

Decentralized Reputation on the Blockchain

in under 10 minutes

November 6th, 2019
Philippe Métais



 **Blockchain
Partner**



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DIDs & Eigentrust

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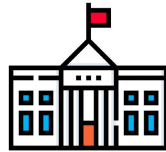
Step 2: Versatility

Step 3: Self-reliance

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DIDs & Eigentrust



Decentralized identities and **claims** on blockchains are now **standardized**: ERC725, ERC734, ERC735.

DIDs & Eigentrust

Transparency & Verifiability

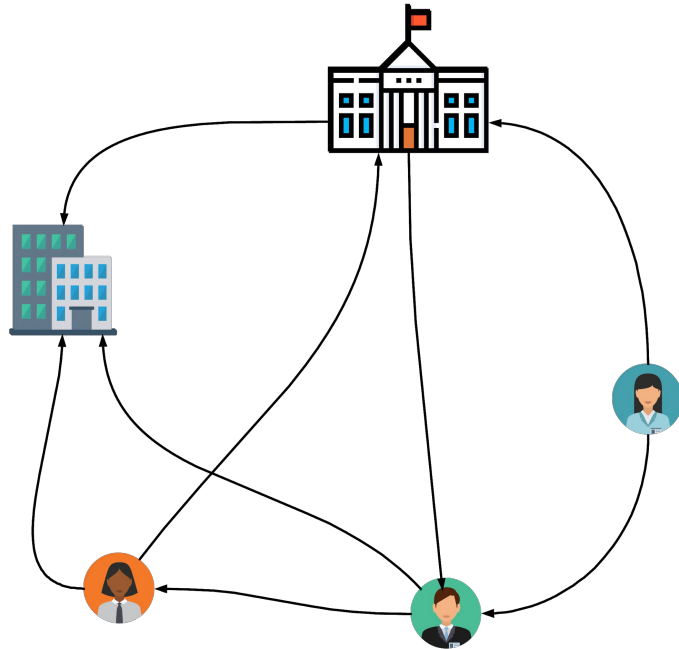
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DIDs & Eigentrust

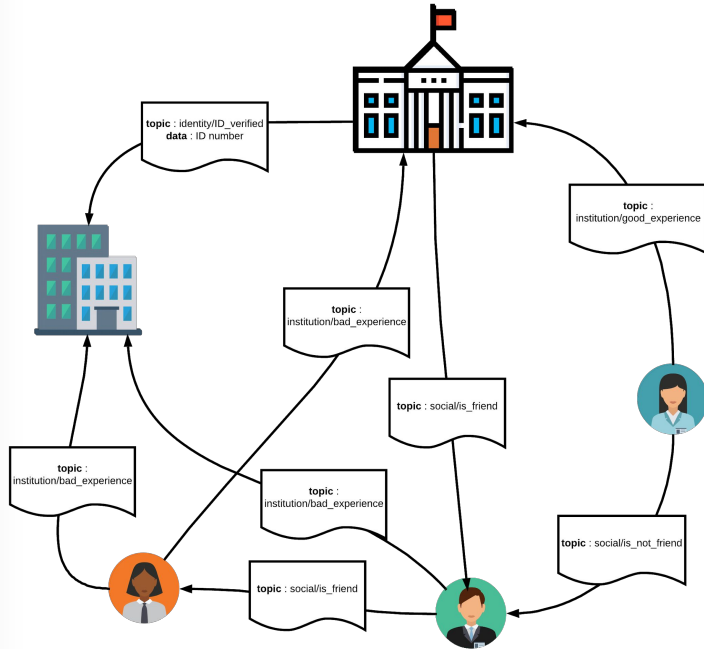
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DIDs & Eigentrust



Decentralized identities and claims on blockchains are now **standardized**: ERC725, ERC734, ERC735.

Claim Holders (ERC735) define claims with a **topic** and **data**.

