ETH
Eidgenössische Technische Hochschule Zürich
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Distributed Computing

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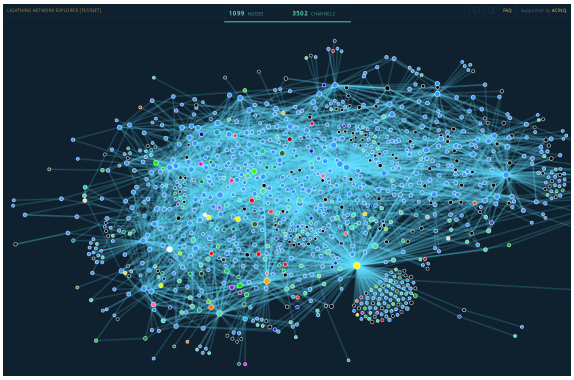
SA:

Exploring Centralized Payment Network Topology

Payment Channels are a promising solution to solve the blockchain scalability problem. Nevertheless, the concept has a big drawback. If two parties, Alice and Bob, generate a Payment Channel they have to deposit capital in the opening transaction. The deposit of one party defines the maximal amount he is able to pay in the opened Payment Channel. This money is blocked as long as the channel is open, and therefore, the number of open payment channels is limited for an user to its total capital. These issue is addressed by introducing a Payment Service Provider (PSP). Instead of creating a channel between Bob and Alice, a three-party channel between Bob, Alice and the PSP is created, whereby the channel is funded only by the PSP. The PSP requires capital to open channels and pays the fees occuring by the interaction with the underlying blockchain. When it comes to many transaction between multiple parties a PSP has strong incentive to minimize the needed capital for handling all transactions, as well as, to maximize profit (fees from transactions minus costs to set up channels). This leads to questions:

- How much capital should be assigned for each party of a channel?
- How should the network be designed to maximize profit with minimum capital?

The goal of this project is to experimentally analyze various network topologies (eg. star, tree, etc) in terms of needed capital and maximal profit for sets of random transactions. In [1] it was shown that a star is a 2-approximate for the problem when executing only profitable transactions. On one hand, experimental data should be provided for this finding, and on another hand, the potential of other topologies to solve the problem should be analyzed.



Interested? Please contact us for more details!

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