Statement Voting
&
Liquid Democracy

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Joint with

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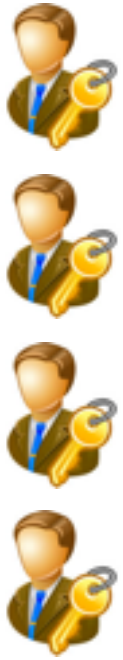
e-voting

- E-voting encompasses a broad range of voting systems that apply electronic elements in one or more steps of the electoral process.

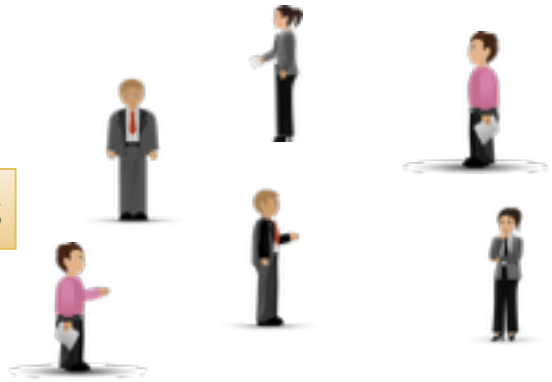
- Two main categories:
  - On-site e-voting systems
  - Remote e-voting systems

conventional voting — roles

Trustees



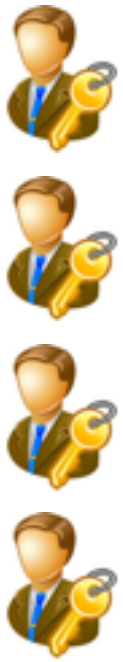
Voters



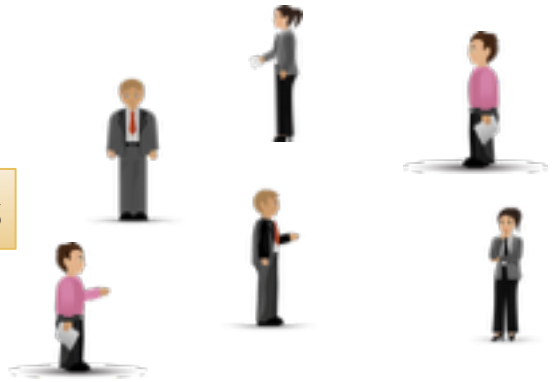
conventional voting — roles

Trustees

Bulletin Board
(broadcast)