DIDs & Eigentrust

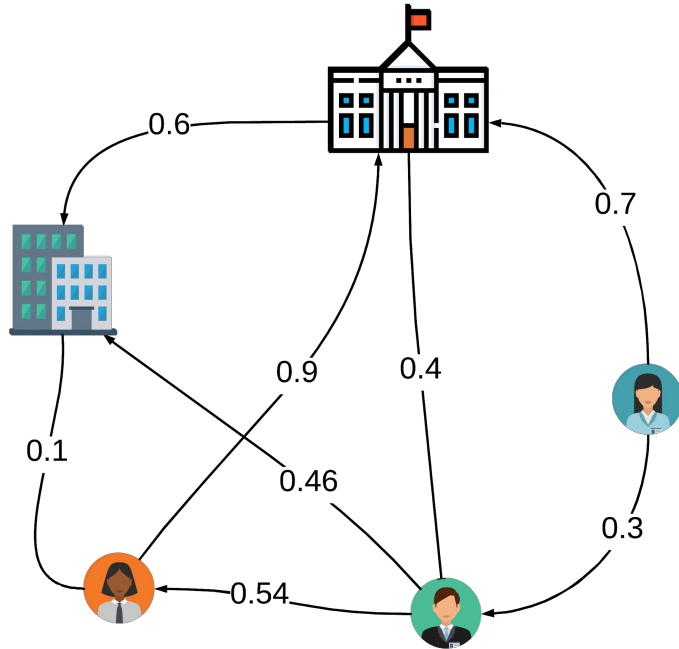
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DIDs & Eigentrust



Eigentrust

Local trust values:

$$C = (c_{ij})$$

DIDs & Eigentrust

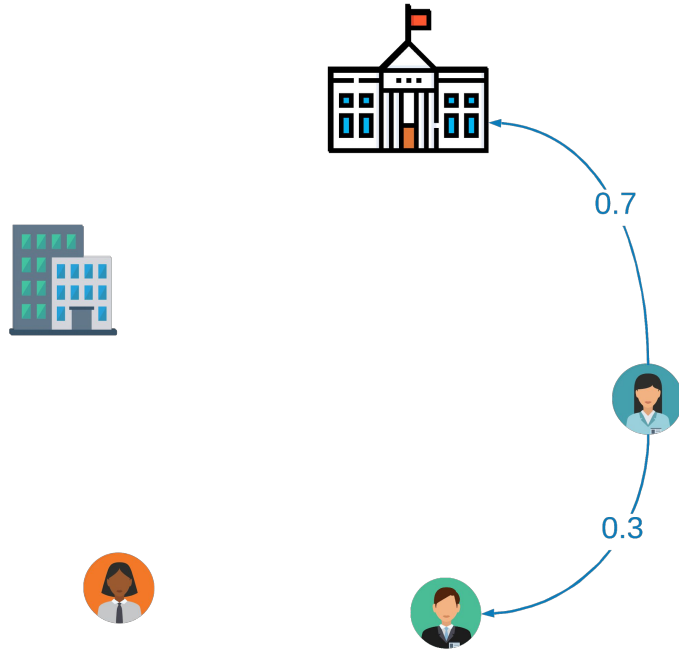
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Eigentrust

Local trust values:

$$C = (c_{ij})$$

Trust transitivity:

$$t_{i,0} = c_i$$

DIDs & Eigentrust

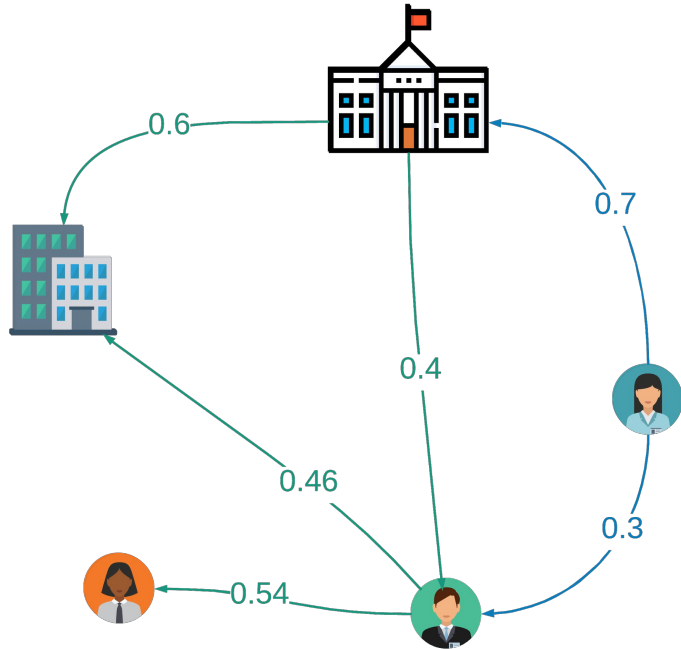
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DIDs & Eigentrust

