



# A Novel Energy Efficient Resource Management System in Cloud Computing Environment.

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## Abstract

Primary target of cloud provider is to provide the maximum resource utilization and increase the revenue by reducing energy consumption and operative cost. In the service providers point of view, resource allocation, resource sharing, migration of resources on demand, memory management, storage management, load balancing, energy efficient resource usage, computational complexity handling in virtualization are some of the major tasks that has to be dealt with. The major issue focused in this paper is to reduce the energy consumption problem and management of computation capacity utilization. For the same, an energy efficient resource management method is proposed to grip the resource scheduling and to minimize the energy utilized by the cloud datacenters for the computational work. Here a novel resource allocation mechanism is proposed, based on the optimization techniques. Also a novel dynamic virtual machine (VM) allocation method is suggested to help dynamic virtual machine allocation and job rescheduling to improve the consolidation of resources to execute the jobs. Experimental results indicated that proposed strategy outperforms as compared to the existing systems.

**Keywords:** Cloud Provider, VM Allocation, Resource Allocation, Resource utilization, Energy consumption.

## 1. Introduction

As in cloud computing, pay-per-use services are used which avoids the huge capital investment of deploying the hardware, software and other resources at home. It has some critical issues of being over-charged, privacy leak and intervention of unauthorized service providers [1-3]. In the service providers point of view, resource allocation, resource sharing, migration of resources on demand, memory management, storage management, load balancing, energy efficient resource usage, computational complexity handling in virtualization are some of the major tasks that has to be dealt with [4-8]. Resource allocation refers to the amount of resources and the types of resources that are allocated to compute the user's job. The service providers are intended to schedule and provide the resources to the users based on their needs [9-14]. The major issue focused in this research work is to reduce the energy consumption problem and management of computation capacity utilization [15-16]. It has also been one of the burning topics in the recent years of research. To overcome the above mention issues, a novel energy efficient resource management system is proposed to handle the resource scheduling and for the minimization of the energy utilized by the cloud data centers for the computational work.

The rest of the paper is organized as follows: section II presents the related work. The Contributions are mentioned in section III. Section IV represents proposed system architecture along with algorithms to efficiently handle the system. Section V describes experimental results and discussion & section VI represents the conclusion.

## 2. Related Work

This section presents different resource allocation and scheduling techniques which helps to present our proposed work. Mehiar Dabbagh et al [17] proposed a system for overcommitted clouds which is an energy-efficient resource allocation system. System saves enormous energy by minimizing Physical Machine (PM) overload occurrences through monitoring and prediction of VM resource usage and reducing the number of active PMs via efficient VM migration and placement tech. Fei Tao et al [18] addressed the optimal scheduling of computing resources (OSCR) problem consisting of energy consumption issue & proposed the energy consumption framework and simplified it to adapt network whose load information is unavailable. Meanwhile, imbalanced load distribution is considered to represent risk on the makespan and used as an effective strategy for both to shorten the makespan and to realize load balance. Tarandeep Kaur [19] proposed Green Cloud Scheduling Model (GCSM). GCSM which is consisting of a scheduler component named as Green Cloud Scheduler for task allocation and scheduling decisions by considering the energy aware capability of heterogeneous Cloud nodes. Jieun Choi et al [20] proposed job scheduling optimization technique which focuses on the performance & QoS metrics in cluster and cloud environments. As a result, this technique controls the ratio of scheduling distribution for distributed environment with respect to characteristics of application and current workload.

A. V. Karthick et al [21] proposed Multi Queue Scheduling (MQS) system which gives additional significance to choose task dynamically to accomplish the optimum cloud scheduling problem and therefore it usages unused free space in an economic manner. Vahid Arabnejad et al [22] presented a new deadline constrained