Voters

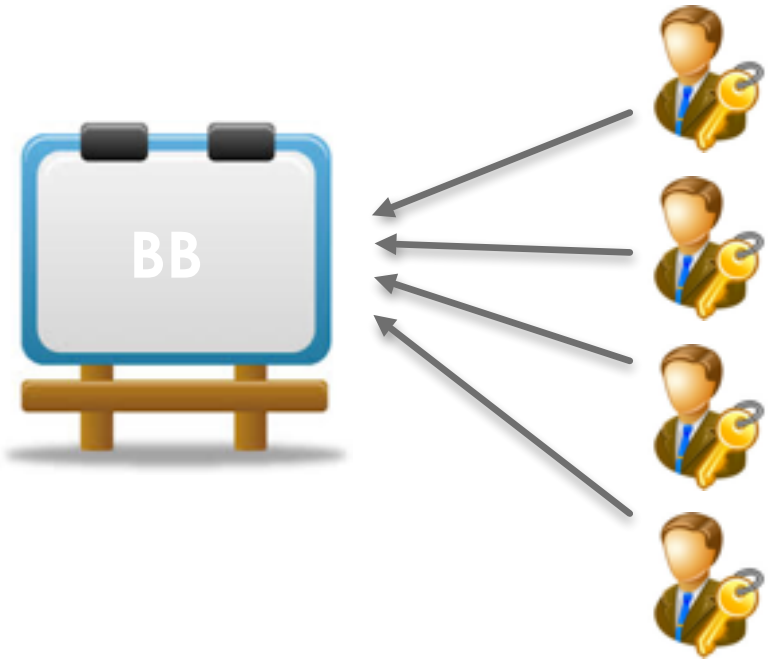


conventional voting

e.g.**Helios**
practical

tally: process the voting ballots

Trustees



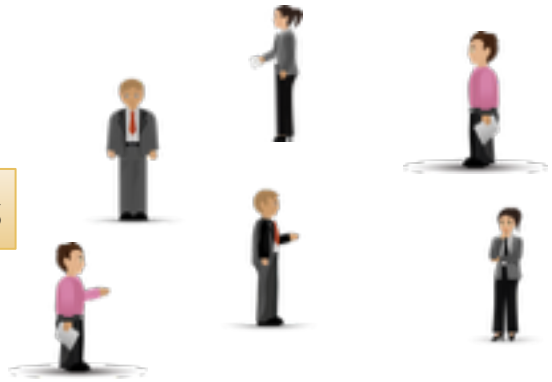
Voters

vote for candidate #1

vote for candidate #2

statement voting: a new concept

Voters



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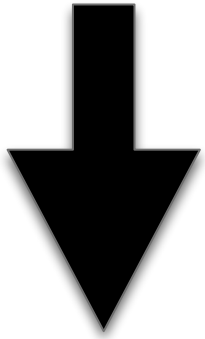
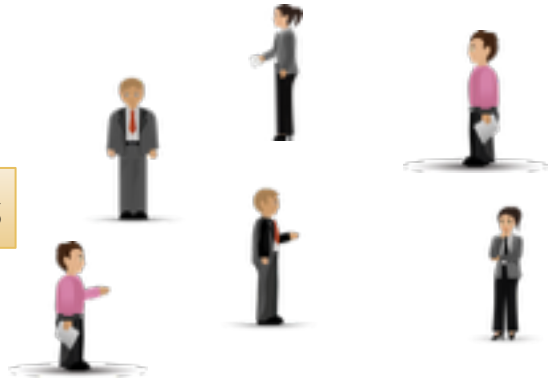


