Cloud Web-Based Operating System (Cloud Web Os)

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ABSTRACT

The cloud computing is the most efficient technology that reduces the time, cost and resources which are used by IT companies of any size from small to large companies. There are many cloud approaches existing nowadays related to store the data files and synchronize file versions. However, few of these cloud models let the user open or configure the file on cloud. Therefore, our new cloud model proposed in this paper concentrate to let the user open, execute, configure, edit, delete, and update his files online, on the cloud. It gives the user all the operating systems features and virtual desktop icons on the cloud. In addition, the proposed cloud operating system offers variety of selected applications that allow the users to write documents, draw graphs, and compile classes and programs.

KEYWORDS

Cloud OS, Cloud Computing, Web OS, Cloud Kernel.

1. INTRODUCTION

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Nowadays, Cloud computing is being the number one concept in IT industry where all large IT companies such as Microsoft, Redhat and Apple are migrating their services to be delivered via the cloud, and through this high competition on cloud-driven services the user is distracted by many different services of different providers which means many different GUIs. A cloud are groups of nodes or machines whose sizes may be different from small machines to datacenters. These machines may be located in different physical places and connected via the internet. The cloud computing is designed to reduce the time, cost and resources that are used by companies of any size from small to large companies [1].

A cloud operating system is a new type of software that is designed to host many types of software that are executed over a collection of hardware distributed over the cloud. While the traditional operating system is a software that manages the hardware devices, exist in a single machine [2].
The cloud has three forms of models: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). In SaaS, the user uses the collections of application running

in the cloud. While in PaaS the user use the tools provided by the platform from classes libraries and other language supports. However, the user has control over the operating system and the application deployed in the IaaS with changing the Infrastructure components and configurations [3].

In this paper, we will use the SaaS model since we are deploying a software to act as a virtual operating system of the cloud user. The SaaS model can also be accessed by any web-browser and cross-platform without any third party required at the users PCs.

Our cloud web based operating system (Web OS) can be used together with any operating system. The cloud web OS will act as a separate operating system after reaching it by any web browser. Therefore, the web OS can be accessed from PCs, Laptops, Smartphones, and any device includes a web browser. A variety of web and non-web applications can be accessed in the web OS without the need to download or install them locally. In other hand, the Cloud Web OS model is not a set of distributed processors that form an OS on the Cloud but it is the software that give the user the OS functionality on the cloud.

The objectives of designed the Web OS can be summarized in these points:

- Prepare a webOS that is integrated with social media services such as (Facebook, Twitter, Flickr, etc).
- Customize the GUI to fit the social media applications needed by simplifying their appearance.
- Make manageable system that can give services, and permissions per users and groups.
- Implement compilers and editors for C++ and Java language over the web OS to let the IT people compile their programs without installing tools for them.
- Offer all of the Microsoft offices applications and utilities for the system users.
- Provide VOIP service for our cloud users.

The Rest of this paper is organized as the following: in Section II, related work about cloud OS is mentioned. Section III describes our Web OS Model. In section IV, a comparison with other cloud solutions is studied. Finally, section V concludes the whole paper.

2. RELATED WORK

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There are many products, which can be described to be as Cloud Web OS. Open web OS is one of the web application that is describes as OS for the developer community and give them different developing environments, while Open Web OS does not really offer a full OS services [4]. Another web OS is called eyeOS which is very similar to our model in term of offering file management and applications tools, however eyeOS cannot really customized and doesn't also offer interaction with social media applications such in our model [5]. The cloud web desktop (CloudMe) is also a WebOS provided from the cloud top company that offers a virtual desktop for its clients, however it cannot be offered through the web browsers such as our cloud web OS [6].

In addition, there are other famous products in the cloud-computing world. Even though, these products are not considered as operating systems in the cloud, they offer many applications services that made many users use it. One of these products is the dropbox cloud solution, which links any file on the user PC be saving them in a folder to be synchronized with the dropbox

servers [7]. Apple also has another cloud solution called Icloud. Icloud is not a full OS for the apple user however, it allow the users to synchronize their files and photos with the apple server and with the other apple devices. It also pack-up most of the users files and setting to the Apple cloud server [8]. Google has also a cloud solution called google chrome, which also allow the users to synchronize their file with google server and can access them everywhere anytime [9]. There are similar products like JuliCloud from openSource and Ubuntu one from Canonical Inc [10,11].

