

# E-Voting in Switzerland

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***Barcelona***

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## Who we are

- Prof. Dr. Eric Dubuis
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  - Head of E-Voting Group of Bern University of Applied Sciences
  - Teaches Data and Application Security
- Oliver Spycher
  - PhD Student in Cryptographic E-Voting Protocols
  - Project manager of *Selectio Helvetica*
  - Former Test Manager
- Partnership with Federal Chancellery of Switzerland

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# I. The Swiss Case

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## Swiss Context (1)

- 3 political levels:
  - federal, cantonal, municipal level
- Direct democracy
  - polls based on initiatives by the people
  - a lot of autonomy on non-federal levels
- Many polls per year
  - up to 4 times on the federal level
  - for cantonal and municipal polls and/or elections:
    - can be interspersed with additional polls and/or elections
- **Swiss living abroad** want to participate easily!



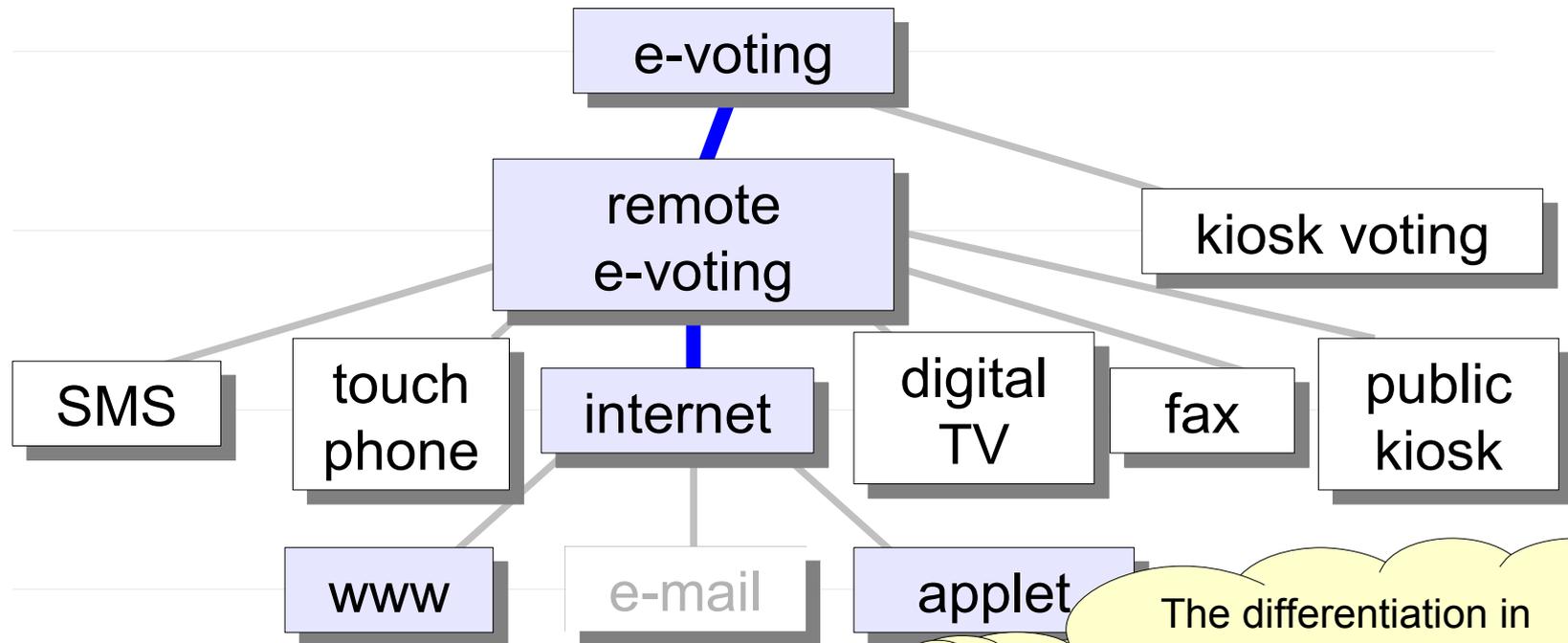
Source: [welt-atlas.de](http://welt-atlas.de)