Voters



P1 votes for candidate #1

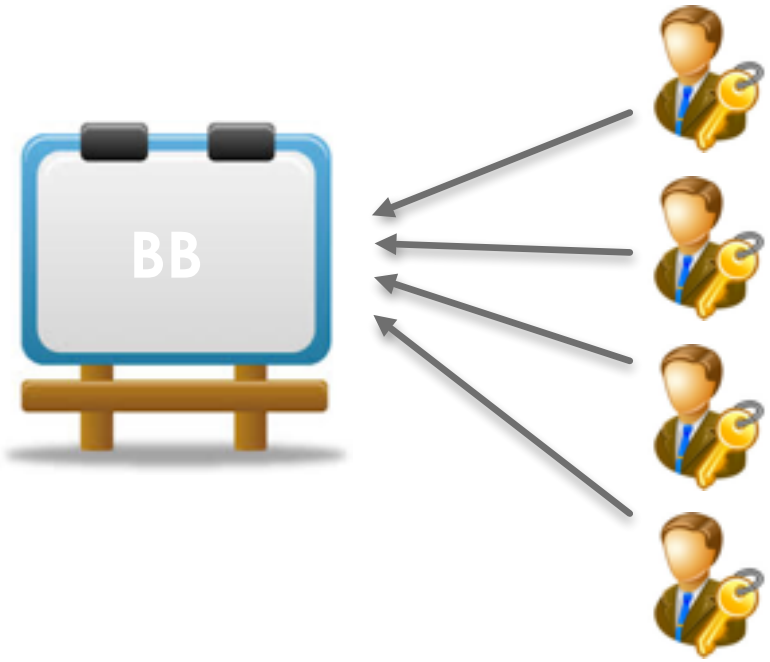
P2 follows P1

P3 follows P1 if P1 votes; otherwise votes for candidate #2

statement voting — without privacy

tally circuit: process the voting statements

Trustees



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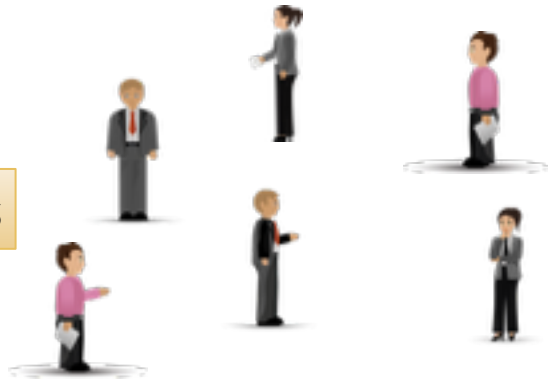

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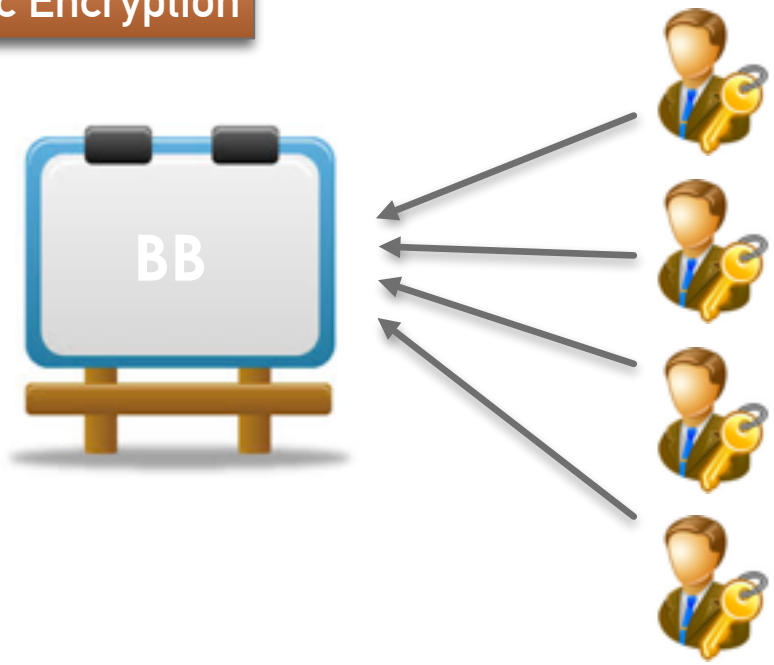
statement voting — with privacy

tally circuit: process the voting statements

Threshold Fully Homomorphic Encryption

Trustees



Voters

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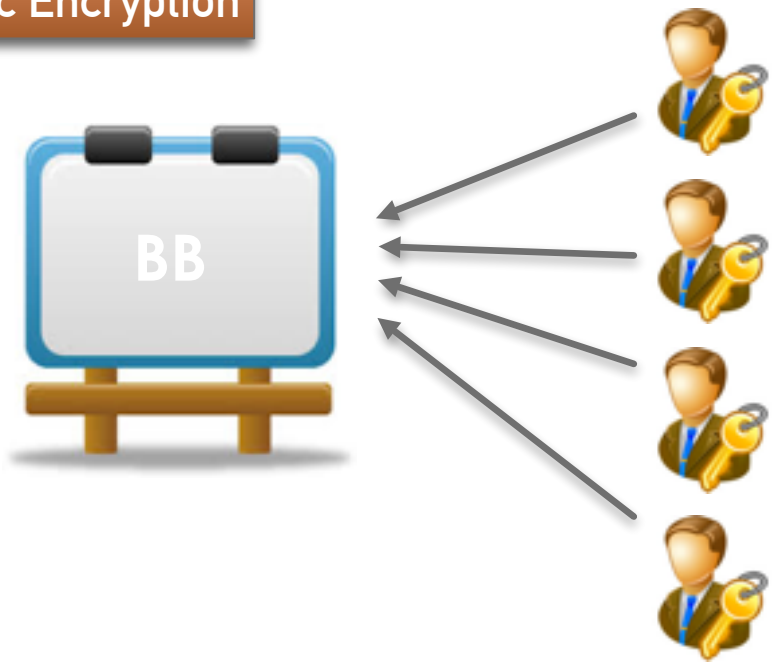
statement voting — with privacy

