Dr. Adrien lebre
Researcher
(currently on leave from Mines Nantes)
adrien.lebre@inria.fr
B216 - Ecole des Mines de Nantes
4, rue Alfred Kastler, BP 20722
44307 Nantes Cedex 3,
France

01 March 2015

Master Internship

Title: Participation to the development of a fully distributed IaaS manager based on OpenStack.
Duration: 4 to 6 months
Location: Ecole des Mines de Nantes (France)
Supervisors:

- Adrien Lebre (adrien.lebre@inria.fr)
- Jonathan Pastor (jonathan.pastor@inria.fr)

I- Context of the Internship

In the current ecosystem of the Internet, service-providers are offering services to their users from all over the world. These services require a large amount of computing resources, and each service-provider has its own computing infrastructure leveraging tens of thousand servers concentrated in large data-centers (DCs).

However, concentrating the production of computing resources leads to several issues:

- Writing scalable software to manage such large scale infrastructures is difficult.
- Large DCs require dedicated electrical and cooling facilities.
- Providing services to far-away users is source of network overhead.
- World-wide infrastructures leads to jurisdictional conflicts.

The DISCOVERY initiative proposes to change this model of **"few large data-centers"** to **"many small data-centers, geographically spread, deployed upon the network backbones"** in order to benefit from existing network centers, starting from the core nodes of the backbone to the different network access points in charge of interconnecting public and private institutions.

By such a mean, network and cloud providers would be able to mutualize resources that are mandatory to operate network/data centers while delivering widely distributed cloud computing platforms being able to better match the geographical dispersal of users.

More information can be found at http://beyondtheclouds.github.io.

II- Description of the Internship

In a first time the intern will study the functionning of OpenStack: he will identify the interactions between its constituting services, in order to understand how they collaborate. In parallel he will take cognizance of the approach proposed by Jonathan Pastor, a Ph.D student of the Ascola team.

In a second time, the intern will focus his work on distributing the Glance image service, which is in charge of managing the images used by the virtual machines that are provisioned by an OpenStack deployment. Leveraging the work accomplished during the first stage, the intern will migrate the database backend from a MySQL solution to a non relational database such as RIAK.

Researchers of the Ascola team are currently working on building a fully distributed IaaS manager based on the OpenStack project. A prototype is actually tested on the Grid'5000 testbed. In the last stage, the intern will integrate its work in this prototype, in order to validate the proposed approach. To facilitate this part, the intern will work closely with Jonathan Pastor, in particular for the validation on Grid'5000.

III- Required skills

- Curiosity and inquiring spirit.
- Good algorithmic skills.
- Knowledge in Python and Scala is a plus.
- Knowledge in web programming is a plus.