3. PROPOSED CLOUD WEB OS MODEL

Our focus in this model is to develop new evolving model of cloud computing which is called webOS or webtop, when the term and the model is extremely new in the era of cloud computing there are a controversy about its definition because of the controversy on what is the limit of its functionalities. Nevertheless, we can define it by: It is a virtual OS desktop running in a web browser. Where the applications, data, files, configuration, settings, and access privileges reside remotely over the network or the internet. Most of the computing operations take place remotely at the server side. The browser is primarily used for displaying file and setting and used for input purposes. After we have made an in-depth research about the web 2.0, cloud computing and social media, we have found that there are many services on the cloud that are scattered here and there which makes it difficult on the user to manage them in one solution. Therefore, we decided to unify these services in one desktop by making a social webOS, which can interact with the existing social communities such as Facebook, Twitter and Flickr in addition to the various application services that it can support.

While, all the scenes now are toward a new cloud service, which simplifies the usage of cloud services. In addition to the cloud basically meant to give the end user the utmost amount of functionalities with the minimal technical knowledge which give us the opportunity to invent a new model of desktops that are delivered via the web browser that unifies the user's interaction with the web by merging it with other cloud services such as emails, social media and blogging avoiding the distraction of multiple many tabs and windows.

There are many cloud services that serves a wide range of uses which varies from business use to social use and from learning purposes to news and media purposes, but the problem with these services that they are scattered which makes the user distracted by many pages and many GUIs in a way that is not time efficient for hardcore web users.

In this case, the user will still stuck to the traditional way of using desktop applications and carrying his storage with him in the laptop, and this way have many problems such as applications installation issues and license issues etc.

There were some cloud providers that tried to solve these issues but they ended up with a high cost and complicated systems that do not suit individual and non-savvy web users.

Since the cloud services are delivered through web browsers then the best way to interact with them is in the same method, using a web OS to integrate all services in one window with an SSO approach, and finally attract customers by free services and charge them for extra services.

As we mention before the SaaS (software as a service) is the scope of our model. At the stages of developing our model, the final product will provide the following functions for users:

The Root user, which is an administrator who can manage all users and assign permissions and roles to the other client users.

The Client Users are the normal Users who can access their desktop icons and use all the authenticated services and applications assigned by the administrator root user.

The Cloud OS has a Web Desktop, which is a nice GUI that is capable to contain multiple windows and allow users to make their normal cloud activities with friendly interfaces. The following context diagram of figure 1 shows the briefs of the users' roles on the cloud server.

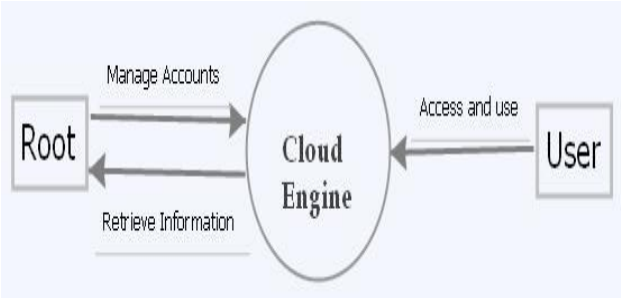

Figure 1 Our cloud OS Model Context diagram

Both users should use their usernames and passwords to login to the cloud OS System throw any web browser on a pc, mac, or even smart phones. A user-friendly desktop will then appears to the user with all the services and applications allowed to him based on his role. This desktop is very similar to the Ubuntu, Windows and Mac operating systems' desktops.

The users can then change the desktop view like wallpaper, themes and icons styles. In addition, he can also save his social web sites account on this cloud OS in order to let him easily access and update his profile there from the cloud web OS. The user can do that also throw the web browser which is also exist in our cloud web OS model, so there is no need to close that and get back to the regular OS.

