Proceedings

SETM 2013

CNSM Workshop on Social-aware Economic Traffic Management for Overlay and Cloud Applications

Collocated with the 9th International Conference on Network and Service Management (CNSM 2013)

October 18, 2013
Zürich, Switzerland

Preface

In the current Internet, important new overlay and cloud applications significantly influence volume and patterns of Internet traffic. While overlay applications such as Content Delivery and P2P store and circulate information among each other with no awareness of the topology and state of the underlying transport network infrastructure, cloud applications delegate storage and computation to the network, which is valuable for devices with limited resources and access. These overlay applications demand a coherent and integrated control in the underlying heterogeneous networks in a scalable, resilient, and energy-efficient manner. A tighter integration of network management and overlay service functionality can lead to cross-layer optimization of operations and management, thus, being a promising approach to offer a large business potential in operational perspectives for all players involved.

In parallel, Online Social Networks (OSNs) have become today's most popular Internet application. The widespread adoption of OSNs has drastically changed the way content is consumed in the Internet, as content consumption is nowadays highly impacted by the information shared by users through OSNs and the popularity of a given content is most often dictated by its "social" success.

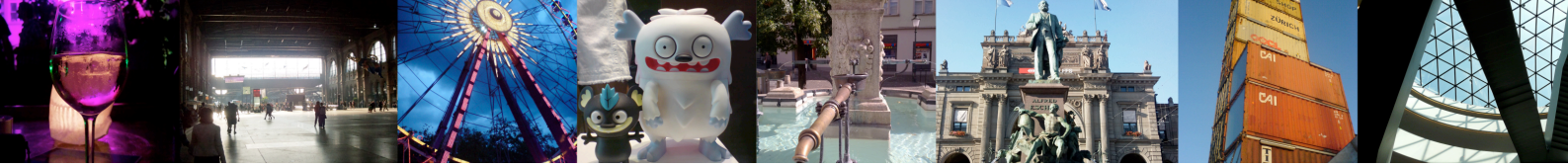
With such a "social-content revolution", operators need to evolve and optimize their network to avoid being overwhelmed by the ever growing traffic volumes resulting from this paradigm change. In turn, the adoption of socially-aware traffic management mechanisms as a new management approach allows for a tighter integration of network management and overlay service functionality which can lead to cross-layer optimization of operations and management, thus, being a promising approach to offer a large business potential.

The CNSM Workshop on Social-aware Economic Traffic Management for Overlay and Cloud Applications "SETM 2013" aims to bridge this gap, by addressing social-aware and incentive-compatible network management mechanisms in support of overlay and cloud applications in an integrated and thus efficient manner. SETM 2013, which is organized in conjunction with this year's CNSM 2013 conference, is a continuation of three successful workshops entitled "Workshop on Economic Traffic Management (ETM)". The last event organized in 2010 was collocated with ITC22. The workshop title has been changed to better reflect the scope of the workshop that basing on economic perspectives in network management extends its scope towards social awareness, cloud computing, content awareness and CDNs. That way the workshop is following current trends in that area.

Following these intentions, SETM 2013 provides a single-track and one-day program, including keynotes, three technical sessions, and a poster session. The keynotes are given by Bruce Maggs (Professor, Department of Computer Science, Duke University and Vice President, Research Akamai Technologies, USA) and Volker Hilt (Head of Networked Services Research, Alcatel-Lucent Bell Labs, Germany). The SETM 2013 workshop is financially sponsored by Orange and Intracom Telecom. Overall, a total of 15 papers were registered. Out of those, 14 papers were finally submitted and one paper was withdrawn. Before the papers entered the review process, the TPC chairs fast-rejected four papers, including plagiarized papers and papers which were completely out of scope.

Each of the remaining 10 papers received in total 3-4 reviews. Based on the thorough reviews, seven papers were finally selected for the workshop program, with two papers being accepted as full papers and 5 papers being accepted as short papers, which are presented during SETM 2013. Additionally, the poster session that is organized jointly with the SVM workshop includes seven invited posters from SETM.

