WIRELESS COMMUNICATIONS AND MOBILE COMPUTING
Wirel. Commun. Mob. Comput. 2011; **11**:443–445
Published online in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/wcm.1136

GUEST EDITORIAL

Next generation mobility management

By Ilsun You, Youn-Hee Han, Yuh-Shyan Chen and Han-Chieh Chao, Guest Editors

Recently, wireless and mobile communication networks have become increasingly popular and the huge number of smart mobile devices and applications has brought the mobile operators with challenges from various aspects. This trend will continue to affect the way in which we live, work, and play with many smart and innovative services, and the intensive mobility control messages and data will give great impact on the traditional wireless and mobile communication networks. For this reason, the mobility management support is one of very important issues for the future generation of wireless and mobile networks and services, and the design of efficient and robust mobility management is one of the most challenging research tasks.

Observing the great need for an in-depth research of the mobility management in both academia and industry, we have put together this special issue through an open call for papers. More than 10 high-quality papers from all around the world were submitted. Although many of them were of high quality, we had room for only three papers that best fit the theme. To guarantee higher quality of this special issue, we also have selectively collected four expanded papers from the proceedings of MobiWorld 2008 workshop while inviting two comprehensive surveys. Accordingly, this special issue brings together nine papers. The first two papers are devoted to review and survey recent developments and methods of mobility management, and the others propose and analyze some of the most interesting and innovative solutions dealing with the mobility management in wireless mobile networks.

The paper "Next generation mobility management: an introduction" by F. Richard Yu, Vincent W. S. Wong, Joo-Han Song, Victor C. M. Leung, and Henry C. B. Chan reviews recent research trend and developments in location management, and surveys methods for inter-system handover management between heterogeneous systems. It classifies the inter-system handover management schemes according to the protocol layer, so that the readers can gain in-depth insight into the topic. It also provides open problems and research direction for the next negation mobility management. Recently, communication devices are being installed in more and more vehicles and roadside infrastructure. In the near future, traveling vehicles will be able to communicate while forming rapidly changing ad hoc networks. The paper "Mobility and Handoff Management in Vehicular Networks: A Survey" by Kun Zhu, Dusit Niyato, Ping Wang, Ekram Hossain, and Dong In Kim presents a good comprehensive survey on existing mobility management works for both vehicle-to-vehicle and vehicle-to-infrastructure communications in vehicular networks, and also provides several open research issues of the topic.

The following four papers refer to the proxy mobile IPv6 (PMIPv6) which is a famous mobility management protocol recently standardized by IETF. PMIPv6 is a representative network-based localized mobility management protocol and has been of great interest to both academia and industry. Unlike host-based IP mobility management protocols, PMIPv6 does not require the participation of mobile nodes in mobility signaling. The paper "Implementation and analysis of proxy MIPv6" by Jianfeng Guan, Huachun Zhou, Zhiwei Yan, Yajuan Qin, and Hongke Zhang analyzes the singling cost of PMIPv6, provides their test-bed implement to evaluate its performance, and shows that its performance is better than the other mobility management protocols. The paper "Smart Buffering for seamless handover in Proxy Mobile IPv6" by Hyon-Young Choi, Kwang-Ryoul Kim, Hyo-Beom Lee, Sung-Gi Min, and Youn-Hee Han presents a PMIPv6 buffering scheme using only network-side information to prevent packet loss by proactively buffering packets that will be lost during handover, and also provides redundant packet elimination and packet reordering methods to minimize duplicate packet delivery and disruption of connection-oriented data flows. The paper "The applicability of virtual interface for inter-technology handovers in Proxy Mobile IPv6" by Ryuji Wakikawa, Sawako Kiriyama, and Sri Gundavelli analyzes the required software function on the mobile node for performing inter-technology handovers and investigates the applicability of virtual interface support available in Linux for implementing the PMIPv6-based inter-technology handover. The paper "QoS aware dynamic route optimization for Proxy Mobile IPv6 networks" by A. Dev Pragad, Vasilis Friderikos, Paul Pangalos, and A. Hamid Aghvami provides a QoS aware dynamic route optimization scheme where the network identifies the lower QoS sessions, and establishes a binding update with the correspondent node (CN) rather than with the LMA.

