# Attacking Ethereum's Network Layer

Blockchain-based distributed systems—such as Bitcoin and Ethereum—are at their core, a mechanism for storing state and performing computation across a network of machines without any centralized trust. These systems run atop a global peer-to-peer (P2P) network over the Internet responsible for disseminating network messages including blockchain data and information on network participants. The structure and operation of these P2P networks directly impact the security and usability of these systems. This includes susceptibility to consensus-level attacks that break foundational security guarantees such as network fairness, centralization, and the ability of actors to manipulate the network. Properties of the P2P network also directly impact user experience related to privacy, censorship, scams, and financial attacks.

The goal of this thesis is to study the safety of Ethereum's Beacon network layer, a recent addition that supports the new proof-of-stake consensus algorithm. We are interested in understanding the newly introduced network-level messages and protocols, in order to identify potential attack vectors and their severity.

Your work will consist of investigating already identified points of weakness, as well as looking for new ones. This involves researching network-level protocols, gathering data, and developing algorithms to analyze it.
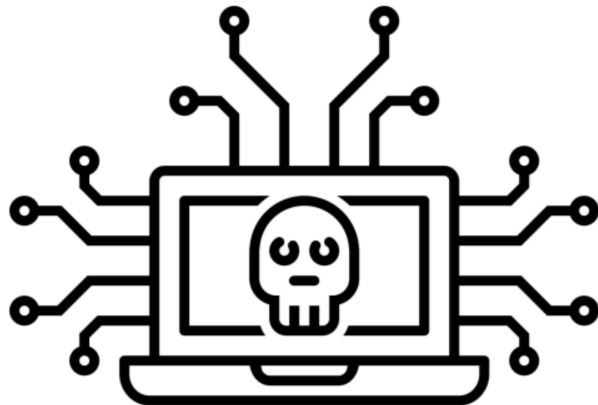
Candidate Profile: An ideal candidate for this project is interested in both gathering real-world data as well as algorithmic challenges in analyzing possible attacks. We will have weekly meetings to discuss open questions and the next steps.

Interested? Please contact us for more details!

Contact

- Dr. Lucianna Kiffer: `lkiffer@ethz.ch`, ETZ G97

- Yann Vonlanthen: `yvonlanthen@ethz.ch`, ETZ G97