Comparison of Hierarchical and Non Hierarchical Approaches for Virtual Machine Migration in Cloud Computing

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Abstract—Cloud computing is an internet based computing, whereby shared resources, software and information are provided to computers and outer devices on demand. It is gaining popularity due to cost effectiveness and ease of availability setup. It is an upcoming paradigm that offers tremendous advantages in economic aspects, such as reduced time to market, flexible computing capabilities, and limitless computing power... However, data owners are very skeptical to place their data outside their own control sphere. Their main concerns are the confidentiality, integrity, security and methods of mining the data from the cloud. Billing in IAAS is the important and a complex task in all organizations. It is often compromised due to lack of various interactions (consumer, provider, budget, manager, agent and online payment) simultaneously along with necessary features like discount, tax, plan etc. Billing is considered as an essential part of IAAS. IAAS refers to computing infrastructure comprising of networking, hardware, virtualization operating systems and software servers offered as a service.

Keywords— Cloud computing, Billing system,1AAS, Virtual machine

I.   INTRODUCTION

Cloud computing is an internet based computing, whereby shared resources, software and information are provided to computers and outer devices on demand. It is gaining popularity due to cost effectiveness and ease of availability setup. There are many IAAS (Infrastructure as a Service) companies that are constantly looking for cost effective implementations of cloud systems. It is the model for convenient on-demand network access, with minimum management efforts for easy and fats network access to resources that are ready to use. It is the model for convenient on-demand network access, with minimum management efforts for easy and fats network access to resources that are ready to use. It is an upcoming paradigm that offers tremendous advantages in economic aspects, such as reduced time to market, flexible computing capabilities, and limitless computing power... However, data owners are very skeptical to place their data outside their own control sphere. Their main concerns are the confidentiality, integrity, security and methods of mining the data from the cloud. Billing in IAAS is the important and a complex task in all organizations. It is often compromised due to lack of various interactions (consumer, provider, budget, manager, agent and online payment) simultaneously along with necessary features like discount, tax, plan etc. Billing is considered as an essential part of IAAS. IAAS refers to computing infrastructure comprising of networking, hardware, virtualization operating systems and software servers offered as a service.

II.   LITERATURE SURVEY

The author in **"Hierarchical Virtual Machine Consolidation in a Cloud Computing System"** is says that these days it is important to save energy due to electric bill issues. The focus of the paper is to deploy the VMs to PMs. Various demands are treated as random variables which can be correlated whit each other. Result show that the proposed method is better in spite of simplicity and scalability.

The author in **"Server Consolidation in Clouds through Gossiping"** Success of cloud computing is due to the large data centers. The energy bill is a big chunk of the operational costs. The focus of the paper is on a nonhierarchical approach call v-man simulations show that in failures the robustness is there. V-man produces an almost optima's VM placement very quickly the protocol in intrinsically robust and can cope with computing mode being added or removed from the system.

In the paper titled **Advance Billing and Metering Architecture for Infrastructure as a Service** by Sukhpal Singh and Inderveer Chana in year 2013, they proposed IaaS online billing system (IOBS) that describes transparency of consumption, billing and frequency of usage of services for a cloud based pay per use system. This system describes various interactions of network and user interface. The billing rules have been stored in a database. The model has been verified through UML that demonstrates that IOBS is effective in improving user interaction by reducing time and increasing customer satisfaction.

In the paper titled **Accounting and Billing for Federated Cloud Infrastructures** by Erik Elmroth and Daniel Henriksson in year 2013, They outline usage scenarios and a set of requirements for such infrastructures, and propose an accounting and billing architecture to be used within RESERVOIR. Even though the primary focus for this architecture is accounting and billing between resource consumers and infrastructure provides, future support for inter-site billing is also taken into account.

In the paper titled **Cloud Computing-Infrastructure as service-Amazon EC2 by Gurudatt Kulkarni**, Ramesh SutarJayantGambhir in year 2012, they aims to provide a means of understanding and investigating IaaS. This paper also outlines the responsibilities of IaaS provider and the facilities to IaaS consumer. Amazon Elastic Cloud is one of the flexible clouds discussed in paper.

In the paper titled **Advance low cost electricity billing system using GSM** by R.B Hiware, P.Bhaskar, and Nilesh Kumar in year 2013, they proposed technique for Prepaid and postpaid scheme using SMS. GSM network is used for sending and receiving SMS. There are many problems in distribution and metering. By using GSM system this problem have been reduced.

In the paper titled **Cloud Computing: Security Concerns, Risk Issues & Legal Aspects** by Dr.A.M. Khan and KaziHazim Ali in year 2013, The present paper deal with cloud computing and security concerns, Assessing Risk Tolerance in Cloud Computing and Legal and Regulatory Issues also discussed, we covered many of the qualities and promises of cloud computing. In addition, we examined the three models for cloud services (SPI) and the four models for cloud deployment (public, private, community and hybrid).While developing a background in cloud computing, we also discussed many security aspects of clouds.

