

Cloud Operating System – An Evolutionary Approach

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Abstract— General operating system can be thought of as heavy system software which works as a platform for other application software to run over the existing machine and efficiently utilizing the resources, although conventional operating systems itself consumes heavy system resources such as memory for their operations and disk space for installation. But with the advent of cloud OS the scenario has been changed. Now the operating system requires no more installation. In this paper, we enlighten the evolutionary journey of cloud operating systems and their revolutionary benefits.

Keywords— Conventional Operating System, Cloud Operating System

I. INTRODUCTION

Cloud is not merely the Natural form of Smoke. Now-a-days it is the most Hyped term in the IT sector. It is on the lips of Everyone, Vendors and all are cloudifying their products and Service offerings [1]. Cloud computing provides plenty of benefits to its users [10]. The same is taking place in the field of the Operating Systems; while an operating system is system software which works as a controller as well as resource manager in a system, but consumes a large portion of system resources. Unlike this cloud operating systems are developed to operate on low resources and still giving effective results. Further in this paper we will first emphasize over the functions of cloud OS, differences between conventional operating systems and cloud operating systems. After that we will discuss some types of cloud operating systems and the pros and cons of those. In the end of paper the conclusion is given.

A Cloud OS has a number of functions:

1. *Management of the Network, Computing and Storage Capacity*: Orchestration of storage, network and virtualization technologies to enable the dynamic placement of the multi-tier services on distributed infrastructures

2. *Management of VM Life-cycle*: Smooth execution of VMs by allocating the resources required for them to operate and by offering the functionality required to implement VM placement policies Management of Workload Placement: Support for the definition of workload and resource-aware allocation policies such as consolidation for energy efficiency, load balancing, affinity-aware, capacity reservation

3. *Management of VM Images*: Exposing of general mechanisms to transfer and clone VM Images Management of Information and Accounting. Provision of indicators that can be used to diagnose the correct operation of the servers and VMs and to support the implementation of the dynamic VM placement policies [11].

4. *Management of Security*: Definition of security policy on the users of the system, guaranteeing that the resources are used only by users with the relevant authorizations and isolation between workloads

5. *Management of Remote Cloud Capacity*: Dynamic extension of local capacity with resources from remote providers.

These functionalities of cloud OS are enabled with the following architecture.



Fig.1. The Basic Layout of the Cloud OS

II. CONVENTIONAL V/S CLOUD OS

The primary purpose of operating system is to improve the resource utilization and to provide convenient interface to the user of the system [2]. Unlike conventional operating systems cloud Operating System is a browser based operating system. The difference between cloud OS and general OS is that the general Operating Systems manages hardware and works as a platform so that the underlying hardware can be used efficiently by the application software, while a cloud OS provides the varying platform on which applications run [3].

A machine running on cloud OS has no OS installed on it in real. Cloud operating system is a simplified operating system that allows the user to perform many simple tasks without booting a full-scale operating system. Cloud operating system can be used as a standalone operating system as well as together with other operating systems [4]. Integrating a web browser with OS facilities enables the applications and data “live and run” on the internet rather than that of on hard drives.

Further the differences between full-fledged conventional operating system and a cloud operating system can be summarized as given in the following table:

Table 1. The differences between a cloud OS and a full-scale OS are shown in the table:

S.No.	Features	Cloud OS	Traditional OS
1	Booting time	Approx seconds	Approx 60 Seconds
2	Storage area	Clouds	Hard drive
3	Maintenance Cost	Low	High
4	OS installation Requirement	No	Yes
5	Maintenance concerns	No	Yes
6	Internet connectivity	Mandatory	Optional
7	Hardware requirements	Low	High
8	Application resources	Pooled	Centralized
9	Security Concerns	High	Low
10	Power consumpt	Low	High

A cloud approach on operating systems makes it modular, more portable and convenient to expand. A cloud approach to operating system is a conceptually centralized system having compute servers, data servers and user workstations [12]. A compute server is used as pooled computation machine available on cloud, a data server is an online repository while user workstations are used to provide interface to the applications to run on compute server and data server [5].

III. TYPES OF CLOUD OPERATING SYSTEM

With this technology user can very easily access their own Virtual Desktop from anywhere in the world, without even having any network access to the Remote PC [6]. Today we have plenty of cloud operating systems available such as:

- Glide OS,
- Amoeba OS,
- myGoya OS,
- Kohive OS,
- Zimdesk OS,
- Ghost OS,
- Joli OS,
- Cloudo OS,

- Corneli OS,
- Lucid Desktop OS,
- Eye OS,
- Startforce OS,
- OpenStack Cloud OS,
- Splashtop OS.

