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Load Balancing and Task Scheduling Using Genetic Algorithm

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ABSTRACT

Cloud computing enables a large range of users to access scattered, scalable, virtualized hardware and/or software infrastructure over the Internet. Multi cloud is a methodology to allocate workload across many computers, or other resources over the network links to achieve optimal resource utilization, make the most of throughput, minimum response time, and avoid overload. It presents a load balancing Task Scheduling algorithms or technique in cloud computing. Efficient task scheduling mechanism should meet users requirements and improve the resource utilization, so as to enhance the overall performance of the cloud computing environment. In order to solve this problem, considering the new characteristics of cloud computing and original adaptive genetic algorithm (AGA), a new scheduling algorithm based on double adaptive algorithm-job spanning time and load balancing genetic algorithm (JLGA) is established

Keywords— Load Balancing, Cloud Computing, Scheduling algorithm, Reviews

ARTICLE INFO

I. INTRODUCTION

The latest vision of large distributed computing is "cloud". Cloud based multimedia system (cms) gained momentum as there are large number of users. Cloud computing is internet based computing, whereby shared resources, software and information are provided to computers and other devices on-demand, like a public utility. Recent the most burning topic is cloud storage for the it user. Because when a user uses a personal or professional computer for a great purpose, then they must have some precious files, for which that man is ready to invest more to protect the file. As the scope of cloud scales up, cloud computing service suppliers needs handling of gigantic requests. Thus in spite of glorious future of cloud computing, many actual problems still essential to be explored for its perfect awareness. One of these concerns is load balancing. Cloud load balancing is the process of distributing workloads and computing resources in a cloud computing environment. Load balancing allows to manage application or workload demanded by users by allocating resources among multiple computers, networks or servers. Cloud computing is a new computing model in todays world. Cloud computing involves a large number of computers connected within a communication network. It has the ability of delivering a flexible, high-performance, pay-asyou-go, on-demand services. Cloud computing operators should guarantee to the subscribers and stick to the service level agreement (sla), which will definitely lead to unsatisfying if the job spanning is too long. Besides, the cloud platform also needs to dynamically balance the load among the servers in order to avoid hotspot and improve resource utility. Therefore, to get to know how dynamically and efficiently schedule tasks and meet subscribers becomes a critical problem to be solved. To solve the problem of load balancing, every cloud giants should have their own solutions. Like google has map-reduce scheduling mechanism and ibm blue cloud has xen and hadoop clusters, whose core algorithm is the same as google. Tasks scheduling in cloud is a np-complement problem with time limit. That means it is seldom impossible to search out a reasonable solution in polynomial time. In this paper, we proposes the job which is least time consuming and load balancing genetic algorithm which finds the optimal task allocation sequence in dynamic cloud system. It minimize the makespan of tasks and balance the load of the whole system. In this paper, we ensuring correct access management (authentication, authorization, and auditing).

Network level migration, in order that it needs minimum value and time to guide carefully to the employment. It also offers correct security to the info in transit and to the info at rest. It also shows that data lineage, knowledge origin and unintended speech act of sensitive data is feasible. Using genetic algorithm we can increases the performance and efficiency of all server

II. LITERATURE SURVEY

1. Y. Jin and k. Li, "an optimal multimedia object allocation solution in multi-powermode storage systems," concurrency and computation: practice and experience, vol. 22, no. 13, pp. 1852–1873, 2010.- resource provisioning is the task of mapping of the resources to different entities of cloud on demand basis. Resources must be allocated in such a manner that no node in the cloud is overloaded and all the available resources in the cloud do not undergo any kind of wastage
2. W. Lin, c. Liang, j. Z. Wang, and r. Buyya, "bandwidth-aware divisible task scheduling for cloud computing," software: practice and experience, vol. 44, no. 2, pp. 163–174, 2014.- the running generation of world, cloud computing has become the most powerful, chief and also lightning technology. It based companies has already changed their way to buy and design hardware through this technology. It is a high utility which can also make software more attractive. Load balancing research in cloud technology is one of the burning technologies in modern time. In this paper, pointing various proposed algorithms, the topic of load balancing in cloud computing are researched and compared to provide a gist of the latest way in this research area. By using genetic algorithm the balance is most flexible which is represented here.
3. J. Gu, j. Hu, t. Zhao, and g. Sun, "a new resource scheduling strategy based on genetic algorithm in cloud computing environment.," journal of computers, vol. 7, no. 1, 2012.- it is a mesh of huge infrastructure and has no relevance with its name "cloud". Infrastructure refers to both the applications delivered to end users as services over the internet and the hardware and system software in datacenters that is responsible for providing those services.
4. J. Dean and s. Ghemawat, "mapreduce: simplified data processing on large clusters," communications of the acm, vol. 51, no. 1, pp. 107–113, 2008. -load balancing may even support prioritizing users by applying appropriate scheduling criteria. This paper presents various load balancing schemes in different cloud environment- in order to make efficient use of these resources and ensure their availability to the end users "computing" is done based on certain criteria specified in sla. Infrastructure in the cloud is made available to the user's on-demand basis in pay-as-you-say-manner
5. k. Chen and w.-m. Zheng, "cloud computing: system instances and current research," journal of software, vol. 20, no. 5, pp. 1337–1348, 2009: the principal challenge converts to keep the performance same or better whenever such an outbreak happens. Thus in spite of glorious future of cloud computing, many actual problems still essential to be explored for its perfect awareness. One of these concerns is load balancing.
6. G.Chen, W.He, J.Liu, S.Nath, L.Rigas, L.Xiao, F.Zhao, "Energy aware server provisioning and load dispatching for connection-intensive internet services.," in NSDI, vol. 8, pp. 337–350, 2008-Load Balancing is an important aspect of cloud computing environment. Efficient load balancing scheme ensures efficient resource utilization by provisioning of resources to cloud user's on-demand basis in pay-as-you-say-manner

