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Weight based Approach for virtual machine migration in Cloud Architecture

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Abstract— *The cloud computing is the architecture which is used to execute the cloudlets on the virtual machines. The most applicable virtual machines are selected on the basis of execution time and failure rate. Due to virtual machine overloading execution time and energy consumption is increased at steady rate. In this paper, weight based technique is applied in which weight of each virtual machine is calculated and virtual machine which has maximum weight is selected on which cloudlet is migrated. The performance of proposed weight based is tested on cloudsim. It is analyzed that weight based algorithm performs well as compared to check pointing algorithm*

I. INTRODUCTION

A large pool of systems which gather together in a public or private environment for providing resources in a shared manner is known as the cloud computing system. The data can be stored as well as utilized by various users through the dynamically scalable infrastructure provided by these systems. The cloud computing technique provides minimization of computation cost; content storage and delivery. There are direct cost advantages achieved due to the utilization of this technique. For the transformation of the different set of capital-intensive to the various cost environment that present within the data centre [1]. It is important to have internet connectivity for the various available applications of cloud computing. Parallel computing has been utilized to solve the large issues embedded in the grid computing [2]. The resources are provided by the utility computing with the help of metered services. Therefore, the users pay amount according to services consumed by them. The services model of a cloud computing is SAAS with the help of this various applications are provided with the network based subscription. All above mentioned services has been utilized by the cloud computing.

The various data storage application of cloud computing can be employed on the various parts like public, private and hybrid depend upon the ventures [3]. In order to determine the direct and exact path for different association cloud integrators has been utilized. The cloud services provide better services at fewer prices to the customers as well as minimal cost infrastructure that is present within the users. This is provided by the model "pay-as-you-go" [4]. In order to build the single enterprises private clouds is utilized. The main objective is to offer the data security and control on the objects that is not provided by the public cloud. Hybrid clouds are the combination of both the public and private cloud models. In case of the hybrid cloud, service providers can access the services of outsiders and also of insiders. It will provide flexibility in computing as they can access the services of outsiders cloud providers partially or fully. The on-demand facility is provisioned on the large scale by the Hybrid cloud [5]. Any unexpected fall down in the workload can be controlled with the help of various resources of a public cloud that has ability to expand a private cloud.

The cloud resources are to be allocated is a proper manner and this is a prior objective of this system. It is to be made

sure that the financial profit is the highest in the selected architecture. One of the major function of cloud computing is the allocation of resources in which the resources are distributed in a proper manner [6].To satisfy the requirements of the users it is required to provide sufficient resources to the users . It is done keeping is mind the perspective of the consumer. The economy of the IT industry is increased by the proficient resource allocation results provided. The clients enter the resources at very less chances for a small job when the skill is to be deployed as a service [7]. In the certain systems, the resource allocation and resource scheduling is done by the certain key algorithms. There should not be violation of the set of constraints while this resource allocation process. There is no prediction of which resources are perfect for the allocation in a particular job provided by the cloud users [8]. The perfect resource allocation procedure involves the proficient allocation along with the least number of resources to be used. This will help in providing maximum profit for the users. The main aim of resource allocation strategy is to provide resources to multiple users for the purpose of concurrent allocation of resources in the cloud computing environment.

II. LITERATURE REVIEW

A theory is used to describe the ambiguity that lies within the computing environment and a scheduling engineering. This proposed theory is utilized to minimize the impacts on the quality of scheduling lies within the data centre [9]. Therefore, a novel scheduling algorithm (PRS1) is proposed on the basis of design. Author concluded that proposed algorithm has many advantages as compare to other existing algorithms. They are also effective and efficient in term of performance of a cloud data centre.

An algorithm that is used to mitigate the infringement embedded within the tasks which requires time and resources are assigned to various tasks [10]. The time constraint is taken as phenomenon to decide, time scheduling on the resources to perform various tasks. The proposed algorithm is superior to some existing algorithm in terms of the scheduling various values within the algorithm and to handle the load of request task.

Algorithm is proposed with, open challenges connected with energy efficient resource allocation [11]. The dimension taxonomy research on the energy-efficient are summarized to the accessible techniques that are presented. The proposed algorithm is compared with the existing algorithm in terms of inconveniences and the focal point. On the basis of this study various techniques are enlisted which can be utilized as per their benefits.

