Introduction and Motivation

Fog/Edge Computing is an emerging architectural as well as technical approach aimed at addressing various shortcomings in traditional cloud computing paradigms and responding to today’s constantly increasing data-demanding services such as Internet-of-Things, 5G embedded artificial intelligence and smart cities. In Fog/Edge Computing, nodes at the edge of a network are equipped with processing, storage, networking, etc. capabilities to take over several tasks that were used to be sent to cloud services. Pre-filtering and aggregation of data as well as online processing and actuation are sample procedures envisaged/dedicated to fog/edge nodes.

Although slightly different in the way they are implemented, fog and edge paradigms are designed in direct response to various challenges in operating smooth IoT and 5G services including—but not limited to: stringent latency requirements from sensing to actuation, network bandwidth limitation for large-sized aggregated data, limited resources for edge devices to perform tasks, and security requirements for all data flows and operations. Satisfying all aforementioned concerns becomes even more challenging when considering the rapid constant grow of edge devices/sensors. For example, the current number of IoT devices will rapidly increase from 15 billion to 50 billion by 2020 (according to CISCO), while the number of sensors will increase to as high as 1 trillion by 2030 (according to HP Labs). As a consequence, sustainability of such systems becomes a necessity rather than a luxury.

To address several major issues regarding sustainability of future fog/edge systems, this special issue aims at highlighting challenges, state-of-the-art, and solutions to a set of currently unresolved key questions including—but not limited to—performance, modelling, optimization, reliability, security, privacy and techno-economic aspects of fog/edge architectures. Through addressing these concerns while understanding their impacts and limitations, technological advancements will be channelled toward more sustainable/efficient platforms for tomorrow’s ever-connected systems.

Topics of Interest

This special issue invites researchers, academics and investigators to share and exchange new ideas, approaches, theories and practice to address/solve challenging issues associated with sustainability of fog/edge computing paradigms. The suggested topics of interest include, but are not limited to:

- Fog/edge architectures for data sensing and processing
- IoT, 5G, Smart cities, etc. architectures and protocols for fog/edge systems
- Interoperability among fog/edge systems
- Big data analytics in/for fog/edge systems
- Networking issues in/for fog/edge systems
- Security and privacy issues in/for fog/edge systems
- Optimization models and/or techniques to process data in/for fog/edge systems
- Social aspects in adopting fog/edge paradigms
- Dynamic resource, service and context management in/for fog/edge computing systems
- Simulation and emulation of fog/edge systems
- Performance evaluation of fog/edge applications and/or systems
- Computation offloading in/for fog/edge systems
- Quality of service/experience (QoS/QoE) in/for fog/edge paradigms
- Emerging applications and use cases for fog/edge computing

Submission Guidelines

Authors are invited to submit their manuscripts electronically adhering to the IEEE Transactions on Sustainable Computing guidelines (https://www.computer.org/web/tsusc/author).

Please submit your papers through the online system (https://mc.manuscriptcentral.com/tsusc-cs) and be sure to select the special issue on Sustainability of Fog/Edge Computing Systems.

Manuscripts should not be published or currently submitted for publication elsewhere. Please submit only full papers intended for review, not abstracts, to the ScholarOne portal.

Important Dates

Paper submission due: 30 June 2018
First-round acceptance notification: August 2018
Revision submission: September 2018
Notification of final decision: October 2018
Submission of final paper: November 2018
Publication date: 2019 TSUSC issue

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