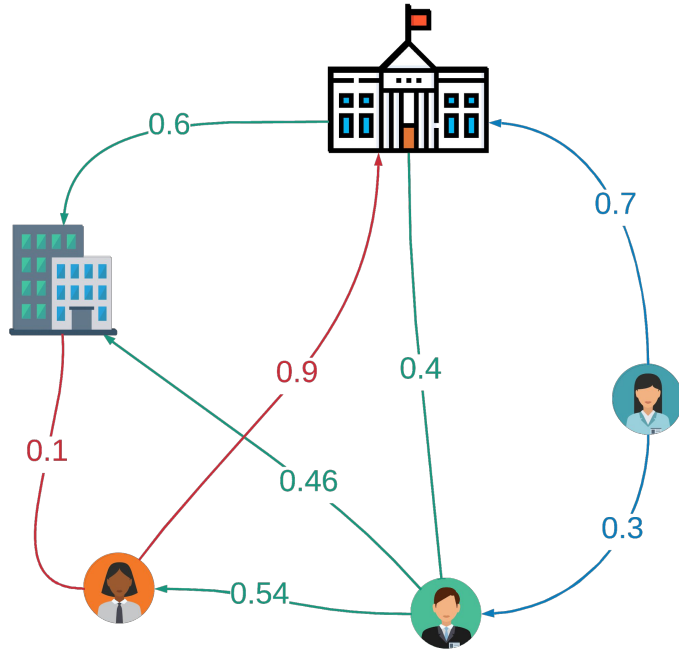
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DIDs & Eigentrust

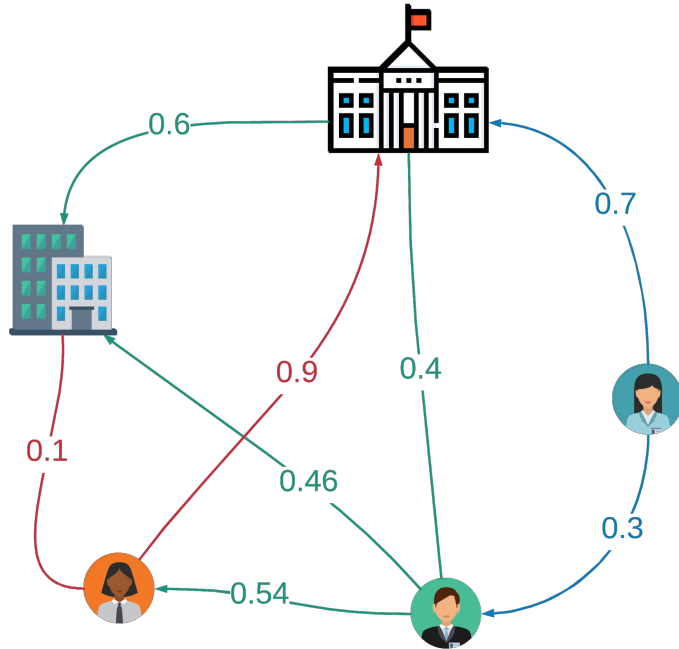
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Global trust vector:

$t_{i,n}$ converges to the left principal eigenvector of C .

