User Authentication for a Digital Academic Credential System

Master project winter semester 2021/2022

PROJECT OUTLINE

In this master project, you will work on a prototype of a Self-Sovereign Identity system for the creation, management and verification of academic digital credentials. The focus of this project will be the implementation of a workflow for users (students) of such a system to authenticate themselves during the creation and verification process of their academic digital credentials. The users should have the choice of different identity providers and authentication methods. Options should include widely used traditional methods such as federated identity providers, as well as more recent developments such as decentralised identity providers.
For this purpose, you will start by implementing a client able to connect to a federal identity provider (e.g. keycloak) via openIDConnect. Subsequently you will extent the client to support usage of a decentralised identity on a Blockchain (e.g Ethereum) which can also be used for authentication.
The challenge in this project is to enable the two different paradigms of federated identity providers and decentralized identity providers in one system and present the users with a workflow with minimal hurdles and ease of use.
Different techniques can be explored, in addition to utilizing resources of existing research efforts such as the Decentralized Identity Foundation, W3C Working Groups and the Sovrin Foundation.

General information and introduction on Self-Sovereign Identity, Decentralized Identifiers and Verifiable Credentials can be found in this NIST Cybersecurity Whitepaper [1].

GRADING

Course applicable: ITSE (Masterprojekt), CS (Masterprojekt)
Graded activity:

- Implementation
- Final report (IEEE/ACM style conference format)
- Presentations (Midterm/Final)

CONTACT

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LITERATURE

[1] Lesavre, Loic D., et al. "A Taxonomic Approach to Understanding Emerging Blockchain Identity Management Systems." (2020). https://nvlpubs.nist.gov/nistpubs/CSWP/NIST.CSWP.01142020.pdf