Electing a University President using Open-Audit Voting

Ben Adida*, *Olivier de Marneffe*, Olivier Pereira
Jean-Jacques Quisquater

* Harvard University
Université catholique de Louvain

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The UCL president election

May 2008

Université catholique de Louvain (Belgium) sets new rules for the election of its president

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- $\approx$ 25.000 potential voters
  - $\approx$ 30 members of the academic senate were voting before
- Voting operations conduced through browser/email
  - Large number of voters
  - Geographic dispersion of the voters
  - High familiarity level of the voters with the Internet
  - Low-coercion environment

Talk Outline

- UCL election specifics
- Helios 1.0
- Challenges and Deployment
- Lessons and statistics

The UCL president election (cnt.)

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  - restrictions apply on sufficient participation rates

$\Rightarrow$ **the weight of each vote depends on the global turnout**

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- (results by category are secret)

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- Voters aren't necessarily computer scientists
- Voters have UCL email address, login/password, member card
- Open-source and free starting point system needed (trust, versatility, time frame)

Helios 1.0 [Adida 2008]

Helios Voting

Elections you can audit

If my vote is supposed to stay secret, how can I verify that it was counted correctly?

The Helios Voting System implements advanced cryptographic techniques to maintain ballot secrecy while providing a mathematical proof that the election tally was correctly computed.

We call this an *open-audit election*, because you or anyone else can audit it.

Check out our Frequently Asked Questions.

Create an Open-Audit Election

[Home] [Login/Register] [Learn] [Blog/Updates]

www.heliosvoting.org

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- Deployed on Google App Engine

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Distribute trust among experts
Use LiveCD, disk- and network-free laptops
Monitoring/Audit by independent company

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Use smaller, approximate weights
Careful choice provided $\approx 10^5$ *sol. for* $\approx 10^{-4}$ *precision*

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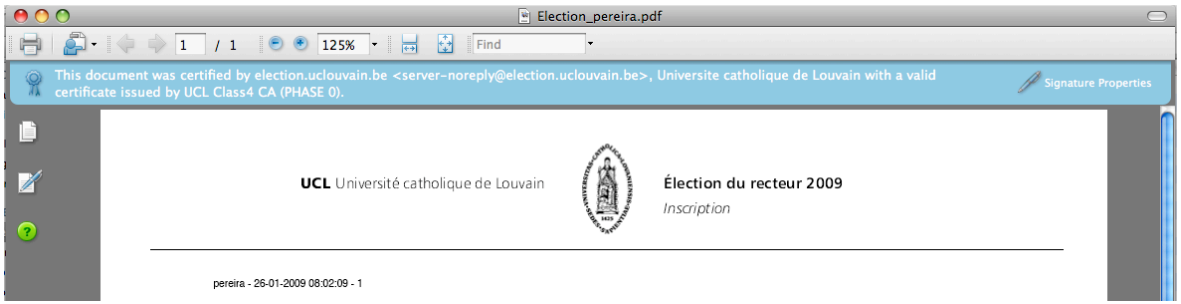
- Voters usually not familiar with signature

  Signed pdf files seem most usable
  Signature through PortableSigner
  UCL Root certificate deployed on all UCL machines



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- Google App Engine constraining : data sent out of EU

  Move to Django/PostgreSQL for free software stack

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Robustness and availability

- Each election round lasts 35 hours

Use redundant in-house servers
Use cloud computing (Amazon EC2)

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  - Test election (student projects, for university sponsoring)

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- Support organization
  - Phone/email support by UCL IT Department
  - Voting offices, with election officers

Election Phases – Organization

Registration Phase

- Voters registration *2 weeks*
  - registration website
  - generation of voters' aliases
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- Voting period *2 days, from 8am to 7pm the next day*
  - same interface as Test Election
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- WBB Audit day *1 day, next to the voting period*
  - voters check the web bulletin board (. . . and may complain)

