Evaluating RIES using the proposed Protection Profile

Hugo Jonker — Eindhoven University of Technology & University of Luxembourg

Melanie Volkamer — University of Passau

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Why RIES?

Why the protection profile (PP)?

rationale

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Why RIES?

- used for parlementarian elections
- security not thoroughly investigated

Why the protection profile (PP)?

rationale

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Why RIES?

- used for parlementarian elections
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Why the protection profile (PP)?

- Common Criteria (CC) = internationally accepted security standard
- PP (part of CC) has been recently developed
- test-case: how to apply the PP?

outline

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- outline
- requirements

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- describes specific security requirements for product category
- compliance to a PP does not imply total security(!)

This PP, *Core Requirements for Remote Electronic Voting*:

- aimed at “regular” elections
- geared towards interface

requirements

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- OverhasteProtection
- Correction
- Confirmation
- OneVoterOneVote
- VoteCount
- AnonElectionCommittee
- after-Integrity
- Cancel
- After-BallotBox
- EndElection
- IntegrityElectionCommittee
- SecretElectionCommittee
- Malfunction
- Log
- StartVoteCount
- SecretMessage
- AuthElectionCommittee
- UnauthorisedVoter
- NoProof
- after-ElectionSecrecy
- IntegrityMessage
- ElectionSecrecy

about

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- pre-election
- election phase
- post election

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History:

- originally developed for water management board elections used in different regional elections, successful
- adapted for ex-pat voting (*RIES-KOA*, 2006)
- based on academic work, actively monitored by researchers, OSCE, WVSCN.NL

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Noteworthy aspects:

- integrates mail-voting and e-voting
- 3 phases: pre-election, election, post election
- verifiability by hashes and commitments

verifiability

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Per voter:

- identity i, secret key $sk(i)$
- “personalised” list of candidates $\mathcal{C}_i$

verifiability

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i

1	can_1
$\vdots$	$\vdots$
n	can_n

$\mathcal{C}$

verifiability

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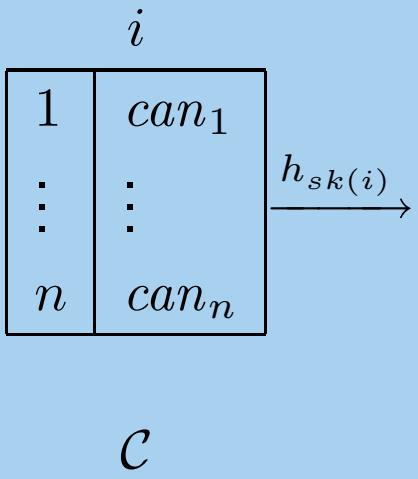

verifiability

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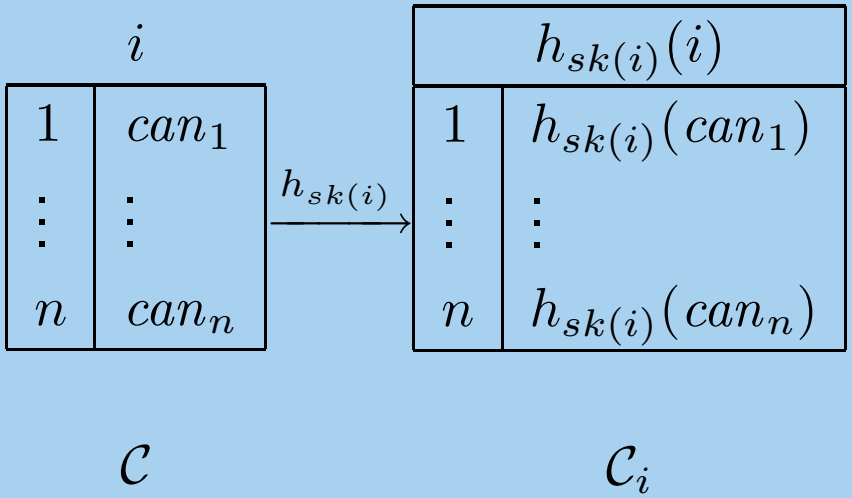

