The Research on Energy Efficient Resource Scheduling For Green Cloud Computing With Hybrid Algorithm

Deepika, Neha

Abstract— **The commercialization of these developments is defined currently as Cloud computing [1], where computing is delivered as utility on a pay-as-you-go basis. Traditionally, business organizations used to invest huge amount of capital and time in acquisition and maintenance of computational resources. The emergence of Cloud computing is rapidly changing this ownership-based approach to subscription-oriented approach by providing access to scalable infrastructure and services on-demand. Users can store, access, and share any amount of information in Cloud. That is, small or medium enterprises/organizations do not have to worry about purchasing, configuring, administering, and maintaining their own computing infrastructure. We proposed algorithm for resource scheduling and power consumption algorithm the hybrid algorithm for efficient green cloud computing.**

Index Terms— **green cloud scheduling algorithm,energy consumption,energy,green,cloud.**

I. INTRODUCTION

1.1 Cloud Computing

Cloud Computing[1] is a collection of a variety of computing concepts in which thousands of computers communicate in real-time to provide a seamless experience to the user, as if he/she is using a single huge resource. This system provides multiple facilities like-web data stores, huge computing resources, data processing servers, etc. the concept of cloud computing is around the early 1950s, although the term was not coined back then.

Cloud computing [2] is an evolving paradigm which is enabling outsourcing of all IT needs such as storage, computation and software such as office and ERP, through large Internet. The shift toward such service-oriented computing is driven primarily by ease of management and administration process involving software upgrades and bug fixes. Most important advantage offered by clouds is in terms of economics of scale; when thousands of users share same facility , cost per user and the server utilization.

1.2 Green Computing

Green Computing[3], is the practice of using computing and IT resources proficiently. As a human being it is our prime responsibility to protect the environment and save energy cost in today's increasingly computing requirements.Green computing or Green IT , is the analysis and practice of environmentally sustainable computing or IT. According to

Deepika, M. Tech Computer Science, Punjab Technical University, India
Neha, AP, M.Tech Computer Science, Department of CSE

San Murugesan "designing, manufacturing, using, and disposing of computers, servers, and associated subsystems-such as monitors, printers, storage devices, and networking and communications systems –efficiently and effectively with minimal or no impact on the environment. The need of green computing is to diminish the use of harmful equipment, increasing energy efficiency, and to promote the reusability of computing devices and IT waste. Green computing provides hope and practical strategies for the future.

II. RELATED WORKS

Cloud Computing [4] is an evolving area of efficient utilization of computing resources. Data centers accommodating Cloud applications ingest massive quantities of energy, contributing to high functioning expenditures and carbon footprints to the atmosphere. Hence, Green Cloud computing resolutions are required not only to save energy for the environment but also to decrease operating charges. In this paper, the emphasis is on the development of energy based resource scheduling framework and present an algorithm that consider the synergy between various data center infrastructures (i.e., software, hardware, etc.), and performance. In specific, this paper proposed (a) architectural principles for energy efficient management of Clouds; (b) energy efficient resource allocation strategies and scheduling algorithm considering Quality of Service (QoS) outlooks. The performance of the proposed algorithm has been evaluated with the existing energy based scheduling algorithms. The experimental results demonstrate that this approach is effective in minimizing the cost and energy consumption of Cloud applications thus moving towards the achievement of Green Clouds.

Green computing[5] concept is to improve environmental condition. The main aim of green computing is to reduce toxic materials. We systematically analyze its energy consumption which is based on types of services and obtain the conditions to facilitate green cloud computing to save overall energy consumption in this system. Today it is the major issue to prepare such equipments by which we achieve efficient energy and to minimize of e-waste and use of non toxic chemicals/materials in preparation of e-equipments. We can implement green computing in computer's fields as CPU servers and other peripheral devices (mobile devices). By using green computing we can reduce resources consumption and disposal of electric waste (e-waste). It has been seen that computers and other electronics devices are increasing day by day, so the amount of electricity consumed by them is also increasing. In this way the percentage of Carbon Dioxide in the atmosphere is also increasing. The other toxic materials which are used in computer/electronics industry are also

harmful for environment. The pros and cons of green computing are discussed for each green computing strategy with its friendly approach towards atmosphere. Green computing can facilitate us to safe, secure place and healthy environment all over in the world. This paper will help us to take some initiatives currently under in the field of computers/electronics industry and new ways to save vast amounts of energy which is wasted in very large scale.

