Ant Colony Based Technique For The Computation of Capacity Management In Clouds

Babu Singh Yadav[1], Shivank Kumar Soni[2], Anurag Jain[3]

Department, Computer Science and Engineering

Radharaman Institute of Technology and Science Bhopal Madhya Pradesh INDIA

Abstract — Cloud Computing is a technique of sharing of resources over internet. During the sharing and access of data over cloud capacity management of virtual data centers are necessary for the chances of overhead and power consumption and migration of virtual machines. Here in the paper an efficient technique of providing capacity management of virtual clouds using ant colony based optimization is implemented which provides efficient load balancing and virtual machine migrations. The proposed methodology also provides less energy consumption and more number of active physical machines and efficient utilization of virtual machines.

Keywords— Cloud Computing, Data Centers, Cloud Storage, Virtual Machine (VM), Virtualzsation.

I. INTRODUCTION

Data centers are being progressively more virtualized on cloud. The increasing demand for storage and computation has determined the development of huge data centers the enormous server farms that run many of today's Internet and business applications. Data center operators face challenges from the initial capacity planning stages of deploying and provisioning novel uses to capably distributing resources to meet the application presentation assurances of live systems. A data center can consist of several thousands of servers and can use as much energy as a small city. The huge amounts of computation power restricted in these arrangements consequences in many attractive distributed structures and resource management problems. The most recent type of large scale data centers are cloud data centers, which are typically used for on-demand service conditions. One major factor in cloud data centers is to extend resource management structures and methods to make available well-organized resource utilization while they are also scalable and computationally feasible, with respect to the amount of the data centers, the external weight and their self-motivated nature.

Internet and business applications are increasingly being shifted to huge data centers that embrace huge server and storage clusters. Current data centers can contain tens or hundreds of thousands of servers and maps are before now being made for data centers holding over a million servers [1]. Some data centers are built to run applications for a single company, such as the search engine clusters run by Google. Some other data centers are managed by service providers that are able to lease storage and computation resources to other clients at incredibly small charge due to their huge amount.

Cloud computing, which refers to hosting platforms that rental fee data center stores to clients is appropriating progressively more well-liked for running Internet websites or business applications. In using all of these data centers the enormous quantities of computation power necessitated to constrain these methods consequences in many demanding and remarkable distributed methods and resource administration difficulty. Virtualization promises to dramatically change how data centers function by splitting the connection between substantial servers and the resource shares granted to functions. Virtualization can be utilized to "slice" a distinct substantial host into one or more virtual machines (VMs) that share its resources. With the increasing popularity of cloud computing, data centers have been widely deployed by companies such as Amazon, Google, Facebook, and Yahoo! to sustain huge amount applications and to store large volumes of data [2].

Most existing approaches to resource management [3-5] are highly centralized and do not scale with the number of servers in the data center. Characteristically, a centralized administrator is needed to implement the necessary complex algorithms because the difficulty at offer is essentially NP-hard. A centralized administrator must also be aware of the state of all the servers, which can be difficult in huge and extremely energetic data centers [6].

In contrast, distributed approaches to resource management can cope with large numbers of resources without requiring centralized control. Within such approaches the method is decayed into numerous interrelating constituents, each of which completes functional and managerial tasks. Global administration is accomplished all the way through co-operative communications between autonomic elements [7]. Approaches of this type have the benefit that the administration measurement repeatedly scales with the functional part.

II. LITERATURE SURVEY

In this paper, author has proposed as part of a holistic cloud management system [8], investigate the problem of when and how a position of distributed VMs should be refilled to a new optimal set of VMs and propose a model to provide the necessitated capability additional charge proficiently. The explanation takes into account the price and capacity of a number of predefined VMs, where capacity most commonly is based on the specific application's performance on a VM of that type. Obviously, cost-transforms may happen ultimately and that by itself is a reason for re-allocation. Additionally, we analyze the different parameters that affect the repacking decisions, including price/performance ratio of an application, cost of reconfigurations, behavior of different autoscalers, and the relation of repacking with expected life-span of the rearranged VM set earlier than scaling down or ahead of the next reconfiguration.

A system based on cloud capacity management (CCM) was presented by Mukil Kesavan et al [9]. This is on demand CCM enriched with various low-overhead techniques. Self motivated by convenient on ground examinations and to achieve scalability allocation for thousands of machines. CCM architecture is split in to three levels that are top-level cloud manager, midlevel super cluster managers, and at last cluster managers at the lowest level. On this figure 3, hosts are logically grouped into clusters stretched with competence manager (VMware DRS) and these clusters are monitored by super cluster. These super clusters are acknowledged as consequent capacity manager. All these excellent clusters come under collection of super clusters known as cloud-level capacity manager.

