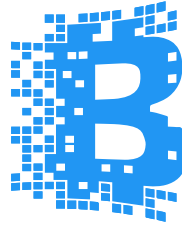
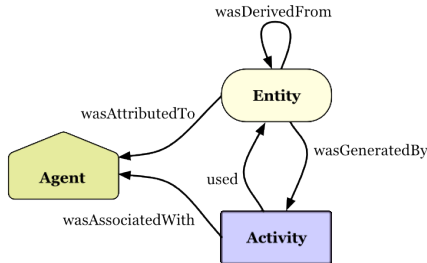


Realizing Data Provenance Using the Blockchain



FAKULTÄT
FÜR INFORMATIK
Faculty of Informatics

Masterthesis



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1 Motivation

Data provenance is achieved through the systematic and reproducible documentation of data assets, data stakeholders, and actions performed on the data assets. The PROV family of specifications [1] defines a core metadata model to achieve data provenance, primarily with regard to digital objects exchanged and accessed through the Internet. One particular aspect not covered by this set of specifications is however how to document the necessary metadata and data in a trustful and permanent way.

The permanent and forgery-proof documentation of transactions is also a core capability of cryptocurrencies like Bitcoin or Ethereum [2]. For this, cryptocurrencies apply blockchain technology, which is also a promising approach for data provenance. Hence, within is Master thesis, it is the goal to provide the technological means to realize data provenance based on PROV and blockchain technology. Blockchains will be investigated both with regard to documentation and enactment functionalities. For the latter, the capabilities of smart contracts offered by second generation blockchains will be exploited.

2 Work Description

- Literature work on data provenance.
- Implementation of data provenance framework based on PROV and a second generation blockchain like Ethereum.
- The framework needs to support both documentation and enactment of data provenance information.
- Qualitative and quantitative evaluation based on use cases.

3 Further Information

Start: Immediately (might also be later)

Basic Requirements: Very good implementation skills; basic knowledge about blockchains is helpful

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References

[1] Yolanda Gil and Simon Miles, editors. *PROV Model Primer*. 2013. W3C Working Group Note.

[2] Florian Tschorsch and Björn Scheuermann. Bitcoin and Beyond: A Technical Survey on Decentralized Digital Currencies. *IEEE Communications Surveys and Tutorials*, 18(3):2084–2123, 2016.



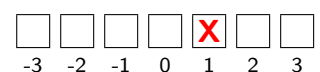
Conceptual (Analytical)



Empirical (Simulation)



Practical (Implementation)



Literature Work