Interface Development for Eucalyptus Based Cloud

Sandeep Kumar Verma
Computer Science Department
Babasaheb bheem Rao Ambedkar University
Lucknow UP (INDIA)

Mala chaturvedi
Assistant Professor
Computer Science Department
Babasaheb bheem Rao Ambedkar University
Lucknow UP (INDIA)

Abstract- The use of Internet and new technologies nowadays, for business and for the current Users, is already part of everyday life. Any information is available anywhere in the world at any time. That was not possible few years ago. Nowadays it have arisen a lot of possibilities of access to public and private information like internet speed access or the deployment of mobile dispositive that allow the connection to Internet from almost everywhere.

Today a lot of people are consulting their mail online through webmail clients, writing collaborative documents using web browsers, creating virtual albums to upload their photos of the holidays. They are running applications and storing data in servers located in Internet and not in their own computers. Something as simple as enter in a web page is the only thing a user needs to begin to use services that reside on a remote server and lets him share private and confidential information, or using computing cycles of a pile of servers that he will ever see with his own eyes. And every day its being used more this services that are called cloud computer services. That name is given because of the metaphor about Internet, as something than the user see like a cloud and cannot see what's inside. This services can be offered by free or by paying by demand (pay for consume), can be simply like a function calling (like asking the temperature in some city in the world for include it in a web page) or complex (like the usage of a virtual machine with its own operating system, applications and storage space for running applications).

Key Words- Cloud computing, Eucalyptus, Amazon EC2, Java, Swing, Typica, Scilab.

1. INTRODUCTION

Nowadays a lot of enterprises or users need to process a long amount of information data or need to do some complex operations, for example some mathematical models calculations, and they need a high amount of process power to resolve it. Maybe the power of a personal computer can be not enough to finish in a determinate time one task, and maybe this task is so punctual that is pointless to acquire the hardware necessary to do it. Also sometimes a user wants to use a program for few times, for example for making some practices in university, and maybe it's pointless to make install this user a program, like Scilab, so for both problems we see convenient to bring the possibility of use some programs without the needing of install in own computers and with the possibility of have more calculation power. So we have to bring to the user the necessary tools to be able of executing a problem in the cloud of the university.

As we will see after, Eucalyptus is software that allows the management of a private cloud infrastructure, we are not going to enter now in technical explanations, but the truth is that a user that wants to run Scilab in the cloud don't need to know about the infrastructure that contain this program, we have to remember than users are working with applications, not with infrastructure. It's also true that for handling with eucalyptus user needs to know their commands and how to use them, so it is needed to deploy a friendly user interface to permit to users open Scilab in the cloud in a comfortable way, forgetting about what it's inside the system.

That is what user sees

USER   SCILAB

This is what really happens

USER   CLOUD   SERVER   NODE   SCILAB

2. RELATED WORK

Cloud computing it's based in the offer of services, we found 3 different kinds of services:

Software as a Service (SaaS): These services are applications over Internet. Normally the user can run these applications using a web-browser. User abstract totally about the hardware and software that is using and simply access to a interface with a web browser and from there he have access to some information and functionalities. It's dedicated to current users, an example to this kind of services may be Google Docs.

Platform as a Service (PaaS): These services are focused on the deployment of applications or services online letting to the developer manage the hardware or software necessary, including also a solution stack. This service includes all the life-cycle of the deployment of application/ service such as design, implementation, testing, deployment, integrity with databases, etc
There are three characteristic points in this service:
· Services for deployment, testing and maintenance of applications
· Multi-user architecture, in other words, scalability.
· Collaborative tools.

Infrastructure as a Service (IaaS): These services are focused to offer a computer infrastructure. All the servers, connections, software and other resources are offered by the providers. And the users see it like an entire infrastructure hosted in the same organization.

Types of clouds

Public: Public cloud (also known as external cloud), is the traditional way, where services are provided by a third part via Internet, and they are visible to everybody (it doesn't mean that they have to be free). So in the cloud it's the information of lots of users but they can't access of course to the information of the others.

Private: This cloud consists on the hosting of private applications, storage, or computation in the same company emulating a cloud in Internet but only for private use (private networks). The coast of infrastructure and maintenance of it is the same that having it in normal way but the scalability and the sharing of the coasts is better.

Hybrid: It's a combination of public and private cloud. An organization can have a part of their services in its own infrastructure but also in public cloud. Or can use the public just when have peaks of usage. It's a good option when you want to have your data or application in local and don't want to invest too much in infrastructure.

3. PROPOSED APPROACH

The project has 4 main tasks, and the each task have different subtasks, the main tasks are information about cloud computing, connection with Eucalyptus, graphic interface and final deployment and testing.

Cloud computing

This task consists in being familiar about cloud computing. Getting information about what is, understanding the way it works, which kind of technology is used, which kinds of cloud computing exists, identify providers and consumers of this technology, search information about infrastructure as a Service, about Amazon EC2 and Eucalyptus and other services providers.

Connection with Eucalyptus

This task consist in get information about the ways of accessing to Eucalyptus, search the existing APIs, and select the most appropriate to work with. Be documented about this API, design the solution of the problem and deploy it.