DIDs & Eigentrust

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Transparency & Verifiability

identity/ID_verified
institution/good_experience
institution/bad_experience
social/is_friend
social/is_not_friend

(0.28 0.35 0.08 0.24 0.05)

Reputation out of claims

Local trust values:

$$C = (c_{ij})$$

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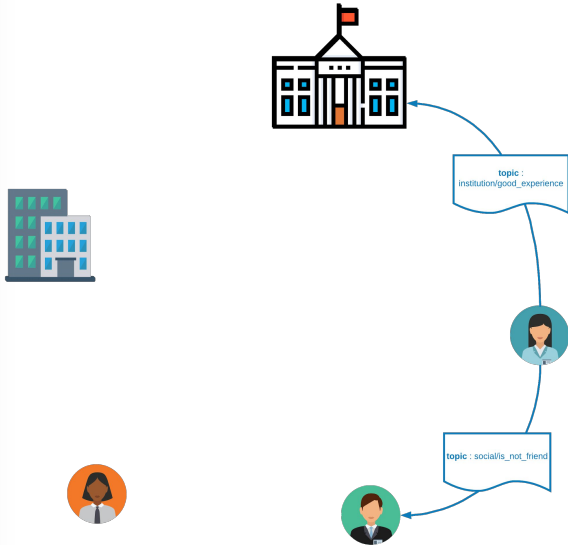
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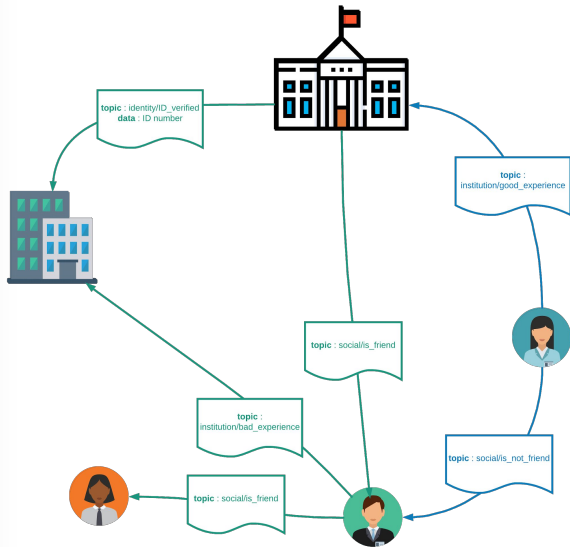
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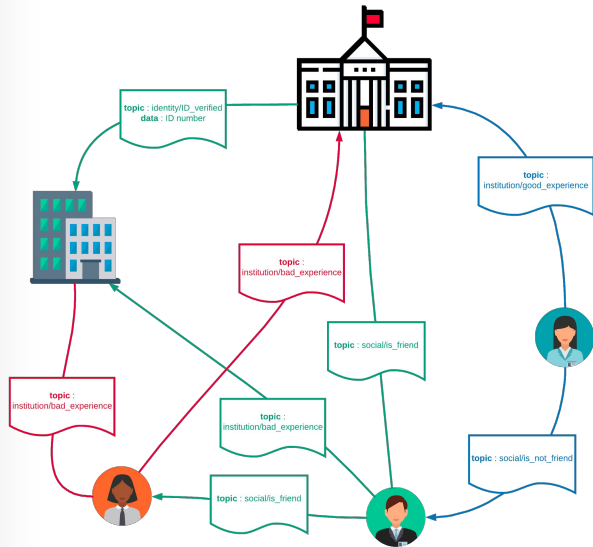
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(0.28 0.35 0.08 0.24 0.05)

