Journal of Universal Computer Science, vol. 14, no. 5 (2008), 612-614
submitted: 16/2/08, accepted: 28/2/08, appeared: 1/3/08 © J.UCS

Socio-Economic Issues in Future Generation Internet

J.UCS Special Issue

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This Special Issue of the Journal of Universal Computer Science (J.UCS) is devoted to the Second EuroNGI/FGI Workshop on Socio-Economic Issues in Future Generation Internet (FGI). The FGI will offer multi-service/multimedia, mobility, service ubiquity and context awareness, convergence (services and fixed-mobile), Quality of Service, variable connectivity in the sense of "always best connected", spontaneous networking and other capabilities as the norm. EuroFGI is a European Network of Excellence (NoE), sponsored by the Sixth Framework Programme (FP6), with the objective of developing and maintaining the most prominent European centre of excellence in Future Generation Internet (FGI) design and engineering and acting as a "Collective Intelligence Think Tank" which represents a major support for the European industry and leading towards a European leadership in this domain.

Quality of Service (QoS) has been a hot topic within Internet-related research for many years. However, corresponding efforts have been contrasted with Internet merely providing connectivity and best-effort service. With the advent of new services such as Triple-Play (voice, video, Internet access) and the fact that some of these services will be charged per use, performance and economic issues regarding Internet and the trade-off between them are perhaps more important than ever before. This is amongst others witnessed by large efforts of major manufacturers and service providers for improving Quality of Experience (QoE) perceived from the users. Investments in networks, on the other hand, require detailed cost analyses. In addition, users need to be equipped with well-adapted security solutions in order to retain trust in networked services. Indeed, QoS and thus QoE relate to both performance and security and come at a cost. Thus, for any (future) Internet-based service, an optimal balance between performance, economy and security has to be found in order to make it well-accepted, which is pivotal to minimize the "Digital Divide". Thus, coordination and cross-fertilization of the domains user-perceived quality, economy/costing and security is required, which was a major goal of the two workshops.

On this background, researchers interested in user-oriented aspects of future Internet-related research established the workshop for integrating and discussing ideas, approaches and results. Acceptance for presentation at the workshop was based on extended abstracts. In the workshop held in June 2007 and organized by the Telematic Engineering Group of the University of Cantabria, Santander, North Spain, participants of the workshop were invited to submit a full paper of their talk to be considered for publication in this Special Issue. In the following weeks the three guest editors Markus Fiedler, Klaus D. Hackbarth and Helmut Hlavacs, being responsible for the reviewing process, contacted numerous international scientists to act as reviewers. The reviews were finished by February 2008, and the accepted papers are found in the sequel.

In more detail, the first two papers of this special issue focus on the central term Quality of Experience. In his work "Quality of Experience in Communications Ecosystem", Kalevi Kilkki develops a common framework for the communications ecosystem around this rather fuzzy term QoE. Denis Collange and Jean-Laurent Costeux then describe how to estimate QoE by applying passive measurements in their paper titled "Passive Estimation of Quality of Experience".

The next two papers combine Quality of Service with costs. In their paper "Trading Links and Paths on a Communication Bandwidth Market", Wojciech Stanczuk, Jozef Lubacz and Eugeniusz Toczylowski describe how to maximize the global economic welfare when buying bandwidth on a bandwidth market. The paper "Cost Model for Bitstream Access Services with QoS Parameters" from Laura Rodríguez de Lope and Klaus Hackbarth apply the TELRIC model to Bitstream Access Services under xDSL technology with different QoS classes.

The next two papers are focused on the topic of security without PKI, in this particular setting when using ZRTP. In the paper titled "Security and Usability Aspects of Man-in-the-Middle Attacks on ZRTP", the authors Martin Petraschek, Thomas Hoeher, Oliver Jung, Helmut Hlavacs, and Wilfried Gansterer carry out and analyze a Man- In-the-Middle attack on this newly proposed media encryption protocol. In the related paper "Enhancing ZRTP by Using Computational Puzzles", Helmut Hlavacs, Wilfried Gansterer, Hannes Schabauer, Joachim Zottl, Martin Petraschek, Thomas Hoeher, and Oliver Jung introduce the idea of using computational puzzles for strengthening the security of media encryption protocols without PKI.

Being a more general topic, the paper "Drives and Barriers for Development of Broadband Access – CE Perspective", Zbigniew Hulicki sheds light on the non-technical factors that influence the development of the Internet in CE countries, thus contributing to the so-called digital divide. Alberto E. Garcia and Klaus D. Hackbarth then develop a model for aggregating Internet traffic based on multilevel model composition.

The last topic touched in this special issue is related to cost and pricing. In their paper "Optimal Transit Price Negotiation: The Distributed Learning Perspective", the authors Dominique Barth, Loubna Echabbi, and Chahinez Hamlaoui show how to set prices for transit traffic under incomplete information by using a Nash equilibrium. Sergios Soursos and Costas Courcoubetis then describe how to dynamically determine bandwidth contracts instead of establishing static contracts as is done nowadays,

described in their paper titled "Dynamic Bandwidth Pricing: Provision Cost, Market Size, Effective Bandwidths and Price Games". The last paper of this special issue is titled "A Normal Copula Model for the Economic Risk Analysis of Correlated Failures in Communications Networks". The authors Maurizio Naldi and Giuseppe D'Acquisto create a model for assessing the consequences of network failure.

Finally we would like to thank all our colleagues who were willing to act as external reviewer for their invaluable help: Hans-Jürgen Zepernick, Armando Ferro Vázquez, Jürgen Lauterjung, Saverio Niccolini, Hannes Tschofenig, Christoph Ruland, Peter Reichl, Patrick Maille, Dragan Ilic, Dieter Elixmann, Sancho Salcedo Sanz, and Roberto Sanz.

Guest Editors
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Klaus Hackbarth
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Karlskrona, Santander and Vienna, February, 2008