

Performance Evaluation on Private Cloud using UEC & EUCALYPTUS

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Abstract—Cloud computing is emerging at the following three major trends — service orientation, virtualization and standardization of computing through the Internet. Cloud computing enables users and developers to use services without knowledge of, nor control over the technology infrastructure that supports them. In this era, Private cloud is now became popular by achieving a great efficiency of resources as well as improved to manage IT resources and services within an enterprise or organization. Cloud Storage is an attractive concept in IT field since it allows the resources to be provisioned according to the user needs. In private cloud resources are provided over intranet within an organization. In the studied research paper the implementation steps of private cloud is given. In this Paper, first we have to establish a private cloud and then we are going to measure the performance factors that is CPU, Memory Usage using System monitoring tools so that it gives the better evaluation under different circumstances of deployment of private cloud .After implementing this, We will capable to measure performance factors on private cloud.

Key words: CPU, Eucalyptus, euca2ools, UEC, Virtualization

I. INTRODUCTION

Cloud Computing represents a strategic generational shift in how IT operates. It is a model promising more efficient use of hardware resources through virtualization. Cloud Computing is a web processing with large amount of resource. The user of the cloud can obtain the service thought network (in both internet and intranet).

Cloud computing is a computing environment, where resources such as computing power, storage, network and software are abstracted and provided as services on the internet in a remotely accessible fashion.

There are four main type of cloud:

- 1) Public cloud: The cloud computing resource is shared outside, anyone can use it and some payment maybe need.
- 2) Private cloud: It is opposite to public cloud, private cloud's resource is limit to a group of people, like a staff of a company etc.
- 3) Hybrid cloud: this is a mixture of previous two clouds, some cloud computing resource is shared outside but some don't.
- 4) Community cloud: this is a special cloud to make use of cloud computing features. More than one community shares a cloud to share and reduce the cost of computing system.

Private cloud refers to a cloud infrastructure that is internal to an organization and is usually not available to the general public. A private cloud infrastructure is normally operated and managed by the organization that owns it. In this, we are using Ubuntu OS & EUCALYPTUS open source tool for developing a private cloud. Eucalyptus

highly relies on the Virtualization technology. The cloud usually provides a virtual machine to the user and a physical machine can run more than one virtual machine (instance). Users can run self-created images (operation system with self-provided application) or provided default images. The architecture has many advantages:

A physical machine can play the rules of different operation systems, and less physical machines are needed in the network. This greatly reduces the budget of computer system set up. Eucalyptus tool has the following characteristics:

- Auto-Scaling - Allows application developers to scale Eucalyptus cloud resources up or down in order to maintain performance
- Elastic Load Balancing - A service that distributes incoming application traffic and service calls across multiple Eucalyptus workload instances, providing greater application fault tolerance.
- CloudWatch - A monitoring tool similar to Amazon CloudWatch that monitors resources and applications on Eucalyptus clouds.

A. Need & scope

1) Need:

The cloud does seem solve some long-standing issues with the ever increasing costs of implementing, maintaining, and supporting an IT infrastructure that is seldom utilized anywhere near its capacity in the single-owner environment. There is an opportunity to increase efficiency and reduce costs in the IT portion of the business and decision-makers are beginning to pay attention. For the private cloud, find out the better evaluation under different circumstances of deployment of private cloud is an important factor so that the user have clear picture where we can deploy private cloud and in what condition it is helpful.

2) Scope:

The scope of the above cited thesis title is applicable in all private organizations & all educational institutes. After implementing this, we are capable of measuring performance factors on private cloud. It gives the better evaluation under different circumstances of deployment of private cloud for the educational institute & all private organization.

B. Purpose:

The main purpose of cloud computing to share the computing resources over the internet as a services on pay per use basis. Resources may be HW, SW, Application as well as Platform. Private cloud is the phrase used to describe a cloud computing platform that is implemented within the corporate firewall, under the control of the IT department. A private cloud is designed to offer the same features and benefits of public cloud systems, but removes a number of objections to the cloud computing model including control over enterprise and customer data, worries about security

II. LITERATURE REVIEW

Cloud computing can be the ability to use applications on the Internet that store and protect data while Providing a service anything including email, sales force automation and tax preparation. It can be using a storage cloud to hold application, business, and personal data. And it can be the ability to use a handful of Web services to integrate photos, maps, and Web browsers. Clone it ten times to meet a sudden workload demand.

