

Guest Editorial

QoS in Wireless Networks

This special issue of the JOURNAL OF COMMUNICATIONS SOFTWARE AND SYSTEM dedicated to QoS in Wireless Networks aims to provide the reader with recent research activities and the state-of-the-art developments in the important area of quality of service in wireless networks. Seven papers have been recommended for publication based on a peer reviewing process.

While the topic of providing quality of service to mobile users have been vastly investigated in the past ten years, still there is not a single solution that can enable network providers to guarantee the service at all situations and network loadings. Mobile users are moving and continuously change their point of attachment to the network. This makes it difficult to promise the same grade of service quality at all parts of the network. The problem becomes even more difficult when new traffic types, real-time and non-real-time, data and voice, and multimedia are entering into the mobile network list of services. The achievable throughput and bit-error-rate in mobile networks are hard (if not impossible) to be maintained at a fixed level when users are roaming from one cell to another and from one network to another network domain.

In recent years, the role of user and network security as a QoS metric has been intensified too, and this will add extra complexity to the problem. Inclusion of ad hoc networks, wireless local area networks (WLAN), and others also make new challenges to the problem. Therefore, the topic of QoS in wireless network will be a continuing research topic for which this special issue and many others to come will contribute only partially to solve the problem.

Two of the proposed papers in this special issue address the area of Queue Management - Based QoS Control. In "Novel queuing model for multimedia over downlink in 3.5G wireless network" by K. Al-Begain et al., a model for multimedia transmission over downlink shared channel in 3.5G wireless network is presented. The proposed approach combines a time-space priority buffer management scheme to optimize quality of service requirements for each real-time and non real-time flows.

In "A new buffer and energy based scheduling scheme for supporting QoS in MANETs" by M. Brahma et al., a new multiple queuing system with an adaptive scheduling taking into account the states of buffers and energy consumption in a mobile ad hoc network is developed. The proposed scheduling scheme uses dynamic weights for each queue. The performance of the scheduling scheme using dynamic weights for each queue is compared with the IEEE 802.11b and the upcoming IEEE 802.11e models.

The next three papers address the area of QoS multicast routing. In "Prioritization-based layered multicast for fixed/mobile networks with fast convergence and inter-session fairness" K. Kashibuchi et al., present a scheme that allows newly-arriving users to promptly converge their data transmission rates to the most optimal rate that best suit the current conditions of the network without degrading the system fairness. The multicast streaming scheme exploits the fact that layered multicast uses priority-based packet dropping policies.

In "Efficient QoS-based mobile multicast using context transfer" by I. Miloucheva et al., an architecture for provision of multicast services in heterogeneous mobile IPv6 environment using context transfer techniques between access routers for seamless handover of active multicast services is analyzed. This work is based on of the mobile multicast architecture developed within the EU IST project DAIDALOS.

In "A pheromone-aided multipath QoS routing protocol and its applications in MANETs", P. B. Jeo et al., present an ant-based multipath QoS routing protocol that utilizes a single link metric applied to a energy efficient multipath algorithm that considers energy and latency. Apheromone-aided routing table is updated to avoid the paths containing malicious nodes.

In the last two papers, the first focus on QoS control in multimedia wireless networks and the second on security in ad hoc networks. In "A utility-maximization bandwidth adaptation scheme for multimedia wireless networks QoS provisioning," N. Lu et al., proposes an integrated bandwidth for multimedia wireless networks using application utility functions. A search-tree based bandwidth adaptation algorithm allows to maximize the total utility of the network. The results show that the bandwidth adaptation scheme is effective for increasing the utility and bandwidth utilization of wireless networks while keeping the call blocking and handoff dropping probabilities low.

In "DelPHIX: A simple and efficient mechanism for wormhole detection in ad hoc networks", H. S. Chiu et al., describe an efficient algorithm observing the delays of different paths to the receiver, for detecting wormhole attack in mobile ad hoc networks. This method requires neither synchronized clocks nor special hardware equipped mobile nodes.

