Tutorial: Quality of Experience versus Energy Consumption from the User's Point of View

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Abstract:

Starting with the motivation for why Quality of Experience (QoE) and energy consumption needs to be considered jointly at the user end of any communication, this tutorial will firstly review qualities and limitations of hardware- and software-based power measurements. It will then present hardware-based power and energy measurements for a selected set of services. The role of stalling events in videos will be studied in detail, with a focus on the overall energy needed for watching an (un-)disturbed video as well as on evidence for QoE problems seen from power measurements. We shall also discuss ways to reduce energy consumption while keeping the desired level of QoE, and close the tutorial by presenting a set of lessons learned as well as future challenges.

Markus Fiedler is a full professor in Teletraffic Systems, with a background as an electrical engineer specialising in Information and Communication Technology (Dipl.-Ing. 1993, Dr.-Ing. 1998) and network performance analysis in particular. He is leading the Communication and Computer Systems Research Laboratory (CCS) at the School of Computing (COM) at Blekinge Institute of Technology (BTH), Karlskrona, Sweden. His research interests include future networks, Quality of Experience (QoE) and sustainability issues with a focus on the application domains e-Health, Smart Energy and Intelligent Transport Systems. Starting off from network performance modelling and analysis, he approached the QoE domain via Network Performance Management and in particular bottleneck detection. During the recent decade, he has been working on QoE modelling, monitoring and control (e.g. through seamless communications), recently also in connection with energy consumption issues. He has co-organised two Dagstuhl seminars on QoE in 2009 and 2012, respectively. In 2013, he was awarded the IEEE ComSoc Fred W.Ellersick Prize for the paper "A Generic Relationship between Quality of Experience and Quality of Service". Having been co-chair of the Future Internet Cluster within EC DG CNECT in 2011 and 2012, he is now serving as COST ICT Domain Committee Member for Sweden.

Selim Ickin is an Electrical and Electronics Engineer, and has been Ph.D. candidate at the School of Computing at Blekinge Institute of Technology (BTH), Sweden since May 2011. He has received his B.Sc. degree from the Electrical and Electronics Engineering Department at Bilkent University, Turkey in 2006; and his M.Sc. and Licentiate of Engineering degrees from BTH in 2010 and in 2013, respectively. He has worked in Nortel Networks as a GSM/UMTS Global Product Software Support Engineer in Turkey between 2006 and 2008. He has worked in the EU-STREP PERIMETER project as a Project Assistant between 2010 and 2011. His current research focuses on the end-user perceived Quality of Experience (QoE) vs Energy Consumption of Android OS wireless network-based applications. His major work involves implementation of software tools for Android-based platforms to understand the underlying QoE metrics of wireless network-based applications and to understand the relation between user-perceived QoE and the energy consumption.