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Defining a national framework for online voting and meeting its requirements: the Swiss experience

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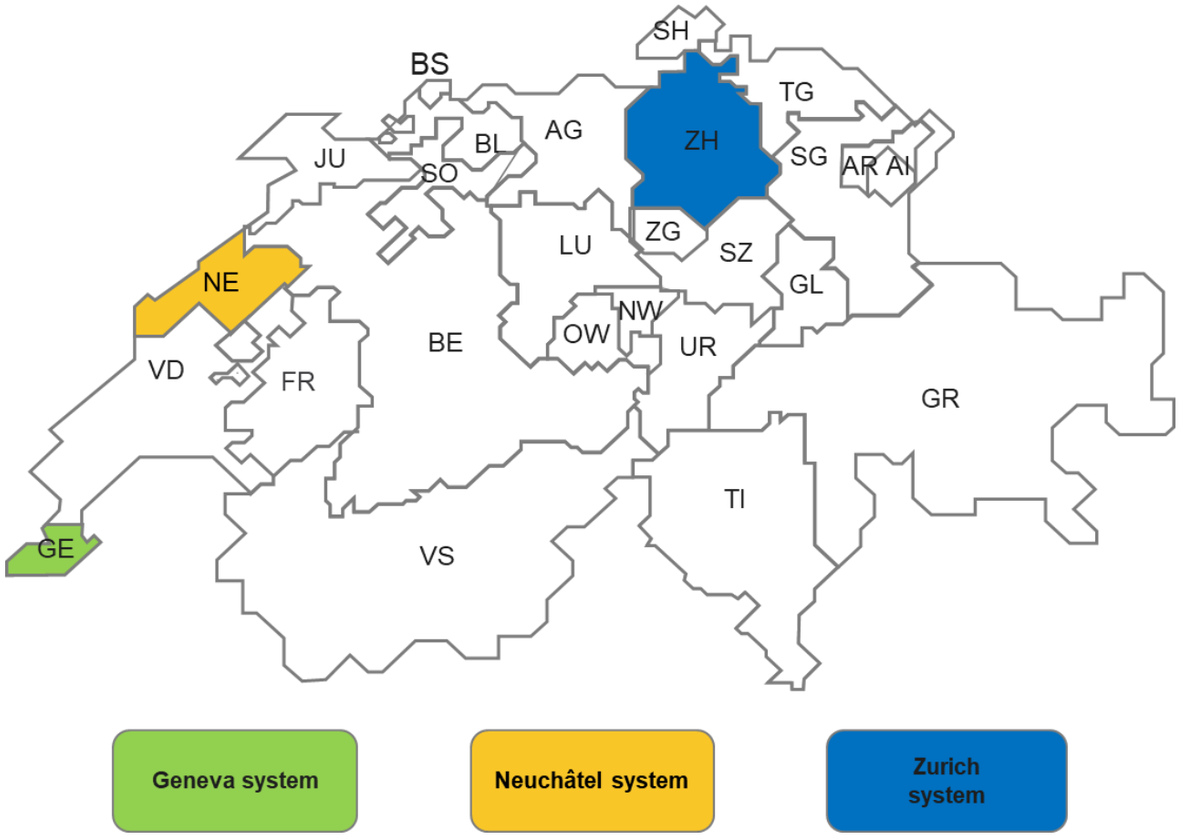
Background
First trials

- A tradition of direct democracy (Landsgemeinde)
- Country's federalism: elections is a subnational matter (Driza Maurer, 2016)
- One of the first countries introducing internet voting (Pratchett and Wingfeld; 2004; Solop, 2004)
  - 1970's: postal voting (1990's generalised)
  - 1998: Federal Council proposes to study internet voting
  - 2000: Swiss Parliament asks Federal Council for starting i-voting program
  - 2002: starts pilots in Geneva (2003); Neuchâtel and Zurich (2005)



