Liquid Democracy, e-Voting and Blockchain: Can they build a new political and economic system?

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Contents

- Types of democracy.
- Current online voting systems.
- Blockchain online voting systems.
Representative Democracy

Liquid Democracy, e-Voting and Blockchain
Representative Democracy
Issues in Representative Democracy

- Representatives are chosen for a wide range of policies ⇒ best interest of the voter is only partially served.

- Election campaign promises are sometimes not fulfilled ⇒ voters deal with the consequences until there are new elections.

- Concentration of power ⇒ increases the risk of corruption.

- Not everyone’s voice is heard ⇒ minorities are often not represented.
Direct Democracy
Issues in Direct Democracy

- Citizens are directly involved with decision-making.
- Everyone’s voice is heard
  \[\Rightarrow\] outcome represents the true majority of the electorate.
- Unfortunately, continuous referenda will most likely result in voter apathy.
Liquid Democracy

![Diagram of liquid democracy representation]

Redbridge Council, 2017
Liquid Democracy

- Combines the advantages of Representative and Direct Democracy.
- Can increase participation in voting.
- More knowledgeable people can influence the final outcome.
- If trust is broken, citizens can deviate their vote to others.
How can liquid democracy have a role in a representative democracy society right now?

1. Local councils can decide to hand over certain decisions to the public in a liquid democracy manner.

2. Representative democracy candidates can attempt to be elected on a liquid democracy platform.
Has Liquid Democracy been implemented?

- ✔️, for local gov and internal political parties decisions:
  - Demoex political party in Stockholm that won local council seats,
  - Pirate parties in Germany, Italy, Austria, Netherlands,
  - Partido de Internet in Spain,
  - Net Party in Argentina.

- ✗️, for larger scale (high risk) decision-making:
  - Liquid democracy performs better online,
  - online voting issues to be first resolved.
# Current Online Voting Overview

<table>
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<tr>
<th>Providers</th>
<th>Clients/Partners</th>
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<td>electoral commission NSW</td>
<td>PIRATEN PARTEI</td>
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</table>
Citizens can put forward proposals, which others can support i.e.:

i402: Picnic area in Liberty park

Dominique Colbert
15744 supporter

This initiative proposes a picnic area in Liberty park with at least 8 tables.

Rationale
Many parks in the nation offer picnic facilities. The overall experience is very positive and the parks become much more attractive.
Liquid Feedback: Responding to a proposal

- Citizens can suggest improvements to proposals, i.e.:

  ![Add a new suggestion for improvement]

  Add a new suggestion for improvement
  A short title (80 chars max) BBQ pits
  Describe how the proposal and/or the reasons of the initiative could be improved
  There should be BBQ pits / designated fireplaces.

- Or suggest competing proposals, i.e.:

  ![Competing initiatives]

  Competing initiatives
  Currently this is the only initiative in this issue, because nobody started a competing initiative (yet).

  START A NEW COMPETING INITIATIVE
Citizens can vote on individual proposals, i.e.:

- Approval
- Abstention
- Disapproval

- i1282: New flyover ramp for HOT access at exit #152

Foster Westbrook, Amity Bradford
Citizens can also rank competing proposals, i.e.:

- **Approval (first preference)**
  - ↑ ↓ i606: Transit center and city operated parking structure (Pines area)
  - Claretta Belmonte

- **Approval (second preference)**
  - ↑ ↓ i605: The Pines area must remain public land
  - Diego Melendez

- **Abstention**

- **Disapproval**
  - ↑ ↓ i602: Sell the Pines area to private investors
  - Anne Roberts
Liquid Feedback: Delegations

- Proposals are tagged by location and topic, i.e.:

- Citizens choose a delegate by area or topic, i.e.:

  Set area delegation

  Choose your delegatee
  Foster Westbrook

  You can choose only members which you have been saved as contact before.
Online Voting: General Architecture

At a high level, this is what you would expect in an online voting system:

![Diagram of Online Voting System]

- **Voting**
  - Vote collection and validation module
  - Vote storage module
  - Vote counting module
  - The Result!
If we are **lucky**:

![Online Voting: General Architecture](image)

- **Voting**
- **Vote collection and validation module**
- **Vote storage module**
- **Vote counting module**
- **The Result!**

Check to see if I have voted
Online Voting: General Architecture

Possible areas of **attack or manipulation**: 

1) **Virus on Voter’s PC can change the vote before it is sent**

1) **Voting**

2) **Vote collection and validation module**

3) **Check to see if I have voted**

3a) **Vote storage module**

4) **Vote counting module**

The Result!
Possible areas of **attack** or **manipulation**:

1) **Virus on Voter's PC** can change the vote before it is sent

2) Single point of entrance to the system – susceptible to **Denial of Service** attacks

3) **Check to see if I have voted**

The Online Voting System:

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3) Private code - are there guarantees that every vote will be counted?
Online Voting: General Architecture

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3) Private code – are **there** guarantees that every vote will be counted?
4) Only invited stakeholders can view the counting process – are **these stakeholders trusted and knowledgeable**. Are independent experts ignored?

The Online Voting System

1) Voting
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4) Only invited stakeholders can view the counting process - are these stakeholders trusted and knowledgeable. Are independent experts ignored?
Online Voting: Tips

Tips to minimise the risks if you want to use an online voting system:

- Attempt **small scale trials**
- Use a provider you can **trust**!
- This provider should **sufficient safeguards against attacks** (e.g. monitoring voting traffic frequency from different locations, secure data storage,...)
- **Be involved** in the project as much as possible (e.g. in the data storage and counting procedures)
- **Do not** use for critical elections without sufficient trials
What is a blockchain?

- It records data across many computers of a decentralised network.
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- Data is organised into blocks that are linked together
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- It records data across many computers of a decentralised network.
- Data is organised into blocks that are linked together.
- Each computer on the network (eventually) has a copy of the same data in the same order.
How to vote using blockchain technology

- Vote through any node of the network (your vote can be encrypted)
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- The vote will sent to all nodes and eventually be added to a block
- The block will reach every node of the network
- If you cannot hold a copy of the blockchain on your computer, you can connect to another computer/server that does have a copy
Blockchain voting systems: weaknesses

- Not all 'blockchain voting systems' use blockchain to its full extent!

Diagram: The Online Voting System with modules: Vote collection and validation, Vote storage, Vote counting. The result is determined by a decentralized network, with 'Blockchain only used for backup' mentioned.
Blockchain voting systems: weaknesses

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- Blockchains are only unhackable if between 25% and 51% of the nodes are not malicious (dependant on which blockchain is used).
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- Blockchains are only unhackable if between 25% and 51% of the nodes are not malicious (dependant on which blockchain is used).
- If you do not hold a copy of the blockchain on your computer, we need to make sure that the connection to the blockchain is secure.
Where are we now?

- Online voting systems for elections of a low and medium importance are ready, e.g.:
  - Blockchain voting enabled systems are generally in the prototype stage ⇒ but they are coming:
    - Electoral Reform Services
    - SMARTMATIC
    - Scytl
    - LiquidFeedback
    - nVotes
    - HORIZON STATE
    - SECUREVOTE
    - Voatz
    - Polys

- Liquid and Direct Democracy at a local or national level can be implemented now ⇒ if the people want it:
  - LiquidFeedback
  - Democracy Earth
  - UNITED VOTE
  - People Power Brum
  - Allman for Congress
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