In order to increase the use of resource utilization proposed an energy-cognizant task for the consolidation of heuristics [12]. Has been proposed and here consider both dynamic and without wasting energy consumption. In order to minimize the energy consumption for the task that is executed can be done by assigning task to the resources with the help of heuristics. It mitigates the performance degradation of that task. Author concluded that on the basis of experiments the proposed algorithm showed its efficiency to save the energy.

Algorithm has been proposed, due to the collaboration of multiple cloud nodes in big data environment, a resource-allocation algorithm that is hierarchical and dynamic in nature [13]. and the proposed algorithm performs better than the MinMin algorithm. The proposed is compared in terms of makespan and communication traffic. It is demonstrated that in order to reduce the number of messages and communication traffic DHRA is utilized. The Proposed algorithm acquired less time or equal time as compared to MinMin to perform its tasks.

The algorithm proposed a pragmatic approximated solution with the accompanying two steps [14]. Most of the selected problems have been solved independently without the use of resource assignments in multiplexing. The existence of Nash equilibrium depends on the feasible solutions provided by the resource allocation. The proposed algorithm relates this progression problem to the large proportion of cloud-based computing services.

III. PROPOSED METHODOLOGY

The cloudlet is the various task which is assigned to different virtual machines for the execution. Considering various algorithms, proposed algorithm is the improvement in the check pointing for cloudlet execution. In the existing algorithm, the check pointing algorithm will assign the tasks to different virtual machines for the execution on basis of their resources. The virtual machine resources are counted in the terms of execution time, failure rate. In the proposed algorithm steps described below are followed for the task reassignment:-

1. Cloudlet Assignment: - The cloudlet assignment is the first step which is applied to search the virtual machine which is most applicable to the cloudlet execution. The virtual machine will be searched on the basis of execution time and failure rate. The virtual machines start executing the cloudlet and also start maintaining the check points on the server for the efficient execution of the cloudlets

2. Overloaded virtual detection and virtual machine migration: - The virtual machines which don't respond back will be considered as the overloaded machine. To

migrate the task weight of each virtual machine is calculated. The virtual machine which has maximum weight will be selected as the machine on which cloudlet will be migrated.

Proposed Algorithm

Input: Hosts, Virtual Machine

Output: Virtual Machine to be migrated, VM_m

1. Input Overloaded host(h)
2. $VM_m \leftarrow$ GetMigratable $V_m(h)$
3. Utilm(VM_{hex})= UtilizationMatrix(VM_{hex});
4. Matrix(n)= CorrelationCoefficient(UtilM(VM_{hex}));
5. for each V_m V_i of VM_{hex}
6. CPU_{hist}= Get CPU Utilization(V_i) check the CPU utaliation
7. RAM(V_i)= Get RAM(V_i)
8. CPU_{mc}= Get FailureRate(V_i)
9. Output= Machine Migrated( )
10. while (execution time & failure rate) V_i
11. if(failure rate && execution time) V_i< define value

Output= Machine Migrated (V_i)

End

End

IV. RESULTS AND DISCUSSION

The proposed algorithm can be implemented in cloudsim.. The performance of proposed weight based algorithm is compared with the check pointing algorithm. The simulation parameters are given in the table 1

Table 1: Simulation Parameters

Number of VM	10
Number of cloudlets	60
Host Memory	2 GB
Processor	Xenon
Number of Data centers	5

