Chapter 11
Importance of Cloud Computing in 5G Radio Access Networks

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ABSTRACT

The fifth generation of wireless networks (5G) will kick off with evolved mobile broadband services as promised by several mobile-related associations, researchers, and operators. Compared to 4G, 5G aims to provide greater data rates with lower latency and higher coverage to numerous users who stream ubiquitous multimedia services. 5G benefits the innovation of internet of things (IoT) as well. To this end, several modifications in the network architecture are required. This chapter is discussing the role of cloud computing centers in 5G networks, and how such integration could be implemented as found in the literature. The benefits of cloud/5G integration will be explained as well. In addition, some challenges related to the integration will be demonstrated.

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INTRODUCTION

The fifth generation of mobile communication systems (5G) will kick off with evolved mobile broadband services as anticipated by several mobile-related associations, researchers and operators. For example, with faster connectivity, it is possible to develop a new radio access network (RAN) for user equipments (UEs). A Cloud-RAN or Centralized-RAN (C-RAN) can be developed leveraging Cloud Computing and 5G networking to provide a new centralized and powerful RAN to resolve capacity and coverage issues in a more effective way. More on Cloud Computing technology and the C-RAN approach will be introduced in the following sections.

CLOUD COMPUTING

Cloud Computing refers to the transfer of on-demand computing services - everything from software programs to hardware-like machines - and storage capacity over a network media based on a pay-per-use model to a large variety of end-users (IBM, Microsoft Azure and Prajapati, Sharma, & Badgujar, 2018). The Cloud concept is called so as it obscures from users the infrastructure details of the underlying hardware. Also, "Cloud" indicates a distance between the service provider and the end-user as it is the case in the shadow resulted by the sky clouds, and provided over long distances. There are several definitions that were put for Cloud Computing by Information Technology (IT) experts in the field (Geelan, 2010). The definition of Cloud Computing as stated by the National Institute of Standards and Technology (NIST) considers it as a model that enables ubiquitous, on-demand and convenient network

Figure 1. Cloud computing (NIST)