Figure 2 Cloud Web OS VOIP client

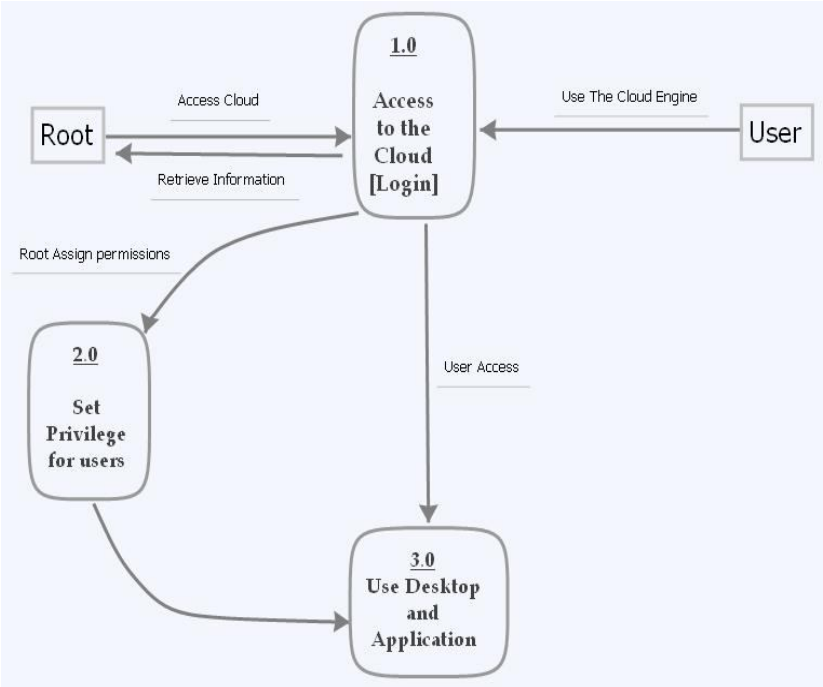

Figure 3 Cloud OS Data Flow Diagram

Furthermore, the users can configure their e-mail accounts and get them available in the email application at our cloud desktop. Saving contacts info also available at our cloud web OS, which let the users to call each other via VOIP softphones client application, showed in Figure 2. In addition, the users can compile and run and Java and C++ classes and programs. As shown in Figure 3, the administrator root user can enjoy all other users' features plus some extra features that nobody have them such as the following:

- The administrator main role is to add, delete. Disable, and enable user accounts on the cloud web OS.
- The administrator can also define, and delete groups with adding or removing users account from the groups.
- The administrator can assign permissions, applications and services of the client users.
- The administrator can specify the users' storage in MB.

Another feature of the system is the secured system: The cloud web OS system has a strong security measures to prevent unauthorized access to the system and protecting it from outside attackers using the latest encryption algorithms and security techniques. It is also Flexible system: The system will be flexible and easy to maintain and capable for future development and additional services and applications, plus have the ability to backup and restore itself.

A fully monitored system: The system is easily monitored by saving the logs of the users and saving the ins and outs of the system plus providing a dashboard for the administrator.

Reliable system: The system code is designed to have the least number of errors and if occurred to prevent data loss with the least damages.

In addition to cloud services that our system offer it can also be used as a network router such as in the following Figure 4. The OS server came with built-in script to act as a virtual cisco routers.

