BeVoting study
<http://www.poueva.be/spip.php?article558>
- 27/10/2011: Smartmatic prototype experiment (BeVoting implementation)
- 14/10/2012: Smartmatic replaces the old system in Flanders (+8) and 2 localities in Brussels (for local elections => organiser = region)
- 05/07/2013: Conseil des ministres approuve l'avant-projet de loi organisant le vote électronique avec preuve papier
<http://presscenter.org/fr/pressrelease/20130705/nouveau-systeme-de-vote-electronique-avec-preuve-papier>

Belgium in 2012+



BeVoting university report

- Consortium of 7 belgian university make a two part report on the possible future of eVoting
- They present 5 possible solutions
- They propose the new « Hybrid Voting » best of both worlds (paper and electronic) = Venezuela
- Unknown requirement
- Unexplained design decision
- Study under influence ?

Old system vs BeVoting

Desktop PC	• Mini PC
MSDOS	• Linux
Boot on floppy	• Boot on CD-ROM
CRT Screen	• LCD Screen
Light Pen	• Touch Screen
Magnetic card (Token)	• Smart card or RFID
Magnetic card (Vote)	• Paper+QRcode
Re-Insert to verify	• Scan station to verify

BeVoting vs Smartmatic

<http://www.poueva.be/spip.php?article698>

- | | |
|------------------------|---------------------|
| RFID or QRcode | • QRcode |
| Scanning center | • Self Scan |
| Encrypted QRcode | • Encryption ??? |
| Mini-PC (of the shelf) | • Specific hardware |
| Boot from CD | • Boot from USB |
| Linux | • Linux |

Problems with BeVoting

- User interface (Digital divide? Need help?)
- You can NOT read the QRcode
- Did you check the human readable version ?
- What you see is what you get ?
- Counted vs Inside Ballot Box
- Counted Invalid vote
- Paper only for audit... not the unique valid vote
- No mandatory audit of the paper trail
- Audit only by experts or required by a judge
- No resources provisioned for a recount
- TEMPEST proof ?
- ...