Hybrid Algorithm for Load Balancing In Cloud Computing Environment

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Abstract— Cloud computing is a technique for distributed system where software and hardware resources will be distributed during the networked Cloud and every services obtain collectively on the source of customer necessities as they require. In cloud computing Load Balancing is forever a big challenge between network researchers. This is since if network load is uniformly alienated onto the complete network it provides closer connectivity on application level as well on hardware level. Our proposed hybrid algorithm focused on utilization of resource and response time based on load balancing using Ant Colony Optimization with modified that genetic algorithm through the facilitate of partial population. our hybrid algorithm that is combination of Throttled and Equal load share algorithm and Round Robin reduction scheme that will help to gratify the request of customer services.

Key words: Ant Colony Optimization, genetic algorithm, Load Balancing Throttled

I. INTRODUCTION

Cloud computing is resourceful and scalable but preserve the firmness of processing so a lot of jobs in the cloud computing environment is a extremely complex problem through load balancing receiving greatly concentration for researchers. because the job influx pattern is not predictable and the capability of every node in the cloud be dissimilar, for load balancing problem, workload control. critical to advance system performance and preserve stability. Load balancing method depending on whether the system dynamics are significant can be together static and dynamic. Static schemes do not utilize the system information and are less multifaceted while dynamic schemes will carry added costs for the system except can modify as the system status change. A dynamic scheme is utilize here meant for its flexibility. The total number of cloud customer during Internet is increasing at an distressing rate so the require of balancing the traffic on the enterprise application in order to provide high Performance and resources accessibility. Well, there are huge numbers of load balancing algorithms accessible in the cloud system, but approximately every the algorithm face a few issues or problem. The major objective of load balancing is to accomplish an successful path for the needs amongst the web servers through a minimum response time. And the further challenge is that the firm face is the elevated cost supervision of web servers where load balancer can be discrete. Cloud based services or stage can be utilize as one of the resolution where web servers can be build as it has a variety of recompense similar to reduced cost, can be effortlessly managed, the virtual instance, and are scalable too. There is a variety of load balancing method accessible in cloud-based services similar to Honey Bee Round Robin, Min Max, Ant Colony FCFS, Round Robin, Throttled. Load balancing in cloud computing systems is in actuality a challenge currently. forever a distributed solution is necessary. Because it is not forever almost possible or cost efficient to preserve one or additional idle services just as to complete the obligatory demands. Jobs cant be allocate to suitable servers and clients independently for proficient load balancing as cloud is a extremely complex structure and components are present during a extensive spread area. now a number of uncertainty is attached though jobs are allocate. We have proposed a survey of load balancing technique. In cloud computing load balancing is one of the major issue. When client is request for service it should be accessible to the client. When several node is overloaded through job at that time load balancer has to set that load on one more free node. consequently load balancing is essential in cloud computing. we have converse every the existing techniques for Load balancing. In this paper, we present a hybrid algorithm interactive load balancing in cloud computing. Our proposed algorithm addresses dissimilar problems from different feature and affords different solutions. a number of limitations of existing algorithms are performance issue, superior processing time, starvation and incomplete to the environment where load dissimilarity are few etc. A excellent load balancing algorithm must avoid the over loading of one node our proposed hybrid on Artificial intelligence network load balancing using Ant Colony Optimization The rest of the paper is organized as follows: Section II briefly describes types of load balancing algorithms. Different load balancing algorithms Section III proposed methodology. lastly, Section IV concludes the paper .

II. RELATED WORK

The process in which the load is alienated between a number of nodes of distributed scheme is call load balancing in cloud computing . Load balancing support the cloud computing during algorithms . Lots of work has been complete to balance the load in order to get better performance and avoid over consumption of resources. a variety of load balancing algorithms have been converse as well as round robin (RR), Min-Min, Max-Min etc. Load balancing algorithm are alienated in two major category, specifically static and dynamic. The categorization of load balancing algorithms. In this section, we give a complete debate on the existing load balancing algorithms for cloud.

RituKapur et al [1] The paper states that Load Balanced Resource Scheduling also leads to a decreased overall cost. A new modified cost effective algorithm is proposed which minimizes the overall resource cost. Various Simulations demonstrated in the paper prove the above fact. Also as the approach deals with the energy efficiency concept, it is also a move towards Green IT.

Yang Lou et al[2],This paper proposes a dynamic testing task scheduling strategy to test task scheduling. Through mining testing tasks, the center firstly get the scheduling scheme which number of parallel tasks is

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maximum. In the process of genetic algorithm, consider elasticity of the cloud to make full of use test resources. The experimental results show that the dynamic testing task scheduling strategy minimizes the make span and realize the load balance. In the future, we will pay more attention on cost model of cloud resource and reducing the solution space in GA.

Aditya Makwe et al[3] In this paper, the problem of scheduling of task in a Cloud Environment is discussed. The theory of AHP has been used to decide the priority of the tasks for allocation of machines. The tasks are pair-wise compared on the basis of their requirement (nature) like bandwidth, RAM size etc. The method of AHP is applied to determine the priorities of the task for scheduling. The method of inconsistency identification is used to determine the perfect order of execution. Use of Analytical Hierarchy Process in scheduling, has also been demonstrated for different nature of tasks.

LipikaDatta et al[4]The objective of this paper is to modify Round Robin scheduling for soft real time systems. It introduces a variation of round robin algorithm, which can schedule tasks considering their priorities in a round robin fashion. Simple Round Robin scheduling algorithm and Priority scheduling algorithm, both have their own drawbacks. The proposed algorithm removes the drawbacks of Round Robin scheduling and Priority scheduling. The proposed scheduling algorithm calculates different time slices for individual processes considering their priorities. Experimental analysis reveals that the proposed algorithm produces better average turnaround time, average waiting time and less number of context switches than some existing algorithms useful for interactive systems.