Although all these cloud operating systems have more or less same features, we will provide some specifications about a few of them as discussed below:

1. Splashtop OS 1.0

This OS focuses on getting the job done and getting us to the internet quickly. It is highly recommended for those who often need to surf Internet. Sometimes, for checking a mere e-mail we need to boot into our OS which is time consuming, cumbersome, inefficient and slow. Splashtop provides an alternate OS that forgoes other tasks and simply letting one to reach the Internet. It is a light Linux-based OS that aims to provide fast booting, fast power off, and fast operation. It comes in an “exe” installer package, which is just 2MB. Installer automatically adds an entry to the Windows boot loader, allowing the user to select between booting Windows or Splashtop while starting. It boots in just a few seconds after the boot entry is selected, depending upon the BIOS settings.

It uses Google Chrome as the browser and no other option is available. There is no task bar, since the only task we will like to run will be our Browser. There is no minimize and close button on the browser, no desktop with any icons, there is only one maximize/restore button that can be used while working with multiple windows [7].

2. Amoeba OS

It is an advanced Online Operating System, which allows user to create free account and login to their account in order to get access to some great applications like Shutterborg, Exstream and Surf.

3. myGoya OS

It is a free online Operating System, which allows accessing the Personal desktop which includes E-mail, chat, file sharing, calendar and an Instant messenger from anywhere in the world through Internet. It also manages Contacts from anywhere in the world.

4. Kohive OS

It is an online desktop, where we can co-hive with others. It is perfect for the freelancers, small businesses, students and to the groups having similar interests.

5. Ghost OS

It offers secure and personal computing from any device. Its web interface is very simple and easy to use, which lets us:

- To manage files and folders easily and quickly,
- To upload data of any type to our cloud storage from any device,
- To view and edit any of our files in any browser,
- To share files and documents instantly with any friend just by sending a link,
- To browse our file and folder from our cellular device,
- To move files between our local hard disk and Cloud file.

6. Joli OS

It provides an easy way to turn any old computer (up to 10 years old) into a new Cloud device. Simply get on to the Web and instantly connect to all our web applications, files and services with the computer we already own.

7. Zimdesk OS

It is our computer on the Web i.e. the entire functionality of a PC – online. It does not have anything to install. The only thing which we need to access our desktop, files and favorite applications is a Web Browser and Internet Connection. It lets us to access our data anytime from any PC from anywhere.

IV. ADVANTAGES OF CLOUD OS

Cloud OS provides plenty of benefits to the user. Some of the main benefits of using cloud OS are as following:

A. *Fast booting:* A cloud OS can boot within a few seconds

B. *No concerns about updates:* A cloud OS is specifically designed and suited for web based applications, as it is always connected to its server where the OS actually resides, the user has to have no concern about any type of updates.

C. *No concerns to buy software:* A cloud OS does not have to buy any software as it runs on the server.

D. *24/7 data availability:* In a cloud OS everything is stored on clouds rather than in your computer. So you can access all your data while travelling far from

workplace and even in case of loss of your computer or laptop.

E. *Reduced maintenance cost*: As the updates and maintenance is done by server side in cloud OS; there is no need for IT maintenance. Even the use of new hardware needs just turning on new machine and logging in.

F. *On-demand scaling applications*: The cloud OS makes use of on-demand feature of cloud computing and reduces purchasing and maintenance efforts.

V. DISADVANTAGES OF CLOUD OS

Although Cloud OS has no serious flaw, still there are some concerns about it. Some of main concerns of Cloud OS technology are as follows:

A. *Concerns about connectivity*: In case of Cloud Os everything is stored in the Cloud, so the user has to concern about connection to server. If the connectivity drops due to any of the reason i.e. dead zone or limited coverage, the user will have nothing in his hands.

B. *Limited file management*: A cloud OS supports limited file management operations due to browser compatibility constraints.

C. *Security and privacy concerns*: As everything is stored on clouds, the user may concern about the privacy of his documents. Although the service providers are committing to provide complete security and privacy of users' documents and files on clouds.

D. *Lack of proper VPN support*: the cloud operating systems are not still fully supported by all virtual private networks.

E. *Lock in*: the cloud operating system services are infected by "Hotel California" syndrome which offers check in services, but no options for check out.

VI. CONCLUSION

Cloud operating systems do not have a clear and complete definition in the literature yet, which is an important task that will help to determine the areas of research and explore new domains for the usage of the Clouds and the various applications. To begin this problem, the main available definitions extracted from the literature have been analyzed to enlighten the evolutionary journey of cloud operating systems and their revolutionary benefits.

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