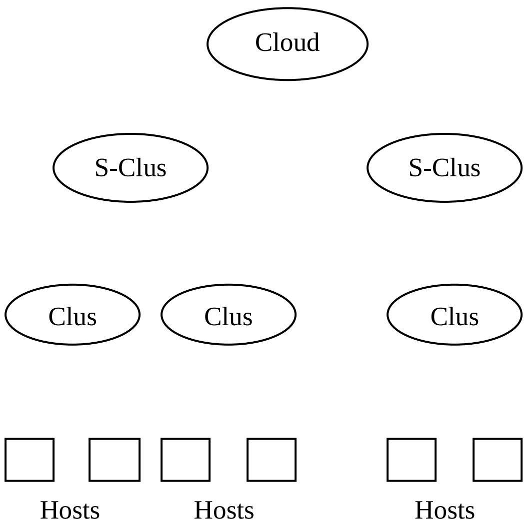


Figure 3: Architecture of Cloud Capacity Management System [9].

In [10] a concept about warehouse for integrating data from various data sharing services without central authorities is presented with our store, data distribution services can keep informed and manage the right of entry and maximum the practice of their collective data, as a replacement of offering data to concern and our storage area will sustain data distribution and calculation. The most important distinctions between their warehouse and presented essential authorities are: 1) warehouse accumulates data from data distribution services based on customers' integration constraints to a certain extent than all the data from the data distribution services as subsisting innermost organization. 2) While subsisting fundamental organization have complete control of the composed data, the competence of store is managed to calculating the incorporation consequences need by consumers and cannot get other information about the information or utilize it for other effort. 3) The data arranged by store cannot be utilized to produce other consequences apart from that of the particular data accumulation demand and for this reason the collaboration of store can only make known the effects of the particular data integration require while the cooperation of central concern will make known all data and accessible a privacy preserving warehouse to put together data from different data distribution services. In distinguish to subsisting data distribution methods; store only accumulates the smallest amount of information [10].

In [11] they presented a survey on cloud computing. Here they described essential expressions of cloud. They also compare cloud with other related technologies. Here author also make an effort to recognizing the top technical and non-technical problems and opportunities of cloud computing. Virtualization is primary security mechanism of cloud computing. It is a powerful defense scheme. It capable to protects against most efforts by customers to attack one another or the fundamental cloud infrastructure. One of the common problems is that all alternatives are not virtualized. Using virtualization software has been acknowledged to enclose bugs that allocate virtualized code to "break loose" to some level. Erroneous network virtualization may consent to user code access to sensitive portions of the service provider's communications or to the sources of other clients. Multiple virtual machines (VMs) can share CPUs and main memory unpredictably glowing in cloud computing. On cloud computing virtualization is crucial to develop architectures and operating systems to efficiently virtualized interrupts and I/O channels [11].

In [12] they presented a cloud database storage architecture that avoids the local administrator in addition to the cloud administrator to study about the outsourced database content. Furthermore, machine readable rights appearances are used in order to limit users of the database that require to recognize source. These limitations are not unpredictable by administrators after the database related application is launched, in view of the fact that a new responsibility of rights editors is defined once an application is get underway. Cloud data must be protected not only against external attackers, but also corrupt insiders. Our proposed scheme tracks the information-centric come within reach of which plans to make cloud data self-intelligent. In this methodology, cloud data are encrypted and wrap up with a practice procedure. The data after accessed will confer with its policy, create a virtualization, and try to review the trustworthiness of the data environment [12].

