Special Issue on “Efficient Management of SDN and NFV-based Systems”

Very recently, leading equipment providers in the network infrastructure market launched the first software-enabled appliances that support network virtualization capabilities. The main advantage of Software Defined Networking (SDN) is that network control is separated from the forwarding plane and allows for a flexible management of the network resources. Network virtualization (NV) brings virtualization concepts to the network, similar to cloud computing, which was enabled by virtualization of servers. Network Function Virtualization (NFV) focuses on virtualization of software-based network functions. Classical examples include virtualization of home gateways, firewalls, set top boxes, deep packet inspection components, IMS components, and monitoring probes. Instead of installing and managing dedicated hardware boxes for these functions, they are instead implemented as software components and deployed on commodity hardware infrastructures, in most cases operated by a network operator and referred to as telco clouds. Service Function Chaining (SFC) consists of building services using virtual network functions (VNFs).

The main reasons for network operators to adopt the above principles are: (i) faster and easier deployment, configuration, and updating of network functions, (ii) maximization of resource utilization when using commodity hardware and software-based functions, and (iii) it enables a Network-as-a-Service business model. From the point-of-view of service providers, the main benefits include: (i) dynamic scaling of resources based on service requirements and traffic patterns, (ii) facilitation of inter-domain Quality of Service and (iii) reduced time to market for services. Standardization activities already started and are very likely to grow significantly in the near future.

Based on these observations, we believe that efficient management of software-defined virtualized telecommunication systems and datacenters will be of key importance in the future. We welcome submissions addressing its underlying challenges (e.g. in the areas listed below) and presenting novel research or experimentation results. Survey papers that offer a perspective on related work and identify key challenges for future research will be considered as well. We look forward to your submissions!

About the special issue
Topics of interest for this special issue, include, but are not limited to the following:

- Design of architectural building blocks for managing virtualized software-defined systems
- APIs and management protocols for software programmable networks
- Virtualization of resources, services and functions in SDN and NFV
- Management of software-defined datacenters
- Efficient management of telco cloud computing infrastructures
- Resource management for SDN or NFV-based systems
- Life cycle management of virtual network functions
• SFC modeling and representation
• Composition algorithms for Service Function Chains (SFCs)
• Automated deployment of Service Function Chains (SFCs)
• Dynamic migration of network functions in NFV-based systems
• Efficient network and service monitoring for SDN or NFV
• Automated configuration and repair of virtualized software-defined systems
• Algorithms for diagnosis and correlation of events in SDN or NFV-based systems
• Availability and resilience of virtualized software-defined systems
• Security management for SDN and NFV-based systems
• Dynamic resource scaling based on user mobility in SDN and NFV-based systems
• Distributed control of SDN/NFV-based systems
• Abstractions for programmable network elements
• Policy based management in SDN or NFV systems
• Debugging and introspection of software-defined virtualized systems
• Management of federated SDN/NFV infrastructures
• Inter-domain Quality of Service in virtualized software-defined telecommunication systems
• Detailed experience reports from experimental testbeds
• Transition strategies from existing networks to SDN/NFV

Submission format
Papers will be evaluated based on their originality, presentation, relevance and contribution to the field of management of software-defined virtualized systems, as well as their overall quality and suitability for the special issue. The submitted papers must be written in a good English and describe original research which has not been published nor currently under review by other journals or conferences. Previously published conference papers should be clearly identified by the authors at the initial submission stage and an explanation should be provided of how such papers have been extended in order to be considered for this special issue. Author guidelines for preparation of a manuscript are available here. For more information, please contact the guest editors.

Submission guideline
All manuscripts and any supplementary material should be submitted through the IEEE TNSM ManuscriptCentral portal.

Authors must indicate in the submission cover letter that their manuscript is intended for the “Efficient Management of SDN and NFV-based Systems” special issue.

Guest editors
Prof. Jun Bi  
Tsinghua University, China

Prof. Raouf Boutaba  
University of Waterloo, Canada

Dr. Prosper Chemouil  
Orange Labs, France

Prof. Filip De Turck  
Ghent University-iMinds, Belgium

Dr. Cedric Westphal  
Huawei and University of California, Santa Cruz, USA

Important dates
Paper submission date: November 15, 2014
Notification of acceptance: January 15, 2015
Publication date*: March 1, 2015

(* online published version with final doi will be available in IEEE Xplore after the camera ready version has been submitted)