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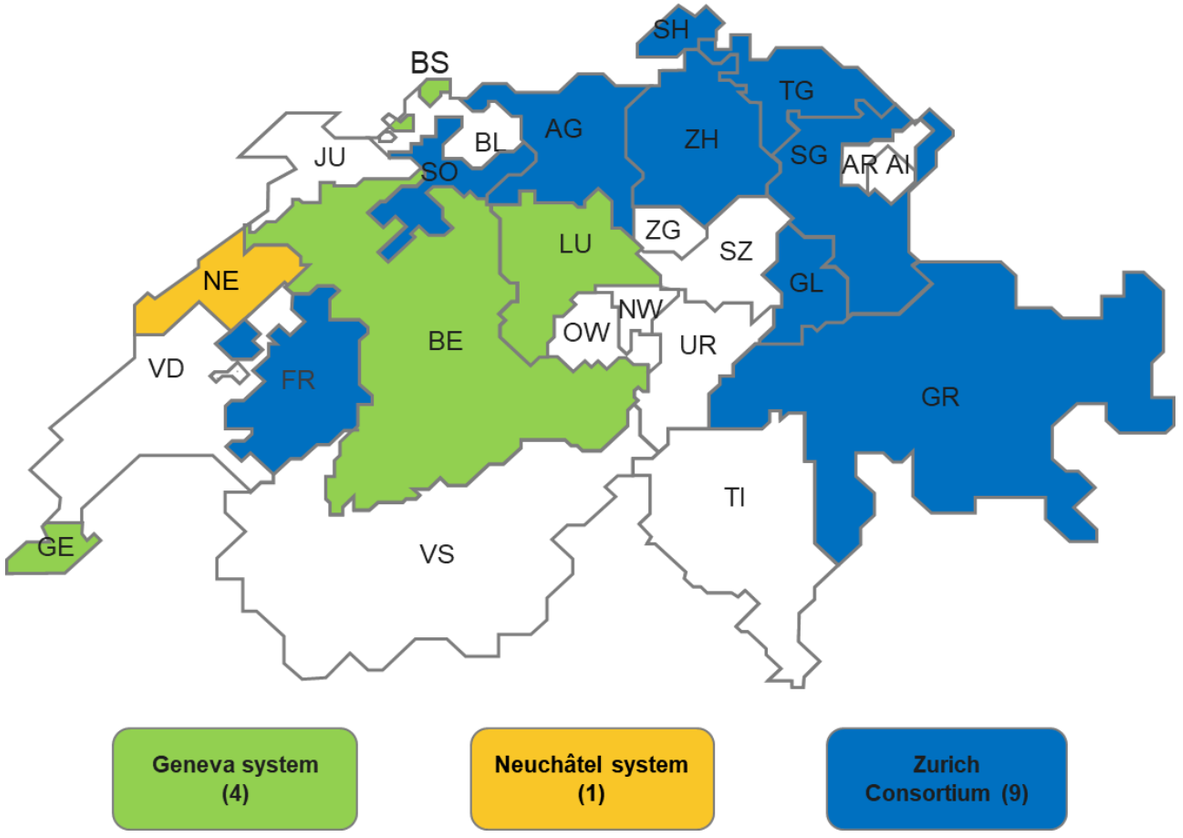
Background
Extending to all Cantons

- In 2006, the Federal Government opened the door for all cantons to use internet voting; with limitations:
  - 20% of the cantonal electorate (later extended to 30%);
  - 10% of the Swiss electoral roll
- Geneva and Zurich (Consortium) started offering their system to other cantons
- Some drawbacks were also experienced:
  - Geneva (2005 – 2007) regulation problems
  - Zurich (2011 – now) technical problems



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The new regulation of 2014

Ordinance of Electronic voting - VEleS

- In 2011, the Federal Council set up a task force to study the security issues of internet voting

- New regulation for internet voting at the Federal level is set up in 2013:
  - Amendment to the Ordinance of Political Rights of 24 May 1978 (OPR)
  - Ordinance on Electronic voting (VEleS) by the Federal Chancellery

- Two main novelties as of 2014:
  - Limits for the use of internet voting by the Cantons
  - Authorisation and certification processes

