Functional Analysis of the Eucalyptus Private Cloud

G. Srinivas Reddy

Abstract—The paper addresses the methodology of deployment of a private cloud in enhancing the functional limits of cloud computation at constrained conditions of configuration. The investigation was performed in environment of well designed configuration in such a way that the load limits are controlled. The attempt reveals that there is considerable low level performance of the machinery configurations with intensive work and task condition. The attempt in the study is associated with simulation study of number parameters like Large Write Operation Completion Time and Small Write Operation Completion with different levels of threads maintained in the network of cloud environment. the experiment is conducted with a view of study on the memory bandwidth and completion time by repeating the simulation at considerable number of times. The intensified background load makes the system performance decrease drastically.

Index Terms— Cloud Computing, Eucalyptus Cloud, Private Cloud, Cloud Configuration.

I. INTRODUCTION

The previous studies have already shown the variations of the performance with different characteristics of the cloud providers. The focus on the public cloud is the main theme of the studies [3]. The function of Amazon cloud is found at inconsistencies at its responses between 10% and 20%. The overall performance is at least 5 times slower than the mean. One of the tests show that with the simultaneous requests for the network there is gradual fall in the performance [6]. The performance of network becomes very less with the decrease in bandwidth of the network channel to a quarter of its mean value. A new methodology implemented in the present paper suggests the association of an innovative approach to the public cloud. The most of the earlier studies are concentrated at this point of direction [9]. It is to consider framing the configuration suitable for the repetition of the function even with unload at the server. An experiment has been carried out with no considerable server loads for enhancing resource sharing among virtual systems and there by much more improvement can be achieved in its processing limits of private cloud function. The performance in functionalities of private cloud over the benchmark scheduling tasks is elevated to extreme limits with careful implementations of a controlled environment. The Eucalyptus cloud has been investigated carefully and a report is given about its functional capabilities in controlled configuration. Software with a proper practical configuration of controlled mechanism has been involved to address the problems that are generally come across in the system of the cloud computational tasks [5].

II. ARCHITECTURE

A. Eucalyptus

There seems to be more enhancement in functional capabilities of the Eucalyptus system in its performance of evaluation process of given work load under a specific designed configuration. The certain process must be followed in installing the Eucalyptus cloud to extend in its limitations in performance [4].

B. KVM

The multiple functions of a CPU in virtual machine are established and enhanced with Kernel subsystems in virtual machines on Linux platform [2-7]. The mechanism of the multiple functionality with virtualization principle is very much essential step in building the advances technologies such as VT-x or AMD-D. Xen and Kernel based tools are very much favorable for the operation and processing of Eucalyptus

C. Modules

The investigated cloud is framed with five functional partitions. Details of this software are presented in brief in the following.

D. Node Controller (NC)

The module mainly controls the process of iterations made at each node in the program by the virtual machine right from the initial to final termination. Each node of its execution is under its interaction. It communicates with the Operating system, Cluster Control, and CPU.

E. Cloud Controller (CL)

The module is of a vital importance in private cloud, and locates the entry point of the entire cloud network. Each Eucalyptus cloud interacts with one CL, installed in the server which is a front-end to the compete frame. The module gives web services interface external to the cloud, interacts with Amazon's Web Services' interfaces. The CL is responsible for authenticating users in monitoring instances running in the cloud and makes the decision of priorities of services [11].

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G. Cluster Controller (CC)

The module manages the nodes in terms of groping. The initial and terminated nodes are accessed simultaneously. The CC can be accessed for both the nodes and the cloud front-end simultaneously

H. Data saving Partition (DSP)

At the time the task is being run, the clients of the cloud have been made to be at the public network. The capability of the virtual machine to access at internet has been successfully examined in the cloud environment. The networking configuration and corresponding results depends on the mode of the Eucalyptus cloud interacting in the process [10]. Control and management features are assigned to the cloud administrator through the four important modes. The networking configuration and corresponding results depends on the mode of the Eucalyptus cloud interacting in the process [10]. Control and management features are assigned to the cloud administrator through the four important modes.

