Edge-Cloud Interplay based on SDN and NFV for Next-Generation IoT Applications

With significant and continuing advances in information and communication technologies, Internet of Things (IoT) plays an increasingly important role in domains such as healthcare, transportation, finance, and energy. In an IoT system, billions of devices (e.g., sensors, wearables, and smart appliances) are been connected to the global network infrastructure, and one associated phenomenon is generation of a large volume of data. Apart from data volume, the velocity, variety, and veracity of these data will pose an enormous burden on conventional networking infrastructures. Parallel to this trend, cloud computing has been integrated with IoT in order to address limitations in existing IoT networks (e.g., storage and computing resources). However, cloud-centric IoT solutions may not be suited for delay sensitive and computationally-intensive applications, for example due to resource availability, end-to-end latency, bandwidth, etc. Hence, there has been a shift to edge computing, where computation and storage resources are moved closer to the proximity of data sources. However, a large number of migration between edge and cloud impose communication delays, as well as resulting in latency, bandwidth, and inefficient energy consumption issues. Thus, there have been attempts to explore the potential of network softwarization paradigms, such as Software Defined Networks (SDN) and Network Function Virtualization (NFV). Furthermore, things in next-generation IoT systems are expected to be extremely heterogeneous in terms of platforms, resources and connectivity. As a result, the amalgamation of SDN and NFV in edge-cloud interplay is, undeniably, promising in improving quality of service (QoS) for complex IoT-driven applications. However, there are challenges like runtime service deployment, resource scheduling, security, energy management, remote orchestration, and lack of aggregation/distribution strategies remain, which need to be addressed for successful deployment of such softwarization paradigms. Thus, in this special issue, we seek state-of-the-art approaches, methodologies, and key technologies, in the design, development, deployment and innovative use of SDN and NFV for edge-cloud integration in next-generation IoT infrastructures.

Topics include, but are not limited to the following:

- Framework, algorithms and protocol design
- Innovative architecture, infrastructure, techniques and testbeds
- Energy management and resource allocation
- Privacy, security and authentication solutions
- Big data analytics frameworks
- Architecture design for computing
- Applications and services
- Low-latency high-reliability communication for heterogeneous networks
- Machine learning, AI and other innovative approaches for communication and networking
- Mission-critical applications like smart grid, healthcare, connected vehicles, etc.
- Other concepts and technologies

Important Dates:

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Final Manuscript Due: February 15, 2020   Publication Date: 2020

Submission Guidelines:

Authors need to follow the manuscript format and allowable number of pages described at: http://ieee-iotj.org/guidelines-for-authors/. To submit a manuscript for consideration for the special issue, please visit the journal submission website at: https://mc.manuscriptcentral.com/iot.

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