tally circuit: process the voting statements

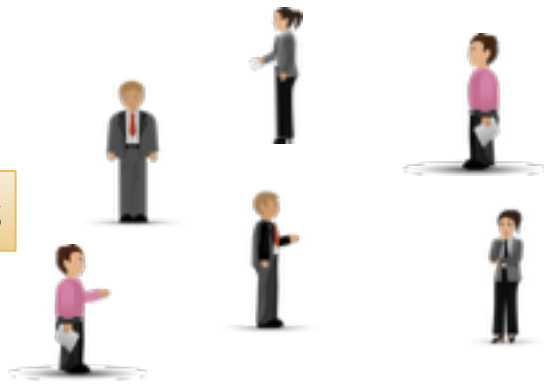
Threshold Fully Homomorphic Encryption

Zero-Knowledge Proof

Trustees



Voters



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statement voting — with privacy

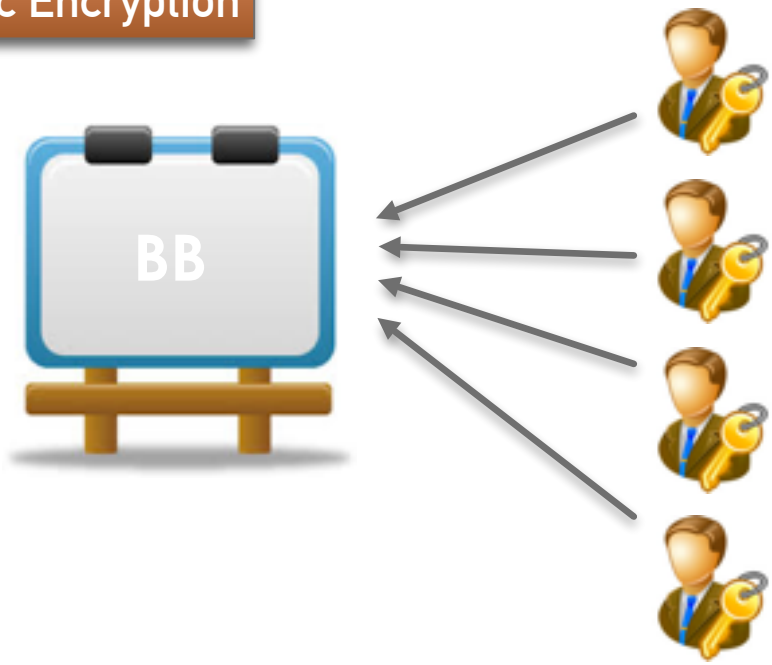
Helios+
not practical

tally circuit: process the voting statements

Threshold Fully Homomorphic Encryption

Zero-Knowledge Proof

Trustees



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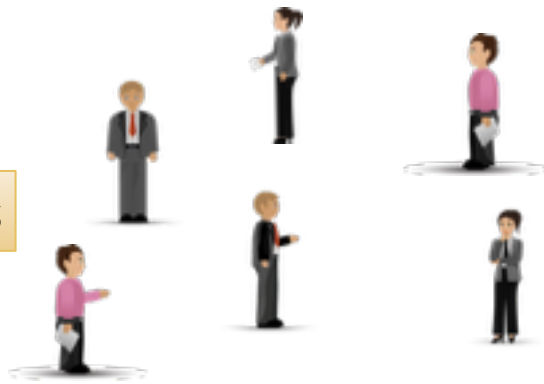

