

## Chapter 66

# Adoption of Virtualization in Cloud Computing: A Foundation Step towards Green Computing

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### **ABSTRACT**

*There has been rapid expansion of the information technology due to contribution to emission of carbon dioxide. The cloud computing technology has been perceived to present solution to various studies that try to investigate on the most appropriate ways of reducing the carbon dioxide gas emissions. The current study aimed at investigating the adoption of virtualization in cloud computing as a means through which the green computing can be achieved. According to the paper virtualization among its many process helps in curtailing equipment required through cloud computing resources to facilitate adequate use of resources to make use of energy and assets.*

### **INTRODUCTION**

There has been an alarming upsurge in IT departments in most organizations due to the increased usage and demand for high speed networks. This increased proliferation is handled by large scale datacenters that amalgamate large number of servers possessing infrastructure like cooling, storage and network system. The operation of datacenters can be accomplished using internet service providers. Traditionally, a large amount of time and money were infused by businesses to procure the computational resources.

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Ownership based approach had been deteriorating and is replaced by subscription oriented approach as a result of cloud computing emanation through bestowing the access to the demanded services and establishing the foundation. As a result any accumulated information can be easily shared by users (Luo, 2010).

## **DISCUSSION**

Organizations must not worry about configuring, administering and buying the computational foundations. As a result, they should concentrate on cuspidation of their expertise through exploiting the godsend of cloud computing such as low charges on software development. Cloud computing involves consumes a lot of power in processing data. However, the increased demand for cloud computing has surpassed the energy devastation for most data centers raising a lot of contention. The major drawback to cloud computing is the increased carbon emission that affects the environment due to the huge translation costs involved that abate profit advancement of the cloud providers. This creates the need to curtail cloud computing impacts on environment through enforcing energy efficient solutions (Trivedi, 2011).

Therefore, virtualization of cloud computing and consolidation of technology can enhance energy efficiency of data centers due to the exasperating problems in carbon emission and global warming. Data centers are prone to extenuation of maximum utilization rates for data centers. It is therefore in the heart of business to enforce green IT through use of increasing the energy efficiency.

## **CLOUD COMPUTING**

Cloud computing refers to various computing concepts involving large number of computers that are connected through real time communication networks such like internet. This describes the ability to run applications or programs on several interconnected computers concurrently. The phrase refers network based services provided by real time servers and served by virtual hardware simulated by the software running on real machines. Cloud computing entails commercialization of the advancement that conveys computing as a pay-as-you-go basis, and a cloud provider aims at reducing the electricity costs instead of carbon emissions. Since cloud computing is among the emanating technologies, and this raises the questions on sustainability (Sherringham, 2011).

## **VIRTUALIZATION**

Virtualization refers to the creation of virtual version of a resource that divides the resource into single or multiple execution environments. This is critical in cloud computing as it enhances scalability since every server is allocated enough storage and computing power needed by a client. The increased demand for user capacity requires more power and capacity (Bianchini et al., 2012).

Virtualization is changing the IT environment where most companies have been able to adopt it as a measure that allows for better utilization of hardware and reduction of costs (see Figure 1). One of the major benefits of virtualization that go unnoticed is the green computing (Sherringham, 2011).

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