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# Cloud Computing task scheduling algorithm based on improved Heuristic Approach

**PG Scholar Shrankhala Jain, Mrs. Divya Thakur**

BTIRT College, Sagar MP, RGPV University Bhopal

Shrankhalajain30@gmail.com

***Abstract*—Cloud Computing and its architecture provide a scalable computing. Processing of multiple requests and handling it with proper response time can be drawn using the cloud components. Cloud help in multiple request handling and managing user's data secure. There are components which find a suitable architecture and thus provide a bonding between the component communications. Virtual machine, data centre and user base are the main communication components available in cloud. Thus handling multiple request, allocation of proper virtual machine to the input request and then providing the finest response time is always required. Many approaches to balance the load on virtual machine is provided. The algorithm such as Round robin, throttle and other VM allocation help in allocation of machine for the users request but in limited Manner. While the improvement for the better allocation of virtual machine, further finding a best suitable allocation is always desired to improve the performance. In this paper an algorithm is presented which is advance heuristic based approach. This is the algorithm which combines the multiple features of virtual machine, its stats and thus finding a best fit virtual machine for request allocation. The approach is simulated using the Cloud Analyst simulation tool and the comparison is made with multiple available algorithms. The comparison is made using computation time, computation cost and Energy consumption parameters. The output result observed shows the effectiveness of approach over traditional techniques.***

***Keywords:** Cloud Load Balancing, Data sharing, Virtualization, Greedy, Heuristic Approach, Bully search, Localization, Dynamic Allocation.*

## I. INTRODUCTION

***There's not an official definition about what is Cloud environment data store & its Computation. For answering this question we will make reference to available multiple definitions among cloud offered by important organizations. The NIST Driven:Cloud environment data store & its Computation is a security and accessible model for enabling ubiquitous, convenient, on-demand connected nodes and its communication access to a pool of sharing resources which is of configurable computing usable entitiess (e.g., connected nodes and its communications, configuration settings, data storage, accessing applications, and user demand services) which provide users utility and on demand service [3].***

## TASK LOAD BALANCING

Load balancing is a dynamic, uniform workload distribution process across all available nodes in the cloud. This improves overall system performance by moving workloads between different nodes. Resources that are not used properly are sometimes overheated, causing carbon emissions. Carbon emissions can be minimized by using resources appropriately [4]. Performance, performance, scalability, response time, resource utilization, and fault tolerance are a few metrics that can be used to evaluate load balancing techniques. These parameters allow us to check whether the technique or the algorithm for balancing the given load is good enough to balance the load or not [5].

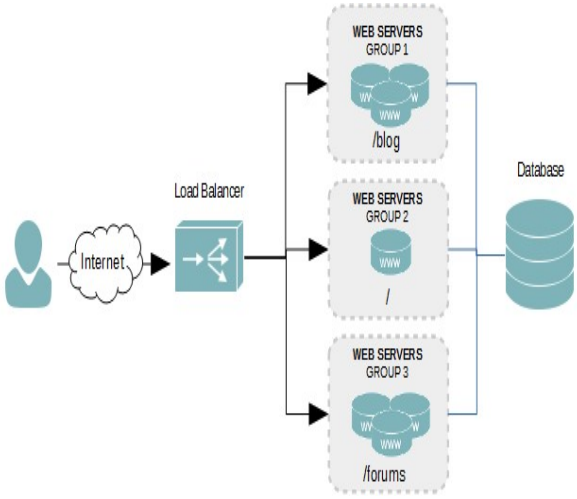


***Figure 1: General Structure of Load balancing in Cloud Environment.***

Load balancing is the process of distributing workloads and IT resources on one or more servers. This type of distribution guarantees maximum performance in the minimum response time. The workload is separated between two or more servers, hard disks, network interfaces, or other computing resources, allowing for better resource utilization and system response time. Therefore, for a high traffic website, the efficient use of load balancing in the cloud can ensure business continuity. The common objectives for using load balancers are:

 

- To maintain system firmness.
- To improve system performance.
- To protect against system failures.

