

Cloud Operating System

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Abstract

Cloud Computing is distinguished in the present world by a large of number of solutions and building blocks. These building blocks are the Operating Systems running on a middleware layers and single virtualized computing environments that try to join the virtualized as well as physical resources. In this paper, the importance and significance of a virtual distributed operating system, a Cloud OS is discussed. A Cloud OS is a medium for unlocking the real potential of the Cloud and it is a computing platform which is provided almost unlimited memory, infinite CPUs and various network resources. A Cloud OS aims to manage the low level resources offered by cloud and hide the details of infrastructure in order to present a high level interface to the application programmers. In addition Cloud OS also provides isolation techniques between various processes of the Cloud and strong incorporation with the resources offered by the network. A Cloud OS is much faster than other operating systems as less CPU specifications are required. It is more scalable and flexible as it has no single point of traffic jam. A Cloud OS is much simpler as it has less line of codes as compared to traditional OS. Various questions like a Cloud OS is a collection of web based applications or traditional OS concepts apply to a Cloud OS or not etc. all these are discussed in this topic.

Keywords

Cloud Computing, Operating Systems, Scalable Operating System.

I. Introduction

In the present world, the computer users are increasing rapidly and their computational requirements are increasing more quickly. They want all the access on their fingertips. All these users have advanced from the mainframes to minicomputers then from mini to desktop and then desktop to laptops. The advancement in these technologies has changed the infrastructure of the computing systems. A few decades earlier, a large amount of space was required for the bulky systems and their storage devices. Today, the physical storage is replaced by invisible and compact storage mediums. For all these technologies, different types of operating systems are generated so as to fully work and integrate with them. Now the technology has revolutionized so much that traditional operating systems are not enough to fulfil the demands of the users. As a result a new set of codes and a new operating system has to be introduced which is up to date and fully agree with the user demands. Then newest class of computational hardware requires a new and well developed operating system which can make users take advantage of increased computational capacity and to simplify their tasks and ease of use (Wentzlaff, et.al. 2010).

Like the traditional operating systems, a new operating system is introduced which is fully capable of satisfying the customer demands and named as a Cloud OS. A Cloud OS is similar to conventional operating systems in managing the resources of computational hardware. In a PC or server, the operating system is responsible for hiding the hardware operations of the chassis, managing the limited resources of hardware and making the best possible use and sharing of these scarce resources. A Cloud OS serves in the same manner but with different hardware specifications. It allows the users to efficiently use all the scarce sources but hide its hardware from them. A Cloud OS hides the infrastructure of the cloud from the application programmers, manages it and coordinate with the sharing of limited resources. However, unlike the normal operating system, a Cloud OS has to do everything with maintaining the balance. Today many of the well known companies have build and developed their clouds like Google, Yahoo, and Microsoft etc. For example it is reported that Google has more than one million servers. The management of these huge infrastructures requires a well developed and scalable

operating system and Cloud OS offer these services (Llorente, 2010, p. 1-2).

II. Cloud OS

A Cloud OS is very similar to a normal operating systems but it differs in managing the underlying resources of the infrastructure. A Cloud OS controls and supervises the complex and widely distributed infrastructure along with the execution of workloads that are virtually serviced (Pianese, 2010). The Cloud OS manages and handles a lot of servers, hardware devices and the services offered by these infrastructures which collectively form a cloud system. This method gives the user the impression that they are operating only a single system with an infinite capacity and speed (Llorente, 2010, p. 1).

The term Cloud OS can be used as a metaphor because it supports atomic computational units on a very large scale, unlike the traditional operating systems supporting only a limited number of computers. The aim and plan of Cloud OS is to offer and supply related and common user interface to the users for the development and deployment of comprehensively scalable functions applications. This Cloud OS manages all the complexities of the widespread infrastructure and provides the users with familiar interface as they are using almost unlimited CPU storage space and bandwidth assigned and allotted by the infrastructure and network of the cloud. The characteristics and attributes of the Cloud OS are an expansion and advancement of the latest operating systems implemented in up to date multicore computers and laptops. A Cloud OS provides simple programming to the application developers and well-built remoteness techniques and methods among the applications and users. The Cloud OS is more focused on the distribution techniques of processes and threads and their execution remotely on an instant rate. A traditional and old operating system is just a piece of software, a set of programming commands which only looks over the present hardware components in the computer. However, a set of distributed and circulated process whose main purpose is the administration and supervision of the resources of the Cloud system is covered by the Cloud OS.