III. EXISTING SYSTEM

Cloud Computing is the utilization of pool of resources for remote users through internet that can be easily accessible, scalable and utilization of resources. To attain maximum utilization of resources the tasks need to be scheduled. The problem in scheduling is allocating the correct resources to the arrived tasks. Dynamic scheduling is that the task arrival is uncertain at run time and allocating resources are tedious as several tasks arrive at the same time.

The running generation of world, cloud computing has become the most powerful, chief and also lightning technology. IT based companies has already changed their way to buy and design hardware through this technology. It is a high utility which can also make software more attractive. Load balancing research in cloud technology is one of the burning technologies in modern time.

IV. PROPOSED SYSTEM

The time required for completing a task with in one process is very high. So the task is divided into no. of sub-tasks and each sub-task is given one one job. Let the task S is di-vided into no. of sub-tasks S1,S2,S3...Sn. Out of these some are executed sequentially and some are executed parallely. So the total time period for completing the task decreases and hence the performance increases. These sub-tasks can be represented in a graph structure known as state

diagram. An example is given below. S1 is executed first. S2,S3,S4 and S5 can be executed parallely during the same time slice. S18 requires the execution of S6 and S7 both, but S19 requires the execution of S8 and so on for all the sub tasks as shown in the state diagram. Our aim is to execute these tasks in different nodes of a distributed network so that the performance can be enhanced.

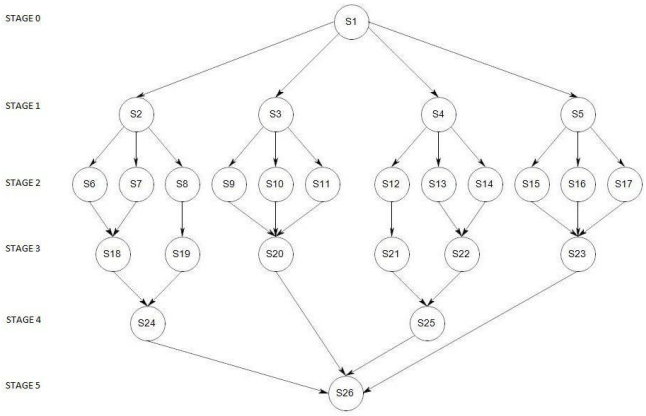

Figure 1: State Flow

The distributed network may follow different topologies. The tasks are distributed over the whole network. One topological network connects with the other through a gate-way. One of the physiacal topologies forming a cloud is shown in the Figure 1. This distributed network is a cloud, because some of the nodes are Mobile clients, some of them are Thin and some are Thick clients. Some of them are treated as masters and some are treated as slaves. There are one or more datacenters distributed among the various nodes, which keeps track of various computational details. Our aim is to apply the Divisible Load Scheduling Theory(DLT) proposed in [9] for the clouds of different sizes and analyze different performance parameters for different algorithms under DLT and compare them.

V. PRODUCT GOAL

1. To study the performance of some of the load balancing system and algorithms.
2. To design and develop the concept of load balancing using Divisible Load Scheduling Theory (DLT) for the clouds of different sizes.
3. To evaluate the performance of the proposed scheme using analytical studies.

VI. SYSTEM ARCHITECTURE

As shown in the figure 3, the process goes through many blocks like getting the data from the user , managing the data and synchronizing the data which leads to the proper data allocation of the resources for the proper storage of the data in the database.

