PhD Position on Robust Traffic Engineering for SDN

The Network and Traffic Optimization research team of the Mathematical and Algorithmic Sciences Lab, Huawei France Research Center, located in the Paris area, is looking for highly motivated candidates for a PhD thesis on Network Optimization. The thesis will be jointly supervised with Telecom Sud Paris within the CIFRE framework.

PhD thesis

In recent years, the control paradigm of Software Defined Networking (SDN), which was originally targeting enterprise and data-center networks, has gained momentum. Telecom Operators, and Cloud Service Providers (CSP) have been building wide area overlays managed by a centralized SDN controller in order to provide worldwide, long-haul and cost effective services. MPLS leased lines, best effort Internet, and PoP (Point of Presence) overlays are used to interconnect enterprise branch offices to cloud infrastructures. The dynamic nature of the traffic as well as the uncertain properties of the IP transit links make the management of these systems challenging. Ideally, the network should be dynamically reconfigured as the system evolves. However, reconfigurations cannot be too frequent due to route stability, forwarding rules instantiation, individual flows dynamics, traffic monitoring overhead, etc.

Motivated by the need to dealing with uncertainty, this thesis aims at investigating and designing new algorithms for the offline planning and online control of SDN systems. Robust and stochastic optimization represents the natural choice to model an SDN system considering multiple traffic and connectivity/capacity scenarios. While similar in the way they might consider the uncertainty, robust and stochastic optimization generally provide different outcomes. Stochastic optimization produces optimal results for the average case. In contrast, robust optimization considers specific "unlucky cases" to compute a solution.

The PhD thesis will focus on the modeling and algorithm design of the offline network planning and online control problems using approaches based on robust and/or stochastic optimization.

Specific Requirements

Ideal candidates should have a Master degree in Telecommunications, Computer Science, or Applied Mathematics from a University or a Grande Ecole. They should have a solid background in Operations Research. Knowledge of telecommunications will be appreciated.

English: Operational

Contacts

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Application

To apply please send a complete CV, a motivation letter, grades of University/Grande Ecole studies, and references.

Huawei

The Huawei France Research Center (FRC) located in Boulogne-Billancourt, Paris area, is responsible for advanced research in the fields of Algorithm and Software design, Aesthetics, MBB & Home devices and Parallel Computing, to create and design the innovative technologies and software platforms for our Brand.