MMIA Improvement and Services for Cloud Computing

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Abstract. In this paper we present the results obtained from the implementation and improvement of the Management Model for Interconnection and Access (MMIA) Services for Cloud Computing, is a mechanism that enables connectivity services provided by a "Public Cloud" are most of the time available to users when they need it.

Keywords: Mobile computing, cloud computing, communications, access, management and networking.

1 Introduction

The Cloud Computing is the convergence and evolution of several concepts related to information technologies, such as virtualization, mobile computing, distributed application design or network design and management and provision of applications, information and data as a service [1].

Thus Cloud Computing efficiently provides access to computer services, regardless of physical systems that use or its actual location, as long as it has access to the Internet [2], and can work together on the same content.

But like all technology that is in its beginnings, Cloud Computing is not without controversy, although availability is an advantage, currently one of the strongest issues facing the growing development of Computer in Cloud is to ensure interconnection and access to services that this technology provides.

This problem is compounded when you take into account that currently the vast majority of computer systems schemes migrate to Cloud Computing, so it is vital to ensure that these systems are interconnected to the network and Computer services in the Cloud as long as possible without interruption.

The structure of this paper consists of eight sections, first discussed the current situation of Cloud Computing in terme s of concept, characteristics and advantages in the second section defines and presents the MMIA, later in the third section defining the architecture that has been developed for the MMIA, in the fourth section discusses the Installing a Public Cloud, followed MMIA Implementation, Testing and Results subsequently obtained, the final conclusions and finally some improvements and work future.

Advances in Computer Science and Engineering
Research in Computing Science 67, 2013 pp. 3–13
Paper Recived 17-08-2013 and Acepted 21-10-2013

2 Management model for the interconnection and availability (Mmia)

In Figure 1 shows the MMIA has been developed, which is equipped with a standard character, ie it can be implemented in different architectures of "Cloud", to allow optimization services availability, connectivity, recognition and link status monitoring and users.

Fig. 1. Management model for cloud computing.

As can be seen the MMIA comprises five interconnected layers, these layers are:

- Interconnect Layer.
- Layer Validation and Identification.
- Layer Information Management.
- Monitoring Layer Connection.
- Correction Layer Techniques.

Through this MMIA has achieved an improvement in the management and delivery of applications and services that are within the Public Cloud Educational and that users can access and use these services at the time you request.

3 Design and architecture MMIA

In Figure 2 shows the architecture of the MMIA, which is very important because it defines as interacting all elements of the MMIA and how they are supported by some standards, standards, protocols, processes, rules etc.., in order to make it fully functional the MMIA designed.

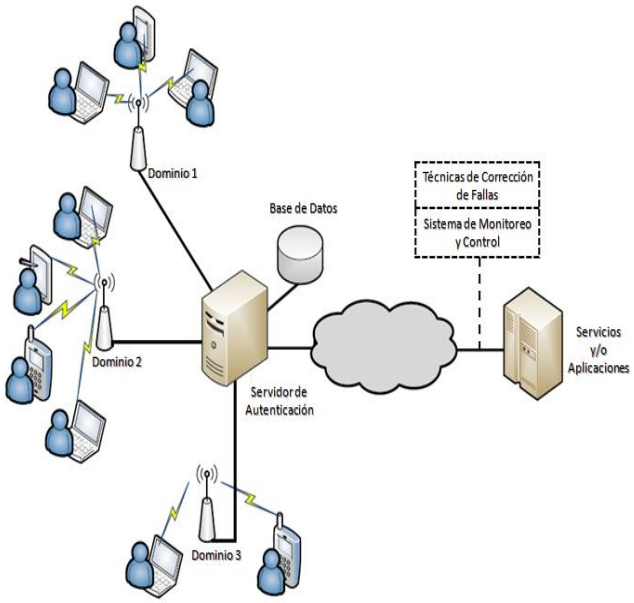

Fig. 2. MMIA architecture in cloud computing.

Then, the architecture of the MMIA has the feature that the user receives immediate attention, as well as total mobility and also, the services offered are managed intelligently [3] depending on the profile with the person who access the "Cloud", will be the type of services to which you have access.

This architecture has allowed users to access their cloud services regardless interconnect various problems such as delays, and intermittent disconnections and several Wireless Technologies to interoperate with each other, so this is not an obstacle in communication, however for our case and for practical purposes has worked with computer Wi - Fi and IEEE 802.11g.

