



ABCDE



Scientific Report

First name / Family name

Doreid Ammar

Nationality

French / Lebanese

Name of the *Host Organisation*

VTT Technical Research Centre of
Finland

First Name / family name
of the *Scientific Coordinator*
Period of the fellowship

Jyrki Huusko

01/05/2013 to 30/06/2015



I – SCIENTIFIC ACTIVITY DURING YOUR FELLOWSHIP

The main research activities carried out during my ABCDE Research Training Program are:

Admission Control

- A simple and robust queue-based solution for admission control was proposed. This new solution for admission control allows to implement a Quality of Service (QoS) policy expressed as a maximum value of packet delays or either on packets loss rate. Unlike existing methods, the proposed solution is based on a simple queueing model, whose parameter values are automatically found thanks to a set of measurements.

Some aspects of this work have been partially and briefly presented at IEEE Conference on Local Computer Networks (LCN) in 2011 and 2012 (see [1, 2]). The work carried out during the fellowship for this research activity is completely overhauled and it contains many additional and important original elements.

This work has been submitted to IEEE/ACM Transactions on Networking.

- A new Admission control solution was designed to enhance the quality experienced by the end-users (Quality of Experience – QoE). The proposed solution is based on real-time estimates of the QoE observed by the end-users.

This work has been accepted for publication at IISA 2015.

Traffic-Aware Routing

- A novel QoE-aware routing solution for video streams was proposed. This solution monitors the network conditions in real-time and dynamically makes adaptive routing decisions based on predictions of end-user perception of video quality. This video quality is quantified by Mean Opinion Score (MOS).

This work led to two publications in IEEE/ACM IWQoS 2015 and IEEE COMSOC MMTC E-Letter

Scientific Peer Control

- Member of the TPC in the international workshop on autonomous monitoring (WAMN 2014).

[1] D. Ammar, T. Begin, I. Guérin-Lassous, and L. Noirie. Evaluation and comparison of MBAC solutions. In Proceedings of the 36th Conference on Local Computer Networks, IEEE LCN 2011, 2011.

[2] D. Ammar, T. Begin, I. Guérin-Lassous, and L. Noirie. Kbac: Knowledge- based admission control. In Proceedings of the 37th Conference on Local Computer Networks, IEEE LCN 2012, 2012.

II – PUBLICATION(S) DURING YOUR FELLOWSHIP

IEEE COMSOC MMTC E-Letter – May 2015

- *Title:* QoE-Aware Routing for Video Streams
- *Authors:* Doreid Ammar
- *Status:* Invited paper



IEEE/ACM IWQoS 2015

- *Title:* QoE-Aware Routing for Video Streaming over Wired Networks
- *Authors:* Doreid Ammar and Martin Varela
- *Abstract:* In this paper, we introduce a novel QoE-aware routing approach for video streams. Our approach monitors the network conditions in real-time and dynamically makes adaptive routing decisions based on predictions of end-user perception of video quality. This video quality is quantified by Mean Opinion Score (MOS). The experimental results show that our proposed approach leads to a good trade-off between the QoE expected by the end-users and resource utilization.
- *Status:* Accepted

IISA 2015

- *Title:* QoE-Driven Admission Control for Video Streams
- *Authors:* Doreid Ammar and Martin Varela
- *Abstract:* The rapid growth of video traffic on the Internet raises many challenges for Internet service providers in managing their network resources. An emerging trend in this regard is the development of network management strategies to enhance the quality experienced by the end-users (Quality of Experience – QoE). In this paper, we introduce an admission control scheme for video streams. Our proposed scheme is based on real-time estimates of the QoE observed by the end-users. The experimental results show that our proposed scheme yields satisfactory results in terms of the trade-off between the QoE delivered and the utilization of the network resources.
- *Status:* Accepted

IEEE/ACM Transactions on Networking

- *Title:* KBAC: A Simple and Robust Queue-Based Solution for Admission Control
- *Authors:* Doreid Ammar, Thomas Begin and Isabelle Guérin Lassous
- *Abstract:* The continuous growth of volume of data traffic sent over the networks calls for intelligent bandwidth management strategies in order to provide a sufficient level of Quality of Service (QoS) for end-users. Admission control, which is used to forbid incoming flows of packets from entering a network when the available resources are deemed insufficient, aims at preventing overloading and congestion within the network. In this paper, we introduce a new solution for admission control, which is referred to as KBAC. It allows to implement a QoS policy expressed as a maximum value of packet delays or either on packets loss rate. Unlike existing methods, the KBAC solution is based on a simple queueing model, whose parameter values are automatically found thanks to a set of measurements. The experimental results show that the proposed KBAC solution generally leads to a very good trade-off between the performance undergone by the flows and the utilization of the link resources, and also that it outperforms the three other tested solutions on all explored examples.
- *Status:* Under review

III – ATTENDED SEMINARS, WORKSHOPS, CONFERENCES

Seminar



- Name: ABCDE Seminar III
- Date: 31/10 - 01/11/2013
- Place: Athens, Greece

Conference

- Name: FCRC 2015 – IWQoS 2015
- Date: 13-19/06/2015
- Place: Portland, Oregon, USA

IV – RESEARCH EXCHANGE PROGRAMME (REP)

REP 1

- *Name of the REP organisation:* INRIA
- *Country:* France
- *Project:* INRIA DANTE – LIP, ENS de Lyon
- *Local scientific coordinator:* Pr. Isabelle Guérin Lassous
- *Dates:* 09-30/09/2013
- *Experience:* The visit was very fruitful and led to a scientific collaboration with the INRIA team in Lyon.

REP 2

- *Name of the REP organisation:* SICS Swedish ICT AB
- *Country:* Sweden
- *Department:* Center for Networked Systems, Stockholm
- *Local scientific coordinator:* Dr. Bengt Ahlgren
- *Dates:* 05-09/05/2014
- *Experience:* The visit started with a talk about the work conducted during this ERCIM fellowship. It served to get a better insight into the group and their work.

REP 3

- *Name of the REP organisation:* NTNU
- *Country:* Norway
- *Department:* Department of Telematics - Trondheim
- *Local scientific coordinator:* Pr. Poul Heegaard
- *Dates:* 01-05/06/2015
- *Experience:* The visit included fruitful discussions, and ended with a talk about the work conducted during this ERCIM fellowship.