International Journal of Advanced and Innovative Research (2278-844)/

Volume 7 Issue 11

A VM Aware and Energy Resource Request Utilization (VMERRU) Cloud Scheduling Algorithm Over Cloud Computing

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Abstract: ***Cloud computing and its components make use of their combine efforts to process input request to any cloud architecture. Cloud components such as virtual machine Vm, Cloud Data center DC, Broker request Br and their configuration cominely configure a cloud scenario. Cloud computing component make use of request , resource and its utilization analysis to process any of the algorithm. It make usage of resource in proper optimization manner. In order to provide better quality of services and proper cloud component scheduling many algorithms were proposed. Algorithm such as round robin, throuttle, Genetic algorithm etc were proposed by the existing research work. Limitations with such algorithms are of monitoring single level of utilization. They are either concentrating on resource utilization or in energy consumption by their resources for that request process. Further the internal process doesnot comply with parallel process of monitoring such utilization. In this research, An Advance Algorithm named VMERRU (Virtual machine energy resource request utilization) is proposed. The approach also make use of utilizing monitoring of energy , resource usage count, input request requirement and matching requirement of assigning DC, VM to it. Thus an optimal request handling algorithm with parallel computation is proposed. An implementation is performed using CloudSim API cloudanalyst simulator and further computation shows the efficiency of proposed algorithm.***

Keywords: Resource Optimization, Cloud Sim, Data Sharing, Virtualization, VMERRU, Parallel Computing, Request Analysis, Cloud component scheduling.

1. INTRODUCTION

Presentation Cloud [1-5] registering is usually a modern automatic improvement within the processing field wherein usually centered everywhere outlining of administrations which are given to the clients within the same route because the structural utilities like maintenance, water, gas, power, and communication. In that modification administrations are created and facilitated at the cloud (a system designed for placing away info known as datacenter) and then these administrations are offered to clients conscientiously at whatever point they need to utilize. The cloud facilitated administrations are conveyed to clients in pay-per-apply, multi-occupancy, adaptability, self-operability, on-request, and efficient way. Distributed computing is turned out to be prominent due to above say administrations offered to clients. Every among the administrations offered by assistant to clients require by cloud technician (CSP) that is functioning identical the ISP (Internet technician organization) inside the web figuring. In the web innovation, approximately imaginative improvement in virtualization and dispersed figuring and getting to of the high-speed connect to minimum effort draw within the focus of clients regarding that technology. This innovation is designed with the innovation of administrations provisioning to clients

without obtaining of the particular administrations and put away in their close by memory.

Figure 1: Cloud Architecture.

In the above Figure 1 the Cloud Architecture has been shown.

- **CLOUD SERVICE MODELS**

The management gave individually distributed computing are separated within ternion throughout recognized classes the particular Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS). Fundamentally, the particular ternion management models are connects to one another and planned 3-levels engineering. Figure 1.3 shows 3-level design of distributed computing.

1. INFRASTRUCTURE-AS-A-SERVICE (IAAS)

It is usually a originally Common 3-level design. It is utilized to give a network to interfacing clients and servers furthermore gives virtual machines to, stop, initiate, get to arrange virtual servers and capacity squares. Pay-per-utilize benefit actualized one layer of the3-level engineering. Cases of IaaS are Amazon EC2, Windows Azure, separation distance, Google Compute Engine etc. Infrastructure-as-a-Service like Amazon Web Services gives virtual server occurrence) begin, stage, get to set up their virtual server capacity.

2. PLATFORM-AS-A-SERVICE (PAAS)

A second and center 3-level design. In this model, a organize require to clients which in general incorporates an operating framework, programming dialects, execution conditions, databases, lines and web server. Illustrations are AWS Elastic Beanstalk, Heroku, Force.com and Google App Engine. Stages a benefit within the cloud is characterized a system programming and its item advancement devices facilitated at the supplier's framework.

