

Chapter 57

Current Drift in Energy Efficiency Cloud Computing: New Provocations, Workload Prediction, Consolidation, and Resource Over Commitment

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ABSTRACT

Energy Efficiency can be defined as reduction of energy used by a given service or level of activity. In spite of scale and complexity of data centre equipment it can be highly difficult to define the proper activity that could be examined for the efficiency of energy. So there can be four scenarios which may define within the system where the energy is not utilised in an efficient manner. The main goal of Cloud service providers is creation of usage of Cloud computing resources proficiently for efficient cloud computing. Cloud computing has many serious issues such as load manager, security and fault tolerance. This chapter discusses the energy efficient approaches in cloud computing environment. The energy efficiency has become the major concern for the service providers. In this chapter, the major concern is the high lightly of resource allocation challenges and there are some which will be given in the data center energy consumption. The focus is done on the power management task and even the virtualization of saving the energy.

INTRODUCTION

Cloud computing is a materialize technology now-a-days that provides computing, storage resources and communication resources and it is that kind of technology which attracts the ICT (Information and communication Technology) services that provides huge distribution of online services. It provides a great infrastructure which involves large centers including the large amount of servers dealing with the requests given by the clients. There is rapid growth of demand for the power which computes the cre-

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ation of large-scale data centers. The data centers consume a huge amount of electricity which results in carbon dioxide emission and high operational costs. The cloud computing is that kind of concept which gives an immediate action of many well researched domains like grid computing, cluster computing, distributed computing and virtualization (Singh, & Malhotra, (2016)). The data centers of cloud computing give many virtualization technologies that may allow the scheduling of workload on less number of servers which keeps the better utilization as the different kind of workload may give different kind of footprints. There are many companies which are offering cloud computing services for the expansion of cloud infrastructures such as Microsoft, Amazon, Go grid, vCloud Express, Layered Technologies, ENKI Prima Cloud. From the Google's point of view, there are five characteristics of cloud computing user centric, task centric, powerfulness, programmability and intelligence. Cloud computing gradually writes off the initial cost over the diversity of workloads, shared system operators and the distributed server's offers different kind of services based on computation and operational tasks (Aljawarneh, et al., 2017). There are many unique issues based on the cloud computing infrastructure such as standardization, dynamic scalability, debugging, reduction of operational costs, reduction of carbon emission and the most important privacy and security of Information and Communicational Technology resources. Now-a-days it has become the major concern of research that "How to reduce carbon emission". This is all because of the energy which is required by the large-scale data centers for its power supply, cooling, and operations. Therefore reduction of power consumption has become a major issue in this present time.

The popularity of cloud computing is growing day by day and making of the efficient energy usage in cloud data centers has a basic proposal which defines its characteristics.

Definition:

A Cloud is a collection of interconnected and the computers which are dynamically provisioned and even presented for computing the resources depending on the service-level agreements which are established for customers and providers.

MODELS

In the following section, there is a complete review of the cloud, its applications and energy models. In their description there is a detail presenting the model which particularly focuses on management of the resources, its characteristics and the issues which come through the cloud service providers.

Cloud Model

The Definite system which is being used for this model comprises of a set which can be identified by R of r resources and these resources can be connected internally in such a way that it a route is defined between them. Let us suppose that the resources are equivalent according to the maximum amount and the computing ability and its justification can be provided depending upon the technologies which are provided by the virtualization. At this present time many virtualization tools such as parallel desktop for Mac, VirtualBox, VMware and many more. On a single physical resource, there is no firm leap for the

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