The Pi-Vote eVoting System

How the Pirate Party Switzerland uses ADDER

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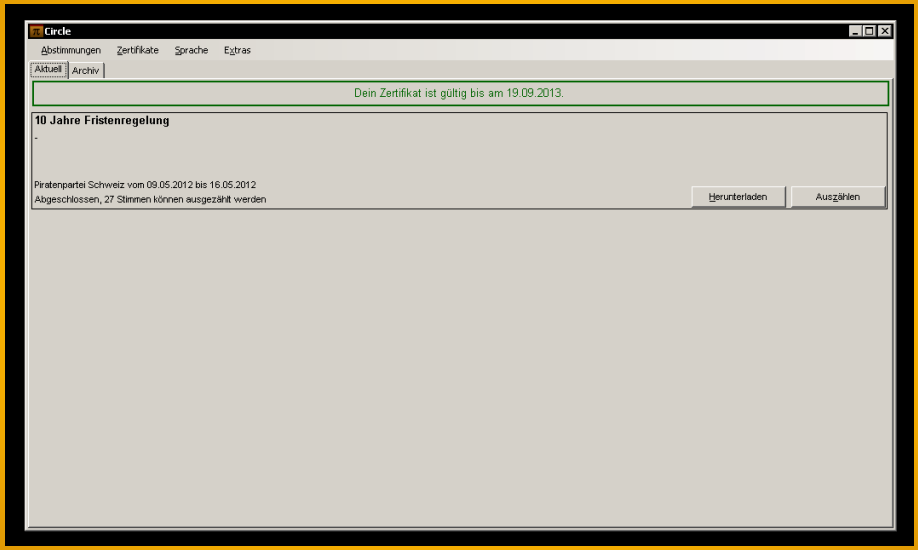
Part I

Why does the Pirate Party Switzerland use eVoting?

About Pi-Vote



Part II

How Pi-Vote works and what Problems remain

Assumptions

We assume...

- Decisional Diffie-Hellman assumption is true;
- Integer factorization is hard;
- SHA-2 is sufficiently close to a random oracle;
- Random number generators in PCs/OS are good.

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How is secrecy achieved?

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Real problems

- Authorities can be unreliable!

Correctness

How is the correctness of ballots ensured?

- Zero knowledge proofs with Fiat-Shamir heuristic

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- Proofs take many CPU cycles to verify

Authorization

How is voting authorized?

- RSA signatures
- Certificates

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Potential problems

- Compromised CA
- Only achieves pseudonymity

Authentication

How are members authenticated?

- Paper form
- 3 signatures from elected notaries

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Real problems

- Not easy enough to use

Tallying

How to guarantee re-tallying at any time?

- Votes and partial decryptions are published and can be downloaded any time

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Potential problems

- Breaking software changes

Receipt-freeness

Is Pi-Vote receipt-free?

- No
- Not a requirement

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Possible solution

- Ballot re-randomization

Manipulated software

How to make sure the software is not manipulated?

- Transparency, Open Source

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- Transparency, Open Source

Not good enough...

- No one ever publicly checked the software security!
- Most users simply download from our page

Denial of service

Internal attacker

- Delete the database
- Shut down the server

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External attacker

- Overload the server

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Impossible to solve...

- Hard to mitigate
- Mostly a case for courts

User acceptance

How do we achieve good user acceptance?

- Open and transparent processes
- Democratic voting on procedures

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Real problems

- Users don't understand what's going on but most don't care either
- Multi-platform support and installation are trouble magnets
- Documentation is insufficient
- User interface is never satisfactory

Future plans

Process changes

- Accept identification by Swiss Post and Communal Administration
- Accept SuisseID

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Technical changes

- Additional Java client
- Android client
- Hardware certificates