3. SOFTWARE-AS-A-SERVICE (SAAS)

A third or upper layer of your 3-layer engineering. The model gives Open-request software to clients on the outside established order setup and running of your application. Clients to pay utilize its about customer. Illustrations are Google Apps and Microsoft office 365. product as-a-benefit cloud describe, the merchant items equipment foundation, the stock element network the client about a front-end entrance. Software -as -a -service (SaaS) is definitely an especially away market. Administrations may be anything beginning at Web-based web to stock regulate and table managing.

- **SECURITY & PRIVACY IN CLOUD COMPUTING**

Cloud computing poses privacy concerns because the service provider can access the data that is in the cloud at any time. It could coincidentally or purposely change or even erase data. Numerous cloud suppliers can impart data to outsiders if important for purposes

behind law and order even without a warrant. That is allowed in their protection arrangements, which clients must agree to before they begin utilizing cloud administrations. Solutions for security incorporate approach and legislation and in addition end clients' decisions for how information is stored. Clients can encrypt information that is handled or stored inside the cloud to prevent unauthorized access.

2. RELATED WORK

Pragati Rajput, Ruchika Mishra, Swati Jain [6]

Existing Approachs like ACO (Ant Colony Optimization), Genetic Algorithm and so forth are not give long haul ideal answer for information outstanding task at hand sharing and adjusting issues. In here and now information remaining burden sharing and adjusting arrangement, there is no affirmation for the proficient execution for the following undertaking is given. A long haul information remaining burden sharing and adjusting answer for the asset assignment issues is displayed by the creators. LB-BC (information outstanding burden sharing and adjusting dependent on bayes and grouping) is normal use from lead the information remaining burden sharing and adjusting errand. In that Approach initial a screen is customary utilization from get the all the status of the VMs and cloud clients. At that point that data is normal use 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.

Dace Baumgartea, Edgars Salnaa [7]

Cloud Approach and its calculation situation or on-request processing is a Para graph where different on-request benefits and usable parts are offered for the clients. In Cloud Approach and its calculation situation, synchronous access of the usable parts is directed by the cloud clients. That creates additional heap for the framework in view of the heap issues like adaptation to internal failure, stockpiling overhead, corrupting execution are happens. Content Delivery There are two sort of information outstanding task at hand sharing and adjusting Approachs either an open source information remaining task at hand sharing and adjusting where session exchanging or bundle exchanging plans are utilized or a pre-processor information remaining task at hand sharing and adjusting.

Pushpendra Kumar Yadav [8]

Ideal information dealing with and preparing of the usable parts is one alternative from the accessible greatest issue in Cloud Approach and its calculation situation. Legitimate adjusting of the hubs is required to give adaptable and versatile cloud benefit for the client. Heap of the usable parts depends on the components like handling limit, stockpiling utilization, get to time and so on in the wake of figuring the status of the usable segments and cloud clients or hubs different information remaining task at hand sharing and adjusting plans are utilized to give a continuous cloud administration to the client.

Hereditary calculation and its variations are utilized to give an improve information remaining task at hand sharing and adjusting answer for the cloud clients. In any case, these Approach not capable manage investigation issues in the Cloud Approach and its calculation situation. A firefly calculation to defeat the issues of the hereditary calculation and give an improved usefulness to get to usable parts over the cloud is displayed. Initially status of the cloud usable parts and demands produced by the cloud clients is recorded. Information outstanding burden sharing and adjusting task based on firefly calculation is directed. That Approach gives an ideal answer for the information outstanding burden sharing and adjusting

issue however as far as possible for the activity is high.