Reputation out of claims

- transparent
- verifiable
- hard to manipulate

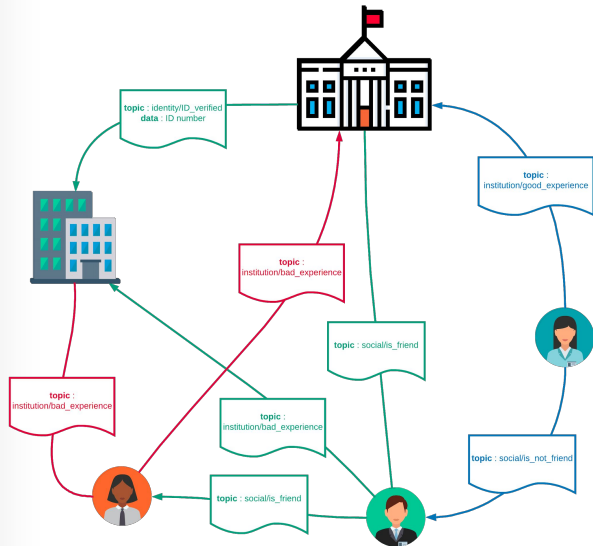
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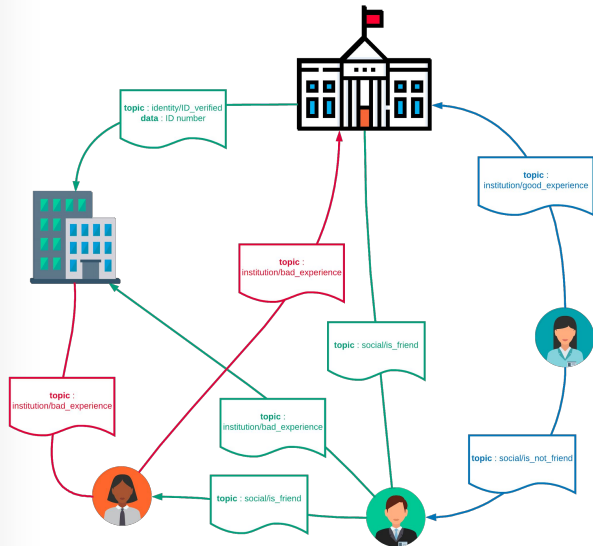
Self-reliance

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Versatility

| | identity/ID_verified | institution/good_experience | institution/bad_experience | social/is_friend | social/is_not_friend |
|--------------------|----------------------|-----------------------------|----------------------------|------------------|----------------------|
| global recognition | 0.28 | 0.35 | 0.08 | 0.24 | 0.05 |
| independence | 0.32 | 0.3 | 0.09 | 0.2 | 0.09 |
| dangerousness | 0.21 | 0.19 | 0.2 | 0.4 | 0 |



Versatility

- multiple domains of reputation
- customizable reputation scoring systems

Example:

Assessing the dangerousness of a chemical could highlight global recognition of research institutes or favour their independence, leading to different and complementary scoring systems.

DIDs & Eigentrust

Transparency & Verifiability

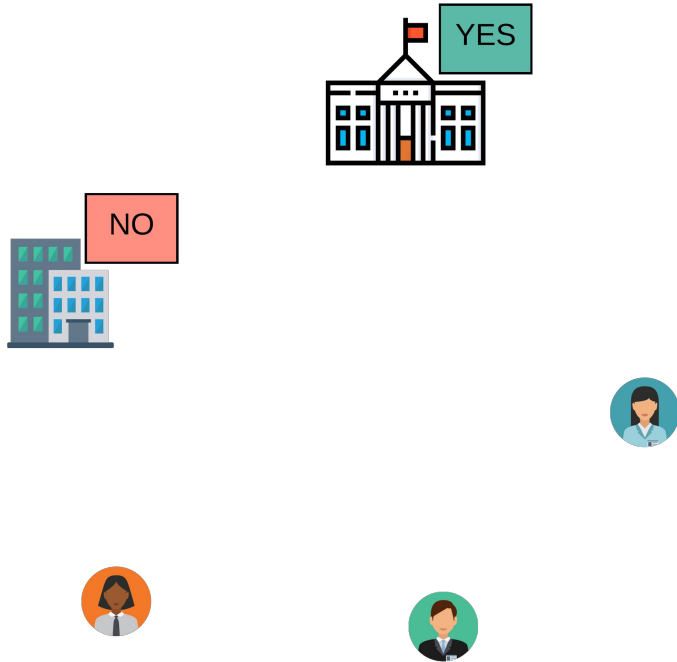
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Self-reliance



Self-reliance

Two dedicated claim topics enable liquid vote:

