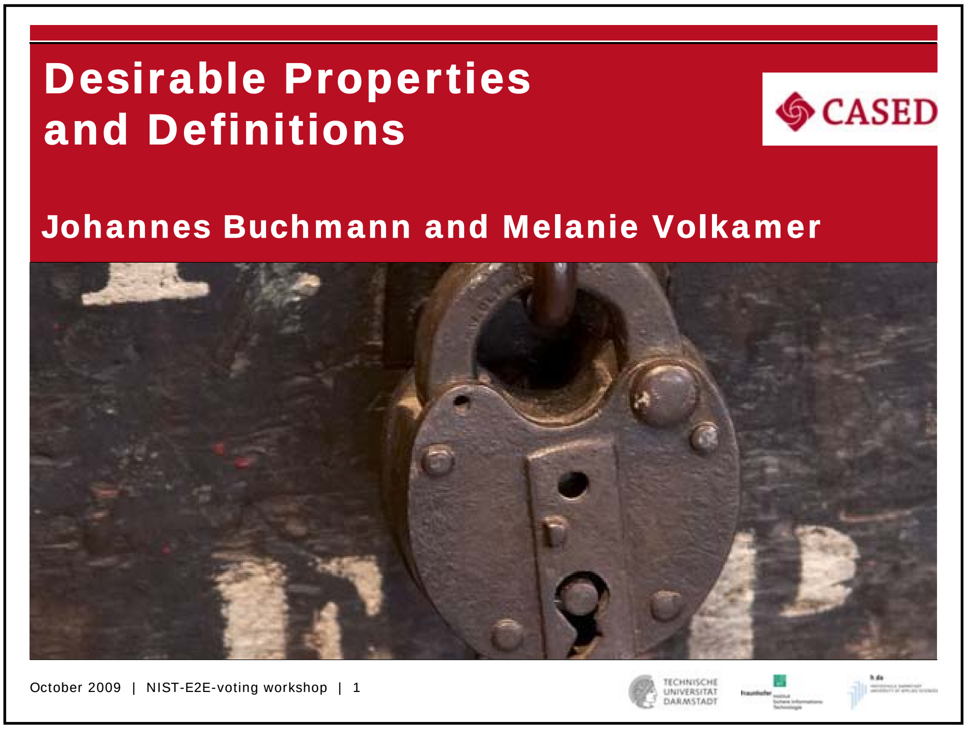
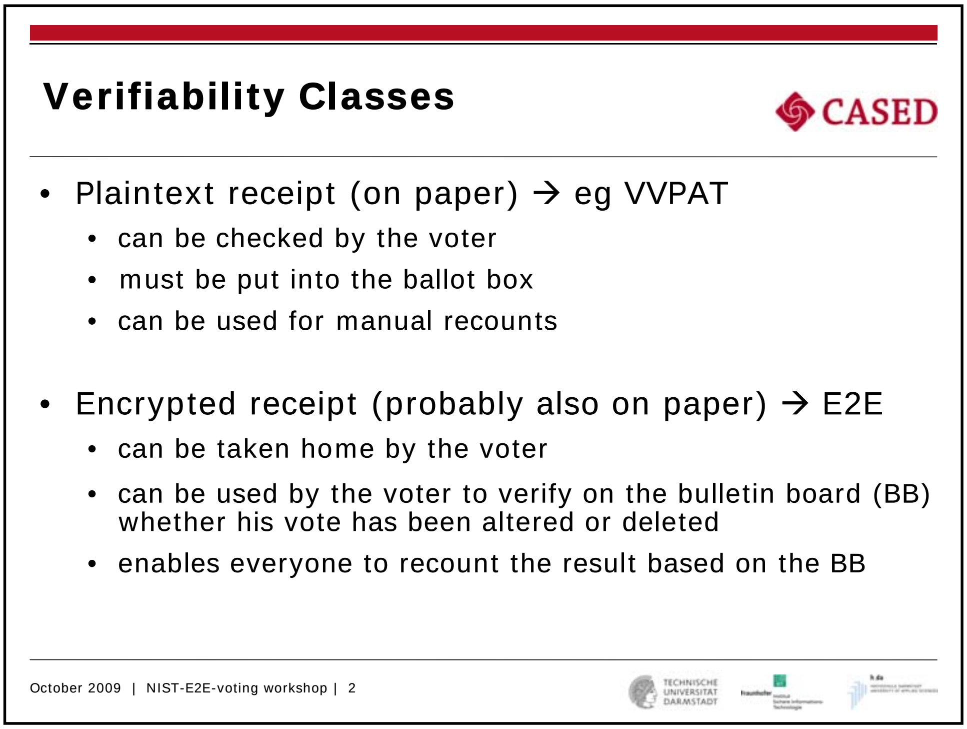


