Online Resource Scheduling using Ant colony algorithm for Cloud Computing

V. Manickavasagan¹, R.Jayathilaga², R.Jaishree³, D.Swathy⁴
Velammal Institute of Technology, Pancheti, Thiruvallur, India

Abstract:
Load balancing is a technique that distributes the excess dynamic local workload evenly across all the nodes. It is used for achieving a better service provisioning and resource utilization ratio, hence improving the overall performance of the system. Incoming tasks are coming from different location are received by the load balancer and then distributed to the data centre, for the proper load distribution. With the demand in Cloud Computing industry, the cloud service providers attract customers with various demands. The diverse price scheme safeguards the discount pricing strategy from the market of Cloud brokers. The Cloud brokers take the full advantage of Cloud service providers. The cloud service providers help every customer to utilize discount pricing strategy offered through online schedule.

Keywords: Load balancing, dynamic scheduling, cloud computing, file transfer.

I. INTRODUCTION

In an infrastructure-as-a-service (IaaS) cloud, the cloud provider dynamically segments the physical machines, using virtualization technologies, to accommodate various virtual machine (VM) requests from its customers. For instance, cloud providers usually adopt an hourly billing scheme, even if the customers do not actually utilize the allocated resources in the whole billing horizon. In the current cloud market, many cloud providers offer big discount for reserved and long-term requests. In addition, cloud providers usually give volume discount to customers with requests of large quantity, e.g., Amazon EC2 cloud gives 10 percent discount for customers spending $25,000 or above on reserved instances and 20 percent discount for customers spending $200,000 or above. The diverse pricing schemes and various discount offers among different IaaS service providers or even within the same provider form a complex economic landscape way beyond the control of individual end users. This leaves opportunities for the cloud brokers to emerge as mediators between the customers and the providers. Load balancing is the process of improving the performance of the system by shifting of workload among the processors. Workload of a machine means the total processing time it requires to execute all the tasks assigned to the machine. Load balancing is done so that every virtual machine in the cloud system does the same amount of work throughout therefore increasing the throughput and minimizing the response time. Load balancing is one of the important factors to heighten the working performance of the cloud service provider. Balancing the load of virtual machines uniformly means that anyone of the available machine is not idle or partially loaded while others are heavily loaded. One of the crucial issue of cloud computing is to divide the workload dynamically. The benefits of distributing the workload includes increased resource utilization ratio which further leads to enhancing the overall performance thereby achieving maximum client satisfaction. Performance of online dynamic speed scaling algorithms for the objective of minimizing a linear combination of energy and response time by Lachlan L.H. Andrew [1]. We prove that there exist tradeoff functions such that no algorithm can attain a competitive ratio less than 2. We consider the following variant of the speed scaling problem introduced by Yao, Demers, and Shenker [2]. We are given a set of jobs and we have a variable-speed processor to process them. The higher the processor speed, the higher the energy consumption. The goal is to schedule all the jobs in the fewest number of active timeslots. The machine consumes a fixed amount of energy per active timeslot, regardless of the number of jobs scheduled in that slot (as long as the number of jobs is non-zero) [3]. Scheduling is essential for the proper functioning of multi-core processors for parallel processing. Scheduling of tasks onto multi-core processors is an interesting problem that is well defined and documented in the literature [4]. We present a wide range of problems concerning minimum cost network flows, and give an overview of the classic linear single-commodity Minimum Cost Network Flow Problem (MCNFP) and some other closely related problems, either tractable or intractable.[5]

Figure 1. The architectural diagram representing the online resource scheduling using ant colony algorithm for cloud computing.

http://ijesc.org/
II. EXISTING SYSTEM

In existing system, Load balancing is not very efficient that’s why mostly real time websites hangs or throws some error. Example: Anna University / Irctc. Current research paper in load balancing deals with theoretical explanation only (Survey papers). No paper has experimental results. Many application use static load balancing algorithms, which is not much efficient in current scenario. Many applications use distributed load balancing technique. Discounts are provided to large customers only. The customer is not receiving the appropriate discount prize because of the cloud-broker; the Cloud-broker is not issuing the allocated discount to the customer. In existing they used Offline algorithm that is based on the priority-based scheduling it has been considered by history and time. First who approaches may get first preference.

III. PROPOSED SYSTEM

We focuses on how a cloud broker can help a group of customers to fully utilize the volume discount pricing strategy offered by cloud service providers through cost efficient online resource scheduling. We proposed dynamic algorithm for load balancing. Ant Colony Optimization Based Load Balancing Algorithm is used here. Our proposed load balancer involves both request monitoring and file access. Also the load balancer will keep track of the virtual machine status i.e., Busy or Ideal, session time, packet size, virtual machine name, type, hostname, port address and bytes read in each virtual machines are been monitored in apache server and based on the status the job is allocated to the virtual machines. Our proposed system will help to analyse the HEAP memory space of the server (maximum request load).

The aim is to achieve the following,

- To increase the availability of services
- To increase the user satisfaction
- To maximize resource utilization
- To reduce the execution time and waiting time of task coming from different location.
- To improve the performance
- Maintain system stability
- Build fault tolerance system
- Accommodate future modification
- Avoid overloading of virtual machine.

These can be modelled using tree data structure wherein every node in the tree is balanced under the supervision of its parent node. Master or manager can use light weight agent process to get statistics of slave nodes or child nodes.