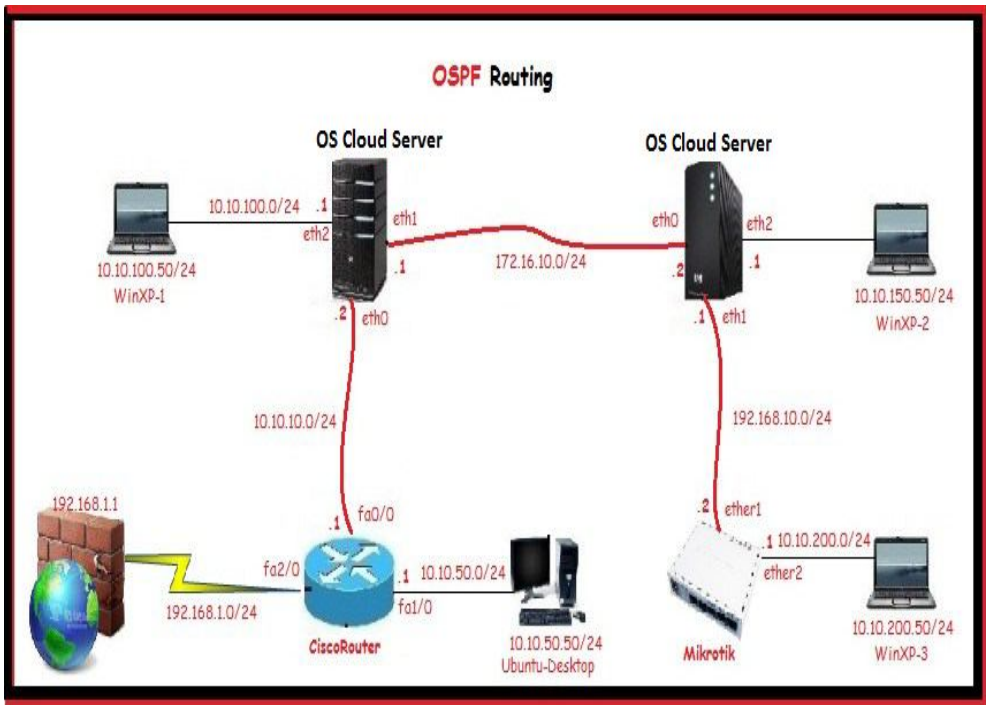

Figure 4 OS Server can Act as a virtual router between the networks.

Figure 5 shows the structure levels of the cloud web OS and the actors of the system, which they are the Root and the normal user. The Root which refers to the admin as in unix, linux world, and the normal user which have certain permissions that is specified by the Root, and he can access his own desktop and launch his favorite applications.

Both client users and root users can access the cloud web OS after they logged in from any web browser. When the root is logged-in he can get reports about users and monitor their action via browsing log files and assign permissions to the client users.

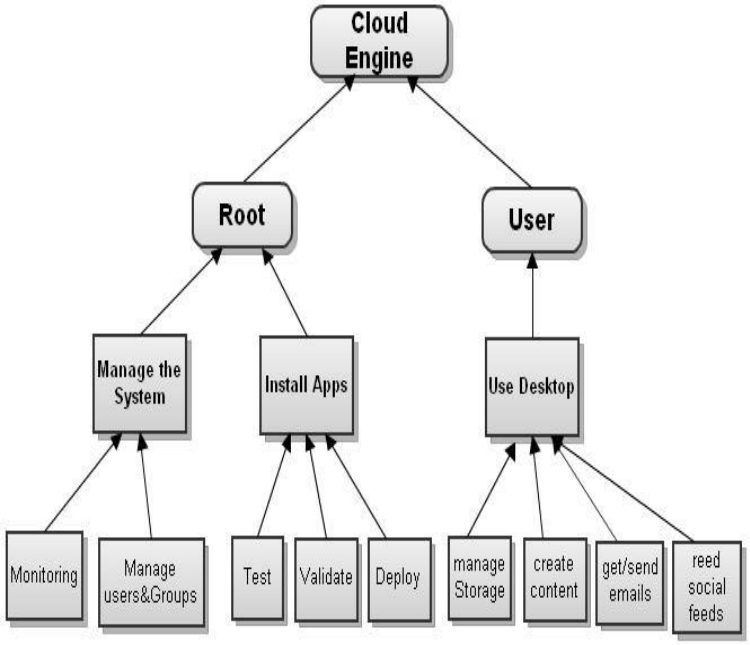

Figure 5 Our Model Sub Functions structure model

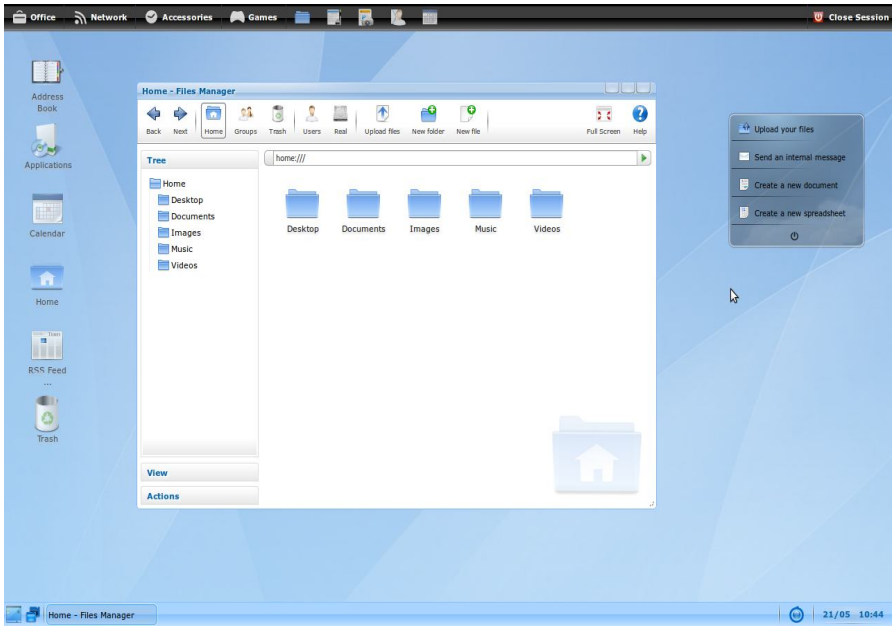

Figure 6 Our Model Layout showing folder and files accessability

As shown in Figure 6 the cloud web OS desktop has a very friendly layout with icons and folders services, which make it easy to use and configure.