Election Phases – Lessons and Statistics 1/3

Participation

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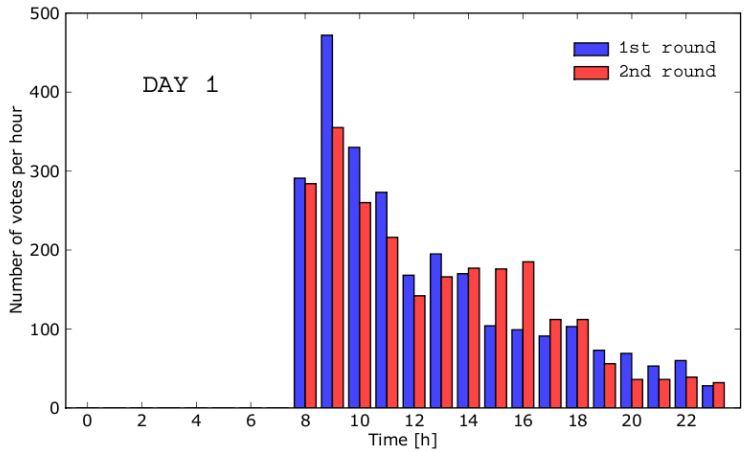
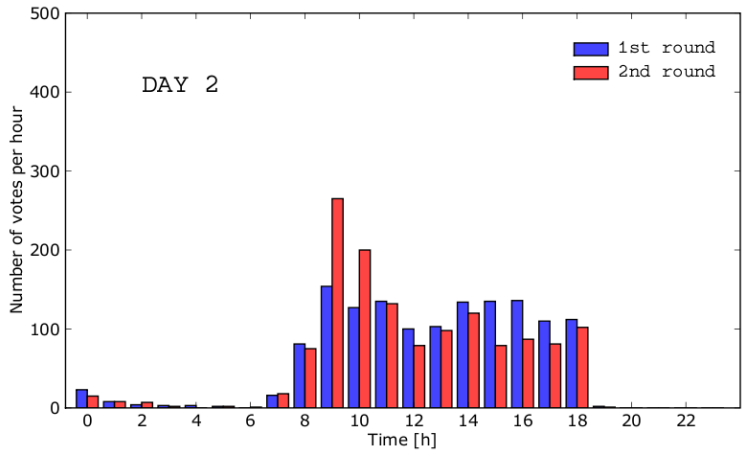
- max. 17 votes/minute, emails trigger vote





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- 120 tickets raised by UCL support
  1. Credentials lost
  2. JVM missing, use of Win95, IE4, . . .
  3. Did I do everything correctly ?

  Importance of testing with broad spectrum of people. . .

Election Phases – Lessons and Statistics 3/3

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  1. I am just trying to vote after the deadline
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Tally

- 1st round leader was < 2 electoral votes from majority

no objection, clear majority on 2nd round

Conclusion

- 1st significant-outcome, multi-thousand-voters open-audit election successful

Elections à l'UCL: un vote électronique vérifiable, "inédit" à grande échelle

L'élection ces 2 et 3 mars du nouveau recteur de l'université catholique de Louvain (UCL), au suffrage universel pondéré, se fait via un système de vote électronique d'une nouvelle génération qui permet à l'électeur de vérifier que le résultat de l'élection est correct, a indiqué l'UCL au premier jour du scrutin.

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Mis en ligne le 23/03/2009

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Il entrera en fonction le 1er septembre 2009. La commission électorale annonce, ce lundi 23 mars, les résultats du 2e tour de l'élection du recteur de l'UCL. 3 758 électeurs ont voté sur un total de 5 143 électeurs inscrits sur les listes électorales. Les résultats enregistrés au 2e tour sont les suivants : Bruno Delvaux : 53,83 %, Vincent Blondel : 42,45 %, Votes blancs : 3,72 %

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  - from election manipulation opportunity
  - to voter verification opportunity
- Each election is a significant project on its own
  Thanks to all the people at who supported it !
  UCL, Harvard, ENS Cachan, BlueKrypt, Google, Nexxit, . . .

Thank you !

https://election.uclouvain.be/test/election