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statement voting — with privacy

full version
practical

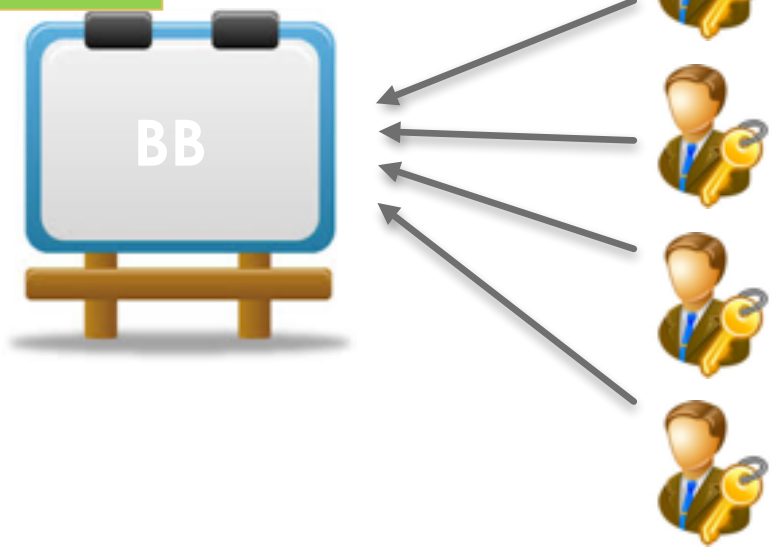
tally circuit: process the voting statements

Threshold Encryption

