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Client
Milvum

Digital Voting Pass

Bachelor thesis
July 3, 2017

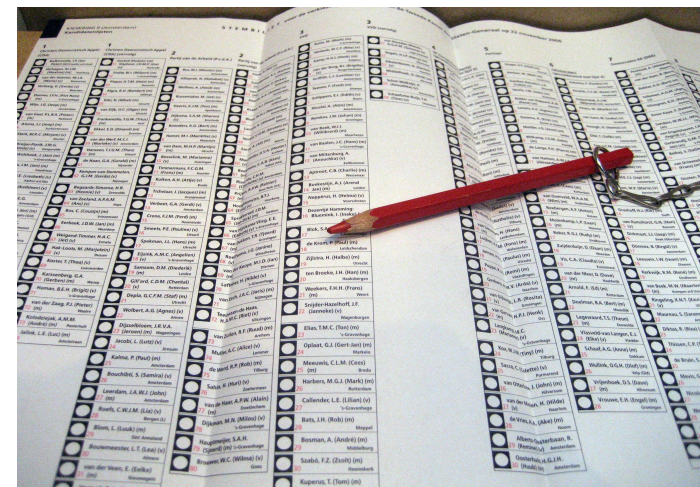
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Rico Tubbing



Introduction

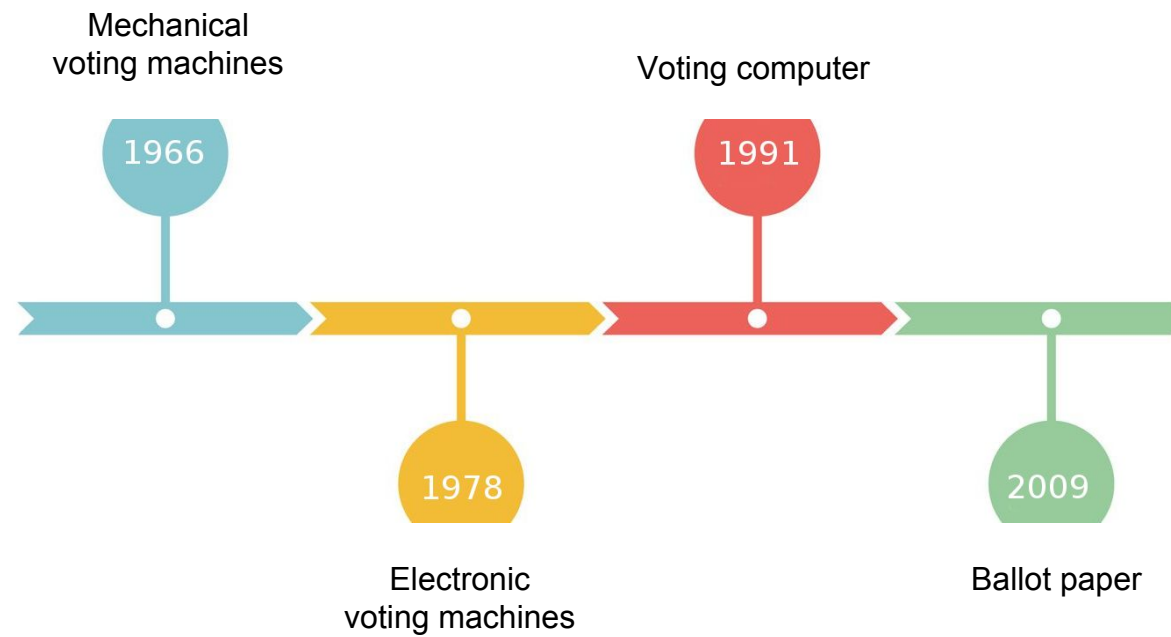


Voting pass



Ballot paper

Voting systems



Old digital voting system

Possible fraud

“We do not trust voting computers” foundation

Analysis of Nedap voting computer

Skepticism



[Stemcomputer]. Reused from *Apparata* website, by R. Rooijackers, 2013. Retrieved from: <https://www.apparata.nl/nieuws/ouderen-willen-liever-stemcomputers-dan-rood-potlood-1780>

Current paper voting

Manual labor

High costs

Inaccurate

Thousands of votes lost



New digital solutions

Blockchain

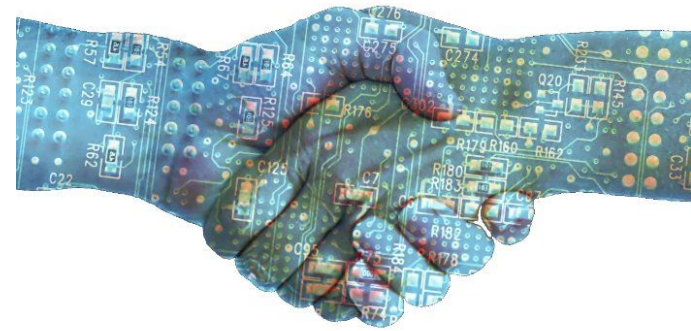
Trustworthy system

Machine readable travel documents

Passports

Identity cards

Driver's licenses



[Blockchain trust]. Reused from *LinkedIn* website, by A. Sethi, 2016, Retrieved from: <https://www.linkedin.com/pulse/block-chain-trust-exchange-protocol-akanksha-sethi>