Therefore, load balancing works for users' enjoyment through proper use of capacity. Therefore, a good load balancing approach underestimates resource consumption. In a cloud computing hypervisor, view a convenient computer screen that adapts to appropriate management features, such as (shared virtual machine) [7] in a cloud-based organization. As a result, various load balancing algorithms have been proposed for the cloud ecosystem and the set of rules determines the development of parameters such as:

**1. Throughput: -** This is the amount of work to be done in the allotted time.

**2. Performance: -** It is the general verification of algorithms that work when considering accuracy, cost and speed.

**3. Fault Tolerance: -** The ability of the load balancing algorithm to allow the system to operate under certain conditions of system failure.

**4. Response Time: -** This is the time used to start satisfying the user's request after the application has been registered.

**5. Resource Utilization:-** It is used to control the use of various resources.

**6. Scalability:-** It is the ability of the algorithm to evolve according to the required conditions.

## II. LITERATURE REVIEW

Tinghuai Ma, Ya Chu, Licheng Zhao [2]

Existing Approachs like ACO (Ant Colony Optimization), Genetic Algorithm etc. are not provide long term optimal solution for data workload sharing & balancing problems. In short term data workload sharing & balancing solution, there is no assurance for the efficient execution for the next task is provided. A long term data workload sharing & balancing solution for the resource allocation problems is presented by the authors. LB-BC (data workload sharing & balancing based on bayes and clustering) is regular usage from conduct the data workload sharing & balancing task. In that Approach first a monitor is regular usage from acquire the all the status of the VMs and cloud users. Then that information is regular usage from it outperform data load sharing task. For that purpose a deployment controllers is used which conduct the task of control and deployment from available all resourcesrequests.

Nidhi Jain Kansal [4]

Cloud Approach and its computation scenario or on-demand computing is a Para diagram where various on-demand services and usable components are offered for the users. In Cloud Approach and its computation scenario, simultaneous access of the usable components is conducted by the cloud users. That generates extra load for the system because of the load issues like fault tolerance, storage overhead, degrading performance are occurs. Thus effective data workload sharing & balancing Approach is required to provide better performance in cloud scenario. There are two type of data workload sharing & balancing Approachs either an open source data workload sharing & balancing where session switching or packet switching schemes are used or a pre-processor data workload sharing & balancing .

Dr. Amit Agarwal, Saloni Jain [9]

Optimal data handling and processing of the usable components is one option from the available biggest issue in Cloud Approach and its computation scenario. Proper balancing of the nodes is required to provide flexible and scalable cloud service for the user. Load of the usable components is based on the factors like processing capacity, storage usage, access time etc. after calculating the status of the usable components and cloud users or nodes various data workload sharing & balancing schemes are used to provide a uninterrupted cloud service for the user. Genetic algorithm and its variants are used to provide an optimize data workload sharing & balancing solution for the cloud users. But these Approach not able deal with exploration problems in the Cloud Approach and its computation scenario. A firefly algorithm to overcome the issues of the genetic algorithm and provide an enhanced functionality to access usable components over the cloud is presented. Firstly status of the cloud usable components and requests generated by the cloud users is listed. Data workload sharing & balancing operation on the basis of firefly algorithm is conducted. That Approach provides an optimal solution for the data workload sharing & balancing problem but the time limit for the operation is high.

Sukhvir Kaur, Supriya Kinger [7]

Data workload sharing & balancing is one option from the available prime concern in Cloud Approach and its computation scenario. In

 

traditional data workload sharing & balancing Approachs used to distribute load on first come first serve basis. But these Approachs does not provide any energy efficient mechanism to distribute load among the cloud nodes. A high reliability replication algorithm for the data workload sharing & balancing is presented. That Approach provides an enhanced mechanism to allocate usable components for the nodes and efficiently management for energy. Efficient Energy allocation improve energy consumption in the cloud scenario and improve the Quality of Service (QoS) of the system. QoS parameters are considered while performing resource allocation and energy allocation for the nodes.