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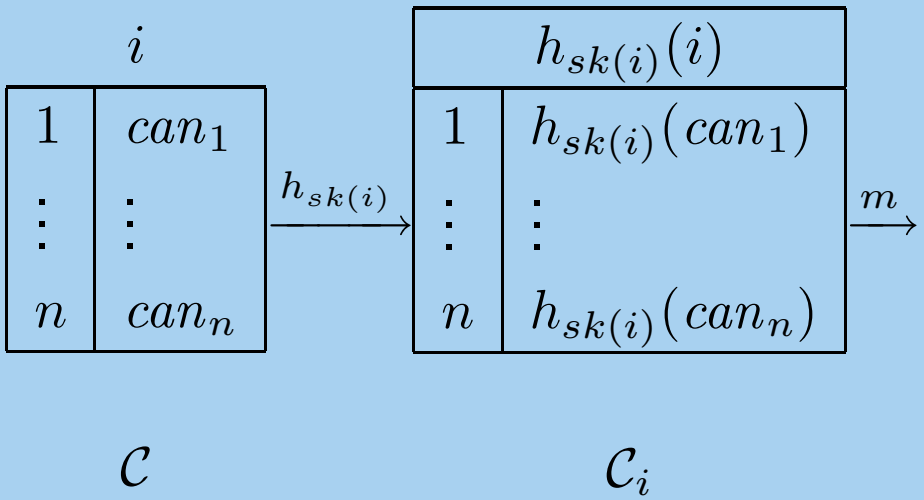

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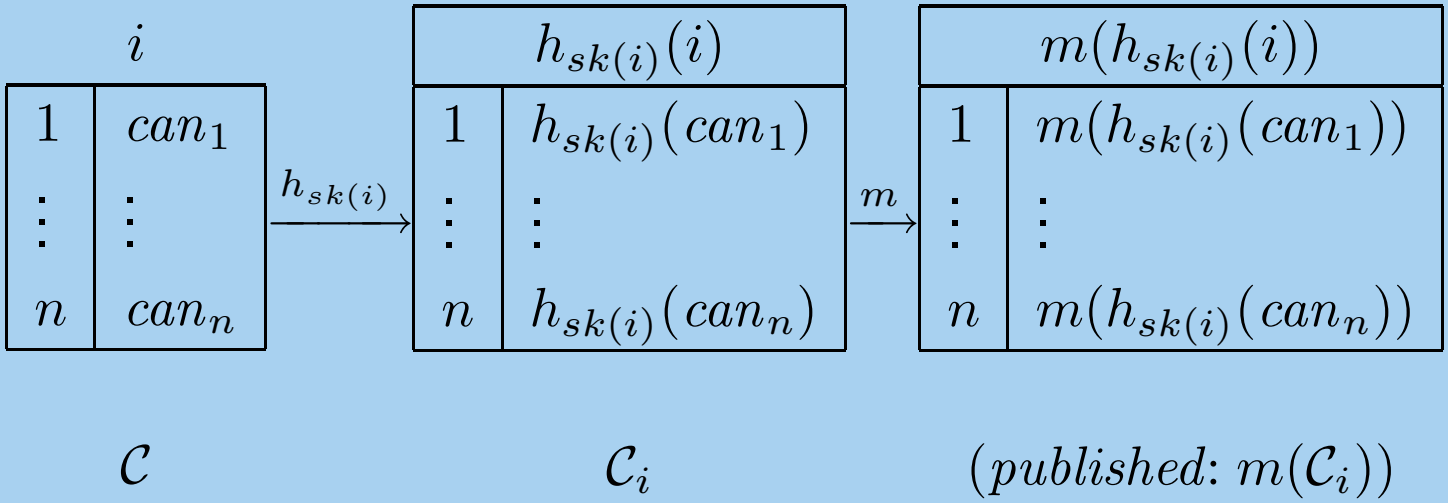

