Special issue on protocols and applications for wireless and mobile peer-to-peer networks

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We are witnessing a paradigm shift in the design of internet scale distributed systems, with peer-to-peer (P2P) communication playing an important role. For large scale content distribution, P2P communication is emerging as an alternative technology to the traditional client-server systems. File sharing and streaming audio/video are examples of popular P2P applications. The key characteristics of some P2P systems are large scale, extremely dynamic topology, and decentralized control. In addition, ubiquity of wireless handheld devices, namely, smartphones and tablet computers, has added a new dimension to the challenges facing the designers of P2P systems. Due to advances in wireless communication technologies, campus and enterprise-wide availability of wireless networks are already a reality. In some cases, an entire metropolitan area is covered by a single wireless network. As a result, the demand to port network applications for mobile handheld devices is increasing. In spite of many interesting technological developments, wireless networks are still constrained by expensive bandwidth and variable channel qualities. Similarly, handheld devices have less resources, namely, processing, memory, storage, and battery, than laptop computers. In addition, security is an added concern in wireless P2P systems. Therefore, application and system designers are faced with new

challenges in the domain of wireless P2P networks. The objective of this special issue is to address some of those challenges.

In response to our call for papers, we received seven submissions. Each paper was reviewed by three experts. After a rigorous process of peer review involving two rounds of revisions, finally three papers have been selected for publication.

In the first article entitled ``Modeling Resource Constrained BitTorrent Proxies for Energy Efficient Mobile Content Sharing,'' I. Kelenyi proposes a two-step approach to download contents on handheld devices in an energy efficient manner. In the first step, data is moved from the server to an intermediate proxy; in the second step, the proxy sends data to smartphones in high speed bursts. The two-step approach has been shown to save energy compared with regular, direct data transfer from the server to smarphones. Next, they discuss how the proxy can be hosted on memory limited broadband routers found in homes. Their results have been validated with both simulations and measurements of real life torrents on a prototype system running on home routers and smartohones running Symbian operating system.

In the second article entitled ``Towards an Effective Integration of Cellular Users to the Structured Peer-to-Peer Network,'' M. Zulhasnine, C. Huang and A. Srinivasan proposed a scheme, called cellular Chord (C-Chord) to integrate users of cellular networks into structured P2P networks in a topology-aware manner. Their C-Chord scheme offers cellular users to make a choice while downloading data: download either from the Internet peers at a faster rate or from other cellular users under the same base station. Peer

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selection is an important step in their work. They show how throughput can be significantly increased by carefully selecting peers among the potential senders.

In the third article entitled ``A Distributed Trust Management Model for Mobile P2P Networks,'' X. Wu proposes a distributed trust management model (DTMM) to construct short and robust trust chains in mobile P2P networks. The paper focuses on prediction of future availability of wireless links and fast generation of valid trust evidences. The paper makes a relationship between mobility patters and trust management in mobile P2P networks. By means of simulations they show the scalability and robustness of their results.

We would like to thank all anonymous reviewers who spent much of their precious time reviewing the papers. Their timely reviews and insightful comments greatly helped the authors in revising their manuscripts and us in selecting the best papers for this special issue. Taking this opportunity we thank all the authors who had submitted their manuscripts for possible publication in this special issue. Special thanks go to the Editor-in-Chief of the journal, Professor Xuemin (Sherman) Shen, for offering us the opportunity to edit this special issue.

Kshirasagar Naik is an associate professor in the Department of Electrical and Computer Engineering at the University of Waterloo in Canada. He received his B. Sc. Engineering degree from Sambalpur University, India and M. Tech degree from the Indian Institute of Technology, Kharagpur. He received his M. Math degree in computer science from the University of Waterloo and Ph.D. degree in electrical and computer engineering from Concordia University, Montreal. He worked as a faculty member at the University of Aizu in Japan and Carleton University in Ottawa. He was a visiting associate professor at the Research Institute of Electrical Communications at Tohoku University, Sendai, Japan, in 2003. He served as a program co-chair of the 5th International Conference on Information Technology held in Bhubaneswar, India, in December 2002. He was a co-guest editor of two special issues of IEEE Journal on Selected Areas in Communications published in June 2005 and January 2007. Now he is an associate editor of the Journal of Peer-to-Peer Networking and Applications and the International Journal of Parallel, Emergent and Distributed Systems. His research interests include dependable wireless communication, resource allocation in wireless, sensor networks, ad hoc networks, mobile computing, peer-to-peer communication, intelligent transportation systems, capability enhancement of smartphones and tablet computers, and communication protocols for smart power grids.