

Guest Editorial

QoS in Wireless Networks

This special issue of the JOURNAL OF COMMUNICATIONS SOFTWARE AND SYSTEMS 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 "An Integrated Bandwidth Adaptation Scheme for Multimedia Wireless Networks and its Connection-Level Performance Analysis" 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.

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