## Swiss Context (2)

- Switzerland has a “long” history in e-voting
  - First legally binding poll: **January 19, 2003**
- Used many times for referendums
  - cantons Geneva (GE), Neuchâtel (NE) and Zürich (ZH)
  - federal, cantonal, and municipal level
- Used for elections, too
  - municipal and cantonal levels only
- On federal level: Only **10%** of the electorate of each of the three cantons may vote by electronic means

## E-Voting in Switzerland means Internet-Voting

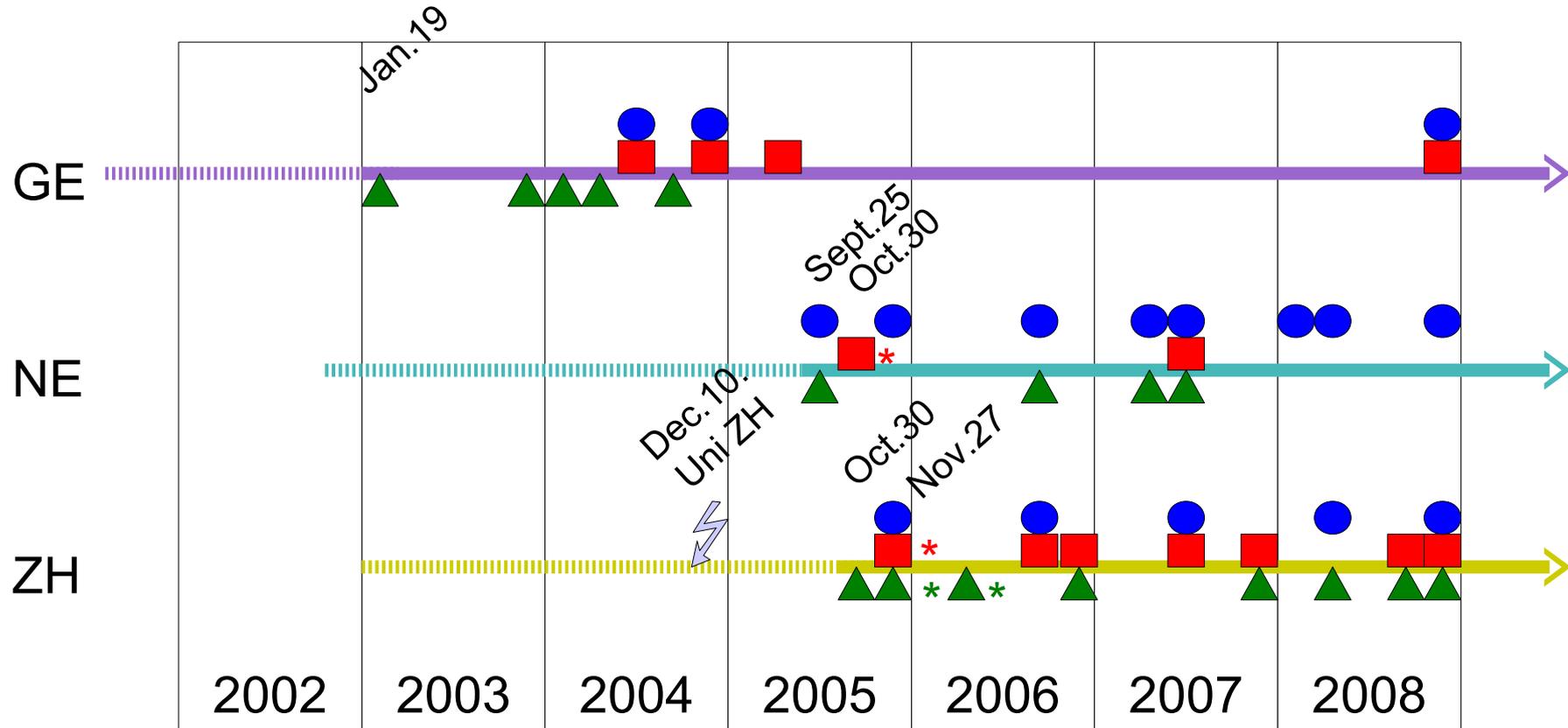
Classification according to EU Recommendation Rec(2004)11:



The differentiation in WWW, applets, etc. is somewhat useless...  
What about JavaScript?