III. NETWORK AND CONFIGURATION DESIGN

The two servers have been linked with an Ethernet, which establishes a private network. The front-end will have two Ethernet interfaces in order to have multiple accesses over the both private and public clouds. The figure 1depicts the fundamental information about the details proposed in the present work. Outline is associated with a considerable number of clients and two virtual machines. The analysis has been made on the two virtual machines with respect to clients and deployed Eucalyptus private cloud.
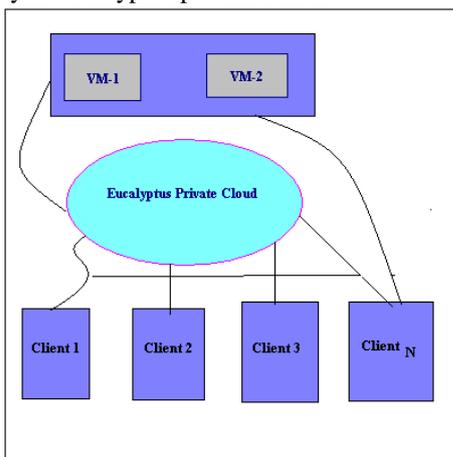

Fig 1: Network outline of the private cloud

A. Web Interface

The client needs to access a web interface to run the private cloud, located at an IP address. This Prospective users request an account that has to be given permission by the cloud administrator to grant the access, which can be achieved by RSA key technique to retrieve information from the cloud controller through Euca2ools or Hybrid fox.

B. Building an Eucalyptus Machine Image (EMI)

A virtual machine can be established in the frame of Eucalyptus private cloud by this image. It has three main components is. A virtual disk image, ii a ram disk image and iii a kernel image. The virtual disk image is a file system image which includes OS .One of important part of modes is an XML for creation of a file to store required information [12]. Establishing an Eucalyptus machine image is not compulsory step to access the private cloud since various types EMIs are available. Establishing an EMI is very necessary step in the process which makes the system automatic [10].

C. CPU test for performance of isolation in cloud computing

A simple code is tested in the form a C program and it is investigated and analyzed whether any sharing is existing among the processors [18]. A task of a numerical computation have been assigned to this program for the analysis of computation time and the information given by the digits to evaluate the functions of the processors. Again the information provided in the also reveals suitability of the digits for the betterment of the performance of the processor. CPU is directed to get more loads generated at 100% as per the instructions given in this check performed in the task. This causes the utility of resources in the background functioning of the mechanism to get more perfection in the task of processing of samples in terms of response time and calculations of the specified digits [17]. The comparisons are made with samples and corresponding variations are shown in the graph. Once the EMI is channelized, then the only process is to upload it to the front-end server. Each of the three parts (ram disk, file system, and kernel) are accessed, will run a code, which can be used after registration of the three parts as a single cluster [12]. If the process is complete, then the resulting machine image enters into the list of EMIs.
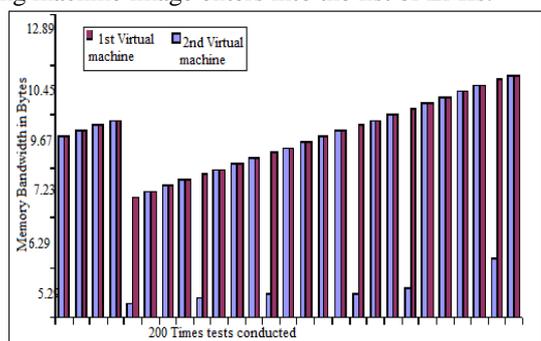

Fig 2: Time for Determination of the Number Pi (In Miliseconds)

The resourses of the processor are assigned to the virtual task by CPU. And it is noted that every instance resourses are involved in virtual tasks. VCPU resourse assigned to CPU is found to be very less than that for CPU.In the evaluation task of the experiment sharing of the processors exist [8].

D. Memory Test

The analysis has been made on the performance with the

different levels of the bandwidth of the networks. A simulation is made on the on the 100 sample data points over the 100 iterations of the code [17]. Some data points in the figure are observed to be deviated from the mean. The degree of deviation of second virtual machine is more than that of the first.