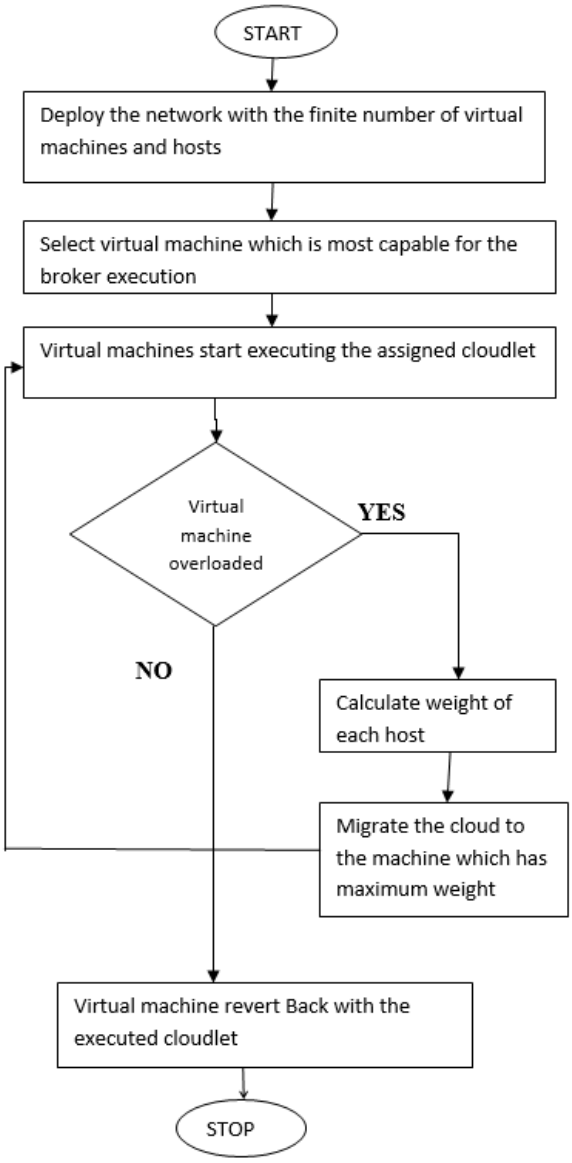

Fig 1: Proposed Flowchart

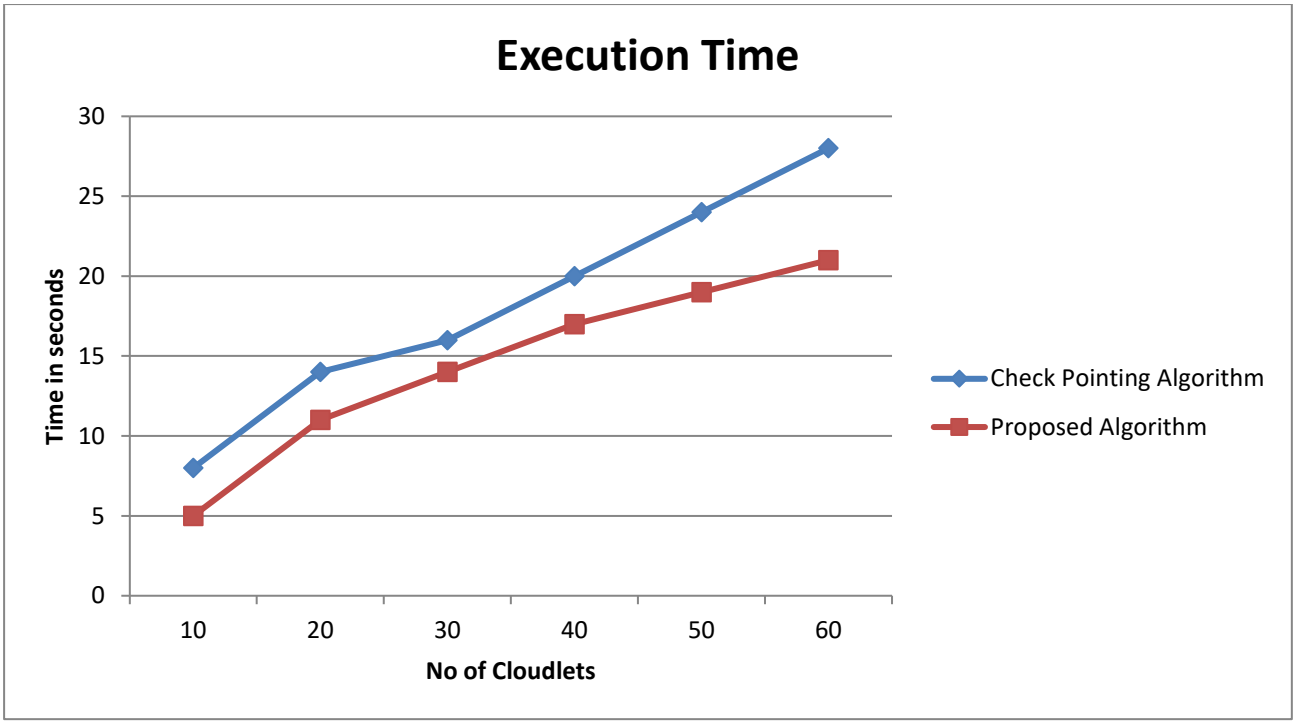

Fig 1: Execution Comparison

As shown in the figure 1, The execution time of the proposed and check pointing technique is compared. It is been analyzed that due to virtual machine overloading execution time is increased at steady rate as compared to proposed algorithm in which task is migrated to another virtual machine

