
**Contract type**: Public service fixed-term contract  
**Renewable contract**: Oui  
**Level of qualifications required**: PhD or equivalent  
**Fonction**: Post-Doctoral Research Visit

**Context**

**Research context**

As part of the BetterNet Inria Project Lab (IPL), we are building a scientific and technical collaborative observatory to measure and improve the Internet service access as perceived by users. We propose new original user-centered measurement methods, which will associate social sciences to better understand Internet usage and the quality of services and networks. Our observatory can be defined as a vantage point, where (1) tools, models and algorithms/heuristics will be provided to collect data, (2) acquired data will be analyzed, and shared appropriately with scientists, stakeholders and civil society, and (3) new value-added services will be proposed to end-users.

This postdoc is within the Inria Project Lab BetterNet (http://project.inria.fr/betternet/). It is a joint position between the Diana team at Inria Sophia Antipolis (south of east of France) and the MiMove team at Inria Paris (near the gare de Lyon). The candidate can be located either in Sophia Antipolis or in Paris.

The IPL is developing and federating a number of measurement tools, each relies on a different measurement methodology (for example, active path measurements for ACQUA and passive observations of user’s traffic for HostView). The vantage points for taking measurements are also diverse (mobile devices, desktops, home gateways). Some of these tools gather user feedback on ongoing experience, which is crucial for understanding the user quality of experience, but also challenging to conciliate across tools. The deployment of these tools is underway, which will give us large-scale datasets to infer a number of interesting properties about the edge of the Internet as well as its usage. The analysis of such large-scale datasets also represents a number of challenges. First, Internet measurements are noisy as results can vary significantly even within small time intervals. Second, different tools use different measurement methods, which yield different results. Finally, given the scale of the Internet we cannot expect our deployments to cover all possible paths, so we will be dealing with sparse datasets.

The two contact persons for this position are Renata.Teixeira@inria.fr and Chadi.Barakat@inria.fr

**Assignment**

**Assignments**

The goal of this post-doctoral grant is to conduct research on the correlated analysis of the IPL BetterNet datasets. This analysis will serve multiple purposes:

1. Develop methods to conduct the correlated analysis of this dataset. We must study whether to first calibrate individual datasets to then put them together or to analyze them together from the start. We can also use different datasets as means of validation to increase the confidence in the results.
2. Improve the methods of the original measurement tools, so that we can better correlate data
points coming from different tools for a single user and across users. It is often hard to identify
a single user or a single service in the datasets (for technical and privacy reasons), so we must
develop means of correlating across users/services without jeopardizing privacy.
3. Design and develop methods to infer properties per access ISP or service. We aim to
understand the performance of different access ISP and services (Are users getting what they
pay for? Which is the best ISP/service at any given region?) as well as their traffic differentiation
rules (Do ISPs treat traffic from a video streaming service better or worse than their own video
streaming service?).

Leverage the variety of measurements coming from the different tools to detect network
degradations and understand their root causes, and identify the most important factors that
determine the quality of experience as perceived by end users.

**Main activities**
The candidate will carry out the above analysis and will be asked to propose the required statistical
methods for an efficient combination of the existing datasets and inference of network performance
related issues. We are in particular interested by those performance issues impacting quality of
experience for Internet access as a whole or for particular Internet applications as VoIP or Video
Streaming.

**Skills**
Technical skills and level required : Internet measurement, statistical data analysis, machine learning
Languages : English
Relational skills : Capacity to work within a group

**Benefits package**
- Subsidised catering service
- Partially-reimbursed public transport

**Remuneration**
- Location: Paris 12ème
- Gross Salary per month: 2653€ brut/mensuel

**Security and defense procedure:**
*This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425
relating to the protection of national scientific and technical potential (PPST).*

*Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial
decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial
decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.*

**General Information**
- **Theme/Domain** : Distributed Systems and middleware
  System & Networks (BAP E)
- **Town/city** : Paris
- **Inria Center** : CRI de Paris
- **Starting date** : 10/1/18
- **Duration of contract** : 1 year, 5 months
- **Deadline to apply** : 3/23/18

**Contacts**
- **Inria Team** : MIMOVE
The keys to success

Conditions for application

Defence Security:
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Recruitment Policy:
As part of its diversity policy, all Inria positions are accessible to people with disabilities.

Warning: you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.