pre-election

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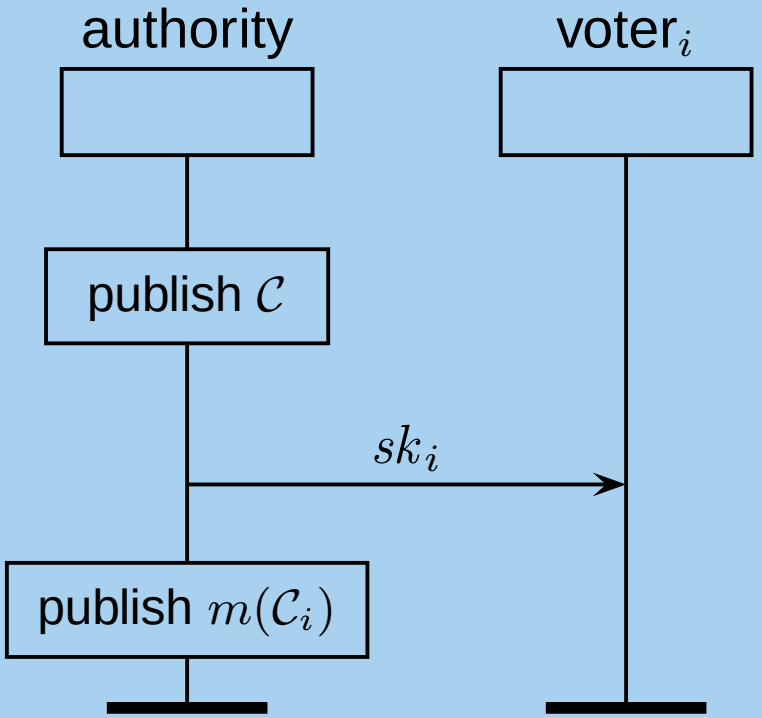
via post office



election phase

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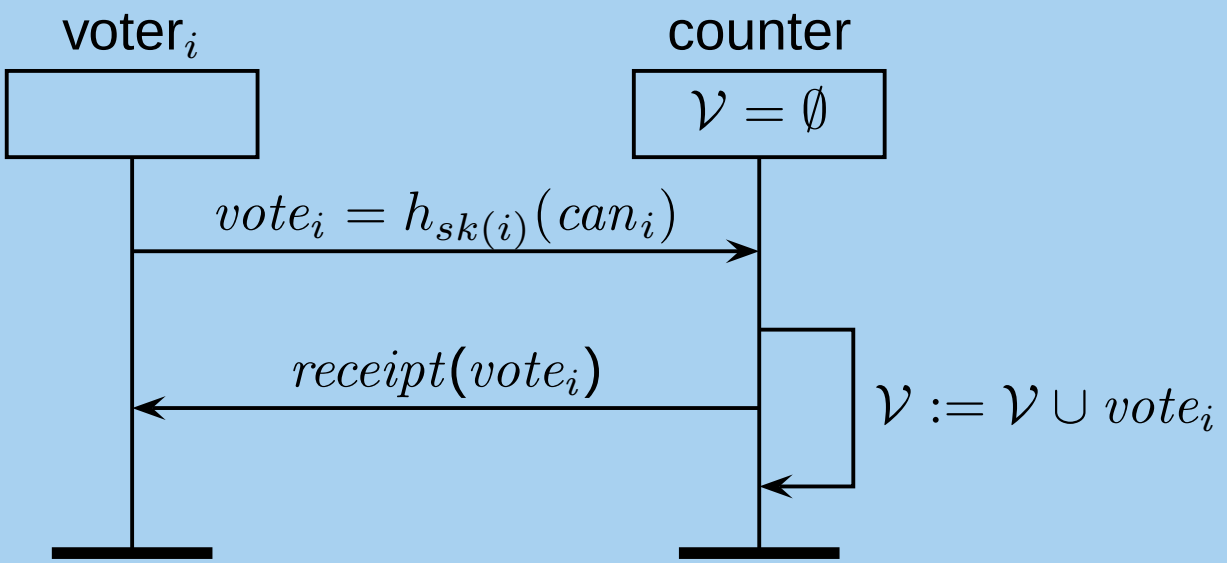
over ssl channel