Additional group and set of features and functionalities is provided

by the Cloud OS that provide managerial and executive rights and rights of entry to the assets in the Cloud system. These features include the allocation and reallocation of virtual machines, execution and termination of programs and setup of inter-process communications etc. A normal operating system gives a typical library of structure calls which the software can use to communicate with the hardware. Unlike the traditional operating system, a set of network based interfaces are offered and provided by the Cloud OS so that they can be used by the applications to manage the resources of the Cloud system and post queries related to issues. Traditional operating system consists of a limited number of typical codes and packages of software however a Cloud OS offers a vast support of software for the scalability of different applications and their opportunistic deployment on the cloud system (Bosch, 2010, p. 335-337).

The functions of Cloud OS are management of the network computing and the capacity of the storage devices. Other functions include the making of scalable account on the virtualization technologies to enable the placement of multitier services on distributed infrastructures dynamically. Management of the virtual machines and their life cycles i.e. smoothly executing the virtual machines by the resource allocation required for their proper operating and offering different functionalities that needed for the implementation of the policies of the virtual machine placement. Cloud OS functions also cover the supporting the workload and allocation of policies by being resource-aware like load balancing, capacity reservation and energy efficiency. Other functions of Cloud OS include the correct defining and management of security in virtual machines and storage device, guaranteeing the users that the resources and information being used is utilized properly by authenticate users only with proper isolation between workloads and authorization.

III. Collection of Web-based Applications or not

A Cloud OS is an operating system with similar functionalities like a traditional operating system but on a large scale. A Cloud OS cannot be considered as a collection of web-based applications as web-based applications are a part of this system. These applications help and benefit users to facilitate their selves according to their needs and requirements. There are two kind of applications introduced in the modern world of computing. These are Client-Server Software and Web-Based Applications. The client-server software which is normally considered as “in-house” is specific softwares that are used only in a desktop system or more precisely in a limited network and hardware system. Web-based applications are usually named as “hosted” applications can be accessed from anywhere in the world, provided with a web browser and internet. These applications are controlled by the ASP’s i.e. Application Service Provider and include a vast majority of applications with different specifications. The web-based applications also contain set of codes and commands and certain rules which are to be followed. However, there main and well-known benefit is that the user can access anywhere from the world. These web-based applications have made the modern computing usage very effortless and handy for the users. However, looking at the developer end, these applications are far more complicated to develop than the traditional client-server software. Both kind of software application have some benefits and detriments. However, web-based applications are widely used and appreciated today due to their ease of access and user friendliness. A Cloud OS can be treated as a Web browser operating system as only a web browser

is required to get access to wide variety of applications. However, the Cloud OS, like other and normal operating systems consist of hardware and software supports. The Cloud OS manages a number of servers and storage devices which are far more in quantity than a normal operating system handles. The misconception about the Cloud OS is that it has no visible hardware only virtual access is possible. This belief has created rumours about the Cloud OS that it is a collection of web-based applications however a vast infrastructure is connected to a Cloud OS which makes it more accessible and remote. On the whole, it can be stated that Cloud OS is an advance operating system with web-based applications as its main feature (Clouse, 2011).

IV. Survival of Cloud OS

The operating system consists of hardware and software support to function properly. In a Cloud OS the hardware part is invisible for the end user as all the data of Cloud OS is stored on remote servers place on different locations. The survival of Cloud OS without normal operating system is possible as the Cloud OS only require a web browser and internet for access to the web-based applications. Many conflicts are observed in the survival of Cloud OS as it will be a big failure in the computational world but still approaches are made for its success. After the announcement of Chrome OS—a Cloud OS by Google, according to some analysts it will be failed by a big margin. Still improvements are made in the Chrome OS for its advancement and success. People believe that the computer users are more influenced to save data, music, files in their personal hard drives and a Cloud OS fails to do so. However, Cloud OS gives users a benefit and advantage that they can store their data on the remote servers which are almost unlimited in size and can be accessed from anywhere in the world, provided a web browser and internet service is available. For Cloud OS, light weight cloud computers are also being introduced in which a web browser and music player are available but no hardware storage as all the data will be stored and accessed online. By these cloud computers the traditional desktop computers will receive a low response among the users as in present world no one likes to sit for hours in front of a screen to access and update the data. It can be strongly persuaded that the existence or survival of Cloud OS is possible without traditional operating system (Roush, 2009).

