Advance Approach for Load Balancing in Cloud Computing Using (HMSO) Hybrid Multi Swarm Optimization

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Abstract: The greatest challenge in cloud computing world is minimization of Response time and cost in instruction to stabilitythe load and increase business performance with customer satisfaction. As cost plays a dynamic role in cloud environment, so decrease in cost would not simply be proficient but correspondingly be highest best significance for customer satisfaction. Enormous quantity of data transfer in a balanced method with inexpensive rate is a bigger benefit in Cloud computing environment.Setting the amount of processors of each VMs, We have proposedtechnique based on Swam Optimization in multi-levelinto account in order to discovery the optimal solution to our resource allocation which affordsenhanced distribution map. We found that the Response time of our proposed technique is efficient one as compared to other two algorithms. Correspondingly the average costs of datacentres for proposed technique is minor than others two algorithms.

Keywords: Cloud computing environment, Particle Swam Optimization Algorithm, Response time, Hybrid Multi Swarm Optimization, load balancing

I. Introduction

Cloud computing is a service-oriented computing paradigm that has considerablytransformed computing by contribution three web-based services – Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) [1][2]. Cloud computing have a number of service that can be applying number of domain, which in common are a group of numerousproprietary procedures in a virtual environment called a virtual machine (VM).

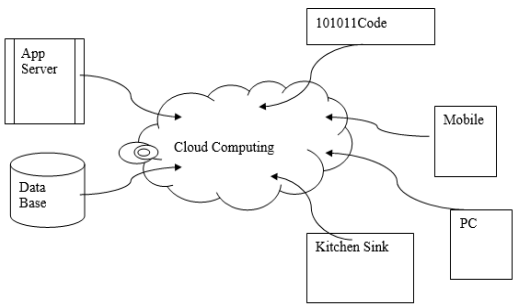

Figure 1: basic Cloud computing Environment

In the Cloud computing environment, dissimilar load balancing scheduling occurs to ensure ansuitable utilization of resource consumption. This is used to efforts to fix the problem that completely the processors in the system and each node in the network essential share an equivalent quantity of workload which is allocated to them. Load balancing technique very useful in resource utilization in a cloud computing environment that can be separated into two classes of technique which can be distinguished: Load balancing is unique of the dominant issues in cloud computing. This technique very useful for allocates the dynamic local workload consistently across all the nodes in the complete cloud to avoid a condition where particular nodes are comprehensively loaded while others are idle or doing little work. It benefits to accomplish a high user satisfaction and resource exploitation ratio, load balancing is useful for improving the total performance and resource effectiveness of the system. It similarly makes sure that each computing resource is disseminated proficiently and equally. It additional prevents bottlenecks of the system which might occur due to load imbalance. Subsequently one or additional components of whichever service fail, load balancing supports in continuance of the service by applying fair-over. In provisioning and de-provisioning of instances of applications without failing. Improving load balancing technique using multi swam optimization these numerous resources (network links, central processing units, disk drives.) to accomplish optimal resource utilization, maximum throughput, maximum response time, and avoiding overload. To distribute load on dissimilar systems, dissimilar load balancing algorithms are used. These algorithm instructions the earlier state as well as the current node and regulates traffic distribution consistently in real time. Throttled Algorithm, Modified Throttled Load Balancing Algorithm, FCFS Algorithm, Particle Swam Optimization Algorithm, Genetic Algorithm, Clustering Algorithm, etc. are some of the collective dynamic algorithms. Cloud computing situation cannot rely on the previous information of nodes capacity, processing power, memory, presentations and users necessities, so dynamic load balancing algorithm fits improved than static load balancing algorithm as the earlier one takes run time statistics for load balancing. And additional superior benefit in dynamic situation lies in the give of user necessities, which might alteration at run time. The rest of the paper is organized as follows. Section II reviews relevant related work. Section III describes the approach, the optimization algorithms, Section IV illustrates the implementation setup used to perform simulations and offerings experimental consequences. Lastly, Section V concludes the paper and converses future perspectives.

II. RELATED WORK

Previous researchers have proposed load balancing techniques to reduce task execution time, exploit system performance and reduce cost using optimization algorithms using as particle swarm optimization (PSO), genetic algorithm(GA), bee colony optimization (BCO), ant colony optimization(ACO). These methods have subsidized to additionaldevelopments of epitome solutions. With altering cloud computingenvironment, VMs are limited to handle the volume of the assignment that frequently reaches datacentres. Thus, approaches applied by current researchers still essential to be moved and to be better with certaindifferent methods.

Ali Al Buhussain et al[1] In this work, conducted a series of general analyses in order to detect the behaviour of particularbio inspiredalgorithms beside extreme load and significantenvironment conditions. The consequences of such analyses affordconditions to improved understand the situations that stimulusthe performance of every algorithm, given that an suggestive of improved parametric configuration and permitting us to propose betterresults that are accomplished to cover such extreme cases, permittingbettercomplete scheduling effectiveness.