III. Proposed Methodology

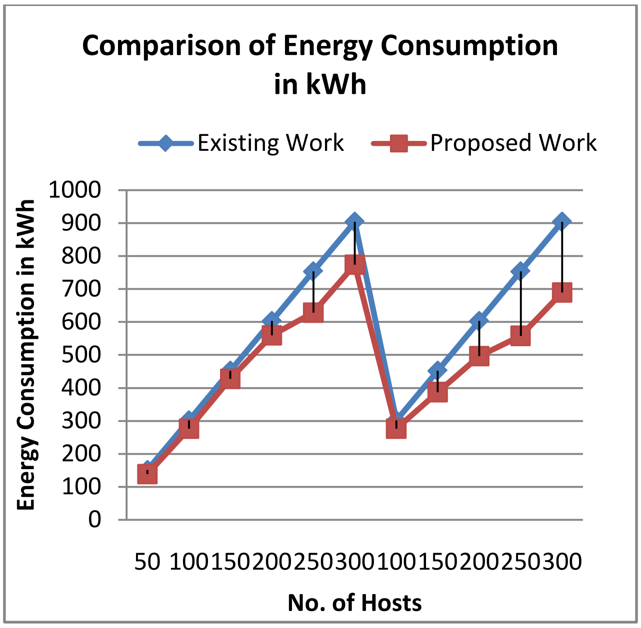
IV. Result Analysis

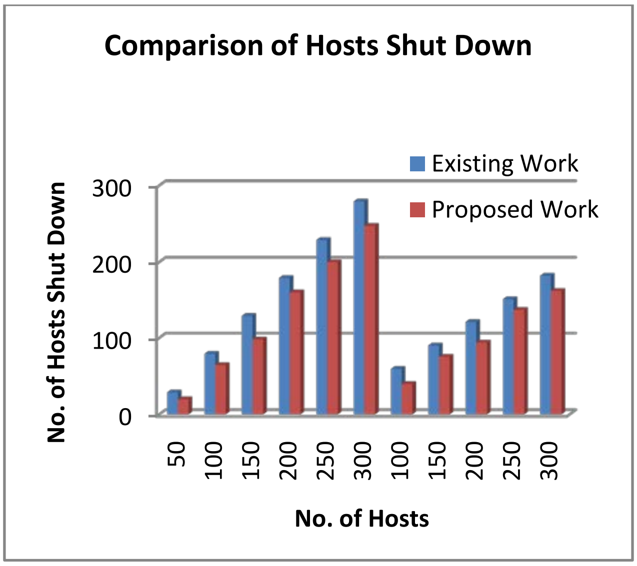
		Energy Consumption in kWh	
No. of VM	No. of Hosts	Existing Work	Proposed Work
50	50	150.68	138.54
50	100	301.35	276.29
50	150	452.03	427.52
50	200	602.7	559.27
50	250	753.38	628.53
50	300	904.05	773.82
100	100	301.35	275.92
150	150	452.03	387.26
200	200	602.7	496.51
250	250	753.38	557.95
300	300	904.05	689.54

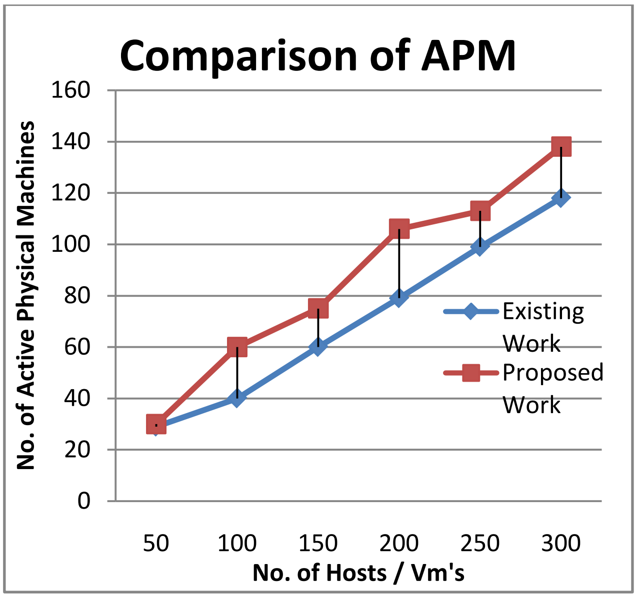
		No. of Hosts Shut Down	
No. of VM	No. of Hosts	Existing Work	Proposed Work
50	50	29	20
50	100	79	65
50	150	129	98
50	200	179	160
50	250	229	200
50	300	279	247
100	100	60	40
150	150	90	75
200	200	121	94
250	250	151	137
300	300	182	162

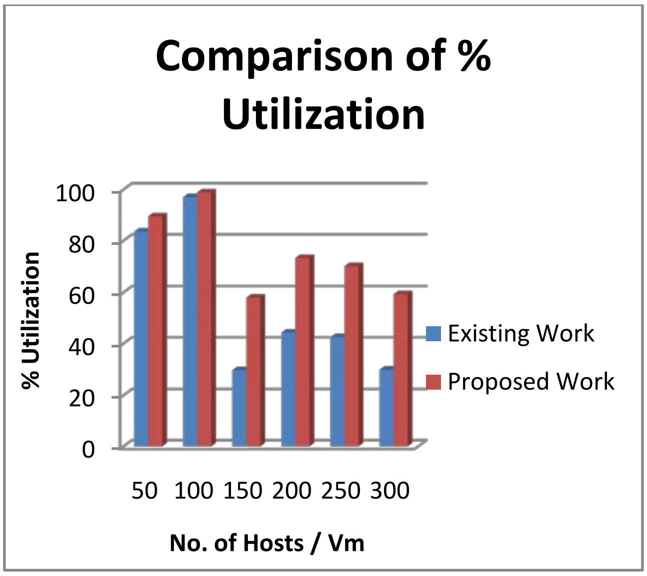
		No. of Active Physical Machines	
No. of VM	No. of Hosts	Existing Work	Proposed Work
50	50	29	30
100	100	40	60
150	150	60	75
200	200	79	106
250	250	99	113
300	300	118	138

		% Utilization	
No. of VM	No. of Hosts	Existing Work	Proposed Work
50	50	83.51	89.47
100	100	97	98.85
150	150	29.49	57.93
200	200	44.23	73.46
250	250	42.44	70.23
300	300	29.72	59.26









V. CONCLUSION

Here in this paper an efficient technique for capacity management on virtual data centers are implemented. The proposed methodology implemented here using ant based optimization and clustering enables minimized energy consumption and more % utilization of virtual data centers in less amount of time.

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