

Multimedia Tools and Applications

Special Issue on

Network Functions Virtualization for Real-Time Multimedia Services

In recent years, we have witnessed an explosive growth of multimedia services, e.g., YouTube, Netflix, Hulu, Skype, and a plethora of online games, which have significant impact on our lifestyles and the way we run our business. At the same time, the demand for these services has been dramatically boosted by the success of mobile devices. However, the current Internet architecture, originally designed for static host-to-host communication with dedicated network devices, is challenged by urgent requirements of high flexibility of service providers to dynamically allocate their computing, storage, networking and communication resources to provide efficient and real-time multimedia content sharing to their end-users with higher quality-of-service (QoS) and quality-of-experience (QoE) and lower capital expenditure (CAPEX) and operational expenditures (OPEX).

Network functions virtualization (NFV) is an emerging and promising network paradigm that can bring the network domain an unprecedented ability to dynamically allocate and deploy network functions on-demand, increase flexibility while reducing the OPEX and CAPEX, by leveraging standard network devices, advanced management, orchestration and virtualization technologies. The network domain flexibility provided by the NFV paradigm in terms of elastic service chain configuration is bringing increasing opportunities and demands of real-time multimedia applications. On the other hand, the real-time/soft real-time satisfaction of dynamic demands of multimedia applications based on service chain re-configuration is highly dependent on the online optimization algorithms. Thus, the computation cost and convergence time of these algorithms in NFV have significant impact on the instant QoS provision and QoE guarantee for real-time multimedia communications.

Nevertheless, existing solutions mainly resort to traditional machine learning algorithms and optimization theories, which are often offline solutions or do not concern the computation delay; thus they are not suitable for real-time applications. In addition, most existing approaches predominantly treat allocation for one or two resources, e.g., computing or storage, but not a combination of those key resources in network domain for multimedia communications. Therefore, tremendous challenges need to be solved before successfully applying NFV in real-time multimedia communications, including the unique architecture design, multiple resource orchestration, traffic characterization, algorithm

optimization, new protocol design, etc.

This special issue is devoted to the most recent developments and research outcomes addressing the related theoretical and practical aspects on NFV for real-time multimedia communications, and aims to provide worldwide researchers and practitioners an ideal platform to innovate new solutions targeting at the corresponding key challenges.

Topics

Topics of interest include but are not limited to the following:

- The architecture design for NFV to support real-time multimedia communications
- Resource management and policy control for real-time multimedia communications over NFV architecture
- Green communication design for NFV to support real-time multimedia applications
- Protocol design, modelling and evaluation for real-time multimedia applications running over NFV
- Network behavioural modelling under dynamic NFV environment running real-time multimedia applications
- Content dissemination in NFV for real-time multimedia communications
- Content Delivery Networks for real-time multimedia communications
- Context-aware resource allocation for NFV to support real-time multimedia communications
- Online optimization algorithms for dynamic resource allocations in NFV supporting real-time multimedia applications
- QoS and QoE in NFV for real-time multimedia communications
- Traffic characteristics in NFV-based Internet for multimedia communications
- Testbed developments for NFV to support real-time multimedia communications
- Security, trust and privacy issues for NFV to support real-time multimedia communications

Submission

Authors should choose the Article Type of “1111T – Network Functions Visualization for Real-Time Multimedia Services” when submitting to the special issue.

Submitted papers should present original, unpublished work, relevant to one of the topics of the Special Issue. All submitted papers will be evaluated on the basis of relevance, significance of contribution, technical quality, scholarship, and quality of presentation, by at least three independent reviewers. It is the policy of the journal that no submission, or substantially overlapping submission, be published or

be under review at another journal or conference at any time during the review process.

Important Dates

Submission deadline:	October 1 st , 2018
First-round review notification:	February 1 st , 2019
Final decision	May 1 st , 2019

Guest Editors

Dr. Yulei Wu
University of Exeter, UK
Email: y.l.wu@exeter.ac.uk

Dr. Zili Shao
The Hong Kong Polytechnic University
Hong Kong, China
Email: cszlshao@comp.polyu.edu.hk

Dr. Jose Saldana
University of Zaragoza, Spain
Email: jsaldana@unizar.es

Professor Chung-Ming Huang
National Cheng Kung University, Taiwan
Email: huangcm@mail.ncku.edu.tw