H. Chen et al[2] in this work improve the Particle Swarm Optimization (PSO) algorithm by adjusting its parameters dynamically and creation the position coding discrete. Then, propose a task scheduling algorithm based on QoS-DPSO. They was showing through results proposed approach very effective in the term of performance.

C.-Y. Liuet al [3] proposed novel task scheduling algorithm MQoS-GAAC with multi-QoS constraints allowing for the time-consuming, expenses, security and reliability in the scheduling process. Proposed algorithm is a combination of hybrid algorithm just called an ant colony optimization algorithm (ACO) with genetic algorithm (GA). To produce the initial pheromone proficiently for ACO, GA is invoked.

Himani et al [4] proposed new approach which yield care of target and cost, then arranged the task according to requirement. This concept Based on space-shared scheduling policy, this work presents Cost-deadline Based (CDB) charge scheduling algorithm to schedule tasks through Cloud-sim by taking into account numerous parameters with task profit, task penalty, quantity, provider profit, customerloss.This paper efforts to overcome the limitations of existingstudies by suggesting a multi-objective optimization model that takes into resource utilization, and VM transfer time. Novel formulas are proposed for the purposesto efficiently handle cloud environment characteristics. In adding, the paper uses hybrid multiswarm intelligence to resolve the optimization model.

III. PROPOSED METHODOLOGY

In this work to proposed a new algorithm for load balancing in cloud computing environment. In the cloud computing as well several research directions that seem routine working on and exploring such as: developing proficient scheduling optimization algorithms in the cloud, implementation of resource allocation and task scheduling models using machine learning concept , and implementing a machine learning algorithm for applying dynamic models to reduce the essential cloud resources and load balancing. We study and applying task optimization scheduling algorithms with different challenges such as migration and value of service constrictions. This study include examiningmachine learning techniques to handle multi-label data such as hybrid level multi swam optimization that can perform the training and testing then find out the effective results with consideration of other appropriate metrics such as the volume of CPU, RAM, data centre and bandwidth.we use multi swam optimization algorithm to construct an optimal migration plan, but while we allocating with significant data, the scheming of a particle mightyield a few minutes, the cost of HMSO to thorough the compute of completely particles is undesirable. It's used for implementation of traditional algorithm just like round robin,Throttled Algorithmis in serial. The algorithm can simplycomputeone by one, if every particle proceeds a long time, the process of existing algorithm would be precise time-consuming. For this motive, we understand parallel HMSOcomprehensive stream computing technology to save time and increase the algorithm performance. We call this novel algorithm as HMSO. HMSO also extended our requisitefor real time.HMSOcomputing is a knowledge to ingest, filter, analyse, and relateincessantresource utilization, and extract effective information from these data resource utilization .HMSO -based Particle Swarm Optimization (PSO) extends the modernisetechnique of particle in PSO, but the implementation of HMSO is dissimilar from PSO, we use HMSO as a tool to create migration decision. HMSO can utilize continuous data streams, and contribute a response to the approachingresource allocation. It similarly can assurance the data that processing by HMSO is latestModernization of this paper is that we apply HMSO algorithm of the swarm intelligence optimization algorithm to a storage system below cloud environment. The algorithm can reduce the cost of time, and boost load balancing degree. Experimental results illustration that this method can efficientlyreduce the load gradient while optimizing the time cost in data migration process.

IV. SIMULATION, RESULTS AND ANALYSIS

In order to study and analysis the above completelyconversedalgorithms to use the tool. Cloud Analyst for widespreadexecution. The Cloud Analyst [2] collected is constructed on the top of Cloud Sim tool kit and on a complete GUI which is used to configure the

simulation at a high level of details. To used for running the cloud analytic tools 4GB Ram , 10GM hard disk, Intel® Core™ i5 Processors. The GUI tool supports the users to construct up and execute simulation experiments simply in order to get preciseresults.

Figure. 1: Cloud Analyst GUI user interface

Figure 1. Belowillustrations the total cost particulars of dissimilar algorithms. The graph suggests that proposed Algorithmtransfers the lowest cost as likenedto the other algorithms. Afterthe above simulation consequences it can be specified that, hybrid Swam Optimization Algorithm is more efficient as it has least Response time and cost Particle Swam Optimization Algorithm is greatestmethod for effective load balancing.There is hardly somevariation in the curve of proposed algorithm, and the value of migration cost is considerablesmaller than traditional algorithm. Due to proposed algorithm read real-time state information, proposed algorithmcan continuouslyselect the migration plan which has minimum cost.

