

Long-term retention in e-voting

Legal requirements and technical implementation

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- 1 Motivation
- 2 Legal background
- 3 Technical measures
- 4 Current practice
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- Applies to paper-based as well as electronic elections
- Retention of election data for paper-based elections is regulated by several laws in Germany
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Starting from paper-based elections

- Parliament
- Works councils
- Governing boards of social security institutions
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- Governing boards of social security institutions \rightsquigarrow 6 years
- Executive committees of associations \rightsquigarrow (2-4 years)
- Retention periods may be extended if scrutiny procedures are pending

Retention duties for paper-based elections

Documents to be retained are fully specified only for parliamentary elections [BWO02]:

- electoral roll
- ballots
- postal vote documents (polling cards and ballots)
- polling card register
- election records – signed by the election board

No unauthorized access!

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Implications for online voting

Documentation should account for...

- compliance with basic voting principles
- due polling procedure and correct calculation of results
- provable security of the system components and applications \rightsquigarrow CC certification

Tallying must be verifiable and hence repeatable

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Security requirements for retention [RFDJ07]

Readability i.e. availability of appropriate hard- & software

Authenticity of the election documentation

Integrity of the election documents

Completeness of interrelated documents

Negotiability i.e. portability maintaining provable data characteristics

Confidentiality of sensitive election data

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- Qualified electronic signatures \rightsquigarrow (provable) integrity, authenticity, completeness, negotiability
- Standardized signature and data formats (e.g. CMS, X.509, PDF, XML) \rightsquigarrow negotiability, readability
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Pioneers on the association level

- GI and DFG have adopted their own regulations for online elections [Ges04, Deu06]
- GI compiles two PDF files:
 - ① electoral roll (including tags: voted/abstained)
 - ② mixed votes
- Both files are printed, signed by the election board and kept in a safe for two years
⇒ Paper-based solution

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Estonia

- Ballots are retained until the term for filing complaints has expired or pending scrutiny procedures have been resolved
- Hereafter the following data is deleted:
 - ① ballots
 - ② unique keys for encryption & decryption of online votes
- Online voting results are kept in a digitally signed document
- Voters' lists and records of the election board are printed and retained permanently
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Our contribution

- Raise awareness on the issue of retention in e-voting
- Give recommendations on long-term retention
- Apply the results to the online voting scheme designed by Juels, Catalano, and Jacobsson [JCJ05]
 - ↪ Consider retention duties already in voting protocol design

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Open questions and future work

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- How can emerging collisions be handled?
e.g. everlasting anonymity vs. temporally limited security of cryptosystems [VK06]
- Appropriate legal framework for e-voting should be promoted

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