Multiple Casts in Online Voting

– Analyzing multiple casts as an easy approach to overcome open questions of online voting –

Melanie Volkamer and Rüdiger Grimm
Overview

- Introduction
- Open Problems of Online Voting
- Forms of Multiple Cast in Online Voting
- Needed Additional Mechanisms
- Advantages / Disadvantages
- Discussion
Introduction Multiple Cast

• Basic Idea of Multiple Cast in Voting
  – Cast more than one vote
  – At different points of time
  – Using different channels
  – BUT: only one of it is counted

• Reason for discussions: Online Election in Estonia
  – 2005: Local Government Council Election
  – Reason: To overcome distance voting problems

• Not a new or online voting specific approach
• Applied in traditional voting systems e.g. in Sweden
Online Election in Estonia

• Ballot Casting

- Voter from the electoral register
  - Voter casts an e-vote
  - Voter has not cast an e-vote

  Cast an e-vote
  - Voter casts another e-vote
  - Voter casts a paper vote

  Counting paper votes

  Checking e-voters

  Keeping only last e-vote per voter

• Counting

  After election day

- Counting e-votes
- Adding both sub results
Open Problems in Online Voting

• Observation problem

• Voting in advance

• Untrustworthy voting client

• Receipt freeness

• Casting one and only one vote in case of problems

• Temporary unlimited election secrecy
Forms of Multiple Cast

- **a)**
  - authorized voter → Online-Voting

- **b)**
  - authorized e-voter → Online-Voting
  - authorized paper voter → Paper based Voting

- **c)**
  - authorized voter → Online-Voting → Paper based Voting

- **d)**
  - authorized voter → Online-Voting → Paper based Voting
Needed Additional Techniques

• Give access only to voters but several times
  - Check the right to vote only the first time \(\rightarrow\) token
  - Check the right to vote each time
• Identification of the last cast ballot
  - Voter’s PC clock
  - Incoming Time \(\rightarrow\) Replay attacks
  - Authentic timestamps
• Identifying old votes from the same voter / removing of e-votes in case of a cast paper vote
  - Assignment voter/vote
    \(\rightarrow\) loosing anonymity/receipt-freeness
  - Depending on the voting scheme
Advantages

• Free and secret ballot casting in the private sector
  → Observation problem/ Ballot Buying
• Voters can change their mind
  → Voting in advance
• Sniffing becomes pointless (espec. case d)
  → Temporary unlimited election secrecy
• Sent Messages are no proof
  → Receipt freeness
• Handle System breakdowns
  → Casting one and only one vote

Untrustworthy voting client??
Disadvantages

• (Untrustworthy voting client)
• Same chance to cast a vote for all voters (beside a)
• Is the counted vote the one the voter wants to be counted? / Timestamps
• Loose the seriousness and the value of elections
• Less degree of anonymity / not applicable to all voting schemes
Summery

• Nice concept to overcome the open problems of remote online voting and voting in advance
• But two main technical problems
  – Not applicable to all voting schemes
  – Integration of authentic timestamps
• And two social ones
  – Equality principle
  – Loose the seriousness and value of elections
Thank you for your attention!

Discussion / Questions?

contact: volkamer@dfki.de