

Thesis
B.Sc.

IDP

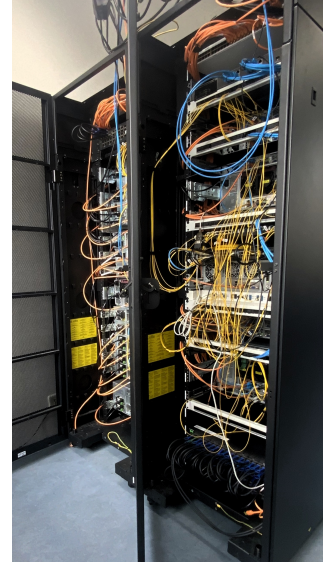
Governance and Tokenomics of a Blockchain-based Payment System for Scientific Testbeds

Motivation

Our research group operates a testbed that allows users to conduct scientific experiments, including the repeatable measurement of networked applications' performance. Authorized users can utilize a tool developed by our group, called *pos* (*plain orchestration service*), to reserve and manage testbed nodes.

In the future, we plan to establish a community of comparable research sites across Germany and Europe. Users will be able to allocate remote resources for large-scale experiments or to access specialized hardware unavailable at their individual research sites. For this purpose, *pos* must be enhanced with the capability to allocate resources across multiple testbeds. The planned system must also incorporate an accounting mechanism to monitor resource consumption and prevent any research site from consuming more than it contributes to the community.

In a previous bachelor's thesis, we developed a prototype of an Algorand-based payment system tailored to our scenario. This prototype supports various workflows, including the transfer of tokens between research groups. Moreover, we implemented essential governance features, such as issuing new tokens, creating new research sites, and allocating initial tokens to a research site. To date, these governance functions have been managed by a centralized manager node, thereby undermining the fundamental principle of a trustless blockchain.



Your Tasks

In this thesis, we explore how our system can be structured as a distributed autonomous organization (DAO). For this purpose, a suitable governance model for our DAO must be identified and its tokenomics clarified.

- Familiarize yourself with *pos*, Algorand, our prototype, and the community concept.
- Conduct a literature review on the principles of governance in blockchain-based distributed systems and tokenomics.
- Analyze how these principles can be applied to our community concept.
- Design, implement, and evaluate selected functionalities.

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