Foram F Kherani [9]

Information remaining task at hand sharing and adjusting is one choice from the accessible prime worry in Cloud Approach and its calculation situation. In customary information remaining task at hand sharing and adjusting Approachs used to disperse stack on first started things out serve premise. However, these Approachs does not give any vitality proficient component to appropriate load among the cloud hubs. A high unwavering quality replication calculation for the information outstanding burden sharing and adjusting is exhibited. That Approach gives an improved system to distribute usable segments for the hubs and proficiently administration for vitality. Productive Energy assignment enhance vitality utilization in the cloud situation and enhance the Quality of Service (QoS) of the framework. QoS parameters are considered while performing asset portion and vitality designation for the hubs.

Wu Mingxin [10]

Simultaneous access of the usable segments is performed in cloud situation, which builds the heap of the entire framework. Employment booking is one choice from the accessible basic assignment to do in cloud condition. A survey of the different Approachs utilized for occupation booking is exhibited. There are Approachs like most brief occupation first, hereditary calculation based planning, need based booking, first started things out serve planning and so forth are utilized for assigning usable segments for the client.

Yuri Bykov, Sanja Petrovic [11]

In Cloud Approach and its calculation situation different on interest usable segments are accommodated the client to lead their errands. Client can get to these usable segments according to their requirements. Simultaneous ask for getting to usable parts are sent by the different hub. For appropriate distribution of the hubs effective information outstanding burden sharing and adjusting 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.

F. Antony Xavier Bronson [12]

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.

3. PREVIOUS APPROACH

In this paper, previous approach and proposed approach result comparison is performed, as per the monitored results from implementation which is obtained is compared. The proposed algorithm is presented and compared with existing solution. This paper gives a comparison graph and statically analysis. As per observed, finally it shows the proposed approach is efficient in terms of total response time, accuracy, simulation processing as well in the implementation analysis.

4. PROBLEM DEFINITION

The following points are the major problem formulation taken for the direction usage and improvement:

1. Working with the input data usage and their storage with appropriate architecture, such that an efficient storage and accessing can be performed.
2. The existing solution does not cover up the facts to provde better and fast request granted.
3. The allocation for the resources to the particular request has been performed in order to provide fast processing with the help of the proposed algorithm along with the round robin scheduling.
4. An Advance Algorithm named VMERRU (Virtual machine energy resource request utilization) is proposed. The approach also make use of utilizing monitoring of energy , resource usage count, input request requirement and matching requirement of assigning DC, VM to it.

Thus the given limitations of the previous approaches are further taken into consideration in the research work.

5. PROPOSED METHODOLOGY

In order to provide an efficient outcome, the proposed algorithm VMERRU is proposed. The algorithm execution pseudo code, its flow diagram and execution steps is shown in the section. Thus the algorithm execution steps clarify the simulation performed by the given proposed work.

Pseudo Code VMERRU Approach

VMERRU Parallel Computing Algorithm:

Inputs : DC i-n, VM i-n, Internet Characteristic ic, hardware configuration Hw, Broker setting Br

Outputs: Request processing, simulation execution , result observation, result analysis.

Steps: Begin [

Initializing cloud components;

Foreach(DC, VM, Br)

{

Configuration and commutation of VMi,DCi and Bri;

}

T1=Time initialized;

Execution of request processing();

Mapping input request();

Thread1: Resource utilization storage();

Thread 2: Input request credibility();

Thread 3: Cost and time estimation();

requestProcess(Th1,Th2,Th3);

return requestProcess outcome;

T2 = finishing time;

Computing Computation time T2-T1;

Energy and Cost computation ();

Return;

Exit;

]End;

The above Pseudo code shows the multiple steps functions which are participating in the communication and virtual machine selection.

EXECUTION STEPS:

There are following step wise explaining of pseudo code and algorithm computation used for the simulation purpose –

Steps of the above pseudo code:

Step 1: in this step the initialization o the variable and the internet characteristics will take place along with the Initializing cloud components.

Step 2: in this step the Configuration and commutation of VMi, DCi and Bri will held for the further use in order to achieve better results.

Step 3: in this step the initialization of the time will be taken place.

Step 4: in this step the requesting function will run ***request processing();*** in order to process the request.

