Technical University of Munich

Thesis B.Sc. Thesis M.Sc. IDP

Optimization Techniques for Blockchain Protocols

Motivation

Many blockchain protocols in recent years aim to solve the blockchain trilemma. We are interested in looking into promising candidates, e.g., Algorand [1]. Such a protocol offers a throughput of more than 1000 transaction per second, scale with a number of nodes and participants in the system, and ensure system security in the presence of adversaries with low finality.
Nevertheless, even such performance might not be sufficient with more extensive adoption and novel use-cases. Therefore, we want to look for optimization aspects that can be categorized on the networking layer or application layers improvement that aim to offer responsive (real-time) behavior to its users. For that, we need to identify bottlenecks and search for their mitigation concerning networking processing [2] and application and protocol design decisions [3].

Your Tasks

- Get familiar with the infrastructure of the Chair for reproducible blockchain experiments
- Get familiar with the blockchain technologies - e.g., Algorand
- Identify suitable approaches for enhancing performance aspects of a corresponding blockchain protocol
- Implement the techniques into the evaluation framework
- Evaluate the impact of the techniques on overall performance of the system

References

[1] - https://people.csail.mit.edu/nickolai/papers/gilad-algorand-eprint.pdf
[2] - https://www.net.in.tum.de/fileadmin/bibtex/publications/papers/gallenmueller_hipn
[3] - http://proceedings.mlr.press/v97/koloskova19a/koloskova19a.pdf

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