Final year theses, R&D studies, assistant jobs: Distributed Ledgers & Network Coding

Motivation

- Distributed ledger technologies (DLT) provide a promising technology for realizing data authenticity and persistency in peer-to-peer environments, such as blockchain applications. Network coding (NC) has promises bandwidth-saving effects in settings where multiple sender nodes broadcast messages to overlapping sets of receiver nodes. Combining DLT and NC has already been shown to be a valid approach. Existing solutions are promising but rely on special settings which prevent their applicability in general internet-wide settings.

Goals

- The major goal of this project is to combine techniques from distributed ledgers and network coding to create efficient and secure distributed consensus protocols that work in an internet wide setting. This also gives a blueprint on how to integrate network coding principles into other application layer protocols.
- Besides developing respective schemes and protocols, a respective prototype will be implemented for practical experiments to explore the boundaries of transaction rates and the possibilities of security measurements.

Tasks

- Open tasks include (but are not limited to):
  - Developing a graph generator to manifest network settings.
  - Lifting NC to the application layer by integration into pBFT.
  - Integrate NC into Paxos (alternative to pBFT).
  - Investigating network topology and application scenarios.

Prerequisites

- Good knowledge or willingness to learn DLT and NC technologies.
- Good knowledge or willingness to learn protocol design.
- Good knowledge of C / C++.
- Good knowledge of English.

Start:

- Right away or by arrangement