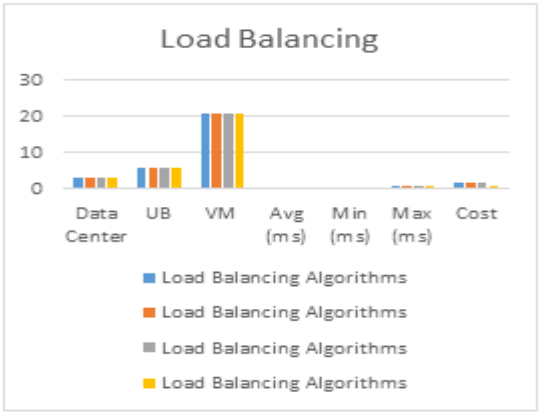

Figure 2: Comparative analysis proposed algorithm and Traditional algorithm

Traditional algorithm cannot do that, so the migration cost increasing asrelocation data volume increasing. Reducing migration cost is one of the foremost goals in our research work, thus our algorithm is additionalappropriate for resolving the problem of data migration decision. Simulation results illustration that proposed is superior to the traditional algorithm in terms of running time and consequences'migration cost. Proposed algorithm yield advantage of load balancing in cloud computingtechnology to make migration strategy fast and successfully.

V. CONCLUSION

In the cloud computing environment, load balancing is the key technology to understand the elastic load balance a good migration strategy can expand the strength of migration. We propose HMSO algorithm to make migration plan. Proposed algorithm understandsTraditional algorithm on the basis of resource utilization computingtechnology. Proposed approach can avoid time consuming, and happen the necessities of real-time. Simulation consequencesillustration that the performance of proposed approach for load balancing is much better than Traditional algorithm. Though, data migration is not analysed in this paper, a relocationmethod that ensuring data consistency will be discussed and studied,and analysisin future work

REFERENCES

[1]. Al Buhussain, E. Robson, and A. Boukerche, "Performance analysis of bio-inspired scheduling algorithms for cloud environments," in Parallel and Distributed Processing Symposium Workshops, 2016 IEEE International. IEEE, 2016, pp. 776–785.

[2]. H. Chen and W. Guo, "Real-time task scheduling algorithm for cloud computing based on particle swarm optimization," in International Conference on Cloud Computing and Big Data in Asia. Springer, 2015, pp. 141–152.

[3]. C.-Y. Liu, C.-M. Zou, and P. Wu, "A task scheduling algorithm based on genetic algorithm and ant colony optimization in cloud computing," in Distributed Computing and Applications to Business, Engineering and Science (DCABES), 2014 13th International Symposium on. IEEE, 2014, pp. 68–72.

[4]. Himani and H. Sidhu, "Cost-Deadline Based Task Scheduling in Cloud Computing", 2015 Second International Conference on Advances in Computing and Communication Engineering, 2015.

[5]. R. Jena, "Multi Objective Task Scheduling in Cloud Environment Using Nested PSO Framework", Procedia Computer Science, vol. 57, pp. 1219-1227,2015.

[6]. H. AI-Olimat, M. Alam, R. Green and 1. Lee, "Cloudlet Scheduling with Particle Swarm Optimization", 2015 Fifth International Conference on Communication Systems and Network Technologies, 2015.

[7]. Thomas, G. Krishnalal and V. Jagathy Raj, "Credit Based Scheduling Aigorithm in Cloud Computing Environment", Procedia Computer Science, vol. 46, pp. 913-920,2015.1995, vol. 4, pp. 1942-1948. 1995.

[8]. [F. Ramezani, J. Lu, and F. K. Hussain, "Task-based system load balancingin cloud computing using particle swarm optimization," InternationalJournal of Parallel Programming, vol. 42, pp. 739-754, 2013.

[9]. M. Nafar, G. B. Gharehpetian, and T. Niknam, "Using modified fuzzyparticle swarm optimization algorithm for parameter estimation of surgearresters models," Int J InnovComputInf Control, vol. 8, pp. 567-582,2012

[10]. G. Rjoub and J. Bentahar, "Cloud Task Scheduling Based on Swarm Intelligence and Machine Learning," 2017 IEEE 5th International Conference on Future Internet of Things and Cloud (FiCloud), Prague, 2017, pp. 272-279. doi: 10.1109/FiCloud.2017.52.

[11]. Q. Cheng, K. Ma and B. Yang, "Stream-based Particle Swarm Optimization for data migration decision," 2015 7th International Conference of Soft Computing and Pattern Recognition (SoCPaR), Fukuoka, 2015, pp. 264-269. doi: 10.1109/SOCPAR.2015.7492818.

[12]. G. Yushui and Y. Jiaheng, "Cloud Data Migration Method Based on PSO Algorithm," 2015 14th International Symposium on Distributed Computing and Applications for Business Engineering and Science (DCABES), Guiyang, 2015, pp. 143-146. doi: 10.1109/DCABES.2015.43