N. S. Raghava et al[5] In this paper, various proposed algorithms addressing the issue of load balancing in Cloud Computing are analyzed and compared to provide a gist of the latest approaches in this research area. The already proposed algorithms by various researchers in literature, their advantages and disadvantages. A comparison has been done on the basis of different criteria like scalability, network overhead, resource utilization, algorithm complexity, fault tolerance, response time, etc.

III. PROPOSED METHODOLOGY

Load balancing in clouds is a system that distributes the surfeit dynamic local workload consistently crossways every the nodes. It is used for achieve a better service provisioning and resource utilization ratio, consequently improving the mostly performance of the classification received tasks are prospect from dissimilar location are accepted by the load balancer and then separate to the data center ,for the appropriate load distribution The most significant controller and the balancers do the load immovability resolution. The major controller primary allocates jobs to the appropriate cloud partition and subsequently communicates with the balancers in every partition to refresh this position information. Since the major controller deal with in sequence for every partition, minor data locate will lead to the higher processing rates. The balancers in every partition collect the status information from each node and then selection the correct technique to allocate the jobs.

A. Phase 1: Algorithm: Hybrid Algorithm

- Step 1: go into set of Jobs j= {j1, j2, j3,....., jn}.
- Step 2: go through set of Resources R={R1,R2,R3,....., Rn}
- Step 3: Initializing a population of wealth based on processing rapidity and encodes them in to binary thread like chromosome.
- Step 4: currently be relevant.
  a) Divide the create Population in equivalent groups of N.
  b) after that functional selection technique (competition selection) on set of N Groups.
  c) collect the in sequence from step b and decide the well chromosome for additional GA process.
- Step 5: currently compute fitness value of novel population based on equation 1.
- Step 6: verify no of iteration are enclosed or not for mainly positive resolution.
  a) establish that chromosome that has lowest fitness value substitute that by excellent fitness value and create a novel list.
  b) be appropriate multipoint crossover for produce novel chromosome.
  c) Mutation is useful for describe novel set based on probability.
  d) utilize novel identified chromosome to gratify the process and additional are moved in to subsequently round.
  e) ensure the iteration circumstance.
- Step 7: stipulation is fulfilled then end.

B. Phase 2: most important process of load balancing with Ant Colony Optimization consists of two steps earlier than load balancing execution as below.

- Step 1: Ant generation. verify the cloud platform sporadically, and generate ants if and basically if there are existing overload nodes or underload nodes.
- step 2: To discover goal nodes. According to penetrating rules, the ant is appear for the goal nodes which convene the circumstances of load balancing in its nearby area. The target node is as well called the applicant node for load balancing. For rapid convergence, we utilize two varied ants in investigate of the slave nodes. At the similar time, we influence max-min rules to activate ant creation, so as to get enhanced the effectiveness of the algorithm.

Load balancing algorithms can be usually confidential keen on two types: Static algorithms and Dynamic algorithms. In Static Scheduling the obligation of tasks to processors is complete previous to program execution instigate in compile time. Scheduling verdict is based on in sequence concerning task execution times and processing resources etc. which is unspecified to be identified at compile time [8]. Static scheduling technique are non-preemptive. The intend of static scheduling technique is to reduce the on the whole execution time. These algorithms cannot familiarize yourself to load modify during run-time [9]. Dynamic scheduling (frequently referred to as dynamic load balancing) is pedestal on the reorganization of process between the processors throughout execution time. This relocation is performing by transfer responsibilities from the a lot loaded processors to the

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unconscientiously loaded processors with the intend of get better the performance of the function. It is above all obliging when the obligation of process is not identified a priori and the most important objective of the system is to maximize the exploitation of resources. The most important disadvantage of dynamic load balancing method is the run-time visual projection owing to the transfer of load information amongst processors, decision creation for the assortment of processes and processors for job convey and the announcement delays connected with the assignment transfer itself. The dynamic load balancing algorithms can be centralized or distributed depending on whether the accountability for the task of comprehensive dynamic scheduling should physically exist in in a single processor (centralized) or the effort concerned in making decisions must be physically distributed between processors [10]. The majority significant feature of creation decisions centrally is simplicity [8]. though centralized algorithms go through from the problem of restricted access and single point failure. Hybrid load balancing algorithms are free from these problems. again hybrid technique dynamic scheduling can be supportive or non cooperative. The previous one is straightforward where individual processors act alone as independent entity and get there at decisions concerning the utilize of their resources independent of the consequence of their decision on the rest of the system. In the previous one each processor has the liability to bring out its have portion of the scheduling assignment to attain a frequent system wide aim [8][10].

IV. CONCLUSION

Load balancing is key problem in several distributed system that vicinity is requirements additional focus for research. There are lots of load balancing techniques are there, we applied technique and identified that every that techniques moreover give random selection or natural selection , consequently in that case those resources are as well believe who has no ability to grip the jobs. That create overload on the cloud environment. Our proposed work is simply focused that resource who are competent to handle jobs in precious way and as well recognized overloaded resources and their replacement. our proposed hybrid algorithm response time based on Artificial intelligence network load balancing using Ant Colony Optimization with modified that genetic algorithm. combination of Throttled and Equal load share algorithm and Round Robin reduction scheme that will help to gratify the request of customer services.

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