

Dynamic management of virtual infrastructures

In the last years with the advent of virtualization technologies and Cloud infrastructures, new possibilities are offered in the scientific area to access computational resources. This technologies offer: “*ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources*”. These technologies enable the scientists to access a great number of virtual resources.

Despite that, currently there are many different Cloud providers, different Cloud software stacks to deploy Cloud platforms, different virtual machine managers, and other components, it is still complex for the users to access the resources. Moreover this diversity complicates the interoperability. So the main objective of this thesis is to move forward in the state of art in the dynamic management of computing infrastructures, with a main focus in the scientific community. This work will provide a platform to deploy and manage Cloud infrastructures easily, so the scientists can focus in their own application issues.

A Cloud platform for investigation must consider all the necessary aspects to the creation and management of the infrastructures. The first step is the specification of the user requirements, both hardware and software, about the resources needed to execute his application. Based on these requirements the system must create the user infrastructure, considering aspects as the Cloud deployment and virtual machine image selection, the contextualization process, etc. The system must enable the user to dynamically modify both the number of computational resources (or units) (horizontal elasticity) and their features (vertical elasticity). Finally the platform must provide interfaces both to user level with command line applications or graphical ones and at programmatic level, enabling upper level layers to access the functionality using an API. The thesis expects to move forward in the specification of software architectures and also deploying and testing a prototype.