Finally, the Editors sincerely hope that this special issue of JCOMSS provides an interesting selection of research work in the areas of QoS in wireless networks. We would like to thank all the authors who submitted their papers and thank all the reviewers for their efforts and valuable contributions.

PASCAL LORENZ

University of Haute Alsace
Colmar, France (lorenz@ieee.org)

ABBAS JAMALIPOUR

University of Sydney
Sydney, Australia (a.jamalipour@ieee.org)

JOEL RODRIGUES

University of Beira Interior
Covilhã, Portugal (joeljr@ieee.org)



PASCAL LORENZ received a PhD degree from the University of Nancy, France. Between 1990 and 1995 he was a research engineer at WorldFIP Europe and at Alcatel-Alsthom. He is a professor at the University of Haute-Alsace and responsible of the Network and Telecommunication Research Group. His research interests include QoS, wireless networks and high-speed networks. He was the Program and Organizing Chair of the IEEE ICATM'98, ICATM'99, ECUMN'00, ICN'01, ECUMN'02 and ICT'03, ICN'04, PWC'05 conferences and co-program chair of ICC'04. Since 2000, he is a Technical Editor of the IEEE Communications Magazine Editorial Board. He is the vice-chair of the IEEE ComSoc Communications Software Technical Committee and secretary of the IEEE ComSoc Communications Systems Integration and Modelling Technical Committee. He is senior member of the IEEE, member of many international program committees and he has served as a guest editor for a number of journals including Telecommunications Systems, IEEE Communications Magazine and LNCS. He has organized and chaired several technical sessions and gave tutorials at major international conferences. He is the author of 3 books and 160 international publications in journals and conferences.



ABBAS JAMALIPOUR has been on the faculty of Sydney University, Australia since 1998. He holds a PhD from Nagoya University, Japan. He is the author of the first book on wireless IP and two other books, and has co-authored five books and over 170 journal and conference papers, all in the field of wireless telecommunications. Professor Jamalipour is an IEEE Distinguished Lecturer, the Editor-in-Chief IEEE Wireless Communications, Senior Member of IEEE, and a Fellow Member of IEAust. He has been very active within the ComSoc, currently serving as the Chair of Satellite and Space Communications TC; Vice Chair of Communications Switching and Routing TC; and Chair of Coordinating Committee Chapter, Asia-Pacific Board. He is a Technical Editor of the Communications Magazine, the Wiley International Journal of Communication Systems, and several other scholarly journals. He is a voting member of GITC (Globecom/ICC Technical Contents Committee) and has been a Vice Chair of WCNC2003 to 2006, Chair of GLOBECOM2005 (Wireless Communications), and a symposium Co-Chair of ICC2005 to 2007,

and GLOBECOM2006, and many other conferences in the past. He is a member of IEEE WCNC Steering Committee.



JOEL RODRIGUES received the 5-year B.S. degree (licentiate) in Informatics Engineering in 1995 from the University of Coimbra, Portugal, received his MSc degree from the University of Beira Interior, Portugal, in 2002, and is currently concluding his PhD in 2006 at the University of Beira Interior, Portugal. Between 1995 and 2000 he worked in the industry and services, namely on Portugal Telecom and Portugal Telecom Research Center. He is currently with the Department of Informatics of the University of Beira Interior, Portugal, and a Researcher of the Institute of Telecommunications, Portugal. His research interests include optical Internet, high speed networks, wireless networks, and knowledge networks. He is member of the Network of Excellence EuroNGI (Design and Engineering of the Next Generation Internet). He has reviewed papers for many international journals, encyclopedias, and conferences and he has authored or co-authored over 40 papers in refereed international journals and conferences, and gave tutorials in several international conferences. He was chair of several international committees. He was member of many Technical Program Committees and Organizing Committees, and chaired many technical sessions at international conferences. He was editor of a IEEE Computer Society book proceedings. He is a licensed Professional Engineer and is a member of IEEE Computer Society and IEEE Communications Society, Internet Society, and a member of the ACM SIGCOMM.