

# Load prediction analysis based on virtual machine execution time using optimal sequencing algorithm in cloud federated environment

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**Abstract** Virtual machine (VM) prediction and an effective resource management are the attractive areas in the cloud environment. VM prediction is an important task to execute the jobs for delay minimization and unnecessary states avoidance. Cloud computing attracted towards the increase in a number of applications that run on remote servers in parallel manner. Increase in parallelism reduces the CPU utilization adversely. Hence, the proper VM prediction and management are necessary stages in provisioning scheme. Also time required for allocating jobs is more in existing algorithms due to the number of computations involved. Therefore a novel algorithm is required to improve the performance of the job allocation with makespan reduction. In this paper the new algorithm is proposed that includes the VM capacity and execution time for load prediction and performance improvement purpose. Our proposed research work utilizes the VM clustering and optimization algorithms to improve job sequencing performance. The cost computation prior to clustering includes the VM capacity as a major factor. Clustering of VM with high-cost and isolation of low-cost and high-cost clusters reduces the searching time of VM and solve the imbalance state problem in traditional methods. The optimization algorithm with suitable initialization function reduces the time and steps for selection of VM for

suitable job. The proposed model outperformance is established by the selected parameters.

**Keywords** Cloud environment · VM capacity · VM prediction · Resource management · Execution time

## 1 Introduction

In cloud computing applications, delivered as service over the Internet and that is provided with the help of hardware and system software of the datacenter (SaaS). Cloud computing is also called as utility computing, the service being sold. Amazon Web Services, Microsoft Azure, Google App Engine are few examples of the cloud service provider. Using cloud, end-user can access data anytime, anywhere [1, 2].

One of the best feature of cloud computing is resource elasticity. Because of which business customer can scale up and down utilization of resources as per their need without investing amount in licensed software and infrastructure. There are three types of cloud service models used widely that are Software as a Service (SaaS) which provides all support online so does not need any installation from client sites, Infrastructure as a Service (IaaS)—it provides the infrastructure such as storage, network, CPU's on demand, these resources are provided on rent basis and Platform as a Service (PaaS)—which is set of tools and services developed to make coding and deploying those applications quickly. In literature four cloud deployment models are discussed that are private, public, community and Hybrid cloud [3].

One of the key feature of cloud computing is virtualization technology which abstracts the physical infrastructure through a virtual machine monitor (VMM) or

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