Integrated stack testing: securing enterprise web applications

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Abstract-: *Recently, many Infrastructure and communication Service platforms avilable. stack Consumer, Developer and stack Providers needs to make decision about which platform is well suited for them. Since, last decades open-source technology help people who do not wish to use commercial infrastructure for stack. Among them different open-source platform OpenNebula, Eucalyptus, OpenStack and CloudStack are the platform which have been majorly used stack management platform and also alternatives of commercially provided stack. Here, we compare and analyzing OpenNebula, Eucalyptus, OpenStack and Cloud`   stack platform. These all   are providing infrastructure as a Service. In this paper we start with short summary of feature set of these projects. And after that we do detailed analysis of different software packages and describe how these stack management platforms relate to other . Here, we also analyze overall architecture of component stack management platforms and refer differing features.*

Keywords: - **OpenNebula, Eucalyptus, OpenStack, Cloud Stack, stack Management Platforms.**
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I. INTRODUCTION

The cloud computing is a very broad area and it covers about each and every online service. "cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."[1]. There are usually three models of cloud service under consideration, Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS).

1. Software as a Service (SaaS): Is the model in which an application is hosted as a service to customers who access it via the Internet. When the software is hosted off-site, the customer doesn't have to maintain it or support it. Applications of SaaS include

2. Platform as a Service (PaaS): Is another application delivery model. PaaS supplies all the resources required to build applications and services completely from the Internet, without having to download or install software.

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3. Infrastructure as a Service (IaaS): It is comprised of highly automated and scalable compute resources, complemented by cloud storage and network capability which can be self-provisioned, metered, and available on-demand [2]. Main difference between SaaS, PaaS and IaaS is shown by figure 1.

Fig.1-: Difference between cloud services

Here, in this paper we only concentrate on IaaS Platform. Single processor can't perform heavy computation efficiently. For heavy computational jobs we require hundred or even thousands of cores, different paradigms have been developed for harnessing the computation power of large group of processors. The two biggest project LHC (Large Hydrogen Collider) and SGE(Sun Grid Engine)[3] have their own infrastructure for IaaS platform and require very high computation of data.

II. STANDARDS OF CLOUD COMPUTING

Large companies require that cloud-computing platforms meet the highest standards of services. To meet these requirements seven standards have been developed for clouding computing these are [4, 5].

1. Security – Providing world class security using different algorithms   and techniques to each and every level of cloud environment.

2. Belief and transparency – Providing transparent environment and availability information. Services are delivered on real-time basis with high performance

3. Accurate multitenancy – Providing maximum scalability and performance to satisfy the requirement of the customers with a true multitenant architecture.

4. Confirmed scale –Providing Support for the millions of users with confirmed scalability.

5. Great performance –Providing reliable and high-speed performance globally.

6. Disaster recovery – Providing several techniques for protecting data of customer by several data centers. Providing backup, data archive recovery form failover.

7. Availability – Providing excellent infrastructure and equipment for high-availability of the application to the user.

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III. GENERIC ARCHITECTURE OF CLOUD COMPUTING PLATFORM

In generic architecture of cloud computing system we have six basics components

1. Hardware & Operating System

2. Network includes DNS, DHCP & Subnet organization of the physical machines and it depends based on different cloud management platforms.

3. Hypervisors Sits between operating system & virtual machines. Different types of hypervisors are Xen, KVM & VMWare etc.

4. VM Disk Images

  I. Template Disk Images: Used for creating multiple VMs on the cloud platform.

  II. Run-time Images : Actually used by Virtual Machines at run-time.

5. Front-end user interface. There are basically two types of interfaces Cloud provider/administrator and cloud consumer are those who request for virtual machines.