Step 5: in this step the multiple threads will tends to run simultaneously as to achieve the output.

Step 6: the calculating finish time for all threads will be sent to the main function.

Step 7: in this step the energy and the cost computation function will proceed to calculate the energy and the cost computation and will return the output to the main.

Step 8: EXIT;

The below are the steps which mainly contribute in the proposed algorithm and its analysis work.

Algorithm Architecture:

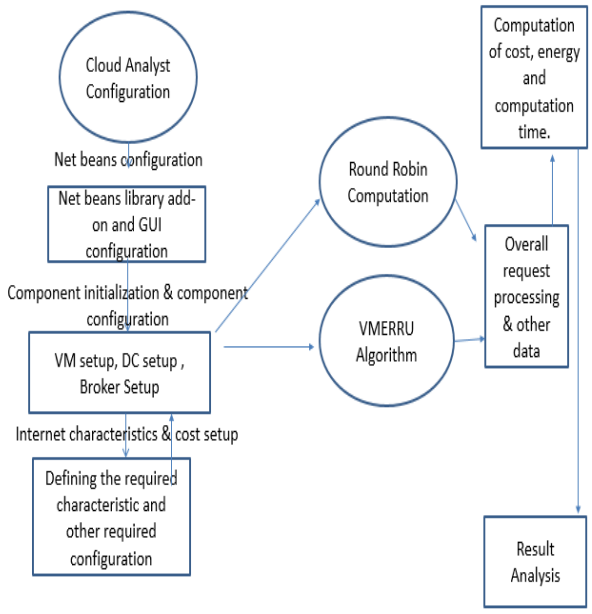

Figure 2: Algorithm Architecture Of Complete Workflow.

In the figure 2 above, An overall architecture of flow is given, the figure shows the initialization of component and finally processing it with algorithms and thus monitoring of utilization comparison parameters.

6. EXPERIMENT EVALUATION & RESULT ANALYSIS

All the experiments were performed using an i3-4005U CPU @ 1.70 GHz processor and 4 GB of RAM running windows 10. The discussed feature selection algorithms were implemented using language Java and the platform Eclipse IDE.

7. RESULT ANALYSIS

As per discussion of proposed algorithm and experimental setup, there is an observation is performed using simulation analysis. Following is the proposed algorithm VMERRU and other existing solution such as Round Robin, Throttle solution is presented. The outcome observation shows the efficiency of proposed algorithm over traditional cloud load scheduling solutions.

- ***UserBase*:** This represents a large numbers of users in CloudAnalyst for efficiency of simulation.

Comparison Analysis

Multiple number of cloud scenario is configured and presented by the help of proposed approach and existing given algorithm:

- **Comparison Among Algorithm On The Basis Of Time:**

Computation Time : It is the time difference between the finishing of algorithm execution request and initial time monitored before starting of execution.

Computation time = Finishing time – Initializing time;

Table 1: Time Comparison Among Algorithms.

TIME COMPARISON	VMERRU TIME (ms)	ROUND ROBIN TIME (ms)
Min Time	226	251
Avg Time	267	290
Max Time	301	376

Table 1 shows the comparison with different unit and comparison with previously available approach.

➢ **Comparison Among Algorithm On The Basis Of Cost:**

Computation Cost: It is the total cost which takes for each component utilization the cost counts using the utilization resources and their handle charge per request between the finishing of algorithm execution request and initial monitored before starting of execution.

Computation cost = Summation of (Cost per VM Hour , Cost per 1Mb Memory Hour , Storage cost per Gb , Data Transfer cost per Gb (both in and out));

Table 2: Cost Comparison Among Algorithms.

Cost Comparison	VMERRU Algorithm TIME (INR)	Round Robin Algorithm (INR)
Min	1.23	1.37
Avg	0.85	1.22
Max	1.90	2.60

➢ **Comparison Among Algorithm On The Basis Of Energy Consumption:**

Energy Consumption: it is the total energy consumption utilization while using VM and Data center along with internet characteristics.