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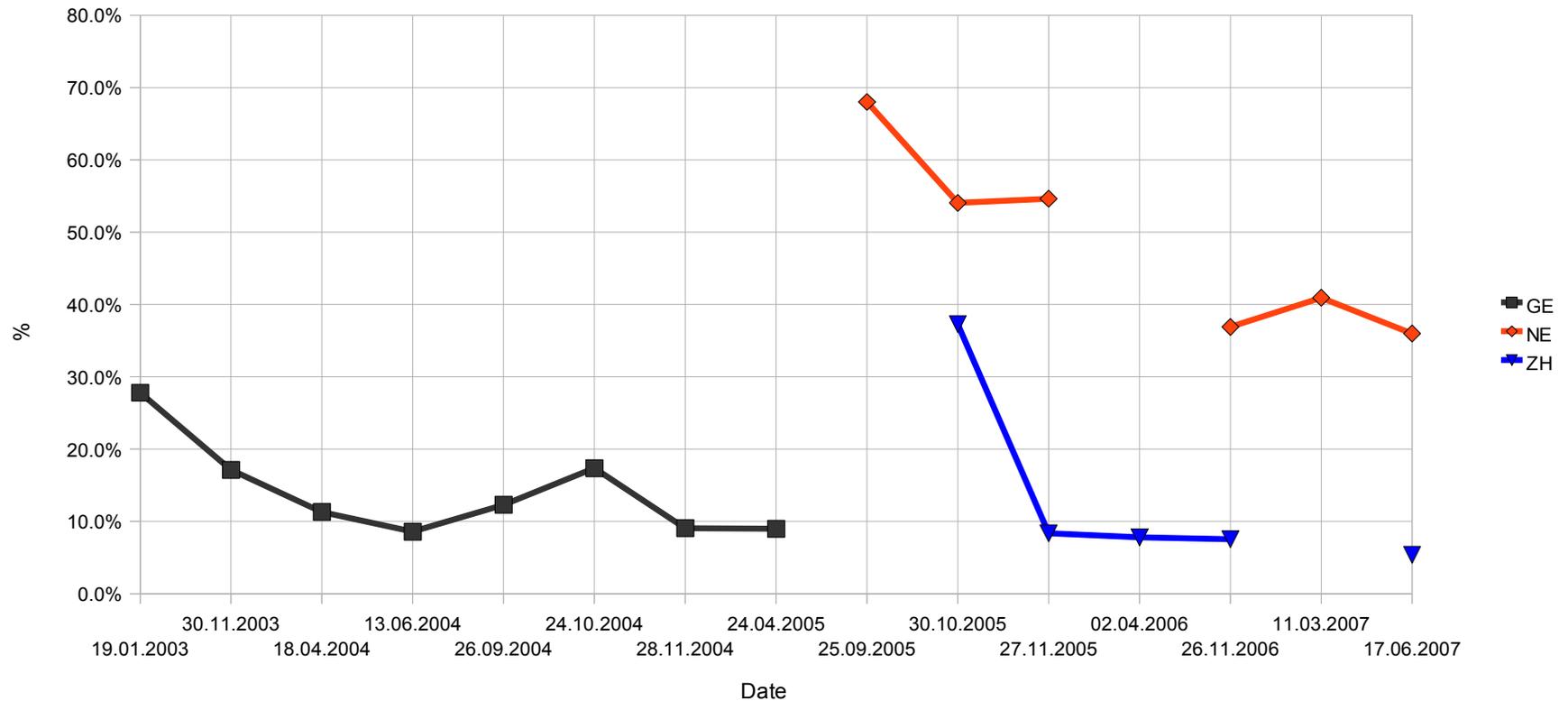
## Application of E-Voting in Switzerland till 2008



Nov. 4, 2010 ● confederation    ■ canton \* : election    ▲ municipality \* : election

## Swiss Experience (1)

Relative Participation



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Source: Federal Chancellery of Switzerland

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## Swiss Experience (2)

Swiss officials state:

- No serious problems so far!
  - However, no serious attack ever occurred...
  - Which attacks would be revealed?
- Would like to raise/remove the 10% barrier
  - Will be soon 20%...
- Would like to allow for federal elections, too

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# I. Security Strategy

## The Rules in Voting

- Eligibility
  - Only eligible voters, only 1 vote per voter.
- Privacy, Receipt Freeness
  - Vote cannot be linked back to voter.
  - Voter cannot prove how he/she has voted.
- Accuracy
  - Votes are not altered, removed, or inserted.
- Fairness
  - No partial results made available prematurely.