Blockchain

Tamper-proof database

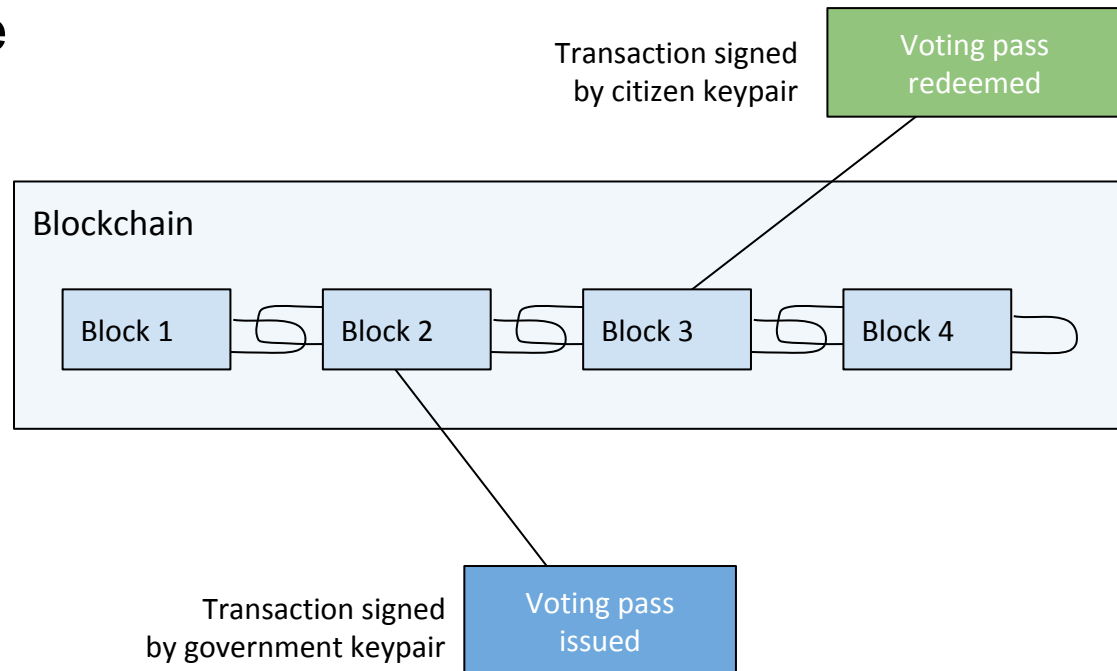
Blocks

- Immutable
- Connected

Decentralized

Transactions

- Signed cryptographically
- Stored in blocks



Travel documents

ePassport chip

Since 2006

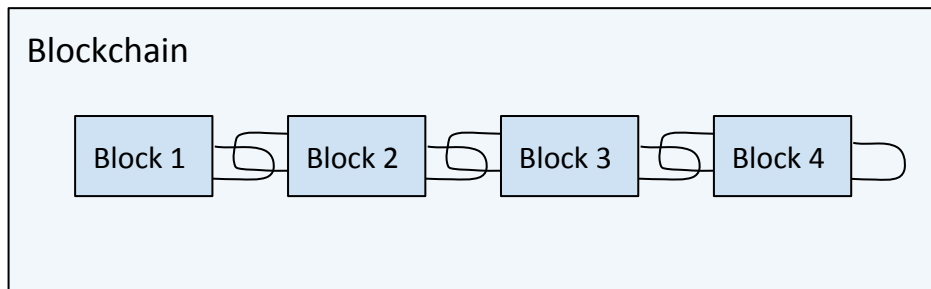
Information about the holder

Cryptographic tools

Signing transactions



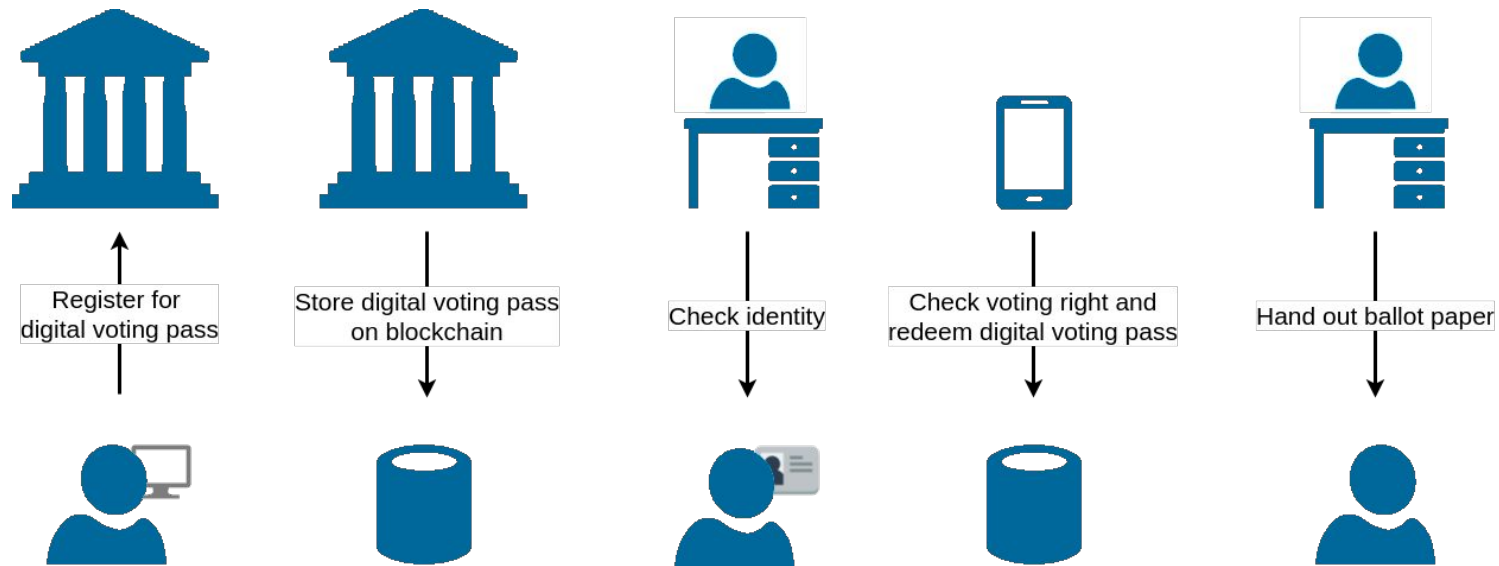
Proposed solution



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System overview



Blockchain technology

MultiChain

Based on Bitcoin

Changing the cryptographic standard

Secp elliptic curve → Brainpool

Signing

Verifying

New blockchain: ePassportChain

ePassport connection

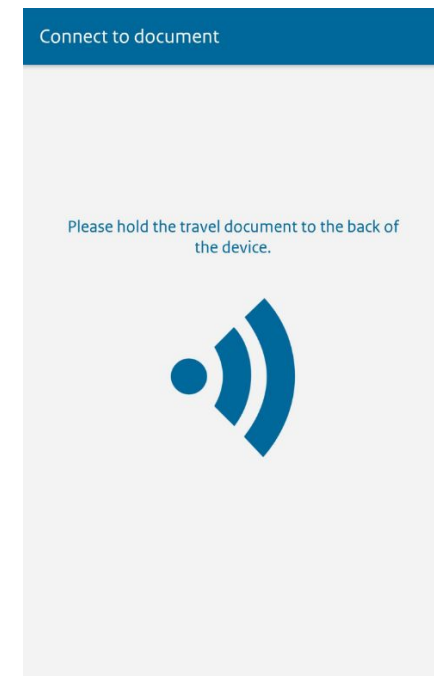
Reading the chip

Near Field Communication