A. Study of Research Paper

1) Alina Mădălina Lonea "Private Cloud Set up Using Eucalyptus Open Source" V.E. Balas et al. (Eds.): *Soft Computing Applications, AISC 195*, pp. 381–389, Springer-Verlag Berlin Heidelberg 2013, springerlink.com

This paper presents the experience of deploying a private cloud using Eucalyptus open source. It identifies the similarities and differences between cloud computing and other technologies. The paper is also providing a useful section with the encountered and solved problems in the Eucalyptus framework, with the purpose to help the researchers who will be interested to work with Eucalyptus. This paper also this paper reveals the euca2ools operations

2) K.Thilagavathy,S.Vasantha "Private cloud in educational institutions: An Implementation using UEC" *International Journal of Computer Applications(0975-8887,Vol 78-No.1,September 2013)*

This paper tries to address the challenges towards Public Cloud and possible alternative, that is a "Private Cloud". This paper also emphasis the advantages of moving to Private Cloud and describes how to set up Private Cloud in an Educational Institution. Educational institutions such as Schools, Colleges. This paper also describes how to access a database server stored in the cloud node to benefit the end users within the Institution

3) Dr. Rahul Athale, Nandan Mirajkar "Implementation of private cloud using eucalyptus and an open source Operating System." *IIT Center of excellence for advanced education and research.*

This Paper describes implementation of Private Cloud using open source operating system Ubuntu 10.04 server edition, installation of Ubuntu Enterprise Cloud with Eucalyptus 1.6.2 and providing CentOS 5.3 operating system through cloud. In this paper it also describes implementation of a private cloud for an organization providing Infrastructure as a service (IaaS) and providing operating system as Platform as a service (PaaS).

4) Prof. R.T. Nakhate , Prof. S.G. Gandhi "Survey paper on Cloud Computing" *International Journal of Scientific and Research Publications, Volume 3, Issue 12, December 2013 ISSN 2250-3153*

This paper describes the understanding on cloud computing as a technology for a new era. Its potential is considered so vast that it is surely going to give up a new dimension for the generation to come. IT organizations can choose to deploy applications on public, private, or hybrid clouds, each of which has its trade-offs.

B. Problems in Existing

In the above all research paper, the implementation of private cloud is discussed in an open source platform[1] using some tools but the factors that affect the performance

while deploying this is also has to be calculated so we better judge the evaluation under different circumstances of deployment of private cloud that is the CPU performance , Memory and networking aspects.

III. PROBLEM DOMAIN & PROPOSAL

A. Problem Domain

The domain of private cloud is a complex and broad domain. To implement a private cloud is the challenging task. To implement a service that is IAAS, PAAS[3], SAAS on that private cloud is again a challenging task. Evaluation of CPU, Memory & Network Usage. The virtual machine images are available in the cloud and upon user request; its instances are created and run. Services were included successfully and made available to the user so when this instance create how much it affect the system performance?

B. Objectives

Installation and configuration of cloud Server[3].

Setup and configure Node Server[3].

Measure the Performance factor.

CPU, MEMORY Usage.

C. Proposed Solution

The proposed work of implementation of private cloud and measure the performance factors, we involve the following work under our solution domain.

- Implementation of Private Cloud Server
- Install Ubuntu Server 10.10
- Install Ubuntu Enterprise Cloud(UEC).
- Installation of Eucalyptus tool.
- Implementation of Node Server.
- Setup & Configure.
- Implementation of Client Machine
- Measurement of performance factor on Cloud server Using System Monitoring tools.

D. Proposed Architecture

1) UEC Architecture

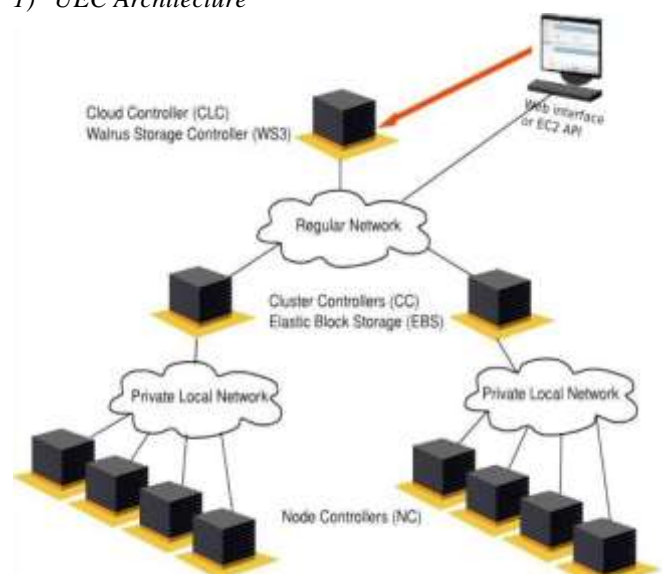


Fig. 1: Architecture of Ubuntu Enterprise Cloud
Ubuntu Enterprise Cloud UEC, is a private cloud set up for developing its our own IT infrastructure. UEC comes up

with many open source software and Eucalyptus is one among them and it makes the installation and configuration of the cloud easier. The basic architecture of UEC consists of A front end which runs one or more Cloud Controller (CLC), Cluster Controller (CC), Walrus (WS3), Storage Controller (SC) and One or more nodes. The architecture of UEC is shown in Fig 3.1. A CLC manages the whole cloud and includes multiple CC's. There will be a WS3 attached to a CLC. A CC can contain multiple NC's and SC's. Ultimately the VM's will be running in the NC making use of its physical resources.

Eucalyptus (Elastic Utility Computing Architecture for Linking Your Programs To Useful Systems) was released in May 2008. Eucalyptus software is available under GPL (General Public License) that helps in creating and managing a private or even a publicly accessible cloud.