## Enforcing the Rules in E-Voting

- How can we be **confident** that the rules are not broken?
  - There are **no traditional mechanisms** to lean on...

“The principle of the 'publicness' of an election which is based on the constitutional basic decisions for democracy, republic and constitutional state dictates that all essential steps of an election are *publicly verifiable*, ...”

Germany: BVerfG, 2 BvC 3/07 of March 3, 2009, paragraph no. 1

Germany: BVerfG, 2 BvC 3/07 of March 3, 2009, paragraph no. 1

## Enforcement (1): System Transparency

- *The e-voting systems used in Switzerland up to now **lack transparency**. Voters must blindly **trust** that the **organizational and procedural steps** are carefully applied during the preparation, the execution, and the tallying phase of an election or poll.*



Source: [seekxl.de](http://seekxl.de)

## Enforcement (2): Data Transparency

### Verifiability of Accuracy in E-Voting

- Individual
  - Did my vote reach the electronic ballot box?
- Universal
  - Are all votes counted correctly?
- Eligibility
  - Are all counted votes legitimate?

## Conclusion: Transparency is the Key to Security

Openness, Reduction on Trust

- **Specifications** of system components should be made available in Switzerland
- Establish justified trust by applying **well-known cryptographic techniques**.

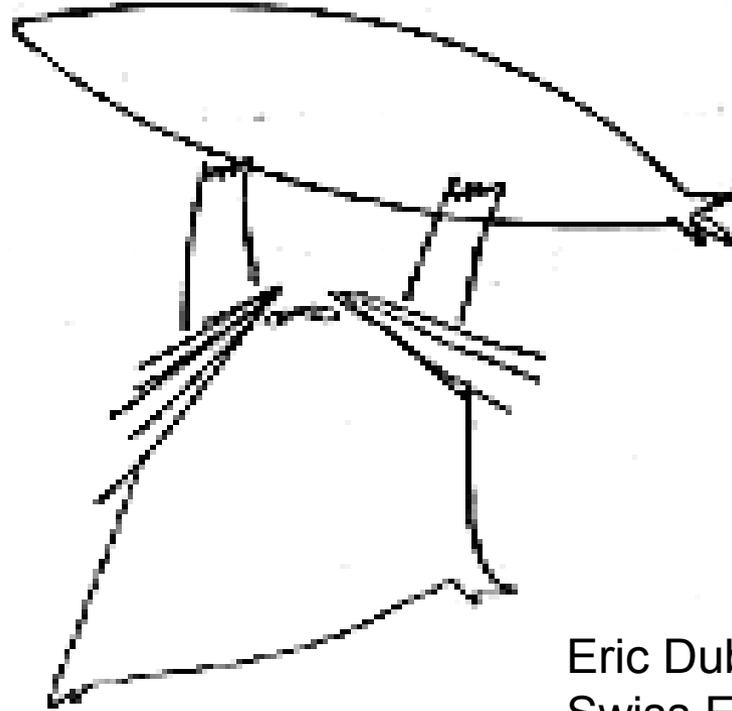


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Source: [geo-reisecommunity.de](http://geo-reisecommunity.de)

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**Thank you for your attention!**



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## Links

- Federal Chancellery of Switzerland, e-voting theme:  
<http://www.bk.admin.ch/themen/pore/evoting/index.html>
- Canton of Geneva, e-voting:  
<http://www.geneve.ch/evoting/>
- Canton of Neuchâtel, Guichet Unique:  
<http://www.ne.ch/guichetunique>
- Canton of Zürich, e-voting:  
<https://evoting.zh.ch/>
- Swiss E-Voting Competence Center:  
<http://www.e-voting-cc.ch/>
- Berner University of Applied Sciences, E-Voting Group:  
<http://e-voting.ti.bfh.ch>