4 MMIA implementation and installation of cloud public education

Both the MMIA and a Computing Cloud Server is implemented within the Mobile Computing Lab School of Computing (ESCOM), since in this are the means and facilities necessary to develop them and to carry out any sufficient evidence to prove operation and functionality.

The software we use to install our Educational Public Cloud is ownCloud, which is based on PHP, SQLite, MySQL or PostgreSQL and can run on all platforms that meet these requirements, it is a free software solution developed that can be downloaded for free and install it on a Server itself and emerges as an alternative to providers of commercial cloud services, in the following table shows the most important features that we installed as Server Cloud.

Table 1. Cloud computing server properties.

Características	Descripción
Configuración	Servidor Cloud
Sistema Operativo	Ubuntu Server 12.04.1 de 32 bits
Computadora	Motherboard Gigabyte Technology Co., Ltd. GA-VM900M
Procesador	Intel Core2 CPU 2300 de 1.80 GHz
Memoria RAM	2 GB DDR3
Disco Duro	320 GB

After installation of the OS on your computer, you must configure the network card to assign a public IP and fixed immediately proceed to install all necessary packages and then download and install the latest version of ownCloud from its official site .

Once ready the Cloud Server, you can proceed to creating users, among the main advantages that the cloud offers us, is that we will have all the space that the server takes on the hard drive and everything staying in he will be only under our control and manage your security, your privacy and ensuring the confidentiality of the information.

The MMIA implemented and is responsible for managing all Cloud Services within an educational environment and the concept of domain, in order to benefit those users (students, teachers, administrative staff, etc..) With mobile equipment are within the coverage area of the point of interconnection to the cloud, to learn more about Cloud Server installation and deployment and configuration of computers that make up the layers of MMIA reader is encouraged to consult some of the previous articles that have been published [4], [5].

5 Tests and results

Thanks to ownCloud package by default in our Cloud Server offers all users the following services: information storage, share files with users and non-users, music playback, image galleries, calendar / address book, file viewer PDF and text editor. In addition to allowing the most common functions such as the Backup and File Synchronization between various devices and the use of the Cloud with WebDAV technology.

At its meeting, the administrator is responsible for providing each user with a name, password and enter them into a workgroup database Cloud Server, which would give them access to their meeting within the cloud and get their services; also assigned each user a certain quota of storage, which in our case is 10 GB of disk space per user, ie according to the size of 320 GB hard disk maximum capacity people in the laboratory that is 30 users. First connection was tested and storing information in the cloud with registered users to date via the Web from your Internet browser to the server in the cloud (see Figure 3 and Figure 4).

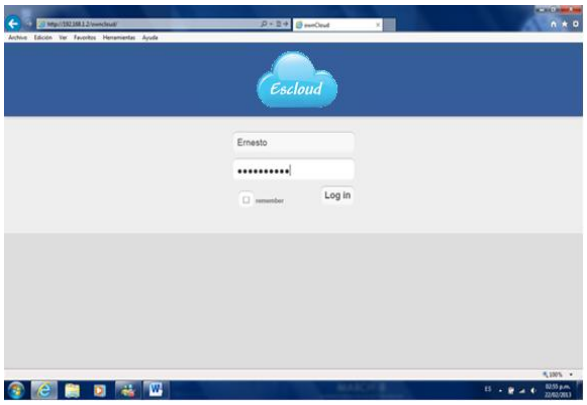

Fig. 3. Access to the cloud from your web browser.

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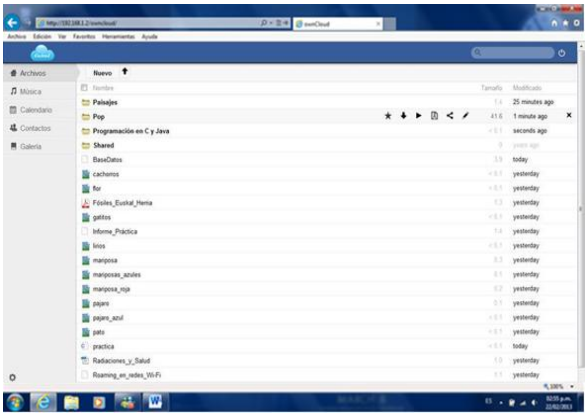

Fig. 4. Session in the cloud via the web.

Also through the file browser of a computer GNU / Linux or Ubuntu using WebDAV, as shown in Figure 5 and Figure 6, respectively.

Fig. 5. Connecting to the cloud using nautilus.

