

# Cloud Computing for everyone

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## Abstract

In the last 5 years, Cloud Computing has been my reference area for most of my research and teaching activities. Having a Cloud Computing testbed able to provide access to students and researchers is really important in order to continue these activities. In this paper, I present the work already done and what I would like to see “up and running” in the Chameleon/CloudLab projects.

## Introduction

In the last 5 years I have been interest in Cloud Computing for two main reasons: research related to resource management and educational related to my teaching activities. In this position paper, I will explain what I have done and what I will like to do in the next future with Chameleon and CloudLab.

## Research on Cloud Computing

My last publications concerning cloud computing are related to resource management problems [1-3]. In particular, I have proposed various frameworks able to automatically manage computing resources of Cloud infrastructures in order to simultaneously achieve suitable Quality-Of-Service level and to reduce as much as possible the amount of energy used for providing services. In my last publication, I have used a framework exploiting feedback fuzzy logic controller able to dynamically adapt the physic CPU capacity allocated to the tiers of an application in order to precisely match the need induced by intensity of its current workload [4].

In order to continue in this research, it is important be able to access to a group of physical resource as root user, since it is necessary run xen/libvirt command that only super user can do. I know all the implication and the risk concerning security issues but I'm also sure that a solution can be implemented. For example, it is possible to provide super user access:

- only for a limit period
- only for specific commands (xen/libvirt)
- inside a VPN accessible only via ssh and forbidding any connections to outside

Alternatively, an efficient Chameleon/CloudLab support team can help the researcher to install/configure/run anything he needs in order to launch its experiment.

My research activities is also related to user interface for different cloud computing platforms. CloudTUI [5] is a multi Cloud Computing platform text-based interface able to make the interaction with Cloud systems easy and intuitive even for users without any prior experience concerning the Cloud Computing paradigm. We are developing a new version of Cloud Computing able to exploit the Phantom API in order to make CloudTUI also able to implement various fault-tolerance policies.

Having Chameleon/CloudLab able to interface with different Cloud platforms and Nimbus Phantom will be very useful for our project.

## Teaching Cloud Computing

In the last year, I have taught Cloud Computing in my university and master course. Besides the importance of the theoretical aspects of the Cloud Computing, I always thought that also the practical experience is necessary to my students in order to provide them a concrete example of what is the gap between theory and state-of-the-art concerning Cloud computing. For this reason, my students have to play with different cloud computing platforms during the course. Moreover, I decided to make publicly available all the material (slides, scripts, references, ...) used during my course, in order to receive feedback from anyone (student/teachers) who has to learn/teach what Cloud Computing is. The feedback was very important and right now many of the courses concerning cloud computing around the world are using the material that I provided [6-7].

In order to continue these teaching activities, I suggest to provided access to different Cloud Computing platform as the FutureGrid project did. As a matter of the fact, I think it is really important be able to experiment different Cloud Computing platforms in order to see for real the pros/cons of each approach. Nimbus, OpenStack, Eucalyptus with their user interfaces should be available for users with an adequate number of physical/virtual machines “up and running”. Also Nimbus Phantom and Boto are discussed in my course, so it will be very helpful having them “ready-to-use” for my future students.

## Bibliography

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