

Preface

The concept of the Internet has been a tremendous success by this time. Other than being a great source of fun and enjoyment, millions of people around the world rely on the Internet for various tasks related to their livelihoods. The overwhelming growth of the Internet and its users is now a reality, which has put new thoughts among the research community to devise new ideas for giving coverage to a huge number of people around the globe. Distributed computing is facilitating the growth and proper utilization of various internetworking technologies.

This book, entitled “*Advancements in Distributed Computing and Internet Technologies: Trends and Issues*,” compiles the recent research trends as well as common issues in the fields of distributed computing, and Internet technologies. The book aims to provide advancements on emerging technologies in these fields to support the effective design and implementation of distributed computing environments and Internet-based technologies. It is written mainly for graduate students, researchers, academics, and industry practitioners, working in the areas of Internet and distributed computing, who want to improve their understanding of the inter-related topics.

THE CONTENTS OF THIS BOOK

This book is comprised of 18 chapters, which are divided into three sections; Section I: Internet-Based Systems Design; Section II: Wireless Sensor Networks and Applications; and Section III: Next Generation Distributed Systems.

Section I of the book focuses on the issues and solutions related to the Internet-based technologies, such as VoIP, IPTV, and IP geolocation. In Chapter 1, Toral-Cruz *et al.* study the behavior of jitter and packet loss of VoIP traffic through the measurement and simulation-based measurements. As a result of this study, a detailed characterization of an accurate model of the QoS parameters is proposed. In Chapter 2, Yildirim and Kosar discuss the factors that affect the end-to-end application throughput in order to provide insight to the characteristics of the end-systems that cause the bottleneck for throughput. The authors then present a model to predict the optimal parallel stream number and show that the model gives very accurate results regardless of the type of the network. In Chapter 3, Zare and Rahbar review the challenges of IPTV in different contexts and present solutions and recommendations for each challenge. The methods to improve multicasting services in IPTV and the methods to improve QoS in DSL and wireless networks are also discussed in this chapter. In Chapter 4, Arif presents a systematic analysis of latency measurements between the Internet nodes and discusses the usages of latency for measurement-based Internet host geolocation. In Chapter 5, Bobelin gives a general overview of the

process leading to topology reconstruction. The author also describes MINTCar that enables multiple sources, multiple destinations network tomography to measure available bandwidth. Chapter 6, by Kousaridas *et al.* presents an approach for service provisioning that incorporates cognitive features and promotes itself. In order to prove the viability and applicability of the proposed approach, the enhancement of the IP multimedia subsystem based on the proposed approach is also introduced.

Section II of the book deals with the WSN-related topics, including performance, energy saving, security, and localization issues. In Chapter 7, Lino *et al.* make a performance analysis of the IEEE 802.15.4 standard by using the author's routing protocol, the drain announcement-based routing scheme, in order to assess the effectiveness of the standard at supporting time-critical event monitoring applications. In Chapter 8, Lin *et al.* study multi-attribute data fusion in sensor networks and propose an energy equilibrium routing method, namely multi-attribute fusion tree, to balance and save energy. In Chapter 9, Zhang *et al.* address the security issues due to outliers and present an outlier detection and countermeasure scheme to identify outliers and consequently defend against their security attacks by using corresponding countermeasures. In Chapter 10, AbuHmed *et al.* describe the problem of public key authentication in context of sensor networks and propose a solution that uses collaboration among sensor nodes for public key authentication. In order to provide precise localization for indoor sensor networks, in Chapter 11, Han *et al.* improve the two-phase positioning algorithm and propose a reference node selection algorithm based on trilateration, which can provide real-time localization service. In Chapter 12, Guerrieri *et al.* define the specific requirements for applications of energy management in the building context and propose a framework for building management to support heterogeneous platforms, based on the requirements.

Section III of the book focuses on the future generation of distributed systems, such as pub/sub architecture, P2P, service oriented network (SON), Grid, and cloud systems. In Chapter 13, Pham and Tran provide a survey on the publish/subscribe techniques, which allows the nodes of a network to publish data and subscribe data interests efficiently, for P2P networks. In Chapter 14, Melchioris *et al.* propose a P2P-based architecture that supports polling network devices in a very flexible way, as required by real current Internet networks. In Chapter 15, Duan presents a new SON (Service-Oriented Networking) paradigm that applies the SOA (Service-Oriented Architecture) with network virtualization for integrating communication networks into distributed computing environments. In Chapter 16, He *et al.* discuss the major advances of the long-term evolution of a cellular network technology for mobile phone systems and its recent research efforts in improving its performance. The chapter is comprehensive, spanning from the physical layer, link layer, handover process, and even to security issues. In Chapter 17, Cardellini *et al.* analyze the problem of service level provisioning and the possible strategies that can be used to address the problem. The authors also propose an approach for the dynamic Quality of Service (QoS) provisioning of cloud-based applications, which takes into account that the provider has to fulfill the service level. In Chapter 18, Rahman *et al.* discuss the major challenges of designing and implementing decentralization in Grid and cloud systems. It also presents a survey of the existing decentralized distributed systems and technologies regarding how these systems have addressed the challenges.

WHAT NOT TO EXPECT FROM THE BOOK

This book is not a tutorial that provides detailed introductory information on the basic topics in the fields of distributed computing and Internet technologies. Even though few chapters contain some in-

trductory information, they should not be considered adequate for beginners. The readers need to have at least some basic knowledge about distributed computing and Internet technologies. Again, the book should not be considered as a detailed research report. Some chapters present specific problems and their solutions that might be helpful for graduate students, while some other chapters talk about elementary information that might be useful for general readers. As a whole, this could be a useful reference book that notes down the latest advancements in the related fields.

Al-Sakib Khan Pathan

International Islamic University Malaysia, Malaysia

Mukaddim Pathan

Australian National University, Australia

Hae Young Lee

Electronics and Telecommunications Research Institute, South Korea