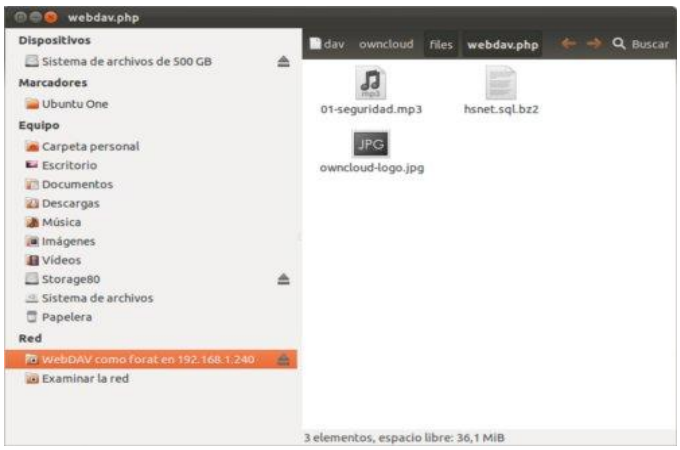

Fig. 6. Session in the cloud as a network drive.

In Figure 7 shows the GUI of an application for mobile devices with Android operating system that was developed, as well as performance tests conducted in order to provide users with a manager that allows access to your information within of the cloud in a much simpler, more flexible and dynamic.

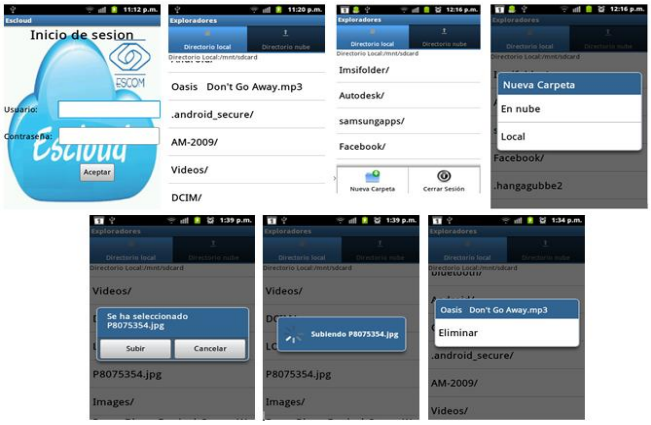

Fig. 7 Evidence of application for android.

Finally for measurements concerning the traffic in the Cloud was used Wireshark Protocol Analyzer, which is also a free software that allows us to capture the packets transmitted and received directly from the wireless network interface of the Cloud.

Using Wireshark Tool can also get valuable information Network Infrastructure (see Figure 8) where the cloud settled and Implement the MMIA, input shows the Host name, the domain to which it is associated, the Directorate IP, MAC Address, the bandwidth consumption, Manufacturer Name, Number of hops to the Domain, Uptime, etc.

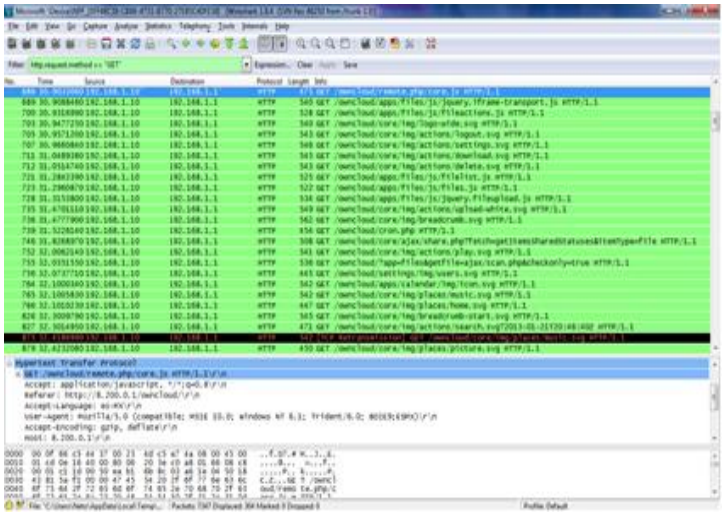

Fig. 8. Recognition cloud network with wireshark.

Now, in Figure 9 are observed Traffic Statistics Packet Interface WLAN, by implementing the Software in the MMIA also been able to classify Packet Flows in traveling on the Cloud.

