Editorial

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Biographical notes: Eduardo Cerqueira received the BS Degree in Data Processing Technology from the University of Amazon (2000), MS in Computer Science from the Federal University of Santa Catarina (2003), Brazil and PhD in Informatics Engineering from the University of Coimbra (UC) (2008). He is Invited Auxiliary Professor at the Department of Informatics Engineering, UC. His research interests include quality of service, quality of experience, mobility and multimedia. His publications include one book, four patents and over than 40 papers in national and international refereed journals/conferences. He participated in European research projects such as Q3M, SAPRA and CONTENT.

Thomas Michael Bohnert (http://tmb.nginet.de) is a senior research scientist at SAP Research. He received a Diploma Engineer Degree in 2005 and is expected to receive his PhD in spring 2009 from the University of Coimbra. His interests are enabling infrastructures for business applications. Within SAP this covers Distributed Systems for Telematic Applications and Business Intelligence. He also continues research in QoS/QoE, WiMAX, and VoIP. He founded the IEEE Broadband Wireless Access Workshop (www.bwaws.org) and co-founded the Future Multimedia Networking Workshop. His works are published in several books, journals and conferences. He was GE for ELSEVIER Computer Communications and EURASIP Wireless Communications.

Fernando Boavida received his PhD in Informatics Engineering in 1990, and he is a full Professor and President of the Department of Informatics Engineering of the University of Coimbra. His main research interests are scalable networking and mobile and ambient networking. He was the chairman of the Program Committee of QofIS'2001, IDMS-PROMS'2002, Networking'2006, WWIC'2007 and FMN'2008 international conferences/ workshops. His publications include six book, five book chapters, and around 35 papers in national conferences and 104 papers in international refereed journals and conferences proceedings. He participated in European initiatives such as RARE, EWOS, COST263, E-NET, EuQoS, Weird, OpenNet and CONTENT.

Real-time multimedia services are contributing to enhance our life experience and are expected to be among the most important applications in future generation networks. The management of real-time multimedia services is an important key to attract and keep customers, while increasing profits to content providers. The efficient delivery and deployment of real-time multimedia services over emerging diverse and heterogeneous wired and wireless systems is a challenging research objective. The interoperability of applications, transport and network protocols, as well as, the demand for improved Quality of Service (QoS), Quality of Experience (QoE) and seamless mobility control creates a challenging study field and also possibilities for research of novel communication protocols, architectures and methods towards Future Multimedia Networking Systems.

In 2008, the First International Future Multimedia Networking (FMN 2008) workshop was organised in Cardiff, Wales, UK, together with the Next Generation Mobile Applications, Services and Technologies (NGMTAS 2008) conference. FMN 2008 achieved exceptional success from the very beginning by receiving 72 submissions from 31 countries. FMN 2008 produced a high quality technical peer reviewed programme with an acceptance rate around 25%. FMN 2008 addressed important aspects of future multimedia systems, such as novel protocol and architectures for multimedia services, multimedia in personal, sensor and ad-hoc networks, QoS and QoE management in multimedia networks, and multimedia in peer-to-peer networks.

Based on the FMN 2008 outcome and on the need to deepen certain topics from a more focused perspective, FMN 2008 has accepted the kind invitation of the *International Journal of Internet Protocol Technology* (IJIPT) to prepare a special issue. The authors of selected papers were asked to produce extended and updated versions of their papers and to submit them to a selection process for publication in this Special Issue. The second volume of this Special Issue has papers that cover Quality of Service (QoS) and Quality of Experience (QoE) support in wired/wireless future multimedia networks.

In the paper 'Multi-component multimedia resource optimisation for 3G and beyond', the authors introduced and evaluated a resource allocation solution for 3G wireless systems that optimises Quality of Service (QoS) control by exploiting the multi-component nature of multimedia applications. The authors built a Markovian model of their Multi-Component Resource Allocation Scheme (MCRAS) and analysed its performance by computing steady-state probability distribution of the Markov Chain.

The paper 'Assessing the Quality of Experience of SopCast' addresses two important research topics: peer-to-peer and Quality of Experience. The authors investigated by means of measurements the functionalities and the traffic characteristics of a BitTorrent-like P2PTV application called SopCast and the QoE perceived by its end users by using both objective and subjective measurement technologies.

In a traditional network stack, data from an application is transmitted in the order that it is received.

The paper 'Application-level QoS: improving video conferencing quality through sending the best packet next' presented a scheme where the transport layer, in cooperation with the application, determines which packets should be sent and in what order they should be sent in. The motivation for this is two-fold. It seems reasonable for the transport layer to discard packets which will no longer be useful for the receiver. It would also seem reasonable for audio packets to be sent before video packets. The proposed solution is implemented as an interface to Datagram Congestion Control Protocol (DCCP) and tested using traffic modelled on video conferencing software. The results show improvement can be made to video conferencing during periods of congestion – substantially more audio packets arrive on time with the algorithm, which leads to higher quality video conferencing.

The paper 'Cross-Layer joint optimisation of FEC channel codes and Multiple Description Coding for video delivery over IEEE 802.11e links', presented two cross-layer optimisation strategies based on the IEEE 802.11e standard that enable a robust video transmission using adaptively Forward Error Correction (FEC) channel codes at transport layer and a Multiple Description Coding (MDC) architecture. The first approach classifies the characteristics of the sequence to be coded and selects the most appropriate coding mode according to the channel conditions obtained through a cross-layer signalling protocol. The second relies on a parametric model of the distortion which is estimated during the coding operations. The performances of these schemes are then improved by a packet classification strategy based on their significance in the decoding process. Experimental results show that both cross-layer optimisation algorithms perform well with a small computational effort but different playout delays.

In the paper 'Wireless multicast cross-layer framework for rate allocation: protocol design', authors explored multicast communication in wireless networks. The paper discussed a framework of rate allocation for a set of multicast sessions over multihop wireless networks. The proposed framework aims to steer the entire network of ad-hoc nodes towards the optimal point in real-time using a totally distributed and asynchronous environment settings. A series of implementation were introduced based on different network settings and presented that not only convergence to the optimal rates is attained in all scenarios but also networking changing conditions such as mobility and dynamic channel capacity can be tracked in real-time.

The efficient delivery and management of real-time multimedia applications with QoE and multimedia awareness are key factors to the success of future multimedia networking systems. The paper 'Quality of Experience management framework for real-time multimedia applications', first explores key requirements to provide QoE assurance for multimedia applications in Content Distribution Networks (CDN). A new management framework, named QoE-aware Real-time Multimedia Management (QoE2M), is introduced to provide end-to-end quality control on real-time multimedia applications over heterogeneous networks based on a combined control of video assessment, QoS and QoE-based mapping and adaptation procedures.

The paper 'Equitable quality video streaming for IP networks', described an equitable quality video streaming system where the video server dynamically selects between multiple versions of the video content coded at different

fixed quality levels, and dynamically selects transmission rates for each video session so that the network bit rate available for video streaming is divided between the concurrent users such that they receive equal video quality at each moment in time. By sharing the backhaul bandwidth rather than getting a fixed allocation, and allowing delivery of data to get arbitrarily ahead of decoding of data, equitable quality video streaming can significantly outperform constant bit rate coding and delivery. The paper also presented that equitable quality video streaming allows 100% more video sessions to be delivered at the same overall perceptual quality as constant bit rate coding and delivery.

We wish to thank all the authors for their great work and for considering the *International Journal of Internet Protocol Technology* for submitting their papers. Special thanks to Professor Sherali Zeadally for his strong support. We hope that this special issue will represent a timely and significant reference for future researches in multimedia networking area.