AN OVERVIEW OF OPEN SOURCE SOLUTIONS IN CLOUD COMPUTING

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Abstract: - In these days, cloud computing is an emerging solution for cooperates as well as individuals. Cloud computing allows to share resources over internet. It shall be very useful to quick start work. This model motivated many academic and industrial institutions to develop open source cloud solutions. Open source solutions are very useful for hobbyist, individual researchers as well as for industries. This paper present and discuss about various open source cloud solutions

Keyword: - Cloud computing, open source, SLA.

I. Introduction

In present days, it is very common to access content and resources over internet which is serviced by different vendors, that can rented according various service level agreement (SLA) policies of vendor's and cloud auditors. Cloud technology is used to provide high standard infrastructure with locality and transparency. In a cloud model, enterprise hosted their application and services in the cloud. Cloud model impose a significant role in reduction of infrastructure since cloud computing allows resources to be provisioned according to the enterprise requirement. In the traditional practices resources are often arranged according to the worst case and peek requirements [1, 2]. Thus cloud users can rent resources as they become necessary in a scalable and elastic way. Moreover, an enterprise can transfer their operational risk to cloud service provider as they are managed by service provider itself. Although cloud computing has a wide area of its applications in present but there is no formal definition for cloud computing [1, 2].

II. Challenges in cloud computing model

The development of a cloud computing model brings various technical challenges together for cloud developers. These challenges can be grouped in three main categories. In first category the challenges are related to how the application developers interact with the cloud as well as the programmability level that the cloud solution will offer. In the second category the challenges are related to how virtual machines are scheduled to meet user requirement. In third category challenges are associated enforcement of decisions and the communications between cloud elements [1, 2].

III. Open source cloud computing solution

With the rapid growth and acceptance of cloud computing enforce academic and non-academic organization to develop cloud computing solution, since there are various cloud computing solution available in which some are commercial or priority solution and some are open source solutions. This paper focused on main features and architecture of open source cloud computing solutions [1, 2].

1. Xen Cloud Platform (XCP)

The Xen hypervisor, developed by citerix systems, is a solution for infrastructure virtualization that provide an abstraction layer between hardware, operating system and servers. A Xen hypervisor allows each physical server to run several "virtual servers" handling the operating system and its applications from the underlying physical server. The Xen solution is used by many cloud solutions such as Amazon EC2, Nimbus and Eucalyptus [3, 4, 5].

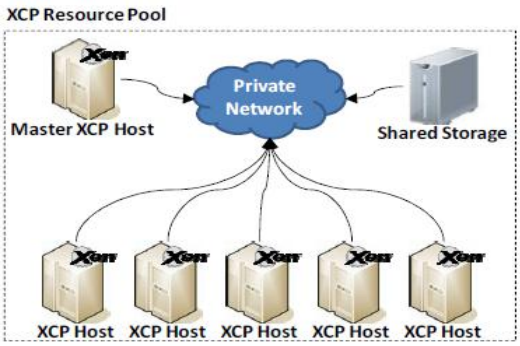

Figure 1: - XCP Architecture.

2. Nimbus

Nimbus (licensed by Apache) is an open source cloud solution used to turn clusters into an Infrastructure as a Service (IaaS) for cloud computing model. It is mainly focus only on scientific computing applications. Nimbus allows users to remotely allocate and configure resources by deploying virtual machines. This is known as Virtual Workspace Service (VWS) [6].

The components of workspace are shown in figure given below.

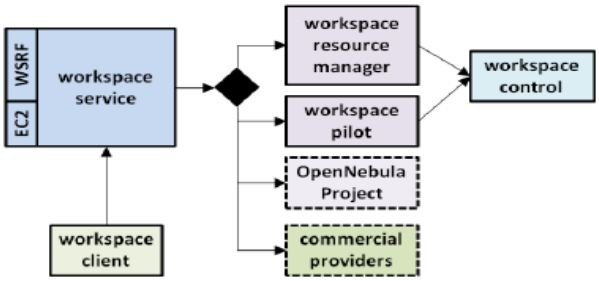

Figure 2: - Components of Nimbus Workspace.