4. COMPARED WITH OTHER CLOUD SOLUTIONS

Some difference make our cloud OS has better achievement in term of use than the other cloud OS and applications. These differences can be summarized in the following points:

1. The cloud web OS has a virtual desktop that let the users access their files and photos in folders and icons such as most of the regular OS desktops, while, most of the other cloud applications don't have virtual desktop.
2. The cloud web OS can be accessed from any web browser on PC, Mac, and Linux and also can be accessed from any Mobile device has a web browser. Therefore it can be easily accessed from anywhere at any time.
3. It is easy to develop and add any feature in future to our system. Therefore, any service or application needs to be added in future, should be developed alone then can be added to our cloud web OS
4. As mentioned before there are a variety of application supported in our cloud server such as applications similar to the Microsoft office applications in order to write, or read documents and sheets. Therefore, using the cloud web OS, there is no need to pay license for any product since it's available or we have similar applications in cloud server.
5. The cloud server can also act as router in the internal network via the built in virtual cisco router implemented inside the server. This will save much money by not paying for a very expensive such a router.

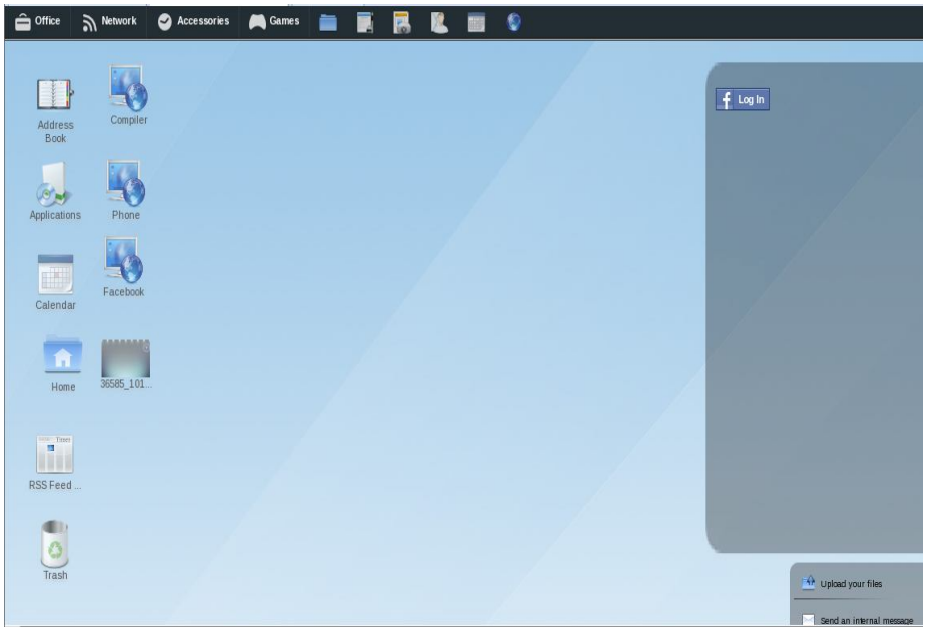

Figure 7 Our cloud web OS Desktop with the Facebook plugins

Apple Icloud Layout [8]

5. CONCLUSION

There are many cloud applications and web OS that become used in various fields recently. Most of these applications are used to synchronies files and photos on different device using a third party device which is the cloud server. Our proposed cloud model is a complete OS web based application that enables the users not only to synchronize their file but also they can manage them at the cloud server side. This cloud web OS can be also used by developer to compile and run Java and C++ applications. It can be also used to edit and update documents, sheets and office applications files. Social web account can be defined on the cloud web OS to simplify the access of the social media web sites. E-mail accounts can be also added on the e-mail software with allowing to make voice call via the VOIP tools implanted inside our cloud system. All of that and more can be added to let the user access the cloud web OS and keep use it, basically, it gives the user all the traditional OS gives to the user. In addition, it can be accessed from any web browser on any device.

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