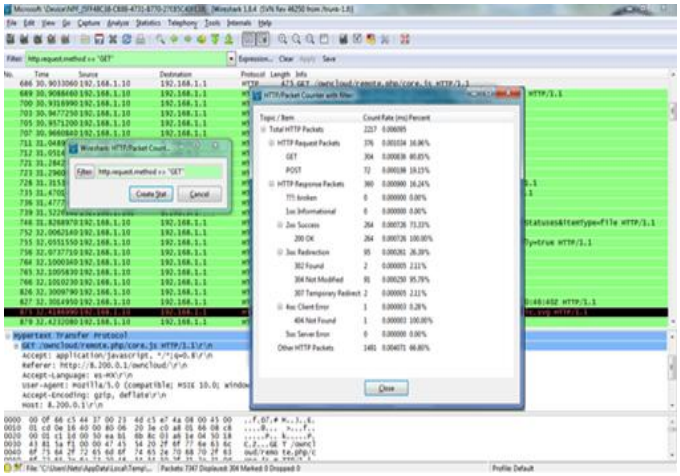

Fig. 9. Recognition of packet traffic in the cloud.

In Figure 10, show that the Packet Traffic Statistics collected and studied over a month on the Cloud environment under study is minimal, the graph shows the average travel data ranging between 10 and 15 Kbps which is within an acceptable range with minimal packet loss.

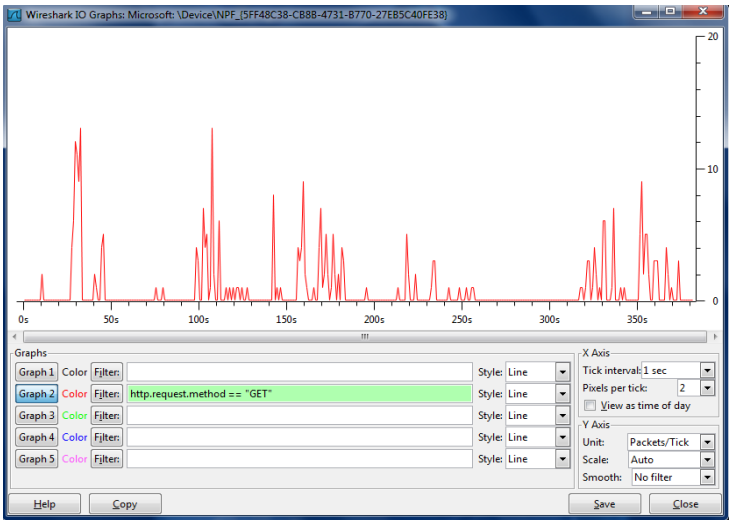

Fig. 10. Traffic Monitoring in the cloud with wireshark.

Below in Figure 11 is a breakdown of the directions in which traffic flows either locally - local, local - remote remote - remote.

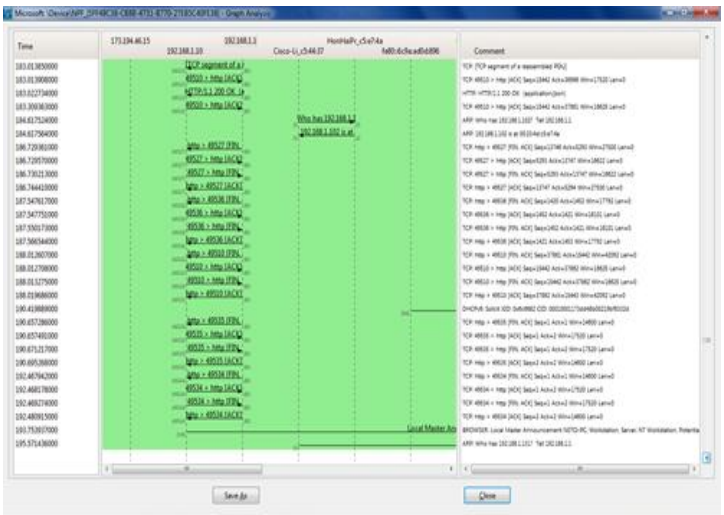

Fig. 11. Breakdown of traffic flow in the cloud.

Another type of result has been obtained in the development of the research is the bandwidth monitoring in the cloud, which is consumed by the registered users to access the Cloud Server and make use of the services offered in this.

