Journal of Computer Networks and Communications

Special Issue on

Advances in Network Function Virtualization and Software Defined Networks

CALL FOR PAPERS

With the aim of bringing greater openness and agility to network dataplanes, Network Function Virtualization (NFV) is emerged as a new way to provide network services. As the next step after Software Defined Networking (SDN), network function virtualization (NFV) is a network architecture concept that adopts the IT virtualization techniques to virtualize physical network node functions into virtualized software applications that may chain together to create communication services. With NFV, the network appliance functionality is moved from proprietary/dedicated hardware (called middleboxes) to software running on commodity and general purpose processors, standard servers, switches, or cloud computing infrastructure, which is expected to significantly lower the capital cost and deployment barriers, as well as greatly improve the efficiency and flexibility of utilizing hardware resources. Furthermore, both SDN and NFV target leveraging automation and virtualization to achieve their respective goals, integrating SDN with NFV in one networking solution, could bring about greater value. With the adoption of SDN, NFV makes the deployment of network services easy and flexible, enabling more powerful feature-rich network functions and more complex network topologies compared to hardware-based implementations. Since its coming into being, NFV has quickly achieved significant momentum with over 200 industry participants and multiple PoC (Proof of Concept) prototypes. Researchers from academia are also making efforts to benefit from NFV. We believe that the next breakthrough in next generation network technologies will emerge from the evolution of NFV techniques integrating with cloud computing and SDN. The communication networks will eventually enter into the era of full cloudification, virtualization, and automation.

While the promising future of NFV is encouraging, the road to NFV faces many technical and practical challenges. The low performance of commodity servers and the high overhead of server virtualization platforms hinder the evolution of NFV abandoning dedicated hardware. Thus, the research on how to design a favorable NFV architecture to overcome the overheads of virtualization layers would be highly expected. Moreover, the general-purposed servers or virtual machines (VMs) are more prone to failures compared to dedicated middleboxes; hence, how to ensure a high availability of the provided network services is an important issue. Besides, as NFV originates from the telecommunications industry and telecommunication networks differ from the cloud networks, deploying NFV in clouds will likely change the way of how cloud services and applications are developed and delivered. How to design the cloud-based NFV architecture to guarantee VNFs perform acceptably in cloud computing environments will be highly desired. Additionally, researches on SDN technologies that are used to help accelerate NFV deployment and facilitate the network configuration and network provisioning are encouraged. Other advanced technologies related to NFV could be further explored, such as NFV scalability, NFV system security, NFV service chaining mechanisms, virtualized resource allocation and management, NFV-based edge computing, NFVI architecture, NFV DC architecture, and NFV network performance optimization. Experts and scholars from both industry and academia are encouraged to demonstrate their latest research progress, achievements and potential directions in this area.

Potential topics include but are not limited to the following:

- Virtualized resource allocation and management
- Network function virtualization infrastructure (NFVI) architecture
- NFV management and Orchestration (NFV MANO)
- Modeling of network functions, resources and services
- Security, privacy, and trust for network function virtualization
- Availability, reliability, or fault tolerance of NFV system and network services
- Network service chaining
- NFV system design and algorithms
- NFV architecture design and performance
- Cloud-based NFV
- SDN-based NFV
- NFV-based edge computing
- NFV performance modeling and evaluation
- NFV cross-layer design and optimization
- Placement optimization and dynamic scaling of virtual applications (VNFs)
- NFV data center network architecture

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