Graphic interface

In this task is included the decision of selecting one graphic library and about one GUI Builder to make easier the deployment of the interface, Design it and finally deploy it.

Final Deployment and testing

It's included the union between the logic and the interface of the program and some tests for detecting problems. And also it is needed to write the memory of the program, as it will be written while the project is being done we can't assign a task for itself, so it means that each task have included the documentation part.
First of all there's the needing to demand to administrator of the system an account, it's easy to do because eucalyptus provide a login menu in its service to login or ask for an account. Once we have access to our account we can download the credentials to access to the system and change the information of our user. Also we can see the images that the cloud can provide us. With these credentials we will have access to the cloud and ask for running images, and for accessing to these machines. We will have this menu like a part of the eucalyptus users where everybody can change their information and also check the images that are prepared for him. For connecting with the virtual machines that are running in Eucalyptus (we have to remember that for the user are like normal machines) it's possible to connect via SSH and also via VNC. For connecting from windows we can use a program like PuttySSH for connecting via SSH and for VNC RealVNC.

SSH

It's a protocol for accessing to remote machines through a network using a secure channel. It was designed to apply more security to the connections between devices. It permits to use the machine through a command line terminal and it also permit execute graphic programs. Use a secure connection encrypted and also permits copy of data. SSH uses public-key cryptography for the authentication. It exist two keys, one public and one private, so we have to keep the private key. It means that when one message it's sent, we can only decrypt it applying the private key. This program is included in UNIX systems but for windows it's needed to install software. For example putty SSH.

VNC

It's a system that permits to share a desktop from one machine (server) to another (clients). It permits the uses of keyboard and mouse and others devices for the communication. There are no restrictions in this connection, the system don't need to use the same operating system, just it's necessary the installation of one application. It uses RFB protocol, it's a protocol for the accessing to graphical interfaces. In windows we can use for example RealVNC.

4. ARCHITECTURE

In this project there are clearly differentiate 4 different main use cases for each process of the system. As we see there's only one actor in this system, cause it's a personally program to manage the Eucalyptus system. He can interact with the system getting information about the available images on the system and the instances running on them, user can create and delete keys and specify and manage all the policies of accessing to these instances. Also user can specify the configuration of the program. Also there's a special use case, open console is included inside the instance management.

Use case diagram
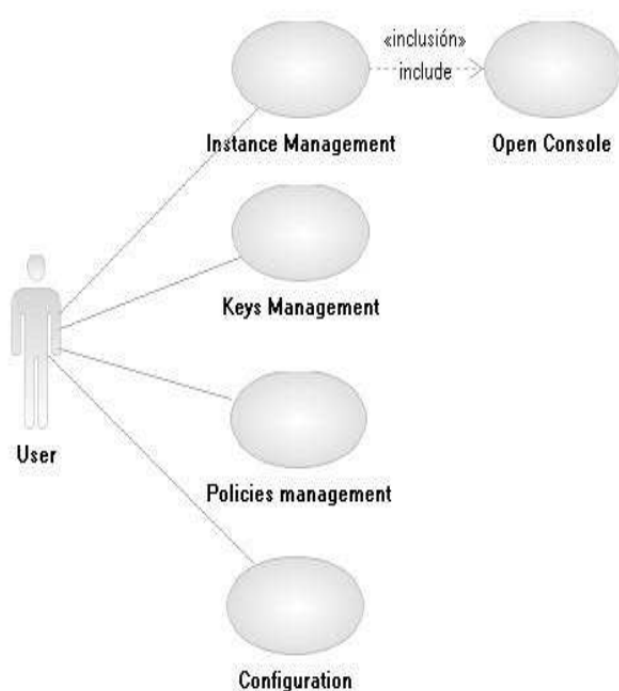
5. CONCLUSION & FUTURE SCOPE

If we look back to the objectives of the work we can differentiate some points, the user friendly interface was easy to design and deploy thanks to the GUI builder of Netbeans that work really well. Also the API JSwing it's very intuitive to use and really well documented. Also there are not many difficulties because Java Swing (now part of Oracle) has very good tutorials online in the same official page and also Netbeans page have some tips and helps for using it. Also programming with Java for this kind of desktop application is always comfortable.

The deployment of the communication with Eucalyptus it was not so easy. At the beginning have been a little bit complicated to understand how Eucalyptus works. Although there is some information the official web page is not really well documented and it's necessary to check the Amazon EC2 documentation to understand some things. Also Typica framework doesn't have a very good documented API so it's necessary to check Amazon documentation a lot of times. Also I found this API not difficult but a little bit uncomfortable to use but just in some punctual moments. Also are some bugs like when an instance is terminated always an exception is thrown. And also the exceptions are not very helpful cause some time there are some errors not specified. But it's also true that the communication with this API is intuitive and becomes easier when you are familiar with it. It's also true that for having such a small cluster sometimes the response of the virtual machines take a long time, it will be good to check why this happens if some day the university wants to use Eucalyptus in some project. Maybe for run an instance we need one minute more or less.

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