post election

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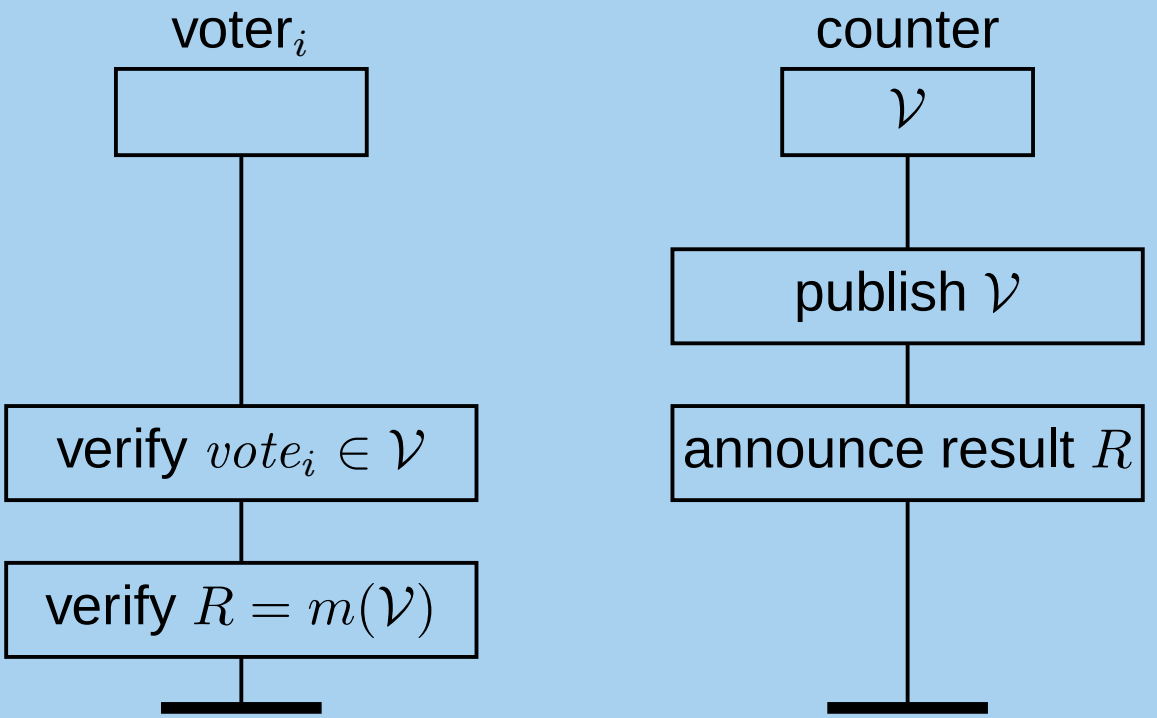

approach

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- results (cont.)

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- not full blown CC-analysis
- based on available documentation
- extended with information gained from discussions / meetings

results

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- results (cont.)

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objective	outcome
OverhasteProtection	PASS
Correction	PASS
Confirmation	PASS
OneVoterOneVote	PASS
VoteCount	PASS
AnonElectionCommittee	PASS
after-Integrity	PASS
Cancel	PASS
after-BallotBox	PASS

results (cont.)

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- results (cont.)

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objective	outcome
EndElection	INCONCL
IntegrityElectionCommittee	INCONCL
SecretElectionCommittee	INCONCL
Malfunction	INCONCL
Log	INCONCL
StartVoteCount	INCONCL
SecretMessage	FAIL
AuthElectionCommittee	FAIL
UnauthorisedVoter	FAIL
NoProof	FAIL
after-ElectionSecrecy	FAIL
IntegrityMessage	FAIL
ElectionSecrecy	FAIL

on RIES

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- documentation lacking (SSL configuration)

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- documentation lacking (SSL configuration)
- voter proofs available

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- voter proofs available
- self-tests? availability of ballot box? logging? starting/stopping guards?

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- documentation lacking (SSL configuration)
- voter proofs available
- self-tests? availability of ballot box? logging? starting/stopping guards?
- authorised voters only!

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- documentation lacking (SSL configuration)
- voter proofs available
- self-tests? availability of ballot box? logging? starting/stopping guards?
- authorised voters only!

Impact:
Suggestions for improvements will be in paper and communicated to voting officials and RIES developers.

on PP

- emphasis on interfaces and correctness

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- emphasis on interfaces and correctness
- not enough requirements on environment

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- emphasis on interfaces and correctness
- not enough requirements on environment
- strong assumptions

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- emphasis on interfaces and correctness
- not enough requirements on environment
- strong assumptions
- compliance does not imply a secure voting system

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- emphasis on interfaces and correctness
- not enough requirements on environment
- strong assumptions
- compliance does not imply a secure voting system
- compliance does (strongly) indicate a correct and somewhat secure voting system

on PP

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- emphasis on interfaces and correctness
- not enough requirements on environment
- strong assumptions
- compliance does not imply a secure voting system
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Future work:

on PP

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- emphasis on interfaces and correctness
- not enough requirements on environment
- strong assumptions
- compliance does not imply a secure voting system
- compliance does (strongly) indicate a correct and somewhat secure voting system

Future work:

- widen scope of PP to accomodate RIES (and similar)
- extend coverage of PP to catch more security

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Thank you for your attention!

hugo.jonker@uni.lu
http://satoss.uni.lu/hugo/