V. Influence of Cloud OS

With computer users and businesses increasingly relying on the cloud computing system, the traditional desktop computer system is becoming less popular and in use. Due to the greater impact of cloud computing, the computers with traditional operating systems are not used nowadays. The Cloud OS has beaten the normal operating systems as mobile devices like smart phones use Cloud OS which directly connect the user to the internet without linking them to normal hardware devices. The Cloud OS are achieving popularity because of their imperceptible infrastructure and ease of access. Only the Cloud OS providers know the complexities and actual infrastructure of these systems however the end user is just profited with their accessibility and mobile usage. Unlike the traditional operating systems no physical CDs or DVDs are required for the installation and up gradation, it only requires new version which are easily accessible on the internet and can be downloaded in short time duration. The operating system needs to boot itself and requires predefined files to be stored in its ROM and Ram to start but a Cloud OS is always ready to use and access, no additional files are required for its booting. The influence of

Cloud OS on normal operating systems is so much high that all the Application Service Providers are moving towards the Cloud OS for their application development rather than making software for the normal operating systems. It can be observed that Cloud OS will supersede the operating system as all the devices are moving towards the internet world and want to stay connected with it all the time (Finnegan, 2012).

VI. Operating System Principles and Cloud OS

The concepts and principles of normal operating systems are still valid and applicable to all other types of operating systems. These principles include the management of data, security, resource allocation and proper hardware usage etc. These concepts are also applied in the Cloud OS as on the backend of the Cloud OS, its infrastructure is much more complicated and complex than of a normal operating system. As Cloud OS consists of a large number of remote servers and access points the management of these resources is very necessary as implemented in the traditional operating systems. The remote and continuous access to the Cloud OS and web-based applications has made it vulnerable to different types of security threats. So like the traditional operating systems, Cloud OS has also to maintain and manage the security of its data which is accessible from everywhere and anywhere. The normal operating system has to manage the resource allocation of its limited hardware in accordance to the software requirements, so as the Cloud OS has to manage these resources as it contains of a lot of resources distributed around the globe. The principles of operating systems like the basic files required the operating system to work properly are also required in the Cloud OS however these files and codes are transparent for the end users. In general, the policies and concepts of traditional operating systems are still applied on the modern Cloud OS, so as to work properly and efficiently, balancing the demands of users and the allocation of resources in accordance.

VII. Significance in Operating Systems

The modern world of computing is being upgraded with the new Cloud OS, which is easily accessible and open. The traditional operating systems require some innovation in them as to compete or overcome the Cloud OS. The mobility and ease of access is the key main feature of Cloud OS which is not available in the normal operating systems. The time consuming start-up of normal and traditional operating systems is a huge drawback in their popularity as the computer users' needs computation on their fingertips and at very fast rates. The time of sitting hours at computers is gone and mobile computing is appreciated. The traditional operating systems need to improve their hardware structure as limited capacity is not accepted by the consumers. The software of operating systems needs to be updated remotely as the applications of Cloud OS are updated over the internet and anywhere from the globe. However, the infrastructure of Cloud OS is much complicated than the normal computer operating system but it is more fast and easily accessible which is deficient in the normal operating systems. The operating systems need to improvise their software and hardware areas so as to compete and surpass the modern Cloud OS.

VIII. Cloud OS Issues

The advantages and benefits of a Cloud OS are almost countless however there are disadvantages and complexities are also connected to them. The Cloud OS are still not so popular like

the traditional operating systems which can be easily found in every home computer. The Cloud OS offers remote access to the user but requires complex set of commands to provide these mobile services. These complex commands are invisible to the end users but are of great significance and lookup factor for the developers as they are the source of Cloud OS. The hardware and infrastructure of a Cloud OS is much larger than normal operating system but it is also very difficult to manage. A variety of applications are required to maintain its scalability as to fulfill the requirements of the consumers. These applications have to consider a lot of factors which can influence the performance of Cloud OS. The web-based applications of Cloud OS are more difficult to develop as the software of operating system is easy to develop. The application developers have to consider various factors in the application development as these applications can be accessed from any mobile device which has its own set of commands and compatibility. The benefits and advantages of Cloud OS are much more than the normal operating systems however its complications and complexities cannot be overlooked (Roberts, et.al. 2011, p. 15-17).

IX. Conclusion

This paper discussed various features of Cloud OS in comparison with the traditional operating systems. Issues focused on cloud computing and desktop computing are also discussed. Cloud OS provides a better environment for modern computing the end users giving them a user friendly environment and ease of access. The complexities and complications involved in the Cloud Os and its web-based applications are also discussed with a brief overview on the hardware specification. Cloud OS unlike traditional operating systems provides a vast number of applications and advantages which are limited in the desktop computing. Cloud computing and Cloud OS has revolutionized the computing world with their remote access and user friendliness.

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