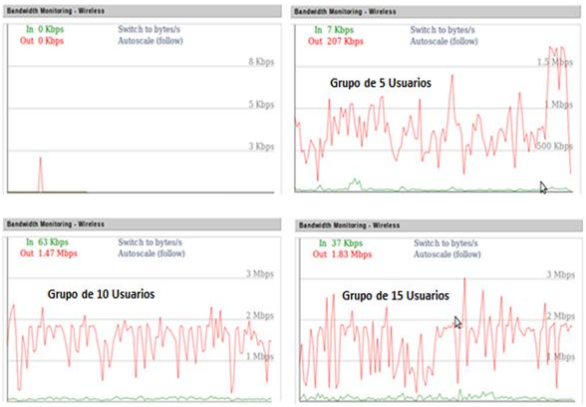

Fig. 12. Bandwidth Monitoring in the cloud.

The tests were conducted to see the bandwidth consumption by the Cloud with different numbers of people in the lab can be seen in Figure 12, observing that with groups of 5, 10 and 15 concurrent users was required bandwidth of 1.55 Mbps, 2.1 Mbps and 3.2 Mbps respectively. However, these needs are fully covered by the interconnection point and IEEE 802.11g standard operates as it can handle a maximum bandwidth of up to 22Mbps. Consumption results Bandwidth Traffic coupled with us "guarantees" that communications have been performing well and that the traffic generated was only the essential, allowing you to have a higher occupancy of the Cloud. In Figure 13, we see the percentage of Success Connections, these tests involved that users came to the lab with his team, will connect to the cloud, will authenticate and receive appropriate services and make use of them, the result was one which 97.78% is considered acceptable for the functionality of the MMIA.

As for the validation and identification layers and management information MMIA, the percentage of successful authentications was 100% as shown in Figure 14, while the results of the information management server within the Cloud can appreciate in Figure 15 and Figure 16. Thus, the average unit tests consisted authentication and management of user information proved successful with a percentage of 98.33% as shown in Figure 17, which shows the reliability, speed and enhanced effectiveness.

Finally after making the calculations was obtained that the Network Infrastructure Public Cloud environment where services are offered filed a 99.97% availability as shown in Figure 18, this indicates an efficient operation MMIA elements that implement and excellent availability of the Services within the Cloud.

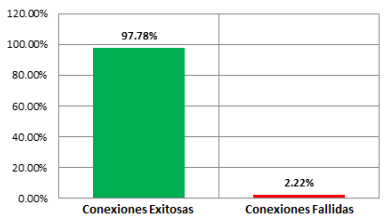

Fig. 13. Testing connection to the cloud.

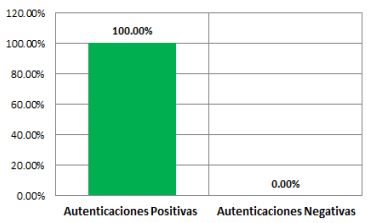

Fig. 14. Test authentication to the cloud.

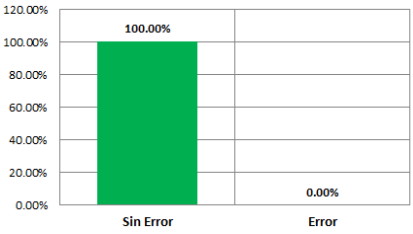

Fig. 15. Testing local management.

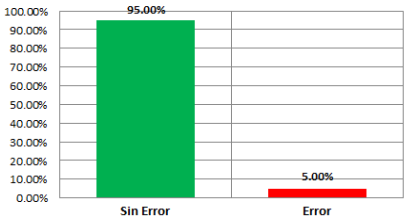

Fig. 16. Tests run in the cloud.

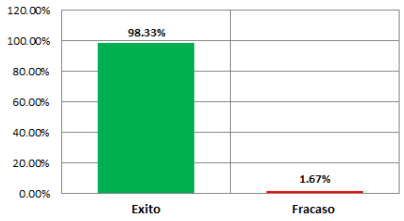

Fig. 17. Result of unit tests.

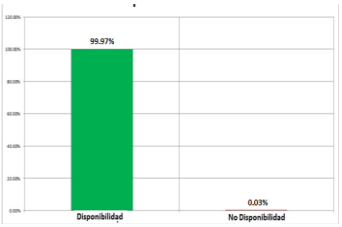

Fig. 18. Percentage of availability of MMIA.

6 Conclusions

The results obtained in this study have proved satisfactory, since it is able to develop and evaluate a MMIA in Cloud Computing for users of a Public Cloud environment could have optimal access to services and applications that this offers. It concludes that the proposed methodology is effective for measuring the availability of the applications according to the results obtained, and the inclusion of Traffic Analysis and Bandwidth consumption as a support tool for as long as the Cloud Server is responsible for responding to requests, process them and provide services to users.

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