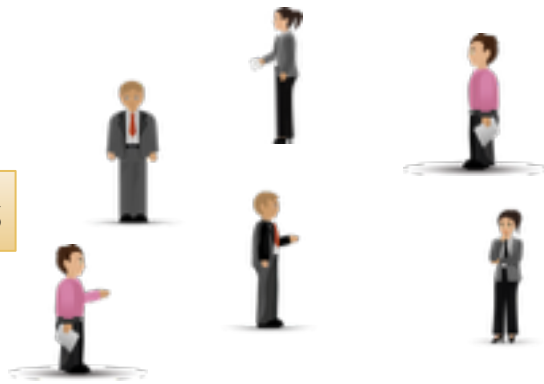
efficient Zero-Knowledge Proof

Mix-net

Trustees



Voters



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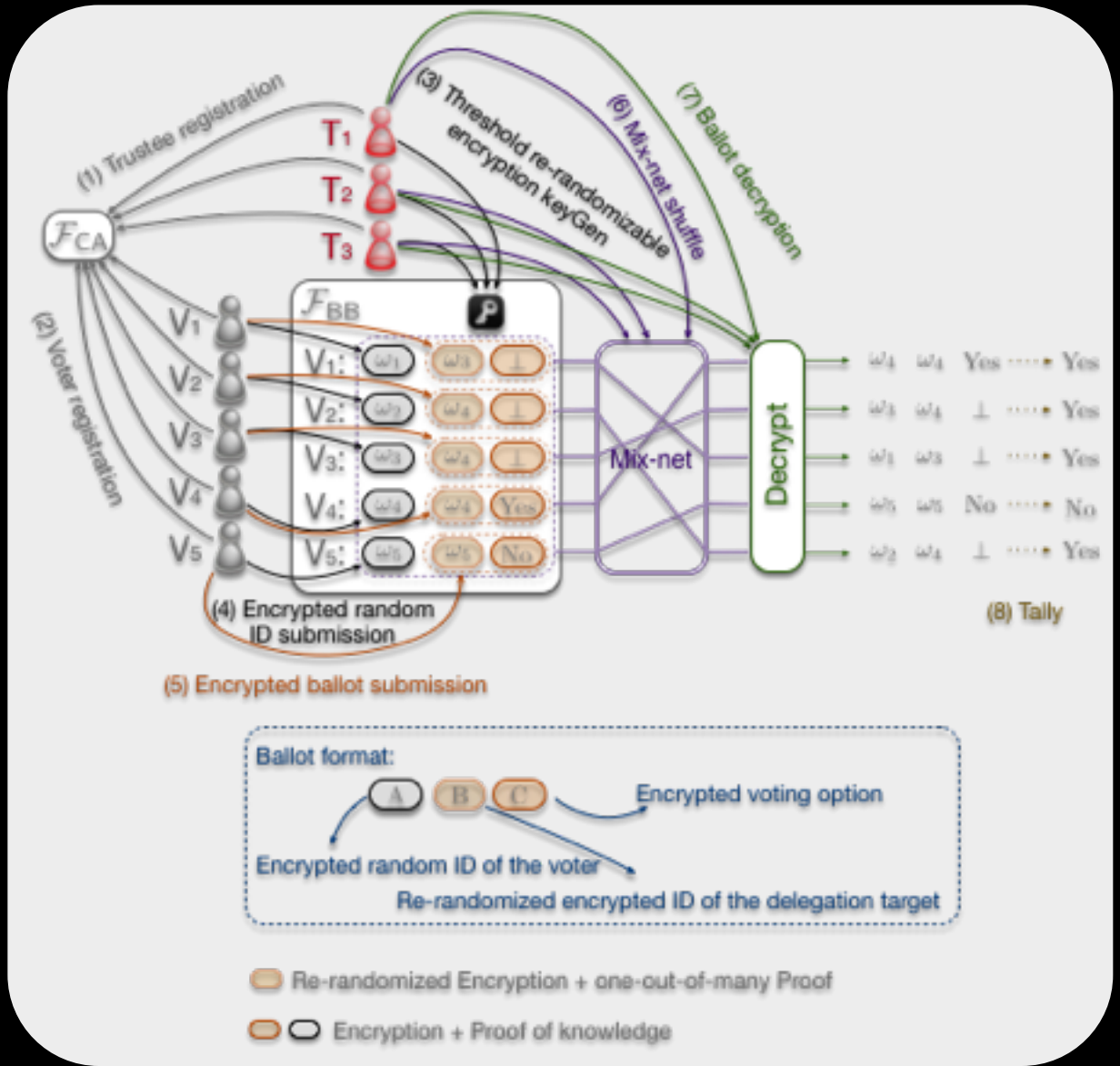
the full scheme



