# EDITORIAL

# PERFORMANCE EVALUATION OF COMPUTER SYSTEMS

## IRFAN AWAN

*Department of Computing,*
*University of Bradford, Bradford, BD7 1DP, UK*
*Email: i.u.awan@ bradford.ac.uk*

Over the recent years performance modelling and evaluation has gained significant importance in many areas of research. Whilst new applications are facilitating users' demands, researchers are facing challenges to provide models, tools and analysis to aid in system design, performance measurements, prototyping, testing and evaluation.

Performance modelling and evaluation is a fast developing subject with exciting developments on several fronts, as is shown by the variety of topics, techniques and approaches in this special issue.

This special issue presents the papers selected from the UKSIM'05 and the first workshop on Performance Modelling of Wired and Wireless Mobile Computing and Networks held in conjunction with the 11th ICPADS 2005, Fukuoka, Japan. These papers were extended and revised before undergoing a rigorous period of peer-review. The purposes of both workshops were to provide international forums for researchers and industry practitioners to present their state-of-art research on performance modelling and evaluation studies in all aspects of wired and wireless networking and computing and to exchange ideas and explore new avenues of collaborations.

In the first paper Balikhina, Maqousi, Duce and Ball introduce the performance modelling approach to evaluate the effectiveness of active network approaches for supporting Distributed-Virtual-Environments (DVEs) and presents an evaluation of messages filtering mechanisms, which are based on the Level of Detail (LoD) concept. The simulation model has been described and a detailed experimentation studies has been presented.

In the second paper Karatza presents the performance of parallel job scheduling in a distributed system. A special type of scheduling called *gang scheduling* has been considered, under which jobs consist of a number of interacting tasks are scheduled to run simultaneously on distinct processors. Various workloads are examined using simulation techniques. The results show that the policy which gives priority to large gangs performs better than the method that does not take into account job characteristics in ordering decisions.

In the third paper, Asfand-e-Yar, Awan and Woodward investigate into effective congestion control mechanisms for the Internet routers in order to provide certain QoS for increasing diverse traffic. They developed a threshold based novel analytical model based on standard RED mechanism. The external bursty and correlated traffic has been modelled using continuous time MMPP. Various numerical examples are presented to demonstrate the effectiveness of their proposed model.

In the fourth paper, Xiao proposed a novel mutual authentication and key exchange protocol based on self-certified mechanism for roaming services in the global mobility network (GLOMONET). The main new features of the proposed protocol include identity anonymity, one-time session key renewal, and distributed security management scheme. The performance analysis of the proposed protocol demonstrates that the computation complexity of his protocol is not high and does satisfy the computation capacity requirement for mobile device while these new security features have been significantly enhanced.

In the final paper, Bordbar, Anane and Okano present an architectural approach to QoS evaluation and admission control, based on the modelling of both system behaviour and QoS requirements. Their proposed approach is model-based and makes use of models representing both behaviour and QoS aspects of the system via Timed Automata. The compatibility of the mechanism with architectures,

which promote QoS management in its own right, such as ITSUMO, is also highlighted.

## Biographies

**Irfan Awan** received his PhD degree ('97) in Performance Analysis of Queueing Network Models with priorities and blocking from the University of Bradford – UK. He is a senior lecturer in the Department of Computing, University of Bradford which he joined in 1999. He is member of the Mobile Computing and Networks Research Group and co-tutor for the MSc Mobile Computing Course. Dr. Awan's research has mainly focussed on developing cost effective analytical models for measuring the performance of complex queueing networks with finite capacities and priorities. He has produced over 100 publications and edited proceedings of the $20^{th}$ UK Performance Engineering Workshop. He has also authored several special issues of the international journals and is a member of various programme committees and steering committees for International conferences. He is a member of IEEE, ILT, BCS and UK Simulation Society.
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