

Bachelor/Master Thesis

Proof of Location - Instrumenting the Mobile Network Infrastructure

Context

Since blockchain transactions are irreversible, the correctness of external data as input for critical business transactions executed on the blockchain is of high importance. This also applies for DApps that rely on geo-locations, e.g. to track goods in a supply chain network where business transactions are executed based on location changes. As location data can easily be faked, a mechanism is required that provides correct location data in a trustless way.

Thesis Topic

In this thesis, it should be explored how the existing mobile network infrastructure could be instrumented to generate a proof that attests an entities geographic location at a given time and that can be verified on the blockchain.

Base stations are a widely deployed infrastructure with static locations. Hence, they appear to be particularly suitable as reliable providers for location information. As a first step, it should be studied whether and how the location of base stations can be brought to the blockchain in a trustless way. Secondly, it should be researched how the base station can reliably attest to a user's location such that this information can be verified on the Blockchain.

Related Work

As an entry point to the topic the following contributions should be considered:

- [1] Giacomo Brambilla, Michele Amore, and Francesco Zanichelli. 2016. Using Block Chain for Peer-to-Peer Proof-of-Location.
- [2] Friedhelm Victor, Sebastian Zickau, 2018. Geofences on the Blockchain: Enabling Decentralized Location-based Services.

Skills

The student is expected to have

- good knowledge in distributed systems, preferentially blockchains.
- ability to understand complex systems.
- good programming skills.

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Our Mission:

Our lectures cover fundamental methods and techniques in the areas of service computing, cloud computing, and enterprise computing. We like to engage students in hands-on building of distributed information systems and to take an interdisciplinary approach to evaluating such systems. Through a close mentoring of students, especially in our seminars, we aim to introduce students to our ongoing research and to excite them to do future studies and research with us.