3. OpenNebula

OpenNibula is a open source cloud computing solution which is used to build public, private and hybrid cloud. It is mainly designed to be integrated with networking and storage solution. The OpenNebula architecture is based on three basic technologies, virtualization, storage and network, to enable the provision of services on a distributed infrastructure [7]. The architecture of OpenNebula is shown in figure given below.

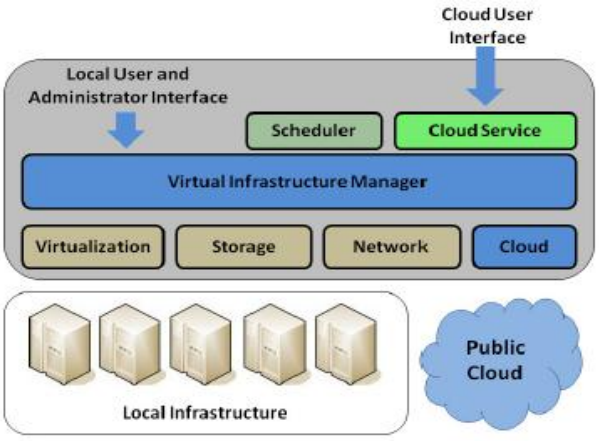

Figure 3:- The OpenNebula Architecture.

4. TPlatform

The TPlatform is a open source cloud computing solution which provides a web mining application development platform. This is a Platform as a Service (PaaS) solution. TPlatform is used in Google Cloud technologies. Their infrastructure is supported by three technologies: a scalable file system called Tianwang File System (TFS) what is similar to the Google File System (GFS), the BigTable data storage mechanism, and the MapReduce programming model [8]. The architecture of TPlatform is shown in figure given below.

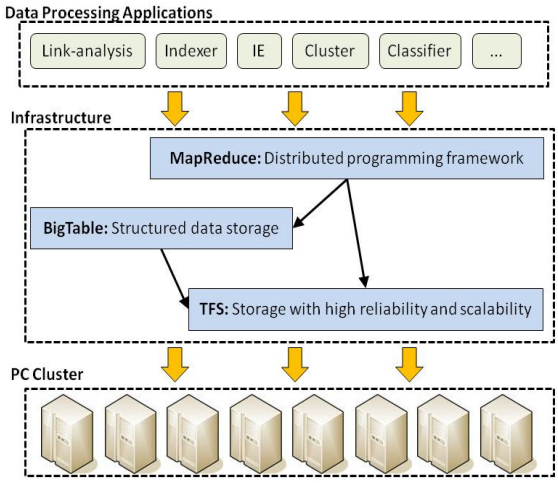

Figure 4:- The TPlatform Architecture.

5. Apache Virtual Computing Lab (VCL)

The Apache Virtual Computing Lab (Apache VCL) is an open-source solution for the remote access over the Internet to dynamically provision and reserve computational resources for diverse applications, acting as Software as a Service (SaaS) solution. VCL has a simple architecture formed by three tiers as listed below [9] –

- ✓ Web Server.
- ✓ Database Server.
- ✓ Management Node.

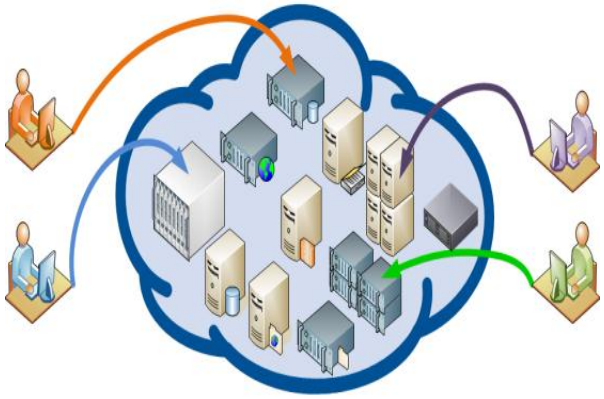

Figure 5: - The Apache VCL conceptual overview.

IV. Conclusion and future work

With the above discussion, it can be concluded that there are various open source cloud computing solution available, they can be used to make public, private and hybrid cloud models, in different layers of cloud service models i.e. IaaS, PaaS and SaaS. Although all cloud computing solutions are standardized but they are different in terms of interface, negotiation and access through web. There is a clear need for the standardization of current cloud platforms.

V. References

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