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The new regulation of 2014
Three authorization levels

Level	Limit(1)	Requirements	Certification
1	30% cantonal 10% Swiss	Functional and security • BSI Common Criteria PP for Internet Voting Products • Council of Europe standards	• None, only ChF experts revisions of documentation (risk assessment, security architecture…) and security tests of system (functional and infrastucture)
2	50% cantonal 30% Swiss	Individual verifiability • Cast-as-intended verifiability • Recorded-as-cast verifiability	• Security: Common Criteria EAL 2 • Cryptography: Security and formal proofs (printing, server and tally are trusted) • Infrastructure and printing offices
3	No limit	Complete verifiability • Individual verifiability • Counted-as-recorded verifiability • Control components (2 or 4)	• Security: Common Criteria EAL 2 + EAL 4 (control components) • Cryptography: Security and formal proofs (printing and one control component are trusted) • Infrastructure and printing offices

(1) According to Art. 27f.2 OPR, expatriate Swiss citizens who are eligible to vote are not included in these limits

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The new regulation of 2014
Authorization requirements

- Authorisation process:
  1. Trials require an initial license from the Federal Council (art. 17a.1 OPR)
  2. Five successive problem-free individual trials in Federal ballots → federal popular votes for 2 years (Art. 27a.3 OPR)
  3. Federal Chancellery authorisation request prior to every voting process (Art. 27e.1 OPR)

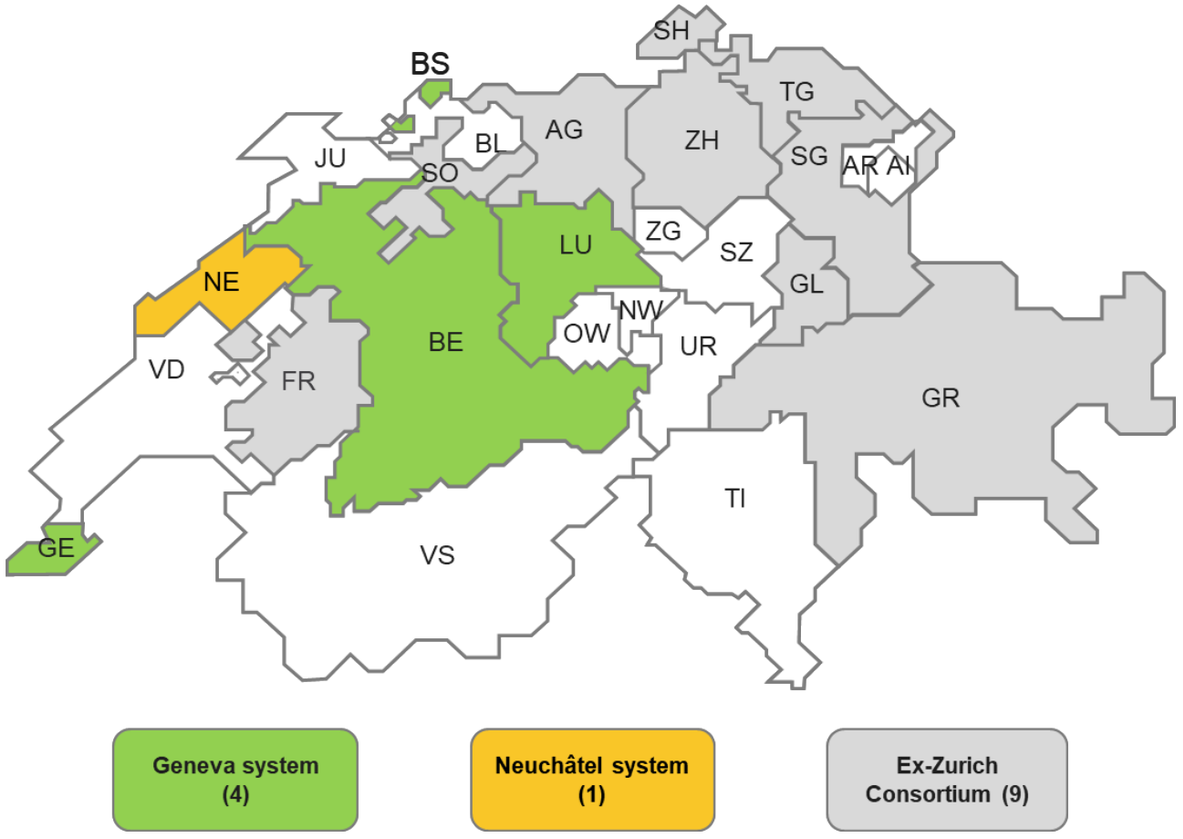
- Participants (Art. 27l.1 OPR):
  - For level 1: *groups d'accompagnement* (four different cantons using a different system) (Art. 511 of the Catalogue)
  - For levels 2 and 3(1): specialised institutions or certification agencies (Annex 5 to the VEleS)
  - At any level: Academic support (Art. 27o2 OPR)

