Implementing Authentication in an Openstack Environment - Survey

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Abstract – Analyzing the implementation of private cloud and Openstack authentication is necessary to work in an Openstack environment. Private cloud is implemented using Openstack and the aim is to provide a better performance in using Openstack and focus is on the underlying infrastructure on the performance of private cloud deployment. This Openstack is highly beneficial for the Research Centre Communities and Organizations that do not have enough funds in deploying high grade cloud services.

Keywords: Openstack, private cloud, Security, Authentication

I. INTRODUCTION

In cloud computing Resources like Storage, Network, Software and computing power were provided to the users as services and were available in an Internet in an accessible fashion. OpenStack is a pack of open source software that service providers can use to setup and run their cloud compute and storage infrastructure [6]. It also offers greater control to users over cost and performance in the storage environment. It is used to build private cloud which is dedicated to single organization provided with high security and privacy. This private cloud is also capable of providing Infrastructure as a Service (IaaS) where the computing resource is provided specifically, computing hardware and Software as a Service (SaaS) where the users can access the software applications over the internet and it can be beneficial to both an organization and personal users. One of the important paradigm in cloud computing is importance of authentication as this is to confirm that to whom we are communicating with. Authentication works effectively in private cloud where users log on via a private virtual network as on a local corporate network [4].

A. Openstack:

Openstack is cloud platform and it is an open source available easily to the users and users can deploy it as an Infrastructure as a service and Software as a service [3]. It consists of pooled resources like Storage, Networking and processing throughout a datacenter which users manage through a web based dashboard. There are various components in an openstack, each one provides different capabilities and services accordingly.

Few major components of an Openstack includes [3],

- Nova- Used to provide Virtualization
- Glance - Image service used to store backups
- Swift- Object storage system used to store objects and files providing scalability and to ensure data integrity and data replication
- Keystone- An Identity service used to check for an Authentication
- Neutron- Openstack Networking system to manage the networks and IP addresses
- Trove-To provide Database as a service.

B. Setting up a Private Cloud:

A cloud is called “Private” cloud and that is not for open use to public, is only dedicated to a single Organization whether it can be managed internally or by third party and hosted internally or externally. A private cloud is to be designed in such a way that some of the objections regarding cloud computing security are avoided as it is implemented within a corporate firewall. The main difference between Traditional data center computing and private cloud is that “Infrastructure” is focused in traditional data center computing whereas “Service Delivery” is focused in a private cloud.

Few important benefits in private cloud are as follows,

![Benefits of Private Cloud](image)
C. Authentication in a Private Cloud:

In general Authentication is one of the main concepts in cloud computing to ensure the security. [2] The functionality of IdAM (Identity and access management framework) is establishing identity through the process of authentication, for example requiring a user to enter a user name and a password. These credentials are then checked with an authentication mechanism, typically by using some form of hashing algorithm so that the user’s password is not transmitted across the network.

A token is generated if the authenticating mechanism validates the user credentials. [2] This token may contain information about the user and the groups of which that user is a member.

Nowadays all companies are migrating to cloud computing to ensure secure problems to be implemented. Corporate concerns of private cloud are as follows;

- Single point of failure for an Authentication

Weak Authentication leads to Data breaches. Private cloud is best for businesses as it provides dynamic computing needs that require direct control over their environments [5].

II. LITERATURE REVIEW

A. Cloud Operating System Trends

In this paper cloud operating system [9] is described which runs a web browser, providing access to web based applications. This helps the users to access easily and also without booting a full scale operating system, simple tasks can be performed. This simplicity enables cloud to boot quickly. The main focus is to design operating system for mobile and PC to browse the Internet and the requirements for a cloud operating system is collected to provide resource management options to facilitate the cloud programming. It is known fact that Traditional OS is to manage the hardware devices in a computer and acts as an interface between user and a computer whereas Cloud operating system is to manage the cloud resources and also by the cloud operating system virtual machines can be allocated and deallocated, migrating the processes and setting up an Inter process communication.

B. Prototype for Private Cloud Implementation

The main objective is to set up a private cloud by using Opensource platform to provide Infrastructure as a service, where users were offered visualized computing resources. [12] Deployment should provide Graphical Interface to access the cloud based resources. The scope is to check for the applications whether they are properly installed and to analyze the performance of applications in cloud Infrastructure. It is observed that applications already running in a non-cloud environment can be migrated to private cloud environment and there was no performance degradation. One can manage the various services using openstack dashboard and in openstack flavors page instances can be launched where Services includes launching different flavors of Instances, Images, service.