With respect to the technical sessions, one focus lies on video services in the Internet responsible for the majority of Internet traffic, as discussed in Session 1. The proposed approaches for improving video delivery ranges from concrete algorithmic solutions (*Multi-source Cooperative Adaptation for QoE-aware Video Multicast Rate control*) to social-aware concepts for recommendation system and content distribution networks (*Determining leaders and clusters in video consumption*), while also economic aspects and business interests are analyzed (*Video Delivery over Next Generation Cellular Networks*). Network traffic management solutions are considered in Session 2 with a focus on the federation of clouds and available bandwidth provisioning systems for offering reliable network transfer services to the cloud systems (*Networking solutions in the federation of clouds*) and the problem of cost-optimal distribution of inevitable inter-domain



traffic on multiple links dynamic solutions (*Dynamic Traffic Management mechanism for active optimization of ISP costs*). Session 3 considers user involved approaches to realize a socially-aware traffic management solution which targets three popular use cases: data offloading to WiFi, content caching/prefetching, and content delivery (*HORST - Home Router Sharing based on Trust*) but also to optimize energy and upload bandwidth of smartphones by proper incentive and collaboration schemes (*Reciprocity with Virtual Nodes: Supporting Mobile Peers in Peer-to-Peer Content Distribution*).

The SETM 2013 workshop would not be a success without the excellent work that has been performed by the members of the technical program committee as well as those reviewers who have spent a considerable amount of their time providing highly qualified reviews.

As organizers of the workshop we thank all members of the Technical Program Committee and all reviewers. We express our sincere appreciation to the organizers of CNSM 2013, in Zurich, in particular Burkhard Stiller and his team at the University of Zurich, and the CNSM 2013 workshop chair Rui L. Aguiar, Universidade de Aveiro, Portugal. Furthermore, we thank Peter Hillmann and Dennis Kergl, Universität der Bundeswehr München, Germany as well as Christos Tsiaras and Andri Lareida, University of Zurich, Switzerland for their technical support.

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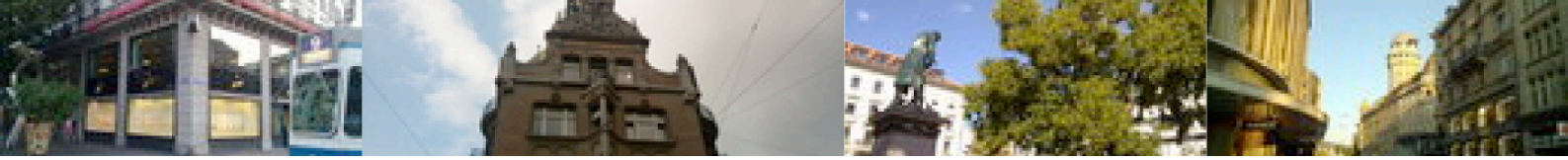
SETM 2013 is supported by the EU projects SmartenIT and eCOUSIN, as well as the DFG Cooperative Research Center 1053 MAKI.

SmartenIT (Socially-aware Management of New Overlay Application Traffic combined with Energy Efficiency in the Internet) targets at an incentive-compatible cross-layer network management for providers of overlay-based application (e.g., cloud applications, content delivery, and social networks), network providers, and end-users to ensure a QoE-awareness, by addressing accordingly load and traffic patterns or special application requirements, and exploiting at the same time social awareness (in terms of user relations and interests). Moreover, the energy efficiency with respect to both end-user devices and underlying networking infrastructure is tackled to ensure an operationally efficient management. Incentive-compatible network management mechanisms for improving metrics in all layers and on an inter-domain basis for ISPs and telecommunication providers, serves as the major mechanism to deal with real-life scenarios.

The goal of eCOUSIN (enhanced COntent distribUtion with Social INformation) is to design a novel social-aware network architecture with built-in content dissemination functionalities that exploits the social-content interdependencies to improve its efficiency. This goal translates into the following specific objectives: (i) the implementation of high performance distributed tools for collecting necessary data to study and model the social-content interdependencies; (ii) the improvement of the scalability of network infrastructures when handling content by exploiting social information; (iii) the design of an on-net operational framework that tightly integrates network functionalities and content-related service functionalities; and (iv) the design of algorithms that exploit social information for placing and delivering contents in an optimized manner with a special focus on mobile environments.

How will the internet of the future look like? Which communication protocols of today will survive the steady evolution? What additional challenges does the increasing use of mobile devices create? Eventually, the challenges lie in very dynamic and heterogeneous conditions, an increasingly diverse use of communication systems, and ever-increasing quality requirements. To address those challenges, the German Research Foundation (DFG) is supporting the collaborative research center Multi-mechanism adaptation for the Future Internet (short: MAKI), which will investigate and research mechanisms in communication systems, their adaptation, their interaction and optimization, as well as long- term improvement.



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