2018-00360 - Measurements to check network neutrality

Level of qualifications required: Graduate degree or equivalent
Function: PhD Position

About the research centre or Inria department
Inria, the French National Institute for computer science and applied mathematics, promotes “scientific excellence for technology transfer and society”. Graduates from the world’s top universities, Inria’s 2,700 employees rise to the challenges of digital sciences. With its open, agile model, Inria is able to explore original approaches with its partners in industry and academia and provide an efficient response to the multidisciplinary and application challenges of the digital transformation. Inria is the source of many innovations that add value and create jobs.

Context
Within the framework of a partnership
- Within the Integrated Project Lab BetterNet (if funding granted)
- collaboration between 2 Inria teams: Dionysos and Madynes
- value-creation and technology transfer contracts with ****

Assignment
The Internet is historically neutral, in the sense that all data packet are supposed to be treated the same at each node of the network, without any distinction of their type, origin or destination. This equality principle has been questioned by network service providers expecting content providers to participate to infrastructure investments; if not paying they could be blocked or slowed down. It initiated the so-called network neutrality debate, still very vivid worldwide. Neutrality has been imposed in Europe, but has recently been repealed in the US.

The goal of this PhD thesis is to develop measurement tools allowing to detect if a non-neutral behavior can be highlighted, this for the various actors of the Internet network: network access providers first, the main targets of the debate, but not only. Indeed, we have emphasized in previous works that a packet-focused neutrality can be circumvented by applying a service differentiation at another level: it could for example be the case by choosing the data cached at the edge of the network to provide a better quality of service. An implicit goal will then be to define a neutral (or fair) behavior for each actor, to define the associated metrics, and to set up corresponding measurement techniques.

This thesis is part of the Inria Integrated Project Lab BetterNet and is related to the french mission TransAlgo on the transparency of algorithms.

Bibliography:
Main activities
Main activities (5 maximum):

Additional activities (3 maximum):

Examples of activities:
- Analyse the requirements of [partners, clients, users]
- Propose **** solutions for ****
- Develop programs/applications/interfaces of ****, ****
- Design experimental platforms ****
- Write documentation
- Write reports
- Write ****
- Test, change up until validation
- Distribute the *** to **** via ****
- Provide user training for the service's main clients
- Lead a user community
- Present the works' progress to partners, ****to an audience of financiers ****
- Other ****

Skills
Knowledge on networking.

Benefits package
- Subsidised catering service
- Partially-reimbursed public transport
- Social security
- Paid leave
- Flexible working hours
- Sports facilities

Remuneration
From 1982 euros before taxes