C. OpenID Authentication as a service

One of the largest open-source Cloud Computing middleware developments is Openstack which supports platform for user authentication. The main aim is to develop a cloud platform as independent and decentralized framework for user authentication.

[7] In front end OpenID authentication is used as a service to perform authentication and in the back end single Policy Decision Point (PDP) is used. The result is ability to shift the dual points of decision making and performing authentication in single PDP in the back end. Design was successfully made using openstack and openstack authentication service is implemented from the Dashboard.
D. Open source cloud for organization
The main goal is to build up a private cloud using openstack for small and midsized organization without high cost to paid to cloud service providers like Amazon services.[11]Cloud Infrastructure to be managed and deployed without high availability .And also this paper also describes the deployment of cloud Infrastructure where users were provided tools to create and manage virtual machines over the existing resources.This Openstack is highly beneficial to the communities,Organizations and Research Centers if they do not have enough funds to deploy high standard cloud services at their own place so that many of the users get benefitted.

E. Security vulnerability Assessment
In this paper few challenges that are raised in deploying opensource cloud was mentioned, That is Intruders can able to access the open source cloud so by deploying the patch certain security vulnerabilities need to be secured. [10]The related work is managing the services and evaluating the performances and security challenges .There are so many security threats in various cases includes Application Integrity, Identity Management, Networking, Virtualization, Data Protection .It was evaluated that Openstack Multi -Tenant environment raises new security vulnerability risks both for the Tenant and cloud provider inside the cloud.

F. Virtual Infrastructure or Dedicated Hardware
Deployment of multiple virtual machines on a single physical machine enhances the reliability and reduces power consumption and also helps in resource utilization. [8]Virtualization is considered to be most important as it distributes On-Demand resources to the consumers in a cost effective and efficient manner. With the help of using Virtualization cloud administrators able to manage the infrastructure flexibly by enabling scaling up and down the utilization of physical resources. The experimental setup includes deploying two separate test beds of openstack which is one on virtual environment “Controller Node” and another is providing computing service and acts as “Compute Node”. The performance of Openstack on both virtualized and Non-Virtualized architecture is studied and in order to measure the performance of openstack in terms of computation three basic tests of “ ” were performed and it was analyzed that deployment of Openstack on dedicated hardware performs better than on virtualized environment, This means that in during computational resource usages comparing to One Level Virtualization, Two Level Virtualization induces significant performance overhead.

G. Building Private Cloud
[1] In this paper the cloud computing and openstack platform is described and experimented; all the users can access the cloud services dynamically over an internet. Two types of cloud which are private and public cloud is described .The discussion on creating a private cloud using openstack platform and operating system is done and also the implementation of private cloud using open source software where private cloud provides Infrastructure and platform service, Implementation of the private cloud should be able to launch images and instances with the help of OpenStack dash board and user can manage various OpenStack services using openstack Horizon.

### III. COMPARISON TABLE

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<th>DESCRIPTION</th>
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<th>DISADVANTAGES</th>
<th>PERFORMANCE EVALUATION</th>
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<tr>
<td>I</td>
<td>“Trends in Cloud Operating System”</td>
<td>Main focus is on requirements and characteristics of cloud operating system. Providing quick and transparent access for the developers to a scalable computing and networking environment.</td>
<td>To Realize the potential of cloud computing, Detailed abstractions is needed.</td>
<td>Implementation of cloud kernel processes.</td>
<td></td>
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<td>II</td>
<td>“A prototype for private cloud Implementation using Open-source platform”</td>
<td>Providing IaaS service delivery model by setting up a private cloud. Applications running in non cloud environment can be migrated to private cloud environment without performance degradation.</td>
<td>Only few components of an openstack is included for an applications.</td>
<td>Applications run on virtual machines dynamically by cloud Infrastructure.</td>
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<tr>
<td>III</td>
<td>“OpenID Authenticatio n As A Service in OpenStack”</td>
<td>Using OpenID as an Open-source authentication mechanism, Independent and flexible cloud</td>
<td>Usability is to be improved.</td>
<td>Shifting the Decision making dual points and performance in an Authentication.</td>
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</table>
### IV. Conclusion

The survey on how to build private cloud using open source software and features of OpenStack platform and its capabilities, services provided to the users in various phases has been done and the issues regarding security and authentication was analyzed. Nowadays most of the companies were migrating their services to cloud computing as it become popular in their service delivery and for its importance and this survey helps to know about the real cloud environment.

### REFERENCES


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