Hierarchical load balancing involves different levels of the cloud in load balancing decision. Such load balancing techniques mostly operate in master slave node. These can be modeled using tree data structure wherein every node in the tree is balanced under the supervision of its parent node. Master or manager can use light weight agent process to get statistics of slave nodes or child nodes. Based upon the information gathered by the parent node provisioning or scheduling decision is made. Aim of the ant colony optimization to search an optimal path between the source of food and colony of ant on the basis of their behavior. This approach aims efficient distribution of work load among the node. When request is initialized the ant starts movement towards the source of food from the head node. Regional Load Balancing Node (RLBN) is chosen in Cloud Computing Service Provider (CCSP) as a head node. Ants keep records the every node they visits ant record their data for future decision making. Ant deposits the pheromones during their movement for other ants to select next node. The intensity of pheromones can vary on the bases of certain factors like distance of food, quality of food etc. When the job gets successful the pheromones is updated. Each ant build their colony algorithm. This language captures the non-determinism in the choices which cannot be quantified, and, its interpretation of probability is generative. ROSA assumes the cooperation of processes by adding the involved rates and assumes the synchronization by choosing the minimum rate (the slowest process will impose its time). In our project, user can login with username and password. The user login is registered successfully means user send the request to ROSA then it will send the data request to the broker and consolidate the user requests and get a discounted pricing for all the customers. In this project we are developing a load balancer for effective user request monitoring and file access. In existing research articles, no papers focus on experimental results and it deals only with types of algorithms used for load balancing. In our proposed system, apache server is used as a server for processing the user request and tomcat is used as virtual machines. The status (idle, busy), session time, packet size, virtual machine name, type, hostname, port address and bytes read in each virtual machines are been monitored in apache server and based on the status the job is allocated to the virtual machines. Thus our proposed project provides an efficient load balancer to avoid congestion and overloading of server in the data centre. For dynamic load balancing, we used ANT colony algorithm. Also in this project, the virtual machines structure adopted is hierarchical load balancing technique. Hierarchical load balancing involves different levels of the cloud in load balancing decision. Such load balancing techniques mostly operate in master slave mode. These can be modeled using tree data structure wherein every node in the tree is balanced under the supervision of its parent node. Master or manager can use light weight agent process to get statistics of slave nodes or child nodes. Based upon the information gathered by the parent node provisioning or scheduling decision is made. Aim of the ant colony optimization to search an optimal path between the source of food and colony of ant on the basis of their behavior. This approach aims efficient distribution of work load among the node. When request is initialized the ant starts movement towards the source of food from the head node. Regional Load Balancing Node (RLBN) is chosen in Cloud Computing Service Provider (CCSP) as a head node. Ants keep records the every node they visits ant record their data for future decision making. Ant deposits the pheromones during their movement for other ants to select next node. The intensity of pheromones can vary on the bases of certain factors like distance of food, quality of food etc. When the job gets successful the pheromones is updated. Each ant build their own individual result set and it is later on built into a complete solution. The ant continuously updates a single result set rather than updating their own result set. By the ant pheromones trials, the solution set is continuously updated. The Advanced Encryption Standard (AES), also known as Rijndael (its original name), is a specification for the encryption of electronic data established by the U.S. National Institute of Standards and Technology (NIST) in 2001. AES is a subset of the Rijndael cipher developed by two Belgian cryptographers, Joan Daemen and Vincent Rijmen. The AES selection process. Rijndael is a family of ciphers with different key and block sizes. AES operates on a 4 x 4 column-major order matrix of bytes, termed the state, although some versions of Rijndael have a larger block size and have additional columns in the state. Most AES calculations are done in a special finite field. AES consists of several rounds of several processing steps that include substitution, permutation, addition, and multiplication operations.
and mixing of the input plaintext and transform it into the final output of cipher text. Finally the data owner files are encrypted using AES algorithm and migrated into cloud for data recovery or data repository. In data recovery, the files are migrated from the virtual machines to cloud named CloudMe for data backup. For Cloud storage we have configured public cloud named CloudMe cloud storage. CloudMe is a personal cloud storage service (sometimes referred to as an online backup service) that is frequently used for file sharing and collaboration. The service provides 2 gigabytes (GB) of storage for free and up to 100 GB on various for-fee plans. CloudMe is cloud storage service that enables users to store files on remote cloud servers and the ability to share files within a synchronized format. CloudMe provides an online storage solution powered by cloud computing service model of infrastructure as a service (IaaS). CloudMe users are provided by an online storage space hosted on Dropbox accessible anywhere via the Internet. The storage space provides storage for virtually any kind of fie type from documents, images, videos etc. In this module, the user have to buy the data with discount pricing with first preference with the help of ROSA technique. For example in existing the user have to get the data without discount of getting the data with help of broker.100mb of data have 5% discount means the user1 has to buy 100mb of data and the user2 have to buy 500mb of data means ROSA technique have to choose the first priority of buying high data with pricing. so we have to able to buy a product with efficiency.

IV. CONCLUSION

The major issues of file access through a server are Load Balancing. Overloading of a system may lead to poor performance which can make the technology unsuccessful, for the efficient utilization of resources; the efficient load balancing algorithm is required. Thus our project provides a complete solution for efficient load balancing along with discounted pricing of storage infrastructure resource in cloud.

VIII. REFERENCES

[3]. A Model For Minimizing Active Processor Time.
[4]. Selective Scheduling Based On Number of Processor Cores for Parallel Processing.