X. Xu, W. Dou, X. Zhang [10]

In Cloud Approach and its computation scenario various on demand usable components are provided for the user to conduct their tasks. User can access these usable components as per their needs. Concurrent request for accessing usable components are sent by the various node. For proper allocation of the nodes efficient data workload sharing & balancing Approach is required. Approachs like genetic algorithm based scheduling, shortest job first scheduling etc. are used to provide better data workload sharing & balancing in cloud scenario. But these Approach not able to provide efficient and optimal solution to allocate usable components. A new soft computing Approach called stochastic hill climbing is given in this paper to allocate usable components in cloud environment. That Approach provides enhanced functionality to access respires in cloud server. That Approach provides quick access for the various usable components.

Feilong Tang Member [1]

In cloud various application servers are hosted at data centre these servers are hosted in various virtual machines. To provide flexible and scalable access of these server a memory management system is required to provide better usable components in cloud scenario. A dynamic memory allocation system which prevent memory overload in cloud data centres is presented. An adaptive feedback filter based Approach is regular usage from allocate memory for the various servers in cloud data centres. A self-configurable memory controller is presented which provides an automatic memory allocation mechanism which based on the analytical model is regular usage from conduct memory management task in cloud data centres. It provides an scalable mechanism to perform the memory management task because various independent controllers are there to conduct memory management operation.

Balaji N, Umamakeshwari [26]

Various type of virtualize and physical usable components are provided for the cloud user in Cloud Approach and its computation scenario. For proper allocation of the usable components scheduling of the usable components is required. There are various virtualize usable components are used to perform various tasks thus an automatic scheduling scheme is required to provide better allocation of the usable components. Because manual scheduling not able to provide better solution for scheduling usable components at that large scale. Approaches like ACO, Gang Bang scheduling, dynamic scheduling are generally used for providing automatic scheduling for the data. Usable components are allocated on the basis of priority.

Dr. Amit Agarwal, Saloni Jain [9]

Task scheduling algorithms are used to distribute load in Cloud Approach and its computation scenario. To reach QoS measures efficient scheduling mechanism is required. A priority based scheduling mechanism is presented by the authors. First priority for the various tasks is assigned and sorting is conducted to sort these task on the basis of priority. Status of the usable components and request of the user is regular usage from allocate resource for the nodes to perform the task. Usable components can be allocated in FCFS (First Come First Serve) manner.

## III. PROBLEM DEFINITION

As per the literature survey is performed with different techniques and different result from the algorithms were monitored such as PRISM , SVM and other different technique for scheduling technique on large amount of structured data packets available dataset our monitoring is performed .

Upon verifying different scenario and the available technique different short comes with the Existing algorithm for scheduling which is taken as base for our research work .

The following are the monitored points which identified as problem and further analyzed and performed further with enhancements .

1. Previous technique such as PRISM & other scheduling algorithm for the processing model generation but still the obvious problem occur with the technique is in generating better result and data allocation policy upon breaking

 

of virtual matchine network. This technique persist better result than existing but still enhancement is required which is provided by the proposed procedure.

2. Previous technique Naïve based classification doesn't perform a better recruitment classification due to lacking of number of rules thus a better probability model cant get generated using the technique.
3. In previous technique distribution is used because of that the data of the topics varies which determine the drawback of different entities than proposed work which include heuristic search and distribution algorithm.
4. In the existing distribution independent proportion among component is found thus there is no relation with the other topics is found, where as in new technique normal distribution is used, which provide relation among the topics and provides a flexible framework for the process.

Thus in order to proposed a better prediction model using classification and further combine approaches requirement is to further aquire an scheme which contribute on getting better outcome and system, here our proposed methodology heuristic is utilize scheme in place of traditional scheduling approach.

## IV. PROPOSED METHODOLOGY

As per our observation about the previous technique and their disadvantage in different terms and scenario's. Our work present a new approach which is productive and consumes high value and thus computational better result over the large number of available dataset.