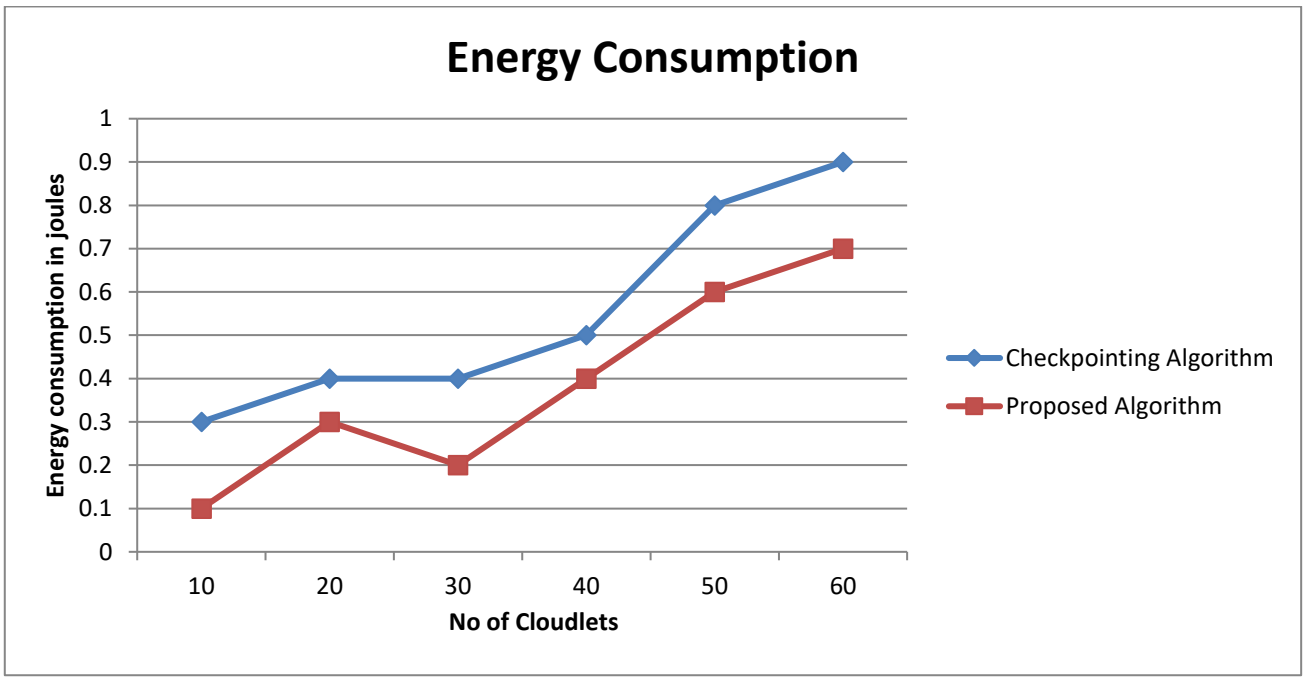

Fig 2: Energy Consumption

As shown in figure 2, the comparison between the proposed and existing algorithm in terms of energy consumption. Due to cloudlet migration the consumed energy by the proposed algorithm is reduced as compared to existing algorithm

Table 1: Execution time

No of cloudlets	Existing Algorithm	Proposed Algorithm
10	7 second	5 seconds
20	11 seconds	8 seconds
30	14 seconds	10 seconds
40	20 seconds	13 seconds
50	21 seconds	18 seconds
60	29 seconds	22 seconds

As shown in table 1, the execution time of the proposed algorithm is compared with the existing algorithm. It is analyzed that proposed algorithm performs well as compared to existing algorithm

Table 2: Energy consumption

No of cloudlets	Existing Algorithm	Proposed Algorithm
10	0.3 joule	0.1 joule
20	0.4 joule	0.23 joule
30	0.41 joule	0.12 joule
40	0.5 joule	0.35 joule
50	0.8 joule	0.6 joule
60	0.85 joule	0.7 joule

As shown in table 2 , the energy consumption of proposed algorithm is compared with the existing algorithm. It is analyzed that proposed algorithm performs well as compared existing algorithm

V. CONCLUSION

In this paper, it is been concluded that due to dynamic architecture of cloud uncertainties may happen in the network. The most applicable virtual machines are selected on the basis of execution time and failure rate. The weight based algorithm is applied which will migrate the task of virtual machine which get overloaded. The performance of proposed algorithm is tested in cloudsim and it is been analyzed that execution time is reduced with the energy consumption

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