Table 3: Energy Comparison Among Algorithms.

Energy Comparison	VMERRU ALGORITHM Energy Consumption (J)	ROUND ROBIN APPROACH Energy Consumption (J)
Min	2.34	3.58
Avg	2.67	2.89
Max	3.09	3.77

Table 3 shows comparison among different considered algorithms with respect to energy consumption.

Results

➢ **Time Based Comparison:**

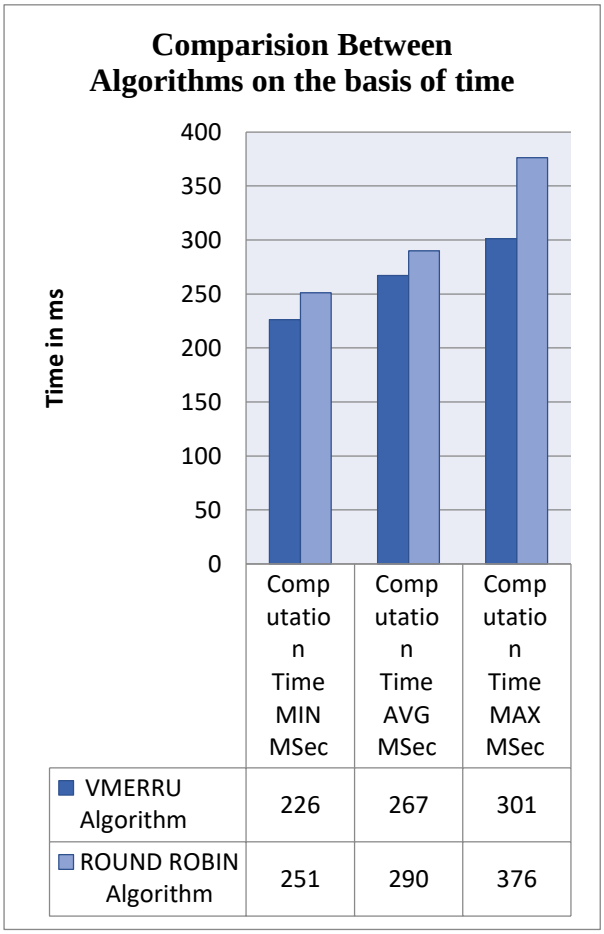

Figure 3: Comparison of algorithm VMERRU Vs Round Robin Scheduling.

In the figure 3 above, it shows the comparison of data scheduling algorithm round robin on cloud while comparing with VMERRU algorithm with parallel processing unit. The given comparison in graph shows the computation time efficiency while comparing with traditional algorithm analysis.

Cost Based Comparison:

Figure 4 shows the graph among algorithms with respect to cost.

