



*Distributed and Network Algorithmics Lab Seminar Series*

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## Network optimization in blockchain and payment channel networks

November 24, 2021  
13:00 – 14:00 p.m. (Greece)

Blockchain usually receives public attention whenever there is a Bitcoin price surge or due to Bitcoin's environmental impact. As a technology, however, blockchain is much deeper: its essence and breakthrough are that it enables multiple parties to reach consensus (e.g. on how much money one owns) without them needing to trust each other. This overview presentation aims to highlight certain networking and network economics aspects of blockchains: how does a blockchain network normally operate and what can go wrong? What is the role of delay on the scalability and the security of the network? What can we do to improve network throughput (transactions per second)? We will deal with these questions and the relevant tradeoffs on the fundamental "Layer 1" network, and then introduce the payment channel network (PCN) "Layer 2" scalability solution and optimization problems arising therein: optimal transaction routing and scheduling, channel rebalancing, and pricing.

Nikos Papadis is currently a Ph.D. student at Yale University in the Department of Electrical Engineering and the Yale Institute for Network Science (YINS), working with Professor Leandros Tassiulas. He has received his undergraduate degree in Electrical and Computer Engineering from the National Technical University of Athens and his M.Sc. and M.Phil. from Yale, and has done internships at IBM Research and Amazon. His research interests include blockchain and distributed ledgers, their networking, scalability, security and financial aspects, as well as payment networks and their efficient design and performance optimization. At Yale, he has received several awards and scholarships, including the 2019 IBM Ph.D. Fellowship, the Onassis Foundation Scholarship, and the A.G. Leventis Foundation Scholarship. His website is <https://campuspress.yale.edu/nikolaospapadis>.

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