Our work propose a new algorithm Heuristic Based prediction model which utilize a new logistic normal distribution technique, which give a relation between the topics and also provide a flexible environemt for the complete process and thus it generate a better prediction model for data transmission.

The proposed algorithm is described below :

1. Loading of all the available data & packets from the created given message which are participating for the communication.
2. Loading the complete node dictionary pair from the dataset.
3. Perform the particular algorithm as per selected by the user for further execution such as existing or proposed
4. Perform node down operation and matching operation if any single match is obtained and conclude that further using model for the data shifting either it is working or not.
5. Perform model and match operation if atleast 2 or more dictionary match is performed by the system.
6. Ontaining parameter wise data for the history model.
7. Observing the values and thus it effect accuracy and efficiency for the complete scenario.
8. Exit.

Algorithm Pseudo Code:

**Advance Heuristic Algorithm:**

**Input :Node data Qi,**

**Output :algorithm process, Metadata, node values.**

**Steps :**

**Active either PRISM or Heuristic**

**While(true) do{**

**Node distribution{p1,p2…..pN};**

**dictionaryRequest();**

**If(scorematching()==1)**

**{**

**Recognition();**

**Perform Heuristic model;**

**Compute the prediction values;**

**{**

**Result computation;**

**}**

**Set status=finish and exit;**

**}If(scorematching()>=2)**

**{**

**Re-distribution;**

 

{

**Computing parameter upon distribution;**

}

**Set status=finish and exit;**

**};**

The above given pseudo code discuss about the steps functions taken for implementation process purpose,

## V. SIMULATION SETUP

We are developing an application which is provided two factor authentications. For developing this application, we are using JDK 1.8 that is JAVA developing kit.

**PARAMETERS DESCRIPTION**

**Throughput:** In general terms, throughput is the rate of production or the rate at which something is processed.

Computation Time:

Table 1: Comparative analysis among topologies.

In the table present below is a statistical comparison of the values which are retrived as time taken by the different process algorithm , throughput and other parameter can be observe.

**Table 1: Data distribution for different data packet.**

| Technique Approach Date packets | Proposed Technique Model | Existing Technique Model |
|---|---|---|
| 1024 | 3374ms | 3889ms |
| 2048 | 4098ms | 4158ms |
| 3072 | 5229ms | 5344ms |
| 4096 | 5310ms | 5391ms |

The above table represent the number of data values from the data and algorithm is performed.

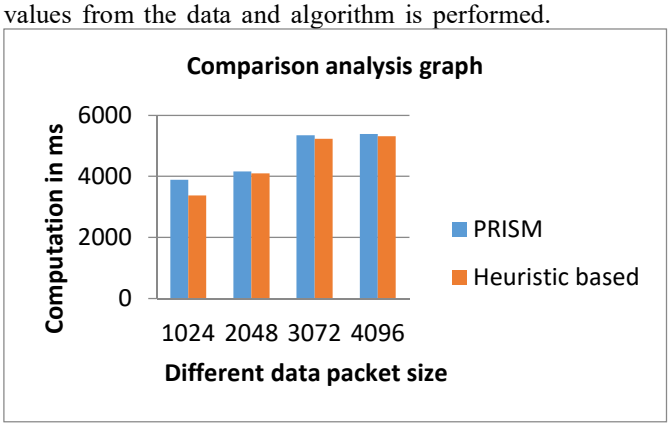


**Figure 1 : Comparison of Line graph for technique analysis**

In the above graph drawn x axis as data from which post were extracted for the query processing for specified dataset and line graph is printed using the chart library provided by the Microsoft and further analysis can easility performed thus the Heuristic based approach outperform the best .

The graph representation shows the efficiency of our proposed algorithm work and it outperform the low forcasting value.

## VI CONCLUSION

In this paper, we have surveyed various load balancing algorithms in the Cloud Computing environment. We discussed major issues which must be taken into consideration while designing any load balancing algorithm. We have discussed 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. In future we will focus on designing algorithms which will maintain a better trade-off among all performance parameters.

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