voting functionality

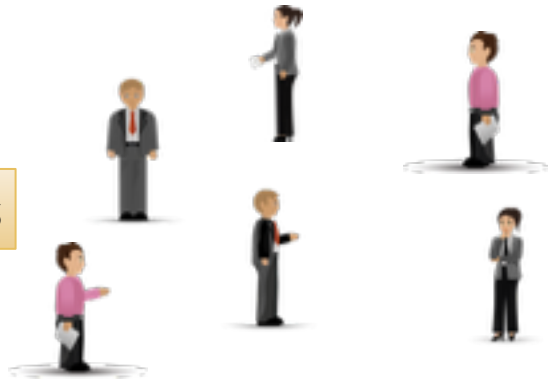
full version
modeling

tally circuit: process the voting statements

Trustees

support voting statements

Voters



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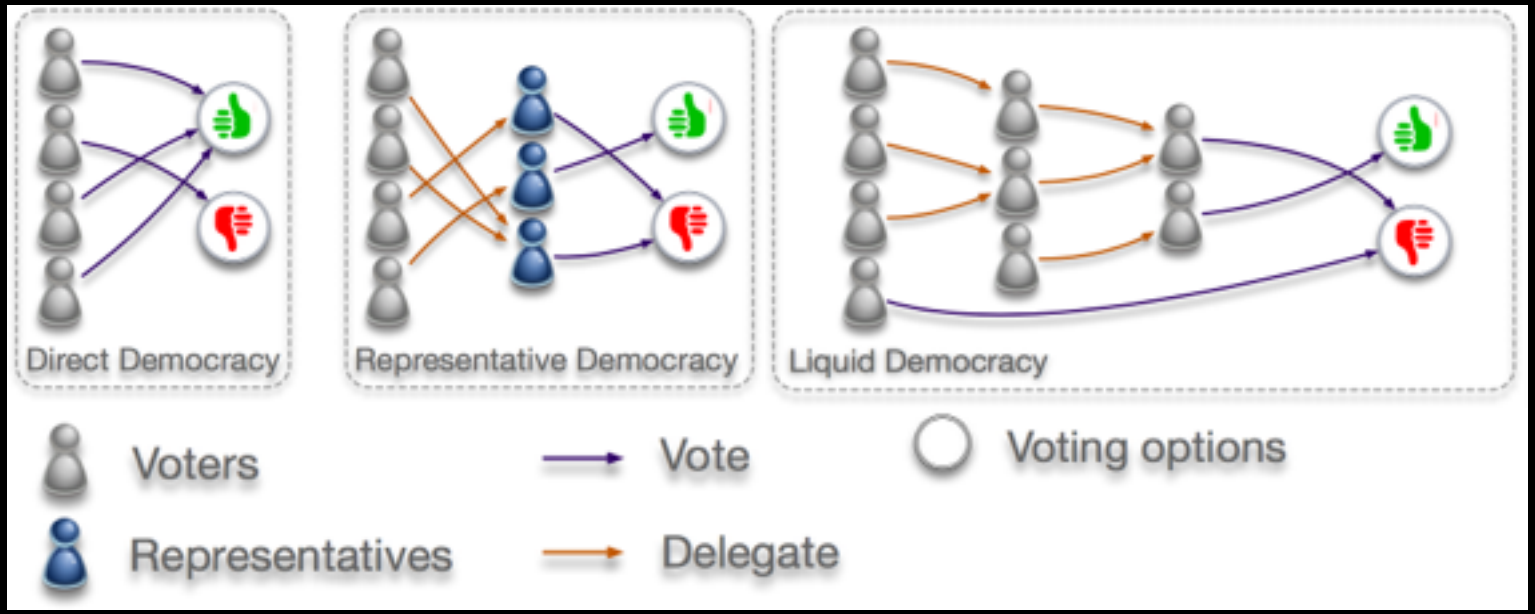
application: liquid democracy

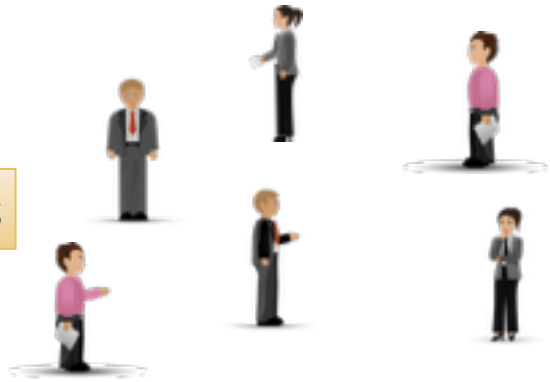
- Liquid democracy (a.k.a. delegative democracy) [Ford 2002] is a hybrid of direct democracy and representative democracy, where the voters can either vote directly on issues, or they can delegate their votes to representatives who vote on their behalf.



statement voting: a new concept

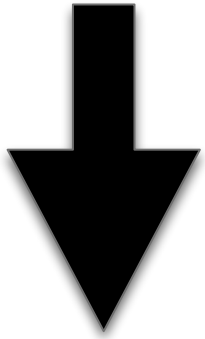
Take home message

Voters



vote for candidate #1

vote for candidate #2



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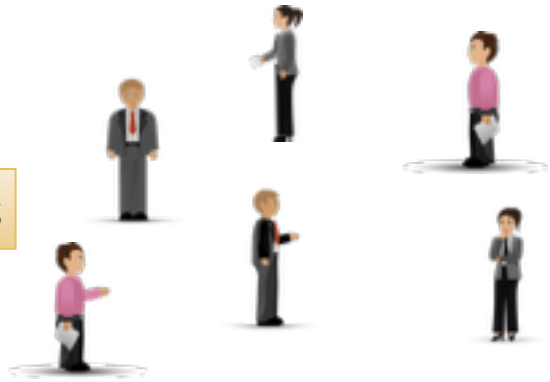

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Reference:
Bingsheng Zhang and Hong-sheng Zhou. Brief Announcement: Statement Voting and Liquid Democracy. *PODC 2017*
Long version at https://eprint.iacr.org/2017/616