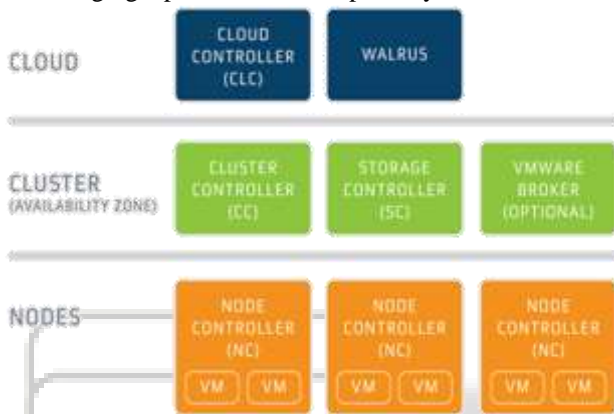


Fig. 2: Architecture of Eucalyptus

Hardware	Server 1		Server 2		Client1	
	minimum	Suggested	minimum	suggested	minimum	suggested
CPU	1 GHz	2*2 GHz	VT EXT ENSI ON	VT,64 BIT, MULTI CORE	VT EXT ENSI ON	VT,64 BIT, MULTI CORE
MEMORY	1 GB	2 GB	1 GB	4 GB	1 GB	2 GB
DISK	5400rpm IDE	7200rpm SATA	5400rpm IDE	7200rpm SATA or SCSI	5400rpm IDE	7200rpm SATA or SCSI
DISK SPACE	40 GB	200 GB	40 GB	100 GB	40 GB	100 GB
NETWORKING	100 Mbps	1000 Mbps	100 Mbps	1000 Mbps	100 Mbps	1000 Mbps

Table 1: Hardware Requirement

2) Software Requirements

- Operating System : UBUNTU SERVER 10.10
- Tools : Ubuntu Enterprise Cloud, Eucalyptus
- Other Skills: Knowledge of networking, Linux commands.
- Other facilities: Internet on server machines.

IV. SIMULATION TOOL

A. Gnome System Monitor

Gnome System Monitor is a GNOME process viewer and system monitor with a nice easy-to-use interface, It has some nice features, such as a tree view for process dependencies, icons for processes, the ability to hide processes that you don't want to see, graphical time histories of CPU/memory/swap usage, the ability to kill/renice processes needing root access, as well as the standard features that you might expect from a process viewer.

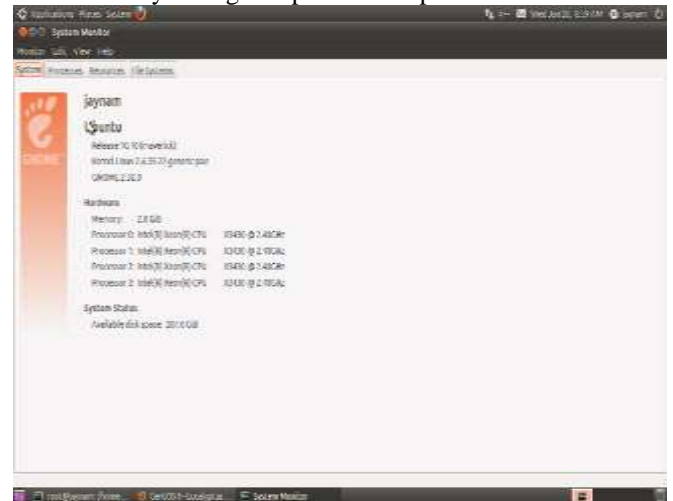


Fig. 3: Gnome System Monitor

1) Calculation of Factors:

Here we are creating multiple instance on private cloud and we measure on the basis of that before creating the instance and after creating the instance

Factors	Before Creating instance	After creating the instance(Adding user to a cloud that can run on individual System)
CPU Performance	CPU1 -61.4% CPU2 - 25.0% CPU3 -1.0% CPU4 -0.0%	CPU1 -48.0% CPU2 - 35.9% CPU3 -4.7% CPU4 -3.0%
Memory & Swapping	39.0%	27.0%

Table 2: Calculations of Factors



Fig. 4: Before Creating the instance



Fig. 5: After Creating the instance

V. CONCLUSION

This chapter provides the summary of the proposed research work. In this Way we will implement private cloud for organization & measures the important factors which affect the performance of private cloud. Private cloud for Educational Institutions mainly helps the institutes in eliminating underutilization of their existing resources and improves security since the management of the data is controlled internally. The setup can be extended on requirement to be merged with public cloud, forming hybrid cloud if necessary. Private clouds provide a good opportunity to get started with cloud computing with on-demand services, satisfying security, and performance and reliability requirements. The virtual machine images are available in the cloud and upon user request; its instances are created and run. Services were included successfully and made available to the user.

VI. FUTURE WORK

In this Way, we will implement private cloud for organization & measures the factors CPU Performance, Memory usage which affect the performance but there are more other factors which affect the performance of private cloud like I/o access, when access on hybrid cloud etc...The researchers also calculate this factor in the future.

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