- REPUTATION_VOTE
- REPUTATION_VOTE_DELEGATE

DIDs &
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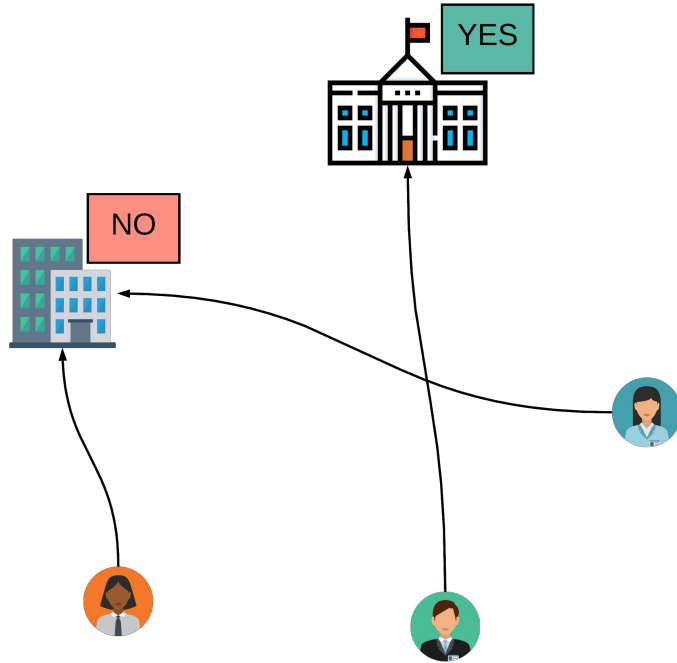
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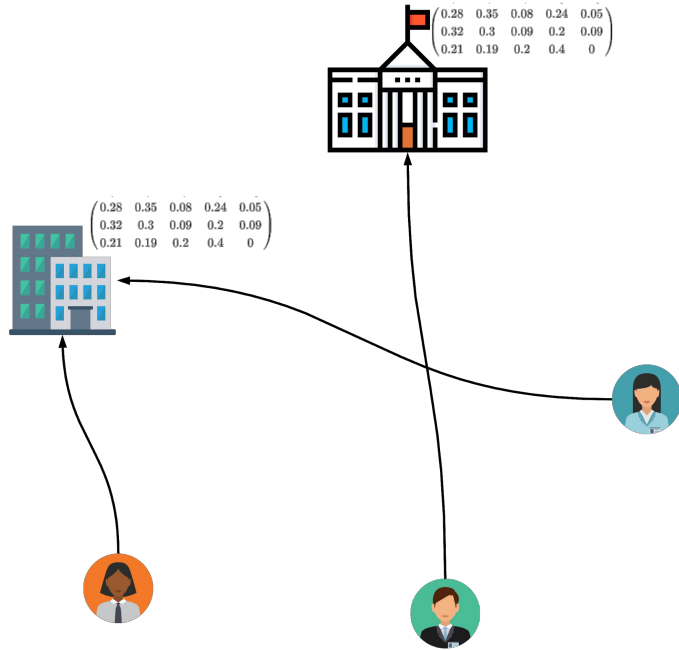
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Self-reliance

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Voting on trust ratios creates a fully on-chain self-sustaining design.

DIDs & Eigentrust

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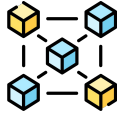
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Blockchain: trustless storage of DIDs and claims.



TheGraph: trustless storage of local trust values.



Trustless computing would enable direct access to global trust values.

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Resources

Medium article

- <https://medium.com/@teamtech/blockchain-a-question-of-reputation-42626caf27fe>

Github

- <https://github.com/Blockchainpartner/hagentrust>

Bibliography

- [Lee, S. \(2018\). A Decentralized Reputation System: How Blockchain Can Restore Trust In Online Markets. Forbes.](#)
- [Xie, L. \(2019\). Decentralized identity and reputation.](#)
- [Kamvar, S.D., Schlosser, M.T., Garcia-Molina, H. \(2003\). The eigentrust algorithm for reputation management in p2p networks. Proceedings of the 12th International Conference on World Wide Web](#)

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