

Title: "Demand-Aware Graphs and Self-Adjusting Networks"

Stefan Schmid, Universität Wien

In this talk, I will introduce the notion of demand-aware graphs: bounded-degree graphs which is optimized toward the traffic matrix (the demand) they serve.

The algorithmic problem underlying the design of demand-aware graphs is related to low-distortion graph spanners, but comes with a twist.

I will first explore metrics to assess by how much demand-aware graphs can improve upon demand-oblivious graphs, and argue that this depends on the conditional entropy of the traffic matrix. I will then derive lower bounds and graph design algorithms which meet this bound.

Finally, we will consider more dynamic settings where the demand can change over time, and an online algorithm needs to strike a balance between the benefits and costs of reconfigurations.

I will argue that the problem of designing such self-adjusting networks is related to self-adjusting datastructures, and present three solutions in more details: SplayNets, ReNets and Push-Down Trees.

The publications and slides related to this talk are available at: <https://www.univie.ac.at/ct/stefan/> .