Green computing[6] is an effective approach to protect our environment from the hazardous material and its effects that comes from the computers and its related devices. It is an effective study of environmental science that use manufacturing, using, disposing and recycling of computer and other electronic devices. In this research paper the concern is about the Green computing, its needs and steps toward Green computing by a common man. This research paper describes that today computer is basic need of everyone. No individual or organization can work without computer, But they also have to aware about the harmful impacts to use of computers, its manufacturing and disposing and what steps we should take to reduce the harmful impacts and save our environment.

  Technology innovation and its adoption are two critical successful factors for any business/organization. Cloud computing is a recent technology paradigm that enables organizations or individuals to share various services in a seamless and cost-effective manner. This paper describes cloud computing, a computing platform for the next generation of the Internet. The paper defines clouds, types of cloud Provides, Comparison of Cloud Computing with Grid Computing, applications and concerns of Cloud Computing , Concept of Virtualization in Cloud Computing. Readers will also discover the working, Architecture and Role of I.T Governance in Cloud Computing[7]

[8]In the IT industry's there is forcefully demand of the technology known as Cloud Computing. It is an emerging trend in computing. There are huge data centres are used in big industries. Environmentally, these systems can produce e-wastes, harmful gases with heat. This paper focuses on security in such a power saving data centres in the enterprises we called them as Green Cloud Computers. The Virtualization technique has been explained and suggested for saving energy and the security framework for the Green Cloud that consist of pool of virtual machines. This security framework consists of policy enforcement, trust management and such a security model.

III. PROPOSED WORKS

The solution to the problem (Energy Efficient Scheduling of Workload) has been designed by the proposed Technique. Following section presents the design of the solution of the proposed Technique and the layered architecture of Cloud computing. PaaS layer includes the Workload Consolidation technique to calculate the energy consumption of the data center and also gives the information about the SLA violation, as the allocation policies are implemented on PaaS layer which are followed by the IaaS layer.

Proposed Algorithm

1) Input: Set of tasks and servers Output: Scheduling of tasks to servers

2) for Each Task x of type i do
- for each Sj do
- Calculate server energy consumption $(E_{i,j}) = P_{i,j} * t_{i,j}$
- if $E(i, j) \leq E(a, b)$ then
- a = i, b = j
- end
- end
- end
- while unscheduled tasks remain do
- for each Sj do
- Calculate energy consumption
- Assigned task to efficient server
- end
- end
- Schedule Task
- end

3)   Below is the proposed algorithm to calculate the power consumption of the data center by the Workload .The algorithm takes host list as an input and gives VM list of the VMs and power consumed by the data center.
- Input: Set of tasks and servers
4)   Output: Scheduling of tasks to servers
- for Each Task x of type i do
- Input the M number of Clouds with L number of Virtual Machines associated with Each cloud.
5)   Input N number of user process request with some parameters specifications like arrival time, process time, required memory etc, i.e hostlist.
- Arrange the process requests in order of memory requirement
- Power ← estimatePower(host, V m)
- for Each Task x do
- For each Vm in Vmlist Do
- if host has enough resource for Vm Then
- Power ← estimatePower(host, V m)
- else
- Calculate server energy consumption $(E_{i,j}) = P_{i,j} * t_{i,j}$ t ←m.getUtil()hostUtil
- end
- end
- return Vmlist, Energy
- end

the above algorithm is used for efficient resource secluding and energy consumption .in this paper we proposed we combination of two algorithm in the first algorithm the priority of the task is defined .the process are scheduled according to priority and task are scheduled efficiently according to requirement as this is not done in previous technique .the second algorithm is for calculating the power consumption with is no of task power consumption consumed is calculated for efficient green clouding. Our technique provide better solution as compared to old techniques

IV. CONCLUSION AND FUTURE SCOPE

This thesis gives the introduction of the Cloud computing technique and discusses various workload allocation techniques to efficient manage workloads. In this work a task assignment technique to manage the energy consumption of the data center has been proposed. Scheduling algorithm is implemented so that there is a considerable reduce in energy consumption .There are too many scheduling algorithms for

the minimization of the electrical energy and also the carbon emissions. Since our   scheduling algorithm which is a NP-Hard problem where we have too much solution space so we can reduce the electrical energy consumption to some extent. Our work should be extended to setup the cloud environment in real world so that the algorithm implemented will give better result than any other scheduling algorithm. Since there are too many scheduling algorithms, there is a need to develop a software platform which reduces the total data center electrical energy. Since an effective algorithm which handles a huge data center must be developed. Though the algorithms developed may be effective in their own terms but that is not sufficient to handle a huge data center. The future should also extend the work on implementing more effective algorithm for better results of energy consumption and also the reduction of carbon emissions to the environment. The researchers should also extend their work to develop a software platform which concerns energy reduction.

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