



Internship Position: Optimal Bandwidth on Demand for SDN Networks

Huawei is a leading global information and communications technology (ICT) solutions provider. Through our dedication to customer-centric innovation and strong partnerships, we have established end-to-end advantages in telecom networks, devices and cloud computing. We are committed to creating maximum value for telecom operators, enterprises and consumers by providing competitive solutions and services. Our products and solutions have been deployed in over 140 countries, serving more than one third of the world's population.

Huawei's French Research Center (FRC) in Paris is responsible for advanced research and develop disruptive technologies in areas such as cloud computing and data centers, wireless, cable and fiber communications and internet of things, with applications to 5G wireless communications and beyond, SDN and big data.

Major Responsibilities

Software-Defined Networking (SDN) technologies have radically transformed the network architecture of data centers, network overlays, and carrier networks. They provide programmable data planes that can be configured from a remote and logically centralized controller. The high flexibility and reprogrammability of SDN infrastructures enable carrier network operators and Internet service providers to exploit more efficiently their network resources, thus offering new types of access services. Bandwidth Calendaring (BWC) and Bandwidth on Demands (BWoD) services enable enterprises or cloud providers to dynamically establish or resize connectivity from the fixed or wireless access network through the core as necessary, so they pay only for what they consume. However, the lack of automation capabilities as well as the high dynamicity of connection requests from Over The Top (OTT) operates hinder the widespread adoption of these services.

The objective of this internship is to formulate and analyze the BWC/BWoD services as combinatorial problems, proposing efficient algorithms to quickly solve them even with large size instances. To this end, particular attention should be paid to decomposition methods, such as Benders' decomposition and Dantzig-Wolfe decomposition, to exploit the special block structure of the problems.

The candidate will have to study and formulate the problem, design efficient algorithms to compute quickly a solution and evaluate their performance through simulations. This internship is in collaboration with the team "Optimisation et Systèmes" of the CERMIS laboratory of the Ecole des Ponts ParisTech.

Duration: 6 months

Location: Boulogne-Billancourt

Required Level: Msc and PhD student in computer science / applied mathematics.

Additional Requirements:

Candidates must have a strong knowledge in combinatorial optimization programming with the following skills and experience being highly desirable:

- Decomposition methods.
- Approximation algorithms.
- Experience on nonlinear programming is a plus.

The following knowledge and skills are required:

- Network architectures and protocols.
- Programming languages (e.g., MATLAB, C, C++, and Java) and development techniques.
- English (reading and writing as well as oral communication).

Please send your applications to Stefano Paris (stefano.paris@huawei.com)

Successful applicants will be contacted within one month. Unfortunately, we are unable to contact every unsuccessful applicant individually