(1) And as of July 2018, for all Cantons using a system providing complete verifiability

Swiss internet voting authorisation in practice

Impact of new ordinance

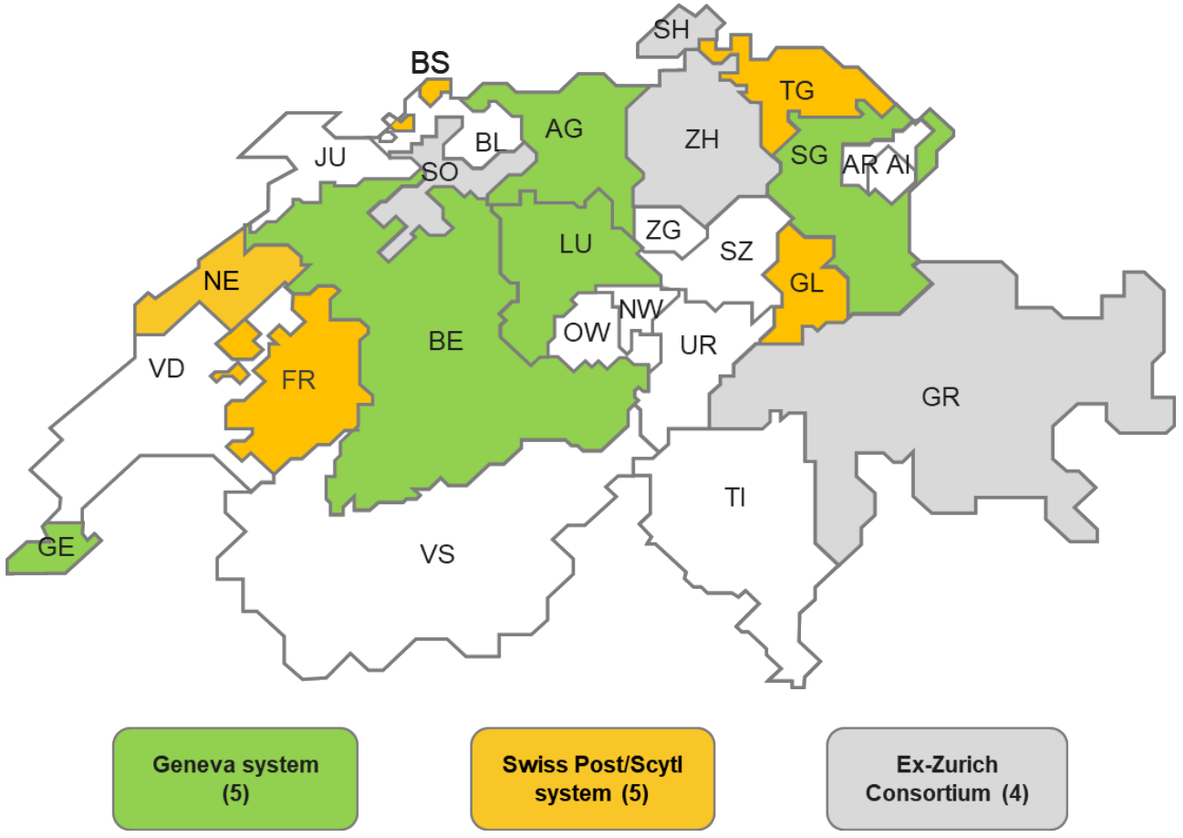
- After the new regulation: level 1 authorisation seek by all existing solutions
  - Neuchâtel was authorised at level 1
  - Geneva upgraded their system and was also authorised at level 1
  - The Consortium upgraded their system but were not authorised (9 cantons were left without voting system)