6. Cloud Management Platforms (CMPs) like OpenNebula, Eucalyptus, OpenStack, CloudStack. The CMP provides the interface at the front-end, uses the disk images from the repository signals VMM(Virtual Machines Manager) to set up VM & then signals DHCP & IP Bridging program to setup MAC & IP address for the VM
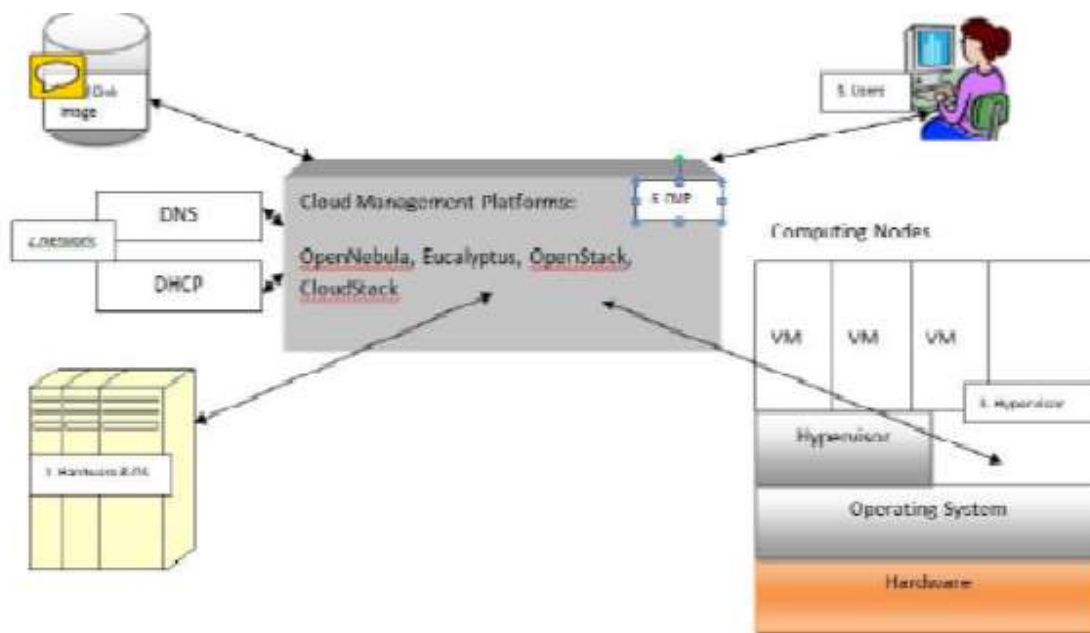

Figure 2-: Generic Architecture of Cloud Management Platforms

IV. OVERVIEW OF OPENNEBULA, EUCALYPTUS, OPENSTACK AND CLOUDSTACK

A. OpenNebula is an open source manager of virtual infrastructure [6], able to build private, public and hybrid clouds. OpenNebula offers flexible architecture, interfaces and components that could be integrated into any data center. This tool supports Xen, KVM and VMware and access to Amazon EC2s. OpenNebula was designed to be integrated into any network and storage solution. OpenNebula manages the storage, networking and virtualization technologies to enable the

establishment of dynamic multi-level services (groups of interconnected virtual machines) on the distributed infrastructure, combining the resources of physical machines and cloud distance, based allocation policies OpenNebula consists of three components [7]

B. Eucalyptus Eucalyptus commands can manage either Amazon or Eucalyptus instances. Users can also move instances between a Eucalyptus private cloud and the Amazon Elastic Compute Cloud[8] to create a hybrid cloud. Hardware virtualization isolates applications from computer hardware details. [9]

C. OpenStack OpenStack is a global collaboration of developers and cloud computing technologists producing the open standard cloud operating system for both public and private clouds. Cloud service providers, enterprises and government organizations can take advantage of the the freely available, Apache-licensed software to build massively scalable cloud environments. OpenStack currently consists of three core software projects: OpenStack Compute (code-name Nova), OpenStack Object Storage (code-name Swift), and OpenStack Image Service (code-name Glance). These projects, along with a vibrant ecosystem of technology providers and future OpenStack projects underway, deliver a pluggable framework and operating system for public and private clouds [10].

D. CloudStack A CloudStack installation consists of two parts: the Management Server and the cloud infrastructure that it manages [11].

V. COMPARISON OF OPENNEBULA, EUCALYPTUS, OPENSTACK, CLOUDSTACK

Based on Cloud Computing Perspectives [12]
1. Developer Perspective-: i. Development Model ii. Development Engagement iii.Governance Model.
2. User Perspective: There will be two types of user perspective one is from the "Cloud Consumer" and other is "Cloud Builder"   i. API Ecosystem ii. Production Readiness

	OpenStack	CloudStack	Eucalyptus	OpenNebula
Development Model	Public development	Public development	Public development	Public development
Developer Engagement	Contributor license agreement	Contributor license agreement	Contributor license agreement	Contributor license agreement
Governance Model	Foundation	Technical meritocracy	Benevolent dictator	Benevolent dictator
API Ecosystem	OpenStack API	Amazon API	Amazon API	Amazon API
Production Readiness	No, only available through any of the several vendor specific "stacks"	Enterprise-ready and direct support from developers	Enterprise-ready and direct support from developers	Enterprise-ready and direct support from developers

TABLE 1 CLOUD COMPUTING USER PERSPECTIVE

CONCLUSION

When study of different open source cloud management platforms, we observe that there are different concept involve while designing the Cloud Management Platforms. OpenNebula and CloudStack is more towards the Datacenter Virtualization and Eucalyptus and OpenStack is more towards the infrastructure provisioning. Among all four CMP's OpenNebula is more flexible compare to all other platforms. Also it is possible to do so much of customization and ongoing development makes it accurate behind the statement.

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