Regular Android smartphone

JMRTD library (Radboud University Nijmegen)

Signing the transaction



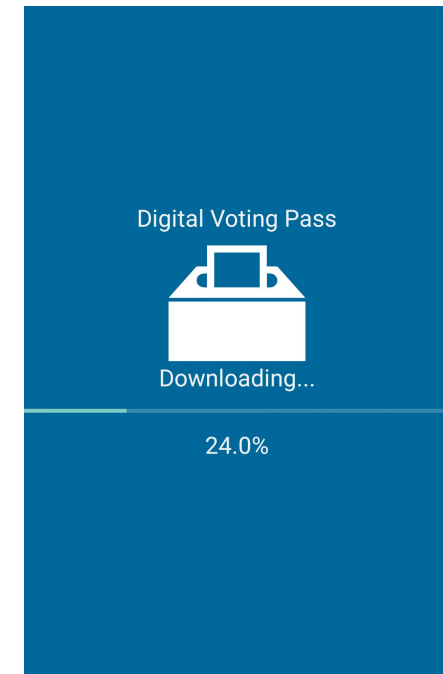
Blockchain connection

Bitcoinj library

Connecting to the network

Downloading the blockchain in Android app

Smartphone as part of the network



Demonstration

The polling station app

Expert review - Town of Emmen

Digital voting solutions for local polls

- Easier participation
- Increased accuracy
- Simplify organization

Positive response

- First step towards a fully digital voting system
- Syncing with government database
- Compatibility with paper voting

Conclusion

Combining technologies

Blockchain

Machine Readable Travel Documents

First step towards digital voting

Transparent

Trustworthy

Easy-to-use