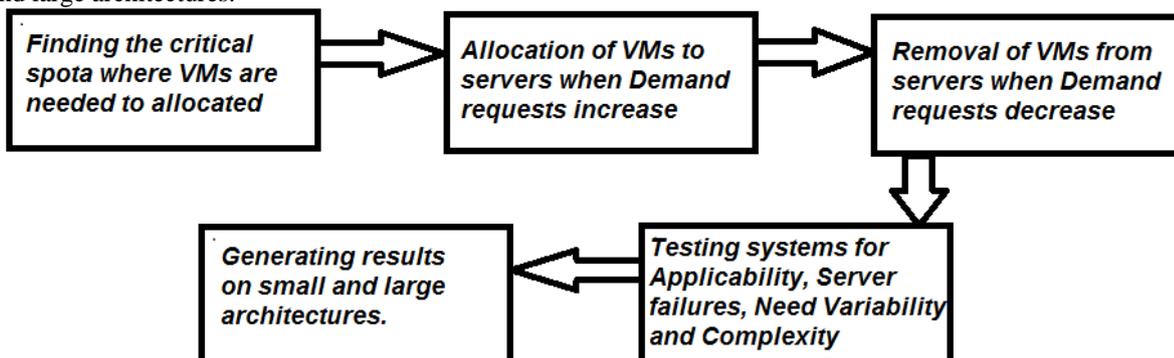### III. COMPARISON OF FLAT AND HIERARCHICAL APPROACHES

Hierarchical Approach

In this approach, our first job is to locate critical spots where it is necessary to allocate VMs. In the next step, VMs are assigned to clusters by Global Manages at higher level of the system. After VMs are assigned to clusters, they are deployed and converted to PMs by local managers at lower level of the system. At last, System is tested for Applicability, Server failures, Need Variability and Complexity and Results are generated on small and large architectures.
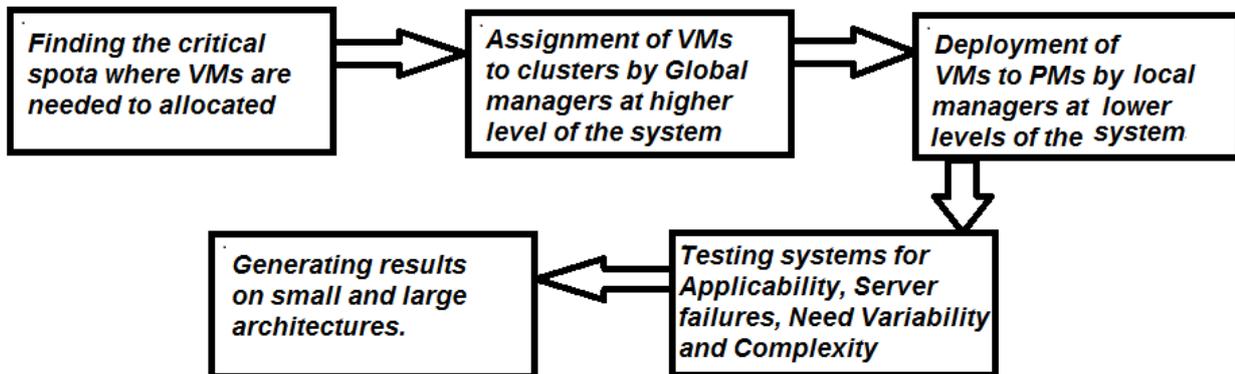
Non Hierarchical approach or FLAT approach

In this approach, our first job is to locate critical spots where it is necessary to allocate VMs. In the next step, VMs are allocated to servers when Demand Requests increase and if request decreases, VMs are removed from servers. At last, System is tested for Applicability, Server failures, Need Variability and Complexity and Results are generated on small and large architectures.

After care full examination of both the techniques and comparison on the basis of four parameters that are **Applicability, Server failures, Need Variability and Complexity**.

Applicability: In terms of applicability the hierarchical approach performs with less accuracy because in its case we cannot apply it on comparatively large architectures approach can be applied on both types of architectures small and large.

Server Failures: When we consider that server failures scenarios we see that in those scenarios the hierarchical approach is more beneficial as it has many level so the disorder from the failure does not disrupt all the other functioning of the system.

Need Variability: In this aspect also hierarchical performs better because of its multi-plane structure. It can be made to add or remove VMs easily.

Complexity: Finally complexity is the only aspect in which hierarchical approach proves to be better than FLAT because it is well organized and easy to implement due to its independent level in which local and global managers control it well enough to understand it easily.

IV. CONCLUSION

After performing all the tests that were Applicability, Server failures, Need Variability and Complexity, we have analyzed the results and three out of four, three tests are in favor of hierarchical approach. So we conclude that when compared with non hierarchical, hierarchical is much better approach for virtual machine migration in cloud computing.

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