

Chapter 101

Cloud Computing, Green Computing, and Green ICT

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ABSTRACT

This chapter reveals the overview of cloud computing; cloud computing, green computing, green ICT, and data center utilization; the importance of cloud computing in the digital age; the advanced issues of green computing; and the important perspectives on green ICT. Cloud computing is computing based on the Internet. Green computing and green ICT are the sustainable business practices of reducing the environmental footprints of technology by efficiently using several resources. Green computing and green ICT are the important perspectives for the businesses to improve their corporate image by meeting regulatory requirements and sustainability demands of both customers and employees. The chapter argues that cloud computing, green computing, and green ICT are the advanced technologies toward improving sustainability and sustainable development in the green economy.

INTRODUCTION

Cloud computing is able to provide the huge resources and computing ability to users (Chen, Li, & Susilo, 2012). In cloud computing, the on-demand resource provisioning ensures the optimal resource allocation and is cost effective (Prasad & Rao, 2014). The major motivations to adopt cloud computing services include no upfront investment on infrastructure toward transferring responsibility of maintenance, backups, and license management to cloud service providers (Dastjerdi, Tabatabaei, & Buyya, 2012).

Computers require power to run (Adhikari & Roy, 2016). The consumers of electricity are responsible for the green production toward reducing overall carbon dioxide emission and greenhouse gases (Adhikari & Roy, 2016). Green computing is the environmental saving computing paradigm, which involve hardware, software, and people (Singh & Gond, 2017). The adoption of green computing involves many improvements, and provides the energy-efficiency services for data centers, power management, and cloud computing (Palanivel & Kuppaswami, 2017).

DOI: 10.4018/978-1-7998-5339-8.ch101

Nowadays, the information and communication technology (ICT) industry forms a complex group of hardware, software, networks, and its users so there must be the systematic classification for green computing approaches, which emphasize the sophisticated problems (Kesswani & Jain, 2017). The usage of cloud computing and its life cycle can produce the hazardous substances that need to be addressed in the efficient and green perspectives (Palanivel & Kuppuswami, 2017).

This chapter is based on a literature review of cloud computing, green computing, and green ICT. The extensive literature of cloud computing, green computing, and green ICT provides a contribution to practitioners and researchers by revealing the aspects of cloud computing, green computing, and green ICT in order to maximize the impact of cloud computing, green computing, and green ICT toward business sustainability.

BACKGROUND

Cloud computing technology is not a new concept for most of the sectors, such as banks, automobile, retail, health care, education, and logistics (Al-Hudhaif & Alkubeyyer, 2011). Cloud computing is an easy-to-adopt technology with simple and latest architecture (Hutchinson, Ward, & Castilon, 2009). This architecture presents information technology (IT) as a paid service in terms of deployment and maintenance (Sean, Zhi, Subhajyoti, Juheng, & Anand, 2011). Various deployment models of cloud computing make the adoption easy for any type of sector, depending on the need of usage (Singh, Mishra, Ali, Shukla, & Shankar, 2015). This innovative technology makes the collaboration easier among companies by the application of cloud computing (Xuan, 2012).

There has been rapid expansion of the IT due to contribution to the carbon dioxide emission (Khan, Shah, & Nusratullah, 2017). The major objective of the Energy Star program is to assign a voluntary label to the computer products, that were successful in minimizing energy consumption while maximizing efficiency (Jena & Dey, 2013). Green computing is recognized as a way for organizations and individuals to be efficient in resources (McWhorter & Delello, 2016), and considers the use of computers and related resources in an eco-friendly manner, such as the implementation of energy efficiency in the computing equipment (Adhikari & Roy, 2016).

ICT is rapidly growing, and has major influence in all fields of activity (Radu, 2014) toward delivering the intelligent products and services (Banerjee, Sing, Chowdhury, & Anwar, 2013). Green ICT emerges as a new perspective for designing, developing, and managing the computing infrastructure aiming for more efficient processes and mechanisms to avoid the waste of resources toward environmental sustainability (Moreno & Xu, 2013). Over the past few decades, the explosion of the ICT devices has led to a particular focus on the environmental impact in the ICT industry (Chitra, 2011). Green ICT is designed to conserve energy, compared to its conventional counterpart (Ryoo & Choi, 2011).

ASPECTS OF CLOUD COMPUTING, GREEN COMPUTING, AND GREEN ICT

This section provides the overview of cloud computing; cloud computing, green computing, green ICT, and data center utilization; the importance of cloud computing in the digital age; the advanced issues of green computing; and the important perspectives on green ICT.

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