Preface

With the rapid development of mobile networks and cloud computing technology, Mobile Cloud Computing (MCC) is attracting great attention from academia, industry, and government. MCC is the combination of cloud computing and mobile networks to bring benefits to mobile users, network operators, as well as cloud providers. As there are more than six billion mobile phone subscribers worldwide, mobile cloud computing has the potential to have a profound effect on the wireless industry and on our society. The book briefly reviews basic concepts and hot topics of mobile cloud computing and focuses on the technical challenges of MCC. It tries to take account of developments and trends that are taking place in the area of MCC and it offers a comprehensive and integrated approach to related issues. The objective of this book is to introduce the applications and techniques for mobile networks and cloud computing. After reading it, you will understand what these techniques are and appreciate their strengths and applicability.

The book is aimed at the reader who is interested in the theories and techniques of mobile cloud computing and related research questions. It will also be of interest to information professionals who need to become acquainted with this new technology and to all those who wish to gain a detailed technical understanding of what issues MCC involves. It is written for computer and network practitioners, developers, information technology managers, specification writers, patent examiners, and curious lay people, as well as students and professors, who need an easy-to-read book to begin related research of MCC.

The book is organized in layers that make the ideas accessible to reader who are interested in grasping the basics, as well as accessible to those who would like more depth of treatment, along with full details on the techniques covered. It is formed by 17 chapters. Chapter 1 addresses cloud computing and mobile cloud computing in order to give an insight about the topic and offer an important overview for the whole book. The technologies and identified advantages to improve and justify the strong use of mobile cloud are both discussed. Chapter 2 introduces the basic concepts and the state of the art of mobile cloud media, and discusses several open research problems associated with it. Specifically, it discusses relevant hot questions like energy saving methods, quality of experience assurance, management for stochastic wireless channel, security and privacy support, and so on. Chapter 3 characterizes critical challenges for deployment of MCC with 4G network technology LTE-Advanced: device battery lifetime, latency, quality of service/experience, and handover. A power tool of statistical modeling is applied to help research these issues in this chapter. Chapter 4 investigates the different technologies and networking of wireless communication, the security methods used in wireless networks, and the types of attacks against secure wireless communication networks. It also displays a variety of challenges in security and privacy of wireless communication networks.

Data security is a major concern and is the main obstacle preventing mobile cloud computing from being more widely adopted. Chapter 5 first gives an overview of the cloud computing concept followed by a description of mobile cloud computing and the different security issues pertinent to the mobile cloud computing environment. Chapter 6 provides an overview of the main challenges in ensuring privacy in
MCC and surveys the most significant contributions from the research community. The other objective of this chapter is to introduce and describe a new framework for privacy protection-based concepts - Virtual Object (VO) and Composite Virtual Object (CVO), where data are encapsulated and protected using a sticky policy approach and a role-based access model.

Quality of Service (QoS) is special in MCC compared to other environments. Chapter 10 argues that always-on connectivity along with increased demand of Cloud services will congest the Internet backbone and create problems in the management of Cloud resources. A new service delivery architecture is proposed to manage Cloud and network resources more efficiently and provide a better quality of experience for the user. Chapter 11 covers several important approaches for performance evaluation in MCC. These approaches, such as Markov processes, scheduling, and game theory, are the most popular methodologies in current research about performance evaluation in MCC. Important QoS problems with details in MCC and corresponding designs and solutions are also explained in this chapter. Chapter 7 presents an agent-based resource management to deal with multiple data and computation-intensive applications of user demand. It offers a promising solution by selecting the best service provider and efficiently utilized mobile network resource given the user’s request constraint. Chapter 8 discusses the main issues like large delay connections, bandwidth variations, power consumption, and high segment loss rates encountered in cloud networks and which affect connection-oriented transport protocols. In the end, this chapter gives some suggestions for future mobile cloud computing transport-layer designs that address different aspects of the network. Chapter 9 describes the recent advances in mobile video cloud technologies and applications and makes deep and detailed discussion of the mobile video cloud system, mobile video cloud management for mobility, context and security, etc. Chapter 12 introduces and describes a new paradigm of the Internet combined with energy management: new models and tools to aid the integration of data. Chapter 13 presents the integration of widely available technologies to bridge the gap between mobile devices and its computation-rich surrounding environments. A novel resource evaluation mechanism is presented, which allows a finer evaluation and a more precise comparison of remote resources, leading to fewer wasted resources and better use of those resources. Chapter 14 performs a survey of state-of-the-art vehicular Cloud computing as well as the existing techniques that utilize Cloud computing for performance improvements in Vehicular Ad Hoc Networks (VANET). The VCC is classified based on the applications, service types, and vehicular Cloud organization. Chapter 15 presents mobile cloud healthcare computing systems that simultaneously leverage the portability and scalability of healthcare services. This chapter also presents the wearable computing system as an application of mobile healthcare. Chapter 16 offers a proposal for multidisciplinary software for people with autism. The multidisciplinary software for Autism treatment is being developed. It is based on PECs, ABA, and TEACCH methods, and it uses ludic games and activity interventions. Chapter 17 aims at presenting technological and application-oriented trends in cloud-based mobile news reporting both for journalists’ (news producers) and users’ (news consumers). Future and emerging perspectives, such as ubiquitous and pervasive computing, incorporating context and location-aware services in semantic interaction modes, are also described from the news-reporting point of view.

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