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Selfish routing in today's Cloud networks

When we drive our cars, we constantly make decisions on what could be the best route to get home or to work.

It is however not uncommon to get stuck in a traffic jam and wonder why everyone else seemed to have taken the same road at the same time.

These type of problems arise when a set of individual entities make uncoordinated decisions. If a global entity could coordinate all the car movements, we would have probably found a better time to leave and a better route with less traffic on the way to our destination. The difference in performance between an uncoordinate and a fully-coordinated solution is what we call the *price of anarchy [1].*

These type of problems arise also in communication networks and we refer to them as *Selfish Routing* problems.

When we deploy a system on a Cloud network, we run our applications on a set of machines that are interconnected to each other by the Cloud provider backbone network. The performance of our applications depends on the critical interplay between the contrasting objectives of the cloud provider and its customers.

Following the work in [2], in this thesis, you will explore techniques to conciliate the competing objective functions of the different entities. For example, the cloud network provider could coordinate with the customers so as to offer a guaranteed level of service.

[1] T. Roughgarden et al. "How Bad is Selfish Routing?". In FOCS 2000. https://dl.acm.org/citation.cfm?id=506153

[2] L. Qiu et al. "On selfish routing in internet-like environments". In Transactions on Networking, 2006. http://dl.acm.org/citation.cfm?id=1217651