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Recent advancements in resource allocation techniques for cloud computing environment: a systematic review

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Abstract There are two actors in cloud computing environment cloud providers and cloud users. On one hand cloud providers hold enormous computing resources in the cloud large data centers that rent the resources out to the cloud users on a pay-per-use basis to maximize the profit by achieving high resource utilization. On the other hand cloud users who have applications with loads variation and lease the resources from the providers they run their applications within minimum expenses. One of the most critical issues of cloud computing is resource management in infrastructure as a service (IaaS). Resource management related problems include resource allocation, resource adaptation, resource brokering, resource discovery, resource mapping, resource modeling, resource provisioning and resource scheduling. In this review we investigated resource allocation schemes and algorithms used by different researchers and categorized these approaches according to the problems addressed schemes and the parameters used in evaluating different approaches. Based on different studies considered, it is observed that different schemes did not consider some important parameters and enhancement is required to improve the performance of the existing schemes. This review contributes to the existing body of research and will help the researchers to gain more insight into resource allocation techniques for IaaS in cloud computing in the future.

Keywords Resource management · Resource allocation · Resource selection · Resource scheduling · Resource utilization · IaaS cloud

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1 Introduction

Resource management is the procedure of assigning virtual machines, computing processes, networks, nodes and storage resources on-demands to a set of applications in cloud computing environment. Through this way, the whole resources are equally assigned between the infrastructure providers and users of cloud. Cloud providers provide resources efficiently within the limits of the service level agreements (SLAs) [1] to the cloud users. These resources are accomplished with the support of virtualization technologies, which assist them in statistical multiplexing of resources for the clients and applications.

Further, resource management helps in synchronization of resources which is emphasized by the management actions and accomplished by the both cloud providers and users. It is the process of resource allocation from resource providers to the resource users on the basis of pay-per-use. It also allows to assign and re-assign resources from the cloud providers to the cloud users where the cloud user can efficiently use the available resources of IaaS [2,3].

In a cloud computing environment there are two actors playing an important role these are cloud providers and cloud users From the perspective of a cloud provider, the providers have a large number of computing resources in their large data centers and they rent out these resources to the users on a pay-per-use basis to maximize the revenue by attaining

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