Dynamic Load Balancing Using Hybrid Approach

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ABSTRACT

Load balancing in a cloud environment for handling multiple process of different size is an important issue. Many advanced technologies are incorporated in the processes-based resource allocation which enhances the system efficiency. The steps of allotting resources to process can be done by taking data which helps to analyze and make important decisions at runtime. This article focuses on the allocation of cloud resources where two models were developed, the first was TLBO (Teacher Learning Based Optimization), a genetic algorithm which finds the correct position for the process to execute. Here, some information used for analysis was total number of machines, memory, execution time, etc. So, the output of the TLBO process sequence was used as training input for the Error Back Propagation Neural Network for learning. This trained neural network improved the work job sequence quality. Training was done in such a way that all sets of features were utilized to pair with their process requirement and current position. For increasing the reliability of the work, an experiment was done on a real dataset. Results show that the proposed model has overcome various evaluation parameters on a different scale as compared to previous approaches adopted by researchers.

KEYWORDS

Cloud Computing, Genetic Algorithm, Load Balancing, Neural Network, Virtual Machines

1. INTRODUCTION

As number of services with better results are demand of today era, so cloud computing is developing new techniques to balance the incoming load from different user requirements. The research area of Cloud computing was getting more demanding as high priority task need cloud to process with proper waiting queue in balanced way. So, some algorithms were developed to manage those high priority jobs, these kinds of systems are termed as static load balancing. Load adjusting impacts the execution in distributed computing as load adjusting plans to upgrade asset utilization, get the most out of throughput, decrease reaction time, and stay away from over-burden of any single resource (Shengjunxue et al., 2016). Hence, this balancing algorithm is demand with goal to distribute incoming jobs equitably among various resources like pool of network node or processor so the running job is assigned with no starvation. Better load balancing makes distributed computing more productive.
and enhances client fulfillment. The targets of load adjusting are to keep up the strength of the system, enhances the execution, assemble the system which is adaptation to non-critical failure and give future variety in the system, for example, security refreshes, discharging clients time and assets for additionally errands too. Cloud input job adjusting is a kind of load adjusting that is executed in distributed computing which can be finished separately and in addition on gathered premise (Gowrishankar et al., 2001; Tailard, 1993). There are different calculations intended for adjusting the load among various resources.

In Round robin planning calculation strategy, it thinks about the current load on each virtual machine. This is static technique for input job adjusting, static load adjusting strategy offer most straightforward implementation and checking of condition however unable to handle heterogeneous nature of cloud. The other calculation known as throttled is totally in light of virtual machine. In this calculation, customer initially request that the load balancer check the right virtual machine which get to that load essentially and execute the tasks which is given by the client or customer. Calculation says that load balancer is essential for checking of occupations which are asked for execution.

The duty of load balancer is to line up these occupations and relegate them to various virtual machines. The balancer consistently investigates the line for crisp occupations and after that dispenses those jobs to the directory of free virtual server. The directory of assignments that are designated to virtual servers are likewise keep up by the balancer, which underpins them to perceive what virtual machines are free and required to be allocated with new jobs (Chunlin et al., 2017; Zhao et al., 2014). The name recommends about this calculation that: it take a set of job to evenly spread the execution for input job on various resources in form of virtual machine. As indicated by our examination result of this calculation as far as reaction time and server request for looking time is low in correlation of other two previous algorithms (Shengjunxue et al., 2016; Mianguo et al., 2018).

The rest of this paper are organized as follows: in the second section, elaborate various techniques proposed to handle this problem by different researchers of this field of load balancing. While third section provide proposed model DLIBGNA explanation, which is a combination of genetic algorithm and neural network where neural network help to learn various pattern of the input jobs. While genetic algorithm increases the dynamic situation of the jobs. Finally, the fourth section provide different outcomes after performing experiment on real data. Here comparison of DLIBGNA with previous approaches and analysis was done. The conclusion of the whole paper is made in the fifth section.

2. RELATED WORK

In Zhang and Li (2009) Fog processing can enhance the resource use proficiency of the user gadget, and tackle the issue about service balancing of the postponement sensitive applications. This article inquires on the structure of the fog processing, and receives Cloud Atomization Technology to transform physical nodes in various levels into virtual machine nodes. On this premise, this paper utilizes the graph separation hypothesis to assemble the fog processing’s load balancing calculation in light of dynamic graph apportioning. The experiment results demonstrate that the structure of the fog registering after Cloud Atomization can build the system network adaptably, and dynamic load balancing instrument can adequately arrange system resources in addition by decreasing the utilization of node migration brought by system changes.

In the paper by (Ningning et al., 2017), it demonstrates an algorithm to decrease the operational cost of cloud server organization with the assistance of fog gadgets, which can maintain a strategic distance from the income misfortune because of wide-zone arrange spread postponement and save system transfer speed while serving closer cloud clients. Since fog gadgets may not be claimed by a cloud specialist organization, they ought to be made up for serving the solicitations of cloud clients. When thinking about temperate pay, the ideal number of solicitations handled locally by each fog gadget ought to be chosen. Therefore, existing burden balancing plans created for cloud server organization can’t be connected specifically and it is exceptionally important to update a cost-product input job
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