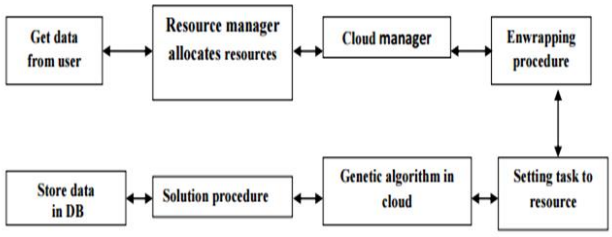

Figure 2: System Architecture

VII. ALGORITHM

- In a distributed system, dynamic load balancing can be done in two different ways: distributed and non-distributed. In the distributed one, the dynamic load balancing algorithm is executed by all nodes present in the system and the task of load balancing is shared among them.

- The interaction among nodes to achieve load balancing can take two forms: cooperative and non-cooperative [4]. In the first one, the nodes work side-by-side to achieve a common objective, for example, to improve the overall response time, etc. In the second form, each node works independently toward a goal local to it, for example, to improve the response time of a local task.

- Dynamic load balancing algorithms of distributed nature, usually generate more messages than the non-distributed ones because, each of the nodes in the system needs to interact with every other node. A benefit, of this is that even if one or more nodes in the system fail, it will not cause the total load balancing process to halt, it instead would effect the system performance to some extent. Distributed dynamic load balancing can introduce immense stress on a system in which each node needs to interchange status information with every other node in the system. It is more advantageous when most of the nodes act individually with very few interactions with others. In non-distributed type, either one node or a group of nodes do the task of load balancing. Non-distributed dynamic load balancing algorithms can take two forms: centralized and semi-distributed.

- In the first form, the load balancing algorithm is executed only by a single node in the whole system: the central node. This node is solely responsible for load balancing of the whole system. The other nodes interact only with the central node. In semi-distributed form, nodes of the system are partitioned into clusters, where the load balancing in 33 each cluster is of centralized form.

- A central node is elected in each cluster by appropriate election technique which takes care of load balancing within that cluster. Hence, the load balancing of the whole system is done via the central nodes of each cluster.

- Centralized dynamic load balancing takes fewer messages to reach a decision, as the number of overall

interactions in the system decreases drastically as compared to the semi-distributed case. \

- However, centralized algorithms can cause a bottleneck in the system at the central node and also the load balancing process is rendered useless once the central node crashes. Therefore, this algorithm is most suited for networks with small size.

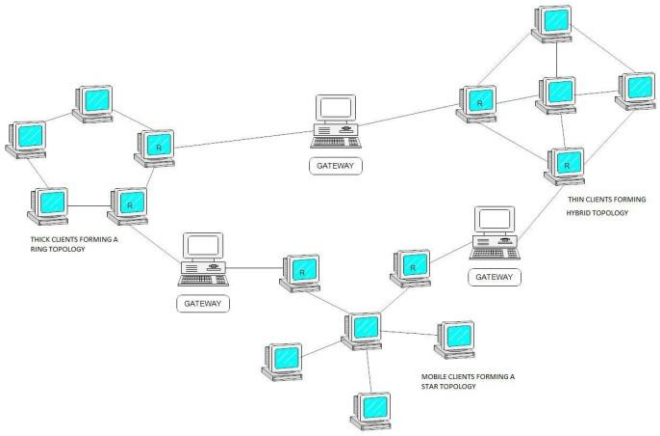

Figure 3: Topology

VIII. RESULT

Load balancing in cloud computing tended to use the direct tasks of users as the overhead application base. Load balancing based task scheduling is a way of measuring both the cost of the objects and the performance of activities and it can measure the cost more accurate than traditional ones in cloud computing. This project introduces an optimised algorithm for task scheduling based on load balancing based scheduling in cloud computing and the implementation of it. Compared with the sequential way of task scheduling ,load balancing based task scheduling method has its own advantages.

IX. FUTURE SCOPE

The experiments need to be done for processors at various platforms and that reduces the execution time. In future reducing the solution space must be reduced. Optimization should be done on shared resources, statelessness, partitioning the database and resource utilization. This helps to combine various resources and tasks.

X. CONCLUSION

Load Balancing in cloud computing tended to use the direct tasks of users as the overhead application base. Load Balancing Based Task Scheduling is a way of measuring both the cost of the objects and the performances of activities and it can measure the cost more accurate than traditional ones in cloud computing. This project introduces an optimized algorithm for task scheduling based on Load Balancing based Scheduling in cloud computing and the implementation of it. Compared with the sequential way of task scheduling, Load Balancing based Task Scheduling method has its own advantages.

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