Swiss internet voting authorisation in practice

New player: Swiss Post

- In 2015, Swiss Post makes a partnership with Scytl and starts offering their solution to cantons
  - Geneva: Aargau (2017), St. Gallen (2017)
  - Swiss Post: Fribourg (2016) + Neuchâtel (2017), Thurgau (2018), Basel Stadt (2019), Glarus (2019)



Swiss internet voting authorisation in practice

Level 2 authorisation: the first certified voting system

- In 2016, KPMG becomes VEleS certification authority

- In 2016, Swiss Posts starts authorisation process for level 2 – achieved in 2017
  - Individual verifiability based on Neuchâtel's return codes: security and symbolic proofs (including with the participation of ETH Zurich)
  - Common Criteria framework for certifying the solution at EAL2 with the BSI Protection Profile
  - System architecture and security controls in compliance with ISO 27001

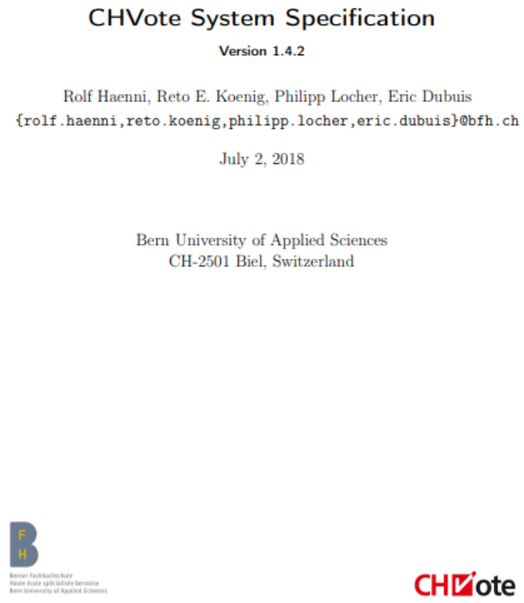
- Swiss Post's is the only solution certified at level 2 → currently working on the authorisation at this level for Thurgau Canton

Swiss internet voting authorisation in practice

Level 3 authorisation: objective 2019 elections

- Since 2016, Geneva is working on certification at level 3
  - Collaboration agreement with Bern University of Applied Sciences (BfH) for the design of a new voting system
  - Proof of concept implemented in 2017
  - Authorisation is expected for the next federal elections (2019)

- Swiss Post is also working on achieving certification at level 3 for the next federal elections (2019)



CHVote System Specification

Version 1.4.2

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Future Plans

- In August 2017, Federal Council stablished a group of experts on internet

- Recommendations by the expert group (April 2018):
  - Authorisation process: simplification with a unique mechanism (with authorisation by the Federal Council) and clarifying the distinction between authorisation and certification + *groups d'acompagnement* should not be compulsory
  - Publication of the source code for those solutions providing complete verifiability and public intrusion test, as amended in July 2018 (Art. 7a and 7b VEleS)
  - Dematerialisation: move towards paper-saving electronic voting (only voting cards are printed) and conduct pilots for full dematerialisation of voting

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Conclusions

- Gradual steps in the introduction of internet voting allow for identifying and mitigating the impact of risks;
- Evaluation processes and requirement definitions should rely on security experts and election management bodies;
- Clear frameworks to evaluate and certify the security of online voting solutions work better than designing specific closed voting solutions;
- Legal and technical requirements should be reviewed often – to cope with evolving technology, security and auditability

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