E. Disk I/O Test

Accessing technique or processing methodology for input and output devices deployed in the virtualization is an important task needed to frame specialized hardware configuration for virtual CPU as third agent in spite of the availability of the other two operating platforms such as Kernel or any other guest mode .Guest mode acts a vital role in managing the various scheduled tasks and other functional units processing unit and memory allocations through the standard Linux environment. The output devices of the system completely depends on the user defined mode. The virtual machine is operated with normal instructions by the code in the processor with aid of the guest mode. Execution of the process continues until it is given an interference of an external instructions in the form of an event occurs. There is an oscillating mechanism between the guest mode and user mode as per the given instructions in the system.
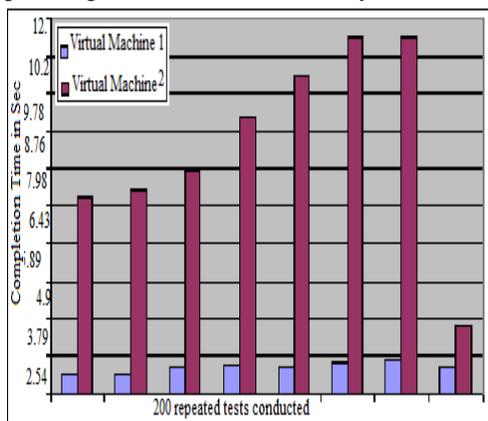

Fig 3: Time for determination of the number Pi (in miliseconds)

The figure 3 shows the time for the processes to complete the tasks assigned in the networks in cloud environment. There is repetition of tests on the two virtual machines for analysis of the completion time. The observed response in terms of less completion time for the first virtual machine duo to its well designed configuration with specific constraints.
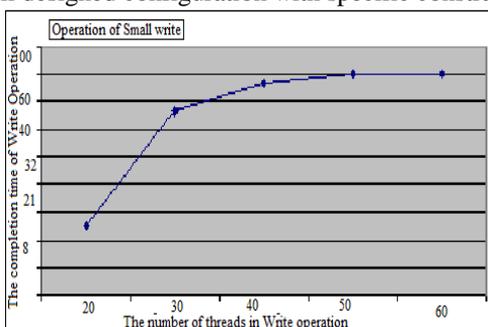

Fig 4 Response of Small writes Operation

The operation of write processing step is also one of the significant parameters in estimating the efficiency of the private cloud in its performance with constraints involved in the networking with virtual machines and servers. The found response from the simulation study in the experiment is observed to be increasing with threads maintained in the clod network.

F. Network Test

The figure shows latency of the packets in the network at various combinations of the parameters of VMs. It is found that Jitter is a predominant with VM [16]. The sharing of bandwidth in the network is proper in jitter and VM. In the case of sending and receiving the packets jitter processes at 40Mbps in LAN and Ethernet.
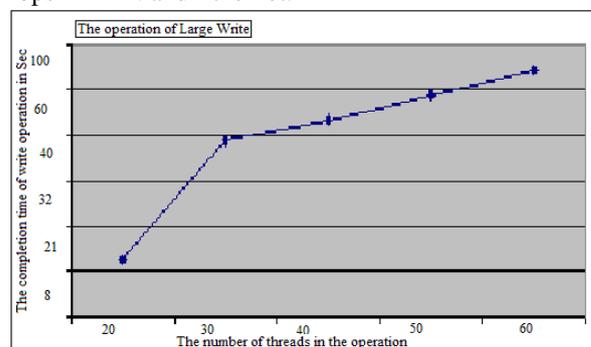

Fig 5 Response Large write Operation process

The large operation process is found to be a weighted parameter in study of the private cloud. As number of threads is made to increase, a steady growth is observed in the completion time of the operation from a particular number of threads.