Desirable Properties and Definitions

Johannes Buchmann and Melanie Volkamer



Verifiability Classes

- Plaintext receipt (on paper) → eg VVPAT
  - can be checked by the voter
  - must be put into the ballot box
  - can be used for manual recounts
- Encrypted receipt (probably also on paper) → E2E
  - can be taken home by the voter
  - can be used by the voter to verify on the bulletin board (BB) whether his vote has been altered or deleted
  - enables everyone to recount the result based on the BB

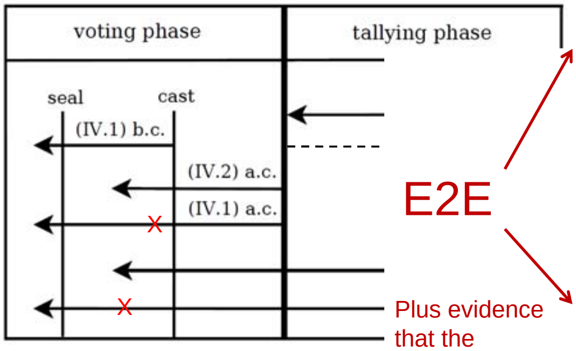
Verifiability Classes

- Plaintext receipt (on paper) → eg VVPAT
  - can be checked by the voter
  - must be put into the ballot box
  - can be used for manual recounts
- **Encrypted receipt (probably also on paper)→E2E**
  - can be taken home by the voter
  - can be used by the voter to verify on the bulletin board (BB) whether his vote has been altered or deleted
  - enables everyone to recount the result based on the BB

Outline

- Definitions for verifiability requirements
- Additional requirements/open issues

Definitions



E2E

Plus evidence that the sealed ballot contains the intended vote

b.c. – before casting
a.c. – after casting
a.t. – after tallying

UV.1: Continuous universal verifiability.: Anyone can verify all parts of the correct processing of the ballots in tallying phase.

UV.1: Discrete universal verifiability.: Anyone can verify certain (but not all) parts of the correct processing of the ballots in tallying phase.

IV.1: Inner individual verifiability: The voter can verify that his ballot contains the vote which the voter intended to cast.

IV.2 Outer individual verifiability. The voter can verify that his ballot has been published on the bulletin board, but he cannot verify that his ballot contains the vote which the voter intended to cast.

Not to forget …

- Ensure election secrecy
  - without verifiability techniques? Hard to explain
  - plus receipt freeness, coercion resistance, long-term secrecy
- Handle complaints like
  - who has to provide the proof? (voter/authority)
  - which information is required? (plaintext votes)
  - what happens if voters wrongly claim that sth. went wrong?
  - how to prevent people to wrongly claim that results are wrong?

Not to forget … (2)

- Usability aspects
  - possible for people without specialist knowledge
  - not too many actions for the voter
  - not to compare too long (hash) strings
- Didactic aspects, how to communicate that
  - system is evaluated but additional mechanisms are required
  - additional steps are required after ballot casting
  - verifiability of pre-ballots ensures accuracy

Not to forget … (3)

- Impact on the Evaluation
  - Can some requirements be removed?
  - How to integrate verifiability requirements?
- Flexibility of Election Law
  - Are randomized candidate order possible?
  - Is vote-updating possible?

Thank you for your attention!
Questions?

Contact
volkamer@cased.de