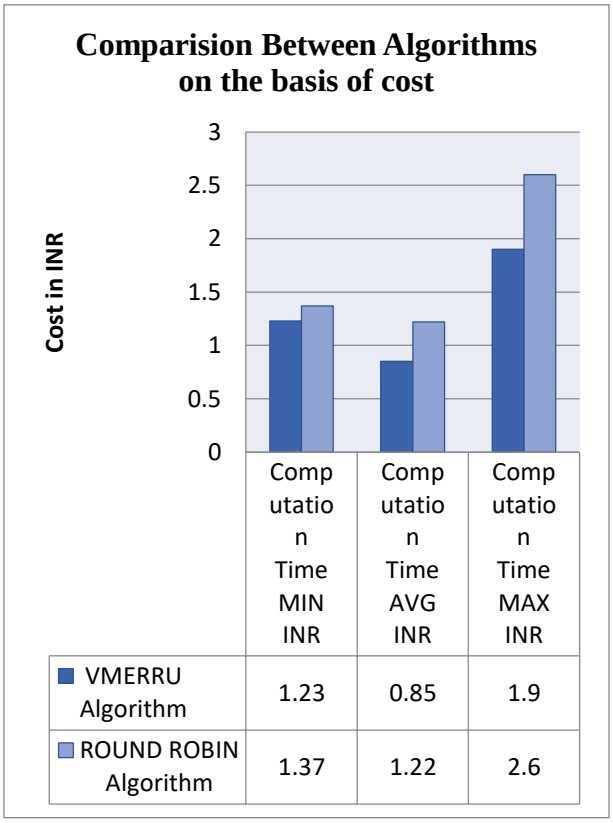

Figure 4: Comparison of algorithm VMERRU Vs Round Robin Scheduling using cost.

In the figure 4 above, it shows the comparison of data scheduling algorithm round robin on cloud while comparing with VMERRU algorithm with parallel processing unit. The given comparison in graph shows the computation cost efficiency while comparing with traditional algorithm analysis.

Energy Based Comparison:

Figure 5 shows the comparison using the energy utilization on processing the simulation over the time.

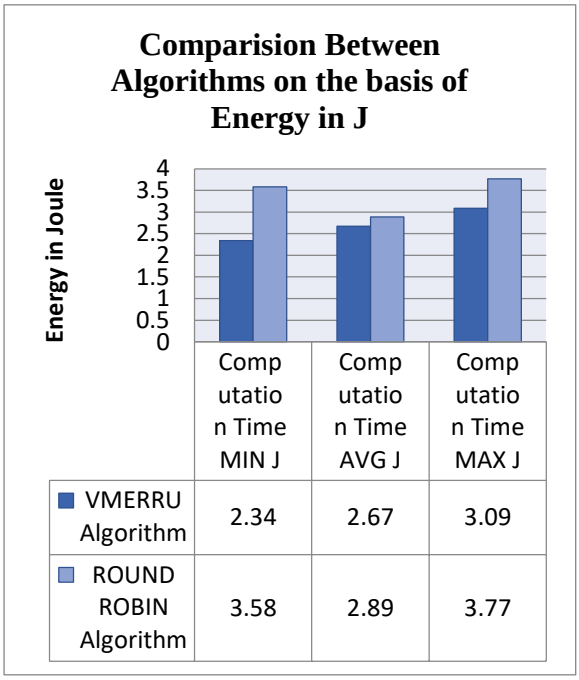

Figure 5: Comparison of algorithm VMERRU Vs Round Robin Scheduling using Energy computation & Utilization.

In the figure 5 above, it shows the comparison of data scheduling algorithm round robin on cloud while comparing with VMERRU algorithm with parallel processing unit. The given comparison in graph shows the energy consumption efficiency while comparing with traditional algorithm analysis.

CONCLUSIONS

Cloud computing component create an architecture for handling input request from the users. It enable processing of input request using the combine efforts of components such as Virtual machines, Data centers and their hardware configuration. Availability of multiple components required an approach which can optimally utilize these components. This research deal with the component analysis, analysis of previously used algorithms and finding limitations with them in component monitoring. Upon finding the problem definitions, the proposed algorithm with parallel computing monitoring of multiple factors involve in request processing is executed. An Algorithm VMERRU Virtual machine energy resource request utilization is proposed by the given work. This algorithm make use of request analysis, its utilization estimation and then finally status of current resources, thus an better decision of redicting the request. Thus an appropriate scheduling algorithm is proposed utilization of multiple factor and processing parallel manner to them. The algorithm is implemented on Java and simulated using the Cloud sim Cloud Analyst simulator. This simulation contains configuration of all the components and applying algorithm with it. Simulated results shows the efficiency of proposed algorithm while compare with existing Round robin, throttle approach for component cloud scheduling. Results are efficient and computed with computation time, computation cost and Energy utilization.

ACKNOWLEDGMENT

I am very thankful to my Guardians who have helped me throughout.

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