The paper "A Cross-Layer Partner-Assisted Handoff Scheme for Hierarchical Mobile IPv6 in IEEE 802.16e Systems" by Yuh-Shyan Chen and Kun-Lin Wu presents a new partner-assisted handoff mechanism based on cross-layer approach by the combination of layer 2 and layer 3 in hierarchical mobile IPv6 which is a protocol standardized by IETF. The paper "Soft handoff support for SIP-NEMO: design, implementation, and performance evaluation" by

Shun-Ren Yang, Ya-Jun Huang, and Chun-Wei Chiu provides a soft handoff mechanism to effectively reduce the handoff disruption time which may be long in thesession initiation protocol and network mobility (SIP-NEMO). The paper "An end-to-end framework of transport layer mobility management" by Yi Wu, Yanqun Le, and Dongmei Zhang extends the TCP migrate work by resolving the simultaneous mobility issue that the existing transport layer mobility schemes do not support and proposes an improved end-to-end framework of TCP migrate scheme through handover redirection and transmission resuming.

We would like to thank all the authors for their great work and for considering this special issue for submitting their papers. We would like to extend our gratitude to the anonymous reviewers who spent much of their precious time reviewing all the papers and providing substantive comments on paper improvements. We also would like to thank the devoted staff of Wiley for their high level of professionalism, and particularly express our sincere thanks to the Editor-in-Chief of WCMC, Professor Mohsen Guizani, for inviting us to edit this special issue and for their continuing keen interest.

It has been a pleasure to put together this special issue on this very timely topic and we hope you enjoy it.

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Youn-Hee Han received his B.S. degree in Mathematics from Korea University, Seoul, Korea, in 1996. He received his M.S. and Ph.D. degrees in Computer Science and Engineering from Korea University in 1998 and 2002, respectively. From March 4, 2002 to February 28, 2006, he was a senior researcher in the Next Generation Network Group of Samsung Advanced Institute of Technology. Since March 2, 2006, he has been a Professor in the School of Computer Science and Engineering at Korea University of Technology and Education, Cheonan, Korea. His primary research interests include theory and application of mobile computing, including protocol design and performance analysis. Since 2002, his activities have focused on mobility management, media independent handover, cross-layering optimization, and dynamic sensor deployment. He has published approximately 100 research papers and 20 patents on the mobile computing area. He has also made several contributions in IETF and IEEE standardization, and served as the chair of 'multi6' working group in Korea TTA IPv6 Project Group.

Yuh-Shyan Chen received the B.S. degree in Computer Science from Tamkang University, Taiwan, R.O.C., in June 1988 and the M.S. and Ph.D. degrees in Computer Science and Information Engineering from the National Central University, Taiwan, R.O.C., in June 1991 and January 1996, respectively. Since 2006, he has been a Professor at the Department of Computer Science and Information Engineering, National Taipei University, Taiwan. Prof. Chen served as Editor-in-Chief of International Journal of Ad Hoc and Ubiquitous Computing (SCIE), Regional Editor (Asia and Pacific) of IET Communications (SCI), Editorial Board of Telecommunication System Journal (SCIE), EURASIP Journal on Wireless Communications and Networking (SCIE), International Journal of Communication Systems (SCIE), Mobile Information Systems (SCIE), and Journal of Internet Technology (SCIE). His paper wins the 2001 IEEE 15th ICOIN-15 Best Paper Award. Prof. Chen was a recipient of the 2005 Young Scholar Research Award, National Chung Cheng University, R.O.C. His recent research topics include wireless communications, mobile computing, and next-generation personal communication system. Dr. Chen is a senior member of the IEEE Communication Society.

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DOI: 10.1002/wcm

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