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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 services of OpenStack and understand their interactions, in order to check which mechanisms can be distributed.

In a second time, the intern will work directly on our prototype of an OpenStack based IaaS manager. The intern will demonstrate the results of its previous work by applying it on the prototype. During this stage, the intern will work in team with members of the Discovery initiative.

At the present time, our prototype is working with a distributed version of the nova controller. The internship will be considered as successful if more components would be distribued at the end of the intern's work.

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.