IV. CONCLUSION

The functional analysis of the server with a view of the private cloud deployed in computational environment has been made thoroughly. The evaluations made in the present study are found to be deviated from the previously established cloud techniques operated in the limited options in the controlled configuration. A potential approach in the enhancement of the performance of the cloud network in terms of less completion time of the tasks and an optimal response of small and large write operation processes with a considerable number of threads involved in the network. The concluded points from the study reveal the low level of functional abilities of the Machine peripherals with intensive work load and task running conditions. The study shows that one can extend functional capability of private cloud with limited intelligent options of the configurations in the controlled environment.

REFERENCES

[1] S Stuart Charlton, "Cloud Computing and the Next Generation"http://www.slideshare.net/StuC/cloud-computing-and-the-nextgeneration-of-enterprisearchitecture-cloud-computing-expo-2008-presentationGrant,

[2] Kefa Rabah, (2010) Build Your Own Private Cloud Using Ubuntu 10.04 Eucalyptus Enterprise Cloud Computing Platform v1.2.

[3] O.Khalid, I.Maljevic and R.Anthony. "Dynamic Scheduling of Virtual Machines Running HPC Workloads in Scientific Grids"IEEE, 2009. Nurmi D. et al. The Eucalyptus Open-source Cloud Computing System. In Proc. of 9th IEEE/ACM International Symposium on Cluster Computing and the Grid, 2009.

[4] Wardley, S., Goyer E., Barcet N. Ubuntu Enterprise Cloud Architecture. Technical White Paper, Canonical, 2009.

[5] The Open Group Architecture Framework (TOGAF), section 21.3, http://www.opengroup.org/architecture/togaf9-doc/arch/

[6] Chief Information Officers Council, "Privacy Recommendations for Cloud Computing", http://www.cio.gov/Documents/Privacy-Recommendations-Cloud-Computing-8-19-2010.docx

[7] http://www.rightscale.com/info_center/solution-briefs/rightscale-eucalyptus-factsheet.pdf

[8] Kefa Rabah, (2010) Build Your Own Private Cloud Using Ubuntu 10.04 Eucalyptus Enterprise Cloud Computing Platform v1.2.

[9] Private cloud, (2008) SearchCloudComputing.com, Definitions; WhatIs.com

[10] Juniper Networks, "Cloud-ready Data Center Reference Architecture",

[11] www.juniper.net/us/en/local/pdf/reference-architectures/8030001-en.pdf

[12] http://docs.media.bitpipe.com/io_10x/io_102645/item_475854/PrivateCloud%20ezine_vol4_Layout%201.pdf

[13] Eucalyptus Systems, Inc. 2010: Eucalyptus Enterprise Edition 2.0Datasheet. Ecalyptus_EEE_DS.pdf> on 6 Aug 2010.

[14] http://www.eucalyptus.com/docs/2.0/ug-ee.pdf

[15] http://www.eucalyptus.com/sites/all/files/sg-eucalyptus-puppetlabs.en.pdf

[16] J. Chase, I. Constandache, A. Demberel, L. Grit, V. Marupadi,

[17] M. Sayler, and A. Yumerefendi. Controlling Dynamic Guests in a Virtual Computing Utility. In International Conference on the Virtual Computing Initiative (an IBM-sponsored workshop), May 2008.

[18] S. Adabala, V. Chadha, P. Chawla, R. Figueiredo, J. Fortes, I. Krsul, A. Matsunaga, M. Tsugawa, J. Zhang, M. Zhao, L. Zhu, and X. Zhu. From virtualized resources to virtual computing grids: the in-vigo system. Future Gener. Comput. Syst., 21(6):896–909, 2005.

AUTHOR'S PROFILE

G. Srinivas Reddy, one of the senior most faculties in reputed engineering college having the best academic credentials along with a rich exposure in the research fields of different areas of Computer Science Engineering. He authored a good number of research papers at international level. His contribution in the field of data processing at Image and stochastic signal processing is most helpful for much number of students in their projects. He obtained his M.Tech (CSE) in First class with distinction from JNTU Hyderabad. The present domain of the research engagement is in Cloud computing and analysis of different algorithms in Cloud computing environment.