Master’s Thesis
Trustless Queries in Centralized Database Systems

Context
Essentially all modern applications rely on database systems to store their data. These systems can be operated by the application’s providers themselves or consumed as a service. In both cases, a single authority controls all the data including access and modification rules.
Unlike this, blockchains (e.g. Bitcoin and Ethereum), a new class of peer-to-peer systems, distribute the responsibility of data and access management to peers in a network. There is no need to trust a single authority anymore.

Problem
While not having to trust a storage provider is a compelling property, storing data on blockchains brings several problems:
- Since data is persisted on every node, storage and data dissemination are costly.
- Throughput of current blockchain implementations is extremely low compared to database systems.
- Data stored on-chain is visible to all participants in the network.
- Queries are expensive and complex query support is minimal

Research Question
The overall question is whether blockchains and traditional database systems can be combined in a way that provides desirable properties without suffering from the problems mentioned above.
At ISE, we designed a prototype which allows trustless interaction with traditional database systems.
The goal of this thesis is to extend that work with trustless queries. This includes a conceptual design as well as a prototype which is used for experimental evaluation.

Skills: Good knowledge of distributed and database systems, programming skills, curiosity

Contact: Jacob Eberhardt je@ise.tu-berlin.de